

Staff Subcommittee on Gas

Sunday, February 9, 2020

Benefits of AMI



Gas

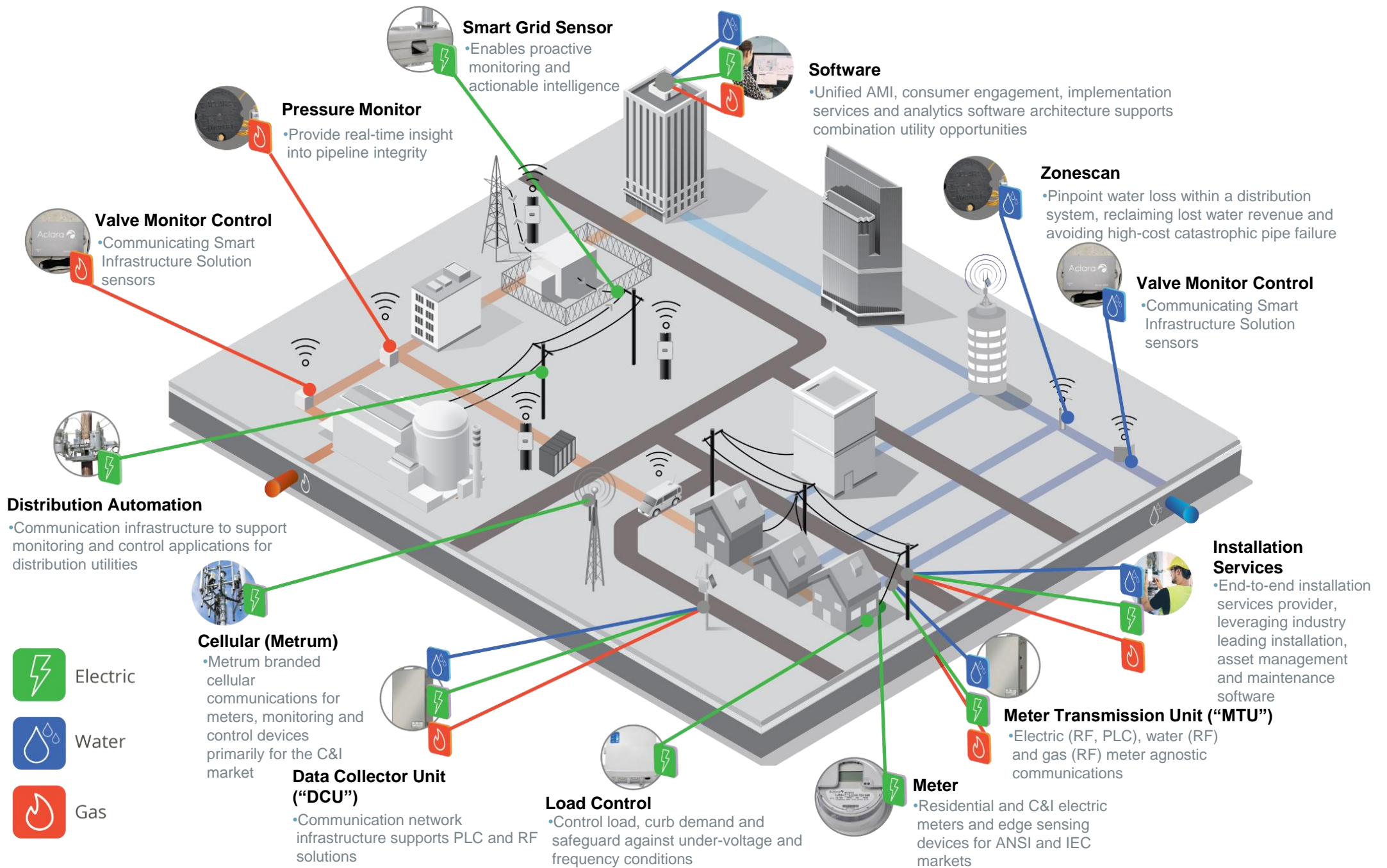


Water



Electric





Advanced Meter Infrastructure (AMI) Benefits

Move from monthly reads (12/yr) to hourly reads (8760/yr)

