CITY OF GLENDALE, CALIFORNIA
REPORT TO THE CITY COUNCIL

AGENDA ITEM

Report: Progress on Glendale's Clean Energy Future

1. Motion to note and file "Progress Report on Glendale's Clean Energy Future", with updates on Demand Response Programs, Commercial Customer Programs, Glendale's Proposed Virtual Power Plant, Electric Cost of Service Analysis, Clean Energy and Storage at City Facilities, Analysis for 100% Clean Energy by 2030.

2. Motion approving an amendment to the Lime Energy Services Company Commercial Direct Install Energy Efficiency Program to allow participation by large commercial customers.

COUNCIL ACTION

Item Type: Action

Approved for March 2, 2021 **calendar**

ADMINISTRATIVE ACTION

Submitted by:
Michael E. De Ghetto, Interim General Manager - Glendale Water and Power

Prepared by:
Craig Kuennen, Assistant General Manager/Business Services - GWP
Mark Young, Assistant General Manager/Power Management - GWP
Christine A. Godinez, Principal Assistant City Attorney

Reviewed by:
Michele Flynn, Director of Finance
Michael J. Garcia, City Attorney

Approved by:
Roubik R. Golanian, P.E., Interim City Manager

RECOMMENDATION

Glendale Water & Power (GWP) staff respectfully recommends that the City Council note and file this "Progress Report on Glendale's Clean Energy Future", with updates on demand response programs, commercial customer programs, Glendale's proposed Virtual Power Plant, electric Cost of Service Analysis, clean energy and storage at City facilities, and ongoing analysis for 100% clean energy by 2030. It is further recommended that the City Council adopt a motion to approve an amendment to the Lime Energy Commercial Direct Install Energy Efficiency Program to allow participation by large commercial customers.

BACKGROUND/ANALYSIS

Introduction:

The purpose of this report is twofold. First to provide a background on GWP's long history of supporting clean energy in Glendale. Second to look ahead and inform discussions on how GWP can continue to support and achieve Glendale's ongoing clean energy program goals into the future. The specific focus of this report is on clean energy programs and projects that are in various stages of implementation.

This "Progress Report on Glendale's Clean Energy Future" is a formal method of regular reporting to the City Council and residents and businesses in Glendale about the continued progress that GWP is making towards a clean energy future for the City. It provides and overview of items described in other Council Reports, regulatory reports, and information on GWP's web page. This report provides an additional opportunity for the Council and GWP to solicit comments from residents and businesses about existing or proposed programs.

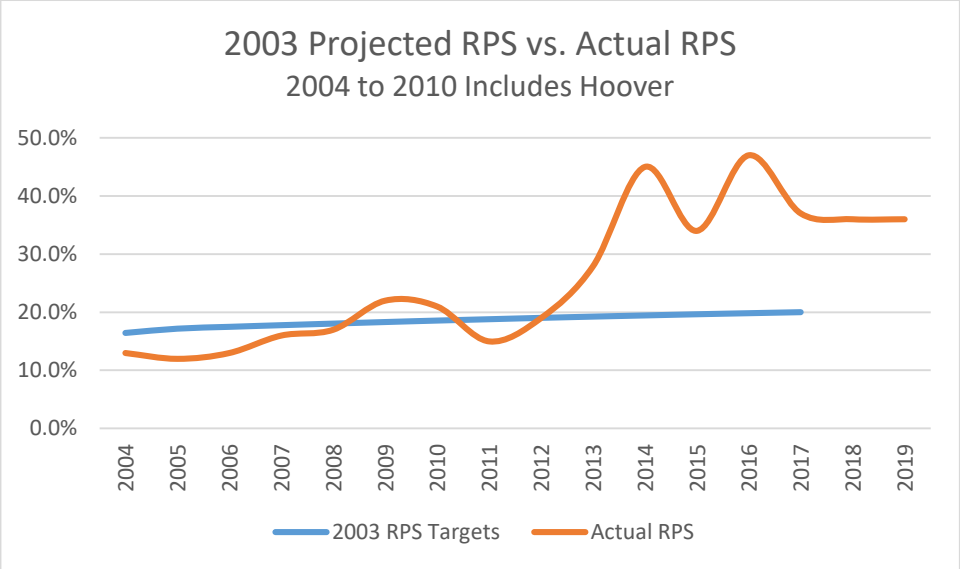
GWP Clean Energy History

Supply Side History

Glendale Water & Power (GWP) has long supported California's clean energy goals. GWP is an original participant in the construction of the Hoover Dam, an important source of clean energy to the City. In the later part of the 20th Century, Glendale partnered with other agencies and procured clean-energy resources from the Pacific Northwest through new High Voltage Direct Current (HVDC) Transmission Lines.

