

Efficient Rooftop Units: Logic Model and Market Progress Indicators

SAG Market Transformation Working Group

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Energy
Efficiency
Program

Agenda

1. Efficient Rooftop Units: Technology Overview
2. Logic Model
3. Market Process Indicators
4. Next Steps

What Are *Efficient* Rooftop Units?

Efficient Rooftop Units (ERTUs)

- Improvement over the historically inefficient RTU product
- Improvements affect whole-box efficiency
- Two tiers of equipment with both a prescriptive and performance path to compliance
 - Tier 1 includes box upgrades (box insulation and low leak dampers)
 - Tier 2 includes Tier 1 upgrades and an energy recovery ventilator or condensing furnace

Other organizations developing ERTU initiatives

- NEEA – Nicor Gas and NEEA have been collaborating since 2020 to develop a new testing specification, validate savings through modeling and lab testing, and continue to collaborate on the ERTU product
- CEE (MN)
- CalMTA
- Department of Energy



<https://betterbricks.com/solutions/efficient-rooftop-units>

ERU Tiers and Components

Tier 1: Prescriptive Path

- All panels (door liners, top panels, divider panels, and mullions) adjacent to conditioned air, including the base, shall be fully insulated with a minimum of R-12
- Leakage rate of outdoor and return air mixing dampers shall be no greater than the rate described in ASHRAE/IESNA 90.1-2019 Table 6.4.3.4.3

Tier 1: Performance Path

- ≥ 0.65 , as measured by CSA P.8 – Edition 3.0

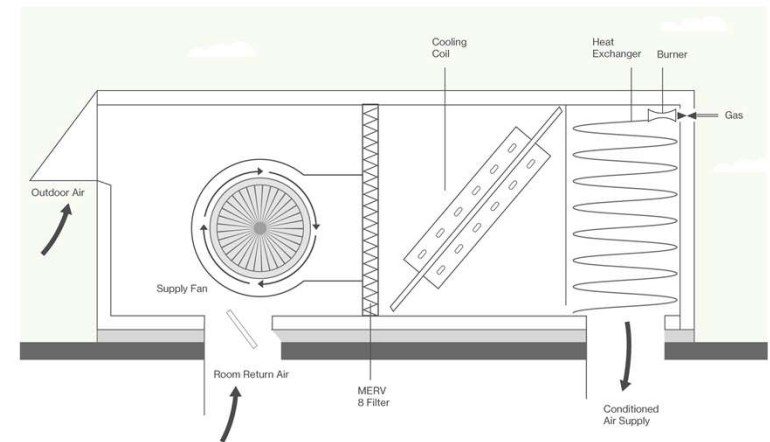
Tier 2: Prescriptive Path – must meet all Tier 1 requirements, and:

- 2A: The unit includes heat or energy recovery with a heat/energy recovery ventilator
- 2B: A furnace with a condensing heat exchanger (90+% TE)

Tier 2: Performance Path

- ≥ 0.80 , as measured by CSA P.8 – Edition 3.0

Standard RTU



<https://betterbricks.com/resources/the-better-and-best-efficiency-in-gas-rooftop-units>

ERTU Logic Model and MPI Development Process

- Draws on ERTU Research:

