

FRANKLIN COUNTY
ENERGY STUDY

RECOMMENDATIONS



June 2018

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The following organizations and communities assisted in the development of the Franklin County Energy Study and the Recommendations: AEP Ohio, American Municipal Power, Buckeye Power, City of Columbus, Clean Fuels Ohio, Columbia Gas of Ohio, Columbus-Franklin County Finance Authority, Columbus Regional Airport Authority, COTA, Franklin County, Go Sustainable Energy, LLC, Homeport, Madison Township, New Morning Energy LLC, Ohio Advanced Energy Economy, Ohio Air Quality Development Authority, Ohio Development Services Agency, Ohio Environmental Council, Ohio Farm Bureau Federation, Ohio Hospital Association, Ohio Partners for Affordable Energy, South Central Power, The Ohio State University, and the Village of Lockbourne.

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INTRODUCTION

Energy production and consumption can be viewed through lenses of the environment, the economy, and the impact on our social fabric. Energy touches every aspect of our individual and collective lives. The Franklin County Energy Study (Study) provided an exceptional amount of insight into the energy use of residents and businesses, what is working well, and areas for improvement. Highlighted are:

- The need to address the residential energy burden in specific ZIP Codes;
- The outflow of energy expenditures from Franklin County; and
- Wasted energy from grid-dependency, end-use inefficiencies and inefficient transportation.

All of the findings in the Study were intentionally presented objectively and represent the baseline from which we will measure future progress. During the public comment period, however, the most common response to the Study was, “Now that we have this information, what do we do with it?”

In November of 2017, the Study’s Advisory Committee convened a sub-group in order to develop recommended actions for Franklin County to take based on the findings. Made up of Advisory Committee members familiar with the Study, as well as new stakeholders with fresh ideas, the sub-group authored this document in a manner which captures the great work already being done, provides direction for areas of opportunity, and allows for the ability to respond to an individual community’s needs.

The following provides a roadmap for Franklin County to begin responding to the immediate energy needs of residents and businesses while developing a framework for future possibilities. Addressing these issues proactively will improve opportunities for employment and business growth, minimize the disparities experienced within specific communities, and increase the environmental quality for all Franklin County residents.

FRANKLIN COUNTY RESIDENTS AND BUSINESSES ARE SPENDING MORE ON ENERGY THAN IS NECESSARY

Nearly four and half billion dollars were spent on energy in Franklin County in 2015. However, only a portion of this energy is put to useful work. The Study found that 69% of energy used in Franklin County is wasted due to inefficiencies in delivering electricity through the grid, inefficiencies in its end-use, and reliance on the internal combustion engine for transportation. Wasted energy accounted for over \$3 billion of consumer spending in 2015.

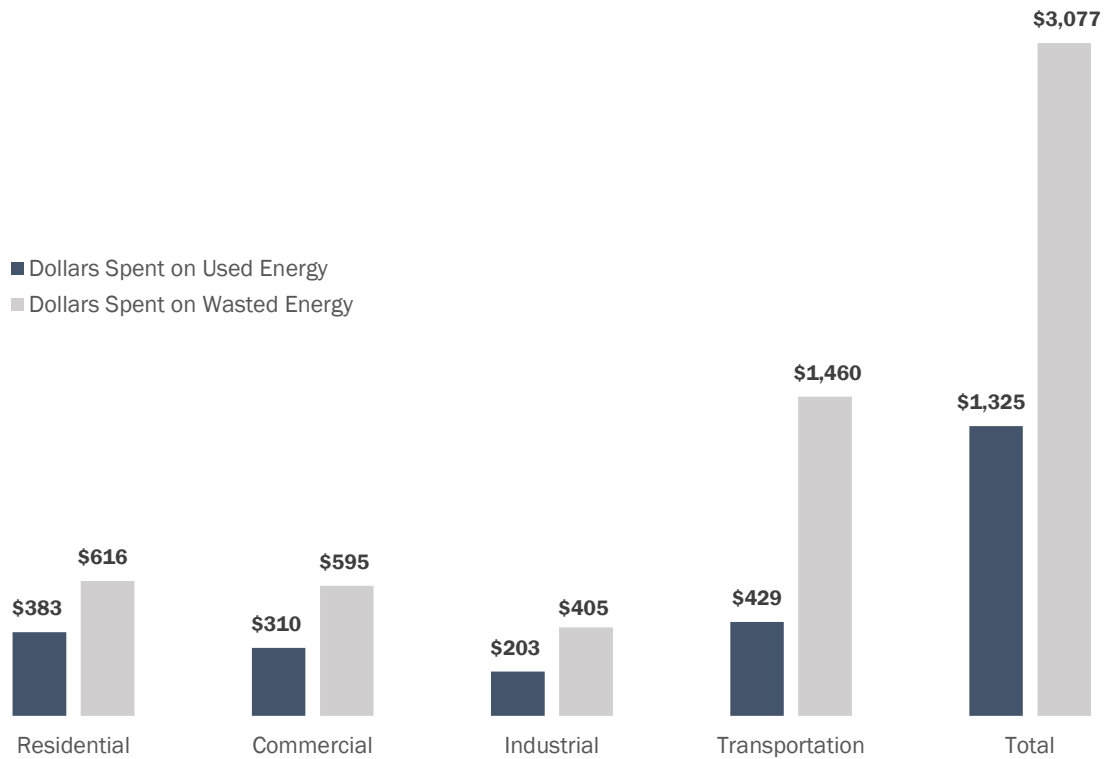


Figure 1. Franklin County Energy Expenditures - 2015
Spending on Used and Wasted Energy (millions of 2015\$)

THE CURRENT ENERGY NETWORK FACILITATES THE OUTFLOW OF EXPENDITURES FROM FRANKLIN COUNTY

Of the \$4.4 billion in expenditures, only \$555 million had a direct effect in Franklin County as spending on salaries, supplies, raw materials, and operating expenses. \$3.8 billion left the county as payment for imported fuels, electricity and other expenses related to the construction and maintenance of the energy network. Due to the reliance on energy from outside of County borders, over 87% of energy expenditures do not have a direct economic impact in areas within Franklin County.

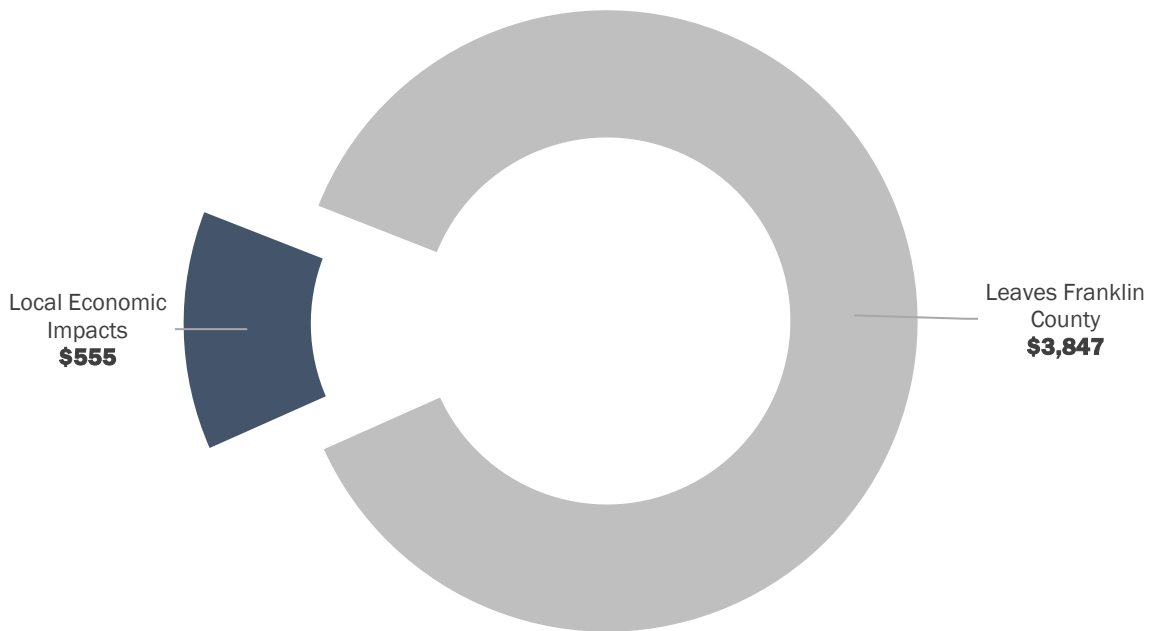


Figure 2. Franklin County Energy Expenditures - 2015
Local Impact and Economic Outflow (millions of 2015\$)

