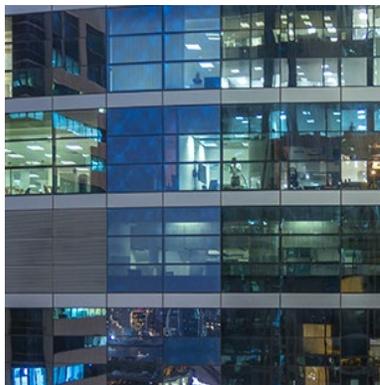


# Emerging Technologies

## Project Catalogue



Updated January 2020

Photos: EcoAdvocates team members (Chicago, IL Q3 2019); Refrigerated display case test configuration (Boulder, CO Q4 2019); Commercial office building (Q4 2019).

# Introduction

2019 flew by for the ComEd Emerging Technologies Team. As you will read in this catalogue update, we were quite busy exploring new program concepts and working with expert partners to test promising technologies. We're excited to share both the progress we've made and the breadth of innovative ideas being examined. We're also proud to showcase work led by over 50 project partners committed to creativity and operational excellence.

Our team celebrated several milestones in Q4 2019. We completed our first R&D project in partnership with the National Renewable Energy Laboratory and developed three more for 2020. We completed research projects on best practices and novel approaches to encouraging energy efficiency action in public housing facilities, commercial real estate, and an aging housing stock. We also worked closely with industry experts to complete two comprehensive studies of energy savings potential associated with regional water systems.

Although 2019 is over, we haven't stopped pursuing the next impactful idea. In the next quarterly update, you will find details for several new pilots and research projects launching in early 2020. In the meantime, please visit our website at [ComEd.com/EmergingTech](https://ComEd.com/EmergingTech) to learn more and submit a proposal. You can reach us directly at [EmergingTech@ComEd.com](mailto:EmergingTech@ComEd.com) or the contact information below.

Sincerely,

The ComEd Emerging Technologies Team

Mark Milby, Manager of Energy Efficiency R&D, ComEd, [Mark.Milby@ComEd.com](mailto:Mark.Milby@ComEd.com)

Steven Labarge, Senior Business Analyst, ComEd, [Steven.Labarge@ComEd.com](mailto:Steven.Labarge@ComEd.com)

Kelly Gunn, Senior Engineer, ComEd, [Kelly.Gunn@ComEd.com](mailto:Kelly.Gunn@ComEd.com)

CLEAResult team – Brittany Zwicker, Program Portfolio Manager, [Brittany.Zwicker@CLEAResult.com](mailto:Brittany.Zwicker@CLEAResult.com)

ILLUME team – Kelly Mulder, Managing Director, [Kelly@ILLUMEdadvising.com](mailto:Kelly@ILLUMEdadvising.com)

# Table of Contents

<b>Active Projects</b> .....	<b>5</b>
<b>Market Segment: Commercial</b> .....	<b>6</b>
Adsorbent Air Cleaner .....	7
Commercial Geothermal Advancement.....	8
Commercial Plug Load Opportunities .....	9
Energy Efficiency R&D Laboratory.....	10
Smart Pressure Independent Control Valves.....	11
<b>Market Segment: Cross Cutting</b> .....	<b>12</b>
AMI Data Analytics for Program Administration Enhancements .....	13
Baseline and Potential Study .....	14
<b>Market Segment: Income Eligible</b> .....	<b>15</b>
Affordable Multifamily Passive House .....	16
BIT Neighborhood.....	17
Breathe Easy.....	18
Chicago Income Eligible Multifamily Benchmarking Outreach.....	19
Data Analysis, Market Research and Segmentation .....	20
Ductless Heat Pumps.....	21
EcoAdvocates.....	22
Energy Efficiency in 2 Unit Buildings.....	23
Energy Efficiency Needs Assessment for Public Housing Authorities .....	24
Healthy Homes.....	25
Home Energy Reports Target Rank .....	26
Income Eligible High User Customer Needs Assessment .....	27
Income Eligible Paging Display.....	28
Income Eligible Program Design .....	29
Savings for Income Eligible Seniors .....	30
Street Operating System (SOS).....	31
<b>Market Segment: Residential</b> .....	<b>32</b>
All Electric Residential New Construction.....	33
Home Energy Reports Paperless Experience .....	34
Residential Real Estate Opportunities.....	35

<b>Completed Projects.....</b>	<b>36</b>
Alternative Refrigerants.....	37
Time of Sale Energy Incentive Acceleration .....	38
Retrofit Chicago Roadmapping 2.0.....	39
Synchronous Motors.....	40
Upstream Small Embedded Data Center Program Design .....	41
Variable Frequency Drives for Refrigeration Condenser Fans.....	42
Building Science Assessment.....	43
Energy-Water Nexus Initial Research .....	44
Green Stormwater Infrastructure .....	45
Technology Scouting and Analysis .....	46
Water Market Analysis.....	47
Income Eligible Customer Journey Mapping .....	48
Rockford Housing Authority Demonstration .....	49
Holiday Light Exchange .....	50
Home Energy Monitor Disaggregation.....	51
HVAC SAVE Quality Installation .....	52
Save and Share .....	53
Seasonal Savings.....	54
Smart Home Interaction Study .....	55
Smart Home Research .....	56
Total Connected Savings: Thermostat Optimization.....	57

*New projects since last catalogue update: none*

*Projects completed since last catalogue update:*

- Time of Sale Energy Incentive Acceleration
- Retrofit Chicago Roadmapping 2.0
- Building Science Assessment
- Green Stormwater Infrastructure
- Technology Scouting and Analysis
- Water Market Analysis
- Save and Share

# Active Projects

# Market Segment: Commercial

## Emerging Technologies - Active Project

### Adsorbent Air Cleaner



#### Primary Objective

Assess the energy savings impacts of the enVerid HVAC Load Reduction (HLR) Module in a real-world large commercial building setting.

#### Primary Research Question

How does deployment of the Adsorbent Air Cleaner technology impact HVAC energy usage and savings in commercial buildings? Does this constitute a reliable and cost-effective measure for further promotion?

#### Overview

The Adsorbent Air Cleaner Technology saves energy through reducing energy use in conditioning outdoor air. The enVerid HLR Module adsorbs gas-phase contaminants from ventilation air, allowing outside air intake to be reduced.

Phase I of the pilot developed energy models for technology deployment, completed a TRM whitepaper, and performed outreach for a field study. Phase II of the pilot secured an agreement to participate with a commercial building customer and will evaluate energy usage as well as other non-energy benefits including indoor air quality.

#### Status

The pilot team has provided an initial cooling season savings analysis for the installed equipment. The analysis indicates the units achieved energy savings and maintained building air quality within acceptable standards. The installed enVerid modules will undergo additional monitoring during Q1 2020 to evaluate performance across a full winter heating season and determine overall cost effectiveness. Guidehouse is reviewing the initial energy savings analysis in preparation for an impact evaluation in 2020.

#### Type

New Technology

#### Timeline

April 2018 to April 2020

## Emerging Technologies - Active Project

# Commercial Geothermal Advancement AECOM

### Primary Objective

Increase market adoption of geothermal heat pump installations in the commercial and light industrial market sectors by streamlining how customers access ComEd incentives for this highly efficient technology.

### Overview

To date, ComEd customers could receive incentives for non-residential geothermal or ground-source heat pump (GSHP) installations through ComEd's Custom Program. Feedback from the geothermal installer community indicated that a more streamlined incentive process could help drive customer adoption of this measure. In 2018, the pilot team collected information on the market opportunity for commercial GSHP projects, developed a streamlined incentive program offering (\$1000/ton) and submitted a TRM workpaper for v7 to help standardize M&V. Pre-applications for pilot incentives were accepted until February 28, 2019. All pilot installations will be complete by the end of the pilot period.

### Status

Installations have been completed at four locations, with a total of 48 tons of geothermal capacity. The pilot team is preparing a final report incorporating an energy savings estimate for these sites. Guidehouse is completing customer interviews of both pilot participants and near-participants to determine the effectiveness of the pilot incentive rate and determine other key customer motivators when considering geothermal technology. In early 2019, the Standard program introduced a new prescriptive measure similar to the pilot incentive, and the Emerging Tech and Standard teams are using the findings from this pilot to identify the most effective way to adapt the Standard incentive going forward and promote this effective but underutilized technology.

### Additional Partners

Energy Resources Center  
Geothermal Alliance of Illinois

### Type

Program Design

### Timeline

April 2018 to February 2020

## Emerging Technologies - Active Project

# Commercial Plug Load Opportunities



### Primary Objective

Identify new energy efficiency program opportunities for managing and reducing energy consumption associated with commercial customer plug loads, and provide recommendations on best practices, market potential and potential program design.

