THE OHIO CLEAN ENERGY AND SUSTAINABLE COMMUNITIES TOOLKIT

Local Communities Leading the Way in Clean Energy Development

Power A Clean Future Ohio

LOCAL COMMUNITIES LEADING THE WAY

October 2020

Acknowledgements

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- Ohio Hospital Association
- Ohio Mayors Alliance
- Sierra Club
- Solar United Neighbors

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Introduction

DEAR COMMUNITY MEMBERS AND LEADERS,

I grew up in a community that counted on the oil and gas industry for jobs to put food on the table for families and for the local revenue that funded our schools, roads, and community programs. Without our oil refinery, the economic fate of my community would have been uncertain. The story of my city is not unique in Ohio. Many other communities had their economic well-being staked on the fossil fuel industry for generations, be it in coal mining, natural gas production and drilling, or power generation. There is dignity and honor in that work for each person that has built their life and supported their families in those jobs. But what comes next for these communities as our world evolves, innovates, and inevitably moves away from costly, polluting energy sources and towards clean energy? Local leaders need to be asking tough questions.

Can we expect these same jobs to be here in 10 years or even 5 years? What happens when these companies leave? How will we feed our families and what happens to our community when the company decides to find profits elsewhere and lays off hundreds? Has this economic relationship with the community always been just and fair? Has it protected vulnerable and marginalized individuals and families? Has it prioritized people, public health, and our environment? **What comes next for your community?**

Power a Clean Future Ohio is working to equip local leaders with the tools, resources, knowledge, and partners to build an equitable economic future powered by clean energy. The solar, wind, electric vehicle, and energy efficiency industries are booming. Attracting these investments to your community is a viable path to economic growth and financial stability for residents.

As a kid I played soccer games in the shadow of smoke stacks and could see the flame from the flaring of gas at the refinery from my backyard. Low-income Americans, and especially those of color, are more likely to live in close proximity to a fossil fuel-fired power plant. Our energy and economic choices as a community have deepened disparities for much of our state's history. Asthma attacks, higher cancer rates, and chronic health conditions accompany poor air quality. But we can build a better future for our local communities that doesn't expose our families and neighbors to these risks.

Our energy and economic choices as a community have deepened disparities for much of our state's history.

A more equitable, just, and sustainable energy industry serves us all. When everyone is at the table, the community is engaged and leaders are listening, we can build a better future together. Join us today to power tomorrow's clean energy future.

Joe Flarida
Executive Director, Power a Clean Future Ohio

EXECUTIVE SUMMARY

As the nation's sixth-largest carbon emitter, the State of Ohio is ripe with opportunities to reduce carbon pollution through clean energy deployment to help ward off the worst effects of our changing climate. Toward this end, municipalities across the state have started to build a renewable energy economy driving greenhouse gas emissions reduction, local investment, and energy independence.

Power a Clean Future Ohio is a diverse coalition of organizations that works with local leaders in Ohio to support the growing number of municipalities taking action by helping them to develop and implement proven climate solutions. Our diverse coalition includes a wide range of stakeholders including solar energy experts, finance experts, energy engineers, attorneys, communications experts, equity coaches, economists, policy experts, and many others.

We are supporting and empowering local leaders with the tools and resources needed to begin or continue creating carbon emission reduction plans and implement them in ways that are achievable, measurable, equitable, and economical. Examples of the types of resources offered by the campaign includes a peer-to-peer network for Ohio cities, support for the development of a Sustainability or Climate Action Plan, on-call technical support for carbon emission reduction strategy development and implementation, and on-going education through a webinar series.

Building a clean energy future that provides equitable opportunities for all Ohioans requires an all-hands-on-deck approach and we're ready to support our local communities as they lead the way.

This Ohio Clean Energy and Sustainable Communities Toolkit is a practical guide intended for local government leaders and staff to discover the opportunities and benefits for a clean energy future in their communities. In addition to providing background on the campaign and the energy sector as well as strategies to serve frontline community members, the Toolkit details many carbon reduction strategies and tactics in key sectors including energy consumption, renewable energy, transportation, and land use management.

Reduce energy consumption	Reducing energy use can be a simple, cost-effective means for local governments and communities to transition to clean energy. Energy efficiency can decrease carbon emissions and energy costs for governments, residents, and private businesses.
Increase renewable energy	Strategies to engage stakeholders and utilize innovative financing can make renewable energy projects more accessible for communities.
Supporting clean transportation	Cities can support transportation programs and strategies that reduce driving and enable zero-emission transportation. Methods of public transportation, shared mobility, biking, and walking can reduce emissions and create safer and healthier communities. Electrification of public transit, fleets, and passenger vehicles can reduce carbon emissions, decrease dependence on fossil fuels, and improve air quality.
Advance land use management practices	By taking a holistic approach to land use management, cities can reduce climate emissions, adapt to climate change impacts, and create healthier and more equitable communities.

Alongside clean energy and sustainability as primary areas of focus, the toolkit prioritizes striving for equity and community engagement. Racially marginalized and economically disadvantaged communities lack environmental equity—fair and just access to healthy, breathable air and drinkable water. As cities embark on their clean energy journey, we're encouraging local leaders to make commitments that ensure the benefits of these programs to all community members.

Power a Clean Future is ready to help your community access the benefits of a clean energy economy. We're excited to offer Ohio communities this toolkit to help you take the next step, no matter where your community is on its clean energy journey.

Please join Power A Clean Future Ohio today as we continue to build momentum for a clean, prosperous future by equipping local leaders for equitable, community-driven carbon reductions.

POWER A CLEAN FUTURE OHIO

OVERVIEW

Power A Clean Future Ohio is a diverse coalition of organizations that works with local leaders in Ohio to develop and implement proven climate solutions. We are committed to reducing carbon emissions throughout Ohio in large and small ways that make sense for each local community, and that also advance equity and inclusion. Ohio's economy, health, and future depend on a new approach to deploying clean energy and tackling climate change equitably by investing in local leadership, listening to local voices, implementing local solutions, and ensuring those solutions benefit all community members.

OUR MISSION

Power a Clean Future Ohio is building momentum now for a clean, prosperous future by equipping local leaders for equitable, community-driven carbon emission reductions in Ohio.

JOIN POWER A CLEAN FUTURE OHIO AND LET'S GET STARTED

We are supporting and empowering local leaders with the tools and resources needed to create carbon emission reduction plans and implement them in ways that are achievable, measurable, equitable, and economical. Our coalition of expert organizations wants to share our technical expertise and resources with your community. Building a clean energy future that provides equitable opportunities for all Ohioans requires an all-hands-on-deck approach and we're ready to support your community as you lead the way.

THE GOALS OF THE CAMPAIGN ARE TO:

Reduce the carbon footprint of local communities across Ohio.

Attract clean energy development to the state to create careers for Ohioans.

Implement equitable policy solutions supported by local communities.

Reduce energy costs for cities, businesses, and residents.

WE WANT TO PARTNER WITH YOUR COMMUNITY TO:

- ☐ build more renewable energy locally
- ☐ create new career opportunities for local residents in the renewable energy, energy efficiency, and electric vehicle industries
- ☐ implement equitable energy policy to support frontline communities
- ☐ reduce energy waste in homes, workplaces, and government operations
- ☐ provide and preserve quality greenspace for residents that also serve as carbon sinks
- ☐ make our communities cleaner, healthier, more vibrant and sustainable for all

There is an incredible opportunity for Ohio to reduce carbon emissions and advance large-scale clean energy progress equitably through working with local communities. As the nation's **sixth-largest carbon emitter,** Ohio is ripe with opportunities to reduce carbon pollution through clean energy deployment. Towns, villages, cities, and counties in Ohio are beginning to build a renewable energy economy. By investing in clean energy solutions, Ohio communities are reducing greenhouse gas emissions, driving local investment, and building energy independence.

Ohio communities are already leading the way. Local examples include:

- **CINCINNATI** has announced a 100-megawatt solar project that would power 25% of the city's energy needs, and 15% of the Residential Aggregation Program, making it the largest municipal solar array in the country. The City is also doing a full facility LED lighting retrofit program and has purchased 16 EV's and 58 Police hybrid vehicles.
- **DAYTON** is replacing all 5,000 of the streetlights it owns with energy-efficient, light-emitting diode (LED) fixtures as part of a special assessment program implemented in 2014.
- The Southeast Ohio Public Energy Council (SOPEC) and the City of **ATHENS** proposed and passed a ballot initiative for a 0.2-cent **carbon fee** for city electrical users. Revenue from the fees will be used to purchase solar arrays for public buildings, reducing the city's emissions and creating cleaner air for its citizens.
- The City of **LAKEWOOD** voted to move the city toward 100% renewable energy by 2050 and will start by adding solar panels on four city buildings. It's the first suburban city in Ohio to make the commitment.
- The Village of **BREWSTER** built 43 solar modules on a 13.7-acre parcel to provide the village with 1.75 megawatts (MW) of solar energy.

Ohio communities have begun to lead the way on clean energy deployment and carbon emission reduction. But as the sixth-largest carbon-emitting state in the country, much more needs to be done to meet the science-based targets that will help reduce the impacts of climate change. The Power A Clean Future Ohio campaign is here to help advance and support the great work that cities have begun.

Power a Clean Future Ohio has a growing list of coalition partners that are supporting and participating in the campaign for a clean and just Ohio. To learn more about our partners, please visit: **https://www.poweracleanfuture.org/pcfopartners**

GETTING STARTED

As individuals and communities, we each have an individual carbon footprint based on the amount of electricity we use, the miles we drive, the amount of food we consume, and materials we use every day. Reducing that carbon footprint results in a more sustainable community and helps address the impacts of climate change.

Across most of Ohio, average temperatures have increased by 1°F over the last century.[1] Changing temperatures have negative impacts on our environment and public health. The increase in temperature has impacted the Great Lakes ecosystems, causing algal blooms that are harmful to the health of wildlife and water quality for drinking water.[2] Higher air temperatures and extreme heat events can put vulnerable populations, including children, elderly, and chronically ill people, at additional risk.[3] Average annual precipitation in the last 50 years has increased by 5-10%, which has increased the frequency and intensity of floods. Peak rainfall has escalated; in the four days with the highest precipitation, rainfall has increased by 35% and water flow into streams has increased by over 20%.[4]

Local governments can lead the effort to reduce the negative impacts of climate change in their communities by taking these steps:

1. Establish a baseline of current emissions of community and government operations.
2. Identify opportunities to reduce emissions through the policymaking process and technology adoption.
3. Make a commitment to reduce emissions with a measurable outcome and timeline.
4. Educate and build support among local residents and businesses about the impacts of climate change locally as well as possible solutions.
5. Engage the community to receive input on policy proposals, partnerships, and investments.
6. Develop a plan for implementation that includes prioritization, timeline, assessment, and review.

ESTABLISHING A BASELINE

Before creating a clean energy plan, the local government should establish an energy baseline and create measurement methods for their community. This energy baseline seeks to identify areas where various energy sources are being consumed within a city and helps project future energy demand. A successful baseline will inventory energy-use sectors: electricity, buildings, and transportation. An energy baseline can be completed through a greenhouse gas inventory.

For example, as a part of their 2018 Climate Action Plan, the **City of Cleveland** included a comprehensive greenhouse gas inventory, comparing metrics from 2016 to a 2010 baseline. The inventory details greenhouse gas emissions from four sources: energy, transportation, waste, and industrial processes.[5] Additionally, the **City of Columbus** created a 2017 Greenhouse Gas Inventory, which breaks down emissions from government operations and generates a community-wide inventory. Emissions from government operations include: buildings and facilities, streetlights and traffic signals, vehicle fleet, solid waste facilities, and waste and water treatment facilities. Emissions from the community-wide inventory include: residential energy, commercial energy, industrial energy, transportation, solid waste, fugitive emissions, and water and wastewater treatment.[6] A few resources for developing a GHG baseline are included in the Appendix C.

IDENTIFY OPPORTUNITIES

Once a community has established its baseline energy use, they will need to develop a plan that takes into account the various sectors, buildings, and energy use practices. The federal government has several tools to help communities do in-depth benchmarking. Communities may develop benchmarks that set goals to deepen emissions reductions over time.

For example, the **City of Youngstown** (informed by their 2010 Carbon Emissions Inventory) created a series of actionable carbon reduction benchmarks: 20% reduction in community emissions by 2020, 20%-30% reduction by 2030, and 30%-40% by 2050.[7]

MAKE A COMMITMENT

These commitments can vary, including commitments from the mayor, resolutions passed by the city council or commission, or through the creation of sustainability committees or task forces.

Every plan needs a goal

Types of commitments include:

- **MAYORAL PLEDGES** like that of Mayor Cranley of Cincinnati or Mayor Ginther of Columbus to move their cities to reduce carbon emissions by a certain date. The City of Cincinnati made a commitment to achieve 100% renewable energy by 2035.
- **RESOLUTIONS** including the cities of **Lakewood** or **South Euclid** that commit the cities to use 100% renewable energy by a specific date.
- The creation of **COMMITTEES OR TASK FORCES** like the Sustainability Committee of Euclid's City Council.

ENGAGE THE COMMUNITY—EDUCATE AND BUILD SUPPORT

We strongly encourage creating an open dialogue about your community's energy future by engaging with both traditional energy stakeholders such as the utility, residents, and businesses as well as non-traditional stakeholders. Power a Clean Future Ohio's partner organizations and equity coaches are available to assist with developing your community engagement strategy.

Create an open dialogue about your community's energy future b engaging with both traditional and non-traditional energy stakeholders.

If a community is going to be successful in not just adopting but also implementing a clean energy goal, there must be a concerted effort to engage a diverse group of stakeholders and local leaders, as well as the general public, throughout the planning and implementation process. The best plans anticipate the needs and desires of all aspects of the community. Seeking input on the front end, and then continually engaging community members throughout the process, is critical for developing plans that meet residents where they are. Creating innovative solutions that address inequities, economic disparities, and financial hurdles are important to creating an equitable energy community.

Following their initial Climate Action Plan in 2013, the **City of Cleveland** published an update in 2018 following a comprehensive public engagement process. The City's Climate Action Advisory Committee, consisting of more than 90 cross-sector stakeholders, provided feedback on the update. Additionally, the City conducted 12 neighborhood workshops with participation from 300 resident leaders and solicited over 200 public comments on the completed draft.[8]

DEVELOP A PLAN FOR IMPLEMENTATION

With the community's support and a comprehensive list of opportunities and ideas, the next step is to develop a plan for implementation. Some communities choose to develop a comprehensive Sustainability Plan that encompasses carbon emission reduction strategies but is broader in scope and some communities choose to create a Climate Action Strategy that is more focused on carbon emission reduction locally. Depending on the scope, this plan could be on a 1, 5, or 10-year timeline or potentially longer if your community is setting a long-term emission reduction or carbon-neutrality goal. Successful plans start with a focus on least-cost solutions to reduce energy consumption by the facility or facilities with the highest energy use per square foot. Setting yearly or 5-year targets to reduce energy consumption from the base year provides a guideline to measure the plan's progress. Careful consideration should be made to build upon policies that are easier to implement and then expand in the following years, giving time and resources that can be planned into future budgets.

The **City of Cincinnati** completed its first greenhouse gas inventory in 2006 that informed the City's goals to achieve an 8% reduction by 2012, 40% reduction by 2028, and 84% reduction by 2050.[9] With this data baseline and a subsequent 2015 inventory to benchmark, the City has also produced three Green Cincinnati Plans in 2008, 2013, and 2018. The 2018 Green Cincinnati Plan details 80 recommendations for climate mitigation and adaptation strategies across the built environment, education & outreach, energy, food, natural system, resilience, transportation, and waste.[10]

TOOLS FOR DEVELOPING YOUR CLEAN ENERGY PLAN

TOOL FINDER FOR LOCAL GOVERNMENT CLEAN ENERGY INITIATIVES

This query tool developed by the US Environmental Protection Agency (EPA) is intended to help local government staff measure the emissions, energy, and economic impacts of current and prospective programs and policies at both the government operations and communitywide scales.[11]

CITIES LEADING THROUGH ENERGY ANALYSIS AND PLANNING

The U.S. Office of Energy Efficiency and Renewable Energy has several tools to explore how different policies would affect a community. This website offers a tool to evaluate new commercial building energy benchmarking data and the energy characteristics of low-income households.[12]

HOW TO USE THIS TOOLKIT

Are you a locally elected leader or city staff member who wants to know how you can take advantage of this toolkit and Power a Clean Future Ohio campaign resources? Follow these steps:

STEP 1.
Identify what your city might be interested in pursuing. Look through the background materials in this toolkit and identify which areas you want to pursue.