- GTI Market Research

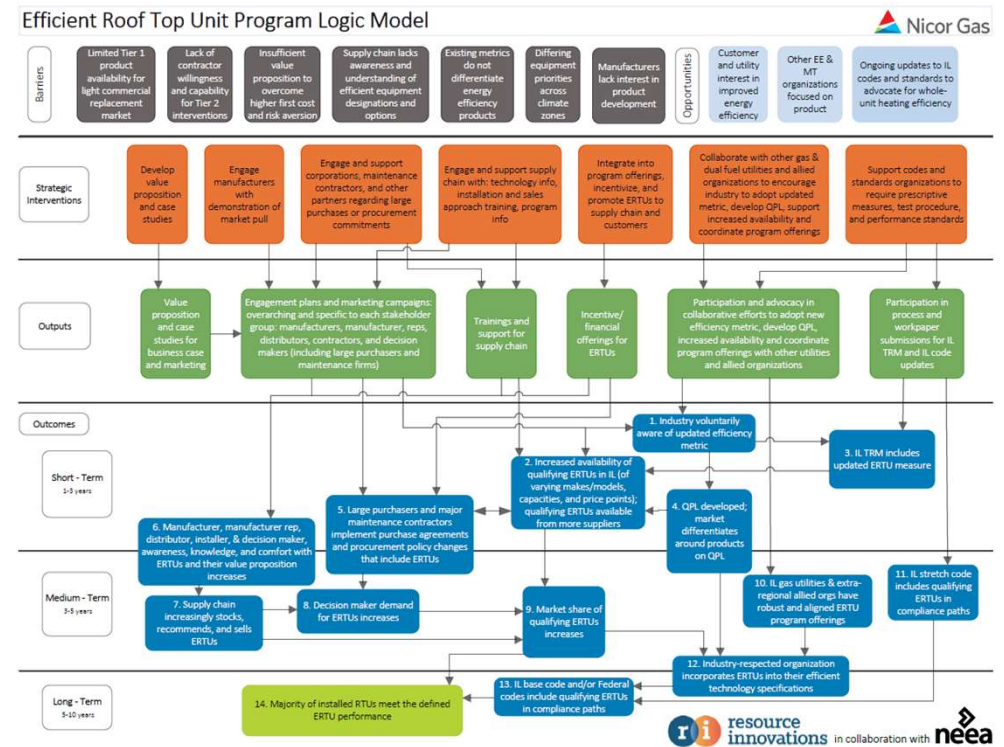
- Characterize existing RTUs on buildings
 - Characterization of existing and new/replacement RTUs on buildings

- NEEA

- Energy modeling of commercial gas rooftop units in support of CSA P.8 standard
 - Energy savings from efficient rooftop units in heating-dominated climates
 - Review of market share forecast and key assumptions for efficient rooftop units

- Co-developed with NEEA, incorporating feedback into the final version

- Reviewed by Guidehouse, incorporating feedback into the final version



Logic Model: Barriers and Opportunities

Barriers

Limited Tier 1 product availability for light commercial replacement market

Lack of contractor willingness and capability for Tier 2 interventions

Insufficient value proposition to overcome higher first cost and risk aversion

Supply chain lacks awareness and understanding of efficient equipment designations and options

Existing metrics do not differentiate energy efficiency products

Differing equipment priorities across climate zones

Manufacturers lack interest in product development

Opportunities

Customer and utility interest in improved energy efficiency

Other EE & MT organizations focused on product

Ongoing updates to IL codes and standards to advocate for whole-unit heating efficiency

Logic Model: Strategic Interventions

Develop value proposition and case studies

Engage manufacturers with demonstration of market pull

Engage and support corporations, maintenance contractors and other partners regarding large purchases or procurement commitments.

Engage and support supply chain with technology info, installation and sales approach, program info

Integrate into program offerings, incentivize and promote ERTUs to supply chain and customers

Collaborate with other gas and dual fuel utilities and allied organizations to encourage industry to adopt updated metrics, develop QPLs, support increased availability and coordinate program offerings

Support codes and standards organizations to require prescriptive measures, test procedure and performance standards

Logic Model: Outcomes Long-Term

Long-term Outcomes: 5-10 years

Industry-respected organization incorporates ERTUs into their efficient technology specifications

IL base code and/or Federal codes include qualifying ERTUs in compliance paths

Majority of installed RTUs meet the defined ERTU performance

Market Progress Indicators

14 MPis

- Each LM Outcome connected to at least one MPI with associated metric(s) and data source(s)

Metric Examples:

- Existence of industry-accepted performance metric
- # manufacturers producing ERTUs, # of models
- # suppliers carrying ERTUs
- # of distributors and installers recommending ERTUs

