2020

Ambler Borough Strategic Plan: Transition to 100% Renewable Energy from 2020 to 2050

Developed by:

Ambler Borough
Council,
Planning Commission,
Environmental Advisory Council,
Code Enforcement,
the Montgomery County
Planning Commission,
and the General Public

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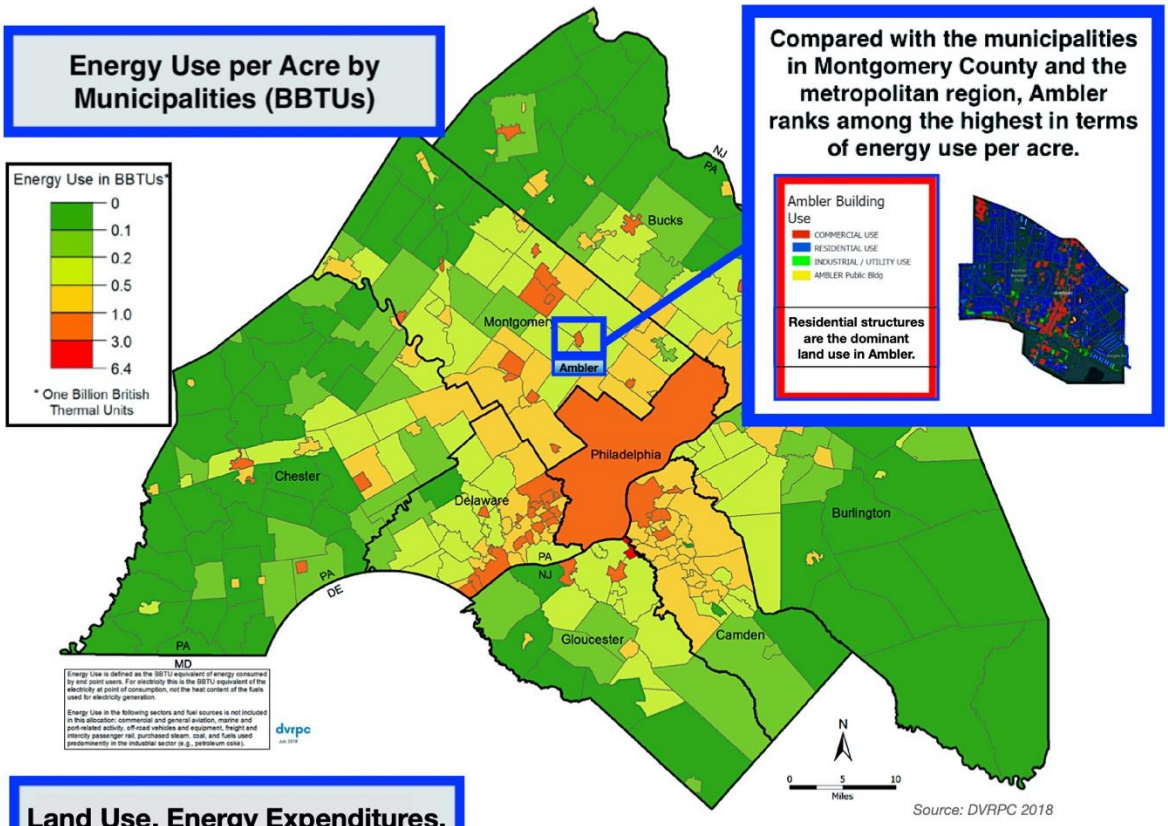
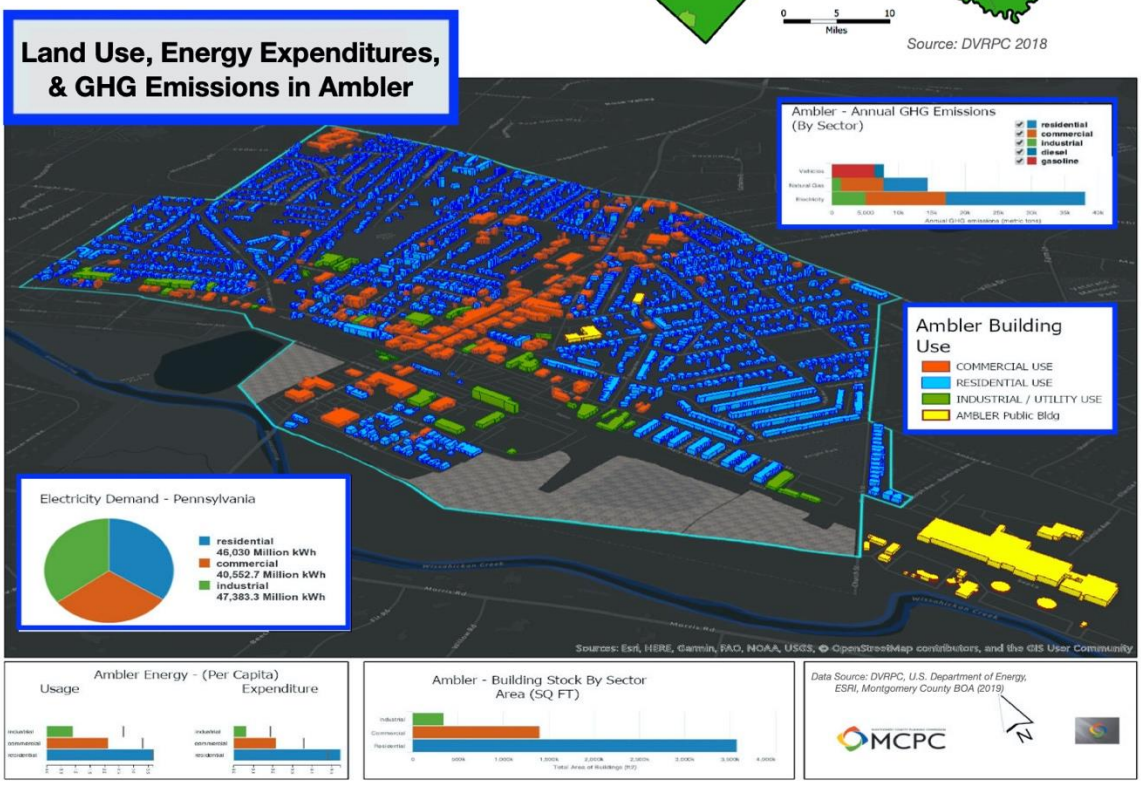

Energy Use per Acre by Municipalities (BBTUs)
Energy Use in BBTUs*
0
0.1
0.2
0.5
1.0
3.0
6.4
* One Billion British Thermal Units
Compared with the municipalities in Montgomery County and the metropolitan region, Ambler ranks among the highest in terms of energy use per acre.
Ambler Building Use
COMMERCIAL USE
RESIDENTIAL USE
INDUSTRIAL / UTILITY USE
AMBLER Public Bldg
Residential structures are the dominant land use in Ambler.
Bucks
Montgomery
Ambler
Philadelphia
Chester
Delaware
Burlington
Gloucester
Camden
PA
NJ
DE
MD
N
0 5 10
Miles
dvrpc
Source: DVRPC 2018


Land Use, Energy Expenditures, & GHG Emissions in Ambler
Ambler - Annual GHG Emissions (By Sector)
residential
commercial
industrial
diesel
gasoline
Ambler Building Use
COMMERCIAL USE
RESIDENTIAL USE
INDUSTRIAL / UTILITY USE
AMBLER Public Bldg
Electricity Demand - Pennsylvania
residential
46,030 Million kWh
commercial
40,552.7 Million kWh
industrial
47,383.3 Million kWh
Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
Ambler Energy - (Per Capita)
Usage
Expenditure
Ambler - Building Stock By Sector
Area (SQ FT)
Data Source: DVRPC, U.S. Department of Energy, ESRI, Montgomery County BOA (2019)
MCPC
N

RESOLUTION NO. 2019-03

Borough of Ambler, Montgomery County, PA
Ready for 100% Renewable Energy Resolution
"A Vision for a 100% Clean Renewable Energy Future"

WHEREAS: Climate change is a global long-term threat to civilization and Earth's living ecosystems;
WHEREAS: More frequent and extreme weather events will become commonplace;
WHEREAS: A major contributor to climate change is the continued use of fossil fuels by individuals, businesses and government agencies;
WHEREAS: Climate change impacts will test our infrastructure, emergency and social services; threaten our access to food, water and energy supplies; and heighten disruption of services, commerce and quality of life;
WHEREAS: The 2015 United Nations Climate Change Conference in Paris resulted in a consensus among all 195 countries to limit the increase in global average temperatures to well below 2°C, ensure that greenhouse gas emissions will not exceed sinks (total carbon capture) by the second half of this century, and become carbon neutral between 2050 and 2100;
WHEREAS: Ambler Borough has demonstrated a commitment to reducing its energy usage by

- Upgrading Borough facility lighting and traffic signals to light-emitting diodes (LEDs), resulting in reduced energy usage and costs
- Implementing a feasibility study performed by the Delaware Valley Regional Planning Commission's Regional Streetlight Procurement Program (RSLPP) and Keystone Lighting Solutions, and initiating the Project Development Phase of their plan to replace all Borough streetlights with LEDs
- Participating in a PECO energy assessment for Borough facilities
- Submitting grant applications for electric vehicles and solar panels;

WHEREAS: Ambler Borough's Government has publicly resolved to make renewable energy a key element of our communities' energy plans, and openly pledged to adopt, honor, and uphold the commitments to the goals enshrined in the Paris Climate Accord;
WHEREAS: Ambler Borough recognizes that it has a responsibility to future generations to take an active stand to reduce the emission of greenhouse gases within the Borough, and Ambler Borough is committed to be a community characterized by equality, health, safety, livability, prosperity and equity;
WHEREAS: The best strategy for achieving a cost effective, even cost saving, energy source transition is through collaboration with other Montgomery County energy leaders and participating in aggregated procurement contracts - Power Purchase Agreements (PPAs) for regional wind and solar energy; to this end, Ambler Borough also recognizes the importance of developing a close, working relationship with its electric energy supplier(s) to create the most advantageous and mutually beneficial plan for integrating locally generated and renewable power;

WHEREAS: A renewable energy initiative can produce energy cost savings for residents and local businesses while stimulating growth in a green economy and creating local jobs, while simultaneously mitigating the risks from climate change for everyone;

NOW, THEREFORE, BE IT RESOLVED THAT:

● Ambler Borough will join other leading towns and cities in the national Ready for 100 movement, to transition to 100% clean, renewable energy for all, and complete this transition to

- 100% clean renewable electricity by 2035
- 100% clean renewable energy when replacing heat & transportation equipment & vehicles by 2050
- As vehicles are replaced, priority will also be given where possible to transitioning the Ambler Borough vehicle fleet to 100% renewable energy sources by 2030;

● The Ambler Borough Environmental Advisory Council (EAC) will work with Borough Council and other local RF100 municipalities to draft an energy transition plan by April 22, 2020 (Earth Day) for achieving these goals. Such a plan could include interim milestones, financial impacts, equity metrics, potential financing mechanisms, and the percentage of renewable energy that is locally produced;

● Renewable energy will be defined as carbon-free and pollution-free energy generated sustainably from renewable sources such as wind, solar, small hydro, tidal, fuel cells and geothermal;

● Locally produced and distributed energy is prioritized whenever feasible for the many advantages it provides to the community;

● All Ambler Borough stakeholders will have the opportunity and will be encouraged to participate in the planning and implementation process;

● Ambler Borough calls on the Commonwealth of Pennsylvania to set a goal to use 100% renewable energy for all purposes no later than 2050; to adopt codes and standards to increase the efficiency of buildings and appliances; and to increase the Alternative Energy Portfolio Standards to levels that put us on track to meet 100% renewable energy goals;

● Ambler Borough commits to working with other Montgomery County Municipalities and the Montgomery County Planning Commission and/or Delaware Valley Regional Planning Commission to create an energy planner/advocate position. The energy planner/advocate will develop and implement renewable energy strategies for Montgomery County municipalities, residents, businesses, and institutions. This energy planner advocate would serve for 3 years at an approximate cost of $100,000 per year, to be funded by a minimum 15 participating municipalities and available grant support;

● For their renewable energy commitment, we commend the municipalities of Phoenixville, West Chester, Downingtown, Uwchlan, Kennett, and East Bradford in Chester County; Haverford and Radnor in Delaware County; along with Springfield, Bridgeport, and Whitemarsh in Montgomery County, for being leaders in setting goals for the transition to renewable energy in their communities. Across the United States, over 100 towns and cities have committed to 100 percent clean, renewable energy so far.

- **Implementation Recommendations**

This report is considered a "living document" that will be updated as the latest information becomes available. The planning process is iterative by design, but even the best-laid plans can sit dormant with no strategy for implementation. This table is intended to serve as a guide for borough staff and Council members as funding and other resources become available:

	OBJECTIVES	ACTION ITEMS
II.K	SIDEWALK CONNECTIONS	Coordinate with property owners and various agencies to fill in the missing gaps within the borough sidewalk network.
II.L	BIKE LANES & RACKS	Work with Bike Montco to evaluate possible locations for bike lanes & racks, and ways to make streets safer for cyclists.
IV.	SOLAR POWER	Evaluate the cost and liability of locally sourced solar panels on borough-owned buildings.
IV.A	SOLAR FARM OPPORTUNITIES	Coordinate with large vacant property owners along with State and Federal agencies on the possibility of converting unused properties into economically productive parcels for the use of a solar farm.
IV.B	SOLAR PARKING CANOPIES	Evaluate the potential for elevated structures that host solar panels and provide shade to be installed in parking lots or other paved areas, including but not limited to borough-owned lots, and reaching out to SEPTA for consideration within the train station lots.
IV.C	SOLSMART	Work toward achieving SolSmart designation. SolSmart provides no-cost technical assistance to evaluate programs and practices that impact solar markets and identify opportunities for improvement.
V.A	ELECTRIC VEHICLES	Evaluate the cost and performance comparison when purchasing and budgeting for all new vehicles.
V.C	EV CHARGERS	Continue to install EV chargers in the borough to keep up with the demand for residents, visitors, and borough fleet.
VI.A	LED LIGHTING	Continue encouraging the use of LED lighting in private residences, individual businesses, and public property.
VI.B	PECO ASSESSMENTS	Increase advertisement for free PECO energy assessments to help residents increase their efficiency and reduce energy costs.
VI.D	WEATHERIZATION	Look into weatherization of existing borough-owned facilities.
VII.H	CODES & STANDARDS	As Ambler moves towards 100% renewable energy, the borough should coordinate code standards with specific benchmarks and goals of increasing overall energy efficiency.

I. Executive Summary

Ambler Borough is a thriving community in the heart of Montgomery County, PA. On March 19, 2019 Borough Council passed a Ready for 100% Renewable Energy Resolution, with the intention of transitioning all borough-owned property away from fossil fuels and towards sustainable energy sources by the year 2050. Council then asked Ambler's Planning Commission to develop a Strategic Transition to Renewable Energy Plan, with the intention of turning it over to a professional advocate, perhaps at the county level, who would ensure continuity between the RF100 plans of surrounding municipalities with similar aspirations. This Strategic Transition to Renewable Energy Plan was approved by the Planning Commission on July 28, 2020. Council approved the plan on October 20, 2020.

The people of Ambler Borough understand the science behind climate change and embrace their responsibility to turn the tide for the sake of future generations. Additionally, data and guidance from both the federal and state levels of government support the development of this planning effort.

