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Cascade Energy & Industrial Heat Pumps (IHPs)

- Scoping case studies
- Customer motivations, barriers
- Contractor & design firm survey
- What next?

Cascade Energy & Industrial Heat Pumps (IHPs)

• IHP Scoping



Source: Leading States Chart Path for Cutting Emissions with Electrification, Pointing Way for Peers | ACEEE

Dairy Scoping - 1



Sink: pasteurization 200°F



70K lift, 2.5 COP

Spark gap (elect/ng) 4.0

Gas savings: \$170k

Electric increase: \$200k

Grid intensity: 635 lb/MWh CO2e Savings: 1,000 tonne/y

Dairy Scoping - 2



New construction

Utility allowed electric boiler baseline

Central IHP system not considered

Two add-on IHP projects identified (~5% NG reduction)

Good economics vs. electric boiler

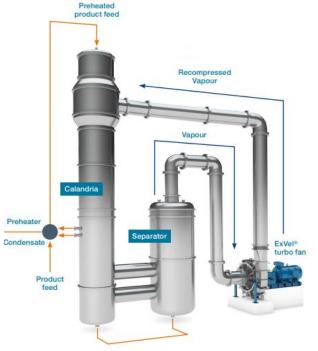
Vegetable processor - 1

Vegetable concentration

Mechanical Vapor Recompression (MVR) on evaporators

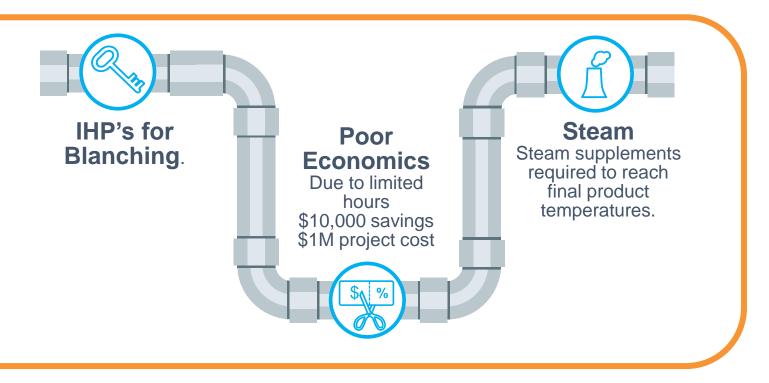
Demonstration plants online

Significant incentives offered



Source: Howden.com MVRHowdenbyChart_MVR_ProductProfileSheet_Digital.pdf

Vegetable processor - 2



Medical manufacturing

Goals: Phase out R22, Save: CO2, H2O, kWh, Therms

Roof mounted ASHPs and WSHPs for clean rooms

WSHPs use cooling tower water, with air compressor & process loads

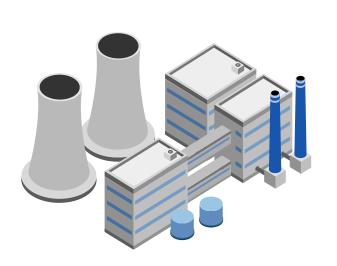
Natural gas backup on ASHPs for very cold weather



Customer Motivations & Barriers

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Motivations





Reduce CO2 emissions

CO2 regu

CO2 regulatory requirements

Barriers



Cost: Equipment & Operating

Design & Integration Barriers

- Source sink distance
- Little support from manufacturers, vendors
- Vendors still learning
- Construction schedules



Temperature Limits



Risks

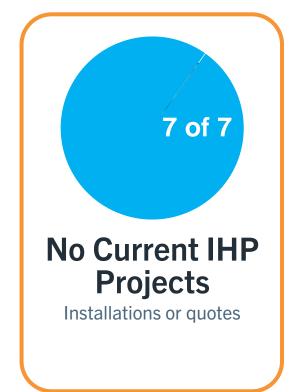
- Don't see competitors installing IHPs
- Nervous it might not work

Refrigeration Contractors / Food & Bev Design

Informal survey

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Survey Results: 7 well known refrigeration contractors

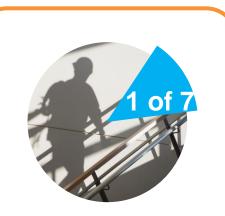




Successful

Heat Recovery (desuperheaters)

