Chapter 13
Energy Conservation Plan

This Chapter presents an evaluation of energy conservation. This is a new element of Malvern's Comprehensive Plan, as local energy conservation planning has become commonplace only in recent years. This Chapter will focus mostly on new and potential initiatives for conserving energy.

Chapter Organization:

OVERVIEW

Energy conservation has been a topic discussed in comprehensive planning for decades, but has only recently become a key focus for municipal planning. This increased interest in energy conservation is largely the result of rising energy costs, concerns with global warming and climate change, and concerns that the nation's security could be compromised if the United States were to become even more dependent on imported fuels. Furthermore, energy conservation and efficiency is one of the major tools to reduce greenhouse gases, which the scientific community has identified as having a significant impact on climate change.

In response to such concerns, the Pennsylvania Legislature amended PA Act 247, the Municipalities Planning Code (MPC) to permit municipalities to address energy conservation as part of a comprehensive plan. In 1983, the MPC was amended to include Section 301.1 entitled "Energy Conservation Plan Element," which set forth that, "…the comprehensive plan may include an energy conservation plan element which systematically analyzes the impact of each other component and element of the comprehensive plan on the present and future use of energy…"

There are five key areas that should be considered when assessing energy use:

- ***Reducing Demand and Consumption*** - how much energy is used.
- ***Improving Energy Efficiency*** - how energy can be used more efficiently.
- ***Revitalization, Reuse, and Recycling*** - how energy use can be reduced by reusing materials, adaptively reusing buildings, or redeveloping previously developed land.
- ***Alternative and Sustainable Energy*** - how energy can be generated from renewable sources.
- ***Reducing Unintentional Barriers to Energy Conservation*** - land use regulations that are meant to improve living conditions, but unintentionally result in higher energy costs for residents, such as homeowner association rules that forbid outdoor drying of laundry.

Energy consumption relates to all forms of energy use and generation by individuals, the business community, and the public sector. While municipal planning can influence the private sector, municipal governments only have direct control over energy use in portions of the public sector. In general, the public sector uses energy for 1) community services, 2) public infrastructure, and 3) utilities. As a result, short-term municipal initiatives for energy conservation focus on those three elements.

ENERGY CONSERVATION INVENTORY

Energy Consumption

There is no readily available information on the amount of energy used by the Borough's energy consumers, who include residents, business operators, and other energy users. Data on the amount of energy consumed at the national level is shown in Figure 13-1 and Table 13-2. Figure 13-1 shows that on the national level, energy consumption is anticipated to rise in the coming decades with no major shift in the type of fuels consumed. It is therefore reasonable to assume that energy sources used in the Borough are unlikely to change significantly in the coming decades. However, new energy technologies are currently being investigated throughout the world, and an unforeseen new invention, or a change in the global economy could alter even the most well thought-out projections.

Figure 13-1: Primary Energy Use by Fuel, 1980-2030

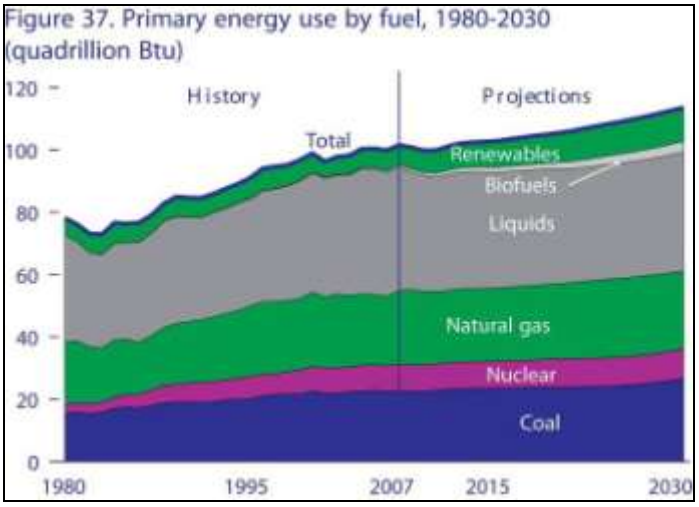
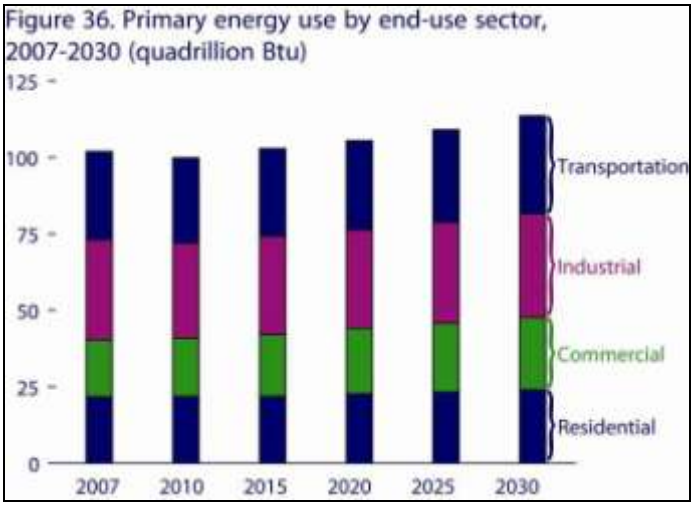


Figure 13-2: Primary Energy Use by End Use Sector, 1980-2030



Source: U. S. Energy Information Administration, *Annual Energy Outlook 2009*

Energy demand is the amount of energy required to make cars, factories, stores, and houses function. The people, businesses, and other entities that use energy are jointly called the "end-use sector." Figure 13-2 and Table 13-2 show energy use by end-use sectors at the national level, while Tables 13-1 and 13-2 show this data at the state level. This data indicates that no one sector is dominant, although transportation and industrial uses account for a large portion of energy consumption. It is likely that Malvern Borough reflects this national data and has a similar energy use mix, with no one sector being overwhelmingly dominant.

