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The Path to Energy Neutral

Patrick Shea, Public Services Director



Philadelphia, Pennsylvania
June 12, 2017

Presentation Overview

ST. CLOUD PUBLIC SERVICES
CITY ENERGY DATA
RENEWABLE ENERGY
& EFFICIENCY INITIATIVE
ENERGY EFFICIENCY
SOLAR INITIATIVE
BIOFUEL RECOVERY
RESULTS



ST.CLOUD
GREATER



ST. CLOUD PUBLIC SERVICES

DEPARTMENT

AIRPORT

ENGINEERING

PUBLIC UTILITIES

PUBLIC WORKS

DIVISION

DESIGN, TRAFFIC SYSTEMS

WATER, WASTEWATER, STORMWATER, HYDROELECTRIC GENERATION

STREETS, STREET LIGHTS, SANITATION, RECYCLING, PARKING, MAINTENANCE



City of St. Cloud, Minnesota Public Services Section



City of St. Cloud, Minnesota Water Treatment Facility



24 MGD Lime Softening Drinking Water Facility
St. Cloud & St. Augusta
Populations Served – 77,000

City of St. Cloud, Minnesota Hydroelectric Generation Facility



8.6 Megawatt Hydroelectric Generation Facility

City of St. Cloud, Minnesota Wastewater Treatment Facility



17.9 MGD Full Biological Nutrient Removal Facility
Regional Facility Wastewater Treatment & Conveyance Services
St. Cloud, St. Joseph, Sartell, Sauk Rapids, Waite Park & St. Augusta
Population Served – 121,000

City of St. Cloud, Minnesota Stormwater Utility



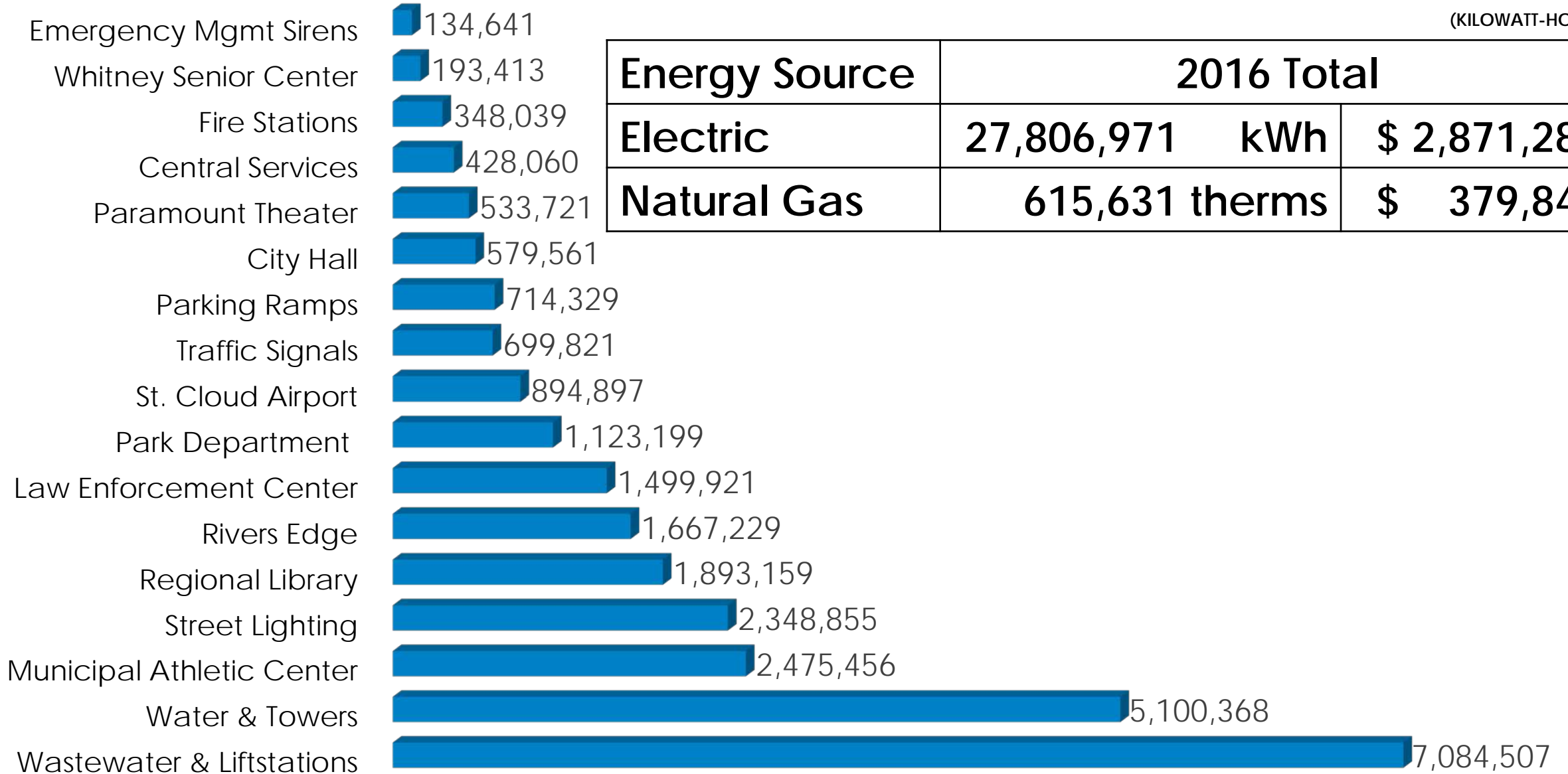


CITY ENERGY DATA



2016 ELECTRICAL CONSUMPTION

(KILOWATT-HOURS)





