ENERGY TRANSITION PLAN

for

Buckingham Township

JANUARY 24, 2024

Meadow, Buckingham Photo: A. Strout

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APPENDICES

1.0 Introduction

This Energy Transition Plan (ETP) addresses the challenges and opportunities of the coming decades related to public and private investment, jobs creation, public health concerns, energy reliability and independence, and public safety concerns as it applies to our current energy consumption patterns. The plan recommends changes that will support Buckingham Township and all of our community's stakeholders in recognizing the breadth of these challenges and in pursuing the steps outlined to enhance the economic, social and environmental foundations of the community, and, by extension, the region, state, nation and planet.

(For the purposes of this plan, the term "stakeholders" includes residents, businesses, schools, healthcare centers and commuters—in short, anyone in our community who will be a consumer of energy and anyone who may be impacted by the decision to transition to renewable energy.)

This ETP proposes a blueprint to direct our efforts to bring about a more robust, stable and resilient society while planning for the transition to an energy economy that is no longer driven by and tied to carbon-based, extracted fuels. Indeed, that transition has already begun in Buckingham; in early 2023, the township contracted with PECO to receive 50% of its electricity from renewable sources (solar, wind, geothermal, biomass, biogas, low-impact hydro) located in North America.

There are many reasons to make that transition: it will foster public-private investment partnerships; it will create investments in local infrastructure that will improve sustainability and create jobs; it will reduce pollution and its associated health issues and costs; and it will facilitate the decentralization of energy production, reducing our dependence on remote suppliers, helping to stabilize supply and increasing our energy security. The recent passage of two pieces of legislation, the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA) is expected to greatly advance these efforts.

Signed into law in November 2021, the BIL is focused on upgrading and hardening our public infrastructure–roads, bridges and power grids, among other systems–to make it more resilient to rising temperatures, extreme weather events and the threat of cyberattacks. It includes money for brownfield and other environmental remediation, for the expansion of EV-charging and passenger-rail networks, and for other measures designed to help the U.S. reach net-zero emissions by mid-century.

Signed into law in August 2022, the IRA builds on provisions in the BIL and contains tax credits and other incentives focused on helping municipalities and their residents meet the net-zero challenge. According to an article in *Forbes* magazine, the IRA has the potential to cut U.S.

greenhouse gases (GHG) by as much as 43 percent from 2005 levels, create 1.3 million jobs and prevent 4,500 air-pollution-related deaths by the end of this decade[1]. This will very much depend on uptake by federal, state and local authorities, however. As more is understood about the opportunities in the IRA for municipalities like ours, this ETP will be updated to reflect them.

The conversion to clean, renewable energy will provide direct and indirect benefits to our township. Early steps include energy efficiency measures to be assessed and implemented where the return on investment is within an acceptable range. Typically these measures meet the established criteria and will provide net savings within a few years, savings that can then be rolled back into further efficiency investments as well as renewable energy installations. Based on U.S. Department of Energy findings, energy usage can be reduced by 30% through conservation and energy efficiency measure alone[2]. According to the American Council for an Energy-Efficient Economy (ACEEE), energy efficiency can achieve a 49% reduction in energy usage[3]. Additionally, the transition to clean, renewable energy will save U.S. citizens hundreds of billions of dollars annually in reduced cost of air pollution[4], which will translate to billions of dollars annually and improve the health of residents in southeastern Pennsylvania.

On October 28, 2020, Resolution 2422 (see Appendix C) was adopted by Buckingham's Board of Supervisors by unanimous consent. It pledges that Buckingham will "[join] other leading municipalities to transition to 100% clean and renewable energy community-wide, and will set goals to complete this transition in the electricity sector by 2035 and in all energy sectors, including heat and transportation, by 2050." At this writing, 43 communities in southeastern Pennsylvania have similar "Ready for 100" resolutions in place. In addition to our own township, in Bucks they include Solebury, Doylestown Township, Warrington and the County government itself. (Our neighbors in Middletown have taken this a step further, creating a climate action plan that has become a model for many other communities.[5]) This plan meets Resolution 2422's objective of developing an energy transition plan for municipal operations and the community.

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[1]Inflation Reduction Act Benefits: Clean Energy Tax Credits, Daniel Esposito, Forbes, August 23, 2022, https://www.forbes.com/sites/energyinnovation/2022/08/23/inflation-reduction-act-benefits-clean-energy-tax-credits-could-double-deployment/?sh=30e1c4de6727

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[2]Reducing Energy Use in Existing Homes by 30%: Learning from Home Performance with ENERGY STAR, Christine Liaukus, Building America Research Alliance, December 2014, https://www.nrel.gov/docs/fy15osti/62328.pdf.

[3] American Council for an Energy-Efficient Economy; Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050; September 2019; https://aceee.org/research-report/u1907.

[4] How much does air pollution cost the U.S.?, Center for Air Quality, Climate, and Energy Solutions (CACES) at Carnegie Mellon University (CMU), 2016, https://earth.stanford.edu/news/how-much-does-air-pollution-cost-us#gs.2xjx59.

[5] Township of Middletown, Bucks County: Climate Action Plan, September 2021, https://www.middletownbucks.org/Resources/Documents-Forms/Administration/Climate-Action-Plan-Draft-3-1-08-16-21.pdf

A steering committee (see Section 3.0) representing the municipal government and Buckingham Township's stakeholders will amend future drafts of this plan as needed and work collaboratively to ensure its implementation remains on track. We welcome the participation of all interested parties within the township in this transition.

The key sections of this report are as follows:

- A statement of purpose (Section 2.0),
- The personnel, organization, and outreach necessary to implement the plan (Section 3.0),
- A description of the actions the municipality will undertake to start the process, along with potential funding sources (Section 4.0). *A more comprehensive list of actions for the township to consider can be found in Appendix D.*

2.0 Statement of Purpose

The following are the guiding principles and goals of this Energy Transition Plan, which provide an integrated approach for planning and actions:

- Appropriate stewardship of energy resources, incorporating best practices in energy conservation and energy efficiency efforts, which are the most cost-effective ways of reducing energy consumption. They can significantly reduce energy use in buildings and transportation systems. These strategies comprise the early steps of this ETP and are central to its structure.
- Redirection in capital investment: Buckingham Township spends $46 million annually on electricity, natural gas, propane, heating oil, gasoline and diesel fuel, according to 2015 Delaware Valley Regional Power Commission (DVRPC) figures, the most recent available. This ETP recommends changes in our energy consumption patterns that will spur a smooth transition to clean renewable energy.
- Emphasis on job generation: Renewable energy projects create good-paying, stable, local jobs. This ETP factors job creation into the actions recommended.
- Public health: This ETP strives to maximize the health benefits provided by the transition from our fossil fuel based economy to a renewable energy economy. Elimination of air contaminants is one of the goals of this ETP.
- Other economic considerations. This ETP considers the impacts of the energy transition on local economic and environmental conditions community-wide. While the IRA contains job-retraining provisions and substantial new tax credits, subsidies and rebates to make it easier for residents to invest in home weatherization improvements and renewable energy installations, gaps will still exist, which it will be in the overall public interest to close so that no one is left behind. This includes citizens whose livelihoods

may be eliminated by the transition, such as workers in energy extraction and related industries.

- Energy independence: This ETP endeavors to make the municipality and the larger community more self-reliant through energy efficiency and conservation and on-site renewable energy development, allowing for reductions of imported fuels.
- Inclusion of all stakeholders: This ETP welcomes the participation of all stakeholders within the municipality and is designed to integrate their input as part of the development process.
- Coordination with other governments: This ETP has been outlined in a manner that will enable multiple communities in conjunction with Buckingham Township, either individually or in groups at the county or regional levels, to develop aggregate planning strategies. This will be facilitated by cost-sharing requirements in the IRA.

3.0 Plan Implementation

This section (1) provides information on energy usage and expenditures and emissions of greenhouse gases within the municipality and (2) discusses how the plan is to be implemented and by whom. This plan has been prepared and will be implemented pursuant to the direction of Buckingham Township's Resolution 2422, which calls for the transition to renewable energy for all purposes by 2050.

3.1 Establishment of a Municipal Team and Coalition for Energy Transition

3.1.1 Steering Committee

A steering committee is necessary to oversee subsequent changes to and implementation of this plan. Buckingham's ETP has been created as a living document, and, as such, will evolve through an iterative process that takes into account new information, opportunities, challenges and technologies. While its actual members may change over time, the steering committee will be headed by the township manager and consist of a mix of municipal officers and/or staff, a member of the Environmental Advisory Commission, other interested volunteers and, whenever possible, members of key stakeholder groups in the township. If it so chooses, the township may engage an outside consultant to review the plan, suggest changes and help keep the steering committee on track. The ideal consultant will be one with deep experience and a proactive interest in engaging municipal staff and community stakeholders to deliver on the transition plan. Some municipalities have opted to share the services and costs of a consultant, and that remains an option for Buckingham.

The Steering Committee membership is presented in the following table:

Person	Represents	Expertise/Perspective
Township Manager	Buckingham Township	All things Buckingham
Sewer & Water Commission member	Buckingham Township	Public water & sewer systems, quality assurance
User of public S&W	Self, others on public system	Public S&W
Planning Commission member	Planning Commission	Municipal planning
EAC member	Environmental Advisory Comm.	Environment, efficiency
Business/commerce leader	Private industry	Commercial interests
School district representative	Public schools	District admin., parents & students
Agribusiness leader	Farming community	Small business, agric. interests

The committee will meet (virtually or in-person) once a month for implementation of the plan. Membership in the committee may change depending on the need for expertise and members' ability to serve. *The Steering Committee serves at the pleasure of the municipality and will report to them every six months.*

3.1.2 Information Collection and Analysis

Guidance regarding energy usage, costs of energy, and emissions of greenhouse gases within the township is presented in Appendix A along with a technical analysis of the strategies for making the transition to a renewable energy economy.

3.1.3 Plan Development and Implementation

This plan is a product of Buckingham Township and is our municipality's blueprint to implement energy conservation and efficiency measures and transition our community to renewable energy in a manner that will enhance community resilience, create jobs, reduce air pollution and protect public health.