STEP 2.
Share the toolkit and your ideas with others in your community, including other elected leaders or city staff.

STEP 3.
Contact Power a Clean Future (joe@poweracleanfuture.org) and let us know about your interests. We will set up a meeting to discuss further.

STEP 4.
Join Power a Clean Future Ohio through a mayoral declaration or resolution passed through council/commission. This is your community's gateway to hands-on expertise and a coalition of organizations that can help turn your ideas into actionable plans.

WE LOOK FORWARD TO YOUR PARTICIPATION!

CREATING AN EQUITABLE CLEAN ENERGY MOVEMENT IN OHIO

The movement of cities to develop clean energy plans originated out of concern for the environment and an interest in reducing the negative impacts of climate change. But as cities have developed their clean energy plans, it has become apparent that many clean energy strategies have co-benefits that also help community members at large. It is now common for cities to make a concerted effort to ensure that the strategies which are pursued for carbon emission reduction also involve a diverse group of stakeholders and benefit as many community members as possible, including marginalized and underrepresented groups.

WHY EQUITY MATTERS

Equity means fairness in process, access, and outcomes. Unlike equality, which assumes that every individual will obtain the same benefit from the equal distribution of resources, equity accounts for individual needs.[13]

EQUITY MEANS...

- We know our neighbors.
- We value diversity.
- All members of our community have the ability and opportunity to co-create the vision for our community and shape decisions.
- We connect with people who are different from us.
- We strive for genuine collaboration.
- Decision-makers in our community reflect those impacted by the decisions.

Figure: Definition of equity from the Sustainable CT Equity Toolkit[14]

WHY RACIAL EQUITY MATTERS

RACIAL EQUITY describes the condition achieved when, in a statistical sense, one's race no longer predicts comparative outcomes. Racial equity benefits far more people than the racial group suffering from marginalization. It's key to making systemic improvements in our communities on all types of issues. Utilizing a racial equity lens to examine community-specific issues like deploying clean energy and tackling climate change creates a pathway to more robust public engagement and involvement at every level. Using such a lens allows for the progression from a "transactional" model of engagement to one that is "transformational" for everyone in your community.

STRUCTURAL RACISM presents the primary obstacle to racial equity. Structural racism describes racial bias across and within society, accumulating and compounding effects of factors such as public policies, institutional practices, cultural representations, and other norms that perpetuate racial inequity.[15]

THE INTERSECTION OF RACIAL AND ENVIRONMENTAL EQUITY

Racially marginalized and economically disadvantaged communities lack environmental equity—fair and just access to healthy, breathable air and drinkable water. As cities and wealthier communities focus on their own economic development and growth, they often overlook environmental equity for their less privileged residents and neighbors.[16]

However, some cities work to connect racial and environmental equity. The City of Cleveland presents a good example by including a "Racial Equity Toolkit" as part of its 2018 Climate Action Plan Update. The plan "represents concerted efforts that are connecting climate change with other community concerns of low-income and communities of color."

> *Climate change and other environmental issues are sometimes viewed as issues that are not relevant to low-income and communities of color. Concern for the environment is frequently perceived as a concern of more affluent and less diverse communities. This narrative paints a false portrait and obscures the real diversity that exists. While there may be a lack of representation of low-income people and people of color in mainstream environmental organizations, this does not translate to a lack of concern with environmental issues. On the contrary, research has shown that people of color support environmental protection at a higher rate than whites. Sixty-eight percent of voters of color feel that climate change is an issue we need to be worried about right now, not something we can put off into the future.*[17]

BEGINNING TO ADDRESS RACIAL AND ENVIRONMENTAL INEQUITY

Since systemic racism shows up everywhere we look—the environment, public health, education, policing, transportation, housing, food scarcity, and so many other places—a thorough community assessment will identify opportunities specific to your community's needs.

When starting to develop a climate action plan or a sustainability plan, begin by using a framework that is "inquiry-based and focused on helping practitioners cultivate problem awareness by exploring 'why' they should address an equity challenge, before identifying 'how' to proceed."[18]

A racial equity assessment tool leads to better decisions related to policy, planning, programming, and budgeting within the city government and other institutions looking to advance racial equity and shared prosperity.

> *Because racial inequities are compounded by institutional policies and decisions, the cumulative implementation of these tools by institutions can create transformational systemic change. Equity in climate planning, in particular, ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. This requires intentional policies and projects that simultaneously address the on-the-ground effects and larger structural forces of the systems that perpetuate both climate change and inequity.*[19]

The Power A Clean Future Ohio campaign can provide or recommend contracted equity coaches to help communities get started. The Connecticut group Sustainable CT piloted a similar model successfully as part of its Optimize for Equity Toolkit.[20] Every community is different. Working directly with equity coaches to plan and assess your community allows you to take advantage of unique community contexts surrounding these issues. More information about training resources and key questions to ask regarding equity can be found in Appendix A.

PREPARING OUR ENTIRE WORKFORCE FOR THE JOBS OF THE FUTURE[21]

America's future jobs will require ever-higher levels of skills and education, but our education and job training systems are not adequately preparing Latinos, African Americans, and other workers of color who are growing as a share of the workforce to succeed in the knowledge-driven economy. In 2017 in Ohio, 64% of the U.S.-born Asian or Pacific Islander population and 16% of the U.S.-born Black population had a Bachelor's degree or higher.

America's future jobs will require ever-higher levels of skills and education.

Rising inequality disproportionately affects workers of color, who are concentrated in low-wage jobs that provide few opportunities for economic security or upward mobility. Workers of color consistently earn lower wages and are more likely to be jobless compared to their white counterparts, and racial gaps remain even among workers with similar education levels. The National Equity Atlas found that in 2017, an Ohio worker of color's median wage was $7 less than the median wage of a white Ohio worker.

Eliminating racial inequities in income would strengthen families, communities, and local economies. Wage and employment gaps by race (as well as gender) not only hurt people of color—they hold back the entire economy. Rising wages and incomes, particularly for low-income households, leads to more consumer spending, which is a key driver of economic growth and job creation. In 2017, the income for Black residents would have increased the most among all racial/ethnic groups if racial gaps in income were eliminated.

The disparity between GDP and job growth rates following the Great Recession reveals who has been left behind as the U.S. economy slowly recovers. Beginning in the 21st century, the economy underwent structural changes that created a growing mismatch between available workers and job opportunities.

Ohio's post-recession (2009-2017) growth in GDP was higher than growth in jobs. Further illustrating if growth were inclusive, job growth would track with GDP growth, but in recent decades, job growth has lagged behind GDP growth. This indicates that the benefits of an expanding economy are not reaching as many workers and their families as they could be.

JOINING POWER A CLEAN FUTURE OHIO (PFCO) PROVIDES PEER LEARNING AND SUPPORT

Power A Clean Future Ohio is focused on helping all communities provide clean, safe, equitable, and affordable energy options. By joining the PCFO campaign, you are joining a growing movement of your peer communities, who are all taking these steps at the same time. Whether it's working with equity coaches to get started, researching technical plans and case studies of other cities doing this work, or talking with your peers and leaders in other Ohio communities, we will be there to offer resources and support the critical work of building a just and equitable future for all Ohioans.

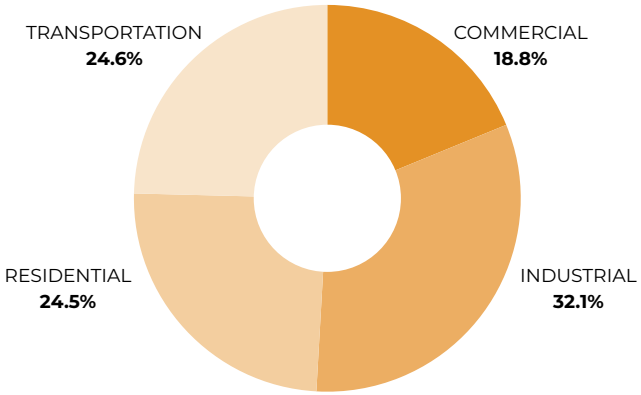
THE ENERGY LANDSCAPE IN OHIO

Ohio is known as a "deregulated" state when it comes to electricity and natural gas, which means that customers of investor-owned utilities (IOUs) can choose to buy their energy supply at market prices from a range of private companies. Ohio consumers can shop for a variety of offers, including fixed- and variable-rate plans, with different durations and contract terms. This gives customers and municipalities the ability to choose where their power comes from.

Ohio law also allows for power purchase agreements (PPAs), which is a common term for an electricity supply contract between two parties, one which generates electricity and one which is looking to purchase electricity. Local governments and businesses have the option to obtain their energy supply through a PPA, and this is a strategy to choose green energy without upfront capital costs. In solar PPAs, a city can lease land to a developer who then designs, finances, and installs a solar project. The city benefits from a lower electricity rate from renewable energy, and the developer receives revenue from electricity sales over the length of the contract.

With its large population, heavily industrial economy, and wide seasonal temperature variations, Ohio is among the top 10 states in total energy consumption.[22] Energy consumption is greatest in Ohio's industrial sector, accounting for about one-third of the state's total end-use.[23] The state's primary economic activities are in the financial and manufacturing sectors. Since the state has the fourth-largest interstate highway system in the United States, the transportation sector represents a significant share of the total energy delivered to consumers. The transportation sector is the second-highest consumer of energy, equivalent to one-fourth of the state's end-use total.[24]

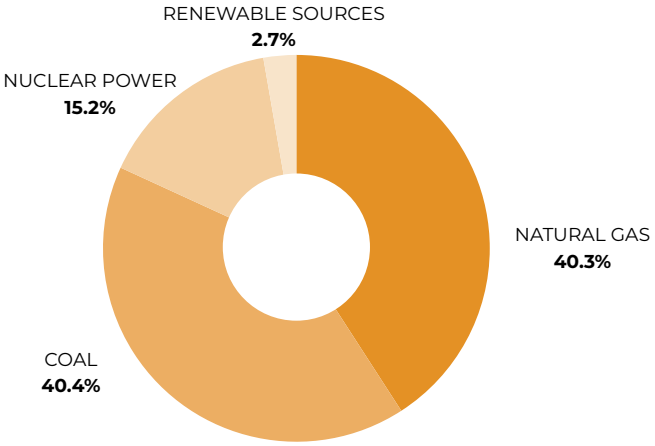
OHIO ENERGY CONSUMPTION BY END-USE SECTORS IN 2018



OHIO ELECTRICITY MIX

According to the Energy Information Administration, as of June 2020 Ohio generates approximately 40% of its electricity from coal, 40% from natural gas, 15% from nuclear power, and about 3% from renewable resources. Though coal remains a major source of energy, the share of electricity generated from coal has significantly decreased with 6% or 750 megawatts of coal going offline in the state in 2019 and more plant retirements are expected.[25] In 2010, coal accounted for 64.6% of Ohio electricity generation. Natural gas, at one time a little-used source for electricity in Ohio, is now a growing and dominant source for electricity generation. In 2000, natural gas made up 8% of Ohio's electricity generation mix before growing to 25% in 2010 and continuing to increase within the energy portfolio to its current level of 40% in 2020.[26]

OHIO ELECTRICITY GENERATION RESOURCE MIX IN 2020



CLEAN ENERGY IN OHIO

Renewable energy resources supply about 3% of Ohio's net electricity generation. Wind provided the largest share, almost three-fifths of total renewable generation. The 304-megawatt Blue Creek Wind Farm became the state's largest wind farm when it was completed in 2012. At the end of 2018, Ohio had 729 megawatts of installed wind capacity from nearly 400 turbines and another 133 megawatts of capacity under construction.[27] In 2018, solar photovoltaic (PV) generation accounted for about one-tenth of Ohio's renewable generation. About half of that solar power came from distributed (small-scale, customer-sited) facilities. The other half came from about two dozen larger utility-scale solar PV power facilities.[28] The two largest solar installations in Ohio are the 20-megawatt Bowling Green solar project and the 10-megawatt Wyandot Solar Farm—both located in the northwest corner of the state.

Transitioning to local clean energy will create economic, social, and health benefits for Ohio. Ohio communities are concerned about economic recovery and creating local careers for their residents. The clean energy industry will play a key role because of its size, reach, and growth potential. The clean energy sector employs more than 114,000 Ohioans. At the end of 2019, more people in Ohio worked in clean energy than real estate agents and brokers, computer programmers, web developers, and restaurant servers combined.[29]

According to the 2020 Clean Jobs Midwest report:

> *"The state's largest clean energy employer remains energy efficiency. The sector has been home to more than 73% of Ohio clean energy jobs and grew 1.8% in 2019. Last year, renewable energy jobs grew at a faster rate in Ohio than in any other Midwestern state — 7.8%. The state also experienced job growth in clean fuels (0.7%) and grid and storage (5.2%). Clean energy jobs are found in every corner of Ohio. While big cities like Cleveland (22,000 jobs), Columbus (16,000), and Cincinnati (16,000) were some of the largest hubs, more than 15% — or more than 17,500 jobs — were located in rural areas as of the end of 2019."*[30]

OHIO 2019 CLEAN ENERGY INDUSTRY CAREER QUICK FACTS

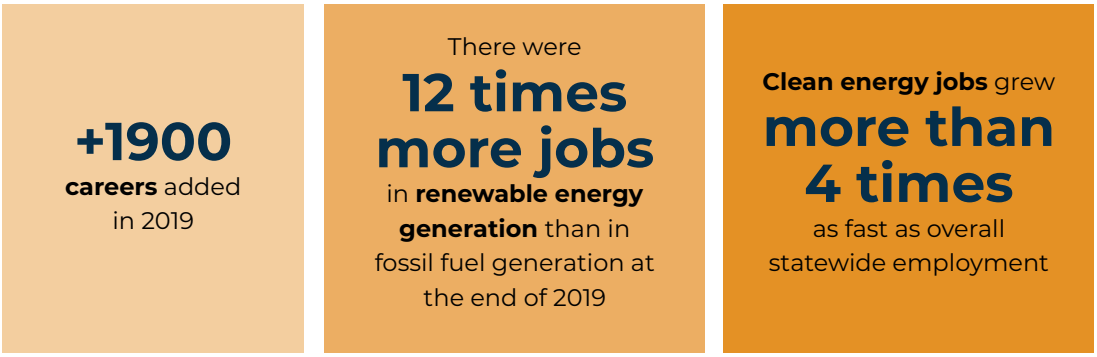


Figure: Clean energy statistics from Clean Jobs Midwest[31]

To learn more details of Ohio's energy landscape including more on energy mix, regulation entities, and how to find your electric utility, please see Appendix B.

CARBON REDUCTION STRATEGIES

PURSUING CLEAN ENERGY IN AN EQUITABLE WAY

Instead of approaching community members with a fully developed plan, we can improve both our planning and our equitable outcomes by listening to a more inclusive, diverse, and equitable group of stakeholders and engaging them throughout the development process.

The Wisconsin Clean Energy Toolkit, published March 10, 2020, provides advice on how to start conversations about systemic changes in our own communities:

In developing and implementing climate action plans, local governments should take into account how the plans relate to and address issues of racial and economic equity. Specific equity issues that should be considered in local plans include:

- Maintaining and/or improving the affordability of energy for lower-income households
- Reducing the disparate impact of fossil fuel-related pollution on communities of color
- Utilizing the necessary investment to create jobs and careers for disadvantaged communities of color
- Assuring equal access to the benefits of greater efficiency, renewable energy, and sustainability
- Recognizing and preventing unintended consequences of climate action plans, such as gentrification
- Countering the disproportionately negative impact of climate change on lower-income communities[32]

REDUCING ENERGY CONSUMPTION

Reducing energy use can be a simple, cost-effective means for local governments and communities to transition to clean energy. For governments, smart policies to encourage energy efficiency can reduce emissions and operational costs. Communities can craft policies and programs that encourage households and businesses to reduce energy and save money. The following list includes key strategies to reduce municipal and community energy consumption.

MUNICIPAL ENERGY CONSUMPTION

Adopt Green Building Standards

Green energy standards ensure that municipal buildings operate more efficiently and cost-effectively. While sustainable buildings often have a higher up-front cost, green building standards reduce the long-term maintenance and energy costs. (Resources on financing options can be found at the end of this toolkit.) A 2011 Government Services Administration study found that certified green federal buildings used 25% less energy, had 19% lower operating costs, reduced carbon emissions by 36%, and had 27% higher occupant satisfaction compared to the national average.[33]

There are also tools available to collect and monitor an energy baseline for buildings, including EnergyCAP's Energy Management Software and the EPA's ENERGY STAR Portfolio Manager. Local governments can also approve ordinances or similar laws that require new buildings, major renovations, or other specified construction projects to achieve specific environmental standards. Many communities use Leadership in Energy and Environmental Design (LEED®) certifications for Cities and Communities developed by the U.S. Green Building Council as the required standard for municipal projects. In Ohio, the cities of **Cincinnati, Cleveland** and **Shaker Heights** have or are in the process of certifying.

