Barriers

Technology Barriers

Electrical constraints: defrost cycling in colder regions increases electric load and need for panel upgrades.

Product barriers:

- Smaller units only < 20-25 ton for heating
- Need variable capacity compressor to modulate discharge temperature, absence of VFDs, VSDs or DCVs
- Load constraints need lighter materials for roof load or develop multi-zone single system

Market Barriers

Product Availability:

- Lag time in getting smaller units
- Stock only 5 to < 20 ton units special order larger sized (cost, lag time)

Measure Cost:

- Price of heat pump > Price AC + furnace
 - Gas to electric (G to E) additional costs
 - High-efficiency models are \$600-\$800 more per ton

Awareness / Acceptance:

- Manufacturers / distributers uncertainty over ability to move product
- · Contractors cautious over benefits / ability of product to meet needs, costs/performance

Information/Data Gap:

 Lack of published sales data limits market signals for distributors and contractors to specify and manufacturers to expand production or develop new products

Policy/Program Barriers

- Incentive amounts are too low
- Permits are not always used
- Stringent program requirements limits eligible products

Activities

Short Term:

Mid Term:

High

Efficiency

RTU

definition

and market

development

<20 tons, like

to like (E to E)

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Off midstream incentives above current **Comfortably CA level**

Define high efficiency for HP RTUs to create next tier for efficiency and incentives. Validate the effectiveness: variable capacity compressors, VFD, VSD & DCV to aid development of advanced measures and incentives.

Analyze sales data for new equipment options to define market size by end user; data shared with distributors and manufacturers

Work with local programs to assess current mid-stream application process

Pilots / field demonstrations and testing electric for gas replacement (>20 tons)

Program offers rich incentives that also offset installation costs for >20 tons RTUs with added features (VFD/VSD/DCV) to offset price differential

High efficiency RTUs are adopted in CA Title 24 and mandated in jurisdictions



Mid-stream / upstream incentives above current **Comfortably CA level**

Clear awareness in the market about benefits of HP **RTUs and additional benefits** of variable capacity compressors, VFD, VSD & DCV

Local programs offer incentives to lower installation costs Sales data collected and shared with manufacturers, distributors, retailers, and contractors

Process evaluation to revise administrative processes for local mid-stream programs

Contractors and distributors trained on benefits of RTUs. and new workforce trained in **RTU** as viable technology

Develop work papers for medium size RTU with added features (VFD/VSD/DCV)

Process evaluation to revise administrative processes for local mid-stream programs

Improve price competitive position of HP RTU for E to E in warm climate applications

Outcomes

New E to E technology offered in local programs with added features, VFD/VSD/DCV/possibly some larger sizes

Local programs offer incentives to lower installation costs to offset cost difference for G to E replacement

Increased participation in local mid-stream programs

Distributors increase stocking to overcome RTU technology constraints G to E, cold climates

Market expands to applications requiring panel upgrades G to E, heating, applications requiring defrost

Increased acceptance of RTUs larger units in G to E replacement scenarios (>20 tons)

Long Term: High Efficiency >20 tons, G to E













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