

City of South Burlington Energy Overview

City Council
October 19, 2020



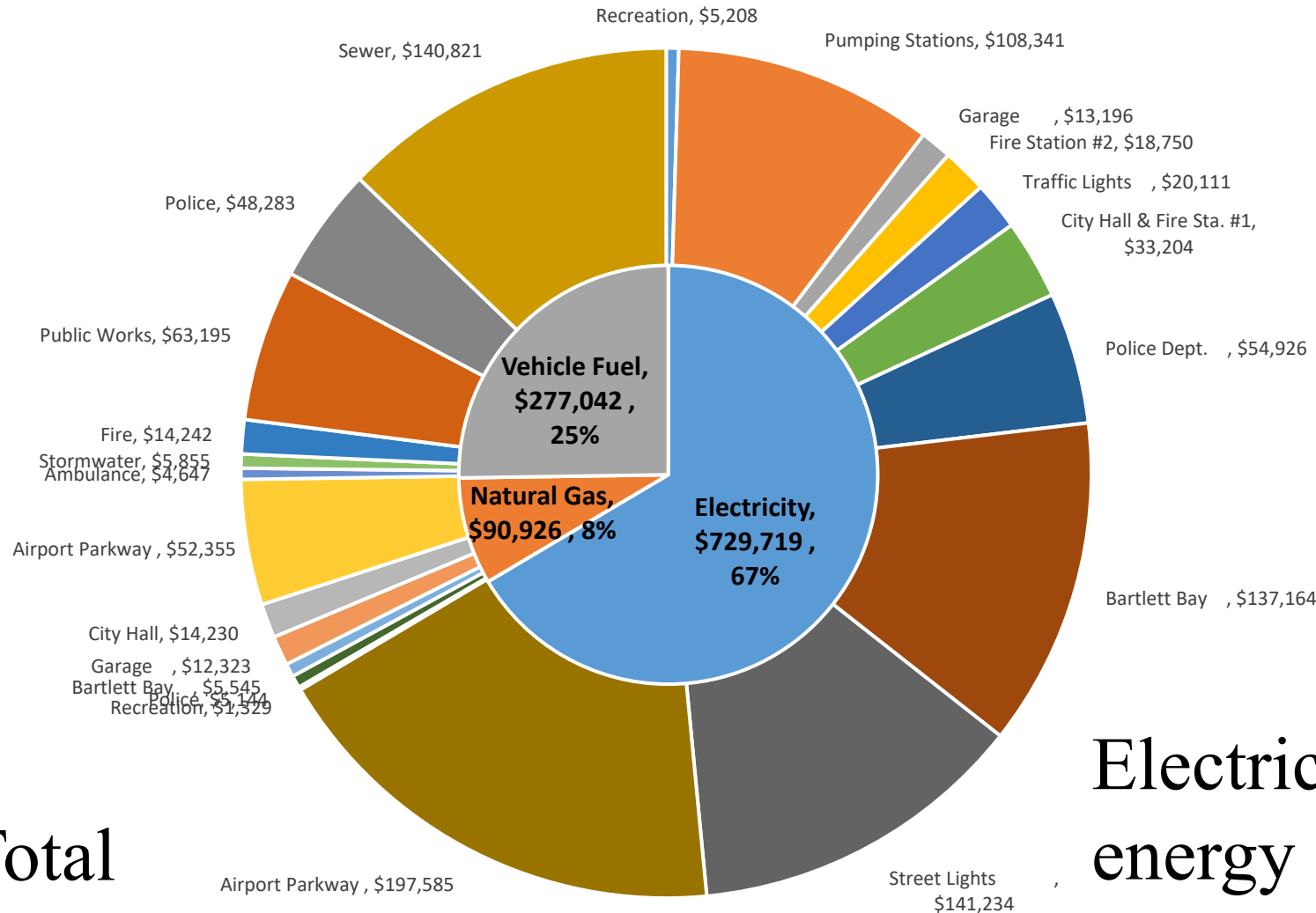
Agenda

- **Where We Have Been**
 - **Data Collection**
 - **Lots of Detail**
 - **Concentrate on the Conclusions**
 - **Completed Projects**
- **Where We Are**
- **Where We Hope To Go**

