



ANN ARBOR'S SUSTAINABLE ENERGY UTILITY

**A publicly owned, locally powered,
reliable, clean, fast, and equitable
power model for our community.**



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EXECUTIVE SUMMARY

“The City of Ann Arbor has adopted an aggressive goal of a just transition to community-wide carbon neutrality by the year 2030 (known as A²ZERO).”



EXECUTIVE SUMMARY

The City of Ann Arbor has adopted an aggressive goal of a just transition to community-wide carbon neutrality by the year 2030 (known as [A²ZERO](#)). Achieving this goal will require ambitious and transformative practices. In the course of reviewing pathways to achieve A²ZERO, especially within the power sector, an idea emerged of creating a sustainable energy utility. A sustainable energy utility (SEU) is a non-profit, publicly owned, municipal utility that focuses on providing affordable, 100% renewable, reliable, and locally sourced power. A SEU is not your parents' – or your grandparents' – kind of utility. It is a model that uses modern energy technology to give residents **reliable**, truly **local**, **clean**, **equitable**, and nearly always **cheaper** energy – **quickly**.

The idea for an Ann Arbor SEU emerged after an Ann Arbor Energy Commission meeting in early spring of 2021. In that meeting, the Commission was presented with details about laws that constrain Ann Arbor's utility options, different forms of community energy procurement, and what possibilities might exist to reach Ann Arbor's goals given those restrictions. While neither speaker explicitly spoke about a SEU, the ideas presented in that meeting instigated research into the creation of a municipal utility built entirely on clean, local, distributed energy technologies instead of traditional generation and distribution models, delivered over failing infrastructure.

Shortly after this Energy Commission meeting, staff in the Ann Arbor Office of Sustainability and Innovations (OSI) reached out to two locations where SEUs are up and running: Delaware and the District of Columbia. While these SEUs operate in areas with more flexible legal frameworks than Michigan, these conversations provided valuable information into how existing SEUs operate, their strengths, and opportunities for enhancement. Following these conversations, OSI created a conceptual model of a Michigan-specific SEU and reached out to five experts in various areas of energy-related law, policy, and technology to gather their professional insights into the viability of the model. All conveyed excitement at the prospect of an Ann Arbor specific SEU, and a willingness to engage with the City to more fully explore the concept.



Fast forward to today. After working closely with these technical advisors to analyze legal, technical, policy, and economic questions, we are delighted to share our findings. The ultimate result: a sustainable energy utility is not only possible in Ann Arbor, it's more reliable, cheaper, cleaner, more local, and more equitable than our current energy system and than a traditional municipal utility. It would not require us to buy the existing investor owned utility's (IOU) aging distribution infrastructure. Plus, we can start working on it today.



Imagine a 100% renewably-powered, resilient, local, shared, and publicly owned municipal energy utility; built by the community for the community. That's the vision for an Ann Arbor Sustainable Energy Utility, one that has the potential to almost immediately become a transformational component of our work to achieve a just transition to community-wide carbon neutrality.

A SEU is not about buying the IOU's substations, circuits, poles, and wires. It is not about investing in an outdated utility model with aging infrastructure. Instead, a SEU focuses investments in local energy generation (e.g., solar and geothermal), rigorous energy waste reduction measures, beneficial electrification, and energy storage across a given geography (i.e., neighborhood, commercial corridor). The solar and energy storage systems could be installed for a single households or business, or, more ideally, be connected across each household or business through a series of microgrids. Microgridding is a critical feature of the SEU, allowing individuals to generate, share, and manage power together in a model that would result in better reliability and more equitably advance energy justice. Over time, the SEU could grow to support additional initiatives such as district geothermal systems or other programs and initiatives desired by the community.

A SEU would be a parallel energy service to the existing IOU, meaning that, at least at first, residents would receive services through the SEU but could still choose to be connected to the traditional grid. By providing a parallel energy service rather than trying to force the IOU to sell us their outmoded, aging infrastructure, the SEU avoids years and significant expenses associated with litigation. Instead, the SEU can immediately focus its attention on generation - ensuring we install new, renewable, zero emissions energy systems in our community in a timeframe commensurate with our 2030 goal. Every dollar we don't spend in litigation or to buy the IOU's old, failing infrastructure is money we can spend on new infrastructure here in Ann Arbor to generate power, distribute power, and store power - dollars we can use to immediately provide reliable, clean, and affordable public power to everyone.

The remainder of this report explores more fully what a SEU is, how it could operate, the value it could provide to the community, and how we can get started.

INTRODUCTION

“In November of 2019, Ann Arbor City Council unanimously declared a climate emergency and set the goal of a just transition to community-wide carbon neutrality by the year 2030.”



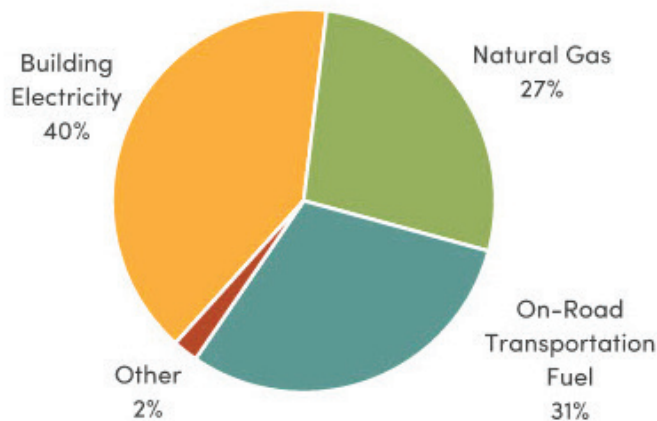
INTRODUCTION

In November of 2019, Ann Arbor City Council unanimously declared a climate emergency and set the goal of a just transition to community-wide carbon neutrality by the year 2030. A few months later, City Council reaffirmed its commitment to climate action by adopting [A²ZERO](#), the City's aggressive, ambitious, and living strategy for achieving community-wide decarbonization. Guided by the values of equity, sustainability, and transformation, A²ZERO is centered on seven overarching strategies:

- 1 Powering our electrical grid with 100% renewable energy.
- 2 Switching our appliances and vehicles from gasoline, diesel, propane, coal, and natural gas to electric
- 3 Significantly improving the energy efficiency in our homes, businesses, schools, places of worship, recreational sites, and government facilities.
- 4 Reducing the miles we travel in our vehicles by at least 50%.
- 5 Changing the way we use, reuse, and dispose of materials.
- 6 Enhancing the resilience of our people and place.
- 7 Cross-cutting actions.

Securing renewable energy for our community is paramount to achieving our carbon neutrality goal at the ambitious pace and scale necessary. This is particularly relevant because 40% of Ann Arbor's greenhouse gas emissions come from electricity usage. Most of the remaining 60% of emissions result from the combustion of fossil fuels: primarily natural gas and gasoline. To address these realities, the A²ZERO plan combines renewable energy generation with

Community-wide Greenhouse Gas Emissions by Source



beneficial electrification and energy waste reduction (e.g., efficiency) to achieve community-wide decarbonization. But, given our local energy usage profile, this means that what currently represents 98% of our community's emissions will need to be supplied by renewable energy, and fast.

In creating the A²ZERO plan, staff worked with thousands of members of the public and dozens of technical advisors. Those engagement and prioritization exercises led to the inclusion of numerous local renewable energy projects into A²ZERO, along with a recommendation to pursue Community Choice Aggregation (CCA). CCA programs are bulk electricity purchasing arrangements through which municipalities negotiate electric supply rates with power providers on behalf of the residents and business owners within their jurisdiction¹. Put another way, CCAs allow communities to make energy supply decisions without buying the poles and wires of the existing electric

utility.² CCAs have been around for over 20 years and have evolved during that time from being effectively renewable energy credit programs (CCA 1.0) to large-scale renewable energy generation programs (CCA 2.0) to focused on local decarbonization (CCA 3.0).

1 <https://www.leanenergyus.org/what-is-cca>

2 https://icma.org/sites/default/files/306456_Community%20Choice%20Aggregation%20Fact%20Sheet.pdf



Because of the prominent role CCA plays in A²ZERO, the Energy Commission invited one of the founders of the model, Paul Fenn, to present during a commission meeting in spring 2021.³ During his remarks, Mr. Fenn shared the history of CCAs and the growing interest and movement towards CCA 3.0 with its focus on local decarbonization. In the arc of this presentation, Mr. Fenn shared some provocative ideas about how local decarbonization could happen in a timeframe commensurate with the ambition established in A²ZERO. His remarks were preceded by a presentation from Attorney Valerie Brader exploring the legal history of the Foote Act (more details below), which helped provide a legal framework for energy law in Michigan.

Going into this presentation, the community conversation around energy choice had squarely centered on three options: do nothing and stay with our investor owned utility; form our own traditional municipal utility; or work to create CCA legislation. These options are not mutually exclusive or collectively exhaustive, but they were the primary options being discussed publicly. Yet, when the presentations from Attorney Brader and Mr. Fenn were combined, another possibility emerged – the creation of a municipal utility that focused on CCA 3.0 (aka, local decarbonization) (this becomes the foundation of the sustainable energy utility recommendation).

This possibility was enticing. Could there be a pathway that allowed us to form a municipal utility that focused on limited-poles and wires solutions, thereby increasing reliability and advancing sustainability? Could we avoid long legal battles and being saddled with failing infrastructure, along with inordinate amounts of debt, while still working towards public ownership? Could we immediately begin investing in creating the clean energy future we need to achieve our goals in a more equitable and just fashion? Could we avoid challenges with the Michigan Legislature and use existing authority to begin work immediately? Could we actually create a municipal utility that improves reliability and customer service while ensuring that our power is clean, local, and cheaper than what we currently have and than what could be offered through a traditional poles and wires municipal utility?

Staff in the Ann Arbor Office of Sustainability and Innovations wanted to know more so they reached out to a few trusted colleagues to gauge their insights, reflections, and cautions. A few colleagues identified the concept of a Sustainable Energy Utility and its potential alignment with CCAs. Staff were intrigued and reached out to [Delaware Sustainable Energy Utility](#) and the [D.C. Sustainable Energy Utility](#) to learn about their operations. Those conversations shed important insight into how these models work, their enabling legislation, how they are funded and staffed, what services they offer, and the strengths and limitations.

With this new data in hand, staff conceptualized and began to outline an Ann Arbor specific Sustainable Energy Utility. The model focused on using the right of Michigan municipalities to create their own municipal utility despite existing electric franchise holders (more details in the Foote Act section). It centered A²ZERO and the goals, ambitions, and values articulated in that plan. Then staff started to ask – is this really possible?

To answer that question, staff convened a small group of individuals to help understand and analyze the legal, technical, policy, administrative, financing, and social feasibility of creating a locally owned sustainable energy utility.⁴ This group of individuals was originally asked to work with the City over a 8-month period to create a report on whether or not a SEU was possible for Ann Arbor and if so, what it should include and how it could be initiated. This work was slated to conclude in early 2022.

