

RENEWABLE ENERGY TRANSITION PLAN

SPRINGFIELD TOWNSHIP, MONTOMERY COUNTY

MUNICIPAL OPERATIONS

Developed by the Springfield Township Environmental Advisory Commission

Approved by the Township Commissioners January 8, 2025

Springfield Township, Montgomery County, Pa.

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How this Plan was Developed and Its Intended Use

This document provides background and guidance to those responsible for making and/or implementing decisions related to achieving Springfield Township’s Renewable Energy goals as outlined in the resolution approved by the Board of Commissioners in [January 2019](#). Principal stakeholders include the Board of Commissioners, relevant Municipal Departments, and the Environmental Advisory Commission (EAC).

This plan will be expanded in the future to provide guidance for the community to move to 100% renewable energy, with the community defined as the members of Springfield Township beyond the municipal government, namely the residents, businesses, schools and other institutions located here.

Development of this plan was authorized by the Board of Commissioners. It was written by members of the EAC with assistance, cooperation and input from many in the Township with relevant professional experience. In developing the plan, the team used the U.S. Department of Energy’s 2013 *Guide to Community Energy Strategic Planning* and the following guiding principles:

1. **Promote Financial and Energy Stewardship:** Prioritize strategies and actions that have the highest rate of return and/or fastest payback period, recognizing that some options require an upfront investment. Make decisions based on evidence and that reflect current scientific and health knowledge. Serve as conscientious stewards of

the Township's financial resources, which is especially important given the recent upward trajectory of energy prices, and the broad expectations by most economists that energy prices will continue to increase throughout the foreseeable future. This plan provides the roadmap to a future in which all (or almost all) of the energy needed for municipal operations is produced onsite by the Township, thereby shielding the Township from anticipated rising energy prices.

2. **Act with Immediacy:** Balance short-term ease of implementation with long-term potential for transformation and impact.
3. **Support Community Growth and Stability:** Implement actions which support Springfield Township's ability to attract and retain residents and businesses, now and in the future.
4. **Improve Public Health for All:** Strive to maximize the health benefits provided by the transition to a renewable energy economy. Consider the impact of decisions and actions on residents in all levels of income and recognize that burning fossil fuels has impact beyond the township.
5. **Include Stakeholders:** Continually obtain and integrate input from all stakeholders as the Plan is implemented and updated. Stakeholders include, but are not limited to: Board of Commissioners, Springfield Township Municipal Departments, Residents, Business Owners, Institutions, Employees, School District, the Springfield Township Environmental Advisory Commission, as well as the other Township Advisory Commissions.
6. **Coordinate with other governments and organizations:** Consult and collaborate with other communities and networks on approaches and aggregate planning strategies at the local, county, regional, state, and/or federal levels.

We thank the following people from the Township for their support and feedback: Commissioners Jim Lee, Brendan May, Peter Wilson, Susie Ratsavong, Jonathan Cobb, Ed Morris, Beth McNamara; Township Manager Mike Taylor, Public Works Director Ian Hammer; and Fleet Manager Gene Irvin. We thank Commissioner May specifically for his leadership as Commissioner Liaison to the EAC. We also thank Upper Dublin Township's Environmental Protection Advisory Board for sharing their Energy Transition plan. We also acknowledge the support provided by Bernadette Fox, Ron Celentano, Desiree Rammon, and Zach Davis (chair of Upper Merion Township EAC).

Environmental Advisory Commission:

Aaron Stemplewicz, chair
Martin Ryan, vice-chair
Stephen Heverin, secretary
Joy Bergey, Pat Hynes, Gail Farmer, Alex Waldman; associate members Ben Schimineck and Patrick Eddis; and student associate member Adam Thorp

Background and Goals

In Springfield Township and across the world, climate change is damaging human health and life, threatening food production, and increasing the cost of daily life in numerous ways. Precipitation in our area in recent years has been arriving in more intense downfalls and storms; gentle spring rains are becoming a thing of the past. The burning of fossil fuels, which leads to Greenhouse Gas (GHG) emissions, is the predominant contributor to climate disruption. We see the effects of climate change in Springfield Township with increasing stormwater and flooding problems, which threaten human safety and cost everyone - residents, business, and the township - more money. More intense and frequent severe storms are hitting very close to home, such as the tornado spawned by Hurricane Ida in September 2021 that damaged or destroyed many homes in Upper Dublin Township. Addressing climate change presents its own risks and challenges. To reach net zero carbon emissions by 2050 and avoid the most deleterious effects of climate change, the U.S., alongside the rest of the world, must electrify fossil fuel-burning infrastructure and switch electricity generation to 100% renewable energy sources. Reaching 100% renewable electricity generation requires investment in both new renewable infrastructure (solar, geothermal, etc.) and more efficient products that use less energy.