Specifically, the City of Cleveland requires all City-owned new construction and major renovations over 10,000 square feet to achieve LEED® Silver certification or higher.[34]

Conduct Building Retrofits

Communities can also improve the energy efficiency of existing municipal buildings. Smart investments, such as installing modern HVAC systems or controls, can save energy and make occupants more comfortable. Because space cooling and heat account for about a third of a building's energy consumption, HVAC retrofits can make a large difference.[35]

Implement Lighting Retrofits

Small changes to lighting can have major benefits for local governments. Switching from incandescent or CFL light bulbs to LED light bulbs can reduce lighting costs by over 70%.[36] Adding light sensors to fixtures can generate even more savings by automatically turning off lights when not in use.

Install Smart Street Lighting

Communities invest in smart street lights—street lights equipped with some combination of LED lights, brightness sensors, motion sensors, and short-distance communication networks—for many economic and environmental reasons. Electricity costs for smart street lights are about 50% less than those for traditional street lights. Communities can use smart street lights to more precisely control lighting levels and provide the foundation for future services like air, pedestrian, and vehicle sensors. Smart street lights also provide better light, last longer, and require less maintenance than traditional street lights.[37] While smart street lights are an effective carbon reduction strategy, the logistics of conversion can be challenging in Ohio due to ownership issues of the assets and the tariff structure which impacts cost effectiveness. Municipalities that have street lights owned by their utility are encouraged to engage directly with the utility to facilitate a conversation on this approach.

Require Energy Efficient Purchasing
Purchasing more energy-efficient products for municipal buildings and operations can reduce energy consumption and save money over the long term. For example, smart thermostats can automatically optimize heating and cooling based on the number of occupants in a building, the time of day, and other factors without occupants directly controlling the system.[38] Energy Star also certifies office equipment, including computers and printers, that use less energy in everyday use.[39]

Conduct a Water Plant Energy Audit
Water and wastewater plants typically are the largest electricity users in municipal operations. Often they can account for over a third of the entire municipal electricity bill. However, wastewater treatment plants are beginning to leverage new technology and renewable resources to reduce their energy use. In 2018, 87% of St. Cloud Wastewater Treatment Plant's energy use came from renewable sources including onsite solar and biofuel conditioning equipment and generators.[40] There are also major energy efficiency savings opportunities at these plants. Conducting an energy audit of the plants will determine the most cost-effective way to reduce electricity and increase renewables at these sites.

COMMUNITY ENERGY CONSUMPTION

Adopt Property Assessed Clean Energy (PACE) Financing
Property Assessed Clean Energy, or PACE, financing uses voluntary special assessments to finance the costs of qualifying improvements. Improvements that may qualify for PACE financing include energy efficiency improvements that reduce energy consumption—things like efficient HVAC systems, insulation, windows, doors, and roofs, and lighting and appliances—and alternative energy improvements, like solar panels and geothermal systems.

In a PACE transaction, the property owner receives up-front capital to pay the costs of the qualifying improvements. In exchange, special assessments are levied on the property and delivered to the capital provider as repayment for the up-front investment.

In many cases, PACE presents a winning solution for all stakeholders. For property owners, PACE can provide long financing terms, typically low fixed interest rates, the ability to transfer the assessments with the building at a sale, and the possibility of passing assessment costs through to tenants or users. For tenants, PACE improvements can result in improved building environments and lower utility bills. For PACE lenders, PACE assessment financing provides a strong security position. For traditional mortgage lenders, PACE can make it possible for their borrowers to make additional investments in their collateral using a non-accelerable source of capital. And for local governments, PACE can help facilitate investment in the community's energy efficiency and building stock without any direct cost to the local government.

Local governments can make PACE available within their jurisdiction by creating or joining an Energy Ppecial Improvement District, or ESID, which can be done in conjunction with the first project. PACE is also a local economic development strategy; these projects can lower the cost of doing business, encourage local business investment, and create new jobs in the community.[41] In 2019, a $95 million renovation project of the Dayton Arcade was approved with PACE financing mechanisms that will transform the space into a mixed-use area with commercial space, public areas, and affordable housing.[42]

PACE programs allow landowners to finance the up-front costs of energy efficiency and energy efficiency upgrades through their property tax bills. PACE is voluntary for homeowners, and those who participate can cover 100% of a project's costs. Projects can include installation of more efficient heating and cooling systems, insulation, energy-efficient appliances, solar panels, and energy-efficient doors and windows. To participate in PACE, homeowners need to live in a community that is part of an ESID.

Support Metered Energy Efficiency Transaction Structure (MEETS™)
MEETS™ is a new, innovative approach to energy efficiency that is designed to address traditional barriers to energy efficiency that utilities, building owners, and investors face. In its most basic form, MEETS™ turns energy efficiency into a metered product like the power we consume, allowing for more investment opportunities.

Develop Aggressive Green Building Standards

While state law provides baseline building standards, municipal governments can still ask more of buildings where the city is making an investment.[43] Communities can pass green building policies or standards that require greater energy efficiency investments as long as they are buildings that receive city funding. Another option is to make these requirements in any agreements that cities sign with a developer.

Green Leasing

Green leasing, also known as energy-aligned, energy-efficient, or high-performance leasing, is the practice of realigning the financial incentives of sustainability or energy measures in lease documents. For many commercial landlords and tenants, cost structures laid out in the lease lead to the principal-agent problem and discourage landlords and tenants from investing in a more efficient building. In residential cases, up to 35% of energy use may be affected by the principal-agent problem.[44] Realigning cost structures through a green lease allows both building owners and tenants to save money, conserve resources, and ensure the efficient operation of buildings.

Implement Community Aggregation

Allowed under Ohio state law, cities are able to incorporate energy efficiency and demand response programs for low-income and residential properties as part of a larger Community Aggregation effort. **Community Choice Aggregation (CCA) is the process whereby the citizens of a political subdivision choose to buy electricity from a power generator as a group rather than as individuals.** This is accomplished by cities, counties, townships, and villages creating an electricity purchasing group in their jurisdiction through a ballot issue voted on by citizens. Communities in Ohio have had the power to establish aggregations for electricity and natural gas since the power sector deregulation in 2000, unless they are served by a municipal utility or rural cooperative. As a result of that deregulation, each customer of an Ohio IOU can select their electrical provider. By banding together, people can use their combined buying power to drive down the overall cost of electricity. The greater the number of people involved in the aggregated pool, the greater the savings that can be obtained. This enables the city to leverage bulk-purchasing power to receive electricity and energy efficiency at lower prices for residents. A map providing information on which Ohio communities have a Public Utilities Commission Ohio certificate to provide natural gas and electric aggregation can be found here.

Create an Energy Efficiency Rebate Program

Cities can join efforts with local economic development boards to offer a rebate program to install more efficient lighting, insulation and HVAC in buildings. Part of the program can be targeted towards low-income properties for weatherization. Other program elements can focus on local businesses. This improves the attractiveness of buildings. If the local utility offers efficiency programs, municipal efforts can complement or be co-marketed with those, but IOU offerings can be uncertain given Ohio's recent elimination of its state efficiency standard. If the city owns a municipal electric utility, this is an especially good option.

Issue Public Service Announcement with Resources

Send a message to community members encouraging them to reduce energy consumption, providing estimates of cost savings, and resources/guides to implement. This could be sent via email/newsletter, post on a government website, a billboard ad, social media or other communications channels.

EXAMPLE STAKEHOLDERS IN ENERGY EFFICIENCY AND THEIR ROLE

LOCAL GOVERNMENTS: Local governments can encourage energy efficiency by influencing both public and private sector actions. Under public sector actions, cities can create or amend policies, including building requirements and zoning codes, while also adopting energy-efficient practices for municipal buildings. To encourage residents and businesses to adopt energy efficiency measures, cities can create incentive programs or financial support programs to assist in retrofitting infrastructure.[45]

UTILITIES: As providers, utilities can create energy efficiency programs that help their customers save on bills and reduce their energy use. By encouraging energy efficiency, utilities can enhance grid reliability and resilience, reducing strain on their infrastructure during peak hours and extreme weather events.[46]

PRIVATE SECTOR: Commercial and industrial buildings often represent a large share of energy. Private sector partners can retrofit their buildings to become more energy-efficient, installing efficient lighting, HVAC, and other appliances. Additionally, employers can encourage employees to adopt low- or no-cost energy reduction habits in the workplace and at home. The private sector can also create and host energy use reduction challenges among and between buildings.

Another option for the private sector to participate is to join a sustainability district. A sustainability district has a wider geographic scope and often has district energy systems, energy efficient neighborhoods and eco-urban developments aiming to reduce emissions and resource consumption by embedding integrated energy efficiency technologies.[47]

If cities choose legislative pathways for expanding energy efficiency programs, the private sector should be engaged through the policymaking process for ordinances affecting commercial properties to gain feedback and increase early support.

RESIDENTS: Cities have created awareness campaigns or incentive programs to encourage private residents to adopt energy efficiency measures in their own homes. There are a variety of low- or no-cost options that residents can use to save money on their energy bills and reduce their carbon footprint.

EQUITY AND INCREASING ENERGY EFFICIENCY

Energy efficiency programs have a wide variety of benefits for the community. For consumers, energy efficiency upgrades can directly reduce monthly energy bills, which can save low-income Americans hundreds of dollars annually. Energy efficiency measures can help address the household energy burden, described as annual utility spending as a percentage of total household income which is a major equity issue for low-income neighborhoods of metropolitan areas.[48] In 2017, 52% of renters who are people of color were burdened. In addition, 28% were severely burdened, with Black and Latinx women renters being most likely to be rent burdened among all other race and gender groups.[49] On average, low-income families spend between 7.2%-10% of their incomes on utility costs while the average household only spends 3.5%.[50] However, in 2015, only 6% of energy efficiency funds were allocated to programs for low-income households.[51]

Aside from direct cost savings, energy efficiency initiatives can create local jobs, reduce air pollution, and improve public health outcomes.[52] Energy efficiency initiatives can increase job opportunities for unemployed or underemployed when paired with local job training programs. Further, by decreasing the peak energy demand, electricity grids can integrate a larger share of renewable energy and reduce reliance on fossil fuel sources. This can improve air quality and reduce health issues related to air pollution.

WHAT CAN GOVERNMENTS DO?

The table below breaks down actionable steps that governments can take to support initiatives to reduce energy consumption. The table is organized by the sequence of the recommendations in the section above. The level of authority that governments have in implementing each step can be described as city-controlled or city-influenced. It is the synergy of both actions that helps create energy efficiency and carbon-neutral energy outcomes.

CATEGORY	ACTIONABLE STEP	CASE STUDY EXAMPLE	CITY CONTROLLED OR INFLUENCED?
Reduce energy consumption	Adopt Green Building Standards	The City of Cleveland requires all City-owned new construction and major renovations over 10,000 square feet to achieve LEED® Silver certification or higher.[53]	City-Controlled
Reduce energy consumption	Conduct Building Retrofits	From 2012-2014, the City of San Diego completed HVAC retrofits at 9 buildings, saving 200,000 kWh of energy and $40,000 annually.[54]	City-Controlled
Reduce energy consumption	Implement Lighting Retrofits	The Goshen Local School District in Ohio completed an energy-efficient lighting program to retrofit their buildings, resulting in $100,000 of annual savings.[55]	City-Controlled
Reduce energy consumption	Install Smart Street Lighting	Through a 4-year process, Chicago installed 270,000 smart LED streetlights and has projected $100 million in savings in the first 10 years.[56]	City-Controlled
Reduce energy consumption	Require Energy Efficient Purchasing	The City of San Francisco's comprehensive Green Technology Purchasing Policy requires departments to purchase energy efficient products.[57]	City-Controlled
Reduce energy consumption	Conduct a Water Plant Energy Audit	The City of Flagstaff completed an energy audit of the City's Water and Wastewater system facilities that consume approximately 35-40% of the City's total energy.[58]	City-Controlled
Reduce energy consumption	Implement Property Assessed Clean Energy (PACE) programs	The City of Sharonville, OH used PACE to finance $240,000 in energy improvements for two municipal buildings.[59]	City-Controlled
Reduce energy consumption	Support Metered Energy Efficiency Transaction Structure (MEETS)	After a successful MEETS pilot project with the Bullitt Center, Seattle City Light established an 'Energy Efficiency as a Service' program for commercial buildings.[60]	City-Influenced
Reduce energy consumption	Develop Aggressive Green Building Standards	The City of Cleveland has developed policies and programs for green buildings for municipal and residential properties, including the Sustainable Municipal Building Policy and the Cleveland Energy$aver program.[61]	City-Controlled
Reduce energy consumption	Implement Community Aggregation	Cincinnati developed the first CCA program that offers 100% carbon-free energy and the 100MW deal will save the city an estimated $1.7 million over the 20-year contract.[62]	City-Controlled
Reduce energy consumption	Create an Energy Efficiency Rebate Program	The City of Naperville, IL offers a residential energy efficiency rebate program for up to 50% of the project costs and a maximum rebate of $6,000.[63]	City-Controlled
Reduce energy consumption	Issue Public Service Announcement with Resources	In 2013, the US Department of Energy ran two public service announcements with 7 no-cost ways consumers could save energy and save money.[64]	City-Controlled

INCREASE RENEWABLE ENERGY

A variety of approaches are available for local governments to increase the use of renewable energy in their communities. Cutting-edge tools, technical assistance and resources to accelerate renewable energy goals are available to local governments.

Directly investing in local, distributed solar and/or wind can enable municipal operations to be powered by onsite generation. Other opportunities may include sponsoring a solar panel group buy, or creating incentives for parking lot spaces that incorporate solar energy.

Encouraging utilities to pursue ambitious renewable energy investment plans has been shown to be effective in achieving energy goals. Municipalities and cooperative boards are in a position to pressure their electric providers to increase renewable energy sources and implement programs that incentivize residential and commercial action.

Another option for municipalities to increase their local renewable energy mix is through Renewable Energy Certificates (RECs). RECs are tradeable market-based credits that represent one megawatt-hour of electricity generated from a renewable energy source. RECs are used as a way to add renewable energy attributes for the purpose of offsetting emissions from grid-supplied electricity used by the customer. Although RECs can offset carbon emissions, these benefits do not translate to direct, local benefits. Since it does not change the share of fossil fuels used in the city's energy production, there is no change in air quality or emissions locally.

Retrofit Municipal Buildings
Local governments can generate their own clean energy by installing solar and geothermal systems on government property and buildings. Generating electricity has multiple, direct benefits for local governments, including reduced energy expenditures and associated operating costs, more predictable power costs, reduced greenhouse gas emissions, greater energy independence, and opportunities to promote the local clean energy economy. This approach can provide an especially significant "bang for the buck" if a municipality's facilities include large energy consumers such as drinking water or wastewater treatment plants.

Adopt Community Choice Aggregation
Properly structured CCAs can provide stable prices over the term of the contract. Under certain circumstances, CCAs can lower overall prices for residents and small businesses while supporting renewable energy and energy efficiency goals. Cities can go 100% clean energy with a percentage or all of the electricity supply can be matched with renewable energy credits (RECs) or have a percentage come from a "sleeved" contract for an aggregation supplier to provide energy from a specific clean energy source in the area or the state of Ohio. Aggregation contracts can also build a small fee into energy rates to provide funding for clean energy priorities, such as building renewable energy projects or creating city-backed energy efficiency programs.

Create a Property Assessed Clean Energy (PACE) Program
While many of the improvements funded by PACE programs fall under energy efficiency, renewable energy improvements such as solar panels can also qualify.

Install Solar Photovoltaic Systems
An onsite solar photovoltaic (PV) system provides electricity directly to the host facility and can offset, on average, up to 80% of a building's energy usage throughout the year, although larger installations may be allowed where technically

feasible. Payback periods range between 10-12 years depending on the size of the system, utility rates/ net metering policy, and available financial incentives. Solar PV has a useful life of 30 years and requires minimal regular maintenance. It's possible to quickly gauge the solar potential of any building by visiting The National Renewable Energy Laboratory's online solar calculator.