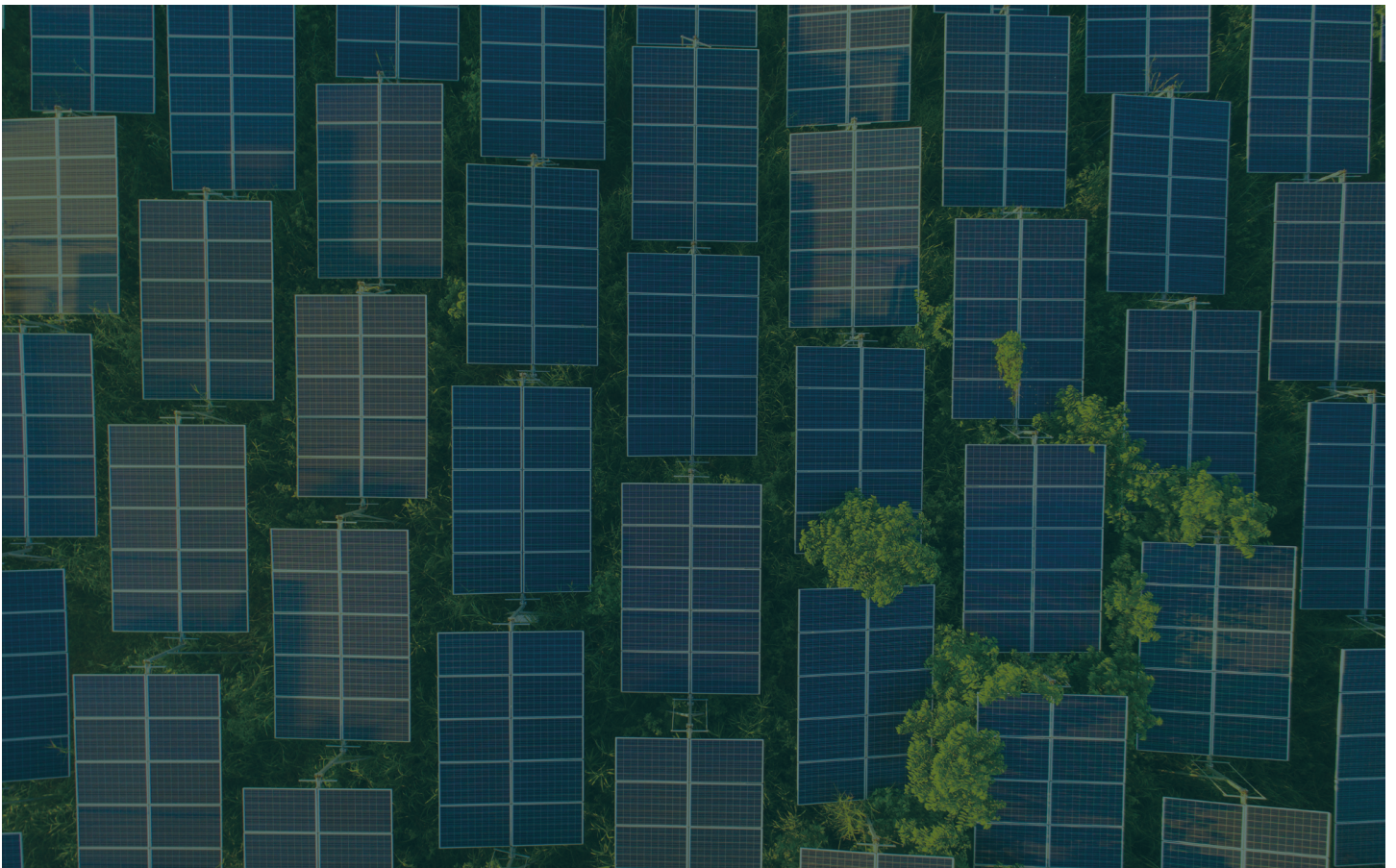
However, as the group got into their work, two things happened. First, many of the key questions about feasibility were easily answered, affirming the City's ability to create a SEU. Secondly, community conversations around starting a traditional municipal utility, focused on owning the poles and wires and the generation and distribution network, were gathering momentum. These efforts focused solely on creating a traditional municipal utility, and acquiring all the liability and risk that comes through this model. But none of those conversations focused on the creation of a limited-poles and wires alternative, like the sustainable energy utility staff and technical advisors were analyzing. Because preliminary analyses showed that a SEU aligned very closely with the goals of A²ZERO, is a municipal utility with associated public ownership, and is faster, cheaper, less risky, cleaner, more reliable, and more local than our current energy system and than a traditional municipal utility, staff decided to expedite the release of this report so that a SEU could be considered as part of the public's deliberations around public power and equitable decarbonization.

³ Ann Arbor's Energy Commission Meeting – March 9, 2021: <https://www.youtube.com/watch?v=C3zGrm0fF3A>

⁴ Representatives included: Douglas Jester, Gregory Bolino, Henry Love, Paul Fenn, and Valerie Brader along with Ann Arbor staff

WHAT IS A SUSTAINABLE ENERGY UTILITY

“Imagine a 100% renewably-powered, reliable, local, shared, and publicly owned energy utility; built by the community for the community.”



WHAT IS A SUSTAINABLE ENERGY UTILITY (SEU)

This section provides more details about what a SEU is and how it compares to more traditional electric utility options including working with an investor owned utility and creating a traditional municipal utility.

Vision for a Sustainable Energy Utility

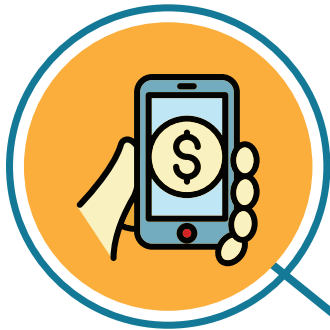
Imagine a 100% renewably-powered, resilient, local, shared, and publicly owned energy utility; built by the community for the community. That's the vision for the Ann Arbor Sustainable Energy Utility.



Traditionally, an electric utility was an all-or-nothing proposition – each customer/household could have only one provider, which would provide 100% of their energy services. Innovations in distributed energy and advancements in energy technologies mean we can think about that differently now – and the SEU envisions a new type of entity that focuses on community installed and community-owned clean energy.

A SEU is a publicly owned municipal utility. What's different, however, is that a SEU does not own or utilize large-scale poles and wires (known as the electric transmission and distribution system). Instead, a SEU generates power through local renewable energy installations such as SEU installed solar/battery systems that provide power to your home or

business, and microgrids or geothermal systems that allow you and your neighbors to share power generated in your neighborhood. In addition to providing power from local renewable energy, the SEU could provide services such as more holistic energy waste reduction (efficiency) upgrades, support with beneficial electrification, and billing and payment options that DTE doesn't offer (e.g. on-bill financing).



Think of improving the insulation in your attic, replacing old inefficient appliances with new high-efficiency electric versions, and installing solar. This would have a high up-front cost, but can significantly reduce energy bills. On-bill financing could enable these changes with little monthly costs to the homeowner, as the financing could be spread out over long periods of time, and the savings from the energy upgrades could help offset the payments. This also helps senior citizens or renters who want to enjoy the added comfort and the opportunity to lower their energy costs but may not be sure how long they will be able to stay in their current dwelling.

A SEU would supplement the current investor-owned utility, allowing residents and business owners more than one choice about where they get their energy. This approach allows us to immediately reduce climate pollution by focusing on new, local, clean energy installations, improve our resilience during major grid events, improve the comfort, safety, and long-term value of our homes and businesses, help lower-income residents make their bills more affordable, and invest in our local economy. A SEU is a pathway to our energy future – one that lessens our reliance on the large-scale production and distribution of the past (i.e., the grid), and all the risks, vulnerabilities, and costs associated with that system.

Objectives for a Sustainable Energy Utility

In designing a SEU, the City focused on six objectives:

- 1** Shifting our energy system from carbon intensive energy sources to carbon-free energy sources as outlined in A²ZERO;
- 2** Finding solutions commensurate with the pace necessary to achieve a just transition to community-wide carbon neutrality by 2030;

- 3 Creating a customer-centric model that empowers people and businesses—regardless of their size or location-- to have choice in meeting their energy needs;
- 4 Centering the needs of low-income and historically under-represented groups in the energy system and ensuring they have access to programs that improve comfort, affordability, and sustainability;
- 5 Moving away from viewing energy as a commodity to viewing energy as a service; and
- 6 Improving our energy system’s reliability and resilience by lowering our dependence on a single grid.

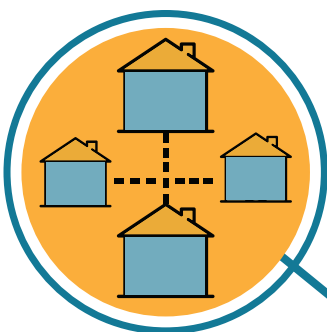
What services could a Sustainable Energy Utility offer

Because a SEU is a municipally-owned utility, it can offer many things not currently available to Ann Arbor residents. In designing a model SEU, staff envisioned it helping residents and businesses reduce energy usage, utilize renewable energy, electrify buildings and transportation systems, improve resilience, save money, and improve indoor comfort, health, and safety.

More specifically, staff envisioned a SEU that offered some or all of the things our residents have told us they want:

- Improved resilience during power outages, by increasing residents’ access to solar and energy storage;
- Microgrids between neighboring households, where solar and storage are shared;
- Robust energy waste reduction (efficiency) programs and rebates to support residents – even those who don’t own their dwellings -- with improving indoor comfort, health, and safety, all while saving money;
- On-bill financing to help lower the costs and increase the flexibility of paying for our clean energy transition;
- District level geothermal systems so that neighbors can jointly tap into the earth to heat and cool their homes and businesses;
- Community solar programs that allow neighboring residents to benefit from solar installed at community centers, in parks, or in shared areas around the City;
- Support for beneficial electrification and associated training and rebate programs to help people transition to cleaner and safer all-electric homes and businesses; and
- Energy justice initiatives, including broad and deep access to renewable energy, the creation of programs for low-income and underserved residents, and the expansion of weatherization services.

Regardless of where we begin, one thing is clear: a SEU must provide electricity. Because of this, we propose starting the SEU immediately by providing four core services: 1) creating solar and storage systems to boost resilience at single locations; 2) piloting microgrids in target neighborhoods; 3) creating robust energy waste reduction offerings; and 4) setting up on-bill financing offerings.



Why microgridding? Currently, people with solar systems at their homes or businesses cannot share this electricity across property lines, because they are not a utility. If the City were to create a SEU, microgridding would become available. Microgrids like this could pair solar generation with energy storage to distribute electricity at scales larger than an individual home/building, meaning the SEU could design solar and energy storage systems for a whole neighborhood with residents literally sharing power. In addition to the climate benefits of microgridding with renewable energy, these power storage and sharing abilities sharply improve resilience, and help expedite equitable access to renewable energy.

How does a Sustainable Energy Utility compare to a traditional municipal utility?

