PROCLAMATION
CALLING A SPECIAL MEETING OF THE BERKELEY CITY COUNCIL

In accordance with the authority in me vested, I do hereby call the Berkeley City Council in special session as follows:

Tuesday, July 21, 2020

6:00 P.M.

JESSE ARREGUIN, MAYOR

Councilmembers:

DISTRICT 1 – RASHI KESARWANI
DISTRICT 2 – CHERYL DAVILA
DISTRICT 3 – BEN BARTLETT
DISTRICT 4 – KATE HARRISON
DISTRICT 5 – SOPHIE HAHN
DISTRICT 6 – SUSAN WENGRAF
DISTRICT 7 – RIGEL ROBINSON
DISTRICT 8 – LORI DROSTE

PUBLIC ADVISORY: THIS MEETING WILL BE CONDUCTED EXCLUSIVELY THROUGH VIDEOCONFERENCE AND TELECONFERENCE

Pursuant to Section 3 of Executive Order N-29-20, issued by Governor Newsom on March 17, 2020, this meeting of the City Council will be conducted exclusively through teleconference and Zoom videoconference. Please be advised that pursuant to the Executive Order and the Shelter-in-Place Order, and to ensure the health and safety of the public by limiting human contact that could spread the COVID-19 virus, there will not be a physical meeting location available.

Live audio is available on KPFB Radio 89.3. Live captioned broadcasts of Council Meetings are available on Cable B-TV (Channel 33) and via internet accessible video stream at http://www.cityofberkeley.info/CalendarEventWebcastMain.aspx.

To access the meeting remotely: Join from a PC, Mac, iPad, iPhone, or Android device: Please use this URL https://us02web.zoom.us/j/89031983199. If you do not wish for your name to appear on the screen, then use the drop down menu and click on "rename" to rename yourself to be anonymous. To request to speak, use the "raise hand" icon by rolling over the bottom of the screen.

*To join by phone: Dial **1-669-900-9128** and enter Meeting ID: **890 3198 3199**. If you wish to comment during the public comment portion of the agenda, Press *9 and wait to be recognized by the Chair.*

To submit an e-mail comment during the meeting to be read aloud during public comment, email clerk@cityofberkeley.info with the Subject Line in this format: "PUBLIC COMMENT ITEM ##." Please observe a 150 word limit. Time limits on public comments will apply. Written comments will be entered into the public record.

Please be mindful that the teleconference will be recorded as any Council meeting is recorded, and all other rules of procedure and decorum will apply for Council meetings conducted by teleconference or videoconference.

This meeting will be conducted in accordance with the Brown Act, Government Code Section 54953. Any member of the public may attend this meeting. Questions regarding this matter may be addressed to Mark Numainville, City Clerk, (510) 981-6900. The City Council may take action related to any subject listed on the Agenda. Meetings will adjourn at 11:00 p.m. - any items outstanding at that time will be carried over to a date/time to be specified.

Preliminary Matters

Roll Call:

Public Comment - Limited to items on this agenda only

Consent Calendar

The Council will first determine whether to move items on the agenda for "Action" or "Information" to the "Consent Calendar", or move "Consent Calendar" items to "Action." Items that remain on the "Consent Calendar" are voted on in one motion as a group. "Information" items are not discussed or acted upon at the Council meeting unless they are moved to "Action" or "Consent".

No additional items can be moved onto the Consent Calendar once public comment has commenced. At any time during, or immediately after, public comment on Information and Consent items, any Councilmember may move any Information or Consent item to "Action." Following this, the Council will vote on the items remaining on the Consent Calendar in one motion.

For items moved to the Action Calendar from the Consent Calendar or Information Calendar, persons who spoke on the item during the Consent Calendar public comment period may speak again at the time the matter is taken up during the Action Calendar.

Public Comment on Consent Calendar and Information Items Only: *The Council will take public comment on any items that are either on the amended Consent Calendar or the Information Calendar. Speakers will be entitled to two minutes each to speak in opposition to or support of Consent Calendar and Information Items. A speaker may only speak once during the period for public comment on Consent Calendar and Information items.*

Additional information regarding public comment by City of Berkeley employees and interns: Employees and interns of the City of Berkeley, although not required, are encouraged to identify themselves as such, the department in which they work and state whether they are speaking as an individual or in their official capacity when addressing the Council in open session or workshops.

1. Berkeley Electric Mobility Roadmap
From: City Manager
Recommendation: Adopt a Resolution approving the Berkeley Electric Mobility Roadmap and refer to the City Manager to form an Electric Mobility Implementation Working Group, including community stakeholders, to prioritize, support, and track implementation of the other actions of this plan, including identification of funding sources for implementation.
Financial Implications: See report
Contact: Jordan Klein, Planning and Development, (510) 981-7400

2. Evaluation and Recommended Updates to the Building Energy Savings Ordinance (BESO)
From: City Manager
Recommendation: Refer to City Manager to amend the Building Energy Saving Ordinance (BESO), Chapter 19.81.170 of the Berkeley Municipal Code, to align with building electrification goals, leverage upcoming rebates and incentives, and develop mandatory energy requirements to be phased in.
Financial Implications: See report
Contact: Jordan Klein, Planning and Development, (510) 981-7400

Consent Calendar

3. Referral Response: Ordinance Amending Berkeley Municipal Code Chapter 7.52, Reducing Tax Imposed for Qualifying Electrification, Energy Efficiency and Water Conservation Retrofits
From: City Manager
Recommendation:
1. Delay adoption of the first reading of an ordinance amending the Berkeley Municipal Code (BMC) Chapter 7.52 to expand the Seismic Transfer Tax Rebate Program to include qualifying sustainability and resilience measures, and any associated budget requests, until FYE 2022 when more information on budget due to COVID-19 response and recovery is available; and
2. Refer to the City Manager the design of a companion Resilient Homes Equity Pilot Program that would provide funding for home retrofit improvements to low-income residents.
Financial Implications: See report
Contact: Jordan Klein, Planning and Development, (510) 981-7400

4. Referral Response: Expanding community engagement within work to address Climate Impacts
From: City Manager
Recommendation:
1. Refer to the City Manager to continually advance engagement around community-driven, equitable climate solutions, and to seek external resources to enable increased community engagement of impacted communities around equitable climate solutions; and
2. Refer to the Agenda Committee a revision to the Council Rules of Procedures to update the Environmental Sustainability section of City Council items and staff reports as “Environmental Sustainability and Climate Impacts.”
Financial Implications: See report
Contact: Jordan Klein, Planning and Development, (510) 981-7400

Action Calendar

The public may comment on each item listed on the agenda for action as the item is taken up. For items moved to the Action Calendar from the Consent Calendar or Information Calendar, persons who spoke on the item during the Consent Calendar public comment period may speak again at the time the matter is taken up during the Action Calendar.

The Presiding Officer will request that persons wishing to speak use the “raise hand” function to determine the number of persons interested in speaking at that time. Up to ten (10) speakers may speak for two minutes. If there are more than ten persons interested in speaking, the Presiding Officer may limit the public comment for all speakers to one minute per speaker. Speakers are permitted to yield their time to one other speaker, however no one speaker shall have more than four minutes. The Presiding Officer may, with the consent of persons representing both sides of an issue, allocate a block of time to each side to present their issue.

Action items may be reordered at the discretion of the Chair with the consent of Council.

5. Presentation: Climate Action Plan and Resilience Update
From: City Manager
Contact: Jordan Klein, Planning and Development, (510) 981-7400

Adjournment

I hereby request that the City Clerk of the City of Berkeley cause personal notice to be given to each member of the Berkeley City Council on the time and place of said meeting, forthwith.

IN WITNESS WHEREOF, I have hereunto set my hand and caused the official seal of the City of Berkeley to be affixed on this 16th day of July, 2020.

Jesse Arreguin, Mayor

Public Notice – this Proclamation serves as the official agenda for this meeting.

ATTEST:

Date: July 16, 2020
Mark Numainville, City Clerk

NOTICE CONCERNING YOUR LEGAL RIGHTS*: If you object to a decision by the City Council to approve or deny an appeal, the following requirements and restrictions apply: 1) Pursuant to Code of Civil Procedure Section 1094.6 and Government Code Section 65009(c)(1)(E), no lawsuit challenging a City decision to deny or approve a Zoning Adjustments Board decision may be filed and served on the City more than 90 days after the date the Notice of Decision of the action of the City Council is mailed. Any lawsuit not filed within that 90-day period will be barred. 2) In any lawsuit that may be filed against a City Council decision to approve or deny a Zoning Adjustments Board decision, the issues and evidence will be limited to those raised by you or someone else, orally or in writing, at a public hearing or prior to the close of the last public hearing on the project.*

Live captioned broadcasts of Council Meetings are available on Cable B-TV (Channel 33), via internet accessible video stream at http://www.cityofberkeley.info/CalendarEventWebcastMain.aspx and KPFB Radio 89.3.

Archived indexed video streams are available at http://www.cityofberkeley.info/citycouncil. Channel 33 rebroadcasts the following Wednesday at 9:00 a.m. and Sunday at 9:00 a.m.

Communications to the City Council are public record and will become part of the City's electronic records, which are accessible through the City's website. **Please note: e-mail addresses, names, addresses, and other contact information are not required, but if included in any communication to the City Council, will become part of the public record.** If you do not want your e-mail address or any other contact information to be made public, you may deliver communications via U.S. Postal Service to the City Clerk Department at 2180 Milvia Street. If you do not want your contact information included in the public record, please do not include that information in your communication. Please contact the City Clerk Department for further information.

Any writings or documents provided to a majority of the City Council regarding any item on this agenda will be posted on the City's website at http://www.cityofberkeley.info.

Agendas and agenda reports may be accessed via the Internet at http://www.cityofberkeley.info/citycouncil

COMMUNICATION ACCESS INFORMATION:
To request a disability-related accommodation(s) to participate in the meeting, including auxiliary aids or services, please contact the Disability Services specialist at (510) 981-6418 (V) or (510) 981-6347 (TDD) at least three business days before the meeting date.

Captioning services are provided at the meeting, on B-TV, and on the Internet.

01
Special Meeting Item

Office of the City Manager

CONSENT CALENDAR
July 21, 2020

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Timothy Burroughs, Director, Planning and Development Department

Subject: Berkeley Electric Mobility Roadmap

RECOMMENDATION

Adopt a Resolution approving the Berkeley Electric Mobility Roadmap and refer to the City Manager to form an Electric Mobility Implementation Working Group, including community stakeholders, to prioritize, support, and track implementation of the other actions of this plan, including identification of funding sources for implementation.

FISCAL IMPACTS OF RECOMMENDATION

Adoption of the Berkeley Electric Mobility Roadmap (Roadmap) has no direct fiscal impacts. However, many Roadmap actions will require funding for implementation. Identification of grant funding and partnership opportunities would be best supported by a future allocation for a new Community Development Project Coordinator position (1.0 FTE) within Public Works, at a cost of approximately $198,386 per year. This position would provide needed capacity to convene the Electric Mobility Implementation Working Group, manage City-owned charging infrastructure, track and utilize emerging mobility options, obtain grant funding, and catalyze actions such as electric mobility equity pilot projects, new best practices for curbside charging, and shared electric mobility hubs. This new position and other Roadmap actions requiring additional City funding for implementation will be proposed through future City Budget processes.

CURRENT SITUATION AND ITS EFFECTS

On February 27, 2018, the Berkeley City Council extended Berkeley's Residential Curbside Electric Vehicle (EV) Charging Pilot, with direction to supplement the extension with efforts to plan for and increase electric vehicle adoption in Berkeley (Resolution No. 66,707-N.S.). On March 13, 2018, Council referred to the Energy Commission and City Manager a request to research best practices to encourage and support the use of electric vehicles, and develop a draft EV Plan for Berkeley (Wengraf, Harrison, Bartlett, and Hahn; see Attachment 2). On June 12, 2018, Council referred a proposed goal of becoming a Fossil Fuel Free City to the Energy and Transportation Commissions, including consideration of rapid adoption of renewable energy sources, affordable densification of cities, and low-emissions public transportation infrastructure.

In furtherance of Council direction and the Strategic Plan goal of championing and demonstrating social and racial equity, the Roadmap is a plan for supporting the use of EVs and other forms of clean transportation that focuses on equitable and affordable access to their benefits. Early engagement of community-based organizations and nonprofits helped identify mobility gaps for low income residents, renters, communities of color, people with disabilities, and other priority stakeholders. For many members of the Berkeley community, access to some forms of clean transportation is limited due to financial, technological (e.g., lack of home internet or smart phone), and/or physical/accessibility barriers. Addressing these barriers and prioritizing equitable access to a range of mobility options was used as a lens through which all proposed strategies were filtered. Community partners were critical in the development of the Roadmap and its equity-focused approach, and our partners will be essential to its implementation.

The Roadmap includes all types of clean transportation, and prioritizes walking/wheelchair use, biking, and public transportation, followed by electrified shared vehicles (including e-bikes, other micromobility, and electric cars). Increasing personal use of EVs in Berkeley is a clear objective within the Roadmap, but the Energy Commission and other stakeholders made it clear that focusing only on private EVs is not enough. A key goal of the Roadmap is also to improve alternatives to driving, in concert with the Bicycle Plan, Pedestrian Master Plan update, Vision Zero Action Plan, Transit-First Policy, and related efforts to improve safety, reduce traffic congestion, and support healthier outcomes from increased physical activity and reduced air pollution.

The Roadmap features analyses and maps, which prioritize geographic areas for equitable electric mobility investment, public and workplace charging, and residential charging. These maps can guide internal planning and investment, as well as provide guidance for external opportunities and partnerships.

The guiding vision established for the Roadmap is ***to create a fossil fuel-free transportation system that integrates with and supports the City's ongoing efforts to increase walking, biking, and public transportation use in Berkeley, and ensures equitable and affordable access to the benefits of clean transportation***. The Roadmap identifies a total of 23 strategies and 58 actions to help achieve this vision, which fall under four goals:

- Ensure Equity in Access to Electric Mobility
  Maximize electric mobility benefits in underserved communities
- Improve Alternatives to Driving
  Shift trips to walking, cycling, and shared electric modes
- Achieve Zero Net Carbon Emissions
  Eliminate emissions from private vehicles
- Demonstrate City Leadership
  Lead by example and guide the electric mobility transition

The Roadmap's goals are the culmination of a 15-month process of engaging residents and stakeholders, analyzing mobility options, assessing barriers, and collaboratively crafting strategies and actions. The Roadmap process engaged staff from all City departments along with community stakeholders, building new relationships to work on issues of electric mobility. The process included:

- Needs Assessment: This assessment included a multi-department kick-off meeting, best practice research, technical modeling and geospatial analysis, community survey (670 participants), and interviews with underserved community representatives and other key stakeholders (11 organizations).
- Strategy Development: A key stakeholder workshop in March 2019 provided direction for drafting the Roadmap goals, strategies, and actions. Feedback on these drafts were gathered at the Community Environmental Advisory Commission, Transportation Commission, and Energy Commission, a public "Ride Electric All the Way Home" workshop, and the "Ride Electric at the Farmer's Market" event.
- Draft Roadmap: An initial draft of the Roadmap was shared on the City's website and comments were solicited in fall 2019. Nearly 30 individuals and organizations submitted comments, including the Berkeley Energy Commission, East Bay Community Energy (EBCE), RCD Housing, Transform, World Institute on Disabilities, Center for Sustainable Living, Rising Sun Center for Opportunity, Walk Bike Berkeley, 350 Bay Area, AC Transit, ChargePoint, Tesla, City staff, and others. These comments were used to refine text of the Roadmap including:
    - New "Traveling in Berkeley" vignettes to provide examples of how people currently travel in Berkeley and what they would like to see in the future.
    - New text to clarify that the Roadmap focuses on the transportation of people (not freight) and prioritizes alternatives to driving such as walking, biking, and quality public transit.
    - E-bike definition and greater inclusion of e-bikes within the Roadmap.
    - Clarified language on barriers and mobility needs for individuals with disabilities.
    - Additional language on the importance of work that provides good wages, benefits, and career pathways as well as just transition efforts for individuals whose work may be impacted by electric mobility.
    - Additional detail on partnership opportunities with EBCE and AC Transit.
    - Additional text on the importance of not contributing to or creating new inequities, particularly for people with low incomes and/or disabilities, as we transition away from fossil fuel vehicles.

To the extent possible, requests for additional data collection/inclusion were also added to the refined Roadmap, such as detail on commute mode share based on American Community Survey data. The refined draft Roadmap is included as Exhibit A to the Resolution proposed for Council adoption.

While the Roadmap was being developed, active work on implementing some of its actions was ongoing, such as the installation of additional charging stations at the Center Street Garage for public and fleet charging, adoption of local amendments to the new California Green Building Standards Code (CALGreen) to require increased EV charging in new construction projects, work with the Planning Commission to draft new transportation demand management measures and requirements, and an EBCE assessment of the City's fleet for electrification by 2030.

Since the development of the Roadmap, local and global transportation have been altered dramatically due to the coronavirus pandemic and the social distancing/shelter in place techniques that have been employed in response. By early April, passenger vehicle travel in the Bay Area declined by over 60% (INRIX Travel Volume Synopsis) and BART ridership dropped by over 90%. These dramatic declines in transportation have contributed to better air quality, fewer traffic injuries, and reduced noise, but at unsustainable costs. Implementation of the Roadmap will be even more critical as coronavirus is better controlled and restrictions on movement are eased. Support is needed to maintain momentum for positive travel behaviors, like walking, biking, and telecommuting; rebuilding trust in public transit and shared vehicles is critical. Based on China's example, car purchases and car use may increase as sheltering restrictions are lifted, so continued work to support active transportation and equitable access to electric mobility is essential.

Formation of an Electric Mobility Implementation Working Group, with representation from internal and external stakeholders and with an emphasis on ensuring representation from underserved communities will support prioritized, equity-focused implementation of other Roadmap actions. If resources are available, staff also recommends creation of a new position in the Department of Public works focused on advancing and accelerating electric mobility strategies in Berkeley.

BACKGROUND

Transportation is the largest source of greenhouse gas (GHG) emissions in Berkeley, accounting for 60% of the community's total emissions in 2016. The City has a robust history of supporting the community benefits of walking and biking, including the Pedestrian Master Plan (originally adopted in 2010 following a 2004 Pedestrian Charter; currently being updated), the Bicycle Plan 2017 (first adopted in 1971), and the Vision Zero Action Plan 2020.

Berkeley has a relatively low drive-alone rate compared to other cities of its size, with more than 50% of residents traveling to work by public transit, walking, bicycle, or other non-single occupant vehicle modes (American Community Survey 5-year 2017 data). Continued support of these options, while also ensuring equitable access to increased electrified motorized transportation modes, is the goal of the Berkeley Electric Mobility Roadmap, and remains particularly critical as COVID-19 travel restrictions are lifted.

The City of Berkeley has been a leader in supporting electric vehicle adoption. Since 2011, the City has installed over 70 public EV charging ports, streamlined permitting for home EV charging, increased requirements for EV readiness in new construction, implemented an innovative residential curbside EV charging pilot, and conducted electric mobility outreach through the City's website, annual Ride Electric events, and EV 101 workshops. However, to reach zero net carbon by 2045, scenario modeling conducted for the Roadmap indicated that EV sales shares would need to reach about 90% by 2025 and nearly 100% by 2030 (up from 16% in 2017). This translates to EVs being approximately 25% of vehicles in use in the community by 2025, 55% by 2030, and 100% by 2045.

ENVIRONMENTAL SUSTAINABILITY

Walking and cycling do not release air pollutants or GHG emissions. Driving an EV in place of a conventional car currently reduces the associated GHG emissions by 70-100% and eliminates tailpipe emissions. Increasing walking, cycling, and public transit ridership, while also electrifying shared and personal vehicles (e-bikes and other micromobility as well as cars), helps achieve the Berkeley Climate Action Plan goal of an 80% GHG reduction from year 2000 levels by 2050. Widespread electric mobility is an essential component of reaching carbon neutrality (zero net carbon) by 2045 and becoming a Fossil Fuel Free City as soon as possible.

RATIONALE FOR RECOMMENDATION

Achieving the ambitious goals of the Electric Mobility Roadmap requires electric mobility options to become ubiquitous and well-utilized, with benefits that are broadly shared. It recognizes that not everyone will benefit from access to clean transportation without equity-focused strategies and actions.

The Roadmap is the first comprehensive view of electric mobility in Berkeley. It includes 23 strategies and 58 actions, with identified timeframes, partners, costs, and resources for each. The creation of an Electric Mobility Implementation Working Group, including community stakeholders, a recommendation from the Roadmap which is specified in the Resolution accompanying this staff report, is essential to prioritizing, supporting, and tracking all of the Roadmap's recommended actions.

Electric mobility is a rapidly evolving area, with frequently changing policies and programs at State and regional levels, technology changes in both vehicles (including micromobility) and charging infrastructure (including load sharing, automation, solar, and battery storage), and service providers and other options. The Roadmap process highlighted the need for new staff capacity to manage City-owned charging infrastructure, minimizing grid impacts and utility charges. New staff would also track and utilize emerging mobility options, and catalyze actions such as electric mobility equity pilot projects, new best practices for curbside charging, and shared electric mobility hubs.

ALTERNATIVE ACTIONS CONSIDERED

Council could opt not to approve the Berkeley Electric Mobility Roadmap as drafted, in which case staff would continue to pursue electric mobility initiatives and infrastructure as staffing permits and opportunities arise. The Roadmap provides an integrated, equity-focused framework from which to identify and pursue electric mobility actions.

CONTACT PERSON

Billi Romain, Manager of the Office of Energy and Sustainable Development, Planning and Development Department, 510-981-7432

Sarah Moore, Sustainability Program Manager, Office of Energy and Sustainable Development, Planning and Development Department, 510-981-7494

Attachments:

1: Resolution

Exhibit A: Berkeley Electric Mobility Roadmap

2: Referral to the Energy Commission and City Manager: Strategies to Improve EV Usage (March 13, 2018, Item 21)

RESOLUTION NO. ##,###-N.S.

APPROVAL OF THE BERKELEY ELECTRIC MOBILITY ROADMAP

WHEREAS, transportation is the largest source of greenhouse gas (GHG) emissions in Berkeley, accounting for 60% of the community's total emissions in 2016; and

WHEREAS, walking and cycling trips do not release air pollutants or GHG emissions; and

WHEREAS, driving an electric vehicle (EV) in place of a conventional automobile in Berkeley currently reduces the GHG emissions associated with its travel by 70-100% and eliminates tailpipe emissions; and

WHEREAS, increasing walking, cycling, and public transit ridership, while also electrifying shared and personal vehicles (e-bikes and other micromobility as well as cars), helps achieve the Berkeley Climate Action Plan goal of an 80% GHG reduction from year 2000 levels by 2050; and

WHEREAS, on March 13, 2018, Council referred the Energy Commission and City Manager to research best practices to encourage and support the use of electric vehicles, and develop a draft EV Plan for Berkeley for City Council adoption; and

WHEREAS, on June 12, 2018, Berkeley City Council referred a proposed goal of becoming a Fossil Fuel Free City to the Energy Commission and Transportation Commission, including consideration of rapid adoption of renewable energy sources, affordable densification of cities, and low-emissions public transportation infrastructure; and

WHEREAS, development of the Berkeley Electric Mobility Roadmap has been a 15-month process of engaging residents and stakeholders, analyzing existing and future mobility options, assessing barriers, and collaboratively crafting strategies and actions; and

WHEREAS, achieving the ambitious goals of the Berkeley Electric Mobility Roadmap requires electric mobility options to become ubiquitous and well-utilized with benefits that are broadly shared; and

WHEREAS, in keeping with the Strategic Plan goal of championing and demonstrating social and racial equity, the Berkeley Electric Mobility Roadmap is a plan for supporting the use of electric vehicles that focuses on equitable and affordable access to the benefits of clean transportation.

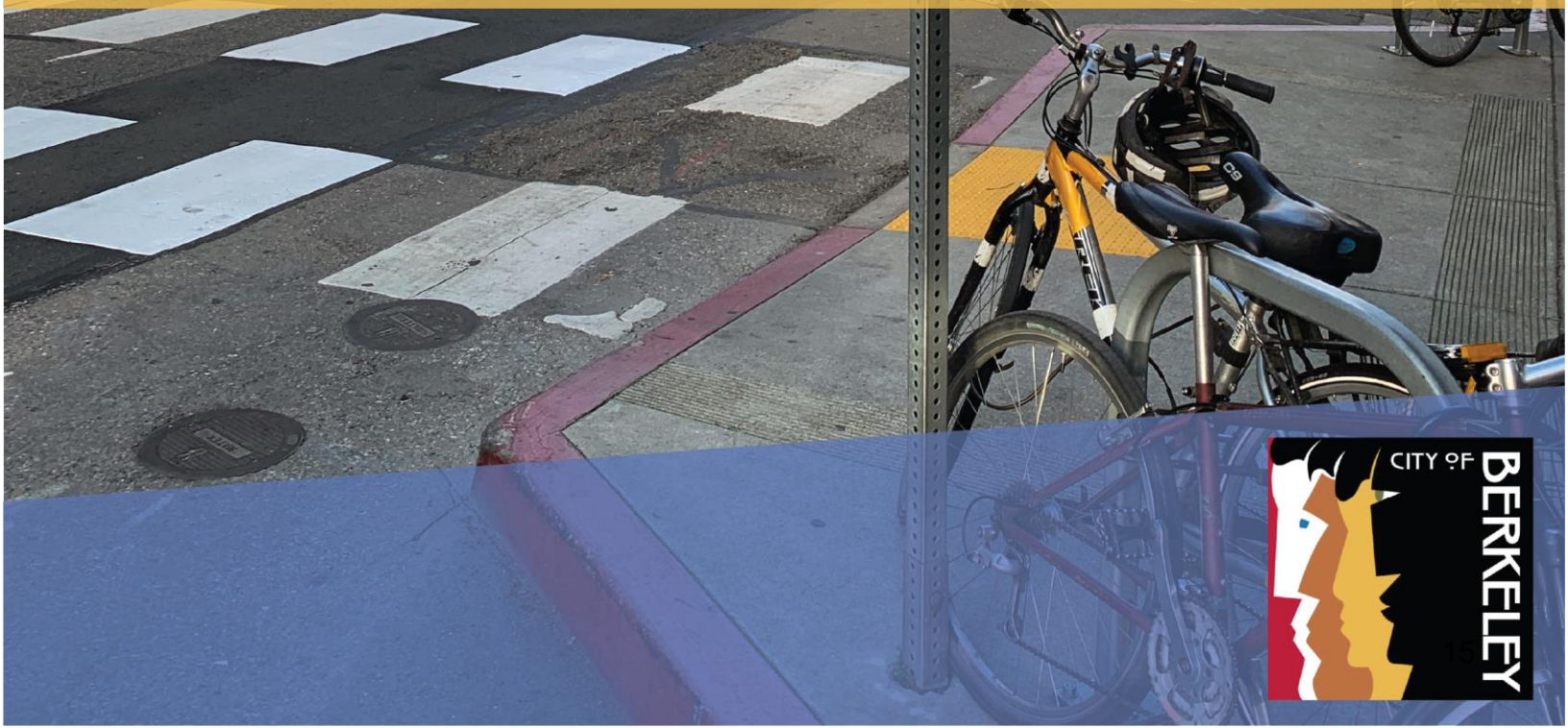
NOW THEREFORE, BE IT RESOLVED by the Council of the City of Berkeley that the Council hereby approves the Berkeley Electric Mobility Roadmap and authorizes the City Manager to form an Electric Mobility Implementation Working Group to prioritize, support, and track implementation of the other actions of this plan, including identification of funding sources for implementation.

Exhibits
A: Berkeley Electric Mobility Roadmap

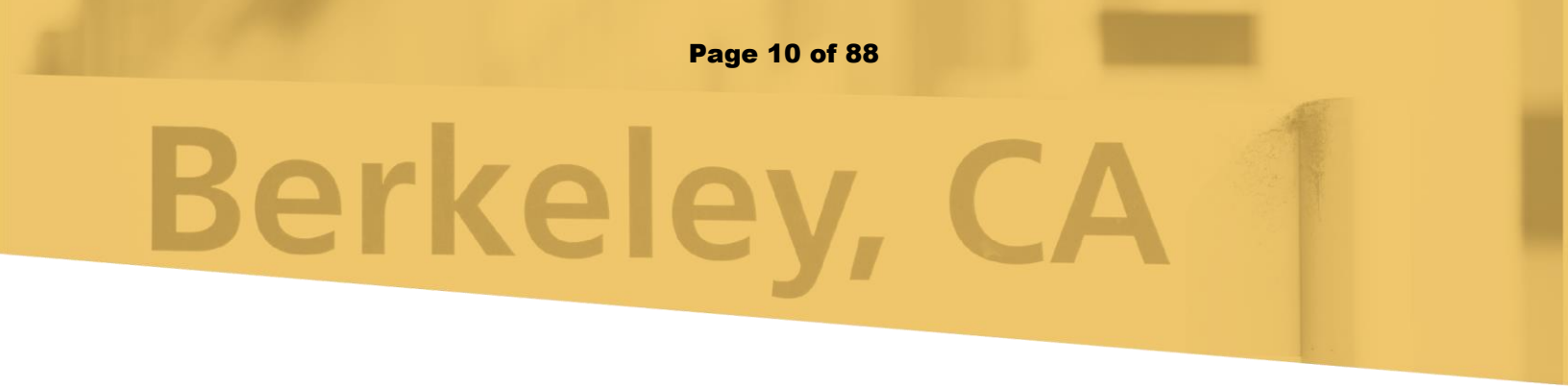
EXHIBIT A

Berkeley Electric Mobility Roadmap

April 2020



CITY OF BERKELEY



Acknowledgements

The City of Berkeley would like to acknowledge the contributions of all who shared their input, guidance, and support for the development of this Roadmap. This list includes hundreds of people such as the individuals who took the online survey, participated in interviews and the stakeholder workshop, shared feedback during public events, and took the time to review the draft Roadmap and provide thoughtful written and verbal comments. Thank you.

The following organizations and individuals were particularly generous in lending their time and ideas during 2019 to shape this Roadmap:

- Center for Independent Living
- World Institute on Disability
- Berkeley Black Ecumenical Ministerial Alliance (BBEMA)
- Church by the Side of the Road/Green the Church
- GRID Alternatives
- Satellite Affordable Housing Developers
- Berkeley Housing Authority
- Resources for Community Development
- BRIDGE Housing
- Building Opportunities for Self-Sufficiency (BOSS)
- Bay Area Organization of Black Owned Businesses (BAOBOB)
- TransForm
- Ecology Center
- Rising Sun Center for Opportunity
- Alameda County Transportation Commission
- Bay Area Air Quality Management District
- PG&E
- East Bay Community Energy (EBCE)
- University of California – Berkeley
- Lawrence Berkeley National Laboratory
- Berkeley Energy Commission
- Berkeley Community Environmental Advisory Commission
- Berkeley Transportation Commission
- Berkeley Climate Action Coalition
- Greenlining Institute (Roadmap equity advisors)
- Ryan Daley, Sawatch Group (data-driven planning advisor)
- Adam Cohen and Susan Shaheen (Roadmap shared mobility advisors)
- Melanie Nutter (public innovation advisor)
- EVGo
- ChargePoint
- Tesla
- GM Maven
- Envoy
- Walk Bike Berkeley
- 350 East Bay
- AC Transit
- Staff from local governments, including Oakland, Sacramento, and Santa Monica
- City of Berkeley Staff

TABLE OF CONTENTS

Executive Summary

The City of Berkeley has a strong history of sustainability leadership. In 2006, Berkeley voters overwhelmingly endorsed a ballot measure to reduce the community's greenhouse gas emissions by 80% below 2000 levels by 2050. In 2018, Berkeley City Council signaled the urgency and importance of climate action by declaring a Climate Emergency and the goal of becoming a Fossil Fuel Free City as soon as possible. Also in 2018, Governor Brown signed Executive Order B-55-18, committing California to carbon neutrality by 2045.

With transportation responsible for 60% of Berkeley's greenhouse gas emissions, carbon neutrality cannot be achieved without electric mobility. Cleaner electricity, now available through East Bay Community Energy, and State and local commitments to 100% renewable electricity by 2045, give electrification tremendous promise. The Berkeley Electric Mobility Roadmap is an essential building block of Berkeley's overall climate strategy.

This effort will not be easy. Transportation was the only sector in which Berkeley's emissions rose between 2000 and 2016. Furthermore, because high-quality transportation options are critical to residents' livelihood and well-being, this Roadmap must also equitably support access to opportunity. This Roadmap focuses on the movement of people, rather than freight. In doing so, it supports alternatives to driving, such as walking, biking, and quality public transit for all stakeholders.

This Roadmap centers equity by acknowledging and addressing the inequalities of our current transportation system. Early engagement of community-based organizations and nonprofits helped to identify important mobility gaps for low-income constituents, renters, communities of color, people with disabilities, and other priority stakeholders. Equity was used as a lens through which all proposed strategies were filtered.

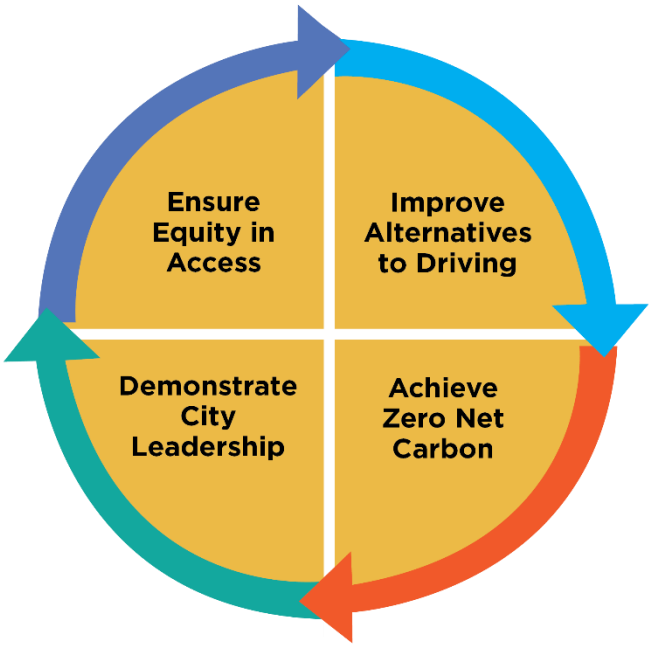
The guiding vision established for the Electric Mobility Roadmap **is to create a fossil fuel-free transportation system that integrates with and supports the City's ongoing efforts to increase walking, biking, and public transportation use in Berkeley, and ensures equitable and affordable access to the benefits of clean transportation.** The following goals were identified to guide the creation and implementation of the Roadmap to achieve Berkeley's vision for inclusive electric mobility:

1. **Ensure Equity in Access to Electric Mobility:** ***Maximize Electric Mobility Benefits in Underserved Communities***: The City is committed to equity in electric mobility, both in the process of developing the Roadmap as well as in implementing equitable solutions that are meaningful and measurable,

EXECUTIVE SUMMARY

and that ensure the clean air and economic benefits of a transition to electric mobility are inclusive and accessible to underserved communities and businesses.

2. **Improve Alternatives to Driving:** ***Shift trips to walking, cycling, and shared electric modes***: A key goal of this Roadmap is to complement Berkeley's efforts to shift trips to walking, biking, and shared modes to reduce congestion, improve quality of life, and support healthier outcomes from increased physical activity and reduced transportation pollution. The Roadmap focuses on increasing the accessibility of active and shared electric mobility options in Berkeley, particularly as the population continues to grow.
3. **Achieve Zero Net Carbon Emissions:** ***Eliminate emissions from private vehicles:*** Clean, safe, and attractive alternatives to driving are critical; in addition, the remaining vehicles must become carbon-free. This Roadmap goal is to scale adoption of light-duty electric vehicles (EVs) in Berkeley to a level that will enable the City to reach carbon neutrality by 2045, if not before. The City and its stakeholders envision increasing awareness and education about EVs, increasing access to EV charging options, and increasing the amount of clean energy to power EVs.
4. **Demonstrate City Leadership:** ***Lead by example and guide the electric mobility transition:*** The City aims to lead by example by accelerating electrification of the city fleet, and by taking tangible, meaningful, city-led actions to increase equitable electric mobility. Additionally, the City will guide implementation of the Roadmap, and will continue adjusting the plan as transportation trends and market conditions evolve.



While the vision and goals of this Roadmap are ambitious, the City has already shown leadership in electric mobility adoption. In 2017, Berkeley had the seventh highest EV sales share of cities in California (16%), and by mid-2019 had 105 publicly listed EV charging ports. In addition, a variety of other electric mobility options are becoming available to the Berkeley community, including eight new electric school buses, several hydrogen fuel cell and battery-electric buses for AC Transit, Bay Wheels' shared pedal assist e-bikes, and an anticipated electric scooter pilot. The Roadmap builds on a strong record of action at the City level as well as on available programs, policies, and regulations to support electric mobility at the state, region, and utility

EXECUTIVE SUMMARY

scales. In the past several years, the City has installed over 70 public EV charging ports, streamlined permitting for home EV charging, increased requirements for EV readiness in new construction, implemented a residential curbside EV charging pilot, conducted electric mobility outreach through the City's website, and hosted annual Ride Electric events and EV 101 workshops.

Even with this progress, the urgency of the climate crisis necessitates a rapid increase in electric mobility adoption. To reach zero net carbon by 2045, scenario modeling conducted for the Roadmap indicates that EV sales shares would need to reach about 90% by 2025 and nearly 100% by 2030 (up from 16% in 2017). This translates to EVs being approximately 25% of the community-wide in-use fleet by 2025, 55% by 2030, and 100% by 2045.

Achieving the ambitious goals set forth in this Roadmap requires electric mobility options to become ubiquitous and well-utilized, with benefits that are broadly shared. The Roadmap explores solutions to the key barriers to adoption of electric mobility, including cost and financial access, education and awareness, access to EV charging, physical challenges and disabilities, and technology access. These barriers must also be viewed within the broader context of regional and systemic challenges that have led to unreliable transportation options and longer commutes, particularly for low-income communities and communities of color, due to displacement and the increasing cost of living. Stakeholders highlighted how these communities often face compounded challenges due to the intersection of poverty, race, and disability, which underscores the need for an integrated approach to provide access to clean, affordable, reliable transportation.

The Roadmap's goals, indicators and targets, and strategies are the culmination of a 15-month process of engaging residents and stakeholders, analyzing existing and future mobility options (including the EV market), assessing barriers, and collaboratively crafting appropriate solutions. The resulting strategies are summarized in the table below, and are described in greater detail in the Roadmap. For each strategy, the Roadmap includes actionable steps, lead departments and partners, timelines, and approximate costs. Over the next five to ten years, the City and its stakeholders will collaborate to implement these strategies, monitor progress, and adjust course as needed.

EXECUTIVE SUMMARY

Goals	Key Indicators and Targets	Strategies
Ensure Equity in Access to Electric Mobility: Maximize electric mobility benefits in underserved communities	✓ **Increase access to mobility** ✓ **Reduce air pollution** ✓ **Increase economic opportunity**	1: Community Driven Equity Pilot Projects
		2: One Stop Shop for Electric Mobility
		3: Digital and Financial Access to Transit and Shared Mobility
		4: Accessible Electric Mobility
		5: Equitable Workforce and Business Strategies
		6: Electric Bus Rapid Transit Routes
Improve Alternatives to Driving: Shift trips to walking, biking, and shared electric modes	✓ **Increase non-auto mode share** ✓ **Increase access to electric mobility options**	1: Access and Use of Shared Mobility and Transit
		2: Electrification of Shared Transportation Fleets
		3: Shared Electric Mobility Hubs
Achieve Zero Net Carbon: Eliminate emissions from private vehicles	✓ **Increase electric vehicle adoption** ✓ **Expand public and workplace EV charging** ✓ **Increase electric mobility awareness and education**	1: EV Charging in New and Existing Buildings
		2: EV Charging Permitting
		3: Public EV Charging on City Property
		4: Private EV Charging Site Hosts
		5: Electric Mobility Education and Outreach
		6: Smart, Resilient, Clean, and Affordable EV Charging
		7: Electrification of Private Fleets
		8: Disincentivize Fossil Fuel Vehicles without Creating New Inequities
Demonstrate City Leadership: Lead by example and guide the electric mobility transition	✓ **Increase electric vehicles in the City fleet** ✓ **Increase capacity for electric mobility**	1: City Fleet Electrification Plan
		2: Electric Mobility Charging Management
		3: Electric Mobility Planning Integration with Streetscape & Construction Projects
		4: Local Innovation to Support Electric Mobility
		5: Electric Mobility Roadmap Implementation Working Group
		6: Funding for Roadmap Implementation

INTRODUCTION

Berkeley's Vision for Electric Mobility

In 2006, Berkeley residents voted to reduce the community's greenhouse gas (GHG) emissions 80% by 2050; the resulting Climate Action Plan was adopted by Berkeley City Council in 2009. In 2018, Berkeley City Council resolved to become a Fossil Fuel Free City as soon as possible, and Governor Brown committed California to carbon neutrality by 2045.

Berkeley City Council also declared a Climate Emergency to signal the urgency with which the City is taking on these ambitious goals, driven by the significant threats climate change poses to Berkeley's future as well as by the City's capacity to play a leadership role in advancing solutions. To address greenhouse gas emissions from transportation—the largest source at 60% of Berkeley's total emissions—the City envisions a future transportation system that increases walking, biking, and electric mobility to expand the benefits of clean transportation to all Berkeley residents, workers, students, and visitors.[1]

With Berkeley committed to reach 100% renewable energy and with the substantial progress already made toward low carbon electricity by joining East Bay Community Energy (EBCE), EVs are becoming an increasingly clean transportation option to reach the City's climate goals and to contribute to reduced regional air pollution levels.[2] Yet simply replacing every vehicle on Berkeley's streets today with vehicles powered by electricity would miss important benefits. Getting people out of cars improves health and quality of life The City and community partners continue to work to improve walking, biking, and public transportation options in Berkeley through implementation of its Bicycle Plan, updating its Pedestrian Master Plan, Vision Zero, and related efforts. The Electric Mobility Roadmap is designed to complement this core work.

Additionally, simply changing technologies would ignore the inequalities present in our current transportation system. Historically, transportation investments and decisions have unjustly burdened low-income communities and communities of color with air pollution and other negative impacts, while simultaneously failing to meet their transportation needs.[3] This has resulted in well-documented race and class disparities in the distribution of transportation burdens and benefits; for example, in Berkeley, the asthma hospitalization rate for children under five for African American children is 10 times higher—and for Latino children is 2.8 times higher—than the rate for white children.[4] Today, low-income communities, communities of color, and the disability community frequently experience the longest, most unreliable commutes, and spend the most as a proportion of their income on transportation costs.[5] Moreover, high upfront costs have thus far kept electric mobility options mostly out of reach for underserved communities.[6] To address these structural and institutional inequities, the Electric Mobility

INTRODUCTION

Roadmap has been developed, with a focus on advancing equitable solutions to the existing transportation gaps.

The guiding vision for the Electric Mobility Roadmap is to create a fossil fuel-free transportation system that integrates with and supports the City's ongoing efforts to increase walking, biking, and public transportation use in Berkeley, and that ensures equitable access to the benefits of clean transportation.

KEY TERMS

Types of electric vehicles (EVs)

- **EV:** A vehicle powered, at least in part, by electricity. In this report, EV refers to all plug-in vehicles.
- **BEV:** Battery-electric vehicle, e.g. a Nissan Leaf or Chevy Bolt. A vehicle powered entirely by electricity.
- **PHEV:** Plug-in hybrid electric vehicle, e.g. a Chevy Volt or Toyota Prius Prime. A vehicle with both a conventional engine and electric motor, powered either by gas or by electricity through a rechargeable battery.
- **ZEV:** Zero emission vehicle, which according to the California Air Resource Board includes full battery-electric, hydrogen fuel cell, and plug-in hybrid-electric vehicles.
- **E-bike**: as defined by California Assembly Bill 1096, a bicycle with fully operable pedals and a motor up to 750 watts. E-bikes can include pedal assist variants which only add power when the rider pedals, and throttle-assisted variants that do not require the rider to pedal, and variants that provide power only when the rider stops pedaling. Each variant has an associated maximum speed and additional regulations.

Electric vehicle charging terms (adapted from AFDC.gov)

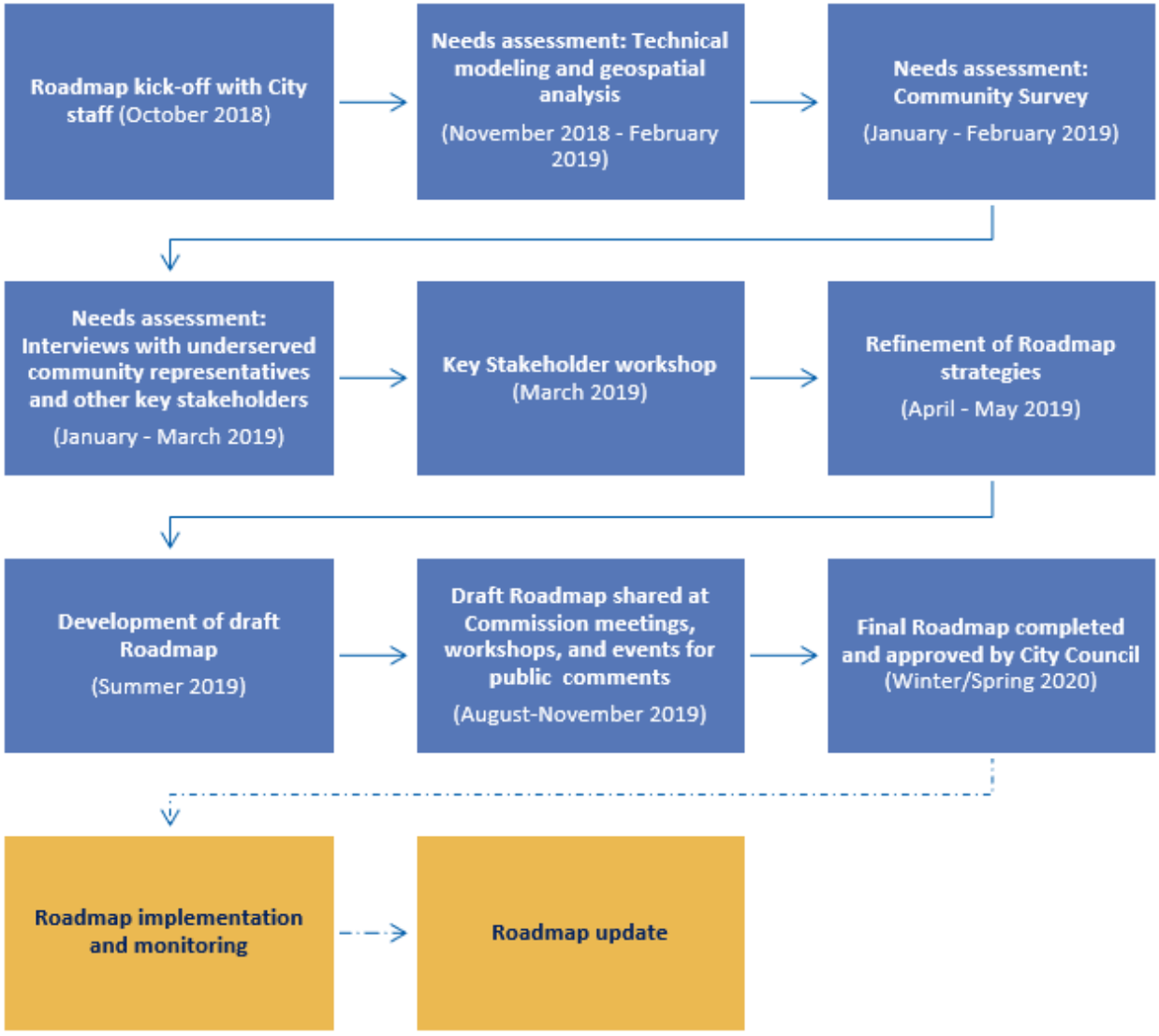
- **Level 1:** AC Level 1 EV charging provides charging through a 120-volt (120V) AC plug (a typical wall outlet) at 12 -16 amps. For every hour of charging, Level 1 EV charging can provide about 3-5 miles of range.
- **Level 2:** AC Level 2 EV charging offers charging through 240V or 208V electrical service (like a dryer plug) at 12-80 amps (typically 32 amps). For every hour, Level 2 EV charging can provide about 10-20 miles of range.
- **DC fast charging (DCFC):** Direct-current (DC), fast-charging equipment, sometimes called Level 3, enables rapid charging at a rate of at least 40 kW, with newer chargers rated up to 350 kW. Depending on rated power and the vehicle's battery size, DCFC can often enable an 80% charge in 20-30 minutes. Currently, there are three types of DCFCs: SAE Combo (known also as Combined Charging System or CCS), CHAdeMO, and Tesla.
- **Electric Vehicle Supply Equipment (EVSE):** The hardware, including connectors, fixtures, devices, and other components required to charge an electric vehicle; commonly called a charging station.
- **Smart charging:** Smart (networked) charging provides control and monitoring features, and allows charging speeds to be modulated, enabling power sharing and demand response to help limit grid impacts.

Other mobility terms

- **Shared mobility:** Shared use of a motor vehicle, bicycle, scooter, or other travel mode.
- **Shared micromobility:** Shared use of a bicycle, scooter, or other low-speed travel mode.
- **Transportation Network Companies (TNCs):** Companies, such as Lyft or Uber, providing prearranged and on-demand transportation services. They connect drivers with passengers through mobile applications.
- **Carsharing:** Programs, like ZipCar, GIG Car Share, or Envoy, where individuals have short-term access to a vehicle without the costs and responsibilities of ownership.
- **Scooter sharing:** Allows individuals access to scooters by joining an organization that maintains a fleet of scooters at various locations. Scooter sharing models can include motorized and non-motorized scooters. The scooter service typically provides electric charge, maintenance, and may include parking as part of the service.
- **Bikesharing:** System where users access bicycles on an as needed basis for one-way (point-to-point) or roundtrip travel. Station-based bikesharing kiosks are typically unattended, concentrated in urban settings, and offer one-way station-based service (bicycles can be returned to any kiosk). Free-floating bikesharing offers users the ability to end their rental at locations not expressly prohibited within a predefined region. Users must not leave bikes where they block sidewalks, ramps for disabled access, driveways, or the street.

INTRODUCTION

Roadmap Process



Over the next five to ten years, the City and its community partners and other stakeholders will work together in a community-based decision-making process to implement the Roadmap strategies, monitor progress, and adjust course as needed. The City is committed to continuing to engage and collaborate

with underserved communities in Roadmap implementation. Given the dynamic nature of the EV market, technology, policy, and equity, the City will aim to revisit the Roadmap by 2025.

Roadmap Goals

Through the Roadmap's engagement with stakeholders, the following goals were identified to guide the creation and implementation of the Roadmap in order to achieve Berkeley's vision for inclusive electric mobility. The following sections describe key elements of each goal, based on input from stakeholders.

Ensure Equity in Access to Electric Mobility: Maximize electric mobility benefits in underserved communities

The City is committed to equity in electric mobility, both in the process of developing strategies as well as in implementing equitable solutions that are meaningful and measurable. The approach to equity in this Roadmap is informed by the Urban Sustainability Directors Network's (USDN) definition of equity, described in FIGURE 1, as well as the work of the Greenlining Institute, which served as an advisor to this project.

FIGURE 1: USDN'S FOUR DIMENSIONS OF EQUITY

The approach to equity in this Roadmap is informed by the Urban Sustainability Directors Network's (USDN) definition of equity, which includes four interlinked components:

1. **Procedural**, which stresses the importance of inclusive, accessible, authentic engagement in the process of developing policies and programs;
2. **Distributional**, which emphasizes the importance of programs and policies that result in fair distributions of benefits and burdens, prioritizing those with highest need;
3. **Structural,** which emphasizes that decision-makers institutionalize accountability and address historic systemic inequities, and
4. **Transgenerational,** which emphasizes that decisions consider generational impacts and do not result in unfair burdens on future generations.

The Roadmap's equity approach includes ensuring solutions address specific mobility needs identified by underserved communities, which include low-income populations, communities of color, and the disability community. This must include increasing physical, financial, and digital access to high-quality (affordable, efficient, reliable, safe) electric mobility options, and ensuring the clean air and economic benefits of a transition to electric mobility are inclusive and accessible to underserved communities and businesses. It also views the electrification of mobility in the context of its impact on job opportunities and economic outcomes for underserved communities.

INTRODUCTION

Improve Alternatives to Driving: Shift trips to walking, cycling, and shared electric modes

A key goal of this Roadmap is to complement Berkeley's ongoing efforts to shift trips to walking, biking, and shared modes to reduce congestion, improve quality of life, and support healthier outcomes from increased physical activity and reduced transportation pollution. To do so, the Roadmap focuses on increasing the availability and accessibility of shared electric mobility options in Berkeley, and on ensuring that Roadmap strategies complement other efforts to get people out of cars. Berkeley already has a relatively low drive-alone rate compared to other cities of its size, with more than 50% of residents traveling to work by public transit, walking, bicycle, or other non-single occupant vehicle modes.[7] The City has the potential to reduce this rate even further. For more detail, see the later section, "Berkeley's Electric Mobility Landscape."

FIGURE 2: BERKELEY'S PRIORITIZATION OF MODES

1. Walking\wheelchair & biking
2. Public transit (with increasingly electrified transit)
4. Electrified shared vehicles (including micromobility)
3. Shared vehicles (shuttles, carpools, car share, ride hailing, etc.)
5. Electric private vehicles
6. Private vehicles

Based on stakeholder input and the guidance of the Roadmap's strategic advisors at the Greenlining Institute, FIGURE 2 outlines the prioritized modes of transit in Berkeley's electric mobility transition. This prioritization maximizes clean air, climate, sustainability, and economic benefits. It emphasizes modes that are active transportation options, shared, and improve the use of public space. For example, while private vehicles represent the greatest proportion of transportation emissions and should be electrified, the City does not want to make owning an EV more attractive than taking public transportation, biking, and walking.

INTRODUCTION

Achieve Zero Net Carbon Emissions: Eliminate emissions from private vehicles

In addition to shifting away from driving, the adoption of EVs in Berkeley, including personal and fleet vehicles, must be scaled to a level that will enable the City to reach carbon neutrality by 2045. To do so, the City and its stakeholders envision increasing awareness and education about EVs, access to EV charging options, and the clean energy available to power EVs. Expanding awareness of and education about electric mobility options, incentive opportunities, and key programs amongst the general public, fleet operators, and other key stakeholders is critical. Creating an "ecosystem of EV charging" that provides a variety of charging options in different locations can serve different types of users and needs.

Demonstrate City Leadership: Lead by example and guide the electric mobility transition

The City aims to lead by example by accelerating electrification of the city fleet, and by taking tangible, meaningful, city-led actions to increase equitable electric mobility. The Roadmap aims to guide implementation by developing an actionable plan that integrates with existing city plans and regional efforts, managing an effective transition by addressing impacts to Berkeley's streetscape, parking, and other city operations; leveraging limited city funds and external funding opportunities to achieve the greatest impact possible; and conducting authentic and ongoing stakeholder engagement, while striving to use equity best practices in community engagement. Finally, the City aims to continue adjusting the Roadmap and planning for the future as conditions change, including planning for resilient electric mobility systems, mitigating potential grid impacts, and preparing for the introduction of new transportation technologies, such as autonomous vehicles (AVs).

INTRODUCTION

Barriers to Widespread Electric Mobility Adoption in Berkeley

Achieving the ambitious goals set forth in this Roadmap requires implementing strategies that can address key barriers and challenges to electric mobility options being ubiquitous and well-utilized, and for their benefits to be broadly shared. TABLE 1 summarizes findings from a survey of Berkeley residents, employees, and visitors as well as interviews with representatives of underserved communities that highlighted challenges to achieving an equitable, multi-modal, and electric mobility future in Berkeley. Stakeholders highlighted how low-income communities, and communities of color in particular, often face more than one of these challenges at a time, stressing the need for an integrated approach to address multiple barriers to accessing clean, affordable, reliable transportation.

Traveling in Berkeley

As part of this Roadmap, several people who live, work, or go to school in Berkeley shared stories of how they currently travel, what they like about it, and things they would like to see in the future.

Sarah

Berkeley Resident and UC-Berkeley Student
Pedestrian/ Bus Commuter

I generally walk or take the bus, taking advantage of the AC Transit Clipper Card that is included in my tuition. Depending on when my day ends, and how safe I feel, I either take the 65 bus or sometimes take the nighttime North Side Safety Shuttle that I really appreciate because it runs so late.

TABLE 1: BARRIERS TO WIDESPREAD ELECTRIC MOBILITY ADOPTION IN BERKELEY

Cost and Financial Barriers: Cost and other financial barriers can inhibit access to electric shared mobility's benefits, whether it is the cost of owning an EV and accessing charging, or financial barriers, such as a lacking a credit card, bank account, or good credit to access shared mobility services or financing for an EV.

Education and Awareness Barriers: Many people are not aware of EVs and other electric mobility options, their benefits, or opportunities such as incentive programs. Some do not know anyone who uses electric mobility. Language barriers and cultural/trust considerations pose an additional challenge for spreading the word about electric mobility opportunities, particularly in underserved communities.

EV Charging Access Barriers: Many Berkeley residents face barriers to convenient, affordable EV charging. These barriers stem primarily from difficulties accessing charging at home due to lacking a parking space or renting one's home, but also extend to public and workplace charging access. Additionally, stakeholders highlight the importance of developing a resilient EV charging system that can still power vehicles in emergencies and power outages.

Physical and Safety Barriers: Many Berkeley residents face physical barriers to accessing certain transportation options, including age (both for seniors and parents transporting young children), disability, and safety (particularly for potential users of bikes, scooters, and other electrified micromobility for whom gaps in ubiquitous safe infrastructure discourages usage).

Technology Barriers: Community members face a range of technological barriers to accessing electric mobility options. For example, some seniors and affordable housing residents report lacking access to smart phones or internet at home, making it difficult to access shared mobility modes or EV information. Others report challenges with EV technology, like range barriers that may limit access to far-away employment opportunities, though EV ranges continue to improve.

Reliability Barriers: Some community members report lacking reliable transportation options. Some struggle with having to depend on older, unreliable personal vehicles, while others rely on public transit with limited schedules and routes, or paratransit service that can be inconvenient and is frequently delayed.

Regional and Systemic Challenges: Throughout the Bay Area, including in Berkeley, jobs-housing imbalances and an acute housing crisis have led to longer commutes and displacement of low-income communities and communities of color. While these challenges are broader than the Electric Mobility Roadmap, it's important to consider the wider context and challenges with creating equitable access to electric transportation options.

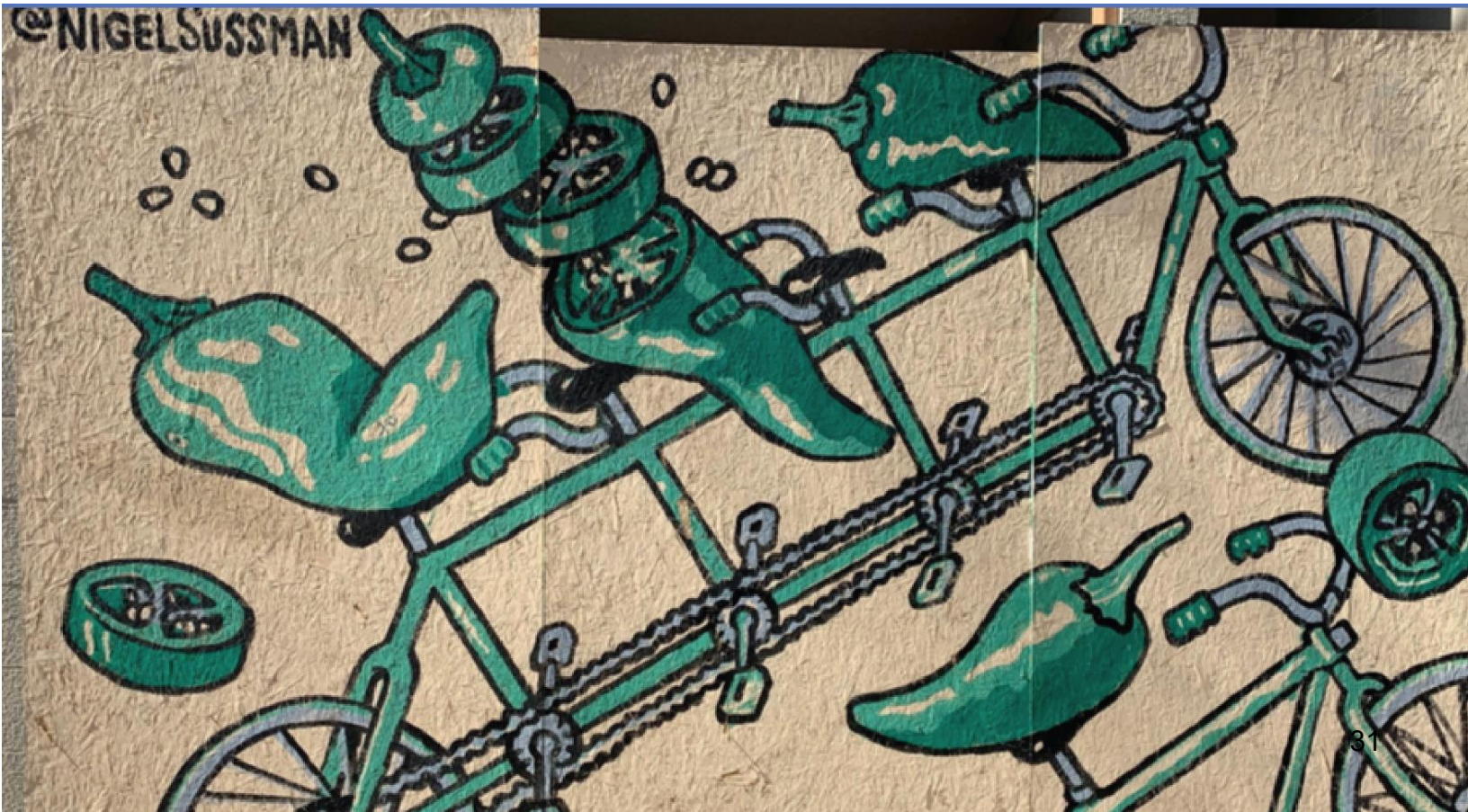
ROADMAP STRATEGIES

Electric Mobility Roadmap Strategies

Overview

Achieving Berkeley's ambitious electric mobility goals will require not one single approach, but a comprehensive set of strategies that can address a variety of barriers preventing acceleration of electric mobility adoption. This section describes the key strategies the City and its stakeholders will pursue together to achieve the goals of the Electric Mobility Roadmap.

The strategies are organized by the Electric Mobility Roadmap goals, and each strategy includes a description, specific actions to implement that strategy, roles and responsibilities of City of Berkeley Departments and key stakeholders, timeline for implementation, approximate cost, and potential resources to leverage in implementation, such as funding sources, programs, policies, and other opportunities.



ROADMAP STRATEGIES

TABLE 1: STRATEGY SUMMARY

Goal	Strategies
Ensure Equity in Access to Electric Mobility: Maximize electric mobility benefits in underserved communities	1: Community Driven Equity Pilot Projects
	2: One Stop Shop for Electric Mobility
	3: Digital and Financial Access to Transit and Shared Mobility
	4: Accessible Electric Mobility
	5: Equitable Workforce and Business Strategies
	6: Electric Bus Rapid Transit Routes
Improve Alternatives to Driving: Shift trips to walking, biking, and shared electric modes	1: Safety and Access
	2: Electrification of Shared Transportation Fleets
	3: Shared Electric Mobility Hubs
Achieve Zero Net Carbon: Eliminate emissions from private vehicles	1: EV Charging in Berkeley's New and Existing Buildings
	2: EV Charging Permitting
	3: Public EV Charging on City Property
	4: Private EV Charging Site Hosts
	5: Electric Mobility Education and Outreach
	6: Smart, Resilient, Clean, and Affordable EV Charging
	7: Electrification of Private Fleets
	8: Disincentivize Fossil Fuel Vehicles without Creating New Inequities
Demonstrate City Leadership: Lead by example and guide the electric mobility transition	1: City Fleet Electrification Plan
	2: Electric Mobility Charging Management
	3: Electric Mobility Planning Integration with Streetscape & Construction Projects
	4: Local Innovation to Support Electric Mobility
	5: Electric Mobility Roadmap Implementation Working Group
	6: Funding for Roadmap Implementation

ROADMAP STRATEGIES

Key Implementation Partners

The development of the Electric Mobility Roadmap has been led by the Office of Energy & Sustainable Development (OESD), who will continue to play a coordinating role with the Public Works Department as the Roadmap moves into implementation. Individual strategies will become the responsibility of other departments, or in some cases external stakeholders. The City is committed to continuing to seek out opportunities to work with other stakeholders to implement or enhance the strategies detailed in the Roadmap. Table 2 highlights key City departments, divisions, or offices, commissions, and external partners who have been involved in the development of the Roadmap, and/or who are likely to be involved with implementation.

TABLE 2: PRELIMINARY KEY IMPLEMENTATION PARTNERS

City of Berkeley Departments/Divisions

- Public Works
- Zero Waste
- Transportation
- Land Use Planning
- Office of Energy and Sustainable Development (OESD)
- Economic Development
- Health Housing & Community Services
- Police
- Fire
- Parks Recreation & Waterfront
- Neighborhood Services
- Finance
- City Attorney

Berkeley Commissions

- Energy Commission
- Transportation Commission
- Community Environmental Advisory Commission

External partners

- East Bay Community Energy (EBCE)
- Pacific Gas & Electric (PG&E)
- Bay Area Air Quality Management District (BAAQMD)
- Alameda County Transportation Commission (Alameda CTC)
- Alameda County Transit (AC Transit)
- Community-based organizations
- EV industry organizations
- TransForm
- Building Opportunities for Self-Sufficiency (BOSS)
- GRID Alternatives
- Greenlining Institute
- Shared Mobility Providers
- Affordable housing providers and other housing developers
- Metropolitan Transportation Commission (MTC)
- Center for Independent Living (CIL)
- World Institute on Disability (WID)
- Charging providers
- Rising Sun Center for Opportunity

STRATEGY: ENSURE EQUITY IN ACCESS

Ensure Equity in Access to Electric Mobility: Maximize electric mobility benefits in underserved communities

Key indicators and targets

- **Increase access to mobility:** Increase access to, and affordability of, electric mobility options for low-income communities of color, people with disabilities, and other underserved communities.
- **Reduce air pollution**: Reduce of air pollution throughout Berkeley, particularly in lower-income communities and those most impacted by air pollution.
- **Increase economic opportunity**: Expand access to employment, job training, and business opportunities and investment for low-income people of color, other people with barriers to employment (including people with disabilities, people with unreliable access to transportation, people with past criminal records, and others), and small, minority- and women-owned businesses.

Strategy Summary

TABLE 3: EQUITY IN ACCESS STRATEGY SUMMARY

Strategy	Action
1: Community Driven Equity Pilot Projects	1a. Develop partnerships with community-based organizations
	1b. Conduct a mobility needs assessment
	1c. Identify and implement pilot project(s)
2: One Stop Shop for Electric Mobility	2a. Connect underserved communities to electric mobility programs
	2b. Pursue options to increase access to used EVs
3: Digital and Financial Access to Transit and Shared Mobility	3a. Increase the use of AC Transit's EasyPass program
	3b. Pursue discounts and digital access strategies for electric shared mobility options
4: Accessible Electric Mobility	4a. Ensure ADA-accessible EV charging in Berkeley
	4b. Support advocacy for accessible shared mobility options
	4c. Provide geographic accessiblity
5: Equitable Workforce and Business Strategies	5a. Collaborate with EV workforce stakeholders to develop and promote training opportunities
	5b. Connect auto industry stakeholders in Berkeley with workforce opportunities
	5c. Center equity in City electric mobility projects and partnerships
6: Electric Bus Rapid Transit Routes	6a. Identify opportunities through Transit First implementation
	6b. Pursue the San Pablo Avenue Corridor Project

STRATEGY: ENSURE EQUITY IN ACCESS

Strategies

1: Community-Driven Equity Pilot Projects

The City will pursue development of partnerships to facilitate one or more community-driven, electric mobility equity pilot projects to benefit low-income communities, communities of color, and the disability community. Key actions to implement this strategy include:

1a. **Develop partnerships with community-based organizations:** Identify partners to develop pilot projects, such as affordable housing providers, the Berkeley Black Ecumenical Ministerial Alliance, GRID Alternatives, the Center for Independent Living (CIL), and Building Opportunities for Self-Sufficiency (BOSS), and other organizations working with underserved communities in Berkeley.