Data Collection

- Cost Data From City Accounts – MONTHLY COSTS
 - Organized By Departments – Started July 2017
 - Lacks Usage Data Because of Solar Rebates
 - 47 Accounts
- Cost and Usage Data From Actual Bills
 - 93 GMP Bills per Month – Started March 2019 – GMP MONTHLY
 - 16 Vermont Gas Bills per Month – Started January 2019 – VT GAS MONTHLY
 - 9 Other Bills – gasoline, diesel, heating oil
- Green House Gas Impact Chart – BTUs
 - From Actual Usage Bills
- Energy Revolving Fund Financial Plan and Status

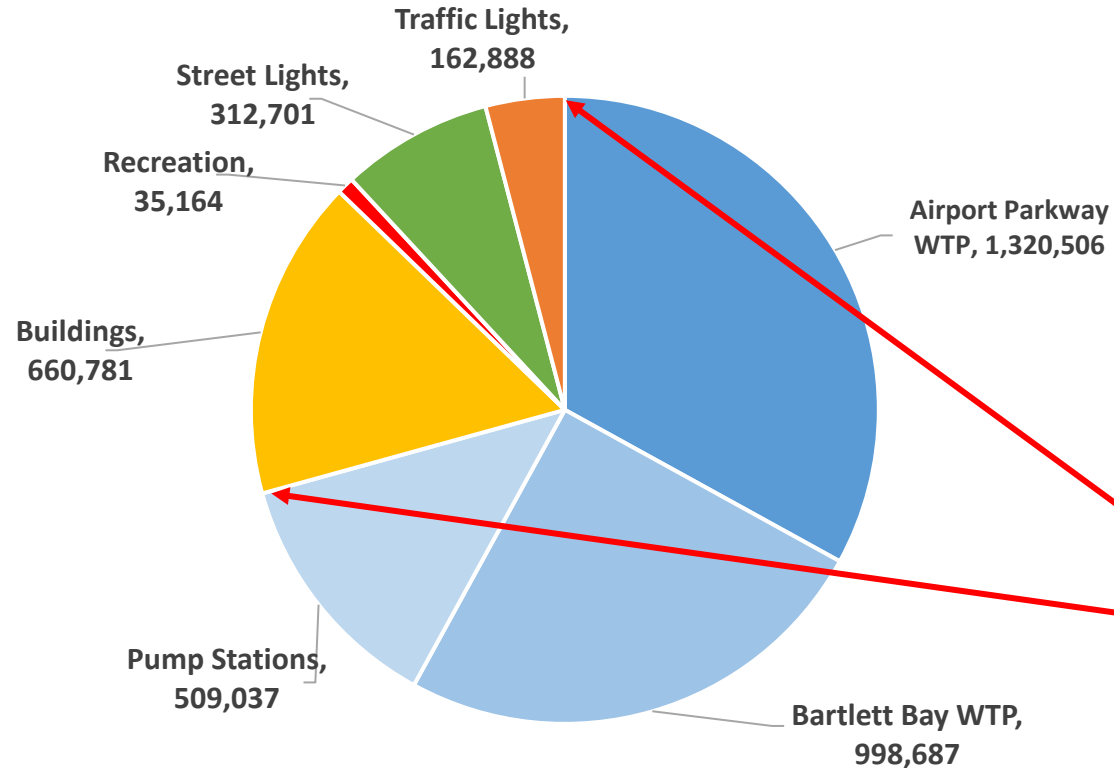
South Burlington FY20 Utility Energy Expense



\$1.1 M Total

Electricity is the largest energy cost. We can make electricity.