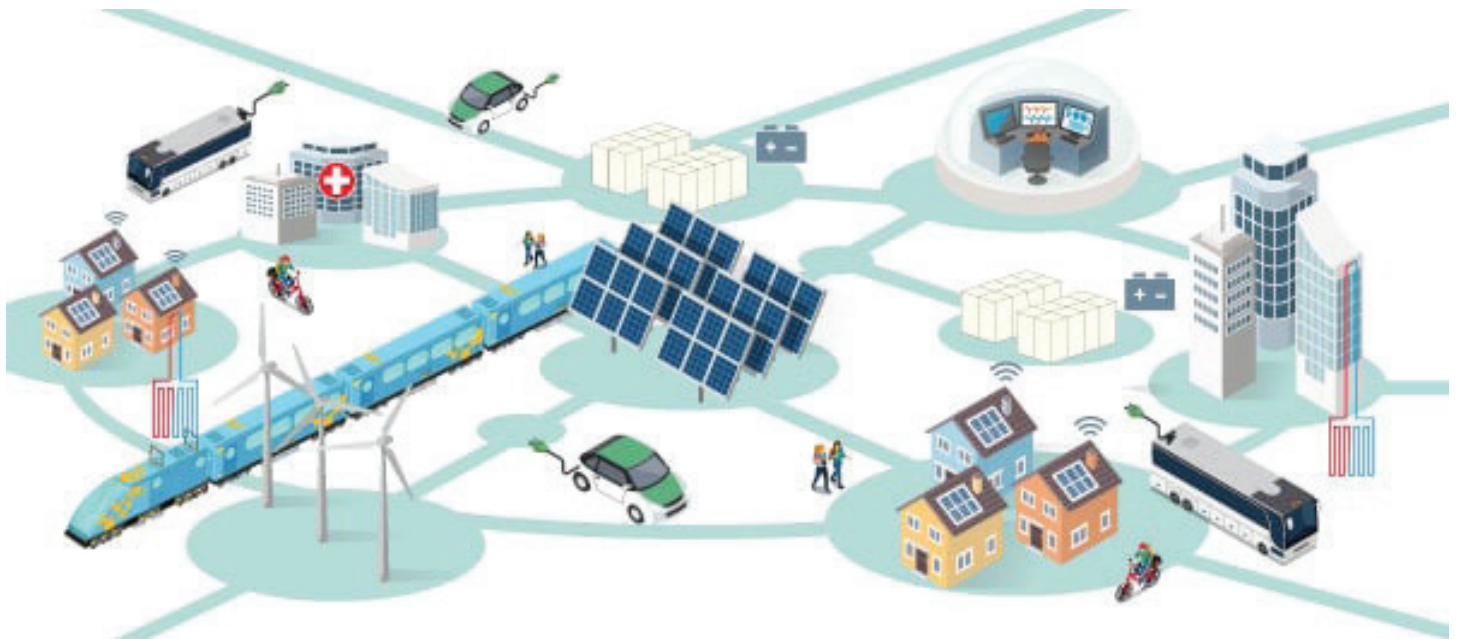
There are varying forms of municipal utilities, but the most common is a public utility which owns the electrical distribution infrastructure and sells electricity from third party generators to its customers which are physically connected to “the grid.” When an entity tries to municipalize in this way, it must use a court process to determine the value of the incumbent utility’s assets and purchase that infrastructure from the utility. Historically in municipalization efforts, these negotiations can take years and cost millions to litigate. If successful, the newly formed utility has significant debt its residents must bear associated with purchasing infrastructure from the previous utility – infrastructure that may not be in the best condition. And the utility still has to determine how it will provide 24-7 power to its customers and meet reliability standards– through power purchase agreements, new generation, or other means.

In contrast, a SEU, as envisioned, would move away from this structure. It would not focus on buying existing poles and wires from an investor owned utility, but would instead focus on investing immediately in local clean energy generation from things such as solar and energy storage. As discussed in the legal section of this report, because the City would not be procuring existing infrastructure from our investor owned utility, we will be able to move much more quickly into action than would otherwise be possible – putting generation into place to advance our 2030 goal. Put another way, if we created a SEU, we could use our resources to immediately begin

investing in local renewable energy projects.

How could the SEU support energy waste reduction

A traditional investor-owned utility (IOU), regulated by the Michigan Public Service Commission (MPSC), is required by law to help individuals reduce their energy usage. However, it can be difficult to make this financially attractive to a for-profit business, because IOU’s traditionally make money and service their debt by selling more energy and building physical infrastructure. In contrast, a municipal utility has no profit motivation and seeks to provide services at cost to its residents. If the utility operated using traditional poles and wires plus energy generation (i.e., a traditional municipal utility), it would have significant costs to recover, limiting the investment that could be made in new technologies and saddling the City with any problems the existing infrastructure may have. In contrast, a SEU would focus on local decarbonization, meaning that energy waste reduction would have to be an important service offering because lowering demand maximizes the benefits of the SEU assets (we don’t have enough roof space, parking lots, and open spaces to meet our current power needs 100% of the time). This means that instead of fixing yesterday’s problems, Ann Arbor’s SEU could invest its money and efforts into tomorrow’s solutions like newer, greener technologies, as well as the deep efficiency and waste reduction efforts that immediately assist homeowners, renters and businesses with reducing energy usage, saving money, and improving the comfort and health of their homes and businesses.



Faster action, lower costs: why a SEU makes sense

If Ann Arbor pursues a traditional municipal utility, we likely face a prolonged, contentious, and expensive period of time attempting to procure aging electrical infrastructure. For all that time and money, our new starting point would be nearly identical to what we have now: energy procured largely from fossil fuels, poles and wires we need to fix and maintain, and homes and businesses that are paying for wasted energy. Instead of focusing on local decarbonization, we would have spent key years figuring out how much money we have to pay a monopoly to inherit its assets. We would also have taken on major debts that must be serviced from energy imports and sales, in effect inheriting many of the same conflicts of interest that prevent DTE from helping customers reduce energy use.

With a SEU, we can start now and focus on meeting our 2030 decarbonization goals while giving our residents options for immediate services -- and results. We can begin building renewable energy and energy storage systems, microgrids, and robust energy waste reduction programs. We can enable local businesses to grow the renewable energy industry. We can invest in degrowth, with increased efficiency measures and progressive reductions in our use of and reliance on the grid. **The grid is not the goal. Decarbonization, resilience, and equity are the goals.**



Is a Sustainable Energy Utility public power?

Yes! A SEU is a municipal utility, which is run by the government (just as our water and sewer services are). A SEU is different, however, than traditional municipal utilities in that it would start as a complementary utility to DTE. This approach provides flexibility for residents as we move away from the centralized grid to investing in local renewable energy generation. Over time, the SEU could grow to become the sole energy provider for the community.

How does a Sustainable Energy Utility compare to Community Choice Aggregation?

Community Choice Aggregation (CCA) disaggregates energy infrastructure from the commodity costs of electricity. It puts the CCA in control of where electricity is procured, enabling access to 100% clean energy at competitive rates to the existing utility. The CCA customer pays the existing utility for using their lines and wires to deliver electricity, with customers still receiving their bills through the existing utility. CCAs, unlike SEUs, would not have the power to offer on-bill financing or other powers that are restricted to utilities.

One key difference between CCA and the SEU is that the SEU does not require new legislation; it is allowed under current laws. CCA would require new state legislation that would almost certainly face strong opposition from incumbent utilities. Another key difference is the amount of control given to residents to choose their energy supply – a CCA transfers that decision making from the utility to the municipality; a SEU gives residents the control.

If CCA were to be enabled by legislation in 2024 (which is not within the City's control), the City would need to form a Joint Powers Authority (JPA) to oversee the eventual creation and management of the CCA. This would be followed by official CCA launch and energy procurement, likely in 2026 or 2027. At this point, all those who do not opt out of the CCA would become customers and have access to 100% renewable electricity.

Creating a SEU and pursuing CCA legislation are not mutually exclusive. Rather, a SEU can create the conditions where a CCA could be incredibly successful, and the SEU does not need CCA to be successful. If CCA legislation does not pass at the State, a SEU puts Ann Arbor well on our way toward achieving our clean energy goals by immediately starting to generate local renewable energy. If CCA is enabled by State law, the City can leverage it to procure renewable energy immediately for the community, supplementing whatever energy needs are not currently being met by the SEU. Thus, CCA and SEU are not competing strategies – but strategies that can be pursued simultaneously.

How a Sustainable Energy Utility aligns with A2ZERO

A SEU is a direct path to achieving our A²ZERO goals. Below are some of the highlights of how this can happen:

- With the enabling of rapid deployment of local renewable energy, we can quickly reduce our reliance on fossil fuels without having to wait for legislation, legal battles, or cooperation from entities with less urgent timelines (Strategy 1).
- We can directly incentivize fuel-switching from methane-producing gas-burning appliances, to clean electricity, in our homes and businesses (Strategy 2).
- We can facilitate and directly assist residents and businesses with deep energy waste reduction measures, creating cost savings, emissions reductions, and improved health and comfort (Strategy 3).
- The deployment of local microgrids with on-site and nearby solar and energy storage can directly enhance our resilience, reducing our reliance on the grid for power, and helping us weather grid outages (Strategy 6).
- We can do all of this centering energy justice, putting resources into programs for low-income and underserved populations so that renewable energy, weatherization, energy waste reduction measures, and resilience are accessible to ALL in our community (Strategies 6&7).

A SEU enables our community to bring our City into the future without having to compromise our principles. It also allows us to create a replicable model in Michigan and the U.S. demonstrating what is possible when you approach local decarbonization in a holistic fashion.

How a Sustainable Energy Utility aligns with the City's adopted Energy Criteria and Principles

The Environmental and Energy Commissions, in collaboration with the Office of Sustainability and Innovations, established a core set of Energy Criteria and Principles to guide our decision-making as we move forward in the complex space of energy procurement and utilization. These criteria and principles were adopted by the City Council, and assist in determining which energy-related actions to consider as part of A²ZERO.

THE THREE ADOPTED CORE ENERGY CRITERIA STATE THAT INVESTMENTS WILL:

- 1 Reduce greenhouse gas emissions.** Our investments must power our energy needs with renewable sources or reduce our energy demand by investing in energy efficiency and HVAC improvements. A SEU achieves this criteria by doing exactly this.
- 2 Add to the available renewable energy within the electric system.** Our investments must result in new renewables that would not otherwise be built without our investments, or add new energy efficiency measures that would not otherwise occur. Current state and regulatory targets do not meet the rapid timeline required by science-based targets, and our investments must be additional to these mandates. The SEU would directly invest in local renewables, efficiency, and electrification that would be additional to programs already existing for energy waste reduction and renewable energy generation as established at the state and utility levels.
- 3 Be grounded in equity and justice.** Our actions must be grounded in procedural and distributive equity, centering low-income and underserved populations in both the decision-making and benefits of solutions. The SEU is a hyper-local solution and can fulfill this core criteria with much greater agility than a large, conventional utility. The SEU can design and administer programs along-side our most at-risk residents, keeping equity at the core of our mission.



