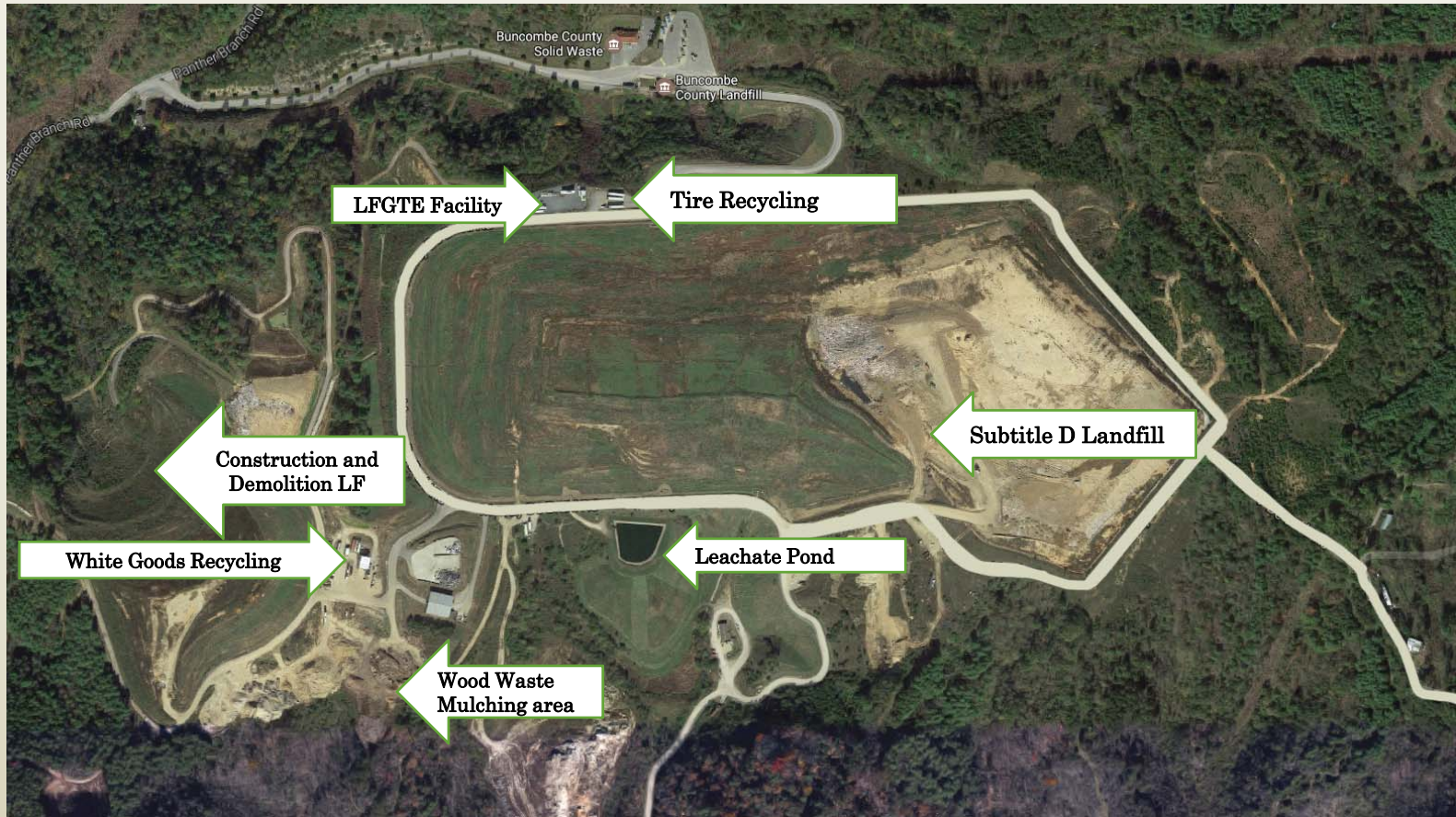




Carbon Emissions 2017 Report

Solid Waste & General Services Department
Buncombe County Government

March 7, 2017



Solid Waste Update

Kristy Smith, Bioreactor Manager

Landfill Overview

- Opened in 1997
- 31 acres filled
- 23 acres actively filling
- 54 acres
(Approximately 11 football fields)



Landfill Overview

- Open 6 days/week and most holidays
- 1,000,000 pounds of waste goes into the landfill each day
- 92,000 pounds of recycling processed everyday
- 1.4 MegaWatts of Renewable Electricity generated everyday, powering 1100 homes
- So how does that relate to emissions?

