

EE Technologies: Reducing Carbon Now and in the Future

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Energy Efficiency R&D

- » **Purpose:** Identify, test, validate and integrate the next generation of energy efficiency technologies and program delivery strategies into the ComEd Energy Efficiency Program.
- » **Portfolios:**
 - *Emerging Opportunities* – new technologies, market adoption for key EE measures, enhancements to current programs, future program models
 - *Market Transformation* – new evaluation approach distinct from Resource Acquisition, moving entire markets long-term toward efficient options
- » EE R&D holds regular solicitations and accepts proposals year-round at www.ComEd.com/EmergingTech
 - EmergingTech@ComEd.com

- » During ComEd’s Plan 5 (2018-2021), the R&D team evaluated 450 new technologies, proposals, and innovative concepts, executed 90 research and pilot projects, and engaged 70 industry partners, including national labs, universities, program implementation firms, and nonprofit or community-based organizations.

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Innovate Energy Efficiency With Us

The ComEd Energy Efficiency Program seeks new and innovative ways to help homes and businesses across northern Illinois save energy. If you have an energy efficiency technology or customer engagement strategy that helps us achieve this goal we'd love to work with you.

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Energy efficiency is a major climate strategy

- » “Energy efficiency can slash U.S. energy use and greenhouse gas emissions by about 50% by 2050, getting us halfway to our national climate goals.” ACEEE
- » “Energy efficiency represents more than 40% of the [global] emissions abatement needed by 2040.” IEA
- » “Energy efficiency is an essential tool for meeting decarbonization goals.” ASE

<https://www.aceee.org/research-report/u1907>

<https://www.iea.org/commentaries/how-energy-efficiency-will-power-net-zero-climate-goals>

<https://www.ase.org/blog/decarbonizing-buildings-through-energy-efficiency>



Lithium-Ion Battery Electric Forklifts

- » Forklifts and Ground Support Equipment represent a major opportunity to help commercial and industrial customers cost-effectively electrify and take advantage of significant energy savings and non-energy benefits.
- » Compared to lead-acid batteries, the improved efficiency and longer run time of Li-ion technology can save substantial time and money through increased productivity, significant energy savings and a lower cost of ownership.
 - No site emissions, major site fuel reduction if replacing diesel or propane
 - 50% higher efficiency than lead acid batteries
 - No spills, chemicals, corrosion issues
 - Lower maintenance; no watering or special battery rooms
 - 30% greater run time than lead acid with 20% of the charging time – much better up time for multiple shift operations



Very High Efficiency HVAC Concept

- » VHE HVAC is a total HVAC system replacement that provides 100% highly filtered outside air, improving air quality while also dramatically reducing energy bills. The system combines high-efficiency heat pumps, heat recovery, a dedicated outdoor air system, and advanced filtration.
- » Demonstrations conducted by NEEA on a range of commercial building types showed 48% to 89% HVAC energy savings.
- » VHE HVAC is a compelling retrofit solution for small-medium commercial buildings with packaged rooftop or small unitary HVAC systems near the end of their service life. It also presents an ideal electrification opportunity.
- » ComEd is working with Institute for Market Transformation to demonstrate this technology in our Midwestern climate. Our initial focus is office, retail, lodging and educational buildings. Our pilot is currently recruiting participants.

BUILDING TYPE	ENERGY SAVINGS
Airport terminal office	89%
Government district office	73%
Government dorms	77%
Law office	75%
Pizza restaurant	51%
Restaurant	77%
Seattle office	69%
Utility district office	48%



Electric Homes New Construction

- » Modern, high efficiency electric homes can dramatically reduce carbon emissions over the lifetime of the building, create operational cost savings for owners, and improve indoor air quality, and the market is headed for cost neutrality.
- » ComEd has a new program aimed at driving the market for high-quality, next-generation, electric homes.
- » Builders of new construction single-family homes, duplexes, townhomes and 2-4 flats are eligible to receive \$2,000 per home for achieving high standards in envelope, all-electric HVAC, heat pump water heating, lighting and appliances.
- » Pilot year 1 (2020): 11 homes, 5 builders; year 2 (2021) 18 homes, 6 builders; year 3 (2022) goal is 60 homes. We have seen a good variety of projects – single family homes, 2-flats, 3-flats, accessory dwelling units.



Project Snapshot: Brightleaf Homes

Energy-Saving Improvements	Air tightness of 1.11-1.26 ACH50; heat pump space and water heating, ENERGY STAR® appliances; WaterSense® plumbing fixtures; LED lighting; induction cooktops; 3kW solar panels
Estimated Annual Energy Savings	6,000–7,600 kWh per home
Estimated Annual Electric Cost Savings	\$760–970 per home

Alternative Refrigerants



- » Refrigerants are ubiquitous and represent a major opportunity to address greenhouse gas emissions outside of electrification and clean energy.
- » Since 2019, ComEd has partnered with the National Renewable Energy Laboratory (NREL) to conduct laboratory testing of next-generation energy efficiency technologies.
- » One recent collaboration studied the performance of a common configuration refrigerated display case using lower GWP refrigerants, including propane.
- » Test results showed significant energy savings potential for both the drop-in replacement and propane cases, however, propane currently requires important safety considerations and is limited by EPA to certain uses.
- » These results help inform how ComEd should be advising customers and developing future incentives to drive market adoption.

Image and results from laboratory testing of refrigerated display cases with alternative refrigerants

	Refrigerant	Global Warming Pot. (GWP)	Daily Energy Usage (kWh)	Savings over baseline	Savings over replacement
Baseline Case	R134a	1,300	11.26	-	-
Drop-In replacement	R513a	573	7.59	33%	-
Propane Refrigerant	R-290	3	4.3	62%	43%



Thank You

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