

Net Zero Energy- Planning and Execution

**PA Municipal League
Sustainability Conference**

**November 3, 2023
Gettysburg, PA**

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Vice President
Forest Hills Borough Council**



The Situation

The Living Earth provides our Life Support System:

- Solar power (stored and incident)
- Fresh Water
- Fertile Ground
- Oxygen-rich Air
- Biodiversity of Species



NASA image

A Call to Action: The laws of Nature are **NOT** negotiable-

- Climate change is **happening now** as a consequence of human actions
- OUR Laws must change to **enable and promote a sustainable economy** instead of promoting fossil extractive industries
- Local government is on the front line for climate response: mitigation and adaptation



"American policy is looking backward to a world that no longer exists."

UNEP Executive Director Achim Steiner

A Case Study in Municipal Climate Action: Forest Hills Borough



Answering a Challenge: Youth Lead!

Building a future for our children

- In 2016 Planning for the Centennial Celebration in 2019
- Updating the Comprehensive Plan from 2003
- Students from WHHS **successfully challenged the School Board to adopt a Climate Action Plan**
- They have organized annual Climate Summit Conferences for Pittsburgh area high school students.



Woodland Hills High School AWESOME 2018 Climate Action Team!

Sequence of Actions:



2016 - 2018- New Municipal Building Decision



2017 - 2019- Updated Comprehensive Plan for Development

Adopted December 2019



2018 - 2020 Climate Action Plan

GESA adopted April 2023 for Borough Buildings to net zero

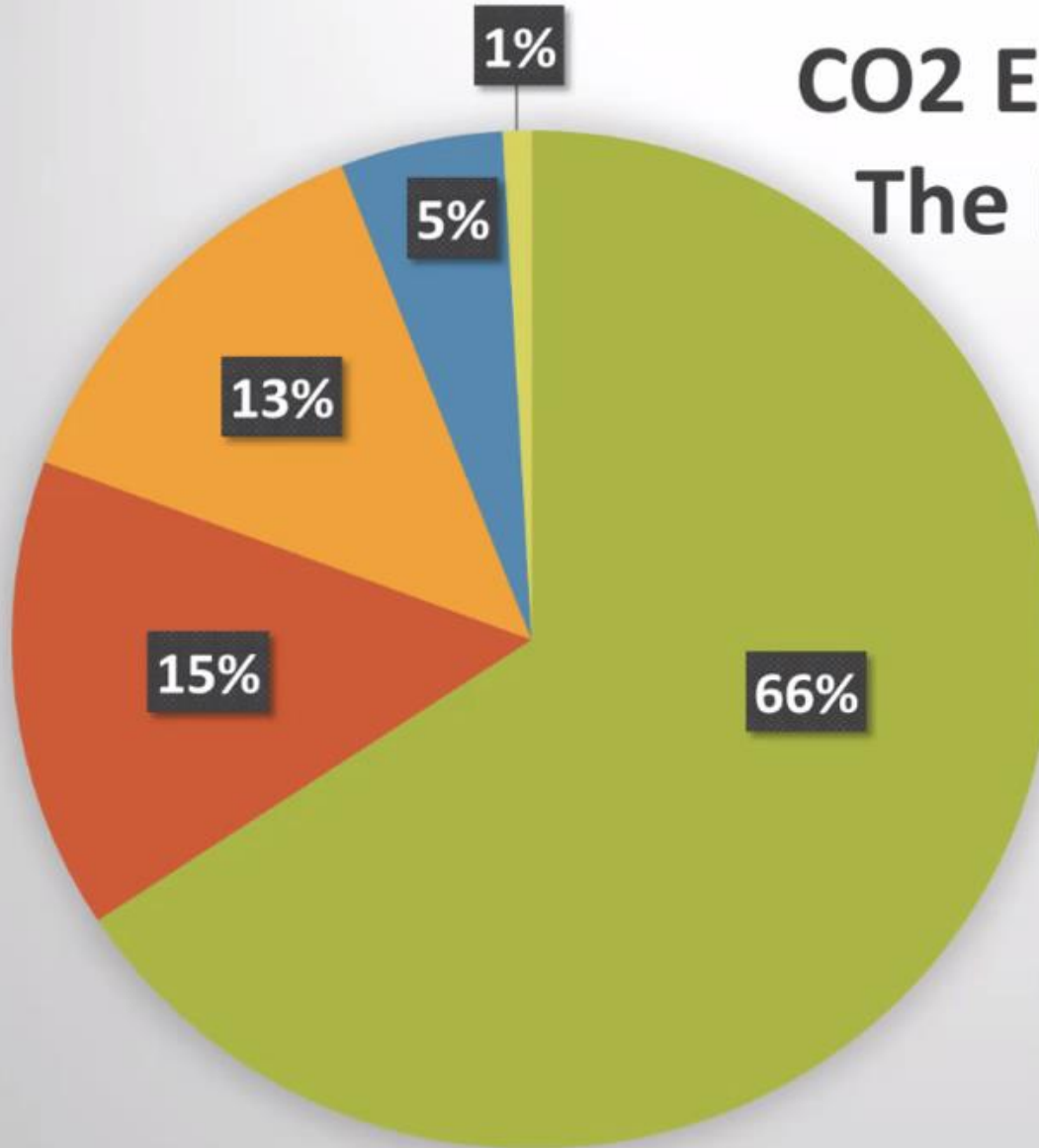


2021 – 2022 Active Transportation Plan

Complete Streets Policy adopted July 2022
35 MPH on Ardmore Boulevard adopted 1-15-2023
Public Stairways and trails grant \$276,000 awarded March 2023

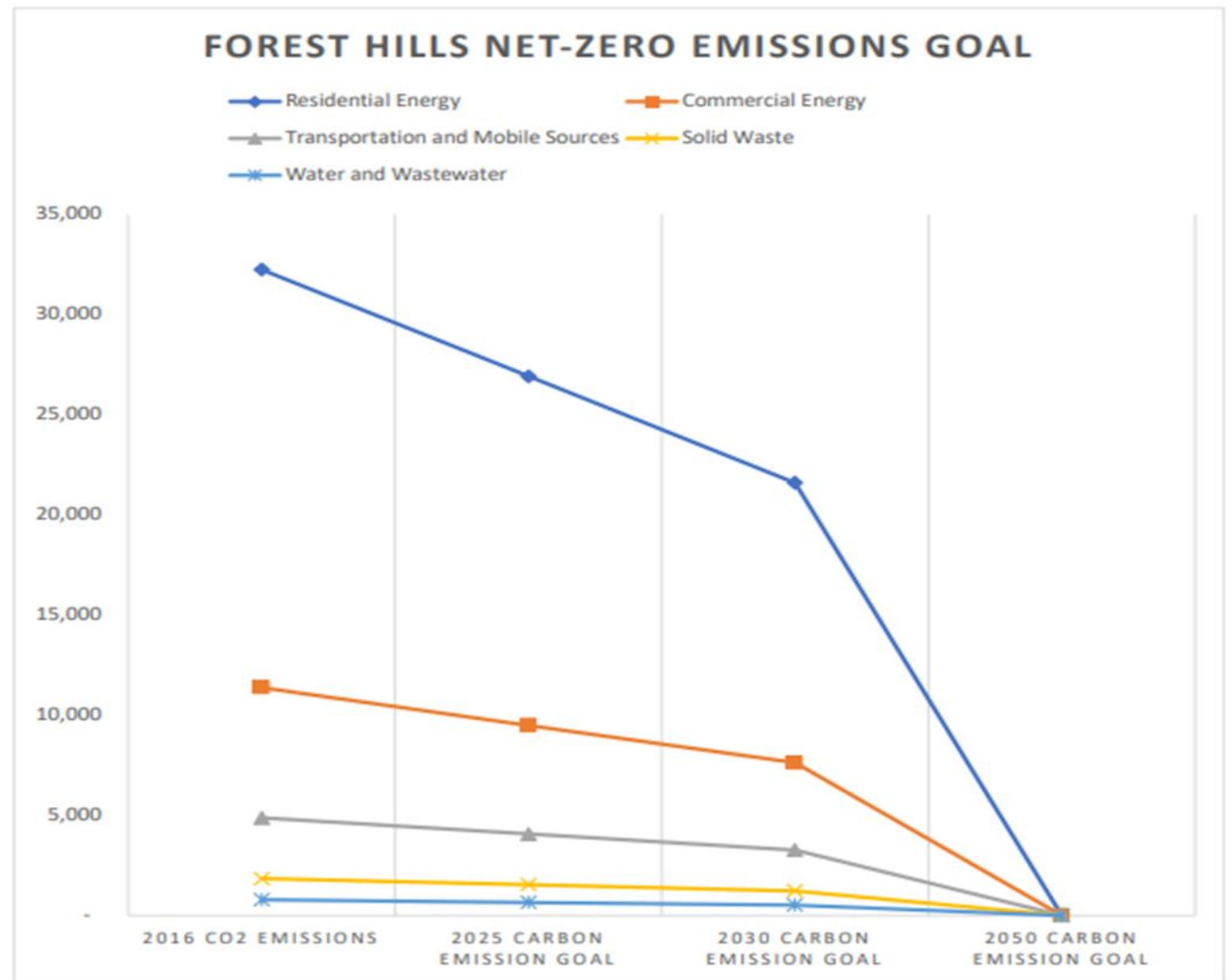
Start with the data:

CO2 Emissions by Category for The Forest Hills Community



- Residential Energy: 23,992 Metric Tons
- Commercial Energy: 5,466 Metric Tons
- Transportation and Mobile Sources: 4,880 Metric Tons
- Solid Waste: 1,849 Metric Tons
- Water and Wastewater: 325 Metric Tons

Establish Goals



Through Proclamation and by action of the Forest Hills Borough Council, we have resolved to adhere to the Climate Action Goals of the Paris Climate Accord of 2015 and **have established a goal of achieving net zero carbon emissions throughout the community by 2050.**

- The **climate vulnerabilities** Forest Hills faces:
 - *Extremes of weather causing summer or winter storm damage,*
 - *Periodic drought effects, and*
 - *Landslide vulnerability over 40% of the land area.*
- Mitigating these already experienced and likely increasing vulnerabilities drives the priority actions in this plan



Planning Goals

- Fiduciary responsibility – consider the future taxpayers for the life of the building
- Co-locating functions
- Accessibility
- Environmentally Efficient: energy & water
- Community Priorities:
 - *No Tax Increase*
 - *Better Service*
 - *Preserve history*
 - *Green design*



September 2015 Planning Begins

Performance Improvement

- Current building O&M = \$2.21/Ft²
(2041 Ardmore Boulevard)
- Conventional Building O&M = \$1.47/Ft²
- Passive Design O&M = \$0.97/Ft²
- New Building parameters:
 - *12,746 Ft²*



The Financing Decision: \$5.02 Million

1. Availability of land for a new building + sale of existing properties to add to tax base (\$550,000)
2. Favorable bond environment and capacity to borrow a portion of the cost (\$3.58 million)
3. Allocated some costs to Corrective Action budget for storm water management (\$350,000)
4. Allocated a portion of the dedicated paving budget for the new paving requirement (\$340,000)
5. Capital Budget and Budget Reserves (\$700,000)
6. CITF Grant for the Library (\$200,000)

(Note: the Inflation Reduction Act of 2022 now provides 30% DIRECT solar savings to municipalities, no more need for a third-party financing Power Purchase Agreement)