THE RESIDENTIAL ENERGY BURDEN IS UNACCEPTABLE IN SIX COMMUNITIES

The residential energy burden is a measure of spending on energy compared to household income; 3.5% is considered typical and acceptable in the United States. Five communities in Franklin County spend 6 to 10% of their income on heating and powering their homes. One community spends over 10%, which puts them at an extreme disadvantage to be able to afford other essentials and hampers their economic growth.

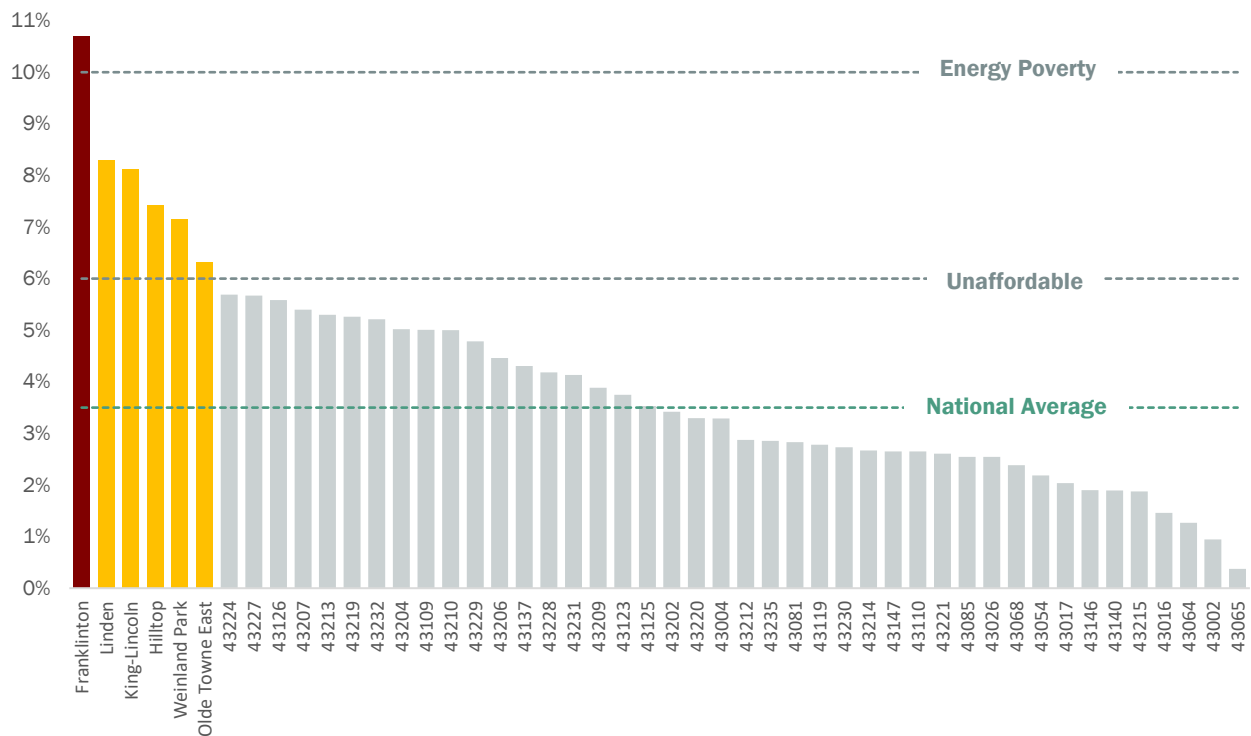


Figure 3. Residential Energy Burden in Franklin County by ZIP Code - 2015

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ROADMAP TO IMPROVEMENT

RESOLVING THESE ISSUES CAN CREATE ECONOMIC OPPORTUNITY, RESILIENCY AND IMPROVE THE ENVIRONMENT

During 2015 alone, the inefficiencies in our energy network resulted in over three billion dollars in wasted expenditures and nearly four billion dollars that did not have a direct economic impact in Franklin County.

We can address these lost opportunities by:

1. Providing policy, technical and financial support;
2. Reducing energy consumption in homes and businesses;
3. Reducing single-occupancy commutes;
4. Increasing the adoption of electric vehicles; and
5. Increasing local renewable generation.

In addition to the immediate benefits that these endeavors will bring, Franklin County will also address issues of energy inequality, build a system of resiliency, and ensure a sustainable future for generations to come.

The following pages will discuss opportunities to keep an additional \$509 million of energy expenditures within the local economy every year and realize up to \$348 million in annual consumer savings for Franklin County residents and businesses.

- \$235 million can be saved annually by increasing the energy efficiency of our homes and businesses
- \$44 million can be saved annually by reducing single-occupancy vehicle commutes
- \$36 million can be saved annually by increasing the number of electric vehicles
- \$33 million can be saved annually by increasing in-county generation

Achieving these savings will require a coordinated effort to align existing programs and partners. Whereas many of the structures of success are already in place, there remains a need to provide a banner under which the multiple stakeholders can rally, as well as the necessary support to achieve this undertaking. Franklin County will be looked upon to provide policy advocacy while supporting initiatives of technical assistance and job training. This endeavor will require increasing available funding opportunities, enhancing available funding mechanisms, and opening the door to innovative technologies to attract sustainability-focused businesses.

There is more opportunity beyond what is mentioned in the road map; however, these recommendations provide ambitious yet achievable goals for improving Franklin County's energy network by 2030.

1

PROVIDE POLICY, TECHNICAL AND FINANCIAL SUPPORT

Targets

12,000 additional clean energy jobs

Franklin County's energy needs create a multi-billion dollar market, which is set to gain an average of 700 jobs per year in the local energy sector through 2030.¹ Whereas the County's energy network is strong, there are opportunities for improvements that will help to ensure an equitable and resilient energy network of the future.

Much of the groundwork has already begun and partnerships continue to be developed. Achieving the economic and environmental benefits of these recommendations will require a commitment from the County in order to provide confidence in the market, and at the same time, increase the capacity for stakeholders to reach these goals. MORPC's Local Government Energy Partnership, supported by the utilities, offers assistance to local governments to perform municipal level energy inventories and technical guidance for energy planning initiatives. Additionally, the continued importance of public-private partnerships cannot be overstated.

COMMIT TO GOALS AND EVALUATION THROUGH RESOLUTION

In order to realize the benefits of this analysis, Franklin County should adopt a resolution for support of these goals and to evaluate the progress made towards them. Regions that focus on the energy needs of residents and businesses attract sustainability-minded opportunities, compounding healthy growth economically, socially and environmentally. The Franklin County Energy Study provides the baseline from which progress should be measured. Every three years, these changes should be validated with utility data.