Data Source Examples

- Supplier websites and catalogs
- Shipment data
- Interviews/surveys
 - Manufacturers
 - Distributors
 - Installers
 - Large purchasers and major maintenance contractors

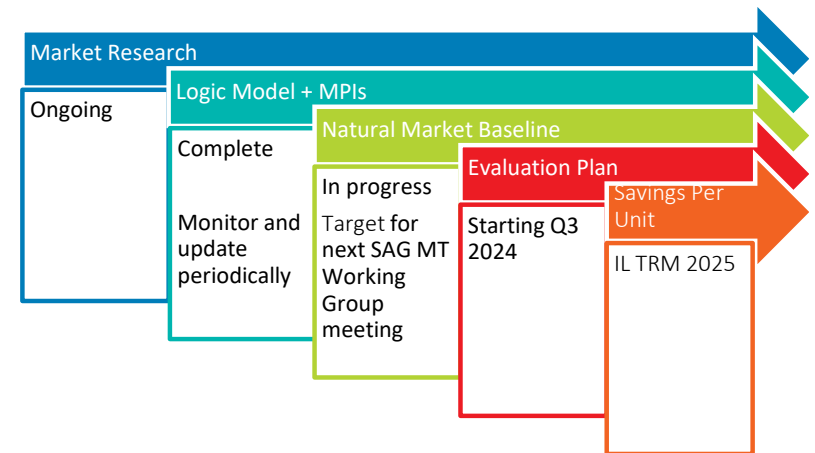
Efficient Rooftop Unit MPI Table					
Outcome #	Term	Logic Model Outcome	Market Progress Indicator (YOY = year-over-year)	Metric	Recommended Data Source(s)
1.	Short	Industry voluntarily uses updated efficiency metric	a. Standards org (or equivalent) uses an agreed upon industry performance metric in published docs	a. ERTU energy performance metric exists	a. Standards org's EE specification publication(s)
2.	Short	Increased availability of qualifying ERTUs in IL (of varying makes/models, capacities, and price points); qualifying ERTUs available from more suppliers	a. YOY increases in number of suppliers carrying qualifying ERTUs b. YOY increases in availability of qualifying ERTUs (of varying makes/models, capacities, price points)	a. Number of suppliers carrying qualifying ERTUs in IL b. Number of manufacturers producing qualifying ERTUs c. Number of qualifying ERTUs available in IL (if feasible, by make/model, capacity, price point)	a. Suppliers website/catalogs b. ERTU shipment data c. Installer/distributor surveys/interviews
3.	Short	IL TRM includes updated ERTU measure	a. IL TRM includes updated definition of EE RTUs	a. IL TRM entry for ERTUs	a. IL TRM
4.	Short/Med	QPL developed; market differentiates around products on QPL	a. QPL published b. YOY increases in number of manufacturers represented and models listed on QPL c. YOY increases in distributors stocking of qualifying ERTUs d. YOY increases in number of qualifying ERTU models in stock (of varying makes/model, capacities, and price points) e. YOY increases in installers and distributors recommending qualifying ERTUs to customers f. YOY increases in number of utilities using QPL to define program-eligible equipment	a. QPL available b. Number of manufacturers represented on QPL c. Number of ERTU models represented on QPL d. Supplier stocking practices of qualifying ERTUs e. Number of contractors and distributors recommending ERTUs f. Number of utilities using QPL to define program-eligible equipment	a. QPL b. Manufacturer interviews (e.g., to determine if/why they're not using QPL, & future plans to use QPL) c. Installer survey/interviews d. Distributor survey/interviews e. Utility staff interviews f. Utility websites/program docs

ERTU MTI Next Steps

- Open to any comments from the Illinois SAG MT working groups on the completed LM and MPI components
- Revisions and updates will be made as needed as work continues

Next Up:

- Natural Market Baseline development
- Prepare ERTU evaluation in collaboration with Guidehouse
- Develop ERTU measure for IL TRMv14 (for inclusion in 2025)



Questions?



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