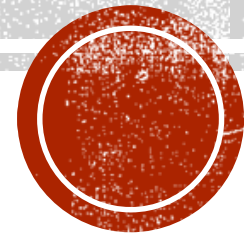


ENERGY AND SUSTAINABILITY PLAN



Presented to the Falmouth Town Council, October 2018

By Peter LaFond, Chair of REAC &

Kimberly Darling, Energy and Sustainability Coordinator

Recycling and Energy Advisory Committee

REAC'S MISSION

- Endeavor to **save local taxpayer dollars** through increased **energy-efficiency of municipal facilities** and operations;
- Prioritize the ad hoc Falmouth Green Ribbon Commission's 2010 recommendations that the Town Council wants to pursue;
- **Educate Falmouth residents and businesses** about energy efficiency, waste reduction, and clean energy opportunities and choices;
- Enhance and promote the Town's **recycling program**;
- **Promote the use of clean, renewable energy sources** in Falmouth's public and private facilities through education and outreach;
- Work with surrounding communities **on potential regional** energy efficiency and clean energy and waste management **strategies**;
- **Monitor new developments** and options in the fields of energy and waste management as technologies evolve and change; and
- Research and report policies to accomplish the above goals and/or related goals deemed appropriate by the Town Council



**HISTORY OF FALMOUTH'S
PROGRESS TOWARDS
SUSTAINABILITY**



2007

- US Mayor's Agreement— First report published in 2010
- Waste Water Dept. electrical upgrade
- LEED Cert. Elementary School and Police Dept.
- Solar PV at Highschool

2011

- Fuel switching in all buildings; oil → propane
- Biomass boilers for all 3 schools
- Municipal streetlight group—final law passed in 2013

2014

- First Annual Home Energy Fair
- Mason Motz Activity Center renovated
- Town Hall renovated

2016

- Efficiency Maine grants for Route 1 lighting
- Waste Water switched from oil → natural gas
- Solar stakeholder group formed
- Town purchased all-electric Nissan LEAF
- Hired full-time Energy and Sustainability Coordinator



2016

- Food waste drop off program launched
- Schools began composting
- Shopping bag ordinance
- Schools received Efficiency Maine lighting rebates, entire campus LED
- Installed water bottle filling stations at Schools

2017

- Town Hall and Food Pantry began composting
- First Business Energy Fair
- Casco Bay Heat Pump Challenge
- WindowDressers

2018

- Purchased all streetlights from utility and converted to LEDs
- REAC manages “waste station” at Town events
- Town received DEP grant to expand food waste drop off program



THE PLAN

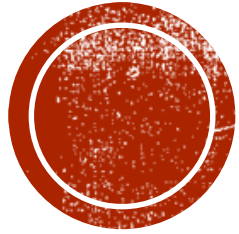
Is separated into sectors with goals and action items to accomplish those goals.

Set in 2010 by the Green Ribbon Commission, and embedded within this working document is Falmouth's commitment to reduce energy with a

2% annual greenhouse gas emissions reduction goal, using 2007 energy data as a baseline.

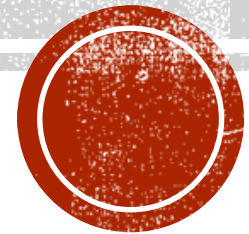


MISSION STATEMENT



Sustainability is balancing environmental stewardship, social responsibility, and economic vitality to meet Falmouth's present needs while ensuring the ability of future generations to meet their own needs.

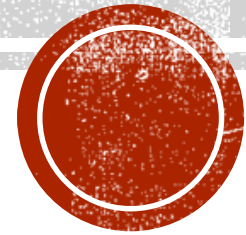
Goal—Enhance efficiencies in municipal operations by being committed to reduce fossil fuel use through energy efficiency, integrating renewable energy when feasible, and implementing waste reduction and diversion practices.



MUNICIPAL

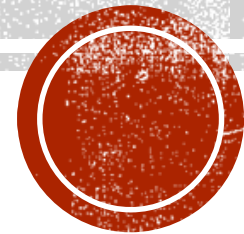
Goal—Enhance collaboration between the Town and schools regarding sustainability initiatives.

