



Office of the City Manager

WORKSESSION
November 3, 2015

To: Honorable Mayor and Members of the City Council
From:  Dee Williams-Ridley, Interim City Manager
Submitted by: Eric Angstadt, Director, Planning & Development
Timothy Burroughs, Chief Resilience Officer, Office of the City Manager
Subject: Climate Action Plan & Resilience Strategy Update

SUMMARY

The purpose of this report is to provide City Council with an annual update on progress toward achieving the Berkeley Climate Action Plan (CAP) goals. According to the latest and best available data, Berkeley's 2013 community-wide greenhouse gas (GHG) emissions, including emissions from transportation, building energy use, and solid waste disposal, are approximately 9% below 2000 baseline levels, despite a population increase of approximately 14% in that same time period. Community-wide GHG emissions decreased by approximately 2% between 2012 and 2013. Data for 2014 are not yet available.

While reducing community-wide GHG emissions below baseline levels is an important achievement not seen in many other cities, there is more work to be done. As reported last year, the community is not currently on a trend to achieve the CAP target of reducing community-wide emissions 33% below 2000 levels by 2020 and 80% by 2050. Emissions levels are approximately 19% higher than our 2013 target. Achieving deeper GHG reductions requires additional and accelerated action.

This report highlights several key existing and planned efforts designed to accelerate reductions in local global warming emissions, advance preparedness for climate change impacts, and achieve other community benefits. Also highlighted in this report is development of a new "idea competition" designed to engage experts and stakeholders in helping the City identify additional, effective GHG reduction strategies.

At the core of the City's current and planned work to accelerate GHG reductions are efforts to:

- *Reduce driving trips* through focusing growth along transit corridors, smart parking policies, and increasing access to low-carbon travel modes, such as bikes and electric vehicles
- *Reduce energy consumption in buildings* through a combination of technical assistance, incentives, and requirements that catalyze investment in energy efficiency and renewable energy, such as solar

- *Divert solid waste from landfills* by maximizing recycling and composting and minimizing solid waste at its source, such as through promoting material reuse and setting restrictions on single-use bag distribution

CURRENT SITUATION AND ITS EFFECTS

Current Community-Wide GHG Emission Trends

According to the latest and best available data, Berkeley's 2013 community-wide greenhouse gas (GHG) emissions, including emissions from transportation, building energy use, and solid waste disposal, are approximately 9% below 2000 baseline levels, despite a population increase of approximately 14% in that same time period. Community-wide GHG emissions decreased by approximately 2% between 2012 and 2013. Annual per capita GHG emissions decreased 20% between 2000 and 2013, from 7.2 to 5.8 metric tons per person per year, and decreased by 3% from 2012 to 2013.

Berkeley's emissions reductions since 2000 are significant and can be attributed to a few main factors. One major factor is emissions from household energy consumption, which declined 16% since 2000. Driving this trend are increases in household energy efficiency and solar installations. Between 2000 and 2014, Berkeley residents and businesses collectively installed 1,452 solar photovoltaic (PV) systems. According to a 2012 "California's Solar Cities" report by Environment America, Berkeley was ranked 10th among mid-size cities in number of solar installations per resident in California and was ranked 13th for California cities for overall number of solar installations.

Another main factor contributing to community-wide emissions is the rate of GHG emissions produced per unit of electricity consumed. Due to state law known as the Renewable Portfolio Standard, the mix of energy PG&E uses to produce electricity is becoming greener. The GHG emissions produced per kilowatt-hour of electricity consumed decreased by approximately 24% in 2013 compared to 2000.

Also contributing to Berkeley's overall community-side emissions trends is a substantial reduction in the amount of solid waste that the community sends to landfills. Solid waste disposal from Berkeley dropped by approximately 50% between 2000 and 2013, and 18% alone between 2012 and 2013. The GHG emissions associated with landfill waste disposal from Berkeley dropped 59% from 2000 to 2013. These welcomed trends in solid waste disposal and the associated emissions are particularly noteworthy given the increase in overall economic activity and new construction following the recession. Services and outreach provided by the Zero Waste Division make it easier for residents and businesses to divert waste from the landfill. For example, in 2014 the City diverted 9,000 tons more construction and demolition debris from the landfill than the previous year.

