National Grid Refrigerants MTM

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Why refrigerants? Why now?

- PAs have a state mandated GHG goal and are focused on determining the most cost efficient pathways to achieving that goal.
- National Grid's Product Development team identified refrigerant replacement and leak repair as a potential GHG reducing measure
    - Identified as a high potential measure due to high GWP and due to current PA engagement with customers for energy efficiency refrigeration projects
- Timeline of the proposal, pending DPU approval, would allow the PAs to plan and implement various refrigerant measures as part of their 2025-2027 three year plan filing (timing will also lend itself to inclusion in potential studies)
- National Grid, and all Program Administrators, are committed to delivering core energy efficiency programs and we are looking to deliver comprehensive decarbonization solutions to better serve our customers and deliver on robust GHG goals as part of our Energy Efficiency & Decarbonization plans

MTM Regulatory Requirements

1. Reasonableness of the size, scope, and scale of the proposed project in relation to the likely benefits to be achieved;
2. Adequacy of the evaluation plan;
3. Extent to which there is appropriate coordination among Program Administrators; and
4. Bill impacts to customers.

Refrigerant 101

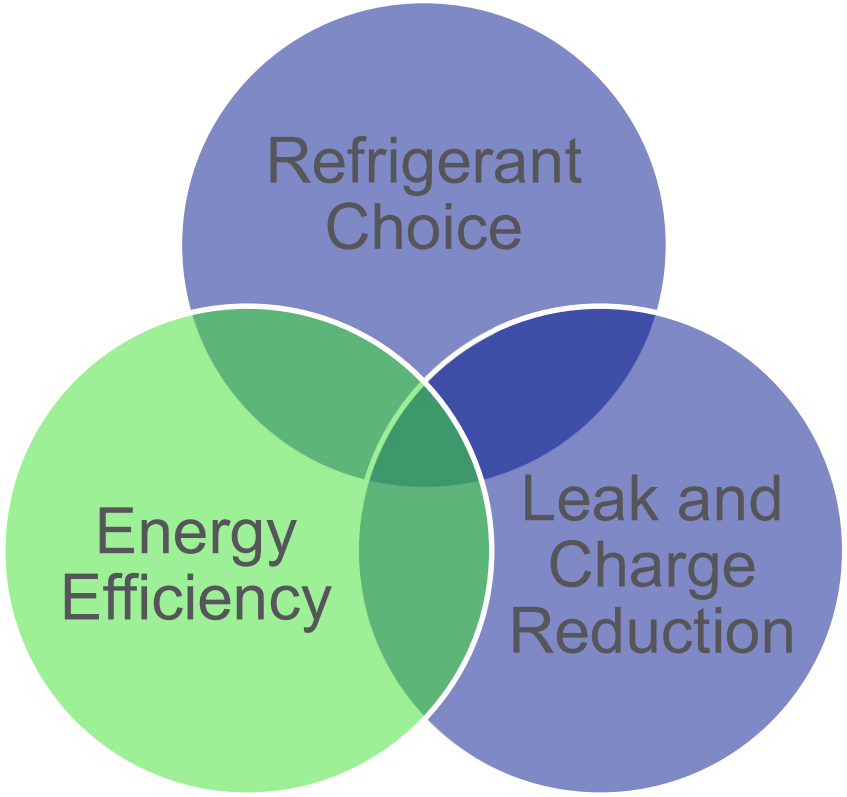
Refrigerants are a component of electric HVAC and refrigeration technology

Refrigerant properties affect system design, performance, cost, regulatory compliance, and climate impact