SCHOOL DEPT.



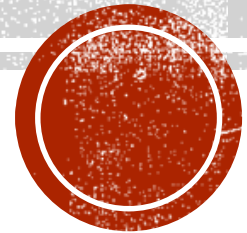
Goal—Work with local businesses to improve their bottom line through sustainable practices.

BUSINESSES

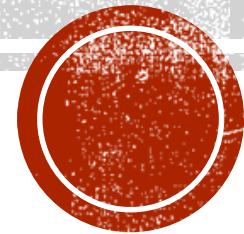


Goal—Provide services to residents needed to improve sustainable practices.

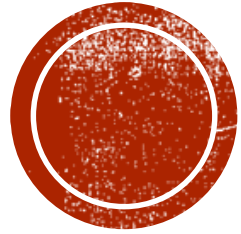
RESIDENTIAL



Goal—Be at the forefront on sustainability policy development at Regional and State levels.



REGIONAL



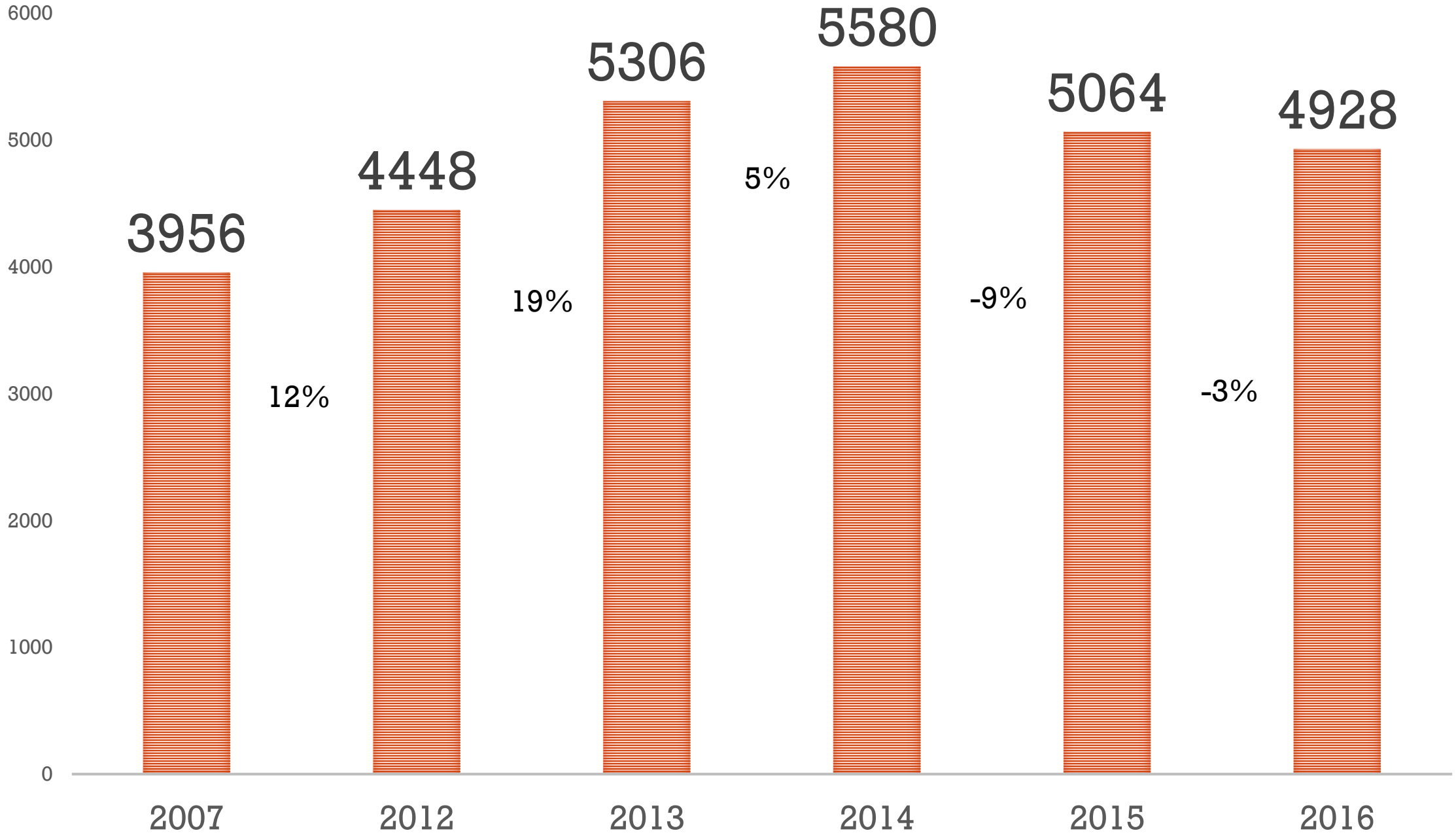
GREENHOUSE GAS EMISSIONS ANALYSIS



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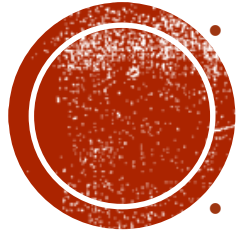
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EMISSIONS ANALYSIS

- Gross square footage of Town buildings has increased by approximately 27% since 2007 (see Appendix III), but efficiency measures has held carbon dioxide equivalence (CO₂E) steady—in fact, a 1% reduction;
- Biomass accounts for 26% of the carbon footprint (the largest single source), and while biomass does have a carbon impact on our environment, we are using a renewable and local resource;
- The School Dept. accounts for a significant portion of the town's carbon footprint. Engaging students could help reduce this as well as provide for educational opportunities;
- Fuel switching from 2007 to the present has made a positive impact on our emissions;