The City of Glendale was an early adopter of the renewable portfolio standard goals for its power supply. In FY 2003 GWP proposed and City Council approved the adoption of our first Renewables Portfolio Standard (RPS) goal of 20% renewable energy by 2017, with a "stretch goal" of 23% provided that GWP was successful in obtaining renewable recourses at reasonable cost. In 2010, the California Energy Commission disallowed large hydro from inclusion in the calculation of the RPS.

As the figure below shows, despite the disallowance of Hoover, GWP reached its goal of 20% in 2013, and has built up upon that success. Since 2013, GWP has entered into many long term contracts for the supply of renewable energy to the City of Glendale, including geothermal, wind, and solar and storage projects. As was reported in GWP's most recent Power Content Label, as of 2019, the most recent reporting year, GWP has achieved 36% renewable and is well on its way to achieve 60% renewable by 2030, and 100% clean energy by 2045.



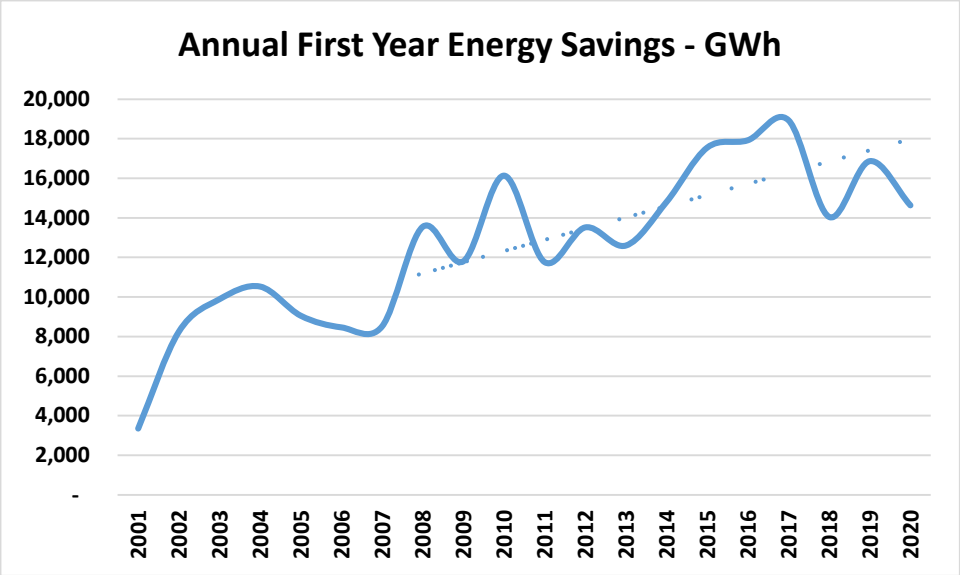
GWP continues to seek out additional renewable projects through its partnership with the Southern California Public Power Authority (SCPPA).

Demand Side Programs History

Since 2000 GWP has provided financial incentives and rebates to its customers to invest in a variety of solar and energy saving measures. Through June 2020, GWP has invested over $46 million in customer directed energy efficiency programs and $18 million in renewable energy projects and incentives to support net energy metered solar for our customers. These investments have provided significant energy savings and new renewable solar energy generation within Glendale, thereby promoting a cleaner environment.

Existing Energy Efficiency Programs

Since 2001, GWP energy efficiency programs have averaged close to 12.5 gigawatt-hours (GWh) in first year energy savings, and 1,907 GWh in cumulative life measure energy savings. These figures include savings from our conservation voltage reduction program. The figure below shows the growth in estimated annual first year energy savings from our energy efficiency programs since 2001.



