DEPLOYING BUILDING PERFORMANCE DATA IN CLIMATE STRATEGY

Clean Energy DC

PUTTING DATA TO WORK

CASE STUDY

IMT
INSTITUTE
FOR MARKET
TRANSFORMATION

ABOUT IMT

The Institute for Market Transformation (IMT) is a national nonprofit organization focused on increasing energy efficiency in buildings to save money, drive economic growth and job creation, reduce harmful pollution, and tackle climate change. IMT ignites greater investment in energy-efficient buildings through hands-on expert guidance, technical and market research, policy and program development and deployment, and promotion of best practices and knowledge exchange. For more information, visit imt.org.

ABOUT PUTTING DATA TO WORK

Putting Data to Work is a three-year pilot project aimed at using building performance data and asset information to help efficiency program implementers better target their outreach to building owners and increase the number of projects executed within these programs. The project used building performance data gathered by City policies to improve energy efficiency program design and delivery in the District of Columbia and New York City, and developed a toolkit of resources to enable local governments, utilities, and program implementers to learn from activities to replicate successes.

This case study examines how the *Clean Energy DC* plan can serve as a model for city policymakers to actively use benchmarking data in climate planning.

★ ★ ★ DEPARTMENT OF **ENERGY &** **ENVIRONMENT**

The District of Columbia Department of Energy and Environment (DOEE) is an executive agency within the District's government. Charged with oversight of environmental and energy programs, services, laws, and regulations, DOEE oversees building-related programs including green buildings, licenses and permits, and energy and water benchmarking.

"The Healthiest, Greenest, Most Livable City"

In its 2012 *Sustainable DC* plan, the District of Columbia announced that it wanted to make the region "the healthiest, greenest, most livable city in the nation." To do so, the District established a series of targets directly addressing energy use, energy generation, and greenhouse gas (GHG) emissions. These targets include

- reducing GHG emissions by 50 percent by 2032 and by at least 80 percent by 2050;

- reducing citywide energy use by 50 percent by 2032; and

- increasing the use of renewable energy to make up at least 50 percent of the District's energy supply by 2032.

In December of 2017, Mayor Muriel Bowser furthered these commitments by pledging that the District will be carbon neutral by 2050. *Clean Energy DC,* the District's climate and energy plan, details how the District plans to use energy policies and programs to achieve its intermediate GHG emissions targets for 2032. The Institute for Market Transformation worked with the District, Integral Group, and the International Living Future Institute on the development of the District's plan, which provides a roadmap to help the District achieve its GHG reduction goals and analyzes the impact on the District's other sustainability targets. Across these goals, the collection and deployment of building energy benchmarking data—gathered through the District's benchmarking policy—plays a strong role.

Clean Energy DC serves as a model for the use of energy benchmarking data in climate planning. The modeling and analysis that underpin *Clean Energy DC* directly integrate the District's benchmarking data—one of the first times that such granular, geographically specific data has been used for this application.

Using Energy Benchmarking Data to Inform Climate Strategy

In order to track energy consumption in the built environment, the District's Clean and Affordable Energy Act of 2008 (CAEA) requires owners of large, privately owned commercial and multifamily buildings over 50,000 square feet and all District government buildings over 10,000 square feet to benchmark their energy and water consumption using the U.S. Environmental Protection Agency's ENERGY STAR Portfolio Manager tool, and to report this information to District of Columbia Department of Energy and Environment (DOEE) annually. It also requires the public disclosure of benchmarking data, which includes information about the buildings (e.g., address, square footage, and property type) as well as energy performance information (e.g., ENERGY STAR score, Energy Use Intensity [EUI, defined as the amount of energy used per square foot], GHG emissions, and energy use by fuel type).

The project team used this benchmarking data to develop the model and analysis for the buildings-related recommendations and estimated savings in the *Clean Energy DC* plan. This allowed the modeling to directly reflect actual building characteristics and energy consumption within the District, rather than relying on assumptions or national-level data, creating a more accurate representation of the expected energy and GHG impact of various recommended actions.

DATASETS AT WORK

In order to model energy use of buildings in the District, the *Clean Energy DC* team used a combination of publicly available datasets and data that are collected and maintained by the District, but not public. Jurisdictions looking to replicate this effort should identify comparable datasets for their local building stock.

Data Sources and Use

- *DC Energy and Water Benchmarking Data:* For the building-related emissions modeling, the most recent publicly-available dataset of buildings 50,000 square feet and above that are covered by the District's benchmarking law was used to characterize the building stock in the District.

- *Property Tax Assessor Data:* To model the energy use of all buildings, the energy use data was multi-plied across the total floor area in the city, by property type.

- *U.S. Department of Energy and Environmental Protection Agency Data:* For building types not in the benchmarking data above, U.S. Department of Energy (DOE) national reference data was used, such as the Residential Energy Consumption Survey (RECS). For all buildings, the GHG intensity was calculated using the U.S. EPA's Emissions & Generation Resource Integrated Database (eGRID) database.