THE FIVE ADOPTED ENERGY PRINCIPLES EVALUATE HOW INVESTMENTS WILL:

- 1 Enhance the resilience of our people, our community and our natural systems.** By implementing local renewables, battery storage and microgrids, a SEU will improve the reliability and resilience of our power infrastructure, reducing the hardships and dangers associated with power outages, especially for vulnerable populations.
- 2 Start local.** Hyper-local investments foster our local economy and workforce while displacing regional fossil fuel generation. Renewable energy, energy storage, and connected microgrids in our neighborhoods are as local as it gets.
- 3 Occur with speed.** The science is clear that time is running out to reduce climate pollution to a level that will minimize the worst impacts of climate change. We are already seeing the worsening impacts of climate change around the world, around our nation, and at home. We not only need to achieve carbon neutrality by 2030, but minimize our emissions every day prior to our deadline. We have limited options for large-scale renewable energy generation that can be implemented today. With a SEU, we do not have to wait for legislative changes, fight lengthy court battles, or look for changes in the state or federal regulatory environment. We can start to decarbonize immediately.
- 4 Be scalable and transferable to other locations.** One of the arguments against traditional municipalization (attempting to purchase the poles and wires from our IOU) is that communities with fewer resources than Ann Arbor would have little to no ability to follow this path, given its massive expense and legal entanglements. Once a SEU is up and running, it creates a precedent and template for other communities to follow. A SEU in another community could be initiated with modest initial offerings, growing over time. Alternatively, Ann Arbor’s SEU could grow to include surrounding areas who wished to participate. We believe this model has the potential to create large-scale changes beyond our city and our region.
- 5 Be cost effective.** A SEU allows us to use our resources to immediately focus on clean energy generation. We don’t have to put resources into protracted legal proceedings, buying antiquated infrastructure, upgrading aging equipment, burying power lines, or even building a large staff. Instead, we can focus on our goal – equitable decarbonization by 2030.

Overall, a SEU strongly aligns with our adopted Energy Criteria and Principles as illustrated below.

	Current System	Traditional Municipal Utility	Community Choice Aggregation	Sustainable Energy Utility
Reduce GHG Emissions	Poor	Fair	Excellent	Excellent
Additionality	Poor	Fair	Good	Excellent
Equity and Justice	Poor	Fair	Fair	Good
Enhance Resilience	Poor	Poor	Good	Excellent
Start Local	Poor	Fair	Fair	Excellent
Speed	Poor	Poor	Uncertain	Excellent
Scalable and Transferable	Poor	Poor	Excellent	Excellent
Cost Effective	Fair	Fair	Good	Good

Have other communities created SEUs? How do they compare to what Ann Arbor is proposing?

A SEU is novel in the context of Michigan’s utilities, but it builds on concepts that are present in other jurisdictions. Both DC and Delaware have a “Sustainable Energy Utility.” Both of these models are working to support equitable clean energy initiatives in their regions. While the utility laws are very different in those places, these examples present insights into what kinds of services could be offered, how they are priced, and what is possible when a utility focuses on renewable energy, equity, and local generation. In addition, some other Michigan municipal utilities, notably Holland, offer innovative programs (on bill financing, low income energy waste reduction offerings) that advance many of the goals we have. Therefore, while a SEU would be groundbreaking, there would be many utility program examples which Ann Arbor could emulate and learn from.



HOW A SUSTAINABLE ENERGY UTILITY WOULD WORK

“This section provides details on how a SEU could work in Ann Arbor.”



HOW A SUSTAINABLE ENERGY UTILITY WOULD WORK

This section provides details on how a SEU could work in Ann Arbor. It starts by presenting some local context that is important in shaping the services, timing, and administration of a SEU. This is followed by an overview of the immediate services we envision a SEU offering. The section concludes by exploring initial suggestions and thoughts regarding the administration, financing, and billing arrangements associated with the creation of a SEU.

Local Context

Overview of Ann Arbor Building Inventories

Ann Arbor is a city full of historic buildings and older houses, plus a high percentage of renters (52% of the approximately 49,000 households in Ann Arbor are rentals)⁵. These elements make Ann Arbor the great city it is, but also present challenges when trying to equitably decarbonize. In Ann Arbor, the average age of housing is 48 years old. The average annual energy cost for older homes is higher than newer homes. Among the existing houses, 41% are single-family detached, 44% are multi-unit apartments, and the rest are duplexes and townhouses.⁶ In terms of greenhouse gas emissions, we know that 23% of local emissions are from residential energy consumption and 22% are from commercial consumption. Space heating and water heating account for over 50% of energy consumption in homes.⁷ In Ann Arbor, 75% of households use a natural gas furnace for space heating, while approximately 22.3% rely on all electric heat resistance (80% of which are renters)⁸. The remaining 3% rely on propane, fuel oil, wood, or another fuel for primary heating.⁹

Electricity and Natural Gas Prices

Currently, average Michigan residential electric rates are 29% higher than the national average (17.84c/kWh, versus 13.85c/kWh nationally), while natural gas prices are 23% lower (\$14.06/ccf, versus \$17.76/ccf). This is because areas of the country that use more natural gas have lower per-resident cost, and vice-versa, since energy is sold on a volumetric basis. This makes the current cost equation for fuel-switching (from cheap gas that emits methane, to pricier but progressively cleaner electricity) more difficult in our state. Burning natural gas in our buildings will never get cleaner, but we can make our grid less environmentally destructive by powering it with clean and renewable electricity.

The US Energy Information Administration (EIA) predicts that natural gas prices will rise dramatically between 2023 – 2050^[2], based largely on increases in the costs of production. These price increases will likely be even greater than predicted due to more and more customers switching to electricity, reducing the number of people paying for gas infrastructure maintenance. Alternatively, electricity prices are expected to stabilize due to increased usage and more generation coming from cheaper renewable energy, balanced by increased costs resulting from upgrades to aging infrastructure.

That said, the cost of electricity from DTE is almost certainly more expensive than the cost of electricity from a SEU. This is largely because the SEU would not be concerned about profits to shareholders, maintaining aging assets, paying depreciation for the coal generation facilities that are being retired earlier than planned, or upgrading large-scale distribution systems. The SEU would be laser-focused on generating energy from the cheapest sources available (energy waste reduction and renewables). Our residents' exposure to anticipated price escalations from fossil fuel generation feeding the grid would be greatly reduced – as would their vulnerability to larger and more prolonged grid outages that climate change is already bringing to Ann Arbor. In this way, a SEU makes immediate progress on Ann Arbor's goals without requiring staff to spend time ameliorating the problems of our current infrastructure.

Service offerings of a Sustainable Energy Utility

As envisioned, an SEU would focus on achieving community-wide carbon-neutrality by 2030 through four inter-related steps: reducing the energy used in our buildings, powering our energy needs with clean energy, electrifying buildings and transportation through beneficial electrification, and building microgrids. Every household enrolled in the SEU would receive these services through a customized package, with subscribers eventually being connected through a microgrid. The microgrid helps make cleaner and cheaper energy available to more Ann Arborites,

5 2019 Census: ACS 1-Year Estimates Detailed Tables

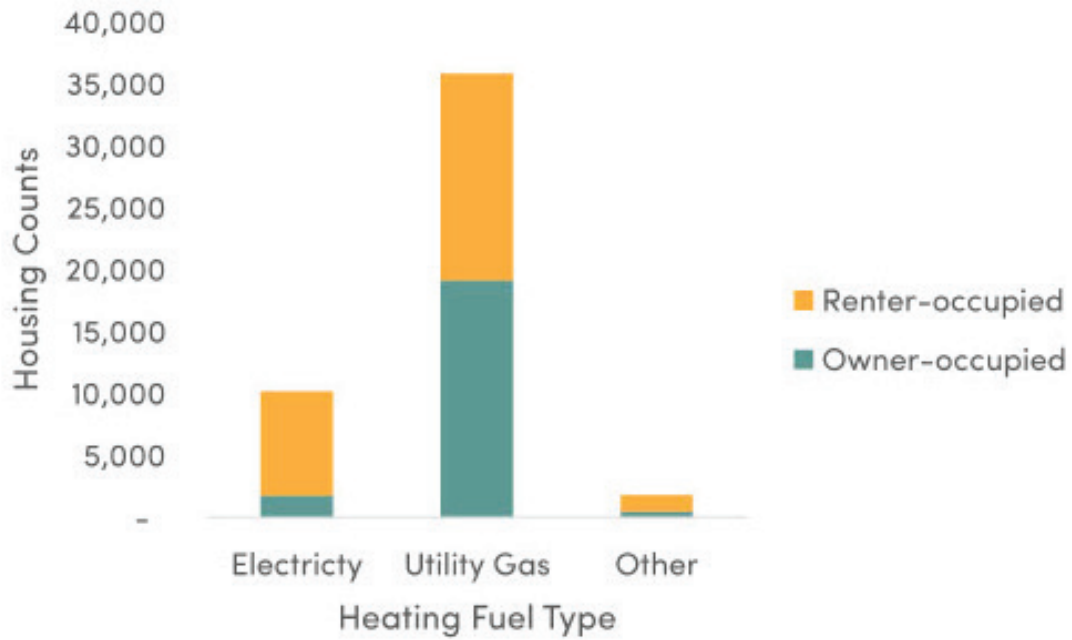
6 https://www.a2gov.org/departments/planning/Documents/Economic%20Health/Housing%20Layout_2014Update.pdf

7 EIA, Residential Energy Consumption Survey, 2009

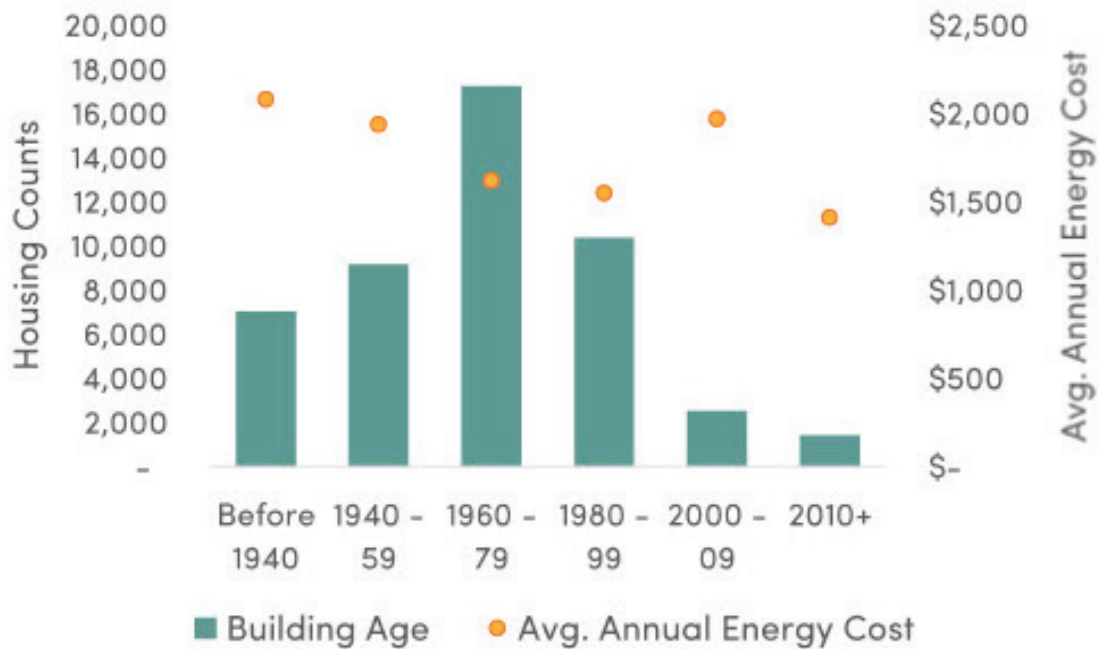
8 <https://www.eia.gov/outlooks/aeo/data/browser/#/?id=1-AEO2021®ion=0-0&cases=ref2021~aeo2020ref&start=2019&end=2050&f=A&linechart=~&ref2021-d113020a.48-1-AEO2021~aeo2020ref-d112119a.48-1-AEO2021&map=&ctype=linechart&chartindexed=0&sourcekey=0>

9 2019 Census: ACS 1-Year Estimates Detailed Tables

Housing Counts by Fuel Type



Housing Counts by Building Age



increases the resilience of subscribers, and helps the SEU balance energy demand with energy load.