Table 13-1: Pennsylvania Energy Consumption, 2000, 2009, 6/2011

per Capita	**Pennsylvania**	**U.S. Rank**	**Year**
Total Energy	290 million Btu	32	2009
by Source	**Pennsylvania**	**Share of U.S.**	**Year**
Total Energy	3,654 trillion Btu	3.9%	2009
Total Petroleum	243.7 million barrels	3.6 %	2009
» Motor Gasoline	121.8 million barrels	3.7 %	2009
» Distillate Fuel	59.8 million barrels	4.5 %	2009
» Liquefied Petroleum Gases	15.5 million barrels	2.1 %	2009
» Jet Fuel	12.5 million barrels	2.5 %	2009
Natural Gas	804,077 million cu ft	3.3 %	2009
Coal	n/a	n/a	2009
by End-Use Sector	**Pennsylvania**	**Share of U.S.**	**Year**
Residential	918,637 billion Btu	4.4 %	2009
Commercial	685,165 billion Btu	3.8 %	2009
Industrial	1,071,772 billion Btu	3.8 %	2009
Transportation	978,534 billion Btu	3.6 %	2009
for Electricity Generation	**Pennsylvania**	**Share of U.S.**	**Year**
Petroleum	71 thousand barrels	2.7 %	6/2011
Natural Gas	26,657 million cu ft	3.7 %	6/2011
Coal	4,422 thousand short tons	5.3 %	6/2011
for Home Heating (share of households)	**Pennsylvania**	**U.S. Avg.**	**Year**
Natural Gas	51 %	51.2 %	2000
Fuel Oil	26 %	9.0 %	2000
Electricity	17 %	30.3 %	2000
Liquefied Petroleum Gases	3 %	6.5 %	2000
Other/None	3 %	1.8 %	2000

US Energy Information Administration, PA state data, September 2011

Table 13-2: Energy Consumption Overview: Estimates by Energy Source and End-Use Sector, PA and the U.S, 2009 (Trillion Btu)

		Sources								**End-Use Sectors** [a]			
		Fossil Fuels											
	Total Energy [b]	**Coal**	**Nat'l Gas** [c]	**Petrol.** [d]	**Total**	**Nuclear Electric Power**	**Renew. Energy** [e]	**Net Interstate Flow of Electricity/ Losses** [f]	**Net Electricity Imports**	**Res.**	**Comm.**	**Indust.** [b]	**Transp.**
PA	3,654.1	1,223.9	833.7	1,280.6	3,338.2	808.8	155.4	-649.0	0.6	918.6	685.2	1,071.8	978.5
U.S.	94,446.9	19,693.2	23,348.2	35,411.4	78,429.0	8,356.0	7,545.7	0.0	116.2	21,026.6	17,895.6	28,559.0	26,965.6

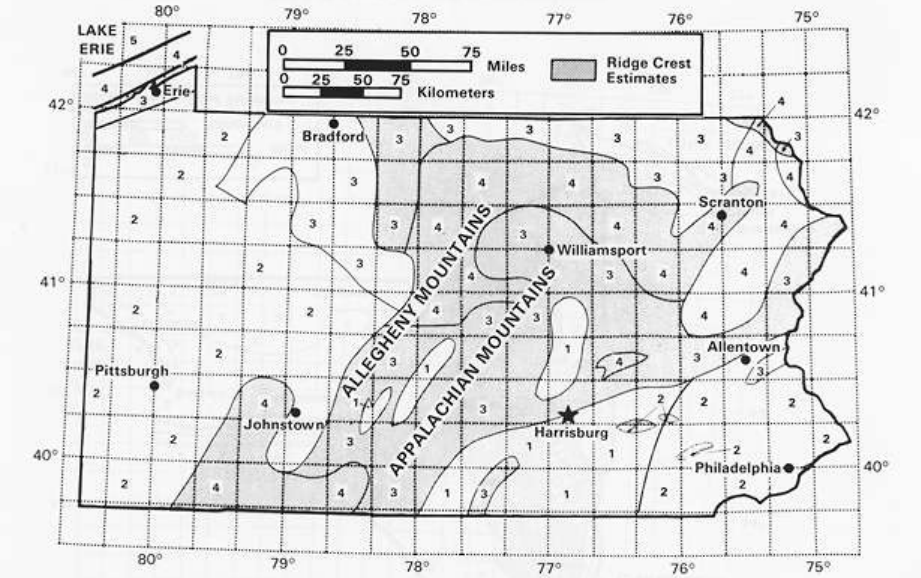
US Energy Information Administration, SEDS, June 2011

