Attachment 5

CITY OF MOUNTAIN VIEW

MEMORANDUM

City Manager's Office

DATE: March 23, 2021

TO: Audrey Seymour Ramberg, Assistant City Manager/ Chief Operating Officer
Dawn S. Cameron, Public Works Director

FROM: Kimbra McCarthy, City Manager

SUBJECT: **Offsetting Carbon Emissions from City Hall/Center for the Performing Arts HVAC System**

PURPOSE

This memorandum provides a response to the City Council's request for information about options to offset the carbon emissions from the City Hall/Center for the Performing Arts boilers.

BACKGROUND

On November 10, 2020, the City Council awarded a contract for replacement of the heating, ventilation, and air conditioning (HVAC) systems at City Hall/ Center for the Performing Arts (CPA) and at Fire Station 1. Because of the extraordinary cost of and time required to install an all-electric system at City Hall/CPA, the approved Scope of Work includes replacement in-kind of the natural gas boilers. As noted in the November 10, 2020 Council report, the fiscal and logistical challenges were driven by the space constraints at the City Hall/CPA site for placement of the heat exchange systems that would be required for an all-electric HVAC option. Staff recommended that the City seek offsets for 200 percent of the greenhouse gas (GHG) generation associated with the natural gas use of the new City Hall/CPA boilers.

Options for Offsetting City Hall/CPA Natural Gas Use

Council directed staff to return during the Operating Budget review process with information about the following three options for offsetting the City Hall/CPA natural gas use:

Option 1: Market offsets, as recommended in the November 10, 2020 Council report;

Option 2: Creating a sustainability fund to be used for costs associated with carbon-emission reduction efforts on projects at other City facilities; and

Option 3: Offsetting the emissions with carbon sequestration or reduction efforts in or near Mountain View.

The carbon emissions from the new natural gas system at City Hall/CPA are estimated to be 725 metric tons of carbon dioxide ($MTCO_2$) per year. Over the 25-year life of the system, total emissions are estimated to be approximately 18,000 $MTCO_2$.

DISCUSSION

Each option is described further below.

Market Offsets

Market offsets fund GHG reduction or sequestration through projects conducted by other agencies or organizations. Examples include tree planting, methane capture at agricultural sites, and forest conservation programs. For an offset to actually reduce emissions, it is important to ensure that the projects would not have been implemented without funding from the offset purchase. Using market offsets, staff estimates that the cost of one-to-one offsets for City Hall/CPA carbon emissions to be $6,000 to $12,000 per year, or $150,000 to $300,000 over the 25-year life of the project.

There are a variety of national and international organizations that create, implement, and operate a portfolio of emission reduction projects from which institutions, businesses, and individuals can purchase offsets; examples include Terrapass, Carbon Fund, and Gold Standard Climate Portfolio. As a local example, the City of Palo Alto funds an offset program through its municipal-run power utility to offset

communitywide natural gas use. Projects listed in the City of Palo Alto's program include:

- **GreenTrees**, a reforestation program with nearly 120,000 acres under contract in Mississippi, Louisiana, and Arkansas with plans to restore 1 million acres of forest along the Mississippi River.

- **Grotegut Dairy Farm**, a 3,900 milk-cow operation in Wisconsin, which installed two anaerobic digesters to capture and combust biogas emissions (methane) to reduce GHG and generate electricity.

- The community of **San Juan Lachao** has launched a forest offset project to improve the management of the forests and help the native community.

Some aspects of market offsets that Council may wish to consider include:

- While the reliability of some early market offset programs were questioned, current programs are available that are reviewed and certified by third-party organizations. This provides reasonable assurance that offset programs provide actual GHG reductions.

- The projects would likely not be local. GHGs are generally considered a global rather than a local air pollution concern, unlike ozone, particulates, or nitrogen, and sulfur oxides. From that standpoint, the location of the project need not be an essential criteria. However, Council may consider a local project desirable to demonstrate a visible local commitment to sustainability and GHG reductions.

- The City has not previously purchased market offsets. If Council selects offsets, staff would investigate alternatives for purchasing offsets and also whether a one-time payment is required or if there is an option for annual payments that could be made over the life of the HVAC equipment.

Sustainability Fund

Using the estimated cost of market offsets as a basis, a sustainability fund could be established to support additional carbon reduction efforts at City facilities. Examples for use of such a fund include:

- Funding the incremental additional cost of installing electric heating systems at the Library or another City building. While staff does not have an estimate of the

additional cost of an electric system at any of the City's buildings, when such a project is undertaken, staff could recommend using the funds for this purpose. The HVAC systems at relatively large facilities, such as the Library and Eagle Pool, will need to be renovated or replaced within the next five years and are potential candidates for such funding.

- Funding the replacement of some of the City's smaller natural gas appliances with carbon-free alternatives. For example, a design has been completed for a solar water heating system at the Senior Center, but no construction funding has been allocated. There are also natural gas water heating systems at four fire stations, the Adobe Building, and other City facilities that could be replaced with electric systems. In the past, such units were typically replaced relatively quickly with a new natural gas unit when the old appliance failed. Quick replacement is not feasible when replacing natural gas with electrical systems because electrical system upgrades are generally needed. With funding available, staff could prioritize the existing units based on age and condition and replace the units before they fail with little down time. Council could place the funding in a capital improvement project from which staff could draw to replace as many units as possible.