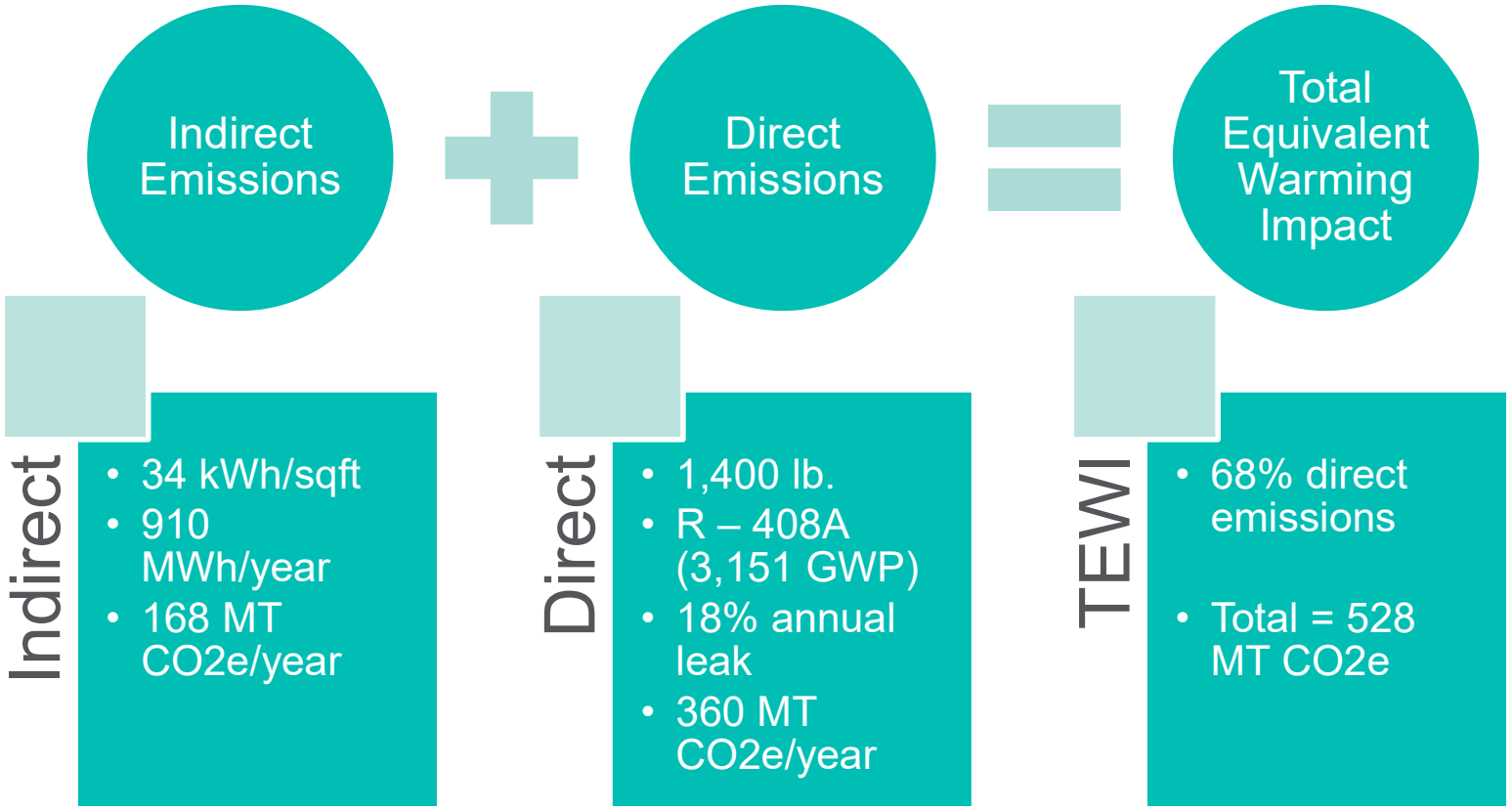
More climate friendly refrigerant solutions may *increase* energy consumption in certain cases

Refrigerants are regulated through state and federal environmental regulation and indirectly through state building code

Market making progress towards natural refrigerant solutions



Grocery Store Operational Emissions



Example from National Grid customer- actual average annual leak rate of 38%!

Proposed Demonstration Measures

Proposed measures reduce both energy related and refrigerant related emissions through one intervention