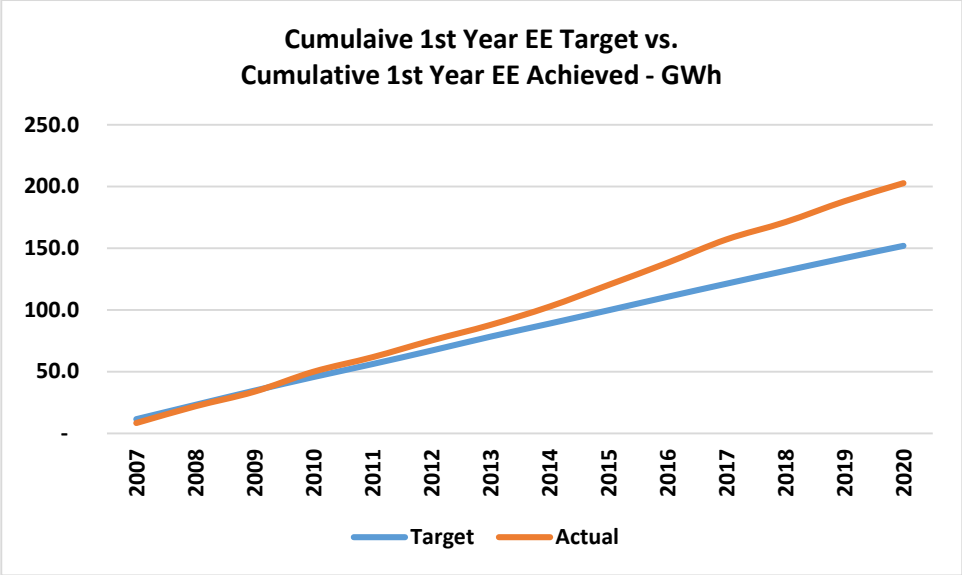
California Senate Bill 1037 (Kehoe), signed into law in September 2005, established several important policies regarding energy efficiency. Among its many provisions is a statewide commitment to cost-effective and feasible energy efficiency, with the expectation that all utilities consider energy efficiency before investing in any other resources to meet growing demand. Additionally, the statute required that each publicly-owned utility (POU) to "report annually to its customers and to the State Energy Resources Conservation and Development Commission, its investment in energy efficiency and demand reduction programs." Assembly Bill 2021 (Levine) added to these policies by requiring the establishment of ten-year energy efficiency targets on a triennial basis.

In response to these new polices, in 2006 GWP became one of the first public utilities to adopt an annual energy savings target for its energy efficiency programs. At that time GWP set its annual target at 1.0% of retail sales. Additionally, GWP joined with SCPPA and the California Municipal Utility Association (CMUA) to report its annual energy savings results to the California Energy Commission. The first report was issued in December 2006, and subsequent reports have been issued annually, usually in March, since then. All GWP annual energy efficiency reports can be found on the GWP website at:

https://www.glendaleca.gov/government/departments/glendale-water-and-power/about-us/reports-plans/gwp-annual-energy-efficiency-program-results

In 2011, GWP joined with SCPPA and CMUA to hire a consultant to develop new energy efficiency targets for members. Those results were first reported to the CEC in the March 2011 edition of the Energy Efficiency in California's Public Power Sector - A Status Report. GWP updated its targets in the 2013 and 2017 reports to the CEC. The table below compares GWPs energy efficiency results to the established energy

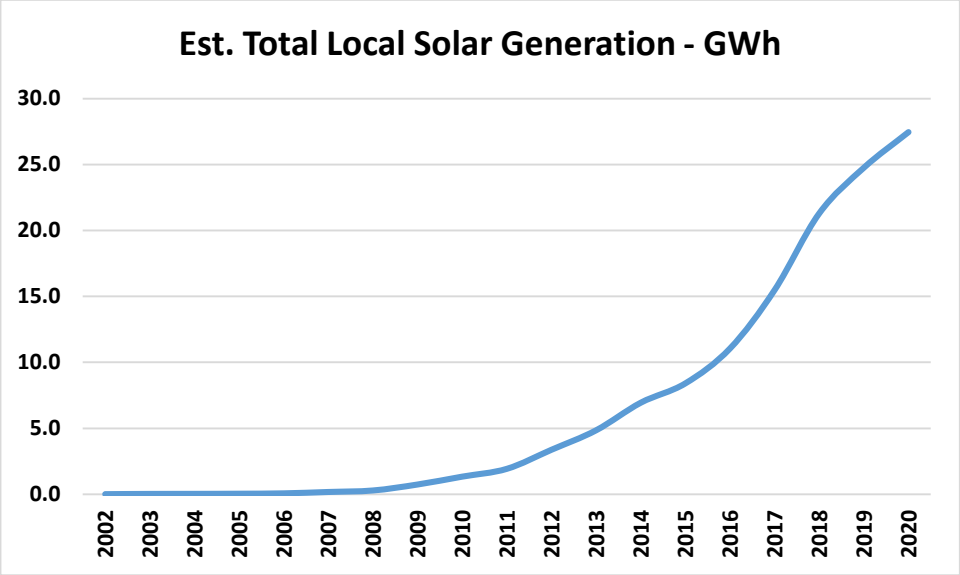
efficiency goals reported the CEC since 2006. As the figure shows, since on or about 2009 GWP has consistently exceeded its established energy savings target.