### Overview

Plug load, the energy used by plugged-in devices as opposed to energy used for lighting and HVAC, is growing in its share of overall energy use in commercial buildings. The California Plug Load Research Center (CalPlug) based at the University of California Irvine will conduct research to identify and prioritize energy end use with high potential impact on plug load consumption, as well as assess the effectiveness of different energy efficiency program design approaches (e.g. new technologies, control strategies, direct-to-buyer rebates, midstream, or upstream targeting) on these device categories. This research will involve review of existing and prior utility programs; historical activity and trends in ComEd's plug load-related measures; regional estimates for current commercial stock of device categories matching the territory and population served by ComEd; and trends in commercial devices including automation, Internet of Things, and other singular or combined device/central control strategies.

### Status

CalPlug started the first phase of their research in the late summer of 2019, which primarily consisted of data gathering and a literature review. Due to the prioritization of project resources in 2019, this research was paused and will resume in February 2020.

Type

Research

Timeline

July 2019 to May 2020

## Emerging Technologies - Active Project

### Energy Efficiency R&D Laboratory



#### Primary Objective

To create a partnership with a leading national laboratory focused on high-impact energy efficiency research and development that supports the ComEd Emerging Technologies team in identifying, selecting, testing and validating large-scale, high-impact energy efficiency emerging technologies.

#### Overview

This partnership is a two-and-a-half-year agreement between ComEd and NREL to carry out various research projects at NREL's state-of-the-art Energy Systems Integration Facility (ESIF). Located in Golden, Colorado, the ESIF provides a unique contained and controlled platform on which research partners (like ComEd) can identify and resolve the technical, operational, and financial risks of integrating emerging energy technologies in today's environment.

NREL and ComEd will engage technology providers to obtain and test promising products and equipment that could help increase energy efficiency for ComEd customers. These laboratory tests may result in work papers and measure development for the Illinois TRM, as well as identify non-energy benefits. ComEd will also participate on the ESIF Commercial Building Lab Technical Advisory Board to help steer overall laboratory design and technology strategy.

#### Status

In early 2019 NREL delivered a prioritized list of relevant technologies for testing, and the Emerging Technologies team reviewed, ranked, and selected several promising technologies based on fitness for the ComEd Energy Efficiency Program. The first of these projects was completed in Q4 2019, a comparison and performance evaluation of three energy efficiency measures for commercial HVAC systems, including a rooftop unit retrofit with switched reluctance motors. In Q1 2020, the NREL and ComEd teams will finalize assessment plans for several additional projects to be carried out in 2020, including switched reluctance motors for conveyor belt systems, refrigerated display cases using R-290 propane refrigerant, and high-performance cold climate heat pumps for residential and small commercial applications.

#### Type

New Technology

#### Timeline

January 2019 to December 2020

## Emerging Technologies - Active Project

# Smart Pressure Independent Control Valves



### Primary Objective

Understand the energy and associated cost savings of utilizing smart valves in chilled water systems. Determine optimal applications for maximum savings, operator and installer satisfaction with these devices and if energy savings are maintainable.

### Primary Research Question

What are the potential energy savings from the application and use of connected or smart pressure independent control valves in chilled water systems?

### Overview

This two-year research and pilot project will investigate the potential energy savings of smart valve technology in the commercial sector. Smart valves reduce demand for chilled water by stabilizing pressure and flow in connection with sensors able to integrate with building automation systems. Slipstream will test the smart valve technology developed by manufacturer FlowEnergy. In the first phase, the project team will conduct product analysis to compare manufacturer savings estimates and verify FlowEnergy's savings methodology. Phases 2 and 3 will involve site recruitment and real-world installation of smart valves at commercial facilities in ComEd service territory, as well as field monitoring and savings verification.

### Status

Phase 2 concluded with a report on the potential savings from installing smart valve technology at four medical buildings in ComEd territory. Phase 3 will select one of these sites for installation and monitoring in Q1 2020, as well as further characterize the drivers of savings from smart valves to be applied to different commercial building types.

### Type

New Technology

### Timeline

December 2018 to April 2021

# Market Segment: Cross Cutting

## Emerging Technologies - Active Project

# AMI Data Analytics for Program Administration Enhancements



Type

Program Design

Timeline

August 2018 to March 2020

### Primary Objective

Understand the value of certain advanced AMI analytics approaches to enhance aspects of program management.

### Primary Research Question

How can advanced AMI analytics enhance the management, oversight and delivery of ComEd's Residential HVAC and Small Business offerings?

### Overview

ComEd will provide Uplight with historical customer energy usage data, firmographic and demographic data, and energy efficiency program participation data, from the residential HVAC and Small Business offerings. Their analytics process overlays all these datasets and detects potentially useful trends, and this approach will be evaluated based on its ability to:

- Identify top kWh savers and reasons why
- Improve program cost-effectiveness through customer targeting
- Increase the cost-effectiveness of QA/QC inspections
- Identify high and low performing Service Providers in terms of metered savings
- Help ComEd understand pathways to future Pay for Performance models

### Status

Data transfer is complete and analysis is underway with completed dashboards expected in Q1 2020. This project experienced an extended delay in 2019 due to IT approvals, data sharing needs, and EnergySavvy's transition to Uplight.

## Emerging Technologies - Active Project

### Baseline and Potential Study



#### Primary Objective

Understand the current landscape of energy use in ComEd service territory and remaining potential for energy efficiency.

#### Primary Research Question

What is the current baseline for energy efficiency consumption and where is there potential for further energy efficiency?

#### Overview

This large-scale research project consists of two main components:

- Baseline Study: A statistically representative survey of ComEd residential, commercial and industrial customers to determine energy-using equipment stock, efficiency, age, and utilization
- Potential Study: Determine energy savings potential for more efficient equipment and behaviors and guide ComEd program design

Itron will take a multi-modal data collection approach leveraging web-based surveys that will greatly increase sample size while reducing cost. The research team will work closely with ComEd to identify the highest-priority energy end uses and customer segments of interest – using ComEd’s previous potential and baseline studies as initial guideposts. Approximately 5,000 multi-modal surveys will be issued for the residential sector, and a total of 450 on-site nonresidential surveys will be conducted.

For both the baseline and the potential portions of the project, Itron will break out public sector and income eligible customers. In addition to gaining a holistic understanding of energy end uses and energy efficiency at each survey site, the team will also ask to investigate the prevalence of and potential for solar, electric vehicles and related charging infrastructure.

#### Status

The research team has completed the Baseline survey portion of the project and is compiling final reports. They presented preliminary findings in October 2019 and will deliver final findings in February 2020. They have recently begun the Potential study portion and will complete that analysis in Q2 2020.

#### Additional Partners

Dunsky Energy Consulting  
Energy Resources Center

#### Type

Research

#### Timeline

October 2018 to June 2020

#### Solicitation

Request for Proposals in 2018

# Market Segment: Income Eligible

## Emerging Technologies - Active Project

# Affordable Multifamily Passive House



### Primary Objective

To study the energy efficiency potential of a very high building standard for affordable multifamily housing and explore pathways to more savings for the Affordable New Construction offering.

### Primary Research Question

Can the Passive House design standard achieve increased energy savings cost-effectively in an affordable multifamily building?

### Overview

Slipstream will help ComEd study the energy savings and non-energy benefits of the Passive House building standard for a multifamily building constructed and owned by Chicago-based affordable housing developer LUCHA (Latin United Community Housing Association). The building is one of the six buildings in LUCHA's Tierra Linda housing development located in Chicago's Humboldt Park neighborhood. The building is constructed according to the Passive House building standard, which provides unique design and construction requirements with the goal of low energy consumption, such as:

- Continuous insulation throughout the building envelope to prevent thermal bridging
- Triple-pane, low-E glass windows
- Utilizing balanced heat- and moisture-recovery ventilation
- Exploiting and minimizing solar gain strategically

Before construction was completed in late 2018, Slipstream embedded energy and air quality monitoring equipment throughout the Passive House building as well as a neighboring, similar multifamily building. These two buildings will be compared to one another as data is collected and analyzed across 2019.

### Status

A preliminary, winter 2019 data analysis was provided in fall 2019. This report captured useful data on the cold climate performance of both buildings, and heating and ventilation systems in particular. Monitoring of energy use and air quality in both buildings will continue, with a first-year report expected at the beginning of Q2 2020. This report will also include full energy modeling results conducted for both buildings as well as resident survey results.

### Additional Partners

LUCHA

### Type

New Technology

### Timeline

June 2018 to May 2020

## Emerging Technologies - Active Project

### BIT Neighborhood



#### Primary Objective

Develop solutions to address barriers to income eligible customer participation in energy efficiency programs such as limited resources, unclear benefits and low trust in or awareness of offerings.

#### Primary Research Question

Can trained community members build trust and localized momentum around energy efficiency and building improvements for multifamily buildings as well as small- and medium-sized commercial buildings within their underserved communities?