> "Rising global average temperature is associated with widespread changes in weather patterns. Scientific studies indicate that extreme weather events such as heat waves and large storms are likely to become more frequent or more intense with human-induced climate change."
>
> EPA - Climate Change Indicators: Weather and Climate

> The Pennsylvania Department of Environmental Protection (PADEP) indicates that municipalities should expect climate change impacts related to energy demand.
>
> PADEP - Climate Change Impacts

> In October of 2019, Pennsylvania Governor Tom Wolf took executive action integrating climate change, greenhouse gas emissions, and energy planning. "Climate change is the most critical environmental threat confronting the world, and power generation is one of the biggest contributors to greenhouse gas emissions." – Governor Tom Wolf
>
> Executive Order (2019) Gov. Wolf

Planning for the future of renewable energy in Ambler with a data driven approach can begin to meet the challenges posed by climate change and extreme weather events on Ambler's energy sources and consumption. Both Ambler's RESOLUTION NO. 2019-03 *Ready for 100% Renewable Energy Resolution* as well as the development of this *Ambler Borough Strategic Plan: Transition to 100% Renewable Energy from 2020 to 2050* are consistent with current guidance at both the state and federal levels.

The borough is already making changes in this direction with Electric Vehicle Chargers, LED Streetlights, and Stormwater Management. Ambler continues to be a local leader in the field of sustainability, in large part due to the volunteer efforts of our Environmental Advisory Council.

The Planning Commission discussed a wide range of options during their public meetings on this topic with Ambler's County Planner, Michael Lowrey, and Code Enforcement Officer, Glenn Kucher. Conservation opportunities, potential solar panel locations, electric vehicle availability, and possible ordinance language were all considered. The Commission wishes to thank Councilwoman DiPietro, Mr. Lowrey, and Mr. Kucher for their enthusiastic support of this project, as evidenced by their extensive research and impressive synthesis of a high volume of informational material.

II. Background Data

II.A Regional Context

The Borough of Ambler is located in the eastern portion of Montgomery County, east of the Wissahickon Creek and approximately 20 miles from Center City Philadelphia. One of only 21 boroughs in the county, Ambler is a denser, older, and generally a more built-out community than the neighboring townships. The density associated with more urban development patterns like those in Amber could possibly provide unique opportunities for success in the borough's energy planning efforts. It is comprised of 0.85-square-miles bordering Whitpain Township to the west, Lower Gwynedd Township to the north, and Upper Dublin Township to the south and east.

II.B Transportation Network Routes

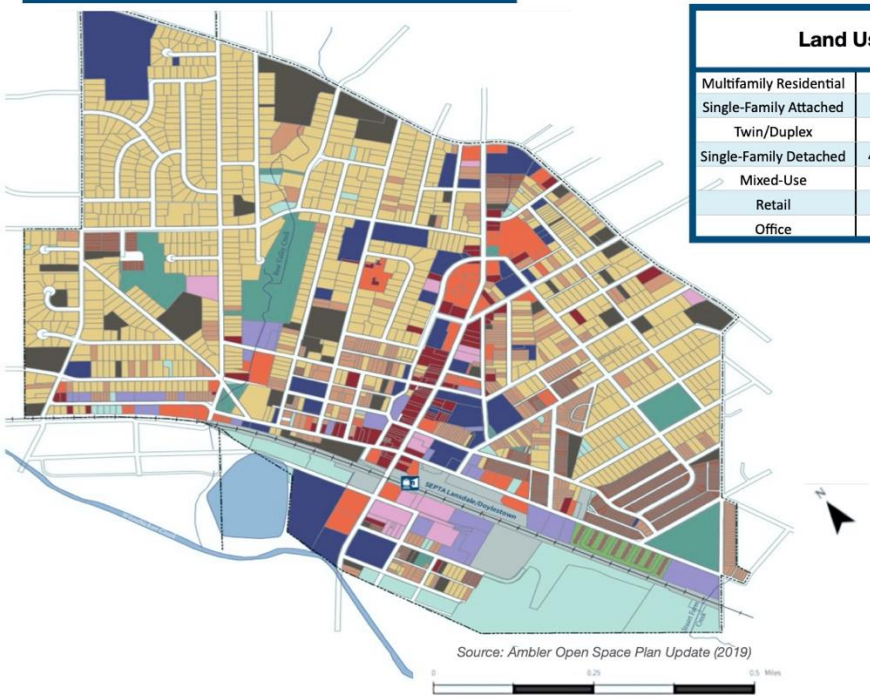
The major arterial roadways connecting Ambler to the region include the PA Turnpike at the Fort Washington Interchange and PA Routes 73 and 309. These roads provide access to significant regional hubs including King of Prussia, Plymouth Meeting, Willow Grove, and Horsham. SEPTA's Lansdale/Doylestown Regional Rail line stops in Ambler providing access to Lansdale, Doylestown, and Bucks County to the north. Southbound trains are within 30 minutes of Temple University and 45 minutes of 30th Street Station, which is Philadelphia's largest transit hub. Two SEPTA bus routes reach the borough; Routes 94 and 95 connect Ambler to Chestnut Hill, Montgomery Mall, Gulph Mills, and Willow Grove.

II.C Land Use

Ambler has an urban character with little undeveloped space. Ambler has been predominantly built-out since the 1960s, leaving little room for new development. Changes in land use are generally the result of infill development or changing uses to existing properties. Residential uses are the most prominent, and single-family detached homes are most common. The most recent authoritative land use breakdown is as follows:

Land Use			
Multifamily Residential	6.7% (30 Acres)	**Industrial**	3.4% (24 Acres)
Single-Family Attached	5.1% (21 Acres)	**Institutional**	9.3% (41 Acres)
Twin/Duplex	7.5% (32 Acres)	**Utilities**	2.5% (8 Acres)
Single-Family Detached	42.0% (185 Acres)	**Undeveloped**	8.7% (35 Acres)
Mixed Use	3.0% (14 Acres)	**Public Open Space**	5.2% (23 Acres)
Retail	4.4% (18 Acres)	**Private Open Space**	0.7% (4 Acres)
Office	1.4% (7 Acres)		Source: MC Board of Assessment

Existing Land Use

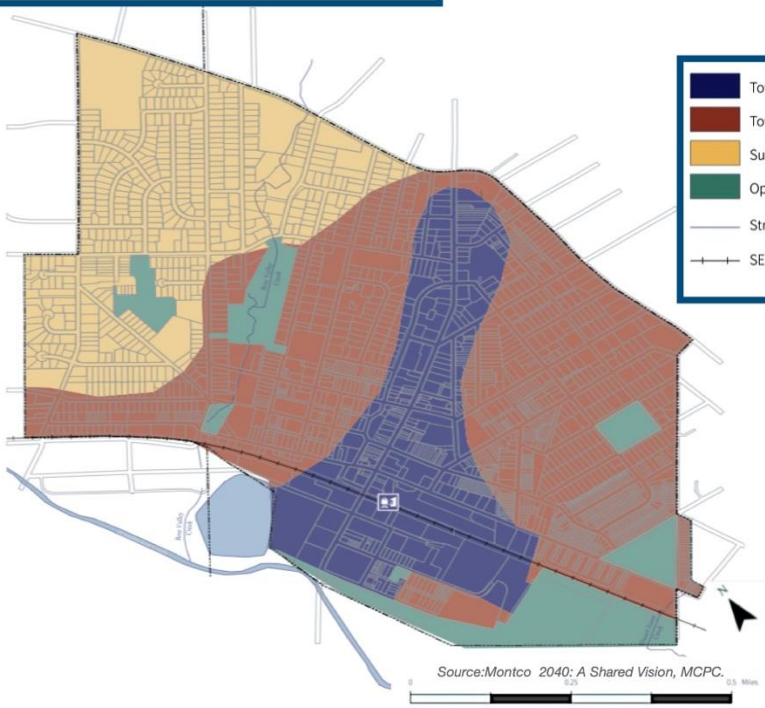


Land Use Composition

Multifamily Residential	6.7%	Industrial	3.4%
Single-Family Attached	5.1%	Institutional	9.3%
Twin/Duplex	7.5%	Utilities	2.5%
Single-Family Detached	42.0%	Undeveloped	8.7%
Mixed-Use	3.0%	Public Open Space	5.2%
Retail	4.4%	Private Open Space	0.7%
Office	1.4%		

- Multifamily
- Single-Family Attached
- Twin/Duplex
- Single-Family Detached
- Mixed Use
- Retail
- Office
- Industrial
- Institutional
- Utilities
- Undeveloped
- Public Open Space
- Private Open Space

Future Land Use



- Town Center
- Town Residential Area
- Suburban Residential Area
- Open Space
- Streams
- SEPTA Regional Rail Lansdale/Doylestown Line

Despite being mostly developed, about 8.7% of the land in Ambler is undeveloped—much of this is the underutilized industrial land along the rail corridor. As remediation efforts continue and proposals for the redevelopment of these areas come to fruition, the borough's land use composition is likely to shift to some degree. The Ambler Wastewater Treatment Plant (WWTP), located along the rail corridor, processes 6.5 MGD (million gallons per day) of potable water servicing borough residents as well as the Townships of Upper Dublin, Lower Gwynedd, Whitemarsh, and Whitpain.

II.D Future Land Use

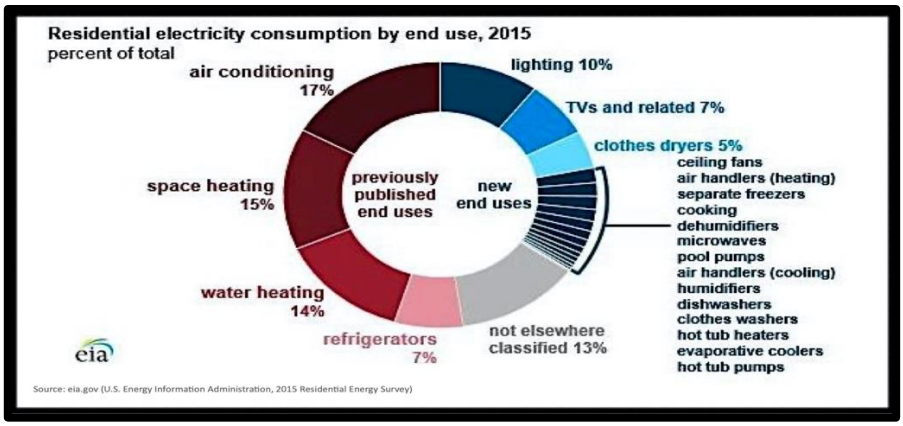
The anticipated distributions of future land uses for Ambler are detailed by The Montgomery County Planning Commission (MCPC) Comprehensive Plan, *Montco 2040: A Shared Vision*. The plan uses existing land use patterns and known development trends to create general land use categories based on the intended character, function, and intensity of an area. The dominant future land use categories projected for Ambler are Town Center, Town Residential, and Suburban Residential. Town Center comprises the areas adjacent to both Butler Avenue and the rail corridor and represents the highest density of structures and dwelling units. These three categories cover similar amounts of land area, with the category of Open Space comprising the limited remainder of land in the borough.

Redevelopment and revitalization efforts along the rail corridor represent a unique opportunity to shape Ambler's future climate resiliency and energy efficiency. Redevelopment at the Ambler Boiler House is a perfect example. The project employs numerous sustainable design strategies: it's transit-oriented, an example of adaptive reuse, a case for brownfield redevelopment and a showcase for creative financing. With its LEED Platinum certification, energy efficiency can be added to the list. LEED-mandated features include a geothermal well, high-efficiency glass, and a reflective roof system. The Station Square townhomes are another example of infill that reflects Transit Oriented Design, which represents a type of energy efficient development that can be emulated in other areas. Developments that foster pedestrian and public rail modes of transportation decrease energy consumption, carbon emissions, and the overall reliance on fossil fuels in the borough.

The Ambler Asbestos Pile and BoRit Superfund sites adjacent to the rail corridor could become sustainable energy assets and serve as unique opportunities for future transformative development. Local programs under the guidance of federal programs could be explored. The EPA's *RE-Powering America's Land Initiative* encourages renewable energy development on current and formerly contaminated lands, landfills, and mine sites when such development is aligned with the community's vision for the site. The Initiative identifies the renewable energy potential of these sites and provides other useful resources for communities, developers, industry, state, and local governments - or anyone interested in reusing these sites for renewable energy development.

II.E Housing

Buildings are a primary driver of energy consumption totals for an area or region and the majority of the buildings in Ambler are residential. In the U.S., residential and commercial sectors of the country account for about 40% (or about 40 quadrillion British Thermal Units) of the total energy consumption. Energy consumption by the commercial sector also includes street and other outdoor lighting, and water and sewage treatment. However, these energy uses are relatively small contributors to the commercial sector's total energy consumption. (Source: USDOE)



The 2013-2017 estimates from the US Census Bureau (ACS) indicate a total of 2,650 households and 2,719 housing units in Ambler. About 50% or 1,313 of those units are renter occupied and 85% pay utilities as an additional cost to rent. The average gross rent is $1,067. As buildings are a primary driver of energy consumption in the borough, the following data generated from ESRI and the ACS can inform strategies for energy baseline comparison, as Ambler moves towards its 100% renewable goals. Data includes number of units by type, year built, tenure, heating fuel type, and number of available vehicles by ownership type.

HOUSING UNITS BY UNITS IN STRUCTURE		
Total	2,719	100.0%
1, detached	923	33.9%
1, attached	687	25.3%
2	303	11.1%
3 or 4	283	10.4%
5 to 9	88	3.2%
10 to 19	93	3.4%
20 to 49	118	4.3%
50 or more	214	7.9%
Mobile home	10	0.4%
Boat, RV, van, etc.	0	0.0%

- Attached homes tend to be more energy efficient
- Encouraging this development in the future can decrease overall consumption.

HOUSING UNITS BY YEAR STRUCTURE BUILT		
Total	2,719	100%
Built 2014 or later	0 0.0%	0.0%
Built 2010 to 2013	18	0.7%
Built 2000 to 2009	123	4.5%
Built 1990 to 1999	39	1.4%
Built 1980 to 1989	136	5.0%
Built 1970 to 1979	154	5.7%
Built 1960 to 1969	341	12.5%
Built 1950 to 1959	575	21.1%
Built 1940 to 1949	300	11.0%
Built 1939 or earlier	1,033	38.0%

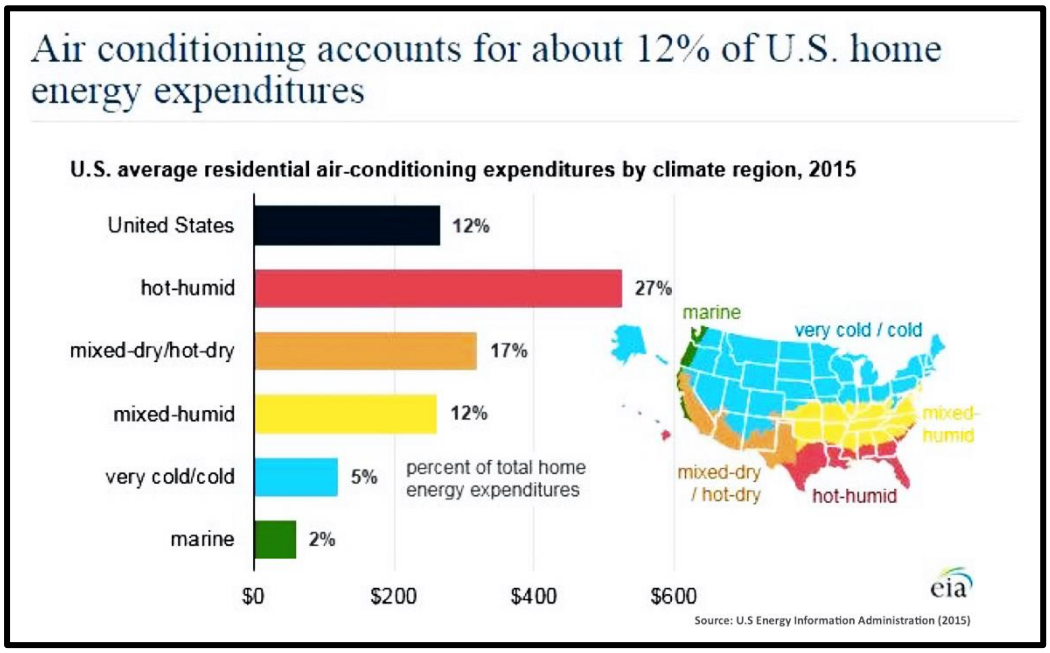
- Older structures are generally less efficient.
- 38% of residential structures in Ambler were built before 1939.
- As redevelopment of older structures occurs, incentives and regulatory guidelines can increase the share of renewable heating sources in residences.