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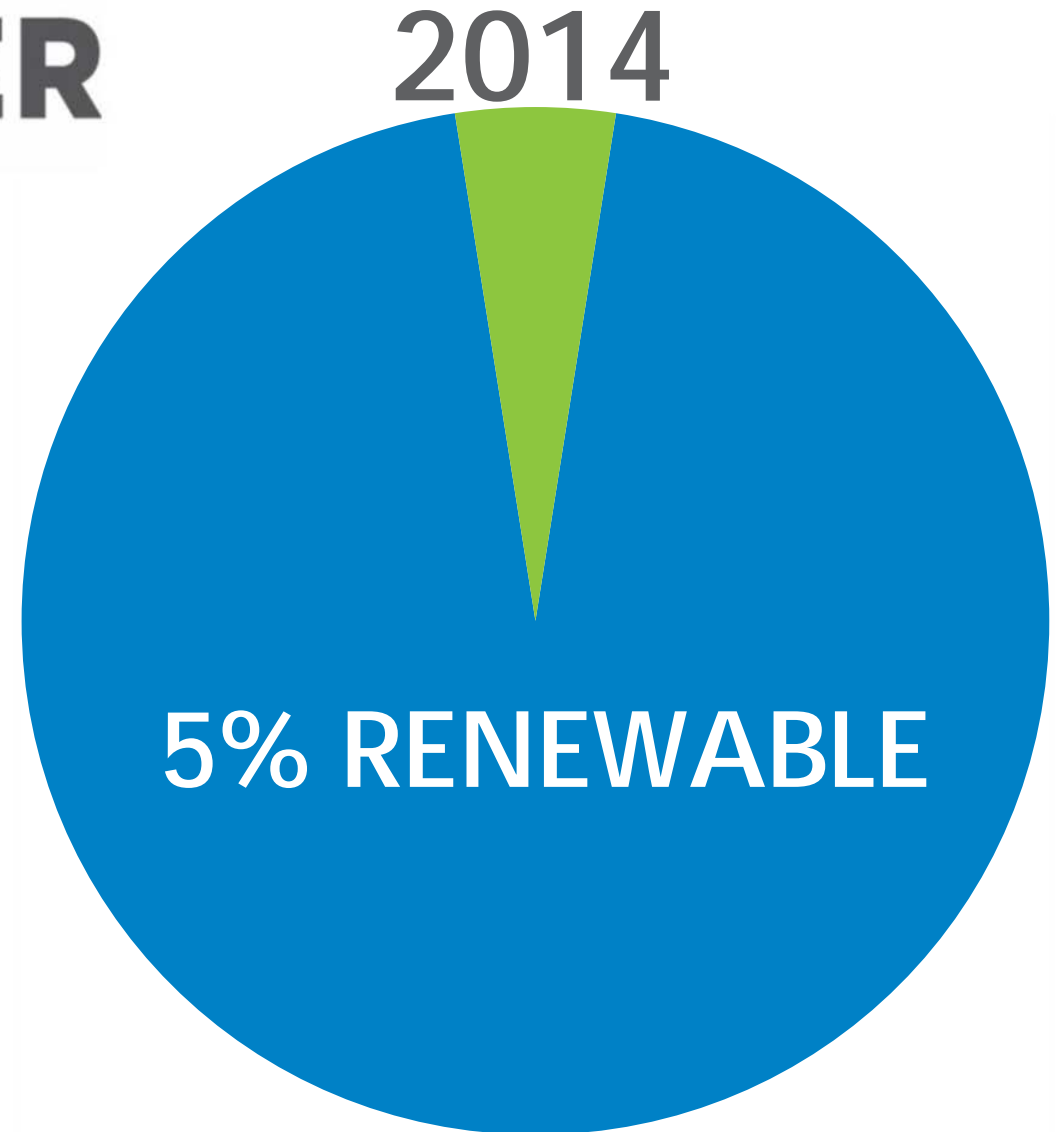
RENEWABLE ENERGY & ENERGY EFFICIENCY INITIATIVE

March 2014



ST.CLOUD > GREATER

Renewable Energy & Efficiency Initiative





2014 ENERGY GOALS

YEAR	REDUCTION
5	25%
10	50%
20	75%





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ENERGY EFFICIENCY

August 2014



ENERGY EFFICIENCY



Lighting



HVAC



Pneumatic System Upgrade



Blower Optimization

ENERGY EFFICIENCY IMPROVEMENTS & UPGRADES



1,600,000
Kilowatt-
Hours



165

Homes' Electricity
(Use for one year)