Finance Locally Generated Solar PV Options

Cities have several options for acquiring locally-generated renewable energy. Cities can invest directly in solar, own the installations outright, and use the energy generated at no added cost. Alternatively, governments can enter into Power Purchase Agreements (PPAs) with an investor who would own the solar—either installed on-site or built locally—and sell the power back to the government. PPAs offer the advantage of not requiring municipalities to make any significant investment upfront. A good example is Cuyahoga County's capped landfill solar project *(pictured below)*.

It is essential to create an atmosphere where renewable energy can grow and thrive.

Utilize Geothermal Sources

A ground source heat pump uses the temperature difference between the ground and air to either heat or cool a building. With geothermal, the system transfers heat from the earth into the building during cold winter months and transfers heat from the building back into the ground during warm summer months. Payback periods range from 2-10 years depending on the type of application and typically last more than 40 years.

Reducing Solar Soft Costs and Streamline Rooftop Solar Permitting

Local governments can help improve access to clean energy for all residents by streamlining the installation permitting process. The Interstate Renewable Energy Council (IREC) outlines nine steps to solar permitting best practices. Crucially, cities should 1) post requirements online, and 2) enable online permitting. Adopting a system that allows for submittal, review, and approval of solar PV permits streamlines operations for local governments, reduces costs, and significantly reduces the need for travel to and from a site.

It is essential to create an atmosphere where renewable energy can grow and thrive. **SolSmart** is a national designation program recognizing cities, counties, and regional organizations that foster the development of mature local solar markets. SolSmart works with municipalities, funded by the U.S. Department of Energy, to help communities review, revise, and amend permitting, planning, and zoning ordinances to lower barriers to solar development while helping to drive the local solar economy. This program helps to bring new business to communities, promotes economic growth, and fosters the creation of new local jobs. Currently, the SolSmart program is working with interested communities to pilot SolarAPP, an instant online permitting tool for code-compliant solar and solar+storage residential systems designed to provide a seamless, low-cost permitting process.

The following are Ohio SolSmart Communities:

GOLD: none

SILVER: City of Oberlin

BRONZE: City of Cleveland, Athens County, City of Athens, Franklin County, Somerset, Amesville.

Learn about how to become a SolSmart community at: SolSmart.org

EXAMPLE STAKEHOLDERS IN RENEWABLE ENERGY DEPLOYMENT AND THEIR ROLE

LOCAL GOVERNMENTS: Through their direct control over land use decisions and local infrastructure, cities can support the development of renewable energy on public land and encourage private residents and businesses to install renewable energy. Governments can acquire renewable energy assets to install on public infrastructure, including municipal buildings and land. Additionally, governments can provide incentives and resources for residents and businesses, including permitting, financing support, and policies that ease implementation.

UTILITIES: Utilities can develop renewable energy to decrease their greenhouse gas emissions and reduce maintenance and operational costs. In addition, utilities can leverage new, smart technologies to overcome barriers of intermittency, optimize maintenance efficiency, and improve resiliency during extreme weather events.

COMMUNITY-BASED ORGANIZATIONS: Cities should engage community-based organizations to understand the needs and concerns of residents, specifically for underserved communities. By engaging these groups, cities can create strategic initiatives to improve equitable outcomes in renewable energy development.

ACADEMIC INSTITUTIONS: Whether public or private, academic institutions have control over large amounts of land area and can be large energy consumers depending on the size of the building. Therefore, academic institutions can generate a significant amount of renewable energy on their properties that can reduce energy expenses.

EQUITY AND INCREASING RENEWABLE ENERGY

With the steep upfront costs of some renewable energy, there have often been barriers to participation for low-income households. In addition to costs, residents who do not own property may be restricted from acquiring renewable energy in leases or rental agreements. However, low-income communities who have been historically excluded from many renewable energy developments may benefit the most. Renewable energy can reduce monthly energy bills and create local job opportunities for skilled work. Additionally, renewable energy can reduce fossil fuel use and air pollution, improving public health outcomes.

Perrysburg's solar-powered signs and signals are efficient, reliable, and low maintenance. There are cost savings in construction as there is no tear up or stringing to install these signals.

The Village of Grafton receives 10% of its energy from solar power. The 30-year power purchase agreement for this 4-megawatt solar array allows the village to receive energy from the panels at a fixed rate.

In Newark, Ohio a 6,000-panel solar project provides 25% of the energy needed for the city's wastewater treatment plant. The solar array was constructed on a vacant brownfield that the city was not utilizing.

Shelby Shifts to Solar, Increasing Renewable Energy Portfolio

John Ensman
Shelby Director of Utilities

Steve Schag
Mayor of Shelby

City Uses Up to 35% Renewable Energy

For more than 100 years, the city of Shelby, Ohio generated electricity from a coal-fired plant that sat near the center of town. That was until the facility was shuttered in 2013. By that time, Shelby had already transitioned to pulling some of its electricity from hydroelectric plants, but the city was looking to become even more renewable.

"We'd been talking about solar for over five years," says Steve Schag, mayor of Shelby. "This was a plan of ours to roll in more renewable energy resources into our portfolio here in Shelby. We felt it was an environmentally responsible thing to do."

On the final day of 2019, the city of Shelby officially powered up its brand-new field of solar arrays. Located off of the town's State Street and next to several industrial buildings, 86 rows of 6,485 solar arrays sit on 14 acres of land. The panels have the capacity to produce anywhere from 8-15% of the city's electricity. Combined with the electricity received from the hydroelectric plants, Shelby is using 35% renewable energy.

Shelby entered a public/private partnership with AEP On-Site Partners to acquire the panels, which gives the city fixed electricity rates for the duration of the 30-year agreement.

"This project has been highly discussed within our community and around the county," says John Ensman, director of utilities in Shelby. "We have received numerous positive calls. In simple terms, it's been very positive for the community in many ways."

> **"We'd been talking about solar for over five years. This was a plan of ours to roll in more renewable energy resources into our portfolio here in Shelby. We felt it was an environmentally responsible thing to do."**
>
> *– Steve Schag*
> *Mayor of Shelby*

One of the other positive factors is the projected cost savings for the city. Shelby believes it could experience $2-3 million in money saved for the city over its 30-year agreement, thanks to its addition of solar.

"We're looking to be a player in the future of energy technology with and eye to our future residents as well," says Jessica Gribben, economic development director for the city of Shelby. "It shows companies that are looking to locate in a small community that we are serious about keeping rates competitive and finding sustainable ways to do so, as well as sophisticated enough to pull off a large-scale solar project."

The Nature Conservancy

nature.org/ohiocleanenergy

March 2020

WHAT CAN GOVERNMENTS DO?

The table below breaks down actionable steps that governments can take to support renewable energy adoption and energy use reduction initiatives. The table is organized by the sequence of the recommendations in the section above. The level of authority that governments have in implementing each step can be described as city-controlled or city-influenced. It is the synergy of both actions that helps create energy efficiency and carbon-neutral energy outcomes.

CATEGORY	ACTIONABLE STEP	CASE STUDY EXAMPLE	CITY CONTROLLED OR INFLUENCED?
Increase renewable energy	Retrofit Municipal Buildings	In Newark, Ohio a 6,000-panel solar project provides 25% of the energy needed for the city's wastewater treatment plant.	City-Controlled
Increase renewable energy	Adopt Community Choice Aggregation (CCA)	Cincinnati is the first aggregation program to offer customers 100% carbon-free electricity and natural gas. In 2016, the program saved participants $1.5 million on electricity and $2 million on natural gas.[65]	City-Controlled
Increase renewable energy	Create a Property Assessed Clean Energy (PACE) Program	In partnership with the Greater Cincinnati Energy Alliance, the Port of Greater Cincinnati Development Authority launched a PACE program for energy-related real estate investments.[66]	City-Controlled
Increase renewable energy	Install Solar Photovoltaic Systems	The Columbus Division of Fleet Management installed 2,650 solar panels with a 240-watt capability on its rooftop and is anticipated to produce half of the facility's energy needs.[67]	City-Controlled
Increase renewable energy	Finance Locally Generated Solar PV Options	In partnership with IGS Solar, Cuyahoga County created a 4MW solar farm on a closed and capped landfill that will generate $3 million in savings on utility bills over 25 years.[68]	City-Controlled
Increase renewable energy	Utilize Geothermal Sources	In 1996, the North Royalton School District in Cleveland installed a geothermal system for a middle school that saves 20-40% in energy costs annually.[69]	City-Controlled
Increase renewable energy	Reducing Solar Soft Costs and Streamline Rooftop Solar Permitting	The City of San Francisco, CA has streamlined permitting by allowing permits for systems 4kW and under to be applied for and processed online.[70]	City-Controlled

THE TRANSPORTATION LANDSCAPE IN OHIO

Transportation is an indelible part of Ohio's economic, social and political landscape. Representing the fourth largest interstate system in the US and with an estimated 195 million total average daily vehicle miles traveled, Ohio's transportation system is the bedrock of the state and a vital national asset.[71] However, the dominance of Ohio's transportation system has a serious environmental cost: Ohio ranks 5th in the United States for air particulate exposure and 8th for premature deaths.[72] The World Bank quantified the impact of pollution exposure globally and found that $18 billion in earnings were lost due to premature deaths caused by air pollution in 2013, while asthma cost an estimated $50.1 billion in direct medical costs and $5.9 billion in lost productivity.[73]

Economic Benefits of Clean Transportation in Ohio

Another critical intersection between transportation and Ohio's history lies in the auto manufacturing industry. According to the Ohio Department of Development, Ohio's motor vehicle cluster produced $4.46 billion worth of goods during 2010, the third overall highest-producing state in the US. Ohio also generates 8.14% of the nation's motor vehicle output, compared to 3.24% of all goods and services.[74] Therefore it is clear that there is an economic imperative for stakeholders to promote the development of Ohio's auto manufacturing industry, especially in a climate where the vehicle market is shifting increasingly towards more sustainable, carbon-friendly transportation alternatives. Given Ohio's legacy as a leader in auto manufacturing, there is real potential for Ohio to emerge as one of the trailblazers in the emerging electric vehicle market if stakeholders play active roles in supporting the transition.

Progress toward clean transportation

Ohio is taking the right steps to ensure that the prosperity of transportation does not have such a staggering human and environmental cost while simultaneously protecting the bedrock of the state's economy. Since 2003, Ohio has cut air pollution exposure nearly in half, resulting in a total decrease of 46.4% while also increasing EV sales by 113% between 2017-2018 alone.[75] Actionable steps and advocacy on behalf of governments, stakeholders, and communities can continue to chart Ohio's progress towards a greener, healthier, and more auspicious future for all.

ELECTRIFICATION IN TRANSPORTATION

Electrification of public transit, fleets, and passenger vehicles is central to developing carbon-reduction solutions. By transitioning from internal combustion engine (ICE) vehicles to electric vehicles (EVs), dependence on petroleum and other non-renewable resources can be reduced dramatically. The societal benefits of electrification are abundant and all-encompassing, extending past collective and human benefits to include stakeholders like utilities, ratepayers, fleet operators and governments. In spite of the numerous benefits of EVs, electrification is nonetheless a complex, multi-layered process that requires early engagement, planning and forethought to ensure the maximization of its potential.

ELECTRIC VEHICLE SUPPLY EQUIPMENT

Electric vehicle supply equipment, or EVSE, is a critical concept in electrification. Understanding the levels of chargers available, where they can be placed, who they are used by and who produces them is foundational for developing successful charging infrastructure. It is also important to note that all Plug In Electric Vehicles (PEVs) come with a Level 1 charge cord as standard equipment.

EVSE CHARGING LEVELS AND EQUIPMENT

	Level 1	Level 2	DC Fast Charging
Voltage	AC 120 V; can be plugged into standard outlet	AC plug: 208-248v	DC plug: 400-1,000v
Use	Personal	Public, Residential/ Commercial	Public; highway corridors
Electric vehicle miles of range per charging hour	3-4 miles	10-60 miles	150-1,500 miles
Example Manufacturers	Duosida, Orion, Bosch	ClipperCreek, Chargepoint, JuiceBox, Siemens, and EVBox	ABB, Signet, Blink, and EVBox
Estimated Cost	$300-1,500	$2,500-4,900	$20,00-100,000
Site Types	Personal homes and garages	Multi-unit dwellings, retail stores, airports, public parking garages, workplaces, on-street	Highway corridors, commuter routes, between urban centers and rest stops
Example Equipment			

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

The success of electrification requires coordination across various dimensions that impact charging equipment including where it's located, who can access the charging equipment, its reliability, and the level of equity these chargers grant EV operators. Addressing these factors reduces the likelihood of EV-related market failures and maximizes the multitude of benefits electrification brings.

The presence of diverse charging locations

A major barrier to the widespread implementation of EVs is a phenomenon known as "range anxiety." Range anxiety describes the reluctance of drivers to fully switch to EVs because of reduced range capacity, which tends to be lower in electric vehicles than conventional vehicles. Without full assurance that a driver can make it to their location safely, EVs will struggle to compete with combustion vehicles.

> **SOLUTION:** Advances in technology are rapidly closing the gap between ICE vehicles and EV range capabilities; however, sophisticated EVSE infrastructure can greatly reduce range anxiety by providing a guarantee that drivers can recharge their vehicles.
>
> **BEST PRACTICE:** EVSE networks should include a diverse array of public charging locations, such as workplace charging, corridor charging, and commercial charging. These locations should be placed strategically along routes and offer a minimum of level 2 charging.

THE LEVEL OF ACCESS AND EQUITY CHARGING STATIONS GRANT EV OPERATORS

An essential principle that should underline any EVSE planning is equity. This especially pertains to EV adoption, which can concentrate heavily in certain neighborhoods—namely educated, upper middle-class and white communities. Because of the nature of EV charging—which occurs at home 80- 90% of the time - appropriate steps need to be taken to ensure that charging is available in a variety of residential locations.

> **SOLUTION:** On-street residential parking and multi-unit dwellings (MUDs) need to be equipped with EVSE.
>
> **BEST PRACTICE:** Ensure permitting processes are smooth and and easy so businesses and network operators can deploy charging stations faster. Additionally, local governments can pass ordinances requiring EV-ready infrastructure in new residential developments like MUDs.

THE RELIABILITY OF EVSE

Another problem that electrification faces is creating an alternate method of fueling that is as predictable, universal, and regulated as traditional petroleum stations. A driver needing to refuel their vehicle should be able, for example, to reasonably predict where to find a fueling location, how much refueling will cost, and how the transaction will take place.

> **SOLUTION:** EVSE infrastructure needs to replicate the level of reliability that petroleum fueling provides.
>
> **BEST PRACTICE:** Create redundancy in charging stations: there should be clusters of chargers as opposed to singular charging stations in case one or more aren't functional. Multiple connectors should be available to reduce interoperability issues. Signage should clearly explain how to use the charger, the system of payment, and safety regulations. When possible, chargers should be networked so real-time availability is transparent across multiple platforms.

EXAMPLE STAKEHOLDERS IN ELECTRIFICATION AND THEIR ROLE IN EV ADOPTION

UTILITIES: Because EVs require charging equipment, commonly referred to as EVSE, utilities must be engaged early on in the planning process to ensure that additional load demands from EV charging can be met and that sufficient infrastructure is in place to support EVSE installation.

GOVERNMENTS: Local governments need to update zoning regulations and municipal codes to be "EV Ready". Common example legislation that falls under the "EV Ready" category includes:

- Updating zoning regulations to streamline the permitting process for EVSE installation
- Encouraging or requiring that all new residential properties are equipped with a 220/240-volt / 40 amp outlet on a dedicated circuit to support the installation of Level 2 charging
- Designating 2%–5% of parking spaces as electric vehicle charging stations
- Including charging station spaces in the calculation for minimum parking spaces required by city ordinance

SITE HOSTS: Planning for electrification also means planning where EVs will dwell, where charging will be accessible, and what level of charging is offered. Site hosts must educate themselves about equipment selection, costs, siting, labor requirements and local regulations to ensure that their property can best serve the needs of all EV owners, including fleet operators.

CAR DEALERSHIPS: In order to encourage EV adoption, suppliers like car dealerships and other EV distributors must have an appropriate stock of electric vehicles that fill diverse EV needs such as heavier-duty vehicles and fleet selections. Dealers also need to be supplied with education on electric vehicles to best communicate with potential buyers.

WHAT CAN GOVERNMENTS DO?