a. End-use sector estimates include electricity sales and associated electrical system energy losses.
b. U.S. total energy and U.S. industrial sector include -23.8 trillion Btu of net imports of coal coke that is not allocated to the States. Where shown, (s) = Value less than +0.05 and greater than -0.05.
c. Excludes supplemental gaseous fuels. Note: Totals may not equal sum of components due to independent rounding.
d. Excludes fuel ethanol blended into motor gasoline. Fuel ethanol is included in "Renewable Energy."
e. Includes conventional hydroelectric power, biomass (wood and biomass waste, fuel ethanol, and losses and co-products from fuel ethanol production), geothermal, solar thermal and photovoltaic, and wind energy.
f. Net interstate flow of electricity is the difference between the amount of energy in the electricity sold within a State (including associated losses) and the energy input at the electric utilities within the State. A positive number indicates that more electricity (including associated losses) came into the State than went out of the State during the year

Wind Power

Chester County is not especially well suited for wind production, as shown on the wind map in Figure 13-3. Although this map dates to the 1980's, it is still commonly referenced. Areas designated Class 3 and 4 are suitable for most wind turbine applications, while Class 2 areas are marginal and Class 1 areas are generally not suitable. Wind power estimates apply to areas that are free of obstructions to the wind and to areas that are well exposed to the wind, such as open plains and hilltops.

Figure 13-3: Pennsylvania Annual Average Wind Power, as of 1983

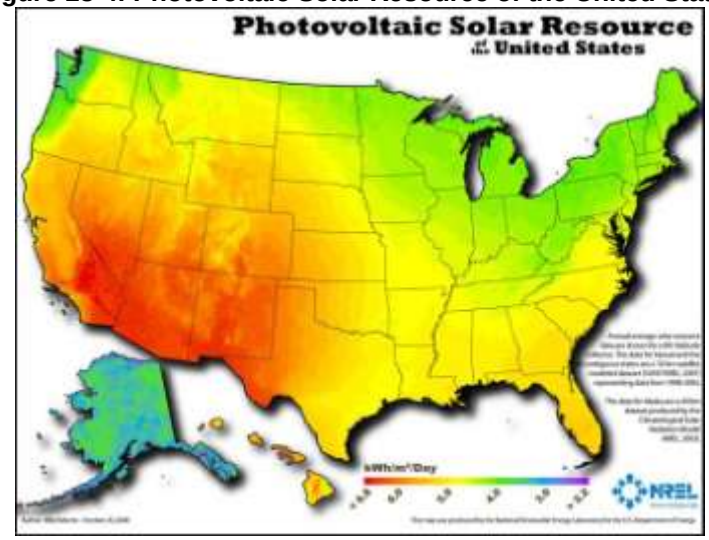


Source: *Wind Energy Resource Atlas of the United States*, US Department of Energy, 1986.

Solar Power

Chester County is somewhat well-suited for solar power generation in the form of photovoltaic panels as would be used on rooftops. As Figure 13-4 shows, southeastern Pennsylvania lies in the mid-range when it come to exposure to sunlight.

Figure 13-4: Photovoltaic Solar Resource of the United States



Source: *National Renewable Energy Laboratory*, US Department of Energy, 2008.

Energy Efficiency Development and Construction Standards

There are a number of new techniques that can be used to make building more energy efficient. Part of this increased efficiency can be realized through the way a building is constructed, and part can come through the efficiency of the appliances and systems used for heating, ventilation, and air conditioning (HVAC). The standards which are commonly used to rate the efficiency of buildings, appliances, and HVAC systems are:

- **Energy Star,** created in 1992, is now an international standard for energy efficient consumer products such as computer products, kitchen appliances, buildings, and other products. Devices carrying the Energy Star logo typically reduce energy by between 20 and 30 percent.

- **Leadership in Energy and Environmental Design** (LEED) Green Building Rating System, developed in 1998 by the U.S. Green Building Council, provides a suite of standards for environmentally sustainable construction. It has since become a standard throughout the U.S.

To date, there have been no major developments in Malvern Borough that have achieved LEED or Energy Star certifications. However, in 2007 a bank called "e3 Bank" was established in the Borough, and they plan to open a bank building which will be built using the latest energy conservation technologies. This bank is currently "under organization", and is searching for a permanent property for their headquarters. They intend to focus their business on financing projects that employ energy conservation and sustainable techniques. This approach is called the "triple bottom line," which refers to practice that expands traditional accounting reporting to take into account ecological and social performance in addition to financial performance.

ENERGY CONSERVATION EFFORTS

Energy conservation had been addressed in general terms in the Borough's 1999 Comprehensive Plan which included Economic Development goals/objectives that call for the revitalization of the downtown and the reuse and rehabilitation of existing buildings and properties. That Plan also supported an efficient and diverse transportation system including transit and pedestrian circulation under Transportation and Circulation goals/objectives. The Borough Revitalization Plan (2009) amendment to the Comprehensive Plan also includes recommendations encouraging the voluntary use of green building technologies and improvements to mass transit and non-motorized transportation facilities.