Dedicated Hot Gas Compressors



Not Interested

Current workload is sufficient

2 Food & Beverage Plant Design Firms

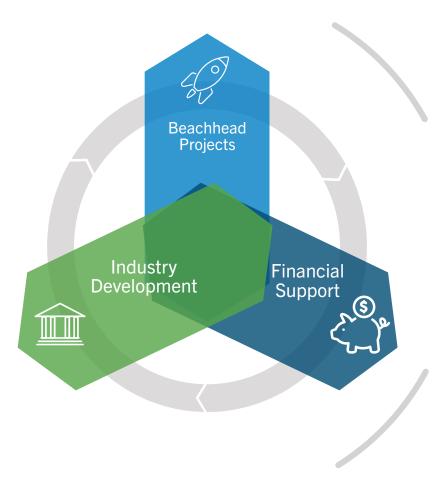


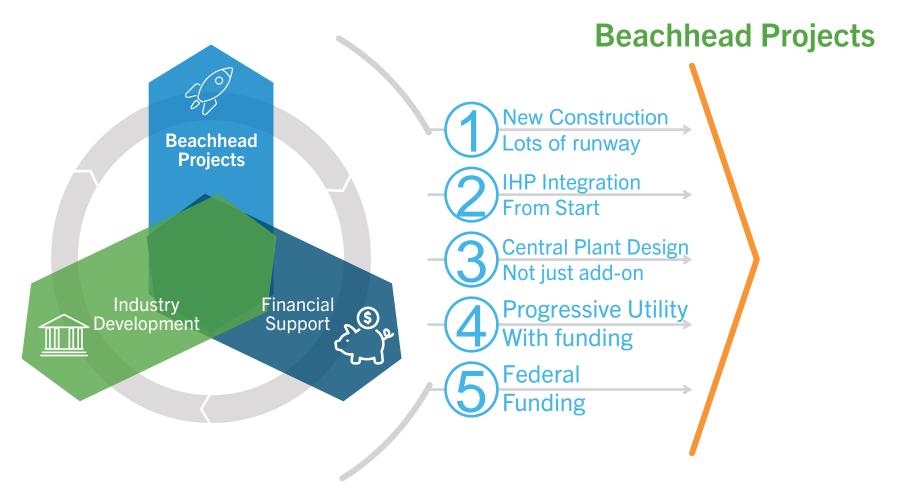
No requests for IHPs in plant design

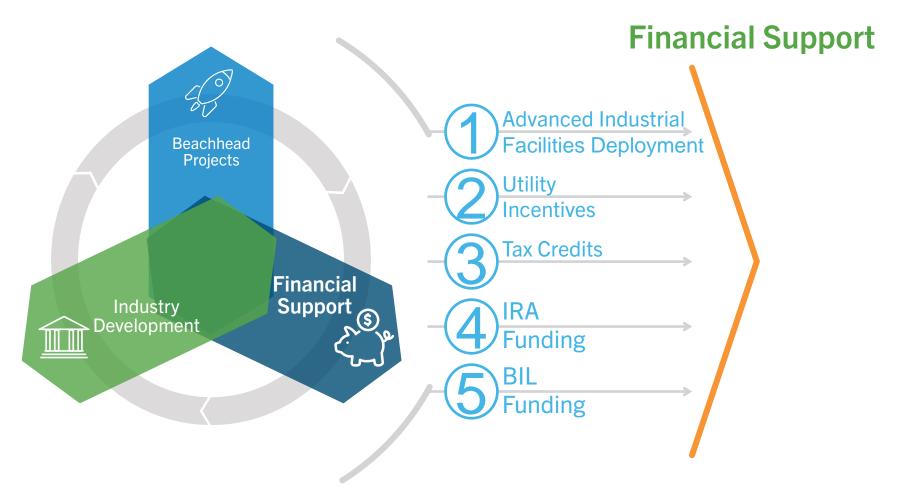


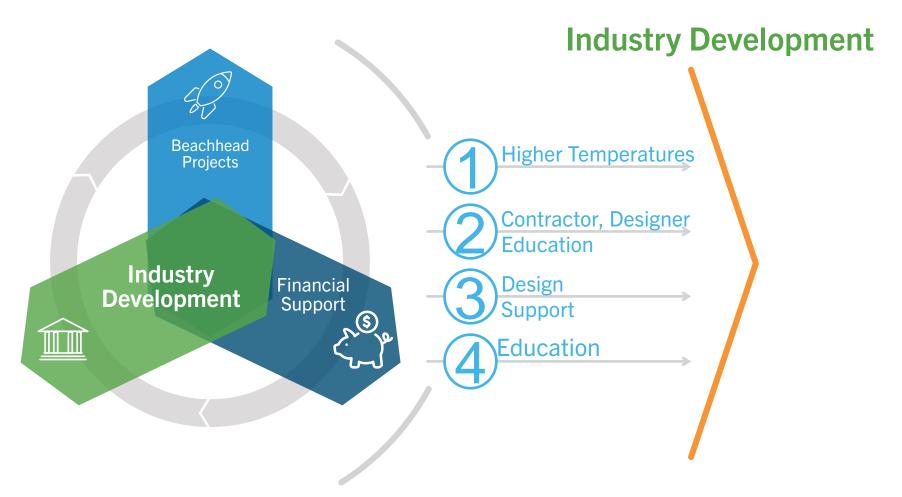
Just quoted IHPs on new plant design, dropped due to cost



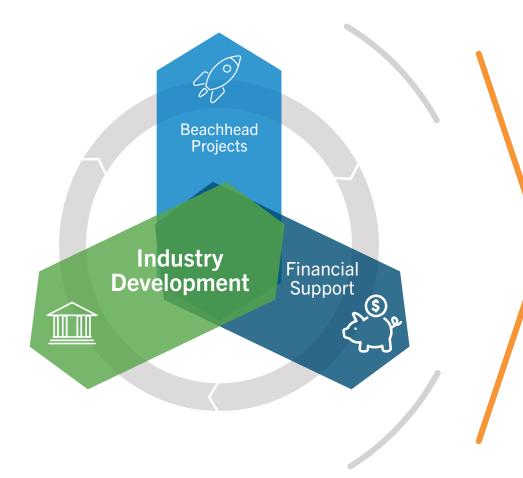












Goals

- ✓ Track record of success
- Changed perception of risk
- ✓ Financial support
- ✓ Industry support

Thank you.

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