The table below breaks down actionable steps that governments can take to support EV adoption. The table is organized by three categories of initiatives: code updates, fleet electrification, and deploying public chargers followed by case study examples of each actionable step. The level of authority that governments have in implementing each step can be described as city-controlled or city-influenced. It is the synergy of both actions that helps create ecosystems that support transportation electrification in all levels of society.

CATEGORY	ACTIONABLE STEP	CASE STUDY EXAMPLE	CITY CONTROLLED OR INFLUENCED?
Fleet Electrification	Perform a fleet inventory (fleet data gathering, telematics, and usage KPIS) to establish fleet emissions baseline. Incorporate this data into a Green Fleet Action Plan	Aurora, Illinois launched a program to collect data on life cycle costs and emissions for community managed fleets and used this information to build out a comprehensive sustainability plan	City-Controlled
Fleet Electrification	Establish sustainable/efficient vehicle purchasing policies	Example policies include achieving an average fleet fuel efficiency of 35 MPG for all light-duty vehicles or achieve a 20% reduction in fuel usage	City-Controlled
Fleet Electrification	Recruit local institutions that have fleets to follow sustainability steps outlined for government-owned fleets	Columbus' Acceleration Partners program supports private sector participants to understand how EVs can support their sustainability goals and reduce fleet management costs	City Influenced
Code Updates	Amend zoning ordinances	Auburn Hills, MI updated its zoning ordinance to allow EVSE installation of all levels in every zoning district when accessory to primary permitted use, vastly streamlining the process of EVSE permitting.	City-Controlled

CATEGORY	ACTIONABLE STEP	CASE STUDY EXAMPLE	CITY CONTROLLED OR INFLUENCED?
Code Updates	Adopt a PEV (Plug-in Electric Vehicle) ordinance to include regulations and design standards for EVSE, EV parking spaces, and design guidelines for installation of EVSE	Milpitas, CA has issued guidance that summarizes PEV permit requirements and includes diagrams that illustrate typical charger configurations and location installation advice along with electronic plan submittal and information on building inspection procedure	City-Controlled
Code Updates	Compensate developers who include pre-writing for EVSE in design plans with additional benefits	The City of San Carlos, CA provides developers with a density bonus for providing parking with EVSE capability by allowing them to exceed allowable floor area ratio by 10% if they provide additional environmental design features, including electric car facilities	City-Controlled
EV Incentives	Encourage EV use by granting certain privileges	The City of Cincinnati, OH offers free parking at any city meter for electric vehicles	City-Controlled
EV Incentives	Encourages developers to allot EV spaces in parking structures	The City of Cincinnati, OH requires 1% of garage spaces to have EV charging in any project that receives city incentive	City-Controlled
Deploying Public Chargers	Add charging infrastructure in City-owned parking garages to support multi-family and workplace charging	Through an American Electric Power grant, the City of Canton, OH is installing four, fast-charging electric vehicle stations in two city-owned parking lots[76]	City-Controlled
Deploying Public Chargers	Reduce regulatory barriers for EVSE providers	States, including Colorado, have enacted statutes to exempt EV charging stations from the definition of "public utility." Because EV charging station owners sell electricity in a service territory, they could become subject to regulation as a public utility. Cost-prohibitive or legally impossible for third-party EVSE owners	City Influenced
Deploying Public Chargers	Implement Load Demand Management	State PUCs should open appropriate proceedings to consider adoption of variable electric rates or similar alternatives to provide clear grid-benefit focused price signals for residential customers	City Influenced
Deploying Public Chargers	Develop an EVSE network	West Coast Green Highway (WCGH) is an extensive network of DC fast-charging stations located every 40 to 80 km along Interstate 5 and other major roadways in the Pacific Northwest	City Controlled

CLEAN TRANSPORTATION OPPORTUNITIES

There are a number of opportunities to reduce emissions from residential and community energy use. Programs and strategies that reduce driving and enable zero-emission transportation, like biking and walking, are essential to reducing emissions and creating safer and healthier communities. The report, Road to Clean Transportation, by the Frontier Group, 1000 Friends of Wisconsin, and WISPIRG found that the following strategies could reduce greenhouse gas emissions by at least 20%.[77]

STRATEGY	EMISSIONS REDUCTION POTENTIAL	KEY 2030 BENCHMARK	KEY 2050 BENCHMARK
Smart Growth	5% to 16%	60% of new urban growth occurs as compact development	90% of new urban growth occurs as compact development
Public Transportation	0.9% to 3.6%	Minimum 2.4% increase in service	Minimum 4.6% increase in service
Active Transportation	0.4% to 1.1%	Comprehensive build-out of connected and safe walking and biking networks in all cities	Comprehensive build-out of connected and safe walking and biking networks in suburbs and exurbs
Shared Mobility	1% to 4%	Expansion of shared bicycles and small vehicles to all cities, with access to parking and the curb	Ubiquitous availability of shared bicycles and small electric vehicles in all cities and towns, with at least 10% of parking spaces allocated to shared modes
Smart Pricing	3.6% to 10.7%	End subsidies for parking in downtowns; smart pricing implemented on highways	End all implicit and explicit subsidies for private vehicle ownership and uses

EXPAND TRANSIT SYSTEM

Communities are working to expand transit systems—buses and trains primarily—to provide access to more people and more places with more frequency on existing routes. Transit expansion offers greater access, mobility, and independence for those who cannot drive. Additionally, increased transit options can demonstrate public transportation as an attractive option for current drivers. By increasing the share of transit users, cities can reduce transportation-related carbon emissions. Per 100 passenger miles, a single-occupancy vehicle emits 89 pounds of carbon while a full bus emits 14 pounds of carbon.[78]

DEVELOP PUBLIC-PRIVATE TRANSIT PARTNERSHIPS

Many communities work with nonprofits or businesses to partially fund or fully fund transit systems; from 1990-2010, over **$46 billion was invested into transportation** systems through public-private partnerships.[79] Many projects have government agencies designing and administering them while businesses support or completely fund the projects.

INCREASE CHARGES FOR PARKING

In order to encourage low- or no-carbon transportation, local governments should evaluate the current policies that subsidize driving. For example, many cities in Wisconsin still provide free, downtown parking at least on evenings and/or weekends.[80] Additionally, most zoning codes have parking minimums, which encourage both urban sprawl and driving. Local governments may evaluate the subsidies they provide to cars and which ones they want to continue to provide and which ones they want to discontinue in order to better serve other transportation choices.

INVEST IN BIKE AND PEDESTRIAN INFRASTRUCTURE

A recent study from the Institute for Transportation and Development Policy found that when cities evaluate future sustainable transportation options, scenarios that include a robust bicycling component reduced emissions by an additional 11%. Creating a bicycle and pedestrian plan is a good first step. However, these plans should address potential cyclist concerns. The number one concern that prevents people from using bicycles is safety. To address these concerns, safety of people over cars should be prioritized in both a bicycle and pedestrian plan and a master plan. Protected and separated bike lanes are often a first step in improving safety. Parking protected bike lanes are an economical option that provides many ancillary benefits, including reducing the likelihood that a cyclist is "doored" (when a cyclist gets hit by a car door) and providing easier and safer access for people in cars who have a wheeled mobility device. Plans should also ensure that streets are designed for the intended speed, so that on smaller residential streets, cyclists and pedestrians feel safe even if there aren't bike lanes. The easiest way to slow vehicle speeds is to build narrower streets.

CREATE COMPLETE STREETS

Communities can also encourage walking and biking by passing a Complete Streets ordinance. Complete Streets is a policy and community approach to planning that focuses on design that ensures the safety of all users, including pedestrians, bicyclists, motorists, and transit riders.[81] Unique to each community, Complete Streets ordinances promote mobility and physical activity for people of all ages, abilities, and income levels. Usually ordinances require that all transportation modes be taken into consideration during street building or major repair. Features of complete streets improvement may include: sidewalks, accessible pedestrian signals, bike lanes, curb extensions and narrowed vehicle lanes, accessible transit stops, and dedicated bus lanes.[82]

IMPLEMENT A BIKE SHARE PROGRAM

Cities can also invest in bike share programs to further promote cycling as a transportation choice. Bike share programs are an essential investment as cities are able to reduce urban transportation carbon emissions by 11% through an increase of cycling.[83] Bike share programs offer many benefits to a city. First, some bike share trips will directly replace short car trips. Second, a well-designed bike share system will connect users to other transit options (i.e. bike share stations could be co-located with transit stops), and thus serve as part of the first/last mile solution. Finally, most bike share systems are much more affordable than bike ownership, thus removing that barrier from increased bicycle use.

Bike share programs are an essential investment as cities are able to reduce urban transportation carbon emissions.

SUPPORT CAR SHARE AND RIDE SHARE PROGRAMS

Car share systems work similarly to bike share; users can rent cars based on time and distance through smartphone applications. Vehicles are either provided through a centralized company, like ZipCar or GIG Car Share, or individual car owners can make their vehicles available for local users through an online market, like Getaround.

Another form of vehicle sharing is rideshare, which describes vehicle trips taken by multiple people through taxi-like services or carpooling. Vehicle sharing can provide an alternative to first-mile, last-mile connections to public transit, or replace shorter car trips. Overall, these vehicle sharing services can decrease per-capita car ownership and per capita transportation-related greenhouse gas emissions. This emissions reduction can also be amplified through partnerships with companies that utilize only electric vehicles, with charging stations at the pick-up and return stations.[84]

SUPPORT SCOOTER SHARE PROGRAMS

Scooter share describes services where users can rent electric scooters of either moped or electric kick scooter styles through a smartphone app. Unlike other shared-mobility services, scooter share systems are more commonly dockless where users can have endpoints in general areas rather than specific addresses. Scooters are mostly electric as well and use a crowdsourced approach to charging, providing a small compensation for individuals to charge the vehicles at home. Scooter share is a viable micro-mobility solution to reduce the amount of short trips taken by vehicles and provide first-mile, last-mile connections to public transit. One important consideration for any community that decides to implement scooter sharing is to set up a permit system for scooter vendors and develop "rules of the streets" to ensure that scooters are placed in an organized way around the city that do not block the sidewalk and impact public safety.

EQUITY AND CLEAN TRANSPORTATION

Some clean transportation options, ranging from access to electric vehicles to electric scooter sharing, have had limited value for underserved populations. Uneven geographic placement and operation have created barriers for participation as well. For example, many shared mobility services require a credit card or bank account, Internet access, and a smartphone to activate, which prevents unbanked individuals from accessing these services. Additionally, shared mobility services are often located in higher-income areas, restricting access further.

Clean transportation can provide various benefits for low-income and underserved communities to create more equitable outcomes when developed and deployed in partnership with the communities they serve. Clean transportation can reduce the amount of air pollution associated with passenger vehicle use. Further, shared-mobility solutions can provide an affordable alternative to owning a vehicle for those who do not live nearby public transit systems.

In addition, electric vehicles are cheaper to operate and maintain than fossil fuel powered vehicles, making them a good choice for low and moderate income residents. Reliability, and therefore, resiliency, is also much better with electric vehicles due to the lower powertrain complexity and fewer parts overall.

WHAT CAN GOVERNMENTS DO?

The table below breaks down actionable steps that governments can take to support community-wide clean transportation. The table is organized by the sequence of the recommendations in the section above. The level of authority that governments have in implementing each step can be described as city-controlled or city-influenced.

CATEGORY	ACTIONABLE STEP	CASE STUDY EXAMPLE	CITY CONTROLLED OR INFLUENCED?
Encourage Public Transit	Expand Transit System	In 2019, the Central OH Transit Authority was awarded a $2.6 million grant to replace diesel buses with electric buses, including 10 electric buses to be added by 2021.[85]	City-Controlled
Encourage Public Transit	Develop Public-Private Transit Partnerships	Through a public-private partnership with the Capital Crossroads Special Improvement District (CCSID), Columbus created a Downtown CPass which gives eligible downtown and municipal employees free transportation on any COTA bus.[86]	City-Influenced
Encourage Public Transit	Increase Charges for Parking	The City of San Francisco has implemented a system that increases parking fees when there is increased demand to encourage alternative forms of transportation.[87]	City-Controlled
Support Alternative Mobility	Invest in Bike and Pedestrian Infrastructure	The City of Columbus created a Multimodal Thoroughfare Plan to make the community more friendly for pedestrians and bicyclists.[88]	City-Controlled
Support Alternative Mobility	Create Complete Streets	In 2018, Cleveland Heights, OH was recognized by the National Complete Streets Coalition for having the best complete streets policy.[89]	City-Controlled
Support Alternative Mobility	Implement a Bike Share Program	With over 59 bicycle stations across the City of Cincinnati, Red Bike is a non-profit bike share organization that operates over 500 standard and electric bicycles.[90]	City-Influenced
Support Alternative Mobility	Support Car Share and Ride Share Programs	After a successful pilot, the City of Los Angeles is expanding its car share program with Blue LA that provides electric vehicles to low-income communities.[91]	City-Influenced
Support Alternative Mobility	Create Planning Codes that Support Car Share	To decrease on-street congestion and encourage car sharing, the City of San Francisco, CA created a planning code that requires certain development projects to include dedicated car share parking spaces.[92]	City-Controlled
Support Alternative Mobility	Support Scooter Share Programs	In Cleveland, dockless e-scooters are available through Bird, Lime, and Spin.[93]	City-Influenced

LAND USE AND LAND MANAGEMENT

The understanding of land use decisions and land use management and their impact on climate change has been increasing. A decade ago, sustainability directors and environment departments would not have been considering their role in guiding or influencing land use decisions in their climate action strategies at the local level. But now, a more holistic approach to reducing carbon emissions includes a variety of strategies and approaches in the realm of land use and management and are detailed below.

IMPLEMENT GREEN INFRASTRUCTURE

Green infrastructure refers to solutions that utilize natural elements, such as vegetation and soil, to address environmental and climate change issues. These elements can increase a city's resiliency by improving stormwater management, reducing flooding, and mitigating the urban heat island effect. By utilizing nature-based solutions, this type of infrastructure can provide environmental co-benefits, including improved air quality, better water quality, and increased biodiversity. Examples of green infrastructure projects include rain gardens, green roofs, permeable pavement, stormwater planters, and bioswales. Many of these solutions utilize layers of soil and plants to collect and filter excess stormwater, diverting stormwater runoff and reducing flooding.[94]

EXPAND GREEN SPACE

Green spaces are undeveloped, often publicly-accessible, spaces with partial or complete vegetative coverage, including grass, trees, shrubs, or other vegetation.[95] Within cities, these spaces can include municipal parks, community gardens, schoolyards, and sports fields. Along with recreational and economic benefits, green spaces improve mental and physical health. Natural open spaces have been linked to improvements in overall health, citing that access to outdoor spaces can provide stress relief and encourage physical activity.[96] The environmental benefits of green spaces are diverse, including reducing the urban heat island effect and improving air pollution. A notable benefit of increased urban green space and urban tree canopy coverage is the ability to remove carbon from the atmosphere.[97]

Urban trees specifically have significant benefits both for the environment and for community members. There is approximately 75 million tons of carbon stored in urban trees and 102 million tons stored in soils of urban parks across the United States. Annually, urban trees remove 2.4 million tons of carbon from the atmosphere.[98] To take advantage of these benefits and to help increase urban tree canopy, cities can set goals regarding the percentage of the city's tree coverage and utilize technology tools, such as GIS, to evaluate and expand coverage.

PROTECT BLUE SPACE

Similarly, blue space describes manmade or natural bodies of water, including coastline, lakes, rivers, reservoirs, canals, and fountains. Blue spaces also have environmental benefits for cities including reducing the urban heat island effect and absorbing excess stormwater to reduce flooding.[99] Furthermore, integration of green and blue elements can create infrastructure to increase a city's resilience to climate change. One example is living shorelines, which are areas that integrate a bank stabilization and habitat reinforcement techniques to prevent shoreline erosion and coastal flooding. With this strategy, grey infrastructure, such as seawalls, can be fully embedded into natural landscapes with wetland vegetation, aquatic plants, and soils/sands.[100]

ADOPT CODES FOR SUSTAINABLE DEVELOPMENT

Over the past few decades, traditional zoning codes have separated residential, retail, and commercial properties.[101] However, urban planners are changing their approach to community development, creating new code frameworks that make cities more accessible, sustainable, and vibrant. Some of the specific types of sustainable development approaches are compact development, mixed-use zoning, and transit-oriented development.