1,200,000

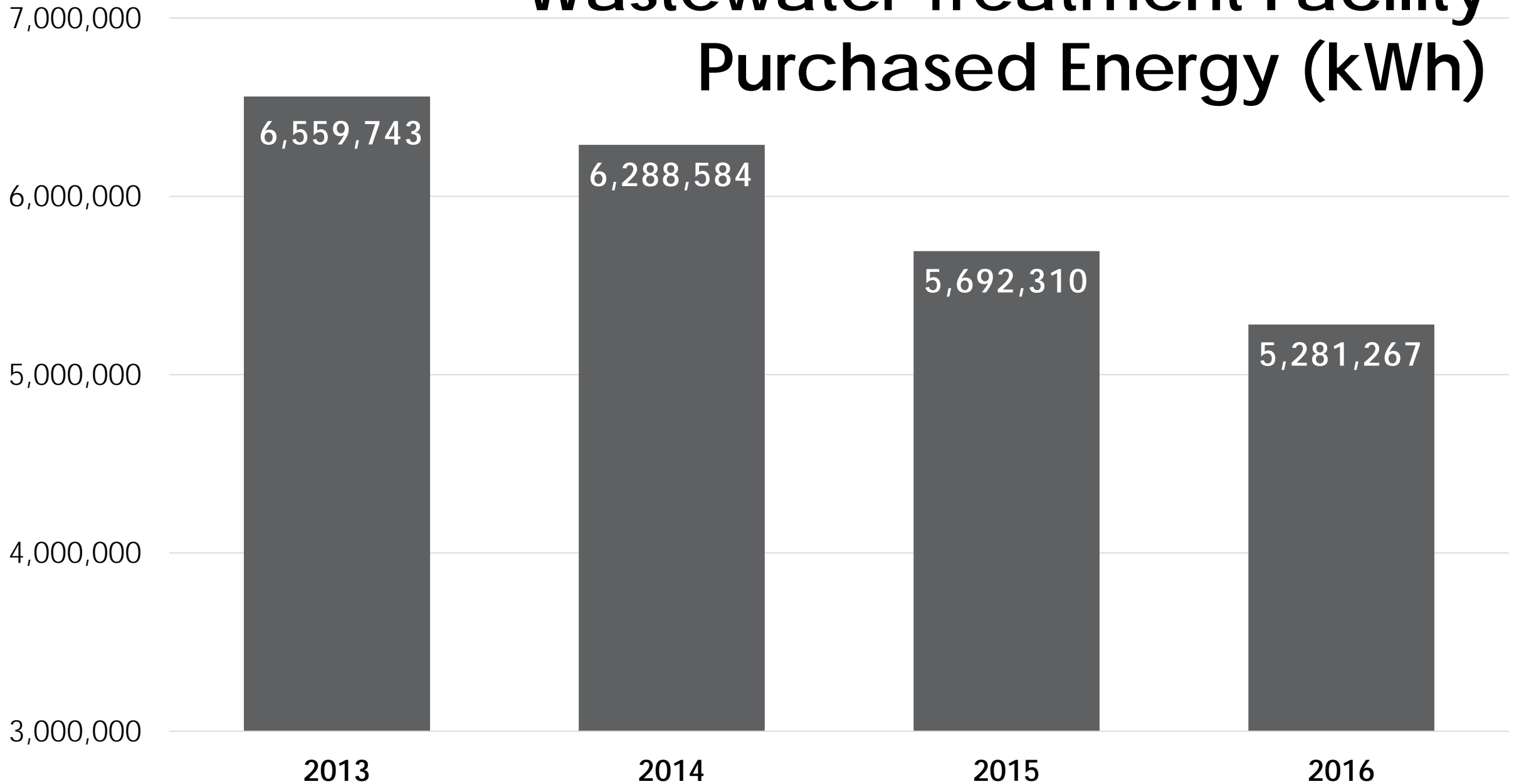
Pounds of Coal



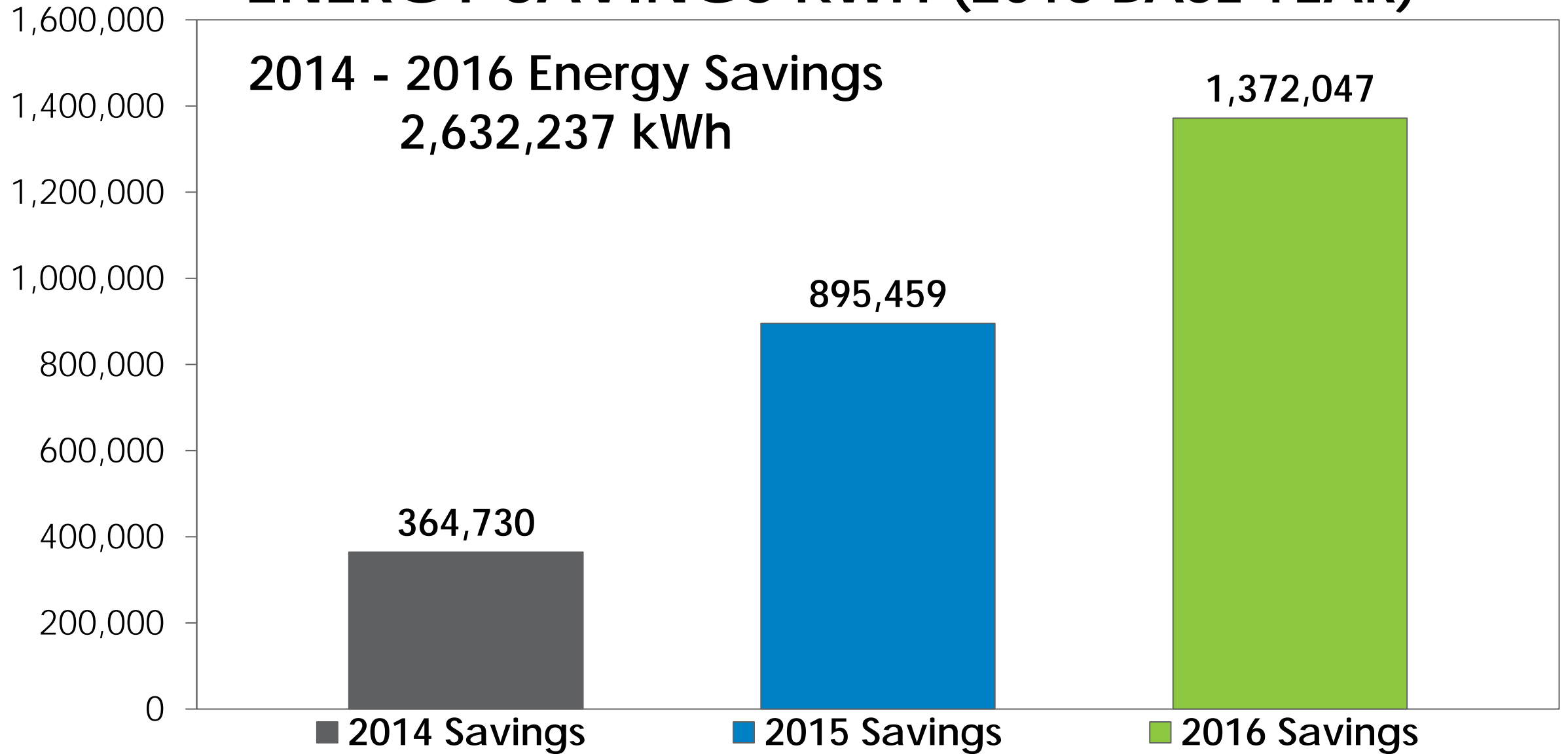
2,700,000

Miles Driven
*(By a passenger
vehicle)*