- Adopting advanced lighting technology such as LED streetlights and LED interior lighting will further reduce our impact;
- Gasoline and diesel fuel in the vehicle fleet are another high cost impact; vehicle fuel efficiency should be assessed;
- **A new target should be established based on a 2012 baseline (vs 2007)—this change reflects complete and accurate data collection, as well as reflection of growth**
....do we keep this at 2% reduction annually?



- Home
- Dashboards
- Data
- Suppliers
- Company

Dashboard

YTD 6M 1Y 3Y 5Y

Jan 2016 — Dec 2016

Sep 2003 Jun 2007 Mar 2011 Dec 2014 Sep 2018

Summary Company Sites **Impacts** Carbon Analytics Choose Energy Offsets

CO2e by Impacts

SITES: Town Hall

IMPACTS: Diesel Fuel - Onroad, Electricity - Consumption, Gasoline, **Heating Oil**, **Propane**



Filters

SITES: Town Hall, Town Landing, Transfer Station, Vehicles, Waste Water Facilities (4)

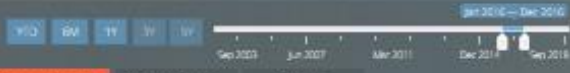
IMPACTS: All, Diesel Fuel - Onroad, Electricity - Consumption, Gasoline, Heating Oil

HIRED CONSULTANT TO HELP WITH GREEN HOUSE GAS EMISSIONS ANALYSIS

Sustainability Metrics, LLC provided detail into emissions based on uses, and their services include software, “a dashboard” called RAPPORT to further assess our impact as a Town.