Functionality Guided Design

Multi-Functional Space

12,748 square feet

Administration

Council Chamber

Police Station

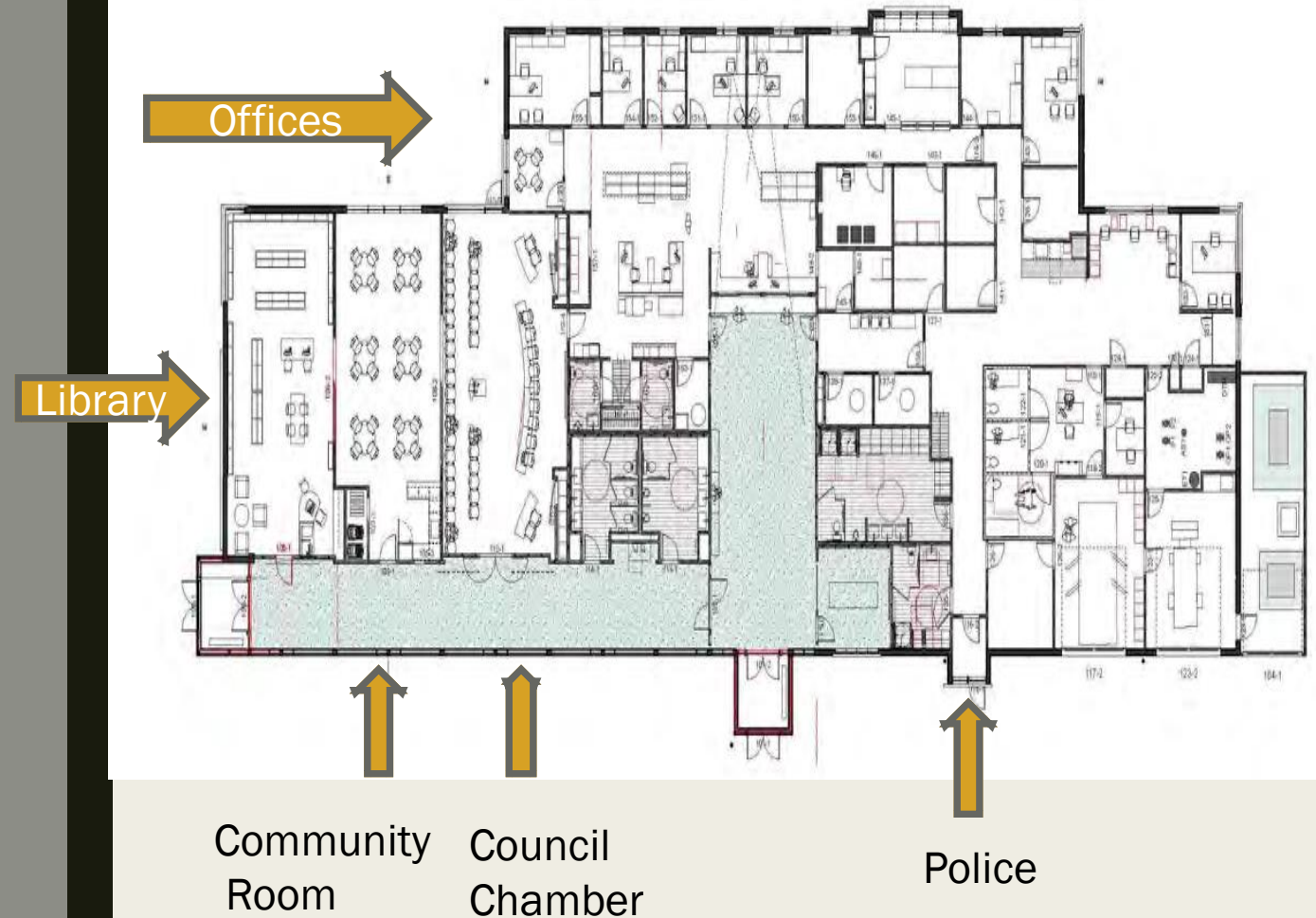
CC Mellor Library

Community Room

Flexible walls

November 3, 2023

<https://patriciademarco.com>



Passive Solar Design + Water Conservation

- Geothermal Wells for HVAC
- High Value Insulation
- Natural materials & Finishes
- Photovoltaic Roof
- Rain gardens & Sloped pavement
- Bio-swales

Zoning Variance required

We adopted new Zoning Ordinance to add solar as allowable auxiliary use on Residential and Commercial zoned property



Net Zero Energy Averaged over a year

DLC
DUQUESNE LIGHT CO.