The elected officials and municipal staff of Springfield Township hold the public's trust for maintenance of a healthy, stable living environment, while also being responsible for wise stewardship of resources, financial and otherwise. In furtherance of this obligation, in 2019, the Board of Commissioners adopted the following renewable energy goals:

Springfield Township Renewable Energy Goals

1. Transition to 100% renewable electricity for all Township municipal operations by 2035
2. Transition to 100% renewable energy for all Township municipal transportation and heating by 2050

Additionally, through outreach and education to Springfield residents and businesses, the Commissioners and the EAC aspire to achieve the following goals:

3. 100% renewable electricity use by the wider community by 2035
4. 100% renewable energy use by the wider community for transportation and heating by 2050

Fortunately, the Township has already begun taking action to reduce our contributions to climate change and saving money for our taxpayers. And while we recognize that it is not **currently** practical or even feasible to incorporate renewable technology into all aspects of Township Operations, such as heavy-duty Public Works vehicles, we remain optimistic that pathways will exist for the Township to reach 100% renewable energy in operations by 2050, if not sooner. Springfield Township is already widely seen as a municipal leader on renewable energy by other municipal staff, elected officials, and volunteers in the region. In furtherance of that mission and obligation, this Renewable Energy Transition Plan for

Township Municipal Operations (“Plan”) outlines strategies and actions to continue towards achieving Goals 1 and 2 in a fiscally responsible manner and is organized into three focus areas.

Focus 1: 100% Renewable Energy for Transportation by 2050

Focus 2: 100% Renewable Electricity in Buildings by 2035

Focus 3: Implement, Monitor and Share Progress

A subsequent Climate Community Action Plan is under development by the EAC to address Goal 3 and Goal 4.

Focus 1: 100% Renewable Energy for Transportation by 2050

This section of the plan discusses and provides recommendations for transitioning the municipal fleet from fossil fuels to renewable energy, initially from the electric grid and then from Township-owned renewably generated electricity. An earlier version of the plan also included recommendations for reducing carbon emissions from community transportation sources by creating policies and programs that will create a more walkable and bikeable community and encourage public use of electric vehicles (EVs). These recommendations have been forwarded to the broader Township Planning Commission and the Parks and Recreation Advisory Committee for incorporation into future community planning strategies.

The benefits of electric vehicles are wide-ranging and well-documented. Generally, an EV is propelled by one or more electric motors, using energy stored in rechargeable batteries. These vehicles are shown to have significantly lower fuel costs and total costs of ownership and maintenance compared with gasoline-powered vehicles. Importantly, they are one of the most promising ways of reducing carbon emissions from the transportation sector, which is the largest contributor to U.S. greenhouse gas emissions.

Springfield Township’s municipal fleet includes a variety of vehicles and equipment powered by internal combustion engines (ICEs) that use fossil fuels, such as police vehicles, light duty trucks, refuse vehicles and lawn mowers. This equipment is a significant contributor to the Township’s Carbon footprint with 2019 emissions from these sources estimated to be 600 metric tons.

In 2021 the Township began taking steps to reduce emissions from the municipal fleet with the purchase of two hybrid police patrol vehicles, and has subsequently committed to replacing any vehicles being retired with hybrid vehicles or EVs. As of 2025, the Township has also started purchasing light duty electric trucks. In the case of police and administrative vehicles, at least two patrol vehicles are replaced on an annual basis, and certain retired patrol vehicles are then repurposed as administrative vehicles when appropriate. We anticipate that these hybrid vehicles, in addition to all vehicles and equipment utilized by Public Works, will be replaced as part of normal life-cycle management by all-electric vehicles well before 2050, to the extent the technology is

available and replacement is practically and financially feasible. This constitutes a non-binding, staggered approach that can be altered as needed by the Township.