OCCUPIED HOUSING UNITS BY YEAR HOUSEHOLDER MOVED INTO UNIT		
Total	2,650	100.0%
Owner occupied		
Moved in 2015 or later	69	2.6%
Moved in 2010 to 2014	205	7.7%
Moved in 2000 to 2009	393	14.8%
Moved in 1990 to 1999	284	10.7%
Moved in 1980 to 1989	171	6.5%
Moved in 1979 or earlier	215	8.1%
Renter occupied		
Moved in 2015 or later	194	7.3%
Moved in 2010 to 2014	594	22.4%
Moved in 2000 to 2009	399	15.1%
Moved in 1990 to 1999	102	3.8%
Moved in 1980 to 1989	9	0.3%
Moved in 1979 or earlier	15	0.6%
Median Year Householder Moved Into Unit	2007	

- About 25% of owner-occupied residents moved to the borough after the year 2000.
- About 45% of renters moved to the borough after 2000; 30% after 2010.
- The trend towards a greater share of renters is increasing.

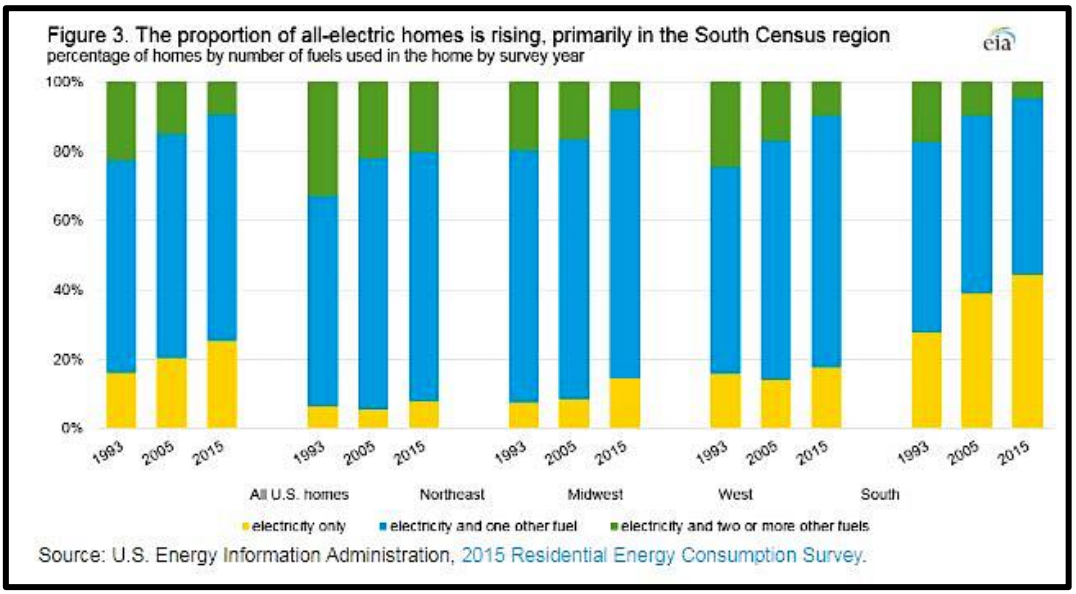
- 78% of housing units use non-renewable fossil fuels for heating.
- The percentage of solar units is not updated in the DOE (EIA.gov) data.

OCCUPIED HOUSING UNITS BY HOUSE HEATING FUEL		
Total	2,650	100.0%
Utility gas	1,485	56.0%
Bottled, tank, or LP gas	48	1.8%
Electricity	548	20.7%
Fuel oil, kerosene, etc.	533	20.1%
Coal or coke	0	0.0%
Wood	0	0.0%
Solar energy	0	0.0%
Other fuel	9	0.3%
No fuel used	27	1.0%



Air Conditioning accounts for 12% of home energy expenditures.

Trends indicate an increase in all-electric homes.



OCCUPIED HOUSING UNITS BY VEHICLES AVAILABLE		
Total	2,650	100.0%
Owner Occupied		
No vehicle available	23	0.9%
1 vehicle available	244	9.2%
2 vehicles available	782	29.5%
3 vehicles available	163	6.2%
4 vehicles available	87	3.3%
5 or more vehicles available	38	1.4%
Renter Occupied		
No vehicle available	342	12.9%
1 vehicle available	674	25.4%
2 vehicles available	273	10.3%
3 vehicles available	24	0.9%
4 vehicles available	0	0.0%
5 or more vehicles available	0	0.0%

- Renters average less vehicles available per housing unit.
- Almost 10% of owner-occupied units have 3 or 4 vehicles.
- Pedestrian, transit-oriented, and bicycle infrastructure design can decrease the number of vehicles demanded.

II.F Natural Resources

Since Ambler is built-out, the preservation of natural resources is important since development can compromise or even destroy these features. These surface waters, floodplains, woodlands, and steep slopes all provide an array of ecosystem services, and they all contribute to Ambler's landscape. In terms of sustainability and energy use, these assets serve as a natural ally in achieving efficiency and decreasing overall energy consumption. As temperature rise and climate patterns vary or intensify, they can serve as the most cost effective and ecologically sound method to mitigate harmful effects and prevent municipal budget shocks associated with extreme weather events. The preservation of these resources is key to maintaining balance between the built and natural environments in the borough, which will also enhance overall energy resiliency. Vegetated stream buffers, wetlands, forests, green stormwater infrastructure, and other natural spaces can help reduce flooding and increase water quality. Tress and vegetation can provide shade to help with cooling costs in the summer and wind blocks to help save resources in the winter.

II.G Open Space

Parks and open spaces that are owned by the Borough of Ambler are permanently protected against threats of development or abandonment. Ambler's open space network offers both active and passive recreational opportunities that accommodate birdwatching, hiking, walking, athletics, picnicking, and more. The borough's passive open space areas, the most notable being Ambler Borough Park, offer visitors a unique opportunity to experience natural landscapes in the midst of an otherwise urban setting. Despite being a small and mostly developed community, Ambler has made the preservation of open space a priority for many years. Currently, there are nine parks and open space areas under borough ownership, totaling 23.5 acres. These areas serve important functions in terms of sustainability and climate change resiliency. They impact the borough's overall energy consumption in terms of heating and cooling, and they mitigate the harmful ecological effects and fiscal impacts of stormwater runoff. Continuous tree canopies in these areas can have a dramatic impact on energy consumption, in addition to their aesthetic benefits.

Buildings are the primary driver of energy consumption. Planned management and protection of open space are key land use measures intended to improve overall efficiency and sustainability in the borough. Recent efforts along Rose Valley Creek's riparian corridor represent an important effort in this regard. The sequestered carbon, infiltration, and tree canopy associated with this corridor provides ecological functions that benefit future municipal budget expenditures, and thermal efficiency to the residences in its proximity. This type of environmental stewardship aids in water quality improvement, flood mitigation, and increased tree cover - all of which can be crucial indirect drivers of energy efficiency in Ambler.

For more information, please see Ambler's 2019 Open Space Plan Update.

II.H Demographics

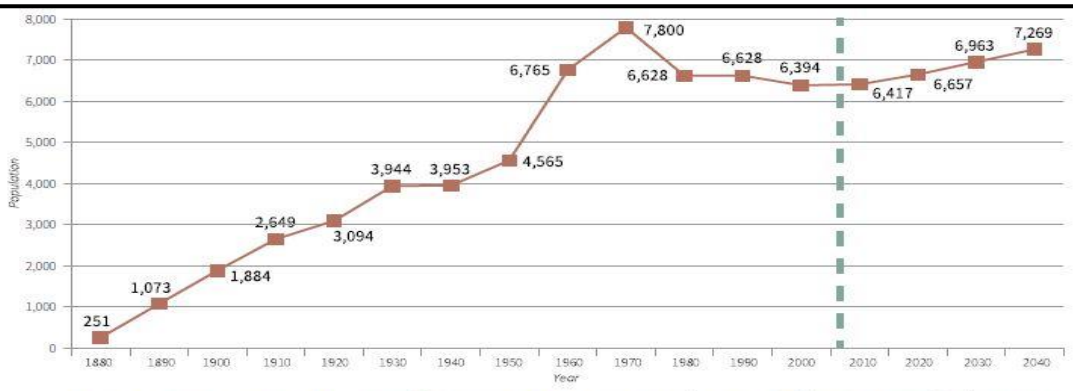
A community's demographics and noted trends can greatly inform and influence how future development will occur and consequently impact forecasts for future energy demand and consumption patterns. Demographics, primarily sourced from the U.S. Census, can help inform some of the central elements of energy planning including:

- How much land should be preserved for adequate green space, stormwater BMPs, and tree canopies to mitigate heat island effects.
- Whether additional, or different, recreational facilities are needed to satisfy demand.
- Predominant age groups and the unique needs they have related to residential dwelling and transportation

mode preferences. Whether the types of existing housing and infrastructure are properly meeting the needs of the populations, as well as what may be the future demand. For example, is there enough pedestrian infrastructure in a community to accommodate a rising millennial population's preferences in terms of transportation modes and residential design forms?

Ambler's population is forecast to increase from 6,521 people in 2017 to approximately 7,269 in 2040, approaching the population seen at the borough's peak around 1970. This represents a revision in the forecast from the U.S. Census data's previous projection of 6,973 for 2040.

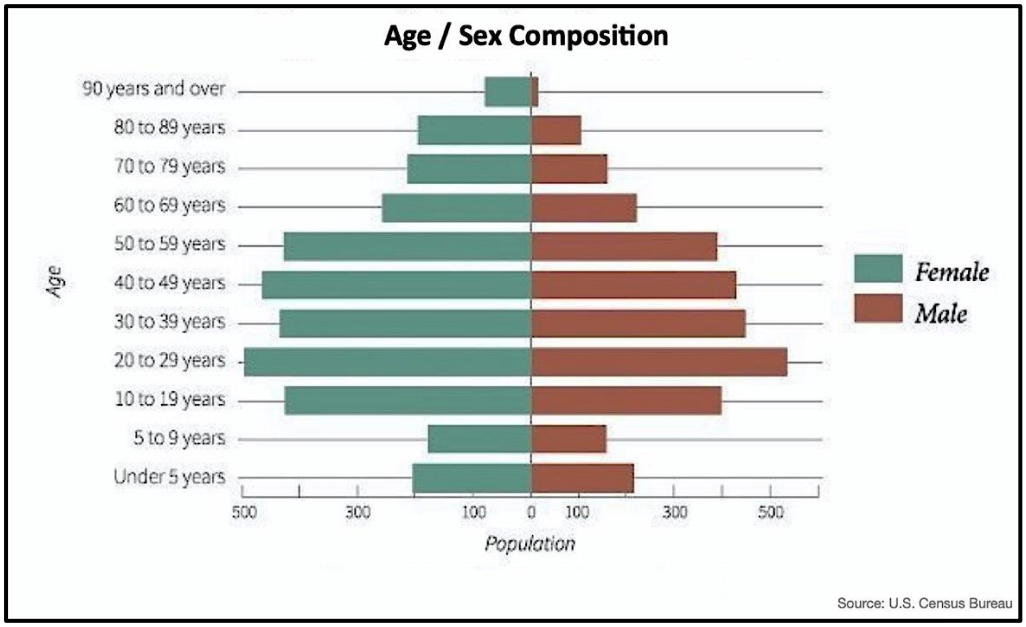
Figure: Ambler Borough Population



Sources: U.S. Census, Decennial Census, 1880-2010. Delaware Valley Regional Planning Commission, Population Projections, 2015-2045.

Fluctuations in population can influence the need for parks and open space areas in a given geographic area, and anticipated growth can activate awareness of land development design forms, infrastructure improvements, and natural resource protection. These factors can play a role in climate change mitigation, sustainability, and the correlating overall energy consumption and efficiency in the borough. Household demographic trends are also an important data point to consider. U.S. Census estimates from 2009-2016 show that the average household size has been fairly steady, from a low of 2.23 people per household in 2011 to a high of 2.41 people in 2014. The average family size in Ambler has likewise remained steady with a low in 2010 of 2.95 persons per family, to a high of 3.20 persons in 2014. Future estimates may increase slightly as young families continue to move into the borough, however national studies have shown an overall trend of couples choosing to have fewer children. Populations in different age cohorts consume energy in different manners in terms of their housing, transportation, lifestyle and overall needs.

In 2010, 52.4% of Ambler's population was female and 47.6% was male. The median age of Ambler residents increased slightly between 1990 and 2000 (from 34.3 to 37.3 years old), and then fell again in 2010 to 36.8 years old, suggesting that the borough's population may be getting younger. The largest age cohort for both sexes is ages 20 to 29, which is consistent with Ambler's appeal to academics, young professionals, and young families. This may indicate that the number of babies and young children in the borough will rise in the coming years, which could generate a greater demand for infrastructure, services and housing appropriate for those ages and the market preferences of younger parents. There is data from various sources showing younger Americans prefer alternative residential green energy, pedestrian friendly environments, more active lifestyles, and less reliance on automobiles.



II.I Race & Language

Ambler's planning effort towards a sustainable energy future is intended to be inclusive to all residents, therefore diversity is another important element of energy planning and management efforts. Census data from 2000 and 2010 show that the borough is becoming more ethnically diverse. For residents who identified with only one race, the Figure (X) below illustrates changes in Ambler's racial composition over that period. The number of white residents fell by 8.2% while all other racial categories grew, particularly the Hispanic or Latino population. Estimates show that about 12.4% of Ambler residents speak a language other than English at home. Energy planning can be more inclusive by considering things like publications/postings in non-English languages, or initiatives that consider the lifestyle preferences of a variety of cultures and their customs.

II.J Transportation

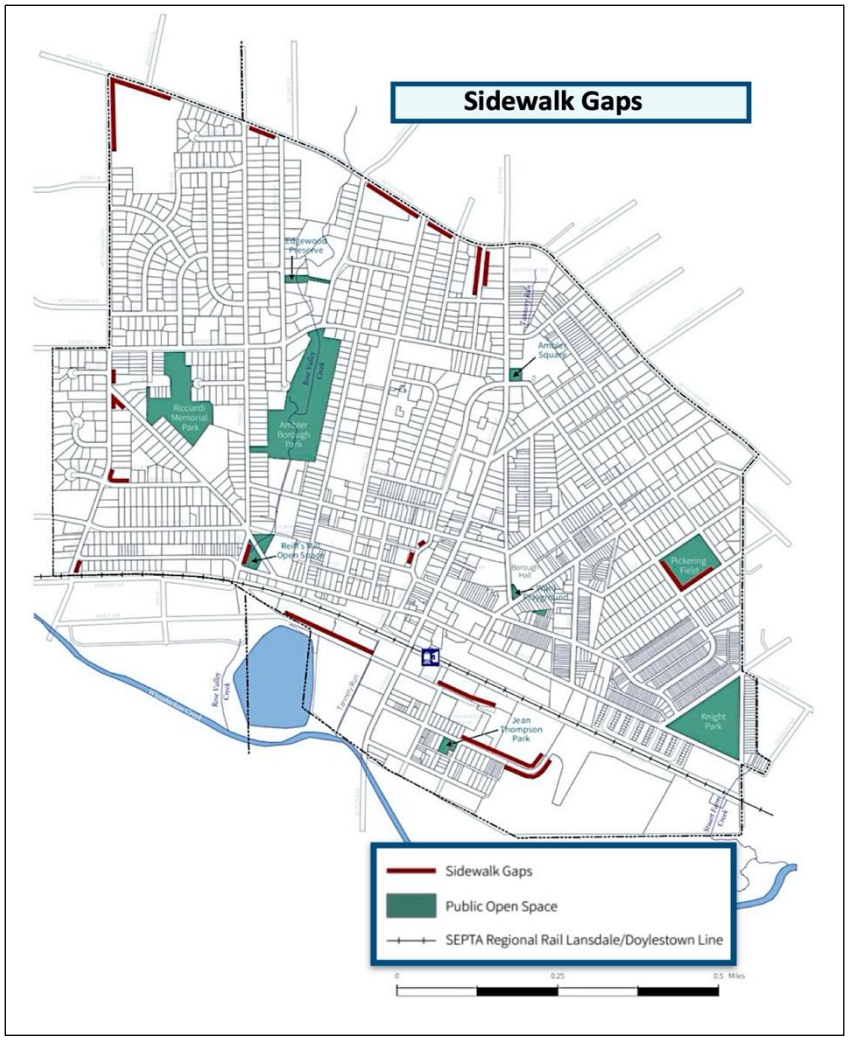
Ambler Borough's urban design benefits all forms of transportation. The interconnections amongst the pedestrian-oriented sidewalks and the fully circulated roadways allow safe and suitable access for those choosing to either walk or drive. With the availability of mass transit options such as SEPTA's Lansdale/Doylestown regional rail line and the 94 and 95 bus routes, those either choosing or having to rely less on privately owned automobile transportation can still travel easily and conveniently throughout the Philadelphia Metropolitan region. It is Ambler Borough's overall transportation goal to maintain and improve upon all of the community's transportation assets. As Ambler moves towards its goal of 100% renewable energy, it can foster planning efforts across all modes of transportation to increase efficiency and reduce its carbon footprint.