Existing Local Solar Programs History

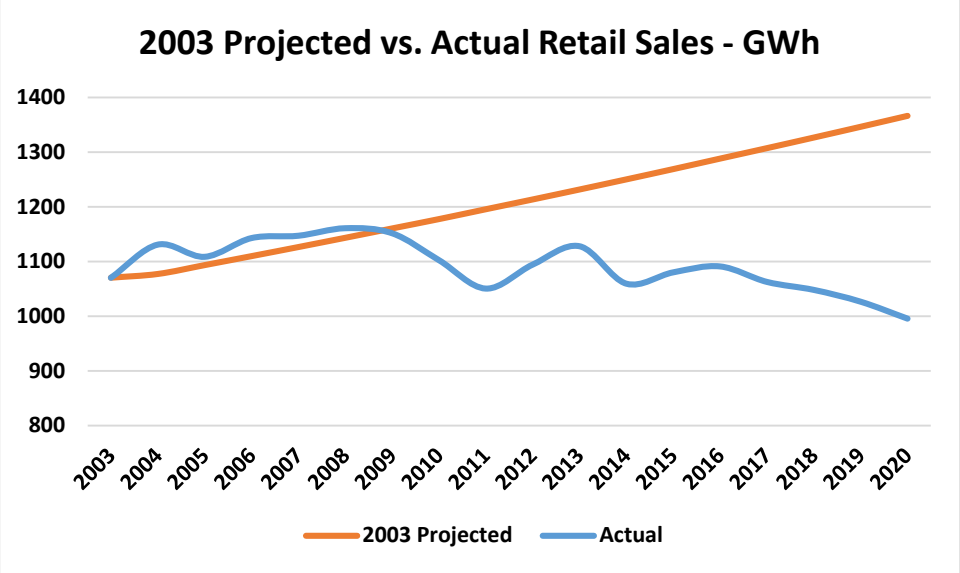
GWP has a long history of supporting local solar development. When City Council approved the GWP Solar Solutions program in 2002, GWP became one of the first municipal utilities to offer solar rebates in California. In 2007, GWP installed its first City-owned and operated solar system at Glendale Community College, a 222 kilowatt (kW) system, at a cost of $2.9 million. The solar facility is still producing local renewable power today.

Since 2002, GWP has helped install over 11.7 megawatts (MW) of local solar on customers' homes and businesses. As of today those incentivized installations are generating over 15.2 GWh in clean renewable energy. In addition to incentivized installations, many customers and businesses chose to install systems on their own. Those installations total 9.0 MW of additional local solar. Today those installations are generating over 12.2 GWh in clean renewable energy. The figure below shows the growth in solar generation from both incentivized and non-incentivized local solar installation since 2002.



Impact of Energy Efficiency and NEM Solar Programs on Retail Sales

Although a number of variables impact retail sales, including weather, price, and changes in population, the ultimate measure of the effectiveness of Energy Efficiency and Net Energy Metering (NEM) Solar Programs is what happens to retail sales over the life of these programs. The figure below provides a glimpse into the impact that GWP's energy efficiency and solar programs have had on retail sales since 2003:



As shown in the figure above, in 2003 as part of its RPS projections GWP expected sales to grow by an average 1.5% a year to over 1,300 GWh by 2017. Continuing that projection through 2020, sales would have reached 1,366 GWh. Though our sales grew at this pace for a few years, as our energy efficiency and NEM solar programs began to mature in 2009, our sales started to decline.

Since 2009, our retail sales have actually declined by an average 1.2% a year. If you add up the difference between the 2003 projected and our actual sales, that difference is just below 2,100 GWh.

Glendale Repowering Project, Clean Energy RFP, and Integrated Resource Plan

Seven years ago, GWP staff began work on a repowering project to replace the oldest units at Grayson Power Plant with modern technology in order to increase the efficiency and reliability of the power plant and reduce emissions. In 2018, GWP presented a final Environmental Impact Report (EIR) for a natural-gas fired generation repowering project to replace the aging generators at the Grayson Power Plant (the Repowering Project). GWP proposed a 262 megawatt (MW) repowering project, and proposed as an alternative a 191 MW repowering with 50 MW of battery energy storage. The City Council took no action on the EIR, but directed GWP to see if it could find cleaner alternatives to the proposed Repowering Project.