Through a letter dated 9/14/2023 from Township Manager Mike Taylor to EAC Chair Aaron Stemplewicz, the Township updated their commitment to include the replacement of any gasoline-powered maintenance equipment with comparable, commercial grade battery-powered equipment, to the extent such equipment is needed, comparable and readily available. A copy of that letter can be found [here](#).

Recommendations for Transitioning to a Renewable Energy Municipal Fleet

As the Township moves forward with electrifying its fleet there are several factors that must be considered, such as the best applications for EVs, ensuring adequate charging infrastructure, training fleet drivers and mechanics, and reporting progress. As such, we have grouped recommended actions into 3 key areas:

- A. Transition vehicles and equipment to renewable energy
- B. Build supporting infrastructure, including municipal charging stations
- C. Adopt best operating practices

A) TRANSITION VEHICLES AND EQUIPMENT TO RENEWABLE ENERGY

The following steps provide a **path to achieving ZERO municipal fleet emissions** in Springfield Township on or before 2050. It is important to note that municipal vehicles not owned by the Township are not included in the emission reduction strategy. This includes emergency (fire/ambulance) vehicles as well as vehicles and equipment owned by the School District of Springfield Township.

- a. **Replace police patrol vehicles as they are retired with hybrid vehicles. Continue** to use the retired police vehicles to replace Administrative vehicles, per the Township's fleet management strategy when appropriate.

Timing: Started in 2021; ongoing

- b. **Replace police patrol vehicles with electric-only* vehicles (EVs).**

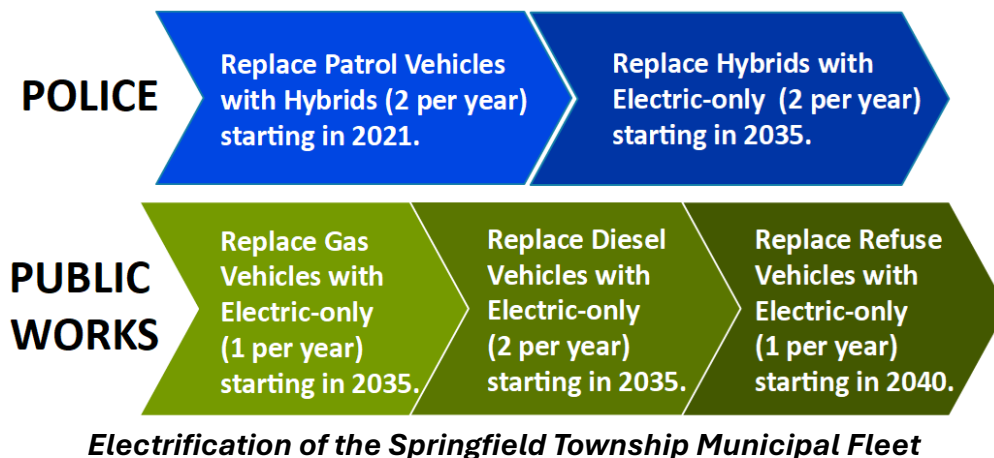
Timing: Begin no Later than 2035 *Note: This date was chosen conservatively. With the rapid advancement in technology and the availability of grants we expect EV purchases may begin much sooner. (A light duty EV truck is expected to be deployed in 2025 for use in Police Investigation work)*

- c. **Replace gasoline and diesel Public Works vehicles and equipment (i.e., pick-up style trucks, dump trucks, loaders, lawn mowers, and refuse vehicles) with electric-only* vehicles and/or equipment as they are retired.**

Timing: As viable electric vehicles and equipment are available

*Please note that the type of vehicle or equipment aspired to is not bound to all-electric or battery-electric energy sources, as advancing technology may offer additional options. The

overarching goal of this transition plan is to eliminate emissions of GHGs from the burning of fossil fuels.