#### Overview

The BIT Neighborhood pilot aims to apply BIT Building practices to unite energy efficiency projects and workforce development initiatives in these communities. BIT Building is a set of cost-effective industry standards for existing buildings that enables all types of property owners and operators (except single family residential) to understand and adopt high performance best practices. The pilot will recruit and train workforce initiative graduates to serve as energy performance improvement coaches, called “BIT Aides”, using the BIT Building curriculum.

In addition to training Bit Aides, Slipstream will recruit 20-30 buildings in income eligible communities into a process involving the benchmarking of energy, air quality, water, and waste performance. BIT Aides will then lead enrolled buildings toward an improvement goal of 10% or greater and implement a continuous improvement workplan. BIT Aides will assist buildings in making operational improvements that generate energy savings and support owners/operators through utility energy efficiency incentive application processes. Slipstream will assist BIT Aides in collecting operational and energy usage data for each project and will create a robust measurement and verification strategy to understand the program’s overall impact on energy use over time.

#### Status

Rather than working with FEJA workforce development groups as initially planned, Slipstream is taking a more straightforward path by working with the Chicago Housing Authority to recruit BIT Aides through Section 3 requirements for community development partners. Slipstream aims to complete BIT Aide recruitment and start training by the end of March 2020.

#### Additional Partners

Southface  
Illinois Green Alliance  
Environmental Defense Fund

#### Type

Outreach

#### Timeline

February 2019 to April 2021

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

### Breathe Easy



#### Primary Objective

Quantify the health impacts of different residential ventilation systems and better understand their energy impacts.

#### Primary Research Question

What is the most effective approach to upgrading residential mechanical ventilation systems in existing homes to reduce indoor pollutants of both indoor and outdoor origin, maintain adequate environmental conditions and ventilation rates, and improve asthma-related health outcomes?

#### Overview

Breathe Easy is a study initially funded by the U.S. Department of Housing and Urban Development (HUD) in partnership with Elevate Energy and Illinois Institute of Technology that began in December 2016. The study is investigating the ability of three distinct approaches to mechanical ventilation in Income Eligible customer homes to improve indoor air quality. The team is collecting and analyzing data on indoor air quality and environmental conditions and obtaining participant asthma symptom data through IRB-approved health surveys. They will also evaluate the impacts of each system type on building energy use and real-world cost of installation by contractors to provide a holistic understanding of the costs and benefits of ventilation systems.

44 low and moderate-income single and multi-family homes with at least one adult asthmatic resident in Chicago have been recruited for this study and are divided into three groups:

- Group A will receive exhaust only ventilation systems
- Group B will receive central-fan-integrated-supply systems with ECMs and auto fan-cycler timers integrated into existing air handling units
- Group C will receive continuous balanced supply and exhaust systems with Energy Recovery Ventilator units

#### Status

All ventilation systems have been installed in participating homes and the interim qualitative analysis is complete. The study team is continuing to monitor and collect data on energy use, indoor air quality and participant health. The team will be collecting and analyzing the final data from the participating homes between February and June 2020, and further statistical analysis on the indoor air quality data will be completed between June-October 2020. The final report will be submitted in November 2020, however, Elevate will share a summary of the available data to ComEd in July 2020.

#### Additional Partners

Illinois Institute of Technology

#### Type

Program Design

#### Timeline

December 2018 to June 2020

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

# Chicago Income Eligible Multifamily Benchmarking Outreach



### Primary Objective

Test a novel outreach strategy involving the City of Chicago's energy benchmarking ordinance.

### Overview

For this pilot, Elevate Energy and the Institute for Market Transformation will partner with the City of Chicago to design and test a novel outreach strategy for the income eligible multifamily sector. The pilot team will analyze benchmarking results for large income eligible multifamily buildings in Chicago and target their owners with a unique support package. The team will test various outreach strategies on the target audience including curated educational resources, workshops, and free energy assessments. The pilot team will then collect and analyze information on building performance, participant engagement in incentive programs, and participant feedback, using this information to develop recommendations for next steps.

### Status

Elevate Energy and the City of Chicago have completed four outreach campaigns to multifamily building owners and are tracking interest and enrollment in building assessments and no-cost resources. These outreach efforts have resulted in two completed multifamily building assessments and eight applications from multifamily building owners looking to improve their energy scores. The pilot team is continuing to follow up with building owners and support their applications.

### Additional Partners

City of Chicago  
Institute for Market Transformation

### Type

Outreach

### Timeline

March 2019 to March 2020

### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

# Data Analysis, Market Research and Segmentation



### Primary Objective

Identify ways to better target Income Eligible customer households and increase participation in the ComEd Energy Efficiency Program.

### Primary Research Question

How can an affordability and occupancy analysis of ComEd residential customers inform program design and generate recommendations to meet the unique needs of Income Eligible communities?

### Overview

This research project aims to inform residential program design and marketing with a focus on the building stock that serves income eligible households. The research team will conduct an affordability and occupancy analysis with tract-level breakdown of single and multifamily housing occupancy and household income, as well as a parcel-level breakdown that includes building characteristics such as age, size, construction type and energy use. This study will be used to create program recommendations specific to geography, housing type and income based on community and sub-market profiles that the research team will create. Necessary data sets will be collected from existing surveys, property assessments and ComEd customer meter records.

### Status

The initial data collection and analysis is complete as is a newly created Tableau tool. The research team has integrated additional levels of customer and building segmentation into the tool including information on whether homes are owner-occupied vs. renter occupied and the age of the building. Elevate Energy is working to incorporate feedback from ComEd into the final deliverable.

#### Type

Research

#### Timeline

March 2019 to March 2020

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

### Ductless Heat Pumps



#### Primary Objective

Investigate performance and feasibility for high performance cold climate ductless heat pumps (DHPs) in income eligible multifamily buildings.

#### Primary Research Question

How can DHPs contribute to energy savings for income eligible all-electric multi-family residential buildings in the ComEd territory?

#### Overview

This pilot targets income eligible customers living in low-rise, all-electric multi-family buildings. During the 2018-19 winter, CMC and partners installed DHPs in 80 apartment units across seven low-rise multifamily buildings to test the performance and feasibility of DHPs in the ComEd market. The pilot team worked with Franklin Energy to identify and recruit buildings, with certified contractors to install the systems, and with Mad Dash to install submetering systems to ensure all relevant performance data is captured.

The team will monitor performance of each system over 12 months, with quarterly checkups and surveys for participants. CMC's final reporting after the completion of the monitoring period will evaluate the performance and energy savings potential of DHPs, as well as evaluate the technology cost and steps of deploying DHPs in a large-scale program effort.

#### Status

Quantitative monitoring continues at the installation sites through early 2020. A preliminary analysis was delivered in November 2019 reporting on data collected between January and June 2019. The final report, expected April 2020, will include a full year's data analysis, the results of two customer surveys, and a summary of lessons learned while designing the pilot, recruiting participants and installing the heat pump and monitoring equipment.

#### Additional Partners

Franklin Energy  
Mad Dash

#### Type

New Technology

#### Timeline

September 2018 to April 2020

#### Solicitation

Request for Proposals August  
2018

## Emerging Technologies - Active Project

### EcoAdvocates



#### Primary Objective

Increase awareness of, and participation in, energy efficiency offerings in income eligible neighborhoods through trained community energy advocates.

#### Primary Research Question

How can engaged community members act as advocates and trusted advisors that positively impact energy efficiency program participation in income eligible communities?

#### Overview

Slipstream and Faith in Place will partner with community organizations to recruit and train residents to become trusted energy advisors in their neighborhoods to boost participation in energy efficiency offerings. Each “EcoAdvocate” will coach, promote and track energy efficiency participation within their community. The pilot will seek to recruit, hire and train three EcoAdvocates from each community for a total of nine individuals.

The pilot will utilize existing program offerings and online tools to the maximum extent possible, including signups for Home Energy Assessment, Fridge Recycling, the ComEd mobile app, and My Account with the suite of online tools. EcoAdvocates will seek to create multiple touchpoints with each participant through several visits throughout a year. EcoAdvocates will be compensated for their work, will receive training prior to the pilot, and will receive real job placement support following the pilot. Slipstream will analyze and report energy savings and participant survey results.

#### Status

The seven EcoAdvocates are continuing their outreach efforts and have received 57 participant applications with 147 opportunities tracked in the Waukegan and South Shore communities. The EcoAdvocates are testing different outreach strategies and messages by working with key community partners and hubs, such as houses of worship and social justice groups, to target participants. Slipstream will develop an interim report in Q2 2020 to inform ComEd program planning.

#### Additional Partners

Faith in Place

#### Type

Outreach

#### Timeline

February 2019 to February 2021

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

# Energy Efficiency in 2 Unit Buildings



### Primary Objective

Provide insight into the existing 2-unit building stock, understand the needs and opportunities of their owners and identify technical solutions for deeper energy savings.