Based upon the City Council's direction, GWP issued a Request for Proposals for Local and Regional Renewable, Low-Carbon, and Zero Carbon Resource Options to Serve the City of Glendale (the Clean Energy RFP). The RFP was open to any technology type, and allowed for clean energy proposals as small as 1 MW in size. The proposals had to be capable of delivering energy or capacity (or energy or capacity savings) to Glendale.

The City received and evaluated proposers from 34 firms for completeness; feasibility; environmental performance; ability to supply reliable energy and capacity to Glendale; experience and expertise to complete the project; administrative burden and contract terms, and cost effectiveness. Top-ranking proposers were interviewed and the proposals modeled by the City's consultant, Ascend Analytics, to determine an optimal portfolio of resources to serve the City's electric needs.

On July 23, 2019, Glendale City Council adopted the 2019 Integrated Resource Plan. Integrated Resource Plans, or IRPs, are "electricity system planning document that describe how utilities plan to meet their energy and capacity resource needs, policy goals, physical and operational constraints, and other utility priorities (such as reducing rate impacts on customer bills)." An IRP does not authorize specified actions, but rather, it is a planning document designed to provide Glendale with guidance to establish policies regarding GWP's electricity supply over the period from January 1, 2019 through December 31, 2030.

The 2019 Integrated Resource Plan identified a preferred energy supply portfolio that included, among other things, the following resources selected from the Clean Energy RFP: (1) a 75 MW/300 megawatt-hour (MWh) battery energy storage system (BESS) of which 50 MW / 200 MWh would be installed in the near term, followed by an additional 25 MW / 100 MWh BESS to be installed in the future; (2) 93 MW of reciprocating internal combustion engine (ICE) generators; and (3) up to 50 MW of clean distributed energy resources.

As an alternative to the proposed Grayson Repowering Project, GWP is also evaluating an option that would retain combustion turbine generator Units 8A and 8BC. This alternative would result in extending the lives of these units by refurbishing the gas turbine generators and replacing other elements of the units with new equipment. The result would be units that are more reliable, efficient, capable of meeting a ten-minute to full load start requirement, and capable of meeting new South Coast AQMD emission requirements set to take affect January 1, 2024. This new option is being evaluated in the proposed Grayson Repowering Project EIR as Alternative 8. In addition to extending the life of Units 8A and 8BC, this Alternative 8 would include the 75 MW / 300 MWh BESS. With Alternative 8, the Grayson Units 1-5 steam plant and related facilities would be demolished, and the new Glendale Switching Station would be added. The work needed to study and evaluate this alternative was approved by City Council on December 15, 2020. This evaluation includes plant configuration studies, conceptual designs, engineering cost estimates, environmental reviews, and air modeling.

New Supply Side and Demand Side Clean Energy Programs

On October 13, 2020, the Glendale City Council (1) approved an Agreement with Franklin Energy Services LLC (Franklin Energy) for a four-year Commercial and Residential Electric Demand Response Program (2) approved an Agreement with Lime Energy Services Company (Lime Energy) for a seven-year Commercial Direct Install Energy Efficiency Program; (3) authorized the City Manager to negotiate contracts with Sunrun, Inc. or its affiliate (Sunrun) for a residential Virtual Power Plant for a term of up to 25 years, with contracts to be presented to City Council for approval prior to execution; and (4) authorized Amendment of a Professional Services Agreement with NewGen Strategies & Solutions, LLC to perform a cost of service analysis and electric rate plan to fund the clean energy programs, and review GWP's distributed energy rates.

The current progress on these initiatives are described in the following sections of this report.

Franklin Demand Response Program

This program will provide commercial and residential Demand Response and a smart thermostat program, and an online marketplace for a four-year term for a total agreement amount not to exceed $7,658,363 plus annual rebate funding for energy efficiency products purchased through the online store. Total program cost, including contract, internal labor, and marketing (but excluding annual rebate funding for energy efficiency products) is estimated at $7,822,740. By year four, the program will offer up to 10 MW of demand response capacity during up to 15 peak load events per year. The capacity of the program is expected to ramp up over the four-year term as additional customers enroll. The table below shows estimated ramp up by program year.

MW	Year 1	Year 2	Year 3	Year 4
Residential	2.2	3.6	4.8	5.9
Commercial	0.9	2.1	3.2	4.1
Total	**3.1**	**5.7**	**8.0**	**10.0**

The contract has been executed and implementation efforts are already underway. The formal internal kickoff meeting took place on January 21, 2021. The program launch for customer enrollment is on April 5, 2021.