Dashboard



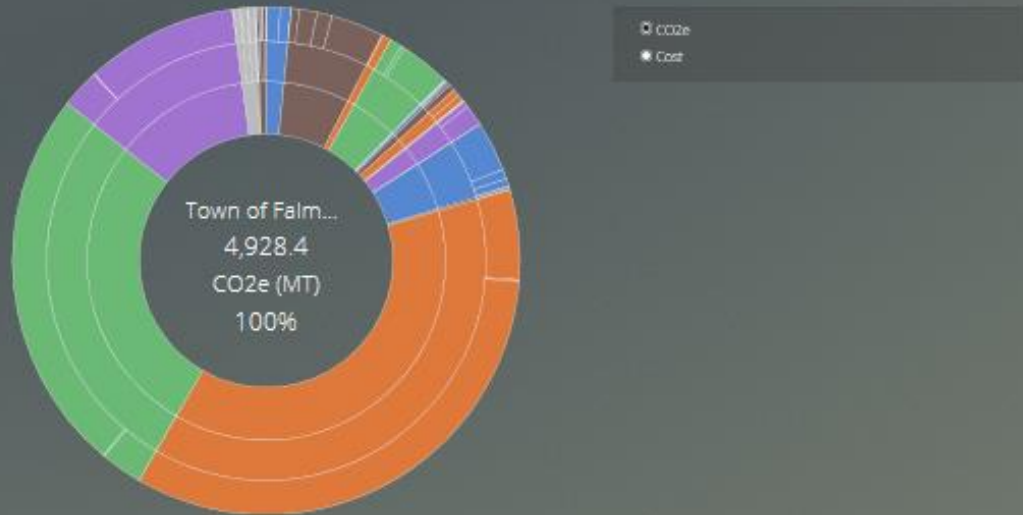
- Summary
- Company
- Sites
- Impacts
- Carbon Analytics**
- Choose Energy
- Offsets

Total Environmental Impact

IMPACTS	VOLUME	CO2 EQUIVALENTS (MT) ¹	COST
Electricity - Consumption	3,047,908 kWh	864.9	\$535,809
Gasoline	31,205 Gallons	273.4	\$66,939
Wood	2,897 Tons	3,267.1	\$190,397
Propane	134,762 Pounds	184.9	\$42,932
Natural Gas	5,340 Therms	57.5	\$10,680
#2 Fuel Oil	1,997 Gallons	20.5	\$2,886
Diesel Fuel - Onroad	25,536 Gallons	260.2	\$61,599
TOTAL		4,928.4	\$911,242

Carbon Map

Town of Falmouth **4,928.4 CO2e (MT)**



OTHER DASHBOARD FEATURES

Can look at different departments impact by fuel type and their associated costs through this interactive dashboard.



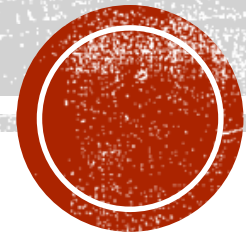
CURRENT PROJECTS AND INITIATIVES

- Annual residential and regional programs/events;
 - National Drive Electric, WindowDressers, Home Energy Fair, ME Compost Week/Earth Day
- Phase II RFP on Municipal Interior Lighting
- RFP on small, and large scale solar projects
- Expanding food waste drop off program
- Explore green building ordinances
- Engage with other town committees—Economic Improvement Committee, Conservation Commission