Like many municipalities, Malvern Borough has not yet addressed energy conservation in depth in its current regulations, for example through provisions regulating the installation of solar panels in Borough zoning or SLDO. As a local example in nearby East Bradford Township, this photo shows how solar panels are being used on a municipal park building.

Another local example in this photo shows how a solar panel array is being used atop Great Valley Middle School. As of June 2011, the array had reached 100,000 kw hrs produced since its activation in December 2010, which equaled about $12,000 in utility energy costs savings (by the school) and about 115,000 tons of CO2 emissions prevented (in terms of carbon footprint savings).[1]

Recycling is a major tool for reducing energy consumption. Pennsylvania Act 101, also known as the Municipal Waste Planning, Recycling, and Waste Reduction Act of 1988, mandates curbside recycling programs in communities with more than 5,000 people and a density of 300 people per square mile.[2] Under Act 101, recycling also includes the composting of yard waste. Although Malvern Borough is not covered under A**c**t 101, it does participate in recycling and has its own recycling program (see Chapter 10).

ENERGY CONSERVATION OPPORTUNITIES AND OBSTACLES

Pursuing a Balanced Energy Conservation Strategy

Because Malvern Borough is a densely developed community with existing infrastructure, building stock, and a central train station, it has many opportunities to pursue energy conservation initiatives. However, much of the Borough's aging building stock may require costly retrofitting in order to implement energy conservation projects related to structures. As well, retrofitting the Borough's aging infrastructure could also require substantial funding. Thus, the strategy for pursuing energy conservation may have to employ a balance that can realistically optimize energy conservation rather than simply maximizing it. The small size of the Borough may also necessitate regional cooperation for larger-scale efforts such as recycling.

Transitioning from Centralized to Distributed Energy Generation

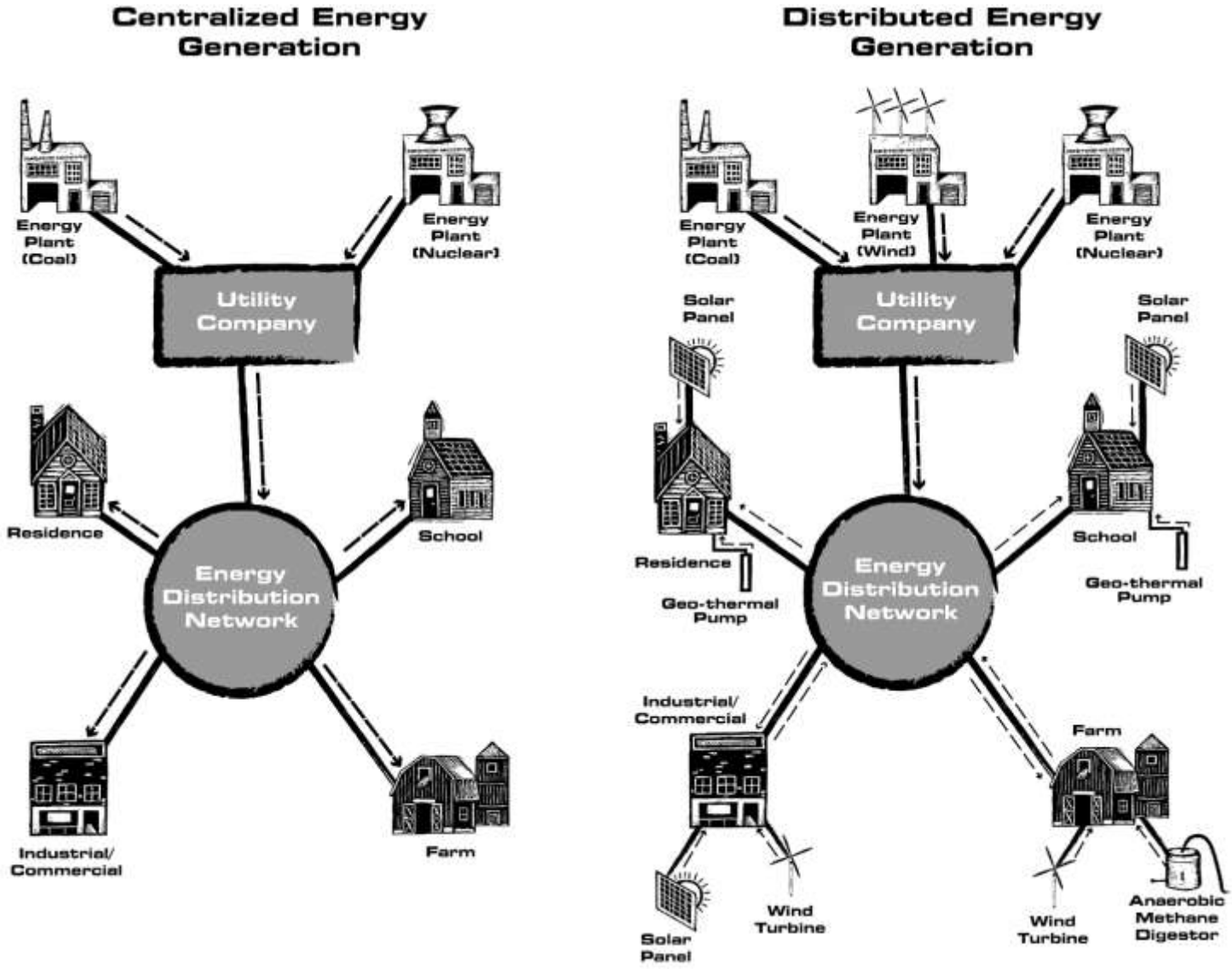
In the coming years the United States - and therefore impacting the Borough – is expected to experience at least a partial transition from centralized to distributed energy generation. **Distributed Energy Generation** refers to an energy network in which there are multiple large and small-scale energy generators, which could include wind turbines, solar panels, and conventional fossil fuels or nuclear power plants. This type of network is also referred to as "Decentralized Energy Generation" because it is a change from the "Centralized Energy Generation" network that is currently the norm.