This conservative, staggered approach allows for the integration and trickle-down of new technology as it becomes available and affordable. **The most important aspect of this approach is to include research and review of alternative fuel vehicles and equipment in the Township’s procurement process.** Sources of information on grants, EV technology, and municipal procurement that would help with the procurement process are widely available, including:

- [Climate Mayors Electric Vehicle Purchasing Collaborative](#)
- PADEP [Energy Programs Office](#)
- Pennsylvania Drive Electric program ([PAEV Roadmap](#))
- Environment America [Electric Vehicle Toolkit for Local Governments](#)
- Consultations with vehicle manufacturers and dealers, as well as governmental entities

A particularly useful resource is the [Electric Vehicle Resource Kit for Municipalities](#) prepared by the Delaware Valley Regional Planning Commission (DVRPC): this toolkit is targeted to municipal incorporation of EVs into municipal fleets in Pennsylvania and New Jersey.

GAS-POWERED SMALL ENGINE EQUIPMENT

While vehicles comprise the majority of fossil fuel use in Springfield, the Township also uses fossil fuel powered small engine equipment to maintain municipal properties, including lawn mowers, leaf blowers, and snow blowers. These small ICE engines contribute noise and disproportionately high levels of particularly dangerous air pollution ([EPA](#)) -- with estimates of an hour of lawn mowing releasing the same amount of pollution as 100 to 350 miles of car travel. As mentioned previously, in September of 2023, the Township also committed to replacing lawn care equipment that is being retired with electric models as they become available, meet all our needs and address our concerns. There are limitations on currently available electric equipment with respect to run time, cost, storage requirements and weight. For example, the newest electric battery-powered

blowers weigh almost twice as much as the equipment currently in use, and the additional weight might cause soft-tissue back injuries.

To further reduce emissions, steps should be taken to minimize the need for using this equipment. As an example, mowing can be reduced by converting areas of municipal lawns and parks not used for recreation to meadows.

B) INSTALL MUNICIPAL CHARGING STATIONS

As the municipal fleet is electrified over time, the Township will need to invest in charging stations to match the growing demand. In planning for charging infrastructure, it is important to consider the amount of energy required, as well as the source of the electricity, as sustainability through use of electrified equipment and vehicles is only as good as the source of the supplied electricity. One potential path to ensuring net zero emissions is to incorporate fleet charging needs into plans to move municipal facilities to 100% renewable energy. The U.S. Department of Energy Alternative Fuels Data Center has a useful tool to determine how the source of electricity has an effect on the carbon footprint of electric vehicles (see https://afdc.energy.gov/vehicles/electric_emissions.html).

Municipal charging stations should be included in future Comprehensive Township Plans. These plans should address charging in two tiers:

- Fleet A are the SUVs and pickup trucks that are likely to be replaced with fully electric models in the next decade.
- Fleet B are the larger and heavier vehicles like dump trucks, sweepers, and refuse vehicles. Road-ready versions of these will roll out over the next decade or two. The power demands of these vehicles will be much greater than Fleet A vehicles.

Additionally, in anticipation of building out the Township's vehicle charging infrastructure, policies that include safety, technical and zoning requirements for these stations should be adopted by year end 2026.

C) ADOPT OPERATIONAL BEST PRACTICES

In addition to purchasing more efficient or electric vehicles, the Township should consider operational best practices that have been shown to further reduce carbon emissions. For example, it may be advisable to investigate the number of hours each vehicle spends idling to look for 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: excessive idling can result in incomplete combustion and can damage engine components, including cylinders, spark plugs, and exhaust systems.

Below are additional operational best practices that should be considered as the Township transitions the fleet:

- Set interim energy efficiency and fuel economy goals for police and administrative vehicles (e.g., 50 mpg by 2026, 100 mpg by 2028).

- Retain an EV integration company to accelerate economic, energy and emissions savings through planned fleet decarbonization.
- Explore innovative ways to reduce the total capital and operational costs of in-fleet charging stations, for example, through EVSE (Electric Vehicle Supply Equipment) sharing agreements for non-emergency vehicles with other public institutions and private businesses.
- Continue cooperation with other local municipalities on EV programs such as collaborating on EV community events and development of an EV charger adoption roadmap.
- Communicate regularly with the non-Township owned municipal services including the three fire companies (Flourtown, Wyndmoor, and Oreland), ambulance operators and the School District about their plans to electrify their fleets.
- Advance electrification of the municipal fleet through employee education.
 - Send Municipal fleet representative to National Drive Electric events
 - Raise awareness and acceptance of EVs by offering information, maintenance training and opportunities for test drives to fleet administrator
 - Promote driver behavior and/or incorporate technologies to reduce vehicle engine idling and other best practices
 - Lead by example by installing workplace chargers for employees.