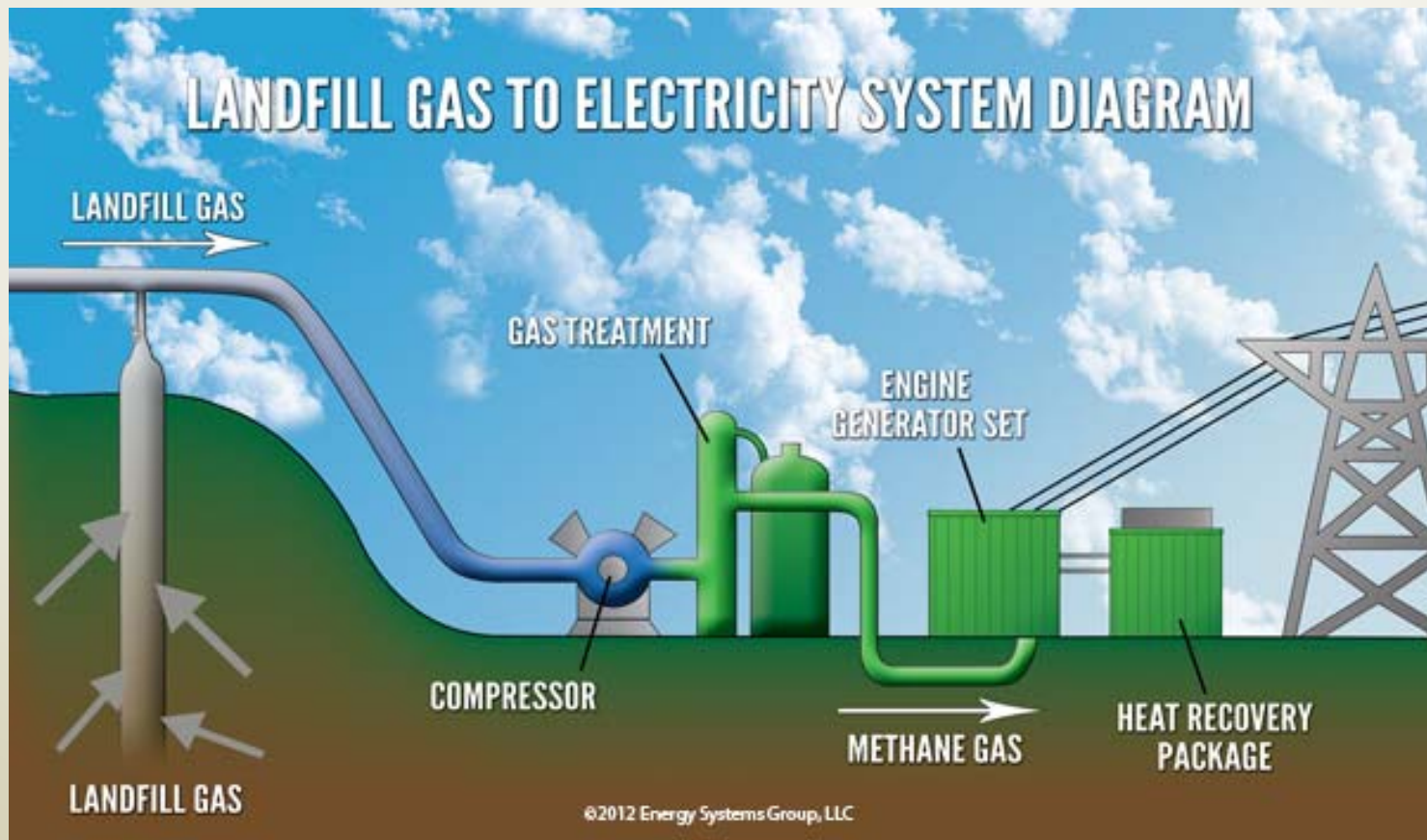


Methane gas is produced as garbage decomposes



Installation of a landfill
gas well

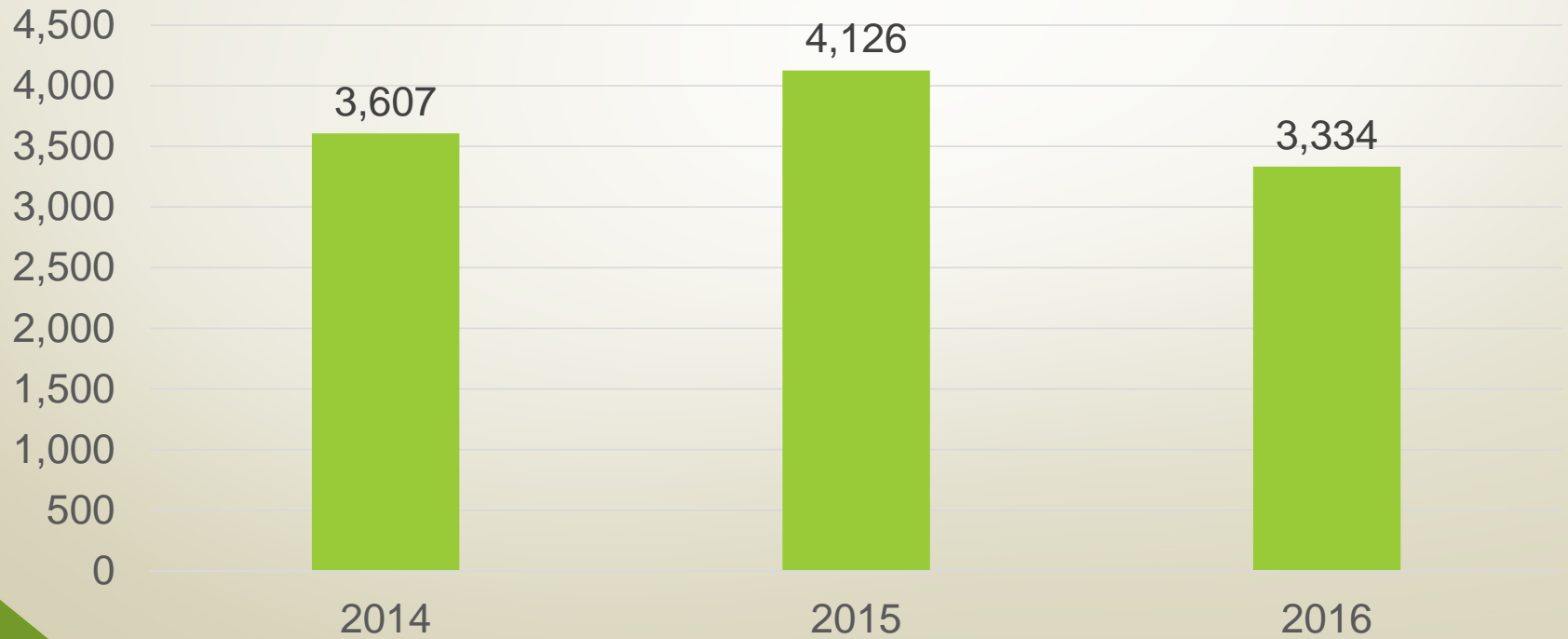
How does methane gas produce electricity?





Emissions Offset by Generator

Total CO2e (MT) Offset by Generator



Generator Output

- During 2014 – 2016, the generator offset **11,067** metric tons (MT) of CO2 emissions.