1b. **Conduct a mobility needs assessment:** With partners, conduct research to identify specific mobility needs, priorities, and opportunities in the community. Potential strategies for engaging community stakeholders in the needs assessment may include design charrettes, community-based participatory research, participatory budgeting, an advisory or shared decision-making group, and community benefits agreements.

Traveling in Berkeley

Senior Center Field Trip Shuttle

Athea

Berkeley Senior Center Member

I get around by BART and bus and I'm eligible for Paratransit. I also get around with my children and church family. Commuting is difficult because I'm disabled and sometimes the lifts on the bus don't work and the bus driver has to get off to help me. I recommend Paratransit for people like me.

STRATEGY: ENSURE EQUITY IN ACCESS

1c. **Identify and implement pilot project(s):** Based on the mobility needs assessment, identify pilot project(s) for implementation, such as electric carsharing or carpooling/vanpooling pilots, bikesharing or e-bike incentive pilots, digital and payment access pilots, pilots to encourage multifamily properties to make Level 1 charging options available to residents, and pilots that address physical barriers to electric mobility for disabled and/or elderly residents. Seek funding for implementation. Projects will be informed by pilots being developed by TransForm and Metropolitan Transportation Commission (MTC) in the Bay Area, transportation equity projects funded by the California Air Resources Board's (CARB) Low Carbon Transportation Program, and those recommended by the Greenlining Institute.[8]

2: One-Stop Shop for Electric Mobility

The City will create outreach materials and services to connect low-income communities, communities of color, and the disability community with existing and upcoming programs that support equitable access to EVs, such as Clean Cars for All, Clean Vehicle Assistance Program, and other regional programs. Key actions to implement this strategy include:

2a. **Connect underserved communities to electric mobility programs:** Develop partnerships and outreach plans with the regional One Stop Shop operator, GRID Alternatives, and other community partners to help connect low-income communities and communities of color in Berkeley with electric mobility programs. Where appropriate, connect these efforts with other community and low-income service delivery, such as health clinics, immigration services, low-income energy efficiency programs, and/or workforce development programs. Partner with community organizations to develop materials and information in other languages to serve non-English speakers, and/or tailored to different audiences.[9] Outreach will focus on education about public transit, e-bikes, electric shared mobility options, used EVs, incentive programs, and consumer protections.

2b. **Pursue options to increase access to used EVs**: Study opportunities to increase awareness of and access to used EVs. Options may include leveraging incentive programs where used EVs are eligible (e.g. Clean Vehicle Assistance Program, Community Housing Development Corporation (CHDC) Transportation Program, and Clean Cars for All), establishing an EV donation program to be deployed at affordable housing sites, or establishing a used EV loaner (i.e., extended test drive) program to increase awareness amongst community leaders and organizations. Such a program could be designed to serve local community leaders, such as ministers in the Berkeley Black Ecumenical Ministerial Alliance, who could gain firsthand experience with EVs and could help educate others on their advantages.[10] Consider opportunities to support home charging for low-

STRATEGY: ENSURE EQUITY IN ACCESS

income communities and communities of color, which may include finding funding sources for electrical panel upgrades for charging (an expense that is not currently covered by other existing programs).

3: Digital and Financial Access to Transit and Shared Mobility

The City will explore strategies to increase digital and financial access to transit and electric shared mobility. Based on a recent study in 10 U.S. cities, lower-income households are 19%–27% less likely to own smartphones than higher-income households, and African Americans and Hispanics are 4.5 more likely to lack bank accounts than whites.[11] Potential strategies include:

3a. **Increase the use of AC Transit's EasyPass program:** Work with affordable housing providers, major employers, and other community partners to raise awareness and use of the EasyPass program, a discounted pass purchasing system often used by employers, colleges, affordable housing, and other multifamily developments, to help underserved Berkeley residents and employees benefit from low-cost, increasingly electrified, bus transportation. Additionally, explore the potential for free, discounted, or means-tested transit passes, in coordination with MTC's efforts to establish means-based fare discount programs at Bay Area transit agencies.[12]

3b. **Pursue discounts and digital access strategies for electric shared mobility options:** Explore partnerships and strategies to enable access for people who lack bank accounts and digitally impoverished households, such as pay-as-you-go cards, cash payments, or other methods such as partnerships for storefront payments (similar to Lime's "PayNearMe" initiative) and opportunities for including as-required conditions of permits/contracts with electric shared mobility options.[13] Discounts may be available for carsharing, bikesharing, and scooter sharing memberships and fees.

STRATEGY: ENSURE EQUITY IN ACCESS

4: Accessible Electric Mobility

The City will support electric mobility options that are accessible to persons with disabilities, both for EV charging as well as electric shared mobility services, and that are geographically distributed to promote access. Key actions to implement this strategy include:

4a. **Ensure ADA-accessible EV charging in Berkeley:** Continue to implement ADA-accessible EV charging policies, both in City of Berkeley-owned projects and in permitting, following the guidance on accessible station design and requirements for the number of accessible of chargers per site, as set forth by the state.[14] Continue to gather input from CIL, World Institute on Disability (WID), and other stakeholders—as well as charging providers—to identify gaps in ADA-accessible EV charging and opportunities to provide additional charging for electric devices such as wheelchairs.

4b. **Require accessible shared mobility options:** Work with shared mobility providers, including micromobility providers, and regulators to ensure shared mobility services are ADA accessible. Specify accessibility requirements in permitting or contracting with providers. Partner with non-profits and the private sector to ensure that shared mobility options do not cause new challenges for people with disabilities.

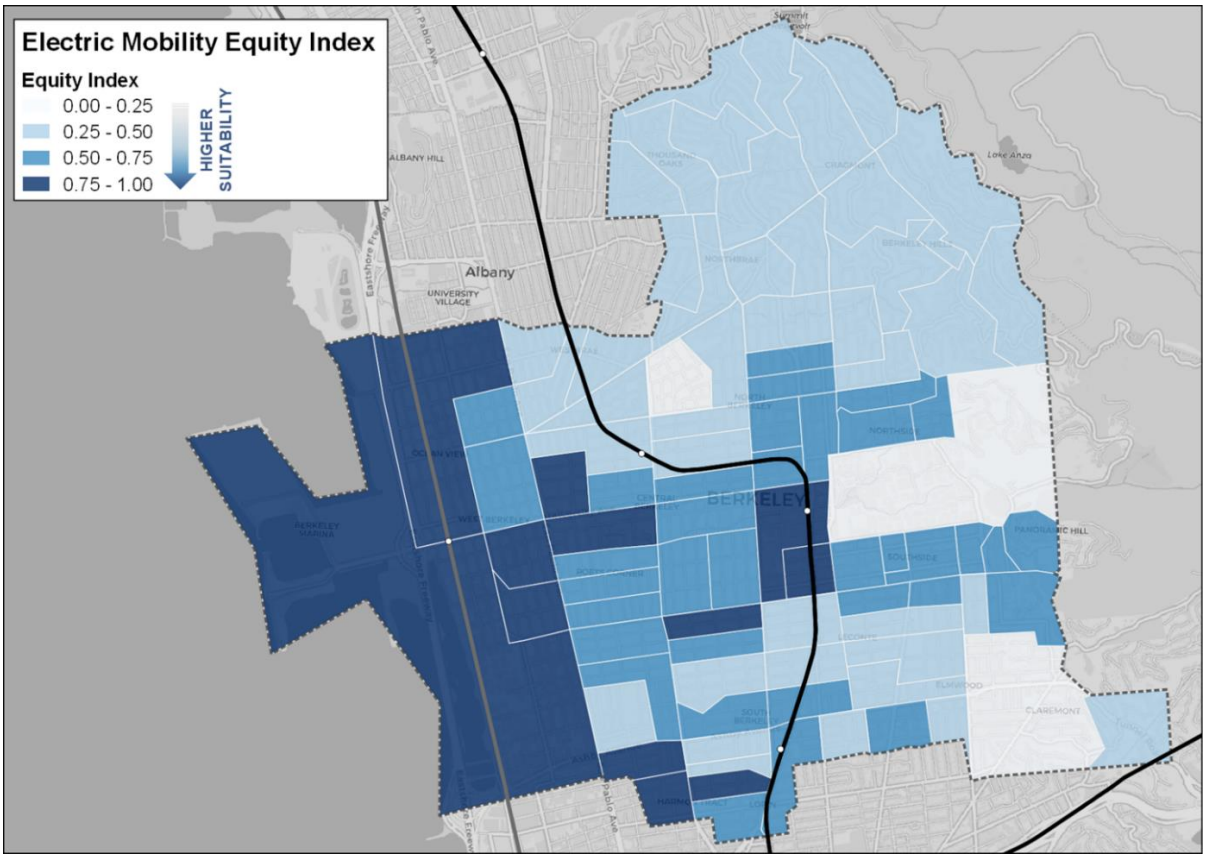
SPOTLIGHT: RIO MOBILITY

Based in Berkeley, Rio Mobility invents, develops, and markets products to overcome obstacles faced by wheelchair users. Their products span fully manual handcycle attachments for wheelchairs, power assist handcycle attachments, and fully electric devices that transform wheelchairs into powered three-wheeled scooters. Such products offered by Rio and its competitors can provide peace of mind for users that they can climb hills and navigate more challenging terrain. They also help overcome a major barrier for wheelchair users to use any micromobility service, the need to have one's wheelchair with them when completing a trip.

4c. **Provide geographic accessibility:** Prioritize equity when locating, contracting, or permitting the location of electric mobility, including micromobility. Ensure that vendors include locations in areas that are more heavily impacted by pollution, poverty, and other socioeconomic vulnerabilities, including physical disabilities. Figure 3, based on a methodology described later in the chapter entitled "Berkeley's Electric Mobility Landscape," suggests areas where access to electric mobility could be prioritized in coordination with community engagement and input.

STRATEGY: ENSURE EQUITY IN ACCESS

FIGURE 3: ELECTRIC MOBILITY EQUITY INDEX MAP



5: Equitable Workforce and Business Strategies

The City will pursue "high road" strategies to support entry of people with barriers to employment into the EV and EV charging industries. A "high road" strategy is "characterized by high-quality work, high-quality jobs and broad access to opportunity for a diversity of businesses and workers." Such high road work typically features good wages, benefits, and career pathways. Key actions to implement this strategy include:

5a. **Collaborate with EV workforce stakeholders to develop and promote training opportunities:** Regionally, identify and raise awareness of EV and EVSE workforce development resources, courses, and other opportunities with EV and EVSE training programs, community colleges, industry leaders, unions, and workforce development programs in Alameda County, Contra Costa County, and neighboring jurisdictions. Within Berkeley, collaborate with organizations like BOSS, GRID Alternatives, and Rising Sun Center for Opportunity to connect underserved community members

STRATEGY: ENSURE EQUITY IN ACCESS

and others with barriers to employment with workforce development opportunities, including addressing potential transportation or cost barriers to access courses and/or providing remote learning opportunities. New work opportunities could require specialized skills (such as becoming an electrician to tap into increased charging infrastructure installation opportunities), while others may be more broadly accessible (e.g., management of the network of assets for expanded shared bike and micromobility networks). Mechanics will need to be upskilled in more advanced diagnostics and vehicle electrical systems.[15]

5b. **Connect auto industry stakeholders in Berkeley with workforce opportunities:** Conduct outreach and interviews to understand the ecosystem and needs of the City's auto industry, including dealers, auto repair and maintenance shops, auto parts shops, and others, to identify their employment needs, particularly in relationship to electric mobility. Work to connect these stakeholders with training programs in the Bay Area, so they can provide input on training needs, refer their technicians for upskilling, find trained employees, and serve as an outreach arm to connect more potential workforce entrants to the trainings. Because widespread EV adoption is expected to reduce maintenance needs, efforts should also focus on providing a just transition for individuals whose jobs may be eliminated or reduced.

5c. **Center equity in City electric mobility projects and partnerships:** Where feasible, develop and use community workforce, community benefit, or project labor agreements for implementation of Roadmap strategies. In addition to standard City contracting requirements for living wage and equal benefits, utilize opportunities to require or incentivize partners and contractors to provide inclusive and equitable workforce and business opportunities. This could include assigning preference points to bidders, contractors, partners that demonstrate workforce equity and inclusion efforts, such as:

- Hiring of low-income workers and other people with barriers to employment;
- Maintaining a racially/ethnically diverse workforce;
- Partnerships with skills development programs targeted at low-income workers and people with barriers to employment, such as job training and pre-apprenticeship programs; especially those that provide support services to participants (e.g. child care, transportation assistance, financial stability).

Alternatively, the City could require that a significant percentage of spending on goods and services related to the implementation of the Roadmap go to these same types of organizations.

STRATEGY: ENSURE EQUITY IN ACCESS

6: Electric Bus Rapid Transit Routes

The City will support opportunities to explore and advance electric buses on all transit routes, including rapid transit routes, which can provide mobility and health benefits—particularly for low-income communities of color. Key opportunities to implement this strategy include:

6a. **Identify Opportunities through Transit-First Implementation:** Adopted through the City's General Plan, Berkeley has a Transit-First Policy with commitments to give priority to alternative transportation and transit over single-occupant vehicles on transit routes. Ongoing implementation of the Transit-First Policy should include community-based organizations, such as Transform, BOSS, and Greenlining Institute, as well as AC Transit, residents, and businesses, to develop a strategy for corridor studies that recognizes mobility and health benefits of electric bus rapid transit for low-income communities of color and prioritizes opportunities for new transit priority treatments that provide these benefits. Transit priority treatments could include features as such dedicated bus lanes, queue jump lanes, and signals allowing buses to bypass congested segments to improve the reliability and speed of bus transit.

6b. **Pursue the San Pablo Avenue Corridor Project:** Work with Alameda County Transportation Commission (Alameda CTC), the lead agency on the current San Pablo Avenue Corridor Project, to identify areas in Berkeley along San Pablo Avenue for potential transit priority treatments. Work also with AC Transit, to advocate for the use of electric buses along this Corridor.

Traveling in Berkeley

Jessica

Berkeley Resident and UC-Berkeley Student Cyclist

I bike everywhere, rain or shine. I like being outside and moving my body, not being stuck in traffic, and having control of my timing. I wish we had more bike boulevards and well maintained roads.

STRATEGY: ENSURE EQUITY IN ACCESS

STRATEGY KEY

TIMELINE OR STATUS	**Short** = 1-2 years **Medium** = 2-5 years **Long** = 5+ years **Ongoing** = existing strategies to be continued and/or strengthened.
LEAD	The division or department within City of Berkeley government who will lead implementation of that action.
POTENTIAL PARTNERS	Other key partners for implementation (see Table 2). These are organizations and departments whose missions and priorities are aligned with or impacted by the Electric Mobility Roadmap strategies. They also bring expertise that the City can leverage to enhance the implementation of the Roadmap. The City has had productive conversations with these partners and will continue to engage them, gather their feedback, and collaborate with them to the extent possible.
ONE-TIME COSTS	This includes costs that occur one time, such as capital infrastructure costs, or the cost to conduct planning studies and analysis. **$** = Low (up to $25,000) **$$** = Medium ($25,000 - $50,000) **$$$** = High (Over $50,000) These ranges reflect thresholds at which an RFP is required ($25,000) and City Council approval is required ($50,000).
ONGOING COSTS	This includes costs that are incurred over time, either for staff time, or other costs such as EV charging networking fees. **$** = Low (up to $25,000) **$$** = Medium ($25,000 - $50,000) **$$$** = High (Over $50,000).
RESOURCES TO LEVERAGE	City funding, incentive programs, or other resources that may be leveraged in implementation. The City will not only develop its own policies and programs to advance electric mobility, but will also closely monitor efforts and proactively communicate with other levels of government to utilize opportunities and to inform others of Berkeley's electric mobility barriers and needs. Currently active federal, state, regional, and utility programs to incent electric mobility are catalogued in the Appendix.

TABLE 4: EQUITY IN ACCESS – STRATEGY AND ACTION SUMMARY

Strategy	Action	Timeframe			Lead	Potential partners	One-time costs	Ongoing costs	Resources to leverage
1: Community Driven Equity Pilot Projects	1a: Develop partnerships with community-based organizations	Short			OESD	TransForm, BOSS, GRID Alternatives, Greenlining	-	$	
	1b: Conduct a mobility needs assessment	Short			OESD	TransForm, BOSS, GRID Alternatives, Greenlining	$$	-	
	1c: Identify and implement pilot project(s)		Medium		OESD	EBCE, PG&E, shared mobility providers, community partners	TBD	TBD	MTC, EBCE, California Air Resources Board
2: One Stop Shop for Electric Mobility	2a: Connect underserved communities to electric mobility programs	Short			OESD	GRID Alternatives	-	$	Clean Vehicle Rebate Project (CVRP), Clean Vehicle Assistance Program, Clean Cars for All
	2b: Pursue options to increase access to used EVs		Medium		OESD	GRID Alternatives	TBD	TBD	
3: Digital and Financial Access to Transit and Shared Mobility	3a: Increase the use of AC Transit's EasyPass program		Medium		Transportation	AC Transit, affordable housing providers, major employers, community partners.	$	$$	MTC Means-Based Fare Discount Program
	3b: Pursue discounts and digital access strategies for electric shared mobility options	Short			Transportation	Shared mobility providers, MTC	$$	$	

Strategy	Action	Timeframe	Lead	Potential partners	One-time costs	Ongoing costs	Resources to leverage
4: Accessible Electric Mobility	4a: Ensure ADA-accessible EV charging in Berkeley	Ongoing	Planning	OESD, CIL, WID, charging providers	$	$	
	4b: Support advocacy for accessible shared mobility options	Ongoing	OESD	CIL, WID, shared mobility providers	$	$	
	4c: Provide geographic accessibility	Ongoing	Transportation	OESD, Planning, HHCS, charging providers, shared mobility providers	$$$	TBD	
5: Equitable Workforce and Business Strategies	5a: Collaborate with EV workforce stakeholders to develop and promote training opportunities	Short	Economic Development	OESD, BOSS, GRID Alternatives, Rising Sun Center for Opportunity	$	$	Workforce development programs in Alameda County, Contra Costa County
	5b: Connect auto industry stakeholders in Berkeley with workforce opportunities	Medium	Economic Development	OESD	$	TBD	
	5c: Center equity in City electric mobility projects and partnerships	Medium	OESD	Finance, City Attorney	$	-	
6: Electric Bus Rapid Transit Routes	6a: Identify Opportunities through Transit-First Implementation	Medium	Transportation	AC Transit	$$	TBD	
	6b: Pursue the San Pablo Avenue Corridor Project	Short	Transportation	Alameda CTC, AC Transit	$	TBD	

STRATEGY: IMPROVE ALTERNATIVES TO DRIVING

Improve Alternatives to Driving: Shift trips to walking, biking, and shared electric modes

Key indicators and targets

- **Increase non-auto mode share:** Increase walking, cycling, and transit mode share through support of ongoing city efforts to implement Berkeley's Transit-First Policy, Bicycle Plan, Pedestrian Master Plan Update, Vision Zero Action Plan, and other key efforts.
- **Increase access to electric mobility options:** Expand electric mobility options available to City residents, including both the diversity and number of mobility options as well as their geographic availability across the City.

Strategy Summary

TABLE 5: IMPROVE ALTERNATIVES TO DRIVING STRATEGY SUMMARY

Strategy	Action
1: Safety and Access	1a. Support safe infrastructure for non-auto modes
	1b. Prioritize safety, equity, and electrification in shared mobility opportunities
	1c. Increase transportation demand management (TDM) program offerings and participation
2: Electrification of Shared Transportation Fleets	2a. Develop program for electrifying fleets for underserved communities
	2b. Support bus electrification
	2c. Pursue options to expand electrification of shared mobility
	2d. Plan for electrified autonomous vehicles (AVs)
3: Shared Electric Mobility Hubs	3a. Develop concept and plans for electric shared mobility hubs

STRATEGY: IMPROVE ALTERNATIVES TO DRIVING

Strategies

1: Safety and Access

The City recognizes that infrastructure which provides safety, connection, and convenience for pedestrians, bikers, and transit-riders encourages the use of alternatives to driving. In comparison to automobile ownership (gasoline or electric), walking, biking, and transit produces fewer GHG emissions and has less embodied carbon. In addition to supporting implementation of the Berkeley Bicycle Plan, Vision Zero Action Plan and other key efforts, the City will develop programs and plans to improve access and use of shared mobility options. These programs may include provisions for shared mobility rights of way, curb space management, and best practices for engaging and partnering with shared mobility providers. Key actions to implement this strategy include:

1a. **Support safe infrastructure for non-auto modes:** Support rapid implementation Berkeley's Transit-First Policy, Bicycle Plan, Pedestrian Master Plan Update, and Vision Zero Action Plan. Biking and walking trips make up 40% of trips in Berkley, but 80% of the severe injuries and fatalities due to collisions.[16] Implementation of Berkeley's existing efforts resulting in improved safety and connections encourages non-auto modes of travel, including e-bikes and other micromobility. It also directly impacts equity because people of color, people with low or no income, youth, seniors, and people with disabilities are disproportionately harmed by severe injury and fatal collisions. Ensure that work on safety and safety infrastructure is prioritized for low-income communities such as in the development of safe bicycle lanes and facilities.

1b. **Prioritize safety, equity, and electrification in shared mobility opportunities:** Utilize existing and future opportunities to regulate operations of shared mobility and charging providers. Working with stakeholders including residents, community-based organizations, and businesses, identify shared mobility offerings that solve transportation challenges for Berkeley residents, workers, and visitors, prioritizing safety and equity that will be executed through agreements with shared mobility providers. Identify opportunities, synergies, and gaps for encouraging expansion and electrification, as opposed to the use of gasoline or diesel, of shared mobility options. Study and implement ways to improve the safety of existing infrastructure for vulnerable road users, taking into account the speeds, visibility, predictability, and behavior of users of these modes of transportation, in alignment with the Vision Zero Action Plan, Bicycle Plan, and Pedestrian Master Plan Update.

1c. **Increase transportation demand management program (TDM) offerings and participation:** Identify opportunities to expand electric mobility offerings within TDM programs and regulations. Increase the utilization of employer-paid or provided transit, vanpool, and bicycle commuter benefits and resident transit benefits in new buildings with transportation demand management requirements,

STRATEGY: IMPROVE ALTERNATIVES TO DRIVING

particularly for electric transportation options, including e-bikes, through increased education and enforcement. For new buildings with TDM requirements, make sure that adequately-sized, secure parking that can incorporate the size and weight of cargo bikes and e-bikes is incorporated into the design and construction.

2: Electrification of Shared Transportation Fleets

The City will pursue strategies, in close partnership with EBCE and PG&E, to support electrification of vehicles used for shared transportation options in Berkeley, with an emphasis on prioritizing vehicles that provide service to underserved communities. Vehicle fleets include public transit, school buses, shuttles, non-profit service providers' vehicles, car sharing, Transportation Network Companies (TNCs), ferries, and others. Key actions to implement this strategy include:

Traveling in Berkeley

Brian

Berkeley Resident and Business Owner
Cyclist

People think that an auto free lifestyle for families isn't attainable, but my electric cargo bike takes me places faster than a car. E-bikes are expensive but in six months they pay for themselves and then you have money to get around for your other transportation expenses like car share. On my e-cargo bike, I interact with my kids who actually notice landmarks. My favorite part of my commute is engaging with my community.

STRATEGY: IMPROVE ALTERNATIVES TO DRIVING

2a. **Develop program for electrifying fleets for underserved communities**: Develop a program to offer technical assistance, connection to state programs, and possibly incentives to organizations to electrify fleets utilized for transportation services to underserved communities. Some organizations that provide services to underserved communities in Berkeley, such as non-profit affordable housing developers, senior services, and others, provide their own transportation services to their communities, and are interested in electrification.

2b. **Support bus electrification:** In collaboration with EBCE, work with AC Transit, BUSD, city-owned shuttles that serve senior centers, private shuttle operators (e.g. shuttles serving UC Berkeley, Berkeley Lab, and West Berkeley), and other bus fleets that serve the Berkeley community to connect fleets with incentives (e.g. Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), Low Carbon Fuel Standard (LCFS) credits, PG&E programs, and EBCE funding) and provide other technical assistance as needed. The State's Innovative Clean Transit regulation requires all public transit agencies to transition to a zero emission bus fleet; as of 2029, all new transit bus purchases must be fully electric with a goal of full transition by 2040.

2c. **Pursue options to expand electrification of shared mobility:** Develop options to enable, incentivize, shape, and expand electrification of shared mobility options, like the City's One-Way Car Share Ordinance, with bikesharing program, and the anticipated scooter sharing pilot. In addition to providing models for people with disabilities, potential bikeshare expansions could include cargo bikes (designed for transporting loads, including children) and long term (monthly) e-bike rental programs.[17] Explore options for partnerships or assistance to identify site hosts for charging (not through financial incentives) to support electrification of taxis and TNCs, and car sharing, as these fleets benefit from having access to dedicated chargers. For TNC vehicles, this will include complementing implementation efforts for the California Clean Miles Standard (SB1014) and Incentive Program, which will require these companies to develop plans to reduce their greenhouse gas emissions on a per-passenger-mile basis beginning in 2022. While most TNC regulation occurs at the state level in California, cities have options to complement or enhance state policies (e.g., SB1014), such as through regulating its curb space or utilizing other traffic engineering strategies, or implementing registration or reporting requirements as San Francisco has done.[18] The City can also monitor for any unintended impacts of TNC electrification, such as barriers that may affect the ability of the community of people with disabilities to access services.

2d. **Plan for electrified autonomous vehicles (AVs):** Monitor market development of AVs, and develop options to guide AV implementation, and incentivize or require AVs to be electric, once introduced.

STRATEGY: IMPROVE ALTERNATIVES TO DRIVING

3: Shared Electric Mobility Hubs

The City will work with partners and potential electric shared mobility site hosts to develop infrastructure needed to support electric shared mobility options. Key actions to implement this strategy include:

3a. **Develop concept and plans for electric shared mobility hubs:** Develop concept and plans for hubs at key locations, such as the University of California—Berkeley, libraries, senior centers, BART and Amtrak stations, and other key destinations, with the intention of enabling last-mile connections to transit and shifting short trips to walking, biking, and electric shared mobility. Consider opportunities for providing multiple services at each hub, such as DCFC for TNC drivers, Level 2 charging for carsharing, charging for micromobility, Wi-Fi access and electric wheelchair charging. Engage with TransForm, MTC, and other cities working on similar concepts to learn from their experiences in implementing shared mobility hubs. Work with shared mobility providers to assess charging infrastructure needs and options, and with potential site hosts (such as BART) to identify opportunities, plans, and funding strategies for infrastructure development.

Traveling in Berkeley

Janet and Steve

Berkeley Residents
Recently gave up car for e-bikes

We have been using e-bikes and it's great because they open the urban landscape for exploration, and can carry up to 100 lbs. of cargo which is great for errands. Unfortunately, most of the destinations are on big avenues that have virtually have zero accommodation for biking. In an ideal world, I would bike on the big streets and safely park there.

TABLE 6: IMPROVE ALTERNATIVES TO DRIVING – STRATEGY AND ACTION SUMMARY

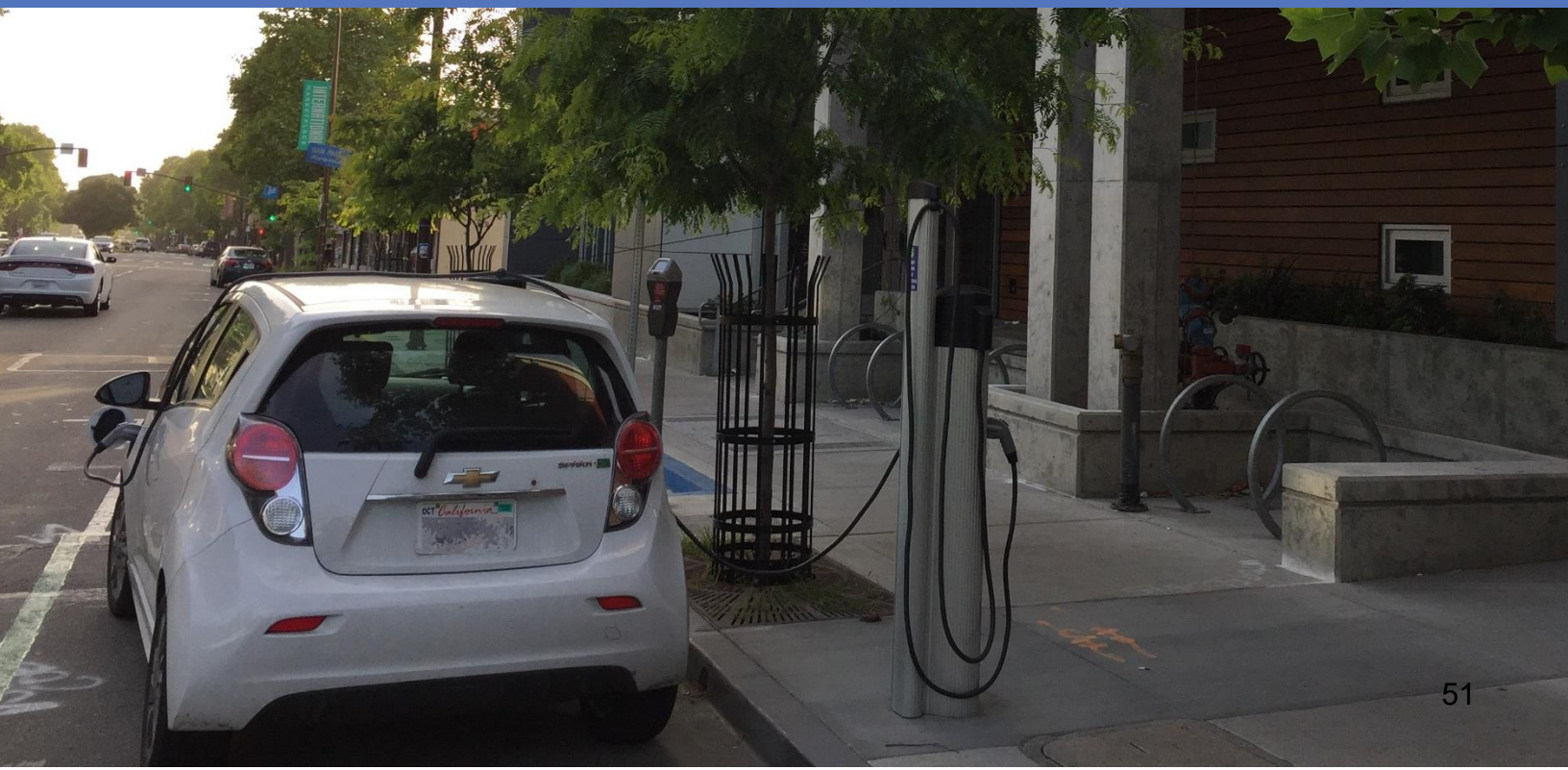
Strategy	Action	Time-Frame	Lead	Potential partners	One-time costs	Ongoing costs	Resources to leverage
1: Safety and Access	1a: Support safe infrastructure for non-auto modes	Ongoing	Transportation	Public Works, community partners	$$$	TBD	MTC, BAAQMD
	1b: Prioritize safety, equity, and electrification in shared mobility opportunities	Short	Transportation	OESD, Shared mobility providers, community partners	$$	-	
	1c: Increase transportation demand management program offerings and participation	Ongoing	Transportation	OESD, major employers, TDM program managers, housing developers	$	$	Tax Relief Action to Cut Commuter Carbon (TRACC) program
2: Electrification of Shared Transportation Fleets	2a: Develop program for electrifying fleets for underserved communities	Medium	Public Works	OESD, PG&E, EBCE, community partners	$$	$	Low Carbon Fuel Standard (LCFS), Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP), CVRP, EBCE, PG&E
	2b: Support bus electrification	Ongoing	Public Works	OESD, PG&E, EBCE, shuttle operators, AC Transit, BUSD	$	$	LCFS, HVIP, EBCE, PG&E
	2c: Pursue options to expand electrification of shared mobility	Medium	Transportation	OESD, shared mobility providers, EV charging providers, PG&E, EBCE	$$	$	SB1014
	2d: Plan for electrified AVs	Long	Transportation	OESD, EV charging provider partners, EBCE, PG&E	$$	-	
3: Shared Electric Mobility Hubs	3a: Develop concept and plans for electric shared mobility hubs	Medium	Public Works	OESD, shared mobility providers, EV charging provider partners, BART, PG&E, EBCE	$$$	$$	EBCE, PG&E, Electrify America

STRATEGY: ACHIEVE ZERO NET CARBON

Achieve Zero Net Carbon: Eliminate emissions from private vehicles

Key indicators and targets

- **Electric vehicle adoption:** To reach carbon neutrality by 2045, it is estimated the city will need to increase adoption of light-duty EVs registered in Berkeley to 25% by 2025, 55% by 2030, and 100% by 2045.
- **Expand public and workplace EV charging availability:** To support the city's target number of EVs on the road by 2025, Berkeley will need at least 420 public Level 2 chargers, 100 public DCFC chargers, and 610 workplace chargers.
- **Increase electric mobility awareness and education.** The City will gauge the community's awareness and perspective of electric mobility options in Berkeley, through surveys and/or participation in educational events.



STRATEGY: ACHIEVE ZERO NET CARBON

Strategy Summary

TABLE 7: ACHIEVE ZERO NET CARBON STRATEGY SUMMARY

Strategy	Action
1: EV Charging in New and Existing Buildings	1a. Strengthen the building code
	1b. Utilize point-of-sale opportunities to incentivize electric panel upgrades and/or EV charger installations
	1c. Develop strategy to reach rental properties and other properties that haven't sold recently
2: EV Charging Permitting	2a. Improve process and communications for EV charging permitting
3: Public EV Charging on City Property	3a. Determine plan for public EV charging network expansion
	3b. Assess City parking spaces with potential for public EV charging
	3c. Develop approach and plan for curbside charging
	3d. Develop partnerships with EV charging providers to expand City EVSE network
4: Private EV Charging Site Hosts	4a. Develop incentive program for EV charging for underserved communities
	4b. Prioritize multifamily charging
	4c. Increase City capacity to conduct outreach and provide technical assistance to private site hosts
5: Electric Mobility Education and Outreach	5a. Maintain updated City electric mobility webpages and materials
	5b. Continue and expand participation in group electric mobility purchase campaigns
	5c. Raise awareness at partner events
	5d. Continue partnering with electric mobility and climate advocates
	5e. Develop culturally relevant awareness campaigns
	5f. Engage auto dealers to raise EV awareness
6: Smart, Resilient, Clean, and Affordable EV Charging	6a. Increase the share of EV charging powered by 100% renewable energy
	6b. Support smart charging
	6c. Support well-designed rates
	6d. Develop strategies to increase EV charging resilience
	6e. Continue to monitor emerging technologies and business models for EV charging
7: Electrification of Private Fleets	7a. Develop a plan to support and incentivize private fleet electrification
8 Disincentivize Fossil Fuel Vehicles without Creating New Inequities	8a. Conduct study on options to disincentivize fossil fuel vehicles

STRATEGY: ACHIEVE ZERO NET CARBON

Strategies

1: EV Charging in New and Existing Buildings

The City will pursue a variety of strategies to increase EV charging in new construction. Although more challenging, the City will also pursue options to encourage or require EV charging in existing buildings, leveraging opportunities to reach buildings undergoing major renovations, changing ownership, or going through rental property inspections. Key actions to implement this strategy include:

1a. **Strengthen the building code:** Update the building code with higher EV charging requirements in new construction to increase EV charging readiness requirements (the provision of electric capacity and conduit to support inexpensive future EV charging station installation) and potentially requiring EV charging station installations in some cases. These changes will require ongoing education and enforcement to assure compliance and can be analyzed to inform future updates. Explore opportunities to require EV readiness in the case of major remodels or renovations, beyond what is required by the building code.

Traveling in Berkeley

Jaron

Berkeley Resident
Pedestrian and Plug-In Hybrid Driver

In Berkeley I mostly get around on my feet. But when I go to work or shop I like to drive because my job is far away from where I live, as are many of the cheaper or bigger stores. When I was driving a gas car I filled up my tank every week; but, I only fill up my Prius Prime once every month.

STRATEGY: ACHIEVE ZERO NET CARBON

1b. **Utilize point-of-sale opportunities to incentivize electric panel upgrades and/or EV charger installations:** Evaluate whether energy assessments completed at the time of property sales or for benchmarking required by Berkeley's Building Energy Saving Ordinance (BESO) could include measures such as electrical panel upgrades to support EV charging. Explore opportunities to expand the transfer tax rebate currently offered to purchasers of residential property for seismic retrofits to other property improvements that would support climate action, such as electrification of buildings and installation of charging infrastructure.

1c. **Develop strategy to reach rental properties and other properties that have not sold recently:** Study and implement options to increase EV readiness and charging access for rental properties as well as properties that have not sold recently. Sample actions may include working with the Berkeley Rent Stabilization Board or Berkeley's Rental Housing Safety Program to reach out to and educate landlords and property managers about EV charging and California's "right to charge" laws, funding electrical panel capacity assessments for multifamily buildings, or providing incentives to increase access to home EV charging for residents of these units.

2: EV Charging Permitting

The City will strive to continually streamline its EV charging permitting process and to exceed the requirements of AB1236, which requires local adoption of an ordinance to streamline and expedite EV charging permitting. The City has already been recognized by Governor's Office of Business and Economic Development[19] for its steps to streamline permitting, but stakeholders suggest even more could be done to lessen the time, cost, and complexity of permitting for EV charging. Key actions to implement this strategy include:

2a. **Improve process and communications for EV charging permitting:** Continue to engage partners such as EBCE, PG&E, EV charging providers, and electricians to solicit feedback and identify actions for permitting process improvement. Also consider best practices identified by peer cities and government agencies.[20] Develop and continually update guidance documents for contractors and site hosts for permitting EV charging installations in different contexts, including home charging, private shared charging such as workplace and multifamily charging, and public charging.

3: Public EV Charging on City Property

As Berkeley's Residential Curbside EV Charging Pilot comes to an end in 2020, the City will study options to alter or expand this program beyond individual charging stations at homes that lack off-street parking to additional opportunities. These could include publicly available infrastructure in curbside zones and city-owned off-street lots, possibly through partnerships with third-party EV charging providers to further leverage City and grant funds. Key actions to implement this strategy include:

STRATEGY: ACHIEVE ZERO NET CARBON

3a. **Determine plan for public EV charging network expansion:** Assess peer cities' approaches to city-led public EV charging infrastructure development, EBCE, PG&E, and Electrify America's plans, and EV charging providers' plans for EVSE development in Berkeley. Consider the pros, cons, and track records of different partnership models with third-party charging providers, such as those piloted by Seattle, Sacramento, and Montreal, as well as options for charging management. Utilize index maps shown in Figures 15-17 to guide Berkeley's approach for meeting Level 2 and DCFC public charging needs.

3b. **Assess City parking spaces with potential for public EV charging:** Identify specific city parking spaces with the greatest feasibility and priority level for EV charging development, including opportunities for shared City fleet and public charging.

3c. **Develop approach and plan for curbside charging:** Develop a plan and potential zones for curbside charging, informed by peer-city research and City coordination of curb space use, with priority placed on encouraging alternatives to driving, such as transit and micromobility. This plan will incorporate lessons learned from the City's Residential Curbside EV Charging Pilot as well as plans to evolve or conclude the pilot. Between City parking spaces and curbside zones, plans will seek to enable convenient neighborhood access to charging, particularly in neighborhoods with high rates of multifamily and rental housing (see Figure 17 in the chapter "Berkeley's Electric Mobility Landscape").[21]

STRATEGY: ACHIEVE ZERO NET CARBON

3d. **Develop partnerships with EV charging providers to expand City EVSE network:** Consider releasing an RFI and/or RFP with the goal of developing partnerships with third-party charging providers to leverage their investment and to develop Level 2 and or DC fast-charging public stations in city-owned parking spaces and/or curbside zones, leveraging grant funding and investment from third-party charging providers where possible.[22]

4: Private EV Charging Site Hosts

The City will develop programs to conduct outreach, offer technical assistance, and possibly provide incentives to potential private EV charging site hosts with the intention of increasing EV charging accessibility at shopping and other destinations, community centers and other institutions, in multifamily housing, and at workplaces. Key actions to implement this strategy include:

4a. **Develop incentive program for EV charging for underserved communities:** Potentially in partnership with EBCE, develop an incentive program to support charging at community-based organizations, service providers, and affordable and/or rent-controlled housing in alignment with the Roadmap's equity goals. This program has the potential to be funded through LCFS credit funds and would aim to complement other EV charging incentive programs to increase EV charging access in underserved communities.[23]

4b. **Prioritize multifamily charging:** In addition to providing support for charging at affordable housing sites, the City will also identify needs and strategies to support charging at multifamily buildings and convenient alternatives for multifamily residents. The City will review best practices and key barriers, engage property owners and managers, assess opportunities within existing policies and programs, and review potential incentive programs and partnerships to leverage. The City will work with partners such as EBCE, PG&E, and Electrify America, to seek opportunities for DCFC installations, ideally as part of shared mobility hubs, near concentrations of multifamily buildings (see Figure 17 in the chapter "Berkeley's Electric Mobility Landscape") to improve access to charging and shared mobility services for the 45% of Berkeley residents who live in multifamily housing.

4c. **Increase City capacity to conduct outreach and to provide technical assistance to private site hosts:** Use the maps created for this Roadmap (Figures 15-17) to identify parking lots in high potential areas as well as to conduct focus groups with current EV charging site hosts, potential site hosts, and charging providers to identify their interests, challenges faced, and suggestions for approaches to recruit new EV charging site hosts. Increase staff capacity to conduct outreach and support workplaces, multifamily housing providers, community organizations, and other private site hosts in accessing incentive programs (including from PG&E, EBCE, and collaborating with Electrify America), going through permitting, and other steps to EV charging station development.[24] This effort may

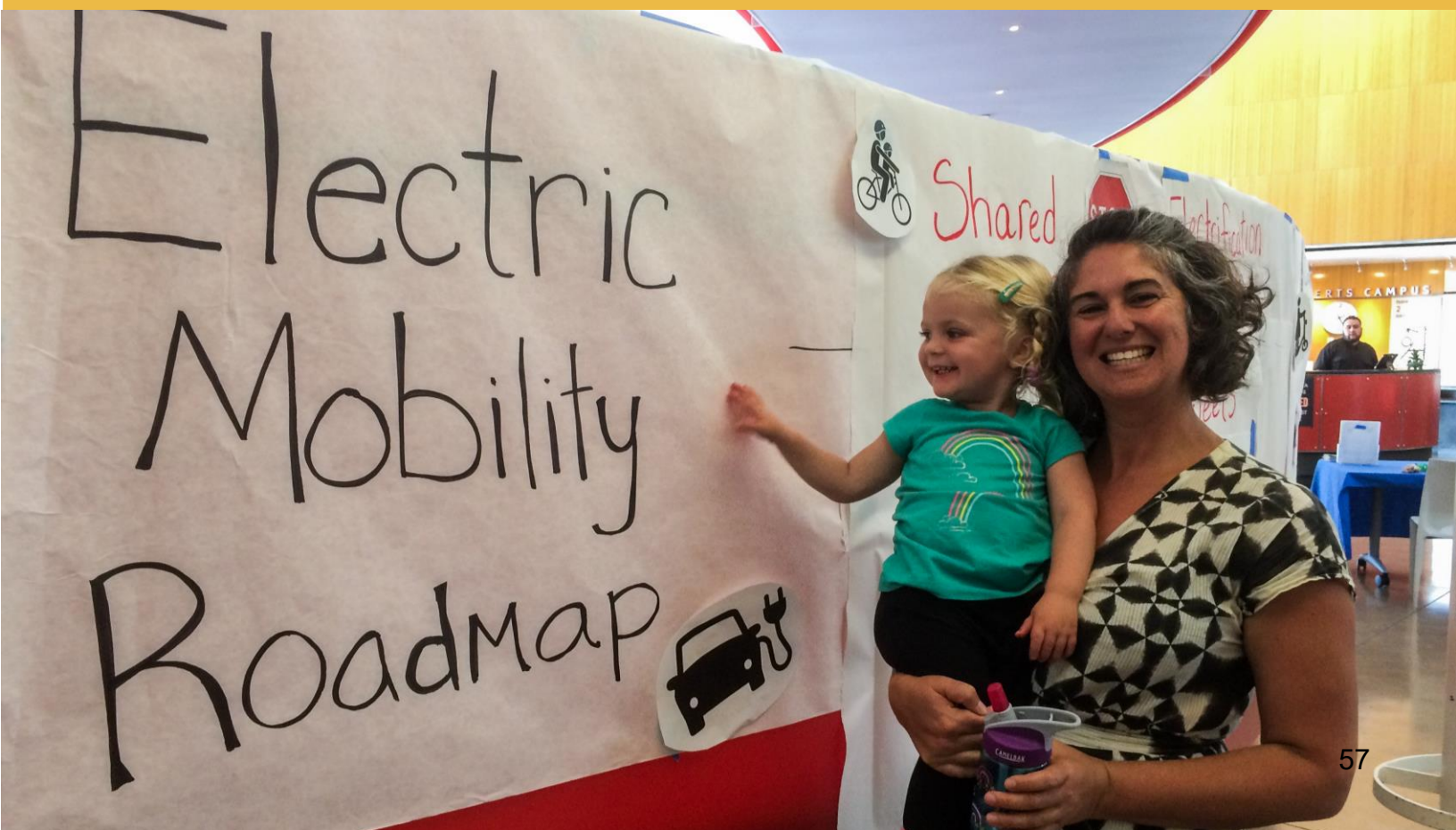
STRATEGY: ACHIEVE ZERO NET CARBON

include development of materials such as permitting guidance documents, sample lease agreements, and other suggestions to be identified through conversations with potential site hosts.

5: Electric Mobility Education and Outreach

The City will continue its existing electric mobility education and outreach activities, and seek to expand its reach and impact through partnerships with key stakeholders, with a goal of increasing awareness of electric mobility options and incentives. In addition to this outreach strategy, a more in-depth approach to reaching and partnering with underserved communities is described in the strategies under *Equity in Access*. The City has hosted annual Ride Electric events since 2017, which have featured private EVs, EV carsharing, and private and shared e-bikes. The City also maintains a website and educational materials about EVs and began offering EV 101 workshops in 2019. Key actions to implement this strategy include:

5a. **Maintain updated City electric mobility webpages and materials:** Include common messaging about electric mobility opportunities, rebates, and updates on Roadmap implementation progress. Identify opportunities to disseminate outreach materials through City communication channels, such as administration of the residential parking permit program, and partners' distribution channels such as 511, UC Berkeley Parking and Transportation outreach, and commuter benefits programs.



STRATEGY: ACHIEVE ZERO NET CARBON

5b. **Continue and expand participation in group electric mobility purchase campaigns:** Continue participating with organizations like Bay Area SunShares and Drive Clean Bay Area to run EV or EV charging group purchase campaigns. Explore opportunities to expand to e-bikes, including electric cargo bicycles, and other forms of electric micromobility, particularly since existing programs don't currently support these purchases.

5c. **Raise awareness at partner events:** Raise awareness about electric mobility opportunities through participation in community partner events and opportunities through other City outreach efforts, such as implementation of the Age-Friendly Berkeley Action Plan.

5d. **Continue partnering with mobility and climate advocates:** Continue and expand work with community organizations like the Ecology Center, Walk Bike Berkeley, 350 Bay Area, and EV driver advocates to help raise public awareness about micromobility, electric mobility, and EV opportunities. Additional EV outreach activities could focus on raising awareness about EV incentive opportunities, electricity rates for EV charging, and peer-to-peer charging apps where residents can find and share home chargers.

Traveling in Berkeley

Abeni

City of Berkeley Employee
Plug-in Hybrid Driver

I drive to work and it's a long commute but I am thankful for the HOV sticker I use to beat traffic even though I'm a solo commuter. I envision a future where we have stations for EV cars like we have gas stations.

STRATEGY: ACHIEVE ZERO NET CARBON

5e. **Develop culturally relevant awareness campaigns:** Develop partnerships with organizations to create culturally appropriate awareness campaigns (in a language other than English, where appropriate), utilizing trusted mediums and messengers (such as Spanish language radio and community newspapers). Explore opportunities to provide grants to community organizations working with underserved communities to conduct electric mobility outreach.

5f. **Engage auto dealers to raise EV awareness:** Partner with organizations such as Plug in America and the Sierra Club, which have campaigns to engage auto dealerships and can play an important role in educating consumers about EVs. Options to engage and encourage dealers to promote and educate their customers about EVs may include dealer recognition programs, support for training salespeople on topics such as charging and available incentives, sharing materials developed for City, state, and EBCE programs, and partnering on ride and drive events.[25] Encourage local car dealerships to participate directly in the Clean Cars for All program to increase access for low-income communities and communities of color to EVs. This engagement effort could also be expanded to include engagement with car rental companies in Berkeley, as they can help expose drivers to EVs if they have EVs available and promote them to customers.

6: Smart, Resilient, Clean, and Affordable EV Charging

The City will work with PG&E, EBCE, and other key stakeholders to ensure EV charging that is smart, resilient, and powered by clean energy. Key action steps to implement this strategy include:

6a. **Increase the share of EV charging powered by 100% renewable energy:** Work with EBCE to promote its 100% renewable electricity options for EV charging, explore the possibility of opting up as a default for all accounts in the city, monitor opt-out rates, and develop contingency plans to ensure clean energy available in Berkeley remains available in the long term for EV charging. Continue to maintain a streamlined process for property owners (particularly workplaces and locations where EVs will use daytime charging) to install solar to contribute to the availability of local clean electricity matched with EV loads.

6b. **Support smart charging:** Smart charging refers to programs that manage EV charging to promote grid stability or efficient resource use, which will become increasingly important as the City seeks to electrify its buildings and transportation systems. These programs can include demand response, managed charging, vehicle-to-building, or vehicle-to-grid applications. Pursue partnerships with EBCE to incentivize smart chargers and to enable customers to opt into grid-controlled charging programs for their home chargers. Pursue smart charging options for medium and heavy duty fleets, including those operated by the City and by private sector operators. Work to connect property owners and fleets with resources to implement smart charging solutions.

STRATEGY: ACHIEVE ZERO NET CARBON

6c. **Support well-designed rates:** Engage with EBCE and PG&E on design of rates and pricing that encourage, or at a minimum do not penalize or discourage, electrification of transportation and buildings.

6d. **Develop strategies to increase EV charging resilience:** As more of the City's transportation systems run on electricity, it will be essential to develop strategies to enable back-up power in emergencies for critical transport services. Strategies may include generators, solar + storage integration, modular solar + storage charging pods, and creation of islandable (meaning can operate connected to the grid or independently) microgrids for charging.

6e. **Continue to monitor emerging technologies and business models for EV charging: Given** the dynamism of the electric mobility space, continue to monitor emerging technologies and business models for EVs and EV charging to be able to identify opportunities for the City. These include solutions such as mobile charging, sponsor-funded charging, valet solutions at workplaces, high-powered DC fast chargers, and other innovations.

7: Electrification of Private Fleets

Although the transport of goods is not the primary focus of this Roadmap, eliminating emissions from these vehicles will also be necessary to achieve zero net carbon. The City, in partnership with EBCE and PG&E, will explore ways to encourage electrification of private fleets used for goods movement and other commercial activities, such as delivery vehicles, heavy-duty fleets, and other institutional and commercial fleets, by providing technical assistance, raising awareness about incentive opportunities, and other regulatory levers. This strategy includes the following action:

7a. **Develop a plan to support and incentivize private-fleet electrification:** Identify and promote available incentives and programs for private-fleet operators, analyze delivery and freight routes and delivery zones in Berkeley, reach out to potential partners, such as the regional Clean Cities Coalition, and develop a list of private-fleet operators to reach out to. Explore options to support and incentivize private fleet operators to commit to an electrification goal, such as creating a designation for companies that make an electrification commitment, supporting programs through EBCE and/or PG&E, and establishing priority loading zones for electric delivery vehicles. Additionally, explore potential to include electric vehicle requirements or preference in City contract language for projects involving private fleets, such as road repair.

8: Disincentivize Fossil Fuel Vehicles without Creating New Inequities

The adoption of electric mobility options will need to accelerate rapidly to reach zero net carbon by 2045 (see "EV Adoption Rates in Berkeley" for more detail on EV adoption scenario modeling). The City

STRATEGY: ACHIEVE ZERO NET CARBON

may need to consider disincentives, in addition to the many state, utility, and local incentives available and proposed in this Roadmap. However, if not designed appropriately, disincentives may unevenly burden certain groups and members of the community. This strategy includes the following action step:

8a. **Conduct study on options to disincentivize fossil fuel vehicles:** To ensure the City reaches its climate goals, conduct a study of options to increasingly disincentivize fossil fuel vehicles relative to EVs over time, through levers such as parking policy and pricing, congestion charges, and excluding fossil fuel vehicles from zones within the city. This could include disincentivizing driving generally, which would also help alleviate congestion and save electricity. Even if implemented at a time when EVs have reached cost parity for the majority of the population, these policies could have unintended adverse impacts on low-income constituents who cannot afford to replace their household vehicle(s), and people whose disabilities are not accommodated by available EV models (e.g., people with heavy wheelchairs that may not fit in EV models). Therefore, the City may consider these disincentives for the long term, when EVs become more and more affordable and more accessible to people with disabilities. Exceptions should be provided in any case when these disincentives would cause undue hardship. The City could consider a long-term action as strong as banning the use of Berkeley streets for internal combustion vehicles or banning sales of gasoline and diesel fuels and/or vehicles by 2045 to send a long-term signal, though the equity and economic impacts, effectiveness, legality, and implementation would need to be studied.

TABLE 8: ACHIEVE ZERO NET CARBON – STRATEGY AND ACTION SUMMARY

Strategy	Action	Time-Frame	Lead	Potential partners	One-time costs	Ongoing costs	Resources to leverage
1: EV Charging in New and Existing Buildings	1a: Strengthen the building code	Short / Medium	Building & Safety	OESD	$	$	
	1b: Utilize point-of-sale opportunities to incentivize electric panel upgrades and/or EV charger installations	Short	OESD	Finance Department	$$	$$	Building Energy Savings Ordinance (BESO), Seismic Retrofit Refund Program
	1c: Develop strategy to reach rental properties and other properties that haven't sold recently	Medium	OESD	Rent board, property owners, community partners	$$	$$	Rental Housing Safety Program
2: EV Charging Permitting	2a: Improve process and communications for EV charging permitting	Ongoing	Building & Safety	OESD	-	$	
3: Public EV Charging on City Property	3a: Determine plan for public EV charging network expansion	Medium	Public Works	OESD, EV charging provider partners, EBCE, PG&E	$$	TBD	
	3b: Assess City parking spaces with potential for public EV charging	Short	Public Works	OESD, Transportation	$	-	
	3c: Develop approach and plan for curbside charging	Medium	Public Works	OESD, Transportation	$$	-	
	3d: Develop partnerships with EV charging providers to expand City EVSE network	Ongoing	Public Works	OESD, EV charging provider partners	TBD	TBD	EBCE, PG&E
4: Private EV Charging Site Hosts	4a: Develop incentive program for EV charging for underserved communities	Short	OESD	Community partners, EBCE	$$	$$$	Low Carbon Fuel Standard (LCFS), EBCE, PG&E, Electrify America
	4b: Prioritize multifamily charging	Short	OESD	Multifamily and affordable housing providers, EBCE, PG&E	$$	$$	EBCE, PG&E, Electrify America

	4c: Increase City capacity to conduct outreach and provide technical assistance to private site hosts	Ongoing			OESD	Land Use Planning, EBCE, PG&E	$$	$$	EBCE, PG&E, Electrify America
5: Electric Mobility Education and Outreach	5a: Maintain updated City electric mobility webpages and materials	Ongoing			OESD		-	$	
	5b: Continue and expand participation in group electric mobility purchase campaigns				OESD	Bay Area SunShares, Drive Clean Bay Area	-	$	
	5c: Raise awareness at partner events	Ongoing			OESD	Community partners	-	$	
	5d: Continue partnering with electric mobility and climate advocates	Ongoing			OESD	Environmental advocates	-	$	
	5e: Develop culturally relevant awareness campaigns	Short			OESD	Community partners	$	$$	
	5f: Engage auto dealers to raise EV awareness		Medium		OESD	Environmental advocates	-	$	
6: Smart, Resilient, Clean, and Affordable EV Charging	6a: Increase the share of EV charging powered by 100% renewable energy	Ongoing			OESD	EBCE	-	$$	
	6b: Support smart charging	Ongoing			Public Works	OESD, EBCE	$$	$	
	6c: Support well-designed rates	Ongoing			OESD	PG&E, EBCE	-	$	
	6d: Develop strategies to increase EV charging resilience		Medium		Public Works	OESD, Fire, Police	$$	TBD	
	6e: Continue to monitor emerging technologies and business models for EV charging	Ongoing			OESD	Public Works	$	$	
7: Electrification of Private Fleets	7a: Develop a plan to support and incentivize private fleet electrification			Long	Public Works	OESD, Private fleet operators, EBCE, PG&E	$$	TBD	
8: Disincentivize Fossil Fuel Vehicles without Creating New Inequities	8a: Conduct study on options to disincentivize fossil fuel vehicles			Long	Transportation	OESD	$$	TBD	

STRATEGY: DEMONSTRATE CITY LEADERSHIP

Demonstrate City Leadership: Lead by example and guide the electric mobility transition

Key indicators and targets

- **All-electric City fleet by 2030:** The City will convert all City vehicles to electric where technically feasible by 2030.

Strategy Summary

TABLE 9: DEMONSTRATE CITY LEADERSHIP STRATEGY SUMMARY

Strategy	Action
1: City Fleet Electrification Plan	1a. Develop transition plan for the city fleet by 2020
	1b. Increase emerging mobility management capacity
2: Electric Mobility Charging Management	2a. Develop city-owned EV charging rules and regulations
	2b. Monitor and adjust EV charging rates over time
	2c. Develop city-owned EV charging operating plans
3: Electric Mobility Planning with Streetscape & Construction Projects	3a. Develop electric mobility integration process with relevant departments
4: Local Innovation to Support Electric Mobility	4a. Utilize business and innovation networks
	4b. Stimulate locally-developed technology pilots
5: Electric Mobility Roadmap Implementation Working Group	5a. Convene working group
	5b. Regularly report on progress
6: Funding for Roadmap Implementation	6a. Annually develop funding plan with working group

STRATEGY: DEMONSTRATE CITY LEADERSHIP

Strategies

1: Develop and Implement City Fleet Electrification Plan

The City will develop a plan to convert all City vehicles to electric, where technically feasible, and phase out their fossil fuel use by 2030. In 2019, the Berkeley City Council issued a directive for Public Works and the City Manager to collaborate on an action plan by June 2020 to "to aggressively accelerate the implementation of the electrification of the City's municipal fleet and phase out fossil fuel use in municipal vehicles by 2030 with consideration of an earlier transition for light-duty passenger vehicles." Key actions to implement this strategy include:

1a. **Develop transition plan for the city fleet by 2020:** Through EBCE, develop an electrification plan that requires all new city-owned vehicles to be electric (except when suitable EV models are not available), considering available technologies for different applications, vehicle ages, and duty cycles. Think broadly about electrification options for City fleet, such as substituting e-bikes or low-speed EVs (e.g., golf carts) instead of sedans, and potential downsizing or outsourcing vehicles. Include a charging infrastructure plan that fits the needs of the City fleet vehicles, and considers possibilities to make charging available either to other fleets or the public for charging during certain times. Include a funding and financing plan that may include alternative procurement and financing strategies and that best leverages the $600,000 in city funds allocated in FY 2020.

1b. **Increase emerging mobility management capacity:** Develop electric and emerging mobility expertise and capacity within the City through new training and/or staffing. Development and management of smart, resilient charging should be integrated into City operations.

STRATEGY: DEMONSTRATE CITY LEADERSHIP

2: Develop Electric Mobility Charging Management

The City will develop a comprehensive set of policies and standards, and assess any changes needed to parking ordinances and operations to effectively integrate management and enforcement of EV charging into the City's existing parking operations. Key actions to implement this strategy include:

2a. **Develop city-owned EV charging rules and regulations:** Develop or refine regulations for EV signage and wayfinding, parking, and enforcement, including parking rates, time limits, fees and penalties, and "parking while charging" restrictions that support turnover and charger availability. Identify EV charging rules that fit most easily within existing parking enforcement regulations and operations. Pursue use of queuing apps and other charging management strategies in partnership with charging providers.

2b. **Monitor and adjust EV charging rates over time:** Evaluate EV charging rates for city-owned chargers in relation to actual costs for the service, the comparable cost of gasoline, the price needed to ensure turnover and charger availability, and State requirements. Rates are approved by City Council and could be used to incentivize charging at specific times of day or locations.

2c. **Develop city-owned EV charging operating plans:** Identify staffing responsible for EV charging installations, operations, and maintenance on City property and other aspects, including managing LCFS credits, potentially in partnership with EBCE. Pursue opportunities to fully utilize charging infrastructure, such as allowing a combination of fleet and public use when appropriate.

3: Integrate Electric Mobility Planning with Streetscape and Construction Projects

The City will work with the Public Works and Planning departments to identify processes to incorporate EV charging and electric shared mobility planning into streetscape projects, re-paving, and other major public works projects to lessen costs and disruptions of EVSE development. Key actions to implement this strategy include:

3a. **Develop electric mobility integration process with relevant departments:** Meet with relevant departments to identify their timelines and processes for streetscape and public works projects, and to identify when and how to consider inclusion of EV charging in that process.

STRATEGY: DEMONSTRATE CITY LEADERSHIP

4: Local Innovation to Support Electric Mobility

The City will utilize the innovation of Berkeley's businesses and institutions, including the University of California – Berkeley and the Lawrence Berkeley National Laboratory, to support electric mobility within the community. The City will provide information, opportunities, and connections to enable this strategy through these key actions:

4a. **Utilize business and innovation networks:** Share information about opportunities for local companies to support citywide electric mobility through a variety of business and innovation networks, including the Berkeley Business District Network, Berkeley Startup Cluster, Berkeley Chamber of Commerce, Alameda County Green Business Network, and the East Bay Economic Development Alliance.

4b. **Stimulate locally-developed technology pilots:** As opportunities arise, introduce Berkeley-based electric mobility business leaders to city staff to explore opportunities for locally developed technology pilots, demonstration projects, or longer-term contracts that enable citywide electric mobility.

5: Electric Mobility Roadmap Implementation Working Group

The City will establish a working group to manage implementation of the Electric Mobility Roadmap that includes both internal and external stakeholders, and that will strive to include a diversity of perspectives and representation from underserved communities and strive to use equity best practices in community engagement. The working group's mandate will be to track and evaluate implementation progress, coordinate amongst department leads and external stakeholders, adjust the Roadmap strategies over time as conditions change or challenges arise, and will be guided by the equity goal in the Roadmap. Key actions to implement this strategy include:

5a. **Convene working group:** Within six months of the approval of the Roadmap, the City will convene a working group, seeking representation from internal and external stakeholders, with an emphasis on representatives from underserved communities.

5b. **Regularly report on progress:** The working group will share progress publicly on an annual basis to track progress towards Roadmap targets and indicators. As additional data become available (for example, on the use of anticipated shared electric mobility fleets or participation in future incentive programs), track and share that data as well.

STRATEGY: DEMONSTRATE CITY LEADERSHIP

6: Identify funding sources for Roadmap Implementation

The City has already committed significant resources to electric mobility, with $600,000 approved in the FY 2020 budget for City fleet and EV charging infrastructure. The City will continue to develop plans to fund Roadmap implementation on an ongoing basis, through leveraging external programs, City funds, and innovative approaches, such as financing options, leveraging LCFS credits generated from city-owned EV chargers, taxes on University of California-Berkeley parking, or other new and unencumbered revenue sources. Ultimately, achieving the ambitious goals in the plan will require investment by private and other public entities beyond the City's limited budget. In identifying funds for Roadmap implementation, the City will consider the beneficiaries of city funds and seek an equitable distribution of those funds.

6a. **Annually develop funding plan with working group:** OESD will work annually with the Roadmap Implementation Working Group to identify funding needs for top priority initiatives for that year as well as potential funding sources, such as a budget request to City Council, LCFS funds, grant funds, or in-kind sources from private sector partners.

Traveling in Berkeley

South Berkeley Senior Center

Daughter of Morie

Berkeley Senior Center Member

My father Morie comes to the Senior Center for sing along with a pianist. I drive him around in our car as we have zero public transit in our neighborhood. As a daughter with an elderly father, I envision a future with small electric buses and taxis having a general route that branches out for elderly people that can't walk far.

TABLE 10: DEMONSTRATE CITY LEADERSHIP—STRATEGY AND ACTION SUMMARY

Strategy	Action	Time-Frame	Lead	Potential partners	One-time costs	Ongoing costs	Resources to leverage
1: City Fleet Electrification Plan	1a: Develop transition plan for the city fleet by 2020	Short	Public Works	OESD, EBCE, PG&E	$$	TBD	HVIP, EBCE, PG&E
	1b: Increase emerging mobility management capacity	Medium	Public Works	OESD	$	$$$	
2: Electric Mobility Charging Management	2a: Develop city-owned EV charging rules and regulations	Short	Transportation	OESD, Public Works, EV charging providers	$$	$	
	2b: Monitor and adjust EV charging rates over time	Ongoing	Transportation	OESD, Public Works, EV charging providers	-	$	
	2c: Develop city-owned EV charging operating plans	Short	Transportation	OESD, Public Works, EV charging providers	$$	$	
3: Electric Mobility Planning with Streetscape & Construction Projects	3a: Develop electric mobility integration process with relevant departments	Short	Public Works	OESD	$$	$	
4: Local Innovation to Support Electric Mobility	4a: Utilize business and innovation networks	Ongoing	Economic Development		-	$	
	4b. Stimulate locally-developed technology pilots	Ongoing	Economic Development	Public Works, OESD, Transportation	-	$	
5: Electric Mobility Roadmap Implementation Working Group	5a: Convene working group	Short	OESD	Transportation, Public Works	$	$	
	5b: Regularly report on progress	Ongoing	OESD		-	$	
6: Funding for Roadmap Implementation	6a: Annually develop funding plan with working group	Ongoing	OESD	Transportation, Public Works	$	TBD	

ELECTRIC MOBILITY LANDSCAPE

Berkeley's Electric Mobility Landscape

This section highlights key learnings from the Needs Assessment, conducted to understand Berkeley's current mobility context and to inform development of the Roadmap. The Needs Assessment included an online survey, stakeholder interviews and workshops, geospatial analysis, and EV adoption and EV charging projections. It provides quantitative and qualitative background for the Roadmap goals.

The online survey was distributed on Berkeley's OpenGov platform in January 2019, and over 670 individuals, who either live, work, study, or spend time in Berkeley, responded to the survey. It is important to note in interpreting the results that a higher percentage of survey respondents were EV owners, homeowners, higher-income, and/or white as compared to the Berkeley population as a whole, and therefore did not provide an accurate representation of the population.

FIGURE 4: STAKEHOLDER INTERVIEWS

- Center for Independent Living
- World Institute on Disability
- Berkeley Black Ecumenical Ministerial Alliance (BBEMA)
- GRID Alternatives
- Satellite Affordable Housing Developers
- Berkeley Housing Authority
- Resources for Community Development
- BRIDGE Housing
- Building Opportunities for Self-Sufficiency (BOSS)
- TransForm
- Bay Area Organization of Black Owned Businesses (BAOBOB)

Interviews were conducted in spring 2019 with representatives of underserved communities and other key stakeholders. The organizations interviewed are shown in Figure 4. Given the distribution of the survey responses, the findings of the stakeholder interviews provide a broader perspective of mobility trends and EV perspectives in the Berkeley community, particularly among underserved communities.

On March 15, 2019, a key stakeholder workshop—including representatives from the community organizations in Figure 4 as well as the Ecology Center, PG&E, EBCE, EVgo, Tesla, ChargePoint, GM Maven, Envoy, UC-Berkeley, Lawrence Berkeley National Lab, Alameda CTC, Berkeley Energy and Transportation Commissioners, and City staff—was held. This workshop shared highlights from the best practices research, interviews, surveys, geospatial analysis, and electric mobility adoption scenarios, and provided an opportunity to share ideas that shaped the goals, strategies, and actions of the Roadmap.