### Overview

This project will involve a market assessment of the small residential buildings sector with a focus on 2-unit buildings in the ComEd service territory. The project team's goal is to identify new energy-saving opportunities for both deep energy retrofits and new construction markets. The assessment will consider best practices from other markets and analyze the northern Illinois building stock to identify segments that represent the most opportunity for ComEd. Following the market assessment, Elevate Energy will submit an interim report to ComEd at which point they will determine if they should move forward with the second project task. For the second task, Elevate proposes to conduct interviews and focus groups with owners of 2-unit buildings to better understand barriers and motivations to making energy efficiency improvements. Finally, the project team will conduct a technical innovation analysis to identify advanced residential technology opportunities relevant to the small residential energy retrofit and new construction markets.

### Status

The market analysis of 2-4-unit buildings in Cook County and the interviews with utility program staff are complete. The preliminary results were compiled into an interim report delivered to ComEd Income Eligible program managers in December 2019. The decision on whether the research team should move forward with the focus group and interview tasks will be made by February 2020. Elevate is finalizing the technical innovation analysis task and will submit for review in early February 2020.

#### Type

Program Design

#### Timeline

April 2019 to March 2020

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

# Energy Efficiency Needs Assessment for Public Housing Authorities



### Primary Objective

To better understand barriers to, and opportunities for, increasing participation among Public Housing Authorities (PHAs) in the ComEd Energy Efficiency Program.

### Primary Research Question

What are the top interests, needs and constraints of PHAs related to energy efficiency, and how can a better understanding of these help ComEd increase the level of participation in energy efficiency offerings and increase savings in buildings owned and operated by PHAs?

### Overview

For this six-month research project, SEDAC will conduct an energy efficiency needs assessment to identify barriers to PHA engagement and implementation and to develop solutions to increase participation in and savings from energy efficiency programs. The project will consist of four tasks: a literature review, a future-looking technical strategies assessment, a stakeholder engagement process, and the completion of a final roadmap report. SEDAC will also provide a segmentation analysis of PHA building inventory in ComEd service territory and a map showing geographic gaps and target areas.

### Status

The Literature Review and Technical Strategies Report were completed and submitted to ComEd in July 2019. During the stakeholder engagement phase of the research project, SEDAC interviewed twelve PHA staff members. These interviews along with the results of the literature review and other tasks were incorporated into the final roadmap report. SEDAC is scheduled to present their findings to ComEd in February 2020.

#### Type

Research

#### Timeline

March 2019 to February 2020

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

### Healthy Homes



#### Primary Objective

Identify, develop and validate scalable approaches to collaborate with local health entities, allowing ComEd to deliver cost-effective energy savings and health benefits for income eligible customers.

#### Primary Research Question

What are the benefits of coordinating a home-based asthma services program with ComEd's income eligible multi-family offering?

#### Overview

The year-long Healthy Homes pilot targets income eligible multi-family residences with high numbers of severe asthma patients. The pilot aims to partner with AMITA Health (formerly known as Presence Health Systems) and complete joint health-energy assessments in 20 units from two multi-family buildings. Green & Healthy Homes Initiative will train and certify two of Elevate Energy's energy assessors as Healthy Home Evaluators so that they are able to conduct assessments for asthma triggers and energy efficiency opportunities at each of the units. Elevate Energy will coordinate the schedule of the subcontractors and families as well as with the community health worker and energy assessor to ensure the installation schedule and measures align with the expectations and desires of the family. In addition to tracking and recording energy cost savings, pre and post surveys will be conducted to track and report feedback from pilot participants and staff to evaluate the success of the coordinated delivery model through energy savings and customer health improvements.

#### Status

Participant recruitment from the hospital has experienced an extended delay due to staffing challenges at AMITA Health. These challenges are a result of the transition of Presence Health Systems, the original project partner, to AMITA Health. The pilot team has been working with AMITA to try to increase recruitment efforts. ComEd will assess the viability of this project at the end of February 2020 and pivot if needed.

#### Additional Partners

AMITA Health  
Green & Healthy Homes  
Initiative

#### Type

Program Design

#### Timeline

February 2019 to February 2020

#### Solicitation

2018 Income Eligible Call for  
Ideas

## Emerging Technologies - Active Project

# Home Energy Reports Target Rank ORACLE®

### Primary Objective

To test a modified Home Energy Report (HER) format with residential customers.

### Primary Research Questions

- Does the temporary (six month) replacement of the Neighbor Comparison module with the Target Rank module increase engagement and customer satisfaction of income eligible customers?
- Does the addition of a short-term, achievable energy efficiency goal to an emailed Home Energy Report (eHER) increase engagement, resulting in energy savings?

### Overview

Target Rank is an alternative user experience that will be deployed for 18,000 income eligible customers already receiving electronic Home Energy Reports (eHER). During the pilot, the Neighbor Comparison module will be replaced with a Target Rank module for six months; the new module provides the customer with a short-term achievable energy saving target (called a “challenge”) in the format of a score on a 100-point scale. The pilot will impact 38,000 total customers that currently receive eHER; 18,000 will receive the Target Rank module as a treatment group, and the rest will serve as a control.

### Status

Customers have been receiving eHERs with the Target Rank module for nearly six months and the last reports will be sent in January 2020. Analysis will take place in February with a final report delivered in March.

#### Type

Program Design

#### Timeline

June 2019 to March 2020

## Emerging Technologies - Active Project

# Income Eligible High User Customer Needs Assessment



### Primary Objective

To characterize ComEd's income eligible high energy users and inform ComEd's implementation teams about unique circumstances among this customer group that have implications for their energy consumption, use of existing programs, or benefit they derive from the programs.

### Overview

This research project focuses on income-eligible residential customers with high energy usage. Bilingual surveys and in-home assessments of these customers combined with focus groups and interviews will identify not only factors that limit customer access to ComEd energy efficiency offerings, but also customer needs not fully addressed by current ComEd program offerings.

### Status

The research team received 298 customer survey responses from income eligible, high energy users in the fall of 2019. In December 2019 and January 2020, they are conducting 20 in-home visits and 15 phone interviews with survey respondents to collect detailed data on their energy usage. All project data will be analyzed and included in the final report along with recommendations and considerations for income eligible program design.

### Additional Partners

Leede Research

### Type

Research

### Timeline

February 2019 to February 2020

### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

### Income Eligible Paging Display

#### Project Led by ComEd Customer Solutions

##### Primary Objective

Provide a simple and inexpensive real-time messaging channel to ComEd customers without requiring access to the internet, smart phones, computers, or similar devices.

##### Primary Research Questions

Can ComEd's existing 152 mHz paging network be used to message customers useful energy-related information in homes with different construction types and layouts? How are specific types of messaging and display indicators interpreted and used by residents? What is the lifetime of the device battery based on message frequency?

##### Overview

This project represents phase 2 of the paging network display effort. Phase 1 tested the ability to connect a device to the 152 mhz paging network and receive data from it. A customer roundtable discussion was also conducted to validate the design of using a simple set of indicators on a fridge magnet to relay information to the customer. These activities were associated with the Income Eligible Customer Journey Mapping project described in the Completed Projects section. Phase 2 will deploy prototype devices to 40 homes and test the robustness of the paging signals, device battery life, and participant reactions to better understand how the ComEd Energy Efficiency Program could leverage these devices to help customers save energy.

##### Status

The paging devices have been constructed in the ComEd Customer Solutions Innovation Lab and will be deployed to 40 pilot participants in Q1 2020. The team experienced some delays in Q4 2019 due to network setup and IT integration.

Type

New Technology

Timeline

May 2019 to May 2020

## Emerging Technologies - Active Project

### Income Eligible Program Design



#### Primary Objective

Inform cost-effective program delivery solutions to income eligible customers and establish new partnerships that can enable access to communities currently underserved by certain energy efficiency offerings.

#### Primary Research Question

Can engaging new income eligible market providers and trade allies catalyze greater program participation and reduce program delivery costs?

#### Overview

The aim of this pilot is to define a framework for scalable program delivery through dedicated market providers and trade allies to create deeper savings, improved delivery and lower delivery costs for the income eligible weatherization offering. Franklin Energy will research, design and execute multiple implementation projects incorporating different combinations of housing stock, measures, market providers, and included services (audits, direct install, and weatherization).

The pilot has two phases. The first phase will involve research and assessment of the housing stock and potential market providers within ComEd's service territory as well as the creation of an onboarding packet and an implementation plan for pilot partners. In phase two, the pilot team will select up to ten groups to test a variety of program design elements determined by the results of phase one. Franklin Energy will work with local Service Providers and new market providers to identify 25 customer sites that meet the needs of each pilot group, then complete the installations and monitor established metrics throughout the process.

#### Status

Four pilots were completed in three communities in 2019 – Joliet, Aurora and Elgin – with varying levels of success. Further pilot groups are under development and will be implemented in 2020, pending input and feedback from the ComEd Income Eligible program team.

