Energy Resilience for Connecticut Municipalities

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CT Public Act 20-5 defines resilience as "the ability to **prepare for and adapt to** changing conditions and **withstand and recover** rapidly from deliberate attacks, accidents or **naturally occurring threats or incidents**, including, but not limited to, threats or incidents associated with the i**mpacts of climate change.**"

What does this mean for towns?

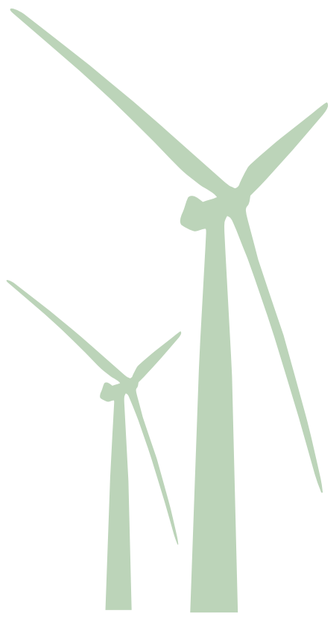
Comprehensive energy planning for both government operations and the town as a whole is a necessity. Climate change is only one of the reasons this is important.

Goals of Resilience

- **Reliable**: Every time you turn the switch, the lights come on.
- **Sustainable**: The strategies you're using now will still work in 10, 25, or 50 years. This means not relying on non-renewable resources.
- **Affordable & accessible**: Everyone in the community should have access to power.
- **Mindful**: The energy sources we use should not be making climate change worse - that is self-defeating.

Strategies

- Distributed generation
  - Renewables
  - Microgrids
- Electrification
- Efficiency
- Storage
- Demand-Response



Resources

- Federal Grants for Resilience Activities
- EnergizeCT for Towns
- DOE's Efficiency-Resilience Nexus
- Resilient Power Planning Guide

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What does a good energy plan look like?

State: The State completed its latest Comprehensive Energy Strategy (CES) in 2018, and is currently working on its 2023 update.

Large cities: Hartford's 2017 Climate Action Plan | New Britain's 2016 Energy & Innovation Roadmap for the Future | West Hartford's 2020 Energy Plan

Mid-size communities: Simsbury's 2019 Energy Plan | Middletown's 2019 Energy Plan | South Windsor's 2019 Municipal, Residential & Business Energy Plan

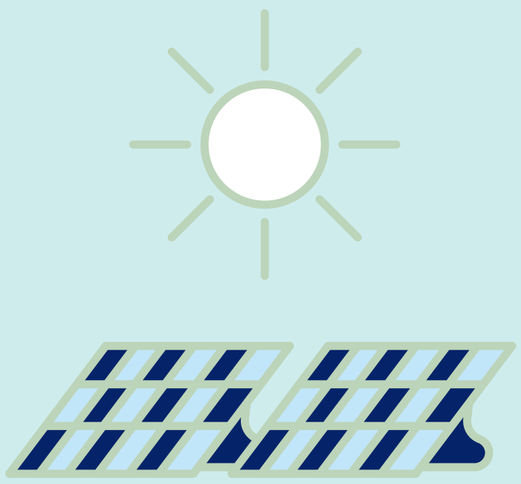
Small towns: Ashford Clean Energy Task Force's 2019 Municipal Action Plan

Distributed Generation: Renewables

The electrical grid - the term we use for the network of cables, substations, and other infrastructure that deliver electricity - is outdated and overburdened, especially during windows of peak demand. To take some of the stress off the grid, municipalities should invest in creating their own power with renewables. These small operations that create energy in the same place it is being consumed (like a wind turbine on a farm or solar panels on a roof) are referred to as distributed generation.

Drawing electricity from the grid also means that power must travel long distances over cables, which are highly susceptible to being knocked down by winds or falling trees in storms. With climate change amplifying the frequency and intensity of such storms, towns are increasingly likely to face outages when reliant on the grid.

Renewables also have important co-benefits, like the fact that they are sustainable in the long term as opposed to non-renewable fossil fuels.



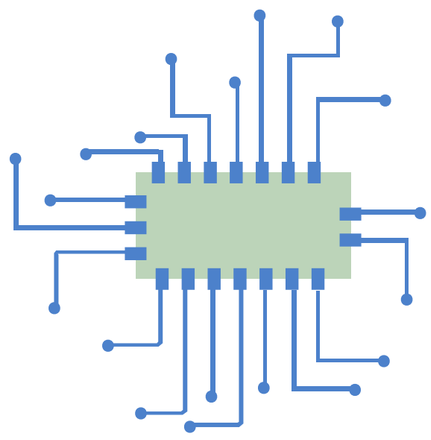
Distributed Generation: Microgrids

The U.S. Department of Energy defines microgrids as "a local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously." The scale of a microgrid could be a few buildings, or an entire neighborhood. They are popular on university campuses (like the University of Bridgeport) or municipal complexes (like Fairfield, Woodbridge, and Milford).

In the climate change era, an energy source able to function independently of the grid is extremely valuable for municipal resilience. Cooling centers with charging stations can remain online during summer heatwaves - the municipal emergency operations center can remain up and running in blizzard. An added benefit is that microgrids tend to have opportunities for “smart grid” tech, such as the Wi-Fi connected thermostats or energy storage capabilities. Even if a microgrid only serves a small portion of your community, it removes strain and demand from the electrical grid, better allowing it to serve other residences and facilities.