The Roadmap was further refined through feedback from Berkeley's Community Environmental Advisory Commission, Transportation Commission, and Energy Commission to Roadmap presentations in July 2019. In addition, the public was invited to learn about the Roadmap at a Berkeley Climate Action Coalition "Ride Electric All the Way Home" workshop on August 22, 2019, and the "Ride Electric at the Farmer's Market" event on September 14, 2019; feedback from these events further refined the content

ELECTRIC MOBILITY LANDSCAPE

and priorities of the Roadmap. For example, electric bus and shuttles were frequently cited as a priority in Berkeley, prompting the creation of the *Electric Bus Rapid Transit Routes* strategy as well as refinements to other strategies on transit and shared mobility.

A complete Draft Roadmap was shared on the City's webpage in October 2019. E-mail notifications were sent to all stakeholders and shared on general distribution lists. Public comments on the Draft Roadmap were accepted between October 15 and November 15, 2019. Nearly 30 individuals and organizations submitted comments, including the Berkeley Energy Commission, EBCE, RCD Housing, Transform, World Institute on Disabilities, Center for Sustainable Living, Rising Sun Center for Opportunity, Walk Bike Berkeley, 350 Bay Area, ChargePoint, Tesla, several City of Berkeley staff, and other individuals. These comments were used to refine the Roadmap, as presented to Berkeley City Council in April 2020.

General Mobility Context in Berkeley

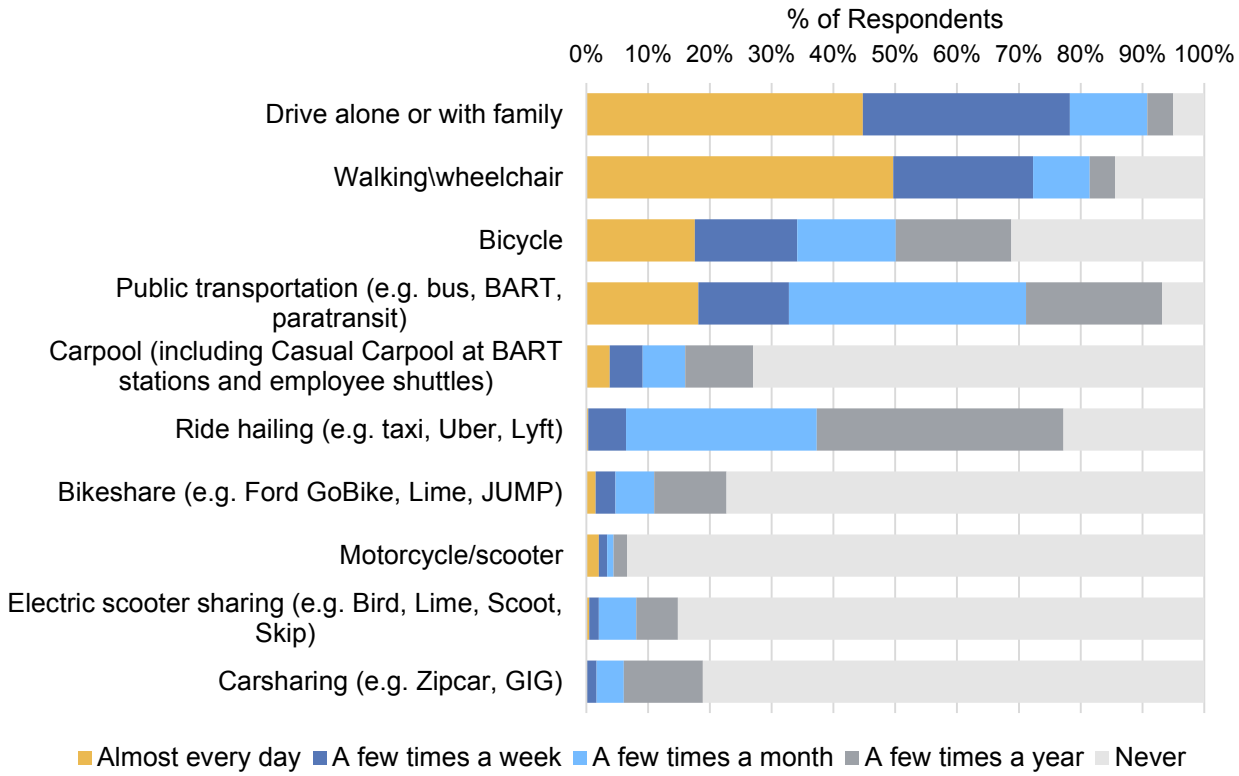
This section provides background on how the Berkeley community travels today and what factors influence transportation decisions to help ground the focus of the Roadmap's strategies.

How the Berkeley Community Travels

Survey respondents report relying most heavily on driving and walking to get around day to day, though many also bicycle or use transit every day or a few times a week (Figure 5). Many respondents also use public transit and TNCs for occasional trips.

FIGURE 5: SURVEY: MOST FREQUENTLY USED TRANSPORTATION MODES

How frequently do you use the following transportation options to get to work, shopping, recreational activities, or other locations? (N=639)



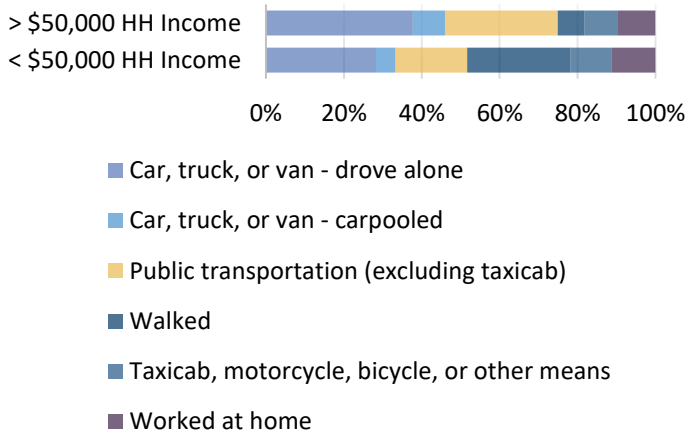
Survey respondents reported the top factors in choosing how to travel were convenience, travel time, safety, cost, and comfort. Some also mentioned environmental motivations, age or other physical limitations that affect their choices, health and exercise benefits, work requirements, and reliability and accessibility of transportation options (particularly for public transit and parking) as key factors.

Interviewees reported that underserved communities in Berkeley rely heavily on public transit, walking/wheelchair, and driving their own vehicles. Some utilize bicycling, carpooling, taxis, TNCs, paratransit, and shuttles (such as those serving Kaiser). Others use specialized services for seniors or persons with disabilities, such as Easy Does It Transportation Services.

ELECTRIC MOBILITY LANDSCAPE

Interviewees stressed that cost is a key factor driving underserved communities' transportation choices, and that many struggle to afford bus or BART fares. Others stressed physical limitations to drive or access certain modes due to age or disability. While many lower-income community members do rely on transit, interviewees stressed that job locations and requirements do necessitate many lower-income community members to drive (both those that are residents and those that commute into Berkeley for a job). In Berkeley, Census commuting data suggest lower-income households commute by car somewhat less than higher-income households, but that at least 30% commute by car or carpooling (see Figure 6). Interviewees also highlighted that displacement pressure has distanced many community members from services and institutions, which, for example, requires some members of historically black churches to drive to church on Sundays from outside of Berkeley.

FIGURE 6: MEANS OF TRANSPORTATION TO WORK BY HOUSEHOLD INCOME FOR BERKELEY RESIDENTS, American Community Survey 5-year 2017



ELECTRIC MOBILITY LANDSCAPE

Vehicle Ownership and Use

Citywide, Census data indicate 79% of Berkeley households have at least one vehicle. For renter-occupied housing, that figure is 67%, while 96% of owner-occupied households have at least one car. While it is estimated that around 3.7% of registered vehicles in Berkeley were EVs as of late 2018, 42% of survey respondents reported owning an EV.[26] This both underscores that the survey sample is not representative of the Berkeley community as a whole, and highlights a strong base of community members who are enthusiastic about owning an EV.

Interviewees reported that vehicle ownership is generally lower in their communities than in the broader population, particularly those that primarily serve seniors or very low-income communities. Interviewees noted that those who must drive spend a disproportionate share of their income on fuel and maintenance, highlighting the potential savings benefits from driving an EV. Interviewees also highlighted the impacts of predatory car loans on their communities, as well as an increasing number of community members driving for TNCs where income and ability to repay those loans can be highly uncertain. Some interviewees' organizations also own vehicles to provide transportation service to their communities, and expressed interest in electrifying those vehicles. For example, one affordable housing organization has six buses to take seniors on trips to the supermarket, recreational activities, and medical appointments.

Awareness and Perspectives on EVs

More than half of survey respondents reported knowing someone who has an EV or has direct experience with EVs, while only 10% said they have no experience with EVs. In considering future vehicle purchases, respondents report that charging at home, purchase price, and range will be the biggest factors influencing their decisions to purchase an EV.

On the other hand, interviewees felt their communities are unfamiliar with EV technology and are not aware of incentive opportunities. Additionally, interviewees expressed concerns that without action, their communities seem unlikely to experience the benefits of EVs, and would likely face difficulties accessing charging at home.

Berkeley's Electric Mobility Context

Existing EV Initiatives in Berkeley

The Roadmap builds on a strong base of local, regional, state, and federal support for EV adoption. To date, the City of Berkeley has taken a number of steps forward to support EV charging and raise awareness about EVs, as is detailed in Figure 7.

ELECTRIC MOBILITY LANDSCAPE

FIGURE 7: KEY CITY OF BERKELEY EV INITIATIVES

- **City-owned public EV charging stations:** Berkeley has installed 73 public Level 2 EV charging ports, including over 50 in the newly-opened Center Street Garage
- **Streamlined permitting for home EV charging:** Berkeley has streamlined permitting for home EV charging, enabling online or in-person applications, and requires only an electrical permit (no plans, manufacturer's specification sheets, zoning review or plan review are required for permitting).
- **EV charging readiness:** Beginning in 2020, Berkeley requires Level 2 EV charging readiness at new single family homes, duplexes and townhomes (at least one space per dwelling unit) and at 20% of parking spaces at new multifamily buildings (and raceway at the remaining 80% of parking spaces). New hotels, motels, and nonresidential buildings must have Level 2 charging installed at 10% of parking spaces (and raceway at 40% of the spaces). These specifications are required through a local amendment to the California Green Building Code. Previously, from 2013-2019, the City had utilized conditions of land use permits to specify that 10% of spaces (or at least one space) in new residential construction must be pre-wired for Level 2 EV charging, and 3% of spaces in non-residential new construction that had at least 20 parking spaces.
- **Residential curbside EV charging pilot**: Berkeley is running a pilot that enables EV drivers without access to an off-street parking space a way to charge at home.
- **Berkeley EV website and materials:** The City maintains an in-depth website with information about driving an EV, including “Drive Electric on a Budget” brochure, info on charging, and more.
- **Annual ride electric events:** The City has partnered with local organizations to host an annual event that enables residents to learn about electric mobility including EVs, EV car sharing, and e-bikes.
- **EV 101 Workshops:** The City has partnered with 350 Bay Area and other communities to hold regular informational workshops on EVs, charging, incentives, financing, and other resources.

In addition to Berkeley’s efforts, there are many programs, policies, and regulations to support EV adoption in place at the state, regional, and utility scales. Berkeley’s distribution utility PG&E, community choice aggregator EBCE, the Bay Area Air Quality Management District, and various state-level agencies each have a variety of programs and incentives available for EVs for personal use and fleet use, as well as for EV charging. While these policies and programs can change frequently, it is essential for the City to continue to monitor and leverage these programs for its own fleet as well as to connect residents, businesses, and other stakeholders with them. Please see the Appendix for a table detailing current key state, regional, and utility EV programs and policies to leverage in the implementation of this Roadmap.

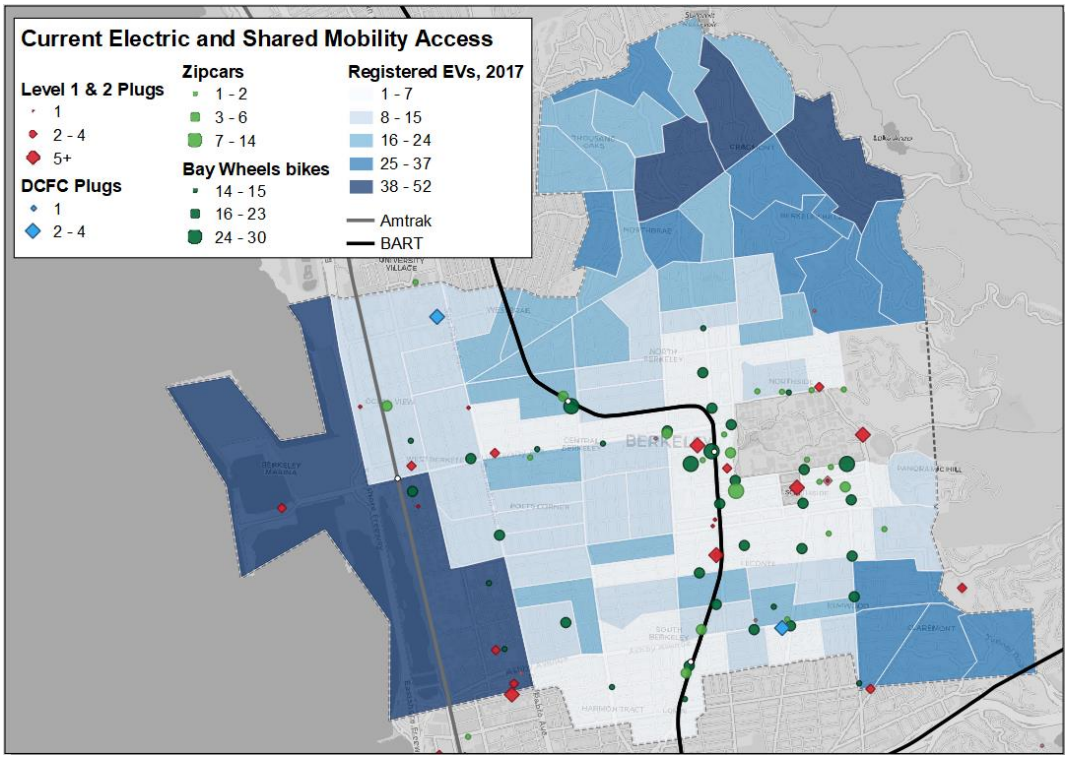
ELECTRIC MOBILITY LANDSCAPE

Current Electric and Shared Mobility Options in Berkeley

In addition to personal EV ownership and access to EV charging, a variety of shared mobility options (some of which are electric) are available in Berkeley. These include Zipcar carsharing (no EVs yet), GIG carshare (hybrid vehicles), Bay Wheels (formerly Ford GoBike, includes conventional bikesharing bikes as well as pedal assist e-bikes), and soon will include an anticipated shared electric scooter pilot. At UC Berkeley, the university received a grant that has enabled them to provide free bikesharing memberships to qualifying students (those with Pell and DREAM grants).[27] In addition, key institutions in Berkeley have also been taking action to advance electric mobility. Berkeley United School District (BUSD) has received funds to electrify eight of its school buses, and AC Transit has been operating 13 hydrogen fuel cell buses for several years and is adding five battery-electric buses to its fleet in 2019.

The map in Figure 8 highlights the distribution of current electric and shared mobility options in Berkeley, including (1) the Census block groups where personal EVs were registered in 2017 (shaded in blue); (2) publicly available Level 1 and 2 EV charging ports (in red and blue diamonds); and (3) shared mobility options in Berkeley (in light and dark green circles).

FIGURE 8: CURRENT ELECTRIC AND SHARED MOBILITY ACCESS IN BERKELEY



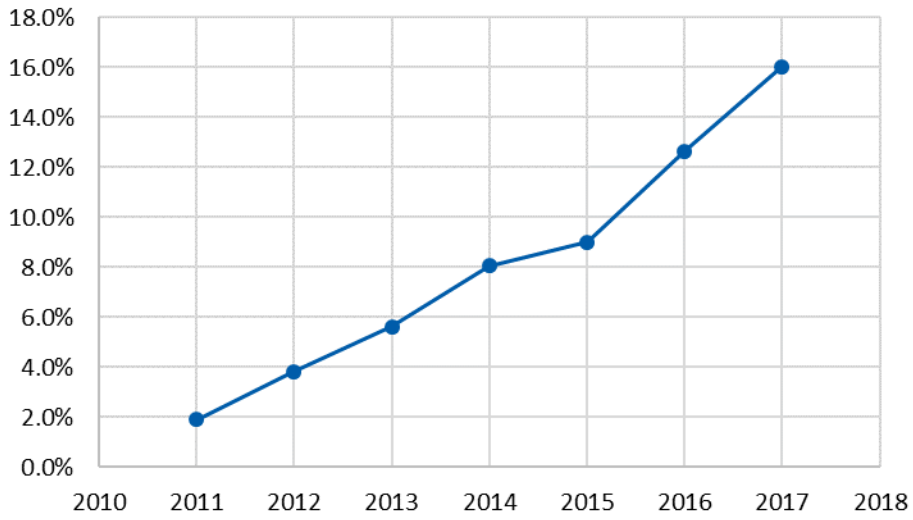
Note: The high share of EV registrations in West Berkeley is driven in part by registrations at a car dealership.

EV Adoption Rates in Berkeley

EV Adoption Trends

In 2017, Berkeley had the seventh highest electric vehicle sales share of cities in California.[28] The percent of new vehicles registered in Berkeley that are EVs (including BEVs and PHEVs) has risen from 1.9% in 2011 to 16% in 2017 (see Figure 9). Out of total registered vehicles on the road in Berkeley, EVs were still a fairly small number as of 2017 according to DMV data: 3.3% of Berkeley's 64,400 personal vehicles; 3.1% of the city's 6,400 commercial vehicles; and 1.5% of government vehicles. As of October 1, 2018, the percentage of EVs grew to 3.7% of registered personal vehicles in Berkeley.[29]

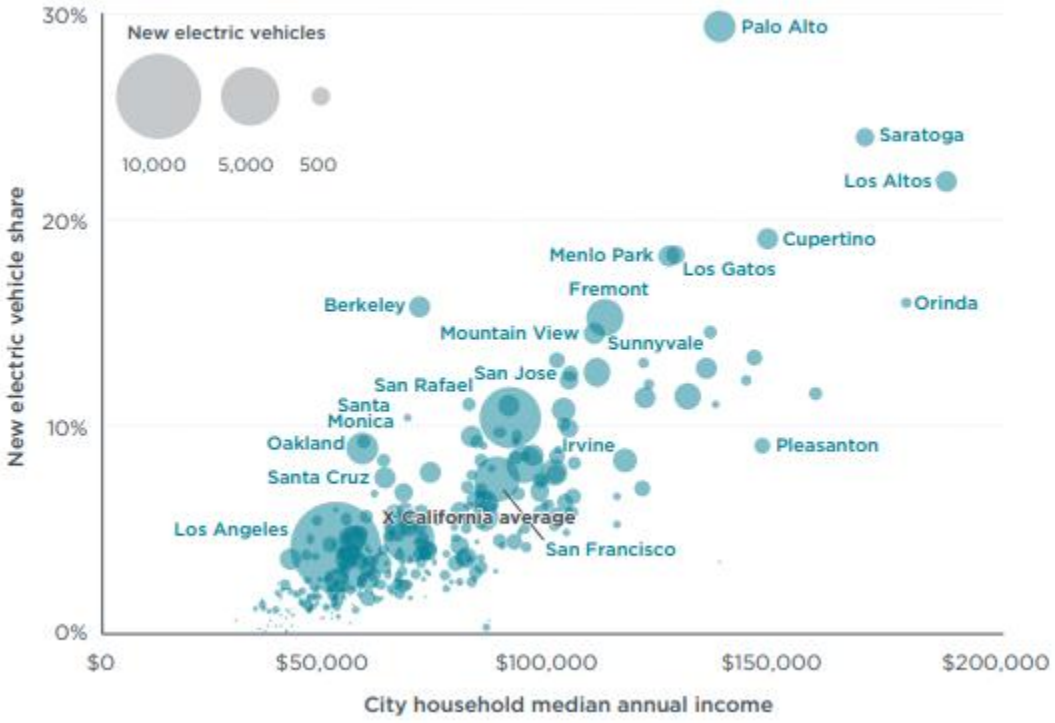
FIGURE 9: EV % OF NEW PERSONAL VEHICLE REGISTRATIONS BY YEAR (DMV)



In 2016, California began offering increased EV rebates for low- and moderate-income applicants. Since that time, Berkeley residents have received 26 of these increased rebates (out of over 600 total rebates received).[30] In addition to ranking among the top 10 cities in California in new EV sales, Berkeley also stands apart from peer cities with similar median household incomes, having nearly double the new EV sales share as many of these cities (see Figure 10).

ELECTRIC MOBILITY LANDSCAPE

FIGURE 10: EV SHARE OF NEW VEHICLE SALES BY CITY MEDIAN HOUSEHOLD INCOME (ICCT 2018)[31]



ELECTRIC MOBILITY LANDSCAPE

EV Adoption Scenarios

To understand what EV adoption rates would be necessary to achieve Berkeley's climate change goals, the Roadmap team developed three scenarios, described in Figure 11. The first scenario illustrates what may happen if EV adoption trends in recent years were to continue, while Scenarios 2 and 3 envision a rapid increase in adoption to reach Berkeley's climate goals.

FIGURE 11: BERKELEY EV ADOPTION SCENARIOS

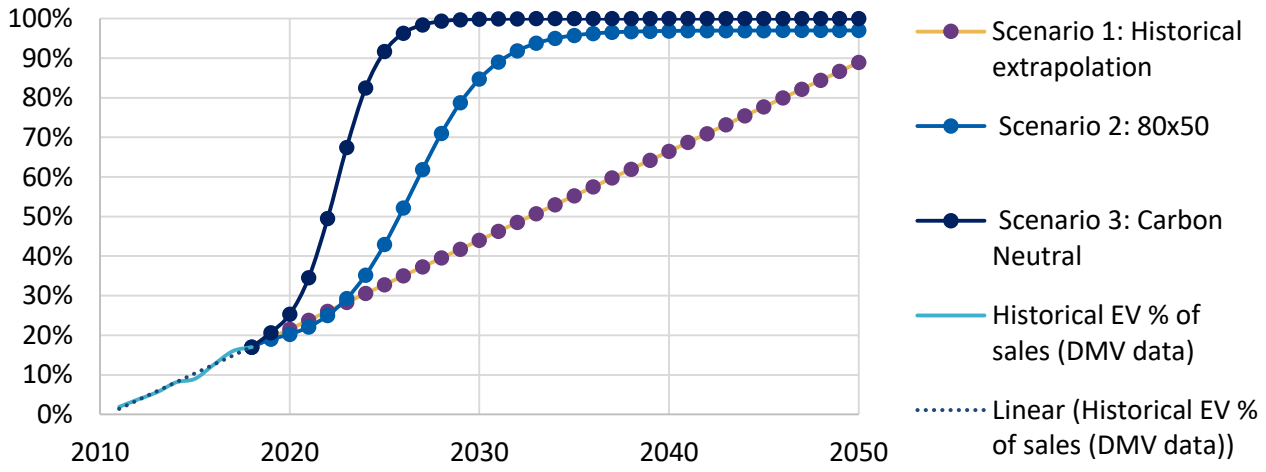
Scenario 1: Historical Extrapolation
Linearly extends historical EV sales trends

Scenario 2: 80x50
Demonstrates needed growth rates to reach 80% reduction in greenhouse gases by 2050

Scenario 3: Zero Net Carbon
Demonstrates needed growth rates to reach carbon neutrality by 2045

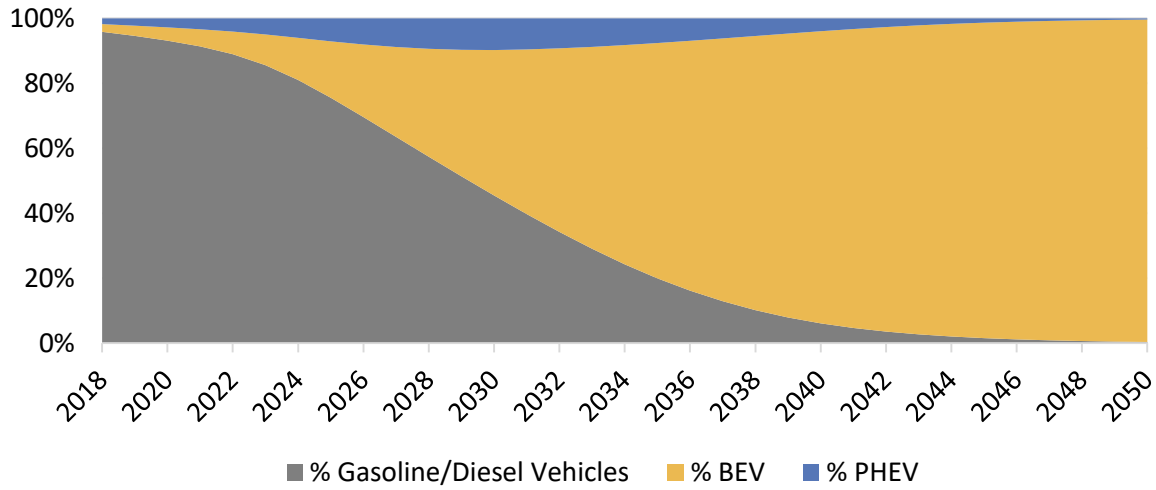
Figure 12 depicts the percent of EVs of total light duty vehicle sales in Berkeley by different scenario between 2019 and 2050. From 2011 through 2018, it includes historical EV sales data in Berkeley. Because vehicles are driven for many years, it is estimated that EV adoption would need to increase rapidly to reach midcentury climate targets. To reach zero net carbon by 2045, EV sales shares would need to reach about 90% by 2025 and nearly 100% by 2030 (up from 16% in 2017).

FIGURE 12: PERCENT EV OF TOTAL LIGHT DUTY SALES IN BERKELEY BY SCENARIO (PHEV & BEV)



When considering typical vehicle scrappage rates, this translates to EVs being approximately 25% of the community-wide in-use fleet by 2025, 55% by 2030, and 100% by 2045 in order to reach the city's zero net climate target (Figure 13). By 2025, this would mean Berkeley having approximately 12,800 EVs on the road, if current vehicle ownership patterns hold constant.

FIGURE 13: PERCENT EV OF TOTAL IN-USE LIGHT DUTY VEHICLES IN BERKELEY, SCENARIO 3

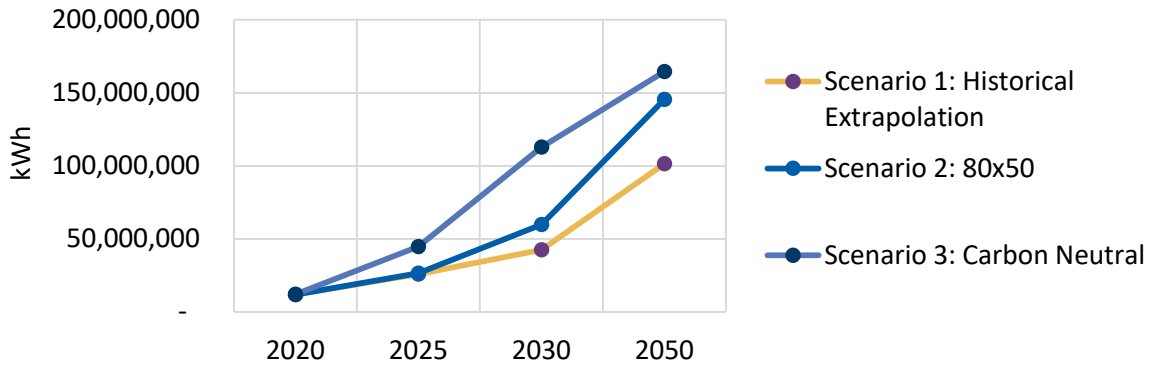


ELECTRIC MOBILITY LANDSCAPE

Electric Mobility Impacts on the Grid

While dramatically increasing adoption of electric mobility, Berkeley must also transition buildings away from fossil fuels for heating and water heating. In summer 2019, Berkeley became the first city in the nation to ban natural gas connections in newly constructed buildings, a major step in driving the city's initiatives on building electrification. Together, the efforts to dramatically scale adoption of building and transportation electrification will add substantial new electricity load to the grid, which could have major impacts on the region's electricity networks if not properly planned and managed. By 2030, light-duty EV electricity use could increase Berkeley's total electricity use by 24% by 2030 in the carbon-neutral scenario, and 35% by 2050 (see Figure 14), starting from a baseline of 470 million kWh (470,000 MWh) in 2016.

FIGURE 14: ELECTRICITY USE FROM LIGHT-DUTY VEHICLES IN BERKELEY BY SCENARIO



The grid impact of this increased electricity use for EVs will depend on when and where vehicles charge. While most early EV adopters have primarily charged at home, overnight, as more people adopt EVs who cannot charge at home, there may be more daytime charging at work or public charging sites. Significant benefits for all can be obtained from aligning EV charging timing with the availability of projected clean power sources and times of lowest utilization of the grid, including reduced emissions and lower electricity rates for all. Daytime charging could leverage surplus renewable energy during the daytime if managed well through strategies like time-of-use rates and smart charging. Early evaluations by Idaho National Labs' EV Project found EV drivers are very responsive to time-of-use rates and will shift much of their charging to off-peak hours.[32]

Berkeley's EV Charging Ecosystem

Existing Public EV Charging Network

As of February 2019, there were 105 total EV charging ports listed on PlugShare and the Department of Energy's Alternative Fuels Data Center in Berkeley. Of those ports, 76 were listed as public access, 21 are residential (meaning a resident has offered to share their home charger with neighbors), and eight are restricted. Table 11 lists the number of EV charging ports available in Berkeley by access and charging level in February 2019.

TABLE 11: EV CHARGING PORTS LISTED IN BERKELEY LISTED ON PLUGSHARE, FEB 2019

Access	Level 1	Level 2	DCFC	Total
Public	2	68	6	**76**
Residential	5	16	0	**21**
Restricted	2	6	0	**8**
Total	**9**	**90**	**6**	**105**

Table 12 summarizes the use of the City's EV charging stations in 2018, including total charging time, utilization rate (charging time divided by total hours in the year), and number of unique users. These figures do not yet include utilization for the EV chargers in Center Street Garage since they came online partway through 2018. Anecdotally, multiple survey respondents reported in open responses that some chargers now have longer waits as the number of EVs in Berkeley increases and the use of EVs by TNC drivers increases.

TABLE 12: CITY-OWNED CHARGER UTILIZATION, 2018

City Charging Station	Charging Time (Hours)	Utilization Rate	Unique Users
Telegraph Channing Garage (3 stations)	3,531	13%	2,313
Oxford Garage (2 stations)	4,678	27%	2,203
Marina Dock (1 station)	1,716	20%	835
West Library (1 station)	1,404	16%	902

Existing Access to Charging at Home and Work

Being able to charge at home or work are considered critical for supporting EV ownership, as these locations are where drivers park their vehicles the longest. The full number of EV charging ports at private homes, multifamily dwellings, and workplaces is not known. A lack of access to charging at home

for renters and multifamily building residents was reported by survey respondents as a primary barrier to increasing the use of EVs in Berkeley. Being able to charge at home can be particularly difficult for renters (57% of Berkeley residents) as well as multifamily residents due to lacking off-street parking, lacking access to a nearby wall outlet or place to install a charger by their parking space, and/or lacking permission to install a charger from their landlord. While the curbside charging pilot has addressed these challenges for some residents, the cost to participate suggests additional solutions will be needed. For workplace charging, just 23% of survey respondents report having access to charging at their school or workplace.

Estimated EV Charging Needs in 2025

The California Energy Commission (CEC) provides low and high estimates for how many EV chargers are needed by 2025 to support the state's zero emission vehicle (ZEV) deployment goals.[33] Berkeley's estimates are based on the CEC report using Alameda County's ratio of needed EV chargers to projected EVs. In 2025, it is estimated Berkeley would need 380–610 workplace chargers, 260–570 public Level 2 chargers, and 60–280 DC fast chargers, depending on the EV adoption scenario and CEC scenario (see Table 13).

In 2025, the adoption rates projected for Scenarios 1 and 2 have not yet diverged significantly enough for the EV charging estimates to be distinct. Estimates beyond 2025 are not included due to the evolving nature of EV charging models and behavior. The CEC methodology does not include low and high estimates for workplace charging, primarily due to more limited variance in charging time period than other types of charging. While the CEC report primarily models Level 2 workplace charging needs, many workplaces have found Level 1 charging to be an affordable and convenient alternative, which could lessen the number of Level 2 workplace ports needed.

TABLE 13: ESTIMATED EV CHARGING PORTS NEEDED IN 2025 BY SCENARIO AND TYPE

			CEC Scenario	
EV Charging Type	***EV Adoption Scenario***	**Existing**	**Low**	**High**
Workplace Level 2	*Scenarios 1 & 2*	Unknown	380	
	Scenario 3		610	
Public Level 2	*Scenarios 1 & 2*	99	260	360
	Scenario 3		420	570
DC Fast Charging	*Scenarios 1 & 2*	6	60	170
	Scenario 3		100	280

ELECTRIC MOBILITY LANDSCAPE

Changing Mobility Trends and Their Impacts on EV Charging

Significant shifts in the transportation sector are likely to impact the projected charging needs described above, requiring the City and its stakeholders to monitor these changes and adjust the Roadmap's course as needed. Some of the trends in the mobility sector with greatest uncertainty and their impacts to the Roadmap charging projections are described in Table 14.

TABLE 14: IMPACTS OF MOBILITY TRENDS ON EV CHARGING SCENARIOS

Trend	Potential Impact to Charging Scenarios
Shared Mobility and Autonomy: While commercially-ready autonomous vehicles are in operation in very few places today, shared mobility options like TNCs, carsharing, and bikesharing have become widely available and are already reshaping how Berkeley community members travel.	If more of Berkeley's travel shifts to shared (and autonomous) mobility options, the City could need to install **more DC fast charging ports** to serve shared mobility fleets, while **lessening its plans for Level 2 chargers** that are most suitable for private vehicles. ⟷
Vehicle Miles Traveled (VMT), Vehicle Ownership, and Mode Share: Some studies predict autonomy and shared mobility could increase VMT by inducing more travel due to lowered costs and increased convenience, while others predict VMT could decrease if shared modes lessen vehicle ownership and use.[34] Experts are similarly divided as to whether recent trends in reduced single occupant vehicle ownership and driving mode share will continue, or reverse in the coming years.	An increase in VMT due to autonomy and shared mobility would likely necessitate a **greater investment in DC fast charging** to serve shared mobility fleets that are utilized heavily throughout the day. A decrease in VMT and/or private vehicle use could **reduce the number of chargers estimated.** ⟷
EV Technology Advancements: Changes in charging and vehicle technology, including increased charging speeds, increased range, and more could impact the number of chargers needed.	Higher powered DC fast chargers may mean **fewer DCFC ports** are required in the future to serve the same number of vehicles, and longer range EVs may also **lessen the need for ports of all types**. ↓

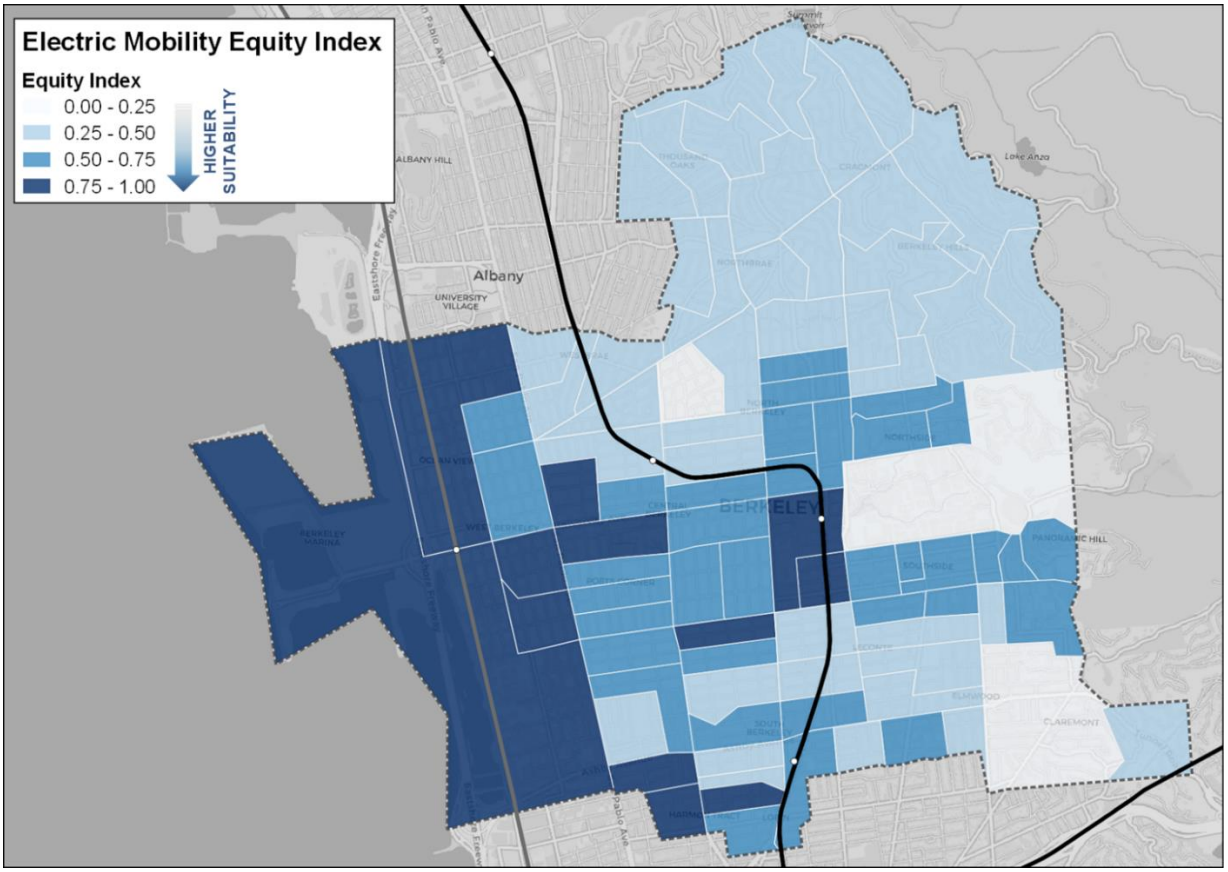
ELECTRIC MOBILITY LANDSCAPE

Priority Areas for Electric Mobility and EV Charging

In addition to the number of EV chargers available, it is also important to consider their locations in the City, and to strive to provide access to a variety of charging options across the City when and where people need them. This includes electric mobility and public charging options near frequent destinations such as retail centers, workplace charging options at people's jobs, and residential charging options either at people's homes or very close by. This section includes maps created for this Roadmap to help guide future charging installations by the City and private site hosts.

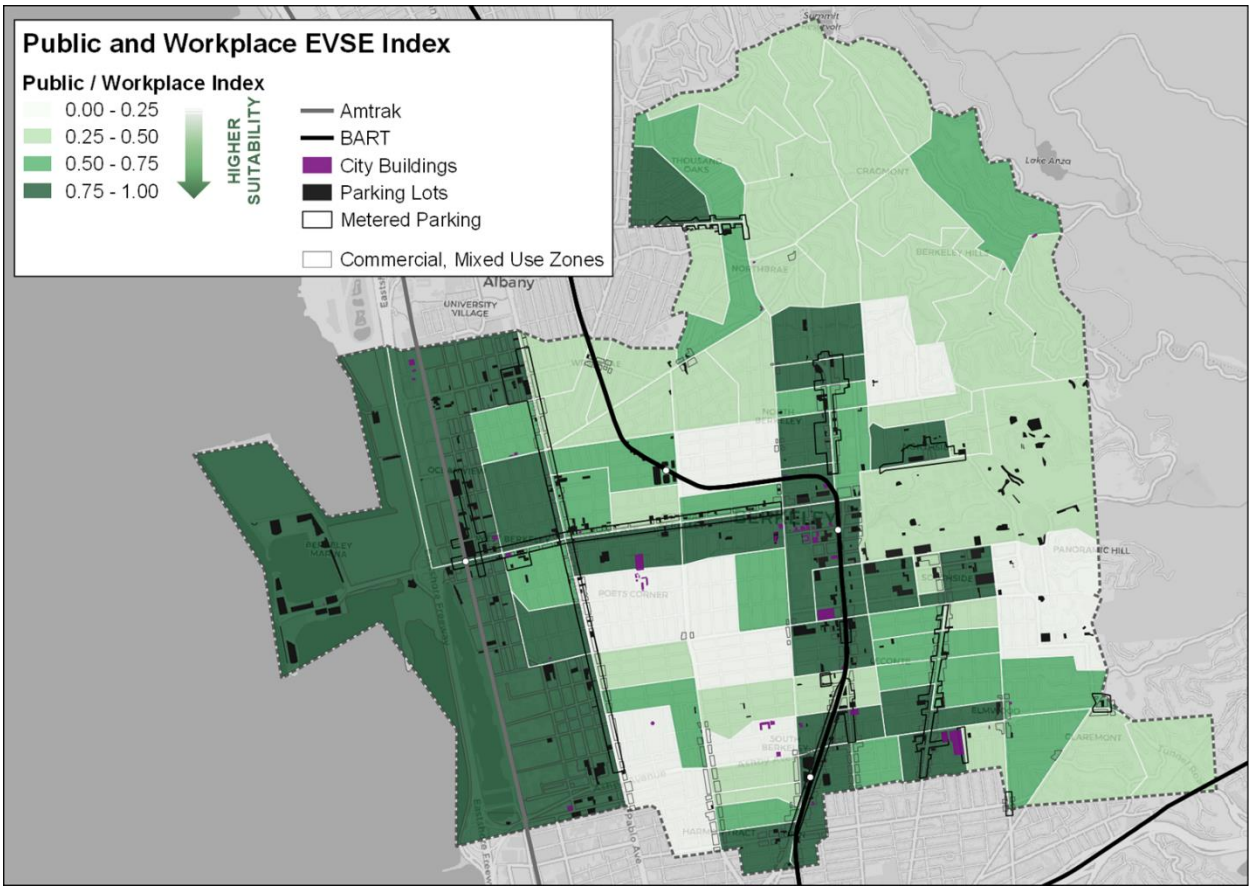
Priority Areas for Equitable Electric Mobility Investment: The map in Figure 15 identifies areas to prioritize equity in electric mobility development, and highlights areas where residents (1) have less access to transportation options (vehicle ownership and public transit access); (2) live in affordable and/or multifamily housing; and (3) are more highly impacted by pollution, poverty, and other socioeconomic vulnerabilities.

FIGURE 15: ELECTRIC MOBILITY EQUITY INDEX MAP



Priority Areas for Public and Workplace EV Charging: The map in Figure 16 identifies census block groups and specific public sites with high potential and need for public and workplace EVSE, by highlighting areas with: (1) less access to EV charging today; (2) higher density of jobs and workplace vehicle miles traveled; and (3) higher density of longer dwell time destinations (e.g., supermarkets, dining, institutions such as churches and schools, and entertainment and recreation destinations). Additionally, the map overlays potential suitable sites within those high potential areas, including city-owned buildings, parking meters, parking lots, and commercially zoned areas.

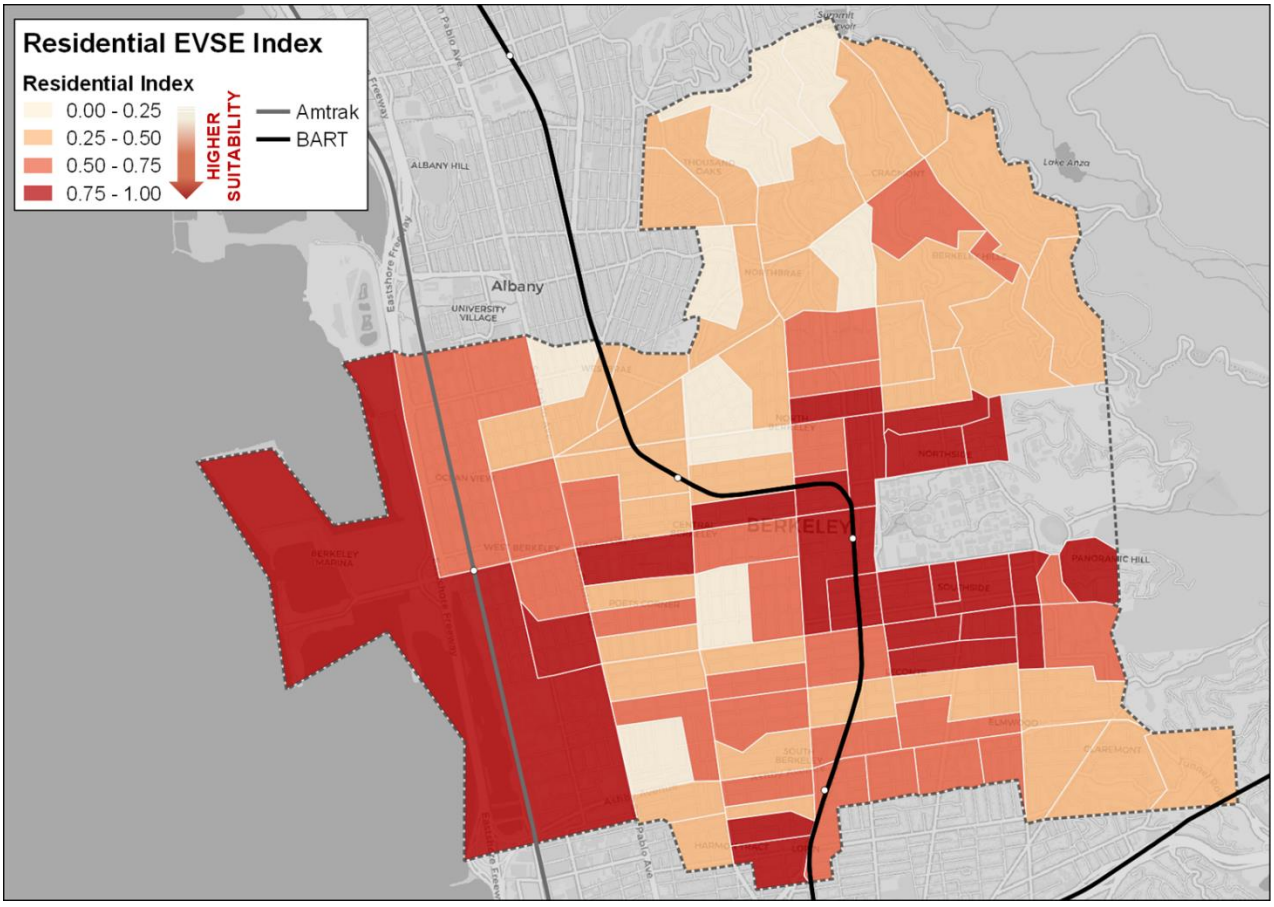
FIGURE 16: PUBLIC AND WORKPLACE EV CHARGING INDEX MAP



ELECTRIC MOBILITY LANDSCAPE

Priority Areas for Residential EV Charging: This map (Figure 17) identifies areas that may have a greater need for residential charging solutions to make EV ownership more accessible, particularly for multifamily residents and renters. Residential charging options for these residents could include installing charging at multifamily buildings, developing public curbside charging in residential neighborhoods with many multifamily and renter residents, or installing off-street public charging in these same areas. The map highlights areas with (1) less access to EV charging currently; (2) a higher share of multifamily buildings; (3) a higher share of renters; and (4) a higher share of residents who drive.

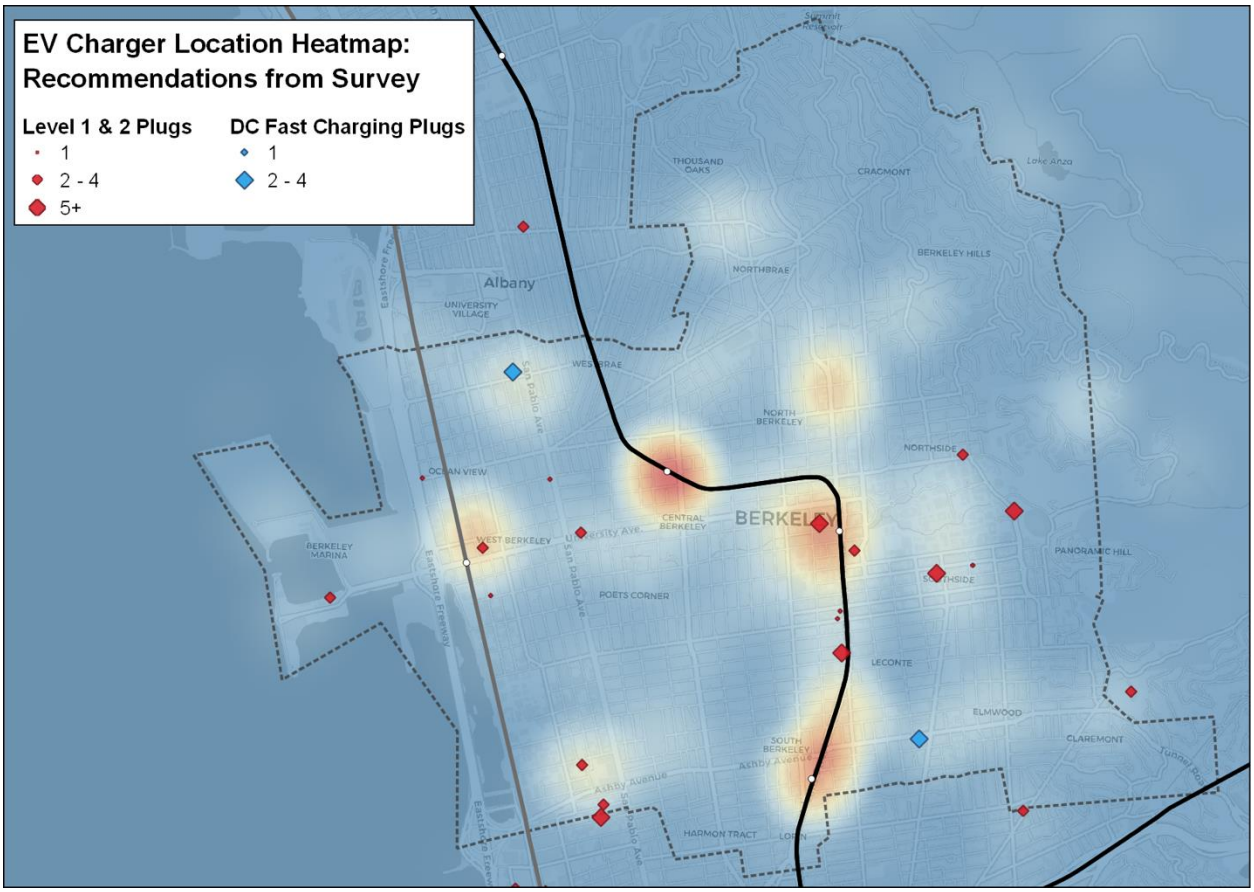
FIGURE 17: RESIDENTIAL EV CHARGING INDEX



ELECTRIC MOBILITY LANDSCAPE

EV Charging Survey Location Recommendations Heat Map: The map in figure 18 highlights areas where survey respondents recommended the most new EV charging investments. Respondents highlighted many similar areas to those in the two EV charging indexes. Despite some areas already having EV charging coverage, the forecast need for new ports by 2025 and some survey responses indicating competition for available chargers suggest a need for more chargers even where some coverage exists.

FIGURE 18: EV CHARGING SURVEY LOCATION RECOMMENDATIONS HEAT MAP



Berkeley, CA

Appendix: State, Regional, and Utility EV Policies and Programs

At the time of publication, programs and policies key to this Roadmap's implementation include:

TABLE 15: EXISTING EV PROGRAMS AND POLICIES TO LEVERAGE

*Note: Equity-oriented strategies are indicated with an **

Initiative	Lead Organization
Consumer Incentives	
Clean Vehicle Rebate Project (CVRP) Rebates*	CARB
Federal Tax Credit	IRS
Plug-In Electric Vehicle (PEV) Rebates	PG&E
Clean Vehicle Assistance Program*	CARB
Community Housing Development Corporation (CHDC) Driving Clean Assistance Program*	CHDC
Clean Cars for All Program*	BAAQMD/CARB
Empower EV Charge Network* (proposed – for LMI customer home charging)	PG&E
High Occupancy Vehicle (HOV) and High Occupancy Toll (HOT) Lane Exemption	California DMV
Toll Discount for EVs on Bay Areas Bridges	FasTrak
Awareness, Outreach, and Engagement	
One-Stop-Shop Pilot* (upcoming outreach effort to connect income-qualifying residents with EV incentives)	CARB/GRID Alternatives
Bay Area EV Acceleration Plan: Off-the-shelf Outreach Toolkit	BAAQMD
Bay Area SunShares (solar and EV group purchasing program)	Business Council on Climate Change
Drive Clean Bay Area (EV group purchasing program)	Cool the Earth
Electric Vehicle Service Personnel Training Program (workforce training program)	City College of San Francisco
Home EV Charger Information Resource Pilot	PG&E
Plug-In Electric Vehicle (PEV) Resource Center (educational website)	CARB and Veloz
EV Charging	
Charge! Program (incentives for public charging infrastructure)	BAAQMD
Low Carbon Fuel Standard (credits from EV charging can be sold to fuel producers to earn revenue)	CARB
Make-ready rebates for DCFC* (approved to fund 52 sites with 234 stations)	PG&E

Initiative	Lead Organization
Electric Vehicle Rate Plans (residential customers have two options for EV charging)	PG&E
PG&E Commercial EV Rate (proposed)	PG&E
Local Development Business Plan (includes support for EV charging, fleet electrification, etc.)	East Bay Community Energy
Cycle 1 and 2 investments (investments in Level 2 and DCFC public charging)	Electrify America
Fleet electrification	
SB1014: Clean Mileage Standard for Ride Hailing Fleets	State Legislature
Clean Fleets Program	BAAQMD
School Bus funding	BAAQMD
CARB Clean Transit Rule	CARB
CVRP Rebates for Fleets	CARB
FleetReady Program	PG&E
Clean Fleets Program	BAAQMD

Endnotes

[1] 2018 Climate Action Plan Update, City of Berkeley. https://www.cityofberkeley.info/climate/

[2] In the Bay Area, on-road mobile sources contribute 43% of ozone-forming NOx emissions, and 12% of PM2.5 emissions. Final 2017 Clean Air Plan. BAAQMD, 2017. http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf?la=en

[3] While air pollution has been falling in the Bay Area, lower income, non-White communities continue to bear higher levels of localized air pollution from localized sources like freeways. Identifying Areas with Cumulative Impacts from Air Pollution in the San Francisco Bay Area. BAAQMD, 2014. http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CARE%20Program/Documents/ImpactCommunities_2_Methodology.ashx?la=en

[4] City of Berkeley Health Status Summary Report, 2018. https://www.cityofberkeley.info/uploadedFiles/Health_Human_Services/Level_3_-_Public_Health/health-status-summary-report-2018.pdf

[5] In the Bay Area, a study by MTC found the region's low-income population spends more as a proportion of their income on transportation, and has been suburbanizing, or increasingly moving out of the Bay Area's central cities. Plan Bay Area Equity Analysis Report. MTC, 2015. https://mtc.ca.gov/sites/default/files/A-04_FINAL_PBA_Equity_Analysis_Report.pdf

[6] EV ownership has been highest to date in California's wealthiest cities, and nationally amongst the highest-income households. California has taken steps to design EV incentives to reach lower-income households to try to address this trend. California's continued electric vehicle market development. ICCT, 2018. https://theicct.org/sites/default/files/publications/CA-cityEV-Briefing-20180507.pdf

[7] American Community Survey 5-year 2017 data.

[8] See TransForm and MTC's Mobility Hubs at Affordable Housing Pilot, CARB's transportation equity pilot projects, and Greenlining Institute's Mobility Equity Framework.

[9] EV Hybrid Noire is the nation's "largest network of diverse EV drivers and enthusiasts", and their website and resources offers useful messaging and insights for community outreach. https://evhy bridnoire.com/

[10] A similar model was piloted in Los Angeles, through CalETC's Prove It! Campaign, which supported week-long test drives for local faith leaders and other trusted community leaders, and shared their testimonials as a way to raise awareness about EVs. CalETC – About Prove it! http://www.caletc.com/prove-it/

[11] Equity and Smart Mobility, ISC and CNT. https://sustain.org/wp-content/uploads/2019/09/Equity-and-Smart-Mobility-Report.pdf

[12] Means-Based Fare Discount Program. https://mtc.ca.gov/our-work/plans-projects/other-plans/means-based-fare-discount-program

[13] Lime "PayNearMe" initiative allows individuals who are eligible for any local, state, or federally run assistance programs to pay for Lime shared bike rides with cash at a CVS, 7-Eleven, Family Dollar, or Casey's General Store at a discounted rate (50-95% discount). No bank accounts or smartphones are needed for this program. https://www.li.me/second-street/paynearme-lime-takes-industry-lead-on-transportation-equity

[14] Electric Vehicle Charging Station Permitting Guidebook. CA Governor's Office of Business and Economic Development, 2019. http://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf

[15] For more detail on job training opportunities and needs, refer to Contra Costa County's EV workforce development research at https://ccta.net/2019/07/30/ev-readiness-blueprint/ (including a report for training needs for mechanics and another for electricians.

[16] California Household Travel Survey for the City of Berkeley, 2012, and the Statewide Integrated Traffic Records System five-year injury collision data, 2013-2017.
[17] Paris launched a low-cost, monthly electric bikeshare and incentive program in September 2019. https://www.citylab.com/transportation/2019/09/electric-bikes-paris-bicycle-rental-france-e-bike-subsidy/598192/.
[18] The TNC Regulatory Landscape: An Overview of Current TNC Regulation in California and Across the Country. San Francisco County Transportation Authority, 2017. https://www.sfcta.org/sites/default/files/2019-03/TNC_regulatory_020218.pdf
[19] California Governor's Office of Business and Economic Development: Electric Vehicle Charging Station Permit Streamlining Map. http://www.business.ca.gov/ZEVReadiness
[20] Electric Vehicle Charging Station Permitting Guidebook. CA Governor's Office of Business and Economic Development, 2019. http://businessportal.ca.gov/wp-content/uploads/2019/07/GoBIZ-EVCharging-Guidebook.pdf
[21] Due to increasing competition for curb space from micro-mobility, transit, TNCs, delivery zones, and other modes, care should be taken to avoid planning curb space for EV charging where it may be best used for encouraging alternatives to personal vehicle travel. Still, curbside charging is beginning to play an important role in enabling convenient neighborhood charging access in cities like Montreal and Amsterdam, which have deployed hundreds to thousands of curbside chargers, as well as American cities like Santa Monica and Sacramento which have begun pilots of curbside charging.
[22] The City of Portland is exploring ways to leverage public-private partnerships to support innovation in potential co-location of services in the right-of-way (or at other site hosts), such as "renewable power generation, wireless internet, lighting or public art." Electric Vehicles the Portland Way. https://www.portlandoregon.gov/shared/cfm/image.cfm?id=309915
[23] As an example, the City of Santa Monica funded a pilot multifamily EV charging incentive. The pilot received a lot of interest from both renter and owner multifamily residents and property owners, utilizing all available grants in the first round of funding. Multi-Unit Dwelling EV Charging Station Rebate Program. City of Santa Monica. https://www.smgov.net/uploadedFiles/Departments/OSE/Categories/Transportation/EV_Rebate_Packet_Phase_2.pdf
[24] In addition to commercial or institutional site hosts, which is the primary focus of this action, the City could consider EV owners themselves to be potential site hosts and, pending legal assessment, conduct outreach to encourage them to list their chargers for others to use, using websites such as Plugshare. Sharing private charging could reduce the need for public infrastructure.
[25] Multi-state Study of the Electric Vehicle Shopping Experience. Sierra Club, 2016.
[26] Fuel Type by City as of 10/1/2018. California DMV.
[27] Bringing Bike-share to Underserved Populations: A Case Study. International Parking & Mobility Institute. https://www.parking-mobility.org/2019/04/17/bringing-bike-share-to-underserved-populations-a-case-study/
[28] California's continued electric vehicle market development. ICCT, 2018.
[29] Fuel Type by City as of 10/1/2018. California DMV.
[30] Clean Vehicle Rebate Statistics. https://cleanvehiclerebate.org/eng/rebate-statistics
[31] California's continued electric vehicle market development. ICCT, 2018.
[32] How do PEV owners respond to time-of-use rates while charging EV Project vehicles? The EV Project, 2013.
[33] California Energy Commission 2018. California PEV Infrastructure Projections 2017-2025. https://www.nrel.gov/docs/fy18osti/70893.pdf
[34] Wadud, Z., MacKenzie, D., & Leiby, P. (2016). Help or hindrance? The travel, energy and carbon impacts of highly automated vehicles. Transportation Research Part A: Policy and Practice, 86, 1-18.

ATTACHMENT 2

Susan Wengraf
Councilmember District 6

CONSENT CALENDAR
March 13, 2018

To: Honorable Mayor and Members of the City Council

From: Councilmembers Wengraf, Harrison, Bartlett, and Hahn

Subject: Referral to the Energy Commission: Strategies to Improve EV Usage

RECOMMENDATION:
Refer to the Energy Commission to research best practices to encourage and support the use of electric vehicles, and develop a draft EV Plan for Berkeley that City Council can adopt. The plan should include realistic goals supported by city-wide initiatives to improve EV infrastructure and incentivize EV use for Berkeley's residents and workers.

FINANCIAL IMPLICATIONS:
None

BACKGROUND:
Transportation is the largest single source of air pollution in the United States. The City of Berkeley's Climate Action Goals aim to reduce greenhouse gas (GHG) emissions by 33% (below 2000 levels) by the year 2020. The vision for a more sustainable Berkeley, outlined in the Climate Action Plan includes, "Personal vehicles run on electricity produced from renewable sources or other low-carbon fuels".

Other cities in California have taken aggressive steps to encourage EV usage. The Energy Commission and City Manager can look at those cities for best practices that might fit with the City of Berkeley. An example of strategies might include: The Sacramento City Council approved their first Electric Vehicle (EV) Strategy on December 12, 2017. EV charging stations in City of Sacramento garages are free for the public to plug into (with one exception), though parking fees still apply. Designated parking facilities offer 50 percent off monthly parking rates to owners or leasers for their 100% electric car. Participating garage locations, types and numbers of chargers are listed on the City's website. The City of San Jose Clean Air Vehicle Parking Program provides free parking at four City downtown area parking garages, on-street parking meters citywide, and the city's regional parks. The City's Planning, Building and Code Enforcement Department implemented a streamlined permitting process to facilitate the installation of home charging systems.

ENVIRONMENTAL SUSTAINABILITY
This item supports the goals of Berkeley's Climate Action Plan

ATTACHMENT 2

CONTACT PERSON
Councilmember Susan Wengraf, Council District 6, 510-981-7160

02
Special Meeting Item

Office of the City Manager

CONSENT CALENDAR
July 21, 2020

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Timothy Burroughs, Director, Planning and Development Department

Subject: Evaluation and Recommended Updates to the Building Energy Savings Ordinance (BESO)

RECOMMENDATION
Refer to City Manager to amend the Building Energy Saving Ordinance (BESO), Chapter 19.81.170 of the Berkeley Municipal Code, to align with building electrification goals, leverage upcoming rebates and incentives, and develop mandatory energy requirements to be phased in.

SUMMARY
BESO is a City of Berkeley ordinance that requires building owners to complete and publicly report building-specific energy efficiency assessments and energy scores. The goal of BESO is to reduce both energy costs and greenhouse gas emissions in Berkeley's existing buildings. BESO uses energy data transparency to allow owners to better manage energy use and encourage investments in energy efficiency upgrades. BESO currently requires that large buildings benchmark energy use annually and conduct an assessment or upgrade every five years. Medium and small buildings must assess or upgrade every 10 years, and single family homes must do so at time of sale, or within one year after sale.

This report provides recommendations informed by the BESO Evaluation Report, by multiple meetings with technical advisors and other stakeholders, and by input from the Berkeley Energy Commission. It balances the urgency of the climate crisis with the economic reality created by COVID-19. In order to accelerate energy efficiency, resilience, and electrification upgrades in homes and buildings, staff propose to return to City Council with an amendment to the ordinance to make BESO better align with building electrification goals, leverage upcoming rebates and incentives, and require the development of mandatory building energy improvements to be phased-in when additional resources to off-set costs for mandatory improvements are available.

The proposed amendment to BESO would be implemented in a phased approach, requiring the development of mandatory energy improvements that would be developed with a stakeholder process. This will allow for a thorough analysis of cost impacts, impacts to equity, and numerous other intended and unintended impacts. If this

recommendation is adopted, staff will develop mandatory measures for Council consideration in the future.

FISCAL IMPACTS OF RECOMMENDATION

There are no direct fiscal impacts to amending BESO to align with electrification goals, leverage rebates and develop mandatory energy requirements. However, there may be fiscal impacts to building owners, subject to BESO, when mandatory energy requirements are phased in. Staff will return to City Council an analysis of costs and benefits to the City and to Berkeley property owners at that time.

CURRENT SITUATION AND ITS EFFECTS

BESO is a City of Berkeley ordinance (No. 7397-NS, Berkeley Municipal Code Chapter 19.81.170) that requires building owners to complete and publicly report energy efficiency assessments and energy scores. When the Berkeley City Council adopted BESO, it required a program evaluation three years after implementation to assess the process and outcomes. The BESO Evaluation Report was conducted by Energy Solutions, an energy consulting firm that designs, implements and evaluates energy programs. This staff report provides recommendations to update BESO informed by this report, and by multiple meetings with technical advisors and other stakeholders, and input from the Berkeley Energy Commission. Since the outreach, meetings, and BESO Evaluation Report were completed prior to the COVID-19 pandemic, staff has also balanced these recommendations with the increased importance of healthy indoor air quality as well as economic and budgetary considerations, to ensure that BESO updates are in-line with a thoughtful and resilient recovery.

BESO Evaluation Report

The BESO Evaluation Report was completed by consultants at Energy Solutions in February 2020. It assessed whether BESO is meeting its goals of being easy, affordable and valuable. As applied to BESO, these goals are 1) ***easy*** administrative procedures for compliance, 2) ***affordable*** requirements that leverage rebates and do not create an undue financial burden, and 3) ***valuable*** outcomes that provide benefits to building owners as well as reductions in greenhouse gas emissions. The evaluation analyzed current program administrative process and data on outcomes as well as actively engaged with key stakeholders, including participants, community partners, the real estate community, the Berkeley Energy Commission, and energy assessors. The evaluation highlighted BESO's need to make improvements to:

- Align with Berkeley's electrification and community resilience's goals
- Leverage the proposed expanded Transfer Tax Rebate Program to incentivize upgrades
- Increase the number of energy upgrades that result from the energy assessment recommendations and improve tracking
- Streamline BESO administrative processes for both staff and the public.

The full report, findings and recommendations are provided in Attachment 1.

Expert Technical Advisory Meetings
Staff had multiple meetings with technical advisors and energy experts and convened technical advisory meetings in late 2019 and early 2020. These included an advisory group with representatives from Natural Resources Defense Council (NRDC), East Bay Community Energy (EBCE), equity partners representing low-income communities, the Berkeley Lab, Bay Area Regional Energy Network (BayREN), architects, contractors, energy efficiency program implementers, and the California Public Utilities Commission (CPUC). These experts weighed in on the opportunities and challenges for updating BESO to add mandatory energy upgrade requirements in addition to the currently required energy assessments. Ultimately, the technical advisory group expressed a favorable recommendation for developing mandatory requirements contingent on whether there could be sufficient rebates to lower costs. Given the rapidly evolving electric heat pump technology and upcoming rebate programs under development, there was consensus that more time was needed to determine the appropriate measures.

