

Energy Transformation: Greatest GHG Reduction Potential Requires Political Will

The local government focus on individual initiatives is shifting to a more comprehensive approach to energy system planning.

The 2016 USDN Member Impact Survey revealed that energy actions in particular have high potential for impact – but also have high costs or many barriers to implementation.

Read more about the survey [here](#).

Urban Energy System Transformation is the process of restructuring energy demand and supply in a municipality to radically reduce the amount of energy consumed, transition energy supply to fossil fuel-free sources, and make the system resilient to future risks. According to a 2015 USDN Innovation Fund study on energy transformation ([here](#)), there are three basic components of energy systems change work:

- [Reduce Energy Demand](#): reducing the total amount of energy (electricity, thermal, and combustion) used in key urban systems like buildings, transportation, and water.
- [De-Carbonize Energy Supply](#): restructuring energy supply systems to maximize the percentage of energy that comes from carbon-free sources.
- [Increase Energy System Resilience](#): designing energy systems so that they are resilient to climate impacts, including increasing the percentage of distributed energy resources.

In communities with strong local political will, energy supply practices are rapidly evolving. When cities first began developing climate action plans with targets for emissions reductions, strategies were typically organized around demonstration programs. There was not enough staff, technical knowledge, or political will to engage in large-scale energy systems change. However, the field has rapidly evolved, and some USDN members are now developing:

- [Aggressive targets](#). USDN members are increasingly setting longer-term and higher GHG reduction targets (i.e., 80% reduction by 2050 or earlier).
- [Implementation plans](#). Some USDN members are implementing strategic energy management systems and processes, including setting targets, hiring energy management staff, dedicating funding, using management software, and purchasing renewable energy.
- [Increasingly sophisticated analysis](#). USDN members are developing internal expertise in the operation of electricity and thermal grids (generation, transmission, and distribution) and understanding the structure of those grids within their municipal boundaries.
- [More aggressive policy engagement](#). USDN members are becoming active participants in the energy sector regulatory process and developing knowledge and skill sets needed to intervene in utility decisions (i.e., rate settings and energy source).
- [Energy systems investments](#). Increasingly, USDN member cities are willing to take on the risk of investing in and managing energy infrastructure and market mechanisms (utility takeover, district energy systems, Community Choice Aggregation, etc.).

While 30% of members are working on 100% Renewable Energy Plans and 38% are working on transforming their utilities, the 2016 Member Impact Survey shows that the local political environment is a strong influencer on how successful these efforts can be. Without it, it is hardest to implement actions like: 100% Renewable Energy Plans, time of sale building energy upgrades, utility transformation, battery installation, micro-grids, and district heating.

The survey also shows that energy consumption reductions are taking root in the municipal, residential, and commercial sectors. Some are nearly universal: Less than 15 respondents said there had been no planned municipal building upgrades in their communities or that they had not begun planning for the switch to 100% LED street lighting. Others are gaining traction: 47% are working on residential energy efficiency programs, and 67% are planning or implementing commercial energy reduction programs. Figure 1 shows the state of implementation of some energy actions throughout the USDN member communities.

Figure 1. Energy Action Implementation in USDN Member Communities, 2016



Energy transformation is critical to reducing community GHG impacts and achieving zero net energy. Beyond building political will, it is important to understand how to get there:

- [Establish the Energy Vision](#). Firm commitment to an energy system that is close to carbon-free, as well as a clear understanding of feasibility and benefits, is essential to achieving the political will necessary to take on the complex issues involved in energy system transformation.
- [Understand Your Energy System](#). It is not possible to make informed choices about a city's energy future without a deep knowledge about how the current system works. "Deep dives" into city energy systems (electricity, natural gas, steam, combined heat and power, renewables, etc.) brings a level of technical knowledge than cities are not typically accustomed to developing.
- [Design Energy System Solutions](#). The path for each community varies based on current system structures, local resources, etc. Multiple choices must be made about power sources and transmission / distribution that balance concerns of emissions reductions, cost, and reliability.
- [Organize for Transformation](#). Communities need to build capacity to manage implementation of their energy systems transformation strategy. This requires both building internal staff capacity and expertise and building relationships with external partners.

From previous research efforts and the 2016 USDN survey, it is clear that local governments are taking a more hands-on approach to energy systems decision structures, infrastructures, and energy sources, with vanguard cities wielding their political will to test waters and develop good practices for others to adopt.