The steering committee's charge is to:

- Educate itself on the actions necessary to efficiently transition the municipality to renewable energy;
- Engage the stakeholders identified in Section 4.0;
- Propose actions to the Board of Supervisors needed for the transition;
- Monitor the implementation of adopted actions; and,
- Adopt new initiatives as the energy transition proceeds.

3.2 Identification of and Engagement with Community Groups

This section lists the stakeholders within the community, the ways in which they can be important participants in this plan, and the talents they bring to the transition to renewable energy. Wherever possible, we will identify those stakeholders that have their own clean energy targets, efficiency programs, renewable energy systems, renewable electricity power purchase agreements and replacement policies that take a transition to clean energy into account.

3.2.1 Municipal Government

Buckingham Township is committed to energy efficiency and the transition to renewable energy in three ways:

- Leading by example: Buckingham has a history of environmental leadership in its preservation of open space, LED street lighting and wastewater system utilizing spray-fields. It will continue this legacy by implementing energy efficiency measures and shifting more energy sources to renewable energy as expeditiously as possible. And, in fact, the township has already made a significant down-payment on that shift by contracting with PECO to purchase 50% of its electricity from renewable sources.
- Support and guidance: The municipality will undertake changes as needed to its planning, zoning ordinance, road system, and other aspects of municipal governance that impact energy usage throughout the community.
- Public education: The municipality will provide information and encouragement to all stakeholders in the community to use energy efficiently and transition to the use of renewable energy.
- Reducing roadblocks: The municipality will consider implementing changes to reduce roadblocks to clean-energy investments and encourage adoption of energy transition programs and investments by residents, institutions and businesses.
- Apply for grants: Municipal governments can seek grants from nonprofits and state/federal programs that subsidize some aspect of projects for energy transition.

Municipalities are limited in the extent to which they can address energy transition issues because many of the legislative and regulatory powers needed to address these issues reside in the county, state, and federal governments. Powers such as energy policy, vehicle efficiency standards, and building energy efficiency standards are beyond the jurisdiction of local government. That said, county, state, and federal officials pay careful attention to the policy positions taken by local officials because they represent, on the local level, a substantial number of the same voters that vote for county, state, and federal officials. Such actions on the part of municipalities are therefore an important part of the transition to renewable energy.

3.2.2 Public School District

Public schools in Pennsylvania are independent entities recognized by the Commonwealth. Each is administered under the authority of an elected school board which appoints the administrative official, sets policy, and approves the budget. With respect to our own schools, all initiatives and actions to transition to renewable energy must be approved by the Central Bucks School District Board of Directors (267-893-2000).

Energy transition opportunities directly applicable to the public schools are:

- Energy efficiency improvements in heating, cooling and hot water supply
- Energy conservation measures to minimize electrical and fuel usage, especially when the school is closed or out of session
- Purchase of renewable electricity through power purchase agreements in coordination with other school districts and other large institutions
- Geothermal systems and rooftop solar arrays
- Gradual electrification of the school bus fleet as old buses are retired
- Inclusion of sustainable energy practices in school curricula and vocational education
- Inclusion of energy efficiency and renewable energy in new building construction
- Inclusion of carbon drawdown initiatives wherever possible, primarily in appropriate landscaping techniques

In addition, our schools have a valuable role to play in educating and engaging their staff, students and their families to take a leadership role in promoting energy conservation and efficiency and the implementation of renewable energy systems.

The following are the public schools located in Buckingham Township:

Name	Address	Phone Number	Contact Person
Buckingham Elementary	Box 158, 2414 Durham Road, Buckingham 18912	267-893-4200	Daniel P. Estep, Principal
Cold Spring Elementary	4150 Durham Road, Doylestown 18902	267-893-3800	Brian A. Finger, Principal
Holicong Middle School	2900 Holicong Road, Doylestown 18902	267-893-2700	Dr. Kevin Shillingford, Principal
Central Bucks High School East	2804 Holicong Road, Doylestown 18902	267-893-2300	Chad Watters

3.2.3 Large Properties and Institutions

Owners and operators of institutions (such as religious organizations, retirement homes and continuing care facilities) are large energy users, have a stake in reducing their energy costs and often have productive relationships with municipal officials.

The following are the large properties and institutions located in Buckingham Township:

Name	Address	Phone Number	Contact Person
Doylestown Airport	3879 Old Easton Road, Doylestown 18902	215-340-0707	
Our Lady of Guadalupe Catholic Church	5194 Cold Spring Creamery Road, Doylestown 18902	267-247-5374	
Covenant Church	4000 Route 202, Doylestown 18902	267-880-3713	Steve Huber, Lead Pastor
Russell-Mandell Preserve	1515 Holicong Road, Buckingham 18912	215-345-7020	Heritage Conservancy
Paunacussing Preserve/ Natural Lands Trust	1031 Palmers Mill Road Media 19063	610-353-5587	
Jackson Pond Preserve	1856 Forest Grove Road, Forest Grove 18922	215-345-7020	Heritage Conservancy
Doylestown Urgent Care	4259 W. Swamp Road Doylestown 18902	215-863-8363	
Buckingham Valley Rehabilitation & Nursing Center	820 Durham Road, Newtown 18940	215-598-0967	

3.2.4 Residents

Buckingham's residents are critical to the success of this plan. As is the case with most of our suburban neighbors, residential activities represent the biggest slice of the energy pie in Buckingham. With its focus on tax credits, the IRA will provide new incentives for Buckingham residents to live, work, play and drive more efficiently. But these new opportunities for residents to save money and reduce their energy consumption will only contribute to a healthier, more resilient community if residents know they exist and understand how to access them. See Section 3.3: Public Input and Engagement with Stakeholders.

3.2.5 Businesses

Businesses are often in the forefront of energy efficiency efforts because such actions

have demonstrated favorable return on investment–a trend that will only accelerate as extracted-energy sources become more uncompetitive, clean-energy technology advances and recently passed legislation provides new tools and incentives for businesses (and the municipalities in which they operate) to run sustainably. Since commercial enterprises are uniquely sensitive to community good will, operating sustainably has the added "soft" benefit for businesses of burnishing their reputations with customers and the community at large.

The following are major businesses located in Buckingham Township:

Name	Address	Phone Number	Contact Person
Wawa	5074 York Road, Holicong 18928	215-794-7043	
Peddler's Village	Routes 202 & 263, Lahaska 18931	215-794-4000	
Buckingham Green	4920 & 4950 York Road, Buckingham 18912	215-348-3753	Silverman Family Partnerships
The Shoppes at Penn's Purchase	5860 York Road, Lahaska 18931		pennspurchaselahaska @gmail.com
Georgetown Crossing Office Park	3655 Swamp Road, Suite 6, Doylestown	215-489-3800 x3	
100 Hyde Park Office Park	3900 Mechanicsville Road, Doylestown 18902	215-3572880 x201	
Heritage Business Center at Buckingham	2325 Heritage Center Drive Buckingham 18925	215-383-0117	
Mercedes-Benz of Doylestown	3664 N. Easton Road, Doylestown 18902	800-823-7172	
Dunkin'	3611 N. Easton Road Doylestown 18902	215-489-2017	
Black-eyed Susan	5222 York Road, Holicong 1892	215-794-1800	Susan Taylor
Bountiful Acres	5074 York Road, Holicong 18928	215-794-7043	
ELA Outdoor Living	5095 US-202, Doylestown 18902	215-794-2400	
Maximuck's Farm & Garden	5793 Long Lane, Doylestown 18902	215-297-9894	
Froehlich's Farm & Garden	3143 York Road, Furlong	215-794-8733	
Geerlings Garden Center	Rte. 413, Buckingham	215-794-7672	
None Such Farm & Market	4458 York Road, Buckingham 18912	215-794-5201	
Baci Ristorante & Heart of Oak Pub	2559 Bogarts Tavern Road, Doylestown 18902	215-794-7784	
Porterhouse Restaurant & Pub	5775 Lower York Road Lahaska 18931	215-794-9373	

Name	Address	Phone Number	Contact Person
Caleb's American Kitchen	5738 Route 202, Lahaska 18931	215-794-8588	Caleb Lentschner, Carol Ann Della Penna
Candlewyck Bar, Grill & Bottle Shop	2551 Durham Road, Buckingham 18912	215-794-8233	
Buckingham Valley Vineyards	1521 Durham Road, PO Box 371, Buckingham 18912	215-794-7188	
Life Celebration by Givnish	4886 York Road, Buckingham 18912	215-794-7696	
Gasper Furniture	760 York Road, Furlong 18925	215-364-2400	
Hendrixson's Furniture	3539 York Road Furlong 18925	215-794-7325	
Barry Luff Auto	3604 York Road, Furlong 18925	215-794-5283	
Morgan's Auto & Truck Repairs	3491 York Road, Furlong 18925	215-794-5849	
The Solebury Club	4612 Hughesian Drive, New Hope 18938	215-794-3494	
The Inn at Barley Sheaf Farm	5281 York Road, PO Box 10, Holicong 18928	215-794-5104	

3.2.6 Nonprofits and Private Schools

Non-profit organizations and small private schools are medium-to-large energy users and have a stake in increasing their efficiency since they often operate on limited funding. As with large institutions and businesses, it is in their interest to work with the municipality to reduce their energy use and costs, while contributing to the long term sustainability of the community.

The following are the nonprofits and private schools located in Buckingham Township:

Name	Address	Phone Number	Contact Person
Pennsylvania Biotechnology Center	3805 Old Easton Road, Doylestown 18902	215-589-6300	
Buckingham Friends School	5684 York Road, PO Box 159, Lahaska 18931	215-794-7491	Paul Lindenmaier, Head of School
Bucks Support Services	5246 York Road, Buckingham 18902	215-260-7570	Dr. Stacy Hunt, Dr. Heidi Dalzell
BARC Developmental Services	PO Box 470, Holicong, PA 18928-0470	215-794-0800	

3.2.7 PECO and Other Utilities

Background: Our regional grid. PECO is the utility which distributes electricity in the urban portion of the five-county southeastern Pennsylvania area and which distributes natural gas to the same area with the exception of the City of Philadelphia. The Philadelphia Gas Works (PGW) supplies natural gas to customers in Philadelphia. Small areas of western and northern Chester, Montgomery, and Bucks Counties are serviced by either Pennsylvania Power and Light (PP&L) or the Metropolitan Edison Company (MetEd) for electricity. These utilities must be heavily involved in the transition to renewable energy.