Berkeley Energy Commission
The Berkeley Energy Commission developed a sub-committee for the BESO evaluation and updates. They met to review the BESO Evaluation Report and provide comments to staff. On February 26, 2020 the Energy Commission voted unanimously to support staff recommendations for the proposed amendments to BESO. Motion/Second to approve the proposed amendments to BESO (Bell, O'Hare). The motion carried 6-0-0-3 (Ayes: Zuckerman, Bell, Weems Paulos, Stromberg, O'Hare. Noes: None. Abstain: None. Absent: Schlachter Leger, Gil). The Commission reiterated its support for staff recommendations for a phased approach to the proposed development of mandatory upgrade requirements, in order to keep up with changes in technology, upcoming rebates, and equity considerations. In addition, the Commission recommended review of new requirements on a regular basis in light of rapidly evolving technology and changing rebates. It also suggested the inclusion of utility bill information in the energy assessments, which will be considered as part of the assessment improvement.

With BESO, Berkeley has become a leader in the home energy assessment and building labeling sphere, with cities across the nation replicating aspects of BESO in their own communities. BESO has been successful at providing data on the energy use and energy efficiency opportunities of Berkeley's existing buildings. This data is being used to inform the *Existing Building Electrification Strategy* study currently in development and scheduled for completion early 2020. The Strategy is identifying a suite of long and short-term policies to equitably transition all of Berkeley's existing buildings from fossil fuels to clean electricity. The current BESO policy allows large

building owners to access energy use trend data to help manage energy use and comply with California State law. Although there are anecdotal reports of time of sale energy assessments leading to participation in energy upgrade incentive programs, data on exact numbers of participants is not available due to utility program privacy rules.

The BESO program has also faced some challenges. Since its original development, the City's priority has shifted beyond energy efficiency, to include electrification, in response to the Climate Emergency and Fossil Fuel Free goals. Implementation has been constrained by the manual compliance system that consumes much of staff's time and does not provide publicly available building energy data to encourage energy efficiency investments. Staff is currently focused on improving compliance rates for medium and large buildings and launching an on-line application and payment portal for time of sale transactions. An additional challenge has been the inability to measure and track energy upgrade outcomes due to rules that restrict access to utility rebate program participation.

Proposed BESO Update
Staff recommends developing an amendment to BESO to bring to a future Council meeting with these proposed updates:

- Integrate electrification and resilience into the energy assessments to better align with the City's goals.
- Develop new rebates when timing is appropriate and coordinate with state and regional programs to maximize available incentives to reduce costs and encourage energy efficiency and electrification upgrades.
- For all buildings that are being sold, change the energy assessment compliance due date to time of listing, rather than time of sale, and encourage inclusion of the energy report on the Multiple Listing Service (MLS) to provide transparency in the sale process and to serve as a market influence.
- Improve City systems for BESO compliance and online payment of BESO fees for better tracking and improved customer service.
- Expand annual benchmarking reporting requirements to medium-sized buildings and streamline energy assessment requirements for small and medium-sized buildings to time of listing.
- Convene expert advisory teams to develop mandatory requirements for homes (1-4 units) and large buildings (over 25,000 sqft) that leverage rebates and guarantee outcomes.

Table 1 compares the current ordinance and the proposed changes:

Table 1 Current and Proposed BESO Requirements

Building Types	Current	Proposed
Homes 1-4 Units	• Energy Efficiency Assessment at time of sale	• **Electrification** assessment **at time of listing** • **Develop mandatory requirements for phase-in when additional rebates to off-set costs are identified**
Small Buildings (up to 15k)	• Energy Efficiency Assessments every 10 years	• **Electrification** assessment **at time of listing**
Medium Buildings (15k-25k)	• Energy Efficiency Assessment every 10 years	• **Electrification** assessment **at time of listing** • **Annual Benchmarking**
Large Buildings (25k+)	• Energy Efficiency Assessment every 5 years • Annual benchmarking	• **Electrification** assessment every 5 years • Annual benchmarking • **Develop mandatory requirements for phase-in when additional rebates to off-set costs are identified**

*__Bold__ text indicates new requirements.

Developing Mandatory Energy Requirements for Phase-In

While there is agreement on the need to strengthen BESO to catalyze action in light of the climate emergency, there is not yet consensus on what building retrofit requirements would be most cost-effective for different existing building types. Staff proposes to develop mandatory requirements in consultation with experts for homes, large commercial, multifamily and mixed-use buildings. Once mandatory requirements are defined and rebates or other compliance resources to off-set costs are identified, the requirements will be brought to City Council for final approval.

A phased approach to updating the BESO program will both provide significant improvements in the promotion of building electrification in the short-term, and create a pathway to mandatory improvements, encouraging early adoption and investments in electrification. Consultation with expert advisors will allow a thorough analysis of cost impacts, evolving technology, potential impacts from refrigerants, electrical infrastructure needs, workforce capacity, changing incentives, impacts to equity and other unintended consequences. Building electrification technology is rapidly evolving, especially for the existing building retrofit market where steps to electrify differ based on building vintage and existing condition.

The integration of building electrification into the current energy efficiency assessments will require updates to the assessments, assessor training, the development of rebates

and alignment with other incentive programs. Staff has been collaborating with the local Home Energy Score partners to integrate electrification into the assessment and recommendations for single family homes, Development of electrification assessment tools for commercial and multifamily buildings requires additional research and collaboration, as well as the identification of incentives to off-set compliance costs.

Given the projected economic set-backs of COVID-19, staff will provide an analysis of financial impacts to Berkeley businesses, housing market and greater community of any proposed mandatory requirements proposed in Phase 2. The timing for the implementation of these requirements is dependent on the completion of Phase 1 training of assessors, identifying incentives to off-set compliance costs, and the development of mandatory requirements. The process for Phase 2 does not have a designated timeline. Rather, this approach will allow for thoughtful development of requirements that are effective, equitable, and do not further limit access to housing in a tight market, while sending a clear signal to the market that investments in electrification are encouraged and valuable.

Proposed Phases for BESO Update: Electrification with Mandatory Requirement Development

1. **Commercial/Residential 15,000 sqft and above** (Approx. 800 buildings)

   Phase 1 – Prioritize electrification and align with rebates
   - Phase-in benchmarking requirements for 300 additional medium-sized buildings (15,000 to 25,000 square feet).
   - Update energy efficiency assessment tools to prioritize electrification and include electrification recommendations.
   - Train assessors in electrification best practices for commercial, multifamily and mixed-use buildings.
   - Work with utility partners, regional entities, and the State to help create and promote electrification incentive programs to reduce compliance costs for building owners.

   Phase 2 – Develop and implement mandatory energy requirements that leverage incentives for buildings 25,000 sqft and above
   - Identify appropriate exemptions and exceptions to encourage early adaptors and advance equity.
   - Develop mandatory energy requirements through a participatory stake holder process for consideration by City Council.
   - Promote electrification incentive programs to offset compliance costs.

2. **Buildings being Sold** (Approx. 900 buildings per year)

Phase 1 – Require at listing, prioritize electrification and align with rebates

- Update compliance trigger to Time of Listing as opposed to Time of Sale using BayREN's newly created Home Energy Score assessment registry.
- Integrate assessment with MLS to inform the sales process.
- Update the Home Energy Score assessment to include electrification recommendations.
- Train energy efficiency assessors on electrification best practices.
- Promote new electrification rebates to encourage new buyers to invest in electrification.
- Create upgrade tracking and proposed rebate processing system, leverage all available electrification incentives.

Phase 2 – Develop and implement mandatory energy requirements that leverage incentives

- Continue to expand strategic electrification outreach and education.
- Identify and address equity impacts that may further limit access to home purchases in Berkeley.
- Update assessment to identify mandatory measures.
- Develop workforce capacity and equipment supply chain availability.
- Develop mandatory energy requirements for homes with inclusive stakeholder process for Council consideration.
- Implement mandatory requirements that leverage rebates and incentives.

The Phase 1 expansion of assessments to include electrification and training of assessors is already underway for single family homes and could be implemented fairly quickly. The development of electrification assessments and retrofit recommendations for commercial and multifamily buildings will require additional research and vetting with stakeholders. The timing of Phase 2 will be dependent the participatory stakeholder process and on the availability of electrification incentives and financing to offset implementation costs.

Amending BESO to align with electrification and resilience goals, leverage upcoming rebates and incentives, and develop mandatory requirements for phase-in advances a number of Strategic Plan priorities, including creating a resilient, safe, connected, and prepared city, and being a global leader in addressing climate change, advancing environmental justice, and protecting the environment.

BACKGROUND

On March 10, 2015 the Berkeley City Council adopted BMC Chapter 19.81 – the Building Energy Savings Ordinance, with the goal of accelerating energy savings in Berkeley's existing buildings. BESO is a Strategic Plan Priority Project. It advances the

City's goal of being a global leader in addressing climate change, advancing environmental justice, and protecting the environment.

When BESO was adopted, it replaced the Residential and Commercial Energy Conservation Ordinances (RECO and CECO), which required building owners to install a prescribed list of minimum energy and water saving measures at the point of sale or during significant remodels. RECO/CECO needed to be updated, as the prescriptive measures at that time did not meet the criteria of being easy, affordable and valuable. The manual compliance system was cumbersome and did not provide acceptable customer service. The required minimum measures were not affordable, as they did not align with rate-payer funded incentive programs. Finally, the list of measures was not valuable because it did not meet climate action emissions reductions targets and was out of date with building science and code requirements.

The development of BESO was conducted with a multi-year, consensus-based community engagement process that included homeowners, residents, realtors, energy professionals, and the Berkeley Energy Commission. The approach of BESO is to assess each building and determine the best strategy to reduce emissions and energy costs and make that data publicly available to encourage upgrades and inform policy development. BESO currently is required prior to sale of a house or building under 25,000 square feet, and on a phased-in schedule for large multifamily and commercial buildings. The assessments are conducted by registered energy assessors who provide building-specific recommendations on how to save energy and link building owners to incentive programs for energy efficiency upgrades; however, BESO does not currently mandate that any of the recommended upgrades be completed. Information from the building assessments, including energy efficiency scores, has been incorporated into the Berkeley Community GIS Portal, providing transparent access to building energy data.

ENVIRONMENTAL SUSTAINABILITY

The adoption of BESO was a key Implementation Action of the Climate Action Plan (CAP). As of the most recent emission inventory, existing buildings are the second largest greenhouse gas emitter and account for 37% of greenhouse gas emissions in Berkeley. BESO is one of the few city policies that addresses existing building greenhouse gas emissions. Updating BESO to better align with electrification and resilience goals, leverage rebates and incentives, and increase the number of energy upgrades in buildings would further the environmental sustainability and climate goals of the City.

Electrification, or switching from natural gas to highly efficient electric heat pumps is a critical climate action strategy that benefits building occupants. Gas, which is primarily used to heat indoor air and water, is responsible for over 90% of emissions from building energy use. Powering building with electricity reduces indoor pollution and increases health and safety for occupants.

RATIONALE FOR RECOMMENDATION

Integrating building electrification into the energy efficiency assessments will accelerate the transition of buildings away from gas appliances, advancing the City's goals of reducing greenhouse gas emissions and becoming free of fossil fuels. In addition to reducing emissions, buildings that electrify have improved health, safety and occupant comfort. The importance of promoting healthy indoor air quality has been highlighted by recent occurrences such as smoke events during wildfire season and the COVID-19 pandemic.

Taking a phased approach will ensure that the updates to BESO will meet the goals of being easy, affordable and valuable. Building electrification technology is rapidly evolving, especially for the existing building retrofit market where steps to electrify differ based on building vintage and existing condition. The development of requirements that accounts for cost impacts, evolving technology, potential impacts from refrigerants, electrical infrastructure needs, workforce capacity, changing incentives, impacts to equity and other unintended consequences, will ensure policy outcomes that are ***affordable*** for building owners and provide ***valuable*** benefits to occupants and the environment.

The proposed changes to BESO will also improve program administration and customer service, meeting the criteria of making it ***easy*** for customers to comply. Currently BESO is administered with a manual compliance system that consumes significant staff time and does not provide publicly available data to encourage energy efficiency investments. The Office of Energy and Sustainable Development is creating its own online application and payment system to address these administrative challenges.

ALTERNATIVE ACTIONS CONSIDERED

The BESO evaluation and technical advisory meetings identified a range of potential options, from maintaining the current policy to requiring homeowners and building owners to make mandatory upgrades.

Alternative 1- No action. Given the urgency of the climate crisis, this option falls short on accelerating greenhouse gas reductions and does not align with the City's goals of electrification.

Alternative 2- Require a more aggressive timeline for mandatory requirements for homes and large buildings. This option would have high-cost impacts for building owners, since rebates to offset upgrade costs are not yet available, and equipment costs are evolving. Given the projected economic recession due to the COVID-19 pandemic, requiring mandatory upgrades without having incentives in place to off-set costs could further financially burden Berkeley businesses and housing market. In addition, requiring mandatory upgrades too quickly would not allow adequate time to build capacity in the workforce and supply stream for emerging electrification technologies. Finally, this approach would not provide sufficient time to address equity concerns and other unintended consequences.

CONTACT PERSON
Billi Romain, Sustainability Manager, Planning & Development Department, 510-982-7432

Attachments:
1: BESO Evaluation Report (Energy Solutions)

City of Berkeley

Building Energy Saving Ordinance Evaluation Report

February 11th, 2020

To: City of Berkeley

Billi Romain
Sustainability Manager

Marna Schwartz
Sustainability Coordinator

Ammon Reagan
Sustainability Program Coordinator

From:

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Senior Project Manager

Michael McGaraghan
Director

Energy Solutions

Table of Contents

1. Executive Summary

As the effects of climate change continue to increase, local governments must enact policies that reduce greenhouse gas (GHG) emissions and encourage resilience in their communities. Buildings are the second largest greenhouse gas emitter in the City of Berkeley and approximately 80% of buildings in Berkeley were built before 1950[i] so addressing the existing building stock is imperative. The Building Energy Saving Ordinance (BESO) is a program designed for this purpose, and after evaluating both the outcomes achieved thus far and the current process of the BESO program, it is clear that improvements need to be made. This evaluation assessed BESO on the criteria of whether it is meeting its goals of being easy, affordable, and valuable, as well how to better align BESO with Berkeley's policy goals of electrification and community resilience.

Overview of findings:

- BESO was originally designed to promote energy efficiency but Berkeley's goals have expanded to include the transition of buildings from natural gas to clean electricity and resilience.
- Changes to incentive programs and privacy issues related to participation rates have hindered Berkeley being able to measure outcomes of the program accurately.
- While the BESO assessment has resulted in valuable information on existing building stock for program planning purposes, conversion rates have not been measurable and are assumed to be low.
- Implementation of BESO is a labor-intensive manual process for both City staff and the public that lacks the appropriate technology.

Based on the findings of this evaluation, a menu of recommendations made by Energy Solutions is included below. The recommendations, categorized by building type, are designed to improve both the outcomes of the program in achieving the City's goals and the program's administrative process. Some of these recommendations may be able to be implemented quickly while others may require more time or additional resources. Given existing staff time and resources, some of the recommendations may not be possible to implement concurrently and will need to be prioritized and phased accordingly.

Type of Recommendation	Recommendations
Outcomes for All Buildings	Update the primary focus of BESO to include electrification and resilience and ensure the ordinance properly reflects the updated goals for all buildings.
	Implement systems and requirements that allow for tracking upgrades and measuring the GHG emission savings, electrification-readiness, and resilience.
	Increase electrification outreach and education for all building types, including developing materials on electrification measures and costs.
	Consider other intervention points to target existing buildings.

Outcomes for Homes (1-4 Units)	Update ordinance requirements to integrate the City Council-proposed expansion of the seismic transfer tax rebate (0.5% of the purchase price) and ensure alignment with efficiency and electrification upgrades.
	Convene technical experts to develop performance standards for electrification upgrades and allow the use of the transfer tax rebate to offset costs and consider mandating upgrades, while addressing any potential equity impacts.
	Consider requiring the Home Energy Score at time of listing rather than at time of sale.
	Continue use of Home Energy Score but require additional electrification-readiness information to be collected during the home energy assessment.
	Investigate free or low-cost assessment tools that could be used for all homes not triggered by the BESO time-of-sale requirements.
Outcomes for Small/Medium Buildings	Prioritize improvements for rental properties with further program development that considers incentives and/or mandatory requirements.
Outcomes for Large Buildings	Develop an energy rating score card to display in the property.
	Ensure building owners have quick and easy access to the most relevant rebate program information for their potential project.
	Include requirement for no-cost/low-cost building tune-up or retro-commissioning measures and track implemented measures and savings.
	Convene a group of technical experts and building owners to develop performance standards based on energy use or greenhouse gas emissions targets with a timeline for requirements.
	Partner with Energy Service Companies (ESCOs) to deliver guaranteed savings.
Process for All Buildings	Continue to build and launch integrated online application processing system for all building types.
	Adjust fees for cost recovery of administrative time.
Process for Homes (1-4 Units)	Formalize exemption threshold of 850 square feet in BESO to exempt buildings between 600 and 850 square feet.
	Increase the time of sale deferral fee to cover additional administrative and enforcement costs.
	Implement a trade professional platform to integrate and streamline key components of the BESO process related to the delivery of assessment and energy upgrade services.
Process for Small/Medium Buildings	Streamline small and medium building requirements by updating the building size categories.
Process for Large Buildings	Utilize the U.S. Department of Energy's Asset Score Reporting template as the assessment data collection tool.

2. Overview

Report Purpose

BESO's Section 19.81.170, Chapter Review and Reconsideration, stipulates that an evaluation should be completed to assess BESO's implementation process and policy outcomes, including:

- Reconsidering extending requirements to all Single Family Buildings starting in 2021;
- Analyzing reporting systems and compliance rates;
- Analyzing the number of energy improvements and amount of energy reduced; and
- Recommending revisions and/or incentive programs to accelerate improvements to low performing buildings as it considers advisable.

This report is intended to comply with the specified evaluation. The evaluation includes a review of both the policy outcomes and administrative processes to make recommendations for improvement. The objectives are summarized as follows.

- *Identify* current barriers and opportunities for BESO;
- *Analyze* the effectiveness of the BESO program for key stakeholders; and
- *Make recommendations* for improvements to both the administrative processes and policy outcomes of BESO to align with City's electrification and resilience goals.

Introduction

On March 10, 2015, the City of Berkeley adopted Berkeley Municipal Code (BMC) 19.81 – the Building Energy Savings Ordinance (BESO) with the goal to accelerate deep energy savings in Berkeley's existing buildings. The adoption of BESO was a key Implementation Action of the Climate Action Plan (CAP). When it was passed, it replaced the Residential and Commercial Energy Conservation Ordinances (RECO and CECO).

RECO and CECO, which had been in effect since the late 1980s, required homes and buildings sold or transferred in Berkeley or undergoing renovations to meet prescriptive energy and water efficiency requirements. The static list of minimum prescriptive measures in RECO and CECO was not achieving deep energy savings and became outdated based on technology changes and code updates. Further, the measures were not tailored to individualized building conditions or designed to maximize savings. A building science approach to energy efficiency requires a performance assessment that looks at all systems within a specific building and how they interact, resulting in performance recommendations with a specific loading order; for example, air sealing must precede attic insulation to maximize efficacy and energy savings. Additionally, as regional incentive programs underwritten by ratepayer funds transitioned to whole building performance improvements, as opposed to individual measures, the RECO and CECO measures were misaligned, potentially preventing building owners from leveraging those funds.

The development of BESO was conducted with a multi-year, consensus-based community engagement process that included realtors, energy professionals, and the Berkeley Energy Commission. BESO essentially replaced the mandatory minimum energy and water efficiency requirements in RECO and CECO with a requirement for property owners to conduct and disclose a site-specific energy efficiency opportunity assessment that provided a roadmap to improvements, incentives, and financing. BESO also included the phase-in of all buildings over 25,000 square feet by a certain date rather than at time-of-sale since these larger buildings don't often transfer ownership.

Building energy performance reports often include:

- Home profile (year built, area, # of bedrooms)
- Details about home's current structure and systems
- Home Energy Score or Energy Star score
- Annual energy use and cost based on energy modeling
- Home's carbon footprint
- Custom energy improvement recommendations

Many of BESO's attributes, like its annual benchmarking requirement and the phased-in compliance schedule for large buildings, and use of Home Energy Score tool[1] for energy assessments for homes are similar to other jurisdictions with the objective of making building energy use, costs, and efficiencies visible to owners, occupants, renters, and potential buyers. However, some programs also require existing buildings to meet specified energy or greenhouse gas (GHG) reduction targets in addition to building energy ratings, assessments, and disclosures. A summary of the different jurisdictions' programs is included in Appendices G & H.

By providing valuable information on energy savings opportunities as well as access to incentive and financing programs, the goal of BESO was to on-ramp building owners to energy efficiency performance improvement programs that are subsidized by utility rate payer funds.[2] Participation in these programs would lower energy costs and reduce greenhouse gas emissions citywide, while providing increased comfort, safety, and health for building occupants. However, due to a number of issues detailed in this report, the ability to track participation in these programs has not been as successful as originally intended.

Climate and Decarbonization Policy Goals

As a key *Implementing Action* identified in the City's Climate Action Plan, it is important that BESO supports emissions reductions goals and resilience policies.

The Climate Action Plan calls for reducing the community's greenhouse gas (GHG) emissions by 80% below year 2000 levels by 2050. The GHG emissions associated with homes and buildings are the second largest source of GHG emissions in Berkeley. Berkeley has been very successful in reducing the amount of energy used in buildings, having achieved a 35% reduction in GHG emissions in buildings below 2000 levels as of 2016 data. Despite these efforts, buildings still account for 37% of GHG emissions in Berkeley.

Since the adoption Climate Action Plan goals in 2009, Berkeley has subsequently committed to more ambitious goals for decarbonization including:

Thus far, Berkeley has set forth a number of policies and goals that advance decarbonization and resilience, including:

- Achieving 100% renewable electricity citywide by 2035
- Reaching the Mayor's pledge and the State's goal for net zero carbon emissions (carbon neutrality) by 2045; and
- Becoming a fossil fuel free city

In an effort to create a more resilient Berkeley in the face of challenges of climate change, the City also adopted the following resiliency goals as part of the Resilience Strategy in 2016:

- Accelerate access to reliable and clean energy
- Adapt to the changing climate

1 A sample Home Energy Score is included in Appendix D.
2 Refers to charges assessed on electric and natural gas bills that specifically fund energy efficiency programs.

By transitioning away from a reliance on natural gas to power buildings through electrification (i.e. switching out natural-gas combustion equipment and appliances for electric-powered equipment and appliances), Berkeley can further reduce GHG emissions in its buildings. Beyond GHG emission reductions, Berkeley must align its existing policies and programs within a resilient and electrification-ready framework in order to prepare the community and its infrastructure for the impacts of climate change. In addition to these goals, BESO should leverage current projects and programs, including:

Existing Buildings Electrification Strategy: The Office of Energy & Sustainable Development is currently working on a report focused on how to equitably transition the existing building stock in Berkeley from natural gas to 100% clean energy (i.e. to electricity).

Transfer Tax Rebate: City Council passed a referral on November 27, 2018 to expand the existing Seismic Transfer Tax Rebate Program[3] for qualifying electrification, energy efficiency, and water conservation retrofits. Staff is currently evaluating options for additional qualifying measures for electrification, resilience/safety, and energy efficiency. This incentive creates multiple opportunities to integrate with BESO that will be further discussed in Section 5.

3. Methodology and Evaluation Criteria

The methodology used throughout the course of this evaluation is summarized in Figure 2 below. Each of the steps is discussed in more detail below.

Figure 1: Evaluation Methodology

Evaluation Criteria

The evaluation is predicated on the criteria used for the development of BESO: easy, affordable, and valuable. *Easy* and *affordable* are most relevant to evaluating the administrative processes while *valuable* is most relevant to evaluating the policy outcomes. The criteria and their associated metrics are summarized in Table 1:

3 The City of Berkeley's existing Seismic Transfer Tax Rebate program refunds one-third of the 1.5% transfer tax amount (equal to 0.5% of the value of the home) back to homeowners who make seismic upgrades to their home. More information can be found at: https://www.cityofberkeley.info/Planning_and_Development/Building_and_Safety/Seismic_Transfer_Tax_Guidelines.aspx

Table 1: Evaluation Criteria and Metrics

Criteria	Metric
Easy	Equitably minimize administrative burden (for City staff, building owners, and occupants)
Affordable	Equitably minimize financial burden (for City staff, building owners, and occupants)
Valuable	Maximize emissions reductions Equitably maximize building occupant resiliency Maximize data quality Maximize consistency with state & regional efforts

Data Collection

DATA ON OUTCOMES

BESO outcomes should be measured by energy efficiency upgrades and their resulting GHG emissions reductions or increased resilience potential as a result of energy assessments or disclosure of energy information. The outcomes include:

1. Level of participation in verified efficiency and electrification programs; and
2. Number and extent of verified energy upgrades made to the building.

Due to privacy issues, utility and regional efficiency rebate programs are unable to share disaggregated participation data with the City of Berkeley. Therefore, in order to determine how Berkeley should improve BESO, analysis was conducted on the existing building stock. There are currently three data sources with information related to outcomes: Home Energy Score assessment data collected through BESO, building stock data collected by The Building Electrification Initiative (BEI)[4], and qualitative survey data collected from this evaluation. However, while these are useful data sources, they do not give Berkeley concrete information about how many and what types of people are making upgrades based on the energy information gleaned from BESO, what types of upgrades are being made, and the resulting GHG emissions reductions associated with those upgrades.

DATA ON PROCESS

The effectiveness of BESO is in part dependent on the effectiveness of the process for administration - compliance rates, staff and participant satisfaction, cost-effectiveness and data quality.

The evaluation team reviewed the administrative process of BESO, including workflow diagrams, and conducted an in-person review of the process. This included an overview of the BESO processes for both time of sale and large buildings, estimated staff time needed to work on various aspects of BESO,

4 In 2019, Berkeley partnered with the Building Electrification Initiative (BEI) to conduct a market segmentation analysis that assessed its local building stock for overlapping opportunities to convert heating and hot water systems away from fossil fuels while also providing needed investments to improve health, quality, resiliency, and affordability. The analysis will guide Berkeley in developing new programs and revenue streams that will be needed to equitably accelerate electrification and decarbonization in its community.

and observing staff procedures, including a physical walk between City departments to manually process checks.

To better understand how the process impacted external stakeholders, a series of surveys and stakeholder meetings were conducted to collect feedback from BESO participants, energy assessors, realtors, and the Berkeley Energy Commission.

Conduct Analyses

Once the data were collected, a holistic systems evaluation of administrative workflows were conducted, identifying the most significant challenges and impactful leverage points.

To evaluate the BESO program process, the evaluation team considered the technical, functional, and potential effectiveness to identify opportunities for improvement. Technical effectiveness determines if the system works as designed; if it is reliable, secure, and scalable for the data it currently holds. Functional effectiveness evaluates if the system contains the features and data needed to support the requirements of the program, to reduce administrative burden, and to measure the status of program goals. Functional effectiveness also accounts for whether the system is designed intuitively, or if users are properly trained to utilize its features or access the data. Potential effectiveness determines if the system can support future phases and plans for the program, expand to serve additional stakeholders as users, and if it is sustainable throughout the expected lifetime of the program data, or if the data can be thoroughly transferred to a new system.

Then, potential solutions were identified, and the pros and cons of each solution were weighed based on existing literature, existing programs in other cities, and the evaluation team's decades of institutional knowledge in energy efficiency and distributed energy resources policy and program analysis, design, and implementation, including its use of information systems to streamline and optimize workflows.

4. Summary of Findings

Findings Related to Program Outcomes

In analyzing the program outcomes, the evaluation determined three overarching findings around program outcomes:

Beneficial electrification: Switching from fossil fuels to electricity, where doing so satisfies at least one of the following conditions, without adversely affecting the others:

- Save consumers money over time;
- Benefit the environment and reduce GHGs
- Improve product quality or consumer quality of life; or
- Foster a more robust and resilient grid.

1. **Policy objective has changed from building energy efficiency to beneficial electrification.**[ii]

   The original objective of BESO, as developed in 2015, was to reduce the use of energy use of both gas and electricity use no longer aligns with the more recently adopted Fossil Fuel Free, decarbonization and resilience goals. A policy objective that prioritizes beneficial electrification will ensure the City is resilient in the face of climate change, yet as currently structured, the program does not prioritize the transition to clean electricity or promote switching away from natural gas-based appliances. This is reflected in the fact that the focus of energy assessments for both homes and larger buildings is on energy efficiency rather than on electrification-readiness.

2. **Conversion rates from assessment to energy upgrade have been difficult to measure due to lack of available data**

   BESO was designed to be an on-ramp to public benefit-funded energy upgrade rebate programs. However, lack of access to utility program participation data due to privacy protections and lack of granular building permit data make it difficult to measure specific outcomes of the current program in terms of which buildings are making upgrades, how much energy is being saved, or how many GHG emissions are being reduced. This has made it difficult to ascertain the conversion rate of buildings that progress from assessment to upgrade. However, a review of limited permit data, survey results, and anecdotal evidence indicate rates of adoption of recommended measures is low. For homes, conversion rates appear unaffected by whether the seller includes the energy assessment in the closing packet for the buyer or whether the buyer completes the assessment themselves. Survey results indicated that cost of upgrades was the main reason[5] why building owners did not complete the energy upgrades that were recommended in the energy assessments.

3. **Data from BESO has been useful in informing and shaping policy development.**

   BESO data provides staff with an overview of their existing building conditions which can help inform proposed policies. For example, the Home Energy

Example of Data Collected through Home Energy Score

Primary Heating System Type	Count	Percent
Baseboard	19	1.4%
Boiler	42	3.2%
Central Furnace	1,027	78.3%
Heat Pump	5	0.4%
Mini Split	2	0.2%
Wall Furnace	213	16.2%

5 32 out of 77 BESO participants who responded to the survey indicated that the cost was a reason they had not completed any energy upgrades.

Score data provides specific building characteristics, such as the type of heating systems, efficiency of the water heater and insulation condition. The data, which can be used to identify which homes might be good candidates for upgrades. Annual benchmark data from large buildings allows staff to see monthly energy usage data, including the breakdown between natural gas and electricity usage. These data allow staff to track energy usage over time and understand the load across seasons. Collecting and reporting this data for large buildings is also a State requirement. As more homes and buildings are touched by BESO, the building inventory data will become even more valuable.

Findings Related to Program Process

In analyzing the program outcomes, the evaluation determined two overarching findings around program process:

1. **BESO administrative process is staff-intensive and time consuming.**
   The implementation of BESO has been hampered by a labor-intensive manual process and the lack of a reporting system. Records have been maintained in an ACCESS database that was clunky, unstable, unable to handle large data sets, and had limited reporting functions. As BESO touches more and more buildings, both through the phase-in of larger buildings and the time of sale trigger, Berkeley will continue to struggle with administering the program effectively if it doesn't change its administrative process and software programs. Not only do these issues affect staff, it also creates a less positive experience for building owners, realtors, and energy assessors. Staff is in the process of creating a BESO online application and payment portal that should help to alleviate some of the administrative process issues.

2. **Ensuring compliance is challenging.**
   Enforcement for BESO compliance requires the ability to contact building owners, though staff often only have access to mailing addresses so communication is inefficient and ineffective. The enforcement of time of sale deferrals (Form C) to comply with the BESO assessment requirement after sale is low. Currently, 54% of the Form Cs that Berkeley has on file are expired and many of the mailing addresses have been returned as "undeliverable." In large buildings, building owners are often not aware of the requirements until they are out of compliance because of the difficulty of reaching the building owners by mail. Until compliance rates and communication improve, it will be difficult to add any additional requirements or increase BESO to include more buildings.

Overview of Berkeley's Existing Building Stock

The City of Berkeley is receiving technical support on electrification initiatives from the Building Electrification Initiative (BEI). BEI conducted a market segmentation analysis for the City of Berkeley that took inventory of all the buildings stock in Berkeley based on number of buildings, total square footage, and greenhouse gas emissions. BEI also analyzed BESO Home Energy Score data for homes (1-4 units).

HOMES (1-4 UNITS)

Based on BEI's analysis, there are about 30,000 homes in Berkeley with 1-4 units. These account for 86% of the total number of buildings and 51% of the total building area. All residential buildings (including those with more than 4 units) account for 48% of building-based GHG emissions.

In terms of building age, 89% of single family homes and 85% of 2-4 unit homes were built before 1950. This means that Berkeley's housing stock is largely existing, aging homes potentially with older building systems and appliances.

BEI also analyzed the BESO assessment data collected on over 1,300 homes between 2015 and 2019. The key takeaways from their analysis include:

- There is little variance in heating system type based on the building vintage.
- 78.3% of homes are using central furnaces and 16.2% of homes are using wall furnaces. Wall furnaces are estimated to use more natural gas per square foot than other heating systems.
- 97.5% of homes use natural gas as the primary heating fuel.
- 95.5% of homes do not have a cooling system.
- 98.95% of homes use natural gas for water heating.

SMALL/MEDIUM BUILDINGS

Based on BEI data, there are approximately 3,050 buildings in Berkeley totaling 12.5 million square feet that fall into the small/medium sized building category (less than 25,000 square feet, excluding 1-4 unit homes). This accounts for about 12% of all buildings and 22% of square footage of all buildings in Berkeley. As the requirements stand, these buildings will be phased in to the BESO requirements starting July 1, 2020.

LARGE BUILDINGS

Large buildings are defined as buildings with a gross square footage of 25,000 square feet, or greater. Based on BEI's evaluation, there are approximately 600 large buildings of 21.8 million square feet gross area in Berkeley. These account for 2% of the overall building stock and 27% of the total building area. In terms of building age, 34% of large buildings were built before 1950. All of these statistics present a unique opportunity for the City of Berkeley to upgrade aging infrastructure and they need to ensure that upgrades made by building owners and tenants are in line with the City's electrification and resiliency goals.

5. Analysis and Recommendations

Program Outcome Recommendations for All Buildings

Recommendation #1: Prioritize Electrification and Resilience

Update the primary focus of BESO to include electrification and resilience and ensure the ordinance properly reflects the updated goals for all buildings.

BESO's primary goal of energy savings should be updated to reflect the City's decarbonization goals. Instead of focusing on energy efficiency, the goal should be expanded to include electrification, emissions reduction, safety, and resilience. BESO should be updated to prioritize beneficial electrification for all building sizes and types, where possible. This will also allow BESO to better align with upcoming state and regional rebates for electric appliances and fuel switching technologies.

Policies that promote electrification and resilience help buildings adapt to the impacts of climate change (e.g. extreme heat, flooding, and fires) as well as improve indoor air quality and overall comfort for occupants. By updating BESO to achieve multiple-benefit solutions, BESO can help Berkeley simultaneously mitigate and adapt to a changing climate.

With an updated focus, the City should also consider updating the name of the ordinance. Currently, the phrasing of an "energy saving" ordinance does not encompass the recommended update to the goals of BESO. One suggestion is the Building Resilience and Electrification Ordinance (BREO).

Recommendation #2: Improve Ability to Measure Outcomes

Implement systems and requirements that allow for tracking upgrades and measuring the GHG emission savings, electrification-readiness, and resilience.

The City should update assessments to ensure that they capture GHG savings, electrification, resilience, and safety benefits of the proposed recommendations listed in the report. While PG&E is not able to share participation rates due to privacy concerns, the City should partner with East Bay Community Energy, BayREN and other regional entities who may provide future electrification rebates to better align and capture conversion from assessment to upgrade.

Recommendation #3: Electrification Outreach and Education

Increase electrification outreach and education for all building types, including developing materials on electrification measures and costs.

It will be important to provide education to homeowners, contractors and building managers on electrification and the relevant technologies, including heat pump water heaters, heat pump air heaters, mini splits, induction stoves, and heat pump dryers. Although each building is unique, having a list of common energy upgrades and electrification technologies can provide building owners with a first step to understanding potential energy and electrification upgrades. The list can be categorized by building size/type and should include the technical and economic considerations for the each

measure and estimated costs. Appendix I provides a sample list of measures for large buildings. Similar lists could be developed for homes and other building sizes and types in order to motivate building owners to pursue energy upgrades.

Recommendation #4: Consider Other Intervention Points

Consider other intervention points to target existing buildings.

There are multiple intervention points in the lifespan of a building where changes can occur to target its energy consumption and related systems. BESO utilizes two intervention points – targeting homes and other small/medium buildings at time of sale and targeting all buildings that meet the size threshold of 25,000 square feet or more on a phased-in schedule. In order to accelerate building improvements, Berkeley should consider policies that leverage other intervention points including point of lease/rental, building renovation, building maintenance or major system replacement, and/or building resilience upgrade (e.g. seismic renovation, flood prevention). Other strategies that should be considered to compliment BESO include targeting by building type (e.g. schools, retail, high rise, and multifamily) or geographically targeted strategies that phase in implementation by neighborhood or business district.

Program Outcome Recommendations for Homes (1-4 Units)

Recommendation #5: Integrate Transfer Tax Rebate with BESO

Update ordinance requirements to integrate the City Council-proposed expansion of the seismic transfer tax rebate** (0.5% of the purchase price) **and ensure alignment with efficiency and electrification upgrades.

In November 2018, Berkeley City Council referred staff to expand the Seismic Transfer Tax Rebate Program for qualifying electrification, energy efficiency, and water conservation retrofits. This presents an important opportunity for BESO to ensure that the transfer tax rebate can be applied to upgrades recommended through the BESO assessment, especially for low performing homes. Survey results[6] and feedback from meetings showed strong stakeholder interest in expanding the rebate to include energy-related upgrades. By providing rebates directly, the City will be able to directly track BESO upgrades and outcomes.

The City will need to determine which measures to incentivize through the transfer tax rebate and coordinate with the home energy assessors to ensure that the opportunity for these measures is evaluated in the home energy assessment. When expanding the transfer tax rebate measures, the City should include measures that enhance resilience or promote electrification-readiness. Potential measures could include upgrading an electrical panel, replacing a gas water heater with a heat pump water heater, completing insulation and air sealing alongside a combustion safety test, or installing an automatic gas shutoff valve.

6 52 out of 77 BESO participants and 33 out of 50 realtors who responded to the survey supported or strongly supported expanding the transfer tax rebates to include energy efficiency upgrades.

Administering the expanded transfer tax rebate will take additional staff time to process the rebates. The City should ensure that it can accurately track how many home sales take advantage of the transfer tax rebate being used for electrification upgrades. It is recommended that after three years the City should analyze the data and reevaluate whether to implement mandatory requirements. This will allow staff to better understand the uptake of measures, including understanding which electrification and resilience upgrades are most common and best suited for Berkeley homes, the costs for these measures, and any challenges for implementation.

Recommendation #6: Consider Requiring Electrification or Resilience Upgrades

Convene technical and trade experts to develop performance standards for electrification upgrades and allow the use of the transfer tax rebate to offset costs and consider mandating upgrades, while addressing any potential equity impacts.

To align with Berkeley's updated goals and catalyze electrification-readiness in homes, Berkeley could use the BESO program to require upgrades that focus on electrification, resilience, and energy efficiency and allow the transfer tax rebate to offset costs. Potential mandatory measures, as outlined in Appendix C, could include electric panel upgrades, duct sealing, upgrading insulation, pre-wiring for heat pump water heaters, etc. A home energy assessor could analyze the existing conditions to determine which of mandatory measures are best suited for a home. The homeowner would then be eligible for the transfer tax rebate to help cover the costs of the required upgrades.

Adding mandatory measures would significantly increase the requirements and costs for BESO compliance. To mitigate this, mandatory measure costs should be capped at or possibly slightly above the transfer tax rebate amount. To require mandatory upgrades, the City also needs to be able to handle the increased administrative time, as there would need to be a robust compliance, enforcement and exemption process to allow for homes that require substantial repair work and are sold "as is." Lastly, the City would be losing the revenue associated with the transfer tax if residents were expended all these funds applying them to mandatory upgrades in all transfers. The City should consider the implications of this reduction in transfer tax revenue.

Recommendation #7: Update Ordinance Trigger Point

Consider requiring the Home Energy Score at time of listing rather than at time of sale.

Currently BESO requires a Home Energy Score report be included in the closing packet or to be deferred to the new buyer. Berkeley should consider following the examples of Portland, Oregon and the European real estate market and require a Home Energy Score be completed earlier, at the time of listing, to ensure that it is truly a disclosure and market transformation tool.

This is expected to make home energy usage and potential upgrade opportunities more visible to homebuyers. With this information available at the beginning of the process, homebuyers are able to more readily consider the financial and practical implications of upgrades along with the rest of homeownership costs and benefits, and ultimately may invest more time and money into making improvements.

A time of listing requirement would necessitate integration with the Multiple Listing Service (MLS) to make the Home Energy Score a standard metric that people see for listings, similar to a walkability score. To integrate with the MLS requires agreement and action on the part of Bridge MLS, which may be beyond control of the City.

While it is important that the Home Energy Score is visible at the time of listing, it is also important that the new home buyer, who will be living in the home and making any upgrades, engage with the report and recommendations.

Additionally, the City should ensure that the transfer tax rebate information (see Recommendation #3) along with the assessment are all available together at the time of listing so potential buyers are receiving both sets of valuable information together at once – the areas for improvement and the available rebates to offset costs. If the City decides not to move the energy assessment to time of listing, it should ensure that the online system has features to help staff better track deferrals.

Recommendation #8: Update Data Collected from Energy Assessment

Continue use of Home Energy Score but require additional electrification-readiness information to be collected during the home energy assessment.

Some stakeholders have expressed dissatisfaction with the Home Energy Score, in part because it does not include recommendations focused on electrification. Eliminating the requirement to conduct the assessment was considered as an option in this evaluation. Ultimately, it is recommended that the City should maintain use of the Home Energy Score for several reasons:

- It is a nationally recognized metric, that was developed by the United States Department of Energy;
- It is a consistent metric used by jurisdictions across the United States;
- It uses a scale of 1-10 which is easy to understand for consumers;
- Many assessors are already trained to evaluate homes using the Home Energy Score criteria;
- It has quality assurance built in; and
- It provides important baseline information about homes.

The most impactful change would be to augment the assessment to include additional information. Adding electrification, resilience, and safety information to the assessment would better align with Berkeley's goals and would provide homeowners with information on how to electrify and make their homes more resilient. The City should consider a tool that includes electrification when updating the energy assessment requirements or create a supplemental set of electrification recommendations that could be added to the Home Energy Score report. In order to add electrification-readiness to a report, energy assessors will need to be trained on how to add these elements to their audits and how to make informed, tailored recommendations for electrification and resilience based on the assessed existing conditions of each home.

The specific recommended energy assessment improvements, along with their pros and cons, are listed in Table 2. An example of a report that includes some of this additional information is included in Appendix E.

Table 2: Energy Assessment Improvement Recommendations

Improvement	Pros	Cons
Require assessors to collect data about electrification-readiness and resilience opportunities	• Aggregates data about electrification potential • Provides electrification and resilience recommendations based on building characteristics	• Additional cost for assessment • Additional training for assessors
Identify measures eligible for transfer tax rebate and link recommendations to any additional rebates available	• Ensures that homeowners are using the transfer tax rebate for measures deemed important for electrification and resilience • Provides homeowners a resource to fund or partially fund recommended upgrades	• Risk of defining measures too narrowly • Additional cost for assessment • Additional training for assessors • Additional administrative time to disseminate updated rebate information to assessors
Require recommendations to include range of the cost of upgrade	Makes clear for homeowners how much they might consider spending on upgrades	Costs vary widely, based on existing conditions, market, and may not be accurate
Estimate emission reduction from each upgrade	Helps homeowner understand the environmental impacts they could be making	Estimate may not be accurate
Resilience and gas appliance safety evaluation	Provides safety information to homeowner	• Additional cost for assessment • Additional training for assessors

Recommendation #9: Investigate Assessment Tools for All Existing Homeowners to Encourage Electrification

Investigate free or low-cost assessment tools that could be used for all homes not triggered by the BESO time-of-sale requirements.

To enhance the tools available, Berkeley could research low-cost or free web-based tools that provide energy efficiency and electrification-readiness recommendations for homes. The City should consider encouraging or requiring all single family buildings, not affected by time-of-sale requirements, to use a free, customer-facing tool to understand how best to electrify their home. Tools could use customer input or publicly available data and building energy modeling to recommend a path for the home to reach zero net energy. Recommendations should be based on a home's unique characteristics, include energy use data for the most robust recommendations, and list the most cost-effective home upgrades.

Program Outcome Recommendations for Small/Medium Buildings

Recommendation #10: Consider Mandatory Requirements for Rental Properties

Prioritize improvements for rental properties with further program development that considers incentives and/or mandatory requirements.

Energy-related upgrades are typically challenging to implement in rental properties because of the 'split incentives.' For example, building owners are responsible for purchasing and maintaining key appliances and the building envelope – e.g., heating and cooling, water heaters, insulation, windows – yet renters pay for the energy related to these building components, thereby splitting the costs and benefits across parties. Additionally, there can be a temporal split incentive where renters' duration of occupancy deters their investment in energy reducing measures, even if contributing is possible. With these barriers to upgrades, additional level of attention is needed, especially since over 89% of 5+ unit multifamily buildings are rentals in Berkeley.[7]

One potential opportunity for Berkeley is programmatically integrating with the Rental Housing Safety Program currently under development. The information collected in this checklist and the energy assessments could help inform the prioritization of upgrades, and these upgrades could be implemented either through incentives and/or mandatory requirements. For example, buildings that do not successfully complete the checklist could be subject to mandatory upgrade requirements and those that do could be assigned incentives via an opt-in waiting list. The City of Berkeley staff should consider and evaluate a few potential pilot programs to ensure optimal solutions that avoid unintended consequences, such an increasing rents, displacement, or decreased safety.

Program Outcome Recommendations for Large Buildings

Recommendation #11: Introduce Energy Performance Card for Display

Develop an energy rating score card to display in the property.

Requiring building owners to display a simplified building energy performance scorecard will encourage them to pursue energy efficiency upgrades and, for well-performing buildings, maintain that high performance.

Chicago's new Energy Rating system,[iii] which is a zero to four-star rating system, requires building owners to post their rating in a prominent location on the property and share the rating information at the time of sale or lease listing. New York City also requires building owners to display their energy efficiency grade and score in a conspicuous location near each public entrance to the building. Implementing this program would require time and resources for City staff to determine which features would work best for Berkeley, educate building owners, and ensure compliance.

7 For 5+ unit multifamily buildings, BEI data showed that 463 out of 4,126 low rise and 13 out of 245 high rise units were owner occupied.

Recommendation #12: Educate Building Owners about Relevant Rebates and Programs to Reduce Project Costs

Ensure building owners have quick and easy access to the most relevant rebate program information for their potential project.

Electrifying a building is a cost-intensive, new idea for building owners and it is important for them to understand its impact on occupant comfort as well as capital and operational cost. One of the lessons learned in various benchmarking programs is the importance of significant outreach to and education of property owners about funding opportunities to reduce project costs.[iv] This was also raised as a point of feedback from assessors; they noted that the City did not provide enough information about rebates but that they didn't have the time to search PG&E's website for the information. Because rebates are often changing, reliable information can be difficult to find from the various rebate providers, including PG&E, East Bay Community Energy, BayREN, and other third-party program providers. Additionally, new rebate and incentive programs, which were previously precluded by the California Public Utilities Commission three-prong test rule, will eventually become available for electrification, changing the rebate landscape even further. Once this happens, PG&E will be selecting a third-party program administrator for all their new incentive programs.

The City should work with the new program administrator and other incentive providers to identify a central location for rebate and incentive programs. Then, this central location can be shared with energy assessors and building owners to ensure that building owners are aware of all the resources available to help them make upgrades, including financing options, energy audits, and rebate guides. This information could be disseminated by regularly updating the Berkeley website with tailored links for energy assessors and building owners and/or creating handouts for energy assessors to give to building owners that are regularly updated.

Other jurisdictions have dedicated teams that coordinate meetings between building owners and utilities or protocols in place that facilitate interactions between customers and local utilities. For instance, the City of Vernon, California, offers a customer incentive program where customers who participate in the program have direct contact with the City's gas and electric department. Additionally, projects funded by the Maryland Energy Administration are mandated to participate in incentive programs which helps reduce the payback period and make even large capital investment projects attractive.

Given that the product-based rebate programs often change and run out of funding, it is important that the information provided by Berkeley be constantly monitored and kept up to date. Examples of current product- and savings-based rebates available through PG&E are listed in Appendix J.

Recommendation #13: Require Mandatory/Prescriptive Building Tune-Up Measures

Include requirement for no-cost/low-cost building tune-up or retro-commissioning measures and track implemented measures and savings.

Per the California retro-commissioning guide,[v] retro-commissioning is "a systematic process for improving an existing building's performance by identifying and implementing relatively low-cost operational and maintenance improvements, helping to ensure that the building's performance meets owner expectations." A typical retro-commissioning project consists of planning, investigation, implementation, and handover phases. The deliverable includes a report which includes benchmarking information, energy audit, preliminary savings with project cost, final savings with invoices and recommendations for capital investment. The energy cost savings and non-energy cost savings for retro-commissioning vary from $0.11 to $0.72 per sq. ft. and $0.10 to $0.45 per sq. ft., respectively. The retro-commissioning cost varies from $0.13 to $0.45/sq. ft. and typical payback is less than two years.

As building systems age there are opportunities for no-cost/low-cost measures to keep these systems running as efficiently as possible, which can reduce building energy use. Some cities have already developed or implemented policies that require mandatory retro-commissioning or building tune-ups. For example, Seattle requires building tune-ups every 5 years; New York City requires retro-commissioning every 10 years; Los Angeles and San Jose will also have similar requirements starting in 2021. Additional information on existing building requirements for various cities is provided in Appendices G & H.

Recommendation #14: Set Performance-Based Energy or GHG-Based Targets

Convene a group of technical experts and building owners to develop performance standards based on energy use or greenhouse gas emissions targets with a timeline for requirements.

Benchmarking and energy assessments will help building owners and the City to understand the energy performance of the buildings, but in order to reduce energy use and GHG emissions, the policy should require energy upgrades and promote electrification. Other cities have developed performance-based targets, setting GHG emission thresholds or energy reduction targets based on building use types. As BESO aligns with Berkeley's fossil fuel free future, natural gas based targets should be explored as a path to electrify Berkeley's large building stock. Staff should convene a group of technical experts and building owners to develop performance standards based on energy use or greenhouse gas emissions targets and determine a timeline for those requirements to go into effect.

Recommendation #15: Team Up with Energy Service Companies

Partner with Energy Service Companies (ESCOs) to deliver guaranteed savings.

Working with ESCOs[vi] can reduce initial costs, increase the confidence level of building owners in the economic viability of projects, and ultimately accelerate the energy savings achieved by projects. The City of Berkeley can start an initiative similar to Building Owners and Managers Association (BOMA)'s Energy Performance Contracting (BEPC) Model[vii] to work with ESCOs and large building owners. This type of initiative helps building owners and operators navigate the difficulties in the Energy Performance Contracts by providing information and templates when executing investment-

grade energy efficiency retrofits. These initiatives are independent of funding resources and do not require a performance guarantee to ensure the opportunity is open to all service providers, but are flexible enough to include a performance guarantee as well as measurement and verification if the building owner intends to do so.

Program Process Recommendations for All Buildings

Recommendation #16: Implement Online System

Continue to build and launch integrated online application processing system for all building types.

Prior to this report being written, Berkeley had already contracted with a consultant to implement an online application and payment processing system. Berkeley should continue development of this online platform and should work to ensure the updated solution meets all of their needs, especially as requirements of the ordinance change.

Recommendation #17: Adjust Fees

Adjust fees for cost recovery of administrative time.

Currently, the fees leveraged for BESO applications are not covering the administrative time it takes to process them, particularly for Form C deferrals. Berkeley is conducting a fee study about how to adjust the BESO fees to better reflect staff time. The City should update the fees to more accurately account for administrative time, making sure to consider the time spent on compliance as well as any time saved from the implementation of the online system.

Program Process Recommendations for Homes (1–4 Units)

Recommendation #18: Formalize Exemption Threshold

Formalize exemption threshold of 850 square feet in BESO to exempt buildings between 600 and 850 square feet.

In updating BESO, Berkeley should formalize the exemption to ensure it is clear that buildings between 600 and 850 square feet are exempt from BESO requirements. This will ensure consistency across requirements and minimize the administrative burden of receiving applications for buildings that are exempt.

Recommendation #19: Increase the Deferral Fee to Cover Administration

Increase the time of sale deferral fee to cover additional administrative and enforcement costs.

Currently, over half of the homes required to comply with BESO opt to use the deferral option (Form C) rather than complete the BESO assessment prior to the point of sale. Low compliance rates from expired deferrals are time consuming for staff.

If the City moves to time of listing, the idea is that the energy assessment information will be more readily available to home buyers and the deferral option should be discouraged. Currently, the fee for submitting a deferral is less expensive than it is to comply with BESO. It is recommended that the City make the cost of deferrals commensurate with the time it takes for staff to process and follow-up with non-compliance of deferrals in order to disincentivize deferrals.

The evaluation team also considered eliminating the deferral option for time-of-sale but concluded that it was necessary in order to not delay or derail real estate transactions. It was also noted that if the deferral option is eliminated or restricted, more staff time may be needed to process exemptions.

Recommendation #20: Use Trade Professional Platform to Track Data

Implement a trade professional platform to integrate and streamline key components of the BESO process related to the delivery of assessment and energy upgrade services.

Given that Berkeley is already implementing upgraded software systems, BESO would benefit from enhancing those upgrades to include an online trade professional platform. This platform could connect home and building owners directly with assessors, who could perform their building assessment, and contractors, who could make the improvements recommended through the BESO assessment. An outline of the workflow and details about the features are included in Appendix F.

Program Process Recommendations for Small/Medium Buildings

Recommendation #21: Streamline Small and Medium Building Requirements

Streamline small and medium building requirements by updating the building size categories.

Currently, small and medium building requirements are a combination of the time of sale requirements and the large building requirements. This creates an administrative burden and causes confusion for building owners. To help mitigate this, the categories should be resized and the new requirement should be:

- 850 square feet or below – exempted
- 850-14,999 square feet – time of sale requirement
- 15,000-24,999 square feet – annual benchmarking requirement

This will change the BESO requirements for some medium-sized buildings from a phase-in schedule to a time-of-sale requirement. Although there may be additional time of sale administrative work, this should be mitigated by the new online system. Additionally, it is not expected that these buildings will turn over ownership very often. The streamlined requirements would also require additional buildings to comply with an annual benchmarking requirement but lessen the assessment requirement, which can be cost-prohibitive for small and medium sized buildings. Annual benchmarking will ensure that energy data is collected about these buildings.

Program Process Recommendations for Large Buildings

Recommendation #22: Standardize Data Collection to Improve Building Inventory

Utilize the U.S. Department of Energy's Asset Score Reporting template as the assessment data collection tool.

Currently, BESO allows data collected through the assessments to be submitted in a variety of tools, some of which don't allow for mass data export. Building information and data is then not able to be aggregated and utilized for any sort of analysis. The City should standardize how data is

submitted and what fields are collected, including main business type, year built, age of the building systems, year of last energy audit, year of completed upgrades if any, primary heating and cooling equipment, primary usage, schedule, any change in building usage type and shared or dedicated meter. Berkeley should collect data from assessments through the U.S. Department of Energy's Assets Score Reporting Template since: it is a nationally used tool to collect energy assessment information, Berkeley assessors are familiar with the tool and most already are using it, and it's free and customizable allowing the City to specify the required fields.

6. Conclusion

In order to use BESO as a means to help achieve Berkeley's climate and decarbonization goals, the City needs to update the primary focus of the ordinance and ensure that it can better measure outcomes that target GHG emission savings, electrification-readiness, and resilience. This will require outreach and education to homeowners, contractors, and building managers.

To improve outcomes for homes, Berkeley should align BESO with the City's proposed transfer tax rebate expansion to help finance energy efficiency, electrification, and resilience upgrades and consider requiring homeowners to make mandatory upgrades. To help ensure prospective homeowners understand the energy efficiency of a home, the BESO program should consider moving the trigger point from time-of-sale to time of listing. Additionally, Berkeley should enhance the Home Energy Score report to include an electrification-readiness assessment and investigate other types of assessment tools that encourage electrification.

For small/medium buildings, Berkeley should consider mandatory requirements for rental properties in order to overcome split incentives of upgrades between building owners and building occupants.

In large buildings, Berkeley should consider requiring mandatory building tune-up measures for large buildings and/or set performance-based energy or GHG-based targets. Berkeley should develop an energy rating score card to display in properties that would make energy efficiency more conspicuous. Berkeley should also ensure building owners have quick and easy access to the most relevant rebate program information for their potential projects and would benefit from teaming up with energy service companies.

From a process standpoint, Berkeley should convene different technical experts as part of an advisory group to ensure stakeholders understand electrification and its benefits. Additionally, the City should continue to implement an integrated online application processing system and should work to adjust fees of the program to accurately recover the cost of administrative time. BESO would also benefit from the development of a knowledge database that includes the most prevalent issues and measures for implementation.

To improve specific process issues, Berkeley should formalize the exemption threshold for buildings between 600 and 850 square feet, implement a trade professional platform, update the requirements for small/medium buildings, and utilize the U.S. Department of Energy's Asset Score Reporting template for collecting data about large buildings.

Overall, the City needs to ensure that any updates made to BESO still allow the ordinance to be flexible enough to adapt to changing City goals and respond to the changing technology landscape that is inevitable as electrification becomes more commonplace.

Appendix A: Stakeholder Outreach

The BESO evaluation relied mainly on conversations with City staff as well as stakeholder surveys and meetings. Surveys were sent to BESO participants, realtors, and energy assessors. For participants, 77 respondents answered ten questions covering:

- Building characteristics;
- Overall feedback on the program;
- How valuable the BESO information was;
- Potential updates to the program; and
- General open-ended feedback.

For realtors, 50 respondents answered ten questions covering:

- Overall feedback on the program;
- Open-ended feedback about the energy assessments;
- Energy assessors;
- Potential updates to the program; and
- General open-ended feedback.

Finally, for energy assessors, 5 home assessors and 11 commercial building assessors answered fourteen questions covering:

- Energy assessment tools;
- Overall feedback on the program;
- Value to clients;
- Time to complete an assessment;
- Potential updates to the program; and
- General open-ended feedback

After receiving the results of the surveys, it was clear that the survey questions had been more focused on process than outcomes. For future evaluations, survey questions should be better designed to understand the outcomes that have resulted from BESO.

In addition to surveys, meetings were held with realtors, energy assessors, and the Energy Commission. The realtor meeting was held on November 4, 2019 with approximately 20 realtors in attendance. It lasted for two hours and feedback was collected about what they thought was working and wasn't working with BESO, the feedback they receive directly from homeowners about the information gleaned from BESO, and their thoughts on integrating BESO with the transfer tax rebate.

The assessor meeting was held on November 15, 2019 with approximately 5 home assessors and 8 large building assessors.[8] This meeting also lasted for two hours where the first hour was a joint session and the second hour was split between home and large building assessors. In the home assessor session, feedback was collected about additional energy assessment tools, additional test they could perform, and ways to

8 This accounts for some assessors who perform both home and large building assessments.

streamline the reporting process. In the large building assessor session, feedback focused on increasing outreach about the program, ensuring benchmarking is done by a professional, and their thoughts about improvements to the program. The presentation for the assessor meeting can be found on Berkeley's website.[viii]

Finally, the progress to-date was presented to the Energy Commission on December 4, 2019. There were 7 commissioners in attendance who gave feedback about the lack of outcomes achieved from BESO and the need for major changes to the ordinance.

Appendix B: Current BESO Requirements

BESO has distinct requirements based on building type and size. For large commercial and multifamily buildings, 25,000 was determined as the minimum threshold for annual benchmarking because smaller building do not often have a dedicated building manager available to comply with this requirement. For 1 to 4 unit homes, 4 units was chosen as the ceiling because it is consistent with ratepayer-based public benefits funded programs for homes such as Energy Upgrade California. Finally, for small and medium commercial and multifamily buildings between 850 and 24,999 square feet, the requirement was determined to be a combination of the homes and large building requirements.

Building Size	Requirements
25,000+ sq. ft.	Annual Benchmark Energy Assessment every 5 years
15,000-24,999 sq. ft.	Time of Sale Requirement or Assessment every 8 years Phase-in 7/1/2020
5,000 – 14,999 sq. ft.	Time of Sale Requirement or Assessment every 8 years Phase-in 7/1/2021
850-4,999 sq. ft.	Time of Sale Requirement or Assessment every 10 years Phase-in 7/1/2022
1 - 4 unit homes	Assessment at Time of Sale

1-4 Unit Homes

When 1-4 unit residential buildings are sold, BESO requires that the seller either submit an energy assessment, apply for a deferral, or qualify for an exemption. The BESO application is the same for all cases with different compliance options listed for the applicant to choose.

If submitting an energy assessment, the applicant must hire a registered BESO energy assessor to complete the assessment. Then, the applicant must submit the energy assessment, a BESO application, and a filing fee to the City of Berkeley before receiving a Compliance Form A.

Alternatively, a seller can apply for a deferral. There are two ways to apply for a deferral:

1. ***Transfer responsibility of BESO compliance from the seller to the buyer.*** Submitting a BESO application and filing fee will generate a Deferral Form C that the seller needs to submit to the title company at closing. The buyer then has 12 months from the sale date to comply with BESO requirements.
2. ***New or planned construction.*** If the house sold is new construction or if there is an extensive renovation where all energy-related equipment and at least half the building envelope is replaced, the reporting requirements may be deferred for up to ten years. The seller must submit a BESO application and all applicable permits that will generate a Deferral Form D to be submitted to the title company at closing.

Additionally, there are three ways a seller can qualify for an exemption:

1. ***Qualifying as a High Performance Building.*** The seller must submit a BESO application and proof that the home has completed an energy efficiency incentive program.

2. ***Being in a particular size category.*** A building qualifies for an exemption if it is greater than 25,000 square feet, under 600[9] square feet, or a duplex with both units under 600 square feet each. The seller must submit a BESO application.
3. ***Being a unit within a larger building.*** Units within larger buildings, such as an individually-owned, attached condo, qualify for an exemption. The seller must submit a BESO application.

Small/Medium Buildings

This category applies to buildings less than 25,000 square feet. The phase in schedule for requirements is as follows:

- July 1, 2020: 15,000 – 24,999 square feet
- July 1, 2021: 5,000 – 14,999 square feet
- July 1, 2022: Less than 5,000 square feet

Upon these deadlines, the buildings in each tier must complete an energy assessment performed by a registered energy assessor; this energy assessment must be completed every 10 years. However, if any of these buildings are sold prior to the phase-in deadline, they must comply with the same Time of Sale requirements to which 1-4 units are subject. To determine the type of assessment required for these buildings, consult the BESO website.[ix]

Buildings with an ENERGY STAR score of 80 or above are exempt from the assessment requirement.

Large Buildings

This category applies to buildings equal to or more than 25,000 square feet. The phase in schedule for requirements is as follows:

- July 1, 2018: Greater than 50,000 square feet
- July 1, 2019: 25,000 – 49,999 square feet

Upon these deadlines, the buildings in each tier must complete an Energy Assessment every 5 years and complete an Annual Benchmarking Report through the ENERGY STAR Portfolio Manager;

This category includes certain exemptions and deferrals:

- Buildings with 50% dedicated to industrial or lab uses are exempt;
- Buildings over 25,000 ft2 are exempt at time of sale;
- Verified High Performance buildings are exempt from the assessment requirement;
- Deferral for Long-Term Tenancy under Rent Control is applicable as defined in BMC chapter 13.76;
- Deferral for New Construction or Extensive Renovation is available for recently constructed or extensively renovated buildings that provide sufficient permitted evidence;
- Low Energy Use Deferral is available to large buildings with a verified or certified U.S. EPA ENERGY STAR Portfolio Manager Performance Score of 80 or greater. A verified Score requires completion of the ENERGY STAR Data Verification by a Professional Engineer or Registered Energy Assessor, excluding the Indoor Air Quality section.

9 As of report writing, 600 square feet is the threshold. Berkeley plans to update this threshold to 850 square feet.

Benchmarking exemptions and deferrals:

- Exemption: If more than half of a building or campus is dedicated to scientific experiments requiring controlled environments or for manufacturing or industrial purposes, it is exempt from benchmarking requirements.
- Data Unavailable Deferral: Energy benchmarking can be deferred if:
  a) A building has less than five residential active utility accounts and the Building Owner can demonstrate that a tenant refused data authorization OR
  b) A building occupant demonstrates to the Administrator that such disclosure may result in the release of proprietary information which can be characterized as a trade secret.

Appendix C: Potential Mandatory Measures for Homes (1–4 Units)

Table 3 below outlines potential mandatory measures that Berkeley could require for homes (1-4 Units).

Table 3: Potential Mandatory Measures for Homes (1-4 Units)

Measure Category	Measure
Electrification	Electric service panel upgrade (200 amp)
Electrification	Electrical work required to install electric appliances that replace gas appliances (e.g. 240 outlets)
Electrification	Electric heat pump space heating/cooling (replacing gas on-ly)
Electrification	Electric heat pump water heater (replacing gas only)
Electrification	Induction stove or range (replacing gas only)
Electrification	Heat pump clothes dryer (replacing gas only)
Electrification	Level 2 electric vehicle charging station
Electrification	Solar panel installation
Resilience	Battery storage installation
Resilience	Solar + Storage
Resilience	Combustion Safety Test
Resilience	Automatic Gas Shutoff Valve
Energy Efficiency	Upgrading insulation
Energy Efficiency	Duct sealing

Appendix D: Sample Home Energy Score

U.S. DEPARTMENT OF ENERGY
Home Energy Score

Know your home. Know your Score.

THIS HOME'S
HOME ENERGY SCORE
6 out of 10

THIS HOME'S ESTIMATED
ENERGY COSTS
$2263 per year

HOME PROFILE

LOCATION:
Berkeley, CA,94703

YEAR BUILT:
1904

HEATED FLOOR AREA:
2552 sq. ft.

NUMBER OF BEDROOMS:
4

ASSESSMENT

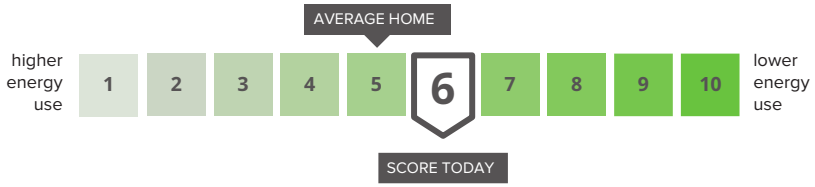
ASSESSMENT DATE:
10/28/2019

ASSESSOR:

PHONE:

EMAIL:

Home Energy Score details



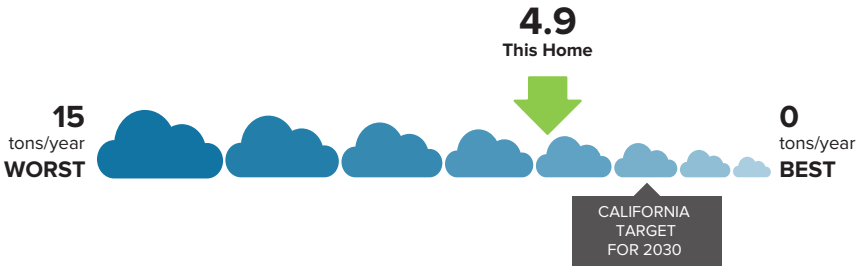
Official Assessment | ID#296958

Home Energy Score is an easy way to see how energy efficient this home is compared to other homes. A higher score is better. This report also contains ways you can make your home more efficient and more comfortable.

How much energy is this home likely to use?

Electric	**8127 kWh/year**	**$1674**
Natural Gas	**419 therms/year**	**$589**
	TOTAL ESTIMATED ENERGY COSTS PER YEAR	**$2263**

This home's carbon footprint



BAYREN
Local Governments Empowering Our Communities

Tackle energy waste today!

Enjoy the rewards of a comfortable, energy efficient home that saves you money.

SCORE TODAY
6
out of 10

- [x] Get your home energy assessment. Done!
- [ ] Choose energy improvements from the list of recommendations below.

  Need help deciding what to do frst? The BayREN Home Upgrade Advisors offer free phone consults with independent expert home advisors. **Call 866-878-6008.**
- [ ] Check out **www.bayareaenergyupgrade.org** for information on Energy Upgrade California® programs and fnancing opportunities.
- [ ] Select a contractor (or two, for comparison) and obtain bids.
- [ ] Perform upgrades and enjoy a more comfortable and energy efficient home.

Energy Improvements, customized for your home.

FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS
Attic Insulation	Insulated to R 11	At least 15% leakage reduction from vintage table defaults
Wall Insulation	Insulated to R 00	Insulate ≥ R 13
Heating Equipment	Central gas furnace 90% AFUE	Ductless heat pump ≥ 9.4 HSPF/17 SEER***
Water Heater	Gas storage 78% EF	Heat pump water heater ≥3.24 EF***

***Electrical panel upgrade may be required for gas to electric change-outs.

Appendix E: Sample Energy Report with Electrification

TUNERGY

Your Energy Audit

nyserda
Energy. Innovation. Solutions.
1-866-NYSERDA • www.nyserda.ny.gov

Home
Sample NYSERDA
15 Glenwood St
Albany, NY 12203

Audit Date
Jul 2, 2015
3:01 pm

Audited By
Sandy Michaels
New York Testing
123 Bell Street
Albany, NY 12203
sandy@snugghome.com

Don & Margery -

Thank you for inviting us to do an energy audit on your beautiful home! We've kept your concerns in mind during our inspection and testing. Let's discuss the recommendations found in this report and see what works best for you.

Thanks,
Sandy

Inside Your Report

Powered by Snugg Pro

TUNERGY

Concerns

We listened to you!
As our client, we want to make sure we are addressing all of your concerns for your home. If we have missed any concerns in this report, please let us know right away.

Air Leaks
Air leaks have been noticed around the window frames, and especially around the front door.

Heating system is old
Furnace needs to be replaced for additional comfort and health & safety issues.

Kitchen gets too hot
The primary culprits are the large number of halogen can lights. Replacing these lights with new efficient bulbs will dramatically reduce the heat created by the lighting.

TUNERGY

Solutions for Your Home

Totals

Cost
$ 20,854

Estimated Savings
$ 1,801 per year

This is an estimate of how much you could save starting in Year 1. Savings will only increase as energy prices rise over the years.

Impact of upgrades

Energy Reduction	42%
Carbon (CO2) Savings	9 tons
Equivalent cars removed from the road	1.9/yr

Call us today to ask a question or discuss the next step!

Details	Installed cost	Approximate annual savings	SIR*
Seal Air Leaks	$1,015	$142.43	2.8
Attic Improvements	$1,883	$140.17	2.2
Cooling System	$3,355	$183.8	0.8
Heating System	$6,288	$263.68	0.8
Thermostat Set Points	$170	$197.02	12.7
Upgrade Water Heater	$1,223	$72.75	0.9
Upgrade Lighting	$77	$238.91	21.9
Insulate Walls	$5,508	$493.01	2.7
Refrigerator	$1,336	$68.86	0.9

* SIR is the Savings to Investment Ratio. Simply put, if the SIR is 1 or greater, then the energy savings from the item will pay for itself before it needs to be replaced again. This metric is used to help prioritize the recommendations by financial merit.

TUNERGY

Seal Air Leaks

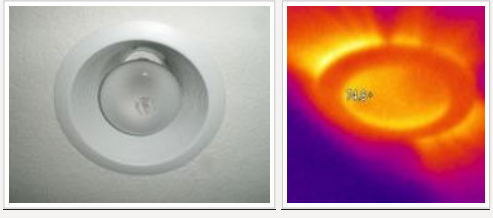
AIR LEAKAGE

Installed Cost
$ 1,015

Energy Savings
Approx. $ 142

Why it matters
Air sealing is typically the most cost effective improvement you can make to your home. To properly seal out air leaks, a large fan called a blower door is used to depressurize your house. This makes air leaks easy to find, so corrective measures can be taken. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.

Good air-sealing and a continuous air barrier between the attic and the home's conditioned (living) space are important, not only to save energy and reduce fuel bills, but also to prevent moisture problems in the attic.



Air leakage at Can Lights:

Air leakage at Attic Hatch:

Seal Air Leaks

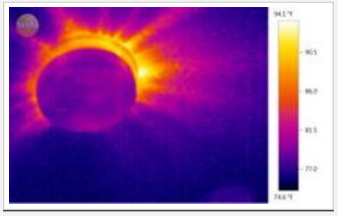
AIR LEAKAGE

Installed Cost
$ 1,015

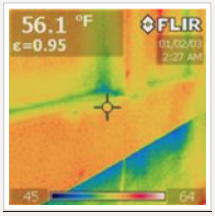
Energy Savings
Approx. $ 142

Why it matters

Air sealing is typically the most cost effective improvement you can make to your home. To properly seal out air leaks, a large fan called a blower door is used to depressurize your house. This makes air leaks easy to find, so corrective measures can be taken. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.



Air leakage at Smoke Detector:



Air leakage at Windows:

Now & Goal

Details	Now	Goal
Blower Door Reading	3,628 CFM50	2,540 CFM50
Wind Zone	2	N/A
N-Factor	15.0	N/A
Equivalent NACH	0.67 NACH	0.47 NACH
Conditioned Air Volume	21,546 ft^3	N/A
Effective Leakage Area	204 in^2	143 in^2
Equivalent ACH50	10.1 ACH50	7.1 ACH50

Attic Improvements

ATTIC

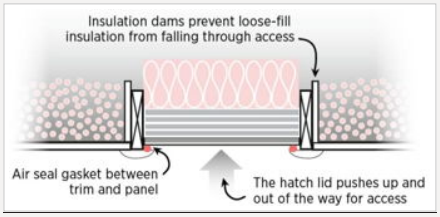
Installed Cost
$ 1,883

Energy Savings
Approx. $ 140

Why it matters

Adding insulation to your attic can lead to a significant reduction in your utility bills. This process is often combined with careful air sealing of the ceiling from the attic side to ensure the new insulation perform at its maximum level.

The current level of insulation in the attic is low and uneven. Taking the R Value to a consistent 49 will vastly improve the comfort and efficiency of your home.



Insulate the Attic Hatch: Openings used for access to the attic such as access panels, doors into kneewalls, or dropdown stairs should be air sealed and insulated.

Now & Goal

Details	Now	Goal
Attic Roof Absorptance	0.92	0.92
Attic Roof Emissivity	0.90	0.90
Modeled Attic Area	1,197 ft^2	1,197 ft^2
Attic Insulation	10 R Value	49 R Value
Radiant Barrier?	No	No

Cooling System

COOLING SYSTEM

Installed Cost
$ 3,355

Energy Savings
Approx. $ 184

Why it matters
Install a more efficient air conditioner or evaporative cooler. Depending on the age of the unit, substantial savings may be gained by replacing it with an Energy Star rated appliance. If it doesn't quite make sense to replace your air conditioner now, be prepared to choose a high efficiency Energy Star unit (14 SEER or higher) when it finally wears out.

If you choose to install / upgrade an AC unit, consider installing an ENERGY STAR rated or higher efficiency unit (14 to 20 SEER). Keep the pad on which the AC unit sits level, shaded and maintain at least one foot from the home and any other obstructions.

Now & Goal

Details	Now	Goal
Cooling Equipment 1		Central AC
Cooling Capacity 1	24,000 BTU/h	24,000 BTU/h
% of Total Cooling Load 1	100 %	100 %
Cooling System Manufacturer 1	Unknown	Unknown
Cooling System Efficiency 1	10.0 SEER	17.0 SEER
Cooling System Model Year 1		2015

Heating System

HEATING SYSTEM

Installed Cost
$ 6,288

Energy Savings
Approx. $ 264

Why it matters
Install a more efficient furnace, boiler or heat pump. Depending on the age of the unit, substantial savings may be gained by replacing it with an Energy Star rated appliance. If you're heating with gas, look for a sealed combustion unit. They're much safer since the exhaust pathway from the unit is sealed and goes directly outside. If it doesn't quite make sense to replace your heating system now, be prepared to replace it with a high efficiency Energy Star unit when it finally wears out.

Upgrade your furnace to a 95-98% efficient, sealed combustion system. You will only be losing 2-5 cents per dollar of heating and you will reduce your risk of carbon monoxide poisoning.

Now & Goal

Details	Now	Goal
Heat Pump Inverter 1		No
Heating Equipment 1		Furnace
Heating Energy Source 1	Natural Gas	Natural Gas
% of Total Heating Load 1	90 %	90 %
Heating Capacity 1	0 BTU/h	50,000 BTU/h
Heating System Efficiency 1	68 AFUE	98 AFUE
Heating System Manufacturer 1	Unknown	Unknown
Heating System Model Year 1		2015
Heat Pump Inverter 2	No	No
Heating Equipment 2	Electric Resistance	Electric Resistance
Heating Energy Source 2		Electricity
% of Total Heating Load 2	10 %	10 %
Heating Capacity 2	100,000 BTU/h	100,000 BTU/h
Heating System Efficiency 2	100 AFUE	100 AFUE
Heating System Manufacturer 2	Unknown	Unknown
Heating System Model Year 2		2015

Thermostat Set Points

THERMOSTAT

Installed Cost
$ 170

Energy Savings
Approx. $ 197

Why it matters
Installing a programmable thermostat (or correctly setting the one you currently have) will help you to use less energy when you're not at home or when you're sleeping.

The location of your thermostat can affect its performance and efficiency. Read the manufacturer's installation instructions to prevent "ghost readings" or unnecessary furnace or air conditioner cycling.

To operate properly, a thermostat must be on an interior wall away from direct sunlight, drafts, doorways, skylights, windows, vents and fans. It should be located where natural room air currents–warm air rising, cool air sinking–occur. Furniture will block natural air movement, so do not place pieces in front of or below your thermostat. Also make sure your thermostat is conveniently located for programming. Energy.gov.

Notes to Homeowners

The improved thermostat settings are the industry standard for energy efficiency. Try these settings to see how they match with your comfort zone, adjust by small degrees if necessary.

Now & Goal

Details	Now	Goal
Heating Setpoint High	68 °F	68 °F
Heating Setpoint Low	68 °F	62 °F
Cooling Setpoint High	75 °F	85 °F
Cooling Setpoint Low	75 °F	78 °F

Upgrade Water Heater

WATER HEATER

Installed Cost
$ 1,223

Energy Savings
Approx. $ 73

Why it matters
High efficient hot water heaters save energy and are safer due to carbon monoxide. Older units run the risk of leaking. Consider replacement if your hot water heater is 13 or more years old.

Tankless water heaters are typically about 20% more efficient than tank-style heaters. If you have hard water, we do not recommend tankless units because minerals from the water can precipitate out inside the heat exchanger, leading to increased maintenance costs.

Now & Goal

Details	Now	Goal
DHW Fuel	Natural Gas	
DHW Type	Standard tank	
DHW Age	21-25	
DHW Location	Garage or Unconditioned Space	
DHW % Load	100 %	100 %
DHW Manufacturer	Unknown	Unknown
DHW Model Year		2015
DHW Energy Factor	56 EF	82 EF
DHW Energy Star	No	Yes

Upgrade Lighting

LIGHTING

Installed Cost
$ 77

Energy Savings
Approx. $ 239

Why it matters
Replacing incandescent bulbs with CFLs or LEDs will save significant energy and replacement costs over time.

Upgrade lighting to CFLs or LEDs. Replace incandescent light bulbs used more than an hour per day with compact fluorescent light bulbs (CFLs), and replace other bulbs with lower-Wattage standard incandescent bulbs. CFLs typically reduce lighting energy use by 75%.

Can lights should be replaced with new LED lights. This will reduce heat gain, save on energy, and prevent any heat related issues with the attic insulation.

Now & Goal

Details	Now	Goal
# of Incandescents	38	4
# of CFLs or LEDs	7	41
% CFL or LED	16 %	90 %

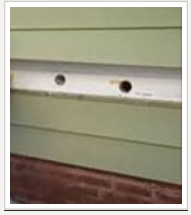
Insulate Walls

WALLS

Installed Cost
$ 5,508

Energy Savings
Approx. $ 493

Why it matters
Insulating your walls can lead to a significant reduction in utility bills. The is done by drilling small holes in the wall cavities either from the inside or outside and filling the space with cellulose, fiberglass, or even foam insulation. If it's time to replace your exterior siding, then be sure to ask your contractor about adding a layer of rigid foam underneath the new sheathing of 1" or more.



Insulate exterior walls:

By “dense packing” cellulose insulation in your wall cavities, air leaks and drafts will be dramatically reduced. To install the insulation, contractors will lightly pry up a few rows of siding of on your house and temporarily remove it. They will then drill a 2” hole in the sheathing for every wall cavity. A blower pushes cellulose insulation at high speed through a hose into the holes, filling the wall cavity. Great care is taken to ensure the cellulose fills into every part of the wall.

Now & Goal

Details	Now	Goal
Exterior Wall Siding	Wood/Fiber Cement siding	
Exterior Wall Construction	Frame	
Wall Cavity Insulation	0 R Value	13 R Value
Wall Continuous Insulation	0 R Value	0 R Value
Modeled Wall Area	2,517 ft^2	N/A

Refrigerator

REFRIGERATOR

Installed Cost
$ 1,336

Energy Savings
Approx. $ 69

Why it matters
Old refrigerators can often cost twice as much to operate as a new refrigerator. Energy Star units can use half the energy as older, less efficient models.

Now & Goal

Details	Now	Goal
Refrigerator Energy Star	No	Yes
Refrigerator Model Year	1990	2015
Refrigerator Manufacturer	Unknown	LG
Refrigerator Usage	840 kWh/yr	461 kWh/yr
Refrigerator Model		LSFS213

Health & Safety

What's This?
These tests are recommended by the Building Performance Institute (BPI). They can help identify potential health and safety concerns in your home.

Install a Low Level Carbon Monoxide Monitor

CO detectors are highly recommended in homes with fuel-burning appliances. The detectors signal homeowners via an audible alarm when CO levels reach potentially dangerous levels.

MOLD & MOISTURE

Moisture control is the key to mold control. Molds need both food and water to survive; since molds can digest most things, water is the factor that limits mold growth. Molds will often grow in damp or wet areas indoors. Common sites for indoor mold growth include bathroom tile, basement walls, areas around windows where moisture condenses, and near leaky water fountains or sinks. Common sources or causes of water or moisture problems include roof leaks, deferred maintenance, condensation associated with high humidity or cold spots in the building, localized flooding due to plumbing failures or heavy rains, slow leaks in plumbing fixtures, and malfunction or poor design of humidification systems. Uncontrolled humidity can also be a source of moisture leading to mold growth, particularly in hot, humid climates.

ELECTRICAL

Have an electrician look at the wall plugs that are located near a water source, to see if a GFCI (ground-fault circuit interrupter) is recommended.

CAZ (combustion appliance zone) test results:

Air Filters

ADDITIONAL NOTES

About this section

Additional notes are miscellanous items that deserve a mention in your home's report.

These mentioned items are not included in the cost or savings of your project.

Why it matters

A dirty filter will slow down air flow and make the system work harder to keep you warm or cool — wasting energy. A clean filter will also prevent dust and dirt from building up in the system — leading to expensive maintenance and/or early system failure. EnergyStar.gov

Check your filter every month, especially during heavy use months (winter and summer). If the filter looks dirty after a month, change it. At a minimum, change the filter every 3 months.

Water Sense

ADDITIONAL NOTES

About this section

Additional notes are miscellanous items that deserve a mention in your home's report.

These mentioned items are not included in the cost or savings of your project.

Why it matters

On a national scale, if every home in the United States installed WaterSense labeled showerheads, we could save more than $2.2 billion in water utility bills and more than 260 billion gallons of water annually. In addition, we could avoid about $2.6 billion in energy costs for heating water. EPA.gov.

Save water and protect the environment by choosing WaterSense labeled products in your home.

Showering is one of the leading ways we use water in the home, accounting for nearly 17 percent of residential indoor water use—for the average family, that adds up to nearly 40 gallons per day.

Rebates & Incentives

1-866-NYSERDA • www.nyserda.ny.gov

The 10% cashback incentive

When you complete energy efficiency upgrades through the Home Performance with ENERGY STAR program, you will be eligible to receive 10 percent of the cost of eligible upgrades back (up to a maximum of $3,000) after the work is complete.

Your contractor can help you verify that your upgrades qualify for this incentive.

For a full list of energy efficiency improvements that qualify for 10% cash back, download this PDF:
bit.ly/ny-eligible-measures

Assisted Home Performance with ENERGY STAR grants

Depending on household income you can qualify for a grant of up to $5,000 to cover up to 50 percent of the cost of energy efficiency upgrades. In most New York State counties, a family of four with a household income up to about $65,000 will qualify.

Two- to four-unit residential buildings with additional income-eligible households can qualify for a grant of up to $10,000.

To learn more go to:http://bit.ly/ny-assisted-3

Get low-interest financing! Two options:

Option 1: On-Bill Recovery Loans with a 3.49% interest rate

An On-Bill Recovery Loan allows you to have your loan payments built into your utility bill. You'll have no extra bills each month and nothing new to keep track of. Even better: your monthly payments will be calculated not to exceed the expected amount your energy upgrades will save you on energy costs. So your energy savings cover most or all of your payment. Interest rates are subject to change.

When you rent or sell your home, you will have the option to transfer the unpaid balance of loan to the new owners or tenants. If you do choose to transfer the balance, you'll be required to provide notice to the new owner or tenant.

On-Bill Recovery Financing requires a declaration to be signed and filed by NYSERDA. The declaration is not a lien on the property but is recorded to provide notice to others of the obligation under the loan note.

Customers of the following utilities are eligible for On-Bill Recovery Financing: Central Hudson Gas & Electric, Con Edison, Long Island Power Authority, NYSEG, National Grid (upstate NY customers only), Orange & Rockland, and Rochester Gas & Electric.

Option 2: Smart Energy Loans with interest rates as low as 3.49%

Smart Energy Loans offer affordable interest rates, flexible terms and simple repayment options. Paying for a Smart Energy Loan is similar to any other conventional loan. You make monthly payments to NYSERDA's loan servicer by check or automatic bank withdrawals. The current interest rate is 3.49% if you pay via automatic bank withdrawals. Interest rates are subject to change

To apply for financing visit Energy Finance Solution:
http://bit.ly/ny-financing

Financing

About financing

The loan scenario(s) listed are examples only and are not a formal offer of financing. Rates, terms and closing costs and eligibility requirements may vary.

Powersaver 203(k) Streamline

Mortgage loans for those looking to purchase and renovate, or refinance and renovate a home. $3,500 of the loan has to go towards qualifying energy upgrades. Low closing costs.

Terms & Conditions

Minimum Loan	$ 3,500
Maximum Loan	$ 35,000
Min. Cash Down	$ 0
Rate	4.00%
Term	360 months
Min. FICO Score	640
Closing costs	N/A

The Math

Job Cost	$ 20,854
Cash down	$ 0
Loan amount	$ 20,854
Your loan payment: (4.00% @ 360 months)	$ 100
Estimated energy savings	$ 150
Estimated net monthly savings	$ 50

Call Lindsay Olsen at 801-803-5495 or email lindsay.olsen@wjbradley.com to apply today!

Elevations Loan - 5 yr

Terms & Conditions

Minimum Loan	$ 500
Maximum Loan	N/A
Min. Cash Down	$ 0
Rate	3.80%
Term	60 months
Min. FICO Score	580
Closing costs	N/A

The Math

Job Cost	$ 20,854
Cash down	$ 0
Loan amount	$ 20,854
Your loan payment: (3.80% @ 60 months)	$ 382
Estimated energy savings	$ 150
Estimated net monthly cost	$ 232

Free energy advising to help you through the process and low interest rates for 3,5,7,10 and 15 year terms.

TUNERGY

Metrics

About the metrics

These metrics are for the whole house in a pre and post-retrofit state.

The 'Baseline' savings numbers will likely not be the same as the actual energy consumption of the home. These numbers are weather normalized and then projected based on the Typical Meteorological Year for the past 30 years (TMY30). In other words, this is the energy consumption of the home for a typical year, not the year that the utility bills were from.

Metric	Baseline	Improved	Saved
Fuel Energy Usage therms/year	2,602	1,450	1,152
Electric Energy Usage kWh/year	16,252	10,963	5,289
Total Energy Usage MMBtu/year	316	182	134
Fuel Energy Cost $/year	1,886	1,051	835
Electric Energy Cost $/year	2,968	2,002	966
Total Energy Cost $/year	4,853	3,053	1,800
CO2 Production Tons/year	23.7	14.4	9.3
Payback years			10
Total Energy Savings			42%
Total Carbon Savings			39%
Net Savings to Investment Ratio SIR			1.7
Net Annualized Return MIRR			7.0%

Heating & Cooling Load Calculations		
Heating Load Btu/hr	70,003 Base	51,544 Improved
Cooling Load: Sensible Btu/hr	40,425 Base	30,096 Improved
Cooling Load: Latent Btu/hr	1,022 Base	1,003 Improved
Winter Design Temperature	7° Outdoor	70° Indoor
Summer Design Temperature	85° Outdoor	75° Indoor

TUNERGY

Tech Specs

Property Details

Year Built:	1928
Conditioned Area:	2,394 ft²
Includes Basement:	No
Average Wall Height:	8.5 ft
Floors Above Grade:	2.00
Number of Occupants:	2.0
Number of Bedrooms:	4.0
Type of Home:	Single Family Detached
Front of Building Orientation:	East
Shielding:	Normal
Tuck Under Garage:	No

Appliances

Dishwasher Energy Star:	No
Range Fuel Type:	Natural Gas
Dryer Fuel Type:	Electricity
Clothes Washer Type:	Top Load
Clothes Washer Energy Star:	No
Dishwasher Installed?:	Yes

Refrigerators 1

Refrigerator Age:	22-24
Refrigerator Size:	19-21
Refrigerator Energy Star:	No
Refrigerator Usage:	840 kWh/yr

Lighting

% CFLs or LEDs:	N/A
Total # of Light Bulbs:	45

Attics 1

Insulation Depth:	1-3
Insulation Type:	Cellulose

Walls 1

Walls Insulated?:	No
Exterior Wall Siding:	Wood/Fiber Cement siding
Exterior Wall Construction:	Frame

Foundation

Crawlsp Insulatic	Crawlspace is uninsulated, open, or vented
Foundation: Basement:	50 %
Foundation: Crawlspace:	50 %
Foundation Above Grade Height:	2.0 ft
Basement Wall Insulation:	None or Bare Walls

Windows 1

Window Type:	Double pane
Window: North Area Percent:	20 %
Window: East Area Percent:	20 %
Window: South Area Percent:	20 %
Window: West Area Percent:	20 %
North Overhang Depth:	2 ft
East Overhang Depth:	2 ft
South Overhang Depth:	2 ft
West Overhang Depth:	2 ft

Doors 1

Door 1 Type:	Wood

Doors 2

Door 2 Type:	Wood with Storm

Air Leakage

Blower Door Reading:	3,628 CFM50

Heating & Cooling 1

System Name:	Central
System 1 Type:	Both
Heating Energy Source:	Natural Gas
Age of Heating Equipment:	16-40
% of Total Heating Load:	90 %
Dual Equipment:	Furnace / Central AC
Age of Cooling Equipment:	16-20
Cooling Capacity:	24,000 BTU/h
Heating System Efficiency:	68 AFUE
% of Total Cooling Load:	100 %
Duct Location:	Basement (unconditioned)
Duct Insulation:	No Insulation
Duct Leakage:	15% - Somewhat leaky

Heating & Cooling 2

System Name:	Baseboards
System 2 Type:	Heating
Heating Equipment:	Electric Resistance
Age of Heating Equipment:	16-40
% of Total Heating Load:	10 %
Heating Capacity:	100,000 BTU/h

Tech Specs

Thermostat

Programmable Thermostat Installed:	No
Heating Setpoint High:	68 °F
Heating Setpoint Low:	68 °F
Cooling Setpoint High:	75 °F
Cooling Setpoint Low:	75 °F

Water Heating 1

DHW Fuel:	Natural Gas
DHW Type:	Standard tank
DHW Age:	21-25
DHW % Load:	100 %
DHW Location:	Garage or Unconditioned Space
DHW Temperature Settings:	High (140-150 F)
DHW Energy Star:	No

Pool & Hot Tub

Pool:	No
Hot Tub:	No

Electricity

Provider:	Easter
Highest monthly summer electric bill:	341
Lowest monthly electric bill:	136

Primary Fuel: Natural Gas

Highest monthly winter natural gas bill:	250 Dollars
Lowest monthly natural gas bill:	57 Dollars

Contractor Contact Information

Sandy Michaels
New York Testing
BPI Certified
123 Bell Street

Glossary

Annual Fuel Utilization Efficiency (AFUE) The measure of seasonal or annual efficiency of a residential heating furnace or boiler. It takes into account the cyclic on/off operation and associated energy losses of the heating unit as it responds to changes in the load, which in turn is affected by changes in weather and occupant controls.

Annualized Return The return an investment provides over a period of time, expressed as a time-weighted annual percentage. This is the equivalent annual interest rate you would get if you put the same amount of money spent on the energy upgrade into a savings account.

Asbestos Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant, but is no longer used in homes. When asbestos-containing materials are damaged or disturbed by repair, remodeling or demolition activities, microscopic fibers become airborne and can be inhaled into the lungs, where they can cause significant health problems.

British Thermal Unit (Btu) The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit; equal to 252 calories.

Carbon Monoxide (CO) A colorless, odorless but poisonous combustible gas with the formula CO. Carbon monoxide is produced in the incomplete combustion of carbon and carbon compounds such as fossil fuels (i.e. coal, petroleum) and their products (e.g. liquefied petroleum gas, gasoline), and biomass.

Cashflow When financing energy efficiency improvements, cashflow is the difference between the average monthly energy savings and the monthly loan payment.

Combustion Appliance Zone (CAZ) A contiguous air volume within a building that contains a combustion appliance such as furnaces, boilers, and water heaters; the zone may include, but is not limited to, a mechanical closet, mechanical room, or the main body of a house, as applicable.

Compact Fluorescent Light bulb (CFL) A smaller version of standard fluorescent lamps which can directly replace standard incandescent lights. These highly efficient lights consist of a gas filled tube, and a magnetic or electronic ballast.

Cubic Feet per Minute (CFM) A measurement of airflow that indicates how many cubic feet of air pass by a stationary point in one minute.

Carbon Dioxide (CO2) A colorless, odorless noncombustible gas that is present in the atmosphere. It is formed by the combustion of carbon and carbon compounds (such as fossil fuels and biomass). It acts as a greenhouse gas which plays a major role in global warming and climate change.

Energy Efficiency Ratio (EER) The measure of the energy efficiency of room air conditioners: cooling capacity in Btu/hr dtided by the watts consumed at a specific outdoor temperature.

Energy Factor (EF) The measure of efficiency for a variety of appliances. For water heaters, the energy factor is based on three factors: 1) the recovery efficiency, or how efficiently the heat from the energy source is transferred to the water; 2) stand-by losses, or the percentage of heat lost per hour from the stored water compared to the content of the water: and 3) cycling losses. For dishwashers, the energy factor is the number of cycles per kWh of input power. For clothes washers, the energy factor is the cubic foot capacity per kWh of input power per cycle. For clothes dryers, the energy factor is the number of pounds of clothes dried per kWh of power consumed.

Heating Seasonal Performance Factor (HSPF) The measure of seasonal efficiency of a heat pump operating in the heating mode. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of heat delivered for every watt-hour of electricity used.

Heat Recovery Ventilator (HRV) / Energy Recovery Ventilator (ERV) A device that captures the heat or energy from the exhaust air from a building and transfers it to the supply/fresh air entering the building to preheat the air and increase overall heating efficiency while providing consistent fresh air.

Light Emitting Diode (LED) Lighting An extremely efficient semiconductor light source. LEDs present many ad- vantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, and smaller size.

Modified Internal Rate of Return (MIRR) This is your return on investment. Roughly speaking, if you invested the same amount of money for this project (listed on this report as the total cost) into a bank account, your equivalent interest rate from all of the energy savings would be the MIRR.

N-Factor A factor of how susceptible your house is to wind, influenced by weather patterns, location, and the number of floors in the home. Used in the calculation of NACH.

Natural Air Changes per Hour (NACH) The number of times in one hour the entire volume of air inside the building leaks to the outside naturally.

Payback Period The amount of time required before the savings resulting from your system equal the system cost.

R-Value A measure of the capacity of a material to resist heat transfer. The R-Value is the reciprocal of the conductivity of a material (U-Value). The larger the R-Value of a material, the greater its insulating properties.

Radon A naturally occurring radioactive gas found in the U.S. in nearly all types of soil, rock, and water. It can migrate into most buildings. Studies have linked high concentrations of radon to lung cancer.

Rim Joist In the framing of a deck or building, a rim joist is the final joist that caps the end of the row of joists that support a floor or ceiling. A rim joist makes up the end of the box that comprises the floor system.

Seasonal Energy Efficiency Ratio (SEER) A measure of seasonal or annual efficiency of a central air conditioner or air conditioning heat pump. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of cooling delivered for every watt-hour of electricity used by the heat pump over a cooling season.

Savings to Investment Ratio (SIR) A ratio used to determine whether a project that aims to save money in the future is worth doing. The ratio compares the investment that is put in now with the amount of savings from the project.

Appendix F:
Potential Trade Professional Platform Workflow & Features

If a trade professional platform were implemented, a potential workflow is outlined in Figure 2 below.

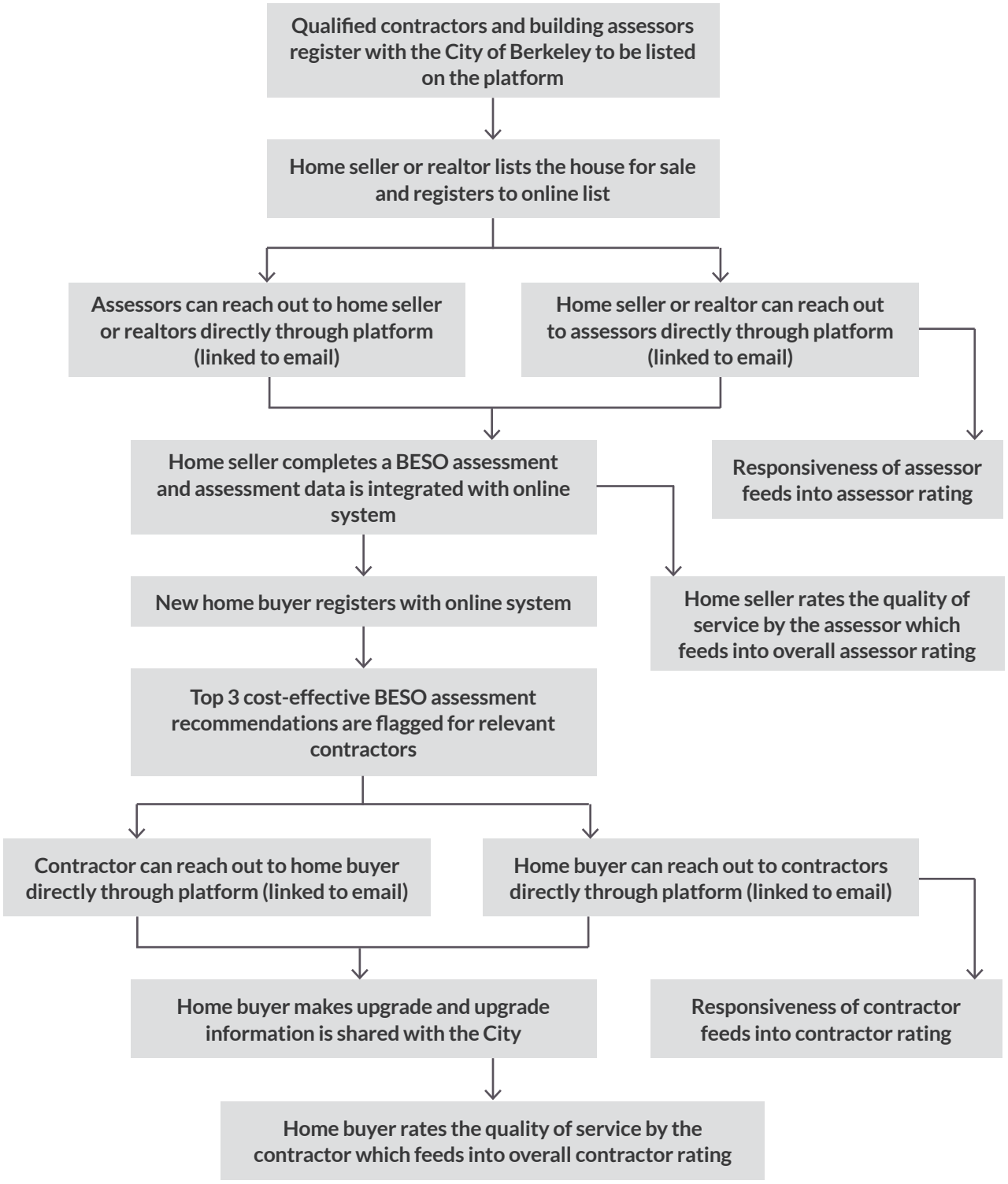


Figure 2: Potential Trade Professional Platform Workflow

Each of the potential workflow features that is associated with an online trade professional platform and their benefits are listed in Table 4 below.

Table 4: Trade Professional Platform Features and Benefits

Platform Feature	Benefits
Qualified contractors and building assessors register with the City of Berkeley to be listed on the platform	• Requires certain qualifications specified by the City • Provides baseline level of quality • Ensures that Berkeley can track whether there are contractors who can perform all possible upgrades recommended through BESO
Home seller or realtor lists the house for sale and registers to online system	• Homeowner or realtor registers to one platform that will contain information about assessors, the assessment completed on the home, and any potential upgrades they might want to make before selling the home
Assessors can reach out to home seller or realtor directly through platform (linked to email)	• Minimizes homeowner or realtor effort needed to determine bid estimate
Home seller or realtor can reach out to assessors directly through platform (linked to email)	• Allows for consumer choice when finding assessors
Responsiveness of assessor feeds into assessor rating	• Incentivizes assessors to respond promptly • Helps ensure home sale process is not hindered
Home seller completes a BESO assessment and data is integrated with online system	• Trade professional platform can be linked to new online application system which ensures multiple aspects of the program are integrated in one online system
Home seller rates the quality of service by the assessor which feeds into overall assessor rating	• Identifies both outstanding and underperforming assessors • Incentivizes assessors to provide quality service
New home buyer registers with online system	• New homeowner can easily see home evaluation information online and the potential upgrades they can make to their home • Ensures the data obtained by seller is consistent with the data that new homeowner receives
Top 3 cost-effective BESO assessment rec-ommendations are flagged for relevant contractors	• While some upgrades may be cost-effective, the upfront cost for the top 3 may vary so it is important to give a variety of options • Using top 3 recommendations gives the home or building owner the option to do one or more upgrades
Contractor can reach out to home buyer directly through platform (linked to email)	• Incentivizes another stakeholder in the BESO process to be involved • Minimizes home or building owner effort needed to determine bid estimate
Home buyer can reach out to contractors directly through platform (linked to email)	• Identifies home or building owners who are motivated to make upgrades • Allows for consumer choice when finding contractors
Responsiveness of contractor feeds into contractor rating	• Incentivizes contractors to respond promptly • Home or building owners receive prompt feedback when the BESO assessment is still fresh in their minds
Home buyer makes upgrade and upgrade information is shared with the City	• Building upgrade data is shared with the City • Data can be used to calculate emissions reductions and track electrification progress
Home buyer rates the quality of service by the contractor which feeds into overall contractor rating	• Identifies both outstanding and underperforming contractors • Incentivizes contractors to provide quality service

Appendix G: Benchmarking and Disclosure Programs

Table 5 below shows certain attributes of benchmarking and disclosure programs across the United States.

Table 5: Examples of Benchmarking and Disclosure Programs[x]

Jurisdiction	No. of Buildings	Area (Million Sq. Ft.)	Average Building size	Penalties?	Compliance Rate
Atlanta	2,900	402	13,862	Yes	NA[10]
Austin	2,800	113	4,036	Yes	NA
Berkeley	257	13.7	5,331	No	NA
Boston	1,600	250	15,625	Yes	73%
Boulder	475	26	5,474	Yes	NA
California	20,573	2400	11,666	Yes	NA
Cambridge	1,100	78	7,091	Yes	95%
Chicago	3,500	900	25,714	Yes	84%
Denver	3,000	360	12,000	No	NA
Evanston	557	45.6	8,187	Yes	NA
Kansas City	1,500	400	26,667	Yes	NA
Los Angeles	14,000	900	6,429	No	NA
New York City	33,147	2800	8,447	Yes	87%
Orlando	826	125.6	15,206	No	NA
Philadelphia	2,900	390	13,448	Yes	91%
Pittsburgh	861	164	19,048	NA	NA
Portland, ME	284	NA	NA	Yes	NA
Portland, OR	1024	87	8,496	Yes	NA
San Francisco	2312	203	8,780	Yes	NA
Seattle	3347	269	8,037	Yes	99%
Washington D.C.	2000	357	17,850	Yes	89%
Washington State	4600	247	5,370	No	N/A

10 Not available.

Appendix H: Performance Requirements in Other Cities

Table 6 below outlines the performance requirements for certain cities' programs across the United States. Berkeley could use these as a guide for requiring mandatory/prescriptive building tune-up measures.

Table 6: Performance Requirements in Other Cities

City	Requirement
Seattle	Requires building tune-ups every five years for commercial buildings 50,000 square feet (sf) or larger, excluding parking.
Los Angeles	Beginning in 2021, privately owned buildings more than 20,000 square feet in the City of Los Angeles must achieve certain efficiency targets or perform audits and retro-commissioning on a 5-year cycle
San Jose	Starting in 2021, if a building demonstrates that it meets key performance standards through yearly benchmarking, it may submit a Performance Verification Report. If a building is not able to meet these standards, it can perform an energy audit, returning, or targeted efficiency upgrade to im-prove performance.
Philadelphia	Mandates all nonresidential buildings 50,000 square feet and larger to either submit a certification of high energy performance to the City's office of Sustainability or conduct tune-up to bring existing building energy systems up to a state of good repair. They also conducted a pilot in city-owned buildings to quantify potential cost savings
New York City	Requires all buildings larger than 50,000 square feet to perform an energy audit and retro-commissioning every 10 years.
Boston	The Boston City policy requires owners of large and medium-sized buildings (>35,000 sq. ft.) to report annual energy and water use while also requiring those buildings to complete a major energy savings action or energy assessment every five years. This requires the building owners report the way they are improving their energy performance which in-cludes by lowering their energy usage, decreasing reliance on fossil fuels or getting an energy assessment. It also requires newly constructed building's report of its energy use for the first full calendar year after receiving a Certificate of Occupancy.

Appendix I: Sample Large Building Measures

Table 7 below shows various examples of large building measures that Berkeley could provide to large building owners in order to motivate them to pursue energy upgrades.

Table 7: Sample Large Building Measures

Measure Type	Measure Description	Strategy
No Cost/Low Cost	• Verify setpoints in consistence with facility requirement • Implement occupied and unoccupied set points • Implement reset strategies based on the space load and or outside condition • Check for economizer operation and modify setpoints to reflect the current facility requirement • Identify and arrest air, water and refrigerant leakages • Implement HVAC unit tune-up to increase the operating efficiency • Identify and implement preventive maintenance procedures • Install timers if appropriate	Building Tune-up/Retune (payback less than 1 year)
Medium cost measures	• Rezone, combine zones or separate zones to make better use of system loading • Calibrate, replace and relocate sensors if necessary • Check and insulate/reinsulate piping and ducting • Install VFDs if the system operates at part load majority of the time. • Check building air leakage and mitigate	Large tune-up (Payback less than 3 years)
Investment grade measures	• Upgrade windows, add window film, add insulation • Conduct envelope and mechanical system air leakage testing and seal the openings. • Recalculate the current cooling and heating load, right size and replace aged equipment • Install cost effective heat recovery devices to reduce the load on the selected system • Install air and water source heat pumps, geothermal heat pump and heat pump water heaters. • Install/upgrade smart control system • Track energy and demand through EMS system and integrate on-demand load curtail strategies	System/equipment replacement and/or ems installation (Payback over 5 years)

Appendix J: Sample of Current PG&E Rebates

Table 8 contains specific examples of current PG&E rebates available under various programs. This list is not exhaustive but this information is an example of what can be used to educate building owners.

Table 8: Select Examples of Current PG&E Rebates

Incentive Type	Measure	Incentive Amount
Product-specific	HVAC Rebates: • VFDs for HVAC fans • Advanced rooftop HVAC controls	• $80/hp for VFDs • Advanced rooftop HVAC controls: up to $1,500 for advanced digital economizer controls; $600 for CO2 sensors; up to $155/ton and $194/ton for enhanced ventilation control for packaged HVAC with and without high efficiency supply fan motors
	Refrigeration Rebates: • Anti-Sweat Heater controls (ASH) • High efficiency refrigeration display cases with special doors • Display cases for open multi-deck replacement	• $25/linear ft for ASH controls • $75/linear ft for refrigeration cases • $175/linear ft and $75/linear ft for low and medium temperature open multi-deck replacements
	Commercial cooling equipment: refrigerators, freezers and ice machines	Up to $350/unit
	Interior high-bay and low-bay LED lighting	Up to $40/ fixture
Custom Retrofit[xi]	Custom incentives are based on calculated kWh, kW, and therm savings; they are determined by whether the savings are to-code, above code, or whole building normalized metered energy	• $0.12/kWh savings for above code and whole building normalized metered energy consumption • $75/kW, $150/kW and $200/kW savings for to code, above code, and whole building metered energy cases, respectively • $0.50/therm, $1.25/therm and $1.75/therm savings for to code, above code, and whole building metered energy cases, respectively
Retro-commission-ing[xii]	One or more of the following measures is used to fine-tune building systems: • Chiller/Boiler optimization; • Reduce ventilation; • Decrease supply air pressure set-point and system rebalancing; and/or • Aligning zone temperature to building's schedule	• $0.06/kWh savings • $0.50/therm savings • $75/on-peak kW savings
Energy Storage and Generation [xiii]	Generation – three-step incentive based on total generation per site: • Waste heat to power, • Combined heat and power (CHP) • Fuel cell (electric only)	Incentive/W generation: • From waste heat: $0.60, $0.50 and $0.40 • From CHP and Fuel Cell: up to $1.20, $1.10 and $1.00
	Storage – five-step incentive based on total storage capacity per site	Incentive/Wh storage: $0.40, $0.35, $0.30, $0.25, $0.20

Endnotes

i BEI Berkeley Market Segmentation Analysis and Discussion.

ii https://beneficialelectrification.com/faqs.

iii https://www.chicago.gov/city/en/progs/env/building-energy-benchmarking---transparency.html.

iv https://www.abettercity.org/docs/06.2012%20-%20Benchmarking%20report%20-%20Final.pdf.

v https://www.cacx.org/resources/documents/CA_Commissioning_Guide_Existing.pdf.

vi https://www.energy.ca.gov/reports/efficiency_handbooks/400-00-001D.PDF.

vii https://www.boma.org/BOMA/Research-Resources/1-BOMA-Reports/BEPCResources.aspx.

viii https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/BESO%20Evaluation%20Recommendations%20-%20Assessor%20Meeting.pdf.

ix https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Assessment%20Requirements%20Chart_current.pdf

x https://emp.lbl.gov/sites/default/files/lbnl_benchmarking_final_050417_0.pdf.

xi https://www.pge.com/en_US/large-business/save-energy-and-money/business-solutions-and-rebates/product-rebates.page.

xii https://www.pge.com/en_US/large-business/save-energy-and-money/facility-improvement/retrocommissioning.page.

xiii https://www.pge.com/en_US/small-medium-business/energy-alternatives/private-solar/understand-the-solar-process.page.

03
Special Meeting Item

Office of the City Manager

CONSENT CALENDAR
July 21, 2020

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Timothy Burroughs, Director, Department of Planning & Development

Subject: Referral Response: Ordinance Amending Berkeley Municipal Code Chapter 7.52, Reducing Tax Imposed for Qualifying Electrification, Energy Efficiency and Water Conservation Retrofits

RECOMMENDATION

1. Delay adoption of the first reading of an ordinance amending the Berkeley Municipal Code (BMC) Chapter 7.52 to expand the Seismic Transfer Tax Rebate Program to include qualifying sustainability and resilience measures, and any associated budget requests, until FYE 2022 when more information on budget due to COVID-19 response and recovery is available; and

2. Refer to the City Manager the design of a companion Resilient Homes Equity Pilot Program that would provide funding for home retrofit improvements to low-income residents.

SUMMARY

On November 27, 2018, City Council adopted a referral sponsored by Councilmembers Harrison and Davila to expand the existing Seismic Transfer Tax Rebate Program to include qualifying electrification, energy efficiency and water conservation retrofits.[1] The Seismic Transfer Tax Rebate Program provides refunds for voluntary seismic upgrades to residential properties. Up to one-third of the base 1.5% transfer tax rate may be refunded, on a dollar-for-dollar basis, for voluntary seismic upgrades to residential property. Applicants have up to one year from the record of transfer to complete all seismic retrofit work, then apply for the rebate. The ordinance allows this deadline to be extended for good cause for up to one additional year.

This report and proposed actions are the result of in-depth analysis and input from stakeholders, including the Energy Commission and Disaster & Fire Safety Commission. The recommendations for updating the Transfer Tax Rebate program have General Fund budget implications for the City. Given challenges and uncertainties from COVID-19 response and recovery, staff now recommend that adoption of these

[1] See November 27, 2018 Council Referral:
https://www.cityofberkeley.info/Clerk/City_Council/2018/11_Nov/Documents/Item_24_Rev_Harrison.aspx

proposed changes be delayed. Staff will return to Council in one year, when more information on future budget constraints is available. Should Council approve the program changes in the future, staff would develop Administrative Regulations to define the qualifying measures and rebate application process.

The current Transfer Tax Rebate Program only benefits Berkeley residents who can afford to purchase a home in Berkeley, while low-income residents who often live in older homes most in need of improvements are excluded from this resource. Given that COVID-19 is exacerbating vulnerabilities of low income homeowners and renters, staff proposes development of a Resilient Homes Equity Pilot Program now, to complement a proposed future update to the Transfer Tax Rebate program.

FISCAL IMPACTS OF RECOMMENDATION

Resilience Transfer Tax Rebate Program

The current proposal of delaying program changes for one year has no fiscal impacts.

If these program changes are adopted in the future, there would be budget impacts. The current Seismic Transfer Tax Rebate Program reserves one-third of the base 1.5% transfer tax amount to be rebated from the General Fund. Based on residential property sales from 2014 to 2019, the average annual total net residential Transfer Tax (1.5%) was nearly $14 million,[2] and the eligible rebate amount was approximately $4.6 million. Funds not spent on rebates have remained in the General Fund.

As of the FY2018-2019 adopted budget, up to $12.5 million of the net Transfer Tax amount goes to the General Fund, including the one-third subset which can be rebated to homeowners as part of the Seismic Transfer Tax Rebate Program. Anything received by the City exceeding $12.5 million is to be used for Capital Improvement Projects.[3]

See Table 1 below for average transfers of residential, commercial, and mixed-use properties from 2014-2019.

[2] This amount does not include the additional 1.0% of Transfer Tax funds that is dedicated for Measure P.
[3] City of Berkeley, Fiscal Years 2018 & 2019 Adopted Biennial Budget: https://www.cityofberkeley.info/uploadedFiles/Manager/Budget/FY%202018-2019%20Adopted%20Budget%20Book.pdf

Table 1 – 2014-2019 Residential, Commercial + Mixed Use Property Transfers[4]

Fiscal Year:	# Residential Transfers	Total Residential 1.5% Transfer Tax Amount	Eligible Residential Rebate Amount	# Commercial + Mixed Use Transfers	Commercial + Mixed Use Transfer Tax Amount ($)	Potential Eligible Commercial + Mixed Use Rebate Amount	Total Potential Residential + Commercial + Mixed Use Rebate ($)
2014	945	$ 12,334,024	$ 4,111,341	69	$ 1,579,799	$ 526,600	$ 4,637,941
2015	886	$ 12,474,066	$ 4,158,022	71	$ 3,093,733	$ 1,031,244	$ 5,189,267
2016	874	$ 13,516,064	$ 4,505,355	64	$ 3,303,230	$ 1,101,077	$ 5,606,431
2017	710	$ 13,410,320	$ 4,470,107	61	$ 3,002,048	$ 1,000,683	$ 5,470,789
2018	793	$ 14,511,819	$ 4,837,273	79	$ 3,705,287	$ 1,235,096	$ 6,072,368
2019	863	*$ 17,577,210*	$ 5,859,070	*53*	*$ 2,519,843*	*$ 839,948*	*$ 6,699,018*
Average 2014-2019	***845.17***	***$ 13,970,584***	***$ 4,656,861***	***66.17***	***$ 2,867,323***	***$ 955,774***	***$ 5,612,636***

Resilient Homes Equity Pilot Program

Staff would design the program with existing capacity and return to Council with a full budget request, implementation strategy, and timelines.

CURRENT SITUATION AND ITS EFFECTS

On November 27, 2018, the City Council adopted a referral, sponsored by Councilmembers Harrison and Davila, to expand the existing Seismic Transfer Tax Rebate Program for qualifying electrification, energy efficiency and water conservation retrofits. The referral was intended to increase use of the program to advance the community's greenhouse gas reductions, address the urgency of the Climate Emergency Declaration, and increase the community's resilience. The referral asked staff to evaluate options for additional qualifying measures, evaluate how the program expansion should interact with the existing seismic program, and consider the framework for a just and equitable transition as set out in the Climate Emergency Declaration.

In response to the referral, staff conducted outreach over many months with staff from multiple City departments, the Energy Commission, the Disaster and Fire Safety Commission, as well as several technical experts and stakeholders. As developed through those efforts, staff developed proposed changes to amend BMC Chapter 7.52 to:

1. Add qualifying measures for the expanded Resilience Transfer Tax Rebate Program to include electrification, sustainability and resilience measures that require a building permit, in addition to the seismic measures already included in the program;

2. Expand the program to apply to all residential, commercial, and mixed-use buildings at time of property transfer, augmenting the current program which applies to only residential or mixed-use buildings with two or more dwelling units; and

[4] From City of Berkeley Finance Department.

3. Expand the deadline of the program so applicants have two years to apply for the rebate plus the opportunity to apply for a one-year extension, instead of the current program's one year deadline with a one-year extension.

Staff is recommending delaying approval of these changes, which would have potentially significant impacts to the General Fund. Staff will return next year and make another recommendation based on the budget situation at that time. If these changes are approved, staff would develop Administrative Regulations including qualifying measures, an implementation strategy, and timelines. In order to develop and administer the proposed changes, the next recommendation would include additional staff capacity to support the increased application review and processing.

Proposal for Resilient Homes Equity Pilot Program

Communities of color and low-income communities are not only most impacted by financial disparities, they are also the frontline communities most impacted by climate change and other disasters. The City of Berkeley values equity and strives to be a leader in developing creative approaches for addressing the affordability and housing crises the City faces, leading to displacement of people of color and low-income community members. The City also has ambitious goals to combat climate change and to become a more resilient City. Further, in the referral, Council urged staff to consider "the framework for a just and equitable transition" as laid out in the Climate Emergency.[5] These goals can all be aligned together to achieve multiple benefits in a new Resilient Homes Equity Pilot Program proposed by City staff.

An equity analysis of the impacts of the Transfer Tax Rebate Program considers who benefits, who is burdened and who is excluded. A transfer tax rebate program only benefits Berkeley residents who can afford to purchase a home, currently selling for an average of $1.27 million[6]. Low-income residents often live in older homes that are most in need of home improvements for safety, health, comfort, efficiency, and resilience. Attachment 2 is an Equity White Paper written by Noel Simpkin, a UC Berkeley Masters of Planning graduate student. This paper applies an equity lens to the Seismic Retrofit Refund Program and recommends developing an equity pilot program that targets Berkeley's underserved residents.

A concurrent Resilient Homes Equity Pilot Program would provide direct funding to low-income residents to improve their homes as a parallel program to the proposed expanded Resilience Transfer Tax Rebate, for home improvements. This equity pilot program would aim to provide a valuable benefit to low-income residents, long-term homeowners with limited incomes, and renters, who are not able to access the existing

[5] City of Berkeley, November 27, 2018 Council Referral: https://www.cityofberkeley.info/Clerk/City_Council/2018/11_Nov/Documents/Item_24_Rev_Harrison.aspx
[6] Zillow, "Berkeley Home Prices & Values": https://www.zillow.com/berkeley-ca/home-values/. Last accessed 3/5/2020.

Seismic or future Resilience Transfer Tax Rebate Program. This program could support homeowners' ability to remain in their homes, improve occupant health and increase resilience in an aging building stock. An equity pilot program would create a replicable example of how City programs can operationalize equity in residential buildings and assure equitable distribution of City resources.

This program, once developed and approved, may provide additional funding and/or free resources for homeowners and leverage work in existing programs that benefit low income residents and homeowners. Staff would design the program in collaboration with community stakeholders to ensure that it will meet the needs of frontline communities such as low-income communities, communities of color, and those most affected by the impacts of climate change. If approved by Council, staff will:

1. Design the program in collaboration with community stakeholders;
2. Develop a detailed budget;
3. Identify potential funding sources for the program;
4. Determine necessary staffing for program administration and implementation;
5. Prepare an implementation strategy including timelines; and
6. Return to Council for approval of the budget and implementation of the program.

This equity pilot program concept was discussed with and received support from the Berkeley Energy Commission, Disaster & Fire Safety Commission, and other stakeholders.

Related Initiatives

Staff is concurrently advancing other programs and initiatives which may be directly impacted by an expansion of the Resilience Transfer Tax Rebate Program:

- *Building Energy Savings Ordinance (BESO)*[7]*:* The BESO program has just completed its evaluation, and will be updated to better align with the City's priorities of building electrification and resilience. The proposed update to BESO would prioritize electrification and provide recommendations at time of listing that would align with the transfer tax rebate eligible measures. This change, along with possible future mandatory requirements, has the potential to increase Transfer Tax Rebate Program participation.

- *Existing Building Electrification Strategy*: In April 24, 2018, Council requested the development of "policies to incentivize energy efficiency and electrification, in support of Climate Action Plan (CAP) goals" and referred $50,000 to the budget process to fund the Existing Building Efficiency Strategy. Staff is working with a team of experts to identify how Berkeley can electrify its existing buildings as soon as

[7] BESO requires building owners and homeowners to complete and publicly report comprehensive energy assessments to uncover energy saving opportunities. More information at: https://www.cityofberkeley.info/BESO/.

possible. This report will include equitable strategies, policies, and programs that will help Berkeley achieve its goal of becoming a fossil fuel-free City, and will include specific building measures that can be supported by the proposed Resilience Transfer Tax Rebate Program and Resilient Homes Equity Pilot Project.

- *Automatic Gas Shutoff Valve Referral:* Another Council referral asked the Disaster & Fire Safety Commission to consider an ordinance amending BMC 19.34.040 to expand requirements for automatic natural gas shut-off valves or excess flow valves. The referral would expand use of such devices in multifamily, condominium and commercial buildings undergoing renovations, and in all existing buildings prior to execution of a contract for sale or close of escrow. It also asks the Commission to consider other triggers as appropriate. Installation of an automatic gas shutoff valve has been included as a qualifying measure under the proposed Resilience Transfer Tax Rebate Program.

Amending the BMC to update the Resilience Transfer Tax Rebate Program as proposed and approving the development of a Resilient Homes Equity Pilot Project would advance the City Strategic Plan goal to be a global leader in addressing climate change, advancing environmental justice, and protecting the environment. It also advances the following goals:

- Create affordable housing and housing support service for our most vulnerable community members.
- Create a resilient, safe, connected, and prepared city.
- Champion and demonstrate social and racial equity.

BACKGROUND

Existing Seismic Transfer Tax Rebate Program

In 1991 the City created the Seismic Retrofit Refund Program which provides refunds for voluntary seismic upgrades to residential properties. Up to one-third of the base 1.5% transfer tax rate may be refunded on a dollar-for-dollar basis, for all expenses incurred on or after October 17, 1989 for voluntary seismic upgrades to residential property. This program applies to structures that are used exclusively for residential purposes, or any mixed-use structures that contains two or more dwelling units. Applicants have up to one year from the recordation of transfer to complete all seismic retrofit work, then apply for the rebate. The ordinance allows this deadline to be extended for good cause for up to one additional year.

Since July 2002, the City has distributed over $12 million to homeowners through the Seismic Transfer Tax Rebate Program, which reduces the real estate transfer tax to

building owners who perform seismic safety work.[8] As shown in the table below, between 2014-2019 an average of 13% of homeowners took advantage of the program.

Table 2 - Seismic Transfer Tax Rebates, 2014-2019

Fiscal Year:	# Residential Transfers	Total # Seismic Transfer Tax Rebates	Total Seismic Rebate Amount Spent ($)	Eligible Residential Rebate Amount	% Seismic Rebate Uptake (#)	% Seismic Rebate Amount Spent	Total Residential 1.5% Transfer Tax Amount
2014	945	171	$ 823,352	$ 4,111,341	18%	20%	$ 12,334,024
2015	886	140	$ 781,447	$ 4,158,022	16%	19%	$ 12,474,066
2016	874	142	$ 826,994	$ 4,505,355	16%	18%	$ 13,516,064
2017	710	77	$ 518,058	$ 4,470,107	11%	12%	$ 13,410,320
2018	793	94	$ 676,042	$ 4,837,273	12%	14%	$ 14,511,819
2019	863	63	$ 427,581	$ 5,859,070	7%	7%	$ 17,577,210
Average 2014-2019	***845.17***	***114.5***	***$ 675,579***	***$ 4,656,861***	***13%***	***15%***	***$ 13,970,584***

ENVIRONMENTAL SUSTAINABILITY

Amending the Resilience Transfer Tax Rebate Program would advance the City's ambitious climate action goals, by incentivizing energy efficiency, electrification, and other resilience improvements in Berkeley's buildings.

Developing a Resilient Homes Equity Pilot Program would extend the City's sustainability efforts further by providing these benefits to more buildings, serving a broader and more diverse set of Berkeley residents than would otherwise have access to the Resilience Transfer Tax Rebate Program.

RATIONALE FOR RECOMMENDATION

Given the need to address COVID-19 response and recovery, and the associated budgetary impacts, staff recommends that Council delay approving the proposed changes to the B.M.C. Chapter 7.52. Staff will return next year for Council to consider approval at that time.

In the future, expanding the current Transfer Tax Rebate Program would encourage and incentivize sustainability and resilience upgrades in homes.

Developing the Resilient Homes Equity Pilot Program is aligned with the City's Strategic Plan Goal to champion and demonstrate social and racial equity, and is aligned with the City's Resilience Strategy goal to advance racial equity. This program would aim to serve as an anti-displacement strategy for low-income homeowners as well as to incorporate equity into existing City policies. This could serve as a pilot equity pilot program that could be replicated and scaled.

[8] City of Berkeley 2019 Local Hazard Mitigation Plan, Summary-11: https://www.cityofberkeley.info/uploadedFiles/Fire/Level_3_-_General/City%20of%20Berkeley%202019%20LHMP%20-%20FINAL%2012-10-19%20-%20REDUCED%20SIZE.pdf

ALTERNATIVE ACTIONS CONSIDERED

Rather than delaying approval of this proposal, Council could consider adopting the proposed changes to the BMC Chapter 7.52 at this time. This would provide a benefit to home buyers sooner, but would have ongoing budget impacts.

Whenever Council does consider adopting the proposed changes to the BMC Chapter 7.52, other potential alternative actions for this proposal include:

- **Qualifying Measures:** Council could consider expanding the qualifying measures to include work that does not require a building permit. This would provide additional options and flexibility to the building owner, but would require design, development, and implementation of a new process to validate the measures, plus additional ongoing staff resources, because it would be staff time-intensive to verify completion of qualifying work.

- **Building Types:**
  - Council could continue to limit the program to residential and mixed-use buildings with two or more dwelling units. This approach would not generate as significant greenhouse gas emissions reductions, electrification, or resilience improvements in buildings.
  - Council could consider including industrial building types, for which sufficient information was not available for analysis in this report.

- **Application Deadline:** Council could keep the current program timeline as is, at one year plus a one year extension, or it could further extend timelines to provide even greater flexibility to applicants.

Resilient Homes Equity Pilot Program: Council could reject the proposal for a Resilient Homes Equity Pilot Program. Eliminating this program would mean no new benefits would be provided to low income residents, and would have no financial impact on the current budget.

CONTACT PERSON

Billi Romain, Sustainability Manager, Office of Energy and Sustainable Development, Planning & Development Department, 510-981-7432.
Katie Van Dyke, Climate Action Program Manager, 510-981-7403.

Attachments:

1. Draft Ordinance language to expand existing Seismic Transfer Tax Rebate Program for possible future action
2. Equity White Paper
3. Potential list of qualifying measures for consideration in Administrative Regulations
4. Original Referral Report from November 27, 2018

ATTACHMENT 1

ORDINANCE NO. XXXX-N.S.

AMENDMENTS TO THE BERKELEY MUNICIPAL CODE TO EXPAND THE TRANSFER TAX REBATE PROGRAM FOR RESILIENCE MEASURES

BE IT ORDAINED by the Council of the City of Berkeley as follows:

Section 1. That Berkeley Municipal Code Chapter 7.52.060 is amended to read as follows:

7.52.060 Exceptions.

K. 1. Up to one-third of the tax imposed by this chapter shall be reduced, on a dollar for dollar basis, for all expenses incurred on or after October 17, 1989 to perform a "resilience ~~seismically retrofit~~retrofit" on ~~either~~ any structure which is used ~~exclusively~~ for residential, mixed-use, or commercial purposes~~, or any mixed use structure which contains two or more dwelling units~~.

2. The term "resilience ~~seismically~~ retrofit" within the meaning of this chapter means any of the following:

a. That work which is needed and directly related to make the structure capable of withstanding lateral loads equivalent to the force levels defined by Chapter 23 of the 1976 Uniform Building Code;

b. Replacement or repair of foundations; replacement or repair of rotted mud sills; bracing of basement or pony walls; bolting of mud sills to standard foundations; installation of shear walls; anchoring of water heaters; and/or securing of chimneys, stacks or water heaters;

c. Corrective work on buildings which fit the criteria in subsection K.1, which are listed on the City of Berkeley inventory of potentially

hazardous, unreinforced masonry buildings when such work is necessary to meet City standards or requirements applicable to such buildings;

d. Any other work found by the building official to substantially increase the capability of those structures, specified in subsection K.1, to withstand destruction or damage in the event of an earthquake.

e. Any other work as defined in the list of qualifying measures for the Resilience Transfer Tax Rebate Program Administrative Regulations, including but not limited to measures that provide the following types of benefits: safety, health, electrification, efficiency, or other resilience measures.

3. The work to perform resilience ~~seismically~~ retrofits on structures as provided herein shall be completed either prior to the transfer of property or as provided in subsection K.4.

4. If the work to perform resilience ~~seismically~~ retrofits on the structures provided for herein is to be performed after the transfer of property which is subject to the tax imposed by this chapter, upon completion of such work and certification by the building official as to the amount of the expenses of such work the City Manager or his/her designee may refund such expenses not to exceed one-third of the base 1.5% transfer tax imposed to the parties to the sale in accordance with the terms of such sale. Any remaining tax shall be retained by the City.

5. From the date of the recordation of the transfer document, the applicant shall have ~~one~~ two years to complete all ~~seismic~~ resilience retrofit work and submit a resilience ~~seismic~~ retrofit verification application to ~~the codes and inspection division of~~ the City of Berkeley. If the work is not completed at the end of ~~one~~ two years, that portion which has been completed may be credited to the applicant upon submission of a resilience ~~seismic~~ retrofit

verification application and substantiating documentation, as required by the ~~codes and inspections division of the~~ City of Berkeley, showing the dollar amount of work completed up to that date. All other monies remaining in escrow will be returned to the City of Berkeley upon written request by the Finance Department.

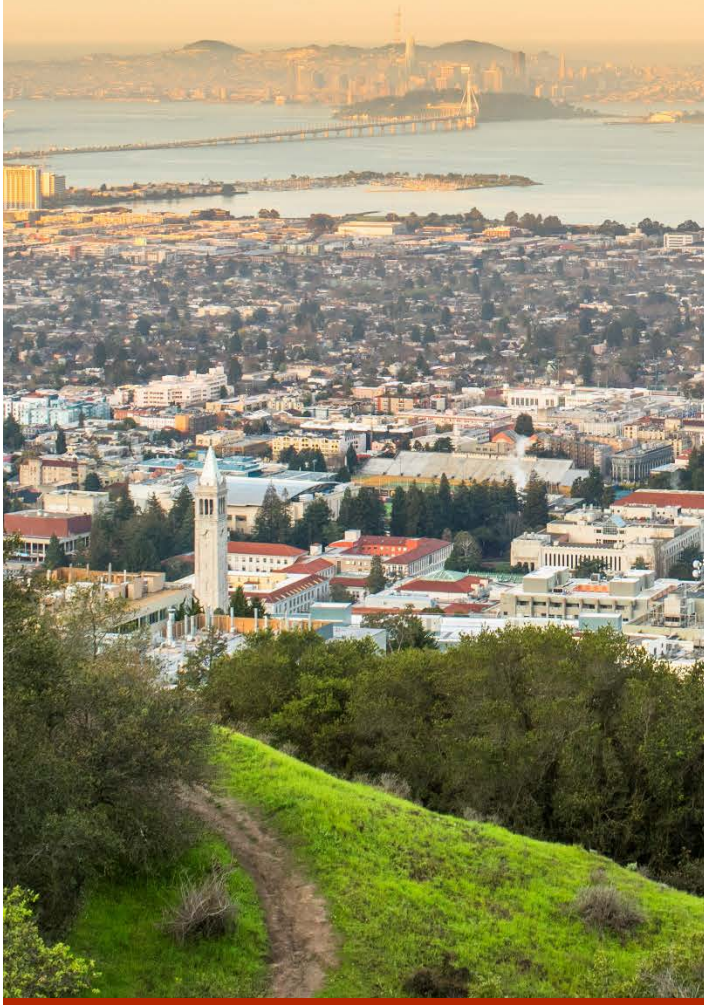
6. Within the ~~one~~two-year period established by paragraph 5, an applicant may request, and the City Manager may approve, an extension of up to one year. The City Manager or his/her designee may grant such an extension only for good cause. The decision of the City Manager or his/her designee shall be entirely within his or her discretion and shall be final.

a. "Good cause" includes (i) the inability of the applicant, after a prompt and diligent search to find and retain the services of an architect, engineer, contractor or other service provider whose services are necessary for the ~~seismic~~ resilience retrofit work; (ii) unforeseen and unforeseeable circumstances such as a significant change in the scope of the ~~seismic~~ resilience retrofit work due to circumstances in the field which could not reasonably have been known earlier; and (iii) serious illness or other extraordinary and unforeseeable circumstances that prevented the timely commencement or completion of the ~~seismic~~resilience retrofit work.

b. "Good cause" does not include (i) ignorance of the applicable City ordinances or regulations concerning the ~~seismic~~ resilience retrofit rebate provided in this chapter or state or local laws relating to the standards with which ~~seismic~~resilience retrofit work must comply; or (ii) any delays which were within the control or responsibility of the applicant. (Ord. 6971-NS § 1, 2007: Ord. 6741-NS § 1, 2003: Ord 6539-NS § 1, 2000: Ord. 6262-NS § 1, 1994: Ord. 6146-NS §§ 1, 2, 1992: Ord. 6072-NS § 2, 1991: Ord. 6069-NS § 1, 1991: Ord. 5061-NS § 5, 1978)

RESILIENCE FOR ALL

Applying an Equity Lens to Berkeley's Seismic Transfer Tax Rebate Program



MARCH 2020

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Contents

I. Executive Summary

The City of Berkeley (City) has long had a reputation for tolerance and inclusiveness, and yet social and racial inequity remains a significant challenge.[1] In its 2018-2019 Strategic Plan, the City identified a goal to "champion and demonstrate social and racial equity" and has prioritized integrating equity considerations throughout City operations and services.[2] To support this work, the City developed a Racial Equity Lens Toolkit (Toolkit) to assess city policies, plans, programs, and budgets in order to identify biases and help ensure equitable access to opportunities for all community members. Incorporating equity is particularly important in City programs aimed at increasing resilience for two reasons: without careful and deliberate planning, resilience strategies can actually exacerbate inequalities,[3] and true resilience can only be achieved when physical challenges as well as social challenges are addressed.[4]

The City's current Seismic Transfer Tax Rebate Program (Program) offers an example of a resilience strategy that addresses physical vulnerabilities but fails to advance social and racial equity. The current Program allows a portion of the City's transfer tax to be refunded to residential property owners for seismic upgrades, thus incentivizing homeowners who recently purchased a home to make important safety improvements. However when analyzing the Program through an equity lens it becomes clear that the Program is not reaching underserved members of the community, despite the fact that low-income and minority communities are more vulnerable to natural disasters and the impacts of climate change.[5] The current median sale price for a single-family home in Berkeley is over $1.2 million, which suggests that many recent homebuyers in Berkeley are economically advantaged.[6] In addition, 75 percent of the City's homeowners are white, and income disparities in the region demonstrate the challenge people of color face to purchase a home in Berkeley.[7]

In 2018, Berkeley City Council declared a Climate Emergency and established a goal of becoming a Fossil Fuel Free city. That same year, Council passed a referral to the City Manager and Office of Energy and Sustainable Development to expand the existing Seismic Transfer Tax Rebate Program in an effort to accelerate the transition toward more sustainable buildings. The referral identified the need for expanding the Program in order to reduce greenhouse gas (GHG) emissions, address the urgency of the Climate Emergency Declaration, and increase the City's resilience. In response, staff is providing recommendations to Council to expand the Program to include specific sustainability and resilience upgrades, as well as to establish a Resilient Homes Equity Pilot Program (Equity Pilot) that would provide similar home-improvement benefits to frontline communities. A new, equity-centered program that parallels the existing Program can help the City more quickly achieve its Fossil Fuel Free

[1] *City of Berkeley Resilience Strategy 2016*
[2] *City of Berkeley Strategic Plan 2018*
[3] *Anguelovski 2016*
[4] *100 Resilient Cities 2019*
[5] *City of Berkeley Resilience Strategy 2016*
[6] *Zillow 2020*
[7] *ACS 2017 5-Year Estimates; Table DP05, Universe: Total Population; and Table B25003H, Universe: Occupied housing units with a householder who is White alone, not Hispanic or Latino.*

goal, while benefitting low-income residents, long-term homeowners with limited incomes, and renters, who are not able to access the current Program.