II.K Sidewalks

Sidewalks exist on the majority of all streets within Ambler and those connections are an integral part of the borough's pedestrian-oriented small-town environment. Ambler Borough's current "Walk Score" is 87%, meaning "Very Walkable – Most errands can be accomplished on foot." All of Ambler's sidewalks are constructed with an appropriate width and contain features like grass strips that promote pedestrian activity. By taking advantage of grant opportunities available by federal, state, county, and local entities, Ambler has created a walkable town with safe streetscapes that include decorative crosswalks, handicap ramps, yield to pedestrian signs, and curb bump outs. Ambler's 2001 Comprehensive Plan, 2005 Vision Plan, and Transportation Revitalization Investment District (TRID) Study, all contain planning objectives encouraging the borough to continue extending ADA compliant sidewalks to streets where they currently do not exist, and improving sidewalks along streets in need of repair. A commitment by the borough to initiate such improvements and strengthen the pedestrian network can decrease the reliance on automobiles while simultaneously catering to the increasing market demand for more walkable communities. A clear opportunity exists to improve these pedestrian amenities while moving Ambler towards a more sustainable future.

> Key Missing Sidewalk Network Linkages

- Pickering Field (E. Park Ave. & Highland Ave.) - The missing sidewalks in this heavily used park are challenged by steep slopes and mature trees on the perimeter.
- Bethlehem Pike & Mt. Pleasant Avenue – Coordination with PennDOT is required since Bethlehem Pike is a state-owned road.
- Rail Corridor – Sidewalk connections here will be key to planning for new residential development along the portions of the rail corridor south of the train tracks.
- This Gap Map is from Ambler Borough's 2019 Open Space Plan Update.



Ricciardi Park, Hendricks St., Ambler

The preservation and improvement of Ambler's pedestrian network and municipal parks is key to maintaining balance between the built and natural environments in the borough, which will also enhance overall energy resiliency.

II.L Bicycle Accessibility

Bicycle movement is possible throughout Ambler since all the streets contain safe widths and travel speeds. Since Ambler is built-out, the borough has recently attempted to find streets suitable for the addition of bike lanes. Many locations within Ambler, such as the train station and Boiler House, promote bicycle mobility by containing bike racks. Strengthening the borough's commitment to provide bicycle amenities, including racks, will benefit the market trend towards more active lifestyles and provide for a transportation mode which does not rely on automobiles. Both sidewalk and bicycle network improvements are efforts that serve Ambler's goal of 100% renewable energy, and Montgomery County's overall goals. These types of improvements may also serve as an opportunity to apply for grants as they are noted in the county's health and Complete Streets policies.

The county's newly adopted *Complete Streets Policy* includes guiding principles of environmental design and multi-modal levels of service. Similarly, Montgomery County's *Bike Montco* plan notes the opportunity to improve the integration of bicycling and transit, particularly along the rail corridor area. It notes that low impact improvements would encourage both bicycling and transit use. These modes can add to Ambler's sustainability and decrease the dependence on non-renewable energy sources.

II.M Sustainability

Ambler places a high priority on sustainability. The aforementioned construction integrating green infrastructure at the Ambler Boiler House is an excellent example. After being vacant for about 40 years, its redevelopment into a state-of-the-art LEED certified office building is a shining model for future sustainable development in Ambler. The whole overall urban design of Ambler should be considered environmentally sustainable. Ambler is a town densely built with existing infrastructure for sewer, water, and electrical utilities. Pedestrian-friendly streets and mass transit services lessen the need for private automobile use. Due to Ambler's urban design and access to transit, its residents use less energy than those living in more disconnected suburban communities. Ambler can build upon this framework in its effort to move towards a 100% renewable energy community.

Regional rail and the Ambler boiler house are current examples of how public transportation and green building design can reduce the use of fossil fuels and decrease the dependance on non-renewable carbon based energy sources.

III. Energy and Emissions Profile for Ambler Borough, Montgomery County, PA

III.A Introduction

In 2018, the Delaware Valley Regional Planning Commission completed a regional energy use and greenhouse gas emissions inventory for the nine-county DVRPC region. As part of this inventory DVRPC allocated both energy use and greenhouse gas emissions to individual counties and municipalities based on **2015** data. This report gathers energy usage, greenhouse gas emissions, and energy expenditure information for Ambler Borough in an easy-to-read document intended to support local decision-making.

This report is meant to serve as a starting point for municipal policy-making. More detailed local analysis can improve on this inventory and reveal particular opportunities for efficiency improvements and emission reductions in both the public and private sector. DVRPC's Office of Energy & Climate Change Initiatives can provide additional guidance and assistance in performing this local analysis. This report will be updated with new data upon completion of DVRPC's energy use and emissions inventory for 2020.

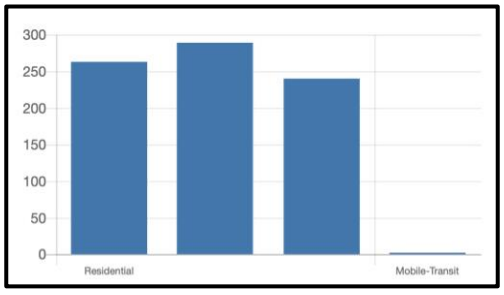
III.B Ambler Borough

Ambler Borough is classified by DVRPC as a Developed Community. A Developed Community is characterized by stability of population and employment growth. Examples include inner ring communities adjacent to core cities, railroad boroughs or trolley car communities, and mature suburban townships.

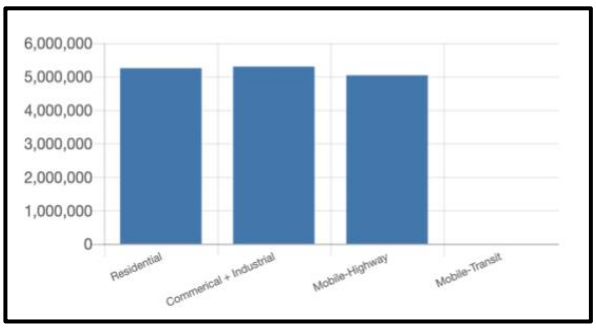
In 2015, 6,505 people lived in Ambler Borough, comprising 2,644 households. The median household income in Ambler Borough was $57,200, and 3,180 jobs were located in Ambler Borough.

DVRPC estimates that Ambler Borough consumed 794 billion BTUs (BBTUs) of energy in stationary (e.g., home heating) and mobile (e.g., automobile travel) applications. The total cost of the energy used in the residential, commercial, and industrial sectors and for on-road vehicle travel is estimated to be $15,600,000. Combustion of fuels to produce the energy consumed in Ambler Borough, in combination with non-energy sources of greenhouse gases, resulted in the release of 91,200 metric tons of CO_2 equivalent ($MTCO_2e$). Of sectors for which data is available and able to be allocated to the municipal level, the commercial and industrial sector consumed the most energy, consuming 288 BBTUs of energy. The commercial and industrial sector also produced the most emissions, emitting 25,300 $MTCO_2e$. Energy use, energy expenditures, and GHG emissions by sector are shown in the charts

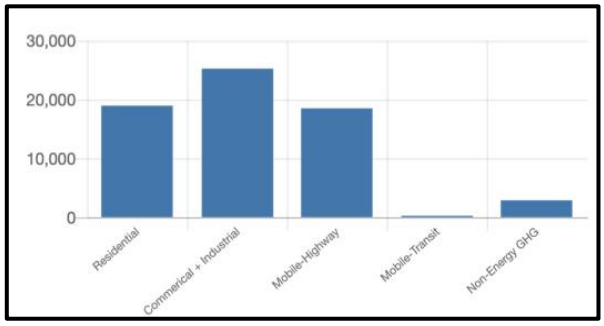
Energy Use by Sector		
Sector	**Energy Use (BBTU)**	**%**
Residential	263	33%
Commercial & Industrial	288	36%
Mobile-Highway	240	30%
Mobile-Transit	2	<1%
Total	**794**	**100%**



Energy Expenditures by Sector		
Sector	**Expenditure (Dollars)**	**%**
Residential	5,247,519	34%
Commercial & Industrial	5,289,756	34%
Mobile-Highway	5,035,714	32%
Mobile-Transit	N/A	0%
Total	**$15,572,989**	**100%**



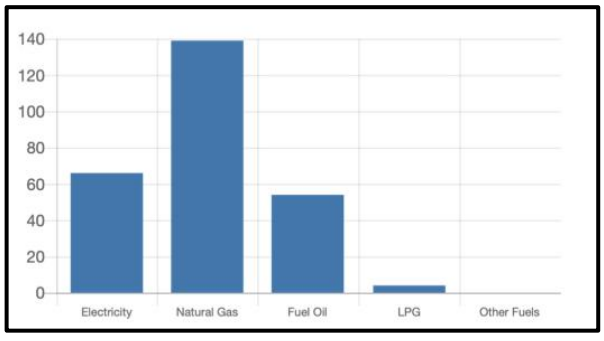
GHG Emissions by Sector		
Sector	**Emissions (MTCO2e.)**	**%**
Residential	5,247,519	29%
Commercial & Industrial	5,289,756	38%
Mobile-Highway	5,035,714	28%
Mobile-Transit	N/A	<1%
Non-Energy GHG	2,091	4%
Total	**$15,572,989**	**100%**



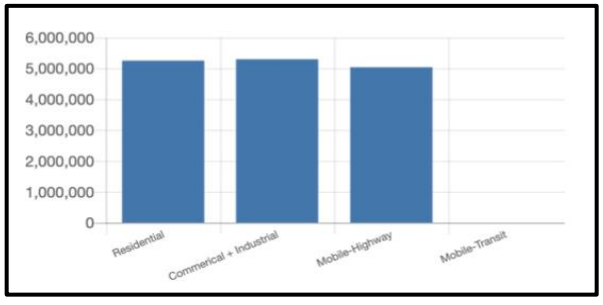
III.C Residential Energy Usage and Emissions

Natural gas provided the most energy for the residential sector in Ambler Borough in terms of BTUs consumed. The residential sector used a total of 1,320,000 CCFs or 139 BBTUs of natural gas. Natural gas was the largest source of Ambler Borough's GHG emissions by the residential sector, resulting in 7,390 $MTCO_2e$ of emissions. Of energy sources for which price data was available, electricity consumption resulted in the highest energy expenditures, costing users $2,620,000.

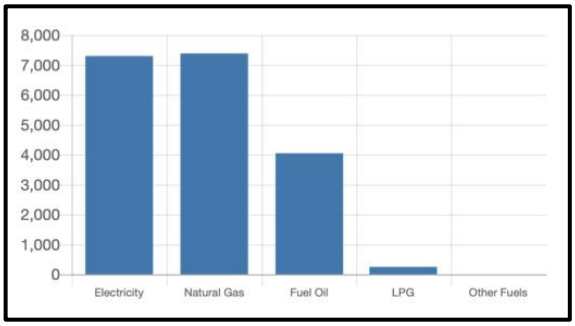
Energy Use By Source		
Energy Source	**Energy Use (BBTUs)***	**%**
Electricity	66	25%
Natural Gas	139	53%
Fuel Oil	54	21%
LPG	4	2%
Other Fuels	0	<1%
Total	**263**	**100%**



Energy Expenditures by Sector		
Sector	**Expenditure (Dollars)**	**%**
Residential	5,247,519	34%
Commercial & Industrial	5,289,756	34%
Mobile-Highway	5,035,714	32%
Mobile-Transit	N/A	0%
Total	**$15,572,989**	**100%**



GHG Emissions By Source		
Energy Source	**Emissions (MTCO2e.)**	**%**
Electricity	7,300	50%
Natural Gas	7,386	28%
Fuel Oil	4,051	20%
LPG	251	2%
Total	**18,988**	**100%**

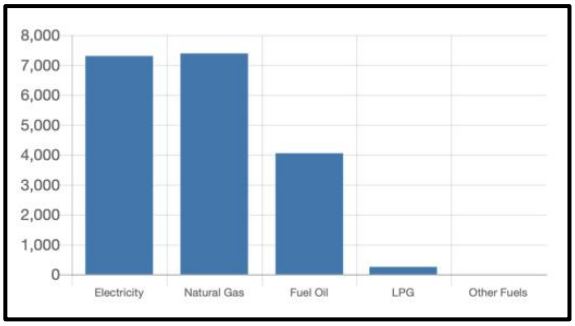


*The value shown for BBTU of electricity represents only the direct energy content of the electricity itself, not that of fuels used to generate the electricity. An estimated 38 BBTU of coal (2,008 short tons), 1 BBTU of oil (155 barrels), 65 BBTU of natural gas (62,399 million cubic feet), and 1 BBTU of other fossil fuels were used to generate this electricity.

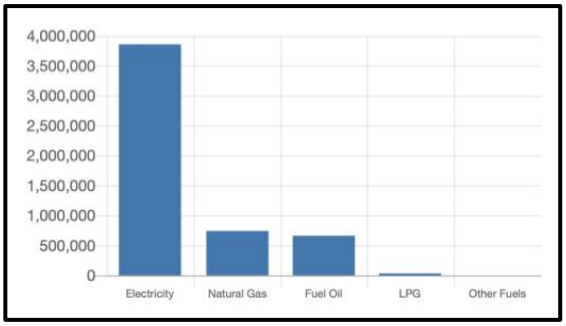
III.D Commercial and Industrial Energy Usage and Emissions

For the combined commercial and industry sector, electricity provided the most used energy in terms of BTUs consumed. Commercial and industrial facilities consumed 46,000,000 kWhs or 157 BBTUs of electricity. Electricity was the largest source of Ambler Borough's GHG emissions by the combined commercial and industrial sector, resulting in 17,500 $MTCO_2e$ of emissions. Of energy sources for which price data was available, electricity consumption resulted in the highest energy expenditures, costing users $3,860,000.

