West Chester's Energy Future

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West Chester’s RF100 Pledge

- Approved in 2017
- 100% Clean Electricity 2035
- 100% Clean Energy, Heat and & Transportation 2050
- For ENTIRE community - some adjacent townships also approved
- How? Consultant hired to write a region-specific plan for WC Borough and five surrounding townships in 2019-2020
WCA Energy Consumption by Sector, Fuel

- Maximize Energy Efficiency
- Electrify Everything
- Build Very Efficient
- Buy Renewable
WCA Energy Consumption by Sector, Fuel

- **Transportation**: 40%
- **Commercial and Industrial**: 37%
- **Residential**: 23%

Energy Consumption (MMBTU):
- **Residential Buildings**
  - Gasoline
  - Diesel
  - Electricity
  - Natural Gas
  - Propane
  - Fuel Oil
- **C&I Buildings**
  - Gasoline
  - Diesel
  - Electricity
  - Natural Gas
- **Transportation**
  - Gasoline
  - Diesel
  - Electricity
  - Natural Gas
  - Propane
  - Fuel Oil
WCA Energy Consumption by Sector, Fuel

- Gasoline: 35.12%
- Natural Gas: 21.81%
- Electricity: 27.42%
- Fuel Oil: 9.95%
- Diesel: 3.67%
- Propane: 1.03%
- Coal: 5.59%
- Nuclear: 10.55%
- Renewable: 1.36%
- Petroleum: 0.05%
- Other: 0.16%
Electrifying Transportation

Consider the following: EVs have achieved price parity
Electrifying Transportation

Consider the following: Fuel costs are 50-75\% less than ICE (DOE)
Electrifying Transportation

Consider the following: EVs cost 26% less to maintain than ICE (AAA)
Electrifying Transportation

Consider the following: EVs are now badass
Electrifying Transportation

Consider the following: Progress on Medium & Heavy Duty
Local Government’s Role?

Electrify fleet, build public charging infrastructure
RESIDENTIAL & SMALL COMMERCIAL BUILDINGS
West Chester’s RF100 Pledge

- Maximize Energy Efficiency
- Electrify Everything
- Build Very Efficient
- Buy Renewable
Energy At Home

- PECO Smart Ideas Audit
- DIY & High ROI
  - LED Lighting
    - Smart thermostat and use it!
    - Reflective roof
    - Hang dry your clothes - $70/year destroying our clothes in the dryer
- Hire a pro - decent ROI
  - Air sealing & insulation
- Upon replacement - good ROI but not a proactive choice
  - Efficient appliances
  - Efficient HVAC - i.e. Heat Pumps!
Heat Pumps

Gigantic Atlantic Coast Gas Pipeline Done In By Humble Household Heat Pump

July 6th, 2020 by Tina Casey

NORTH CAROLINA ROUTE
New Construction
Local Government’s Role?
ENERGY SUPPLY
Energy Supply

Planned U.S. electric generating capacity additions (2020)
gigawatts (GW)

Source: U.S. Energy Information Administration, Preliminary Monthly Electric Generator Inventory
Levelized Cost $/MWH
Levelized Cost \$/MWH

<table>
<thead>
<tr>
<th>Year</th>
<th>Gas—Combined Cycle (32%)</th>
<th>Wind (70%)</th>
<th>Solar PV—Crystalline (89%)</th>
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<tbody>
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<td>$109</td>
<td>$91</td>
<td>$56</td>
<td>$41</td>
</tr>
<tr>
<td>$41</td>
<td>$40</td>
<td>2019</td>
<td></td>
</tr>
</tbody>
</table>

2009 to 2019 graph showing cost trends for different energy sources.
• WCB and five surrounding townships released an RFI in October
• Responses due Friday after next
• If successful we’ll solicit a power purchase agreement through a full RFP 1Q 2021
• Most likely a Virtual PPA
  • Offset our electricity use via new, regional clean energy placed on grid
The Intermittency Issue
Energy Storage

Lithium-ion battery price outlook

Lithium-ion battery pack price (real 2018 $/kWh)

- Observed prices
- 18% learning rate

2010 2015 2020 2025 2030

2024 implied price $94/kWh
2030 implied price $62/kWh

Source: BloombergNEF
Seasonal Intermittency
Seasonal Intermittency

- Efficiency
- Heat Pumps
- On-site solar
- Offshore wind?
- Nukes?
- Gas Peakers?
We don’t have to figure it out alone!

- Ambler
- Cheltenham
- Conshohocken
- Downingtown
- East Bradford
- East Pikeland
- Haverford
- Kennett Square
- Narberth
- Norristown
- Phoenixville
- Plymouth Meeting
- Radnor
- Reading
- Schuylkill
- Springfield
- State College
- Swarthmore
- Tredyffrin
- Upper Merion (KoP)
- Uwchlan
- Whitemarsh

U.S. population committed to 100% clean energy over time

Sourced using 2016 census. Incremental population for 100% states is reduced by the cities previously committed to 100% clean energy in those states, so as not to double count.
THANKS!