This paper analyzes the current Seismic Transfer Tax Rebate Program through an equity lens, and aims to demonstrate the need for a more inclusive approach to increasing Berkeley's resilience. In addition, it recommends Berkeley City Council take the following actions to build both physical and social resilience:

1. Approve the development of a Resilient Homes Equity Pilot Program that leverages the City's Racial Equity Lens Toolkit in collaboration with community organizations and stakeholders.
2. Confirm a commitment to dedicate additional future funding to implement the Equity Pilot, with the exact annual amount to be determined during the program design phase.

An Equity Pilot offers many potential benefits, including: increased safety, improved health outcomes, reduction in GHG emissions, and it enables a Just Transition. It is also an opportunity to operationalize the City's Toolkit, and learnings can inform how other City programs and policies can incorporate equity and assure equitable distribution of City resources. Through the Equity Pilot, the City will be better positioned to achieve its goals of demonstrating social equity and becoming Fossil Fuel Free, while building a safer, healthier, more sustainable, and more resilient community.

II. Introduction

The City's Resilience Strategy, released in 2016, prioritizes both physical and social resilience: through a combination of long-term goals and short-term actions, the strategy aims to build the capacity of residents, institutions, and businesses to manage physical challenges, such as earthquakes and sea level rise, as well as social challenges, including racial inequity.[8] The City reaffirmed this holistic approach more recently in its 2018-2019 Strategic Plan, which articulates a goal to "create a resilient, safe, connected and prepared city" as well as a "responsibility to advance social and racial equity."[9] In order to make progress in these areas, City policies and programs must be designed to enable *all* residents to participate in, contribute to, and benefit from building Berkeley's resilience – especially historically underserved residents. There is an opportunity to make meaningful progress toward achieving these goals while prioritizing those most in need by examining the City's Seismic Transfer Tax Rebate Program, historically referred to as the Seismic Retrofit Rebate Program, through an equity lens. The current Program allows a portion of the City's transfer tax to be refunded to residential property owners for seismic upgrades. This program incentivizes homeowners who recently purchased a home to make important safety improvements and creates a more resilient housing stock. However, because the median price to purchase a home in Berkeley is currently over $1.2 million,[10] the Program is primarily supporting higher-income households and fails to reach low-income or long-term members of the community.

[8] *City of Berkeley Resilience Strategy 2016*
[9] *City of Berkeley Strategic Plan 2018*
[10] *Zillow 2020*

"We have a responsibility to advance social and racial equity."

- City of Berkeley 2018-2019 Strategic Plan

In November 2018 Berkeley City Council passed a referral to the City Manager and the Office of Energy and Sustainable Development to expand the existing Program to include subsidies beyond seismic retrofit and potentially include qualifying electrification, energy efficiency, and water conservation retrofits. In addition, Council urged staff to consider "the framework for a just and equitable transition" as laid out in the Climate Emergency..[11] In response, staff has conducted an analysis with stakeholder input.[12] and is providing recommendations to Council to expand the Program to include specific sustainability and resilience upgrades, as well as to establish a Resilient Homes Equity Pilot Program that would provide similar home-improvement benefits to frontline communities. An Equity Pilot, that parallels the existing Program, can improve physical resilience and advance equity by enabling underserved residents to improve their physical environments – making them safer, more comfortable, more sustainable, and less susceptible to disasters and climate change (more on potential impact in Section VII). The following sections describe how an Equity Pilot aims to address the impacts of harmful racist policies that favor high-income, white homeowners while furthering the City's goals of resilience and equity.

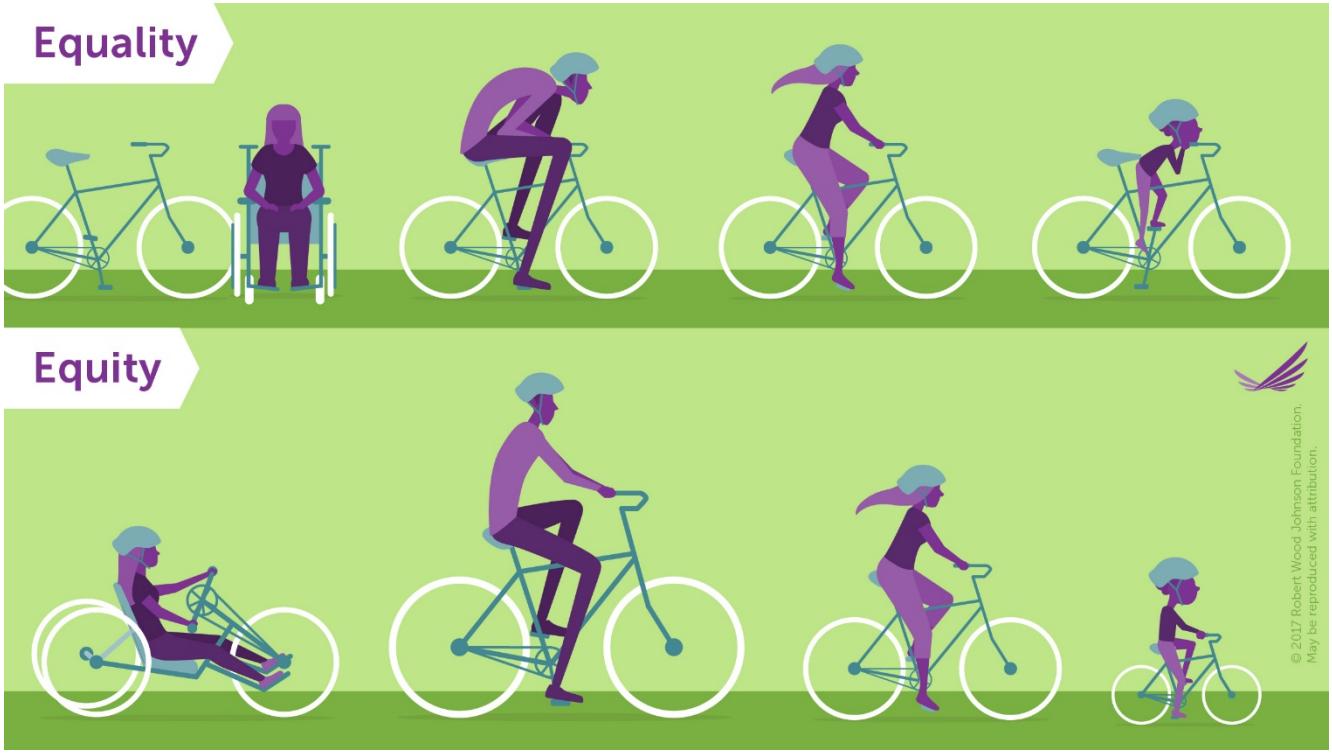
III. Equity Principles & Frameworks

Income inequality and health disparities are unfortunate realities in Berkeley: white families earn roughly three times more than African American families, and African American residents experience higher rates of hospitalization due to high blood pressure, stroke, asthma, and diabetes compared to other groups..[13] Improving these and other outcomes requires the City and its partners to address the "underlying social, economic, and environmental inequities that perpetuate them.".[14] However, addressing these inequities is rarely simple or straightforward and without intentional, strategic planning even well-intentioned efforts can reinforce injustices. When discussing equity principles and frameworks, it's important to first define what is meant by "equity". Equity is focused on giving communities what they need to thrive, while equality is about treating everyone the same (see Figure 1).

Equity frameworks are a valuable tool for governments, community development practitioners, and others to design and evaluate equitable policies and programs. By identifying who will benefit from or be burdened by decisions and potential unintended consequences of an intervention, equity frameworks help decision-makers mitigate negative effects and implement solutions that emphasize *equity* instead of *equality*..[15] In addition, it's important to clearly identify the 'who' when assessing

[11] *City of Berkeley Short-Term Referral Item 24, Nov. 27, 2018*
[12] *Including the Energy Commission, Disaster & Fire Safety Commission, as well as other internal and external stakeholders*
[13] *City of Berkeley Health Status Report 2018*
[14] *Ibid.*
[15] *GARE 2016*

Figure 1: Equity is focused on giving communities what they need to thrive, while equality is about treating everyone the same



Source: Robert Wood Johnson Foundation 2017

who may benefit or be burdened by interventions, and use the appropriate language to describe this group. There are a variety of terms that can describe potential target groups, such as frontline, underserved, vulnerable, low-income, and marginalized. These terms are often used interchangeably in development programs, despite the fact that they each have different definitions. According to The Greenlining Institute, "in conversations about social equity, terms such as underserved, vulnerable, low-income, disadvantaged, or environmental justice community are often interchanged but can potentially have different meaning depending the context."[16] As a result, it's important when designing an equitable program to clearly identify and define the target communities it aims to impact. In addition to providing clarity on specific target populations, terms are important because words can "promote compassion, empowerment, inclusiveness and equity."[17] For example, the term 'vulnerable' can describe a population group that is socioeconomically disadvantaged, but it can also be a term that communities choose not to identify with because it can feel disempowering. For the purposes of this paper, the terms 'underserved' and 'frontline' are used interchangeably, and refers to "communities that are already facing environmental, health and socioeconomic inequities, and that are disproportionately impacted by climate change" as well as disasters.[18]

The following is a set of equity frameworks the City has engaged with and/or implemented in various planning processes and projects in recent years. In addition, principles from each framework presented

[16] *The Greenlining Institute 2019*
[17] *National Collaborating Centre for Determinants of Health 2013*
[18] *The Greenlining Institute 2019*

below have helped to inform this analysis of the current Seismic Transfer Tax Rebate Program through an equity lens, and may be further leveraged in the development of the Equity Pilot.

1 | Community-Driven Engagement

Engaging communities is a critical part of developing equitable programs, however in order to be effective involving community members must be done in an authentic, strategic manner. Staff may use the following Continuum of Community Engagement as a way to strengthen its approach to creating a collaborative planning process (see Figure 2). Developed by the Urban Sustainability Directors Network, this continuum demonstrates increasing levels of engagement and partnership from left to right. The USC Program for Environmental and Regional Equity as well as The Greenlining Institute – organizations committed to racial and economic justice – advocate for program development that creates "authentic partnerships that center the perspectives of vulnerable communities, support community-based participation and power, and result in shared decision-making"..[19] The California Public Utilities Commission (CPUC) recently leveraged principles of joint decision-making in its San Joaquin Valley Disadvantaged Communities Pilot Project, which brings clean, affordable energy options to frontline communities. The project aims to empower communities who rely on propane or wood-burning appliances for heating and cooking to choose an energy solution that worked best for

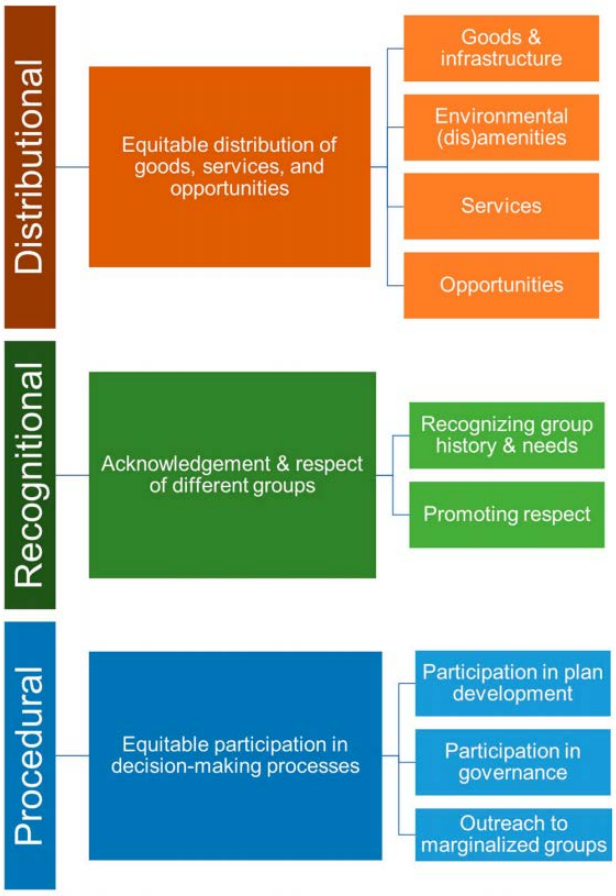
Figure 2: Continuum of Community Engagement

Inform	Consult	Involve	Shared Leadership	Community-Driven
Local government initiates an effort, coordinates with departments, and uses a variety of channels to inform the community to take action	Local government gathers information from the community to inform local government-led interventions	Local government engages community members to shape government priorities and plans	Community and local government share in decision-making to co-create solutions together	Community initiates and directs strategy and action with participation and technical assistance from local government
Characteristics of Engagement				
- Primarily one-way channel of communication - One interaction - Term-limited to project - Addresses immediate need of local government	- Primarily one-way channel of communication - One to multiple interactions - Short to medium-term - Shapes and informs local government programs	- Two-way channel of communication - Multiple interactions - Medium to long-term - Advancement of solutions to complex problems	- Two-way channel of communication - Multiple interactions - Medium to long-term - Advancement of solutions to complex problems	- Two-way channel of communication - Multiple interactions - Medium to long-term - Advancement of solutions to complex problems
Strategies				
Media releases, brochures, pamphlets, outreach to population groups, translated information, new and social media	Focus groups, interviews, community surveys, public hearings, public comment periods	Forums, advisory boards, stakeholder involvement, coalitions, policy development and advocacy, including legislative briefings, and testimony, workshops, community-wide events	Co-led community meetings, advisory boards, coalitions, and partnerships, policy development and advocacy, including legislative briefings and testimony	Community-led planning efforts, community-hosted forums, collaborative partnerships, coalitions, policy development and advocacy including legislative briefings and testimony

Source: Urban Sustainability Directors Network 2017 (Adapted from King County, Washington and IAP2)

[19] *The Greenlining Institute 2019*

Figure 3: Tripartite approach to equity in resilience planning



Source: Meerow et al. 2019

them. Ten out of the 11 pilot communities will receive cleaner energy through electrification, and one community will implement a joint gas and electrification approach.[20] This project demonstrates "community members can decide the best ways to overcome the challenges they see".[21] and serves as a model for community decision-making.

2 | Targeted Universalism

Targeted Universalism, a framework developed by the Othering & Belonging Institute at UC Berkeley, promotes establishing a universal goal with corresponding, specific strategies that target different groups to achieve that goal. This approach focuses on advancing all people toward the same goal through diverse implementation strategies that account for how different groups "are situated within structures, culture, and across geographies."[22] The City is incorporating a Targeted Universalism approach in its Pathway to Clean Energy Buildings work to ensure that proposed programs and policies benefit all communities.

3 | Tripartite Approach to Equity

In 2014 the City of Berkeley was one of the first 32 cities selected by the Rockefeller Foundation to participate in 100 Resilient Cities (100RC), an initiative aimed at building community resilience to face social, economic, and physical challenges.[23] Last year, researchers at Arizona State University and the University of Toronto released a study analyzing the goals, priorities, and strategies of the 100RC initiative, and developed a tripartite framework of equity that includes distributional, recognitional, and procedural dimensions (see Figure 3). In their analysis, researchers found that many cities that participated in the 100RC program emphasized the distributional aspect of equity, but focused less on the recognitional and procedural dimensions. They go on to advocate for resilience strategies that "explicitly consider resilience for whom, while at the same time promoting the equitable distribution of social and material goods, meaningful participation and engagement in decision-making processes, and acknowledgment of social, cultural, and political differences."[24]

[20] *The Greenlining Institute 2019*
[21] *Ibid.*
[22] *Powell et al. 2019*
[23] *City of Berkeley Agenda Item 1, June 6 2015*
[24] *Meerow et al. 2019*

4 | GARE Racial Equity Toolkit

The GARE (Government Alliance on Race & Equity), a national network of governments working to achieve racial equity, developed the Racial Equity Toolkit in 2015. The toolkit presents a multi-layered approach to integrating racial equity into city decisions and processes, and is incorporated into the City of Berkeley's Resilience Strategy as well as the 2018-2019 Strategic Plan. As described in the toolkit, when "racial equity is not explicitly brought into operations and decision-making, racial inequities are likely to be perpetuated."[25] Questions in the toolkit, such as – Who will benefit from or be burdened by your proposal? What are your strategies for advancing racial equity or mitigating unintended consequences? – help decision-makers place racial equity at the center of every strategy and make more thoughtful, informed decisions.

5 | City of Berkeley Racial Equity Lens Toolkit

As part of its Adeline Corridor Specific Plan process, the City of Berkeley developed its own Racial Equity Lens Toolkit to assess city policies, plans, programs, and budgets in order to identify biases and help ensure equitable access to opportunities for all community members. This Toolkit, which was adapted from the City of Madison's racial equity work and builds on principles outlined in the GARE toolkit, was created not only to inform work on the Adeline Corridor, but to enable City staff to integrate equity considerations into all operations and services. Through a series of questions, the Toolkit is designed to help users think about the interaction between race and place, and design successful neighborhood change efforts with a focus on underserved populations.[26] A few of the guiding questions include:

- How can our approaches to increasing affordable housing, health, wealth, and equitable development become more effective – particularly for the most racially, socially, and economically vulnerable?
- How do we know if we are being successful without ensuring that success is measured through an equity lens?
- How do we get neighborhood transformation right?

The Toolkit offers a number of tactics to help users get neighborhood transformation right, such as engaging communities in the design and development process, building the capacity of local community members, and analyzing data not only to understand the story that it tells but also to consider what stories may be missing. The Toolkit also provides guidance on how to determine the appropriate language for target communities by working toward mutually agreed upon language that is both clear and works to reduce power imbalances.

Developing a Resilient Homes Equity Pilot Program as a parallel program to the City's Seismic Transfer Tax Rebate Program presents a perfect opportunity to operationalize this Toolkit and use the tactics, as well as other equity principles mentioned above, to enable a more equity-centered approach to increasing the City's resilience. Furthermore, this approach can serve as a valuable example of how to

[25] *GARE 2016*
[26] *City of Berkeley Racial Equity Lens Toolkit 2019 (adapted from City of Madison, Race Forward)*

incorporate equity into a City program, and learnings can help the City scale use of the Toolkit to other activities and operations – enabling the City to further its goal of championing social and racial equity.

IV. Berkeley's Seismic Transfer Tax Rebate Program

In response to the 1989 Loma Prieta earthquake, the City took multiple steps to improve the seismic safety of buildings. One of those measures included the Seismic Transfer Tax Rebate Program, which allows up to 1/3 of the base 1.5 percent City Transfer Tax to be refunded on a dollar-for-dollar basis for voluntary seismic upgrades to residential property within one year of purchase.[27] Examples of qualifying seismic retrofits include: work to repair or replace substandard foundations, securing chimneys, and anchoring existing water heaters. The Program has been extremely successful at increasing seismic safety, and has contributed to roughly 75 percent of Berkeley's homes becoming more seismically safe over a 20-year period.[28] Since July 2002, more than 3,000 rebates have been processed resulting in over $12 million to property owners.[29] With fewer homes needing seismic retrofits, the Program has seen a decline in program participation in recent years (see Figure 3). Between 2014 and 2019, the number of rebates decreased by 63 percent. As a result of this trend, as well as a desire to make progress on the City's broader goals around electrification and GHG emission reduction targets, Council is considering expansion of the Program to include rebates for other sustainability-related improvements.

Figure 4: Seismic Transfer Tax Rebate

Fiscal Year	# Residential Transfers	Total # Seismic Transfer Tax Rebates	Total Seismic Rebate Amount Spent ($)	Eligible Residential Rebate Amount	% Seismic Rebate Uptake (#)	% Seismic Rebate Amount Spent
2014	945	171	$823,352	$4,111,341	18%	20%
2015	886	140	$781,447	$4,158,022	16%	19%
2016	874	142	$826,993	$4,505,354	16%	18%
2017	710	77	$518,057	$4,470,106	11%	12%
2018	793	94	$676,042	$4,837,272	12%	14%
2019	863	63	$427,581	$5,859,070	7%	7%
Average 2014–2019	845	114	$675,579	$4,656,861	13%	15%

Source: City of Berkeley Finance Department

V. Applying an Equity Lens to the Seismic Transfer Tax Rebate Program

Expanding the Program to include specific sustainability upgrades is a strong strategy to increase program participation and to accelerate progress toward the City's broader resilience and sustainability goals. However, the Program only benefits those who can afford to purchase a home in Berkeley.

[27] *The Program applies to structures that are used exclusively for residential purposes, or any mixed-use structure that contains two or more dwelling units.*
[28] *Bohland et al. 2018*
[29] *City of Berkeley Local Hazard Mitigation Plan 2019*

When assessing the Program in the context of the City's Racial Equity Lens Toolkit, it becomes clear that the Program has failed on a number of fronts:

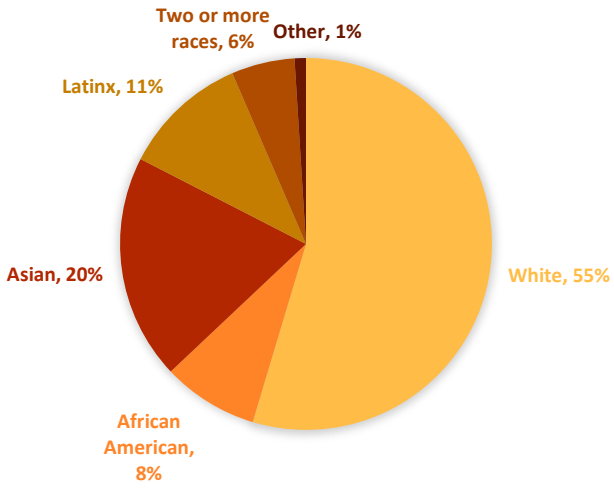
- Success is not measured through an equity lens: Program metrics focus on number of rebates and total funding issued, and data related to race/ethnicity, age, ability, gender, or other social factors are unavailable.
- It does not consider how access to the rebate may be limited for certain groups: barriers likely prevent individuals in certain racial/ethnic or socioeconomic groups from benefitting from this program, as it primarily benefits homeowners..[30]

Although Program data is limited, current homeownership trends and other information related to income, segregation, and displacement helps to illustrate how the current Program excludes frontline communities. Exclusion not only keeps resilience out of reach for these communities, but it perpetuates social and racial inequality in the City.

1 | Current Homeownership

The City is nearly equally split among homeowners and renters, with homeowners representing 46 percent of the population..[31] Homeownership rates are not distributed evenly, however, among Berkeley residents: while white residents make up 55 percent of Berkeley's population they represent 75 percent of the City's homeowners (see Figure 5 and 6)..[32] The current median sale price for a single-family home in Berkeley is over $1.2 million, which requires an annual household income of approximately $200,000..[33] Income disparities in the region demonstrate one barrier people of color face to purchase a home in Berkeley (see Figure 7). In addition, since the rebate is only available for one year after purchasing a property, long-time Berkeley homeowners do not qualify for the Program. These residents may struggle to find the capital needed to make home improvements – making them more susceptible to unsafe living conditions and/or displacement.

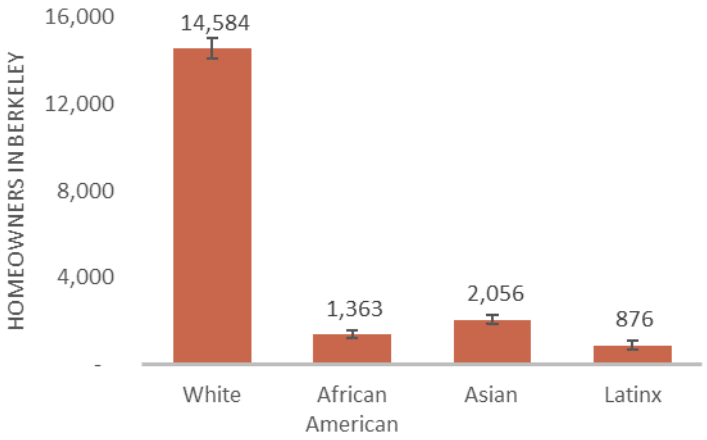
Figure 5: There are significantly more white homeowners in Berkeley compared to any other racial group



Source: ACS 2017 5-Year Estimates; Table DP05, Universe: Total Population, N=120,179

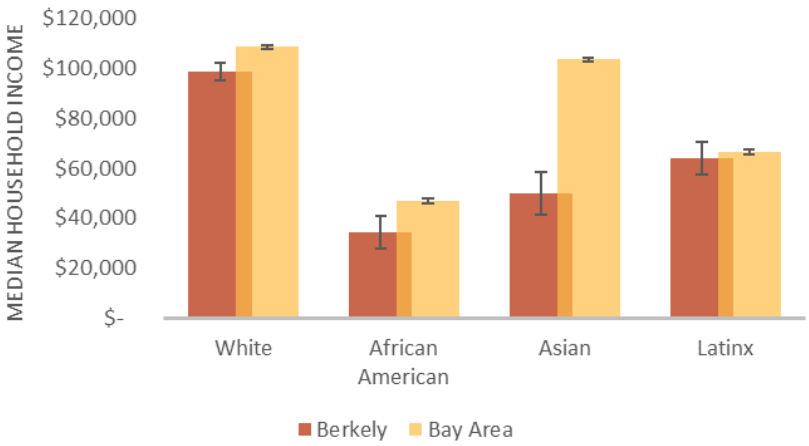
[30] *Buyers of multifamily properties are eligible for the rebate, which in some situations may benefit low-income renters; however, the rebate is primarily used by single-family residential properties.*
[31] *American Community Survey (ACS) 2017 5-Year Estimates; Table B25033; Universe: Total Population in Occupied Housing Units; N = 107,408*
[32] *ACS 2017 5-Year Estimates; Table DP05, Universe: Total Population; and Table B25003H, Universe: Occupied housing units with a householder who is White alone, not Hispanic or Latino.*
[33] *Data from Zillow 2019, expects 20 percent down payment.*

Figure 6: There are significantly more white homeowners in Berkeley compared to any other racial group



Source: ACS 2017 5-Year Estimates; Tables B25003B, B25003D, B25003H, B25003I; Universe: Occupied housing units; Note: Figure 4 does not include the race & ethnicity categories for American Indian & Alaska Native, Native Hawaiian and Other Pacific Islander, Some Other Race, or Two or More Races; Margins of Error expressed at 90 percent confidence level

Figure 7: On average, white households in Berkeley make almost three times more than African American households



Source: ACS 2017 5-Year Estimates; Tables B19013B, B19013D, B19013H, B19013I; Universe: Households; Note: 'Bay Area' consists of San Francisco, Alameda, Marin, Contra Costa, and San Mateo counties; Margins of Error expressed at 90 percent confidence level

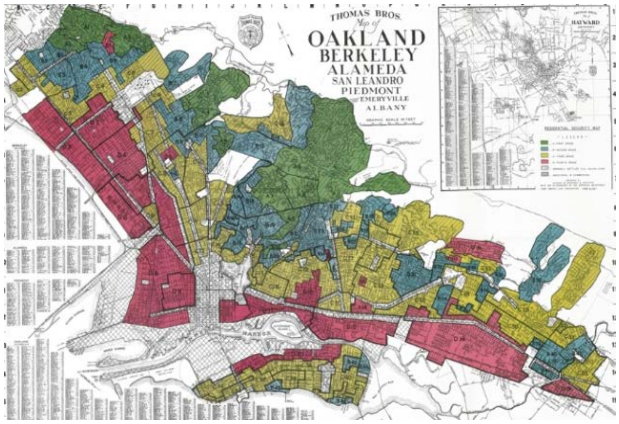
2 | Segregation and Displacement

Institutional and structural racism has and continues to contribute to unequal outcomes, not only in homeownership and income, as described above, but also in terms of segregation and displacement. These issues are interrelated, and a result of racist and discriminatory practices such as slavery, Jim Crow laws, racially restrictive covenants, and redlining. Although these policies have been banned, they have resulted in severe and lasting impacts on communities of color.

The history of redlining is particularly important for understanding how segregation and displacement affect the Berkeley community still today, and helps shed light on how programs aimed at recent homebuyers – such as the Seismic Transfer Tax Rebate Program – support racial exclusion. The Home Owners' Loan Corporation (HOLC), a federal agency created in 1933 as part of President Roosevelt's New Deal legislation, was designed to provide relief for homeowners that were in default or at risk of foreclosure by refinancing mortgages; indeed, it successfully refinanced over one million mortgages, saving 80 percent of homes for the original owner..[34]

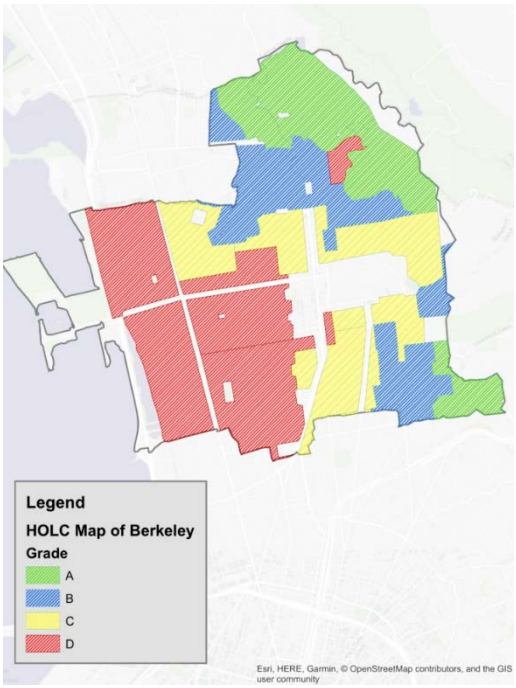
[34] *TIME 1951*

Figure 8: A 1937 San Francisco "residential security map" created by the Home Owners' Loan Corporation



Source: Green 2016

Figure 9: Redlining in Berkeley



Source: Barber 2018

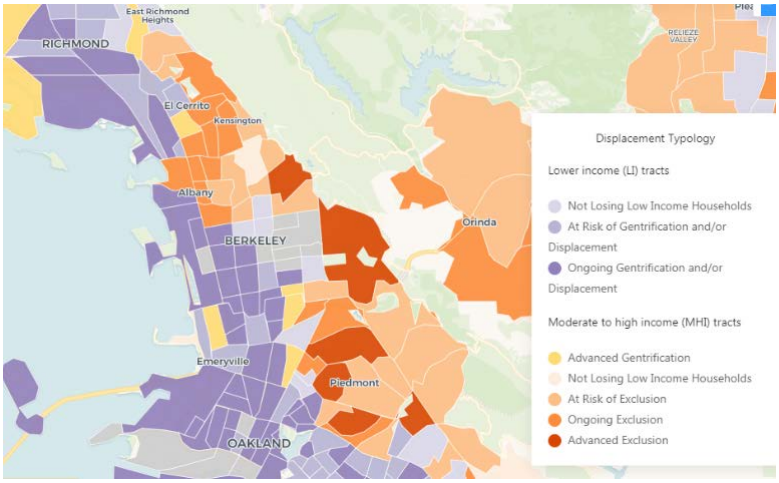
However, access to these government-backed, low-interest mortgages was not equal.[35] HOLC developed and relied on 'residential security maps' to evaluate mortgage lending risk in large American cities. Neighborhoods were classified as Best (green), Desirable (blue), Declining (yellow), or Hazardous (red) based on criteria such as: age and condition of housing stock, as well as economic class, employment status, and racial and ethnic composition of residents.[36] Potential borrowers in neighborhoods classified as Hazardous were often "redlined," or denied access to credit based on the location of their property in minority or economically disadvantaged neighborhoods. As a result of limited access to traditional loans, many potential borrowers in these neighborhoods could not purchase property or fell victim to high-interest loans or other discriminatory practices. Because access to credit is a critical part of economic inclusion and purchasing a home can lead to building wealth within families over generations, we can see a lasting effect of redlining through racial disparities in poverty. On a national level, the median net worth of white families is nearly 10 times the size of black families, and nearly 1 in 5 black families have zero or negative net worth – twice the rate of white families.[37] In Berkeley today, "the proportion of families living in poverty is 8 times higher among African American families, 5 times higher among Latin[x] families, and 3 times higher among Asian families, compared to White families."[38]

Although redlining was prohibited under the Fair Housing Act of 1968, its enduring effect is still evident across the US, including in Berkeley – not only in poverty rates, homeownership, and income, but also in segregation and displacement. According to the Urban Displacement Project, 83 percent of today's

[35] *Mitchell & Franco 2018*
[36] *Ibid.*
[37] *Jan 2017*
[38] *City of Berkeley Health Status Report 2018*

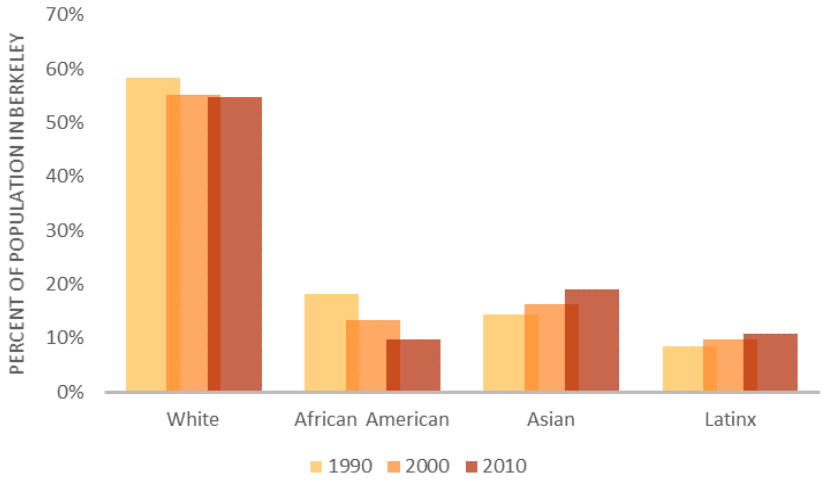
gentrifying areas in the East Bay were rated as hazardous (red) or declining (yellow) by HOLC, and 75 percent of today's exclusionary areas were rated as best (green) or desirable (blue)..[39] Redlining led to racial and economic segregation in cities, and South and West Berkeley – historically redlined communities – still contain more of Berkeley's low-income communities and communities of color..[40] In addition, as the cost of living increases along with increased urbanization, these communities are also facing the greatest risk of gentrification and displacement (see Figure 10). As a result, Berkeley is losing its communities of color and low-income communities. For example, the African American population across Berkeley fell from 13.3 percent in 2000 to 9.7 percent in 2010 (see Figure 11). The change is even more pronounced in South and West Berkeley: between 2000 and 2017 the number of African American residents declined by 40 percent (see Figure 12). This trend is not only impacting the diversity of Berkeley, but also highlights the continual disenfranchisement of people of color.

Figure 10: Formerly redlined communities are experiencing higher rates of gentrification and displacement



Source: Urban Displacement Project

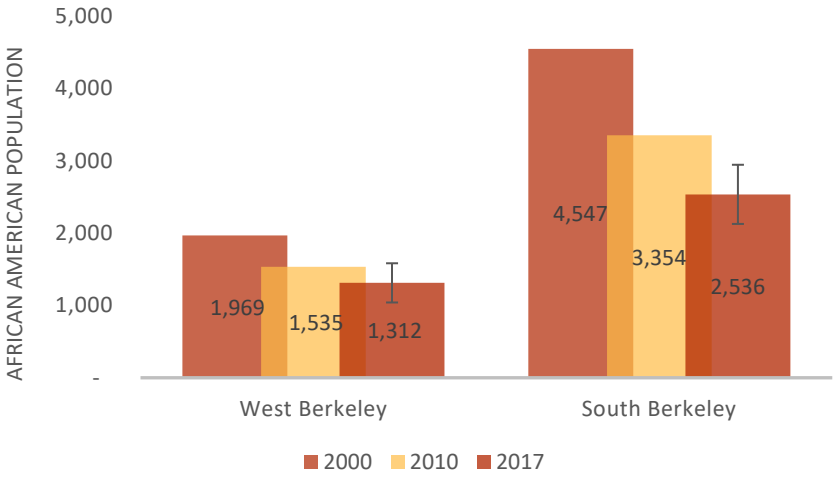
Figure 11: Berkeley is losing its African American population



Source: Decennial Census 1990, 2000, 2010; Table DP-1 and Table P004; Universe: Total Population; Note: 1990 N=102,724, 2000 N=102,743, and 2010 N=112,580

[39] *Urban Displacement Project*
[40] *City of Berkeley Agenda Item 22, April 30 2019*

Figure 12: West Berkeley and South Berkeley have experienced the highest rate of decline in the African American population



Source: Decennial Census 2000 & 2010; Table DP-1; and ACS 2017 5-Year Estimates; Table B03002; Universe: Total Population; Note: Margins of Error expressed at 90 percent confidence level. Census tracts for West Berkeley include 4220, 4221, 4232, and South Berkeley include 4232, 4235, 4239.01, 4240.01

VI. Recommendations

The City of Berkeley has committed to creating institutional change on racial equity,[41] and the Resilient Homes Equity Pilot Program is a perfect opportunity for the City to further its commitment. The City has already invested in creating a Racial Equity Lens Toolkit, which can be used to guide program expansion in a manner that reduces racial disparities and increases social resilience. As a result, this paper recommends Berkeley City Council take the following actions to build both physical and social resilience:

1. **Approve the development of a Resilient Homes Equity Pilot Program that leverages the City's Racial Equity Lens Toolkit in collaboration with community organizations and stakeholders.**
2. **Confirm a commitment to dedicate additional future funding to implement the Equity Pilot, with the exact annual amount to be determined during the program design phase.**

If these requests are approved by Council, staff will work with community-based organizations to determine a target group for the Equity Pilot and co-create it with community members. Using the City Toolkit as a guide, staff should also focus on creating an evaluation framework for the Equity Pilot that measures success through an equity lens, including program metrics that reflect data related to race/ethnicity, age, ability, gender, or other social factors when available.

[41] *City of Berkeley Resilience Strategy 2016*

At a high level, the Equity Pilot may enable underserved households to make seismic, sustainability, electrification and resilience upgrades through subsidies or other mechanisms leading to safer, healthier, and more sustainable living environments. More research is required to determine the most appropriate mechanism, but rebates (like the existing Program structure) will likely not be an effective method for low-income groups because they require households to have cash upfront to make costly improvements. More work is also required to determine the Pilot's specific target group. The Seismic Transfer Tax Rebate Program, as it is currently designed, reinforces economic inequality by benefitting recent homebuyers who are already economically advantaged.[42] To enable more equitable outcomes, the Equity Pilot should focus on reaching frontline communities, including communities of color, low-income communities, and long-term homeowners with limited incomes. More specifically, the Equity Pilot may target benefitting renters, residents with disabilities or elderly residents, and others who are not able to access the Seismic Transfer Tax Rebate Program.

Potential Target Groups

One group the Pilot may target is renters. Renters are generally less secure financially[43] and more vulnerable to displacement,[44] and could benefit greatly from home improvements that they (or their landlords) could otherwise not afford. In California, 70 percent of low-income households are renters and 47 percent live in multifamily housing.[45] In Berkeley, 83 percent of households earning less than $50,000 in annual income are renters.[46] Focusing on renters may also mean impacting more communities of color: 67 percent of Berkeley's African American households are renters[47] and 74 percent of Latinx households are renters.[48]

Other potential target groups for the Pilot include priority populations that are homeowners, such as differently abled residents, seniors, and communities of color. Differently abled homeowners have more complex energy reliability needs, and often need more support preparing for and after a disaster. Because senior homeowners often have fixed incomes, they may struggle with housing maintenance costs.[49] Additionally, research shows that seniors may be more vulnerable to displacement.[50] With the number of residents 65-years and older expected to more than double by 2030 in Berkeley,[51] the need for services or additional support may also increase. Another important trend is the change in Berkeley's diversity: between 2000 and 2010 the largest change to Berkeley's ethnic diversity was the decline in its African American population[52] – and this trend has continued in recent years. Instituting

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[42] Recent buyers in Berkeley can be considered economically advantaged because they have the resources and capital to purchase a property in a highly-competitive housing market. However, we recognize there is a range of home prices in the City, and not all buyers can afford a million-dollar home. We believe the Program offers real value for buyers in the lower range of home prices and who may not have the disposable income to spend on important safety or sustainability upgrades.

[43] Scally 2018

[44] Florida 2017

[45] Scavo 2016

[46] ACS 2017 5-Year Estimates; Table B25118; Universe: Occupied Housing Units

[47] ACS 2017 5-Year Estimates; Table B25003B; Universe: Occupied housing units with a householder who is Black or African American alone

[48] ACS 2017 5-Year Estimates; Table B25003I; Universe: Occupied housing units with a householder who is Hispanic or Latino

[49] City of Berkeley Housing Element 2015

[50] Nyden et al. 2006

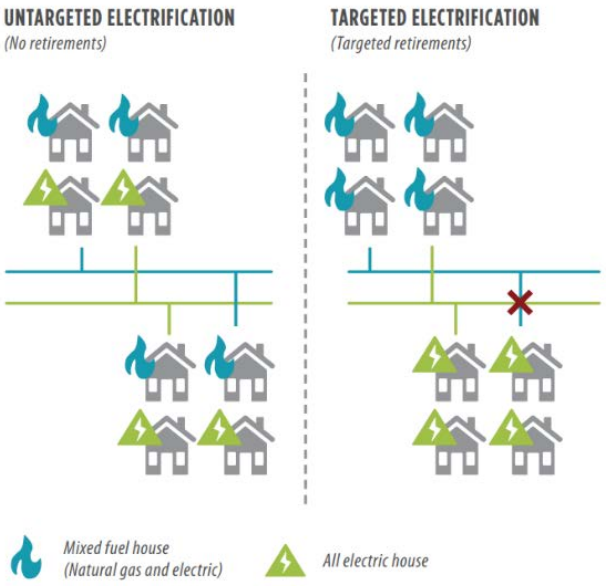
[51] Age-Friendly Berkeley Action Plan 2018

[52] City of Berkeley Housing Element 2015

additional anti-displacement measures, such as a Resilient Homes Equity Pilot, can slow this trend and enable more long-term members of the community to stay in their homes. Enabling homeowners to make important repairs is an effective strategy for preventing displacement.[53, 54]

Another way staff may choose to focus the Pilot is based on location of existing natural gas infrastructure. Targeting a group of underserved households that rely on the same segment of the gas distribution system, and helping them transition to all-electric, could lead to that entire gas line segment becoming decommissioned (see Figure 13). Strategic decommissioning of gas lines can help the overall system maintain sufficient pressure and reliable service, and may even lead to savings on maintenance costs.[55] Electrification of these homes would also provide health and safety benefits to the residents, as discussed in more detail below.

Figure 13: Approaches to neighborhood-level electrification



Source: Gridworks 2019

VII. Potential Impact

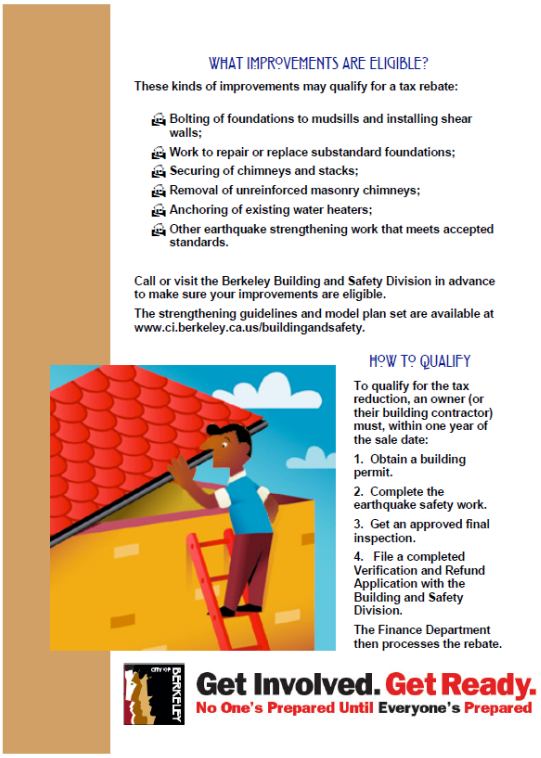
An equity-centered Pilot offers several potential benefits for Berkeley residents. As previously mentioned, the Equity Pilot is a great opportunity to operationalize the City's existing Equity Toolkit – and can provide valuable learnings for how to integrate the Toolkit across other City programs. In addition, while the specifics of the Pilot need to be developed in partnership with community members and various stakeholders, several high-level impacts can be inferred based on a preliminary understanding of what the Pilot might include. Enabling underserved residents to improve their living space not only benefits them as individuals, but the community as a whole can benefit from a safer, healthier, more sustainable, and more inclusive environment.

1 | Increased Safety

It is estimated that in the event of a major earthquake over 600 housing units in Berkeley would be destroyed and 20,000 would be damaged, with low-income housing units experiencing the highest rate of damage.[56] Extending the Program to low-income residents (or landlords with low-income tenants) can enable them to make the necessary seismic improvements to better protect themselves and their homes during an earthquake. Improving the stability of buildings to withstand a major earthquake not

[53] *The Housing Development Consortium of Seattle-King County 2019*
[54] *Alameda County 2018 The Housing Development Consortium of Seattle-King County 2019*
[55] *Gridworks 2019*
[56] *City of Berkeley Resilience Strategy 2016*

Figure 14: Berkeley Seismic Transfer Tax Rebate Program Flier



Source: City of Berkeley

only reduces an individual's risk of displacement, loss of property or loss of life, but better positions the city as a whole to recover more rapidly after an earthquake.[57] The Berkeley Seismic Transfer Tax Rebate Program flier says it best: "Get Involved. Get Ready. No One's Prepared Until Everyone's Prepared" (see Figure 14).

Offering qualifying electrification upgrades as part of the Equity Pilot can also significantly reduce the risk of gas leaks following an earthquake. Gas leaks in general pose a safety risk, as can be seen in the Porter Ranch incident[58] and San Bruno gas explosion,[59] thus lessening the City's reliance on natural gas can improve public safety. In addition, because repairing electric infrastructure post-disaster can happen faster than repairing gas lines, increasing electrification can position the city to recover more quickly post-disaster.[60]

2 | Improved Health Outcomes

Many aspects of the physical environment can directly affect people's health. Enabling more households to switch to electric appliances can improve indoor air quality, which can have dramatic effects on health.[61] Gas stoves release nitrogen dioxide and other particulates while burning, and prolonged exposure to these can lead to asthma or other respiratory illnesses – especially among children and seniors.[62] One study found that children living in a home with a gas stove have a 42 percent increased risk of asthma and have a 24 percent increased risk of asthma over their lifetime.[63] Electric stoves do not emit particulates and, since electric stoves do not rely on combustion, there is also no risk of carbon monoxide poisoning. In addition, the risk of carbon monoxide poisoning can be reduced by replacing gas furnaces with electric heat pumps. According to the Center for Disease Control (CDC), approximately 50,000 people in the U.S. visit the emergency room each year as a result of accidental carbon monoxide poisoning and at least 430 people die from accidental exposure.[64] Electric heat pumps, which provide both heating and cooling, can also provide critical temperature control during heat waves. In 2017, 14 people died in the Bay Area as a result of extreme heat.[65] It is predicted that by 2100, Berkeley will have 6-10 additional heat waves each year,

[57] *FEMA 2016*
[58] *Siders 2016*
[59] *Bowe et al. 2015*
[60] *City of Berkeley Adopt an Ordinance, Item 21, July 9, 2019*
[61] *Barron 2017*
[62] *The Greenlining Institute 2019*
[63] *Lin et al. 2013*
[64] *CDC 2020*
[65] *Peterson 2018*

which will disproportionately impact seniors, children under five, and low-income community members..[66] As heat waves grow more frequent and more severe due to climate change, enabling low-income and underserved communities to access clean cooling technology can be an important public health strategy..[67]

By prioritizing communities of color, the Equity Pilot can also contribute to reducing health disparities. People of color in Berkeley are more likely than white people to experience a wide variety of health problems throughout their lives and die prematurely..[68] Asthma hospitalization rates for African American children under five is 10 times higher than the rate among white children, and for Latinx children it is 2.8 times higher..[69] A key piece to improving health outcomes is ensuring access to environments that support health,.[70] and a program that enables low-income and communities of color to improve their living environment and have access to clean technology can support better health and lead to better health outcomes.

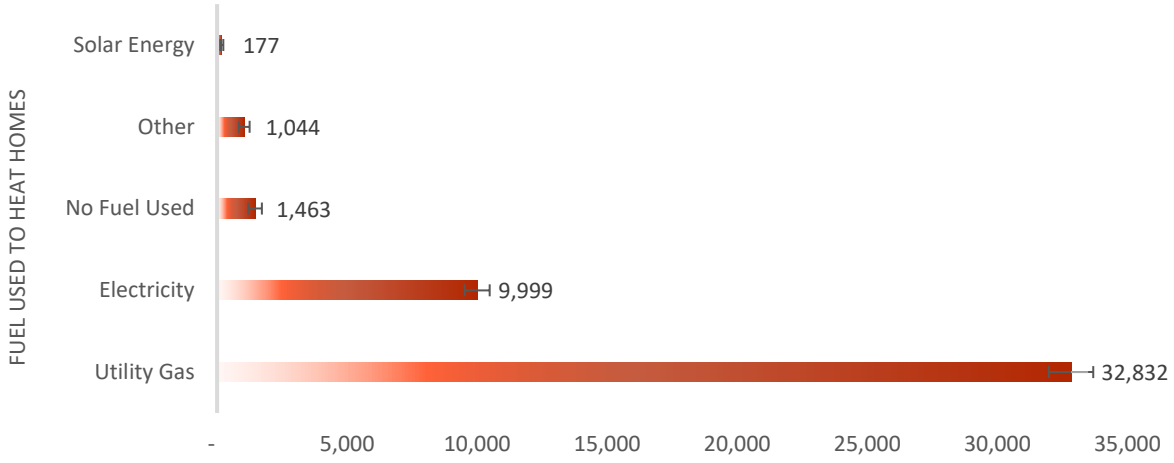
3 | Reduction in GHG Emissions

Berkeley has been a longtime leader in climate change mitigation. In 2006, Berkeley voters overwhelmingly endorsed a ballot measure to reduce the community's GHG emissions by 80 percent below 2000 levels by 2050,.[71] and three years later the City adopted a Climate Action Plan that included a vision to achieve zero net energy consumption for all new and existing buildings by 2050..[72] In 2018, the City Council declared a Climate Emergency and established a goal of becoming a Fossil Fuel Free City. That same year, Berkeley Mayor Jesse Arreguin set a goal to reach 100 percent renewable electricity by 2035 and achieve net-zero carbon emissions by the year 2050. Because energy use in homes and commercial buildings is the second largest contributor of greenhouse gases in Berkeley (making up almost 40 percent of overall GHG emissions),.[73] electrification of buildings is essential to reducing emissions and energy usage. Roughly 72 percent of Berkeley residents rely on gas for heating their homes, thus strategies aimed at accelerating the electrification of buildings could contribute significantly to the City's goal of achieving Fossil Fuel Free status (see Figure 15).

The City has made progress toward these goals and is leading the state and nation in pursuing stricter green building standards through the adoption of a natural gas ban in new residential buildings as well as through stretch and reach codes (codes beyond the minimum imposed by the state)..[74] However, more action is needed if the City intends to meet its goals..[75] Council has identified building retrofits as a key strategy, and recommended staff consider offering financial incentives to subsidize the transition toward sustainable buildings, including expanding the existing transfer tax subsidy..[76] The Equity Pilot

[66] *City of Berkeley Local Hazard Mitigation Plan 2014*
[67] *E3 2019*
[68] *City of Berkeley Health Status Report 2018*
[69] *Ibid.*
[70] *Ibid.*
[71] *City of Berkeley Electric Mobility Roadmap 2019*
[72] *Arreguin 2018*
[73] *City of Berkeley Pathway to Clean Energy Building Report RFP March 20, 2019*
[74] *City of Berkeley Short-Term Referral Item 24, Nov. 27, 2018*
[75] *According to the 2016 GHG emissions inventory, the City has achieved 15 percent reductions below 2000 levels.*
[76] *City of Berkeley Short-Term Referral Item 24, Nov. 27, 2018*

Figure 15: Roughly 72 percent of Berkeley households rely on natural gas for heating



Source: ACS 2017 5-Year Estimates; Table B25040; Universe: Occupied Housing Units;
Note: Margins of Error expressed at 90 percent confidence level

builds on this strategy of encouraging fuel switching to clean energy, and helps prevent low-income households from being left behind. All residents, regardless of their income or whether they own or rent their home, should have the opportunity to benefit from clean energy and contribute to Berkeley's climate action goals.

4 | Enables a Just Transition

Accelerating progress towards the City's Fossil Fuel Free goal is an important part of Berkeley's fight against climate change; however, efforts to achieve this goal must be carried out in a manner that reduces (not perpetuates) harmful inequalities. Council urged staff to consider "the framework for a just and equitable transition," and the Equity Pilot helps to enable a just transition. More specifically, it can address three critical elements:

- Transitioning buildings away from fossil fuels to cleaner electricity is a key strategy for Berkeley; however, high upfront costs can make this transition difficult for low-income homeowners. For example, electrical panel upgrades range between $2,000-$4,000.[77] and heat pump water heaters are currently more expensive than traditional gas water heaters. Subsidies or similar mechanisms can help households cover the higher upfront cost of such technologies, enabling households to benefit from cleaner, more efficient appliances.
- As more buildings transition away from natural gas, the cost of gas will inevitably rise: the gas distribution system is expensive to maintain, and as the number of ratepayers decreases the costs will be distributed across fewer ratepayers – leading to higher bills for those who are still using it..[78] The cost today for natural gas is roughly $1.50 per therm, and estimates place the cost as high as $19 per therm by 2050..[79] The last customers relying on the gas system could experience unreasonably high rates; and these customers "may well be those among us who

[77] *E3 2019*
[78] *Gridworks 2019*
[79] *Ibid.*

are least able to afford high rates and least able to finance the new appliances needed to convert to electricity."[80] It is therefore critical to develop strategies that enable more low-income communities to transition to all-electric and not be left to pay for an expensive, aging gas system. The City is in the process of developing an Existing Building Electrification Strategy, which will identify and assess the potential pathways to phasing out fossil fuels across all existing buildings in Berkeley as soon as possible and will incorporate an emphasis on a just transition.

- Because many low-income households are renters, strategies must consider how to incentivize landlords to invest in clean technology in a way that does not lead to higher rents (and prevents the cost of upgrades being passed through to tenants). Furthermore, tenants should benefit from the bill savings of more energy efficient appliances.

VIII. Conclusion

Berkeley's Seismic Transfer Tax Rebate Program has no doubt contributed to making the City more resilient to earthquakes and expanding the Program to include sustainability and energy efficiency upgrades will further build the City's resilience to natural disasters and climate change. However, the current Program fails to reach underserved members of the community despite the fact that low-income and minority communities are more vulnerable to natural disasters and the impacts of climate change..[81] Exclusion not only keeps resilience out of reach for frontline communities, but it perpetuates social and racial inequality in the City. Establishing a new, equity-centered program that incorporates key strategies from the City's Racial Equity Lens Toolkit can enable all residents to contribute to and benefit from building Berkeley's resilience – especially those most in need and historically underserved. With Council's support, a Resilient Homes Equity Pilot Program can help the City further its commitment to social and racial equity and secure its position as a leader in climate change, while also building a safer, healthier, more inclusive and more resilient community.

A Resilient Homes Equity Pilot can help Berkeley further its commitment to social and racial equity and secure its position as a leader in climate change, while also building a safer, healthier, more inclusive and more resilient community.

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[80] *Gridworks 2019*
[81] *City of Berkeley Resilience Strategy 2016*

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Potential Qualifying Measures for Consideration

Below is a list of potential qualifying measures being considered for the expanded Resilience Transfer Tax Rebate Program. Measures are listed by color according to the type of resilience benefit they provide, and those with multiple benefits are shown with multiple colors.

The list of final qualifying measures will be specified in the Administrative Regulations.

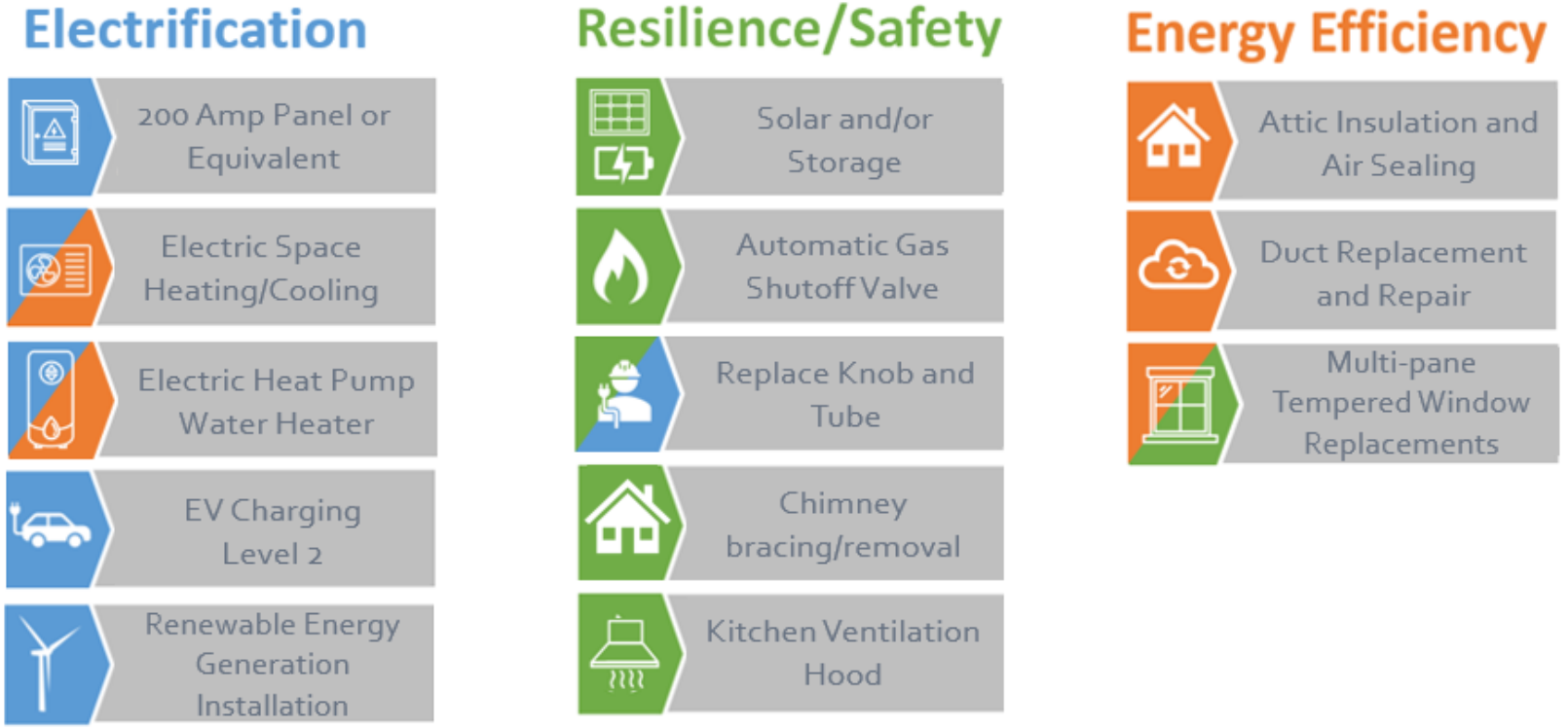

Figure A - Potential Qualifying Measures

Kate Harrison
Councilmember, District 4

REVISED
AGENDA MATERIAL
for Supplemental Packet 2

Meeting Date: **November 27, 2018**

Item Number: **24**

Item Description: **Short-Term Referral to City Manager and Office of Energy and Sustainable Development to Draft Ordinance Amending Berkeley Municipal Code Chapter 7.52, Reducing Tax Imposed for Qualifying Electrification, Energy Efficiency and Water Conservation Retrofits**

Submitted by: **Councilmember Harrison**

Added Councilmember Hahn as a cosponsor.

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E-Mail: *kharrison@CityofBerkeley.info*

Kate Harrison
Councilmember District 4

CONSENT CALENDAR
November 27, 2018

To: Honorable Mayor and Members of the City Council

From: Councilmembers Harrison, ~~and~~ Davila and Hahn

Subject: Short-Term Referral to City Manager and Office of Energy and Sustainable Development to Draft Ordinance Amending Berkeley Municipal Code Chapter 7.52, Reducing Tax Imposed for Qualifying Electrification, Energy Efficiency and Water Conservation Retrofits

RECOMMENDATION

Short-term referral to the City Manager and the Office of Energy and Sustainable Development to draft an ordinance amending Berkeley Municipal Code (BMC) Chapter 7.52, reducing tax imposed for qualifying electrification, energy efficiency, and water conservation retrofits.

BACKGROUND

The City of Berkeley faces climate change and water usage emergencies. A recent UN Intergovernmental Panel on Climate Change report highlighted the immediacy of the climate emergency, suggesting that in order to keep warming under 1.5 degrees Celsius, carbon emissions would need to be cut 45% by 2030.[1] Though California is no longer in extreme drought, Berkeley is still categorized as abnormally dry, almost 50% of the state is in moderate drought or worse, and we can expect to face major droughts in the future.[2]

The City is already leading the state and nation in pursuing stricter green building standards through the adoption of stretch and reach codes (codes beyond the minimum imposed by the state) favoring sustainable buildings and time of sale energy audits, but progress is still hindered by a significant lack of financial incentives to encourage the replacing and phasing-out of energy inefficient, carbon and water-intensive infrastructure in new and existing buildings. For example, even though electric heat pump water heaters can prevent significant carbon emissions and save money on heating bills, the relatively higher purchase and installation costs associated with heat pumps as compared to gas-fired heaters remains a major disincentive.

[1] IPCC Press Release, Summary for Policymakers of IPCC Special Report on Global Warming of 1.5ºC approved by Governments, 8 October 2018, http://www.ipcc.ch/pdf/session48/pr_181008_P48_spm_en.pdf

[2] National Integrated Drought Information System, Drought in California, https://www.drought.gov/drought/states/california.

The City has identified building retrofits as a key part of reducing emissions and energy and water usage. To achieve the ambitious sustainability goals set by the Council, the City cannot rely solely upon the market, state, federal and utility level incentives. It would do well to explore offering significant financial incentives to subsidize the transition towards sustainable building, including expanding the existing transfer tax subsidy for seismic retrofits to include qualifying sustainability retrofits.

Following the devastating 1989 Loma Prieta earthquake, the Council passed Ordinance 6072-NS in 1991 to reduce up to one-third of the transfer tax imposed on property owners who seismically retrofit any structure which is used exclusively for residential purposes, or any mixed use structure which contains two or more dwelling units. In passing the ordinance, forward-looking leaders acted independently of the state and federal government to subsidize critical building improvements in anticipation of relatively infrequent but exceedingly devastating earthquake emergencies. The seismic retrofit subsidy program offers a model for accelerating opportunities to address the major emergencies of our time.

This referral asks the City Manager and Office of Energy & Sustainable Development (OESD) to develop amendments to BMC Chapter 7.52 that expand the existing seismic retrofit subsidy in order to include appropriate reductions in transfer tax imposed on sales of property for qualifying electrification, energy efficiency, and water conservation retrofits. According to a 2018 City Manager report, 737 Berkeley residences were transferred in 2017.[3]

In drafting the ordinance, staff should consider existing City sustainability goals such as the 2009 Berkeley Climate Action Plan, and the framework for a just and equitable transition as set out in the Climate Emergency Declaration. Staff should tailor the subsidy to be commensurate with the emergency at hand and should design it to result in quantifiable reductions in emissions as well as energy and water waste.

OESD staff recently issued a request for proposals (RFP) for expert analysis identifying a set of measureable policies and programs to transition Berkeley's building stock to efficient and 100% clean energy.[4] The resulting analysis report should help inform staff in determining which types of greenhouse gas reduction measures transfer tax reductions could fund. Additionally, within the context of the City's sustainability goals

[3] Placing a Measure on the November 6, 2018 Ballot to Increase the Transfer Tax on Property Sales to Pay for General Municipal Services Including Funding Homeless Services, City Manager, July 31, 2018, https://www.cityofberkeley.info/Clerk/City_Council/2018/07_Jul/Documents/2018-07-31_Item_05_Placing_a_Measure_on_the_November_6.aspx

[4] Request for Proposals (RFP) Specification No. 19-11256-C for Pathway to Clean Energy Buildings Report: Existing Building Program Evaluation and Recommendations, OESD, October, 10, 2018, https://www.cityofberkeley.info/uploadedFiles/Finance/Level_3_-_General/19-11256-C%20-%20RFP%20Pathway%20to%20Clean%20Energy%20Building%20Report_revd%201017.pdf.

and the RFP analysis, staff should specifically consider developing and codifying definitions of qualifying improvements, including but not limited to:

- Electric service panel upgrades for the purpose of transitioning to electric appliances
- Transitioning home appliances to efficient electric versions, e.g. replacing gas burning appliances and systems such as fossil fuel HVACs, cooktops and ovens, washers and dryers, and water heaters.
- Solar or other clean energy generation installations
- Electric vehicle charging stations
- Building weatherization upgrades in coordination with the Building Energy Saving Ordinance (BESO)
- Graywater recapture systems
- Water efficient fixtures and irrigation systems

The seismic retrofit program was limited to residential and mixed use buildings, but staff should consider the appropriateness and effectiveness of extending the subsidy program to commercial and/or industrial properties for the purpose of achieving city-wide sustainability goals. It should also review whether the existing requirement for completing seismic retrofits following property transfers is appropriate for the sustainability retrofits outlined in this referral.

Finally, staff should attempt to estimate the carbon, electrical, and water savings that are likely to result from adoption of their proposal, and determine whether alternatives exist which, at a similar cost the city, would result in greater reductions.

This referral is compatible with OESD's 2017 Climate Action Report update suggesting that the Council take bold steps to meet Berkeley's 2050 emission reduction goals. The report highlighted the urgency of identifying resources for incentivizing electrification measures, building efficiency, generation of renewable electricity, and transitioning buildings and vehicles away from fossil fuel.[5]

[5] Berkeley Climate Action Plan Update, Office of Energy and Sustainable Development, December 7, 2017, https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/2017-12-07%20WS%20Item%2001%20Climate%20Action%20Plan%20Update.pdf

FINANCIAL IMPLICATIONS
Possible reduction in tax revenue, the magnitude of which is dependent on which retrofits are found to be qualifying.

ENVIRONMENTAL SUSTAINABILITY
Incentivizing electrification, energy efficiency, and water savings is directly in line with the City's climate and environmental goals.