The electric utilities mentioned above are part of the PJM regional grid, which operates under a deregulated system. In a deregulated system, the electrical generating companies, transmission companies, and distribution utilities must be independent entities. Any customer within the distribution utility's service area may purchase electricity directly from any electrical generation company or from the distribution utility. This allows for direct purchase of renewable electricity by the customer. The electricity is delivered through the distribution utility's electric grid and that particular utility is compensated for the distribution service.

Examples of the ways in which the distribution utility can assist in energy conservation and the conversion to renewable energy are:

- They can perform energy audits to identify areas and practices for energy conservation, increased efficiency and savings
- They can participate in rebate programs for energy efficiency measures and energy efficient equipment. Energy Star is one of those rebate programs;
- They can facilitate easy and fast approval of connection of solar arrays to their system;
- They can use their influence with the PA Public Utilities Commission (PUC) to implement changes to purchasing of renewable electricity; and,
- They can upgrade their system to accommodate and take advantage of distributed energy resources (DERs); and
- In conjunction with regional planning initiatives, they can facilitate the development of regional microgrids and storage applications.

3.2.8 County, Regional, and State Government

County, regional, and state governments have buildings, motor vehicle fleets, outdoor lighting, etc., which can be made greener. And county or regional planning groups can be powerful in terms of data gathering (like the DVRPC, which has gathered greenhouse gas emissions data),

pull together information on best practices in terms of technology adoption, zoning and building code model statutes (as Montgomery County and, more recently, Bucks itself has done), provide wider forums for discussion of solarization and other sustainability goals. Counties can also put resolutions on the ballot, including visionary resolutions to promote change, resolutions for clean-energy administrative actions or tax or bond measures to finance renewables or weatherization programs. Another goal of coordination is to encourage higher levels of government, especially at the county level, to help coordinate the efforts of the municipalities that have taken the lead in this effort. This will both strengthen the planning process and assist in achieving increased uniformity and coordination between municipalities. In Buckingham, a designated member of the steering committee will communicate any concerns to our legislative representatives as needed.

3.3 Public Input and Engagement with Stakeholders

Public input is an invaluable part of the overall planning and implementation of Buckingham's plan. One or more 'visioning' sessions will be held to ensure that stakeholders in the community have ample opportunity to provide input and to voice concerns. Again, stakeholders include those who live, own or operate businesses, work, attend school and/or pay taxes in our township, i.e., anyone who may be impacted by the decision to transition to renewable energy. The goal of these 'visioning' sessions will be to explain the plan's objectives, and to solicit input in the form of opportunities, obstacles, concerns and all other ideas. These sessions will take the form of work sessions to ensure maximum participation in the process.

Interviews with Stakeholders: To further develop stakeholder input, select interviews will be conducted by members of the steering committee. The interview team will first identify 10 to 20 "key stakeholders" or stakeholder categories. Interviews will then be conducted individually with representatives of these groups or by stakeholder category to leverage group dynamics. The goal is to generate as much input from the public as possible through direct question and answer sessions.

Consolidated Input: Once the visioning sessions and the interviews have been completed, the full set of input will be consolidated to look for trends in each area of input: opportunities, obstacles, concerns, and other ideas. We will use weighting criteria as appropriate. This consolidated input will be made available to the planning team and will guide our steps throughout the planning and implementation process.

To the extent possible, we will also share this consolidated input with stakeholders for the sake of transparency and as a reminder of their importance in this process. This may take the form of periodic status memos to key stakeholder group members to keep these contacts engaged and informed.

Given that challenges to the implementation of this plan will inevitably arise, it may be advisable to form sub-committees to meet them. Finding acceptable alternative pathways, especially local ones that have proven successful, will take us a long way toward achieving our goals.

Follow Up: After the plan is "complete," or in mostly complete draft form, we will circle back with stakeholders to go over those aspects of the plan that will impact them to get their further feedback. *This is an iterative process.* As much as possible, we will engage with community groups and make them part of the process. We will need their help when it comes time to roll out the plan and start the implementation phase.

4.0 Summation of Actions Implemented within Buckingham Township

4.1 Actions

Many communities have found it helpful to identify five to 10 actions that the steering committee judges to be quickly achievable to kick-start the process, and to identify other longer-term but critical actions that flow directly from those initial steps. Below is an example that may be helpful as we begin to populate the blank table that immediately follows.

Who Takes the Action?	What is the Action?	How Soon and How Long?	Lead person in Implementing	Measure of Success	When to Check for Progress
Steering Committee	Plan Oversight				
Municipal Staff	Plan Implementation				
Municipality– Lead by example	Benchmark major municipal buildings				
	Prepare and implement EV/PHEV transition plan				
	Construct EV charging stations at municipal facilities (installed 2021)				
	Plan to purchase renewable electricity through PPA				
	Install LEDs in street lighting and traffic lights (installed 2018)				
	Establish Energy Savings Reinvestment Fund				
Municipality – Support and Guidance	Update renewable energy zoning code sections				
	Require new buildings to be solar ready and EV ready				
	Require energy usage disclosure at time of sale or lease				
Schools - Action 1	Petition school board to phase in electric buses				
PECO - Action 2	Work with PECO to streamline solar interconnection process				
Residents - Action 3	Educate residents on the need and the benefits or energy efficiency and a transition to renewable energy				
Coordination with other municipalities, county planning commission, DVRPC	Renewable electricity purchasing, EV purchasing, etc.				

The following is a tabular summary of the initiatives adopted for implementation by Buckingham Township:

Who Takes the Action?	What is the Action?	How Soon and How Long?	Lead person in Implementing	Measure of Success	When to Check for Progress
Steering Committee	Plan Oversight				
Municipal Staff	Plan Implementation				
Municipality– Lead by example					
Municipality – Enabling others					
Community in General					
Specific Group Action 1					
Specific Group Action 2					
Specific Group Action 3					

4.2 Funding

Funding for the various above actions is obviously critical to their implementation. As previously noted, the clean-energy funding landscape has changed significantly since Resolution 2422 was adopted by Buckingham in Fall 2020. The passage of the IRA, in particular, is so recent that its specific material implications for municipalities like ours are not yet clear. At this writing, the DVRPC is at work on a regional plan using BIL funds to harden infrastructure and otherwise strengthen our climate resiliency. We will update this ETP as more information about the impacts of both laws becomes available. In the meantime, here are several websites to watch for BIL updates and one focused on new incentives for homeowners under the IRA:

https://www.energy.gov/bil/bipartisan-infrastructure-law-programs
https://www.transportation.gov/bipartisan-infrastructure-law
https://www.epa.gov/infrastructure
https://www.dep.pa.gov/Citizens/Energy/EnergyEfficiencyandConservation/Pages/Incentives-Fact-Sheet-PA-PUC-Electric-Choice.aspx.

In addition, the DSIRE websites (https://programs.dsireusa.org/system/program?fromSir=0&state=PA) list existing funding sources for energy efficiency and renewable energy projects in Pennsylvania.

Our municipality and other levels of government may also have the option of setting up local financing mechanisms to:

- Allocate funds for staff time to work on actions or for individual actions themselves
- Establish revolving loan fund for residential energy upgrades
- Establish revolving loan fund for distributed generation – resilience battery storage or renewable energy emergency services
- Establish weatherization loan fund
- Develop local bank partnerships
- Create a solar hot water retrofit program for affordable housing
- Partner with other municipal departments
- Establish Commercial Property Assessed Clean Energy (CPACE) program, if not already approved by municipality or county
- Plan for Residential PACE program
- Establish a benefit assessment measure
- Use (CPACE) and other financing mechanisms to fund renewable installations
- Develop an energy savings reinvestment plan: Establishing an Energy Savings Reinvestment Plan allows future projects to be internally self-funded. These plans can

be set up so that up to 80% of a project's savings goes to the energy fund to pay for future energy efficiency projects, while the remaining amount is returned to the city's general fund.

A NOTE ON FUNDING:

No funding was needed for this draft of the plan. We relied on the following individuals for their expertise, research, access to records, time, deep knowledge of Buckingham Township and/or the clean-energy challenges facing southeastern Pennsylvania:

- *Maggie Rash, Vice Chair, Buckingham Township Board of Supervisors and Liaison to the Environmental Advisory Commission (EAC);*
- *Dana S. Cozza, Esq., Township Manager;*
- *Jill G. Pistory, CPA, Finance Director and Buckingham Township Treasurer;*
- *Andrea Strout, Chair, Buckingham EAC; and*
- *Jim Wylie and Ready for 100 colleagues*

Special thanks go to Paula Kline, Henry Alexander, Bill Sabey and colleagues at the Community Energy Strategic Planning (CESP) initiative for giving us a blueprint and the skills, encouragement and resources to move forward with this plan. It would not have happened without you.

5.0 Useful References

The following are useful references for renewable energy transition planning:

General

- Municipal Energy Management Toolbox: An Energy Plan & Action Strategy for Delaware County Municipalities, https://drive.google.com/drive/folders/1Vz57aLiyfJ3jJfOejgA0wqthV1uhIzEg
- Philadelphia Municipal Energy Master Plan
- Philadelphia Office of Sustainability Energy Office
- Philadelphia Energy Authority
- Burlington, VT. Climate Change Plan, https://www.burlingtonvt.gov/sites/default/files/CEDO/Sustainability/Climate%20Action%20Plan.pdf
- Township of Middletown, Bucks County: Climate Action Plan, September 2021, https://www.middletownbucks.org/Resources/Documents-Forms/Administration/Climate-Action-Plan-Draft-3-1-08-16-21.pdf
- Summary of Carbon Free City Handbook Rocky Mountain Institute, https://rmi.org/insight/the-carbon-free-city-handbook-buildings/
- CREATING EV-READY TOWNS AND CITIES: A GUIDE TO PLANNING AND POLICY TOOL SELECTRIC VEHICLE SUPPLY EQUIPMENT SUPPORT STUDY.