Transportation accounts for approximately 55% of Berkeley's overall GHG emissions, and Berkeley has seen an estimated 2% reduction in vehicle miles travelled (VMT) since 2000, despite the significant increase in population in Berkeley and the region.

Data from the Metropolitan Transportation Commission (MTC) suggest that, broadly, two main factors are at play. One is the economic downturn starting in 2008, which affected the number of vehicle trips; the other is mixed-use, transit-oriented development in combination with ongoing improvements to bicycle and pedestrian infrastructure that enable Berkeley residents and visitors to drive less. Driving trips were replaced by increases in both bicycling and walking to work as well as an increase in those working from home.

Comparative GHG Emissions Trends

Staff is aware of few communities that can illustrate an overall reduction in community-wide GHG emissions. A 2014 report by the Climate Protection Campaign¹ cited Berkeley as one of nine leading U.S. cities achieving GHG reductions at a community scale.

While GHG emissions are measured differently at the state and regional level and the measurements start from different baselines, it is worth noting that statewide emissions decreased approximately 2% since 2000, compared to the 9% reduction achieved in Berkeley. 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.

Bay Area emissions increased 29% between 1990 and 2011, driven by a 23% increase in the region's population and a 77% increase in the Gross Regional Product during that time period.

Locally, both UC Berkeley and Lawrence Berkeley National Lab are playing leadership roles in reducing the carbon footprint of their campuses and operations. UC Berkeley reduced its emissions associated with building energy use, transportation, and solid waste disposal by 19% since 2007. The Berkeley Lab reduced its onsite emissions by approximately 7% since 2008.

Filling the Gap between Current and Targeted Emissions Levels

Despite significant reductions in community-wide emissions since 2000, Berkeley has much more work to do. The community is not currently on a trend to achieve the target of reducing community-wide emissions 33% below 2000 levels by 2020 and, ultimately, 80% by 2050. Current emission levels are approximately 19% higher than our targeted trend for 2013.²

¹ <http://climateprotection.org/proven-promising-climate-measures-u-s-communities-possible-application-sonoma-county/>

² Note that these emissions trends do not include assumptions related to the implementation of the recently passed California SB 350 bill, 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.

In 2014, staff presented City Council an analysis that identifies a combination of state and local policies that can help fill the gap between current and targeted 2020 GHG emission levels. That analysis still holds. Staff estimates that state climate action policies, such as the Renewable Portfolio Standard, the Low Carbon Fuel Standard, and the “Pavley” Clean Car Standards could achieve approximately 53% of the emission reductions needed to meet Berkeley’s 2020 target. An additional 20% - 37% of the gap between current and targeted emissions levels could be achieved by existing and planned local initiatives, such as transportation demand management efforts, local solar and energy efficiency programs, efforts to achieve zero waste, and implementation of an Alameda County Community Choice Aggregation (CCA) program. ***In short, 73% - 90% of the gap between current and targeted emissions levels could be achieved by 2020 through a combination of existing and planned state and local initiatives.*** The impact on emissions of a CCA program depends on how green the energy mix is that would be available to CCA customers, which is why forecasted emission reductions from existing and planned local initiatives are presented as a range.

Based on staff’s analysis of current community-wide GHG trends and forecasted emission reductions, achieving Berkeley’s target requires not only advancing existing and planned initiatives, but also identification of new strategies at the state, regional and local levels. Outlined below are existing and planned efforts that staff is currently advancing and that are critical to accelerating local GHG reductions moving forward. Also described below is an “idea competition” that staff is currently developing to engage experts, entrepreneurs, and other stakeholders in helping the City identify additional, effective GHG reduction strategies.

Summary of Critical Current & Planned GHG Emissions Reduction Efforts

Transportation accounts for approximately 55% of Berkeley’s overall GHG emissions. Transportation emissions decreased approximately 1% between 2012 and 2013. Critical to reducing vehicle trips and the associated emissions moving forward is continuing to focus growth along transit corridors, implement smart parking policies, and increase access to low or no-carbon transportation modes, such as bicycles and electric vehicles.