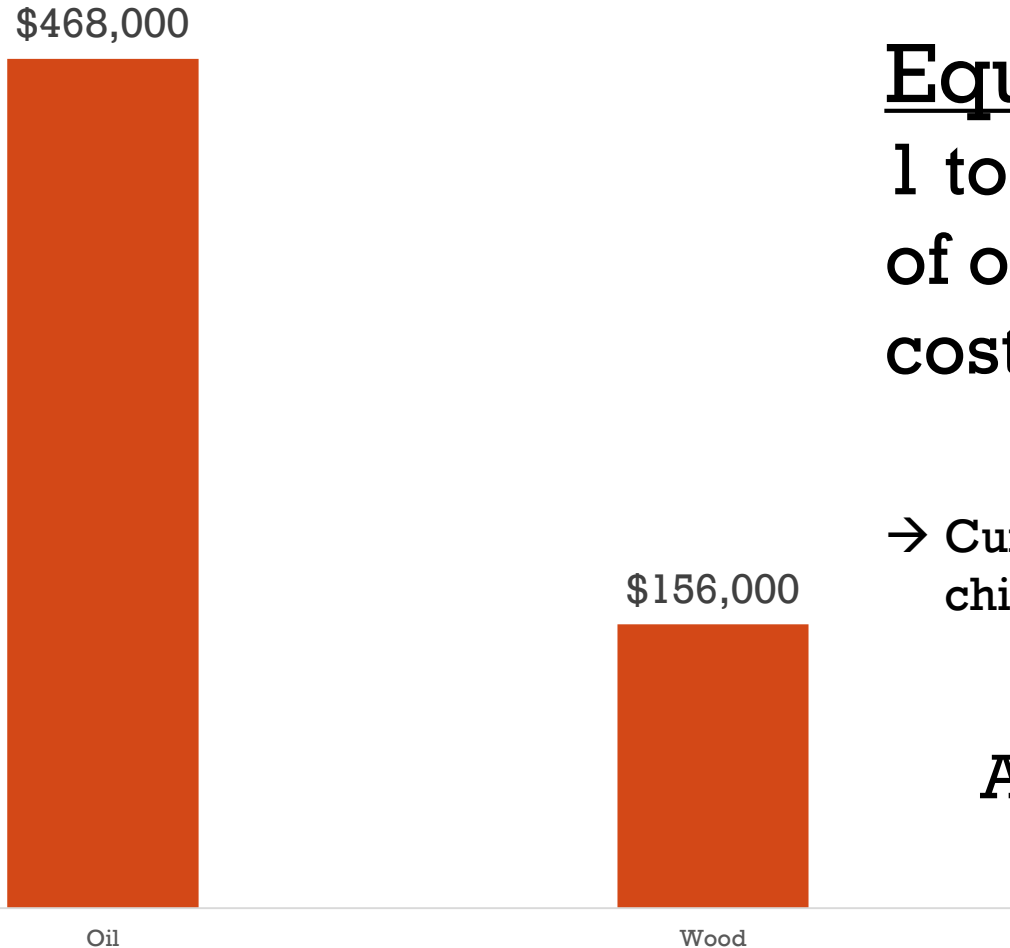




HEATING THE SCHOOL CAMPUS WITH WOOD



Costs of Oil vs Wood



Equivalent heating comparison:
1 ton woodchips (\$65/ton) = 70 gallons of oil. Equivalent heating cost/efficiency if oil was \$1.07 per gal.

→ Current heating costs for all schools, 2,400 tons of wood chips (\$156,000), a renewable, local resource.