FY 20 Electricity Consumption -Kwh

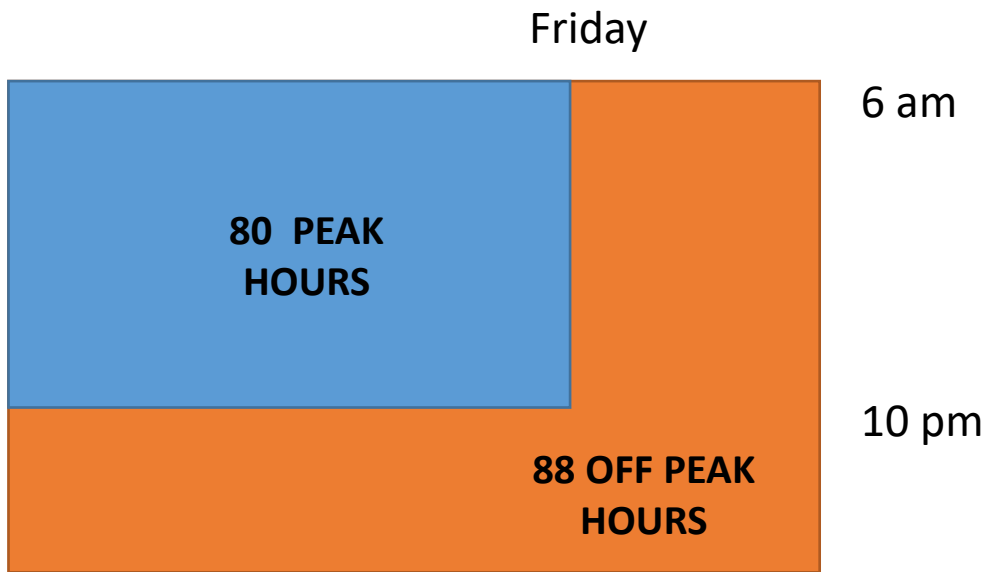


Total = 3,999,842 Kwh

Equivalent to 152 Electric Clothes Dryers Running on Hot Continuously for a Year