Buildings

- Best Practices in Municipal Energy Management and Efficiency, Fall 2015; Best Practices in Municipal Energy Management and Efficiency
- New Buildings Institute. *Getting to Zero: ZNE Project Guide*
- Developing City Action Plans for Building Decarbonization, https://www.wri.org/update/developing-city-action-plans-building-decarbonization
- Energy & Buildings, C40 Cities, https://www.c40.org/what-we-do/scaling-up-climate-action/energy-and-buildings/
- Getting to Zero: ZNE Project Guide, New Buildings Institute, *Getting to Zero: ZNE Project Guide*
- Do-It-Yourself Home Energy Audits, U.S. Department of Energy, https://www.energy.gov/energysaver/home-energy-audits/do-it-yourself-home-energy-audits
- ENERGY STAR Building Upgrade Manual, U.S. Environmental Protection Agency, https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/comprehensive-approach/energy-star

Transportation

- Pennsylvania Department of Transportation: EV Model Ordinance Toolkit, https://www.penndot.pa.gov/ProjectAndPrograms/Planning/EVs/Pages/EV-Model-Ordinance-Toolkit.aspx.
- Compilation of State, County, and Local Anti-Idling Regulations, US EPA, April 2006, Compilation of state and local vehicle idling laws.
- Sample Fleet Electrification Action Plan for Municipalities, Sample fleet electrification plan for municipalities.
- EV Charging Financial Analysis Tool, EV Financial Analysis Tool.
- CREATING EV-READY TOWNS AND CITIES: A GUIDE TO PLANNING AND POLICY TOOL SELECTRIC VEHICLE SUPPLY EQUIPMENT SUPPORT STUDY.

Renewable Energy

- PA Department of Energy: Renewable Energy, https://www.dep.pa.gov/Citizens/Energy/Renewables/Pages/default.aspx
- PA Public Utility Commission: Renewable Energy, http://www.puc.pa.gov/consumer_info/electricity/renewable_energy.aspx
- U.S. EPA: Local Renewable Energy Benefits and Resources, https://www.epa.gov/statelocalenergy/local-renewable-energy-benefits-and-resources

Waste Management

- Delaware Riverkeeper: Natural Wastewater Treatment: Spray Irrigation, https://www.delawareriverkeeper.org/sites/default/files/resources/Factsheets/Natural_Wastewater_Treatment_-_Spray_Irrigation.pdf
- Water and Wastewater Facilities: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs, US EPA, 2013, Energy Efficiency in Water and Wastewater Treatment Facilities.

Appendix A – Information for Achieving Energy Transition

A.0 Information for Achieving Energy Transition in Buckingham Township

A.1 Information on Energy Usage and Expenditures and GHG Emissions

The most recent and comprehensive assessment of the energy usage and emissions of GHGs in the southeastern Pennsylvania area was conducted for the year 2015 by the Delaware Valley Regional Planning Commission (DVRPC). These energy and emissions data are available for each municipality. The GHG emissions in Buckingham Township are presented in Table A1. Table A2 presents detailed information on fuel usage, fuel costs, and GHG emissions by fuel type for each of the residential, commercial & industrial, highway, and rail transit sectors. Figure A1 provides a chart of the GHG emissions data for Buckingham Township.

As shown in Figure A1, the emissions from energy use in buildings and in transportation together account for **92%** of the GHG emissions in Buckingham Township. (Solid waste generated in the area accounts for **3.5%** of the emissions, which represents landfill gas emitted from landfills to which the municipality's waste goes.) Aside from reducing our generation of solid waste, virtually all of the GHG emissions in Buckingham Township come from building energy usage and highway vehicles.

Table A1
2015 Emission Inventory of Buckingham Township

Sector	Metric Tons CO_2 e	Percent of Total
Residential	**68,832**	**36.18%**
Commercial and Industrial	**43,831**	**23.04%**
Highway	**61,489**	**32.32%**
Rail Transit	**232**	**0.12%**
Solid Waste	**6,683**	**3.51%**
Natural Gas Systems	**760**	**0.40%**
Agriculture	**7,799**	**4.10%**
Wastewater	**626**	**0.33%**
Industrial Processes	**0**	**0.0%**
TOTAL	**190,252**	**100.0%**

Table A2

2015 Fuel Information for Residential, Commercial & Ind., Highway, and Rail Transit Sectors

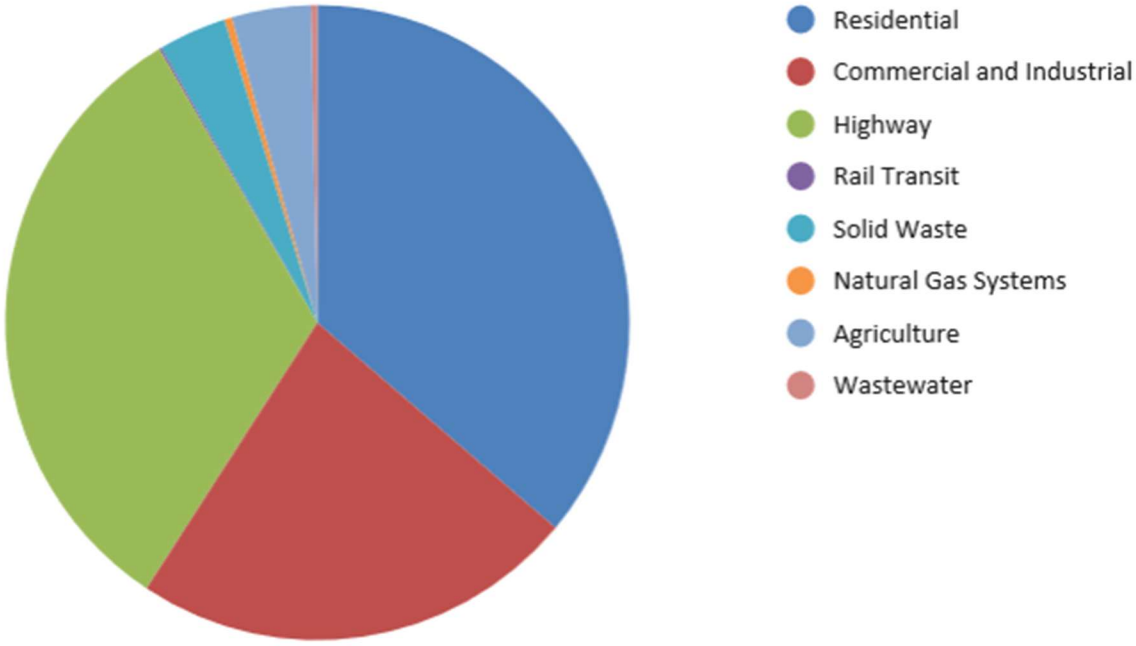
Residential	Electricity	Natural Gas	Fuel Oil	LPG	Total
Energy Content - Billion BTU	275	383	223	21	901
Energy by Physical Units	80,472,727	3,645,551	1,624,631	246,400	--
Emissions ($MTCO_2$ e)	30,587	20,364	16,5591	1,289	68,832
Energy Expenditure ($)	$10,977,426	$4,030,703	$4,311,638	$580,638	$19,900,406

Commercial and Industrial	Electricity	Natural Gas	Fuel Oil	LPG	Total
Energy Content - Billion BTU	259	88	130	10	487
Energy by Physical Units	76,015,283	833,894	945,898	117,873	--
Emissions ($MTCO_2$ e)	28,893	4,658	9,663	617	43,831
Energy Expenditure ($)	$6,382,952	$700,471	$2,338,084	$147,662	$9,569,168

Highway	Gasoline	Diesel			Total
Energy Content - Billion BTU	611	184			795
Energy by Physical Units (gal.)	5,071,713	,340,2051			--
Emissions ($MTCO_2$ e)	--	--			61,489
Energy Expenditure ($)	$12,780,717	$3,922,781			$16,703,498
VMT (1,000 miles/day)	350				

Rail Transit	Diesel	Electricity			Total
Energy Content - Billion BTU	0.1	2.0			2.1
Energy by Physical Units (gal.)	1,005	583,713			--
Emissions ($MTCO_2$ e)	--	--			232
Energy Expenditure ($)	--	--			

Figure A1
2015 GHG Emission Inventory of Buckingham Township

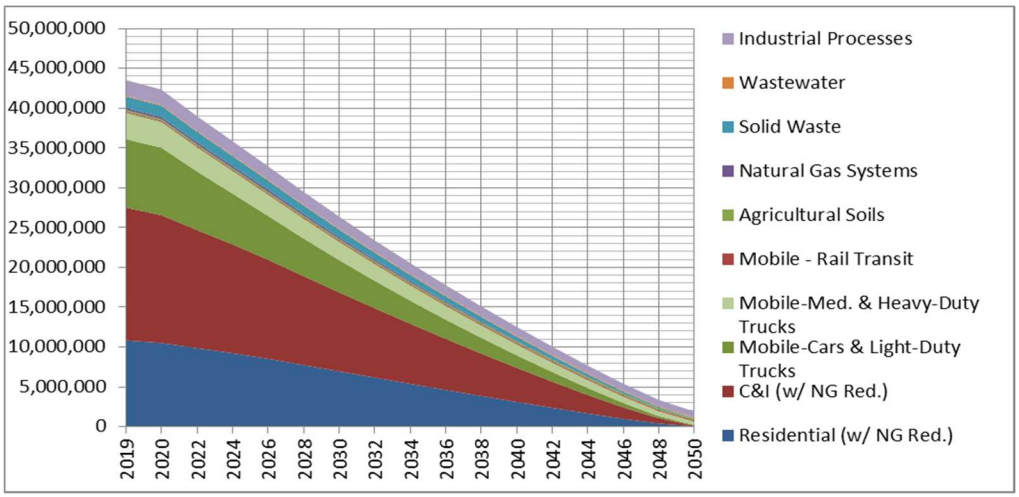


A.2 Strategies for Energy Transition and GHG Emission Reductions

There are five basic strategies for making the transition to renewable energy and achieving reductions of GHGs in **Buckingham Township**. (Please note that not all of these strategies can be carried out on the municipal level. But the municipal government *can* indicate to other levels of government the need for them to undertake certain initiatives.)

