



**DATE:** July 16, 2018

**TO:** Council Sustainability Committee

**FROM:** Director of Utilities & Environmental Services

**SUBJECT:** Building Electrification & Reducing Natural Gas Use

## **RECOMMENDATION**

That the Committee reviews and comments on this report.

## **SUMMARY**

To meet long term goals for reducing greenhouse gas (GHG) emissions, our use of natural gas must be curtailed significantly. This report provides information about electrifying the space heating, water heating, and cooking appliances in buildings and a review of policies and programs related to electrification.

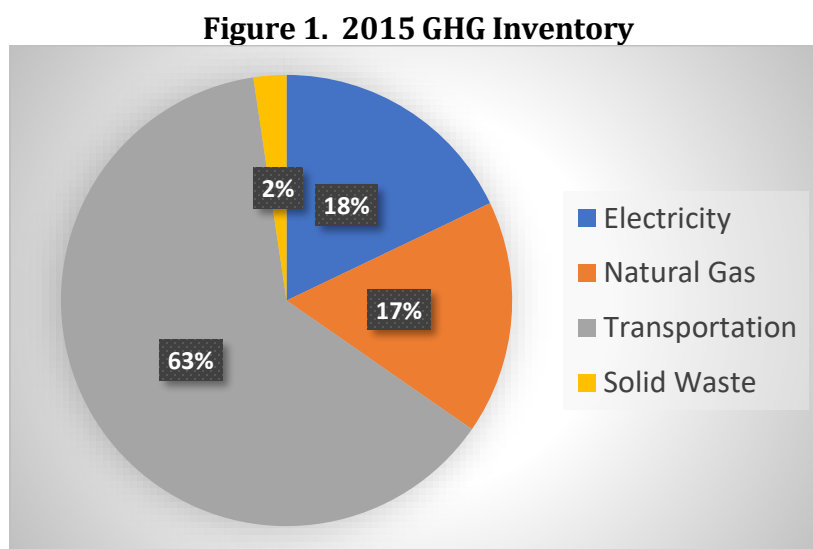
## **BACKGROUND**

Hayward's General Plan includes goals for reducing GHG emissions by 20% below 2005 baseline levels by 2020, 61.7% by 2040 and 82.5% by 2050. The City's first Climate Action Plan adopted in 2009, which included the same 2050 goal, identified the following aggressive long-term goals would need to be achieved to meet the 2050 target.

- Reduce VMT of passenger vehicles to 30 percent below the projected emissions level
- Reduce VMT of diesel vehicles (heavy trucks) by 10 percent below projected emissions level
- Increase average fuel economy of passenger vehicles to 75 mpg
- Increase average fuel economy of diesel vehicles to 11.5 mpg
- Supply 100 percent of electricity from renewable sources
- Reduce electricity consumption to 65 percent below emissions projections
- Reduce natural gas consumption to 50 percent below emissions projections (underlined for emphasis)
- Eliminate emissions from methane produced from waste decomposition

As noted in the 2015 greenhouse gas inventory report presented to the Committee on September 11, 2017, approximately 17% of Hayward's emissions come from natural gas (see

Figure 1). In order to meet Hayward's 2050 GHG reduction goal, emissions from all sectors must be addressed.



Emissions from vehicles are being addressed by vehicle manufacturers and the State of California with electric vehicle incentives, fuel efficiency standards and the low carbon fuel standard. Emissions from electricity are being addressed by East Bay Community Energy. While the City still needs to support electric vehicle adoption with additional charging station infrastructure and the City needs to assist businesses and households with increasing energy efficiency, the next big source of emissions to be addressed is natural gas. Natural gas is primarily used for space heating, water heating, cooking, and industrial processes.

