DATE: July 16, 2018

TO: Council Sustainability Committee

FROM: Director of Utilities & Environmental Services

SUBJECT Progress on Zero Net Energy Goal for Municipal Portfolio

RECOMMENDATION

That the Committee reviews and comments on this report and provides guidance to staff for future energy projects to achieve the City's goal of Zero Net Energy for municipal facilities by 2025.

SUMMARY

To meet the Council-adopted goals for reducing greenhouse gas (GHG) emissions related to municipal facilities, all energy used by City buildings and facilities will need to come from renewable sources by 2050. To accelerate this transition, the City Council set a goal to achieve cumulative Zero Net Energy (ZNE) at all City facilities by 2025. Analysis of the City's 2017 energy generation and demand figures has revealed that the City currently produces almost half of its total energy needs – meaning that the City is approximately 56% of the way toward its ZNE goal. Additionally, the City is projected to be at 65% of its ZNE goal by year's-end 2019.

BACKGROUND

ZNE Policy for New and Retrofitted City Buildings – On May 17, 2016, Council adopted Resolution 16-082 requiring that any new or significant retrofits of City buildings that begin design after January 1, 2017 be constructed as ZNE buildings.

Council Sustainability Committee – On July 11, 2016, staff presented a report about City-wide renewable energy use and a timeline for achieving cumulative ZNE for City facilities. Staff showed that the City has the potential to install sufficient renewable energy on City facilities to meet or offset all of its electricity and natural gas use.

ZNE Goal for Municipal Portfolio – On December 6, 2016, Council adopted Resolution 16-219 establishing the goal of achieving ZNE for electricity and natural gas use for the City's portfolio of facilities by 2025.

East Bay Community Energy (EBCE) – On March 6, 2018, Council adopted Resolution 18-028 to purchase EBCE's Brilliant 100 product so that most City facilities will receive 100% carbon free electricity starting in June 2018. Brilliant 100 will only be purchased for the City's accounts that are not enrolled in PG&E's Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT). Accounts enrolled in RES-BCT will be switched to EBCE in late 2019.

DISCUSSION

The City of Hayward has been producing renewable electricity for decades via two main sources:

1. Water Pollution Control Facility (WPCF) Cogeneration System (combined heat and power): This system has been in operation since 1982 and was replaced in 2015.

2. Solar projects: Solar panels have been installed at municipally-owned facilities throughout the City. Projects include:

    - Rooftop solar at the animal shelter/landscape building on Barnes Court (2005)
    - WPCF Solar Phase I (2010)
    - Rooftop solar at the Utilities Center (2012)
    - Rooftop solar at the Corporation Yard (2012)
    - Rooftop solar at Fire Station 8 (2017)

In 2017, the above sources produced almost 12 million kWh of electricity, which is approximately 56% of the electricity consumed by all City facilities, and approximately 45% of the City's total energy consumption (electricity and natural gas, combined).

Table 1. Hayward's Total Municipal Energy Demand vs. Generation (kWh)

	2015 Demand	2017 Generation	2017 Demand	2019 (Est.) Generation	2019 (Est.) Demand
WPCF Cogeneration		8,877,724		8,877,724	
WPCF Solar Phase I		2,204,308		2,204,308	
WPCF Solar Phase II		Not yet active		4,800,000	
Rooftop Solar at Animal Shelter/ Landscape Bldg., Utilities Center, Corp Yard, & Fire Station 8		666,286		666,286	
Rooftop Solar at Fire Stations 2, 3, 4, and 5		Not yet active		104,279	
Electricity Demand	21,821,062		21,100,426		20,767,490
Natural Gas Demand*	5,552,467		5,011,089		4,819,012
Total	**27,373,529**	**11,748,318**	**26,111,515**	**16,652,597**	**25,586,502**

* Natural gas figures have been converted from therms to equivalent kilowatt hours (kWh)

As indicated above in Table 1, Hayward's municipal energy generation is increasing while its demand is decreasing, which means the City is on track to reach ZNE. The downward trend experienced by the demand figures is particularly interesting because both electricity and natural gas use have actually increased for most of the City's buildings. However, the conversion of Hayward's streetlights and traffic signals to LED lights has led to such a large demand decrease that the City's overall electricity usage has been reduced. Similarly, the WPCF has decreased the amount of natural gas used in the cogeneration engine, which has driven total natural gas usage down. The City's electricity and natural gas demand is expected to continue to decrease with the demolition of Hayward's existing main library.