Where people live affects how much they drive. For that reason, the City continues to focus new compact, mixed-use development along transit corridors in designated Priority Development Areas (PDAs), particularly in or near Downtown Berkeley. For example, three projects in Downtown, bringing a total of over 330 new dwelling units, have completed the entitlement process, obtained building permits, and started construction in the last 18 months. Along the University Avenue PDA, an additional three projects, with over 230 dwelling units, have completed the entitlement process in this time period. This development compliments other recently entitled projects in the Southside and the San Pablo PDA, as well as projects in Downtown Berkeley that were entitled earlier and have now submitted building permit applications. The locations of this growth are consistent with California’s SB 375, which sets regional targets for

emission reductions from passenger vehicles, and with the City's Climate Action Plan goals.

In order to drive less, residents, employees and visitors also need access to alternatives to conventional cars. In Berkeley, bicycles accounted for 9% of commute trips in 2013 compared to 6% in 2000. According to the U.S. Census, as of 2012 Berkeley has the 3rd highest cycling-to-work rate and the 2nd highest walk-to-work rate in the nation. Staff is eager to build on these positive trends through launch of the Bike Share program in 2017; construction of new, innovative bike and pedestrian infrastructure, such as the Hearst Avenue Complete Streets Project; and continuing to supply safe bike parking spaces throughout the city (the City installed over 800 new bike parking spaces from 2010 – 2012). In July 2015, staff submitted a bundle of grant applications to the Alameda County Transportation Commission (ACTC) for the planning, design, and construction of approximately 250 projects that will improve the safety, efficiency, and convenience of all modes of travel in Berkeley. Collectively, the projects are intended to reduce vehicle trips and promote cycling, walking and public transit. If awarded, funding for proposed projects would be available starting in FY 2018.

Staff also continues to remove barriers to electric vehicle adoption in Berkeley. Between August 2013 and August 2015, the number of electric vehicles (EVs) in Berkeley nearly tripled, bringing the estimated total to 750 vehicles. An EV operating on its electric battery produces approximately 70% less GHG emissions than a conventional vehicle and removes other tailpipe emissions. The City has made it easier to own and operate an EV in Berkeley by providing technical assistance and streamlining permitting for charging stations. In addition, in September 2015, the City installed a total of six new dual-port Level 2 public charging stations in the Telegraph/Channing Street Garage, Oxford Garage and at the Berkeley Marina. This added 12 new public charging ports to the 2 ports (at the Center Street Garage) that had been provided by the City for public charging.

In addition, the City successfully obtained foundation grant funding to support the development and implementation of a Residential Curbside EV Charging Pilot program that was launched in December 2014. This Pilot offers home charging opportunities for residents that lack off-street parking by allowing for the creation of new front yard spaces for EV charging or for curbside EV charging stations. There have been 24 applicants for this Pilot and 2 installed charging stations (1 curbside and 1 on-site) as of September 15, 2015.

The City's goBerkeley program is also a critical component of emission reduction efforts. Launched in July 2013, the program shows that parking and transportation demand management strategies can be effectively linked to improve parking conditions and reduce congestion and GHG emissions. The program reduces GHG emissions through demand-based parking pricing that minimizes the time it takes for a driver to find a parking space and by providing incentives for local employees in designated pilot project areas to take public transit and utilize car share.

Building energy use, including residential, commercial, and municipal, accounts for approximately 44% of community-wide GHG emissions. Building energy use emissions decreased by approximately 3% between 2012 and 2013. Critical to reducing emissions associated with building energy use is increasing energy efficiency and clean electricity in all building types.

Adopted on March 10, 2015, Berkeley's Building Energy Savings Ordinance (BESO) is designed to catalyze investment in energy-saving upgrades in homes and businesses. BESO requires energy assessments to uncover opportunities to minimize wasted energy, improve occupant comfort, and lower utility bills. The ordinance will affect approximately 600 1-4 unit buildings annually and all 2,700 multifamily and commercial buildings by 2020.

The City is also making significant gains at improving the energy efficiency of municipal facilities. Municipal energy consumption per square foot decreased 11% since 2000. Several recent and current or planned projects will put the City on track to reduce the emissions associated with municipal energy use by 33% below 2000 levels by 2020, consistent with CAP targets.