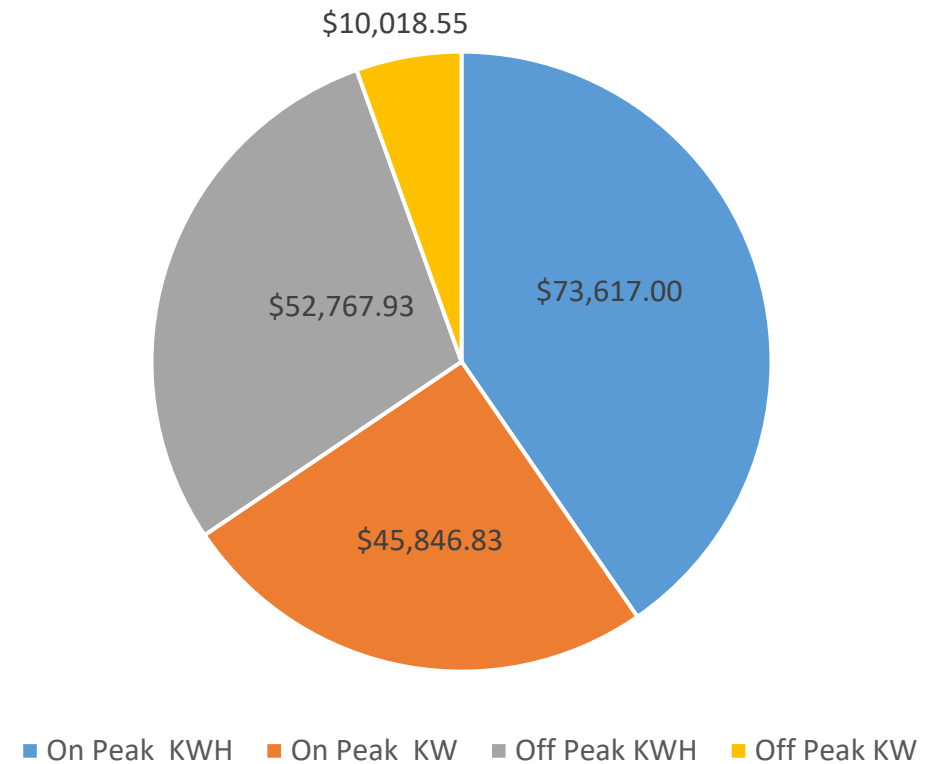
Water Treatment Operations

Other Data



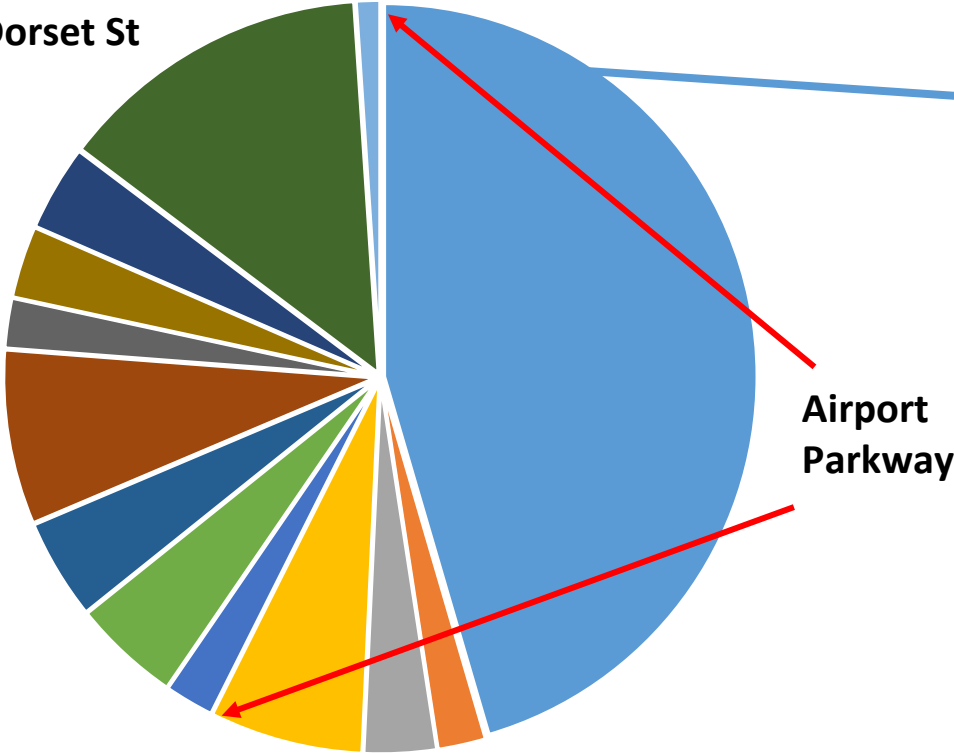
•Peak electricity usage was 5% higher than off peak usage but cost was 90% higher.