Compact Development

Sprawling developments necessitate more driving. On the other hand, developments that house people closer together result in shorter travel times, more vibrant communities, and reduced carbon emissions. In compact neighborhoods, the amount that individuals drive decreases by anywhere from 20-40%. Higher density also necessitates the expansion of transportation options, including public transit networks and shared mobility.[102]

Compact developments can also make essential services and resource provision more efficient; government services (waste collection, mail, police, and fire), healthcare, groceries, and other assets are optimized when there is a higher density of residents.[103] Furthermore, compact development can significantly reduce greenhouse gas emissions. Compared to single-family homes, densely developed neighborhoods use up to 50% less energy.[104]

Mixed-Use Zoning

Mixed-use zoning integrates residential, commercial, and/or industrial properties within a single district. This approach can create diverse neighborhoods, increasing economic opportunities for small businesses, and overall quality of life. Mixed-use zoning can also reduce reliance on single-occupancy vehicles by integrating complete streets policies and enhancing mobility options.[105]

Transit-oriented Development

Transit-oriented development is a type of mixed-use planning approach that is centered around high-quality rail systems.[106] By integrating the principles of mixed-use development, communities encourage non-vehicle transportation use and can decrease vehicle-miles-traveled by up to 85%.[107] Transit-oriented communities can attract new business, since the area is more accessible to transit services for potential employees. Cities are also utilizing transit-oriented development to increase the stock of affordable housing, providing a convenient, accessible alternative to car travel for low-income populations.[108]

WHAT CAN GOVERNMENTS DO?

The table below breaks down actionable steps that governments can take to support sustainable land use strategies. The table is organized by the sequence of the recommendations in the section above, providing a brief case study example. The level of authority that governments have in implementing each step can be described as city-controlled or city-influenced. It is the synergy of both city controlled and influenced action that helps create communities that are sustainable and equitable.

CATEGORY	ACTIONABLE STEP	CASE STUDY EXAMPLE	CITY CONTROLLED OR INFLUENCED?
Green infrastructure	Implement green infrastructure	The City of Chicago has a comprehensive green infrastructure program that has increased green roofs, green alleys, and urban trees which have the capacity to capture over 80 million gallons of stormwater runoff per year.	City-Controlled
Green space	Expand Green Space	Columbus, OH has made new commitments to green space, setting a goal to increase the number of residents who can access green space within a 10-minute walk from 52%-100%.[109]	City-Controlled
Blue space	Protect Blue Space	The City of Miami Beach, FL has utilized living shoreline techniques to stabilize the shoreline and protect against storm surges, while also creating a recreational, public blue space.[110]	City-Controlled
Sustainable Development	Encourage compact development	The City of Austin, TX has a new initiative called CodeNEXT that revises the Land Development Code to promote compact, connected, and sustainable development.[111]	City-Controlled
Sustainable Development	Utilize mixed-use zoning	To guide and encourage mixed-use development, the City of Sunnyvale, CA created a 'Toolkit for Mixed-Use Development' with overall principles and planning guidelines.[112]	City-Controlled
Sustainable Development	Support transit-oriented development	In the Brewery Blocks district of Portland, a $300 million transit-oriented development program increased Portland Streetcar ridership by focusing commercial and residential redevelopment around Streetcar accessibility.[113]	City-Controlled

EXAMPLE STAKEHOLDERS IN LAND USE MANAGEMENT AND THEIR ROLE

LOCAL GOVERNMENTS: Local governments can lead public and private investment in land use solutions. Governments can directly achieve these goals by creating initiatives for tree planting and expanding public parks. Cities can develop policies that require new developments to integrate green infrastructure or encourage sustainable development patterns.

PRIVATE SECTOR: Private partners are integral for implementation and financing. Since private businesses manage a large amount of infrastructure, there is potential to increase green infrastructure or green/blue space on these properties. Additionally, private partners, such as real estate developers, architecture and engineering consultants, and local businesses, can provide valuable expertise in creating equitable and sustainable developments.

COMMUNITY-BASED ORGANIZATIONS: Cities should engage community-based organizations to ensure that land use policies create equitable outcomes. Rezoning efforts for sustainable development should engage communities that currently live in these areas to understand their specific needs and ensure that redevelopment does not cause displacement.

RESIDENTS: Throughout the planning process, cities engage residents and meaningfully integrate feedback. Residents can help to identify the needs of the community, priority locations to maximize impact, and understand concerns. By engaging residents early, cities can generate support for new land use plans and foster community participation.

EQUITY AND LAND USE

There is a growing trend for cities to reimagine sustainable planning efforts with increased equity as a prominent outcome. Unfortunately, some previous actions for sustainable development have displaced low-income communities and communities of color through a process called 'green gentrification.' In the absence of effective housing policies, investment in sustainable improvements, such as green infrastructure, can lead to the displacement of the very communities green infrastructure can benefit most.

Therefore, before beginning any sustainable land use initiatives, cities should evaluate existing policies and engage with a wide variety of community members to ensure that greening efforts do not lead to displacement. Under-resourced communities should be protected from displacement so that they can benefit from the outcomes that sustainable land use can provide, including flood protection, transit accessibility, and urban park access.

WHY SCHOOLS INVEST IN CLEAN ENERGY

With over 50 million students and over 2 million acres of land, the K-12 public school system in the United States has a large impact on communities.[114] K-12 schools consume approximately 8% of the energy used in US commercial buildings.[115] In 2019, the Ohio public school system had nearly 1.8 million K-12 students enrolled.[116]

INVEST IN ON-SITE RENEWABLE ENERGY GENERATION

The United States public school system has tremendous potential to reduce costs and greenhouse gas emissions by investing in clean energy. Across the nation, school districts spend $8 billion annually on energy costs, an expense second only to personnel salaries.[117] Through energy efficiency upgrades alone, schools have the potential to save 30% in energy use and over $2 billion in energy costs per year.[118] With solar generation on-site, schools can produce renewable energy to meet up to 75% of their energy needs, saving a significant amount on energy costs that can be reinvested.[119]

In 2017, 5,489 K-12 schools installed solar energy on-site with a combined capacity of 910 megawatts, with 45 of these schools in Ohio.[120] Annually, these solar energy systems produce approximately 1.4 million megawatt-hours, which is enough to power 190,000 homes.[121] Schools can utilize rooftop space or create solar canopies in parking lots to provide shade for vehicles or bicycle racks.[122] In 2019, Federal Hocking Local School District in southeast Ohio completed a nearly 2,000-panel rooftop solar array that generates approximately 700 kilowatts, meeting 70% of the district's energy needs and saving $20,000 annually.[123]

TRANSITION TO CLEANER FUELS FOR SCHOOL BUSES

Another clean energy investment that schools can make is transitioning to cleaner fuels for school buses. Over half of school-aged students, approximately 25 million children, ride a school bus regularly.[124] Unfortunately, most school buses currently run on diesel fuel, which has been linked to allergies, asthma attacks, and lung cancer.[125] Exposure to dirtier bus exhaust has been linked to health issues and poor school performance. In K-12 students, asthma is a common cause of absences; asthma was linked to 13.2 million missed instructional days in 2015.[126] Further, these health disparities compound inequities in education. Students living in low-income areas were found to be twice as likely to miss school due to asthma.[127] Outside of health-related absences, a 2019 study found that exposure to unfiltered diesel fuel was correlated with lower test scores.[128]

Investing in cleaner bus fuel is also cost-efficient for schools. A study conducted by Georgia State University reviewed public school districts that have transitioned from diesel to propane buses. Compared to diesel, propane buses have fewer maintenance and operational costs, with less expensive fuel and less engine pollution. In Fulton County, the school system's transportation director has replaced approximately 200 diesel buses with propane, reducing the operational budget by $360,000 annually.[129]

Overall, methods to invest in clean energy can reduce operational costs and reduce air pollution for public schools across the country. Renewable energy and cleaner bus fuels can improve air quality in the surrounding community, improving health and educational outcomes.

UPGRADE FACILITIES TO HIGH-PERFORMANCE SCHOOL BUILDINGS

High-performance school buildings are designed to provide a healthier environment for students. Fossil fuel combustion contributes to air and water pollution, leading to asthma absences for teachers and students. Students in schools that are poorly ventilated suffer 50% to 70% more from respiratory illnesses. Cognitive function is also significantly impacted by a building's ventilation and carbon dioxide levels. Buildings that are resource-efficient enhance wellness through tangible improvements in the temperature and air quality that students and staff breathe. Using all-electric heating and cooling along with other energy efficiency measures can improve air quality in the classroom, decreasing respiratory illness among students and teachers. Clean energy school districts also alleviate air and water pollution in the wider community due to a decrease in fossil fuel combustion.

Overall, energy efficiency or renewable energy upgrades to school buildings are financially beneficial and feasible over the long-term. Through a small capital budget investment for these improvements, administrators will see lower operational costs each year that also minimize ongoing impacts to the budget, beyond the initial investment.

INTEGRATE CLEAN ENERGY IN STEM EDUCATION

Since schools are spaces to engage with and instruct students, clean energy schools allow teachers to demonstrate to students in a hands-on way that 100% clean energy is achievable. Buildings that are energy efficient and powered by clean energy provide opportunities for project-based learning in STEM disciplines. Students who are engaged in clean energy projects can learn about where energy comes from as well as the planning, installation, and monitoring aspects of using clean energy.

ELEVATE THE ROLE OF SCHOOL DISTRICTS IN COMMUNITY RESILIENCE

As school districts are major beacons within their community, bringing awareness towards clean energy and committing to 100% clean energy illustrates to the broader community that it is attainable. Furthermore, schools are also a beacon of safety during and after emergencies. Schools that use clean energy—like solar power plus battery storage—can enhance the resilience of a school by ensuring that facilities and services are usable during power outages.

Ohio Valley Schools in Adams County, Ohio has generated nearly 8 million kilowatt hours of electricity and saved almost $900,000. That's an average savings of approximately $125,000 per year. Photo: The Nature Conservancy

A student-led initiative brought solar energy to Graham Local Schools in Champaign County, Ohio. The solar arrays are able to produce approximately 136,000 kilowatts of energy per year, which measures to be about 78% of the school district's energy usage. Photo: The Nature Conservancy

Graham Local Schools Saves Money by Using Solar Energy to Power Elementary and Middle Schools

Student-led initiative Brought Solar Energy to Graham Schools

In January 2020, Graham Local Schools in Champaign County, Ohio, became one of the latest school districts to start using solar power as an energy source.

"The solar arrays are able to produce approximately 136,000 kilowatts of energy per year, which measures to be about 78% of our usage," says Don Burley, director of operations for Graham Local Schools.

Through a purchase power agreement, the district installed two separate solar arrays in December 2019, one to power the middle school and another to power the neighboring elementary school. Through the agreement with a third party, company-owned panels were installed, helping Graham Local Schools avoid any out-of-pocket investment. In turn, IGS Energy receives a seven-year tax credit for the project. The solar energy generated from the panels is metered and sold to the district at an agreed-upon rate that is lower than what the district had been paying to its utility company.

The district hopes its savings might one day allow it to purchase the panels from IGS Energy.

Interestingly, the move to solar was driven in large part by a group of middle school students a few years ago.

"I've been looking into solar myself for over 10 years here in the district, and it wasn't until our students really had a passion for it and jumped on board, that it became a reality," Burley says.

Beginning in late 2017, five students at Graham's only middle school formed what is known as the "Middle School Energy Team." The team's focus was to find ways to improve energy usage in the district.

> **"The solar arrays are able to produce approximately 136,000 kilowatts of energy per year, which measures to be about 78% of our usage."**
>
> *– Don Burley*
> *Director of Operations for Graham Local Schools*

The group partnered with Energy Optimizers USA to find a solar solution. Energy Optimizers, which helps school districts improve their energy efficiency, conducted five full-day workshops to teach the students about solar energy. The company then connected the district with IGS Energy that entered into the purchase power agreement with Graham Local Schools, giving the district an affordable option for obtaining solar energy.

"The students helped design the project and helped with the calculations of how big it would need to be and that's what makes this very special to us," Burley says. "It's been a student-led, student-engaged project, and now those same students are at the high school asking if they can do the same thing there."

The Nature Conservancy

nature.org/ohiocleanenergy

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FINANCING CLEAN ENERGY

Communities can secure resources for financing clean energy from state and federal agencies. This section highlights programs and opportunities available to help a community identify funding for clean energy.

PACE FINANCING

Property Assessed Clean Energy (PACE) financing is a local economic development tool used by municipalities to help fund the upfront costs of energy efficiency, renewable energy, and water conservation upgrades by property owners without taxpayer assistance. PACE programs use a property tax repayment method that is long-term, allowing the payment to be transferred with the property, even when it's sold.

- Office of Energy Efficiency & Renewable Energy
- US DOE – Commercial PACE Working Group: Technical Assistance Overview
- US DOE C-PACE - A Fact Sheet for State and Local Governments

GREEN POWER PURCHASE

Purchasing renewable energy certificates (RECs) from solar, wind and geothermal providers is a legitimate way for local governments, individuals, businesses, and organizations to offset their fossil fuel energy use with clean, renewable energy. There are many companies that provide clean energy RECs in the marketplace nationwide. Look for green-e certified programs; they are third-party verified by the nonprofit Center for Solutions.

- EPA Green Power Partnership: RECs
- EnergySage Guide to RECs

ECO-LINK

The ECO-Link program is a partnership between the Office of the Ohio Treasurer of State and local banks that is designed to help Ohio homeowners reduce the cost of their home improvement projects up to $50,000 by offering low-interest loans. This program supports the Ohio economy by stimulating businesses that provide products or services to the homeowners. In addition, the program helps homeowners save money through lower interest rates and possible energy cost reduction.

- Office of the Ohio Treasurer ECO-Link Brochure
- ECO-Link Application Details

OHIO AIR QUALITY DEVELOPMENT AUTHORITY (OAQDA)

OAQDA works to improve air quality by supporting businesses, creating jobs, and improving communities while enhancing the health and safety of all Ohioans. OAQDA makes clean air compliance easily accessible and affordable by helping to finance air quality facilities such as energy-efficient equipment purchases and renewable energy projects for small and large businesses, utilities, governments, and universities. Projects receiving OAQDA financing are exempt from certain state taxes, and OAQDA may also give grants to qualifying small businesses.

- About OAQDA
- OAQDA Clean Air Resource Center (CARC): Supporting Ohio's Small Businesses
- OAQDA Clean Air Improvement Program (CAIP)

OHIO ENERGY LOAN FUND

The Ohio Development Services Agency's Energy Loan Fund provides low-interest financing and free audit assistance to identify and fund efficiency improvements to lower energy use and costs. Eligible applicants include small businesses, local governments, manufacturers, school districts, colleges and universities, and nonprofit organizations.

- Ohio Energy Loan Fund Overview
- Energy Loan Fund Program Guidelines and Application Process 2019

NET METERING POLICIES AND THIRD-PARTY OWNERSHIP

FINANCING FOR TRANSPORTATION PROGRAMS

A number of public and private/utility programs exist to support clean transportation in Ohio. Not all support the same project or offer the same guidelines, so it is crucial to understand the aims of your electrification plan to best understand what type of program and/or grant suits your specific needs.

Financing programs can take the form of grants, rebate programs, leasing programs, or incentives, and they can be administered through both private and public channels including utility providers. The four major investor-owned utilities in Ohio—Duke Energy, FirstEnergy, AEP Ohio and Dayton Power and Light support accelerating EV adoption and expanding EV charging infrastructure. AEP Ohio has operated an extremely successful EVSE incentive program that directly supported clean transportation initiatives. The first phase of the program was fully subscribed within 17 months, with phase 2 currently underway.

Figure 1.1 and 1.2 exemplify different EV acquisition options to illustrate the diversity of funding and financing options and other creative leasing models.

FIGURE 1.1: EVSE AND EV FUNDING PROGRAMS IN OHIO[130]

Program Name	Description	Source	Ideal Candidate
Commercial (EVSE) Incentive Program	American Electric Power (AEP) Ohio offers financial incentives for the hardware, network services, and installation of EVSE for up to 300 Level 2 and 75 direct current (DC) fast-charging stations.	Private; AEP Ohio	Non-residential AEP customers who want to install EVSE at a public location such as a workplace, government facility, multi-unit dwelling, or other publicly available locations served by AEP
Medium- and Heavy-Duty Emissions Reduction Grants	The Ohio Environmental Protection Agency (EPA) provides matching grants of $50,000 to $2 million for the replacement or repower of medium- and heavy-duty, on- and off-road vehicles with new clean diesel or natural gas, propane, hybrid electric, or all-electric vehicles and equipment in 26 Ohio counties.	Public; Ohio Environmental Protection Agency VW settlement funds	Owners of eligible medium- and heavy-duty diesel fleets (including school buses,transit buses, freight trucks, etc) in priority counties
Diesel Emissions Reduction Grant Program (DERG)	Program provides support to public transit systems serving Ohio counties, for the early retirement and replacement of older diesel transit buses, trucks, school buses, marine fleets, locomotives, and highway construction equipment.	Public; Ohio Environmental Protection Agency; VW settlement funds	Public fleets that operate at least 65% of the time in Ohio counties that have been designated nonattainment or maintenance for particulate matter 2.5 and/or ozone. Private fleets are eligible, but they must establish a public-private partnership with a government entity

There are also acquisition solutions that help to manage the upfront cost of fleet transition through leasing programs and purchasing cooperatives. This type of model is ideal for any government or municipality that does not qualify for other programs but would benefit from financial assistance in managing costs, as seen in Figure 1.2 below. Navigating financing options can be complicated, but organizations like Clean Fuels Ohio can provide guidance with clean transportation laws, incentives, and funding opportunities in Ohio.