CONTACT PERSON
Councilmember Kate Harrison, Council District 4, (510) 981-7140

Attachments:
1. BMC Section 7.52.060

7.52.060 Exceptions.

A. Any tax imposed pursuant to this chapter shall not apply to any instrument in writing given to secure a debt.

B. Any deed, instrument or writing to which the United States, or any agency or instrumentality thereof, any state or territory, or political subdivision thereof, is a party shall be exempt from any tax imposed pursuant to this chapter when the exempt agency is acquiring title.

C. Any tax imposed pursuant to this chapter shall not apply to the making, delivery, or filing of conveyances to make effective any plan of reorganization or adjustment:

1. Confirmed under the Federal Bankruptcy Act, as amended;

2. Approved in an equity receivership proceeding in a court involving a railroad corporation, as defined in subdivision (m) of Section 205 of Title 11 of the United States Code, as amended;

3. Approved in an equity receivership proceeding in a court involving a corporation, as defined in subdivision (3) of Section 506 of Title 11 of the United States Code, as amended; or

4. Whereby a mere change in identity, form or place of organization is effected.

Subdivisions 1 to 4, inclusive, of this section shall only apply if the making, delivering or filing of instruments of transfer of conveyance occurs within five years from the date of such confirmation, approval or change.

D. Any tax imposed pursuant to this chapter shall not apply to the making or delivering of conveyances to make effective any order of the Securities and Exchange Commission, as defined in subdivision (a) of Section 1083 of the Internal Revenue Code of 1954; but only if:

1. The order of the Securities and Exchange Commission in obedience to which such conveyance is made recites that such conveyance is necessary or appropriate to effectuate the provisions of Section 79k of Title 15 of the United States Code, relating to the Public Utility Holding Company Act of 1935;

2. Such order specifies the property which is ordered to be conveyed;

3. Such conveyance is made in obedience to such order.

E.

1. In the case of any realty held by a partnership, no levy shall be imposed pursuant to this chapter by reason of any transfer of an interest in a partnership or otherwise, if:

a. Such partnership (or another partnership) is considered a continuing partnership within the meaning of Section 708 of the Internal Revenue Code of 1954; and

b. Such continuing partnership continues to hold the realty concerned.

2. If there is a termination of any partnership within the meaning of Section 708 of the Internal Revenue Code of 1954, for purposes of this chapter, such partnership shall be treated as having executed an instrument whereby there was conveyed, for fair market value (exclusive of the value of any lien or encumbrance remaining thereon), all realty held by such partnership at the time of such termination.

3. Not more than one tax shall be imposed pursuant to this chapter by reason of a termination described in subdivision 2, and any transfer pursuant thereto, with respect to the realty held by such partnership at the time of such termination.

F.

1. Any tax imposed pursuant to this chapter shall not apply to any transfer of property from one spouse or domestic partner to the other in order to create a joint tenancy or tenancy in common of their common residence.

2. Any tax imposed pursuant to this chapter shall not apply to any transfer of property from one spouse to the other in accordance with the terms of a decree of dissolution or in fulfillment of a property settlement incident thereto; provided, however, that such property was acquired by the husband and wife or husband or wife prior to the final decree of dissolution. Any tax imposed pursuant to this chapter also shall not apply to any transfer from one domestic partner, as that term is used in the City of Berkeley's policy establishing domestic partnership registration, to another, where (1) prior to such transfer an affidavit of domestic partnership has been filed with the City Clerk pursuant to Section IV of the City of Berkeley's policy establishing domestic partnership registration; (2) subsequent to the filing of such affidavit of domestic partnership, either or both domestic partner(s) files a statement of termination with the City Clerk pursuant to Section V of the domestic partnership policy; (3) such transfer of real property is made pursuant to a written agreement between the domestic partners upon the termination of their domestic partnership; and (4) the real property was acquired by either or both domestic partner(s) prior to the filing of the statement of termination.

G. Any tax imposed pursuant to this chapter shall not apply to transfers, conveyance, lease or sub-lease without consideration which confirm or correct a deed previously recorded or filed.

H. Any tax imposed pursuant to this chapter shall not apply to transfers recorded prior to the effective date of the ordinance codified in this chapter.

I. The tax imposed pursuant to this chapter shall not apply with respect to any deed, instrument, or writing to a beneficiary or mortgagee, which is taken from the mortgagor or trustor as a result of or in lieu of foreclosure; provided, that such tax shall apply to the extent that the consideration exceeds the unpaid debt, including accrued interest and cost foreclosure. Consideration, unpaid debt amount and identification of grantee as beneficiary or mortgagee shall be noted on said deed, instrument or writing or stated in an affidavit or declaration under penalty of perjury for tax purposes.

J. Reserved.

K.

1. Up to one-third of the tax imposed by this chapter shall be reduced, on a dollar for dollar basis, for all expenses incurred on or after October 17, 1989 to "seismically retrofit" either any structure which is used exclusively for residential purposes, or any mixed use structure which contains two or more dwelling units.

2. The term "seismically retrofit" within the meaning of this chapter means any of the following:

a. That work which is needed and directly related to make the structure capable of withstanding lateral loads equivalent to the force levels defined by Chapter 23 of the 1976 Uniform Building Code;

b. Replacement or repair of foundations; replacement or repair of rotted mud sills; bracing of basement or pony walls; bolting of mud sills to standard foundations; installation of shear walls; anchoring of water heaters; and/or securing of chimneys, stacks or water heaters;

c. Corrective work on buildings which fit the criteria in subsection K.1, which are listed on the City of Berkeley inventory of potentially hazardous, unreinforced masonry buildings when such work is necessary to meet City standards or requirements applicable to such buildings;

d. Any other work found by the building official to substantially increase the capability of those structures, specified in subsection K.1, to withstand destruction or damage in the event of an earthquake.

3. The work to seismically retrofit structures as provided herein shall be completed either prior to the transfer of property or as provided in subsection K.4.

4. If the work to seismically retrofit the structures provided for herein is to be performed after the transfer of property which is subject to the tax imposed by this chapter, upon completion of such work and certification by the building official as to the amount of the expenses of such work the City Manager or his/her designee may refund such expenses not to exceed one-third of the tax imposed to the parties to the sale in accordance with the terms of such sale. Any remaining tax shall be retained by the City.

5. From the date of the recordation of the transfer document, the applicant shall have one year to complete all seismic retrofit work and submit a seismic retrofit verification application to the codes and inspection division of the City of Berkeley. If the work is not completed at the end of one year, that portion which has been completed may be credited to the applicant upon submission of a seismic retrofit verification application and substantiating documentation, as required by the codes and inspections division of the City of Berkeley, showing the dollar amount of work completed up to that date. All other monies remaining in escrow will be returned to the City of Berkeley upon written request by the Finance Department.

6. Within the one-year period established by paragraph 5, an applicant may request, and the City Manager may approve, an extension of up to one year. The City Manager or his/her designee may grant such an extension only for good cause. The decision of the City Manager or his/her designee shall be entirely within his or her discretion and shall be final.

a. "Good cause" includes (i) the inability of the applicant, after a prompt and diligent search to find and retain the services of an architect, engineer, contractor or other service provider whose services are necessary for the seismic retrofit work; (ii) unforeseen and unforeseeable circumstances such as a significant change in the scope of the seismic retrofit work due to circumstances in the field which could not reasonably have been known earlier; and (iii) serious illness or other extraordinary and unforeseeable circumstances that prevented the timely commencement or completion of the seismic retrofit work.

b. "Good cause" does not include (i) ignorance of the applicable City ordinances or regulations concerning the seismic retrofit rebate provided in this chapter or state or local laws relating to the standards with which seismic retrofit work must comply; or (ii) any delays which were within the control or responsibility of the applicant.

04
Special Meeting Item

Office of the City Manager

CONSENT CALENDAR
July 21, 2020

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Timothy Burroughs, Director, Planning and Community Development

Subject: Referral Response: Expanding community engagement within work to address Climate Impacts

RECOMMENDATION

1. Refer to the City Manager to continually advance engagement around community-driven, equitable climate solutions, and to seek external resources to enable increased community engagement of impacted communities around equitable climate solutions; and

2. Refer to the Agenda Committee a revision to the Council Rules of Procedures to update the Environmental Sustainability section of City Council items and staff reports as "*Environmental Sustainability and Climate Impacts*."

FISCAL IMPACTS OF RECOMMENDATION

There are no fiscal impacts for the first recommendation to continue engagement around equitable climate solutions and to seek external funding. The Office of Energy and Sustainable Development will continue to center equity within existing programs, using existing staff resources.

The second recommendation to update to City Council reports to include consideration of climate impacts would require additional time from existing staff to develop guidelines and provide training for all Departments on how to analyze and respond to the revised *Environmental Sustainability and Climate Impacts* section. These tasks would need to be integrated into staff's current work plan and would impact other projects.

CURRENT SITUATION AND ITS EFFECTS

This referral response builds on the momentum of the Climate Emergency Declaration, adopted by the City Council on June 12, 2018, by augmenting current efforts to reduce community-wide greenhouse gas emissions, raise awareness of climate impacts, and help the community adapt to a changing climate.

The Office of Energy and Sustainable Development is committed to equitable community engagement and policies. Recent and current activities include:

- In 2018 Berkeley received a grant to host a training on **Equitable Community-driven Climate Solutions with Movement Strategies** that focused on the continuum of Community Engagement, through collaboration and shared decision-making between local government staff and the community, with the aim of co-creating equitable climate preparedness solutions. See Attachment 3 for Continuum of Community Engagement adapted from King County, Washington and the International Association of Public Participation.

- Berkeley was chosen as one of eight leading cities to receive free technical assistance valued at more than $50,000, with an additional $2,000 for community engagement stipends through the **Building Electrification Initiative.** That effort analyzed opportunities and barriers to building electrification with an equity analysis, including spatial analysis of social vulnerabilities and environmental risk factors, and interviews with organizations serving low-income communities, limited English-speakers, people of color, and people with disabilities. Current work includes research on ways to support both affordable housing and building electrification strategies, local workforce development, and economic inclusion for marginalized communities. This work is being used to supplement the Existing Building Electrification Strategy.

- In 2018 Council provided funding for consultants to develop a **Berkeley Existing Building Electrification Strategy** which will provide recommendations for the highest value short- and long-term strategies to electrify all of Berkeley's existing buildings, in an equitable way, as soon as possible. Staff included requirements for equity expertise and deliverables as part of the Request for Proposals and in the scope of work. The consultant team developing the Strategy consists of Rincon Associates, Rocky Mountain Institute and the Ecology Center, with the latter serving as the lead on equity. The team is evaluating policy options that address all buildings in Berkeley in an inclusive approach that advances equity and prioritizes multiple benefit solutions to improve health, comfort and affordability.

- The **Electric Mobility Roadmap** included the Greenlining Institute as a paid strategic equity advisor throughout its development. Community organizations who work with underserved communities, including low-income populations, communities of color, and people with disabilities, were interviewed as part of the early needs assessment phase, and became partners in the development of draft strategies and actions, and implementation. This work led to "Equity in Access to Electric Mobility" being one of the four goals of the Roadmap with recommendations that includes collaboration on an equity pilot project and workforce development to support opportunities for people with barriers to employment.

Although communities of color, renters, seniors, students, people with disabilities, and low-income residents are disproportionally impacted by climate change, they are often marginalized in the development of climate solutions. These impacted communities may face multiple competing priorities and other barriers, such as language and lack of access to resources, which can limit their ability to meaningfully participate in creating and implementing climate solutions. Community-driven engagement aims to strengthen the capacity of individuals and organizations to self-advocate and identify needs, priorities and solutions. It also emphasizes meaningful participation in the decision-making process of policies and programs.

Prior to the COVID-19 pandemic, staff developed a scope of work and budget for enhancing community capacity for engagement. A draft Scope of Work and a 2-year budget of $236,000 was developed to support dedicated staffing for the Berkeley Climate Action Coalition (BCAC), co-convened by the Ecology Center and the City of Berkeley Office of Energy & Sustainable Development, to coordinate an engagement plan (see Attachment 2). However, given the uncertainty surrounding the local economy, impacts on the City's budget, and safety implications of in-person community engagement due to COVID-19, staff is not recommending allocating funding for this proposal at this time.

In lieu of a funding request to enhance the work of BCAC, staff will continue to apply an equity lens to policy development and implementation and support a wide range of community engagement efforts with existing staff resources. Staff will seek additional resources and apply for external grant funding to more deeply engage with communities most negatively affected by increasingly frequent climate-related events, such as extreme heat, exposure to wildfire smoke, public safety power shutoffs, and flooding, and by the health and economic impacts of COVID-19. OESD staff will also leverage partnerships with East Bay Community Energy (EBCE) and the Bay Area Regional Energy Network (BayREN) to enhance outreach on issues such as electricity rate changes and programs targeted to reduce energy costs for low-income community members.

Meaningful engagement is also critical to the creation of community-driven solutions that are a core principle for the equity programs being recommended through the Electric Mobility Roadmap, and other programs for building electrification as recommended in the Existing Building Electrification Strategy. Due to the unknown future prospects of public gatherings, it is challenging to effectively engage with frontline communities in traditional ways (e.g., in-person convenings and workshops). Remote or virtual engagement can heighten the digital divide and may only be available to those who are not dealing with urgent health and economic challenges. To overcome these challenges, staff will explore innovative, safe and accessible engagement strategies to reach impacted communities while limits on public gatherings persist, and will plan for opportunities for innovative, safe in-person community engagement when that approach can safely resume.

Environmental Sustainability and Climate Impacts Section of Council Reports
A revision to the current "Environmental Sustainability" section of City Council reports to include "*Environmental Sustainability and Climate Impacts"* would enhance efforts started in 2014, when the current "Environmental Sustainability" section was added to Council report templates. The "Environmental Sustainability" section was implemented through the development of guidelines, instructional materials, staff training throughout the City, and a six-month period of review of all Council reports by staff in the Office of Energy & Sustainable Development. These guidelines and training are now integrated into Council Report Writing Training provided to staff by the City Clerk's Office. Staff would want to update and augment that training to ensure that a newly revised Council report template is effective and meaningful.

Equity-focused, climate-driven community engagement and increasing consideration of climate impacts in Council reports supports a number of Strategic Plan goals, including: creating a resilient, safe, connected, and prepared city; championing and demonstrating social and racial equity; and being a global leader in addressing climate change, advancing environmental justice, and protecting the environment.

BACKGROUND
On January 21, 2020, City Council approved a referral sponsored by Councilmembers Davila and Bartlett, which referred to the City Manager:

- To look at how to improve and increase External Community Engagement – including funding for regular on-going town halls or neighborhood assemblies for external community engagement, and collaboration to engage the community and allow for input on new policies and programs which affect marginalized and front-line communities.
- To report back and identify funding resources and funding needed to adequately implement the increased engagement efforts, including different organizational structure options, and to make recommendations for funding.
- To require that all City Council items and staff reports include Climate Impacts in addition to Environmental Sustainability.

Since 2012, BCAC has been the City's main vehicle for climate engagement. Its membership of nearly 1,000 people includes residents, nonprofits, neighborhood groups, faith-based organizations, schools, businesses, and UC Berkeley. From 2012-2016, BCAC received funding from the San Francisco Foundation and the City of Berkeley that supported quarterly convenings and workshops on a variety of topics such as climate change and health, intergenerational climate change, clean transportation and energy, and climate justice. Over the years, BCAC has supported a variety of volunteer-led working groups on topics including land use, water, transportation, community choice energy, electrification, and environmental health, and BCAC

continues to play an active role in large public events such as the annual Ride Electric event and 2019 East Bay Electrification Expo.

ENVIRONMENTAL SUSTAINABILITY

The development of community-driven equitable climate solutions is critical to the success of the Climate Action Plan and the City's Resilience Strategy, and responds to the Climate Emergency Declaration. The engagement of marginalized and frontline communities advances the goals of climate mitigation and adaptation, as well as resilience by advancing racial equity and accelerating access to reliable and clean energy and transportation.

RATIONALE FOR RECOMMENDATION

Engagement with marginalized communities addresses historical and structural racism and economic inequality. This work requires an approach that allows community members to explore how climate change impacts them and to collaborate in the creation of solutions to meet their needs. Deep and authentic community engagement is best accomplished through in-person meetings and events. Until such events can resume, staff are working to engage with stakeholders from impacted communities through virtual means, with a focus on equity and inclusion.

ALTERNATIVE ACTIONS CONSIDERED

City Council could choose to fund all or part of the attached Scope of Work to create non-virtual community engagement strategies while limits on public gatherings persist, and move to interactive, in-person events when they are deemed safe. By partnering with trusted external organizations like BCAC and the Ecology Center, the City could build on existing community relationships, strengthen capacity of community members and organizations to engage on climate issues, and leverage outreach efforts.

CONTACT PERSON

Billi Romain, Sustainability Manager, Planning Department – Office of Energy & Sustainable Development, (510) 981-7432

Attachments:

1 Original Referral Report from January 21, 2020:
2 Ecology Center Berkeley Climate Action Coalition Draft Scope of Work
3 Continuum of Community Engagement

Cheryl Davila
Councilmember
District 2

REVISED AGENDA MATERIAL

Meeting Date: January 21, 2020

Item Description: Short Term Referral to the City Manager: 1. Improve and increase External Community Engagement; 2. Identify the funding resources needed to adequately implement number 1; and 3. Implement and require all City Council items and staff reports include Climate Impacts in addition to Environmental Sustainability

Submitted by: Councilmember Cheryl Davila

Updated agenda report and resolution to reflect the actions from December 5, 2019 Council Facilities, Infrastructure, Transportation, Environment and Sustainability Committee meeting:

Send the item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation, the establishment of a new department, in the committee as a discussion item. Also, the committee took action to amend the recommendations:

1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect “marginalized and front-line communities.”

2. Short Term Referral to the City Manager to report back and identify funding resources and funding needed to adequately implement number 1, including different organizational structure options; and recommendations for funding.

3. Implement and require all City Council items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

Cheryl Davila
Councilmember
District 2

CONSENT CALENDAR
January 21, 2020
~~December 3, 2019~~

To: Honorable Mayor and Members of the City Council

From: Councilmembers Cheryl Davila and Ben Bartlett

Subject: Short Term Referral to the City Manager: 1. Improve and increase External Community Engagement; 2. Identify the funding resources needed to adequately implement number 1; and 3. Implement and require all City Council items and staff reports include Climate Impacts in addition to Environmental Sustainability ~~Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 day~~

RECOMMENDATION

Adopt the following amended actions with a positive recommendation from the Council Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Committee:

1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities."

~~Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 days with the following actions:~~

~~1. *Establishment of a new department* - Create a Climate Emergency Mobilization Department (CEMD) and transition existing city staff (current Chief Sustainability and Resilience Officers) into the new department. The CEMD is proposed to have oversight authority of existing departments and boards regarding planning and coordination of the City's response to climate change, including public education and outreach. In addition, the CEMD would measure and track ongoing greenhouse gas emissions and pollutants, develop an annual climate emissions budget and identify grant funding.~~

2. Short Term Referral to the City Manager to report back and identify funding resources and funding needed to adequately implement number 1, including different organizational structure options; and recommendations for funding.

~~2. *External Community Engagement* - Provide a timeline for regular on-going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities." As part of this process, the proposal further recommends that community capacity building in the form of training and education be provided, and that potential pilot projects be considered which could be tested in these communities.~~

3. Implement and require all City Council items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

~~3. *A Report from the City Manager within 90 days regarding*: The number of positions to adequately implement and operate the CEM department; and recommendations for funding in the upcoming fiscal year budget.~~

POLICY COMMITTEE RECOMMENDATION

On December 5, 2019, the Facilities, Infrastructure, Transportation, Environment, and Sustainability Committee adopted the following action: M/S/C (Harrison/Robinson) to send the item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation, the establishment of a new department, in the committee as a discussion item.
Amend the recommendation to read as follows:
1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on-going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities".
2. A Report from the City Manager within 90 days regarding: The resources needed to adequately implement these efforts, including different organizational structure options; and recommendations for funding.
3. Recommend that all staff reports address climate change in addition to environmental sustainability.
Vote: All Ayes.

BACKGROUND

The Berkeley City Council unanimously passed the Climate Emergency Declaration June 12, 2018. Since then, Richmond, Oakland, Hayward, Alameda, El Cerrito, Chico, Fairfax, Healdsburg, Davis, Arcata, Cloverdale, Malibu, Petaluma, San Jose, San Mateo County, Santa Cruz City & County, Sonoma County and Windsor have also passed Climate Emergency Declarations. There are over 48 cities throughout the United States who have declared, as well as over 1,146 governments and 22 countries throughout the world. The declaration is the first step.

As unprecedented winter wildfires are impacting our City with fierce urgency, we must begin to prepare for our future in these times of climate disruption. Without an immediate and drastic change from the status quo, humans will cause irreversible and ever-worsening damage to the Earth's climate. To act too late, or to be too cautious in our vision and do too little, carries the risk of condemning the City and its residents to an increasingly uninhabitable climate and potentially catastrophic economic losses caused by worsening disasters.

While the wildfires and mudslides demonstrate that the climate emergency threatens everyone, the disasters wrought by an abruptly destabilizing climate have so far most devastatingly impact lower-income communities of color first and worst. Drought, famine, and instability have devastated countries in the Global South. Millions of climate refugees have already left their homes in search of a safe place to live. In the United States, we have seen this after hurricanes Katrina, Sandy, Harvey, Irma and Maria how environmentally and economically vulnerable people have been left to fend for themselves.

The City must therefore aggressively move to reduce and remove greenhouse gas emissions, adapt and restore ecosystems by rapidly adopting legislation to mandate such efforts Citywide and by doing so in such a way that lower-income and frontline communities of color benefit first from mitigation and adaptation funds. The City can thereby create a model for other cities to follow and use its global climate leadership standing to lead the way. By doing so, Berkeleyans can trigger a global mobilization to restore a safe climate, thereby creating the conditions for a future, not of chaos and misery, but of community and dignity.

At the December 5, 2019 meeting of the Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Council Committee, the committee requested to send this item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation "the establishment of a new department" in the FITES committee as a discussion item. Also, the committee took action to amend the recommendations: (1) Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities". (2) Short Term Referral to the City Manager to report back and identify the resources and funding needed to adequately implement these efforts, including different organizational structure options; and recommendations for funding. (3) Implement and require all City Council reports/items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

FISCAL IMPACTS OF RECOMMENDATION
To be determined.

ENVIRONMENTAL SUSTAINABILITY
The Berkeley City Council unanimously passed the Climate Emergency Declaration in June 2018, it is important, now more than ever to take the next step to insure that we are prepared and ready for the climate crisis we will face.

CONTACT PERSON
Cheryl Davila
Councilmember District 2
510.981.7120
cdavila@cityofberkeley.info

ATTACHMENTS:
1. Resolution
2. Track changes from original Council item

RESOLUTION NO. XXXX

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BERKELEY TO ESTABLISH A NEW CITY DEPARTMENT CALLED CLIMATE EMERGENCY MOBILIZATION DEPARTMENT

WHEREAS, The Berkeley City Council unanimously passed the Climate Emergency Declaration on June 12, 2018; and

WHEREAS, the cities of Richmond, Oakland, Hayward, Alameda, El Cerrito, Chico, Fairfax, Healdsburg, Davis, Arcata, Cloverdale, Malibu, Petaluma, San Jose, San Mateo County, Santa

Cruz City & County, Sonoma County and Windsor have also passed Climate Emergency Declarations; and

WHEREAS, There are over 48 cities throughout the United States who have declared, as well as over 1,146 governments and 22 countries throughout the world. The declaration is the first step; and

WHEREAS, The Climate Emergency Declaration was the first step, and creating the Climate Emergency Mobilization Department is the next step; and

WHEREAS, As unprecedented winter wildfires and ensuing mudslides destroyed parts of our City and region, a climate emergency mobilization of our City has never been more fiercely urgent; and

WHEREAS, Such an effort must end to the maximum extent technically feasible city-wide greenhouse gas emissions in every sector by 2025 and begin a large-scale effort to safely and justly remove carbon from the atmosphere; and

WHEREAS, Without an immediate and drastic change from the status quo, humans will cause irreversible and ever-worsening damage to the Earth's climate; and

WHEREAS, To act too late, or to be too cautious in our vision and do too little, carries the risk of condemning the City and its residents to an increasingly uninhabitable climate and potentially catastrophic economic losses caused by worsening disasters; and

WHEREAS, abnormal wildfires, tornadoes, mudslides and other demonstrate that the climate emergency threatens everyone, the disasters wrought by an abruptly destabilizing climate have so far most devastatingly impacted lower-income communities of color first and worst. Drought, famine, and instability have devastated countries in the Global South; and

WHEREAS, Millions of climate refugees have already left their homes in search of a safe place to live. In the United States, we have seen after Hurricanes Katrina, Sandy, Harvey, Irma and Maria how environmentally and economically vulnerable have been generally left to fend for themselves; and

WHEREAS, The City must therefore aggressively move to reduce and remove greenhouse gas emissions and adapt and restore ecosystems by rapidly adopting legislation to mandate such efforts Citywide and by doing so in such a way that lower-income and frontline communities of color benefit first from mitigation and adaptation funds. The City can thereby create a model for other cities to follow and use its global climate leadership standing to lead the way. By doing so, Berkeleyan can trigger a global mobilization to restore a safe climate, thereby creating the conditions for a future, not of chaos and misery, but of community and dignity; and

At the December 5, 2019 meeting of the Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Council Committee, the committee requested to send this item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation "the establishment of a new department" in the FITES committee as a discussion item. Also, the committee took action to amend the recommendations: (1) Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities". (2) Short Term Referral to the City Manager to report back and identify the resources and funding needed to adequately implement these efforts, including different organizational structure options; and recommendations for funding. (3) Implement and require all City Council

reports/items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

NOW, THEREFORE IT BE RESOLVED, that the Berkeley City Council directs a Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 days with the following actions:

Adopt the following amended actions with a positive recommendation from the Council Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Committee:
1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities."
~~Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 days with the following actions:~~
~~1. *Establishment of a new department* - Create a Climate Emergency Mobilization Department (CEMD) and transition existing city staff (current Chief Sustainability and Resilience Officers) into the new department. The CEMD is proposed to have oversight authority of existing departments and boards regarding planning and coordination of the City's response to climate change, including public education and outreach. In addition, the CEMD would measure and track ongoing greenhouse gas emissions and pollutants, develop an annual climate emissions budget and identify grant funding.~~
2. Short Term Referral to the City Manager to report back and identify funding resources and funding needed to adequately implement number 1, including different organizational structure options; and recommendations for funding.
~~2. *External Community Engagement* - Provide a timeline for regular on-going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities." As part of this process, the proposal further recommends that community capacity building in the form of training and education be provided, and that potential pilot projects be considered which could be tested in these communities.~~
3. Implement and require all City Council items, and staff reports include Climate Impacts in addition to Environmental Sustainability.
~~3. *A Report from the City Manager within 90 days regarding*: The number of positions to adequately implement and operate the CEM department; and recommendations for funding in the upcoming fiscal year budget.~~

BE IT FURTHER RESOLVED, that the City Council directs the City Planning Department to report back on opportunities for radical greenhouse gas emissions reductions and carbon drawdown and removal opportunities through the City's General Plan and Community Plan Updates, including on metrics which can prioritize climate-adaptive land use planning.

BE IT FURTHER RESOLVED, that the City Council directs the City Manager or Designee to report back on opportunities and funding to address climate emergencies and mitigation through existing hazard mitigation programs.

BE IT FURTHER RESOLVED, that the City Council direct the City Clerk to work with the City Manager to include greenhouse gas impact statements and greenhouse gas removal or reduction statements in all relevant Council motions, much as it currently includes fiscal impact statements.

Cheryl Davila
Councilmember
District 2

REVISED AGENDA MATERIAL

Meeting Date: January 21, 2020

Item Description: Short Term Referral to the City Manager: 1. Improve and increase External Community Engagement; 2. Identify the funding resources needed to adequately implement number 1; and 3. Implement and require all City Council items and staff reports include Climate Impacts in addition to Environmental Sustainability

Submitted by: Councilmember Cheryl Davila

Updated agenda report and resolution to reflect the actions from December 5, 2019 Council Facilities, Infrastructure, Transportation, Environment and Sustainability Committee meeting:

Send the item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation, the establishment of a new department, in the committee as a discussion item. Also, the committee took action to amend the recommendations:

1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect “marginalized and front-line communities.”

2. Short Term Referral to the City Manager to report back and identify funding resources and funding needed to adequately implement number 1, including different organizational structure options; and recommendations for funding.

3. Implement and require all City Council items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

Cheryl Davila
Councilmember
District 2

CONSENT CALENDAR
January 21, 2020
~~December 3, 2019~~

To: Honorable Mayor and Members of the City Council

From: Councilmember Cheryl Davila and Ben Bartlett

Subject: Short Term Referral to the City Manager: 1. Improve and increase External Community Engagement; 2. Identify the funding resources needed to adequately implement number 1; and 3. Implement and require all City Council items and staff reports include Climate Impacts in addition to Environmental Sustainability

~~Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 day~~

RECOMMENDATION

Adopt the following amended actions with a positive recommendation from the Council Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Committee:

1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities."

~~Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 days with the following actions:~~

~~1. *Establishment of a new department* - Create a Climate Emergency Mobilization Department (CEMD) and transition existing city staff (current Chief Sustainability and Resilience Officers) into the new department. The CEMD is proposed to have oversight authority of existing departments and boards regarding planning and coordination of the City's response to climate change, including public education and outreach. In addition, the CEMD would measure and track ongoing greenhouse gas emissions and pollutants, develop an annual climate emissions budget and identify grant funding.~~

2. Short Term Referral to the City Manager to report back and identify funding resources and funding needed to adequately implement number 1, including different organizational structure options; and recommendations for funding.

~~2. *External Community Engagement* - Provide a timeline for regular on-going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities." As part of this process, the proposal further recommends that community capacity building in the form of training and education be provided, and that potential pilot projects be considered which could be tested in these communities.~~

3. Implement and require all City Council items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

~~3. *A Report from the City Manager within 90 days regarding*: The number of positions to adequately implement and operate the CEM department; and recommendations for funding in the upcoming fiscal year budget.~~

BACKGROUND
The Berkeley City Council unanimously passed the Climate Emergency Declaration June 12, 2018. Since then, Richmond, Oakland, Hayward, Alameda, El Cerrito, Chico, Fairfax, Healdsburg, Davis, Arcata, Cloverdale, Malibu, Petaluma, San Jose, San Mateo County, Santa Cruz City & County, Sonoma County and Windsor have also passed Climate Emergency Declarations. There are over 48 cities throughout the United States who have declared, as well as over 1,146 governments and 22 countries throughout the world. The declaration is the first step.

As unprecedented winter wildfires are impacting our City with fierce urgency, we must begin to prepare for our future in these times of climate disruption. Without an immediate and drastic change from the status quo, humans will cause irreversible and ever-worsening damage to the Earth's climate. To act too late, or to be too cautious in our vision and do too little, carries the risk of condemning the City and its residents to an increasingly uninhabitable climate and potentially catastrophic economic losses caused by worsening disasters.

While the wildfires and mudslides demonstrate that the climate emergency threatens everyone, the disasters wrought by an abruptly destabilizing climate have so far most devastatingly impact lower-income communities of color first and worst. Drought, famine, and instability have devastated countries in the Global South. Millions of climate refugees have already left their homes in search of a safe place to live. In the United States, we have seen this after hurricanes Katrina, Sandy, Harvey, Irma and Maria how environmentally and economically vulnerable people have been left to fend for themselves.

The City must therefore aggressively move to reduce and remove greenhouse gas emissions, adapt and restore ecosystems by rapidly adopting legislation to mandate such efforts Citywide and by doing so in such a way that lower-income and frontline communities of color benefit first from mitigation and adaptation funds. The City can thereby create a model for other cities to follow and use its global climate leadership standing to lead the way. By doing so, Berkeleyans can trigger a global mobilization to restore a safe climate, thereby creating the conditions for a future, not of chaos and misery, but of community and dignity.

At the December 5, 2019 meeting of the Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Council Committee, the committee requested to send this item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation "the establishment of a new department" in the FITES committee as a discussion item. Also, the committee took action to amend the recommendations: (1) Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities". (2) Short Term Referral to the City Manager to report back and identify the resources and funding needed to adequately implement these efforts, including different organizational structure options; and recommendations for funding. (3) Implement and require all City Council reports/items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

FISCAL IMPACTS OF RECOMMENDATION
To be determined.

ENVIRONMENTAL SUSTAINABILITY

The Berkeley City Council unanimously passed the Climate Emergency Declaration in June 2018, it is important, now more than ever to take the next step to insure that we are prepared and ready for the climate crisis we will face.

CONTACT PERSON
Cheryl Davila
Councilmember District 2
510.981.7120
cdavila@cityofberkeley.info

ATTACHMENTS:

1. Resolution
2. Track changes from original Council item

RESOLUTION NO. XXXX

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BERKELEY TO ESTABLISH A NEW CITY DEPARTMENT CALLED CLIMATE EMERGENCY MOBILIZATION DEPARTMENT

WHEREAS, The Berkeley City Council unanimously passed the Climate Emergency Declaration on June 12, 2018; and

WHEREAS, the cities of Richmond, Oakland, Hayward, Alameda, El Cerrito, Chico, Fairfax, Healdsburg, Davis, Arcata, Cloverdale, Malibu, Petaluma, San Jose, San Mateo County, Santa Cruz City & County, Sonoma County and Windsor have also passed Climate Emergency Declarations; and

WHEREAS, There are over 48 cities throughout the United States who have declared, as well as over 1,146 governments and 22 countries throughout the world. The declaration is the first step; and

WHEREAS, The Climate Emergency Declaration was the first step, and creating the Climate Emergency Mobilization Department is the next step; and

WHEREAS, As unprecedented winter wildfires and ensuing mudslides destroyed parts of our City and region, a climate emergency mobilization of our City has never been more fiercely urgent; and

WHEREAS, Such an effort must end to the maximum extent technically feasible city-wide greenhouse gas emissions in every sector by 2025 and begin a large-scale effort to safely and justly remove carbon from the atmosphere; and

WHEREAS, Without an immediate and drastic change from the status quo, humans will cause irreversible and ever-worsening damage to the Earth’s climate; and

WHEREAS, To act too late, or to be too cautious in our vision and do too little, carries the risk of condemning the City and its residents to an increasingly uninhabitable climate and potentially catastrophic economic losses caused by worsening disasters; and

WHEREAS, abnormal wildfires, tornadoes, mudslides and other demonstrate that the climate emergency threatens everyone, the disasters wrought by an abruptly destabilizing climate have so far most devastatingly impacted lower-income communities of color first and worst. Drought, famine, and instability have devastated countries in the Global South; and

WHEREAS, Millions of climate refugees have already left their homes in search of a safe place to live. In the United States, we have seen after Hurricanes Katrina, Sandy, Harvey, Irma and Maria how environmentally and economically vulnerable have been generally left to fend for themselves; and

WHEREAS, The City must therefore aggressively move to reduce and remove greenhouse gas emissions and adapt and restore ecosystems by rapidly adopting legislation to mandate such efforts Citywide and by doing so in such a way that lower-income and frontline communities of color benefit first from mitigation and adaptation funds. The City can thereby create a model for other cities to follow and use its global climate leadership standing to lead the way. By doing so, Berkeleyan can trigger a global mobilization to restore a safe climate, thereby creating the conditions for a future, not of chaos and misery, but of community and dignity; and

At the December 5, 2019 meeting of the Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Council Committee, the committee requested to send this item, as amended, back to the City Council with a Positive Recommendation and to keep the first recommendation “the establishment of a new department” in the FITES committee as a discussion item. Also, the committee took action to amend the recommendations: (1) Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect “marginalized and front-line communities”. (2) Short Term Referral to the City Manager to report back and identify the resources and funding needed to adequately implement these efforts, including different organizational structure options; and recommendations for funding. (3) Implement and require all City Council reports/items, and staff reports include Climate Impacts in addition to Environmental Sustainability.

NOW, THEREFORE IT BE RESOLVED, that the Berkeley City Council directs a Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 days with the following actions:

Adopt the following amended actions with a positive recommendation from the Council Facilities, Infrastructure, Transportation, Environment and Sustainability (FITES) Committee:
1. Short Term Referral to the City Manager: to look at how to improve and increase External Community Engagement – including funding for regular on- going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect “marginalized and front-line communities.”
~~Short Term Referral to the City Manager on how to establish a New Department: Climate Emergency Mobilization Department within 90 days with the following actions:~~
~~1. *Establishment of a new department* - Create a Climate Emergency Mobilization Department (CEMD) and transition existing city staff (current Chief Sustainability and Resilience Officers) into the new department. The CEMD is proposed to have oversight authority of existing departments and boards regarding planning and coordination of the City’s response to climate change, including public education and outreach. In addition, the~~

~~CEMD would measure and track ongoing greenhouse gas emissions and pollutants, develop an annual climate emissions budget and identify grant funding.~~
2. Short Term Referral to the City Manager to report back and identify funding resources and funding needed to adequately implement number 1, including different organizational structure options; and recommendations for funding.
~~2. *External Community Engagement* - Provide a timeline for regular on-going town halls or neighborhood assemblies for external community engagement and collaboration to engage the community and allow for input on new policies and programs which affect "marginalized and front-line communities." As part of this process, the proposal further recommends that community capacity building in the form of training and education be provided, and that potential pilot projects be considered which could be tested in these communities.~~
3. Implement and require all City Council items, and staff reports include Climate Impacts in addition to Environmental Sustainability.
~~3. *A Report from the City Manager within 90 days regarding*: The number of positions to adequately implement and operate the CEM department; and recommendations for funding in the upcoming fiscal year budget.~~

BE IT FURTHER RESOLVED, that the City Council directs the City Planning Department to report back on opportunities for radical greenhouse gas emissions reductions and carbon drawdown and removal opportunities through the City's General Plan and Community Plan Updates, including on metrics which can prioritize climate-adaptive land use planning.

BE IT FURTHER RESOLVED, that the City Council directs the City Manager or Designee to report back on opportunities and funding to address climate emergencies and mitigation through existing hazard mitigation programs.

BE IT FURTHER RESOLVED, that the City Council direct the City Clerk to work with the City Manager to include greenhouse gas impact statements and greenhouse gas removal or reduction statements in all relevant Council motions, much as it currently includes fiscal impact statements.

ATTACHMENT 2

The Ecology Center Community Engagement Proposed Scope of Work for the Berkeley Climate Action Coalition

Program Summary: The success of the City of Berkeley's Climate Action Plan, Resilience Strategy, and response to the Climate Emergency Declaration is dependent on input from and engagement with Berkeley's most vulnerable and climate-impacted communities. Citywide interventions must work for all, and without adequate feedback, the City's responses to the climate threat can exacerbate impacts on the communities least able to bear them. These communities are often the most negatively affected by pollution and climate change impacts, yet rarely have a voice in how to create policies to mitigate and adapt to such adversities. The Ecology Center co-convenes the Berkeley Climate Action Coalition along with the Office of Energy and Sustainable Development, and has long-standing relationships with a diverse array of community organizations.

This program seeks to strengthen the capacity of individuals and organizations from vulnerable, impacted, underserved and low-income communities to identify their own needs, priorities and solutions and to self-advocate for appropriate outcomes within a climate action framework. Equitable outreach is collaborative in nature, and aims to:

- Support leadership development of people from impacted communities to engage on issues of concern related to climate action resilience.
- Create opportunities for community members to explore how climate change impacts them and to generate solution to meet their needs.
- Ensure community members understand City processes and decision points.
- Support partners to be able to engage in City processes in an ongoing fashion.
- Ensure resources for culturally appropriate meeting spaces, facilitation, food, childcare, and translation necessary to achieve these goals.

Target Population: People of color, renters, seniors, students, people with disabilities, low-income residents, and other "harder-to-reach" communities most vulnerable to the impacts of climate change and/or historically excluded in the development of climate change and resiliency solutions.

Draft Scope of Work:

- Ongoing community engagement (minimum of 20 activities per year) on topics of concern (see below) that may include meetings with key stakeholders and community organizations' staff members; outreach at facilities serving frontline communities such as senior centers, or onsite at local agencies; and topic-specific working groups.

- At least two public convenings or town hall meetings per year that utilize hands-on, interactive learning components.
    - Public meetings will include, as needed, culturally appropriate meeting spaces, facilitation, food, childcare, and translation
    - Public meetings will be planned in partnership with community organizations serving frontline communities

Engagement and outreach will focus on the intersection of climate **topics of concern** to frontline communities and City climate initiatives:

- Changes in electricity rates from Time of Use (TOU), potential opt-up to more expensive East Bay Community Energy (EBCE) electricity product, and any other potential rate increases and savings opportunities
- Preparing for climate-related heat and smoke events
- Energy assurance during Public Safety Power Shutoff (PSPS) events
- Access to clean, electric mobility options
- Incentive programs for income-qualified residents
- Building electrification: 1) understanding barriers and promoting health benefits and incentive programs; 2) creation of a proposed Resilient Homes Equity Pilot Program for building electrification and efficiency to complement the transfer tax rebate program for low-income home owners and/or renters

Timeline: The program will be delivered over a two-year period as follows:

- 1-3 months: relationship, coalition and capacity building
- 3-6 months: identifying priorities, program planning and coordination
- 6-24 months: program implementation

Provider: The Ecology Center, a 50-year-old Berkeley organization, deeply rooted in the community, is ideally situated to deliver this outreach program. The Ecology Center, which co-convenes the Berkeley Climate Action Coalition (BCAC) with the City, has long-standing relationships with a variety of local climate organizations. Additionally, through its farmers' markets and food access programs (i.e. Farmers' Market EBT and Market Match), and successful soda tax campaign, the Ecology Center has developed strong alliances with health and human services organizations serving many of Berkeley's frontline communities. Partnering with these organizations is critical as

adverse health impacts are often associated with climate change, and health issues can be an entry point for meaningful engagement.

Proposed Ecology Center Budget: $236,000 over 2 years, ($118,000 per year)
Annual Breakdown:

- $75,000 1 FTE Lead Staff (including taxes and benefits)
- $10,000: Support for partnering community organizations to build capacity to co-host convenings
- $10,000: Public meeting resources such as childcare, translation, food, etc.
- $23,000: Administrative overhead

CONTINUUM OF COMMUNITY ENGAGEMENT

Community engagement is often depicted as a continuum increasing in the level of engagement and partnership from left to right, as shown in the figure below. Within any given planning process, various strategies for community engagement may be employed at different points in time.

INFORM	CONSULT	INVOLVE	SHARED LEADERSHIP	COMMUNITY-DRIVEN
Local government initiates an effort, coordinates with departments, and uses a variety of channels to inform the community to take action	Local government gathers information from the community to inform local government-led interventions	Local government engages community members to shape government priorities and plans	Community and local government share in decision-making to co-create solutions together	Community initiates and directs strategy and action with participation and technical assistance from local government
CHARACTERISTICS OF ENGAGEMENT				
• Primarily one-way channel of communication • One interaction • Term-limited to project • Addresses immediate need of local government	• Primarily one-way channel of communication • One to multiple interactions • Short to medium-term • Shapes and informs local government programs	• Two-way channel of communication • Multiple interactions • Medium- to long-term • Advancement of solutions to complex problems	• Two-way channel of communication • Multiple interactions • Medium- to long-term • Advancement of solutions to complex problems	Two-way channel of communication Multiple interactions Medium to long-term Advancement of solutions to complex problems
STRATEGIES				
Media releases, brochures, pamphlets, outreach to population groups, translated information, new and social media	Focus groups, interviews, community surveys, public hearings, public comment periods	Forums, advisory boards, stakeholder involvement, coalitions, policy development and advocacy, including legislative briefings, and testimony, workshops, community-wide events	Co-led community meetings, advisory boards, coalitions, and partnerships, policy development and advocacy, including legislative briefings and testimony	Community-led planning efforts, community-hosted forums, collaborative partnerships, coalitions, policy development and advocacy including legislative briefings and testimony

Adapted from King County, Washington and IAP2

A community-driven equitable climate preparedness planning process involves collaboration and shared decision-making between local government staff and the community with the aim of co-creating an equitable climate preparedness plan. In terms of the levels of engagement continuum depicted above, this approach most aligns with shared leadership and community-driven, where there is an emphasis on a shared decision-making and co-ownership over the development of the plan.

Office of the City Manager

ACTION CALENDAR
July 21, 2020

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Timothy Burroughs, Director, Department of Planning and Development

Subject: Climate Action Plan and Resilience Update

SUMMARY
The City of Berkeley has long been a leader on climate action. In 2006, Berkeley residents voted to reduce the community's greenhouse gas (GHG) emissions by 80% below 2000 levels by 2050, and the resulting Climate Action Plan (CAP) was adopted by Berkeley City Council in 2009. In 2018, then-Governor Brown committed California to carbon neutrality by 2045, the Berkeley City Council resolved to become a "Fossil Fuel-Free City," and the Council declared a Climate Emergency, all steps to signal the urgency of these ambitious goals and the need to act on climate threats in an equitable manner.

The community is making notable progress in reducing GHG emissions. Based on the best currently available data from 2018, the community has reduced overall GHG emissions by 26% since 2000, despite population increasing by 18% and an expanding economy.[1] This achievement is largely due to reduced energy use in buildings and the transition to purchasing cleaner electricity provided by East Bay Community Energy (EBCE), Alameda County's community-based electricity provider, which started enrolling customers in 2018. EBCE currently offers product options to purchase electricity that are either emissions-free (Brilliant 100 or Renewable 100) or have half of the emissions compared to PG&E (Bright Choice). Further declines in emissions due to this change are anticipated in 2019. The leadership and commitment of the Berkeley community and City Council to create and join EBCE were critical in achieving this success.

Although Berkeley has made significant progress, additional work is required to achieve the City's ambitious goal to become a Fossil Fuel-Free City. Alongside GHG emission reductions, staff also remains committed to developing community resilience, adapting to the changing climate, and advancing racial equity. As the world faces unprecedented challenges in recovering from COVID-19 and addressing racial justice, the City can

[1] Staff Report: Berkeley Economic Dashboards, March 26, 2019: https://www.cityofberkeley.info/uploadedFiles/Manager/Economic_Development/2019-03-26%20Item%2026%20Berkeley%20Economic%20Dashboards.pdf

rebuild as a stronger, more equitable, and more resilient community by prioritizing solutions that address climate change while advancing racial equity.

This report provides a summary of work being done throughout the City to meet Berkeley's ambitious climate goals.

CURRENT SITUATION AND ITS EFFECTS

City staff annually calculates community greenhouse gas (GHG) emissions to understand which sectors and fuels contribute the most emissions in Berkeley, track progress toward the community's climate goals, and provide data that can be used for prioritizing programs and policies.

Figure 1 below shows the community emissions inventory for 2018, the most recent available data: emissions from transportation account for over half (59%) and emissions from buildings account for over a third (37%). Due to the purchase of clean electricity from East Bay Community Energy (EBCE) starting in 2018, emissions from the building electricity sector are substantially less than previous years.

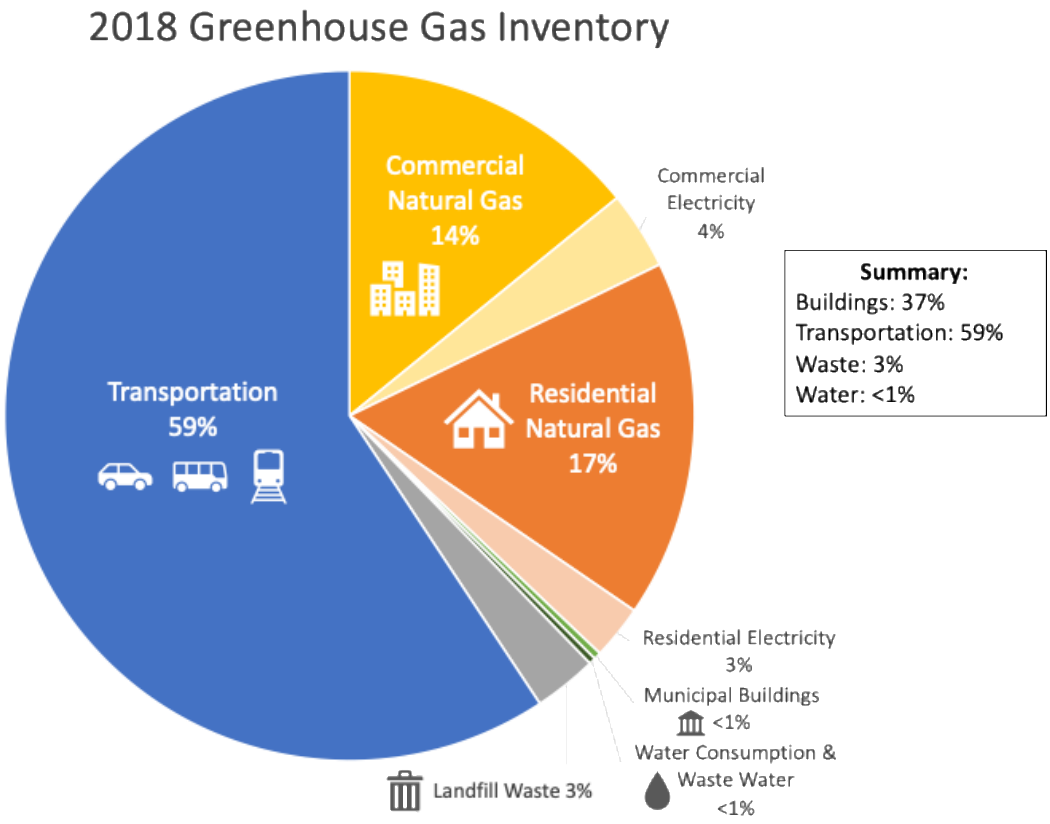

Figure 1 - Pie chart of 2018 community-wide GHG emissions inventory, broken down by sector and fuel.

According to 2018 data, Berkeley reduced GHG emissions by 26% below year 2000 levels, even as its population grew by 18% and Berkeley's economy expanded. This significant decrease in emissions can largely be attributed to Berkeley joining EBCE in 2018. Even though customers transitioned to EBCE over the course of 2018 and during a portion of the year were still using PG&E electricity, overall community emissions were significantly less because in 2018 EBCE's electricity was considerably cleaner than PG&E's (approximately half the amount of carbon dioxide equivalent [CO_2e]). It is anticipated that building energy emissions will continue to drop for 2019—the first complete year of Berkeley's participation in EBCE—and going forward, as EBCE continues to reduce the carbon intensity of its electricity.

Energy usage also has declined since 2000. The residential sector decreased electricity usage by 20% and natural gas usage by 26%, and the commercial and industrial sectors decreased electricity usage by 32% and natural gas usage by 2%. Attachment 1 provides more detail on Berkeley's sector-based GHG inventory, as well as an overview of a 2013 consumption-based inventory which accounts for the GHGs released to produce, transport, sell, use, and dispose of goods consumed in Berkeley.

The community accomplishments to date are impressive, but more is needed to achieve Berkeley's ambitious goals. The City is actively working on analyses and strategic planning initiatives to identify how best to make Berkeley's buildings and transportation more efficient, and free of fossil fuels. These efforts will determine the most valuable and achievable programs and policies. This work aligns with the Strategic Plan priority of advancing the City's goal to be a global leader in addressing climate change, advancing environmental justice, and protecting the environment.

In order to truly achieve a more sustainable and resilient future, especially as the City rebuilds from COVID-19, it is critical to prioritize and consider the impacts on **equity** (who benefits, who is burdened, who is left out), **resilience** (how to make the community stronger and better able to recover from challenges together), **climate change** (how to mitigate and adapt to the impacts of climate change), **health and well-being** (how to improve health and social outcomes for all), and **prosperity** (how to encourage workforce development and good quality, high-paying local jobs). These overarching values guide staff's work to achieve Berkeley's climate goals.

Key accomplishments and examples of work underway at the City to reduce GHG emissions and address the climate emergency are described below. Although the data for GHG emissions is for the calendar year of 2018, the progress on programs described in the following sections includes efforts since December 6, 2018, the last time that this report was updated for City Council.

Equity

Prioritizing the advancement of equity outcomes into policies and programs.

Climate change affects everyone, but its impacts are not felt equally. Programs and policies that address climate change must prioritize communities that have been subject to structural and institutional racism and/or are disproportionately affected by climate change. City staff is committed to applying an equity approach to climate work to ensure that policies, plans, and programs are developed in a way that involves input and collaboration with community members and organizations representing underserved communities. This approach begins with an analysis of who benefits, who is burdened, and who is excluded from City sustainability programs and policies in order to prioritize policy solutions that advance equity, accessibility, and inclusion.

Examples of equity work underway in OESD include:

- **Existing Building Electrification Strategy:** Staff is working with a team of building electrification experts to develop a report with short and long-term equitable strategies to electrify all of Berkeley's existing buildings. To ensure that equity is at the center of this Strategy, equity expertise and deliverables were integrated into the procurement process and contract. The Ecology Center is serving as the consultant on equity and is facilitating discussions with community organizations on this topic. The team is using an equity analysis to understand the impacts of policy options on the most vulnerable and impacted communities, in order to identify solutions that advance equity.

- **Electric Mobility Roadmap**: Providing equity, both in the process of developing strategies, as well as in implementing equitable solutions that are meaningful and measurable, was a clear and consistent focus while creating the Electric Mobility Roadmap (Roadmap). Community organizations who work with underserved communities, including low-income populations, communities of color, and people with disabilities, were interviewed as part of the early needs assessment phase, became thought-partners as draft strategies and actions were developed, and remain potential partners for implementation. Greenlining Institute was a paid strategic advisor on this project and provided clear, thoughtful direction and language to ensure that equity was addressed in a meaningful way.

- **Proposed Resilient Homes Equity Pilot Program:** Concurrent to the referral to update the Transfer Tax Rebate Program, staff is recommending that Council consider supporting the development of a parallel equity program (the Resilient Homes Equity Pilot Program) that would provide funding for low-income residents who are not able to access the existing Seismic or future proposed Resilience

Transfer Tax Rebate Program. This program could support homeowners' ability to remain in their homes, improve resilience in an aging building stock, and serve as a replicable example of how City programs can operationalize equity and assure equitable distribution of City resources. If approved by Council, staff would design the program in collaboration with community stakeholders to meet the needs of frontline communities such as low-income communities, communities of color, and those most affected by the impacts of climate change.

Transportation

Biggest opportunity sector, advancing opportunities for people to safely walk, bike, take public transit, and electrify mobility options.

Transportation accounts for 59% of Berkeley's total 2018 GHG inventory. This is the largest sector of GHG emissions and the most challenging to tackle. The City continues to work to get people out of cars by prioritizing walking and biking, and into less-polluting modes of transportation.

As the City and transportation agencies continue to respond to and recover from COVID-19, transportation services and emissions from this sector will be impacted. For example, with more people working from home, emissions from commutes have decreased, but as people begin to go back to work, those who have access to private vehicles may prefer to use their own vehicles over public transit. There are also many equity impacts related to travel options. Support will be needed to maintain momentum for positive travel behaviors, like walking, biking, and telecommuting; rebuilding trust in public transit will be critical.

Active Transportation and Reducing Vehicle Miles
Active transportation refers to strategies encourage walking, biking, and public transit over single occupancy vehicles. Strategies in this area include: bike share and other shared micromobility options; transit infrastructure investments to increase ridership by reducing transit travel time and delay; safe, abundant pedestrian and bicycle infrastructure; and eliminating severe traffic crashes for all travelers. The City continues to focus new compact, mixed-use development along public transit corridors in designated Priority Development Areas, particularly in or near Downtown Berkeley, at BART stations, and along San Pablo Avenue. Additionally, in order to reduce the amount of time and miles driven in single occupancy vehicles, strategies include the goBerkeley parking management program, which reduces vehicle travel associated with searching for parking; and car sharing service options, including one-way car share.

Strategic work within this sector includes updating and implementing transportation plans. The Pedestrian Plan Update and the Transit-First Policy Implementation Plan are

scheduled for completion by the end of 2020. The Pedestrian Plan will propose programs, policies, and projects to make walking more comfortable and safe, with a particular focus on infrastructure to improve street crossings and reduce motor traffic speeds. The Transit-First Policy Implementation Plan is anticipated to establish protocols for bus stop location and transit signal priority, lay out a schedule for future transit corridor studies, and contain transit-supportive street design prototypes. Implementation of the Berkeley Strategic Transportation (BeST) Plan is also underway, including the adoption of the Berkeley Vision Zero Action Plan in March 2020, with the goal of ending traffic deaths and severe injuries on Berkeley streets by the year 2028. Traffic safety improvements and housing density near jobs have contributed to Berkeley having the highest walking commute rate in California (among cities with populations over 5,000), and the highest bicycling commute rate in the nation among cities of 100,000 residents or more.

Implementation of the Berkeley Bicycle Plan (2017) supports bicycle travel and commuting by reducing traffic stress experienced by existing and potential bicyclists. According to surveys completed for the Bicycle Plan, low stress bikeways could encourage up to 71% of Berkeley residents to try cycling or to cycle more. Nearly 10% of Berkeley residents bike to work, and approximately 14% of all trips in Berkeley are by bicycle. Following the successful rollout of regional bike share (Bay Wheels) in Berkeley in 2018, staff have continued to work with electric scooter share companies and other vendors to bring the next generation of micromobility to Berkeley in a safe, accessible way. In December 2019 the City Council approved the conceptual design for a new protected bikeway on Milvia Street between Hearst Avenue and Blake Street through Downtown Berkeley. The project is fully funded as part of the Affordable Housing and Sustainable Communities grant for the Berkeley Way project and is scheduled to be constructed in 2021. The Center Street Garage continues to serve as the permanent home for the Downtown Berkeley Bike Station, offering secure valet bike parking, rentals, and repairs.

Upcoming projects highlight Berkeley's Transit First, Complete Streets, Vision Zero, and economic development policies. Most notably, the City received a grant of over $7 million in federal funding to design and construct the Southside Complete Streets project, including transit time reliability improvements, traffic safety projects, and better access to Southside businesses. The project will focus on adding bus only lanes, protected bikeways, pedestrian crossing safety improvements, and passenger and loading zone improvements at various locations on Telegraph Avenue, Bancroft Way, Dana Street, and Fulton Street. The project will kick off public engagement in fall 2020, with construction scheduled for 2023.

Electric Mobility Roadmap
Staff began work with the community and Energy Commission in late 2018 to draft Berkeley's first Electric Mobility Roadmap (Roadmap). The Roadmap supports clean transportation, including walking, biking, public transportation, and a wide range of

electric vehicles, with a focus on equitable and affordable access. The Roadmap identifies strategies and actions to achieve these four goals:

- Ensure Equity in Access to Electric Mobility
  Maximize electric mobility benefits in underserved communities
- Improve Alternatives to Driving
  Shift trips to walking, cycling, and shared electric modes
- Achieve Zero Net Carbon Emissions
  Eliminate emissions from private vehicles
- Demonstrate City Leadership
  Lead by example and guide the electric mobility transition

The Roadmap includes scenario modeling of what is needed to reach carbon neutrality by 2045 and found that electric vehicle (EV) sales in Berkeley would need to reach about 90% of vehicle purchases by 2025 and nearly 100% by 2030 (up from 16% in 2017). This would translate to EVs being approximately 25% of vehicles in use within Berkeley by 2025, 55% by 2030, and 100% by 2045. However, these numbers could be offset by supporting clean alternatives to driving which could also reduce the total number of vehicles and provide co-benefits such as lower traffic congestion and healthy, active transportation, as well as reduced or eliminated GHG emissions.

Electric Vehicles & Charging Stations
The City continues to install EV charging stations for public use, and promote the use of electric vehicles. As of October 2018, EVs were nearly 4% of registered personal vehicles in Berkeley. There were 105 total publicly-available EV charging ports listed on PlugShare and the Department of Energy's Alternative Fuels Data Center in Berkeley as of February 2019[2]. The City of Berkeley currently provides a total of 73 Level 2 EV charging ports for public and fleet charging, including 37 new EV charging ports that were installed in Center Street Garage at the end of 2019.

Fleet
Tied to the Roadmap goal of demonstrating City leadership, staff worked with EBCE to conduct a municipal fleet electrification assessment. This assessment, also scheduled for City Council consideration on July 28, 2020, presents an EV deployment and associated charging infrastructure plan through 2030 including distributed energy resource (solar and battery storage) charging options. If investments can be made to transition the light duty municipal fleet to EVs over the next 10 years, it will reduce the associated lifecycle (well-to-wheels) GHG emissions of these vehicles from 56.6 to 2.1 metric tons, a 96% reduction by 2030.

[2] These stations were located on municipal property and at Berkeley businesses including grocery stores, offices, and hotels. Residential home charging stations are not included.

Buildings

Reducing energy use, promoting cleaner energy, and transitioning all buildings to clean electricity.

In the 2018 inventory, buildings account for 37% of GHG emissions in Berkeley, and of those emissions 83% are from natural gas. Natural gas use in buildings account for 31% of all community emissions. Key accomplishments have been made to reduce energy use in buildings, use cleaner electricity in buildings, as well as to transition buildings away from natural gas infrastructure to clean electricity.

Removing natural gas from buildings, or building electrification, not only reduces GHG emissions, but it also improves indoor air quality and safety by removing the potential for natural gas leaks. Furthermore, the elimination of gas in buildings will ultimately allow for the strategic decommissioning of natural gas distribution infrastructure and the associated leakage of methane leakage, the main component of natural gas. This is significant because methane traps 86 times more heat that carbon dioxide. Berkeley's building electrification strategy is based on the following three objectives:

1. **No new connections** to the natural gas distribution system,
2. Creating requirements or incentives to **promote electrification** in existing buildings throughout the City, and
3. Developing a plan for **strategic electrification by geographic area** that allows for the early retirement and decommissioning of the natural gas distribution infrastructure and elimination of associated methane emissions.

Berkeley is a leader in advancing electrification in new buildings, specifically through its Natural Gas Prohibition and 2019 Energy Reach Code. Progress is being made in each of the objectives, as reported below.

1. No new connections to natural gas
Berkeley is achieving this objective by eliminating gas in new construction through its landmark natural gas prohibition and electric-favored reach code.

- ***Natural Gas Prohibition***
  In July 2019, the City Council adopted the first ordinance in the nation to prohibit the use of natural gas in newly constructed buildings. The Natural Gas Prohibition became effective on January 1, 2020, and applies to new building applications for land use permits or zoning certificates. New buildings subject to the prohibition will use highly efficient heat pumps, for water heating and for heat and air conditioning, and electrically powered appliances. This policy supports

State and City efforts to decarbonize buildings, removing not only the GHGs produced by the combustion of natural gas (methane) within buildings, but new methane pipeline connections as well, and the leakage associated with this potent, and persistent, GHG.

- ***2019 Electric-Favored Energy Reach Code***
  In December 2019, Berkeley City Council adopted local amendments to the California Energy Code. This electric-favored "reach code," approved by the California Energy Commission in February 2020, requires newly constructed buildings to include solar PV systems and feature either all-electric systems or mixed-fuel construction that exceeds the efficiency requirements of the Energy Code and includes electric-readiness. The reach code and prohibition work in tandem to support building electrification and its health, safety, and climate benefits.

2. **Requirements and incentives to promote efficiency and electrification in existing buildings**
   Berkeley is making progress in this area, but additional work identifying and leveraging incentives to offset costs of electrification is needed.

   - ***Building Energy Saving Ordinance***
     Berkeley's Building Energy Savings Ordinance (BESO) requires building owners to complete and publicly report building-specific energy efficiency assessments and energy scores. The goal of BESO is to reduce both energy costs and GHG emissions in Berkeley's existing buildings. To date, BESO has achieved many successes, including:

     - Made Berkeley a national model for building energy labeling.
     - Provided data on the energy use and energy efficiency opportunities of Berkeley's existing building stock.
     - 1,532 Energy assessments completed.
     - 1,256 Home Energy Scores[3] completed, with an average of 4.3 out of 10.
     - 92 Large building Energy Star Portfolio Manager Benchmarks completed.
     - 33 large buildings (over 25,000 square feet) have achieved an ENERGY STAR Score of 80 or greater and qualified as High Performance Buildings exempted from the requirement for an energy improvement or assessment every 5 years.

[3] Developed by the US Department of Energy and its national laboratories, the Home Energy Score provides home owners, buyers, and renters directly comparable and credible information about a home's energy use. Each Home Energy Score is shown on a simple one-to-ten scale, where a ten represents the most efficient homes. More information can be found at: https://www.energy.gov/eere/buildings/downloads/home-energy-score#:~:text=Developed%20by%20DOE%20and%20its,about%20a%20home's%20energy%20use.&text=Each%20Home%20Energy%20Score%20is,represents%20the%20most%20efficient%20homes.

In February of 2020, a third-party evaluation of the BESO program was completed to assess whether BESO is meeting its goals of being easy, affordable and valuable. The evaluation recommended:

- Align with Berkeley's electrification and community resilience goals;
- Identify and leverage incentives to encourage upgrades;
- Increase the number of energy upgrades that result from the energy assessment recommendations and improve tracking; and
- Streamline BESO administrative processes for both staff and the public.

Staff is providing a separate complete report to City Council on the BESO Evaluation and proposed recommendations.

- ***Financial Incentives***
  Incentives are critical to the advancement of energy efficiency and electrification. As electrification of buildings requires financial investments by owners, it is important to identify incentives to accelerate adoption of these newer technologies. For the first time, due to recent changes by the California Public Utilities Commission (CPUC) to allow publicly funded energy efficiency dollars to be spent on "fuel switching" (changing from gas to electric appliances), there are now incentives available to electrify residential and multifamily buildings:

  - The BayREN Home+ program[4] provides both energy efficiency and electrification incentives, a network of certified contractors, and free technical advice. Homeowners can access electrification rebates through the BayREN program for heat pump space heating and cooling ($1,000), heat pump water heaters ($1,000), induction electric ranges or cooktops ($300) and heat pump clothes dryers ($300). Additionally, BayREN offers up to $1,000 for heat pump water heaters through an installer incentive[5]. Multifamily buildings can access incentives through the Bay Area Multifamily Building Enhancements (BAMBE) program[6] for both central and in-unit heat pump HVAC and water heaters, electric dryers, cooktops and heat pump pool heaters.

  Figure 2 below shows the rebates provided in Berkeley through the Home+ program in 2019, when the program launched, and the BAMBE program for 2018 and 2019.

[4] BayREN Home+: https://bayrenresidential.org/
[5] BayREN Heat Pump Water Heater Incentive for Contractors: https://www.bayren.org/hpwh
[6] Bay Area Multifamily Building Enhancements (BAMBE) program: https://bayareamultifamily.org/programs

2019 Home+:

Year	# of households	# of measures installed	kWh savings	Therms savings	Total rebate amount
2019	93	315	5,947	5,619	$ 124,047

BAMBE:

Year	# of projects	# of units	kWh savings	Therms savings	Total rebate amount
2018	<5	100	13,155	4,138	$ 75,000
2019	<5	103	32,149	3,715	$ 77,250

Figure 2 - Berkeley Rebates from Home+ (2019) and BAMBE Programs (2018-2019)

- ***Existing Building Electrification Strategy***

Achieving Berkeley's GHG emission reductions goals will require phasing natural gas out of existing buildings. The City is working with a team of experts (including the Rocky Mountain Institute, Rincon Consultants, Inc., and the Ecology Center) on a Berkeley Existing Buildings Electrification Strategy to identify long and short-term strategies to make the buildings in Berkeley free of fossil fuels. This analysis will include costs and timelines, as well as identify the most effective policies and programs to achieve the Fossil Fuel-Free City goal. This Strategy is being developed with the Ecology Center as a dedicated equity consultant, to ensure that the policies and programs are evaluated with racial and social equity as a priority.

The team is currently conducting a technoeconomic analysis focused on Berkeley buildings and a review of strategies for accelerating an electrification transition. Over the next few months, City staff will be engaging community stakeholders and technical experts to evaluate policy options, with a final report expected for Council consideration in early 2021. Strategies being evaluated include piloting neighborhood electrification, financing for whole building electrification, and targeted electrification at specific leverage points like time of sale and/or time of replacement policies. An initial finding is that pairing solar PV with whole home electrification has a viable payback, therefore it is important to promote or subsidize solar, especially for low or moderate-income residents.

3. **Strategic electrification and early retirement of gas distribution infrastructure**

The City is working to identify geographic opportunity areas that could be considered for strategic electrification, with the goal of retiring the associated gas infrastructure serving adjacent buildings or a neighborhood. Identifying a potential pilot project in a low-income neighborhood could provide health and comfort benefits to households most impacted by climate change. The City is leading the way in exploring this innovative concept.