Airport Parkway Electricity Major Power Costs
Sept. 2019 thru Aug. 2020



FY20 Natural Gas Consumption - ccf

575 Dorset St



Airport Parkway

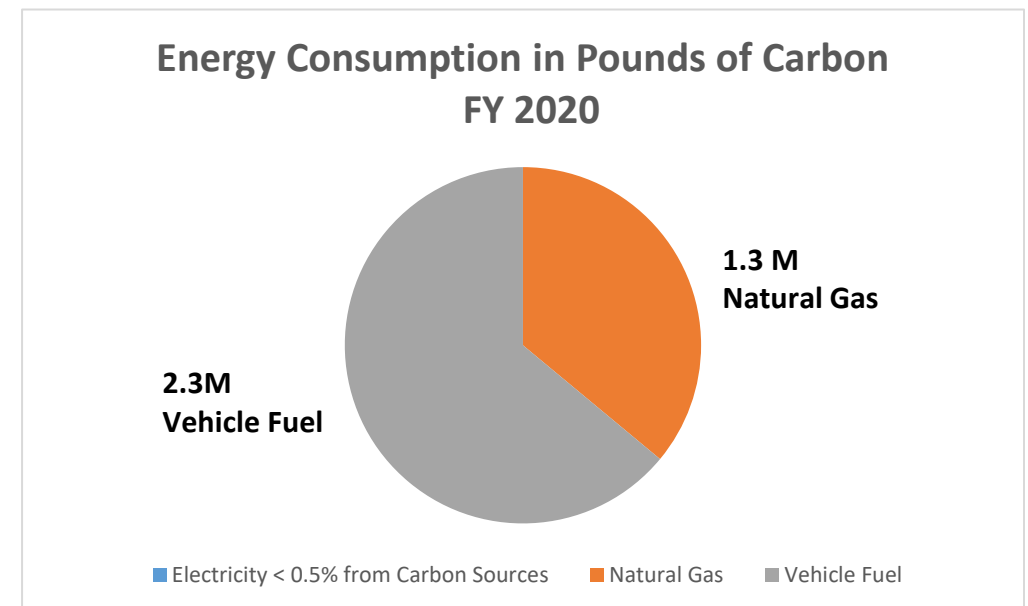
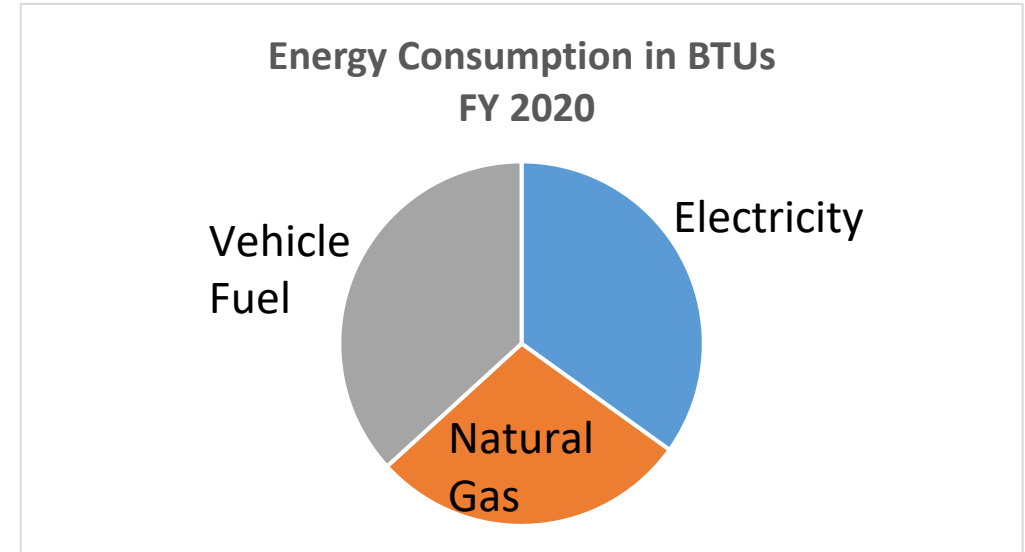
- 1015 Airport Parkway- Thermophilic Digester
- 1015 Airport Parkway - Secondary Complex
- 1015 Airport Parkway - Administration
- 1015 Airport Parkway - Dewatering
- 1015 Airport Parkway - UV Complex
- 15 Bartlett Bay Rd.
- 208 Landfill Rd. # Garage
- 128 Landfill Rd. # Office
- 155 Dorset St #B-1 Library
- 3 Holmes Rd.
- 19 Gregory Dr. # R.E.M.
- 575 Dorset St.
- Misc.