Hard Savings

- Meter reads
- Billing
- Field service
- Customer conservation

Soft Savings

- Safety
- Environmental

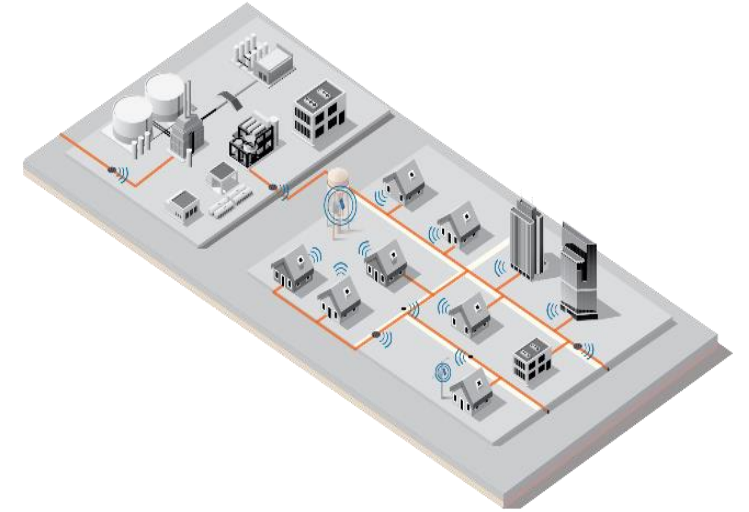
ADVANCED SOLUTIONS ENABLED



METHANE DETECTION



GAS PRESSURE MONITORING



OTHER GAS SENSORS

- Cathodic protection
- Valve state monitor
- Fiber optic intrusion

Questions

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Thermal Heat Pumps – RD&D Overview

Dan LeFevers - Director, State and Consumer Programs

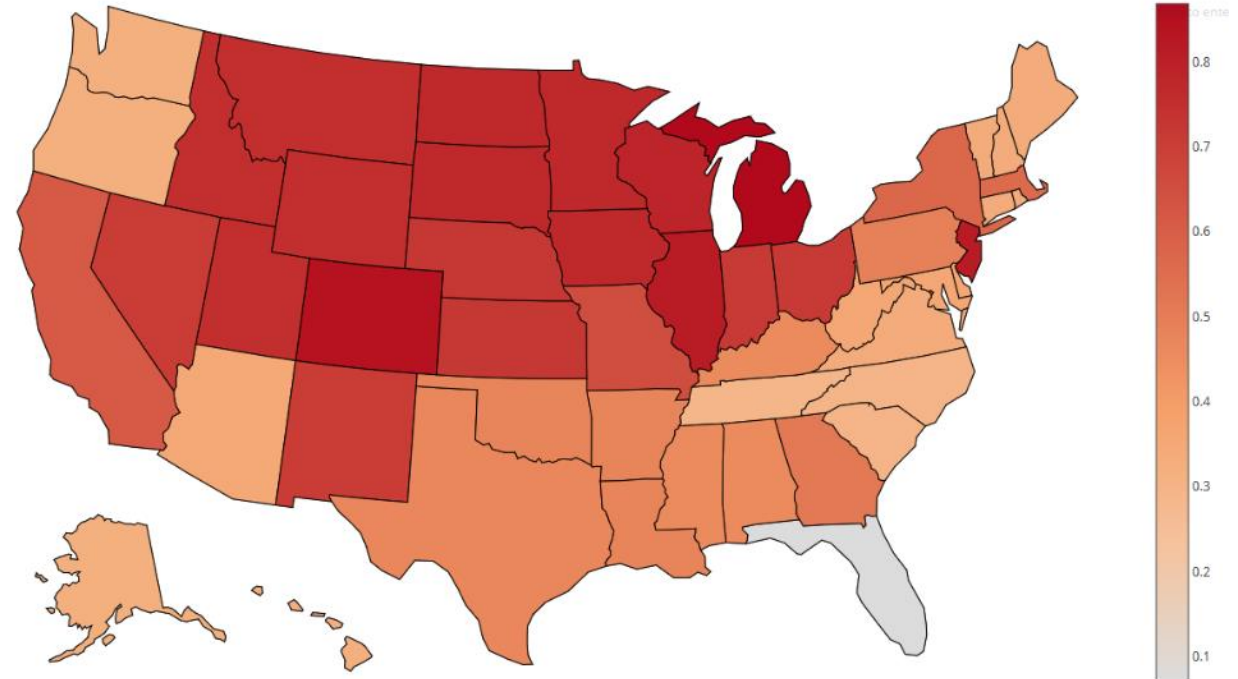
Natural Gas Subcommittee
NARUC Winter meeting 2-20