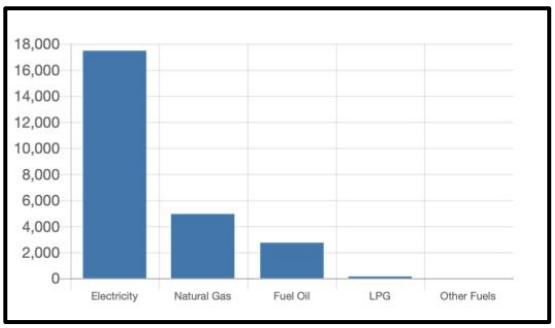
Energy Use By Source		
Energy Source	**Energy Use (BBTUs)***	**%**
Electricity	157	55%
Natural Gas	93	32%
Fuel Oil	37	13%
LPG	2	1%
Other Fuels	0	<1%
Total	**288**	**100%**



Energy Expenditures By Source		
Energy Source	**Cost**	**%**
Electricity	$3,858,712	73%
Natural Gas	$ 742,279	14%
Fuel Oil	$ 658,144	12%
LPG	$ 30,621	1%
Other Fuels	N/A	0%
Total	**$5,289,756**	**100%**



GHG Emissions By Source		
Energy Source	Emissions (MTCO2e.)	%
Electricity	17,467	35%
Natural Gas	4,936	10%
Fuel Oil	2,720	5%
LPG	128	<1%
Other Fuels	0	<1%
Total	50,502	100%

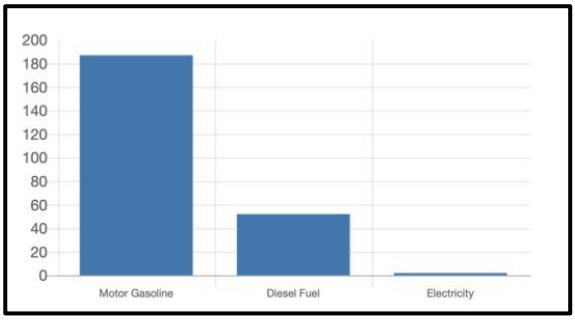


III.E Mobile Energy Usage and Emissions

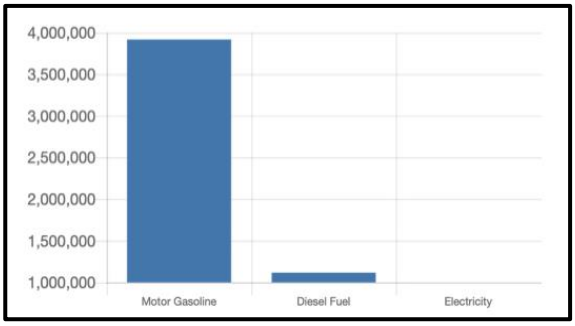
Vehicles of all kinds, including private passenger vehicles, commercial vehicles, and public transit vehicles, also contribute to energy usage and GHG emissions in Ambler Borough. Motor gasoline provided the most energy. Motor vehicles with trips either starting or ending in Ambler Borough consumed 1,550,000 gallons of motor gasoline, containing 187 BBTUs of energy. Half of each trip originating or terminating in Ambler Borough was allocated to Ambler Borough. The remainder was allocated to the municipality at the other end of each trip.

This consumption cost users an estimated $5,040,000. Altogether, emissions related to mobile energy use from all sources attributed to Ambler Borough amounted to 18,800 $MTCO_2e$ from all sources. Note that the electricity use for transportation is an allocated amount of electricity use for rail, not for electric cars.

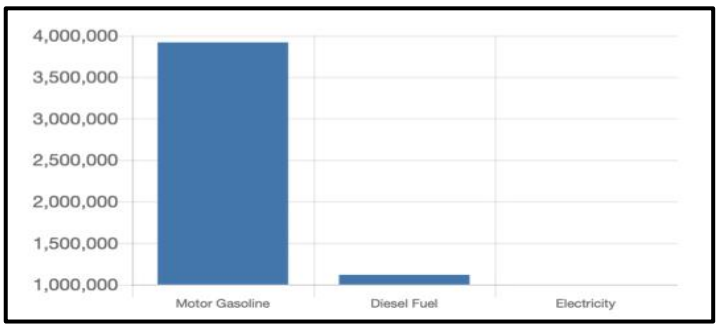
Energy Use By Fuel		
Fuel	Energy Use (BBTUs)*	%
Motor Gasoline	187	77%
Diesel Fuel	52	21%
Electricity	2	1%
Total	242	100%



Energy Expenditures By Fuel		
Fuel	Cost (Dollars)	%
Motor Gasoline	3,918,580	78%
Diesel Fuel	1,117,135	22%
Electricity	N/A	0%
Total	$5,035,714	100%



GHG Emissions By Source		
Source	**Emissions (MTCO2e.)**	**%**
Mobile Highway	18,518	99%
Mobile Transit	269	1%
Total	**18,787**	**100%**



III.F Non-Energy Greenhouse Gas Emissions

Waste management accounted for the largest proportion of Ambler Borough's non-energy greenhouse gas (GHG) emissions, contributing 2,120 $MTCO_2e$ of the municipality's total emissions:

Agricultural Sources	Fugitive Emissions	Waste Management	Wastewater Management	Industrial Processes	LULUCF* *Land Use, Land Use Change, and Forestry	Total
0	374	2,115	200	0	212	**2,901**

IV. Solar Power

Locally Sourced Solar Options

- BOROUGH HALL: 14,304 sqft building with flat roof, including mechanical equipment
- PUBLIC WORKS GARAGE: 9,120 sqft building with pitched roof
- PUBLIC UTILIES: Sewer Plant, Water Towers, Water Company owned properties
- Various limitation assessments and structural engineering evaluations required

IV.A Solar Farm Opportunities

Solar farm development projects are being proposed in municipalities throughout Montgomery County. Montgomery County gets enough sunlight per year, has large parcels available for development and is well-connected to the electric grid. All these factors make the county an attractive location for solar farm developments.

A solar farm is a term commonly used to describe a collection of photovoltaic solar panels. There is no official number of panels installed or acres of land used that qualify a project as a solar farm, though a peak output of one megawatt of power has been cited as a common standard. Due to the lack of a standardized definition for solar farms, most industry representatives and government agencies refer to solar farms as utility-scale solar applications. When this publication refers to solar farms, it means only those projects that can be categorized as utility-scale solar applications.

The definition of a solar farm is not based on the number of panels or energy generated, but on the purpose of the energy. If the primary purpose of power from a solar application's is the sale for commercial gain, then it is considered a utility scale solar application. Energy generated by a solar farm is typically sold to energy companies, rather than end-users. The owners of the solar application obtain a permit from the State of Pennsylvania and are listed by the Department Of Energy as a power generation source.

If a solar application primarily powers a residence or business, then it is not utility-scale, even if it sells back any excess electricity through net metering. In this application, the energy derived is used to run the primary use of the property. This type of application is commonly seen on houses and businesses in the county.

A solar farm can be located many places throughout a municipality. It can turn a closed landfill, a brownfield site or even some superfund sites into economically productive parcels. It can be placed on large commercial properties either on the ground or possibly on rooftops. There may even be instances where it can also be placed on farm land or unprotected open space, though the municipality, community, and developer should all agree that this is the best use for the land before the development proceeds. No matter what kind of land is being used, the site must have the correct solar orientation, geology, topography and should be close to an area where there is a sufficient demand for electricity and a means to distribute it are available.

Zoning Ordinances:

The municipal zoning ordinance can be used to direct utility scale solar projects to appropriate areas of the municipality and regulate certain aspects of them. A municipality that receives a land development application for a solar farm but has no ordinance in place to regulate such activity should anticipate a complicated variance process. The municipality should enact an ordinance, or amend an existing solar ordinance, to regulate the development of utility-scale solar applications as a conditional use in appropriate zoning districts. This will benefit both the municipality and the developer. The municipality will be able to require the developer to meet certain conditions that will ensure a project is completed responsibly. The developer will understand the municipality's requirements before the project begins, allowing them to plan appropriately, saving time and money throughout the regulatory process.

Municipal Considerations:

Financing:
While financing is not under municipal purview, it is a critical aspect of a utility-scale solar project that can have an immense impact on the municipality. Many of these projects are financed through a solar power purchase agreement (SPPA). A SPPA can be a very complicated lease and purchasing agreement, including multiple parties such as the host site, a solar developer, financial backers, and power purchasers. The Environmental Protection Agency has information explaining this topic on its website at www.epa.gov/greenpower/buygp/ solarpower.htm. Obtaining the financing for a project of this scale can be difficult and ensuring that it will be funded through to completion can be even more difficult. This difficulty is due to the many entities involved and the possible financial risks that come with a long-term, multi-million dollar project requiring the sale of energy in an emerging market. A municipality should become knowledgeable about the complexities of a SPPA to be better prepared for the development process.

The municipality should require proof that all the financing is in place before any land development begins. A project that removes trees, grades land and builds roads but then lacks the funding to install the solar panels can leave many acres of land in a distressed state.

Insurance:
A municipality should require proof that all the necessary insurance is in place before land development begins. This is especially important if the project is going to take place on a landfill or brownfield.

Connections:
Just because a project can be financed and built does not mean that the electric grid has the capacity to support the energy generated. It is important to know that the project can get all the necessary connections. The developer should follow all the interconnection regulations required by the local network operator, probably PECO or PPL, and by the Public Utility Commission (PUC). The PUC publishes its interconnection rules on its website at www.puc.state.pa.us; under the electric tab, select "alternative energy," and scroll down to "interconnections" for the most recent information. The municipality should require proof that the interconnections are possible before allowing land development to begin. It is also possible that the interconnections may need new transmission lines to be run to the site and that these lines may require new easements, property purchases, etc. The municipality should be made aware of any impacts stemming from the interconnection.

Pennsylvania Natural Diversity Inventory (PNDI) and Cultural Resource Notice (CRN):
A municipality should require the completion of these two common state forms before any land development begins to help ensure the protection of any plant or animal species of concern, and any historical resources on the parcel.

Stormwater:
It is commonly thought that solar panels are not an impervious surface due to the fact that they are elevated, tilted, and allow the stormwater to flow onto the ground. While that may be the case, large areas of solar panels will definitely have an impact on how stormwater flows. The panels may channelize the flows and create higher velocities of stormwater. The footings for the panels, the conduit trenches, and the associated service roads may also affect the stormwater flows on and leaving a site. A municipality should pay special attention to the stormwater management on a solar site and require best management practices (BMPs) be installed. This may include meadow mixes under the panels instead of gravel, vegetated swales, or naturalized basins. The owner/operator of the site should be required to create and follow a maintenance/ operation guide for the BMPs.

Fencing:
The developer and municipality may want to require fencing around the site to ensure the panels are not damaged and no one is accidentally injured on the site. Consideration should be given as to the type of fencing to ensure it serves its purpose while also attempting to fit into the character of the surrounding area.

Viewshed / Glare:
This is an important issue to help avoid complaints from neighbors. A municipality could require the applicant to demonstrate that the proposal will not have an adverse effect on neighboring properties. Information provided by the applicant should include aerials of the site, graphic renderings of the project, and/or pictures from the site of surrounding parcels demonstrating sight lines. The municipality could also require renderings of the proposed project site as viewed from nearby public right-of-ways, open space, parks, trails, etc. Appropriate vegetated buffers could also be required to help limit the visual impact of the site and possible glare issues. Tree replacement: If trees must be removed from the site the municipality should require that a tree replacement policy be followed to minimize the environmental impact of the project.

Construction Standards:
Because the profitability of the site is directly correlated to the solar site's quality of construction, most developers will work diligently to ensure it is built properly. The municipality should take steps to ensure that the site is inspected by all necessary municipal authorities, PECO, and state authorities.

Community Resources:
A utility-scale solar project's primary goal is to produce power, but it can also be a community resource. A municipality can encourage the project to integrate educational opportunities such as partnerships with schools and the provision of educational materials at the site as appropriate. The project site may also be suitable for open space and trail opportunities which would allow the public to use a portion of the site for recreation while becoming educated about the benefits of solar energy.

The Delaware Valley Planning Commission, Montgomery County, and Ambler Borough are exploring the potential locations in the region to accommodate large solar farms to provide electric to the borough

along with utilities. Montgomery County Planning Commission can serve as an excellent resource for information through its renewable energy series on solar farms.

IV.B Solar Parking Canopies

- Ambler Borough owns four parking lots in the borough totaling approximately 100,000 sqft.
- SEPTA owns approximately 260,000 sqft of parking lots.
- These estimates include driveways, parking islands, walkways, and driving lanes.

The financial and environmental benefits of solar are greater than ever, and companies looking to benefit can now install a solar canopy over their parking lots to share in the savings. Businesses across the country are building solar parking lots that provide shade for cars while simultaneously generating renewable energy – and they're saving thousands of dollars on electricity bills in the process.

What is a solar canopy?
Solar parking canopies are elevated structures that host solar panels and provide shade. These overhead solar panel installations are typically installed in parking lots or other paved areas.

In practice, solar canopies are similar to solar carports and ground mounted solar panels – each provides an alternative to rooftop solar, whether because a roof can't host solar panels or because a property's electricity needs are too large for a rooftop solar system. Many solar parking lots also incorporate electric car charging stations so that drivers of electric vehicles can recharge with solar power while parked.

Benefits of solar parking canopies

The benefits of solar are well documented: when you install a solar energy system, you reduce your electric bills, protect against rising energy costs, and reduce your impact on the environment. Solar parking lots have a few additional benefits that standard roof-mounted and ground-mounted solar panel systems don't always offer.

Solar canopies are an efficient use of space

Parking lots are an untapped opportunity for solar installations all across the country. According to the Lawrence Berkeley National Laboratory, pavement makes up 35 to 50 percent of total surface area in cities, and 40 percent of that pavement is parking lots. Installing a solar canopy over an existing parking lot is simply a more efficient use of space than installing a standard ground-mounted system – when you build a solar canopy, you add more uses to the same square footage and do not have to set aside additional space.

Solar panel parking lots also provide shade

Anyone who's had to get into a hot car that has been sitting in the sun all day, will understand why the shade that solar parking canopies offer is another major benefit. However, shade isn't just a matter of comfort in your car. When you build a solar canopy in your parking lot, the shade it provides can also improve the fuel economy of cars that park under it.

According to FuelEconomy.gov, running your car's air conditioning (AC) system is the main cause of reduced fuel economy in hot weather. Under very hot conditions (such as when your car has been baking in the hot sun), using the AC can reduce a conventional vehicle's fuel economy by more than 25 percent. For hybrids, plug-in hybrids, and electric vehicles, the effect can be even larger. By keeping cars cool on hot days, solar parking lots reduce the need for heavy air conditioning use.

Canopy parking can be oriented for maximum production

Rooftop solar arrays are restricted by the characteristics of the roof on which they are installed. If your roof isn't at the right angle, doesn't face south, or has obstructions like chimneys, skylights, or vents, then your solar array will be less productive. The solar panels on your parking canopy, however, can be oriented so that they produce as much electricity as possible, which means maximum savings.

How much can you save with a solar parking canopy installation?

Your solar canopy economics will depend on the size of your system and how much you currently pay for electricity. A few things to keep in mind:

- Solar panels typically reach their maximum production in the afternoon, when demand charges can be very high. If your business is subject to demand charges during moments of peak electricity consumption, a solar canopy can dramatically reduce your bill by cutting your grid electricity use during those times.

- A solar parking lot will cost more than a similarly sized rooftop installation because of the additional labor and equipment needed to construct the canopies to host the panels. However, as mentioned above, solar canopies also offer additional environmental benefits, can produce more electricity, and aren't subject to the same space restrictions as rooftop systems.

IV.C SolSmart

"Nationally Distinguished – Locally Powered"

solsmart.org

SolSmart is a national designation program recognizing cities, counties, and regional organizations that foster the development of mature local solar markets.

SolSmart is led by the International City/County Management Association and The Solar Foundation, along with a team of partners with deep expertise in solar energy and local governments. Local governments have tremendous influence over the prospects for solar energy growth. Unnecessary paperwork, red tape, and other burdensome requirements increase costs and discourage solar companies from moving to the area. By streamlining these requirements and taking other steps to encourage solar development, communities become "open for solar business." And since the solar industry is a leading source of American job creation, attracting solar investment in our community is a great way to promote economic development and new jobs.

SolSmart uses objective criteria to designate communities that have successfully met these goals. These communities receive designations of SolSmart Gold, Silver, and Bronze. Since the program launched in 2016, more than 300 cities, counties, and regional organizations nationwide have achieved SolSmart designation.

To help communities achieve designation, SolSmart provides no-cost technical assistance from a team of national experts who work to evaluate programs and practices that impact solar markets, and identify high-prospect opportunities for improvement. A select number of communities also hosted SolSmart Advisors: fully-funded, experienced staff who work in communities for periods of up to six months. All cities, counties, and regional organizations are eligible to join SolSmart and receive no-cost technical assistance to achieve designation.