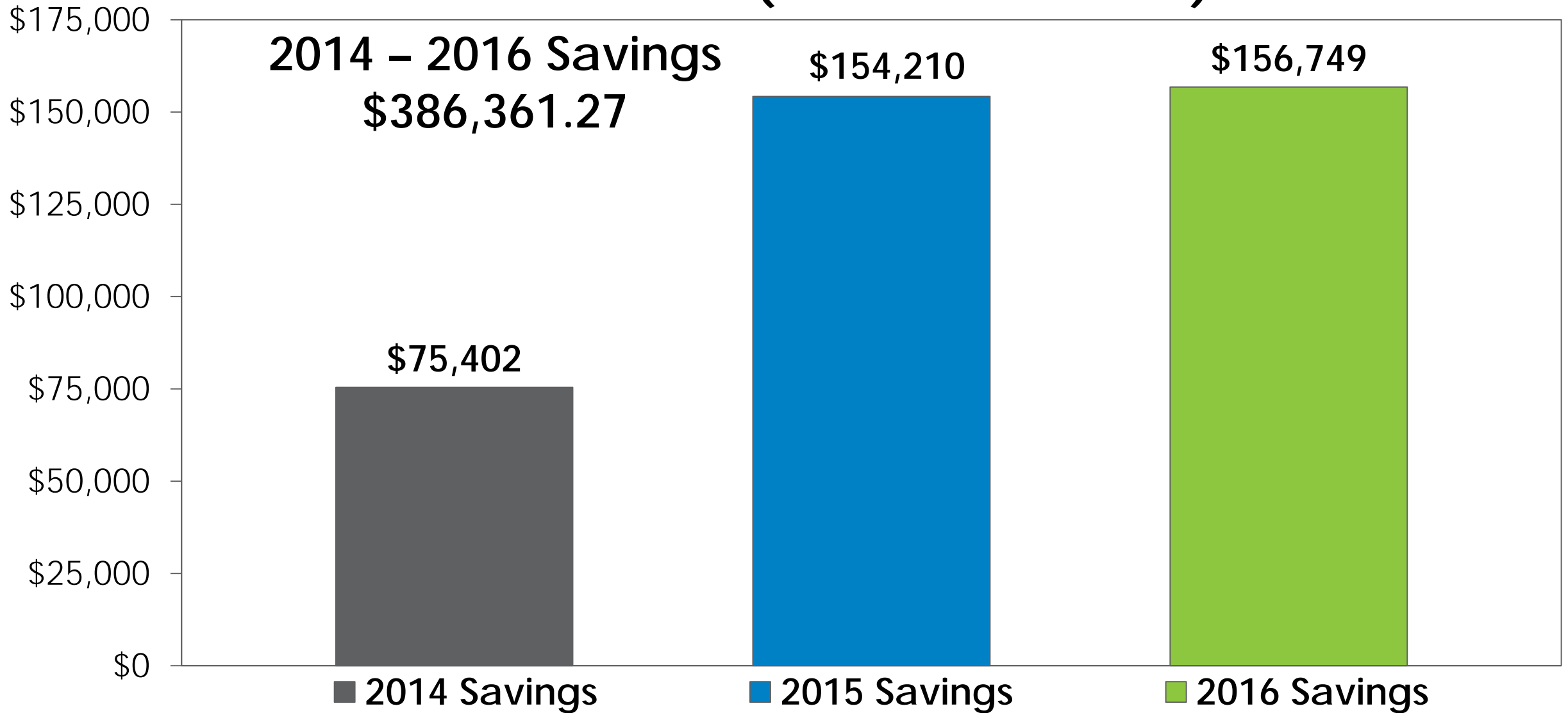
Wastewater Treatment Facility Purchased Energy (kWh)



ENERGY SAVINGS KWH (2013 BASE YEAR)



ENERGY SAVINGS (2013 BASE YEAR)