FIGURE 1.2: OTHER CREATIVE LEASING MODELS

Provider Name	Description	Type
Mike Albert Fleet Solutions	Lease-to-own contract that allows government entities to partake in the federal EV tax credit program by short-term leasing from a private entity (Mike Albert Fleet Solutions) before fully owning the vehicles	Private company
Climate Mayors Electric Vehicle Purchasing Collaborative	The Collaborative works to leverage the buying power of Climate Mayors cities to reduce the costs of EVs and charging infrastructure for all U.S. cities, counties, state governments and public universities, thereby accelerating fleet transitions.	National Purchasing Cooperative

GREEN BONDS

Green Bonds are defined as fixed income debt instruments used to raise capital to be exclusively used to fund environmental projects. In the majority of cases, green bonds fund large-scale, capital-intensive green infrastructure projects, with similar structure, risk, and return as traditional bonds. Green bonds can be issued by municipal entities, private sector, or multilateral institutions and are subject to the same Municipal Securities Rulemaking Board (MSRB) regulations for purchasing and selling if they are distributed by municipal entities.[131]

Although there is no universally accepted market standard for "green" bonds, there are two internationally-recognized standards that issuers can utilize to attract investors and create successful green bonds. First, the Climate Bond Standard and Certification framework that evaluates whether a bond is consistent with the greenhouse gas mitigation goals of the Paris Agreement.[132] Second, the Green Bond Principles (GBP), created in 2014, are voluntary guidelines managed by the International Capital Markets Association. The GPB guides issuers through key elements of creating and managing green bonds, promoting high disclosure standards and transparency with investors.[133]

Globally, the green bond market has expanded. In 2014, $37 billion in green bonds was issued, increasing to a record-high of nearly $255 billion in 2020.[134] The United States bond market accounted for $50.6 billion of these investments.[135] Most green bonds finance projects that fall into the following categories: green buildings/infrastructure, clean transportation, industrial efficiency, agriculture/bioenergy, water and stormwater management, clean energy, and waste reduction.[136] A 2018 study surveying 2,083 municipal green bonds found that most projects funded were categorized as "public power, mass transit, education (e.g., energy-efficient schools), and water and sewer projects."[137]

Cities can utilize green bonds to finance capital-intensive, long-term environmental projects. The label of "green bond" can expand and diversify the pool of investors that are interested in the city, attracting investors who are motivated by climate action or are trying to reduce their vulnerability to climate risks.[138] Cities should identify existing or potential projects that could qualify under the guidelines of a "green bond." Prior to the issuance of the bond, cities should consult independent reviewers and best practices guidelines to ensure that there are established procedures for tracking and reporting the use of funds and the environmental impacts of the projects.[139] Finally, cities can follow the standard structure and credit rating approvals of traditional municipal bonds to issue green bonds.[140]

CONCLUSION

Power A Clean Future Ohio is committed to making the transition to clean, renewable energy accessible and achievable for every community in Ohio. The Ohio Clean Energy and Sustainable Communities Toolkit provides an introductory guide into the types of opportunities and improvements that your community can implement for change and impact. If pursuing clean energy is a pathway that your community has started or is considering, please join PCFO as a participating community. By joining the campaign, your city will have access to a panel of technical experts and support organizations that will help you develop and implement equitable policy actions that support your community's and the State of Ohio's clean energy future.

Visit https://www.poweracleanfuture.org/ to accelerate your clean energy journey today!

Glossary of Terms

BENCHMARKING: A method to discover current performance of a system or sector by measuring and comparing it to a standard.

IOUS (INVESTOR OWNED UTILITIES): Investor-owned utilities are private enterprises acting as public utilities.

MOUS (MUNICIPALLY OWNED UTILITIES): Utilities that are owned and operated by the local government or another state body to provide a service to the public.

PV SYSTEM (PHOTOVOLTAIC SYSTEM): A technology that converts sunlight (solar radiation) into direct current electricity by using semiconductors. When the sun hits the semiconductor within the PV cell, electrons are freed and form an electric current.

PPA (POWER PURCHASE AGREEMENTS): A contract between a government agency and a private utility company. The private company agrees to produce electricity, or some other power source, for the government agency over a long period of time.

RECS (RENEWABLE ENERGY CERTIFICATES): Certificates that prove energy has been generated from renewable sources such as solar or wind power.

HVAC SYSTEMS (HEATING, VENTILATION, AND AIR CONDITIONING): Heating, ventilation, and air conditioning (HVAC) is the technology of indoor and vehicular environmental comfort. Its goal is to provide thermal comfort and acceptable indoor air quality.

VFDS (VARIABLE FREQUENCY DRIVES): A type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the electric motor.

PACE PROGRAM (PROPERTY ASSESSED CLEAN ENERGY): PACE financing is a means of financing energy efficiency upgrades, disaster resiliency improvements, water conservation measures, or renewable energy installations of residential, commercial, and industrial property owners.

ESID (ENERGY SPECIAL IMPROVEMENT DISTRICT): A specific type of special improvement district. Special improvement districts have long been used by townships and municipal corporations to undertake locally controlled public improvement projects.

EV (ELECTRIC VEHICLE): A broad category that includes all vehicles that are fully or partially powered by a battery-powered engine.

ICE VEHICLE (INTERNAL COMBUSTION ENGINE VEHICLE): An ICE is powered by combustible fuel, often petroleum or natural gas products.

EVSE (ELECTRIC VEHICLE SUPPLY EQUIPMENT): Infrastructure designed to supply power to EVs. EVSE can charge a wide variety of EVs including BEVs and PHEVs.

MUDS: Multi-unit dwellings.

PEV: Plug-in electric vehicle.

GBP (GREEN BOND PRINCIPLES): Promote integrity in the Green Bond market through guidelines that recommend transparency, disclosure and reporting. They are intended for use by market participants and are designed to drive the provision of information needed to increase capital allocation to such projects.

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Appendix A
ADDITIONAL EQUITY INFORMATION

An alliance of trainers and organizers, the Racial Equity Institute (REI) brings awareness to and analyzes the root causes of racial disparities and disproportionality to create racially equitable organizations and systems. They illustrate structural racism in their innovative Groundwater training with a simple analogy:

> *If you have a lake in front of your house and one fish is floating belly-up dead, it makes sense to analyze the fish. What is wrong with it? Imagine the fish is one student failing in the education system. We'd ask: Did it study hard enough? Is it getting the support it needs at home?*
>
> *But if you come out to that same lake and half the fish are floating belly-up dead, what should you do? This time you've got to analyze the lake. Imagine the lake is the education system and half the students are failing. This time we'd ask: Might the system itself be causing such consistent, unacceptable outcomes for students? If so, how?*
>
> *Now... picture five lakes around your house, and in each and every lake half the fish are floating belly-up dead! What is it time to do? We say it's time to analyze the groundwater. How did the water in all these lakes end up with the same contamination? On the surface the lakes don't appear to be connected, but it's possible—even likely—that they are. In fact, over 95% of the freshwater on the planet is not above ground where we can see it; it is below the surface in the groundwater.*[141]

The Cleveland Plan is now in the third year of its implementation. The first year in 2018 was a "Year of Deeper Awareness and Action" outlined in a report by Cleveland Neighborhood Progress (CNP), a local community development funding intermediary helping lead the work.

> *Through organizational introspection and soliciting the insight of our dynamic partners, we created a new strategic plan for the next five years that reflects our best thinking about the potential of Cleveland's community development system to create stronger and more connected neighborhoods. This plan preserves the essential elements of our philosophical commitment to comprehensive community development—an approach that balances the importance of people and place—and refines our strategies in response to the changing nature of our work.*
>
> *Through this strategic planning process, three emergent priorities have been intentionally infused into the DNA of our organization: Policy, Advocacy, and Research; Racial Equity and Inclusion; and Thought Leadership. We believe that each of these priorities are interconnected and mutually reinforcing, and are part of a natural evolution for our organization and for Cleveland's community development industry. The strategic planning process for Cleveland Neighborhood Progress has resulted in a revised mission and vision.*[142]

Racial Equity Institute (REI) Groundwater and Phase I in-depth trainings have been incorporated as foundations to the work. In 2020, the Cleveland-specific trainings led by REI also includes a training on "Latino Challenges" described as:

> *Latino Challenges is a two-day workshop for people who live in or work with Latino communities and are interested in ending racial disparities in our institutions and working together for social justice. Participants engage in a critical analysis of how racism dis-empowers Latinos, hindering both individual well-being and community development. We examine how Latinos have been racialized in the US, as well as the cultural backdrop of race and racism in Latin America that shapes our layered identity today. At the same time, we explore how our particular cultures, identities and histories of struggle are vital sources of strength for individuals and families of Latin American origin in the United States. Further, we directly address how racism is used as a wedge between Latinos and African Americans and undermines the anti-racism movement.*[143]

WHO DOES THIS INVOLVE?

Environmental, public health, and clean energy issues affect all of us, but many community leaders wonder how to engage more people than the few who come to council meeting(s).

The National Association for the Advancement of Colored People's (NAACP) guide, Just Energy and Practices for Action Tool Kit, helps communities create an environmental justice committee and research marginalized communities' energy needs.[144]

Most importantly, think of opportunities in your specific community. Are local or regional sustainability plans being debated, planned, implemented, or updated? How about community agreements, collaborations, or local commissions on any issues, not just environmental? Where have people been naturally plugging in that you hadn't thought of before? How broadly can you go about involving community members from the outset?

Consider reaching out to residents involved with the following types of organizations to help craft equitable solutions in your community:

- Black Indigenous People Of Color (BIPOC) led organizations
- NAACP branch membership, volunteers, and staff
- Local environmental justice organizations
- Local grassroots organizations, coalitions
- Local community councils or neighborhood-sponsored groups
- Local environmental organizations
- African American and Hispanic Chambers of Commerce
- Universities, colleges, and high schools
- School boards, in particular to reach parents in addition to board members
- Churches and places of worship
- LGBTQI+ organizations
- Labor organizations
- Public housing organizations
- Healthcare organizations and Federally Qualified Health Centers
- Individuals who have testified on community issues at your city council committees or body in the past

KEEP ASKING THESE QUESTIONS:

- Do the stakeholders represent a mix of perspectives, experiences, and roles relative to energy justice and community issues in your community?
- Do the stakeholders reflect the diversity of your community in terms of race, ethnicity, age, income level, sexual orientation, education, gender identity, ability, etc.? Casting a wide net ensures that your committee will represent the people who live and are affected by energy injustice in your community.
- Do the stakeholders have all of the skills you think you will need? Who and what skills are missing?
- Are you reaching all of the stakeholders you would like to? If not, is there another way to reach people in different parts of your community you haven't tried yet?

As you're using your diverse, inclusive, and equitable process to gather a list of interested individuals from within your community, the NAACP Just Energy and Practices for Action Tool Kit recommends you also take a step back and analyze your list.[145] Inviting people to the table is just the first step, and like most invitations, asking once usually isn't enough. You'll want to make sure to also think about how you're inviting people to the process, and the method(s) they might use to hear community news of any kind.

Appendix B
OHIO'S ENERGY LANDSCAPE

As stated in the toolkit, Ohio is a deregulated energy state, meaning that customers of investor-owned utilities (IOUs) can choose to buy their energy supply at market prices from a range of private companies. These companies are known as Competitive Retail Electric Service (CRES) and Competitive Retail Natural Gas Service (CRNGS) providers and operate without the price being regulated by the Public Utilities Commission of Ohio. Prior to this deregulation under Senate Bill 3 in July 1999, Ohio's eight electric IOUs powered 91% of the state.[146]

The duties of the state's IOUs were broken up into four components:

- **INCUMBENT UTILITIES** — Also known as Electric Distribution Utilities (EDUs) on the electric side, they provide transmission and distribution service (aka the system "poles and wires" or "pipes")
- **MARKETERS** — Providers who sell retail power supply to residential and business customers
- **BROKERS OR AGGREGATORS** — Service providers who contract with retailers on behalf of individuals or groups of buyers
- **GOVERNMENT AGGREGATORS** — County, municipal, or local community governments that contract with suppliers for service on behalf on their residents

EDUs distribute energy to all customers whether they have switched to an energy marketer, aggregator, or are on the EDU's default service offering. Ohio consumers can shop for a variety of offers, including fixed- and variable-rate plans, with different durations and contract terms.

OHIO'S ENERGY MIX

In 2019, natural gas production in Ohio was more than 30 times greater than in 2012, rising from less than 0.4% of the nation's total to 6.4% during that period.[147] Almost all of the state's natural gas production comes from Utica Shale gas wells, where horizontal drilling and hydraulic fracturing break open rock to release trapped natural gas reserves. Ohio is the 15th largest coal-producing state in the nation, and it is the third-largest coal-consuming state in the nation after Texas and Indiana.[148]

OHIO'S ADVANCED ENERGY PORTFOLIO STANDARD

In 2008, Ohio enacted an Advanced Energy Portfolio Standard, mandating that by 2025, 12.5% of all kilowatt-hours produced by investor-owned electric distribution companies must be generated by renewable sources.[149] The legislation (SB 221) defined renewable sources as including but not limited to wind, biomass, waste heat recovery, and solar. SB 221 also addressed energy efficiency, requiring utilities to a cumulative reduction of electricity consumption 22% by 2025.[150] This Energy Efficiency Resource Standard (EERS) allowed utilities to create peak demand reduction programs for residential, commercial, or industrial consumers. Various incentives were offered by Ohio's electric distribution utilities for each customer class, saving all consumers $5.1 billion in energy bill savings from 2009-2017.[151]

RECENT LEGISLATIVE CHANGES

House Bill 6, recent legislation that went into effect October 22, 2019, made significant, negative changes to Ohio's EERS and Renewable Portfolio Standards (RPS). Titled by its sponsors as the "Ohio Clean Air Program", the law subsidizes coal and nuclear power plants with over $300M to be accrued from the public through energy bill riders while effectively eliminating the EERS and RPS.[152] The RPS is reduced from 12.5% to 8.5% by the end of 2026 and then eliminated altogether.[153] The EERS benchmarks for 2021-2027 are replaced with a 17.5% requirement that can be met through previous efficiency savings, effectively nullifying the requirement for ongoing energy efficiency programs.[154]

OHIO ENERGY REGULATION ENTITIES

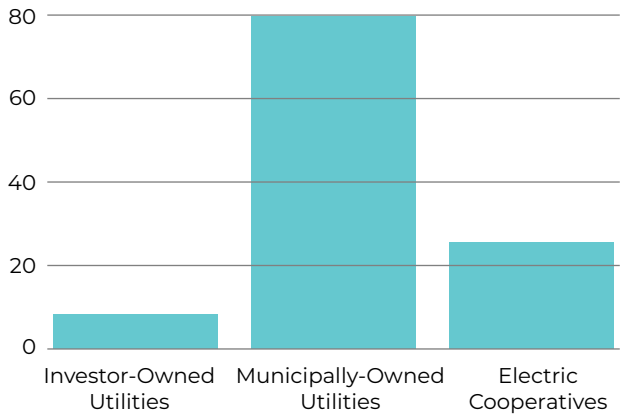
The Public Utilities Commission of Ohio (PUCO) regulates providers of all kinds of utility services, including electric and natural gas companies, telephone companies, water and wastewater companies, and rail and trucking companies.[155] It most recently gained the responsibility for facilitating competitive electric utility choices for Ohio consumers after deregulation in 1999. The Commission staff includes engineers, economists, attorneys, and safety inspectors tasked with ensuring Ohioians have adequate, safe, and reliable services.

The PUCO regulates the generation and distribution services provided by IOUs in addition to their overall costs of serving customers and rate design.