Earlier this year, the City completed conversion of the nearly 8,000 street and pathway lights to high-efficiency LED technology. The project is expected to reduce electricity consumption from streetlighting by 60% and save \$450,000 annually.

Staff is also in the process of developing a Request for Proposals to secure a technical assistance firm to conduct energy and water audits of City facilities that identify upgrades that can be financed through the upgrades' expected utility bill savings.

With significant input from the community, staff is also developing plans for the reconstruction of the Center Street Garage that include high-efficiency lighting, solar panels covering 50% of the roof area, and a design that will enable 70% solar coverage and energy storage in the future, among other green elements.

Beyond energy efficiency and rooftop solar, GHG emissions are also affected by the mix of energy sources used to produce the electricity consumed. One program under development and designed to reduce emissions from electricity consumption is the Alameda County Community Choice Aggregation (CCA) program. The City is participating on the Alameda County Board of Supervisors CCA Steering Committee. Community Choice Aggregation, also known as Community Choice Energy, is a provision of California law that allows cities, counties or joint powers agencies to purchase electricity and other necessary electrical services on behalf of the customers in their territories. CCAs are able to determine their own energy supply mixes and rate structures.

A preliminary analysis indicates that a CCA program that produces 80% of its energy supply using renewable energy sources could reduce Berkeley's community-wide emissions by about 2% in 2020; a 95% renewable energy CCA could reduce emissions

by about 8% in 2020. If approved, a CCA in Alameda County would not begin operating before 2017.

Finally, each of the above efforts contributes to Berkeley's competitiveness for the Georgetown University Energy Prize. The City of Berkeley is a semi-finalist along with 49 other cities nationwide in a competition to reduce the most energy consumption and win a \$5 million prize. The competition runs from 2015 – 2016.

Solid waste disposal accounts for approximately 1% of community-wide GHG emissions. Although it is a small contributor of emissions compared to buildings and transportation, strategies such as recycling and composting reduce landfill waste and are consistent with the City's Zero Waste by 2020 goal. Emissions from solid waste decreased 18% between 2012 and 2013. Critical to continuing and accelerating this trend is increased recycling and composting for all property types.

Implementation of the Alameda County Mandatory Recycling Ordinance (the ordinance was effective for all businesses starting July 2014) has resulted in more businesses and multifamily properties taking advantage of recycling and composting services than ever before. The Zero Waste Division continues to conduct outreach and provide assistance to in order to enable more properties to divert solid waste from the landfill.

Also affecting solid waste diversion trends moving forward is that the City will be providing all commercial refuse and recycling services (except for roll-off containers). With this change from the current franchise collection system, the City will have an opportunity and increased role to affect waste diversion efforts in the commercial sector.

Identifying Additional Emission Reduction Strategies and Necessary Funding

Based on staff's analysis of current community-wide GHG trends and forecasted emission reductions, a combination of existing and planned state and local policies and programs will achieve approximately 73% - 90% of the gap between current and targeted emissions levels by 2020. Additional effective GHG reduction strategies are needed. To identify new ideas, staff is developing an "idea competition" designed to engage experts, entrepreneurs, and other interested stakeholders in helping the City develop additional, viable emissions reduction strategies. Staff is developing the "idea competition" with support from a grant received from the Urban Sustainability Directors Network in partnership with the cities of Palo Alto, Santa Monica, and Aspen, CO. The four cities are partnering with the Presidio Graduate School in San Francisco to develop competition guidelines and an outreach strategy, and to invite entities such as academic and research institutions to submit idea proposals. Staff anticipates launching the competition in early 2016, and hopes that the process will result in several actionable GHG-reduction strategies that can be implemented in Berkeley. Staff will work with the winner(s) of the competition to identify implementation funding in the form of grants or other sources. Staff is also working to identify prizes to encourage participation.

Expansion of existing efforts and implementation of new initiatives to achieve Berkeley's CAP targets requires additional resources. Beyond ongoing efforts to secure grant funding, staff also proposes to analyze the potential to create additional sustained funding for CAP implementation.