#### Type

Program Design

#### Timeline

October 2018 to January 2020

#### Solicitation

2018 Income Eligible Call for Ideas

## Emerging Technologies - Active Project

# Savings for Income Eligible Seniors



**Green Home Experts**

### Primary Objective

To test an approach aimed at providing greater access to energy efficiency measures for income eligible senior customers.

### Primary Research Question

How can engaging case workers and member agencies working with income eligible senior customers increase access and remove barriers to energy efficiency measures for these customers?

### Overview

The pilot team will target income eligible senior (aged 60 and older) residential ComEd customers for direct installation of a standard measure package (free for participants). The measure package will include weather stripping, door sweeps, caulking, smart thermostats, LED lamps, and LED nightlights. Green Home Experts will work with AgeOptions, the state of Illinois Department on Aging's Area Service Agency for suburban Cook County, to solicit participants for the pilot, including a marketing strategy and customer verification. Because of their direct interaction with the target audience, AgeOptions and similar agencies may be promising avenues for income eligible participation in energy efficiency offerings.

### Status

The 2019 LIHEAP enrollment period led to an increase in recruitment and installations for the end of 2019. Senior care agencies in additional municipalities have been onboarded, and the pilot is on track to meet its customer installation goal by the end of the pilot in April 2020.

### Additional Partners

AgeOptions,  
Illinois Department on Aging

### Type

Outreach

### Timeline

February 2019 to April 2020

### Solicitation

2018 Income Eligible Call for  
Ideas

## Emerging Technologies - Active Project

# Street Operating System (SOS)



### Primary Objective

Increase awareness of and engagement in the ComEd Energy Efficiency Program in income-eligible communities facing numerous social and economic challenges.

### Primary Research Question

Can the principles and strategies of BIG SOS promote and drive adoption of energy efficiency options in the West Woodlawn community? Specifically, what increases in (a) access to energy efficiency resources, (b) awareness of energy efficiency resources, (c) use or installation of energy efficiency equipment/technology, and (d) participation in the ComEd Energy Efficiency Program can these strategies deliver?

### Overview

Blacks in Green (BIG) has developed a novel outreach pilot project that will increase awareness of ComEd's energy efficiency offerings in Chicago's Woodlawn neighborhood. SOS and the Green Living Room (a community destination, including free wi-fi and similar amenities) is a communications conduit through which climate, energy, emergency, community news, career connections, and conservation lifestyle tips can move. BIG brings real, trusted avenues to reach populations that face barriers to participating in the ComEd Energy Efficiency Program. BIG has delivered sustainability education and outreach nationally since 2007 and since 2010 in Woodlawn.

### Status

The soft launch of the Green Living Room was held in August 2019 and the official opening was held in October 2019, with steady attendance and positive reception from the community since opening. The Street Operating System team is continuing to engage community members through door-to-door outreach and through community events at the Green Living Room. BIG has coordinated training and professional development opportunities for their staff on topics related to energy efficiency and sustainability and has supported three of their SOS team members in finding full time positions at other companies in the industry.

#### Type

Outreach

#### Timeline

January 2019 to March 2020

#### Solicitation

2018 Income Eligible Call for Ideas

# Market Segment: Residential

## Emerging Technologies - Active Project

### All Electric Residential New Construction



Type

Program Design

Timeline

March 2019 December 2021

#### Primary Objective

To study the savings potential and programmatic viability of an all-electric new homes offering.

#### Primary Research Question

What is the market potential, incremental cost and energy savings for all-electric new homes in the residential new construction market in ComEd service territory?

#### Overview

This research project will quantify the current market size, home buyer demand and growth trajectory of the all-electric homes market in Illinois along with associated program cost and energy savings potential. This will include a market analysis informed by secondary research and interviews with local builders and home energy raters. The findings from the market analysis will be used to evaluate different potential pathways for incentivizing deeper levels of energy efficiency in residential new construction. The research team will then compare various incentive strategies for all-electric homes using existing ComEd incentive offerings. The team will make recommendations for an all-electric homes pilot; such an effort would likely seek create partnerships with several builders and incentivize 5-20 homes for construction in 2020-2021.

#### Status

Using the information and guidance completed during Phase 1 research in 2019, preparations have been made for a January 2020 pilot launch. This coincides with the sunset of the existing Residential New Construction program. The pilot team has finalized launch marketing materials, informational documents and applications, and has met with several builders and energy raters to date.

## Emerging Technologies - Active Project

# Home Energy Reports Paperless Experience ORACLE®

### Primary Objective

To determine if a fully digital Home Energy Report (HER) experience can produce similar savings to the well tested paper/digital experience residential customers traditionally receive.

### Primary Research Question

Does a fully digital HER experience generate similar savings?

### Overview

Oracle will field test a paperless, fully-digital behavioral program for residential customers. Oracle will provide monthly electronic Home Energy Reports (eHERs) and High Bill Alerts (HBAs) to up to 20,000 customers who have not previously received digital home energy reports. An equivalent number of customers will serve as a control.

### Status

The treatment group for this pilot has successfully begun receiving the digital-only HER experience. Analyses comparing the treatment group to control groups will occur in 2020.

### Type

Program Design

### Timeline

April 2019 to December 2021

## Emerging Technologies - Active Project

# Residential Real Estate Opportunities



### Primary Objective

Improve training for real estate professionals and expand the amount of home energy information available to homebuyers and their real estate agents in the Chicago area to increase participation in the ComEd Energy Efficiency Program.

### Primary Research Question

Can training for real estate professionals and a home energy scorecard increase communication about, and participation in, energy efficiency offerings?

### Overview

The project team will first develop and implement an educational outreach plan to the real estate professional community focused on providing continuing education units with training focused on local energy efficiency programs and Energy eCompliance, a tool that provides access to home energy use information via real estate listings. Outreach will include lunch-and-learns, trainings and affiliation with local real estate associations.

In part two, the project team will conduct focus groups with recent homebuyers to understand what energy efficiency features are most important to them in the homebuying process and will outline how ComEd can integrate the real estate transaction and key stakeholders into energy efficiency outreach strategies. The team will also work with MRED and its members to understand how Energy eCompliance is currently being used in real estate transactions.

### Status

The real estate professional educational curriculum has been accepted by the Chicago Association of REALTORS and Mainstreet Organizations of Realtors. The course will be offered to real estate agents across Q1-Q2 2020. Energy eCompliance surveys will be sent to MRED members in January 2020.

#### Additional Partners

Midwest Energy Efficiency Alliance

#### Type

Program Design

#### Timeline

January 2019 to May 2020

#### Solicitation

2018 Income Eligible Call for Ideas

# Completed Projects

Since January 1, 2018 (start of the ComEd 2018-2022 Plan)

## Emerging Technologies - Completed Project

### Alternative Refrigerants



#### Primary Objective

Develop measurement and verification procedures for the testing of alternative refrigerants and conduct a field test for the Alltemp-M product.

#### Primary Research Question

What are the energy use and performance impacts of the Alltemp-M alternative refrigerant product on walk-in cooler and freezer refrigeration systems compared to systems using standard R-404A?

#### Overview

This pilot focused on commercial customers with walk-in cooler and freezer refrigeration systems using HFC blend refrigerant R-404A. Alltemp-M refrigerant is marketed as a replacement product for R-404A, as 404A is now discouraged for use in retrofits due to its high global warming potential.

In early 2018, Slipstream recruited five sites for the pilot, including three quick-service restaurants and two hotels. Among these sites, seven systems were selected for testing, including four walk-in freezers and three walk-in coolers, all using R-404A. Monitoring of the systems included measurement of refrigeration system electrical energy consumption; temperatures of the freezer or cooler interior, the room area near the freezer or cooler, and outdoor temperature for systems with outdoor condensers; and freezer or cooler door opening times.

#### Results and Outcomes

Slipstream found that the capacity of both coolers and freezers was reduced when using the alternative refrigerant, and energy savings varied greatly across the five systems tested. Also, the manufacturer-recommended conversion procedures and pressure-temperature tables for Alltemp-M were inadequate at the start of work. Full results can be found in the final project report, available upon request. The Emerging Tech team has taken lessons learned during this project into account when presented with new alternate refrigerant products as energy saving opportunities.

#### Type

New Technology

#### Timeline

December 2017 to September 2018

## Emerging Technologies - Completed Project

### Energy Incentive Acceleration

#### AECOM

##### Primary Objective

Test new ways to introduce information about ComEd energy efficiency incentives to commercial real estate customers and better understand how to take advantage of time of sale as a motivating time for building owners.

##### Primary Research Question

Can actively engaging owners of newly acquired commercial real estate lead to expanded and accelerated applications for ComEd energy efficiency incentives?