Centralized Energy Distribution is characterized by large electric generating plants that are usually located at a distance from where the energy is consumed. The electricity is then transported through the transmission and distribution infrastructure to the energy consumer. Figure 13-4 illustrates how a Central Energy Generation system could be gradually modified into a Distributed Energy System.

[1] A $500,000 Energy Harvest Grant helped fund the solar array/installation. Based on GVSD, Solar Renewable Energy Certificates may be available, and, when combined with the utility cost savings, could allow the array to pay for itself in about 6 years.

[2] In these communities, Act 101 mandates the recycling of glass, paper, aluminum, steel, plastics, and the composting of leaves and branches. Furthermore, Act 101 requires the creation of recycling drop-off centers at landfills and trash incinerator facilities. Act 101 also established the Recycling Fund, which provides grants to local governments to help implement recycling programs in their communities.

Figure 13-4: Centralized Versus Distributed Energy Generation



Source: Chester County Planning Commission, 2009.

Energy Conservation through Borough Initiatives

The Borough has the option to initiate certain energy conservation efforts on its own, such as updating ordinances, building codes, and other regulations to either promote or permit green infrastructure and emerging technologies. Such efforts should also update those regulations already in place that may inadvertently limit the use of new energy conservation techniques. The Borough can also serve in an educational role for its residents by using its facilities, vehicle fleet, etc. as demonstration projects showcasing new technologies.

Land Use Development that Promotes Energy Efficient Transportation

The Borough's existing street grid and central train station are well-suited for transportation-related energy conservation efforts. The Borough has initiated planning for Transit Oriented Development (TOD), an approach in which the land around a public transit stop, such as a train station, becomes a center for pedestrian facilities and higher-density residential uses to reduce the need for the use of automobiles. The Borough also employs mixed-use development, in which residential, commercial, and employment centers are built close enough together that they can be reached on foot, much like towns were in the past.

The Borough has already implemented certain parking management strategies like shared parking requirements that permits one parking lot to be shared by two adjacent land uses that are used at different times of the day or week. The SEPTA train station, which is sparsely used on weekends, has a great potential for this approach, especially if its parking facilities are ever expanded.

Accommodating Plug-in and Alternative Fuel Vehicles

Much of the Borough may not be well-suited to accommodate plug-in electric or alternative fuels cars. Alternative fueled vehicles are only practical if there are nearby alternative fueling stations, which there are none in Malvern as of 2011; however there is a PECO Energy compressed natural gas public refueling station in the Malvern area at PECO's Berwyn Station. Also within a 10-mile radius from the Borough, there is another natural gas public refueling station at PECO's Phoenixville Service Building and there is an ethanol (E85) public refueling station in Exton.

Plug-in vehicles can easily be re-charged if the owner has an indoor garage, carport, or driveway which has ready and safe access to an appropriate outdoor outlet. However, recharging a car that is parked on the street, in a townhouse parking lot, or at a mall or train station would require the construction of new outdoor outlets and outlet stations. It is difficult to predict if these proposed automobile technologies will become commonplace, but it could be prudent for the Borough to establish policies that will not discourage alternative fuel stations.

Green Infrastructure and Low Impact Development

The Borough is well suited to benefit from energy conservation through the use of green infrastructure and low impact development. **Green Infrastructure** refers to the use of scientifically-designed vegetation plantings and landscaping that can be used instead of brick and mortar public infrastructure, such as stormwater sewers or sewage treatment plants. In the Borough, which already contains significant investment in traditional brick and mortar infrastructure, green infrastructure could be used, at least initially, to supplement and as needed expand existing infrastructure.

According to the U.S. EPA, green infrastructure encompasses an "interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife". Green infrastructure is an effective tool for reducing energy consumption because it is usually vegetation-based, and so does not require electricity to function. Examples of green infrastructure are presented in Table 13-3.