2014 – 2016 Savings
\$386,361.27

\$154,210

\$156,749

\$75,402

■ 2014 Savings

■ 2015 Savings

■ 2016 Savings



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SOLAR INITIATIVE

July 2015





SOLAR INITIATIVES

Made in Minnesota Solar Program

- Wastewater Treatment Facility 20 kW
- Police Station Headquarters 40 kW
- Fire Station #2 40 kW

Behind the Meter Projects

- Wastewater Ground Mount 220 kW
- Water Rooftop 233 kW
- Whitney Senior Center Rooftop 144 kW
- Central Services Facility Rooftop 173 kW

Community Solar Gardens

- Subscribed to 27 Gardens 40% of 20 MW
- One Installed on City Property 40% of 5 MW





342,000 KWH ANNUAL PRODUCTION
FIRST SOLAR ROOFTOP INSTALL 20 kW
FIRST BEHIND THE METER INSTALL 220 kW

2018 CITYWIDE SOLAR PRODUCTION*



1,300,000
Kilowatt-
Hours



130
Homes' Electricity
(Use for one year)



943,000
Pounds of Coal



2,200,000
Miles Driven
*(By a passenger
vehicle)*

*does not
include CSGs



GUARANTEED SAVINGS PROJECTS



Energy Efficiency & Biofuel Recovery \$4.6M Energy Bond

- Completed February 2017
- \$500,000 Energy Rebates (2016 – 2018)



Street Light Improvement Project \$7.1M Tax Abatement Bond

- Expect Completion July 2017
- \$250,000 Energy Rebates (2016 – 2018)

STREET LIGHT IMPROVEMENT ENERGY SAVINGS



2,873,000
Kilowatt
Hours



258
Homes' Electricity
(Use for one year)



2,130,760
Pounds of Coal



4,737,971
Miles Driven
*(By a passenger
vehicle)*



BIOFUEL RECOVERY

April 2016



BIOFUEL RECOVERY



Hydrogen Sulfide Removal



Siloxane Removal



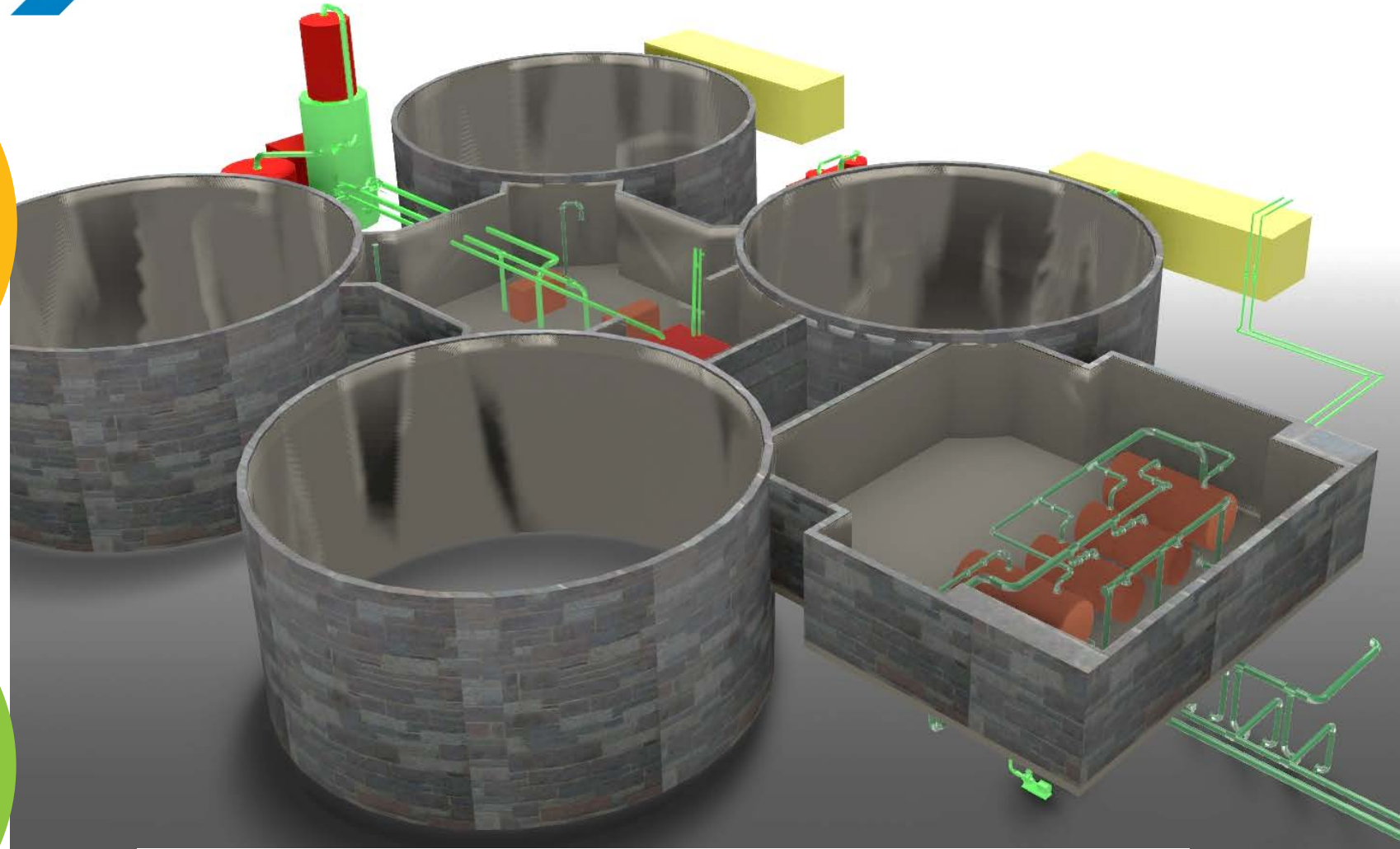
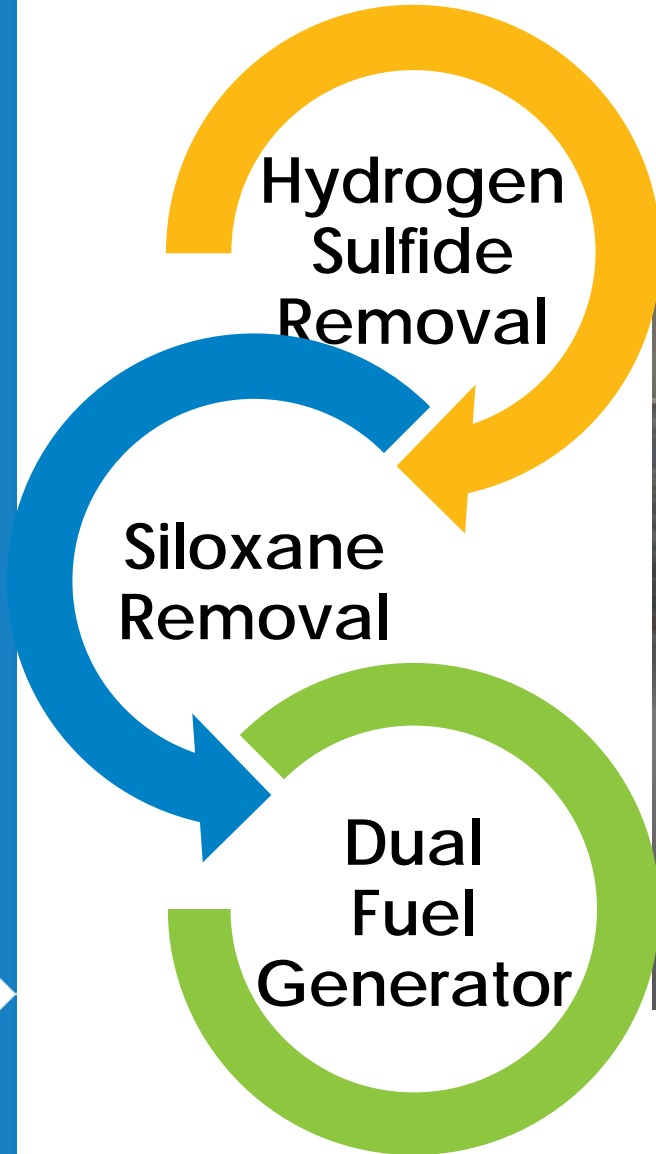
633kW Generator