ANNUAL SAVINGS of \$312,000

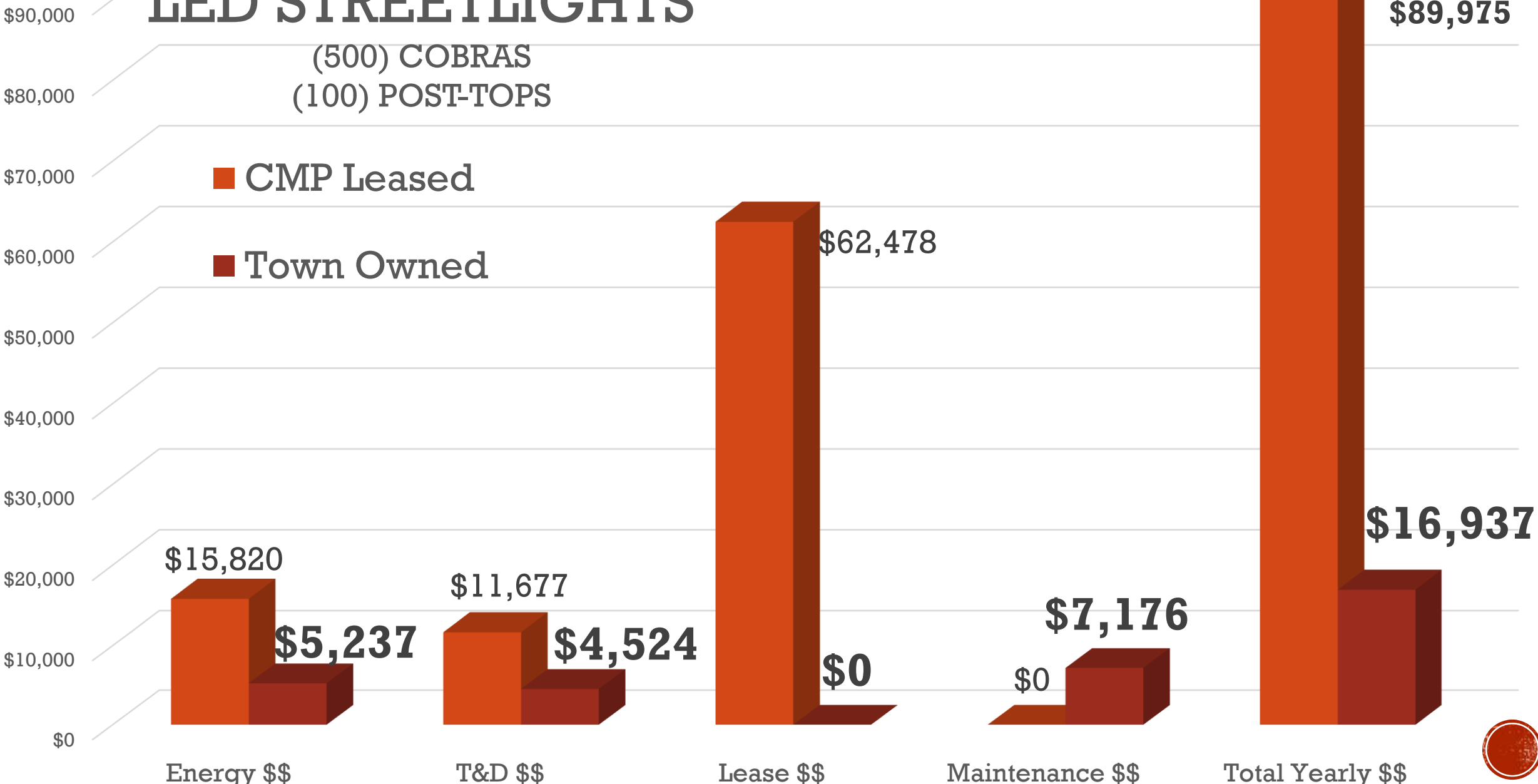


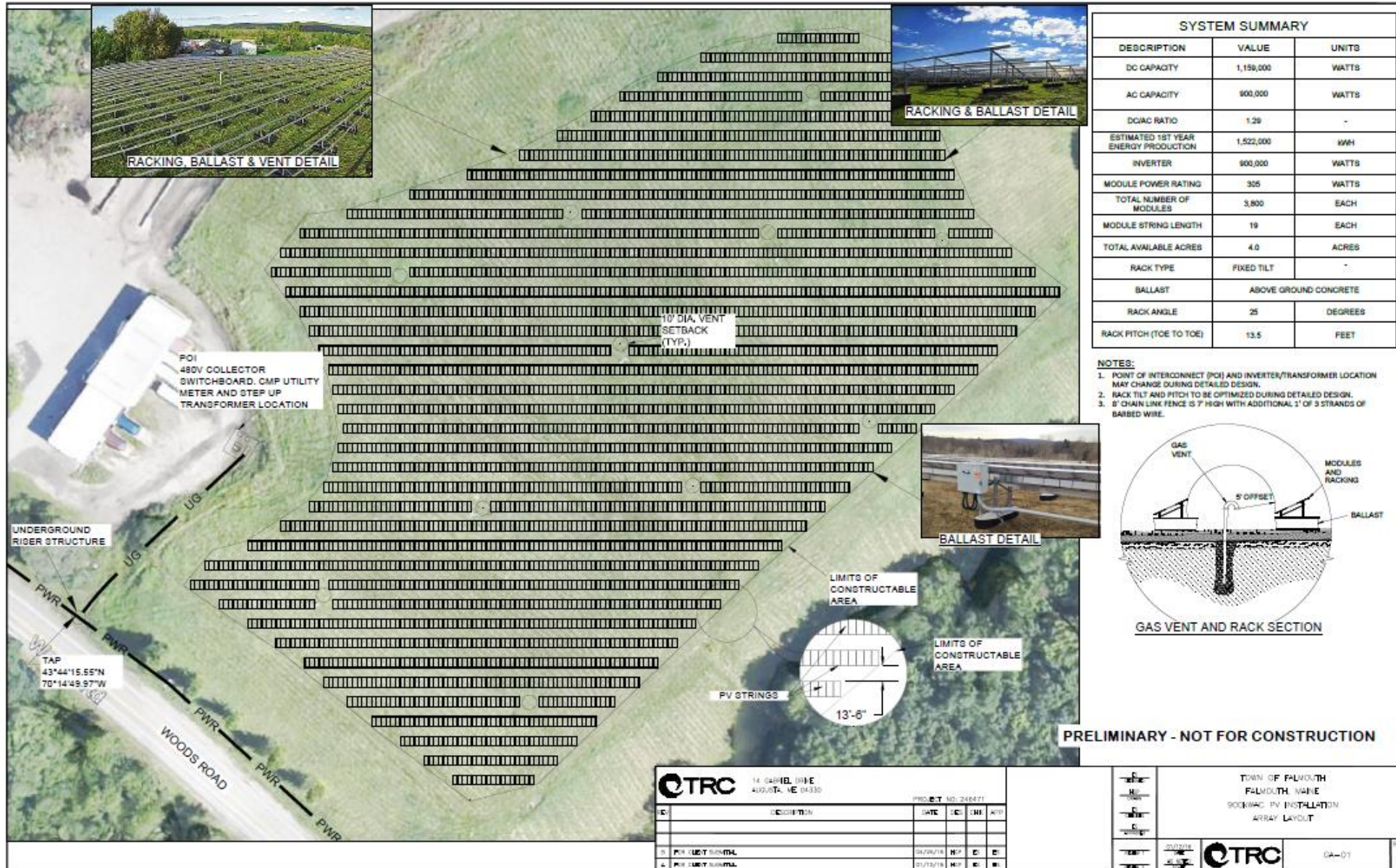
LED STREETLIGHTS

(500) COBRAS
(100) POST-TOPS

 CMP Leased

 Town Owned





SYSTEM SUMMARY		
DESCRIPTION	VALUE	UNITS
DC CAPACITY	1,159,000	WATTS
AC CAPACITY	900,000	WATTS
DC/AC RATIO	1.29	-
ESTIMATED 1ST YEAR ENERGY PRODUCTION	1,522,000	kWh
INVERTER	900,000	WATTS
MODULE POWER RATING	305	WATTS
TOTAL NUMBER OF MODULES	3,800	EACH
MODULE STRING LENGTH	19	EACH
TOTAL AVAILABLE ACRES	4.0	ACRES
RACK TYPE	FIXED TILT	-
BALLAST	ABOVE GROUND CONCRETE	-
RACK ANGLE	25	DEGREES
RACK PITCH (TOE TO TOE)	13.5	FEET

- NOTES:**
1. POINT OF INTERCONNECT (POI) AND INVERTER/TRANSFORMER LOCATION MAY CHANGE DURING DETAILED DESIGN.
 2. RACK TILT AND PITCH TO BE OPTIMIZED DURING DETAILED DESIGN.
 3. 8' CHAIN LINK FENCE IS 7' HIGH WITH ADDITIONAL 1' OF 3 STRANDS OF BARBED WIRE.

System size (max build)—1.159 MW = 1,522,000 kWh produced annually

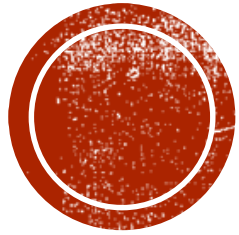
Municipal load—**(2015)** 4,159,481 kWh

This system has the potential to offset municipal power load by 20-30%

Woods Rd. Transfer Station Landfill Solar PV



VISION STATEMENT



By highlighting existing achievements, evaluating and employing sustainable practices with our residents, schools and business community, Falmouth will continue to be a regionally engaged and sustainable community.

QUESTIONS?