Preparing for Climate Change Impacts

In addition to efforts underway to reduce global warming emissions, staff is also advancing work to better prepare for the impacts of climate change and other hazards. The main climate-related impacts in Berkeley are increased flooding due to sea-level rise and extreme storms, drought, and wildfire. Staff is leveraging funding and other technical assistance resources provided by the Rockefeller Foundation through the 100 Resilient Cities program to better prepare for these impacts. Current focus areas include:

- *Improving access to clean emergency back-up power for critical facilities, such as the Public Safety Building and emergency care and shelter sites.* Loss of power due to wildfire, earthquake or a major storm impedes response and recovery. Staff recently conducted a Request for Proposals process to assemble a team of technical assistance providers that can assist the City to secure grant funding for a "micro-grid" project designed to provide back-up power and other benefits for critical facilities.
- *Increasing water efficiency and diversifying water supply.* The City reduced water consumption in municipal operations by 29% compared to 2013 levels, mainly through reduced irrigation, fixing leaks, and conservation among staff. Maintaining these trends requires additional steps to increase water use efficiency, especially for irrigation, and identifying alternative water supply. Staff is partnering with UC Berkeley to share best practices in drought-tolerant landscape management and water efficient irrigation systems. A UC Berkeley team of professors and students is also working with the City to research opportunities to utilize ground water for back-up water supply and irrigation. Staff is also analyzing opportunities to capture and reuse stormwater.
- *Mitigating flooding due to sea-level rise, extreme storms, and aging stormwater infrastructure.* Sea-level rise and more severe storm events exacerbate the limits of Berkeley's aging stormwater infrastructure. Staff is partnering with technical assistance firms provided by the Rockefeller Foundation to illustrate the impact of sea-level rise on Berkeley's shoreline, identify vulnerabilities in the stormwater system and potential opportunities for upgrades, and identify funding options.
- *Expanding the urban forest.* Berkeley's urban forest reduces local air temperatures, helps to reduce stormwater runoff, and sequesters GHG emissions, among other benefits. The City has gained over 4,700 street and park trees since 2000, and in 2014 alone over 450 trees were planted.

These and other resilience efforts will be articulated in Berkeley's "Resilience Strategy," which will be delivered to City Council in early 2016.

Achieving Scale – Integrating Sustainability throughout City Operations

Achieving scale with Berkeley's climate action efforts requires that environmental sustainability be integrated throughout City operations and that it is part of everyone's job. The City's Sustainability Working Group (SWG) was established in May 2013 to help achieve this objective. It is a multi-departmental team chaired by the Chief Resilience Officer. To date, the SWG has implemented three main strategies:

- 1) *Created an "Environmental Sustainability" section in all reports to City Council.* The new section requires all City staff to consider and articulate the linkages between the subject of the report and the City's environmental sustainability goals.
- 2) *Integrated environmental sustainability practices in Citywide work plan.* For the FY 2015 Citywide work plan, each City department was tasked with identifying practices designed to integrate environmental sustainability into the department's operations.
- 3) *Launched the annual Berkeley Environmental Achievement Awards.* The awards are designed to celebrate City employee actions that benefit the environment and contribute to a culture of sustainability throughout the City government.

In FY 2016, the SWG is advancing projects to improve recycling in City buildings and to develop training on environmental sustainability for new and existing City employees.

BACKGROUND

Adopted by City Council on June 2, 2009, the CAP is the community's guide for reducing greenhouse gas (GHG) emissions to 33 percent below 2000 levels by 2020 and 80 percent by 2050. CAP strategies are designed to not only reduce GHG emissions, but also to achieve several other benefits, including improved public health due to less local air pollution and more active transportation modes; improved access to green jobs due to increased demand for solar and energy efficiency upgrades; and cost savings for residents, businesses, and the City government due to reduced energy use.

The City reports a range of climate action performance metrics online at www.cityofberkeley.info/climateprogress.

ENVIRONMENTAL SUSTAINABILITY

The Climate Action Plan is designed to guide community-wide efforts to reduce global warming emissions and improve environmental performance. CAP policies and programs have contributed to reductions in energy use, solid waste disposal, and vehicle miles traveled in the Berkeley community.

POSSIBLE FUTURE ACTION

The purpose of this report and the associated work session is to provide City Council with an update on GHG emission trends to date and to provide an opportunity for discussion on policy and program options for closing the gap between current and targeted GHG emission levels.

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 and are dependent on policy choices.

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