

A Prescriptive Solution for Affordable Housing Performance IIs

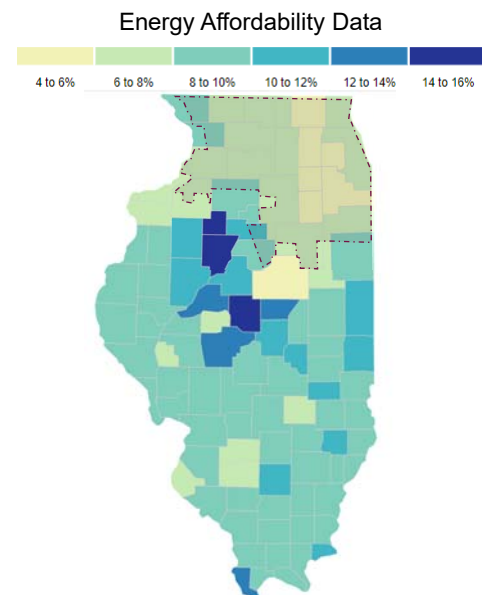
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10/10/19



Program Overview

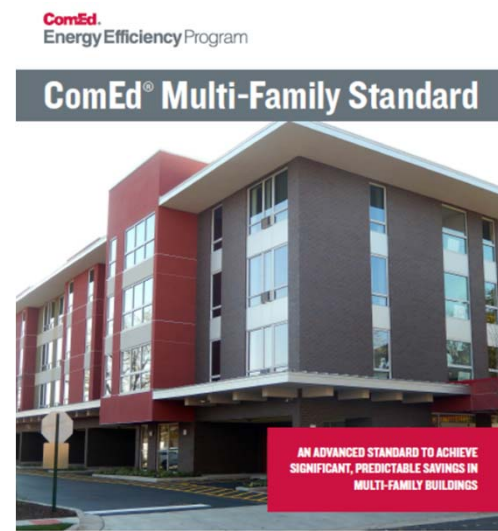
- Started in 2017 (Previously operated since 1999 through State)
- ComEd service territory with joint support from People's Gas and Nicor Gas
- Serving 50+ active projects with total units 4,120 units served since 2017
- \$2.2M annual budget
- 2,800,000 kWh and 230,000 therms saved in 2019



Source: IL <80% AMI, energy.gov/leere/slsc/maps/lead-tool

Program Requirements

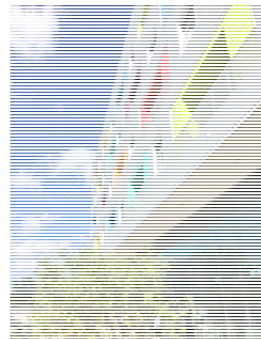
1. Must be in ComEd service territory
2. Housing for occupants at or below 80% AMI
3. Must meet the requirements of the ComEd Multi-family Standard



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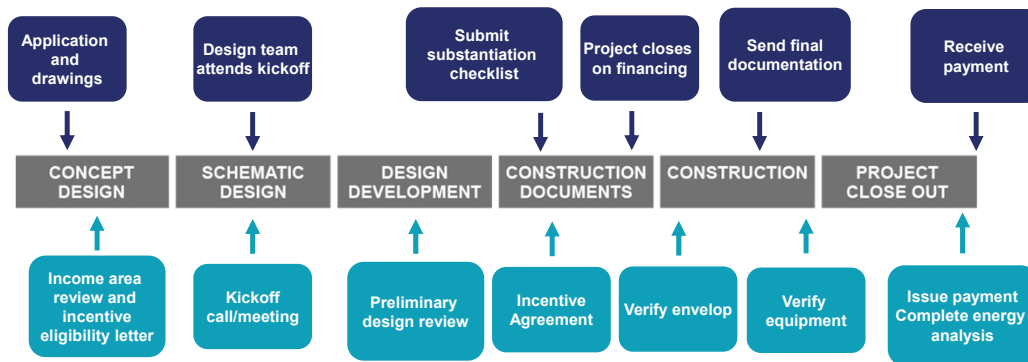
Types of Buildings



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How does the program work



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13 Measures

Envelope Performance Measures

1. **HIGH-PERFORMANCE WINDOWS:** Improved windows with above-code specifications for U-factor and Solar Heat Gain Coefficient (SHGC).
2. **REDUCED INFILTRATION:** Reduced envelope infiltration verified by testing.
3. **REDUCED THERMAL BRIDGING:** Improved detailing of the thermal envelope and better accounting for thermal bridges. The measure includes a straightforward list of prescriptive requirements.