##### Overview

When commercial real estate changes hands, the new owners typically make significant investments in upgrades and repairs as they seek to increase the value of their asset. At the time of transfer, AECOM is assisting building teams to better understand how to employ ComEd energy efficiency programs to meet real estate investors' goals of attracting and retaining tenants, as well as meet energy efficiency goals.

For each participant in the pilot, AECOM is developing a specifically tailored Energy Incentive Acceleration Plan. This plan will provide the customer with energy efficiency opportunities and assist them in participating in existing ComEd programs. AECOM is holding follow up meetings with the customers and aims to have each customer submit an application within the end of the year.

##### Results and Outcomes

This pilot has completed and is in the final stages of submitting deliverables. AECOM engaged the owners of 20 large commercial real estate properties and provided an Energy Incentive Acceleration Plan. The pilot final report is in development, which will include the total amount and impact of energy savings measures identified and strategies on how the ComEd Energy Efficiency Program can better target large commercial real estate properties as building ownership changes.

##### Type

Program Design

##### Timeline

October 2018 to December 2019

## Emerging Technologies - Completed Project

# Retrofit Chicago Roadmapping 2.0

## AECOM

### Primary Objective

Determine how a modified and improved Energy Roadmap design combined with continued engagement can help achieve greater energy savings for ComEd customers.

### Overview

The first phase of this pilot was a review of the 2012 Gateway Energy Road Maps developed for customers participating in the Chicago Energy Retrofit Challenge. AECOM reviewed the energy savings of participants and conducted interviews to see how future Energy Road Map efforts could be more effective.

The second phase of the project is to develop an improved Energy Roadmap process and engage with several facilities in Chicago to test the procedure. The improved Roadmap includes several features:

- Establishment of baseline energy use conditions
- Incorporation of past studies, capital plans, operating budgets, contracts and proposals
- Consideration and planning for capital investment constraints
- Alignment with ComEd energy efficiency incentive programs
- Prioritization of energy efficiency projects

The goal of the pilot is to start customers on the path to achieving 20% facility energy savings over the next five years.

### Results and Outcomes

AECOM submitted a final report in December 2019. Roadmaps were developed for three facilities in Chicago. The Emerging Technologies team is currently reviewing the results for next steps.

Type

Outreach

Timeline

January 2018 to December 2019

## Emerging Technologies - Completed Project

### Synchronous Motors



#### Primary Objective

To validate the energy savings of new synchronous motor technology for walk-in freezer and cooler applications.

#### Primary Research Question

How does the installation of Q-Sync motors to drive evaporator circulation fans in refrigerated display cases and walk-in coolers/freezers in supermarkets impact energy use, performance and savings for ComEd commercial customers?

#### Overview

The pilot team deployed Q-sync motors, a new type of Permanent Magnet Alternate Current Motor that can replace shaded pole or EC motors in existing refrigerated cases and walk-in coolers/freezers and monitor fan/motor energy performance before and after replacement. Slipstream recruited three supermarkets and deployed 18 Q-sync motor retrofits in walk-in coolers and refrigerated display cases. Slipstream analyzed field data and provided qualitative lessons derived from field work, including cost, installation, and operational impacts.

#### Results and Outcomes

It was determined in early 2018 that there was already enough available data verifying the energy savings associated with Q-Sync motors for reach-in refrigerated display cases. Thus, the measure was submitted as a workpaper to the TRM. As less validation data was available for walk-in freezer/cooler applications, ComEd decided to obtain the necessary data through this pilot. Full results can be found in the final project report, available upon request. A TRM measure update for version 8 has been submitted using the savings estimates from the pilot. As next steps, the Emerging Technologies team will work with the Standard incentives and Small Business teams to create a plan to promote their new Q-Sync motors measures.

#### Additional Partners

QM Power  
OGNI Group

#### Type

New Technology

#### Timeline

April 2018 to November 2018

## Emerging Technologies - Completed Project

# Upstream Small Embedded Data Center Program Design



### Primary Objective

Characterize energy savings market potential among small embedded data centers (SEDCs) in ComEd service territory and develop recommendations for potential upstream program design.

### Primary Research Questions

How may improving energy efficiency at SEDCs fit into ComEd's energy efficiency program portfolio? What program pathways are most appropriate?

### Overview

This research project will evaluate the market potential for an upstream SEDC program for commercial customers in ComEd service territory. Slipstream will first characterize the magnitude of potential energy savings and translate their recent Minnesota and Wisconsin research results to the ComEd service territory. They will then develop a preliminary program design vetted through conversations with key market actors, including data center owners and operators and IT equipment suppliers and installers. The results of this research will be used to recommend a program design for implementation of an upstream SEDC program with ComEd.

### Results and Outcomes

Opportunities for new measures and program designs were identified, but the Emerging Technologies team has determined that for the time being, the opportunities are likely not significant enough to pursue on a program level.

Type

Research

Timeline

September 2018 to August 2019

## Emerging Technologies - Completed Project

# Variable Frequency Drives for Refrigeration Condenser Fans



### Primary Objective

To test in real world conditions an emerging technology retrofit concept and assess its relevance to the ComEd Energy Efficiency Program.

### Primary Research Question

How does adding variable frequency drives (VFDs) to refrigeration systems in supermarkets impact system performance and energy use?

### Overview

Slipstream studied the impact of adding variable frequency drives (VFDs) to refrigeration system condenser fans in 23 condensers in 4 supermarkets. The pilot compared pre- and post-condenser fan retrofit with VFD and provided energy and cost impacts in a TRM workpaper.

### Results and Outcomes

Four supermarkets participated in the pilot, and savings estimates were developed based on the monitoring results. Full results can be found in the final project report, available upon request. Navigant conducted an impact evaluation in addition to Slipstream's analysis. A TRM measure update was submitted based on these savings estimates. As next steps, the Emerging Technologies team plans to work with the Standard incentive and Small Business teams to consider a new incentive around this measure; there is not currently an incentive and this project was originally developed as a Custom incentive concept.

#### Type

New Technology

#### Timeline

January 2018 to September  
2018

## Emerging Technologies - Completed Project

### Building Science Assessment



**BERKELEY LAB**

#### Primary Objective

To enhance ComEd's understanding on several critical research questions related to state-of-the-art building science developments.

#### Overview

In this year-long research project, Lawrence Berkeley National Laboratory will conduct research and provide expert analysis on the latest developments in building science, including:

- Identification and measurement techniques for energy and health parameters
- Building energy diagnostic tools and their potential relationship to energy efficiency programs
- Building simulation tools and energy assessments
- Building zoning control strategies
- New methods of building and ventilation system air sealing
- Energy retrofits and the discovery/remediation of health and safety issues
- The state of the art in monitoring building occupant comfort and health
- Best practices among energy utility energy efficiency programs in the areas of diagnostics, ventilation, and health
- New technologies in these areas and the testing required to determine and realize the benefits of those technologies

#### Results and Outcomes

LBNL completed their technical assessments and final report deliverable. They presented their findings as part of a final report-out to ComEd in December 2019. The Emerging Technologies team is using the findings of this report to direct research and project strategy in 2020.

Type

Research

Timeline

September 2018 to December 2019

## Emerging Technologies - Completed Project

### Energy-Water Nexus Initial Research



Type

Research

Timeline

January 2018 to January 2019

#### Primary Objective

To understand the energy savings potential of water conservation activities and to explore new opportunities for customer water and energy savings.

#### Primary Research Questions

What is the average kWh/gallon of delivered water to a customer site, and how can water saving measures be valued as energy saving measures? What measures might be cost-effective additions for the ComEd Energy Efficiency Program?

#### Overview

This research project was cross-cutting in scope, addressing all market segments of ComEd customers. Elevate Energy conducted a literature review and led discussions with local water utility stakeholders (Metropolitan Water Reclamation District and Chicago Department of Water Management) to develop a TRM workpaper with an energy-water factor accounting for water-system-wide energy savings created during conservation activities at customer sites. The energy savings from hot water reduction (water heating) was already known for many measures; however, the distribution and treatment system savings of cold-water reduction had not yet been explored.

#### Results and Outcomes

The project team submitted a TRM workpaper that was eventually accepted into TRM version 7 as a secondary savings factor added to existing water conservation-related measures. A report was also produced with examples of water utility incentive programs, water-energy utility partnerships, and recommendations for new potential measures focused on cold water efficiency. Much of the Emerging Technologies team's work on this topic in 2019 was informed by this research project.

## Emerging Technologies - Completed Project

### Green Stormwater Infrastructure



#### Primary Objective

To identify the municipalities in the ComEd service territory with the greatest potential for adoption of green stormwater infrastructure (GSI) and to quantify the energy savings potential and non-energy impacts.

#### Primary Research Question

What is the energy savings potential of, and adoption potential for, green stormwater infrastructure projects in municipalities in the ComEd service territory with combined sewer systems?