There are three types of electric providers in Ohio:

- **INVESTOR-OWNED UTILITIES (IOUS):** These are private companies financed by a combination of shareholder equity and bondholder debt. Ohio is home to 8 IOUs.
- **MUNICIPALLY-OWNED UTILITIES (MOUS):** These utilities are governed by elected city council members or another commission. Ohio is a leader in municipally-owned utilities in the United States. These MOUs operate with the goal of protecting the independence and constitutional rights of their municipal electric systems. Currently in Ohio, over 80 Ohio municipalities run municipal electric systems.
- **ELECTRIC COOPERATIVES (CO-OPS):** These are private, member-owned entities overseen by a customer-elected board. Today, 25 electric cooperatives serve more than 380,000 homes and businesses in 77 of Ohio's 88 counties. These cooperatives foster collaboration and advocacy for their members with the aim of providing them with affordable power. To transform the electric sector, electric cooperatives enabled by the use of advanced communications and automated technologies drive the resilience of their energy efficiency systems while focusing on reducing environmental impacts.

ELECTRIC PROVIDERS IN OHIO



Competitive retail energy suppliers are also subject to some PUCO regulations, mostly focused on consumer protection. Although Ohio customers pay transmission costs through their utility bills, most regulation of utility transmission investments as well as wholesale markets for energy (e.g., sales between generators and energy providers) is handled at the federal level.

Non-investor-owned-utilities such as municipal utilities and electric cooperatives are not classified as public utilities and thus are not regulated by the PUCO. All operations of these locally owned utilities, including rate design, are overseen by elected boards.

FIND YOUR ELECTRIC UTILITY HERE!

The Ohio Power Siting Board (OPSB) must approve the construction of generation projects greater than 50 MW in the state, regardless of who owns the projects, as well as "economically significant wind farms" sized between 5 and 50 MW.[156] The OPSB also oversees the construction transmission infrastructure projects in the state of Ohio. Where a project receives OPSB approval, it is generally exempt from local siting regulation.

Appendix C
CLIMATE ACTION AND SUSTAINABILITY PLANNING

Climate Action Plans and Sustainability Plans are strategic guides for cities to improve outcomes related to the environment and climate change. When deciding between which plan to create, cities should consider what they would like the scope of their planning effort to include.

Generally, Climate Action Plans tend to be more narrowly focused on measuring, planning, and reducing greenhouse gas emissions and the impacts of climate change. Expanding further, Sustainability Plans address broader environmental, social, and economic issues that extend beyond the direct scope of climate change. Since climate mitigation and adaptation strategies can extend to multiple aspects of sustainability, communities have incorporated Climate Action Plans as a part of their comprehensive Sustainability Plans in the second phase of planning.

CLIMATE ACTION PLANS

Climate Action Plans establish targets, measures, strategies, and policies for climate mitigation and adaptation. Greenhouse gas inventories are at the foundation of Climate Action Plans; these inventories catalog the emissions from production and consumption within a municipality's boundaries. By conducting a greenhouse gas inventory, cities can identify areas where climate mitigation strategies will be most impactful to reduce the city's overall greenhouse gas emissions. This data can also be used to set achievable, but ambitious goals and measure progress over time.[157] Climate Action Plans should also address strategies for climate adaptation. Cities should evaluate the existing and potential future impacts of climate change. Once these vulnerabilities are identified, cities can create strategies to prepare their communities for unavoidable climate impacts.

SUSTAINABILITY PLANS

Sustainability Plans take a more holistic approach to community health, advancing goals across environmental, economic, social, and public health sectors. These plans establish an actionable, long-term guide to improve quality of life and environmental outcomes for the community. Beyond the climate-specific goals of Climate Action Plans, Sustainability Plans employ cross-sector strategies to achieve both environmental goals and other benefits. For example, cities can create goals to diversify their zoning codes to encourage compact, multi-use development that can reduce greenhouse gas emissions, increase affordable housing, and encourage non-vehicle transportation.[158]

Choosing the Right Plan

When a city is deciding on an environmental planning pathway, there are a few key considerations:

1. What is the preferred scope of the plan?
2. What are the existing gaps in the city's goal-setting documents and strategic initiatives?
3. What is the city's existing budget for plan development?
4. What is the city staff's current capacity?
5. What current data assets does the city have?

Since Sustainability Plans have a much broader scope, they tend to be more labor and resource intensive than Climate Action Plans. This will require greater staff participation and typically a larger budget for plan development.

PRIORITY AREAS FOR STRATEGIC PLANNING

There are 10 main priority areas that Sustainability Plans and Climate Action Plans cover. Overall, Climate Action Plans tend to encompass the first 6 priority areas, while Sustainability Plans extend to all 10 priority areas. This information is intended to provide background on the scope of a comprehensive plan. Power a Clean Future Ohio can provide assistance in any of the areas discussed in the carbon reduction strategies sections of this toolkit and can also offer suggestions for finding support in other priority areas that are outside the campaign's expertise.

1. **ENERGY EFFICIENCY AND BUILDINGS:** Reducing energy usage of new buildings and renovating old buildings by optimizing processes such as lighting and improving insulation to reduce need for heating and cooling
2. **CLIMATE ADAPTATION AND RESILIENCE:** Improving the community's preparedness to adapt to increased climate vulnerabilities, health risks, and climate related disasters
3. **RENEWABLE ENERGY:** Increase the share of renewable energy in the city's energy profile through procurement or local generation
4. **TRANSPORTATION AND MOBILITY:** Decreasing carbon emissions from transportation and passenger vehicles by optimizing the efficiency, accessibility, and affordability of public transportation
5. **WASTE MANAGEMENT:** Expanding local recycling and composting systems as well as increasing public waste education to promote landfill diversion and food waste reduction rates
6. **NATURAL RESOURCES AND MANAGEMENT:** Leveraging data and best management practices to protect and enhance green spaces that increase air quality, water quality, and habitat preservation
7. **ECONOMIC DEVELOPMENT:** Financially investing in green job opportunities, workforce development, and sustainable businesses to adapt to foster economic growth with sustainable development.
8. **LAND USE:** Utilizing land to fit community needs and promote sustainability such as the implementation of green spaces, affordable housing, and mobility infrastructure.
9. **DIVERSITY, EQUITY, AND INCLUSION:** Centering on equitable approaches to planning, infrastructure, and local programs that include and address the needs of vulnerable populations such as the unhoused population and low-income communities.
10. **COMMUNITY HEALTH:** Improving public health outcomes related to environmental issues, including respiratory illness from poor air quality, heat-related illness due to extreme heat events, and barriers to physical exercise such as a lack of green space

Priority Area	Exemplary Strategies
Energy Efficiency and Buildings	• Install LED fixtures for indoor and outdoor lighting • Upgrade HVAC systems for energy efficiency • Enact a Energy Benchmarking Ordinance for large municipal and commercial buildings
Climate Adaptation and Resilience	• Implement green stormwater infrastructure to reduce flooding and pollutant runoff • Assess the urban heat island effect in the community • Engage vulnerable communities to prepare for extreme weather events
Renewable Energy	• Support community solar gardens • Consider net metering for city-owned or residential solar energy generation • Explore innovative financing for municipal solar, including PPAs or GESCs
Transportation and Mobility	• Encourage shared mobility options for first-mile, last-mile connections to public transit • Transition the city's fleet to electric vehicles • Expand mobility options and access for low-income communities
Waste Management	• Utilize data to increase the efficiency of waste collection • Create a zero waste strategy for the city to increase landfill diversion • Generate community engagement materials to encourage residents to reduce waste
Natural Resources and Management	• Create a forestry plan and tree cover goal • Utilize GIS and other technology to inventory and monitor natural resources • Develop goals for access to green space or municipal parks per 1000 residents
Economic Development	• Prioritize workforce development in sustainable industries • Develop 'innovation districts' to pilot best practices in sustainable development and centralize public transit access • Integrate sustainability in economic development programs for businesses and community development
Land Use	• Explore new development code opportunities, including compact development, mixed-use zoning, and transit-oriented development • Improve equitable access to open spaces • Design streets to encourage non-vehicle transportation methods
Diversity, Equity, and Inclusion	• Expand resources for homeless populations and low-income families • Advance digital equity by expanding access to Internet, digital devices, and digital literacy • Prioritize diversity, equity, and inclusion in every project
Community Health	• Address and prepare for the public health risks from extreme heat • Create a network of community partners to increase awareness and preparedness for climate-related risks • Reduce air pollution to mitigate respiratory illness

PLANNING PROCESS—AT A GLANCE

1. Establish a leadership and management structure for the planning process, including budget and city staff capacity
2. Identify the goals and quantifiable targets for the next 5, 10, 15 or 20 years for the city
3. Conduct a baseline assessment, including data sets, existing and completed projects, and technology tools
4. Evaluate the existing gaps in goals and programming related to climate change and sustainability
5. Cultivate a network of partners from local and regional municipal agencies, private sector, academia, and community-based organizations
6. Develop a draft of the plan, including quantitative and qualitative targets, benchmarks, strategic actions, and key performance indicators
7. Gather comprehensive feedback from stakeholders and conduct community engagement to gain public feedback
8. Publish the final plan with transparency and accountability mechanisms, such as an online portal for progress on key performance indicators[159]

KEY ELEMENTS OF THE PLANNING PROCESS

GREENHOUSE GAS INVENTORY

A greenhouse gas inventory defines the amount of greenhouse gas emissions produced in a defined geographic area. Most cities partner with private consultants or non-profit organizations to complete the greenhouse gas inventory. The footprint analyzes emissions by sector, with the most common sectors being energy use, transportation, waste and wastewater management, industrial processes, and goods consumed within the municipality. There are also two types of approaches. Both include emissions from consumption and production inside of the city; however, a sector-based approach includes GHG emissions from items produced in the city and exported elsewhere. On the other hand, a consumption-based approach includes emissions from imported products consumed within the city.[160]

A few resources for creating a greenhouse gas emissions inventory include:

- Carbon Disclosure Project
- ICLEI Greenhouse Gas Protocols
- EPA Local Greenhouse Gas Inventory Tool

An example of a county that worked with a group of cities to develop their GHG emission inventory can be found here.

STAKEHOLDER ENGAGEMENT

Cities should engage a diverse group of stakeholders from the public sector, private sectors, community-based organizations, academia, and others. In the planning process, this cohort can provide insight into community needs, particularly in relation to enhancing diversity and equity. Participation in planning can also increase the long-term success of the plan by establishing partnerships to implement initiatives and achieve goals. By leveraging a coalition, the city can diversify and expand the scope of the plan's strategies and goals, encouraging multi-sector solutions. Coalition members, specifically in the private sector and academia, often have direct control of infrastructure and personnel. Therefore, these members can reflect the city's goals into their organization to achieve environmental benefits, such as reducing greenhouse gas emissions, encouraging non-vehicle commuting, and increasing renewable energy capacity. Finally, creating a coalition can increase the financial resources and community participation in environmental initiatives.

KEY PERFORMANCE INDICATORS

For each goal set, the city should create key performance indicators (KPIs) to establish a baseline and track future progress over time. In addition to internally evaluating progress, cities have also created online portals for residents to view the city's progress on climate action and sustainability goals through KPIs. These public-facing portals can improve government transparency and accountability, advance community engagement, and connect residents to ways to get involved.

TIMELINES AND FINANCING MECHANISMS

In the final plans, cities should develop actionable timelines with key project milestones to make implementation more efficient. However, prior to implementation, cities should determine an approximate budget for each project and identify funding sources. For environmental and sustainability projects, cities have used both traditional and innovative financing mechanisms. Traditional financing may include general funds, green municipal bonds, or grants. To expand financing options, cities have also utilized more innovative approaches, such as public-private partnerships, guaranteed energy savings contracts, or community innovation programs.

Sustainability Plans:

1. 'Sustainability Action Agenda' - **City of Detroit, MI (Summer 2019):** The Plan includes 10 goals and 43 actions to achieve four main outcomes: 1) healthy, thriving people, 2) affordable, quality homes, 3) clean, connected neighborhoods, and 4) an equitable, green city. Through this Plan, the City has fundamentally tied sustainability and quality of life together.
2. 'Thrive Indianapolis' - **City of Indianapolis, IN and Marion County (February 2019):** This is the first planning document for sustainability and resiliency action that the City of Indianapolis has produced. The final plan includes 16 key objectives and 59 strategic actions to accomplish by 2025. One of the noteworthy goals of the plan is for the city to be carbon neutral by 2050.
3. 'Sustainability Action Plan' - **City of Bloomington, IN (October 2018):** This Plan was the first formal sustainability planning effort by the City of Bloomington. The Sustainability Action Plan received the Indiana Department of Environmental Management's award in the category for Greening the Government.
4. 'Green Cincinnati Plan' - **City of Cincinnati, OH (May 2018):** The Green Cincinnati Plan defines the City's vision to be a sustainable, equitable, and resilient city. Overall, the Plan includes 80 climate strategies to reduce greenhouse gas emissions by 80% by 2050. The Plan also addresses recommendations to improve resilience, develop the green economy, and advance equity.
5. 'Sustainability Plan: FY2017-FY2021' - **City of Grand Rapids, MI (July 2016):** The City of Grand Rapids has created a reputation for sustainability success in Michigan, earning gold certification from the Michigan Green Communities Network. This Sustainability Plan outlines four pillars for sustainability, including economic, social, environmental, and governance approaches.
6. 'Columbus Green Community Plan (2015-2020): Green Memo III' - **City of Columbus, OH (2015):** Green Memo III builds on Columbus's series of 5-year sustainability plans, which began in 2005. This plan helped Columbus achieve the 4-STAR community ranking by the STAR Community Ranking system in 2016.

Climate Action Plans:

1. 'A2Zero Climate Action Plan' - **City of Ann Arbor, MI (April 2020):** A coalition of 60 stakeholders collaborated to plan and achieve carbon neutrality by 2030. The success of this plan centers around 6 key strategies and 44 actions.
2. 'Cleveland Climate Action Plan' - **City of Cleveland, OH (2018 Update):** Since the release of the first Climate Action Plan in 2013, Cleveland has supported more than 50 community-led, neighborhood-based projects and installed more than 70 miles of bike infrastructure. The updated 2018 Plan has put social and racial equity, green jobs, climate resilience, and business leadership at the forefront of their continued climate work.
3. 'Climate Action and Resilience Plan' - **City of Evanston, IL (November 2018):** Though Evanston has already successfully implemented 2 climate action plans, their new climate plan has committed to ambitious goals, including being carbon neutral by 2050, 100% renewable energy by 2030, and zero waste by 2050.
4. 'Climate Action and Adaptation Plan' - **City of Iowa City, IA (September 2018):** The Plan includes strategies for both the public and private sectors to achieve 45% reduction in greenhouse gas emissions by 2030 and net-zero emissions by 2050.
5. 'Detroit Climate Action Plan' - **City of Detroit, MI (October 2017):** The Detroit Climate Action Plan was created by a coalition of 26 businesses, environmental organizations, community-based groups, and universities. Integral to their climate action is improving public health outcomes and environmental conditions for all residents to advance equity.

6. 'Climate Action Plan Phase 2: 2015-2020' - **City of Urbana, IL (2015):** The City's second Climate Action Plan outlines 6 goals and 23 actions. In the 2019 Sustainability and Resilience Annual Report, the City had completed 35% of the Climate Action Plan's proposed actions, maintained continuous progress on 17%, and showed 34% in progress.

Planning Resources:

1. 'Climate Action Planning Guide' - **Climate Smart Communities Program by New York State:** The Climate Action Planning Guide provides an introduction to climate action planning and has a framework to develop a successful greenhouse gas mitigation plan. The Guide outlines steps in the climate action planning process.
2. 'A Sustainability Planning Guide for Healthy Communities' - **Centers for Disease Control and Prevention:** The Sustainability Planning Guide provides a process for developing policy strategies and successful implementation. The Guide also includes development strategies and management techniques for a Sustainability Coalition.
3. 'Local Climate Action Framework: A Step-by-Step Implementation Guide' - **U.S. EPA:** This website provides a high-level framework to guide local governments through climate action planning.
4. 'Quick Start Guide for Climate Action Planning' - **California Statewide Energy Efficiency Collaborative:** The Guide provides a 10 step process to creating a Climate Action Plan, including strategies for success at each step.
5. 'Planning for a Sustainable Future: A Guide for Local Governments' - **U.S. EPA:** This Guide provides steps to start sustainability planning and areas of opportunity to improve sustainability for local governments.