Focus 2: 100% Renewable Electricity in Buildings by 2035

This section of the Plan discusses and provides recommendations for transitioning all building operations (electricity and heat) to net zero, meaning that the buildings' operations will not, on net, create any Greenhouse Gas (GHG) emissions that lead to climate change. For example, if the buildings have solar panels, but cannot generate sufficient power on a cloudy day to power the buildings, and provisions must ultimately be in place to purchase energy from renewable sources or use solar energy stored in batteries.

Note: The terms *net zero*, *100% Renewable Energy*, and *100% RE* are used interchangeably in this document.

Actions Taken as of 2024 to Reduce Carbon Emissions from Municipal Buildings and Operations

Since adopting the 2019 resolution to transition all municipal operations to renewable sources of energy the Township has implemented several programs to reduce carbon emissions including conducting a comprehensive energy audit of the buildings at the Municipal Campus on Paper Mill Road. All streetlights were replaced with new LED technology in 2017. Both actions have significantly lowered the Township's energy consumption - resulting in reduced carbon emissions as well as energy costs. You can find more information on these programs [Here](#).

Current Township Operations

The Township currently owns and operates several buildings and structures that are powered by electricity and heated by natural gas, including:

Three sizable buildings on the main campus at Paper Mill Road and Hawthorne Lane:

- Administration/police building
- Library
- Public Works building

Several other buildings and properties located throughout the Township including:

- Flourtown Country Club
- Black Horse Inn
- Recreation Center (on Willow Grove Avenue in Wyndmoor) that is planned to be rebuilt in 2025/2026)
- Various outbuildings and structures located at township parks and ballfields
- Three Firehouses (Oreland, Wyndmoor, and Flourtown), although these are not owned or operated by the Township.

The electricity to operate these facilities is currently purchased from PECO, and is primarily generated from natural gas and nuclear power, with only a small percent from renewable energy. Township buildings are currently heated by burning natural gas, which is not renewable and is also purchased from PECO.

Recommendations for Transitioning Municipal Facilities to RE

As the Township plans to transition municipal operations to RE sources there are several factors to be considered, such as cost, demonstrated effectiveness of reducing carbon, the age of existing equipment, reducing the amount of energy used, and the availability of new technologies. Given this, we have grouped our recommended actions into key areas:

A) Transition Municipal Operations to Self-Generated Renewable Energy

There are currently three primary avenues municipalities can pursue to achieve net zero emissions (in order of impact highest to lowest):

1. Self-generate renewable energy
2. Purchase renewable energy (RE) from other sources
3. Purchase renewable energy credits (REC) from brokers to offset emissions

While installing self-generating RE equipment, such as solar panels and heat pumps, requires an initial outlay of capital, available grant funding and government subsidies can significantly reduce these costs, making self-generation both economically feasible and impactful. On the other hand, purchasing RE or RECs requires no capital outlay, *however both have proven to be unreliable and ineffective means to achieving net zero due to minimal oversight and inconsistent practices amongst suppliers/brokers.*

Recommendation: The EAC recommends directing the Township's energy expenditures towards transitioning operations to self-generated RE. Specific recommendations for self-generating electricity and heat follow below.

Electricity

Solar energy is the primary source for renewable electricity in our area. (n.b. While wind is another much-discussed source of RE, it is not feasible to generate it locally in our area.) The costs of installing solar equipment have decreased significantly, and have become even more affordable with the federal government offering 30% [Direct Pay rebates](#). The Commissioners' goal of getting to electricity that's 100% renewable by 2035 is entirely realistic with solar. In fact, it should be feasible and affordable to achieve this by 2030 if not earlier.

The Township should install enough solar panels to meet the demand for:

- Electricity, heating and air conditioning for all its buildings, parking lots, and streetlights, and
- The charging infrastructure necessary for a fully electrified township fleet. This can be built out over time to match the replacement of those vehicles with internal combustion engines (ICE's) with electric vehicles (EV's) or hybrids.