IV.D Solarize Southeast PA

"*Neighbors helping neighbors join the clean energy revolution"*

solarizesoutheastpa.com

The following FAQ from Solarize will be helpful in conceptualizing a future solar project:

- Assess your roof & estimate solar potential for free
- Compare with current usage & offer approximate cost
- If needed, suggest ways to reduce electricity usage
- Discuss "Electrifying Everything" to transition fossil fuel uses to electric
- Share stories about local solar installations
- Answer questions, resolve concerns
- Organize buying groups
- Connect you with area installers

Is my roof suitable for solar? We use satellite images to check for shading as well as orientation; contact us to assess your roof.

What size system do I need? We can estimate how many panels could fit on your roof, and compare this to your current usage. Contact us with your address and a recent electric bill (or usage data).

How is a solar project sized and priced? Generally, if space allows, the aim is to install a system that will generate the same amount of electricity as you use in a year. Though you're billed for electricity use in kilowatt hours (kWh), solar projects are sized in kilowatts (kW), and priced by the watt ($/W). Generally, the larger the system, the lower the price per watt due to economies of scale. We'll help translate for your project.

What am I getting when we commit on a solar project? You typically get solar panels, racking and an inverter – installed. You also get a warranty from the installer, typically for 10 years on the equipment and labor.

How long do solar panels last? Solar panels are considered a 25 year investment. Though they continue to operate well past that, they generate less and less energy over time.

How do I maintain solar panels? You don't. In our region, dust & pollen gets washed off by precipitation.

What's the warranty for these systems? The manufacturer of each component typically warranties them for 20 years. The installer warranties their work for about 10 years. There's also a warranty for the power produced by the system, about 80% of the system's original capacity for at least 25 years.

What if the power goes out? Most installations are grid-tied, meaning you lose power when the grid power goes out, even if the sun is shining. This is to protect nearby workers repairing the downed power lines. If you want electricity when the grid is down, you'll want to ask for a battery backup system as part of your quote.

What if I generate more than I use? Since most systems are grid-tied, any excess power is fed back to the grid. The utility compensates you via a concept called net metering, because our combined added power helps them during periods of peak demand.

Do you recommend solar when it produces less than total yearly cost? You can consider energy efficiency to reduce your usage. We recommend you contact PECO for a home energy assessment. In the complete walk-thru of your house, they'll look at the building envelope (where energy could be leaking), the installed equipment and the current energy usage and make recommendations. They'll even swap out most bulbs with LED bulbs. The team can be reached at 888.573.2672 or peco.com/assessment. It is well worth the $25 cost. And reducing energy use is a key first step to transitioning to renewables!

What would the ball park cost be to install? I'll have to walk you thru some math. Assuming the 20 panels have a capacity of 315 watts per panel, your system size would be 6300 watts (20 x 315); systems are priced by the watt. Using a regional average price of $3.15 per watt, your system would cost about $19,000. This would be for a turnkey system including all labor and materials, and all permitting. Please note that installers don't like us giving this, since we don't do the work, they do! So take this as a very rough number.

Do you purchase or rent the panels? Purchase. It's easier that way if you need to sell the house.

How long does installation take? Residential installations take a couple of days. Getting a permit from the municipality, and interconnection approval from PECO takes longer.

IV.E PA Electricity Deregulation

In the state of Pennsylvania, people have the option to select an electric service provider of their choice. This might seem like a simple right, but only a few states in the country have fully deregulated or semi-regulated utility markets. By allowing consumers in PA to purchase their energy supply from numerous different electricity providers, deregulation has caused a positive increase in competition among the many energy suppliers available. It has also led to modern innovations in energy distribution and made progress in offering new products and services to the state, like renewables.

Pennsylvania's deregulated utility market is mostly seen as a win-win situation by residents of the state. Deregulation has provided competitive low utility rates. It continues to help improve state growth by bringing in both big and small businesses alike; by offering them competitively low-cost power rates when conducting onsite business in the state.

For more guidance on what a consumer should consider when choosing an electricity provider, please consider the following resources:
PA PowerSwitch – PA PUC – Switching Electric Suppliers in PA
2018 Powering Our Future: A Clean Energy Vision for Philadelphia (page 15)

Residential small-scale accessory rooftop solar PV (Bethlehem Pike, Ambler)

- Some Ambler residents have already taken advantage of renewable solar energy for home use.

V. Electric Vehicles by 2030

V.A Borough Vehicles

Ambler Borough used approximately 19,000 gallons of gasoline and spent a total of $37,000 on fuel to power its fleet of vehicles in 2019. Below is a breakdown of the Borough fleet by department:

- Police fleet – 6 vehicles
- Highway fleet – 17 vehicles
- Code Enforcement – 1 vehicle
- Public Utilities – separate

The demands of police / highway vehicles and their cargo may limit the types of improvements possible in the fleet. However, shy of purchasing more efficient or electric vehicles, there may be operational changes that can be made. It may be advisable for the Borough to investigate the number of hours each vehicle spends idling to see whether there are opportunities to reduce this. For most automobiles, idling for more than ten seconds wastes more fuel than simply turning off and restarting. Also, many studies have shown that frequent restarting has little effect on the mechanics of an automobile - while excessive idling can result in incomplete combustion, and can damage engine components, including cylinders, spark plugs, and exhaust systems.

V.B Electric Vehicle Charging Opportunities

Currently most electric vehicles charge at home or work. Most public chargers are one of these options:

Level 2 (25miles / hour of charging)

- Good for “topping off” while shopping
- Best for drivers with charging stations at work or home

DC Fast Charger (100 miles / hour of charging)

- Suited for drivers with no at home charging option (ex: those with no off-street parking availability)
- Suitable for those on long trips who need to fill up without waiting a long time

Benefits of Public Electrical Vehicle Charging Stations

- Will preferentially shop in locations with charges
- Attracts outside customers into a new place in order to charge
- No charger is instantaneous, drivers need something to do while charging

V.C EV Chargers Installed in Public Lots

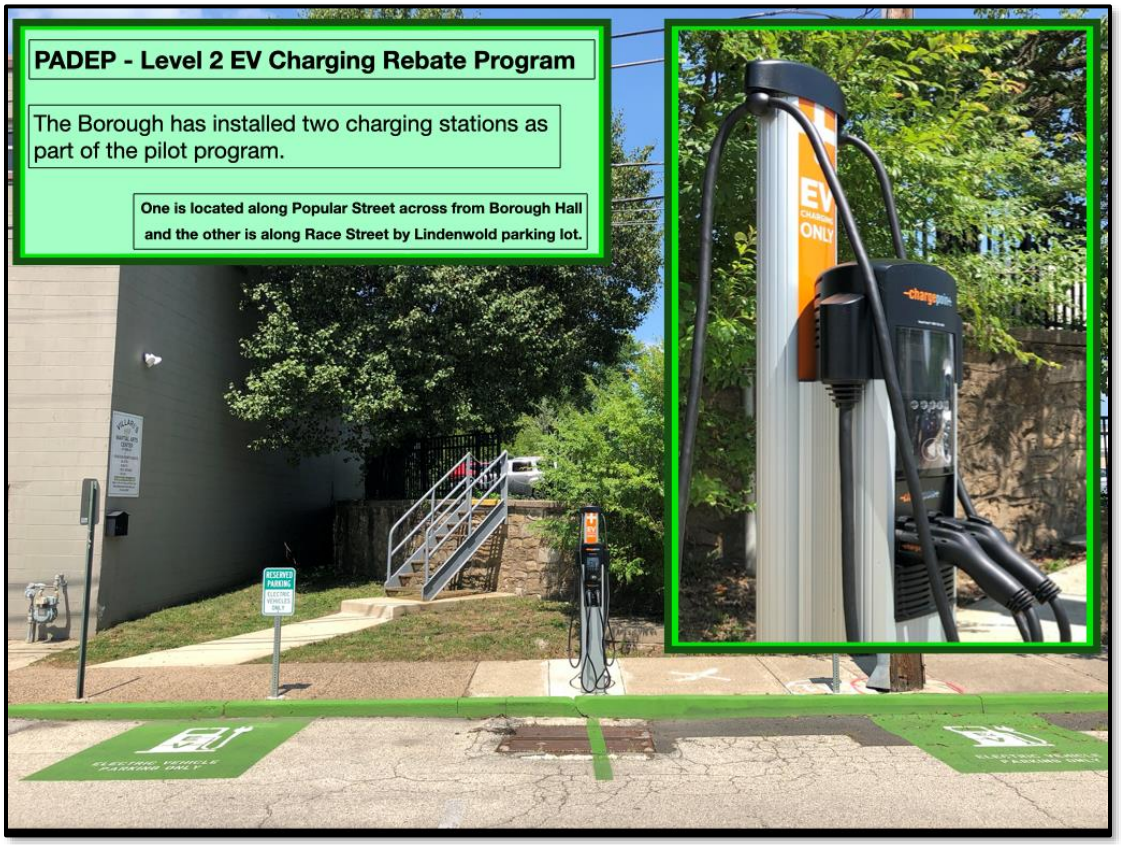
The Borough has installed two Chargepoint CT4000 charging stations as part of a pilot program. One is located along Popular Street across from Borough Hall and the other is along Race Street by Lindenwold parking lot. The Borough is working to encourage SEPTA to take advantage of this program, and other businesses such as Weaver Way Co-op and Ambler Beverage have also followed suit in their parking lots.

Funding for this program was provided through the Pennsylvania Department of Environmental Protection Level 2 EV Charging Rebate Program. Approximately $7.7 million is being allocated over a 5-year period to fund a rebate program for the installation of level 2 electric vehicle (EV) charging equipment.

Rebates will be provided for Level 2 EV charging equipment for:

- Public use at government owned property
- Public use at non-government owned property
- Non-public use at work places
- Non-public use at multi-unit dwellings

PA organizations that submit complete and eligible applications will be provided rebate vouchers on a first come, first served basis. All projects for which a rebate is requested must be approved in advance by DEP. Complete applications that meet eligibility criteria will receive a voucher to hold their rebate funding for their project on a first come, first served basis.



VI. Energy Conservation

VI.A The DVRPC Regional Streetlight Procurement Program

Ambler Borough recently replaced all of its streetlights with LEDs, by participating in the Delaware Valley Regional Planning Commission (DVRPC) Regional Streetlight Procurement Program (RSLPP). This program assembles the resources needed to design, procure, and finance the transition to light-emitting-diode (LED) street lighting tailored to each municipality's needs. The RSLPP is designed to help municipalities overcome the barriers of implementing an LED conversion project, such as navigating the conversion process, identifying the best solutions, finding trusted project partners, and paying for the upfront cost of the project.

Benefits of LED Streetlights

- Reduce energy consumption and cost by 50-75%
- Reduce system maintenance costs by 50-80%
- Improve lighting performance and quality, leading to improved safety
- Reduce light pollution and trespass
- Controllable light source helps manage both the quality and quantity of light
- Advance control options provide additional cost savings opportunities

Turnkey Program Approach

- Feasibility Study
- Transparent Pooled Procurement
- Technical Design Assistance
- Project Development / Management
- Municipal Decision-Making Support
- Optional Pool of Low-Cost Financing
- Post Construction Savings Verification

Round 1 Results

- 35 municipalities in Southeastern PA implemented LED upgrade projects
- Over 25,000 street and area lighting fixtures upgraded to LED technology
- Over 5,500 traffic signal lamps upgraded to LED technology
- $15.3M net savings over 20 years
- 10.6M kWh and 5,500 metric tons of CO2 emissions saved annually

RSLPP Round 2

- 26 municipalities currently engaged in the feasibility phase of the program
- Approximately 15,000 streetlights represented

Pooled Procurement Approach

- DVRPC-led pooled procurement leverages the project scale of multiple municipalities
- Municipalities “piggy-back” off DVRPC procurement
- Solicitations for material, distributor, and installer products and services
- Comprehensive evaluation approach that delivers the best product and service solutions at the best price

Results

- Awards pending final contract execution to a single installation partner, a single distribution partner, and six manufacturers representing all required product families
- Estimated 18% lower costs than the successful RSLPP Round 1 product and service portfolio

VI.B PECO Energy Efficiency Solutions and Incentives Program

In April 2019 Ambler took advantage of the “PECO Energy Efficiency Solutions and Incentives” for small businesses. With PECO’s technical expertise, financial incentives and one-stop approach to improving energy efficiency the Borough was lower energy costs, improve productivity and environmental stewardship.

By taking advantage of this program, PECO was able to help the Borough reduce operating costs, freshen up the look of its space and make energy efficiency projects hassle-free and affordable.

- Receive a comprehensive on-site energy analysis and a proposal highlighting the estimated energy savings associated with recommended upgrades.
- Get direct installation of energy-saving improvements.

After the complimentary energy analysis, the borough was able to upgrade 225 fixtures throughout the borough facility. PECO was able to contribute $4,000 toward this proposal, the project will save the borough $217.00 off of its collective electric bills, and will pay for itself in full within 3 years. The borough also was able to take advantage of this for the Borough Public Works Garage. PECO was able to contribute over 30% towards the cost of this project (approximately $1,000), the project will pay for itself in 2 years based on the savings, and will save an estimated $70 off of the borough electric bill each month.

VI.C PECO Energy Assessment Residential Program

PECO also offers an energy assessment for residential properties for a fee. This includes an in-person visit from a PECO energy advisor, who will show where residents are wasting energy by letting warmed air out and cold air in. A personalized report with energy-saving recommendations that save an average of 10%–20% on electric costs annually is provided. Free energy-saving products are installed throughout the home (up to $125 value). Higher heating and cooling equipment rebates are available through a participating PECO HVAC contractor for qualifying recommended upgrades. For more information contact PECO energy: https://www.peco.com/WaysToSave/ForYourHome/Pages/Assessment.aspx

VI.D Weatherization

Weatherization services are cost-effective, energy efficiency measures for existing residential and multifamily housing with income-eligible residents. These services are derived by using a diagnostic energy audit and building assessment that determines the necessary energy efficiency measures for each unique home.

Weatherization crews use home energy audits and diagnostic equipment such as blower doors and infrared cameras to determine the most cost-effective measures for that particular home. Typical measures include installing insulation, reducing air infiltration and pressure imbalances, sealing and repairing ducts, and tuning and repairing heating and cooling units.

Weatherization crews install energy-efficiency measures that meet a savings-to-investment ratio of 1:1 and higher. During the installation, crews can address energy-related health and safety problems or perform incidental repairs. This approach ensures the program's cost-effectiveness.

What role does weatherization play in promoting residential health and safety?

Weatherization service providers check major energy systems to ensure occupant safety, such as looking at the house as a system under the concept of "whole-house weatherization." Under the program, measures are taken to improve indoor air quality of the home being weatherized. Also, weatherization providers in many states have combined resources from other programs to address additional needs of their clients through Weatherization Plus Health, which helps communities connect resources so that residents can access comprehensive solutions to their housing problem.

These services may include:

- Testing heating systems and appliances for combustion safety
- Testing for carbon monoxide and gas leaks
- Monitoring for possible moisture damage or mold infestations
- Checking electrical panels and wiring for safety
- Replacing and/or providing tune-ups for unsafe heating and cooling systems
- Installing smoke and carbon monoxide detectors

Weatherization services pay for themselves in energy bill savings over the long or short term, depending on the cost of energy in the given region. Apart from economic benefits of energy savings, families that do not qualify as low-income have a number of options for financial assistance.

Energy auditors use advanced diagnostic equipment, such as a blower door, manometer, or infrared camera to determine the most cost-effective measures appropriate for each home. For instance, technician uses a blower door to depressurize the house to determine how tight it is and check for air leaks; diagnostic tools such as infrared cameras help detect heat losses, leaky ducts, and poor insulation. Additionally, testing is done to apply safe, effective insulation; high efficiency furnaces; low energy use refrigerators; programmable thermostats; compact fluorescent lighting — the list goes on as new technologies become available and cost effective.