Connecticut DEEP even has a Microgrid Grant & Loan Program to help you get started.

Electrification



New England is moving towards a decarbonized, more renewable-based grid, which is better for environmental and economic sustainability. In order to access these benefits, municipal buildings and vehicles should electrify. By continuing to use oil to heat a recreation center or gas-fired stoves in cafeterias, municipalities remain dependent upon harmful fossil fuels.

CT DEEP committed in their 2022-2024 Conservation and Load Management Plan to transition their Residential New Construction program into an all-electric offering, with their CHEAPR rebate making fleet electrification more affordable as well. Electrification also pairs perfectly with distributed generation and microgrids, as it allows facilities and fleets to subsist on energy produced at the source rather than on oil and gas delivered from other sources. With pipeline attacks making recent headlines, and it makes sense for municipalities to build resilience against such threats.

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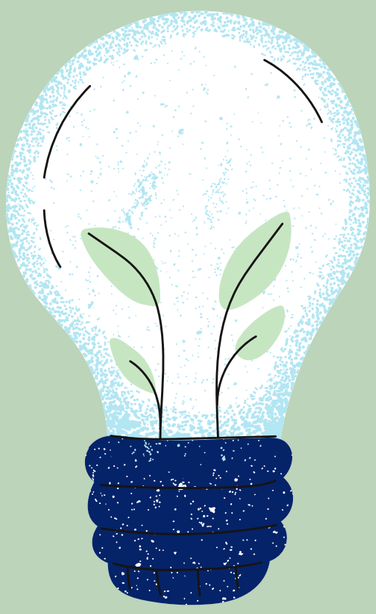
Efficiency

Energy efficiency is the use of less energy to perform the same task or produce the same result. It is quite likely that your municipality has already engaged in some kind of efficiency measure - whether it was replacing CFL lightbulbs with LEDs, adding weather stripping to maintain indoor temperatures, or adding a fuel-efficient vehicle to the fleet. The U.S. Department of Energy describes efficiency as "one of the easiest and most cost-effective ways to combat climate change, reduce energy costs for consumers, and improve the competitiveness of U.S. businesses."

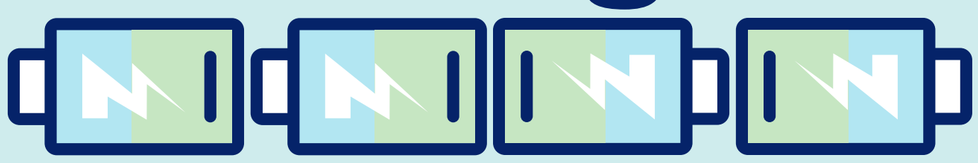
Because energy efficiency is in everyone's best interest, the State of Connecticut codified in Section 33 of Public Act 11-80 an Energy Conservation Management Board that assists electric utilities in providing incentives and programs to save energy. Energize CT is a vehicle for much of this work, in partnership with the CT DEEP and the Connecticut Green Bank. Before beginning work on public projects, it is well worth reaching out to these entities to understand if funding or guidance is available to your municipality.



Energy Star (ES) is the EPA-backed certification program for energy efficiency in appliances and technology. It can be an excellent tool in identifying upgrades to existing buildings from small scale (lightbulbs, computer monitors) to large scale (heating systems, data center equipment). For instance, switching from conventional phones to ES phones can result in 40% energy savings, while upgrading to ES ductless heat pumps can cut heating costs by 60% and cooling costs by 30%. The EPA's "Energy Efficiency in Local Government Operations" strategy guide contains excellent planning resources for crafting your own energy efficiency program.

Just like with any other commodity, the less energy you use, the smaller your bill is. Efficiency isn't just resilient - it makes economic sense.

Storage



Energy sources that can be deployed specifically when needed are referred to as "dispatchable." Oil, coal, natural gas, and nuclear are dispatchable; but wind and solar are not, instead called "intermittent." This becomes an issue when there is a mismatch between supply (no sun shining at night) and demand (subzero weather, where everyone has the heat running). The key to making these intermittent resources available when demand spikes is energy storage.

Energy storage allows ongoing power when an extreme weather event disconnects a facility from the grid. It is also a great way for municipalities to save money. When demand is high but supply is low, if you are on a peak pricing plan, your prices go up. Having a reserve of power to use at these critical times means municipalities can avoid peak pricing, while also reducing strain on the rest of the community's supply.

There are several types of storage including fuel cells and lithium-ion batteries. New technologies in this field are still emerging, and one of the most important areas of research is how to scale energy storage to accommodate more capacity.

Demand Response

Local energy resilience can also come from encouraging residents and businesses to lower their power usage during stressful times for the grid - such as hot, humid summer afternoons. This encouragement typically involves a utility increasing prices during these peak periods thereby discouraging power consumption.

Communications from the utility or even a municipality, often through social media, to its customers or residents has proven to be helpful in reducing consumption when it is the most needed. Municipalities could work with utilities on communicating with residents and local businesses in this regard similar to how they do with water companies and drought guidelines.

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There are numerous federal and state incentives for municipalities to implement these strategies. For more information, click here to contact CIRCA.