- Increase in the efficiency with which we use energy;
- The electrification within buildings (heating, cooling, domestic hot water, cooking, clothes washing and drying);
- The electrification of transportation;
- Conversion of electricity generation from fossil fuels to clean renewable sources of energy;
- Carbon capture (planting trees, capturing CO_2 from electric generation and industrial processes)

Figure A2
Typical Emission Reductions Achievable in Southeastern PA Area (MT CO2 e)



Energy efficiency: According to the American Council for an Energy-Efficient Economy (ACEEE)[6], energy efficiency can achieve a 49% reduction in energy usage and GHG emissions. Stated alternatively, it would take almost twice as much renewable energy without implementing energy efficiency measures. Here is a list of the energy efficiency measures that will achieve this dramatic reduction in energy demand:

For residential, commercial, and industrial buildings:

- Building efficiency: The energy usage in homes and commercial and industrial buildings today can be substantially reduced through energy efficiency measures in air sealing and insulation improvements, building heating and cooling, and hot water heating, appliances, lighting, and behavioral changes
- The efficiency of new construction can be significantly improved through zero-energy, passive house, and living building design and construction practices
- The efficiency of heat pumps: A substantial reduction in energy usage in building and hot water heating can be achieved by replacing fossil fuel fired systems with heat pumps when the fossil fuel furnace or heater must be replaced. Further, new heat pumps are coming to market that are: 1) more efficient and cheaper than older generations, especially when new government incentives are factored in; and 2) don't rely on the use of hydrofluorocarbons (HFCs), greenhouse gases that contribute to warming.

For transportation:

[6] American Council for an Energy-Efficient Economy; Halfway There: Energy Efficiency Can Cut Energy Use and Greenhouse Gas Emissions in Half by 2050; September 2019; https://aceee.org/research-report/u1907.

- Reduction in travel by cars and light-duty trucks (LDTs): Reductions in travel can be achieved (1) by diversion of trips in cars and LDTs to public transit and by elimination of the need for trips in the first place through telecommuting for work and meetings, (2) gradual but steady changes in land-use patterns which favor walking, bicycling, and public transit, and (3) by consolidation of trips for greater efficiency. These strategies decrease the vehicle miles of travel (VMT) and associated energy usage
- Energy efficiency in internal combustion engine (ICE) cars and LDTs: A gradual but steady increase in the fuel efficiency of ICE vehicles represented by fleet-wide average miles per gallon (MPH) will significantly reduce the energy usage in fossil fuel powered vehicles. The fleet wide average fuel efficiency in the US in 2017 was 24 miles per gallon[7]. A one mile per gallon increase in fleet wide fuel efficiency per year, up to a maximum of 50 MPG, is achievable. This would dramatically reduce fuel usage, pollution, and GHG emissions in the early years as the transition to electric vehicles occurs
- Replacement of ICE vehicles with electric vehicles (EVs): A substantial reduction in energy usage in motor vehicles can be achieved simply by replacing ICE vehicles with electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) when it is time to purchase a new car. An EV is conservatively 68% more efficient than an ICE vehicle. An ICE vehicle is only about 17%–21% efficient in converting energy to power, whereas an EV is over 77% efficient[8]
- Energy efficiency in medium- and heavy-duty trucks (MDTs and HDTs): According to a review of the literature, the Union of Concerned Scientists has determined that a 50% reduction in energy usage can be achieved in MDTs and HDTs through efficiency measures such as improvements in engines and drive trains, aerodynamics, and tire and wheel design[9]. Tesla has developed a long-distance, electric-powered tractor trailer that it demonstrates meets all industry technical and economic requirements and has a much higher efficiency.[10] Volvo, and Freightliner are also developing electric powered trucks[11]

Electrification of building heating systems:

- Electrification: The use of heat pumps and geothermal for heating and cooling buildings facilitates the conversion to electric sources of energy, which can be powered by

[7] U.S. Environmental Protection Agency, Automotive Trends Report, https://www.epa.gov/automotive-trends/highlights-automotive-trends-report.
[8] U. S. Department of Energy, Office of Energy Efficiency and Renewable energy, https://www.fueleconomy.gov/feg/evtech.shtml
[9] Union of Concerned Scientists, https://www.ucsusa.org/resources/heavy-duty-truck-fuel-efficiency.
[10] https://www.tesla.com/semi
[11] Electrification: Opportunities in many but not all applications https://www.aceee.org/blog-post/2020/02/electrification-opportunities-many-not-all-applications

renewable energy. Heating by oil, propane, or natural gas can never emit fewer GHGs due to the nature of the process, nor can they also provide air conditioning. A heat pump can work as an air conditioner

Electrification of transportation:

- Electrification: The conversion from ICE vehicles to EVs facilitates the conversion to electric sources of energy, which can be powered by renewable energy. Use of gasoline or diesel fuel can never emit fewer GHGs due to the nature of the process

Conversion of electricity generation to clean renewable energy[12]:

- Renewable energy: The final step in the transition to a renewable energy future (not in time but in process) is to replace the generation of electricity by fossil fuels with renewable sources such as solar, wind, and hydro power

Carbon capture

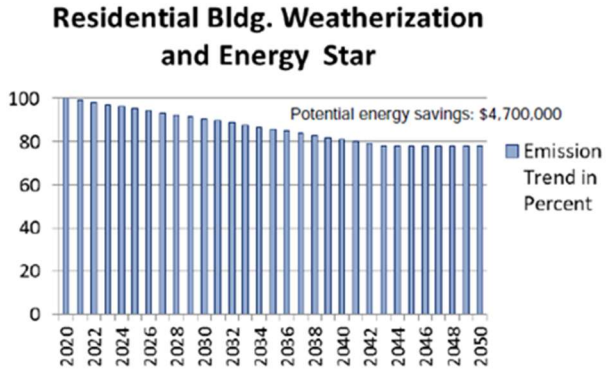
- Carbon capture: As discussed above, industrial carbon capture faces considerable cost issues which place future economic viability in doubt. Planting of trees will contribute to carbon capture and should be strongly encouraged for many reasons. But tree planting has a relatively limited and delayed impact on CO_2 reduction within this municipality

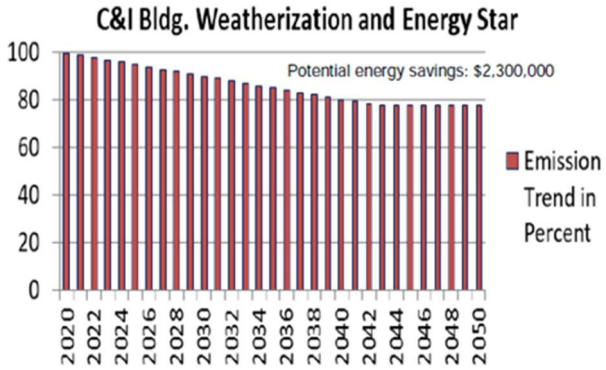
What would this energy transition look like in Buckingham Township?

The following information illustrates how such a transition to efficient, clean, renewable energy could be achieved in Buckingham Township:

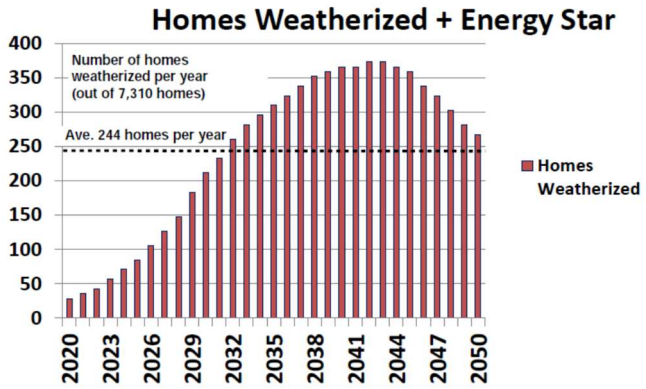
Up to 24% reduction in emissions can be achieved through energy efficiency alone! (By weatherizing our buildings, installing LED lights, and purchasing Energy Star appliances from now on.) The annual energy savings will more than offset the initial cost of transition.

[12] The clean 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

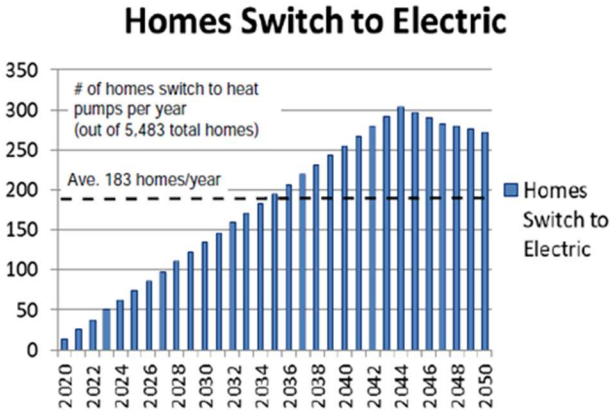


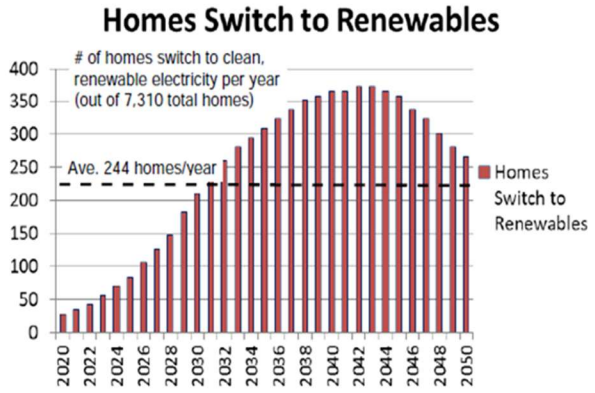


The homes in Buckingham Township would be gradually weatherized and would be outfitted with Energy Start appliances as the existing appliances wear out.



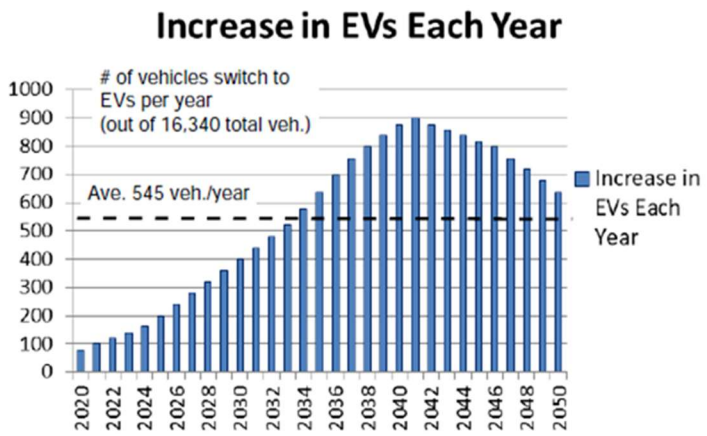
Then over time, our homes and buildings would gradually electrify their heating systems and appliances and obtain their electricity from renewable sources:





Heat pumps are 3 times more efficient than oil or natural gas at heating buildings AND will provide cooling in the summer.