#### Overview

The project team will use scoring criteria to select ten municipalities in the ComEd service territory with high potential for adoption of GSI. Municipal leaders in each selected community will then be interviewed to better understand the likelihood of adoption of GSI, the level of intervention needed for adoption, and how income eligible customer and business participation can be prioritized in these cities. The team will also model GSI energy saving potential and non-energy impacts including economic development, public safety and environmental health. Finally, the team will create customer journey maps to demonstrate the process of, and best practices for, building strong relationships with municipalities and water utilities. A report will be produced and recommendations made on whether ComEd should consider a GSI-centered offering for municipalities.

#### Results and Outcomes

Greenprint Partners and MIST Environment completed interviews with nine municipalities and used this data to outline the potential for energy savings and non-energy benefits from GSI in these municipalities. The energy analysis that Greenprint Partners conducted showed a range of energy savings potential between 1.4-8.3 GWh/year between the nine municipalities. The non-energy impact analysis estimated measurable benefits that could be expected for each municipality from the installation of GSI, such as reduced crime, beautification and increased wildlife and pollinator habitat. Greenprint Partners made the following recommendations to ComEd based on the project findings: investigate the viability of a GSI incentive for municipalities, modify the TRM to include GSI as a measure, research best practices for GSI incentive programs across the country, and invest in a pilot to test a GSI incentive program with municipalities. ComEd is reviewing the analysis and will determine next steps in Q1 2020.

#### Additional Partners

MIST Environment

#### Type

Research

#### Timeline

March 2019 to November 2019

## Emerging Technologies - Completed Project

# Technology Scouting and Analysis



### Primary Objective

Search start-up, incubator, accelerator, and venture capital networks to identify emerging companies with technologies or services that align with the goals of the ComEd Energy Efficiency Program; and facilitate introductions to those companies.

### Primary Research Question

What are the most promising startups and emerging growth companies that align with the goals of the ComEd Energy Efficiency Program?

### Overview

Clean Energy Trust (CET) is leading a scouting effort drawing on their database of startups and outreach to their networks to identify 50-75 highly relevant companies for consideration. CET will conduct extensive analysis of the top 5-10 companies selected from the list and facilitate introductions to the selected companies.

### Results and Outcomes

The initial list of scouted companies was down-selected to sixteen promising companies. CET provided detailed reports these companies for consideration by the ComEd Emerging Technologies team. Ultimately six companies were selected, and CET facilitated introductions with these companies to ComEd.

### Additional Partners

Freshwater Advisors

### Type

Research

### Timeline

April 2019 to December 2019

## Emerging Technologies - Completed Project

### Water Market Analysis



#### Primary Objective

Better understand the northern Illinois water market and help determine potential water-energy savings opportunities.

#### Primary Research Questions

What makes up the water channel in the ComEd service territory? Which technologies, processes and products are being considered in this territory and what is their likelihood of adoption? How will the water market, the channel and the consumption of water and electricity be impacted by these new technologies, processes and products?

#### Overview

Axiom led research on the water channel in the ComEd service territory and the latest industry trends and technologies used by the biggest players in the water market in this territory. Through two rounds of depth interviews and a Delphi Study with municipalities, government agencies and large industrial and commercial high users of water, the team characterized the water market and demonstrated the potential for emerging technologies as well as the implications and opportunities for ComEd.

#### Results and Outcomes

The research concluded the greatest cold-water savings can be achieved from updating water pumps, aeration, and filtration systems. Axiom identified ample opportunity to save 10 GWh of energy through cold water savings and potentially over 24 GWh by focusing on the production of drinking water and the treatment of wastewater. Based on their research and data analysis, Axiom made the following recommendations to ComEd for continued work in the energy-water nexus: provide municipal and manufacturing incentives for more efficient technologies for moving and treating water, explore financing opportunities, partner with water consultants and experts, establish a specific energy-water nexus audit program for manufacturers and municipalities, and create a communication plan for sharing out these findings.

Type

Research

Timeline

April 2019 to November 2019

## Emerging Technologies - Completed Project

# Income Eligible Customer Journey Mapping

## FJORD™

Design and Innovation from  
Accenture Interactive

### Primary Objective

To define a better overall experience for income eligible customer participation in the ComEd Energy Efficiency Program.

### Overview

This customer journey mapping project was focused on three goals:

- Gain an understanding of the current-state program experience through the eyes of current participants and non-participants;
- Define the ideal future-state vision that is grounded in human needs and business goals;
- Create a strategic roadmap to move from the current state to the future state.

### Results and Outcomes

This project featured workshops with stakeholders and interviews with income eligible customers. Recommendations were generated out of the strategic roadmap to move from the current state to a future state that is now more clearly defined. The Emerging Technologies team acted on these recommendations within projects underway in 2019 and 2020.

Type

Research

Timeline

October 2018 to March 2019

## Emerging Technologies - Completed Project

# Rockford Housing Authority Demonstration



### Primary Objective

To test a suite of efficient HVAC and weatherization technologies to reduce energy use in income eligible public housing properties.

### Primary Research Question

Can a combination of highly efficient technologies reduce energy use by over 50% in income eligible public housing buildings?

### Overview

This pilot is a carryover project from the Illinois Department of Commerce and Economic Opportunity's research and development initiative. The goal was to test low-capacity furnaces and cold climate heat pumps with standard weatherization practices in seven units in Rockford Housing Authority residential properties. Modeling suggested these measures could reduce total energy use by over 50%. Franklin Energy and the Gas Technology Institute led the testing of the ability of these newer technologies to deliver efficient comfort and recorded installation costs and experience.

### Results and Outcomes

A final report was delivered in Q3 2019. The project demonstrated deep savings through the combination of retrofit strategies implemented, although it was difficult to separate the combinatorial effects of some of the measures.

### Additional Partners

Gas Technology Institute  
Rockford Housing Authority

### Type

Program Design

### Timeline

June 2017 to July 2019

## Emerging Technologies - Completed Project

# Holiday Light Exchange CLEAResult<sup>®</sup>

### Primary Objective

Identify the energy savings opportunities associated with LED holiday string lighting, develop a TRM measure and create a new offering.

### Overview

This pilot, centered around the 2017/18 winter, targeted LED holiday string lights as a new energy efficiency measure. Customers were encouraged to exchange their traditional (incandescent) holiday light strands for efficient LED strands. Exchange events were held in convenient locations such as Home Depot and Lincoln Park Zoo and supplemented with educational materials and other efficiency measure giveaways.

### Results and Outcomes

In 2018, a TRM workpaper was completed and accepted for version 7. The new TRM measure requires the exchange of old lights for new lights rather than just the purchase of new lights, which limits its potential. In winter 2018/19, the Residential programs team held another series of exchange events and may continue to repeat them in the future; the events are high visibility and create a positive interaction between customers and the ComEd Energy Efficiency Program.

#### Type

Program Design

#### Timeline

April 2017 to April 2018

## Emerging Technologies - Completed Project

### Home Energy Monitor Disaggregation



#### Primary Objective

To test the reduction of energy use among residential customers through a new means of digital engagement.

#### Primary Research Question

How does the Bidgely Home Energy Monitor application create energy savings through behavioral change in residential customers?

#### Overview

This pilot targeted residential customers, combining energy usage information and digital messages to help customers save energy. Customers opted in to downloading Bidgely's Home Energy Monitor application. Using AMI data for their households, customers received energy usage information in hourly, daily, and monthly increments; this information was further disaggregated into heating load, cooling load, pool pump load, and always-on load segments. Customers also received tips and recommendations to reduce consumption, as well as actual and projected spend for the current billing cycle. Some pilot participants also received a HomeBeat Home Area Network device allowing real-time usage information through a connection with their smart meter.

#### Results and Outcomes

After evaluation, this pilot demonstrated PY9 (June 1, 2016 to December 31, 2017) verified savings of 99,586 kWh for 1,218 participants. This represented an average of 1.1% of participant energy use; however, participants who logged into the app more often were shown to have saved more energy. The measure life was deemed to be one year for the pilot evaluation, and there may have been some self-selection bias in enrollment as pilot participants had lower average home energy usage than other ComEd energy efficiency program participants.

Several valuable lessons were learned throughout this pilot, including best practices related to AMI data access, customer recruitment, residential pilot design, energy use disaggregation services, and how customers prefer to access and receive energy usage information. Due to small savings potential and short measure life, this pilot has not yet been scaled into a larger program offering.

Type

New Technology

Timeline

June 2016 to January 2018

## Emerging Technologies - Completed Project

# HVAC SAVE Quality Installation CLEAResult<sup>®</sup>

### Primary Objective

To test a service provider-driven Verified Quality Installation program that yields improved residential air conditioner savings and performance.