Carbon Equivalencies



2,338
passenger
vehicles taken
off road for one
year

OR



Carbon absorbed
by **10,475** acres
of U.S. forests in
one year

* www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Total Carbon Equivalencies

$$\begin{array}{rcl} 11,067 & + & 67,000 \\ \text{(Generator} & & \text{(Cumulative} \\ \text{Offsets)} & & \text{Carbon} \\ & & \text{Credits)} \\ \hline & = & 78,067 \\ & & \text{Metric Tons} \\ & & \text{(CO}_2\text{e)} \end{array}$$

That's like:



16,490
passenger vehicles
taken off
road for one year

OR



8.8 million
gallons of
gasoline not
consumed

OR



8,244
homes'
energy use for
one year



Facilities Overview

Clint Shepherd, General Services Manager

Terminology – what do you mean?



CO₂e: Carbon dioxide equivalent, a standard unit for measuring carbon footprints. Expressed in metric tons (MT).



kilowatt-hour (KWh): A unit of measure for electricity



kBTU: one thousand British Thermal Units (BTU), a common unit of measuring thermal energy

Facilities Portfolio Overview

- **84** facilities controlled by Buncombe County
- Total Area – 1.71 million SF
(About 30 football fields!)
- 2016 Utility Cost - \$1.87 million
- Average Utility Cost per SF - \$1.10



2014 Energy Audit – Resolution #13-12-06

- Shaw Environmental and Infrastructure
 - Professional Engineering Team
 - 5 member team
 - 20+ years of experience
 - Strong Duke Energy relationship
 - Utility Incentive Total - \$45,000
- ASHRAE level 3 Assessment – 10 Largest Buildings
 - (American Society of Heating Refrigeration and Air-Conditioning Engineers)
 - Energy Use Analysis
 - Walk-through Survey
 - Capital Measure Recommendations



Slide 14

- CS1** Courthouse, Detention Center A, Detention Center B, 35 Woodfin, 40 Coxe, 200 College, 202 Haywood, Animal Shelter, 164 Erwin Hills Rd, 59 Woodfin Pl
Clint Shepherd, 1/4/2017
- CS2** American Society of Heating, Refrigeration, and Air Conditioning Engineers
Clint Shepherd, 1/4/2017
- CS3** Net Audit Cost - \$66,000
Clint Shepherd, 1/4/2017
- CS4** Resolution #13-12-06 - establishes a goal of 2% reduction annually until a final goal of 80% is achieved
Clint Shepherd, 1/5/2017

10 Largest Buildings

- Courthouse
- Detention Center
- Detention Addition
- Family Justice Center
- County Administration
- Sheriff Department
- Animal Shelter
- 911 Center
- Interchange Building
- Health & Human Services



Audit Results – What did they find?

Identified **26** Energy Cost Reduction Measures (**ECRMs**)



- Total Annual Energy Savings - \$250,000 per year
- Total Implementation Cost - \$2.9 Million
- Return on Investment (ROI) – 12 year (average)

Execution — What was the first step?

9 Measures

- Less than a 5 yr ROI
- 4% Carbon Emissions Reduction Projected (over 2 Yrs)
- Total Implementation Cost - \$250,000
- Total Potential Energy Savings - \$100,000 per year



9 Measures — at a glance

ECRM	ECRM Name	% CO₂e Reduction	Payback Period
3	De-lamp Fixtures	.13	2.5
5	Thermostat Programming	.77	1.5
6	Thermostat Additions	.81	3.8
8	Utilize outside air	.42	3.3
9	HVAC adjustments	1.06	1.0
12	Vending Machine Controls	.04	1.7
13	Computer Controls	.68	2.7
22	Efficient Clothes Washers	.03	3.0
26	Solar heating system tune-up	.02	2.0
Total		4%	2.5 Years

Challenges & Considerations— To Name a Few

- Standard maintenance practices
- Changing facility portfolio
- Efficient practices in new construction design
- Seasonal Fluctuations
- Maintaining the existing workplace environment