PROVIDE THE NECESSARY MECHANISMS TO CONDUCT ENERGY DEVELOPMENT PLANS IN EACH LOCAL COMMUNITY

Much of the groundwork has already begun and partnerships continue to be developed between the utilities, local communities and Franklin County. MORPC's Local Government Energy Partnership has been developed to enhance local communities' ability to define energy goals and reach them. As the program continues, opportunities for greater involvement by the County will be identified and expand the capacity of local communities to focus on energy.

ASSESS AND DEVELOP FINANCIAL INCENTIVES AND PRODUCTS TO ASSIST IN DEVELOPMENT

Having a clear understanding of the financing strengths and potential opportunities will be necessary to ensure stakeholders are capable of carrying out the recommendations. Energy Works, Property Assessed Clean Energy (PACE) financing, capital leases, municipal loans, the Investment Tax Credit and the Modified Accelerated Cost Recovery Schedule are programs and tools that can help reduce the cost of energy projects. Franklin County should work through the Columbus Franklin County Finance Authority and the Local Government Energy Partnership to identify other available financing sources for local governments, residents and businesses. In addition, the County should seek to monetize the benefits of energy improvements² in a manner that allows for the development of other financial mechanisms, such as linked deposits, grants, incentives, loan-risk reductions, and rate reductions.

PROMOTE THE ATTRACTION AND RETENTION OF CLEAN ENERGY BUSINESSES

As businesses analyze the suitability of Ohio as a location for their new or expanded business operations, they will invariably look to the region's initiatives and energy goals. Making it clear that Franklin County is open for business to the clean energy economy will ensure that new employment is captured here.

SUPPORT LOCAL GOVERNMENTS IN ASSESSING ALTERNATIVE FUEL OPPORTUNITIES

With the recent designation of the Federal highways in Franklin County as an Alternative Fuel Corridor, Franklin County and the local governments should consider increasing alternative fuel vehicles where cost-effective. Coordination between local governments has led to reduced infrastructure costs for these endeavors.

SUPPORT OF A MODERNIZING UTILITY

Technology is changing rapidly, and the utilities are evolving their strategies to best provide for the market. It is essential for Franklin County to support the integration of distributed resources and the policies necessary to provide for an energy network that is modern into the future. Many market regulations will need to be updated in order to ensure reliability during these changes. Franklin County should continue to advocate for residents' and businesses' ability to participate in this new market.

DEVELOP AN INNOVATIVE ENERGY NETWORK

The energy network of the future will not only include distributed generation, but will also incorporate microgrids and perhaps innovative market infrastructure such as blockchain.³ Microgrids and energy storage as a resource to reduce peak demand and associated costs. The will to develop microgrid pilot projects in the County has been shown by The Ohio State University, Engie Services, and AEP Ohio. Franklin County should coordinate with them to define appropriate roles. The County has a strong foundation of research institutions. Where possible, the development of new technologies to be produced and deployed in Franklin County should be encouraged.

DEVELOP A FRANKLIN COUNTY CLEAN ENERGY JOBS PROGRAM

Over the course of implementation, the strategies and activities in this document have the potential to create over 12,000 new jobs in Franklin County. This program can serve to correct employment issues and economic imbalances within the County. The County's People Works Program is in a strong position to assist in achieving this potential.⁴

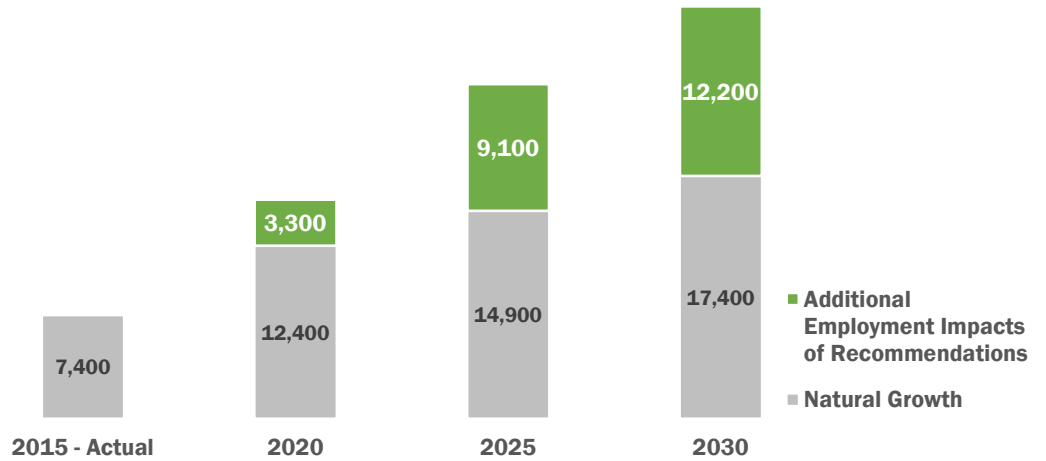


Figure 4. 2015 Clean Energy Employment and Projected Additional Clean Energy Sector Employment from Recommendations

2

REDUCE ENERGY CONSUMPTION IN HOMES AND BUSINESSES

Targets

Energy Savings: 20% by 2030

Average Residential Energy Burden: Less than 5% average in any ZIP Code

\$235
Million
Annual Savings

32
TBtu
Energy Savings

5
Percent
Reduction in
Outflow

The first step in improving our energy network is to reduce waste. By setting an energy reduction target, Franklin County can serve as the nexus between the multiple stakeholders necessary to achieve this goal. The outcome of this endeavor is reducing the energy burden for all residents and businesses, and an improvement in quality of life.

Addressing wasted energy has a very direct impact on residents in Franklin County. By reducing unnecessary expenditures on energy, residents have a stronger ability to focus finances where they are needed, and prepare for future emergencies and opportunities. Further analysis of the Franklin County Energy Study results found that there is a direct correlation between the age of a home and its energy consumption, suggesting much of our energy use is a matter of efficiency rather than primarily choices we make as consumers. Efficiency programs should be run complimentary to home repair programs in order to both lower costs and increase immediate health impacts. Figure 5 shows the potential improvement in these areas. Despite the significant improvement of an overall 20% reduction in energy consumption, addressing the energy burden in some areas will require strategic intervention.

By leveraging existing programs by the utilities and MORPC, as well as implementing innovative approaches to energy savings, Franklin County residents could save, on average, nearly \$170 per year over the next ten years. In addition to the personal benefits gained, over \$235 million would potentially stay local and have a compounding effect on Franklin County's economy.⁵ This leads to greater economic growth, which in turn leads to more employment opportunity for residents.

For reference, the City of Columbus has an energy reduction goal of 20%, and The Ohio State University (OSU) has a similar goal of 25%.

SUPPORT STATE, REGIONAL AND FEDERAL POLICY THAT INCREASES OPPORTUNITIES FOR ENERGY EFFICIENCY GAINS

As legislative changes are proposed, Franklin County should respond to requests for comments in favor of energy efficiency. Increasing opportunities to realize efficiency savings has economic, social and environmental benefits.

DEVELOP LOCAL GOVERNMENTS AS ENERGY ADVOCATES

MORPC's Local Government Energy Partnership serves as the nexus between our local governments and member organizations, the utilities serving these areas, and the residents and businesses that call the Central Ohio region home. In order to become their communities' trusted energy advocates, Franklin County should continue to engage with local communities within the Local Government Energy Partnership at all appropriate levels.

UNLOCK ENERGY EFFICIENCY POTENTIAL AT COUNTY-OWNED BUILDINGS

It is recommended that Franklin County include all county buildings in MORPC's Benchmarking Program in order to establish baseline and develop reduction targets. Benchmarking Programs see an average of 2.4% reductions in energy consumption for participants, even without additional measures. ⁶

LOCATION-BASED COMMUNITY ENERGY EFFICIENCY IMPROVEMENTS

The Franklin County Energy Study identified the areas within Franklin County that have energy burdens at unacceptable levels. Focusing efforts in these areas will increase the ability of residents to become more resilient and alleviate issues associated with unaffordable living expenses. In addition to developing and implementing energy reduction programs, Franklin County should work with the local utilities to improve the effectiveness of the gas and electric utilities' energy efficiency programs, such as Columbia Gas of Ohio's WarmChoice, AEP's Community Assistance Program and the Community Energy Savers Program. Pairing these initiatives with home repair programs available through Franklin County, City of Columbus and other local governments will create opportunity to maximize health benefits while minimizing costs.