What is one of the best ways to weatherize a home at a low cost?

All homes are different, but on average, air sealing and insulation represent the greatest opportunity for energy savings at the lowest cost. Simple improvements in heating and cooling equipment efficiency such as duct sealing, filter replacement and tuning of equipment is also a highly effective way to increase your home's efficiency affordably.

VI.E Federal & State Financial Policies concerning Greenhouse Gas (GHG) Emissions

Climate change mitigation / Reduction of greenhouse gas emissions
According to the Environmental and Energy Study Institute, the use of fossil fuels incurs what economists call negative externalities, which are costs that are not directly borne by the user. For instance, burning coal to generate electricity emits harmful pollutants, which can impact the health of nearby communities. The coal plant's owners, however, may not themselves live near enough to the plant to be affected, and so have no financial incentive to reduce the plant's emissions or to switch to a cleaner fuel. Economists agree that such negative externalities must be properly taken into account and priced in order to prevent harm to third parties and ensure the proper functioning of markets. From a climate policy standpoint, that means CO2 emissions and other greenhouse gases (methane, soot, hydrofluorocarbons (HFCs)) must be regulated, taxed or traded at a price that reflects their true environmental and social costs. Once this happens, market forces will be set in motion that will lead us to more sustainable solutions.

Within the past few years, the dialogue in both chambers of Congress over how to address climate change in the United States has included a variety of measures that would assign a cost to greenhouse gas emissions. The two comprehensive approaches that have emerged as the most likely next step for U.S. climate policy include a nationwide cap and trade system on greenhouse gas emissions or a carbon tax.

Environmental Protection Agency (EPA)

The EPA has proposed New Source Performance Standards which mandate that new electricity generating facilities emit less than 1,000 pounds of carbon dioxide per megawatt-hour of electricity.

Cap and Trade

In a cap and trade system, an overall cap would be placed on greenhouse gas emissions in the United States, to be lowered incrementally (over the course of several years), until it reaches a specified target level. Parties responsible for these emissions, such as electricity generators or fuel refiners, would obtain allowances to emit a specific amount of these greenhouse gases within the cap, with allowances distributed either through an auction or free allocation. Should a participating member of the cap and trade system emit more than its allotted amount, it would be required to purchase more allowances. These allowances could be purchased from members who did not need all of their allowances and are now able to sell off their remaining allowances within the emission trading system (ETS). While this approach has the benefit of ensuring emissions are capped at a specific level, concerns about any binding policy changes and local market dynamics should be considered.

Conclusion

Despite the debate on what approach policymakers choose to mitigate greenhouse gas emissions, there is widespread acknowledgment that complementary measures must also be in place to ensure the broadest reduction in emissions. Examples of such measures are a national renewable electricity standard (RES), renewable energy payments (also known as feed-in tariffs), a renewable fuel standard and/or low carbon fuel standard, high fuel efficiency standards for motor vehicles, energy efficiency resource standards, appliance/equipment efficiency standards, stricter building codes, the use of smart meters, and smart growth in urban planning.

VII. Codes & Standards

VII.A Overview

The built environment is crucial when planning for efficiency and moving towards 100% renewable energy. An examination of the types of buildings in Ambler and both the amount and type of energy they consume is an important component to the energy transition plan's goals. The composition of the buildings in Ambler, along with the background data in Section II can inform a thoughtful analysis of the borough's ordinances and the existing standards in Ambler's Code of Ordinances. From that analysis, this plan can provide a framework of strategies and recommendations to utilize borough codes as a tool to guide development towards the goal of 100% renewable energy across the borough.

In 2018, the residential and commercial sectors accounted for about 40% of total U.S. energy consumption. Nearly all building related, these sectors account for nearly all of the energy consumption in U.S. buildings. Households account for 55% of the energy used in buildings in the United States. For more national information, please go to the US Energy Information Administration's website.

Examining Ambler's existing codes and standards provides an opportunity for the borough to make changes which can impact sustainability and efficiency. These can be affected through building design, orientation, infrastructure, and overall efficiency. Gradual changes to the Borough's code of ordinances through the amendment process can be an integral part of Ambler's strategic RF100 goals. It is important to note that the following examination of subdivision, land development, and zoning ordinances only represent a starting point. Codification of any ordinance amendment would have to be considered carefully, and diligently reviewed by all of the appropriate commissions and governing bodies.

Three areas of focus for improved codes and standards are best suited to guide Ambler towards 100% renewable energy:

- Ordinances that provide for renewable energy equipment and infrastructure.
- Permitting, design standards, and zoning that encourage renewable energy systems as redevelopment and infill development occurs.
- Ensuring that Ambler's codes includes clear guidance that encourages renewables in a manner that incorporates safety as well as the boroughs vision for future development.

VII.B DVRPC & MCPC Renewable Energy Ordinance Frameworks

The Delaware Valley Regional Planning Commission (DVRPC) and the Montgomery County Planning Commission (MCPC) provide the technological background and ordinance frameworks so that municipalities can make informed choices in both providing for and encouraging renewable energy systems in their ordinances. Specifically, DVRPC's Alternative Energy Ordinance Working Group (AEOWG) provides specific guidance or each form of renewable energy. The purpose of these frameworks is to provide clear, consistent guidance on how to construct renewable energy ordinances that are:

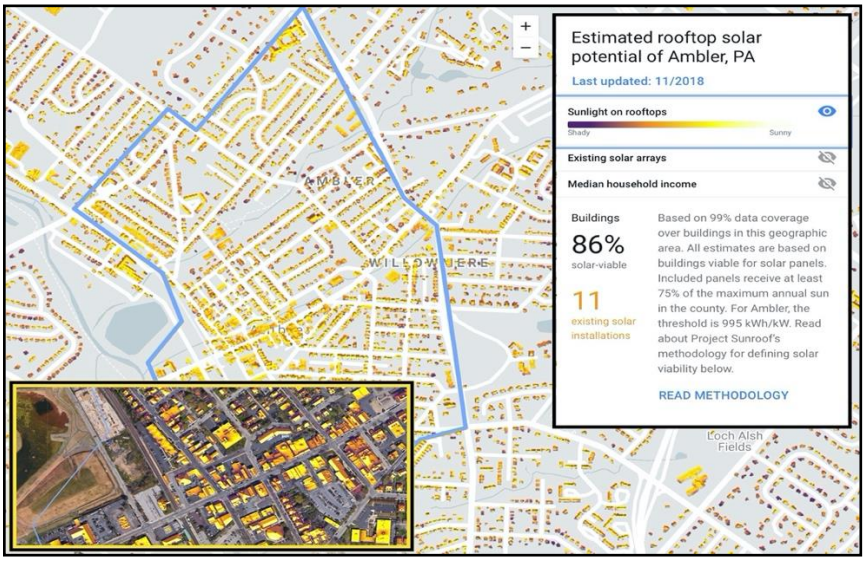
- Consistent with state laws.
- Not overly restrictive or contradictory to the nature of renewable energy systems.
- Promote safe and sound community development.

The following sections address each area where Ambler can construct sound ordinances that promote renewable energy, efficiency, and sustainability. Linked at the beginning of each section are the source documents from DVRPC and MCPC to provide background information on each renewable form and the corresponding ordinance framework with sample language.

VII.C Solar

Background Information: Small-Scale Solar Energy Systems
Ordinance Framework: Solar PV - Renewable Energy Ordinance Framework

A growing number of Ambler residents are taking advantage of solar energy for its cost and environmental benefits. Rapidly advancing technology is consistently making solar a more attractive energy production option, with a variety of solar technologies now available on the consumer market. For Ambler, the approach in terms of borough codes should focus on small-scale and accessory solar systems. For residences and small businesses alike, these can assist or replace electrical supply as well as water heating for both space heating and hot water use.



An examination of Ambler Borough via the Google Sunroof solar calculator shows the exciting opportunity for renewable solar energy in Ambler. Google Earth imagery is used to analyze roof shape and local weather patterns to calculate and quantify solar power viability. Individual homeowners and businesses can also utilize this tool to personalize site specific solar analysis and finance options.

Provision of Solar Uses

Ambler has many options for the provision and regulation of solar PV through its zoning code. Among the renewable energy options for residents and business, solar potentially presents as the most flexible and achievable option for Ambler, and this section contains the most in-depth analysis. Solar energy systems can be simply incorporated into the definitions section of existing zoning as an accessory use. In this framework systems are subject to the same height and setback regulations as any other accessory use. It is recommended that Ambler go a step further in terms of a strategic energy transition plan, as standard accessory use regulations can be overly restrictive and affect performance or overall viability. These simple supplemental regulations would apply just to solar systems and can balance siting needs and the compatibility with adjacent land uses.

Potential Zoning Provisions/Standards

- Height Exemptions
- Structural setbacks from roof edges or lot lines
- Impervious cover exemptions
- Safety Concerns
- Compatibility with existing land use

Regulatory Concerns Addressed:

- **Visual.** It is possible to regulate the visual impact of solar energy systems. They can be prohibited from the front of a building or any area visible from the street. To ensure a solar system can effectively produce energy, many regulations include the language "unless such installation is proven to be ineffective or impossible" to allow installation in a visible area if it is the only viable location. Screening regulations can be included for ground-array systems, and provisions can be included to regulate glare from the system.
- **Height**. Roof-mounted systems are usually regulated by zoning height allowances and are usually no more than 6 inches to 3 feet off the roof surface. Ground array height can be limited to a range of 6 feet to 12 feet from the ground.
- **Setbacks.** Regulations for roof-mounted systems may include a setback from the edge of the roof or prohibit systems from extending beyond the roof edge. Ground-array systems may have a setback of 5-10 feet from property lines, be allowed only on parcels of 1 or more acres, and/or not cover more than 20% of the lot. Often this can be regulated under existing accessory structure standards. Accessory structure standards in Ambler's SALDO current require a four (4) foot setback from property lines and ten (10) feet from the street line.
- **Use of energy.** An ordinance can require that the primary purpose of the solar energy system is to provide power for the principal use of the property on which the system is located and not for commercial sale of the energy. This is not intended to prohibit the sale of excess power generated at times from the system, it simply defines the intended primary purpose of the system. An ordinance can also require that a solar energy system only be permitted as an accessory use on the same lot as the principal use.

Solar Easements

Solar easements are legal agreements that protect access to sunlight on a property. A solar easement is defined as a restriction on adjoining properties to prohibit obstruction of direct sunlight from buildings or vegetation. Municipalities will typically not want to be involved with the establishment of solar easements, which is an agreement between two property owners, but they can encourage residents to obtain easements in the zoning code.

Recommendations and guidance on solar easements from the DVRPC:

- Must be in writing.
- Must be recorded as any other real property interest.
- Express the horizontal and vertical angles of the easement.
- Include provisions relating to the granting or termination of the easement.
- Provide compensatory arrangements for the grantor and/or grantee.

Solar easements are not enforceable through zoning or permitting. It is recommended that Ambler encourage permit applicants for solar energy systems to obtain a solar access easement with neighboring/adjacent properties. Information, language, guidance, and example agreements can be posted on the borough website for the public to access.

Solar Rights

Solar rights are defined as the ability to install solar energy systems on residential and commercial property that is subject to private or governmental restrictions. It is important that regulatory language does not prohibit solar energy systems. It is recommended that Ambler examine the following possible regulatory measures for solar rights in order to determine which method would be the most appropriate.

- Solar Fence – hypothetical for non-obstruction
- First come / First Serve – (prior existence)
- Solar Districts – specificity (most relaxed in certain areas)

Detailed explanations of these different regulatory methods can be found here:

- APA - Planning and Zoning for Solar Energy
- Solsmart - Solar Energy Toolkit for Local Governments

By-right/Permitted Use: If Ambler wishes to encourage solar in the borough, allowing solar as by-right (a permitted use) in all districts should be considered. This can also be made subject to specific standards that would be reviewed by the municipal zoning officer and planning commission. Typically, municipalities that wish to encourage solar will allow solar as by-right in all districts subject to standards outlined in the ordinance. However, some may wish to allow solar by-right only in some districts because they wish to have an added layer of review for specific districts such as historic or institutional districts.

While it is not required that a municipality zone for solar systems, there can be many benefits to Ambler and applicants by doing so. Regulatory measures that enable renewable energy promote cost effectiveness and compatibility with existing land-use. Additionally, Ambler can seek a review of existing zoning from various agencies to ensure the most flexible and facilitative zoning options for putting its strategic plan into action. These include assistance from DVRPC, the Montgomery County Planning Commission, or a SolSmart Zoning Review.

Large-Scale Solar

Background Information: MCPC - Solar Farm

The following recommendations are meant to give guidance on large-scale, primary-use solar projects, such as solar farms or utility-scale solar projects. A municipality that receives a land development application for a solar farm but has no ordinance in place to regulate such activity should anticipate a complicated variance process. The municipality should enact an ordinance, or amend an existing solar ordinance, to regulate the development of utility-scale solar applications as a conditional use in appropriate zoning districts. Since Ambler is mostly built-out this may not be a paramount concern.

Solar farm on landfill/ brownfield

The asbestos piles west of the SEPTA Lansdale line could also play a part in Ambler's strategic energy transition plan. More research in terms of suitability for a large-scale solar installation at this site would need to occur given this unique site and EPA regulations. Linked below are EPA resources, information, and examples from the RE-Powering America's Land Initiative which encourages renewable energy development on current and formerly contaminated lands, landfills, and mine sites when such development is aligned with the community's vision for the site.
EPA - RE-Powering Siting RE-Powering Projects Handbook on Siting Renewable Energy Projects

VII.D Wind

Background Information: Small Wind Turbines
Ordinance Framework: Small Wind - Renewable Energy Ordinance Framework

Wind energy as a broad scale renewable energy source presents itself with regional geography challenges for Ambler. The unique climate patterns in our region are not conducive to consistency or overall economic viability in terms of small-scale accessory use. For more information on small wind systems and ordinances see the above links which describe the technology and ordinance frameworks. The topics examined include:

- Smaller-scale accessory-use can be provisioned and/or permitted.
- The most common usage is as accessory structure to the primary use to reduce on-site consumption of utility power.
- Height, permitted zoning districts, aesthetics, and sound can be regulated.

VII.E Geothermal

Background Information: Geothermal

Similar to renewable wind energy, geothermal energy as a source presents with regional challenges for Ambler. The unique geology under Ambler is nearly as conducive as small scale solar in terms of the viability of small-scale use. In terms of codes and standards, geothermal is regulated by the Board of Health and measures at state levels in Pennsylvania. Key points of interest include:

- Equipment is similar to HVAC in both scale and size. Installation is generally located in a resident's basement.
- The Board of Health is the superseding regulatory mechanism and framework. Local regulatory measures are not generally appropriate.
- If codified, national standards for installation can be referenced in the local permitting verbiage.

VII.F Building/Site Design

The employment of some best practices in Ambler's codes and standards for buildings, land development, and site design can play an important part in the energy transition plan. Renewable energy systems and efficiency can be incentivized and guided in this manner. It is recommended that Ambler perform a review

of the existing zoning, subdivision, and land development codes. There may be opportunities for minor changes that can impact development from an early stage. Additionally, language that incentivizes both energy efficiency and renewable infrastructure can be included. Additional assistance regarding a review of these frameworks can be provided by the Montgomery County Planning Commission and DVRPC.