In the summer of 2024, the Township commissioned studies to determine the feasibility of a solar installation at the main campus. These studies looked at the amount of power that could be generated, the cost, and the pay-back period. The studies also looked at:

- Financing options, whether the township will buy the solar equipment outright or lease it from a third party who would own the panels (a Power Purchase Agreement)
- Whether to purchase batteries to store any excess power produced, to then be used at night or on cloudy days
- Whether the Admin/Police building and Public Works building roofs can safely accommodate the weight of solar panels.

The study reports can be found here:

[Financial Feasibility](#)

[Structural Analysis](#)

Heating

Generally, two technologies are used in conjunction to replace natural gas furnaces and get to 100% RE for building heat: **heat pumps and geothermal systems**. As when considering solar, the first step is to hire a professional to conduct a feasibility study for the municipal buildings. This should consider factors such as the local climate, geology, available technology, energy consumption patterns, cost analysis, and potential environmental impacts.

Heat pumps use electricity to move heat from one location (e.g., outdoor air or ground) to another (the indoor building space). Unlike the conventional approach, heat pumps are very efficient and can virtually eliminate GHG emissions when combined with renewable energy production. Heat pumps have several constraints. They require space outdoors for heat exchangers, limiting their potential where outdoor space (e.g., rooftops) is constrained. And as external temperatures drop, they become less efficient. As a result, the full electrification of some buildings may require both heat pumps and a secondary

system such as electric heating coils. This would avoid natural gas/fossil fuel back-ups. Note that heat pumps result in an increase in the demand for electricity, which needs to be planned for.

Alternatively, geothermal heating and cooling systems provide significant cost savings, eliminate emissions of GHG, couple easily with heat pumps, and work well in almost all climates, including southeast Pennsylvania. They require significant upfront installation costs, may result in landscape alterations, and can only be built where geotechnical engineering verifies the underlying soil infrastructure is adequate.

B) Construct New Buildings and Additions as Net Zero

Recommendation: Any new Township buildings, or additions to existing Township buildings, must be designed and implemented as net zero. This must be made clear throughout the design and construction phases for any new building, stating this as a requirement in RFPs and all interactions with contract professionals in the design and build phases. In addition, all equipment must be “commissioned” to ensure they are installed and operating as specified prior to turning over operation to the township.

C) Create and Maintain an Inventory of HVAC Systems and Timeline for Replacement

Recommendation: By 6/30/2025, the Township staff should create and maintain an inventory of HVAC equipment in each building, its age, expected service life and transition timeline. Using this information, the staff should conduct life-cycle analyses on these systems and recommend to the Commissioners when they should be replaced with systems powered by electric, geothermal, or other renewable energy systems. This will provide a timeline for phasing out and replacing fossil fuel-based HVAC systems.

D) Conduct Regular Maintenance Procedures

To ensure equipment is properly maintained and running efficiently, the Township currently conducts regular preventative maintenance (PM) on Township owned HVAC equipment, as well as controls in the Police/Administration, Library, & Public Works buildings. Volunteers on the Environmental Advisory Commission also monitor energy consumption in all three buildings monthly, and alert Public Works staff when problems are identified.

Recommendation: Transition responsibility for monthly monitoring from EAC volunteers to Township staff to ensure proper continuity and accountability.

E) Stay Current with Best Practices and Evolving Technology

Recommendation: Best management practices for managing energy use efficiently in all buildings are continuously evolving. In parallel, renewable energy technology is evolving steadily, and prices are generally falling. These factors make it critical that the Township follow advances and adhere to the latest building standards -- for both managing existing

buildings and planning new buildings or additions. Responsibility for doing this should be developed by the Commissioners and Township staff, with input from the EAC.

Focus 3: Implement, Monitor, and Share Progress

The transition to renewable energy is not a ‘one and done’ task. As outlined in this plan, it will take years to implement the actions to successfully achieve Springfield Township’s goals. With such a long implementation timeline the risk of failure increases. While it is reasonable to expect that some necessary changes to the plan will be required over time, strong commitment and oversight from the Board of Commissioners, Township Staff, and the EAC will be required to ensure shifting priorities, changes in funding, new personnel, and implementation setbacks do not derail the plan. As such, the EAC recommends the Township take steps to ensure implementation of the plan remains on track, most importantly by putting roles in place to oversee the implementation and establishing mechanisms for monitoring and reporting on progress towards our goals.