UNLOCK ENERGY EFFICIENCY POTENTIAL IN MULTI-FAMILY BUILDINGS

Increasing the energy efficiency of multi-family buildings has been difficult with existing mechanisms. By assisting in the marketing of programs, as well as developing innovative approaches through local financing mechanisms, Franklin County can help improve a market that has typically been underserved.

SUPPORT ENERGY EFFICIENCY INITIATIVES IN COMMERCIAL AND INDUSTRIAL BUILDINGS

AEP Ohio and Columbia Gas of Ohio have benchmarking programs geared towards the non-residential energy customer. Franklin County should seek to encourage all commercial and industrial customers within the County to participate in these programs in order to identify efficiency projects that are cost effective. As an economic development service to retain local businesses, Franklin County would find benefit in promoting participation in efficiency programs and the utilization of energy project financing mechanisms, such as PACE, capital leases and municipal loans.

INCENTIVIZE HIGHER EFFICIENCY NEW CONSTRUCTION

Franklin County has the opportunity to promote higher efficiency construction through initiatives such as fast-tracking homes through the permitting process. The EfficiencyCrafted standard used by both AEP Ohio and Columbia Gas of Ohio can be used as a minimum efficiency for reduced wait times and permitting fees. In addition, incentivizing EV- and solar-ready homes will speed their adoption in the future. Heat pump technology has also proven itself an effective source of energy savings when used in the correct context. The Local Government Energy Partnership can assist in developing a study to better understand the energy savings potential within the County.

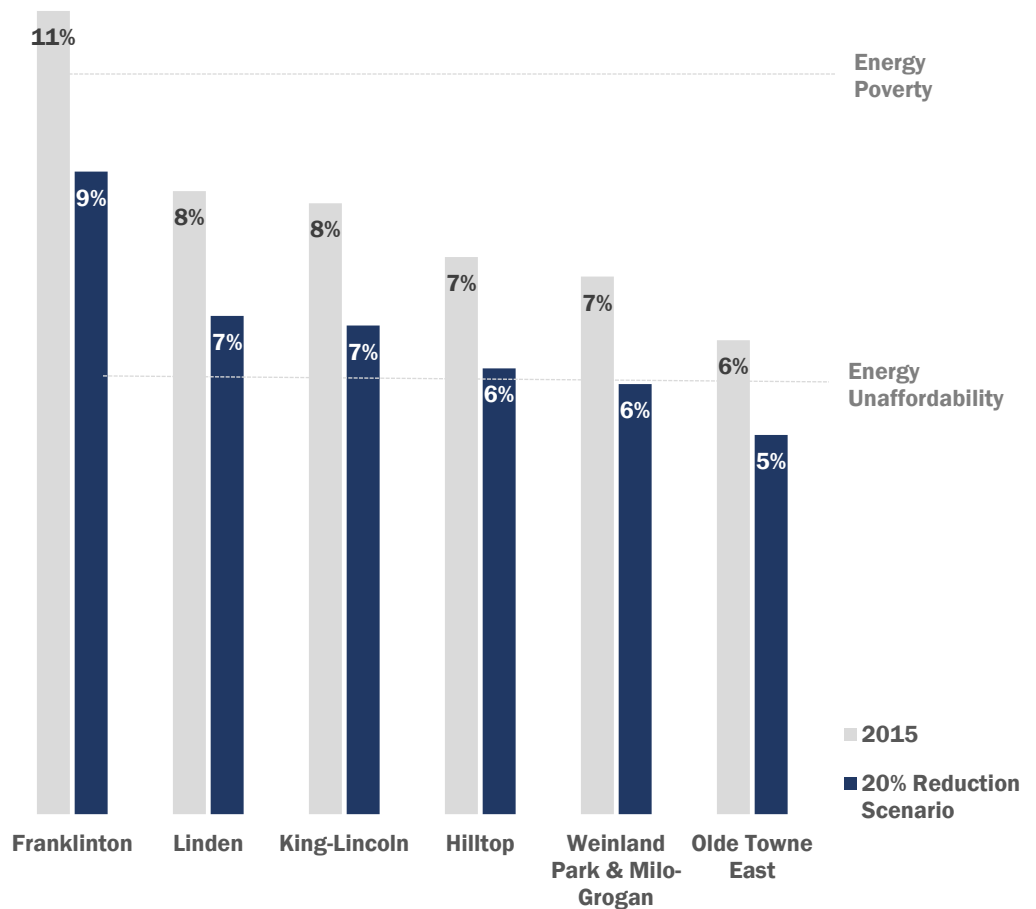


Figure 5. Residential Energy Burden with 20% Reduction in Energy Consumption

3

REDUCE SINGLE-OCCUPANCY VEHICLE COMMUTES

Targets

2030 Target Mode Split: Drive Alone: 75%
Sustainable Modes: 25%

\$44
Million
Annual Savings

3
TBtu
Energy Savings

1
Percent
Reduction in
Outflow

The population in Franklin County is expected to grow 15% by 2030. With the current mode split, it could mean the County would need to grow its roadways to accommodate 70,000 more people driving to work. By setting a goal to reduce single-occupancy vehicle commutes to 75%, Franklin County would alleviate the need for the infrastructure to support 44,000 vehicles. Reducing these commutes also offers significant dollar, emissions, and energy savings. Reducing the number of single-occupancy commutes also improves public health and the well-being of Franklin County.⁷

Sustainable modes of transportation include mass-transit, bicycling, walking, working from home, and potentially ride-sharing. It will be necessary to provide more options for these modes. Currently, there are multiple regional initiatives which seek to address this including Smart Columbus, COTA's plans, Connect Columbus, MORPC's Metropolitan Transportation Plan and Complete Street Policies for adoption by local governments.⁸

Smart Columbus is focused on changing behavior of single-occupancy vehicle commuters by promoting alternative modes of transportation and services. These transportation services include mass transit, ridesharing, and alternative transportation options.⁹ Overall, Smart Columbus seeks to reduce single-occupancy vehicle commutes by 10% amongst top employers in Columbus by 2020.

The Downtown C-pass pilot was launched on June 1, 2018 and provides approximately 45,000 downtown Columbus employees with access to unlimited use of the COTA transit system at no cost. This program is the product of a multi-agency collaboration between the Capital Crossroads Special Improvement District, MORPC, and COTA, as well as property owners who have agreed to special assessments to pay for a portion of the program costs. The program, set to run through December 2020, is expected to contribute to a significant reduction in the SOV rate among downtown employees, reducing fossil fuel use and allowing downtown buildings to be reoccupied. The pre-pilot demonstrated results that, when extrapolated, support an estimated reduction of at least 2,000 SOV commutes.

CONTINUED SUPPORT OF INNOVATIVE PROGRAMS AND SMART MOBILITY EFFORTS

Franklin County should ensure the opportunity to test innovative transportation programs and technologies that can be applied to its unique features. With rural, suburban and urban areas, the County will likely need various approaches to solving transportation issues.

FINANCIAL AND POLICY SUPPORT FOR TRANSIT-ORIENTED DEVELOPMENT

Wherever possible, Franklin County will benefit from an increase in multi-modal transit facilities and support for transit-oriented development. As density increases, it will be necessary to ensure appropriate transportation technologies are available to residents. Working with local governments to ensure their codes and regulations are supportive of this is essential.