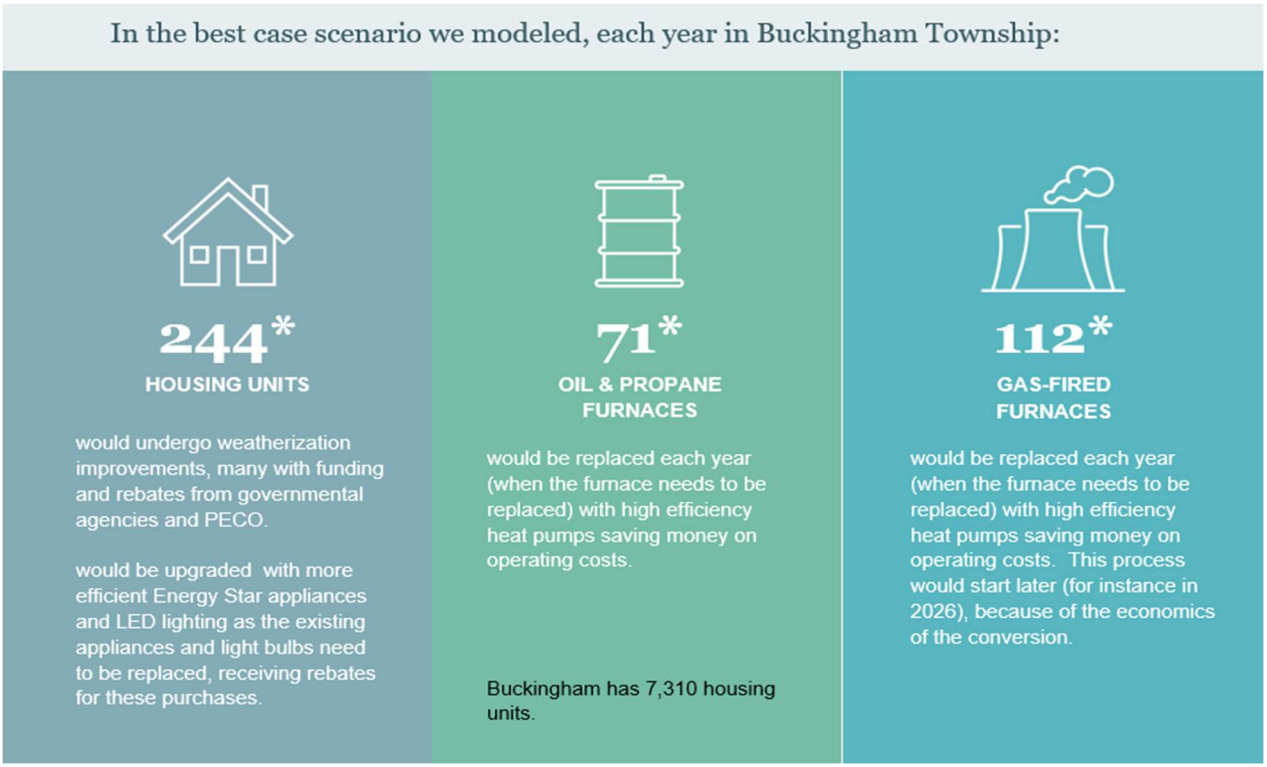
At the same time, electric vehicles (EVs) would replace gasoline and diesel vehicles as they wear out:



The great changes that we need to make are relatively easy when started now and made over a period of 25 or 30 years.

We need to encourage voluntary action over the next 2 decades.

In the best case scenario we modeled, each year in Buckingham Township:



Appendix B – Municipal Energy Usage and GHG Emissions Data

The following table presents the energy usage in the 12-month period preceding the pandemic (circa 2019 and early 2020). Updated information can be generated from the most recent energy invoices or by software available from PECO. Please note that information was not available for the gasoline and diesel fuel usage by township vehicle. Fuel usage by these vehicles is a substantial fuel usage in most municipalities.

Facility Nickname	Total Annual Electric Consumption (kWh)	Total Annual Gas Consumption (Ccf)	Liquid Fuels (gallons)	Facility Type	Street Address
Motor Vehicle Fuels			??		
BUCKINGHAM TOWNSHIP WATER DEPT	758,495			Government Office	0YORK RDSPRAY 2 SITE 1
BUCKINGHAM TOWNSHIP	611,333			Government Office	15REDFIELD DRW W S S
BUCKINGHAM TOWNSHIP	483,854			Government Office	2380DURHAM RD
BUCKINGHAM TOWNSHIP	231,675			Government Office	0GREEN-RIDGE RDFURLONG WWTP2
BUCKINGHAM TOWNSHIP	181,726			Other-Utility	4107CRESTVIEW WAYSEWER 2
BUCKINGHAM TWP ADMIN BLDG	169,330			Government Office	4613HUGHESIAN DRADM BL
BUCKINGHAM TOWNSHIP	136,390			Contractor	3808SMITH RDWATER TREATMENT SYS
BUCKINGHAM TOWNSHIP	119,452			Government Office	0YORK RDSP-27
BUCKINGHAM TOWNSHIP	113,340			Government Office	4837COLD-SPRNG-CRM RDHSTNEWTR
BUCKINGHAM TOWNSHIP	98,792			Other-Utility	3487WELLSFORD RDPUMP HOUSE
BUCKINGHAM TOWNSHIP	92,233				3913HILLCREST DRWASTE WATER DISPOSAL
BUCKINGHAM TOWNSHIP	68,150			Government Office	0COLD-SPR-CRM RDBWCO 3 SITE 3
BUCKINGHAM TOWNSHIP WATER DEPT	63,946			Government Office	0UPPER-MOUNTAIN RDBOOSTER
BUCKINGHAM TOWNSHIP	63,326			Other-Utility	0UPPER-MOUNTAIN RDWELL 4&5
BUCKINGHAM TOWNSHIP MAINTANCE FACILITY	50,152			Government Office	4991UPPER-MOUNTAIN RD
BUCKINGHAM TOWNSHIP	47,987			Government Office	0FORREST-GROVE RDWELL F-1
BUCKINGHAM TOWNSHIP	47,383			Other-Utility	0COLD-SPRING-CREAMERY RDPUMP STARDNGS OF BCK
BUCKINGHAM TOWNSHIP	46,945			Government Office	0W BRIGHTON STWTR BSTR
BUCKINGHAM TOWNSHIP	39,157			Other-Utility	0ROSEMONT TRLSEW PUMP
BUCKINGHAM TOWNSHIP	38,169			Government Office	4400LOIS LNBWCO 3
BUCKINGHAM PARK AUTHORITY	34,874			Government Office	0HANSELL RDPARK
BUCKINGHAM TOWNSHIP	29,229			Other-Utility	0HOLICONG RDPMP STN-4
BUCKINGHAM TOWNSHIP	24,889			Government Office	0COLD-SPR-CRM RDBWCO11 SITE 3
BUCKINGHAM TOWNSHIP	23,650			Other-Utility	2080HAWTHORNE RDSAN PUMP
BUCKINGHAM TOWNSHIP	20,235			Other-Utility	0BRADLEY CTWATER-1
BUCKINGHAM TOWNSHIP	19,771			Government Office	0STREET RDPS-6 SITE 1
BUCKINGHAM TOWNSHIP	18,781			Other-Utility	0NOTTINGHAMSHIRE RDPUMP DEVONSHIRE ESTS
BUCKINGHAM TOWNSHIP WATER DEPT	18,779			Other-Utility	0YORK RDPUMP SUGARBOTTOM RD
BUCKINGHAM TOWNSHIP	18,739			Other-Utility	4047AHOLLY WAYWATER 2
BUCKINGHAM TOWNSHIP PUMPING STATION 8	16,036			Government Office	0RT-202 HWYPS8 & RT 413 HW NEW
BUCKINGHAM TOWNSHIP	14,282			Government Office	0OLD-YORK RDPS-3
BUCKINGHAM TOWNSHIP	13,141			Other-Utility	0FOREST-GROVE RDWELL F3
BUCKINGHAM TOWNSHIP	12,620			Contractor	4034HILLCREST DRLOT 73 PUMP STATION
BUCKINGHAM TOWNSHIP WATER DEPT	11,836			Other-Utility	0STREET RDPUMP STN UPR YRK RD
BUCKINGHAM TWP SUPERV	11,522			Government Office	0MECHANICSVL RDMAINT BLCHURCH SCHOOL
BUCKINGHAM TWP	8,233			Government Office	3868BURNT-HSE-HL RDPAVILION
BUCKINGHAM TOWNSHIP	7,484			Government Office	5385LONG LNDERSTINE
BUCKINGHAM TOWNSHIP PUMPING STATION 9	7,268			Government Office	2929MILL RDPS9
BUCKINGHAM TOWNSHIP	7,232			Government Office	2200SWAMP RDPS 15
BUCKINGHAM TOWNSHIP	6,838			Government Office	0FOREST-GROVE RDWELL F-2
BUCKINGHAM TOWNSHIP PUMPING STATION 7	6,389			Government Office	0RT-202 HWYPS-7
BUCKINGHAM TOWNSHIP	5,743			Government Office	2800HEARTH PLPS 1
BUCKINGHAM TOWNSHIP	5,140			Other-Utility	0PUMP STAPUMP STA
BUCKINGHAM TWP	4,144			Government Office	5115YORK RDPARK
BUCKINGHAM TOWNSHIP	4,143			Government Office	3573WINDRIDGE DRPS11
BUCKINGHAM TOWNSHIP	3,491			Government Office	0RED-GATE DRPS-2
BUCKINGHAM TOWNSHIP	1,746			Government Office	0COLD-SPRING-CREAMERY RDASHLEIGH BLVD
BUCKINGHAM TOWNSHIP	555			Property Management	0COLD-SPRING-CREAMERY RDVALVE VAULT
BUCKINGHAM TOWNSHIP	349			Government Office	0YORK RDSO DURHAM RD
BUCKINGHAM TWP	330			Government Office	0MAIN ST& RAILROAD AV-STA HS
BUCKINGHAM TOWNSHIP SEWER FAC	0			Government Office	0STREET RDMS SITE1WO RT 202
BUCKINGHAM TOWNSHIP	0			Government Office	0YORK RDVALVE CTRL PANEL
BUCKINGHAM TWP ADMIN BLDG		1,757		Government Office	4613HUGHESIAN DRADMIN BL
Total	**3,819,303**	**1,757**	**??**		
Facilities				**Sewage-related**	

The following table presents the resulting emissions of greenhouse gases.

