"Decarbonization-as-a-Service" Platform for Utility Planning and Customer Engagement

Startup
Dynamhex
Baltimore, MD

Host
Ameren

Technology Solution

With many states, cities, local jurisdictions, institutions, and corporations joining utilities in establishing decarbonization and other sustainability goals, the role of buildings as a lever for achieving economy-wide emission reductions is gaining in importance. Utilities are ideally positioned to work alongside governments and other entities in aligning both internal and external decarbonization objectives with energy efficiency, demand response, electricity supply, and additional customer offerings. However, these customers often lack the data, expertise, and funds needed to create and manage their decarbonization plans.

This pilot was initiated to demonstrate the decarbonization-as-a-service (DaaS) platform developed by Dynamhex for assisting customers in meeting decarbonization goals by taking advantage of utility offerings. The platform aggregates energy use and other data to create digital twins for individual residential, commercial, and industrial buildings within a geographic region or service area. Geospatial modules calculate emissions for each building, and built-in analytics deliver targeted, prescriptive decarbonization roadmaps that identify actionable energy- and emission-reducing opportunities and available utility programs and incentives. Bottom-up modeling of building-level actions supports tracking and standardized reporting of progress toward decarbonization by individual stakeholders and collectively.

Dynamhex's cloud-based platform includes both utility-focused and customer-centric features for analyzing and reducing carbon emissions.

Project Overview

Dynamhex, Ameren, and EPRI teamed up to demonstrate and test the DaaS platform by analyzing how Ameren's customer programs can help in decarbonizing the building sector within its service territories in Missouri and Illinois. Estimating the current and potential future carbon footprint of the building stock—while taking factors such as demographics, equity, and social justice into account—is expected to help optimize program design and rollout.

Specific pilot project goals were to apply the platform for mapping and modeling carbon emissions, with granular details, across three municipalities covering

1.1 million residents; and to gather feedback from internal Ameren teams, as well as external stakeholders, addressing the following:

- Platform capabilities and user experiences for Ameren and its customers;
- Clarity on emission reduction potential and mitigation solutions;
- Consistency with assumptions, methodologies, and standards commonly used for quantifying emissions and benchmarking performance at building, sector, and other levels; and
- Future data types and platform enhancements and features.

Participating municipalities included St. Louis County and the city of St. Louis in Missouri, as well as Champaign County in Illinois. In addition, the project team interacted with and solicited feedback from the cities of St. Louis and Urbana, IL, plus six large customers—three corporations and three universities.

Results & Learnings

Over a 24-day period, the overall Ameren territory was analyzed to quantify total greenhouse gas emissions. Additional model calibration was conducted on all buildings, facilities, and transportation activities across the three participating municipalities and in collaboration with individual corporate customers.

Dynamhex simplified the process of collecting and aggregating the needed data—including metering data, historical building upgrade information, permitting records, rooftop imagery, local grid conditions, etc.—and standardizing models to provide Ameren with a ready-made platform with which to engage customers across its service territory. This included creation of an on-demand web portal to facilitate the ongoing transfer of customer energy consumption
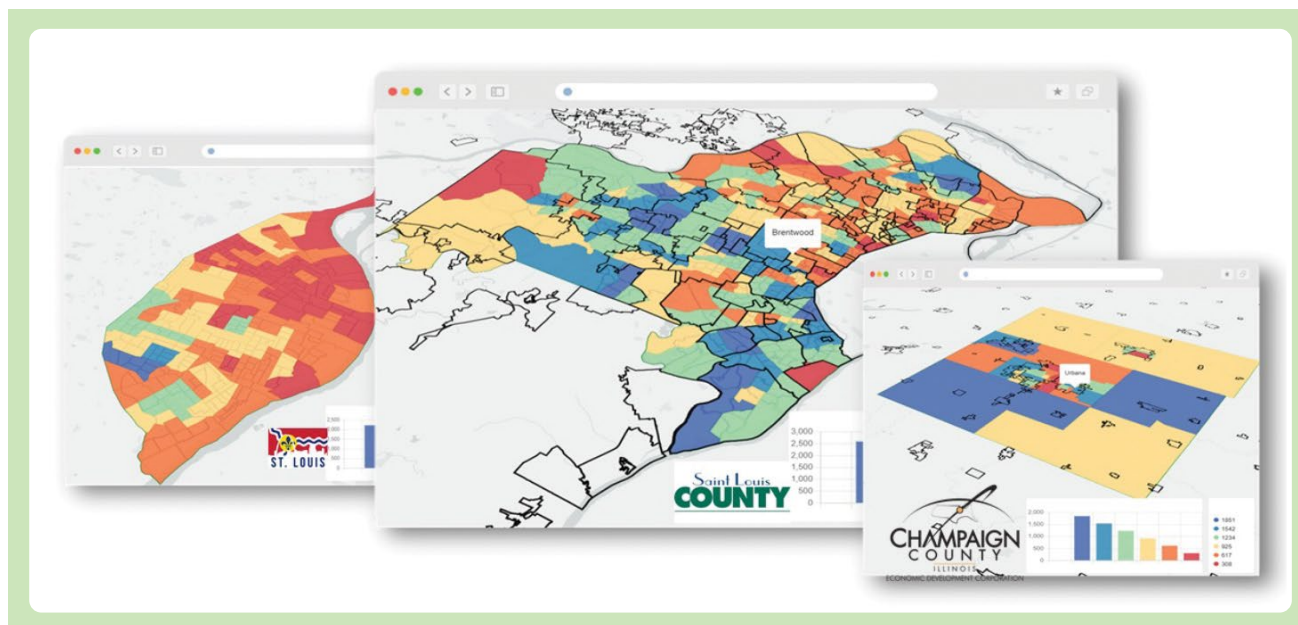
The Dynamhex platform facilitated the process of integrating diversity, equity, and inclusion considerations in evaluating decarbonization opportunities across municipalities by analyzing demographics, community risk profiles, environmental justice concerns, and other factors.