Electrical Generation



BIOFUEL RECOVERY



BIOFUEL RECOVERY



BIOFUEL RECOVERY



5,400,000
Kilowatt-
Hours



561

Homes' Electricity
(Use for one year)



4,049,616

Pounds of Coal



9,095,285

Miles Driven
*(By a passenger
vehicle)*

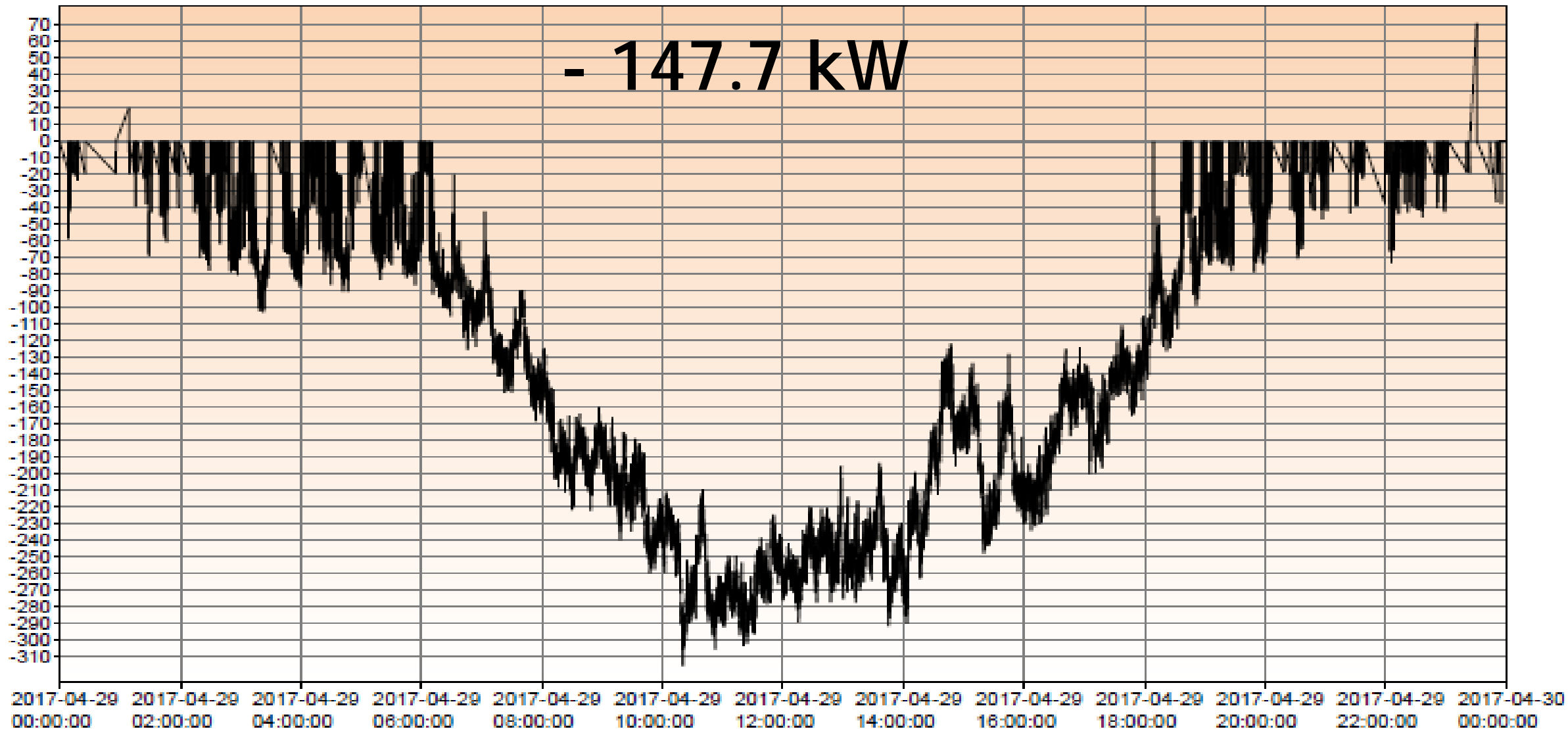


RESULTS



April 29th 130 % Renewable

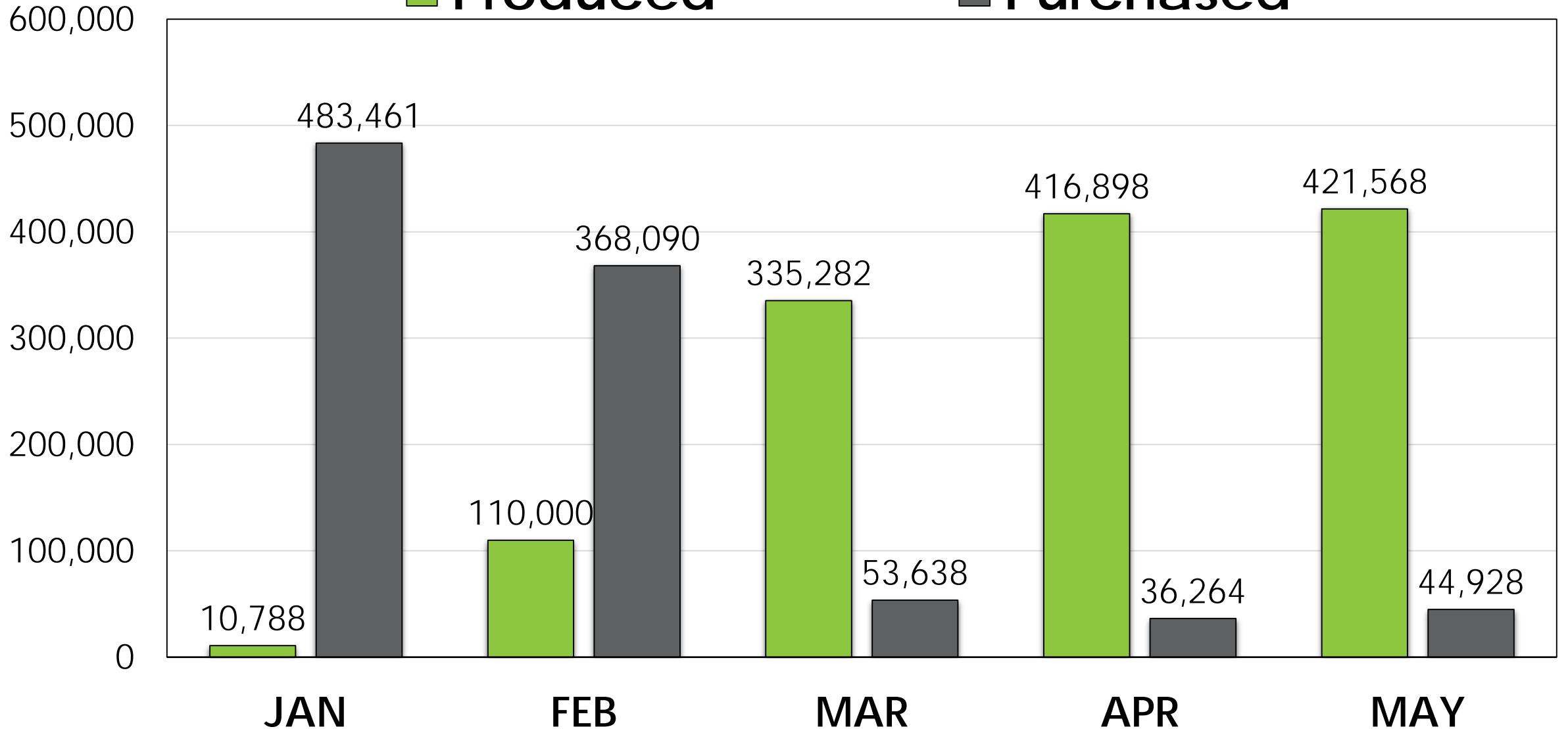
- 147.7 kW



2017 ENERGY PRODUCED VS PURCHASED KWH

Produced

Purchased



% RENEWABLE

2%

January

February

22%

86%

March

April

92%

90%

May

2017

Energy Reduced, Renewable Energy Produced, Solar Energy Purchased



28,300,000
Kilowatt
Hours



2,100

Homes' Electricity
(Use for one year)