Facility Nickname	Facility Type	Street Address	Carbon Emissions from Electricity	Carbon Emissions from NG	Liquid Fuel Emissions	Total Carbon Emissions
Motor Vehicle Fuels					??	??
BUCKINGHAM TOWNSHIP WATER DEPT	Government Office	0YORK RDSPRAY 2 SITE 1	288.29			288.29
BUCKINGHAM TOWNSHIP	Government Office	15REDFIELD DRW W S S	232.36			232.36
BUCKINGHAM TOWNSHIP	Government Office	2380DURHAM RD	183.90			183.90
BUCKINGHAM TOWNSHIP	Government Office	0GREEN-RIDGE RDFURLONG WWTP2	88.06			88.06
BUCKINGHAM TOWNSHIP	Other-Utility	4107CRESTVIEW WAYSEWER 2	69.07			69.07
BUCKINGHAM TWP ADMIN BLDG	Government Office	4613HUGHESIAN DRADM BL	64.36			64.36
BUCKINGHAM TOWNSHIP	Contractor	3808SMITH RDWATER TREATMENT SYS	51.84			51.84
BUCKINGHAM TOWNSHIP	Government Office	0YORK RDSP-27	45.40			45.40
BUCKINGHAM TOWNSHIP	Government Office	4837COLD-SPRNG-CRM RDHSTNEWTR	43.08			43.08
BUCKINGHAM TOWNSHIP	Other-Utility	3487WELLSFORD RDPUMP HOUSE	37.55			37.55
BUCKINGHAM TOWNSHIP		3913HILLCREST DRWASTE WATER DISPOSAL	35.06			35.06
BUCKINGHAM TOWNSHIP	Government Office	0COLD-SPR-CRM RDBWCO 3 SITE 3	25.90			25.90
BUCKINGHAM TOWNSHIP WATER DEPT	Government Office	0UPPER-MOUNTAIN RDBOOSTER	24.30			24.30
BUCKINGHAM TOWNSHIP	Other-Utility	0UPPER-MOUNTAIN RDWELL 4&5	24.07			24.07
BUCKINGHAM TOWNSHIP MAINTANCE FACILITY	Government Office	4991UPPER-MOUNTAIN RD	19.06			19.06
BUCKINGHAM TOWNSHIP	Government Office	0FORREST-GROVE RDWELL F-1	18.24			18.24
BUCKINGHAM TOWNSHIP	Other-Utility	0COLD-SPRING-CREAMERY RDPUMP STARDNGS OF BCK	18.01			18.01
BUCKINGHAM TOWNSHIP	Government Office	0W BRIGHTON STWTR BSTR	17.84			17.84
BUCKINGHAM TOWNSHIP	Other-Utility	0ROSEMONT TRLSEW PUMP	14.88			14.88
BUCKINGHAM TOWNSHIP	Government Office	4400LOIS LNBWCO 3	14.51			14.51
BUCKINGHAM PARK AUTHORITY	Government Office	0HANSELL RDPARK	13.25			13.25
BUCKINGHAM TOWNSHIP	Other-Utility	0HOLICONG RDPMP STN-4	11.11			11.11
BUCKINGHAM TOWNSHIP	Government Office	0COLD-SPR-CRM RDBWCO11 SITE 3	9.46			9.46
BUCKINGHAM TOWNSHIP	Other-Utility	2080HAWTHORNE RDSAN PUMP	8.99			8.99
BUCKINGHAM TOWNSHIP	Other-Utility	0BRADLEY CTWATER-1	7.69			7.69
BUCKINGHAM TOWNSHIP	Government Office	0STREET RDPS-6 SITE 1	7.51			7.51
BUCKINGHAM TOWNSHIP	Other-Utility	0NOTTINGHAMSHIRE RDPUMP DEVONSHIRE ESTS	7.14			7.14
BUCKINGHAM TOWNSHIP WATER DEPT	Other-Utility	0YORK RDPUMP SUGARBOTTOM RD	7.14			7.14
BUCKINGHAM TOWNSHIP	Other-Utility	4047AHOLLY WAYWATER 2	7.12			7.12
BUCKINGHAM TOWNSHIP PUMPING STATION 8	Government Office	0RT-202 HWYPS8 & RT 413 HW NEW	6.10			6.10
BUCKINGHAM TOWNSHIP	Government Office	0OLD-YORK RDPS-3	5.43			5.43
BUCKINGHAM TOWNSHIP	Other-Utility	0FOREST-GROVE RDWELL F3	4.99			4.99
BUCKINGHAM TOWNSHIP	Contractor	4034HILLCREST DRLOT 73 PUMP STATION	4.80			4.80
BUCKINGHAM TOWNSHIP WATER DEPT	Other-Utility	0STREET RDPUMP STN UPR YRK RD	4.50			4.50
BUCKINGHAM TWP SUPERV	Government Office	0MECHANICSVL RDMAINT BLCHURCH SCHOOL	4.38			4.38
BUCKINGHAM TWP	Government Office	3868BURNT-HSE-HL RDPAVILION	3.13			3.13
BUCKINGHAM TOWNSHIP	Government Office	5385LONG LNDERSTINE	2.84			2.84
BUCKINGHAM TOWNSHIP PUMPING STATION 9	Government Office	2929MILL RDPS9	2.76			2.76
BUCKINGHAM TOWNSHIP	Government Office	2200SWAMP RDPS 15	2.75			2.75
BUCKINGHAM TOWNSHIP	Government Office	0FOREST-GROVE RDWELL F-2	2.60			2.60
BUCKINGHAM TOWNSHIP PUMPING STATION 7	Government Office	0RT-202 HWYPS-7	2.43			2.43
BUCKINGHAM TOWNSHIP	Government Office	2800HEARTH PLPS 1	2.18			2.18
BUCKINGHAM TOWNSHIP	Other-Utility	0PUMP STAPUMP STA	1.95			1.95
BUCKINGHAM TWP	Government Office	5115YORK RDPARK	1.58			1.58
BUCKINGHAM TOWNSHIP	Government Office	3573WINDRIDGE DRPS11	1.57			1.57
BUCKINGHAM TOWNSHIP	Government Office	0RED-GATE DRPS-2	1.33			1.33
BUCKINGHAM TOWNSHIP	Government Office	0COLD-SPRING-CREAMERY RDASHLEIGH BLVD	0.66			0.66
BUCKINGHAM TOWNSHIP	Property Management	0COLD-SPRING-CREAMERY RDVALVE VAULT	0.21			0.21
BUCKINGHAM TOWNSHIP	Government Office	0YORK RDSO DURHAM RD	0.13			0.13
BUCKINGHAM TWP	Government Office	0MAIN ST& RAILROAD AV-STA HS	0.13			0.13
BUCKINGHAM TOWNSHIP SEWER FAC	Government Office	0STREET RDMS SITE1WO RT 202				0.00
BUCKINGHAM TOWNSHIP	Government Office	0YORK RDVALVE CTRL PANEL				0.00
BUCKINGHAM TWP ADMIN BLDG	Government Office	4613HUGHESIAN DRADMIN BL		9.35		9.35
Total			**1,451.7**	**9.3**	**??**	**1,461.0**

Appendix C – Facsimile of Resolution 2422

RESOLUTION NO. 2422
TOWNSHIP OF BUCKINGHAM
BUCKS COUNTY, PENNSYLVANIA

A RESOLUTION SETTING FORTH THE GOALS FOR BUCKINGHAM TOWNSHIP TO USE 100% CLEAN, RENEWABLE ENERGY FOR ALL PURPOSES NO LATER THAN 2050.

WHEREAS, Buckingham Township is committed to reducing our carbon footprint and protecting our environment; and

WHEREAS, for more than 40 years, and especially since 1995 when Buckingham approved a referendum to establish a township land-preservation program, becoming one of the first municipalities in Bucks County to do so, the residents and Board of Supervisors of Buckingham have demonstrated their commitment to environmental protection, a commitment that has garnered the overwhelming support of Buckingham voters and resulted in the permanent protection of 6113 acres of prime township land (including farms, parks, schools, open space in developments and land trust properties) as of July 2020; and

WHEREAS, Buckingham Township has created a wastewater system for those residents on our public wastewater system that utilizes sprayfields; an environmentally sound and sustainable method that recharges the groundwater; and

WHEREAS, the Buckingham Township Wastewater Systems preserves over 175 acres of open land, 40 acres in nursery stock and 32 wooded acres; and

WHEREAS, the U.S. government's November 2017 *Climate Science Special Report* states that "It is extremely likely that human activities are the dominant cause of the observed warming since the mid-20th century"; and

WHEREAS, carbon dioxide (CO_2) is the primary greenhouse gas emitted by human activities, and there is a body of evidence that the rate at which climate change is occurring may be the result of the increase in the concentration of carbon dioxide in the atmosphere, and combustion of fossil fuels for energy is the primary source of carbon dioxide emissions; and

WHEREAS, the extreme weather events associated with climate change have the immediate potential to test our infrastructure, emergency and social services; impact our food, water and energy supplies; disrupt services, commerce and quality of life; increase the cost of disaster relief, restoration and prevention; and result in a commensurate increase in the cost of services to pay for these effects; and

WHEREAS, Buckingham has demonstrated a commitment to reducing fossil-fuel energy in its municipal operations through the installation of cost-saving LED lighting in its street lights, an effort recognized as forward-looking in area presentations by the Sierra Club's Ready for 100 campaign; and

WHEREAS, Buckingham remains committed to being a community characterized by health, safety, livability, prosperity, and equity; it now recognizes that additional longer-term goals must be set and achieved to meet consensus worldwide goals; and

WHEREAS, a strategy for achieving a cost-effective, even cost-saving, energy source transition is through collaboration with other Bucks County energy leaders and participating in aggregated procurement contracts, such as Power Purchase Agreements (PPAs) for regional wind and solar energy; and