## DISCUSSION

Natural gas burns cleaner than coal and other fossil fuels and has been considered a “bridge” fuel during the long-term transition to renewables, but it still has significant emissions associated with its use. The process of extracting natural gas is also not clean and can have serious environmental impacts. As stated by Bill McKibben, founder of 350.org, “The climate movement’s biggest failure has been its inability to successfully make the case that natural gas is not a clean replacement for other fossil fuels. So as natural gas has boomed, U.S. emissions of methane, a potent greenhouse gas, have increased dramatically.”<sup>1</sup>

In addition to GHG emissions associated with end uses such as natural gas-burning appliances, there are other reasons to reduce our reliance on natural gas. According to a [report](#) by the San Francisco Department of the Environment, “there is growing evidence that policymakers and operators are underestimating climate and health risks associated with the natural gas system, especially when it comes to accounting for the heat-trapping power of methane emissions from extracting, transporting, and using natural gas.” The report includes

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<sup>1</sup> <https://e360.yale.edu/features/how-climate-activists-failed-to-make-clear-the-problem-with-natural-gas-mckibben>

a list of top ten priority actions for cities to address methane leaks, which include improved GHG accounting for methane leaks, better data collection regarding methane leaks and building electrification. The report also highlights the risk of fire and explosions from natural gas pipelines and states that in the last 20 years, there have been on average 14 fatalities from pipeline incidents per year.

*EBCE and Building Electrification* – The East Bay Community Energy’s recently released draft [Local Development Business Plan](#) provides goals and strategies for developing new local renewable energy facilities, improving energy efficiency, and reducing GHG emissions. The Plan includes a section about fuel switching programs and notes that switching appliances to electric models can reduce GHG emissions and can also increase and stabilize retail electricity sales. The Plan includes the following recommendations related to building electrification:

1. Pursue grant funding opportunities to support initial building electrification pilot incentives to evaluate program design parameters, appropriate rebate levels, and consumer interest.
2. Use the experience and data gleaned from the pilot to conduct internal analysis of customer load profiles using the integrated data platform and refine program design criteria.
3. Include fuel switching strategies and electric heat pump technologies in workforce training initiatives, to support development of the trade skills necessary to implement a robust EBCE building electrification strategy.
4. Evaluate opportunities for enhancing building electrification strategies, such as the potential to provide a premium opt-in natural gas service to provide new revenues to support enhanced fuel switching rebates and incentives.

Providing a premium opt-in natural gas service would mean that EBCE would become a Core Transport Agent (CTA) and would enter into a Core Gas Aggregation Service Agreement with PG&E<sup>2</sup>.

*Alternatives To Natural Gas Appliances* – Many people enjoy cooking with natural gas because there is a visible flame, making it easier to gauge the heat level and therefore exert more control while cooking. However, if not vented properly, gas cooking can contribute to poor indoor air quality<sup>3</sup>. While their use is currently very limited, induction cooktops and ranges are gaining in popularity and cause fewer indoor air pollutants.

Other electrification opportunities exist for water heating. While tankless water heaters, which typically use natural gas to instantaneously heat water, were encouraged as an energy-efficient option in the last 10 to 15 years, heat pump water heaters are now more widely available and are more efficient. A heat pump water heater uses electricity and a refrigerant to

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<sup>2</sup> More information about CTAs is available at [https://www.pge.com/en\\_US/business/services/alternatives-to-pge/gas-services/core-gas-aggregation/core-gas-aggregation-transport-agents.page](https://www.pge.com/en_US/business/services/alternatives-to-pge/gas-services/core-gas-aggregation/core-gas-aggregation-transport-agents.page) and <http://www.cpuc.ca.gov/General.aspx?id=4812>

<sup>3</sup> <https://ehp.niehs.nih.gov/122-a27/>

take heat from the air and transfer it to the water. Several cities have electrification resources for consumers and information about various alternative technologies:

- City of Berkeley: [Residential Heat Pump Water Heaters: Replacing a Gas Water Heater](#)
- City of Oakland: [7 Steps to a Clean Energy Oakland Home](#)
- City of Palo Alto: [Heat Pump Water Heaters: What is the Carbon Footprint of your Water Heater?](#) (includes a video and rebate information)
- Menlo Park: [A Guide to the All-Electric Low-Carbon, Clean Home](#) (this fact sheet is by Menlo Spark, a Menlo Park Nonprofit)

PG&E offers a \$300 rebate for residential installation of a high-efficiency electric heat pump storage water heater<sup>4</sup>. By comparison, the Sacramento Municipal Utility District (SMUD) offers a \$3,000 rebate for changing a gas water heater to an electric heat pump water heater<sup>5</sup>. The City of Palo Alto offers a \$1,500 rebate for installation of an electric heat pump water heater. In addition, effective June 1, 2018, SMUD is offering new rebates to encourage all-electric homes. Rebate packages are up to \$5,000 for new homes and \$13,750 for conversion of existing homes<sup>6</sup>.