Some aspects of a sustainability fund that Council may wish to consider include:

- Most of the City's facilities are better candidates for electrification than the buildings at the Civic Center (City Hall/CPA and the Library). The relatively large size of the Civic Center buildings, coupled with the space constraints at the site, pose unique challenges. Electrification of the City's other buildings may be possible without the need for this additional funding source.

- Staff has not evaluated the feasibility (including cost) of installing an all-electric system at the Library. This project will begin within the next two years as the boiler nears the end of its useful life. Considering the site constraints at the Library, the City may deem an electrification project infeasible even with the support of a sustainability fund.

- There are a number of smaller natural gas appliances at City facilities that could be prioritized and replaced. This is a scalable project that could be sized to meet the available funding.

Local Offset Project

This option is similar to the first option (Market Offsets), but funding in this case would be earmarked for local projects that remove carbon from the air and sequester it in the soil, typically through tree planting, wetland restoration, or similar mitigation projects. Wetland projects are technically challenging, expensive, and generally more focused on habitat enhancement than carbon avoidance. There are no cost-effective opportunities to reduce carbon at the City's closed landfill because the City already has effective methane capture measures in place. Tree planting is simpler and the carbon offset value is more easily quantified. However, because of the amount of GHG emissions estimated from the new natural gas boilers at City Hall/CPA, staff does not recommend such a project based primarily on the limited opportunity to plant a sufficient number of trees. Additional analysis is provided below.

Tree Planting by City Staff

This option would direct funding to the Forestry and Roadway Division of the Community Services Department to plant trees within the City. Tree planting brings a number of benefits, among them GHG reduction, oxygen generation, habitat creation, and temperature cooling. However, staff has expressed concern regarding the lack of viable planting locations for the number of trees required to offset the estimated emissions. Staff has expressed interest in utilizing the money to improve, replace, or construct new irrigation infrastructure for plots where trees could be planted or are already planted. Carbon offset estimates of irrigation replacement and planting, as well as the cost for such an undertaking, are currently unknown.

Although a local carbon offset project has benefits, it is important to look at scalability and how much carbon dioxide tree planting can offset. Research from the European Environment Agency suggests that a typical hardwood tree sequesters approximately 48 pounds of CO_2 per year, or approximately 1 MT of CO_2 by the time it reaches 40 years old. To offset the 18,000 $MTCO_2$ emissions generated by the HVAC system over 25 years, approximately 33,300 trees would need to be planted. As a point of comparison, the current Community Tree Master Plan (2015) calls for planting an additional 11,000 trees to increase City's canopy by 5 percent over 15 years.

Even if staff was able to identify space for 33,300 new trees, tree planting of this scale is beyond the capacity of City staff. With market offsets, this challenge is resolved since the third parties managing such large-scale projects have infrastructure in place to do so.

Tree Planting by a Local Organization

With this option, the City would seek to engage with a local organization such as Canopy (a Bay Area urban forestry nonprofit that runs tree-planting events in our community) to determine how many trees they could plant for the funding provided. However, the same problem exists here as with tree planting by City staff. There likely is not enough space within the City to plant the 33,300 trees required to offset the 18,000 MT CO_2 emissions generated by the HVAC system over 25 years.

Some aspects of Local Offset Projects the Council may wish to consider include:

- City funds invested in local tree planting would have long-term environmental, health, and quality-of-life benefits for the community, regardless of their carbon-offsetting footprint.

- Local Offset Projects would likely be more expensive per MT CO_2 reduced than most commercially available market offsets.

- The City will likely not be able to offset all emissions from the new HVAC system using Local Offset Projects alone.

Summary of Options

Of the three options presented, market offsets likely provide the greatest GHG reduction per dollar spent. While staff does not have estimates for the cost per ton of GHG reduction for the other two options, the flexibility of offsets, both in terms of type and location of project, would likely provide the greatest reduction for the cost allocated. However, staff recommends Option 2, which creates a sustainability fund for projects that will reduce carbon emissions at City facilities. This will allow the City to accelerate the electrification of municipal operations and demonstrate local leadership. It will also provide an opportunity to utilize solar water heating to reduce energy costs.

RECOMMENDATION

Staff recommends Option 2, the creation of a sustainability fund in the amount of $450,000. This amount is the midpoint of staff's estimate of the cost of market offsets for 200 percent of the lifetime emissions of the new natural gas boilers at City Hall/CPA. This funding could be placed in a capital improvement project to be used for replacement of natural gas appliances at City facilities. Unlike market offsets, this option would

reduce the City's municipal operations GHG inventory by replacing natural gas with clean electricity from Silicon Valley Clean Energy.

If Council selects Option 2, staff would return during the Capital Improvement Program development process and propose one or more projects consistent with this recommendation.

ALTERNATIVES

As an alternative, Council could choose Option 1 or could direct staff to explore a smaller-scale local tree planting project (Option 3), in combination with either Option 1 or Option 2.

KM/TS/1/MGR
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