Upcoming Energy Projects:

There are several energy projects slated to come online in the next couple years that will bring the City even closer to Zero Net Energy. These projects include:

- 21st Century Library: A ZNE library that will be all electric and will include such sustainability features as rainwater capture and solar panels. Expected completion date: Fall 2018
- Fire Station Rooftop Solar: PV solar will be added to Fire Stations 2, 3, 4, and 5. Expected completion date for all Stations: Mid 2018
- WPCF Solar Phase II: A 2 MW expansion of the solar panels behind the WPCF. Expected completion date: Mid 2019

Staff expects these projects to collectively increase the City's renewable energy generation by approximately 5 million kWh and reduce energy demand by approximately 500,000 kWh with the replacement of the existing library with the energy efficient and all electric 21st Century library (accounted for in Table 1). For example, the new main library will not have a conventional air conditioner, instead radiant cooling and air movement will provide cooling for the building. These new projects will bring the City's total energy generation to nearly 17 million kWh in 2019, which will meet approximately 80% of the City's projected electricity demand and 65% of the City's total energy demand, as outlined below in Table 2.

Table 2. ZNE Progress

	2015	**2017**	**2019 (Est.)**
Percent of Electricity Generated	57%	56%	80%
Percent of Total Energy Generated (electricity + natural gas)	45%	45%	65%
kWh of New Generation Needed to Achieve ZNE	15,008,271	14,363,197	8,933,906

Potential Future Energy Projects:

While the upcoming energy projects identified previously will bring the City significantly closer its ZNE goal, continued investment in renewable energy projects is critical in order to generate the remaining 8.9 million kWh. As such, staff has identified a number of potential locations at which solar PV could be installed or expanded to increase the City's total energy generation. These locations include City Hall, the Cinema parking garage, and the Airport Administration building, as well as various parking lots and reservoirs. The projected generation potential for each location is identified on the following page in Table 3.

Table 3. Potential PV Solar Projects

	Address	kW	kWh per year
Carport between Fleet Management and Streets	24505 Soto Rd.	270	473,040
City Hall	777 B St.	63	110,113
Airport	20301 Skywest Dr.	1,774	4,174,139
Police Station	300 W. Winton Ave.	345	604,440
Watkins Parking Structure (2nd Half)	Watkins & B St.	283	422,179
Muni Lot (Foothill, A, Main, B) – access from A St.	1025 A St.	188	328,500
Muni Lot (B, C, Foothill, 2nd)	Foothill & B St.	240	420,480
Muni Lot (Maple Ct. & A St.)	22456 Maple Ct. (north half)	251	440,190
Muni Lot (Foothill, Russell, 2nd, A)	Foothill & A St.	180	315,360
Cinema Parking Garage	22695 Foothill St.	152	265,428
Hesperian Pump Station with Canopy	28471 Hesperian Bl.	165	289,080
Various Reservoir and Pump Stations*	Various locations	856	1,495,332
Total		**4,767**	**9,338,281**

* Includes the following locations, identified in Attachment I to the July 11, 2016 report: Walpert Pump Reservoir/Station, 500 Reservoir, 750 Reservoir, 1000 Reservoir, 1285 Reservoir, 1285 Reservoir, May Road, Garin Reservoir, Emergency Well E, and Mohrland Emergency Well.

While it does not technically contribute to the City's ZNE goals, it is worth noting that as of June 2018, the electricity consumed by most municipal facilities is now EBCE's Brilliant 100 product, which is 100% carbon-free. Even though use of Brilliant 100 will reduce the City's carbon emissions, the product is not considered "renewable energy" because it will be partially generated by such environmentally-taxing sources as large-hydroelectric dams. It is also not necessarily locally-sourced, as these dams can be located thousands of miles away. Though use of Brilliant 100 cannot be factored into the City's energy demand-to-generation ratio, utilizing 100% carbon-free electricity is still a critical step toward the City's larger GHG reduction goals.

STRATEGIC INITIATIVES

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

ECONOMIC IMPACT

The City's investments in renewable energy will have little impact on the local economy, but projects may be constructed by local businesses and may create some new local jobs.

FISCAL IMPACT

The City's investments in renewable energy require upfront investment but yield long term cost savings. Hayward currently spends approximately $2.5 million per year on electricity and natural gas. The total estimated project costs for the WPCF Phase II Solar Project is approximately $5,765,000 and is expected to generate 4,800,000 kWh per year, reducing the City's electricity purchases. The project will recoup the upfront costs in approximately eighteen years, and the rest of the project's lifespan will save the City almost $400,000 a year.

SUSTAINABILITY FEATURES

Achieving municipal ZNE by 2025 supports the City's sustainability and long-term GHG reduction goals. It is consistent with General Plan Policies NR-4.4 (Energy Resource Conservation in Public Buildings), NR-4.10 (Public Renewable Energy Generation), and NR-4.11 (Green Building Standards). Additionally, if the goal is achieved, the City and the community will benefit from the following sustainability features:

> *Energy*: Achieving municipal ZNE will reduce the City's reliance on fossil fuels and provide energy from clean and renewable sources.
>
> *Air*: Achieving municipal ZNE will reduce pollutants and make significant progress toward meeting the City's municipal greenhouse gas emissions reduction goals.

NEXT STEPS

Upon direction from the Committee, staff will continue to monitor ZNE progress and will work to install additional renewable energy generation across the City.

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