INCREASE SUPPORT FOR PUBLIC TRANSPORTATION, BIKE AND PEDESTRIAN INFRASTRUCTURE, AND WORK AT HOME OPTIONS

MORPC's Gohio Commute program was created in 2017 with the intent of helping employers reduce the SOV rate at their workplaces. The program consists of online tools and resources that can help employees in Franklin County try new modes of transportation. Individuals can explore their travel options within the multi-modal trip planner, find carpool partners, learn about bike-friendly routes, and request a free Emergency Ride Home. Gohio Commute can also provide a toolkit and free consultation to Franklin County to help the organization investigate, develop, and implement commuter programs that provide smarter commute options to their employees. Actively participating in, and managing the Gohio Commute package will increase the opportunity for employees to choose transit options for their commutes.¹⁰ A key opportunity for savings will be to increase the number of people who can work from home.

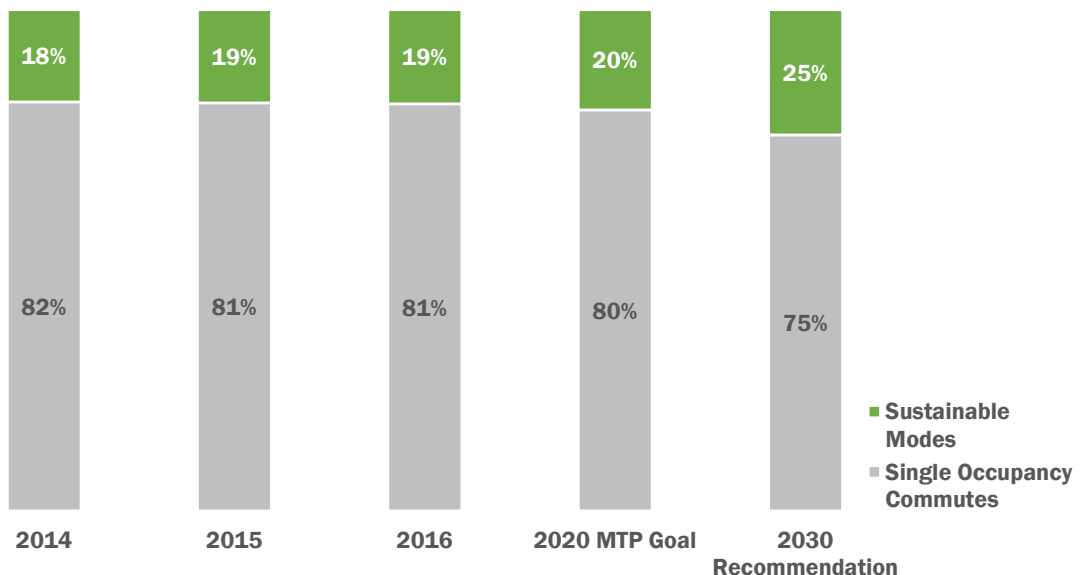


Figure 6. Historic and Goal Mode Splits

4

INCREASE THE ADOPTION OF ELECTRIC VEHICLES

Targets

EV Adoption Rate: 10% by 2030

\$36
Million
Annual Savings

1
TBtu
Energy Savings

1
Percent
Reduction in
Outflow

The market is naturally moving in this direction. By 2030, nearly every automaker will have electrified their entire lines, some solely offering electric vehicles (EVs).¹¹ Smart Columbus has a current goal of a 1.8% market penetration for EVs by 2020. Additionally, they are focused on electrification of nearly 800 public, private, and taxi fleet vehicles by 2020, while also promoting wider EV charging options at public, workplace, multi-unit dwelling, and residential locations. At the same time, COTA is currently investigating a pilot program for ten electric buses to advance clean, innovative, and sustainable energy technologies in transportation.

While much of this work is already being done, further support beyond 2020 is necessary to ensure market transformation and success of the current programs. A 10% adoption rate would mean an additional 60,000 EVs on the road by 2030, each one saving up to \$720 annually in fuel costs.¹²

The secondary market will be extremely useful in ensuring that this technological shift is equitably available to all of Franklin County residents. As such, it will be necessary to ensure public charging infrastructure accounts for the various charging technologies being used.

CONTINUED SUPPORT OF CURRENT PROGRAMS

Franklin County's participation in Smart Columbus' and COTA's programs are essential to ensuring they are not only successful, but are equitably available to across the region. As the Smart Columbus Region includes the seven adjacent counties, Franklin County has an integral part in coordinating cross-county initiatives.

DEVELOP A COUNTYWIDE PUBLIC CHARGING INFRASTRUCTURE NETWORK

Much of this work is in the process of being completed through Smart Columbus, the U.S. National Renewable Energy Laboratory and OSU. The County should continue to support this work as possible by expediting related activities where necessary. It will be necessary to work with MORPC's Regional Corridor Analysis to support level 2 and fast charging along corridors where growth is expected.

EDUCATE MUNICIPAL PLANNERS REGARDING REQUIREMENTS AND OPPORTUNITIES

Local governments are expected to coordinate infrastructure development for their communities. To do so, it is essential to understand the technology and best practices surrounding them. MORPC through its Local Government Energy Partnership can assist in assuring that local governments are aware of what makes EV and charging infrastructure initiatives successful.

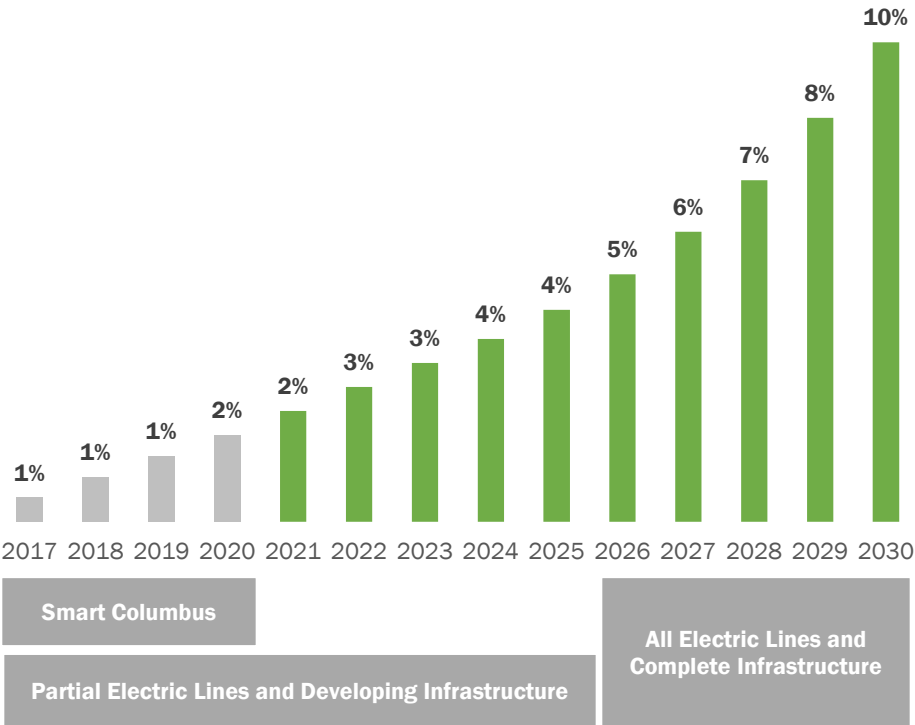


Figure 7. EV Adoption Rates Shown with Smart Columbus Program Years, Market Transformation, and Infrastructure Development

5

INCREASE LOCAL RENEWABLE GENERATION

Targets

1 Gigawatt of electric capacity from solar, combined heat and power, and battery storage

\$33
Million
Annual Savings

1
Gigawatt
Increase in Local
Renewable Capacity

6
Percent
Reduction in
Outflow

The lack of local generation in Franklin County led to more than \$3.8 billion leaving the County in 2015 alone. As the population grows, this amount will increase without any the availability of local generation to serve the demand. Solar energy, combined heat and power, on-site energy storage and microgrids all have the potential to minimize the outflow of expenditures from the County, reduce the cost of electricity, improve the environment, and increase the value of our energy network.