FOREST HILLS BOROUGH
4400 GREENSBURG PIKE
Account # 2732-117-435

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Due Date	Amount Due
09/02/2021	\$0.00

Usage and Demand

Period	Total kWh Usage	Avg Daily kWh Usage	# of Days	Avg Daily Temp (F)
Current Month	-13927	0	29	73
Last Month	-16784	0	32	75
Same Month Last Year	-28711	0	59	78

kWh:

Average Monthly Usage for the last 12 months: -5216 kWh
Total Annual Usage for the last 12 months: -62593 kWh

Bill Summary

Bill ID: 273400335121 Date Prepared: 08/17/2021

Previous Account Balance	-\$6,131.68
Payment(s) Received	\$0.00
Balance Forward	-\$6,131.68
DLC Charges	\$174.62
Supply Charges	\$31.45
NEW ACCOUNT BALANCE	-\$5,925.61
AMOUNT DUE BY 09/02/2021	\$0.00

Message Center

Signing up for DLC's e-Bill program is fast and easy! Enroll today at DuquesneLight.com/ebill and you'll receive an email each month when your bill is available.

Duquesne Light partners with Dollar Energy Fund to provide assistance to customers who struggle to pay their electric bill. If you would like to support the Dollar Energy Fund and your neighbors in need, make a tax deductible monthly pledge at DuquesneLight.com/dollar.

Billing Demand:

DOLLAR ENERGY FUND RECEIVED
AUG 23 2021
FOREST HILLS BORO

- The building uses electricity from the Duquesne Light grid when requirements exceed Solar PV output
- Shows solar generation exceeds building energy use on annual basis
- The Net Billing Tariff allows annual averaging

Next Steps: Net Zero Borough Operations






- **A Net Zero Emissions goal for all Borough Buildings**
- Under PA Guaranteed Energy Savings Act 62 Pa C.S. §3751 Interviewed four providers
- **Contracted with Siemens Infrastructure Group-** Conducted Engineering Audits of all eight Borough buildings
- Identified a total project cost of \$3.2 Million
- Forest Hills contributes \$450,000 from Capital Budget + Solar Benefits of IRA funds
- Siemens finances the balance against savings projections by contract over 20 years



Siemens Industry, Inc.

GHG Emissions reductions from GESA Program in Forest Hills Borough Buildings

Resulting Greenhouse Gas (GhG) Emission Reductions Projected Annual Avoided Emission (CO²) Production

Utility & Reductions Over Time 	Annual GhG Emission Reductions (Lbs.) 	Pounds of Coal Not Burned 	Gallons of Gasoline Not Consumed 	Barrels of Oil Not Consumed 
Electric	405,270	256,707	25,787	530
Natural Gas	99,966			
Totals (Annual):	505,236	256,707	25,787	530
Totals (20 Years):	10,104,720	5,134,140	515,740	10,600

Siemens_Forest Hills GESA IGA Report 6-20-2023

Thanks to the Team!

NZE Borough Building:

Rob Pfaffmann & Associates- Architect
Volpatt Construction – General Contractor
EIS Solar for PV system interface

Energy Efficiency Upgrades:

Siemens Infrastructure Group
EIS Solar

Steve Morus- Forest Hills Borough Manager

Forest Hills Borough Council

2016-2023



Groundbreaking for the new Borough Building

Thank You!

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Siemens Infrastructure Group