Some of the aspects of building and site design that can be addressed include:

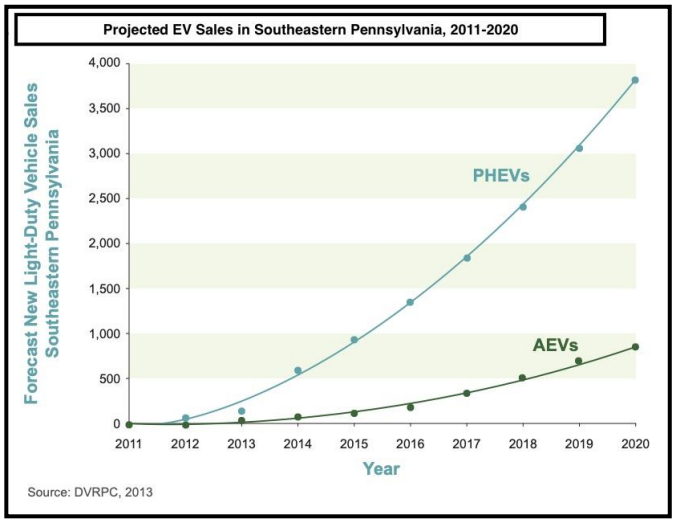
- Orientation. Incentives or regulatory measures can be included to optimize the solar radiation and minimize wind break of new structures. Minimizing east/west exposure increases energy efficiency while optimizing orientation for solar radiation and can increase efficiency and facilitate small-scale solar.
- Roof load specifications for new construction can ensure that new construction can facilitate rooftop solar PV hardware.
- Subdivision and Land Development Ordinances (SALDO): Careful selection of shade trees in terms of species, siting, and screening requirements can increase efficiency overall by improving Ambler's tree canopy to reduce the heat island effect.

Many of the standards for land development and construction are governed by the Uniform Construction Code (UCC) in PA, yet some early stage opportunities still exist. Most of these include incentivizing as laws often cannot require or mandate measures beyond the UCC. A few examples of the incentive frameworks that Ambler may consider, as well as LEED documentation are provided below:

- Density bonus for a reduction in the existing impervious surface percentage or LEED certification.
- Tax exemption, expedited permits, or fee reduction for orientation, renewable infrastructure, or LEED certification.
- LEED Guide - US Green Building Council

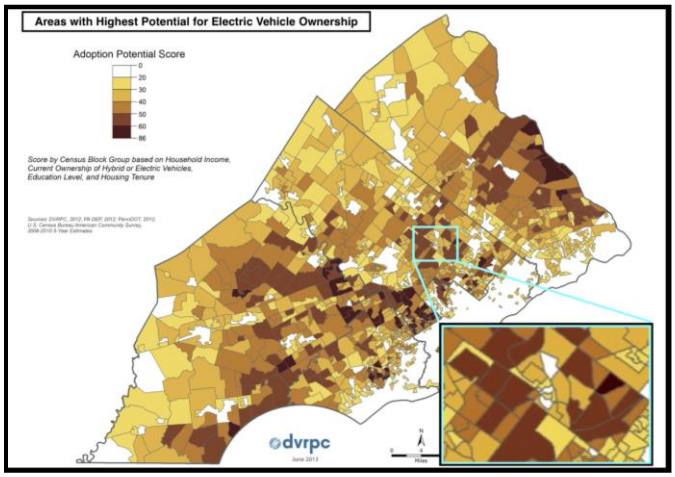
VII.G Electric Vehicle (EV) Ready Codes

Background Information: PADEP - Electric Vehicles in PA
Ordinance Framework: DVRPC - Ready To Roll



A community can go beyond simply allowing Electric Vehicle Supply Equipment (EVSE) as a permitted use in the zoning code, by requiring EVSE installation in specific kinds of development. For example, a community may require EVSE installation in developments of a certain square footage, including construction of new buildings, off-street parking facilities, or additions to existing buildings or parking facilities. Although the EV sales projection at left is for prior years, most indicators show that sales will be greater with projections for steeper demand for EVs in the future.

Communities may also choose to specify the type of land uses required for EVSE, such as multi-household residential uses or commercial land uses. The zoning code could set a minimum numerical or percentage-based requirement for EV parking spaces for each development type. Communities can decide whether those reserved EV parking spaces must include EVSE. In an effort to provide flexibility, communities may also determine a range of parking spaces for each kind of development that must include EVSE (e.g., two percent).



Zoning and permitting can incentivize new EV construction through providing bonuses or streamlining permitting processes. Ambler may consider the following strategies:

- Adopt consistent EV-related definitions in borough code definitions chapters. This also lays the foundation for future EV-related regulations.
- Potential ways to amend local zoning codes to support EV and EVSE deployment:
    - Add EVSE as a permitted use in some or all zoning districts.
    - Require EVSE for specific kinds of land use developments.
    - Provide incentives for developers to include electrical conduit or pre-wiring, or install EVSE in new construction.
    - Include EVSE design standards in local zoning codes to facilitate EV and EVSE deployment. Standards may pertain to EVSE location, accessibility, equipment type, maintenance, and signage and labeling.
    - Bonus Floor Area Ratio (FAR) for reduced parking requirements.
    - Create a network of public electric vehicle charging stations (EVSEs).
    - Combine public installations with regulatory and incentive provisions for private properties and developments. Phoenixville provides a good example: EV in Phoenixville

VII.H MontCo Planner Recommendations

#1 Ambler should include specific provisions for solar energy systems in its zoning code.

#2 Borough codes should be reviewed to determine where amendments could incentivize renewable energy systems.

#3 As Ambler moves towards 100% renewable energy, the borough should coordinate code standards with specific benchmarks and goals of increasing overall energy efficiency.

The Ambler boiler house is a excellent example of LEED building design that is successful in terms of both renewable energy efficiency and adaptive reuse.

Future Land Use - Codes and standards can incentivize commercial development and encourage designs that minimize the need for renewable energy as well as increase efficiency

VIII. Community Support

Ambler Borough commits to working with other Municipalities and the Montgomery County Planning Commission and/or the Delaware Valley Regional Planning Commission to create an energy planner-advocate position. The energy planner-advocate would develop and implement energy conservation and renewable energy strategies for Montgomery County municipalities, residents, businesses, and institutions.

The Sierra Club group, RF100 MontCo, supports Ambler's efforts and the efforts of neighbors such as Springfield, Bridgeport, and Whitemarsh in Montgomery County; Phoenixville, West Chester, Downingtown, Uwchlan, Kennett, and East Bradford in Chester County; and Haverford and Radnor in Delaware County. The group is ready to work with local municipalities to attain their sustainability goals.

As the borough transitions away from fossil fuels, it can serve as a model for residents and business owners as they consider enacting similar measures in their own homes and offices. Ambler offers numerous events and resources in this regard, such as:

a. Ambler Environmental Advisory Council's EarthFest
b. Ambler Main Street's Farmers Market
c. EV Charger @ Ambler Beverage Exchange
d. EV Charger @ Weavers Way
e. National Drive Electric Week @ Weavers Way
f. Thrive Fest

Current members of Ambler Borough Council include Frank DeRuosi, Sara Hertz, Nancy Deininger, Glynnis Siskind, Nellie DiPietro, Erin McKenna-Endicott, Jennifer Henderson, Haley Welch, and Brooke Marshall.

Current members of the Planning Commission include Robert LaGreca, Al Comly, Carol Ann DiPietro, Salvatore A. Boccuti, William Mulroy, Peter A. Amento, Elizabeth Iovine, Carissa Hazelton, and David Kralle.

Current members of the Environmental Advisory Council include Mary-Margaret Monser, Jillian Sanchez, Erin Landis, Shelly Grinar-Boyd, Elizabeth Rosencrans, Nancy Roecker-Coates, and Wes Pipitone.

This document was edited by Elizabeth Russell and Nellie DiPietro. Many thanks to everyone involved in this ongoing initiative!

APPENDIX I

I. *General EV Resources*

a. Delaware Valley Regional Planning Commission (DVRPC)
    a. Alternative Fuel Vehicles

b. Northeast States for Coordinated Air Use Management (NESCAUM)
    a. Zero-Emission Vehicles

c. PA Department of Environmental Protection (DEP)
    a. Driving PA Forward
    b. Drive Electric PA Coalition
    c. Alternative Fuels Incentive Grants

d. PA Department of General Services
    a. Mark Hand, Director of GreenGov Council
        i. mhand@pa.gov
        ii. 717-705-4797

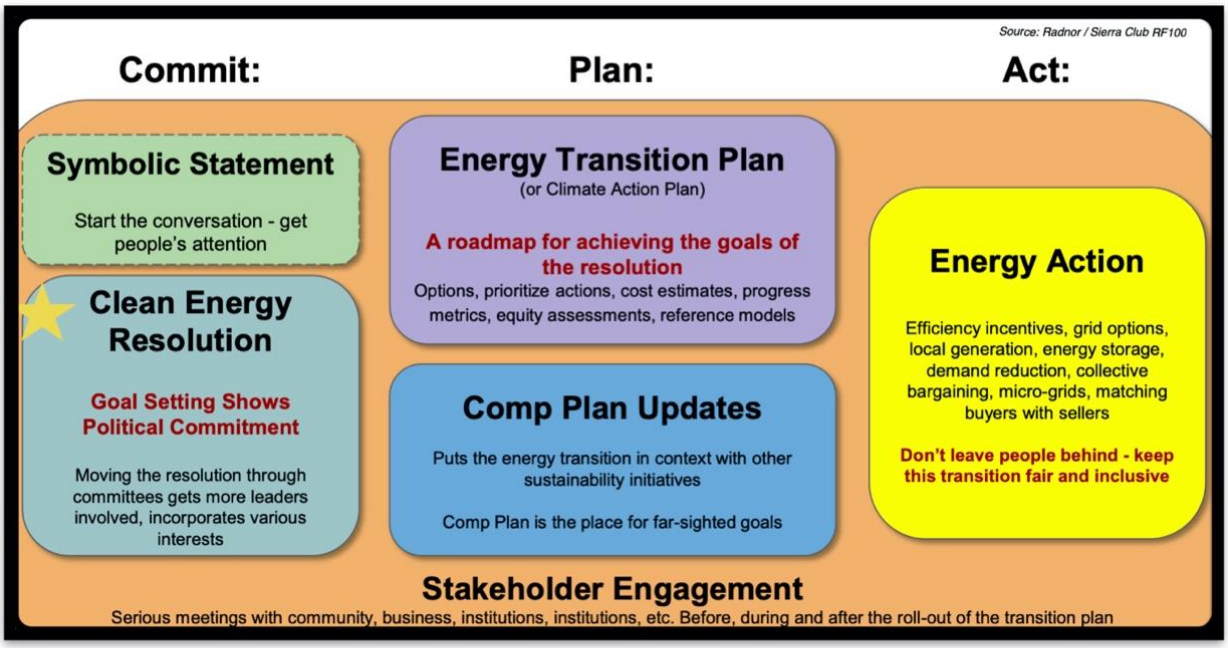
e. Transportation & Climate Initiative of the Northeast and Mid-Atlantic States
    a. Northeast Electric Vehicle Network

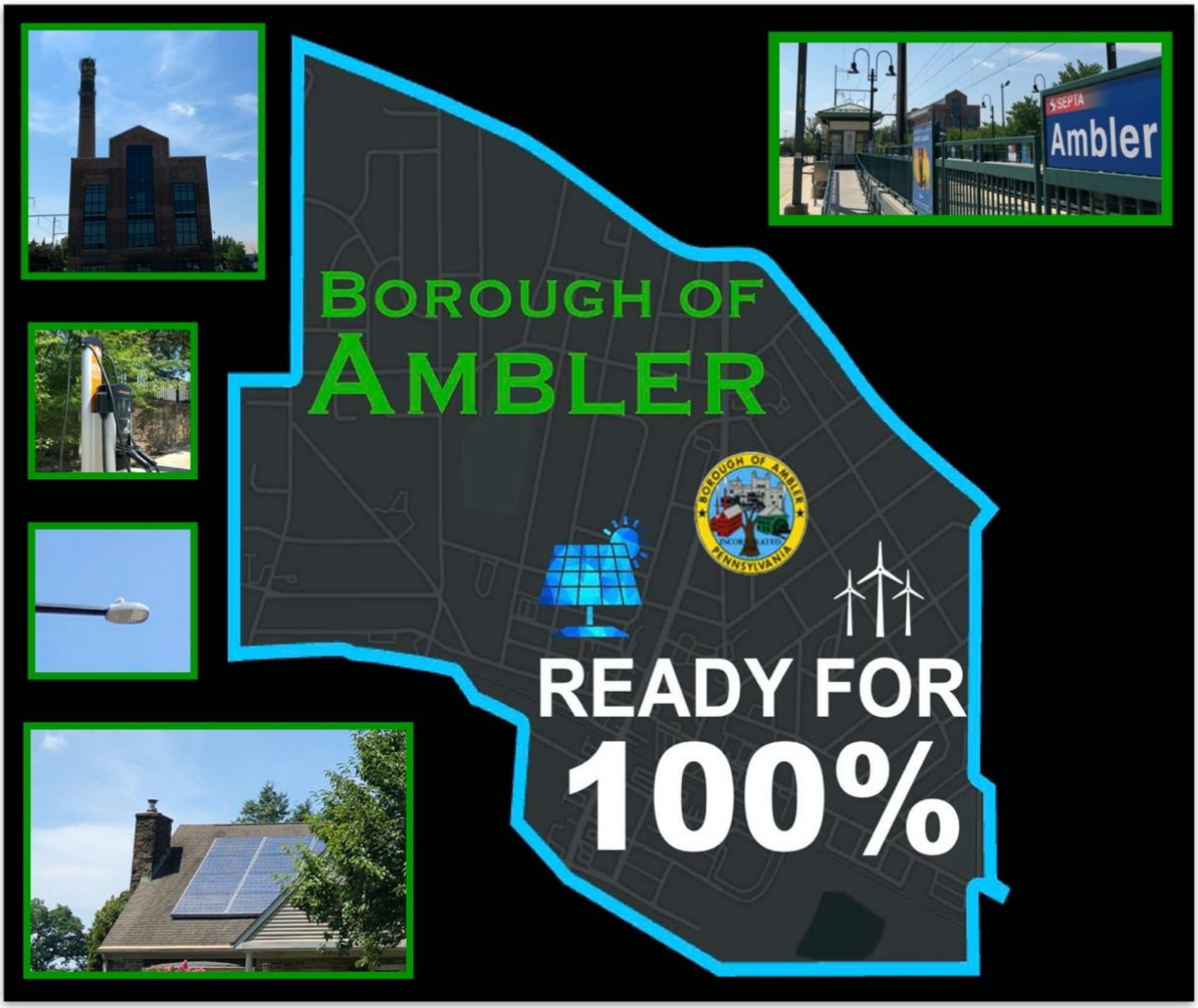
f. US Department of Energy
    a. Alternative Fuels Data Center

APPENDIX II

II. General Sustainability Information

a. RF100 Examples
    a. 2020 Vancouver Action Plan
    b. 2019 Cambridge Net Zero Progress Report
    c. 2019 Hanover Plan
    d. 2018 Sarasota's Roadmap
b. Ambler Borough Plans
    a. 2006 Open Space Plan
    b. 2019 Open Space Plan Update
    c. 2013 Comprehensive Plan Update
c. Local Transportation Information
    a. 2018 Bike Montco: Pages 96-99
    b. Wissahickon Trail
    c. Ambler Train Station
    d. Bus 94 & Bus 95
d. Brownfield Guidelines
    a. Best Practices for Siting Solar Photovoltaics on Municipal Solid Waste Landfills
e. DVRPC's Renewable Energy Ordinance Frameworks


Source: Radnor / Sierra Club RF100
Commit:
Plan:
Act:
Symbolic Statement
Start the conversation - get people's attention
Clean Energy Resolution
Goal Setting Shows Political Commitment
Moving the resolution through committees gets more leaders involved, incorporates various interests
Energy Transition Plan
(or Climate Action Plan)
A roadmap for achieving the goals of the resolution
Options, prioritize actions, cost estimates, progress metrics, equity assessments, reference models
Comp Plan Updates
Puts the energy transition in context with other sustainability initiatives
Comp Plan is the place for far-sighted goals
Energy Action
Efficiency incentives, grid options, local generation, energy storage, demand reduction, collective bargaining, micro-grids, matching buyers with sellers
Don't leave people behind - keep this transition fair and inclusive
Stakeholder Engagement
Serious meetings with community, business, institutions, institutions, etc. Before, during and after the roll-out of the transition plan


SEPTA
Ambler
BOROUGH OF
AMBLER
READY FOR
100%