### Overview

For this midstream-focused pilot, approved contractors who participated in the residential HVAC rebate program were trained and certified to perform a Verified Quality Installation (QI) for residential HVAC equipment, in accordance with the HVAC SAVE (Systems Adjustment and Verified Efficiency) program model developed by MEEA. Special software and bonus incentives were provided to service providers verifying each QI project. To adequately evaluate the impact of training and the QI process, this pilot aimed to complete 400 projects across the 2018 cooling season.

### Results and Outcomes

This pilot resulted in a new addition to the existing central air conditioners measure in TRM version 7. The measure addition proposed a de-rating value for the actual installed efficiency of baseline equipment and of non-QI replacements. The de-rating assumptions are based on research from many sources, including the U.S. Department of Energy. To verify additional savings as well as any impacts from the HVAC SAVE training alone, replacements completed in this pilot were evaluated through billing analysis, electric submetering and ride-along interviews with installing technicians. However, issues with recruitment of trade allies resulted in only 120 homes being recruited for QI, which was not a large enough sample size to conduct a statistically robust impact evaluation. The Emerging Technologies team did not continue the pilot in 2019 but is exploring alternative ways to capture QI data, such as through sensors or data analytics.

### Additional Partners

Midwest Energy Efficiency  
Alliance (MEEA)

### Type

Program Design

### Timeline

January 2018 to January 2019

## Emerging Technologies - Completed Project

### Save and Share

#### Multiple Partners

#### Primary Objective

Leverage smart meters and new technology to provide customers with information to help them save energy and support their local community.

#### Primary Research Question

Can ComEd create a mobile app that is personalized to both the customer and their community to better drive energy savings?

#### Overview

The Save and Share Mobile App leverages AMI data to provide day-after energy information to help residential customers save energy. It also provides the user with weekly energy usage predications based on AMI data.

The pilot is aimed at income eligible residential customers within Chicago's Bronzeville neighborhood. The app offers users information on their energy usage and personalized energy savings recommendations. The app predicts a baseline energy usage for the week, and energy savings that customer achieves (beating the pre-established baseline) is matched by ComEd in a special account the customer can use to share with local community groups including churches, youth organizations, and other non-for-profits. In 2019, ComEd worked with the L3 Agency to engage local community groups to drive customer participation and register organizations on the app. EnergySavvy (now Uplight) provided the M&V 2.0 backbone while Metergenius developed the app interface.

#### Results and Outcomes

Customer adoption of the Save and Share app was low, and to foster more participation among both customers and partner organizations ("Community All-Stars"), the Emerging Technologies team in partnership with L3 Agency led a significant re-launch of the pilot in Q3 2019. A successful re-launch event was held, and L3 helped the partner organizations participate in several local community events throughout Q4 2019 to encourage additional participation.

Ultimately, the app presented several significant barriers to adoption that hindered participation. However, the pilot did explore other ways to promote participating organizations to their community and beyond. L3 is holding a presentation early Q1 2020 to discuss the results of the pilot. The findings from working so closely with Bronzeville community organizations through this pilot will help influence future ComEd efforts in neighborhood.

#### Partners

EnergySavvy  
MeterGenius  
L3 Agency

#### Type

New Technology

#### Timeline

April 2018 to December 2019

#### Solicitation

Request for Proposals  
March 2018

## Emerging Technologies - Completed Project

### Seasonal Savings



#### Primary Objective

To determine whether Seasonal Savings, a schedule optimization program provided by Nest, is effective at delivering additional energy savings to customers above the standard performance of a smart thermostat.

#### Primary Research Question

Does Seasonal Savings provide persisting energy savings across multiple years?  
How do customers respond to two summers of schedule adjustments?

#### Overview

This pilot was conducted in two phases across 2017 and 2018. The Seasonal Savings offering allows customers with Nest Learning Thermostats to opt-in to a service that makes small adjustments to thermostat setpoints over a 3-week tune-up period while maintaining customer comfort. On average, scheduled setpoints are adjusted up by 1.5°F during the cooling season, with the biggest temperature adjustments taking place when customers are typically away from home. The pilot was implemented using a randomized encouragement design, in which all customers in ComEd's service territory with a Nest thermostat were randomly assigned into a treatment or a control group. Treatment group participants opted in using a prompt shown on their thermostat.

#### Results and Outcomes

The first pilot found an average savings per treated thermostat of 71.7 kWh or 4.5% of cooling load from late June/mid-July through October 14, 2017; and 38.8 kWh or 2.5% of daily heating load for the 2017/18 heating season. The number of opt-in participants as compared to all qualifying devices was 53,334, meaning 62% of eligible devices opted in.

Navigant's evaluation found it was successful in testing the technical feasibility of thermostat optimization and in customer acceptance of the offering. However, important questions remained regarding incremental savings from future deployments, persistence of savings, and expected savings from a full season deployment. The second season of pilot participation was aimed at determining measure persistence or whether there may be increased savings, as ComEd had recently transitioned to CPAS goals. That impact evaluation found some interesting multi-year effects and evidence that could support a two-year measure life, but due to the short overall measure life, the Emerging Technologies team has not yet developed this service into a larger scale offering.

Type

New Technology

Timeline

June 2017 to December 2018

## Emerging Technologies - Completed Project

### Smart Home Interaction Study



#### Primary Objective

To better understand potential mechanisms by which home automation can save energy. To better understand potential mechanisms by which home automation and connected devices can save energy.

#### Overview

This pilot, a partnership with ComEd's Customer Solutions Innovation Team, aimed to gain a better understanding of how residential customers view and interact with smart home technologies. Numerous devices exist to control home functions remotely or wirelessly, from light bulbs and outlets to thermostats and faucets. Green Marbles installed bundles of connected devices in eight homes and Slipstream analyzed device-level usage data and surveyed homeowners to determine how people use connected devices that impact energy, how customers feel about that experience and which functions within these devices have the potential to save energy.

#### Results and Outcomes

The project team encountered major issues establishing consistent access to the output data from most of the connected devices. There were also issues experienced during system set up. However, these were important lessons learned from this effort. The project was unable to evaluate energy savings.

#### Additional Partners

Green Marbles

#### Type

New Technology

#### Timeline

March 2018 to December 2018

## Emerging Technologies - Completed Project

### Smart Home Research

# ILLUME

#### Primary Objective

Inform cost-effective program delivery strategies, future requests for proposals/pilots, and short- and long-term strategies around the technology area of smart home and residential connected devices.

#### Primary Research Question

- Understand customer expectations, desires, needs and experiences with current smart home products and services, including potential service gaps and opportunities for utility program models
- Identify promising future technologies and/or trends that can be tested now (e.g., voice control, whole building management) even if they are still 3-5 years from impacting the energy efficiency space
- Identify vendors who may be candidates for ComEd smart home pilots, including vendors already operating in the energy space, and those with capabilities aligned with ComEd needs.

#### Overview

This research initiative will assess the applicability of smart home products and services to the ComEd energy efficiency program portfolio and will look at smart home opportunities from multiple perspectives, including customer needs (and the ability of a potential smart home offering to serve a range of customers); existing utility smart home program, pilot and business models; the vendor landscape; and the broader consumer market (e.g., established and emerging products and services). The outcome of this research will be a strategy document that guides the Emerging Technologies team toward next steps in this space.

#### Results and Outcomes

Initial research has concluded. The Emerging Technologies team is considering options for further smart home research. However, the team believes the energy savings potential of such a pilot is likely to be low, and the costs and complexity for participants is likely to be high.

Type

Research

Timeline

January 2019 to May 2019

## Emerging Technologies - Completed Project

# Total Connected Savings: Thermostat Optimization



WHISKERLABS

### Primary Objective

Test the ability of Whisker Labs' Total Connected Savings thermostat optimization offering to provide cost-effective energy savings to residential customers with a common thermostat type.

### Primary Research Question

Does the Total Connected Savings service deliver HVAC savings for Wi-Fi-connected thermostats?

### Overview

This pilot, a collaboration between ComEd and Nicor Gas, tested an over-the-air deployed algorithm that promised to convert a connected thermostat (from manufacturer Honeywell) to a smart thermostat. Whisker Labs leverages real time weather data to update setback schedules and shorten run times, potentially presenting ComEd with a lower first-cost alternative to expensive smart thermostats. If the algorithm and advanced control being tested were successful, this system had potential to be expanded to other brands and types of thermostats, providing ComEd with a unique retrofit path toward smart thermostat customer adoption goals.

### Results and Outcomes

Over a thousand residential participants used the deployed algorithm during the pilot period. The Navigant impact evaluation results were received in April 2019. The pilot demonstrated low savings potential; due to this and the assumed short measure life of such a service, the decision was made not to proceed. Additionally, shortly after the pilot launched, Nest launched released the Nest-E, reducing the value of this concept as the incremental cost (particularly after incentives) made the Nest-E smart thermostat cost competitive with a programmable Wi-Fi thermostat.

### Additional Partners

Honeywell

### Type

Program Design

### Timeline

December 2017 to December 2018