21,223,000

Pounds of Coal



47,666,000

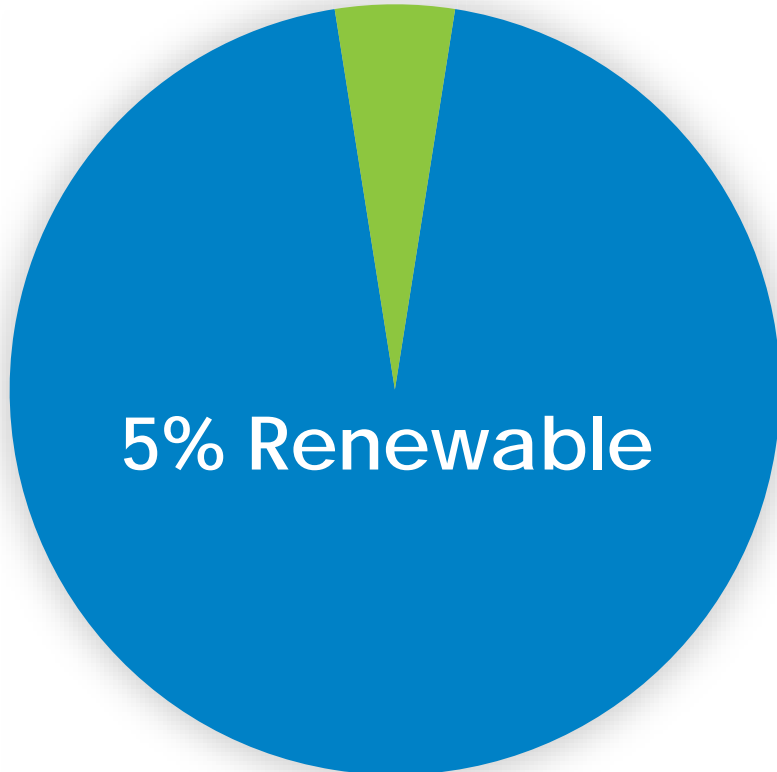
Miles Driven
*(By a passenger
vehicle)*



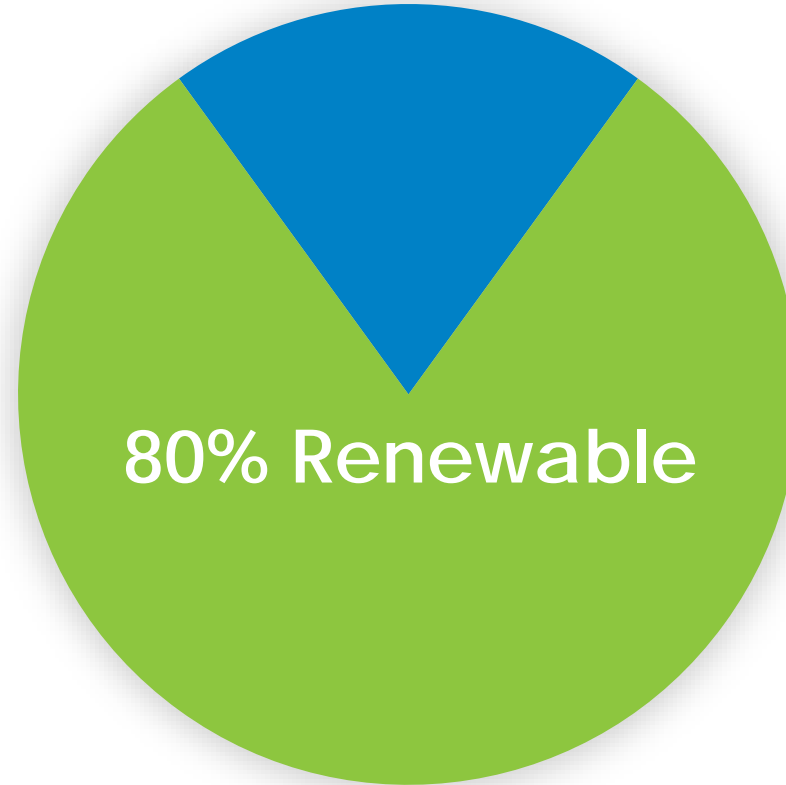
ST.CLOUD GREATER

Renewable Energy & Efficiency Initiative

2014



2018



CONVERSION TO RENEWABLE ENERGY SOURCES

NEXT STEPS

OPTIMIZATION

HIGH STRENGTH WASTE FEED RATE
DIGESTER MIXING MODIFICATIONS

**HIGH STRENGTH WASTE
FEED SOURCES**

BIOFUEL STORAGE

PHASE 2 – ENERGY EFFICIENCY

RENEWABLES – WIND/SOLAR





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CITY OF
ST.CLOUD
MINNESOTA



CITY OF ST. CLOUD STAFF

Tracy Hodel, Assistant Public Utilities Director
Emma Larson, Utilities Water Quality Coordinator
Chris Plautz, Wastewater Services Supervisor
Brian Schoenecker, Utilities Maintenance Mechanic
Jacob Ethen, Industrial Electronics Technician



Shameless Plug



**BEST OF THE BEST TASTE TEST
CITY OF ST. CLOUD – MINNESOTA**



**ST.CLOUD > GREATER
WATER QUALITY**



American Water Works Association
Minnesota Section



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QUESTIONS?

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