WHEREAS, a renewable energy initiative can produce energy cost-savings for residents and local businesses while stimulating new economic activity and local jobs as well as make a significant contribution to reducing the township's GHG emissions;

Therefore, be it RESOLVED that:

- Buckingham Township will preserve the past and embrace the future by joining other leading municipalities to transition to 100% clean and renewable energy community-wide, and will set goals to complete this transition in the electricity sector by 2035 and in all energy sectors, including heat and transportation, by 2050;

- The Board of Supervisors will use the Buckingham Environmental Advisory Commission (EAC) as a valuable source of guidance in the creation of an energy transition plan for achieving these goals, the drafting of such plan to be completed within 24 months of the approval of this resolution and to include interim milestones, financial impacts, equity metrics and potential financing mechanisms;

- The Board of Supervisors will encourage all Buckingham residents to participate in the planning and implementation process;

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

- Locally produced and distributed energy is prioritized whenever feasible for the resilience benefits it provides to the community;

- The Board of Supervisors calls on the County of Bucks and the Commonwealth of Pennsylvania to adopt codes and standards to increase the efficiency of buildings and appliances;

- The Board of Supervisors calls on the County of Bucks and the Commonwealth of Pennsylvania to set a goal to use 100% clean, renewable energy for all purposes no later than 2050;

- The Board of Supervisors calls on the County of Bucks and the Commonwealth of Pennsylvania to increase the Alternative Energy Portfolio Standard to levels that put us on track to meet 100% clean and renewable energy goals.

RESOLVED this 28th day of October, 2020

BUCKINGHAM TOWNSHIP
BOARD OF SUPERVISORS

Jon Forest, Chairman

Maggie Rash, Vice Chairman

Paul Calderaio, Member

ATTEST: Dana Cozza
Dana Cozza, Esq., Township Manager

Appendix D

Photo: A. Strout

ETP Actions

For Future Consideration

INSIDE:

Recommended actions for buildings, transportation, renewable electricity and waste management.

July 2023

For more information, contact
alstrout_2000@yahoo.com

Actions for Buildings

The following is a list of actions applicable to building systems that could be adopted by Buckingham Township as part of the ETP:

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Energy Efficiency											
Establish an Energy Management Plan	■	■	■		■	■			*		Here
Conduct Energy Audits	■	■	■		■	■				H	Here
Benchmarking	■	■	■		■	■		■			Here
Energy Star program	■	■	■	■	■	■	■	■			Here
Lighting upgrades	■	■	■	■	■	■	■	■			Here
Building envelope upgrades	■	■	■	■	■	■		■	*		Here
HVAC inspection and adjustment	■	■	■	■	■	■		■			Here
HVAC upgrades	■	■	■	■	■	■		■			Here
Recommissioning of large existing buildings	■		■		■	■	■	■			Here
Promote residential energy efficiency	■			■	■	■		■			Here
Energy disclosure at time of sale or lease	■			■	■						Here
New buildings – enforcement of energy codes	■										Here
Provide code incentives for new buildings	■										Here
Encourage LEED, Net Zero Energy (NZEB), or comparable certification	■							■			Here

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Incentivize energy efficiency in zoning code											Here
Require new buildings to be solar ready											Here
Require new buildings to be EV ready											Here
Pass municipal ordinance to require cool or green roofs on new buildings and reroofs of existing buildings to reduce heating and cooling needs										H	Here
Support CPACE to fund renewable installations and energy efficiency											Here
Phase in mandates for no or low carbon standards for new construction and remodels											
Bring all buildings up to current building code or retrofit a majority of existing buildings (determine what percent need to be completed every year to meet targets)											Here
Provide incentives for energy efficiency retrofits											Here
Conduct energy efficiency challenges and provide incentives to drive energy retrofits											Here
Encourage and incentivize energy efficiency retrofits in rental housing											Here
Implement mandatory, phased energy efficiency upgrades for rental units											Here
Pilot green leasing strategies to address the landlord and tenant split initiative											Here

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Incentivize urban infill development in the most dense activity centers through zoning	■							■			Here
Expand housing choice to create more life-work opportunities	■							■			
Building Electrification											
Install heat pump technology in new building construction and when upgrading heating and cooling system. Heat pumps can be connected to the outside atmosphere or be geothermal.	■	■	■	■	■	■	■				Here Here
Increase the efficiency of space and water heating and convert to electric. Consider a tankless water heater	■	■	■	■	■	■	■				Here

*As noted in Resolution 2422

Actions for Transportation

The following is a list of actions applicable to transportation that could be adopted by Buckingham Township as part of the ETP:

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Energy Efficiency											
Convert traffic lights to LEDs	■							■			Here
Convert street lights to LEDs (implemented YEAR TK)	■							■			Here
Adopt anti-idling policy	■							■			Here
Trip Reduction											
Facilitate pedestrian transportation	■	■						■			Here
Facilitate public transit	■							■			Here
Facilitate bicycles transportation and bike lanes	■							■			Here
Encourage telecommuting for work and meetings	■		■	■	■	■		■			Here
Encourage carpooling and ride sharing	■	■	■	■	■						Here
Adopt more integrated land use patterns in zoning ordinances	■										Here
Enhance first and last mile connectivity to transit,	■							■			Here
Electric Vehicles											
Convert vehicle fleets to EVs or plug-in hybrid EVs as part of vehicle replacement policy	■	■	■		■	■		■			Here

Make an EV or Plug-in EV your next car											Here
Develop municipal plan for EV charging stations											Here
Build EV charging stations at municipal facilities											Here
Streamline permitting and inspections for charging stations so that they are uncomplicated, affordable, and fast.											Here
Policy to replace retired school buses with EVs											Here
Parking ordinances to favor the inclusion of EV charging stations requiring a gradually increasing percentage of spaces for EVs											Here
Partner with state and federal funding agencies to increase uptake of EV charging stations											Here

Actions for Renewable Electricity

The following is a list of actions applicable to renewable electricity that could be adopted by Buckingham Township as part of the ETP:

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Promote Renewable Energy											
Develop an energy savings reinvestment plan: Establishing an Energy Savings Reinvestment Plan allows future projects to be internally self-funded. These plans can be set up so that up to 80% of a project's savings goes to the energy fund to pay for future energy efficiency projects, while the remaining amount is returned to the city's general fund.											Here
Update zoning, permitting, and inspection for renewable energy systems											Here
Standardize zoning, permitting, and inspection for renewable energy systems with surrounding municipalities											Here
Apply for assistance through Solsmart											Here
Buy electricity together from utility scale solar and wind facilities											Here
Install residential and commercial scale solar arrays											Here
Institute an authority to purchase renewable electricity through PPAs											Here

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Enable consumers to purchase and produce renewable energy	■						■	■			Here
Work with PECO to remove/reduce current complexity in connecting individual solar PV systems to the electric grid	■						■				Here
Support a group purchasing program for rooftop solar installations (e.g. Solarize)	■						■	■			Here
Support CPACE to fund energy efficiency and renewable installations	■						■				Here
Establish renewable energy purchasing requirements [for government properties]	■							■			Here
Partner with utility and/or third party to procure renewable energy: ● Assess municipality's current total annual electricity usage ● Assess municipality's current power purchasing contracts to determine timeline for transition to renewables ● Identify large electricity users within the municipality as potential partners for shared power purchase agreements	■	■	■		■	■	■	■			Here
Aggregate energy demand from a group of public and/or private buildings in order to engage a PPA for off-site renewable energy.	■	■	■		■	■	■	■			Here
Develop renewable programs for low income households	■						■	■			Here
Assist large entities in implementing clean energy purchases (e.g. PPAs and Virtual PPAs)	■							■			Here

Action	Municipal	Public Schools	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA., Feds	Timeframe	Relative Cost	Description (Hyperlink)
Work with PECO and others to site and develop renewable capacity in local service area											Here
Work with PECO to advance regional grid flexibility to enable predominantly renewable electricity supply											Here
Invest in energy storage											Here
Support relevant state and federal policies through active legislative and regulatory engagement											
Incentivize buildings with rooftop space such as warehouses, factories, schools, parking to install rooftop renewables.											Here
Develop methane gas capture and Combined Heat and Power (CPH) for wastewater treatment plants											Here
Consider opportunities for biogas production											Here
Preserve forests (including heritage trees,) which capture carbon											Here

Actions for Waste Management

The following is a list of actions applicable to waste management that could be adopted by Buckingham Township as part of the ETP:

Action	Municipal	Public	Institutions	Residents	Businesses	Non-Profits	PECO	Co., PA.,	Timeframe	Relative Cost	Description (Hyperlink)
Develop or update recycling plan	■							■			Here
Outreach to residents and businesses	■							■			
Implement more comprehensive recycling	■	■	■	■	■	■					Here
Implement residential composting	■			■							Here
Increase rates of, and participation in, composting and recycling	■	■	■	■	■	■					Here
Increase compliance with waste diversion ordinances	■										Here
Explore a residential Pay As You Throw (PAYT) program	■										Here
Benchmark waste management facilities	■	■	■	■	■	■					Here
Upgrade or retrofit facilities to higher energy efficiency pumps in water or sewer systems. Ensure pumps are sized appropriately and installing variable frequency drives, whose speed varies to match flow conditions	■										Here
For water facilities: Promote water efficiency and conservation, detect and fix distribution leaks.	■										Here
Encourage residential and commercial low-flow toilets and low-flow showerheads.	■	■	■	■	■	■	■	■			Here
Improve efficiency of aeration equipment. Aeration systems in wastewater plants typically account for about half of a wastewater treatment plant's energy use.	■										Here
Improve efficiency of operations. Installing Supervisory Control and Data Acquisition (SCADA) software can increase the efficiency of process monitoring and operating control	■										Here

Require recycling bins at all public facilities and events	■										Here
Increase use of reusable shopping bags	■			■							Here
Consider single use plastic ordinance	■			■							Here
Maximize diversion of construction and demolition waste					■						Here
Require all major construction and demolition projects to submit a waste management plan	■										Here
Develop procurement policies to assure purchase of low energy intensive equipment (in accordance with Energy Star and other programs)	■	■	■		■	■					Here
Eliminate single use plastic products.	■	■	■	■	■	■		■			Here