The remainder of this section explores each of the four main and inter-related prongs of the SEU. Where possible, we include preliminary cost estimates to demonstrate the impact of the SEU compared with staying with the existing utility. It should be noted that this cost analysis focuses on the financial aspects of energy waste reduction, electrification, and solar plus energy storage. It does not include the non-monetary benefits such as health, comfort, and resilience that will also be enhanced through the SEU, nor does it include the social cost of carbon, also known as the cost of inaction.



Energy waste reduction

The cheapest, cleanest energy is the energy we never need to use. That is why energy waste reduction is at the heart of the SEU. Through the SEU, the City will provide subscribers with opt-in services to upgrade their appliances to high-efficiency (and electric) options. The SEU will also provide building envelope improvements, recognizing that building envelopes play an essential role in maintaining comfortable and safe indoor living conditions. In fact, proper insulation and air-sealing techniques can typically achieve whole-house energy savings of 10-20% over pre-upgrade energy usage. In older homes and homes with little or no insulation, savings may be much higher. Additionally, those homes become more comfortable to live in, with fewer drafts. Thus, energy waste reduction is a key tool in advancing the City's goals of decarbonization, equity, and affordable housing.

Another benefit of a SEU is that its approach to financing energy efficiency can overcome numerous barriers that exist under the current paradigm of providing rebates and asking customers to pay for upfront capital costs. Some approaches the SEU can take to address this concern are:

- **Bill Neutrality.** The SEU could offer loan repayments structured to match or be lower than the monthly utility bill savings, resulting in a positive cash-flow for the customer immediately.
- **Overcoming Landlord-Tenant Split Incentives.** These occur when property owners must pay the costs for capital improvements, and tenants pay for the energy bills. The SEU can work with landlords and tenants to structure green leases and offer financing to ensure the loan is repaid in a more equitable manner.
- **Overcoming the Initial Cost Barrier.** The capital cost of efficiency is a barrier to program participation for many customers. The SEU, however, will finance the upfront costs of these upgrades making efficiency accessible to nearly everyone.
- **Enabling Longer Paybacks.** The SEU can offer financing that matches the payback or even lifetime of the measures installed, leading to deeper retrofits.
- **Debt Avoidance.** As an off-balance sheet mechanism, SEU program financing will obviate the need to pay for efficiency measures out of capital budgets, which are typically harder to access. This is relevant to commercial and institutional customers.
- **Transactional Costs.** While energy efficiency financing mechanisms do exist for certain customer types, navigating available options and negotiating with lenders directly adds a transactional cost to each project, and is a hassle for the customer. Both of these drive down participation, and are avoided by having the SEU structure and execute financing agreements.
- **Shared Savings' Agreements.** SEU financing of energy efficiency measures in homes and businesses would

include a ‘shared savings’ agreement: in return for financing and implementing the measures, the SEU microgrid network would receive a portion of the value of the efficiency savings that result to lower rates and recover administrative costs.

Repayment Mechanisms for Demand Side Management. The SEU will explore using on-bill financing as the preferred repayment mechanism to service the debt on deployed demand-side assets, because it offers the ability to tie repayment to the meter rather than the SEU customer; this allows deeper retrofits with longer repayment timelines.

Beneficial Electrification

The SEU will assist homeowners with transitioning appliances to electric through the process known as beneficial electrification. Through this work, the SEU will support residents and businesses in upgrading old and inefficient appliances and equipment with high-efficiency electric options. The specific services provided will depend on the nuances of each building but, in general, support will focus on transitioning to cold-climate air source heat pumps, heat pump water heaters, heat pump dryers, and induction ranges.

Below we outline how this support might vary depending on the primary heating fuel currently used in a home. The analysis is based on energy modeling of cost-effective improvements made with a “typical” existing Ann Arbor home. It uses the hourly energy consumption profile by end-users to estimate the hourly energy saving under various scenarios. Based on Ann Arbor's climate, the hourly load profile for a single residential house is simulated from the 2014 Building America B10 Benchmark Load Model. It breaks out the energy consumption by end-users such as space heating, water heating, cooling, lighting and miscellaneous, etc. Due to data limitations, the electrification model only focuses on HVAC and water heater energy usage.

As the energy usage and cost of efficiency upgrades are site-specific, a comprehensive cost analysis is needed to estimate the costs and savings by building type, size, and existing heating and cooling system, etc. This will be an important component of the SEU going forward.

All-electric homes

In Ann Arbor, 22% of homes rely on all-electric heat resistance for space and water heating. Among them, 80% of homes are occupied by renters. Because air source heat pumps for space heating are two to three times more efficient than electric heat resistance, adding a mini-split heat pump to the existing space heating system could easily cut electricity use for heating by 50%. Additionally, a heat pump water heater could reduce the energy consumption up to 60% compared to a standard electric system.

The table below illustrates the energy reduction and bill savings the SEU could facilitate by making upgrades to an “average” all-electric Ann Arbor home. Under this scenario, replacing an electric water heater with a heat pump water heater and adding a mini-split air source heat pump to an all-electric home will have an upfront upgrade cost of \$29K and generate a \$3K utility bill savings annually. Annual energy bill savings could pay the incremental upfront costs for the upgrade within ten years. The table below shows the incremental appliance upgrade costs and savings of adding a heat pump as a primary source for heating and replacing an old electric water heater with a heat pump water heater. Most all-electric homes that use electric resistance for space heating don't have duct systems. Adding a duct system is costly and takes space. For some old homes, installing a duct system is not feasible due to the architectural layout. Therefore, the air source mini-split heat pump is a good choice, both financially and technically. The heat pump would be the primary space heating source until the outdoor temperature is lower than its lowest outdoor operating temperature. Then, the existing electric heat resistance would kick in to support space heating. As the heat pump only consumes one-third of the energy compared to electric resistance heating, it could generate significant energy bill saving. The savings could pay off the incremental upgrade cost within ten years. For the same reason, replacing an electric water heater with a heat pump water heater, would likely pay back the upfront upgrade costs within six years.

Table 1: Annual Energy Savings by Making Upgrades with Heat Pumps to an “Average” All-Electric Home

An All-Electric Home Upgrade	Adding Mini-Split Heat Pump*	Replacing an Electric Water Heater with a Heat Pump Water Heater**
Replacement Costs (\$)	\$25,000	\$4,500
Energy Savings (% of kWh)	62%	75%
Value of Energy Savings (\$)	\$2,450	\$547
Incremental Appliance Upgrade Costs (\$)	\$25,000	\$3,480
Payback Period of Upgrade Costs (yrs)	10	6

*: Estimated energy saving for space heating only. Modeled a heat pump with a 3.8 coefficient of performance with a lowest outdoor working temperature as -15°F.

**: The modeled energy efficient factor of the heat pump water heater is 3.75.

Homes using natural gas and electricity

The previous section looked at the opportunity to conduct efficiency and electrification upgrades in homes heating with electric resistance heating. However, we know that in Ann Arbor, 75% of homes use natural gas for space heating and water heating. As such, staff modeled two options the SEU could use to upgrade homes that use natural gas for space heating: all-electric and dual fuel. We also modeled the status quo option for comparison: replacing the old HVAC system with a new AC and a new gas furnace. The all-electric option replaces the air conditioner and gas furnace with a cold climate air source heat pump, an air handler, and backup electric resistance heat. Since the lowest outdoor operating temperature for a cold climate air source heat pump can be as low as negative 15°F, meaning the heat pump can operate at 100% capacity down to this temperature, it could serve as the primary heating source for homes in Ann Arbor. When the outdoor temperature drops below negative 15°F, the electric heat resistance starts to work, supplementing the heat pump. For the past winter, Ann Arbor had less than 20 hours below negative 15°F.¹⁰ Therefore, the all-electric option is a viable solution for our community. For this option, some homes may need additional electrical work to accommodate the power supply for the backup electric resistance heat. The cost of electrical work varies depending on a home’s existing electrical wiring and capacity.

For the second option, the dual fuel option, we modeled replacing the air conditioner with a traditional air source heat pump and using the gas furnace as a backup heating source. When the outdoor temperature drops below 30°F, the natural gas furnace automatically kicks in - everything up until that point is powered through the heat pump.

To make an apple to apple comparison of the different HVAC systems, we assumed the homeowner doing a status quo replacement would replace the old inefficient AC and gas furnace with more efficient ones that have variable speeds. Based on the quotes we got from local contractors, we found the upfront cost of the Status Quo scenario is only \$2,000 to \$3,000 less than the Dual Fuel scenario. The upfront cost is highest for an all-electric scenario because the cold climate heat pump costs more than a standard heat pump.

The table below illustrates the energy impacts from each of the three scenarios. As the replacement cost varies depending on the existing HVAC system and home condition, we used quotes for three replacement scenarios from multiple local HVAC contractors for the “average” Ann Arbor home. All scenarios could reduce total energy usage: 69% reduction for all-electric, 51% for dual fuel, and 17% for status quo. Compared with replacing the aging HVAC system with the same type of appliances, the all-electric option would cost \$14K more to install, and the dual-fuel option would cost an additional \$3K. In addition, the resident’s energy bill would increase after the upgrades because electricity prices are higher than natural gas prices in Ann Arbor. Though the model estimation is an illustration, it does demonstrate why reducing upfront costs and securing affordable electricity is critical to the SEU. And that is why the third prong – renewable energy generation – is an essential component of the SEU.