Lime Energy Efficiency Program

This program is designed to provide energy efficiency upgrades to commercial businesses in GWP's service territory. As approved by City Council in October 2020, this program would target small and medium customers for energy efficiency retrofits. The program was to be implemented over a seven-year term with the energy efficiency savings of the installed energy efficiency measures expected to last an average of 12.5 years. In terms of energy savings, savings were to ramp up to 35,000 MWh per year by year seven. Installed measures are expected to have an average life of 12.5-years. The not-to-exceed amount of the Lime Energy contract is $18,900,000. Total program cost, including contract, internal labor, and marketing is estimated at $19,111,253.

Following the City Council's approval of the program in October 2020, Lime Energy requested that GWP consider expanding the program to include large business customers. Subject to City Council approval, GWP proposes that the program would be amended to include large business customers, with an approximate break down of 2/3 small/medium and 1/3 large business customer participants. The program will ramp up to 36,500 MWh per year by year seven, a 4.3% increase in energy efficiency savings compared to the original Lime Energy program. The table below shows estimated ramp up by program year.

MWH	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Small Business	2,000	5,000	9,000	13,000	17,000	21,000	24,500
Large Business	600	1,800	3,600	5,400	7,800	10,200	12,000
Total	**2,600**	**6,800**	**12,600**	**18,400**	**24,800**	**31,200**	**36,500**

MW	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Small Business	0.5	1.1	2.1	3.0	3.9	4.8	5.6
Large Business	0.1	0.4	0.8	1.2	1.8	2.3	2.7
Total	**0.6**	**1.6**	**2.9**	**4.2**	**5.7**	**7.1**	**8.3**

The addition of large commercial customer participants would not change the installed life of the energy efficiency measures, which are still expected to have an average life of 12.5-years. Additionally, the not-to-exceed amount of the Lime Energy contract would be reduced to $17,955,000, a 5% cost reduction. Contract, marketing, and internal labor costs are not expected to change.

If City Council adopts the motion opening the program to large commercial customers, the large customer program terms will be added to the scope of work and the contract. GWP estimates the program will launch around May 2021.

Sunrun Virtual Power Plant

This program would deploy a Virtual Power Plant (VPP) to approximately 3,400 single-family and multifamily residential rooftop solar and battery energy storage systems within Glendale territory. The VPP would provide up to 25.25 MW of dispatchable capacity over a two-hour period to help GWP manage existing and emerging load conditions on its grid.

As proposed, the VPP project would deliver energy, Renewable Energy Credits, and capacity for Glendale over a 25-year contract term, including a four-year ramp up period. Participating customers would not be enrolled under GWP's Net Energy Metering tariff; instead Sunrun would install systems in front of the customer meter and the solar power (and Portfolio Content Category 1 Renewable Energy Credits (RECs) produced would go directly to Glendale via a Power Purchase Agreement for resale. GWP would pay participating single-family-home (SFH) customers a program participation fee of $15 a month for allowing Sunrun, Inc. to use space at their premises for the solar and battery installations, which will be owned, managed, and maintained by Sunrun for the life of the program. In addition, customers would have access to a portion of the battery energy storage system for back-up power during system outages

Over the past few months, City and Sunrun teams have met regularly to plan for the implementation of this proposed program – the first of its kind. One key hurdle has been the need for guidance from the CEC regarding the mechanism to achieve Renewable Portfolio Content Category 1 (PCC1) eligibility for the renewable energy credits and CEC approval of one-line diagrams. CEC certification of the program as a Portfolio Content Category 1 resource affects the value of the program. PCC1 REC eligibility and finalized metering diagrams -- which demonstrate where energy and RECs will be delivered, measured, guaranteed, and paid for -- affect the drafting of key contract terms. This program is novel for the CEC; accordingly, Sunrun and GWP have held several meetings with CEC staff and Sunrun will be filing a formal application for pre-certification of the program to confirm its eligibility as a PCC1 eligible renewable resource. The timing for approval is subject to the CEC. In addition to working on CEC certification, the GWP and Sunrun teams have been working on meter collar installation and interconnection processes, and data security and integration with Sunrun's VPP Distributed Energy Resource Management System (Autogrid), Glendale SCADA, PI Historian and Energy Trading software systems.

