

# PTAC to PTHP Pilot Project

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# Energy Resources Center

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The Energy Resources Center (ERC) located within the College of Engineering at the University of Illinois at Chicago, is an interdisciplinary public service, research, and special projects organization that works to improve energy efficiency and the environment.

ERC trains and mentor future engineers and young professionals by providing on-site work experiences and field-work opportunities.



# PTAC to PTHP Pilot - Chicago High-Rises

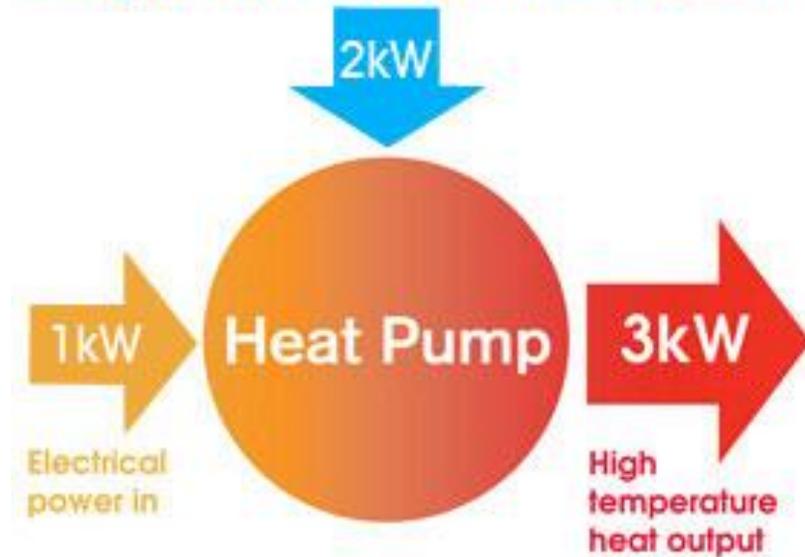
- Applicable Utilities
  - ComEd
- Pilot Idea
  - Establishment of PTAC to PTHP retrofits in the high-rise marketplace
- Rationale
  - Energy savings potential
  - Underserved market
  - Simplicity of delivery
- Impact
  - Cost effective, innovative approach to help ComEd reach statutory goals



From making  
heat to  
moving heat



Low temperature renewable heat  
energy recovered from the environment



# Technological Challenges Unique to Cold Climate Heat Pumps

- Electric Resistance
- Defrost
- Condensate Removal



# Proposed Solutions for Successful PTAC to PTHP Replacements

- Reverse cycle defrost
- Internal condensate removal
- Working with industry professionals
- Carefully vetting projects
- Measuring results
- Use best available technology
- Variable speed compressors

# Energy Savings Potential

**Table 11. Electric resistance heat switch-over temp and annual effective PTHP COP**

New York City

Building Type	Location	Building Efficiency	Electric Heat Temp	Annual Effective COP	% Heating Savings from PTHP
Multifamily	NYC	ASHRAE 2004	40	1.34	25%
Multifamily	NYC	ASHRAE 2004	35	1.76	43%
Multifamily	NYC	ASHRAE 2004	30	2.18	54%
Multifamily	NYC	ASHRAE 2004	25	2.53	60%
Multifamily	NYC	ASHRAE 2004	20	2.85	65%
Multifamily	NYC	ASHRAE 2004	15	3.10	68%
Multifamily	NYC	ASHRAE 2004	10	3.16	68%
Multifamily	NYC	ASHRAE 2004	5	3.19	69%

*Regulations* are the limiting factor

*Technology* and persistence can yield success

Nyserda, 2018 Market Study



# Collaboration with Industry Leaders



Office of  
**ENERGY EFFICIENCY &  
RENEWABLE ENERGY**



**GE APPLIANCES**





Proposed program targets residential high-rises along Chicago lakeshore

Surprisingly overlooked marketplace

PTACs popular choice among residential high rises built in 1950-2000

Chicago Benchmarking Data analysis estimates: **2000+** ER PTACs in high-rises

Lakeshore facing north





1313 N Ritchie Ct

148 units

Averaging 3 PTACs  
per unit



1150 N Lake Shore  
Drive  
247 Units



65 E Scott  
230 Units  
Rental



6325 N Sheridan

136 Units

Edgewater  
Neighborhood



# The Case for Cold Climate PTHPs

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- Ease of installation
- Ease of service
- Low cost
- Reduced equipment
- No fuel-switching



# Year 1

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- Work with different manufactures to test out various models
- Monitor and verify energy savings
- Work with Condo Associations and Building Management Groups to Identify market opportunities throughout the city

# Years 2-4+

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- Increase program penetration shifting focus to maximize energy savings
- Strengthen relationship with leading manufactures
- Looks toward expanding reach towards hotel industry



# Thank you!

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