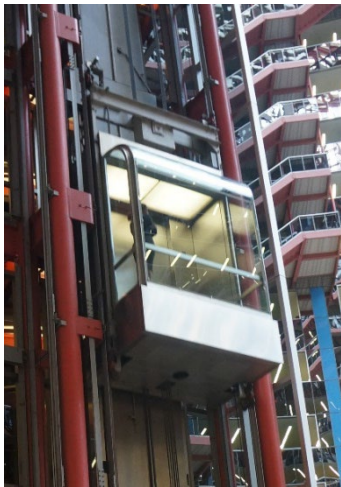


# COMED ENERGY EFFICIENCY MEASURES FOR ELEVATORS RESEARCH STUDY EXECUTIVE SUMMARY

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## **1.0 EXECUTIVE SUMMARY**

Electricity consumption from elevators typically represents 5% or less of the total electrical load in buildings. Although this energy use is relatively small, there are hundreds of thousands of elevators in ComEd territory, providing potentially significant aggregate energy saving opportunities. Over 200,000 elevators in ComEd territory are old and inefficient, with upgrade opportunities that could substantially improve energy efficiency.

We assume a full or partial modernization is needed between 20 and 50 years after installation and categorize elevator modernization potential by age.

- Likely to need modernization. There are 141,000 elevators installed before 1969. Estimated baseline annual energy use is in the range of 3,520 GWh/yr and 12,478 GWh/yr.
- May need modernization. There are approximately 129,000 elevators installed between 1970 and 1999. These elevators are potential candidates for modernization, depending on age, maintenance and other factors. Estimated energy use is in the range between 3,267 GWh/yr and 11,658 GWh/yr.
- Unlikely to need modernization. 34,000 elevators were installed after 2000.

There is approximately a 49% reduction in energy use that might result from modernization projects. For elevators that are potential candidates for modernization, savings estimates are estimated at 3,667 GWh/yr.

This report summarizes the results of the Energy Efficiency Measures for Elevators Research Study. The goals were to identify baseline energy and standard practices in the current elevator retrofit market, estimate the elevator energy savings opportunity in the ComEd service territory and suggest a roadmap toward a ComEd elevator energy efficiency program that addresses barriers to adoption and potential savings. The scope of study was limited to existing buildings and did not include new construction.

Based on the project findings, we **do not recommend** a ComEd elevator energy efficiency program for existing buildings. It is not likely to succeed for the following reasons:

- Stakeholders indicated that elevator modernization upgrade decisions are driven by safety and functionality concerns, not energy efficiency.
- Our technical analysis shows that with simple paybacks of 35 years to over 100 years, elevator upgrades are too costly to justify for energy savings.
- Of the available retrofit technologies, efficient motor drives provide the greatest energy savings. However, the industry has moved away from inefficient drives, and this undermines the justification that incentives would

influence customers to select more efficient retrofits instead of less efficient retrofit.

While we believe a dedicated elevator program offering is not likely to succeed, select measures that were evaluated in this research may find success in existing ComEd offerings. Lighting retrofits in older elevators may present an opportunity for the Standard Program. For the 200,000+ older elevators in ComEd territory, LED lamp retrofits generate average savings of 3,500 kWh/year per elevator cab, where incandescent lamps are still present.

If an elevator energy efficiency program were to be pursued, then a prescriptive incentive approach, rather than custom, would be recommended to reduce the uncertainties and application burden for the customer. An upstream or midstream approach would further reduce customer burden and potentially realize program efficiencies associated with engaging fewer market actors. Finally, a pilot project would be recommended to resolve key areas of technical uncertainty, including better understanding of the applications where regenerative drives actually provide savings, unbiased evaluation of destination dispatch controls, and data collection of real-world elevator run times.

This research project involved in-depth review of the literature, stakeholder interviews, market potential and technology potential analysis. The subsequent sections of this report provide detailed descriptions of methods and summaries of the key findings that lead to our overall conclusion that a ComEd elevator energy efficiency program would not be feasible nor cost-effective for existing buildings.