HVAC Performance Measures

4. **HIGH-PERFORMANCE HVAC EQUIPMENT:** Above-code levels of performance for HVAC equipment that generally correspond to the Consortium for Energy Efficiency (CEE) Tier 2.
5. **HIGH-PERFORMANCE FANS:** High efficiency fans, including requirements for both system and exhaust/ventilator fans.
6. **EFFICIENT VENTILATION:** Improved ventilation through the adoption of strategies based on ASHRAE 62.2.
7. **ADVANCED HVAC CONTROLS:** Smart thermostats

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13 Measures

Lighting Performance Measures

8. **HIGH-PERFORMANCE INTERIOR LIGHTING:** Reduced lighting power density in common areas and improved lamp efficacy in dwelling units.
9. **INTERIOR LIGHTING CONTROLS:** Occupancy and vacancy controls for common areas paired with implementation of bi-level lighting in some areas.
10. **HIGH-PERFORMANCE EXTERIOR LIGHTING:** Improved lamp efficacy for exterior site, landscape and architectural lighting.

Hot Water and Appliance Measures

11. **HIGH-PERFORMANCE WATER HEATING EQUIPMENT:** Higher-efficiency water heaters and boilers used for water heating.
12. **HOT WATER CONSERVATION:** Low-flow fixtures in kitchens and bathrooms meeting WaterSense® criteria
13. **EFFICIENT APPLIANCES:** ENERGY STAR® appliances and other equipment.

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Why does this approach work

- ✓ Up-front requirements
- ✓ Predictable savings
- ✓ Both developer and utility share risks
- ✓ Incentive at the end

INCENTIVE SUMMARY

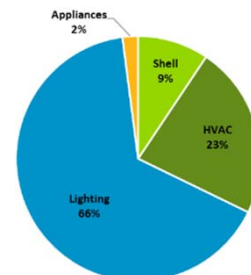
UNITS PER PROJECT	MAJOR RENOVATION	NEW CONSTRUCTION
Less than 80 total living units	Up to \$4.85/IE-gsf*	Up to \$4.55/IE-gsf*
80 or more total living units	Up to \$4.55/IE-gsf*	Up to \$4.30 /IE-gsf*

*Incentives levels are calculated per gross square foot (gsf) of income eligible (IE) living space (IE-gsf).

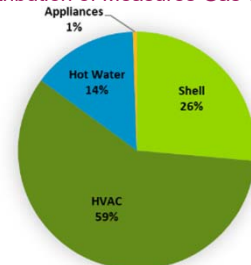
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Measure mix for savings

Distribution of Measures Electric Savings



Distribution of Measures Gas Savings



Partners

- **IHDA**
 - Alignment with QAP
 - Supplemental funding
 - 10 of 12 projects in ComEd Territory
- **City of Chicago**
 - Due diligence
 - Alignment with SDP
- **Local Housing Authorities**
 - Largest developer in Chicago (3rd largest housing authority)
 - RAD, and HCV for capital and operational support
- **Community Development Financial Institutions**
 - Supplemental funding
 - Due diligence
- **Habitat for Humanity**
 - Replicable scattered sites
- **IHC**
 - Combined marketing efforts

“These are excellent programs and we want everyone to take advantage of them.”

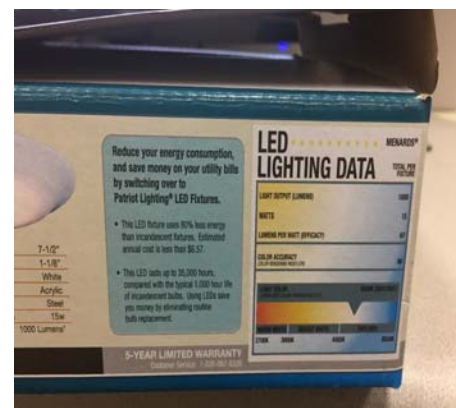
-City of Chicago

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Tie – Lighting

- Switched to relaxed requirement of EnergyStar®
- Many projects able to meet original lighting requirements especially in common areas
- Lighting procurement can be varied
- Exceptions for some fixtures