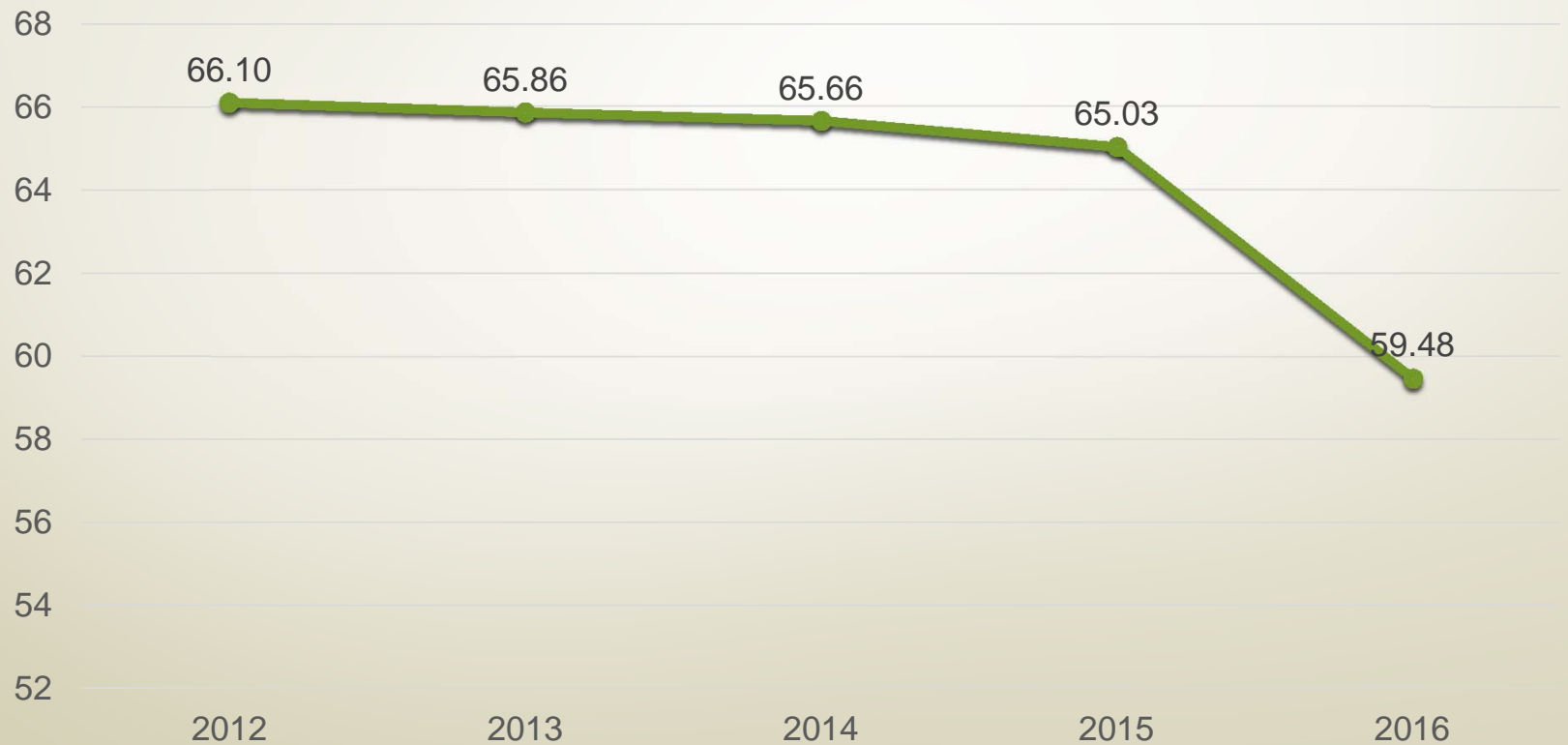


Energy Intensity – kBTU/sq. ft.

For Reference

Energy Intensity: measure of energy used for an area

kBTU: a standard unit used to measure energy



Utilities – Average Cost/SF

(Includes Electricity, Water, and Natural Gas)





Fleet Overview

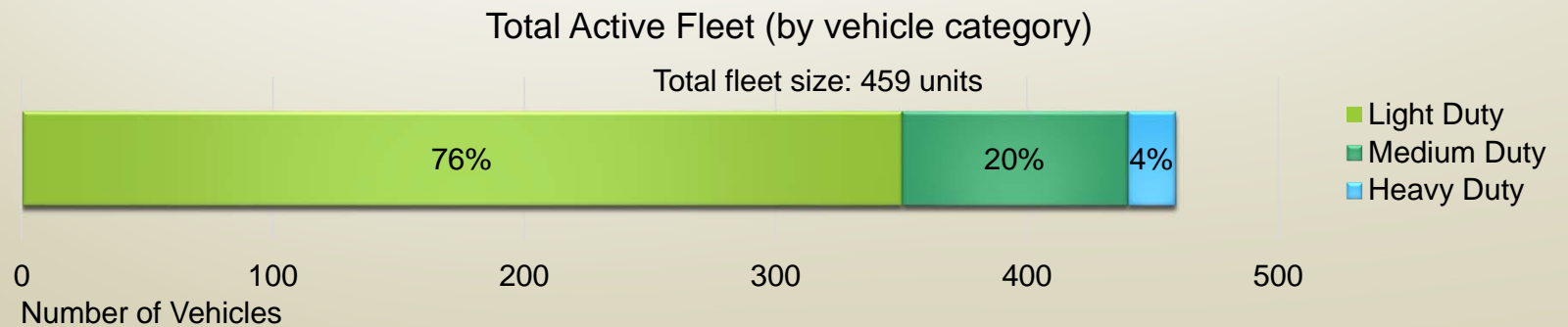
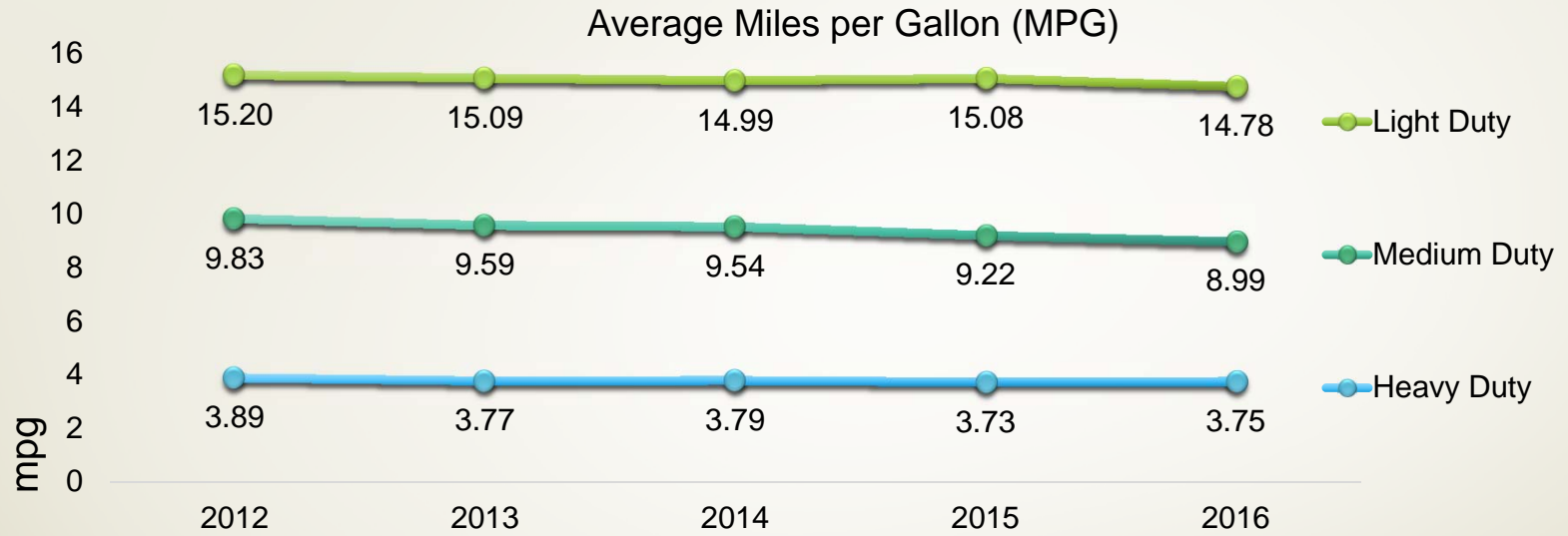
Fleet Portfolio Overview