A) Designate Roles and Responsibilities to Coordinate Implementation

This Plan was created by Township volunteers on the EAC who relied heavily on input from federal planning documents as well as strategic planning documents developed and approved by neighboring municipalities. The greatest lesson learned during this effort is that the transition to renewable energy cannot be achieved solely by volunteers. **To achieve a timely and successful transition, the responsibility must sit with those ultimately accountable for day-to-day operation of the respective functional areas.**

Therefore, the EAC recommends that the Township designate a staff member or hire a new staff member, to be the “Energy Manager,” an onsite expert responsible for planning and executing the energy transition. While the Energy Manager may have other job responsibilities, it should be expected that a **significant portion of their time** will be dedicated to oversight of the transition to renewable energy. For example, other local Townships have assigned energy sustainability duties to the Assistant Township Manager or have dedicated staff responsible for sustainability and energy management.

An Energy Manager benefits the Township and municipal operations by:

- helping lower the Township’s energy costs and emissions by overseeing the timely and efficient implementation of plan actions
- maximizing funding sources from grants and low- or no-cost loans for achieving the goals
- making best possible decisions with respect to energy procurement and production
- avoiding duplication of efforts by coordination with staff
- improving the Township’s public image by communicating results of the Plan efforts to residents
- helping to realize cost savings by collaborating at the county and local levels

An Energy Manager will help ensure the Township remains thoroughly apprised of the rapidly expanding area of renewable energy and will serve as the coordinator and motivator of staff efforts to realize the RE goals. Essential tasks will range from coordinating

actions/implementation across departments, to learning about technological advances, to seeking funding through county, state, federal and private grants, to reporting on progress towards goals to the Commissioners and the community.

B) Establish Metrics, Measure and Share Progress

Regular tracking and reporting on implementation progress and outcomes will help the Township determine what adjustments are required as well as provide transparency to taxpayers and residents. Additionally, demonstrating **cost savings and reduced emissions** could accelerate acceptance of the technology by township residents, and *should be shared with the Commissioners, Operating Departments, the various Advisory Boards, and the public on an annual basis through the newsletter and website, at a minimum.*

Some recommended metrics are shared below; however, it is important that the Energy Manager maintain overall responsibility for the development and maintenance of the metrics plan, including the rate at which each metric is met (factoring in changes to laws, costs/budget, and technology). For example, in December of 2024, the Director of Public works provided an update on hybrid/EV technology and the feasibility of incorporating into police, administrative and public works vehicles. This type of assessment should be conducted annually and used to update implementation and outcome goals for the next 1-3 years.

It should also be noted that while the Energy Manager is responsible for the Metrics plan, the respective Township Operating Departments should be responsible for measuring and reporting progress in their areas. [Energy Star Portfolio Manager](#), is a tool that can help the Township and the Energy Manager track building-related metrics and compare the Township's progress to other local municipalities.

Recommended Metrics

Fleet / Transportation		
Outcomes	CO2 Emissions (as measured by the Greenhouse Gas Protocol, ghgprotocol.org)	Total Annual Emissions
		CO2/Mile
	Cost	Total Annual Emissions
		\$\$/Mile
Energy Usage	Gas	Total Annual Gals MPG
	Diesel	Total Annual Gals MPG
	Electric	Total Annual KWh KWh/Mile
Energy Cost	Gas	\$/Gal Total \$\$
	Diesel	\$/Gal Total \$\$
	Electric	\$/KWh Total \$\$
Mileage	Police Vehicles Admin/Public Works Vehicles	Total Miles Driven
Fleet Conversion Progress	Police/Admin Vehicles Public Works Vehicles/Equip	% Gas / Diesel
		% Hybrid
		% Electric
Chrging	Municipal Charging Capacity	Total Charging Capacity
		% of Fleet Supported by Municipal Charging Stations
		% of Charging capacity sourced from renewable energy
Land Maintenance	Acres of Mowed Twp Property	
	Acres of Unmowed Twp Meadows	