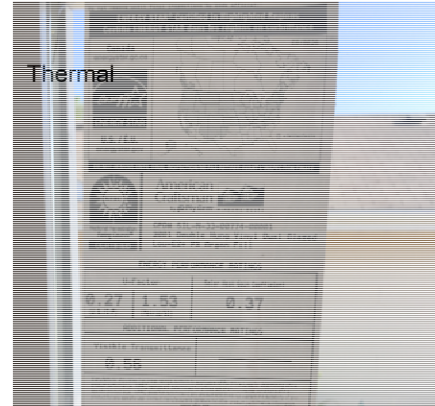


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Tie – Envelope Performance

- Importance of recognizing difference between residential and commercial grade windows
- Blower door testing was already required by the State, healthy workforce behind it and developers used to it
- Continuous insulation varies among design and development teams

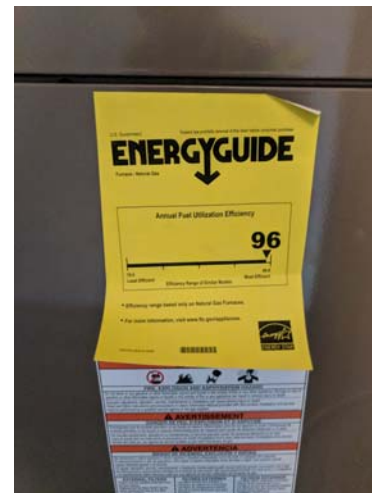


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Win – HVAC Efficiency

- CEE Tier 2 – based on high performance but readily available equipment
- Typical equipment rated performance above Standard is 7-12%
- Large number of projects using high performance VRF or condensing furnaces
- Only one developer using radiant boilers and wall ACs



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Win – Hot Water

- Systems mostly storage
- All meeting high performance requirements
- Some projects using heat pump water heaters
- Watersense® fixtures, State of IL now counts energy savings from water reductions



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Concession – Ducted Corridors

- City of Chicago allows undercuts
- 2 of 26 projects with common corridors ducting to residences
- Require continuous exhaust with boosted operation in bathrooms



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Concession – Smart Thermostats

- Senior and supportive housing populations
- Savings in question



https://commons.wikimedia.org/wiki/File:Ecobee4_on_the_wall_from_an_angle_showing_home_screen.jpg

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Comparing against other criteria

- Energystar®
 - Designed for national code cycles
 - Doesn't require airPLUS
- PHIUS+
 - Deemed vs actual savings
 - Doubling up on verification

	EnergyStar® MFNC	ComEd Standard	PHIUS+
Documentation	- -	-	- - -
QA/QC	+ +	+	+ + +
Envelope	+	+	+ + +
HVAC	+	+ +	+ +
Lighting	+	+ +	+ +
Hot Water	+	+ +	+ + +
Appliances	+ +	+ +	+
Ventilation	-	+ +	+ + +
Total	5	11	14

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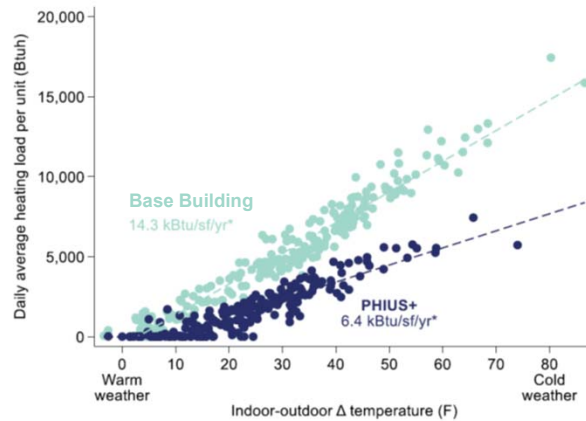


Looking ahead

Energy and Cost Comparison:

Average annual costs per housing unit...		Base Property	PHIUS+
Space heating	Electricity	\$21	\$291
	Gas	\$201	\$0
	Subtotal	\$222	\$291
Space cooling (electricity)*		TBD	TBD
Ventilation (electricity)		\$6	\$37
Annual customer charges	Electricity	\$204	\$226
	Gas	\$536	\$271
	Subtotal	\$740	\$537
Total		\$968	\$865

*Note: space-cooling costs are omitted in these preliminary results – these will be analyzed at the conclusion of the 2019 cooling season



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Looking ahead

Air quality comparison using PM2.5

- Base: 40 CFM Continuous with boost
- PHIUS+: 100 cfm continuous ERV
- Also looked at CO2 and TVOC



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Next steps

Partial Renovations

- Already cover deep retro-fits
- Existing equipment replacement program

PHIUS+ pass through program

- Deemed vs modeled savings
- Reduce implementation costs



Photo courtesy of Paul Knight

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