(FY 2017 Year-to-Date)

- Fleet Size – **just over 450 vehicles**
- Fuel Cost – **about \$550,000 this year**
- Average Cost/Mile - **\$0.22**



Fleet – Fuel Mileage





Carbon Emissions Reduction

Tracking our reduction goal

Resolution & Baseline Approach

- **Resolution adopted** December, 2013 (Fiscal Year 2014)
- Resolution established goal of **2% annual reduction** in emissions
- To measure goal, emissions for Fiscal Year 2014 were set as the **baseline.**
- Reduction is for **combined** fleet and facility carbon emissions.

Facility & Fleet Carbon Emissions

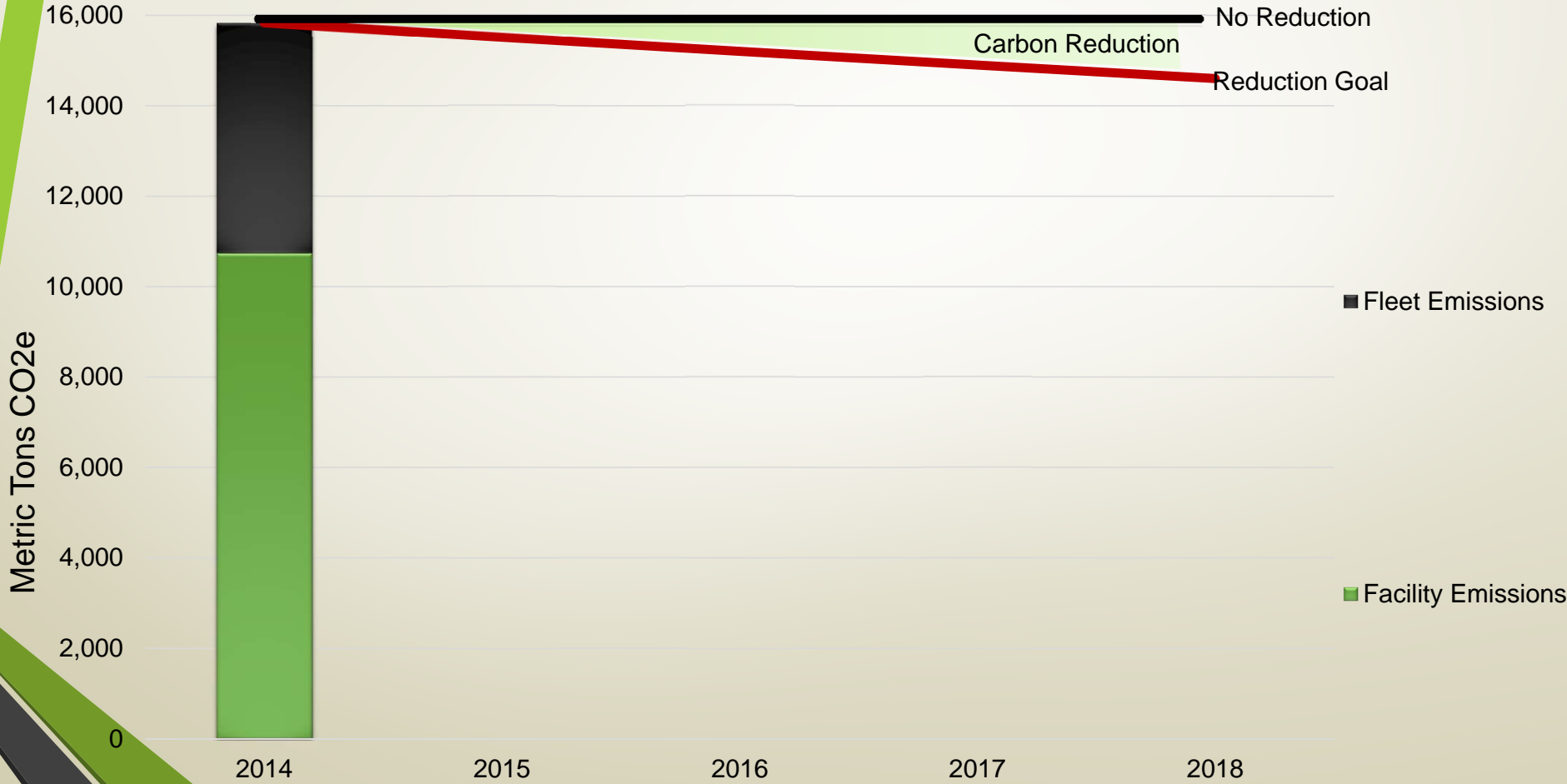
Determining the Baseline



Facility & Fleet Carbon Emissions

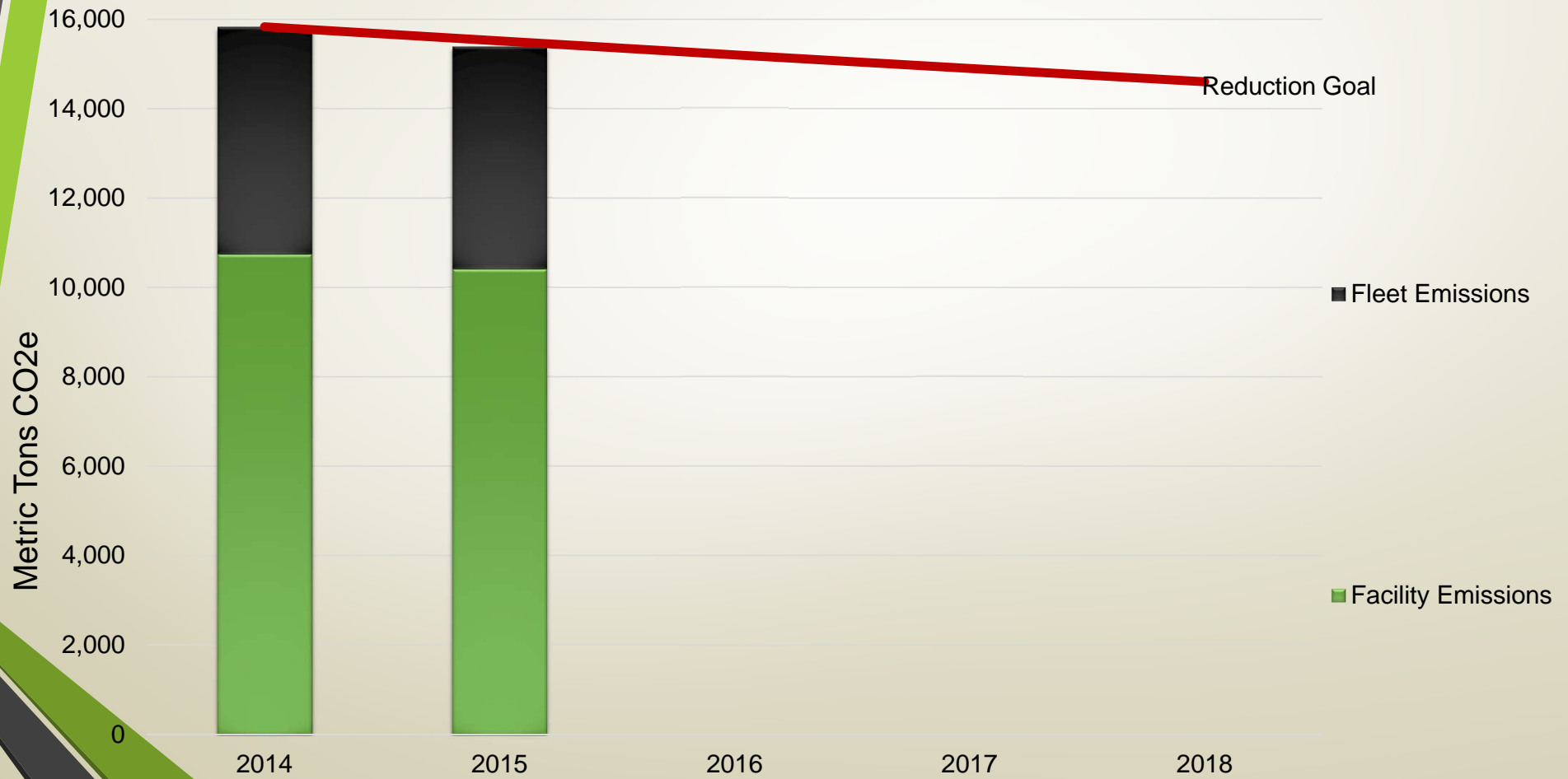
Setting the Goal (2% Annual Reduction)

Future Emissions to be Below Line!