The cost of this recommendation is significant; however, the benefits would certainly outweigh the costs with the availability of net savings after the initial capital investments.¹³ This recommendation specifically focuses on increasing generation within Franklin County borders in order to capture the economic benefits as well as the environmental benefits. As such, priority should be given to residential projects, community energy projects, and commercial projects where generation occurs at or near the point of consumption.¹⁴ For a point of reference, 1 GW of solar photovoltaic capacity would require around 60,000,000 square feet of rooftops, or roughly the amount available within the rooftop space of the Rickenbacker Airport area.

The current Renewable Portfolio Standard (RPS) for Ohio requires 12.5% of electricity to be generated by renewables, of which .5% must be solar. The 1 GW goal would supply Franklin County with 10% of its electricity needs, and account for 8% of the RPS requirement for renewables. Local generation from solar arrays offer an immediate reduction in grid-supplied electricity that translates into an additional 87% of energy expenditures having a direct economic impact locally. With this, there are significant reductions in emissions which otherwise lead to climate change and air quality issues.

Franklin County has already achieved an important step on this goal by being awarded with the “SolSmart Bronze” Designation funded by the U.S. Department of Energy SunShot Initiative and led by the International City/County Management Association. As a result of this award, the County has access to no-cost technical assistance provided by The Solar Foundation. The County is the first municipality in the State of Ohio to receive the SolSmart designation and one of just 17 counties and 78 municipalities nationwide to do so.

DEVELOP A PROGRAM TO DELIVER SOLAR CAPACITY FOR RESIDENTIAL, COMMERCIAL AND COMMUNITY ARRAYS

The focus is on countywide procurement process that stimulates a cost-effective market and an economy of scale for acquiring solar electric equipment, including both hard and soft costs associated with installation. Where possible, incentivizing Franklin County-based companies and Ohio-made panels will increase this local impact of investments. This initiative is significant and will require dedicated staff to coordinate implementation.

FURTHER DEVELOP THE CAPACITY FOR LOCAL GENERATION

Solar adoption training programs are available for local governments through the Department of Energy and the National Renewable Energy Laboratory. MORPC is able to facilitate this training through the Local Government Energy Partnership. As part of this training, local governments should be empowered to pre-identify parcels as “Community Solar Ready” and “Utility-Scale Solar Ready.” Working with the private sector, local governments can work to pre-identify viable commercial projects for both solar and combined heat and power. Much of this will require outreach to the residential and business communities, a task which local governments are well suited for. A rooftop replacement study of larger buildings would be valuable in the timing of projects.

WORK WITH PARTNERS TO SITE UTILITY-SCALE SOLAR

The County’s role in utility-scale solar development will require close coordination with AEP Ohio and South Central Power, as they lead these projects and each utility is subject to different requirements. Whereas Smart Columbus has a goal of an additional 905 MW of utility-scale renewable generation, Franklin County should seek to site part of this generation within its borders or develop additional solar projects close to the energy demand.

PROVIDE HIGH ENERGY BURDEN AREAS WITH COMMUNITY SOLAR OPTIONS

Community solar projects designed to reduce the residential energy burden for low income persons have seen success in recent years.¹⁵ Providing this option for residents of the areas identifies in the Franklin County Energy Study can reduce electricity costs upwards of 50%.¹⁶ Pursuing these solar-for-affordable-housing programs is recommended where cost-effective.

PURSUE THE POTENTIAL TO GROW FRANKLIN COUNTY’S SOLAR WORKFORCE

Solar panel installation and manufacturing continues to be a successful enterprise in Ohio as well. Franklin County’s Economic Development & Planning Department should pursue the development of an economic package that would entice companies to locate in the County, thus compounding the economic benefits of the recommendations.

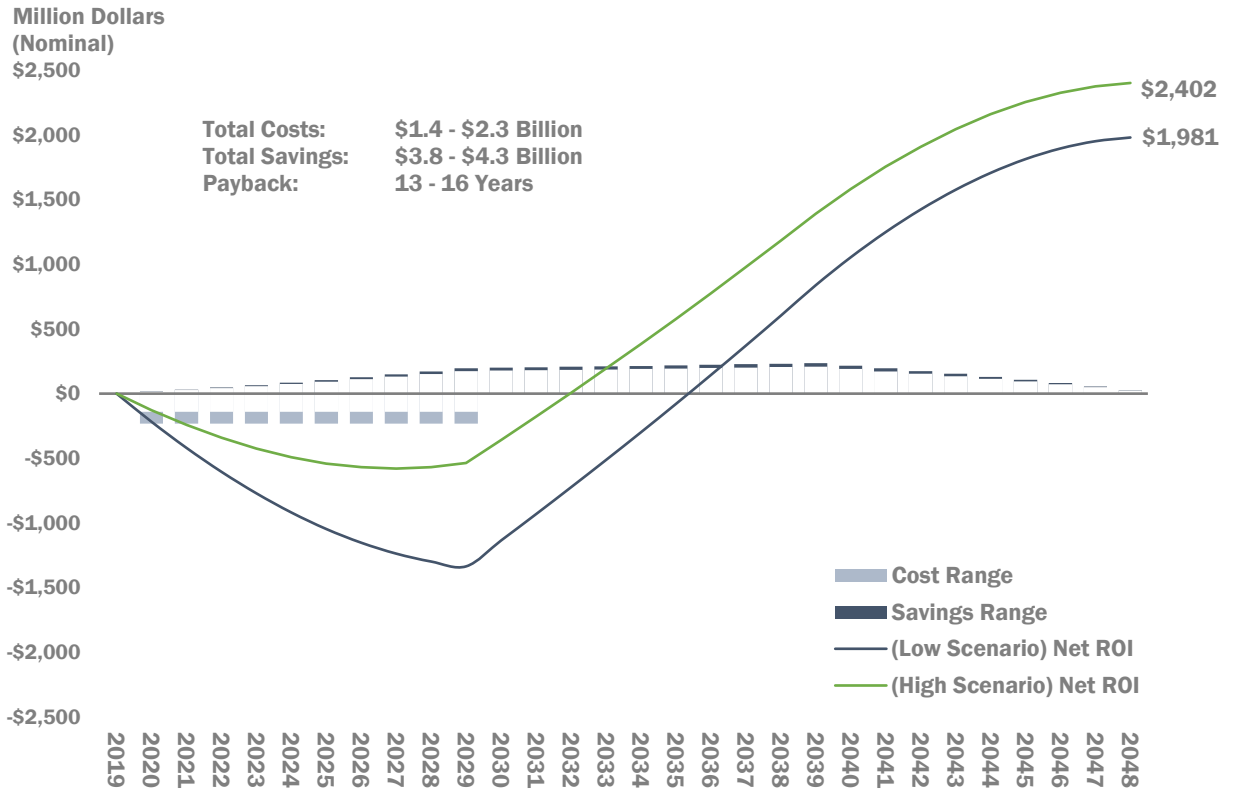


Figure 8. Return on Investment Analysis for Different Mixes of Residential, Commercial and Utility-Scale Solar Arrays

