
CITY COUNCIL REPORT

TO: Karen Peters
Deputy City Manager

FROM: Mark Hartman
Chief Sustainability Officer

SUBJECT: PROGRESS TOWARD 2020 ENERGY EFFICIENCY AND 2025 RENEWABLE
ENERGY GOALS

This report to the Finance, Efficiency, Economy and Sustainability (FEES) Subcommittee provides an update on the City's 2020 energy use reduction goal and the 2025 renewable energy goal.

THE ISSUE

The City has two goals related to energy efficiency and renewable energy:

1. On May 15, 2012, as part of the national leadership initiative called the Better Buildings Challenge, City Council adopted a "20x20" goal seeking to reduce energy use in City buildings 20% by the year 2020, using 2009 as a baseline.
2. On April 9, 2008, the Parks, Education, Bio-Science and Sustainability Subcommittee recommended a "15x25" goal seeking to generate the equivalent of 15% of the City's total energy needs through City-owned or City-facilitated renewable energy projects by the year 2025.

The following sections highlight the progress to date and planned next steps.

The 20% Energy Use Reduction Goal

Energy efficiency and innovation have been hallmarks of the City of Phoenix. In 2012, the City joined the national Better Building Challenge to commit to reducing energy use in City-owned and operated buildings 20% by the year 2020. Since that time, energy upgrades have been implemented in the majority of City facilities resulting in the energy use per square foot (energy intensity) decreasing in City buildings by 8.4% from 2009 to 2014. During that same period, there was also an increase in the total number of buildings and a growth in total square footage of 3%, yet the total energy use, in absolute terms, declined by 5.7%, saving over \$1 million annually. Appendix 1 provides a summary of the data related to the City's energy use comparing the 2009 baseline to 2014.

Staff will continue to evaluate and pursue all cost-effective energy use opportunities, and are seeking to meet the energy use reduction goal of 20% by

2020. However, this may be challenging given that departments have already implemented many of the common low-cost energy efficiency measures. Looking at best practices, other cities have launched aggressive programs that evaluate all possible cost-effective measures (leveraging market tools such as energy performance contracts) and found that reductions in the 20% to 30% range are possible.

As a next step, to assess what would be required to achieve the 2020 energy use reduction goal, staff is preparing to issue a Request for Information (RFI) to energy service providers to solicit best practice approaches, costs and savings of a comprehensive program to achieve the 20% reduction. Once responses have been evaluated, staff will bring forward a report and recommendation to this Subcommittee.

The 15% Renewable Energy Goal

Over 30 renewable energy projects have advanced on City property through City ownership, sponsorship or partnerships, and those projects generate over half the energy needed to achieve the goal of 15% renewable energy. This amount of energy is equivalent to powering 5,000 homes in a year. Future project development opportunities, including the proposed Hoover Dam Hydropower capacity allocated to the City, have the potential to significantly exceed the City's renewable energy goal.

Going forward, staff will continue to research and pursue all cost-effective renewable energy opportunities and partnerships, and seek grant funding in support of those projects whenever possible. Appendix 2 provides a summary of opportunities currently being explored. However, these are presented with a caveat that market forces and regulatory changes could significantly influence the viability of any of the envisioned projects. If all projects proceed, each with the projections as identified, then the City could far surpass its 15% renewable energy goal.

RECOMMENDATION

This report is for information and discussion.

Appendix 1: Changes in Energy Use and Energy Intensity from 2009 to 2014

Energy Efficiency Savings from 2009 to 2014		2009	2014	% change
Citywide Energy Consumption ¹	KWh/Yr	700,762,433	668,198,271	-4.7%
Building Energy Consumption ²	KWh/Yr	212,038,056	200,968,955	-5.2%
Total Energy Bill for Buildings	\$	\$19.8M	\$18.7M	-5.6%
Number of Facilities (No.)		162	172	
Building Area	sq. ft.	8,693,038	8,955,683	+3.0%
Annual Energy Metric ³	kWh/sq. ft. / Yr.	24.4	19.6	-8.4%
Subset of Typical Buildings ⁴				
Public Works/Office	kWh/Sq.ft./Yr	20.3	15.6	-23.2%
Public Safety (Police)		27.9	23.7	-15.0%
Fire Stations		18.1	16.6	-8.2%
Parking Garage/Office		37.1	10.5	-71.8%
Aviation Terminals		48.9	47.6	-2.7%
Convention		12.0	11.4	-5.6%

¹ Citywide consumption pertains to the sum of all electricity and natural gas bills even those that do not pertain to buildings—including water pumping, wastewater treatment, and street lighting. Total energy use citywide has declined by 4.65% since 2009.

² Building Energy Consumption pertains specifically to energy use in City owned and operated buildings. In absolute terms, energy use in buildings has declined by 5.22% even while adding over 1.5 million square feet of space during the same period.

³ Annual Energy Metric measures the energy efficiency per square foot per year or “energy intensity”, which is commonly used by industry to indicate energy performance. Using that metric, energy performance has improved by 19.5% for the period 2009 to 2014.

⁴ The Subset of Typical Buildings highlights specific savings by department. It is most relevant to departments that have buildings with standard operating characteristics for lighting and cooling and are less impacted by occupancy. Energy efficiency in departments such as Aviation would be better represented using a metric of energy use per passenger or, in the case of the convention center, energy use based on days of use. Of note is the energy savings in parking garages, where lighting upgrades and solar have reduced energy intensity by 72%.

Appendix 2: Current and Potential Sources of Renewable Energy

Renewable Energy		2015 (Projected)	2020 (Projected)	2025 (Projected)
City-Wide Energy Use in kwh (assuming ongoing reductions in total energy use)		660,000	585,500	560,600 ⁵
Actual Solar Generation in 2015:				
Lake Pleasant Wastewater Treatment (MW)		7.50		
Aviation garages and Rental Car Center (MW)		5.39		
All other Solar on City Facilities & Garages		3.16		
SR85 Landfill DESERT STAR - APS (MW)		15.63		
TOTAL Solar Generation in MW		31.68		
TOTAL Renewable Generation (MWh/Yr)		43,100		
Potential Sources of Future Generation				
Hydro (Hoover Dam, post-2017 allocation)			6,500	
91st Ave. WWTP - Digester Gas			40,000	
23rd Ave. WWTP - Digester Gas			19,500	
I- Potential Renewable Generation			66,000	
Landfill Gas (SR-85)				40,000
II -Potential Renewable Generation				40,000
Total Identified Renewable Potential		43,100	109,100	149,100
Percent of 2025 Target		51%	130%	177%

⁵ The renewable energy target assumes the total energy use at the City will decline by 15% over the next 10 years. If total energy use does not decline, then a higher percentage of renewable energy will need to be generated in order to meet the 15% renewable energy target.