Thermophilic Digester

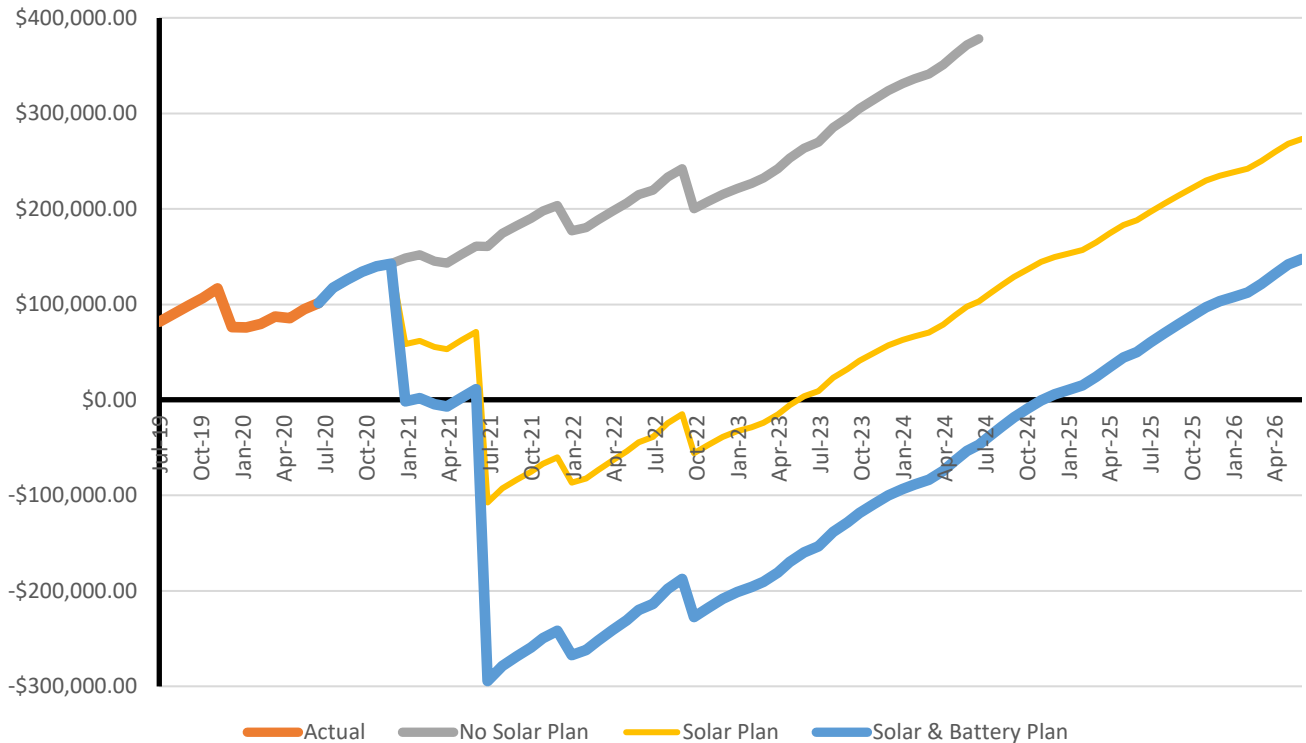
Green House Gas

	Apr-20	May-20	Jun-20
Electric - kWh	336,725	323,081	336,015
Electric - MMBtu	1,148.91	1,102.35	1,146.48
Gas - ccf	9,491	7,146	4,577
Gas - MMBtu	973.78	733.18	469.60
Police Gasoline-gal	1,733	1,947	2,843
Public Works Gasoline-gal	0	0	4,499
Gasoline-gal			
Gasoline - MMBtu			
Diesel- gal	4,003	0	4,000
Heating Oil - Wheeler	0	0	0
Diesel - MMBtu	556	0	556
Soil/Sludge Management			
Cost	\$4,605.00	\$6,129.00	\$5,109.00
Diesel- gal	307	409	341
Diesel - MMBtu	43	57	47
Total - MMBtu	2,722	1,892	2,219



Energy Revolving Fund

Energy Fund Balance With City Hall Solar & Battery Options
(incorporates FY21 capital fund projects)