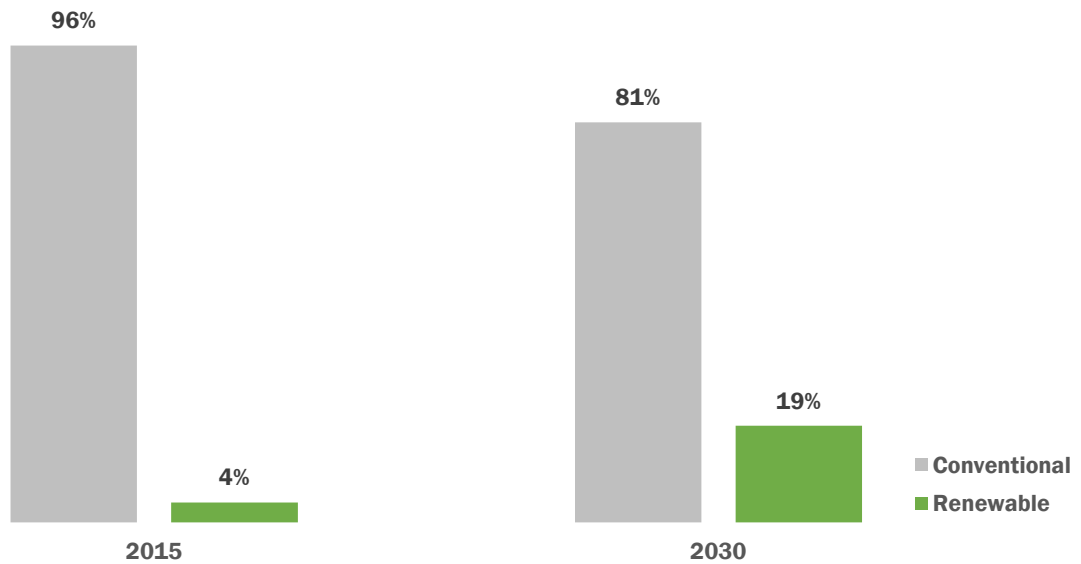


Figure 9. Renewable Content of Franklin County Electricity in 2015 and Projected with Recommendation for 2030 (inclusive of 10% renewable goal for PJM)

CONCLUSION

The Insight2050 analysis suggested an additional 500,000 to 1 million additional residents in Central Ohio by 2050. It is expected that Franklin County will absorb most of this growth. A minimum of an additional 80,000 households will be created by 2030. This growth will exert pressure on the current energy infrastructure. The County can prepare for it by developing policies that allow for a modern energy network. A forward-looking vision and approach is necessary to avoid costly changes and unnecessary expenditures in the future.

Likewise, the commercial and industrial sectors will experience commensurate growth. The County will be presented with the opportunity to guide this growth in a manner that provides well-paying jobs at a minimal impact to the local environment. It is essential to stay nimble and be welcoming of innovation in order to take advantage of commercial opportunities. An “open for business” approach to innovative solutions can drive investment in the local economy, and insulate it from unforeseen market fluctuations.

The recommendations included in the document are designed to minimize the amount of wasted energy experienced in Franklin County, reduce the outflow of expenditures in order to turn our everyday expenses into local investments, and return the average energy burden of Franklin County communities to manageable levels. At the same time, Franklin County can utilize these recommendations to increase quality of life and the environment, resiliency, and economic opportunity for all residents and businesses.

Economic Impacts of Recommendations		
Goal	Annual Consumer Savings	Annual Reduction in Outflow
Reduce Energy Consumption (20% Reduction from 2015)	\$235 mil.	5.3%
Reduce SOV Commutes (75% Drive Alone, 25% Sustainable Modes)	\$44 mil.	1.2%
Increase the Adoption of EVs (10% of market share)	\$36 mil.	0.8%
Increase Local Renewable Generation (1 GW of Solar, CHP and Battery Storage)	\$33 mil.	6.0%
Economic Benefits	\$348 mil.	13.3%

STRATEGY TABLES

Recommendation 1 – Provide Policy, Technical and Financial Support		
Strategy	Activity	Partners
Conduct baseline comparison	<ul style="list-style-type: none"> Adopt resolution for baseline comparison annually. Validate with utility data every 3 years. 	Franklin County MORPC Utilities
Asses and develop financing mechanisms	<ul style="list-style-type: none"> Work with partners to develop appropriate financial tools to support recommendations. 	Columbus Franklin County Finance Authority Franklin County Economic Development Private Sector
Develop a Franklin County clean energy jobs Program	<ul style="list-style-type: none"> Work with local colleges to prepare a local workforce to implement programs. 	Local Colleges and Vocational Schools People Works Building Futures
Promote the attraction and retention of energy efficient businesses	<ul style="list-style-type: none"> Develop County-approved renewable energy, energy efficiency and emissions reduction targets for year 2030. 	Franklin County MORPC Smart Columbus Utilities Private Sector
Conduct energy development plans for all communities in Franklin County	<ul style="list-style-type: none"> Identify the needs of communities. Develop a pipeline of projects that reduces wasted energy, expenditures and emissions. Assist in the removal of barriers to implementation at the County level. 	Franklin County Local Governments Private Sector MORPC
Assess opportunities for alternative fuels	<ul style="list-style-type: none"> Investigate the potential savings and necessary coordination to increase alternative fuels where appropriate. 	Franklin County Local Governments MORPC Clean Fuels Ohio
Support of a Modernizing Utility	<ul style="list-style-type: none"> Promote a distributed and innovative energy network in policy and responses to requests for comment by the PUCO. 	Franklin County MORPC Utilities

Recommendation 1 – Provide Policy, Technical and Financial Support

Strategy	Activity	Partners
Develop an innovative energy network	<ul style="list-style-type: none"> ▪ Promotion of distributed energy resources, such as solar and combined heat and power systems. ▪ Research and development of new technologies to be produced and deployed in Franklin County. ▪ Microgrids and energy storage as a resource to reduce peak demand and associated costs. ▪ Replace aging and decommissioned petroleum-fueled generating units in Franklin County with energy storage systems. 	<p>Franklin County Local Governments Private Sector MORPC Utilities Battelle OSU Local Business and Technology Incubators</p>

Recommendation 2 – Reducing Energy Consumption In Homes and Businesses

Strategy	Activity	Partners
Support state, regional and Federal policy which increases energy efficiency	<ul style="list-style-type: none"> Respond to request for comments from the PUCO, State and Federal legislation. 	Franklin County MORPC
Develop local governments as energy advocates	<ul style="list-style-type: none"> Support the participation in and continuance of the Local Government Energy Partnership. 	MORPC Local Governments
Unlock energy efficiency potential at County-owned buildings	<ul style="list-style-type: none"> Include all county buildings in MORPC's Benchmarking Program in order to establish baseline and develop reduction target. 	MORPC Franklin County Utilities
Location-based community energy efficiency improvements	<ul style="list-style-type: none"> Utilize the Franklin County Energy Study to target areas with the greatest energy burden. Support the Community Energy Savers Program. Pair with County Home Repair Program. Develop a solar-for-affordable-housing incentive program. 	MORPC Local Governments Utilities Community Leaders and Residents Housing Authority Private Sector
Unlock energy efficiency potential in multi-family buildings	<ul style="list-style-type: none"> Policy and financial support for innovative energy efficiency programs. Improve marketing of programs. 	Utilities Private Sector MORPC
Support energy efficiency initiatives in commercial and industrial buildings	<ul style="list-style-type: none"> Promote benchmarking programs available to the private sector. Improve marketing of energy efficiency programs and the utilization of energy project financing mechanisms (PACE, capital leases, municipal loans). 	Utilities Private Sector Columbus-Franklin County Finance Authority
Incentivize higher efficiency new construction	<ul style="list-style-type: none"> Promote initiatives to fast-track higher efficiency homes Incentivize EV-ready construction. Conduct heat pump potential studies. 	Franklin County Utilities Private Sector