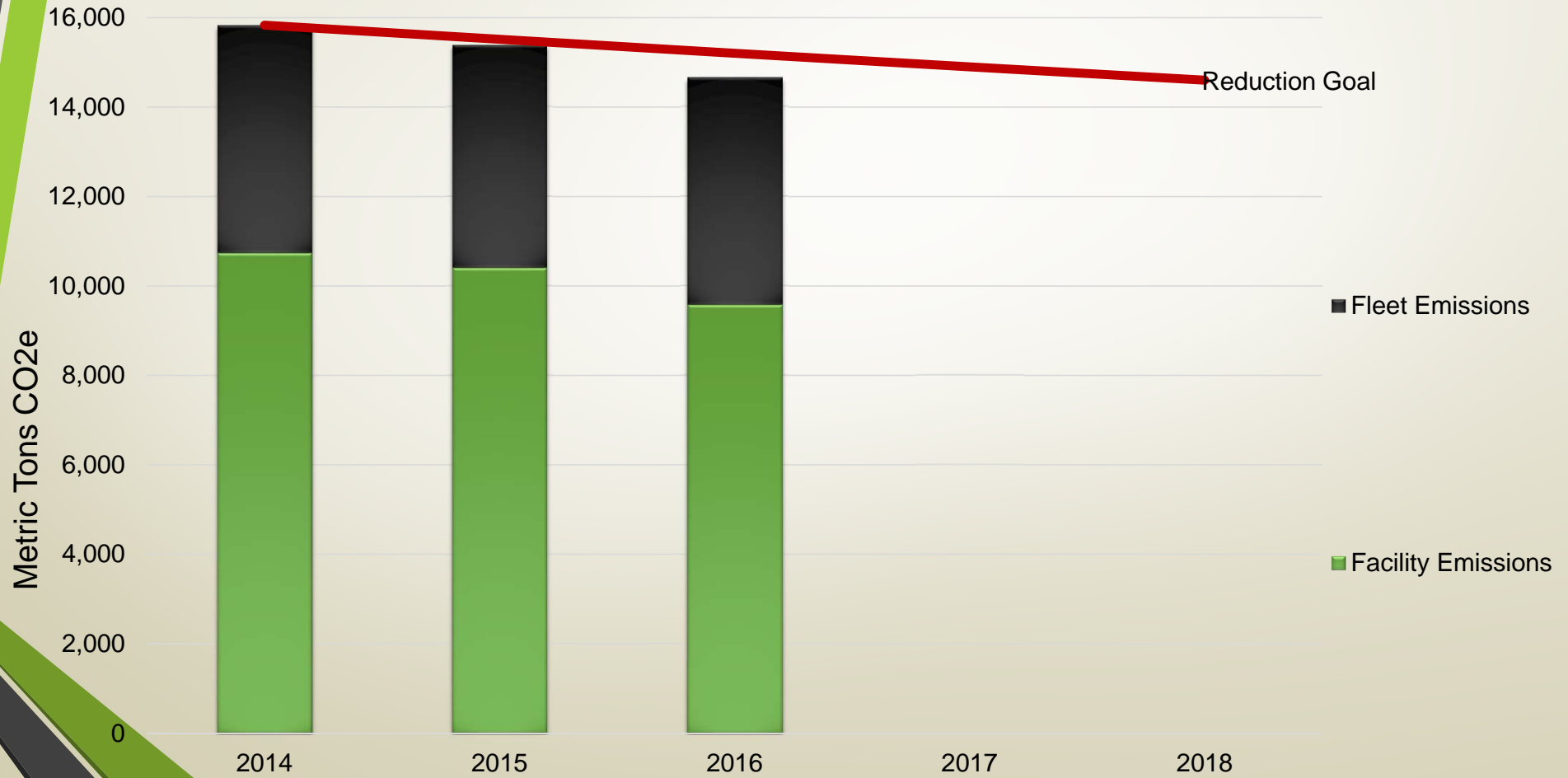
Facility & Fleet Carbon Emissions

FY 2015 vs. Goal



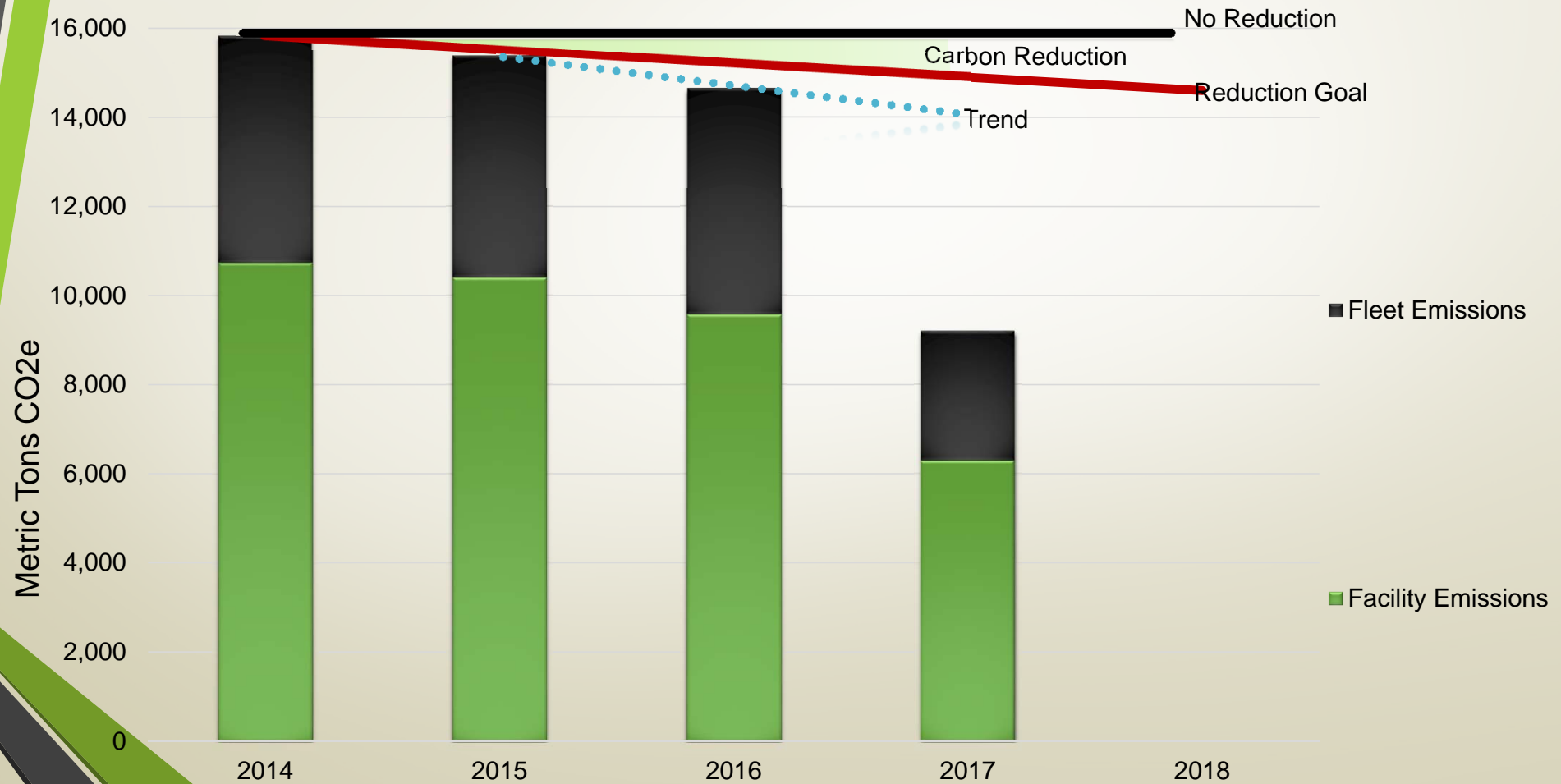
Facility & Fleet Carbon Emissions


FY 2016 vs. Goal



Facility & Fleet Carbon Emissions

FY 2017 Trend vs. Goal





Emissions Reduction Through Strategic Maintenance

Example Projects

Judicial Center LED's — a maintenance project

Project Details

- Ongoing
- 120 kits installed to-date
- 90w replaced w/ 30w
- 15,000 KWh saved / yr
- **\$1,200 annual savings, 3 year payback**