data programmatically, through a single sign-on process, effectively bypassing lengthy manual processes and related workflows. Ameren's portal also included more than 30 utility programs available to residential, commercial, and industrial customers.

The platform's target-setting module enabled Ameren to align its programs and initiatives with the overall emission reduction targets and sustainability goals of individual customers and communities. For example, on the supply side, the utility's current electricity supply portfolio and its future mix can be used to show planned reductions in regional emissions from the generation fleet and the associated impacts on the electricity-related emissions of customers. Similarly, demand-side solutions can be overlaid on existing service addresses and building footprints to provide personalized decarbonization solution packages on

a proactive basis, thereby improving the customer experience.

Dynamhex modeling showed that select utility programs could help individual customers reduce their emissions by almost 32%, enabling significant progress toward their decarbonization goals. According to utility interviews, the typical process of measuring the carbon footprint of a single customer normally takes hours. Offering tailored emission reduction recommendations tied directly to available utility programs requires additional investment of time and resources. Without the DaaS platform, delivering this level of customization across thousands of customers would be impractical.

By establishing relevant demographic and ethnographic predictors, the Dynamhex platform also was able to shed light on which of thousands of building

owners have the highest propensity to take advantage of specific utility offerings in carrying out upgrades. In turn, the ability to represent the source, location, time, and other characteristics of emissions proved highly valuable in helping customers understand their carbon footprints and evaluate reduction opportunities given their unique load profiles. Going forward, the platform will provide a means for customers to verify the impacts of actions taken.

During the customer demonstrations, the platform also was applied to new use cases, ranging from completing a regional greenhouse gas footprint exercise across five counties to capturing and visualizing customer uptake of specific utility programs in the city of Urbana.

Implications & Next Steps

This project has shown that the Dynamhex platform can help Ameren in collaborating with municipal, corporate, and institutional customers in developing actionable plans for reducing their current emissions and meeting longer-term objectives. Bottom-up modeling based on data and insights specific to individual buildings and customers increases accuracy, flexibility, and depth of analysis, as compared to traditional top-down models. Currently, Ameren is planning a broader deployment.

As customers look to better understand their energy consumption and emissions for buildings and additional assets, the DaaS platform shows promise for helping Ameren and other utilities both position and promote existing programs and design and roll out new offerings in a data-backed manner. In particular, utilities and their partners can apply the platform to rapidly produce and deliver proposals that specify how energy savings and other customer benefits can

be increased by implementing multiple technologies and measures. This will facilitate the process of bundling individual upgrades and programs, which has traditionally been done in a piecemeal fashion.

The DaaS platform also enables utilities to better set and communicate decarbonization and sustainability goals internally and to apply best practices for engaging customers and additional stakeholders in these areas. Improving understanding of utility offerings—in areas such as efficiency and load management, electrification, neighborhood and community solar, solar plus storage, smart charging, green power choice, etc.—is expected to help in turning internal and external decarbonization commitments into actions.

Recognizing that each utility and customer has their own set of objectives and challenges, the platform can be used to start the engagement process using pre-integrated, publicly available datasets and then can be customized based on data, needs, and goals

identified during interactions. Built-in interoperability supports seamless connection with existing applications and datasets and facilitates reporting.

In addition to evaluating enhancements based on lessons learned and customer feedback, Dynamhex is actively exploring collaborative opportunities to apply the DaaS platform in decarbonization-related research projects sponsored by EPRI and by agencies such as the U.S. Department of Energy and California Energy Commission.

Resources

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TESTIMONIAL: Dynamhex

Working with Ameren and EPRI helped demonstrate how AI-enabled platforms can support complex, multi-goal, multi-stakeholder workflows. Governments and individual customers are actively seeking data to inform their emission reduction and sustainability initiatives, and this project showed how utilities using our DaaS platform can both facilitate and deliver data-backed results.

TESTIMONIAL: Ameren

Based on the Dynamhex demonstrations, several of our customers initiated engagement regarding next steps to put plans and solutions in place to address their specific decarbonization goals.

TESTIMONIAL: City Customer

The Dynamhex platform was amazing—exactly the type of solution we need to estimate our annual emissions from different sources and to understand where and how we can collaborate to reduce them through utility programs, projects, and offerings and other available interventions.

Resources

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