Table 13-3: Green Infrastructure and Energy Conservation

Type of Green Infrastructure	Energy Conservation Impact
Development and Construction Techniques	
Greyfield and Brownfield Redevelopment is the reuse of brownfields (abandoned or underused industrial or commercial properties where redevelopment is complicated by actual or perceived environmental contamination) or greyfields (empty or economically unviable malls or office centers).	***Greyfield and Brownfield Redevelopment*** promotes energy conservation by locating development already built areas, thus reducing the need to extend utilities. It also promotes clustering, reducing transportation fuel consumption.
Infill Development and Redevelopment involves the re-use of vacant land and property within a built-up area for further construction or development, especially as part of neighborhood revitalization.	***Infill Development and Redevelopment*** promotes energy conservation by locating development already built areas, thus reducing the need to extend utilities. It also promotes clustering, reducing transportation fuel consumption.
Green Roofs are conventional roofs covered with a layer of vegetation. They absorb rainwater, providing insulation, creating a habitat for wildlife, and helping to lower urban air temperatures.	***Green Roofs*** provide insulation thus retaining energy, and they reduce runoff thus reducing the need for the construction of brick and mortar storm water management facilities and structures.
Transportation and Parking Facilities	
Permeable Pavements can include pervious concrete, asphalt, or pavers that allow precipitation to percolate through otherwise be impervious paved areas. It permits stormwater to infiltrate through to the soil below.	***Permeable pavements*** reduce runoff thus reducing the need for the construction of brick and mortar storm water management facilities and structures.
Green Parking refers to techniques that reduce the total impervious cover on a property, such as using alternative pavers in overflow parking areas, using bioretention areas to treat stormwater, and encouraging shared parking.	***Green Parking*** reduces runoff thus reducing the need for the construction of brick and mortar storm water management facilities and structures.
Green Streets and Highways refers to a street or highway that uses vegetated facilities to manage stormwater runoff at its source.	***Green Streets and Highways*** reduce runoff thus reducing the need for the construction of brick and mortar storm water management facilities and structures.
Land and Natural Resource Management	
Vegetated Swales are shallow channels with vegetation covering the side slopes and bottom. They promote infiltration, reduce the velocity of stormwater runoff, and trap particulate pollutants such as suspended solids and trace metals.	***Vegetated Swales*** reduce runoff and purify water thus reducing the need for the construction of brick and mortar storm water management and water purification facilities and structures.
Shade Trees and Urban Forestry refers to the careful care and management of tree populations in developed settings for the purpose of improving the urban environment.	***Shade Trees and Urban Forestry*** can reduce heating and cooling cost to nearby buildings. Tree leaves shade structures in the summer, and buffer winds in the winter.
Riparian Buffers are vegetated areas next to streams and lakes that protect them from nonpoint source pollution while providing bank stabilization and habitat for wildlife and aquatic species.	***Riparian Buffers*** reduce runoff and purify water thus reducing the need for the construction of brick and mortar storm water management and water purification facilities and structures.

Source: Chester County Planning Commission, 2009.

Low Impact Development (LID) is similar to Green Infrastructure, but it is used to describe land planning and engineering designs that manage stormwater runoff. LID emphasizes conservation and the use of on-site natural features to protect water quality and control run off. This approach implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime of watersheds through infiltrating, filtering, storing, evaporating, and detaining runoff close to its source. LID plays a role in energy conservation because it improves water quality without the operation of treatment plants.

Influencing Public Utilities to Initiate Energy Conservation

For some issues, the Borough's role is limited to advocacy and education. The Borough can request that regional utilities and service providers cooperate with the Borough's policies on energy conservation. In 2007, the Consortium for Energy Efficiency [3] (CEE) reported that public drinking water and wastewater facilities account for approximately three percent of total U.S. electricity use. These facilities can represent up to 35 percent of municipal government energy use.

The high energy consumption by public utility plants is in part due to facilities such as wastewater treatment plant sludge blowers, which operate 24 hours. Although the Borough does not operate these facilities and cannot order improvements in their efficiency, the Borough can formally adopt policies in its comprehensive plan which call for improved energy efficiency by its utility providers. Section 71.21(5)(d) of PA Act 537, the Pennsylvania Sewage Facilities Act, requires that official sewage facilities plan (also known as an "Act 537 plan") identify alternatives for establishing or upgrading facilities based on municipal comprehensive plans.

Underground electric transmission power lines are sometimes considered a more energy efficient method. Traditionally, overhead lines have been preferred as the lower cost choice to meet demand needs and high supply quality. Underground lines and their installation have been more expensive than overhead lines and have lesser power carrying capacity than overhead lines of the same size (due to line insulation technological and thermal issues). Also, they are more difficult to access for maintenance and can have environmental impacts, for example on soils, tree roots, and archaeology. Recently, however, there have been significant technological advances in line insulation. This means that high voltage (HV) lines can be used to achieve a lower total-system cost resulting in underground line now being a more competitive alternative to overhead lines. As well, HV lines now are having faster installation and higher transmission reliability, while still continuing to have the benefits of being less visually intrusive, more energy efficient with low energy losses (due to the inherent underground isolative qualities and the tight spacing of the conductors), and a lesser risk of total network failure than overhead lines as they are less often damaged by lighting and storms.

ENERGY CONSERVATION PLANNING RECOMMENDATIONS

Recycling, Reuse, and Redevelopment

13.1 Pursue, on a voluntary basis, consistency with the recycling requirements of PA Act 101, The Municipal Waste Planning Recycling and Waste Reduction Act.

By keeping consistent with state requirements, the Borough will be better situated to take advantage of state or federal programs that may become available in the coming years.

13.2 Continue to promote and undertake emerging recycling and composting initiatives that improve energy efficiency and reduce public expenditures.