Building Operations		
Outcomes	CO2 Emissions (same note as above)	Total Annual Emissions
		CO2/square foot
	Cost	Total Annual Emissions
		\$\$/Mile
Energy Usage	Gas	Total Annual CCF CCF/SF*
	Electric	Total Annual KWh KWH/SF*
Energy Cost	Gas	\$/CCF Total \$\$
	Electric	\$/KWh Total \$\$
Energy Source	Gas	% Self Generated
	Electric	% Purchased RE
General		
Grant dollars	Grant dollars and free hours of technical assistance received	
Education	# of Employee / Resident Education Sessions	

GLOSSARY

Term	Definition
Carbon Emissions	Gases containing carbon that are released into the atmosphere when fossil fuels like coal, natural gas, and oil are extracted, refined, transported, and burned. Carbon dioxide (CO ₂) and methane are the primary types of carbon emissions generated and are “greenhouse gases” that absorb radiation and prevent heat from escaping our atmosphere.
Charging Infrastructure	One or more stations that recharge the batteries in electric and plug-in hybrid vehicles. Charging stations are also known as EVSEs.
CO ₂ Carbon Dioxide	An atmospheric gas that is the largest contributor to climate change. There are natural sources of CO ₂ , however excess CO ₂ is created by the burning of fossil fuels
DEP, PADEP Pennsylvania Department of Environmental Protection	The state analog of the Environmental Protection Agency (EPA). DEP enforces state regulations, as well as making grants available.
Direct Pay	The feature within the Inflation Reduction Act that allows non-taxpaying entities (like municipal governments) to be reimbursed by the federal government after installing qualifying equipment, e.g., solar panels.
Emissions	In the context of energy planning, emissions can be thought of as air pollution, but generally refer to CO ₂ emitted by creating energy
Energy conservation (EC) vs. energy efficiency (EE)	Energy conservation and energy efficiency are operational goals that use less energy to meet or exceed a need. An example of energy efficiency is replacing incandescent light bulbs with LEDs, while energy conservation seeks to make sure that the light is turned off when not needed. EE and EC should be considered the first "tool" in transitions to renewable energy.
Energy Manager	The entity within the township who optimizes the energy performance of the buildings and fleet. The Energy Manager tracks the performance of the electrical, mechanical, and building infrastructure, analyzing the optimum solutions to reduce energy consumption in a cost-effective approach. This role can be included in the role of Sustainability Manager.
EPA, USEPA Environmental Protection Agency	The federal agency responsible for enforcing environmental laws, as well as assisting local governments with tools, grants, and subsidies.
EV Electric Vehicle	A vehicle powered only by battery
EVSE Electric Vehicle Supply Equipment	Generally, an EV charging station. EVSE's include the electrical conductors, related equipment, software, and communications protocols that deliver energy efficiently and safely to the vehicle.
Geothermal energy	Energy in the form of heat that can be extracted from the earth and can be used as a renewable source of building heat. Some heat pumps utilize geothermal energy to heat and cool buildings.

GHG Greenhouse Gas	Atmospheric gases that absorb radiation and prevent heat from escaping our atmosphere, primarily carbon dioxide (CO2) and methane
HEV Hybrid Electric Vehicle	HEVs run on both an internal combustion engine and an electric motor that uses energy stored in a battery. Unlike most electric vehicles, however, the battery is charged HEV via regenerative braking.
ICE Internal Combustion Engine	Vehicles that burn gasoline or diesel as their source of power
IRA Inflation Reduction Act	The Inflation Reduction Act of 2022 included significant financial incentives to promote renewable energy and energy efficiency.
Methane	An atmospheric gas that is a major contributor to climate change. There are natural sources of methane, however excess methane is created by the burning of fossil fuels
Net Zero	Net Zero means meeting energy needs without producing any carbon emissions. For buildings and vehicles, this means providing power from only renewable resources, including solar and geothermal.
PHEV Plug-in Hybrid Electric Vehicle	PHEVs run on both an internal combustion engine and an electric motor that uses energy stored in a battery. The electric battery is charged by plugging into an electric charging station.
RE Renewable Energy	For purposes of this plan: Electricity, heat, or power generated by solar panels or geothermal installations.
RECs Renewable Energy Credits	A renewable energy certificate, or REC (pronounced REK), represents the property rights to the environmental attributes of renewable electricity generation. A REC is issued when one megawatt-hour (MWh) of electricity is generated and delivered to the grid from a renewable resource.
SRECs Solar Renewable Energy Credits	A solar REC that is generated from solar power.