Recommendation 3 – Reduce Single-Occupancy Vehicle Commutes

Strategy	Activity	Partners
Minimize single-occupancy commutes	<ul style="list-style-type: none"> Continued support of public transportation, multi-modal transit activities, and smart mobility efforts. Support for transit-oriented development. Participate in and actively manage Gohio Commute package for Franklin County. Increase support of work-from-home programs. 	COTA Smart Columbus MORPC Franklin County Local Governments

Recommendation 4 – Increase the Adoption of Electric Vehicles

Strategy	Activity	Partners
Support adoption of electric and alternative fuel vehicles	<ul style="list-style-type: none"> Develop county-wide public charging infrastructure network. Support level 2 and fast-charging regionally along major corridors. Educate municipal planners regarding requirements and opportunities. 	Smart Columbus Franklin County ODOT Electric Utilities MORPC Local Governments and Interest Organizations Private Sector

Recommendation 5 – Increase Local Renewable Generation

Strategy	Activity	Partners
Further develop the capacity for local renewable generation	<ul style="list-style-type: none"> Conduct solar adoption training program for local governments. Expand the use of the SolSmart program to deploy more solar within the County. Focus EnergyWorks and PACE towards these projects at partner facilities. Develop a county procurement process. Develop a solar-for-affordable-housing incentive program. Explore CHP and battery storage potential. 	Electric Utilities Columbus Franklin County Finance Authority Housing Authority SolSmart MORPC Hospitals Business/Office Parks Intermodal Facilities Airports
Provide high energy burden areas with solar options	<ul style="list-style-type: none"> Designate parcels as “Community Solar-Ready”. Coordinate outreach between community energy developers and community residents. 	Franklin County Electric Utilities Private Sector

END NOTES

¹ Job creation potentials were calculated using values from the Bureau of Labor Statistics (bls.gov) and Clean Jobs Midwest (cleanjobsmidwest.com). They are based on historical growth rates as well as assumed economic impact of initiatives included in the recommendations. Clean energy jobs include energy efficiency, renewable energy generation, advanced transportation, clean fuels, and those contributing to the advanced grid.

² Energy efficiency and renewable energy provide environmental and social benefits as well as economic. These benefits (such as air quality), when monetized, can potentially justify the use of funds which otherwise may be reserved for different initiatives. Franklin County Public Health has been exceptionally forward thinking in its efforts to connect sustainability and public health. Metrics vary, however, and all involved parties should be confident that common goals will provide shared benefits.

³ Blockchain is a technology that is currently being explored around the world. Blockchain provides an immutable ledger of transactions and offers the potential to empower market dynamics in virtual net metering applications as well as others. It is expected that blockchain will play a part in the infrastructure of future smart cities, although much development is still required.

⁴ Please see ACEEE's "Through the Local Government Lens: Developing the Energy Efficiency Workforce" (June 2018) for further information. <http://aceee.org/research-report/u1805>

⁵ Further analysis would be needed to calculate the additional benefits of price suppression, avoided costs associated with the development, operation and maintenance of transmission and distribution infrastructure, as well as any co-benefits. Environmental benefits were not monetized for this analysis. Reduction in outflow is representative of increased direct economic impacts, and does not reflect changes to indirect or induced economic activity.

⁶ <https://www.energystar.gov/buildings/about-us/how-can-we-help-you/benchmark-energy-use/benchmarking>

⁷ Vehicles on our roadways produce 58% of two significant air pollutants in Franklin county, nitrogen dioxide and volatile organic compounds, according to data from the 2011 National Emissions Inventory. These pollutants have health impacts of their own and they also chemically react in heat and sunlight to form ozone pollution. Ozone pollution causes reduced lung function, irritates the respiratory system and increases symptoms for individuals with asthma and other lung diseases. The public health impacts of these pollutants strains the health care system and keeps people from work and schools. Central Ohio has been in violation of federal standards for ozone pollution in the past and several counties in Central Ohio, including Franklin County, are currently being recommended by the Ohio EPA as not in compliance with the 2015 National Ambient Air Quality Standards though the official designation of non-compliance hasn't been completed by the US EPA yet. If the counties are in violation of the standards, restrictions can be placed on use of pollution creating equipment and impacts which types of transportation projects can receive funding.

⁸ This analysis only considered options that could be led or championed by Franklin County. Light rail would provide significant environmental and economic benefits, but is best led by the City of Columbus, and therefore was not considered here.

⁹ The recent entrance of Chariot (a micro-transit service) to the Columbus market, providing transportation service for JP Morgan Chase employees, is one such example. Reducing single-occupancy vehicle commutes not only reduces cost and time burden on the employee, but also reduces parking burden for employers.

¹⁰ Access the toolkit or schedule a complimentary consultation with Gohio Commute staff at: <http://morpc.gohio.com/commute-resources/employer-coaching/>.

¹¹ See: <https://mashable.com/2017/10/03/electric-car-development-plans-ford-gm/#kJTaIFNiiqR> and <https://www.iea.org/publications/freepublications/publication/GlobalEVO Outlook2017.pdf>

¹² Since energy created by the internal combustion engine occurs in Franklin County, it was necessary to include electricity losses in the calculation for energy savings in order to appropriately compare. As the grid becomes more efficient and more electricity is generated locally, these savings will likely increase. 2016 data was used in the analysis in order to more accurately reflect current gasoline and electricity prices, as well as the impacts associated with the goal. It will be important to study the constraints on the electricity system and market, which

this goal may create. NREL and OSU are both studying the impacts of increased adoption. For fuel economies, see: <https://fueleconomy.gov/feg/evtech.shtml#end-notes>

¹³ MORPC analyzed multiple scenarios of solar installation. Net return on investment ranged from \$1.9 to \$2.4 billion over the lifetime of the panels. Scenarios included varying penetrations of residential, commercial and utility-scale arrays totaling 1 GW. Cost of installation was calculated using the United States Energy Information Administration's (EIA) latest values at the time of writing (Q4 2017). A twenty-year lifetime for panels and a 5% discount rate were assumed. Avoided costs were assumed based on EIA's electricity price forecasts for each sector. No assumption was made for price suppression based on behind the meter installations.

¹⁴ Solar photovoltaic (PV) potential in Franklin County was analyzed using satellite imagery, assessing orientation, shading, and the ability to mount at least four adjacent panels in a minimum 2 kW array that would receive at least 75% of annual sunlight. Eighty-eight percent of rooftops were viable in this scenario. When considering other factors that impact the ability to install PV arrays, it was assumed that 20% of viable rooftops could potentially be developed, leading to a total capacity of 1,020 MW. This includes residential and commercial rooftops, some large enough to host utility-scale arrays. The potential for ground-mounted arrays was not analyzed, although this would undoubtedly add to the total PV potential for Franklin County. The potential for Combined Heat and Power or battery storage were also not analyzed. Again, this would add to the total capacity potential for Franklin County. Although MORPC recommends a blend of these technologies to increase local capacity, MORPC does not prescribe a specific blend. Franklin County should work closely with the utilities, the PUCO and MORPC in order to develop a thorough implementation plan.

¹⁵ See: <https://www.colorado.gov/pacific/sites/default/files/Insights%20from%20the%20CEO%20Low-Income%20Community%20Solar%20Demonstration%20Project.pdf> and <http://aceee.org/research-report/u1804>

¹⁶ Opportunities exist for the development of community solar installations. South Central Power recently built a cooperative-owned solar installation in neighboring Fairfield County, which allows South Central Power members to purchase locally produced solar power. With no up-front initial investment required by the cooperative's members, the facility costs are paid over time by members who opt-in. The facility sits on four acres of otherwise unusable land inside an industrial park, and produces enough electricity to power roughly 60 homes. This example could serve as a model for Franklin County.