¹⁰ <https://mrcc.purdue.edu/>

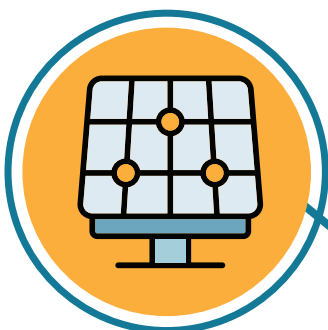
Table 2: Annual Energy Savings by Making Upgrades with Heat Pumps to an “Average” Home using Gas Furnace

Scenarios (HVAC Replacement)	Status Quo (AC + Furnace)*	All-Electric*	Dual Fuel*
Replacement Costs (\$)	\$11,000	\$25,000	\$14,000
Energy Savings (% of kWh)	17%	69%	51%
Value of Energy Savings (\$)	\$124	-\$896	-\$105
Incremental Appliance Upgrade Costs	N/A	\$14,000	\$3,000

*: Modeled replacing an old gas furnace with 80% energy efficiency factor (EF) with a new gas furnace with 96% EF. It does not include energy saving of space cooling associated with the appliance upgrade because of insufficient data for estimating energy used for space cooling.

**: Estimated energy saving for space heating only. We modeled a heat pump with a 3.8 Coefficient of Performance with the lowest outdoor working temperature as -15°F. It comes with a 15 KW heat resistance as backup heat.

***: Modeled replacing the old HVAC system with an air source heat pump with 13 HSPF and a lowest outdoor operating temperature of 30°F and a new gas furnace with 96% EF as backup heat.



Renewable Power

The analysis in this section covers the strategies to power Ann Arbor with resilient, reliable, safe, and clean energy generated locally through rooftop solar, solar carports, and community solar. The energy sources will be connected through a smart microgrid system with shared battery storage.

Rooftop solar

Rooftop solar is a wildly popular concept in Ann Arbor that has been gaining traction and momentum over the last several years. With a rooftop solar system, an individual installs a solar array on their roof, along with supporting equipment, and uses the energy generated from that array to power their home directly. Any additional energy generated through that array is sold back to the grid (at a discounted rate). When the sun is down and energy is needed, it is pulled from the grid. This model has been used by hundreds of Ann Arborites to lower their carbon footprint, decrease their reliance on the investor owned utility, and reduce their energy costs. The challenges with this model are that it necessitates: 1) you own your roof; 2) have high solar potential on site (e.g., limited tree shading), and 3) that you have the financial capital or credit worthiness to finance a large investment.

While individuals could still purchase solar arrays to enjoy the full financial benefit of owning their own distributed energy resource, the SEU would enable a lot more people to get the benefit of rooftop solar by directly paying for the installation of solar on residential and business roofs. What’s different in this model is that the resident wouldn’t be the owner of that solar system, the SEU would. The resident, however, would get to subscribe to purchase their energy, at a rate that is based on costs without profit, from the system on their (or their neighbor’s) roof. Any power in excess of what the resident needs is distributed to their neighbor. If all the neighbors energy needs are met, the excess power flows into a battery system. If additional power is needed, the resident can pull from their neighbor’s solar system. If the neighbor’s system is being consumed, the resident pulls from the neighborhood battery. Through this model, the whole neighborhood is paying a lower price per kWh to access and share clean, locally powered energy.

Renewable energy has a highly beneficial impact on the project economics for electrification in Ann Arbor and, as such, is a critical component of the SEU. Without solar, some homeowners would see a utility bill increase because of the rate difference between natural gas and electricity. Rooftop solar helps make the economics work as it is a low-cost source of clean energy. However, as mentioned previously, the high upfront cost and the homeownership requirement limit adoption among residents and businesses, especially low and moderate-income families. A large-scale, community-wide rooftop solar installation program could reduce the solar installation costs to around \$2/ watt, yielding a levelized cost of energy (LCOE) of \$0.05/kWh, which is about 1/3 of DTE’s retail rate. Based on the

cost estimation of the "average" Ann Arbor home, bundling electrification and energy waste reduction upgrades with rooftop solar could reduce the incremental cost of electrification and generate cost savings.

Google's Project Sunroof estimates that three-quarter of the roofs including residential and commercial buildings in Ann Arbor, are good candidates for a solar PV system:

- 71% of rooftops are considered "solar viable."
- 60% of rooftops can support a 5+ kW solar system.

The aggregated generation capacity of solar-viable rooftops could reach 400 MW and produce 1/3 of total electricity consumption for residential, commercial, and industrial users, along with the University of Michigan. This is why supporting the massive deployment of rooftop solar is a critical component of the SEU.

Solar Carports

Besides rooftop solar, solar carports on parking lots near multifamily units, retail spaces, and parks could add additional generation capacity while providing the amenity of covered parking. This generation capacity could be used to charge electric vehicles (EVs) and power adjacent buildings, or utilize Vehicle to Grid/Building Charging (V2G/V2B), thereby serving as a backup supply of power for energy resilience and/or a node in our inter energy management system.

Based on EIA's Residential Energy Consumption Survey, in Michigan, slightly over 40% of cars are parked within 20 feet of an electrical outlet. With a large percentage of our population living in multi-unit dwellings and rental units, this figure is likely even greater in Ann Arbor. This population has less influence over their parking domain, and may not be able to install EV parking where they live. Accessibility of public charge points as well as the ability to charge at home are influential criteria for people contemplating an EV purchase. Because of this, expanding charging access, especially for multi-family unit dwellers, is important to achieving the EV adoption goals in A²ZERO.



Additionally, load interconnection capacity constraints limit the total number and locations of EV chargers in the City. To make the situation worse, the limited electricity generation and substation capacities impede large-scale EV charger installation in residential properties, where capacity is not nearly enough to distribute electricity to a large number of EV drivers. A SEU could help install a significant number of EV chargers that are directly powered with solar – thereby reducing demand on the grid and helping facilitate the transition to an electrified transportation system, especially in hard to reach populations.

Community Solar

A SEU would allow us to immediately begin building and utilizing community solar. We could identify and utilize open spaces and park areas that are suitable to help expand the amount of local solar generation and then allow residents to subscribe to the generation. In Michigan, current Energy Law prohibits private industries from owning and operating a community solar installation unless it is in cooperation with a utility. Despite this, in Michigan, we have seen two community solar programs offered by utilities that are generating bill savings and positive investment returns for participants.

With a SEU, the City could create an innovative community solar infrastructure which includes solar, microgridding, commercial scale battery storage, and a smart central power management system. It would be a system that utilizes local solar potential, is financially self-sufficient, and ultimately reinvests revenues into the community.

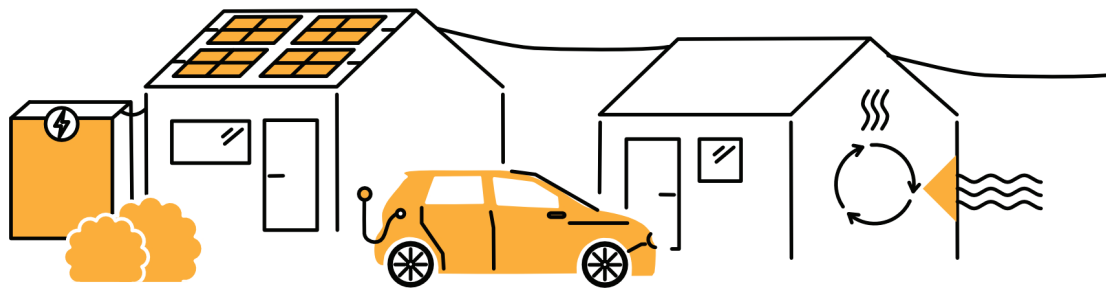


Consumers can save significant amounts of money by switching from an internal combustion engine (ICE) vehicle to an electric alternative due to the substantially lower fuel, maintenance, and repair costs. Consumer Reports found that, on average, an EV driver charging at home can save between \$800 and \$1,000 a year on fuel costs alone compared to an ICE counterpart. In addition to the substantial financial rationale, transitioning from fossil fuel powered internal combustion to electricity powered vehicles allows us to continually reduce our transportation related emissions by powering our mobility with renewable and local electricity.

Microgrids

A microgrid is a distributed energy resource that can be operated, controlled, and coordinated within a defined boundary. It can be operated via connection with the main power grid and/or work in “island” mode (e.g., completely off-grid). Microgrids can be designed to create and store local clean energy and meet the demand-supply ratio, avoiding leakage and loss of valuable energy through transmission.

Once formed, the SEU would not be limited by current utility restrictions that limit system sizes, but could maximize viable sunny roof space. It could install solar on commercial buildings, community parks, and public parking lots, as well as ground mounts



where appropriate. Those individual solar systems would be connected through the microgrid, not DTE’s grid. The SEU owns the solar, battery, and connecting wires, charges everyone for power usage at an equivalent rate, and does load management to handle as much load locally as possible.

A building that is hosting solar can use the power generated onsite directly (paying per kWh of usage), with unused electricity feeding homes that don’t have solar or that are in need of additional energy via the microgrid. If excess electricity remains, it will be banked in the shared battery of an onsite microgrid, interoperable with similar microgrids. The system would be a parallel power service to the existing utility with the SEU providing a supplementary service that allows customers to use solar in the daytime, draw from the battery at night, and then use DTE’s electricity when local generation and storage aren’t quite enough to meet demand. When DTE has a power outage, SEU users still get power from the shared battery and solar systems. Over time, the system could become a closed microgrid loop that has limited to no connection to DTE’s grid.

Property owners who have installed rooftop solar using their own funds would have the option to sell their excess electricity to the SEU at a rate equal to or better than the outflow rate offered by DTE. In addition to getting paid by supplying excess clean power to neighbors and local businesses, those property owners could continue to use the power generated from solar during DTE’s power outage instead of shutting off the solar system. In addition, their solar system could charge the neighborhood’s shared battery and power their neighbors’ apartments and offices while waiting for DTE to fix their poles, wires and equipment. The microgrid system could serve as a safety net for the whole neighborhood during power outages, by powering emergency shelters during extreme weather events, community centers, or relief stations.



SEU "ALL ENERGY" OFFERINGS

In addition to the above, we will offer a suite of additional services to build heat and vehicle storage onto microgrids to support local decarbonization. These two services will be phased into the SEU over its first few years of operation.

Geothermal

While not anticipated to be a widespread initial offering of the SEU, the vision is to eventually offer district level geothermal to support heating and cooling. This would mean that residents could harness the heat energy just below the surface of the earth to heat and cool their homes, relying on a truly renewable energy source. Staff envision that the SEU would begin piloting district geothermal early in the creation of the SEU, using the pilot to inform a much larger, city-wide offering.

Transportation electrification

The SEU could also offer services around electrified transportation, such as financial incentives on electric vehicles and chargers. With the more substantial microgrid offerings envisioned by the SEU, these services could even include facilitating electricity sales between neighbors, with one neighbor selling energy stored in their EV battery to nearby neighbors through the SEU. This could allow neighbors to potentially avoid higher costs of grid electricity, or to avoid pulling from the grid altogether and instead power the vehicle with electricity produced within the microgrid.