Refrigerant Leak Mitigation

Manual survey and repair of existing leaks

Survey and repairs typically take 2-3 days

National Grid has prior experience

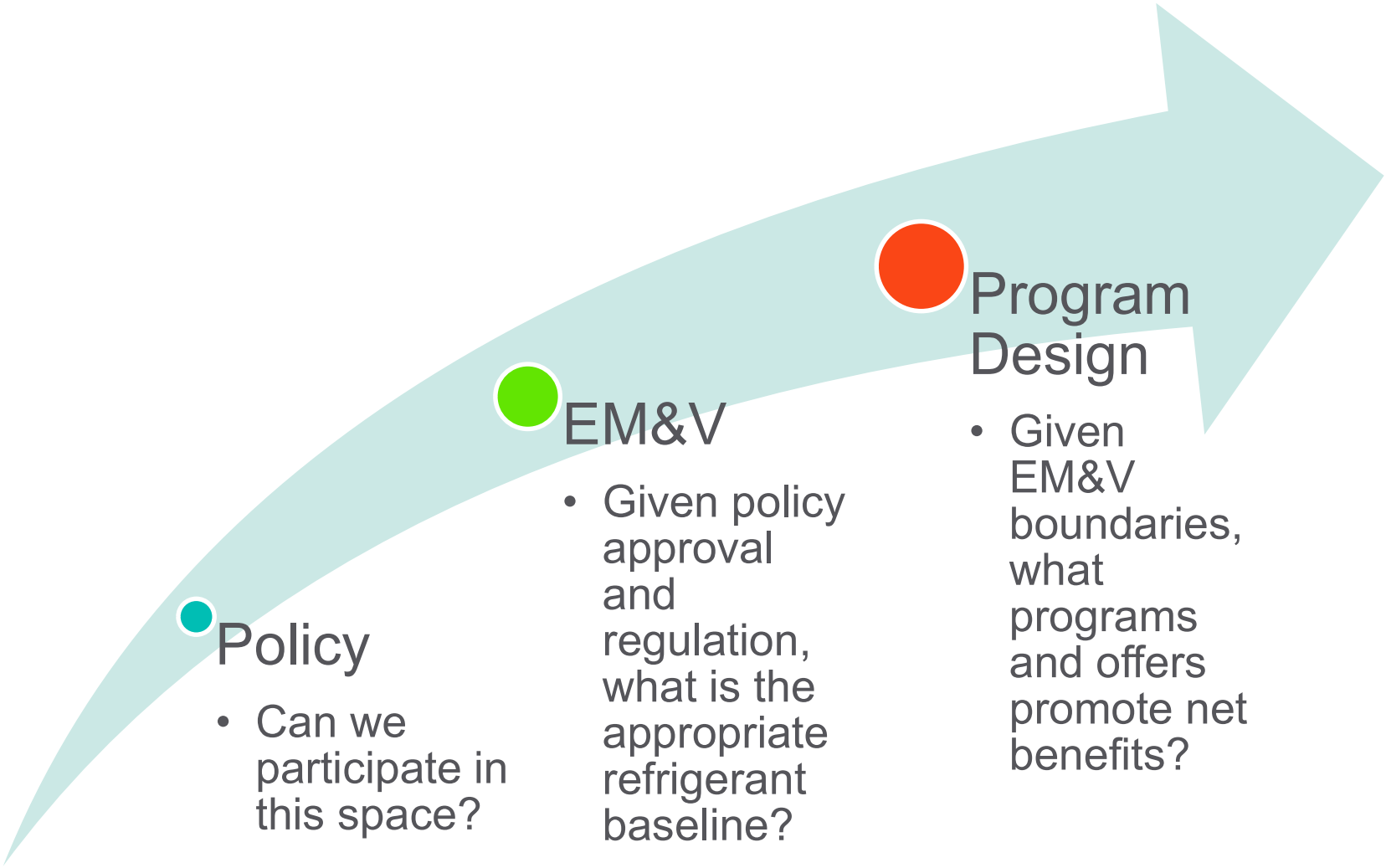
Refrigerant Retrofits

Replacing existing, high GWP refrigerant with lower GWP refrigerants

Existing systems not subject to same regulatory requirements as new systems

National Grid has no prior experience

Threshold Questions for Claimable GHG Reductions



Planning past the MTM

Reduce Leaks on Existing Equipment

Equipment with HFC refrigerants will be in the field for decades to come

Reduce leaks in equipment with HFC refrigerants through:

- **Leak mitigation**
- **Refrigerant retrofits**
- Automated leak detection
- Tie in or amplify other refrigerant programs

Bridge Technologies – Holistic Design

Support smarter designs using available technology and HFC refrigerants

- Support for higher energy consumption, lower carbon systems
- Secondary refrigerant loops to reduce refrigerant charge (grocery and VRF)
- Early replacement or retrofit of operational HVAC *equipment* considering energy and refrigerant

Install Natural Refrigerant Systems

Support transition to "future proof" systems

- Support for higher energy consumption, lower carbon systems
- Higher incentives for natural refrigerant systems

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By the numbers

Per Site

	Cost to Implement	Energy Savings (kWh and MT CO2e)	Refrigerant Emission Reduction (MT CO2e)	Total Emission Reduction (MT CO2e)	BCR without Refrigerant Emissions	BCR with Refrigerant Emissions
Refrigerant Mitigation	$12,000	15,000	62	65	0.83	4.39
Refrigerant Retrofit	$70,000	30,000	424	427	0.56	9.15

Demonstration Budget

	Number of Sites	Total Incentive per site*	Evaluation and Recruitment per site	Other Evaluation	Total
Refrigerant Mitigation	5	$20,000	$31,000	$150,000	$330,000
Refrigerant Retrofit	5	$78,000	$31,000		$620,000
Total (all sites)	10	$490,000	$310,000	$150,000	$950,000

Evaluation Plan

Phase 1

- Preliminary findings intended for inclusion in planning
- Installation of meters at all sites
- Customer interviews and historic data collection

Phase 2

- Continued, longer term metering
- Customer follow up interviews
- Final energy and GHG analysis
- Final Report

Apply impact evaluation and process evaluation methods to assess appropriate baselines, energy and GHG reductions, and potential program offer