Pursuant to the City Council's direction, GWP has also engaged in negotiations with Sunrun to obtain the best pricing for the City. After extensive negotiations, GWP and Sunrun have agreed, subject to City Council approval, to the terms shown below under the column "Configuration After Negotiations." The table below summarizes the changes from the proposed terms presented to City Council in October 2020:

	Original Proposed Configuration	Configuration After Negotiations	Difference
VPP capacity - Maximum	25.25 MW	25.25 MW	No Change
Solar production / yr Maximum	39,800 MWh	45,128 MWh	13.4% increase
Solar PPA price	$0.1425	$0.1300	8.8% price reduction
SREC price ($ / kWh)*	$0.0100	$0.0085	15.0% reduction; but applies to all installs
Annual escalator	0%	0%	No Change
VPP capacity price - Average	$150/kW-yr	$137.50/kW-yr	8.3% price reduction
Contract term	25 yr	25 yr	No Change
Aggregate customer program participation payment	$13.5M	$12.7M	5.9% cost reduction
Aggregate nominal cost to GWP	$245M	$228M	6.9% total program cost reduction
All in Cost Per Peak MW-year	$ 388,119	$ 361,188.12	6.9% Peak MW-year cost reduction
*Applied to multifamily projects only in October option; applies to all projects in final option; subject to PCC1 eligibility.			

As shown in the table above, the program will provide 33.2% more MW of installed solar, a 13.4% increase in the maximum annual solar MWh produced, an 8.8% reduction in the solar PPA price, an 8.3% reduction in the VPP capacity price, a 5.9% reduction in expected customer payments, and a 6.9% reduction in the total contract price.

Additionally, GWP proposes that, subject to City Council approval, it would suspend its current solar rebate program and point customers to the new Sunrun program.
The next steps are for the parties to complete drafting and negotiate the program agreements, including the Power Purchase Agreement, Co-Marketing Agreement, and Interconnection Agreement. In addition, as mentioned, Sunrun is working to obtain CEC certification. GWP is working with Sunrun to accelerate the schedule for completing the agreements, and anticipates that negotiation of the contracts to be completed by the summer of 2021.

The Sunrun program would ramp up to 45,128 MWh of solar generation per year and 25.25 MW battery storage per year by program year four. The table below shows estimated ramp up by program year.

Solar MWH	Year 1	Year 2	Year 3	Year 4
Single Family	1,401	8,395	20,941	27,788
Multi-Family	1,755	8,762	17,472	17,340
Total	**3,156**	**17,157**	**38,413**	**45,128**

Battery MW	Year 1	Year 2	Year 3	Year 4
Single Family	0.75	4.50	11.25	15.00
Multi-Family	1.03	5.13	10.25	10.25
Total	**1.78**	**9.63**	**21.50**	**25.25**

Electric Cost of Service Analysis (COSA)

The Scope of Services for the new COSA is separated into four phases. Phase I: Financial Forecast will develop the long-term financial planning model using a Microsoft Excel-based electric utility financial model that will forecast potential rate, debt, and capital impacts, including the impacts of the proposed new Clean Energy Programs (CEP). Phase II: Cost of Service Analysis will allocate the total costs to operate the utility to each of the customer classes served by GWP. This will determine if current rates are adequately recovering the class' costs on the system. Phase III: Rate Design and Customer Usage Analysis will design the rates for each customer class aligned with the results of Phase II. This will also include the development of potential new rates, or evaluation of existing rates, such as:

- Customer Cogeneration Rate
- Feed in Tariff (FIT)
- Green Tariff rates
- Electric Vehicle (EV) Rate

Phase IV: Report and Presentations will include a draft and final report, and virtual presentations to the Community, GWP Commission, and City Council.

There are two key variables that will have the most effect on the COSA results. The first is the capital plan, both bonded and PayGo. What and how much do we fund with bonds, and what and how much do we fund with PayGo, each year, will need to be determined in order to finalize the COSA analysis. The more we can fund with bonds, the lower the impact on the COSA and the quicker we can get priority projects completed. Staff have made some assumptions for the first COSA run to get a baseline for future discussions.

Another key variable is GWP's projected Operations and Maintenance (O&M) costs, including power supply costs. Our goal is to keep non-power supply O&M increases to a minimum, and staff are currently working with Ascend Analytics to update the power supply cost projections.

Once we have the preliminary results, staff can share those with City Council to get policy direction that will inform the assumptions made in the COSA. GWP's goal is to meet City Council's policy objectives with minimal impact on customer rates.