Through the SEU, the city could provide financial incentives for fuel switching to electric vehicles. The Federal Government provides a tax credit of \$2,500 to \$7,500 on the purchase of new electric vehicles, depending on the size of the vehicle and the capacity

of the battery. Many states and utilities around the country offer additional incentives for making this switch. Another future SEU service offering around EVs could be a Bulk Buy program, similar to the City's current Solarize program. Here, consumers interested in electric vehicles would come together to pool their buying power and receive competitive purchase offers as a result. In these ways, in combination with significant increases in charging infrastructure described above, a SEU could help lower the barriers to EV ownership, creating wider accessibility and furthering our move away from fossil fuels.

In addition, the SEU, could develop multi-car EV share parking sites based on lease or sale at appropriate microgrid sites to provide flexible storage support for its microgrid network. In addition, the city through the SEU may also adapt its vehicle procurement and parking planning to replace and redeploy city EVs at parking spots on microgrids to improve economic performance, reduce cost of decarbonization and enhance neighborhood resilience.

ADMINISTERING A SEU

Creating a SEU is a novel endeavor, but the City has the building blocks needed to administer the SEU, as we currently administer our water, water recovery, and stormwater utilities. As envisioned, a SEU would leverage contractors for installation and maintenance of the physical infrastructure of the utility (e.g., solar systems, energy storage, wires, telecommunications connections). Items such as billing and customer service would most likely be handled in whole or large-part by the City. It is quite possible the City would want to contract with an entity to support billing operations at the onset of the program. This could help streamline the administration

and provide the City with time to grow the skillset and knowledge base needed to administer the unique billing operations of the SEU. Moreover, the City could explore partnerships with other existing traditional municipal utilities (e.g. Chelsea) to identify possible efficiencies by using already up-and-running systems.

New program creation and overall management would be handled by the City, providing significant flexibility in nimbly adjusting offerings and services to reflect the needs of the community as well as changing technology. If administered in this way, the impact to staffing at the City would be minimal but the impact in the private market place would be significant. This model would help create dozens of new, family-sustaining jobs in the community and provide the trained workforce to not only support our SEU, but to support other communities with operationalizing their clean energy futures.

ON-BILL FINANCING

Another significant benefit of forming a SEU is that the City would have the ability to offer on-bill financing. This mechanism allows the City to pay the upfront cost of improvements (e.g., efficiency or electrification upgrades) and have the resident pay back the costs through their utility bills. On-bill financing also allows the cost of the improvements to stay with the home, as opposed to the resident. That means if a homeowner moves 5 years after improvements are made, but those improvements are amortized over 10 years, the bill will stay with the home, carrying forward to the new owner who is benefiting from the upgraded system. On-bill financing is permitted by law and offered by some municipal utilities, but DTE has not chosen to offer it. As a municipal utility, the SEU could make that a core component of its operations.



LEGAL FRAMEWORK FOR FORMING A MUNICIPAL UTILITY

*“Ann Arbor’s SEU would be the first utility of its kind in Michigan,
and therefore does not have a precise legal precedent.”*



LEGAL FRAMEWORK FOR FORMING A MUNICIPAL UTILITY

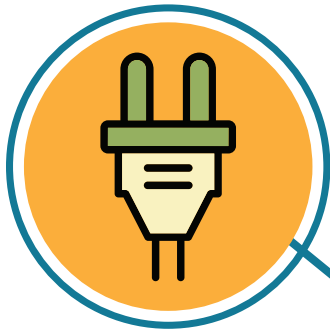
Ann Arbor's SEU would be the first utility of its kind in Michigan, and therefore does not have a precise legal precedent. Therefore, a discussion of where the concept fits in the current understanding of the law is an important grounding. This analysis assumes a new municipal utility would only serve residents of Ann Arbor, and would not seek to serve beyond those boundaries, at least to start.

Historical Context

Utility laws in Michigan – and those in the rest of the country – grew out of the technology available at the turn of the 20th century. Simply put, in order to economically supply power, you needed a central power station (often burning coal), and wires that connected that station to each user. Building a power plant and a network of electrical wires was a very expensive proposition. To get these kind of projects financed, you needed serious financial backing – either taxing power or a stable base of customers to support those projects.

In Michigan, as in other parts of the country, only a utility can sell electricity to another entity; while users can self-supply, they cannot supply others. Every part of the state is part of the territory of one (or in certain cases, two) electric utility. These utilities come in three broad flavors:

- Municipal utilities, which are governmental entities that supply electricity just as most cities supply water or sewer services in their service territory;
- Cooperative utilities, which are non-profit entities that supply electricity to their members in their service territory; and
- Investor-owned utilities, which are for-profit entities that supply electricity to customers in their service territory.



Ann Arbor's first electric franchise was granted in 1895. In 1905 the franchisee, Washtenaw Light and Power Co., was purchased (along with companies owning various local dams) by a predecessor to the current franchise holder, DTE Electric Co.

Thus, early on, cities that wanted electrical power went down one of two paths. Either they laid out considerable resources to build their own electrical lines and power plants (e.g. Chelsea, MI) or they went the more common path of inducing private companies to provide these services by giving a company a “franchise” (e.g. Ann Arbor, MI). A “franchise” in the utility context is a monopoly on providing specific utility services (e.g. water, electricity, natural gas) for a period of time, and grants the right to use public rights-of-way for the necessary infrastructure to do so (like poles and wires). Sometimes, cities started municipal utilities for their streetlighting or core downtown, but later gave franchises to expand into other parts of the city (e.g. Lansing and Marshall, MI). Cooperative utilities formed in places that were often rural and where they had neither the municipal tax base nor sufficient customers to attract the level of investment needed to get electricity infrastructure in place.

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The Foote Act

In 1905, the Michigan legislature passed a law called the “Foote Act” which made any electric utility franchise that had been granted by a local government permanent. The Foote Act essentially made it impossible for a municipality to switch or add companies that provide electric service.

This was immediately controversial. In 1907–1908, Michigan had a constitutional convention, and the new constitution had new provisions that were clearly a response to the Foote Act. Those provisions required that a supermajority of voters had to approve any franchises and that franchises could only last for 30 years at a time. The new Constitution, which was adopted in 1908, also explicitly stated that cities generally retained the rights over their own streets and rights-of-way. The constitution also explicitly affirmed the rights of municipalities to provide utilities, including electric service (all these provisions are also in our current state Constitution).

With the new Constitution, a court challenge to the Foote Act immediately began, with the City of Lansing leading the charge. In 1914, the Michigan Supreme Court issued a ruling – in favor of the private utilities who held the Foote Act-granted franchises. The court reasoned that what the Foote Act did was give contractual rights to private companies, which could not be later abolished by the government under either the U.S. or Michigan constitution (both of which have provisions restricting the interference with contracts).

This was the first of many lawsuits municipalities brought challenging the Foote Act over the years, but the City of Lansing case is still the law of the land. This means that the only utility that is available to Ann Arbor right now is DTE, and it is not possible to “switch” to a different private or cooperative utility provider.

Thus, when assessing Ann Arbor’s utility options, the only path the Foote Act leaves open to having an alternative to DTE for electric service is to form a municipal utility. This is different from other places in the country and some parts of Michigan, which still have the ability to periodically switch utility providers. Legally, the Foote Act leaves the City two possible structures for such a municipal utility (with variations within each):

- **Sole Provider.** Become the sole provider of electricity by “taking” DTE’s franchise (paying them for all physical property needed to provide service to Ann Arbor as well as the value associated with their monopoly); or
- **Additional Provider.** Create a municipal utility that gives customers of DTE in Ann Arbor more energy options without using DTE’s infrastructure.

Until recent advances in technology, the second option wasn’t practical because it involves investing a large amount of money to duplicate the poles, wires, etc., and often the central generating plant, for an unknown number of customers. With more recent advances in “distributed” energy resources like solar panels and battery storage, the ability for a single customer to be served by multiple utilities is much more possible.

PROCESS FOR CREATING A TRADITIONAL MUNICIPAL UTILITY THAT IS THE SOLE PROVIDER

If Ann Arbor wished to create a traditional municipal utility that would essentially replace DTE as the sole provider of electric service within the City of Ann Arbor, it would have to acquire the right to do so by acquiring the property rights of DTE, either through a contract (very unlikely) or via a condemnation/taking of property. To do so, it would likely need to do each of the following steps:

- 1** Amend the City Charter to specifically provide a procedure for voting on the contract to purchase the public utility property.
- 2** Secure a vote of the people (with a 3/5 majority) to authorize the acquisition of the public utility.
- 3** Enact an ordinance providing for the newly owned and operated utility. The Council is already permitted to do this by Charter after any hearings and procedures otherwise required by law are completed.
- 4** Institute (and complete) condemnation procedures (court process) to determine the value of DTE’s franchise.

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Once the amount that must be paid to DTE as part of that condemnation is known:

- a. Secure a vote of the people on contract to purchase the utility property under whatever process the new charter provision provides; and
- b. Authorize the mechanism for funding the compensation to DTE decided in the condemnation process, plus any additional funding necessary to stand up the utility (e.g. approval of new bond debt) under the legal requirements for approving such funding mechanism.

These steps are only a high-level summary of the legal requirements for establishment of the municipal utility, and are in addition to any other work that would be needed to actually be ready to operate the utility, including but not limited to the securing of generation resources (including sufficient capacity to meet peak load 3 years in advance), standing up a billing structure, establishing compliant IT infrastructure, giving notice to customers, and standing up the staff necessary to operate the infrastructure.

PROCESS FOR CREATING A MUNICIPAL UTILITY THAT IS THE ADDITIONAL PROVIDER

What if, unlike other traditional municipal utilities in Michigan, Ann Arbor were to create a municipal utility that did not assume utility service is binary – that residents could be served not by only DTE or only the City, but that the City customers could choose to supplement their DTE service with options offered by a municipal utility? If that utility did not use or need any of the DTE property to operate, it would not necessitate a charter amendment, nor any of the proceedings relating to the condemnation or purchase of property.

An ordinance providing for the newly owned and operated utility would need to be enacted. The question then becomes if a vote of the people is necessary. It is likely not required, although a no-risk path would be to do so. Below is a short discussion of the three possible sources of a requirement for a vote of the people and a discussion of their application to a SEU.



Franchise Grant

If the City was required to grant itself a franchise to serve, then a vote of the people would be needed under Article VII, § 25 of the Michigan Constitution. However, it is unlikely that this is necessary. Franchises are fundamentally contracts that allow the use of rights of way to furnish utility service. The constitutional provision that requires a vote for a franchise also restates the rights of cities to their own rights of way; cities also have inherent powers to provide services to their citizens. Since any grant of a franchise by a City to itself is the equivalent of requiring the City to enter into a contract with itself, such a reading of the provision is strained. Initial research indicates cities today generally do not ask voters for permission to continue providing their own water or sewer services, so such a reading would also conflict with long practice (franchises are of course required for municipal governments to serve outside City boundaries, since the rights of way would not belong to the service provider).