Such initiatives include the use of single stream recycling and increasing the types of material recycled. Malvern already uses single stream recycling, but there are other innovative

[3] The CEE is a nonprofit, organization composed of electric, gas and water utilities, research organizations, and state and regional energy offices. CEE works in cooperation with the U. S. Environmental Protection Agency and the U. S. Department of Energy.

initiatives that can be used such to conserve energy, such as modifying how recycling contractors schedule and map collection routes for recycling pick up and hauling.

13.3 Support programs that offer consumers opportunities to reuse items which would otherwise be disposed of.

Such programs include curbside pickup of items for reuse or "free-cycling". Free-cycling is a newer and growing technique where individuals post notices on free-cycling websites, offering to give away useful items that they no longer need, instead of disposing of the materials.

13.4 Encourage the rehabilitation and reuse of existing buildings and historic resources.

Reusing already built structures promotes energy conservation as new materials are not needed. Adaptive reuse and building rehabilitation fully utilizes and capitalizes on continued use of the embodied energy that went into an existing building's material and construction, and can be promoted via ordinances and building codes sympathetic to the issues inherent in existing and older buildings. As well, educational measures can be undertaken.

13.5 Promote the redevelopment of brownfields and greyfields, as well as infill development on vacant properties in developed neighborhoods.

Periodically there are state and federal programs that assist in brownfield and greyfield redevelopment, which sometimes involve public-private partnerships with developers. On a local level, this can be encouraged through continuing to permit a variety of institutional uses and incentivizing energy efficient building in Borough ordinances.

13.6 Promote the development of energy efficient public buildings and uses in the Borough and in existing developed areas near the Borough.

Such buildings could include schools, government offices, and other publicly funded structures. As existing building infrastructure ages and needs to be replaced or updated, the Borough and the school district could construct or rehabilitate buildings using new more energy efficient techniques. It is anticipated that there may also be state and federal grants available in the coming years for such projects. The C-4 zoning district, as of 2011, requires LEED certification for new development and the Borough could consider a more widespread use of this requirement in other zoning districts when the zoning ordinance is updated.

13.7 Promote appropriate on-site energy generation and other alternative technologies in all land uses.

On-site energy generation, such as solar, wind, and methane digesters, can be installed in all land uses from residential to industrial, but it must be sensitive to surrounding land uses and to site conditions. For example, it may be appropriate to install modern solar panels in an isolated industrial site, but not in a visible manner from the public right-of-way in an historic residential district. The Borough should monitor these technologies, technological updates, and cost to determine their effectiveness for and in conjunction with various Borough and other projects. Also, the Borough may consider investigating developing a guide or an ordinance addressing appropriately locating solar panels so they are usable while being compatible with neighboring land uses, such as minimizing reflective glare onto adjacent properties and roadways.

Government, Utility, and Public Facilities and Infrastructure

13.8 Support the purchase of energy efficient supplies, equipment, and physical plant elements for Borough buildings and facilities.

The Borough could implement this policy by determining which supplies are likely to be replaced in the near future and researching if or how they can be replaced with more efficient models. Such an approach will be useful in a situation where a needed piece of equipment breaks, and needs to be replaced quickly.

13.9 Promote a policy for a portion of the Borough's energy purchases to come from renewable energy sources, if or when such an option is available.

Municipal governments can agree to purchase energy from companies which generate a specific percentage of their energy from renewable sources, typically wind or solar.

13.10 Monitor opportunities to benefit from using readily available raw materials for the production of biofuels.

Biofuels, such as cellulosic ethanol, can be produced from readily available local raw materials of tree and lawn clippings that result from the management of parks, public open spaces, and roadside vegetation. Tree and grass clippings have the potential to be used in "cellulosic" ethanol production, although the technology is not advanced enough at this time for mass production. Municipalities, who accumulate large amounts of these clippings, may be able to use them as a revenue source in the future. It is prudent for the Borough to monitor such opportunities, and develop policies which will not discourage them should they occur.

13.11 Support the upgrading of electric power infrastructure to promote more efficient energy conversion, storage, and transmission to meet anticipated consumption.

The increase in electronic devices and the increasing development of plug-in hybrid or all-electric cars likely will require an increase in the amount of electricity needed from utilities.

13.12 On a regional level, promote the use of vegetative-based or alternative wastewater treatment and disposal technologies, such as through retrofitting existing wastewater treatment facilities, in order to improve energy efficiency.

As Borough policy is to promote connection to the public sewer system, this recommendation would apply to the larger scale wastewater treatment system of which the Borough is a part. However, should St. Joseph's Retreat develop and remain with an on-lot system, this recommendation could be an option.

13.13 Encourage the Great Valley School District (GVSD) to reduce energy use through efficient bus routes, upgrades to the fuel efficiency of bus fleets, safe walking routes to school, and efficient energy use in buildings, athletic fields, and property management.

School districts can reduce energy by using more energy efficient busses, and managing how the bus routes are designed. School districts can also promote having children walk to school or walk longer but safe and reasonable distances to bus stops, thus reducing the number of stops a bus must make. Such large entities as the school district can make an impact in

implementing energy efficient strategies and serve as a 'role model' for other entities that are considering undertaking energy conservation methods. The Borough should encourage private schools and other institutions in the Borough to implement such energy efficient strategies, as relevant, as well.