***Building Electrification Policies*** – In late June 2018, Green Cities California held a two-day workshop for local governments to collaborate and begin developing a guide to help municipal agencies throughout California pave the way for building electrification in their communities. Over the course of the workshop, the following strategies were identified:

1. Focus Building Electrification Efforts on Municipal Buildings
2. Promote Switching from Natural Gas to Clean Electricity or Solar Thermal Energy
3. Develop, Implement and Disseminate Codes and Standards that encourage or require Building Electrification – particularly for new construction
4. Advocate for Building Electrification Policies and Practices at Regional and State Levels
5. Develop Campaigns to Communicate and Educate Local Business and Professional Audiences about Building Electrification
6. Develop Campaigns to Communicate and Educate Residential/Home Owner Audiences about Building Electrification
7. Incorporate Building Electrification Smart Cities Planning and Implementation Efforts

Some jurisdictions in the Bay Area have already taken steps to facilitate and encourage building electrification. Marin County and the City of Palo Alto have adopted local ordinances to encourage construction of all-electric buildings and require energy efficiency standards that go above and beyond state requirements<sup>7</sup>. Building an all-electric home has its advantages and can decrease construction costs if a connection to the gas main can be

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<sup>4</sup> [https://www.pge.com/includes/docs/pdfs/shared/saveenergymoney/rebates/ee\\_residential\\_rebate\\_catalog.pdf](https://www.pge.com/includes/docs/pdfs/shared/saveenergymoney/rebates/ee_residential_rebate_catalog.pdf)

<sup>5</sup> <https://www.smud.org/en/Rebates-and-Savings-Tips/Rebates-for-My-Home/Home-Appliances-and-Electronics-Rebates>

<sup>6</sup> <https://www.greentechmedia.com/articles/read/sacramento-utility-pushes-all-electric-homes#gs.LM7RJK0>

<sup>7</sup> [https://www.greentechmedia.com/articles/read/local-governments-look-to-all-electric-buildings-to-reduce-greenhouse-gas-e?utm\\_source=Daily&utm\\_medium=email&utm\\_campaign=GTMDaily#gs.8m8xxKE](https://www.greentechmedia.com/articles/read/local-governments-look-to-all-electric-buildings-to-reduce-greenhouse-gas-e?utm_source=Daily&utm_medium=email&utm_campaign=GTMDaily#gs.8m8xxKE)

avoided. Electrifying an existing home, however, can be quite challenging. As detailed in this [article](#), some homes require upgrading the electric panel to handle additional electric appliances. The article also details the state-level regulatory and legislative challenges with going all-electric.

## **STRATEGIC INITIATIVES**

This agenda item does not relate to one of Council's three Strategic Initiatives.

## **SUSTAINABILITY FEATURES**

Building electrification will be necessary to meet the City's long-term GHG reduction goals. Electrification also has the following sustainability features:

*Energy:* Building electrification will reduce the City's reliance on fossil fuels and electricity, which will be sourced increasingly from more renewable energy by EBCE.

*Air:* Building electrification can improve indoor air quality as well as reduce global methane and other GHG emissions.

## **NEXT STEPS**

Depending on direction from the Committee, staff will encourage electrification by adding resources to the City's website, working with EBCE, and working with the East Bay Energy Watch and the Alameda County Energy Council to further study and promote fuel switching. Staff will also explore the possibility of amending the City's building code to require that new construction incorporate electric panels capable of supporting all electric appliances.

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*Approved by:*



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