GWP Owned Local Solar and Storage Program

This program will identify and ultimately develop local solar and (where cost-effective and feasible) energy storage at City-owned properties within the City of Glendale. GWP will initially have two contracts to assist with this effort. The first contract will be an Owners Engineering contract with a structural engineering firm to analyze the structural integrity of the Civic Center Parking Garage to assess the potential for installing solar, and, if feasible, storage, and to recommend and design any needed structural upgrades so that it could accommodate a future solar system on the top floor. City Council has already approved this professional services agreement with PCubed Associates, Inc, for an amount not to exceed $139,600, and we expect the contract to be executed by the early March 2021.

The second proposed contract will be for an Owner's Engineering firm to assess, and develop plans and specifications for potential PV solar, and energy storage – where feasible and needed – at City-owned properties. The contractor will also be tasked to perform assessments of the GWP distribution grid on an ongoing basis. These assessments are necessary to ensure that no distribution grid section is overloaded due to the addition of new distributed energy resources deployed in Glendale, including new customer owned solar and storage, new City and or GWP owned solar and storage, and other customer owned generation and other related infrastructure that could potentially overload the distribution grid if not managed properly. This proposed contract award will be presented to City Council on March 9, 2021 for its consideration.

GWP will provide regular updates on the work as it proceeds in future Clean Energy Update reports.

100% Clean by 2030 Analysis

Ascend Analytics' work on the "100% Clean by 2030" analysis is almost completed, and GWP looks forward to presenting the results of the study to the City Council at its March 30, 2021 meeting.

FISCAL IMPACT

Funding to cover the Lime Clean Energy Program costs for this year are included in the FY 20-21 budget in the Electric Works Revenue Fund (5820) per Resolution of Appropriation No. 20-153 dated October 13, 2020.

Future funding for the Lime Clean Energy Program, including contractual obligations for subsequent years, labor, IT/Marketing and customer payment costs will be incorporated in the annual budget for Fiscal Years 2022-2045.

ALTERNATIVES

Alternative 1: Adopt a motion to note and file the "Progress Report on Glendale's Clean Energy Future", with updates on Demand Response Programs, Commercial Customer Programs, Glendale's Proposed Virtual Power Plant, Electric Cost of Service Analysis, Clean Energy and Storage at City Facilities, and Analysis of 100% Clean Energy by 2030, and to adopt a motion approving an amendment to the Lime Energy Commercial Direct Install Energy Efficiency Program to allow participation by large commercial customers.

Alternative 2: The City Council may choose to adopt a motion to note and file the Progress Report on Glendale's Clean Energy Future, and choose not to adopt the motion to amend the Lime Energy Commercial Direct Install Energy Efficiency Program to allow participation by large commercial customers. This alternative would result in large commercial customers not being allowed to participate in the program, potentially reducing the amount of energy savings achieved form this program.

Alternative 3: The City Council may consider any other alternative not proposed by staff.

CAMPAIGN DISCLOSURE

In accordance with the City Campaign Finance Ordinance, the following are the names and business addresses of the members of the board of directors, the chairperson, CEO, COO, CFO, Subcontractors and any person or entity with 10% interest or more in the company proposed for contract in this Agenda Item Report:

Directors of **Lime Energy:**

Full Name	Title	Business Address	City	State	Zip
Thomas D. Brisbin	Chairman of the Board	2401 E. Katella Avenue, Suite 300	Anaheim	CA	92806

Officers of **Lime Energy**:

Full Name	Title	Business Address	City	State	Zip
Thomas D. Brisbin	CEO & Chairman of the Board	2401 E. Katella Avenue, Suite 300	Anaheim	CA	92806
Adam Procell	President, Chief Executive Officer	100 Mulberry St, 4 Gateway Center 4th Floor	Newark	NJ	07102
Stacy McLaughlin	Treasurer	2401 E. Katella Avenue, Suite 300	Anaheim	CA	92806

Creighton K. Early	Chief Financial Officer	2401 E. Katella Avenue, Suite 300	Anaheim	CA	92806
Phil Luccarelli	Vice President	100 Mulberry St, 4 Gateway Center 4th Floor	Newark	NJ	07102
Alex Castro	Vice President	100 Mulberry St, 4 Gateway Center 4th Floor	Newark	NJ	07102
Kate Nguyen	Secretary	2401 E. Katella Avenue, Suite 300	Anaheim	CA	92806
Cathaleen D. Steele	Assistant Secretary	2401 E. Katella Avenue, Suite 300	Anaheim	CA	92806

Subcontractors of **Lime Energy:**

Full Name	Title	Business Address	City	State	Zip

Ownership Interest of more than ten percent (10%) in **Lime Energy**:

Full Name	Title	Business Address	City	State	Zip

EXHIBIT(S)

None.