- *Other Data:* The emissions model that was developed for *Clean Energy DC* also includes renewable energy, energy supply, and transportation, which pulled data from various sources. For the purposes of this case study, the focus is on buildings and the use of benchmarking data.

Building Types

Buildings subject to the District's benchmarking law, which include commercial and multifamily buildings 50,000 square feet and larger.

In short, the team developing the plan created district-specific EUI assumptions for each building type, and then multiplied these out across the total square footage for that building type in the District. For buildings not in the dataset, such as single-family homes and smaller commercial properties, other U.S. Department of Energy data sources were used, including the Building Performance Database (BPD) and the Residential Energy Consumption Survey (RECS). This bottom-up calculation for total energy use was then compared to top-down data from the utility companies, and trued up where needed.

It should be noted that while the benchmarking data was very useful in creating this model, it was limited to whole-building data analysis, and the addition of data from building energy audits, which would provide system-level information and additional detail on building characteristics, would have greatly improved the detail of the model.

In practice, using locally specific data made coming up with a plan to meet the District's GHG reduction goals harder, not easier. This is because District buildings are, on average, more efficient than national norms, so the potential energy savings available from improvements in those buildings are less than national or regional datasets would suggest.

Success: Using Policy Data to Set and Achieve Local Climate Goals

If fully implemented, the *Clean Energy DC* recommendations will result in a GHG reduction of 39.8 percent by 2032, when compared with a 2032 business-as-usual (BAU) scenario. *Clean Energy DC* recommends 30 distinct actions for buildings (out of 55 actions overall). Actions related to existing buildings are projected to result in a 6.6 percent GHG reduction relative to a 2032 BAU scenario, and actions related to new construction are projected to result in a 5.2 percent GHG reduction relative to a 2032 BAU scenario. Building-related actions, totaling 11.8 percent GHG reduction relative to 2032 BAU, make up over a quarter of the total savings modeled in the plan. Several recommended actions also build specifically on the benchmarking data that has been collected to create new policies and programs. Since the recommendations build upon one another, strategic and cohesive implementation of these recommendations is crucial to fully realizing the expected reductions.

What's more, to build on the public transparency of the District's benchmarking data, the DOEE worked with the District of Columbia Sustainable Energy Utility (DCSEU) to incorporate energy and water benchmarking data into the DCSEU's customer outreach process, as well as worked to better integrate DOEE and DCSEU data-sharing practices.

> If fully implemented, the Clean Energy DC recommendations will result in a GHG reduction of 39.8 percent by 2032.

Lessons Learned

Other jurisdictions may learn from the District's example of using data to inform target setting and tracking for sustainability goals. In addition, examples of other cities that have incorporated energy benchmarking data into their comprehensive energy planning include New York City's Roadmap to 80x50 (published in September 2016, and including, strategies in Energy, Buildings, Transportation, and Waste) and Seattle's Climate Action Plan Implementation Strategy (published in October 2013, and including actions in Transportation and Land Use, Building Energy, Waste, and Preparing for Climate Change).

Among the lessons learned in the District's recent exercises are:

- **High-quality data are important.** High compliance, high-quality inputs, and a method for "cleaning" submitted data are important prerequisites for using this information in energy efficiency policymaking and program design. Users of the data, both government and private market actors, must have confidence that the information is accurate in order to rely on it to make decisions, and most importantly, to ensure that those decisions are driving increases in energy efficiency.

- **Planning and target setting should be informed by local data.** City sustainability targets should be ambitious and forward-looking, but should also be grounded in the reality of circumstances within the city. Several considerations for target setting and action planning are summarized in the table below.

CONSIDERATIONS WHEN SETTING TARGETS	CONSIDERATIONS WHEN MAPPING ACTIONS TO MEET TARGETS
What will be the driving target? Energy? GHG reduction?	What actions are already underway that can be further implemented or leveraged?
How will progress be measured?	What are other cities doing to target these sectors?
Whose participation will be critical in achieving milestone progress toward targets?	What are the economic implications of actions being taken?

What's Next?

A draft of *Clean Energy DC* was peer reviewed in September 2016, and released publicly thereafter. The plan will be updated and modified as needed during and following the public stakeholder feedback process, which is scheduled to be completed in early 2018.

Since the actions outlined in *Clean Energy DC* require near-term activity to achieve the expected energy and emissions savings, the District will need to begin implementation of the recommendations as quickly as possible. For existing buildings, this means retrofitting a significant portion of the building stock to increase its efficiency and reduce reliance on fossil fuels. This will require a combination of well-financed, data-driven, and strategically targeted programs from the City, the DCSEU, partner organizations, and the private sector. ●

WWW.

ADDITIONAL INFORMATION

Clean and Affordable Energy Act of 2008

DOEE Energy Benchmarking

Sustainable DC

Clean Energy DC

Putting Data to Work Toolkit

U.S. Department of Energy Building Performance Database

U.S. Energy Information Administration Residential Energy Consumption Survey

PUTTING DATA TO WORK

Institute for Market Transformation | imt.org/PuttingDatatoWork