Therefore, it is very unlikely, that Article VII, § 25 of the Michigan Constitution requires a supermajority vote of the people for formation of the SEU.

"Acquirement"

MCL 117.4f(c) requires a 3/5 vote of electors to "acquire" a public utility. Therefore, the question would be if establishment of a SEU would be found to be "acquirement." This is unlikely. The same paragraph notes that "acquirement...may be either by purchase or condemnation." A prior provision, however, notes that charters can provide for "the acquirement, ownership, establishment, construction, and operation, either within or outside its corporate limits, of public utilities for supplying water, light, heat, power, and transportation to the city and the city's inhabitants, for domestic, commercial, and municipal purposes." A SEU would be established, owned, constructed or operated by the City, but would not involve either purchase or condemnation of property or other utility assets from DTE.

Therefore, it is very unlikely, that MCL 117.4f requires a supermajority vote of the people for formation of the SEU.

Funding

Depending on the level and method of funding necessary to launch the SEU, a vote of the people may be required to authorize that funding (e.g. a dedicated millage or certain bonds). In the alternative, if private investment dollars are found that are willing to use future rates as a repayment, such a vote may not be needed.

Therefore, when considering the legal steps necessary to establish a SEU that operates alongside DTE without seeking to replace it or use any DTE property, the only clearly required step would be for the Council to pass an ordinance establishing the SEU. Depending on funding structure, a vote of the people may or may not be necessary. While a no-risk strategy would include a vote of the people, neither the constitutional nor statutory requirements for a 3/5ths vote are likely to apply if the SEU operates within City boundaries in a way that does not seek to replace DTE or use its property.



FINANCING

“As a decentralized municipal utility, the SEU can take advantage of a variety of funding and financing mechanisms.”



FINANCING

As a decentralized municipal utility, the SEU can take advantage of a variety of funding and financing mechanisms. The most obvious source of funds are rates charged to customers. However, in addition to more typical options, finance under a SEU can be as diverse as the products it offers customers, and the types of customers who elect to be served.

A traditional municipal “wires” or distribution-owning utility invests most of its money in acquiring energy distribution and power plants. Rates therefore end up having to cover the costs of that debt service, as well as operating revenues for wires and remote power generation. That can limit the utility’s ability to accommodate investments in new technologies, like large amounts of neighborhood-level generation and thus physical reduction of imported energy.

In contrast a SEU is poised to focus all of its investment on new, renewable megawatts and load reducing “negawatts” from on-building energy systems that generate most of their own energy requirements. Thus, rather than financing old wires and power plants, a SEU will finance a broad array of renewable power, energy waste reduction, beneficial electrification, and microgrids almost immediately. As the administrator of installed energy devices, the SEU will use its sovereign rate design authority to tailor ownership offerings to customers for all these services.

Because of the inherently complex nature of decentralizing energy and tailoring solutions for voluntary investment by any Ann Arbor resident or business, using the full range of currently available financing options is appropriate, ideally with some customer choice. Larger municipal facilities are generally financed through public methods, and small consumer appliances or automobiles through commercial credit. In between these bookends there are options.

1 Municipally-owned projects may employ municipal bonds. The most common bond used for utility services are revenue bonds, which secure debt based upon non-tax revenues such as monthly utility bill payments, monthly payments by co-investors, or other contracts with residential and commercial energy users. General obligation (GAO) bonds secure debt by recourse to property taxes. As energy users, municipalities may secure revenues for such bonds based on contracts with their utility accounts and also the accounts of residents and businesses who elect to receive SEU products and services.

2 Green Bonds are a growing area of investment within financial markets and may be a viable source to help create and support the SEU. Green Bonds provide a SEU with considerable flexibility, without excluding private or state financing when available on better terms, creating a stable structure for a multi-year community-wide energy transition. Specifics of how Green Bonds are used in connection with a SEU depends on what kinds of projects are to be financed, the sources of repayment, which must be secured by the revenues derived from fees and charges associated with the operation of an enterprise (not municipal General Funds) or from other municipal enterprises, or a loan agreement with a SEU customer. A bond rating from a rating agency will be required for Green Bonds. Municipalities have a wide degree of discretion regarding the use of Green Bond proceeds broadly for public and/or private sector renewable energy and conservation projects, including SEU identified offerings such as energy efficiency, onsite renewable storage, HVAC fuel switching, and hot water fuel switching. The specific programs and users of facilities will impact whether the interest on such bonds are tax-exempt under Internal Revenue Service provisions.

3 Investors looking to take advantage of federal tax incentives (which are available for investment in many of the services provided by the SEU like solar and storage) may be able to eliminate or buy down the upfront costs of certain SEU-related infrastructure.

4 Tax dollars or other municipal revenue sources could be used to initiate the SEU. For example, if the City were to move forward with a community climate action millage, funding from the millage could be used to build the infrastructure of the SEU.

5 Federal, state, and philanthropic grants are likely to be a viable option for the SEU given its novel nature and strong alignment with current federal priorities around equitable decarbonization.

The above are only some of the financial pathways to operationalizing a SEU. Overall, if the City were to move forward with creating a SEU, all of the financial pathways associated with creating a traditional municipal utility would be available to us, plus some additional, more innovative funding streams.

ADDITIONAL CONSIDERATIONS

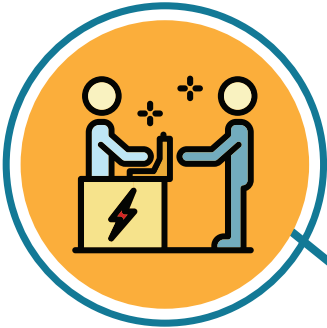
“Because the SEU would be a parallel utility to DTE, it will be important to cast a wide net early, educating people about the SEU and securing their commitment to participate.”



ADDITIONAL CONSIDERATIONS

Obtaining Customers

Because the SEU would be a parallel utility to DTE, it will be important to cast a wide net early, educating residents about the SEU and securing their commitment to participate. The City will need to decide what contract term it will ask residents to sign (e.g., 5-year, 10-year) so as to have some stability of customers prior to investing. Since a SEU's infrastructure and services can be deployed at a small-scale, a few committed customers in a neighborhood would still allow some services to be offered at an attractive cost. From a value proposition, it is recommended the City focus its recruitment into the SEU in four categories:



- 1) customers that have significant demand (e.g., commercial clients);
- 2) customers who are efficient to serve due to location or high interest from neighbors;
- 3) residential and commercial customers in areas that are struggling with reliability; and
- 4) low-income households that could immediately secure reductions in energy bills due to their participation in the SEU.

It is also important to register a critical mass of subscribers in a given area to ensure that the microgridding feature of the SEU is viable. A next step is piloting the SEU, exploring exactly what level of subscription is necessary in key recruitment geographies to make the microgrid economically and technically viable.

Overall, should the City decide to pursue a SEU it can immediately begin recruiting residents into the utility, keeping a waitlist that helps understand demand. This waitlist can also help support financing as it will demonstrate community support for the SEU.

Limited Distribution. Minimal Poles and Wires

While this topic has been discussed in other sections of the report, it's worth calling out that the envisioned SEU is one that uses limited poles and wires. This is important because it means the community won't be caught spending hundreds of millions of dollars in upfront costs to procure aging, antiquated, and unreliable infrastructure that relies on a dirty and vulnerable grid. This is the same grid that makes us vulnerable to rolling blackouts and power outages right now. Having the City procure this system does not make us less vulnerable - it just transfers the risks and liability for this system to the City. Rather than spending years and millions to purchase these systems, only to find ourselves in the same spot we are in now, we can invest these funds in a way that enhances neighborhood resilience, sets customers up for ongoing savings, generates local jobs, and that allows us to immediately start decarbonizing our electricity system.



STEPS TO ESTABLISHING A SEU

“This not a traditional utility takeover but the creation of something new. It is not a single acquisition but a parallel process: redevelopment of neighborhoods for climate mobilization.”



STEPS TO ESTABLISHING A SUSTAINABLE ENERGY UTILITY

As previous sections of this report detail, this not a traditional utility takeover but the creation of something new. It is not a single acquisition but a parallel process: redevelopment of neighborhoods for climate mobilization. A SEU launch will consist of the accelerated city-wide build-out of a new kind of infrastructure that integrates all energy users and serves them onsite through an interoperable network of semiautonomous microgrids, based on an ambitious engagement of each and every interested utility customer in the community.

SEU formation involves City authorization and funding to implement the program, establishment of the new agency, commencement of enrollment of any resident or business who affirmatively elects to take parallel service, and administration of local redevelopment as described in this document. Should the City decide to move forward with creating a SEU, the following steps would be required or recommended:

The City has established aggressive, audacious, and nation-leading goals around decarbonization and equity. The

- 1 Pass an ordinance by Council providing for the creation of a SEU (required).
- 2 Immediately begin assessing interest from residents in joining the SEU, creating a waitlist (recommended).
- 3 Complete a rate analysis (recommended).
- 4 Pilot district geothermal in at least one neighborhood (recommended).
- 5 Depending on the funding or financing mechanisms, a vote of the people may be needed. (If the SEU is funded solely through grants, philanthropy, or other methods that don't involve borrowing or taxation, a vote of the people would not be necessary).

CONCLUSIONS

“A SEU presents a novel way the City can leverage advances in distributed energy resources to rapidly invest in energy waste reduction, beneficial electrification, and local renewable energy generation.”

City has established aggressive, audacious, and nation-leading goals around decarbonization and equity. Achieving these goals necessitates immediate investments in clean energy. A SEU presents a novel way the City can leverage advances in distributed energy resources to rapidly invest in energy waste reduction, beneficial electrification, and local renewable energy generation. This pathway has the potential to create numerous family-sustaining jobs, address major energy justice concerns, and improve the resilience and reliability of our energy system.

A SEU is a municipal, publicly owned utility -- cleaner, cheaper, faster, more local, and more reliable than any other public power option. It is groundbreaking in our state, but well-tested elsewhere and clearly enabled by Michigan law. As we all double down on our commitment to equitable decarbonization, Ann Arbor's SEU needs to be part of the conversation.

THANK YOU

Special thanks to the individuals who helped make this report possible. To the “brain trust” who helped unpack the technical, policy, legal, and financial considerations associated with a Sustainable Energy Utility, and who helped write this report and bring the vision of a SEU into focus, we give our deepest and most heartfelt thanks:

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Paul Fenn, Local Power, LLC
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Greg Bolino, DG Reimagined
Henry Love, Elevate

To representatives from the DC Sustainable Energy Utility and the Delaware Sustainable Energy Utility who shared their expertise and insights with us, thank you for your leadership.

And finally, to all the residents who continue to push Ann Arbor to achieve equitable decarbonization by the year 2030, thank you for your motivation and inspiration.