Efficient Vehicles, Transportation Facilities, and Transportation Management

13.14 Accommodate the future use of alternative fuel-powered vehicles, the establishment of alternative fuels stations, and the retrofitting of existing buildings and parking facilities to provide for new fueling technologies.

This recommendation could apply to Borough buildings and facilities as well as ensuring that there are no impediments, for example in ordinances that would disallow residents and businesses from using these alternative technologies. More specifically, a new up-and-coming fuel technology to consider is vehicular electric plug-in stations.

13.15 Continue to promote the use of alternative transportation options to single occupancy vehicles.

Such alternative options include the SEPTA commuter rail line, bus transit, ridesharing, carpooling, and park-and-rides. The Borough already has a train station that is popular with regional commuters, and the Borough can continue to pursue improved parking facilities and ways to link rail travels to bus and other travel options.

13.16 Continue to promote the efficient use of parking facilities through continued parking management strategies.

The Borough should continue to permit new and innovative alternatives in zoning regulations to conventional parking, such as continuing to permit, and perhaps expand, allowances for shared parking lots by multiple uses that actively use the lot at different times during the day (night time use versus day time use) or on different days (weekdays versus weekends).

13.17 Promote travel demand management strategies.

Travel demand management strategies, which are techniques to reduce travel associated with commuting to work, include home offices, flex time, ridesharing, on-site daycare, and compressed work week schedules.

13.18 Support non-motorized transportation options.

Such options include pedestrian and bicycle facilities, and the expansion of crosswalks, sidewalks, bicycle lanes, and trail networks.

13.19 Continue to pursue and expand opportunities for transit oriented development (TOD) and related infrastructure within walking distance to transit stops.

Because the SEPTA train station is the central transit feature in the Borough, it can be expected that any major TOD projects will involve coordination with SEPTA and perhaps other regional or statewide agencies.

13.20 Continue to pursue and expand mixed-use development that reduces travel distances between residential, commercial, and employment centers.

This effort will be done in coordination with recommendation 13.19 within the Borough. On a larger scale, it may also require multi-municipal or regional coordination since the Borough is in close proximity to the large cluster of industrial parks along Route 29 to the north.

Industrial and Commercial Efficiency

13.21 Promote the use of energy efficiency standards and the installation of alternative energy generation systems in commercial and industrial operations, and where appropriate, in mixed-use developments.

Energy efficiency standards include those such as LEED and Energy Star. Given that LEED certification is a relatively new concept, the Borough will likely have to initially pursue part of this recommendation by providing information to residents and businesses about the value of LEED certification.

13.22 Support the county-wide expansion and promotion of manufacturing and agricultural operations that provide local products to nearby major markets, and support regional efforts to promote the sale of these products.

Local products include those produced within approximately a 100-mile radius of an end market. Such efforts could include promoting the Chester County Agricultural Development Council guide to local fresh food markets.

Residential Land Use and Property Management

13.23 Promote energy efficiency standards for the development or redevelopment of residential buildings and areas.

Energy efficiency standards include those such as LEED and Energy Star. The Borough can promote this recommendation though education, but also by example by pursuing energy efficiency on public property. Also see recommendation 13.21.

13.24 Continue to promote higher density residential uses and pursue 'walkable communities' through innovative development and redevelopment designs.

The Borough should keep abreast of approaches to promote walkabilty that are found to be successful in other nearby towns as well as in neighborhoods in Philadelphia. Such development design includes town-oriented design, traditional neighborhood design, and continued mixed uses.

13.25 Remove restrictions that inadvertently discourage energy efficiency in ordinances and homeowner association covenants.

Restrictions, such as prohibiting the hanging of laundry outdoors to dry or forbidding the practice of seasonal-only mowing of low-use lawn areas, can serve to discourage energy conservation. This effort would include the Borough reviewing Borough ordinances and coordinating with homeowner associations for their review of their homeowner's provisions.

13.26 Support programs that allow residents to improve energy efficiency in their homes through weatherization, efficient climate control, and the conservation of hot water.

Because the Borough is a dense and close knit community, the Borough may be able to play an active roll in promoting community programs that improve energy efficiency. Such a program might involve helping to coordinate the bulk purchase of energy efficient water faucet aerators for a large number of residences, thus reducing overall purchase, and ultimately utility, costs for the residencies.

Energy Education, Information Distribution, and Demonstration Projects

13.27 Support education efforts that encourage energy and resource saving practices at home, school, and the work place.

Such efforts could include school programs and workplace programs, such as encouraging students and employees to drink tap water or filtered tap water from a reusable bottle instead of pre-bottled water. The Borough could support and promote such efforts by publicizing them at community events and through the Borough newsletter and website.

13.28 Support construction and development projects that implement energy conservation.

The Borough could encourage projects involving buildings open to the public which employ energy conservation features that can be viewed by the public. The Borough could monitor, as time permits, energy conservation demonstration programs in the Region and provide relevant web links on the Borough website to raise citizen awareness about these programs and their energy sensitive features. Also, the Borough should monitor possible future funding programs for developing Borough demonstration projects or programs.