OR

Carbon Equivalencies

- 10 metric tons reduced



- 2 vehicles avoided



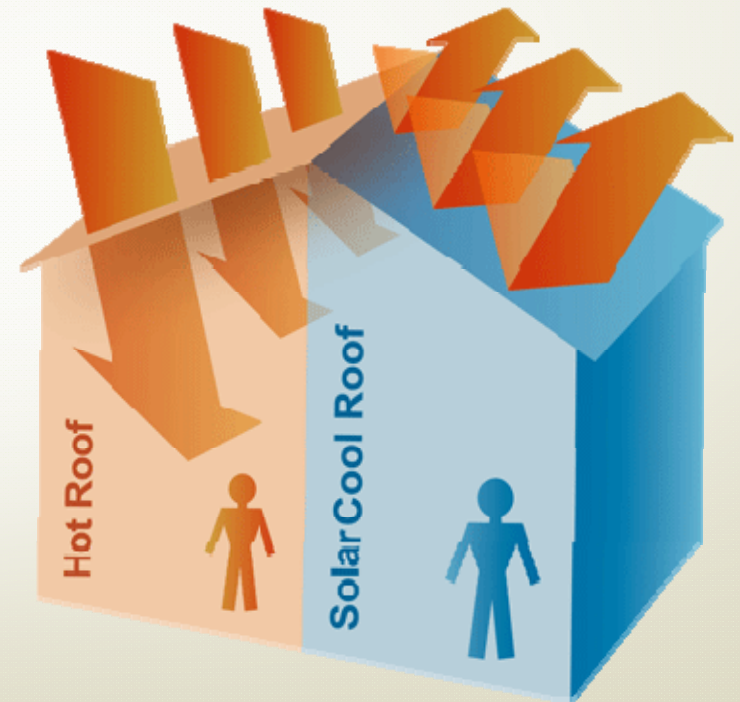
- 270 tree seedlings planted

(and grown for 10 years)



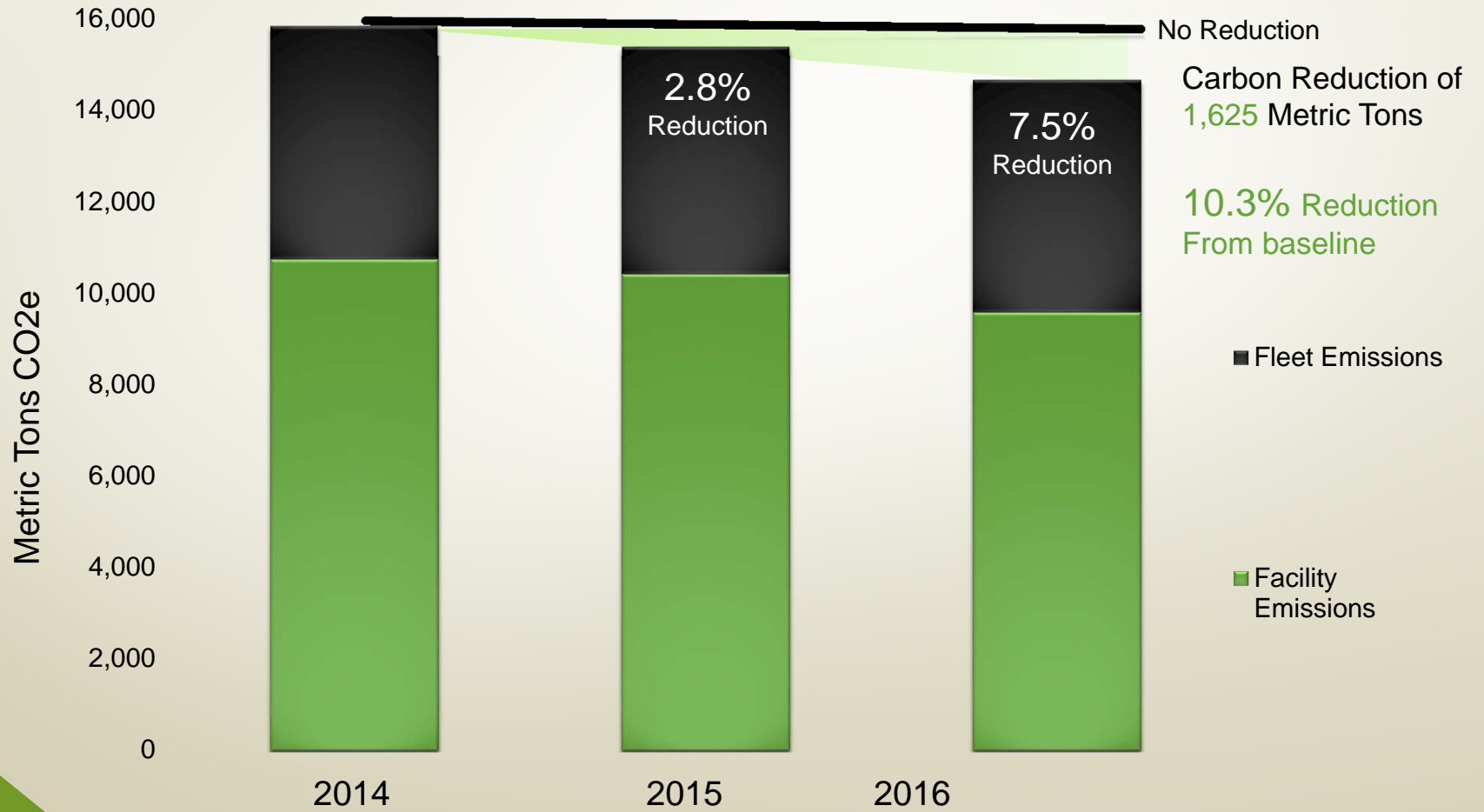
Roofing Projects – more maintenance completed

- Over **30,000 SF** replaced since FY15
- A cool roof is very light in color and provides a high level of reflection
- Can reduce roof temperature by 50 degrees*
- Can reduce electricity **10-15%***



* www.energystar.gov

Emissions Reduction to Date



Carbon Footprint Reduced!

Savings during 2014-2016:

Fleet & Facilities	Generator Offsets	Carbon Credits	Total Savings
1,625	11,067	67,000	79,692
			Metric Tons (CO2e)

Equivalent to:



16,883
passenger vehicles
taken off
road for one year

OR



9.0 million
gallons of
gasoline not
consumed

OR



8,400
homes'
energy use for
one year