- ***eLab Accelerator on Strategic Electrification and Retirement of Gas Assets***
The City of Berkeley has been invited to participate in the Rocky Mountain Institute's eLab Accelerator Program on strategic electrification and gas distribution system retirement. This project brings together staff from Pacific Gas and Electric (PG&E), the CA Public Utilities Commission (CPUC), the Natural Resources Defense Council (NRDC), and other experts. The goal is to develop a proposal for a pilot project for specific location(s) that helps existing buildings switch from natural gas to electric for heating/cooling needs, and to also decommission natural gas infrastructure distribution pipelines. The project seeks to identify regulatory and financial barriers and safe and equitable solutions, though no implementation funding has yet been identified.

Municipal Facilities
GHG emissions from municipal facilities account for less than 1% of overall community emissions, but it is important that the City leads by example in making its facilities as clean, efficient, safe, and healthy as possible. Since the City opted its buildings to purchase carbon-free electricity from EBCE, emissions have dropped significantly. The City has also shown leadership in energy efficiency and building electrification. Energy efficiency projects have been successfully completed at James Kenney Recreation Center and the Public Safety Building, and electrification measures have been included in upgrades to the North Berkeley Senior Center and Live Oak Park. The upgrade to the Mental Health Building will result in an all-electric building that is zero emissions.

For more information on progress made in municipal facilities, please see Attachment 2.

Waste

Leading the way towards zero waste in policy, planning and practice.

Although waste is a small contributor to Berkeley's communitywide GHG emissions in comparison to transportation and buildings, reducing the amount of waste produced can directly save energy and emissions related to producing and transporting goods. In addition, reducing the amount of waste that ends up in a landfill reduces methane emissions, a powerful GHG released as organic materials decompose in a landfill.

The Zero Waste Division is strategically planning and implementing programs and services to bring the City closer to its zero landfilled waste goal. Some key efforts toward this goal include:

Zero Waste Transfer Station Rebuild Feasibility Study

The Solid Waste & Recycling Transfer Station Feasibility Study was completed in late 2019 with two options for the replacement of all facilities currently operating at the Second and Gilman streets location. A CEQA Compliance Request for Proposals (RFP) for the project was issued on April 23, 2020 and a contract is scheduled to be awarded by late July 2020. This phase of the project may take up to three years to complete with a Mitigated Negative Declaration or, if necessary, a Final Environmental Impact Report issued and approved. The replacement Facility will serve as the hub for the City to transfer garbage, sorted recyclables, compost and other materials, at a state-of-the-art zero waste facility to meet current and future needs and achieve the City's goal of zero waste.

Senate Bill 1383
On September 19, 2016, SB 1383 was signed into law. This State legislation is designed to reduce short-lived climate pollutants and requires 75% organic waste reduction by 2025 and a 20% increase in recovery of edible food that is currently disposed by 2025. California local jurisdictions have significant, new requirements to implement additional waste reduction programs and enhanced reporting and enforcement protocols to comply with the state legislation. City staff is participating in a regional task force convened by StopWaste to assess the impacts to current programs and policies. The new requirements must be implemented by January 1, 2022.

Single Use Foodware and Litter Reduction Ordinance
On January 22, 2019, City Council unanimously passed the Single Use Foodware and Litter Reduction Ordinance designed to reduce single-use disposable foodware and promote reusable foodware. This ordinance was developed with community and stakeholder input gathered through online and in-person surveys and six public input sessions convened by the City's Zero Waste Commission. The final ordinance incorporated recommendations developed by the Zero Waste Commission that were based on the public and stakeholder input. Outreach material was sent to 840 Prepared Food Vendors in 2019 to inform them of the ordinance requirements and offer available resources, including onsite technical assistance provided by a contracted vendor. It will be necessary to allocate additional funding to provide onsite technical assistance and mini-grants to all Prepared Food Vendors. COVID-19 has impacted the implementation of this ordinance, including the March 31, 2020 Health Order that does not permit customers to bring their own bags, mugs, or other reusable items from home.

Zero Waste Strategic Plan
Based on a Council-approved Zero Waste Commission recommendation, staff plans to release a Request for Proposals for a Zero Waste Strategic Plan by mid-2021 to improve existing programs and propose a roadmap of options and policies that will help the City reach its Zero Waste goal effectively.

Community Outreach & Engagement

Achieving equitable climate action together.

Berkeley is committed to community engagement and education. Recent events and outreach topics have included green and healthy homes, electric vehicles, solar, access to clean energy, and electrification for both residents and building professionals. A summary of outreach events from February 2019-February 2020 can be found in Attachment 4. Outreach is also being conducted focused specifically on communities of color and those most impacted by climate change, as described above in this report.

As COVID-19 social distancing measures have severe impacts on the ability to do in-person outreach events, staff is exploring innovative, safe and accessible engagement strategies to reach impacted communities while limits on public gatherings persist, and will plan for opportunities for innovative, safe in-person community engagement when that approach can safely resume.

Engagement for Marginalized and Front-line Communities: City Council adopted a referral on January 21, 2020 to (1) improve and increase external community engagement, to engage the community and allow for input on new policies and programs which affect marginalized and front-line communities (2) identify the funding resources needed to adequately implement this engagement, and (3) include a Climate Impacts section in all City Council items and staff reports. In response, staff is proposing in a separate report steps to (1) continue engagement around community-driven, equitable climate solutions, and to seek external resources to enable meaningful community engagement of impacted communities around equitable climate solutions; and (2) refer to the Agenda Committee a revision to the Council Rules of Procedures to update the Environmental Sustainability section of City Council items and staff reports as “Environmental Sustainability and Climate Impacts.”

Outreach on clean energy
The City highlights energy efficiency, clean energy and electrification strategies in outreach efforts. The City, in conjunction with StopWaste, hosted workshops about the BayREN Home+ and BAMBE programs to help homeowners and multifamily property owners access resources and incentives for energy and water saving upgrades to increase savings, improve indoor air quality and comfort, and decarbonize buildings.

The City promoted access to clean energy by educating the community about EBCE, and the option to opt up to EBCE’s Brilliant 100 (100% carbon-free) or Renewable 100 (100% solar and wind) electricity products. The City has increased access to rooftop solar by streamlining permitting and inspection, which was nationally recognized with a SolSmart Gold designation in 2018, and by participating in the seasonal Bay Area

SunShares program for the fourth consecutive year. SunShares provides time-limited group discounts, vetted providers, community workshops, and a streamlined process to remove barriers to solar adoption. Berkeley has been one of the top outreach partners every year (2016-2019), resulting in 77 rooftop solar installations (219 kilowatts).

The 2019 East Bay Electrification Expo, co-convened by the Ecology Center, StopWaste and the Berkeley Climate Action Coalition, showcased the benefits of all electric homes and was one of the highlights of the year. The Expo brought together community members, building professionals, and manufacturers to attend workshops, talk to local residents about electrifying their homes and apartments, watch induction cooktop demonstrations, see ultra-efficient heat pump technology, and meet local contractors experienced with this technology.

Outreach on clean transportation
Staff conducts outreach on the climate, health and financial benefits of electric transportation, focusing on incentives and special programs for income-qualified drivers. Key events included a Berkeley Climate Action Coalition *Clean Transportation Convening* and the 2019 *3rd Annual Ride Electric at the Farmers' Market*, part of National Drive Electric Week. *Ride Electric* showcased the latest electric cars and bikes and local EV drivers and enthusiasts. The City also partnered with 350 Bay Area and the Ecology Center to deliver *Electric Cars 101* workshops. OESD's CivicSpark fellow also translated the presentation into Spanish to help reach underserved, non-English speaking communities.

Berkeley Climate Action Coalition (BCAC)
Since 2012, the Berkeley Climate Action Coalition (BCAC), co-convened by the Ecology Center and the City, has been a vehicle for climate engagement. BCAC's membership has grown to nearly 1,000 people, which includes residents, nonprofits, neighborhood groups, faith-based organizations, schools, businesses and UC Berkeley. From 2012-2016, BCAC received funding from the San Francisco Foundation and the City of Berkeley that supported quarterly convenings on a variety of topics such as climate change and health, intergenerational climate change, clean transportation and energy, and climate justice. Over the years, BCAC has supported a variety of volunteer-led working groups on topics including land use, water, transportation, community choice energy, electrification, and environmental health, and BCAC members continue to play an active role in large public events such as Ride Electric and the East Bay Electrification Expo. BCAC has advocated for free youth bus passes, energy solutions for renters, limiting refinery expansion in frontline communities, community choice energy, and solar for all.

Climate Adaptation & Community Resilience

Strengthening and preparing the community for shocks and stresses, including adapting to the impacts of climate change.

Solar + Storage for Critical Facilities

The City of Berkeley is committed to pursuing resilient energy assurance solutions, like solar and battery storage systems at critical facilities that can operate both on the electricity grid, and separate from the grid to continue operating during a power outage (also called islandable solar + storage systems). These islandable solar + storage systems can bring multiple benefits to the community including reliable backup power in the event of a planned or unplanned power outage, clean, local distributed energy, and potential cost savings. The City is working with EBCE, which received a grant from the Bay Area Air Quality Management District to assess the potential for resilient solar + storage systems at critical municipal facilities throughout Alameda County. The City of Berkeley submitted a list of potential critical facilities to the EBCE project portfolio, which totals 300 buildings across Alameda County.

EBCE and its partners have conducted initial analysis of location and sizing potential for the sites and will launch a territory-wide procurement process that will reduce the cost and complexity of potential system deployment. EBCE recently released a Request for Information to solicit input from potential vendors on procurement options and plans to release a full Request for Proposals for vendors to bid on the various projects in Summer/Fall 2020. The City will have the opportunity to participate in the procurement and eventual implementation of solar + storage. If the City Council decides to move forward, additional funding may be needed to retrofit buildings in order to install the solar + storage at those sites.

Sea Level Rise

The City's Parks, Recreation & Waterfront Department provided a one-time funding request to Council to provide resources to complete a Shoreline Stabilization Project and the Waterfront Master Plan, which will contain a sea level rise study.[7]

Local Hazard Mitigation Plan (LHMP)

The recently updated LHMP, approved in 2019, identifies climate change as a man-made hazard that will affect the Berkeley community. The LHMP is the main document

[7] City of Berkeley, "Shoreline Stabilization Project and the Berkeley Waterfront Sea-Level Rise Study" Staff Report, June 19, 2018: https://www.cityofberkeley.info/uploadedFiles/Clerk/Level_3_-_General/Shoreline%20Stabilization%20Project%20061918.pdf

that houses the City's climate adaptation work. This includes hazards such as extreme heat, sea-level rise and flooding, and water security.

Bay Area Climate Adaptation Network (BayCAN)
Berkeley is a founding member and participates in the Steering Committee of the Bay Area Climate Adaptation Network (BayCAN), a network of local government staff helping coordinate an effective and equitable response to the impacts of climate change. BayCAN works to share best practices, develop opportunities for collaboration and program implementation, and secure funding and resources for climate adaptation.

UC Berkeley and The Berkeley Lab

UC Berkeley and the Berkeley Lab are not included in Berkeley's GHG emissions inventory since their campuses are outside of the City's jurisdiction. However, both institutions track their own emissions reduction goals and are engaged community partners in addressing climate change. The Berkeley Lab has partnered directly with the City on several innovative sustainability projects including building data management tools and zero-net energy analysis of municipal buildings. UC Berkeley has collaborated on the Berkeley Climate Action Coalition and has provided research and technical assistance on a variety of projects. Please see Attachment 3 for progress reports from both UC Berkeley and the Berkeley Lab on their individual climate goals, programs, and policies.

BACKGROUND
In recognition of the climate crisis, the City has added additional climate goals to bolster the Climate Action Plan goal of reducing greenhouse gas emissions below 2000 levels by the year 2050. These local goals include:

- **Fossil Fuel Free Berkeley:** In June 2018, Berkeley City Council referred a proposed resolution[8] to the Energy Commission and Transportation Commission to further implement the Climate Action Plan and establish a goal of becoming a Fossil Fuel Free City.

- **Climate Emergency:** On June 12, 2018, the Berkeley City Council adopted a Climate Emergency Declaration[9].

[8] Fossil Fuel Free City proposed resolution: https://www.cityofberkeley.info/Clerk/City_Council/2018/06_June/Documents/06-12_Annotated_Agenda.aspx
[9] Climate Emergency Declaration: https://www.cityofberkeley.info/uploadedFiles/Council_2/Level_3_-_General/Climate%20Emergency%20Declaration%20-%20Adopted%2012%20June%202018%20-%20BCC.pdf

- **Net-Zero Carbon Emissions:** In 2018, Mayor Arreguin announced the City's intention to achieve zero net carbon emissions by 2045, in alignment with California state-wide goals.

- **Vision 2050:** Vision 2050, supported by Measure R in the November 2018 election, is an effort to develop a framework for a 30-year sustainable infrastructure plan. The goal of the Vision 2050 plan is to ensure that Berkeley is prepared for climate change by identifying and guiding the implementation of a climate smart, technologically advanced, integrated, and efficient infrastructure system.

In order to achieve these ambitious goals, ***Berkeley's path to a clean energy future*** is summarized below and described in more detail in the 2018 CAP Update Report to City Council[10]:

- Step 1 – Reduce energy use and waste
- Step 2 – Support clean electricity
- Step 3 - Electrify transportation and buildings

The framework and overarching values (equity, resilience, climate change, health and well-being, and prosperity) guide the work to achieve the City's climate goals.

ENVIRONMENTAL SUSTAINABILITY

The City's Climate Action Plan, Resilience Strategy, Local Hazard Mitigation Plan, and Strategic Plan all contribute to advancing the community towards a clean and resilient energy future that successfully meets Berkeley's climate goals. Mitigation of GHG emissions within Berkeley and planning for the impact of climate change are interrelated and, with careful strategic planning, can address environmental concerns and achieve a more sustainable, equitable, and resilient future.

[10] Staff Report: Climate Action Plan Update, December 6, 2018: https://www.cityofberkeley.info/recordsonline/api/Document/AS1qYEO88qcY6Ips8nwbGgL4jGxxlSquza3ESlDOTS6DL2nWI1jPxxzLJVhyvQgYDIlKPuJDdT3oigVB31dHEfM%3D/

POSSIBLE FUTURE ACTION

This report provides the City Council with an update on GHG emission trends, an overview of associated current activities, and the planning efforts underway to develop strategies to accelerate the rate of GHG emission reductions to reach Berkeley's increasingly ambitious climate goals. The current strategic planning efforts for transportation, waste, and buildings will provide a pathway for concentrated reductions in energy use, clean electricity, and electrification of the building and transportation sectors. Staff will return to the City Council for direction on prioritization and funding based on the findings of these strategic plans. As the community responds to and recovers from the impacts of COVID-19, strategic prioritization will need to be applied to identify target areas of focus, and equity and resilience should continue to be central in recovery efforts.

FISCAL IMPACTS OF POSSIBLE FUTURE ACTION

Current climate action priorities are funded by existing grants, enterprise funds, and General Fund allocations. Staff continues to seek additional grants and other sources of funding to accelerate existing efforts. The fiscal impacts of accelerating CAP implementation are currently unknown, but are expected to be significant, and are dependent on City Council's policy choices. Some areas of future investment could include support for additional staff to implement the Mobility Roadmap, resources to incentivize electrification upgrades, funding to support pilot equity programs, and capital funding to make municipal building improvements for electrification, air quality and ventilation improvements, and resilience through solar + storage.

Strategic electrification is key to achieving Berkeley's ambitious climate goals. However, current rate structures and projected increases can impede electrification efforts, making electrification a costly option. Moving forward, close collaboration and cooperation with PG&E and EBCE will be necessary to create rates that are equitable and provide a pathway to fossil-free energy sources for Berkeley residents and businesses and ensure a resilient and safe electricity grid. An equitable transition to clean electricity will require strategic investment in buildings and people.

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Attachments:
1: 2018 Berkeley Community-Wide Greenhouse Gas Inventory
2: Municipal Facilities Update
3: Progress Report from UC Berkeley & the Berkeley Lab
4: Summary of Community Outreach Events, February 2019-February 2020

Attachment 1: Berkeley's Community-Wide Greenhouse Gas Emissions Inventory

Introduction

In order to understand the sources of community-wide greenhouse gas (GHG) emissions, City staff conducts an annual GHG emission inventory. Data is gathered from regional entities on sector-specific activities, and is then converted to metric tons of carbon dioxide equivalent (MT CO_2e). The inventory utilizes the best available data (despite challenges regarding access to accurate, consistent datasets) and follows the Global Covenant of Mayors for Climate & Energy protocol which allows the City to report consistently to the community and to other agencies. This inventory focuses on emissions that are created within Berkeley's border, considering sectors like transportation, the built environment, landfilled solid waste, water consumption, and wastewater usage. A separate inventory methodology called a "consumption-based inventory" accounts for the impacts of goods and services consumed by Berkeley residents and businesses, even if the related emissions were created elsewhere. These two approaches, compared side-by-side, can help paint a more holistic picture of Berkeley's carbon footprint and how reduction strategies should be prioritized.

Community-Wide GHG Emission Inventory

Creating and updating a consistent GHG emissions inventory helps to define the extent to which certain sectors and fuels contribute to GHG emissions, and helps to track progress toward the community's climate goals over time. This type of inventory focuses on emissions that have occurred within Berkeley's jurisdictional boundaries, which includes the following emissions sources: transportation modeled from traffic analysis, building electricity usage, building natural gas consumption, landfilled solid waste, as well as emissions from water consumption and wastewater treatment. The most recent full year of available data is from 2018. Although this inventory does not include UC Berkeley and The Berkeley Lab, as they are outside the City's jurisdiction, they continue to be valued partners in efforts working to improve Berkeley's shared community and combat climate change. See Attachment 3 of the Climate Action Plan Update for progress reports from UC Berkeley and the Berkeley Lab.

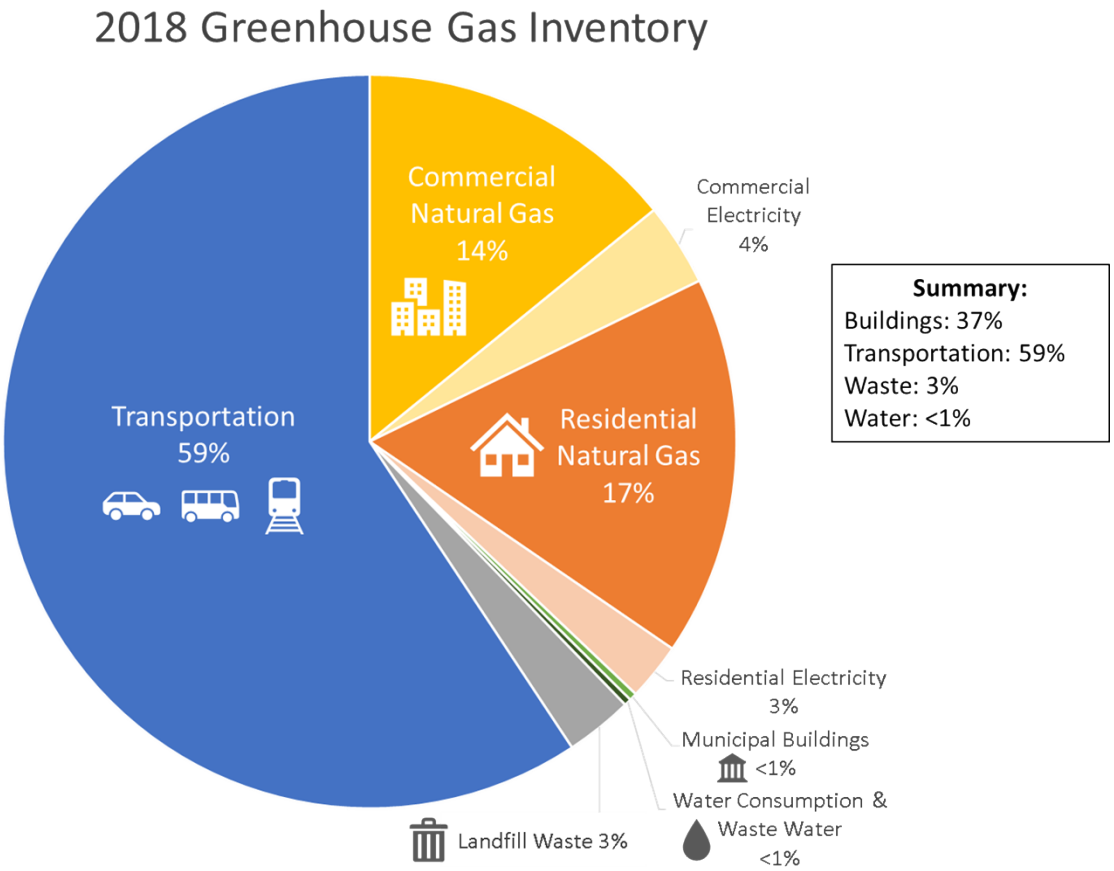


Figure 1: Pie chart of 2018 community-wide GHG emissions inventory, broken down by sector and fuel.

Creating an emissions inventory that tracks each sector and fuel individually informs policies and programs that may provide the biggest impact to achieving the Climate Action Plan (CAP) emission reduction goals. The distribution seen in Figure 1 is similar to inventories conducted in the past, with over half of emissions coming from the transportation sector, calculated from a regional traffic analysis model conducted by the Metropolitan Transportation Commission.

Energy usage data in Berkeley buildings is provided by East Bay Community Energy (EBCE) and PG&E, and is broken down into residential, municipal, and commercial (including industrial) buildings—for both electricity use and natural gas combustion. The built environment is the second largest source of emissions at 37%.

Other sectors include landfilled waste, water consumption, and wastewater treatment. These sectors, although seemingly small based on this inventory, represent much broader environmental concerns, such as the impact on water management systems as California experiences more frequent and intense droughts. Solid waste, particularly organic material, emits methane when landfilled, which is accounted for in this inventory. However, the impacts related to the production, transport, and consumption

of goods and services, long before reaching a landfill, must also be considered. Please see the section below on consumption-based inventories for more detail.

Current Community-Wide Sector-Based GHG Emission Trends

The most current community emissions are compared to the CAP baseline year of 2000, to identify reductions achieved thus far. A historic summary of Berkeley's annual emissions inventories from 2000 to 2018 is provided in Figure 2. Please note that due to data access issues for accurate building energy use data between 2014-2017, years of inventory data developed with assumptions are represented in shaded coloring, and as no inventory was calculated for 2017 this year of data is omitted.

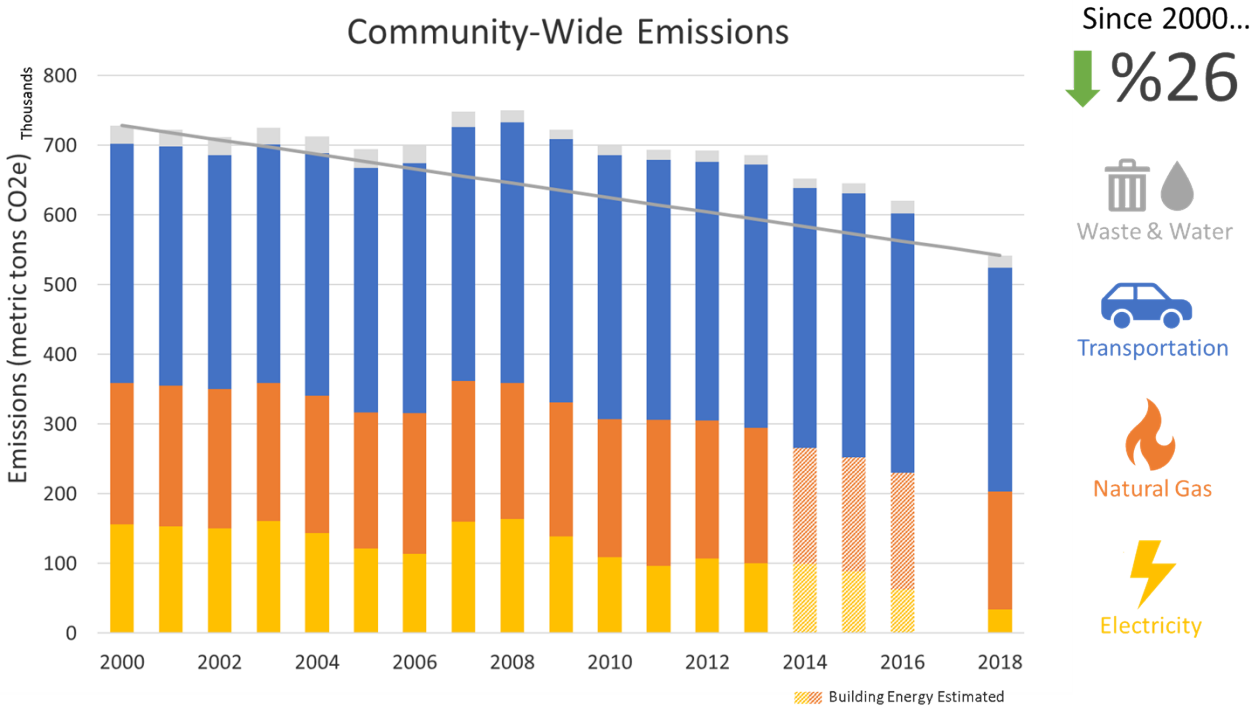


Figure 2: Historic Berkeley emissions inventories back to 2000, broken out into building natural gas and electricity, transportation, and other (water, wastewater treatment, and landfilled solid waste).

Community-wide emissions were 26% below 2000 levels in 2018 even though Berkeley's population increased approximately 18% and the economy expanded[1] during that same time period.

[1] Staff Report: Berkeley Economic Dashboards, March 26, 2019: https://www.cityofberkeley.info/uploadedFiles/Manager/Economic_Development/2019-03-26%20Item%2026%20Berkeley%20Economic%20Dashboards.pdf

	Residential	Commercial / Industrial / Municipal	All Buildings
Electricity Usage	-20%	-31%	-28%
Electricity GHG Emissions	-73%	-81%	-78%
Natural Gas Usage	-26%	-2%	-17%
Natural Gas GHG Emissions	-26%	-4%	-17%

Table 1: Summary of 2018 trend in electricity and natural gas usage within each building sector—compared to 2000 baseline year.

This is a notable achievement, with reductions resulting from a combination of state, regional, and local efforts including:

- Cleaner electricity mix: As seen in Table 1 above, the GHG emissions from electricity have decreased by 78% in all buildings since 2000. This is largely due to the community joining EBCE, as well as State laws like the Renewables Portfolio Standard (RPS) which require utilities to increase the amount of renewable energy on the grid, causing the GHG emissions produced per kilowatt-hour of electricity consumed to decrease. Participation in EBCE, which has half as much carbon in its Bright Choice base product than PG&E's base product, as well as offering its Brilliant 100 carbon-free and Renewable 100 fully renewable products, has had a significant impact in accelerating the Berkeley community toward emissions-free electricity.
- Reduction in building energy use: See Table 1 above for a breakdown of electricity and natural gas reductions in each building sector since 2000. Energy efficiency measures contribute to these savings, including those reached through rebate programs such as Energy Upgrade California, more efficient lighting and appliances, and improved building envelopes. Reducing the energy needs of a building first reduces the cost and feasibility of renewable energy and electrification efforts.
- Increased rooftop solar: According to data from the California Solar Initiative, Berkeley businesses and residents collectively installed over 2,618 solar photovoltaic (PV) systems from 2000 to 2018, increasing solar capacity to approximately 10,930 kW AC, providing renewable energy to power buildings and adding any excess clean electricity back into the grid.
- Water consumption: The community reduced its water consumption in buildings by 26% between 2000-2018, and a 2% decrease in consumption between 2017 and 2018. Water conservation continues to be critical as the Bay Area is expected to experience further drought in the coming years.
- Reduction of landfilled waste: The community has significantly reduced the amount of waste sent to landfills since 2000 through the expansion of recycling and composting services. Further reductions could be achieved through source reduction, preventing waste by reusing items or avoiding disposable, single-use products.

- Transportation: Transportation is the largest source of community-wide emissions, and modeled data shows a decrease of 6% from 2000 to 2018. The municipal vehicle fleet decreased emissions by 28% due to cleaner and more efficient vehicles.

In comparison, statewide emissions decreased approximately 10% from 2000[2] to 2017. This however cannot be directly compared to the 26% reduction achieved in Berkeley by 2018, as the City does not have a complete dataset available for 2017, and there were significant GHG reductions in 2018 when it joined EBCE. Statewide emissions reductions are expected to accelerate with the recent passing of SB 350, which sets a goal for 50% of the electricity in California to come from renewable energy by 2030, and doubling the energy efficiency of buildings in the next 15 years.

Considerations for tracking progress

Natural Gas Emissions: It is important to note that emissions from natural gas may be much larger than what is depicted in this inventory. According to research conducted by San Francisco Department of the Environment, current emissions methodology may severely underestimate the impact of leakage throughout the entire natural gas system. Not only do natural gas leaks pose a health and safety threat to the community but they also release methane (the main component in natural gas) into the atmosphere, which traps 86 times more heat than carbon dioxide. Natural gas leakage is estimated to be approximately 1.4%, whereas new independent studies average that leakage could be 4.52%, with estimates seen up to 12%.[3] A methodology to integrate this into Berkeley's emissions inventory is not yet available.

Data Access & Accuracy: A CPUC ruling regarding data privacy has severely hindered staff's ability to attain accurate and consistent building energy usage data from PG&E for the GHG emissions inventory. The ruling dictates certain thresholds a dataset must meet in order to protect individual customer usage data from being disaggregated from the total. This ruling resulted in an incomplete dataset from PG&E between 2014-2017.

Consumption-Based GHG Emissions Inventory
Although the more traditional emission inventory that Berkeley uses—known as a "production-based" or "sector-based" inventory, like the one described above—lays a foundation for key climate policy and program planning, taking a look at the emissions beyond Berkeley's borders can be beneficial to addressing the climate crisis as a regional or global issue. An individual's impact on the environment does not end at its city's boundaries, but extends to imported and exported goods consumed by that individual. Consumption-based inventories take into account the entire life cycle of a specific product to calculate its GHG emissions. Included are goods and services such as air travel (even if, as for Berkeley, the airport is located outside of a jurisdictional

[2]California Air Resources Board, GHG Current California Emission Inventory Data: https://www.arb.ca.gov/cc/inventory/data/data.htm. Please note methodologies between state, regional, and local emissions inventories may vary slightly.
[3] Methane Math: How Cities Can Rethink Emissions from Natural Gas, San Francisco Department of the Environment (November 2017) https://sfenvironment.org/download/methane-math-how-cities-can-rethink-emissions-from-natural-gas

boundary), food, appliances, and construction of buildings. See Figure 3 for a diagram of the relationship between consumption- and sector-based approaches.

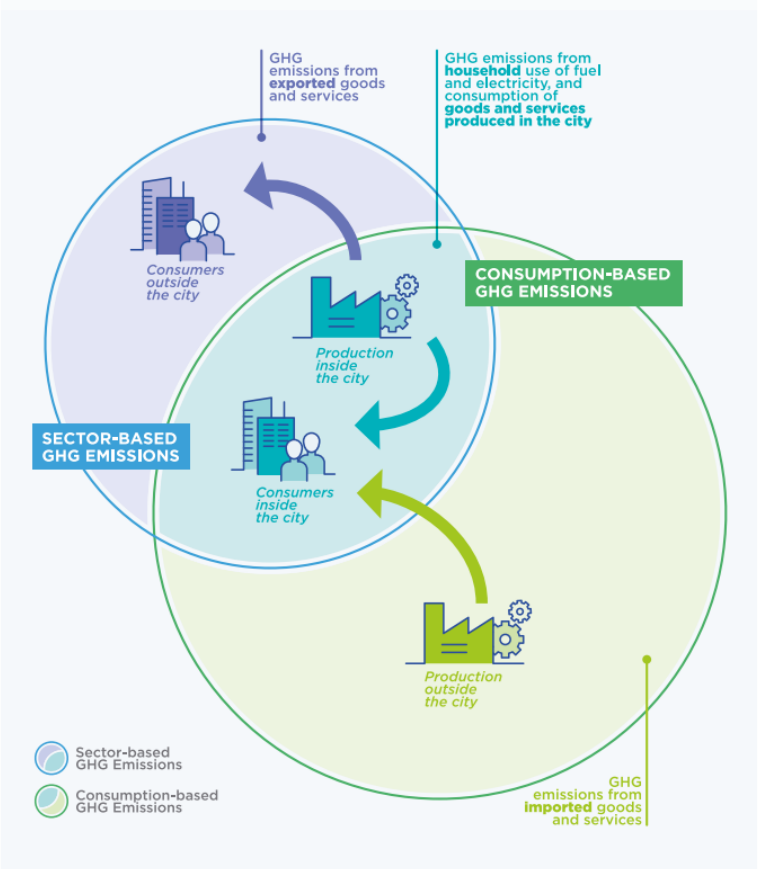


Figure 3: A diagram depicting the relationship between sector- and consumption-based approaches to GHG emissions tracking. [4]

Although this type of inventory would be helpful to track Berkeley's complete carbon emission profile, capturing this data accurately has been proven very complex. Currently no standardized or accurate methodology across cities has yet been adopted. However, the CoolClimate Network, a research partnership including UC Berkeley, created a consumption-based inventory for every city in the Bay Area using 2013 data.[5] This inventory was presented to Council in December 2018[6]. Though it has not been updated, the 2013 data showed that Berkeley has a relatively low carbon footprint per household, in comparison with other Alameda County cities. This could be due to Berkeley's denser housing, transit service, and biking and pedestrian infrastructure.

[4] C40 Cities, Consumption-Based GHG Emissions of C40 Cities. https://www.c40.org/researches/consumption-based-emissions
[5] Bay Area Air Quality Management District, Consumption-Based GHG Emissions Inventory: https://www.baaqmd.gov/about-air-quality/research-and-data/emission-inventory/consumption-based-ghg-emissions-inventory
[6] CAP Report Update to City Council, December 18, 2018: https://www.cityofberkeley.info/recordsonline/api/Document/AS1qYEO88qcY6Ips8nwbGgL4jGxxlSquza3ESlDOTS6DL2nWl1jPxxzLJVhyvQgYDIlKPuJDdT3oigVB31dHEfM%3D/

Due to overlapping categories with the sector-based approach (shown in Figure 3), this consumption-based inventory cannot be added directly into Berkeley's sector-based inventory. However, analyzing both inventories separately paints a more complete picture of how Berkeley residents and businesses, as global consumers, can address their carbon footprint. The outcome of the consumption-based study can be found in the last CAP Update Report to Council, as well as on an interactive online SF Bay Area Carbon Footprint Map[7], where specific sectors can be isolated and compared across Berkeley zip codes.

[7] Bay Area Air Quality District, SF Bay Area Carbon Footprint Map.
https://baaqmd.maps.arcgis.com/apps/MapSeries/index.html?appid=94b9eff6547f459fba27a6853327e1a2

Attachment 2 – Municipal Facility Update

Staff continues to make improvements in municipal facilities to increase energy efficiency, lower energy costs, reduce greenhouse gas (GHG) emissions, and transition buildings toward being all-electric powered by clean electricity. Municipal buildings purchase emissions-free electricity, the Brilliant 100 product from East Bay Community Energy.

Electrification Retrofits of Municipal Buildings

Several buildings undergoing construction include plans to advance electrification, including:

- **The Mental Health Clinic** is being retrofitted as a zero-emissions building and will have no gas meter on site. Using a grant from the Berkeley Lab, the historic building includes passive daylighting, saving on electric lighting, and will use high efficiency electric heat pumps for space heating, cooling and ventilation. Water heating and other appliances are all electric. This building will have a formal case study done, as the Berkeley Lab grant includes energy monitoring of all systems. The building is scheduled for completion in October 2020.

- **Live Oak Recreation Center** is also currently under construction. This will be a nearly all-electric building, with heat pumps providing space heating and cooling and water heating. Supplementing the heat pumps will be a number of ceiling fans in the social hall, art room, and other activity rooms, to facilitate cooling and help prevent air stagnation. The kitchen will have an electric induction range. The roof and electrical system will be solar PV-ready, but funding has not been identified for a solar installation. The gas furnace in the theater will be the only fossil-fuel component remaining. The building is scheduled for completion in October 2020.

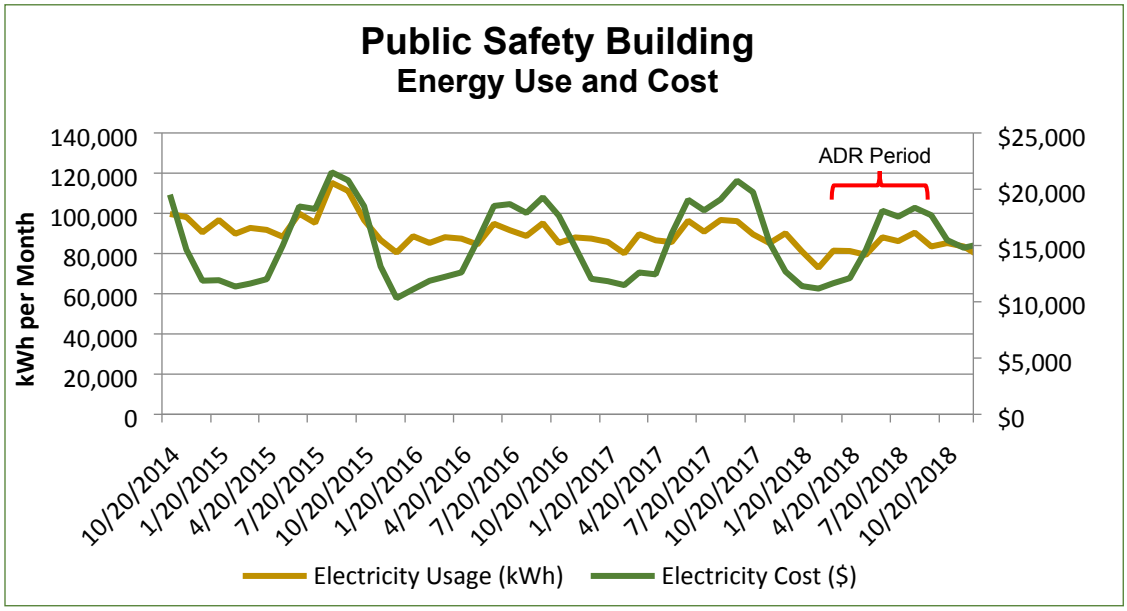
- **North Berkeley Senior Center** is currently undergoing a major seismic improvement renovation, which has been expanded to include the electrification of a number of the building's energy systems. These will include replacing the three boilers which provided forced hot water heating, with new high efficiency electric heat pumps, and solar PV to help offset the additional electric load. The solar inverter is "battery-ready", so that if a future battery system can be installed, it could provide both emergency power and will be able to operate from the battery at times of day when energy is most expensive. The building also received high efficiency double paned insulated windows and new wall and attic insulation, which will reduce the overall heating and cooling loads. At this time, the building will still have a natural gas range and oven, and there is no funding identified for battery storage. The building is planned for completion in November 2020.

Other Energy Efficiency, Emissions Reduction and Cost Savings Projects

In the past 2 years, the City implemented several projects to improve energy efficiency, reduce peak electricity use and reduce GHGs.

- **Automated Demand Response (ADR)** programs aim to reduce electricity during times of peak demand, when electricity has the highest cost and GHG emissions. These projects were implemented at the Public Safety Building and the James Kenney Recreation Center, because the energy management software at each site was compatible. The Public Safety Building saved 42,400 kWh, or about $11,000 in air conditioning costs as shown below:

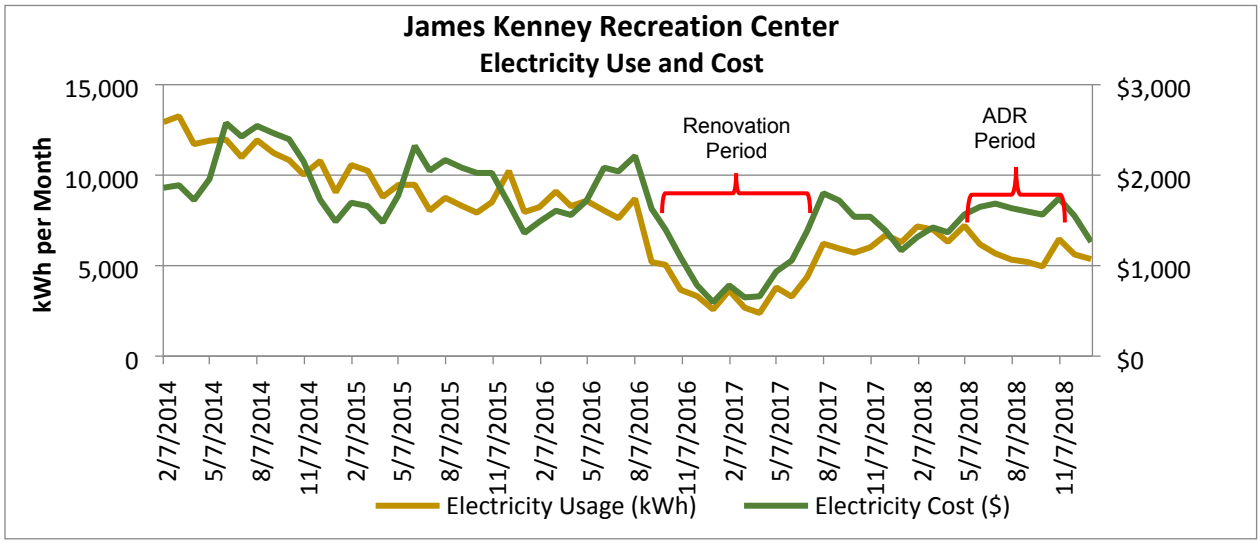
Figure 1- Public Safety Building Energy Use and Cost



The Public Safety Building also underwent a complete lighting upgrade to high efficiency LEDs. This project was completed in 2019 and was the City's first On-Bill Financing project. The total cost was $250,000, with zero up-front costs from the City of Berkeley. These projects were funded through a PG&E program that provides immediate payment to the energy contractors, and allow the City to repay the loan on its monthly utility bill. The loan payment is roughly equal to the energy cost savings, resulting in no cost increase for the City, while reducing energy use and GHG emissions.

James Kenney Recreation Center had proportionally similar results with its Automated Demand Response lighting project, saving nearly 4,500 kWh, and about $4,000. Note that the energy and cost comparisons were made to 2016 energy use, since the building was under renovation in 2017.

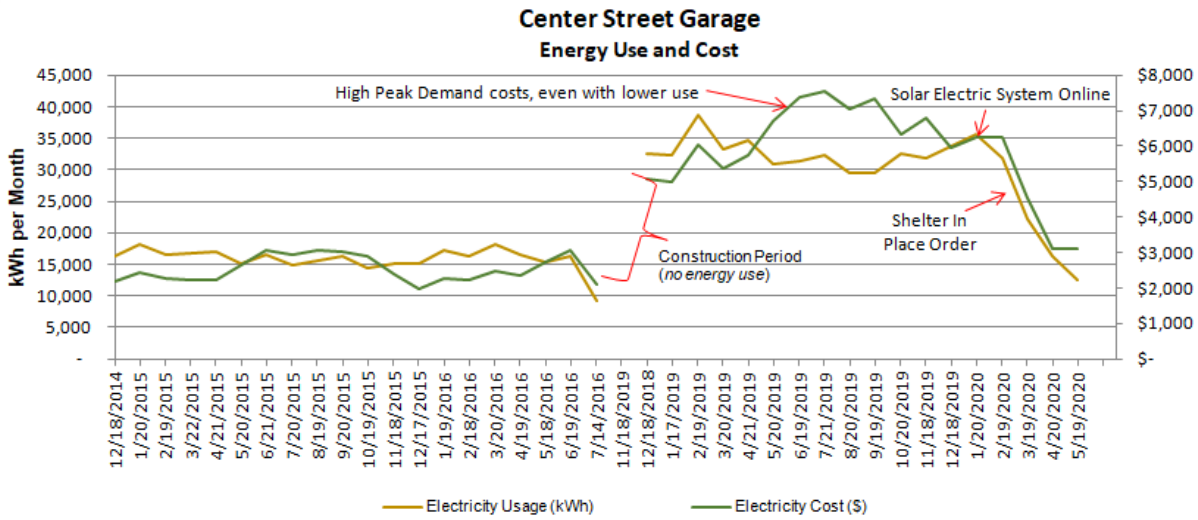
Figure 2 – James Kenney Recreation Center Electricity Use and Cost



- **On-site Solar PV** at the Center Street Garage was completely rebuilt beginning mid-2016, re-opening in November 2018. The new garage is 300% larger, initially had 20 electric vehicle charging ports, and now has 57. This explains the significant jump in overall costs and use, but there is a similar gain in revenue to help offset this increased cost of operations. The solar PV system was installed last, and due to commissioning and testing, did not come online until January 2020. The effects were immediate, reducing energy costs and energy use.

  Note that before the solar came online, the demand energy cost was comparatively high (green line, below), even though the actual energy consumed was low. High demand was due to the EV charging stations, which were in use at times of day when energy costs are the highest.

Figure 3 - Center Street Garage Energy Use and Cost



- **Future Projects** will be developed as energy efficiency and electrification assessments are completed for buildings, including the Spring Animal Shelter, South Berkeley Senior Center, the Central Library, and the South Berkeley Branch Library. Once these assessments have been completed, the goal is to use On Bill Financing to make energy improvements, including LED lighting, heating, cooling or ventilation improvements. Efficiency in these systems is a fast and efficient way to reduce costs and GHG emissions.

UC Berkeley: 2018-2019

UC Berkeley finished its first-ever complete submission for the Sustainability Tracking, Rating and Assessment System, or STARS, earning a high Gold rating with 78.5 points. That result placed UC Berkeley 11th out of 349 colleges and universities having completed a full STARS assessment. The campus's top-ranked environmental sciences programs helped UC Berkeley earn top-notch STARS scores for its sustainability-themed undergraduate and graduate programs and sustainability-focused research. UC Berkeley also earned perfect scores in fields that measure diversity and equity in the campus community. The STARS rating additionally earned UC Berkeley a coveted spot among the top 20 greenest universities, according to the Sierra Club and the Princeton Review.

The popular Cool Campus Challenge returned to UC in April 2019, and UC Berkeley took the overall honor as the Coolest UC, achieving the most carbon-saving points of any UC campus or medical center. Engaging more than 4,200 participants, or 7.5 percent of the campus, UC Berkeley is saving tons of carbon dioxide from participants' actions, equivalent to taking 500 cars off the road for an entire year. Also in support of carbon reduction action, UC Berkeley's chancellor, in coordination with students, signed a memorandum of understanding committing the Berkeley campus to 100 percent clean, renewable energy by 2050.

Berkeley received five best practice awards at the annual California Higher Education Sustainability Conference. UC Berkeley's efforts on zero waste curriculum and operations, environmental justice, toxin reduction and climate action took the honors. The awards highlight the breadth, depth and leadership in sustainability the campus both values and excels in.

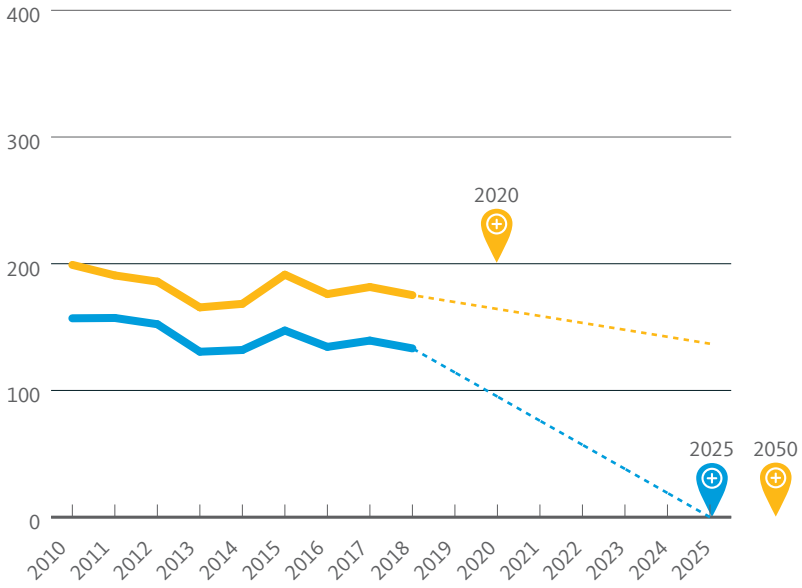
UC Berkeley's newest building, the Connie and Kevin Chou Hall at Haas School of Business, is now one of the greenest academic buildings ever. It has earned a trifecta of green building certifications. The building achieved TRUE Zero Waste certification at the highest possible level, along with LEED Platinum Certification for its architectural design, construction and energy efficiency. Most recently it became the campus's first WELL certified space at the Silver level. With no landfill bins in the building, a team of staff and students is working to phase out single-use, disposable materials in favor of reusable containers and supplies, and the building's on-site food vendor adheres to zero waste practices.

Credit: Elena Zhukova

UC Berkeley, By the Numbers 2018

GREENHOUSE GAS EMISSIONS

(1,000 metric tons CO_2e)



- Scopes 1 (natural gas, campus fleet, fugitive) + 2 (purchased electricity)
- Scopes 1, 2 + 3 (campus commute, business air travel)

Goals:

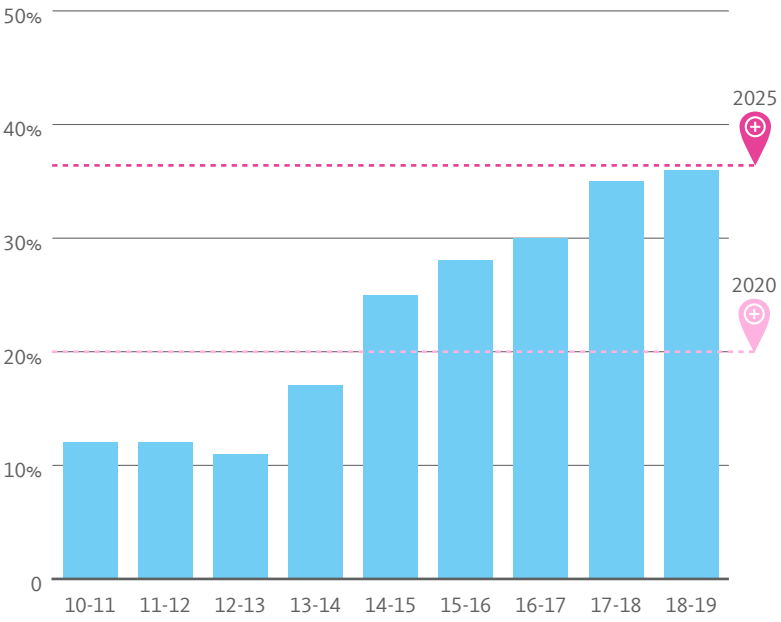
- 1990 levels by 2020 (scopes 1, 2 + 3)
- Carbon neutral by 2025 (scopes 1 + 2)
- Carbon neutral by 2050 (scopes 1, 2 + 3)

Progress:

- 2020 goal met

WATER

(Percent reduction in per capita potable water consumption)



Goal:

- 20% reduction from baseline in per capita potable water use by 2020 and 36% reduction from baseline in per capita potable water use by 2025

Progress:

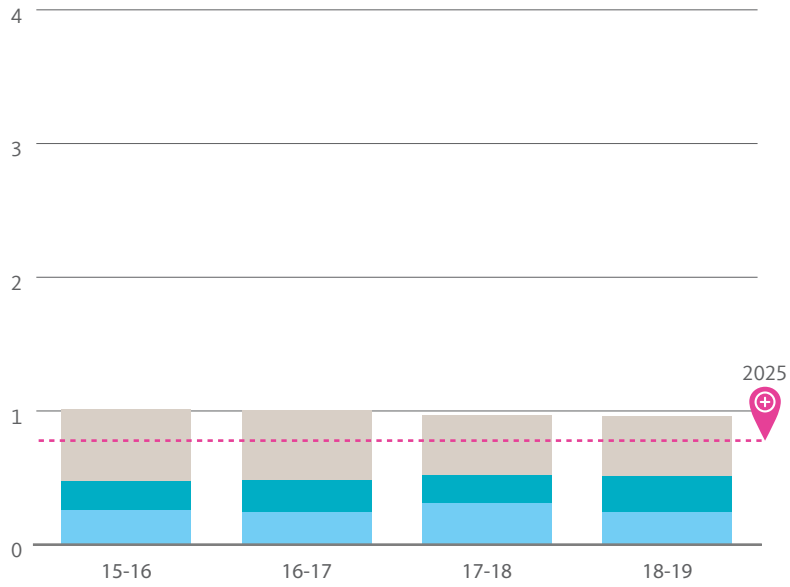
- 2020 goal met
- 2025 goal met

2018-19 gallons per capita: 13,185

UC Berkeley, By the Numbers 2018

WASTE

(Daily per capita waste generation in pounds)

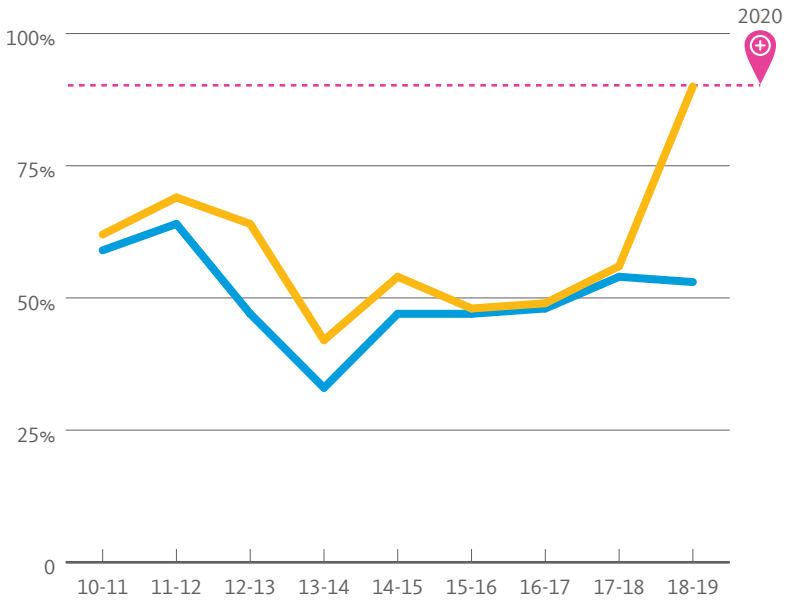


- Recycle
- Organics
- Landfill

Goals:

- Reduce waste generation per capita to FY 2015-16 levels by 2020, 25 percent below FY 2015-16 levels by 2025, and 50 percent below FY 2015-16 levels by 2030
- Zero waste by 2020

(Diversion rate)



- Diversion Rate (C&D + MSW)
- Diversion Rate (MSW)

UC Berkeley, By the Numbers 2018

FOOD

Goal:

- 20% of food service spend to be from sustainable products by 2020

Progress:
Residential: 28%
Retail: 14%

UC Berkeley has met the 2020 goal for residential sustainable food service spend.

PROCUREMENT

Goal:

- 25% green spend as a total percentage of spend per product category

Progress:
Cleaning supplies: 85%

UC Berkeley has met the green spend goal for cleaning supplies.

TRANSPORTATION

Goals:

- 50% of all new light-duty fleet vehicles purchased at each campus will be zero-emission or hybrid by 2025
- Reduce SOV commute rate to no more than 40% of employees and no more than 30% of all employees and students by 2050. (In other words, 60% of employees and 70% of employees and students will use alternative commute modes to get to campus)

Progress:
Percent of all new light-duty fleet vehicles zero-emission or hybrid: 25%

Alternative commute rate:

Employee: 62%
Overall: 83%

UC Berkeley has met the employee and overall alternate commute goal.

GREEN BUILDING

Goals:

- LEED Silver minimum for all new construction
- Certify at least one LEED EBOM project on each campus

Progress:
UC Berkeley added one new LEED Silver building in 2019 to total:

Platinum: 2
Gold: 12
Silver: 7
Certified: 1

This list includes the Connie and Kevin Chou Hall (LEED Platinum in 2018) and the David Blackwell Residence Hall (LEED Gold in 2018).

Number of LEED EBOM projects: 0

SUSTAINABLE BUILDING OPERATIONS AND LABS

Goal:

- Assess three research labs

Progress:
Number of assessed research labs: 18

UC Berkeley has met the sustainable research lab assessment.

2020 Berkeley Lab Greenhouse Gas Emissions Summary for the City of Berkeley

Sustainability Goals

Berkeley Lab pursues three broad initiatives to reach sustainability goals. These initiatives, listed below, are described in greater detail at sbl.lbl.gov.

- Climate: Improving buildings, greening the energy grid, and low-carbon commutes
- Waste: Rethinking waste through composting, recycling, and smart purchasing
- Water: Upgrading fixtures, stopping leaks, and encouraging conservation

Our sustainability goals are driven by requirements of the federal government, California state law, and University of California policy. These goals are continuously updated and summarized here. The primary sustainability goals include:

- **Efficiency and Climate**
  - Improve energy efficiency 2% annually
  - Reduce overall GHG emissions 30% by 2025 (2015 baseline)
  - Procure or produce at least 7.5% of electricity use from renewable sources
- **New Construction**
  - Limit new construction energy use to 35%-50% of an existing building baseline
  - Outperform energy code by 30%
  - Eliminate on-site fossil fuel use in new construction by 2020
  - Meet additional requirements in the Berkeley Lab Sustainability Standards for New Construction
- **Waste Minimization**
  - Achieve Zero Waste by 2020 (>90% waste diversion)
  - Reduce solid waste per capita 50% by 2030
- **Water Conservation**
  - Reduce per capita water consumption 36% by 2025 (2007 baseline)

Strategies

The Lab's key current sustainability strategies include:

- **BUILDINGS**: Improve efficiency, enhance performance, and eliminate GHG impacts
- **RENEWABLE ENERGY**: Decarbonize our energy supply, develop local generation and storage
- **FOOD AND ORGANICS**: Minimize the impacts of our food choices
- **MATERIALS**: Create the building blocks of a circular materials economy
- **TRANSPORTATION**: Electrify and lower impacts from commute choices
- **WATER**: Waste less water
- **AIR QUALITY AND HEALTH**: Reduce pollution and improve health

Greenhouse Gas Emissions

Total Berkeley Lab greenhouse gas emissions for fiscal year 2019 (ending September 2019) were 54,864 MTCO2e. These emissions are 29% below 2008 levels and 20% below 2015 levels. Emissions are updated annually in December and shared in the data section of the Sustainable Berkeley Lab website (see sbl.lbl.gov/data.) These emissions are reported according to a federal greenhouse gas reporting protocol and include Scope 1 direct emissions from onsite combustion of fuels and emissions of gases used for refrigeration and scientific research, Scope 2 indirect emissions from purchased electricity, as well as Scope 3 indirect emissions from employee commuting, business air and ground travel, electricity transmission and distribution, off-site wastewater treatment, and off-site municipal solid waste disposal.

Sustainability Metrics

As of spring 2020, Berkeley Lab is maintaining an annual energy savings portfolio of 13.0 million kWh and water savings of 20 million gallons. This is equivalent to the energy generation from an 8.4 MW photovoltaic array, which would occupy 25 football fields or 33 acres. Other key sustainability performance metrics for the Lab, as of October 1, 2019 include:

- Lab-wide energy use intensity (weather-corrected energy consumption divided by square footage) has improved 14% since FY 2015. See Change in Energy Use Intensity and Consumption from Baseline at sbl.lbl.gov/data for more detail.
- The Lab has made particular progress in reducing natural gas consumption. Lab-wide weather-corrected natural gas consumption as of October 2019 is 13% lower than in FY 2015.
- 21% of electricity use (and 16% of all energy use) is procured or generated from renewable sources (beyond the renewables included in the grid power mix).
- Waste diversion is at 75% (see chart), and diversion from construction and demolition projects is at 84%.
- Water use intensity is 16% below 2007 levels (see chart).

Awards

The Lab's sustainability efforts were recognized by five awards since our last report to the Council.

- The Lab was awarded a 2020 Best Practice Award in Overall Sustainable Design for the newly completed Integrative Genomics Building. The award will be presented by the California Higher Education Sustainability Conference in July.
- The Lab won a 2019 Department of Energy Sustainability Award - Outstanding Sustainability Program or Project for its policy on Sustainability Standards for New Construction.
- The Lab received a 2019 Best Practice Award from the California Higher Education Sustainability Conference for advanced use of SkySpark (a building analytics platform) to support the ongoing commissioning (OCx) process.

- The Lab received a 2019 "Accelerating Smart Labs" Project Award from the Department of Energy, on behalf of the Better Buildings Smart Lab Accelerator. The award recognizes the Lab's innovative approach to generate energy and water savings through continual improvement in building operations, what the Lab calls an ongoing commissioning (OCx) process.
- The Lab received a 2019 EPEAT Purchaser Award from the Green Electronics Council. The award recognizes the Lab's efforts to purchase sustainable Information Technology (IT) products. Berkeley Lab is one of eight organizations that achieved the Five-Star level, and one of 59 organizations that received an EPEAT Purchaser Award.

Highlights

Recent highlights are summarized below.

CLIMATE

Energy Information and Management

- **Energy and Water Savings in High Performance Computing**: The Lab has continued work with its high-performance computing center (known as NERSC) to protect savings and strengthen monitoring capabilities. The Lab verified annual maintained savings of over 1.8 million kWh at NERSC - approximately 37% of the baseline "non-compute" electricity use - and over 500,000 gallons of water. See details on the NERSC Efficiency Optimization at sbl.lbl.gov/progress.

- **Efficiency Improvements in Berkeley Labs Computing Center**: The power utilization effectiveness (or PUE, a measure of the non-compute load as a percentage of the total data center load) at the Lab's Berkeley Research Computing Center has been reduced from an average of 1.45 to 1.37 in the last year. This means that the "overhead" energy use of the facility was reduced by 18%. These savings have been generated by decommissioning computer room air conditioning (CRAC) units in favor of rear door heat exchangers at each rack.
- **Site-Wide Exterior Lighting**: The Lab continues efforts to modernize exterior lighting on its Hill campus. See a Lighting Modernization project overview at sbl.lbl.gov/progress. A retrofit of fixtures in the building 50 garage completed in early FY 2019 resulted in 95 percent energy savings and higher quality lighting.
- **ISO 50001 Implementation**: The Lab has completed a two-year project to align energy and water management

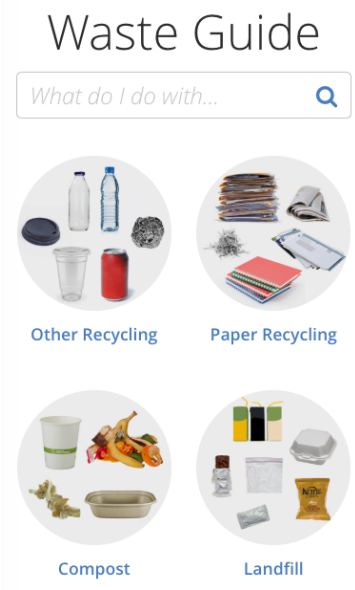
activities to ISO 50001, an international energy management standard. ISO 50001 alignment is a key strategy to ensure that energy and water management at the Lab is strategic, effective, and persistent. The primary project deliverable is an online Energy and Water Management System Manual. A new energy and water management policy has also been finalized to support ISO 50001 certification. ISO 50001 efforts have been coordinated closely with the Lab's Energy Technologies Area, which was instrumental in developing the standard.

Green Building

- **Updated Sustainability Standards for New Construction**: The Lab updated its policy on Sustainability Standards for New Construction in April 2019.
- **High Performance New Construction**: The Integrated Genomics Building was occupied in November 2019 and is designed to meet deep energy efficiency targets (consuming 36% of the energy used by the prior facility in Walnut Creek), use no natural gas, and offset about 15% of its total energy use with rooftop photovoltaics. See more details about the Integrative Genomics Building (IGB) Design at sbl.lbl.gov/progress. Photovoltaic panels are planned for future installation.

Transportation

- **Increased Electric Vehicle Charging**: The Lab increased the size of its charging community by about 28% in FY 2019 to (from 145 to 171). Approximately 95 EV drivers are charging regularly each month at the Lab's main site. Details about the Staff EV Charging Program are available at sbl.lbl.gov/progress.
- **Improved Shuttle Routes**: In November 2018, the Lab introduced a new shuttle route serving north Berkeley, intended to reduce single-occupancy vehicle trips and avoid the need for 75 parking spaces at the Lab's main site. The Lab continues to optimize shuttle routes from the Rockridge BART station, which were expanded in September 2018. As of October 2019, the Lab also updated its NextBus Alert system, which allows riders on all shuttle routes to be notified when the next shuttle is arriving at a stop.



WASTE

- **Online Waste Guide**: The Lab has continued hosting an online Waste Guide (wasteguide.lbl.gov) to educate the Lab community on how to reduce, reuse, and recycle more than 250 items. The Guide has been very useful and popular. It

indicates how to dispose of items and provides additional details about what happens after items are put in the bin.

- **Site-Wide Waste Audits**: The Lab has maintained its site-wide waste audit system to track building-level diversion and identify the composition of waste streams in order to better target diversion efforts. Explore Waste Diversion by Building at sbl.lbl.gov/data and read about the Lab's data-driven waste diversion efforts at sbl.lbl.gov/progress.
- **IGB Pioneers as First Zero Waste Building**: IGB has demonstrated leadership by committing to be the Lab's first building to go "zero waste," with updated infrastructure to reach and sustain greater than 90% waste diversion.
- **New Policies for Zero Waste and Waste Reduction**: New policies were finalized this year to clarify roles and responsibilities related to achieving zero waste (greater than 90% diversion).

WATER

- **New Water Policies:** Three policies were finalized this year intended to reduce water consumption. These include policies defining limitations for landscape watering, for water-conserving restroom fixtures, and to eliminate water waste associated with single-pass cooling. Single-pass cooling refers to the use of a cold water supply as a source of cooling in which water is run through a piece of laboratory or building cooling system equipment to a drain.

ATTACHMENT 4: Sustainability Community Outreach Events
February 2019 – February 2020

DATE	EVENT	ATTENDEES*	PARTNERS**
2/1/19	**Equity & Adaption Training**	48	Urban Sustainability Directors Network (USDN), Movement Strategy Center, Rami & Assoc.
2/7/19	**East Bay Electrification Expo**	280	Ecology Center, StopWaste
3/15/19	**Electric Mobility Stakeholder Workshop**	50	
3/19/19	**Senior Center East Bay Community Energy (EBCE) Outreach** (tabling)		
3/26/19	**Bay Area Multifamily Building Enhancements (BAMBE) Multi-Family Workshop - large properties**	34	StopWaste
3/26/19	**BAMBE Multi-Family Workshop - small properties**	25	StopWaste
4/8/19	**Senior Center EBCE Outreach** (tabling + presentation)	20	
5/4/19	**Energy Town Hall** (tabling + presentation)	40	Hosted by: Councilmembers Harrison & Bartlett
6/23/19	**Electric Cars 101 Workshop**	30	Ecology Center, 350 Bay Area
6/25/19	**Electric Cars 101 Workshop**	30	Ecology Center, 350 Bay Area
6/29/19	**Making a Healthier Home Workshop**	30	Ecology Center, StopWaste
8/22/19	**Clean Transportation Convening**	135	Berkeley Climate Action Coalition (BCAC), Ecology Center
9/14/19	**3rd Annual Ride Electric**	300-500	Ecology Center
10/15/19	**2019 SunShares Workshop**	50	Ecology Center
10/16/19	**Planning Department Open House** (tabling)	n/a	
10/20/19	**City of Berkeley Open House** (tabling)	n/a	Hosted by: City Manager
11/5/19	**Get Ready for 2020: Electrification for Home Builders & Designers Workshop**	98	BCAC, Ecology Center, StopWaste
11/9/19	**Awakening the Dreamer Symposium** (tabling)		Hosted by: Unitarian Universalist Church, Pachamama Alliance
11/17/19	**Making a Healthier Home Workshop**	75	StopWaste, City of Albany
1/21/20	**Citizen's Climate Lobby (CCL): Climate Restoration - We Are Not Doomed!** (tabling)	n/a	Hosted by CCL: BCAC + multiple community partners
2/26/20	**Bridge Association of Realtors: Electrification 101 for Realtors Workshop**	63	Hosted by: Bridge Association of Realtors

*Total attendees (participants, staff & presenters) for workshops only.
**Unless noted, OESD was either the lead entity or a co-host of events. At events hosted by another organization or City department, OESD participated by tabling and/or presenting.