Principal Income Source – Landfill Solar Array

Financially Supports Future Work

Small Projects Engaged Efficiently

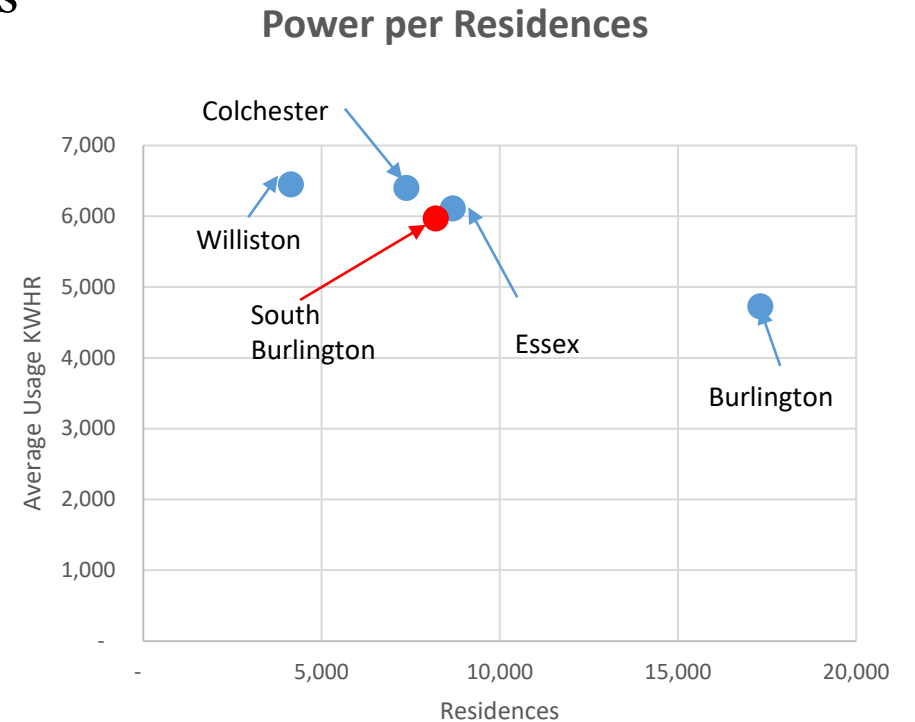
Medium Projects Publically Identified

Large Projects Beyond Scope of Fund

Reconciled With General Ledger Annually

Organizational Activity

- Efficiency Vermont
 - Continually Coordination Regarding Rebate Programs
 - Water Treatment Plant Cohort
 - Monthly Meetings to Coordinate Activity
 - Assists in Funding Energy Studies
 - Plant visits – Best Practices
 - Webinars – on Everything
- Vermont Clean Cities Coalition
 - Federal Funding Through UVM
 - Concentrates on Fossil Powered Vehicles
- CCRPC
 - Data Gathering and Planning



Completed Projects

- **Police Station LED Lighting**

- Capital Cost \$55,292 - \$12,000 = \$43,292
- Average Savings \$4,734
- Project Life 25 Years

- **Power Factor Capacitors**

- Capital Cost \$10,500
- Average Savings \$5,746
- Project Life 15 Years

- **Street LED Lights** – Efficiency Vermont Rebate \$6,000

- **Public Works Insulation & Ventilation**

- **Studies**

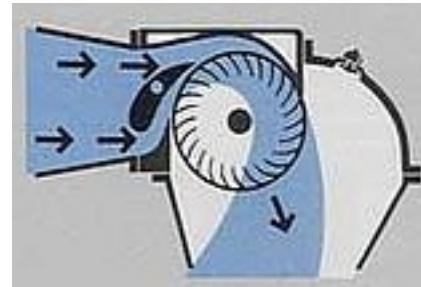
- All Buildings Have Been Surveyed For Potential Projects
- Reaffirmed Results of Previous Studies



Energy Efficiency Is Best Achieved In The Design Process

Where We Are

- **Solar – 180 Market St. –**
 - **Work Authorized**
 - **Battery Use Being Reviewed**
- **FY 21 Capital Fund Projects**
 - **Water Outflow Turbine**
 - **Design in Process**
 - **Construction Planned for 2021**
 - **Constant Power Source**
 - **Produced Power Increases With Need**
 - **Expected Average Power – 20 KW**
 - **Bartlett Bay WTP Upgrade Studies in Process**
 - **Facility Projects**
 - **Dubois & King Studying Gas Projects at Airport Parkway**
 - **Concentration on Thermophilic Digester Complex**
 - **Vermont Gas May Share Costs on Pursued Projects**



Where We Hope To Go

• Water Treatment Plants - Solar

- Learning From 180 Market St. Project
 - Analysis Simpler Than 180 Market St.
 - Construction More Involved
- Directly Addresses Largest Electricity Consumption
- Large Potential Areas Exist
 - Add To Airport Parkway WTP Facility
 - Design Into Bartlett Bay WTP Facility Upgrade



Waterbury Installation



Where We Hope To Go

Fire Station #2 –Holmes Rd.

Built 1970s

Building Looks Good

Insulation Standards Old

Utility Costs - \$20,000 per Year

Recommended Action:

Multiple Studies

Replace Roof, Siding & Windows



Electric Vehicles & Equipment

Procurement decisions should consider:

Technical applicability – use and maintenance

Cost – Purchase and Life Cycle



Where We Hope To Go

Thermophilic Digester Gas Reduction

Big – 30 ft. dia. X 50 ft. tall

Produces Gas That Runs Electric

Generator – Micro Turbine

Constant Temperature 138 F

Largest City Consumer of Natural Gas

Future Plans

Results of Dubois & King Study

Will Vermont Allow Future Use?



Allows The Most Cost Effective and Environmentally
Friendly Waste Stream Around

Summary

- Performance is Being Monitored
- Energy Revolving Fund Supports Continued Progress
 - Integrated With Capital Fund
 - Small Projects Engaged Efficiently
 - Medium Projects Publically Identified – Capital Plan
 - Large Projects Beyond Scope of Fund
- Energy Project Manager Role Should Be Expanded
- Energy Efficiency Is Best Achieved In The Design Process