THPs - Motivation

- > 84% of gas in buildings for heating and service hot water (SHW)
 - 76 billion therms, 25% of national NG consumption
 - Responsible for ~10% of US CO2 emissions
- > Of the ~57% of U.S. homes with gas-fired heating/DHW:
 - For 85% of those with central furnaces, less than half have 90% AFUE or better
 - Only 5% of 4MM gas storage water heaters are 0.67 UEF or better (EnergyStar)

Potential: Cut emissions/energy consumption by **40% or greater** with retrofit, potential for peak load management in winter/summer

Fraction of Housing Units Heated with NG/Propane



¼ of U.S. Res. Gas Water Heaters in CA

>50% of space heating equipment in Midwest are >90%

5.6 million households receive financial assistance with heating costs (LIHEAP), need is greater

THPs - Motivation

Small-scale THPs, available overseas, have many advantages:

- > Best-in-class operating efficiency (primary basis)
- > Good part-load performance and in cold climates
- > Typically do not require backup heating and can continue operation during defrost
- > Opportunities for peak load management
- > Commonly use natural refrigerants/working fluids with low/no GWP/ODP
- > NOx and GHG emissions are decreased by half or greater and combustion 'sealed' or occurs outdoors (IAQ & venting)



THPs – GHG Reduction Potential

Near-Term
(25-50+%)

Expanded use of high-efficiency gas equipment



Hybrid natural gas furnace/boilers and electric heat pump systems



Building envelope improvements



Next-Gen
(40-60+%)

Natural gas heat pumps for space & water heating



Micro CHP systems



Deep building retrofits



Renewables
(Added 10-30%)

Renewable natural gas blends (biomethane)



Solar thermal/natural gas space & water heating systems



Lower Methane Emissions
(5-10%)

Reducing full fuel cycle natural gas methane emissions

THPs – Overview

- Summary of GTI THP Activities
 - Deployment of Gas Engine-driven HPs
 - Commercialization of Low-cost Gas Absorption HPs
 - Development of Next Generation THPs

Three Major THP Types

Vapor Compression

Sorption

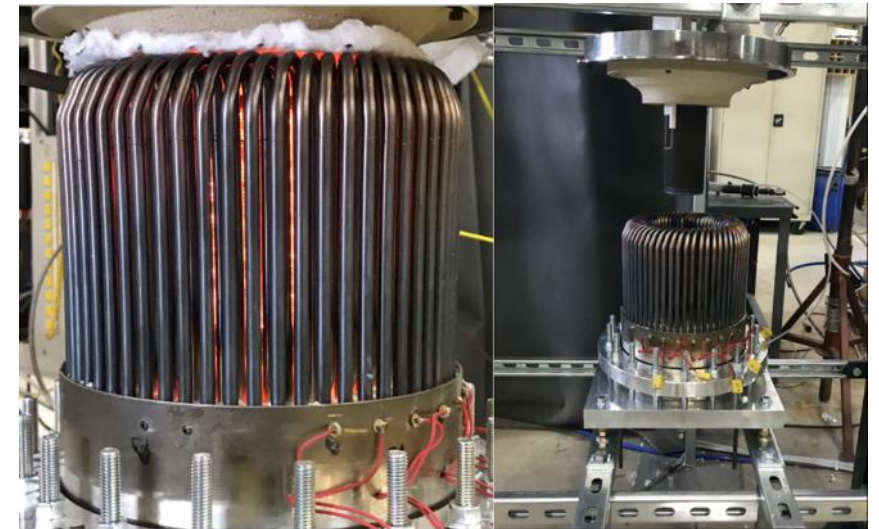
Thermal Compression



GEHP operating in Boise, ID

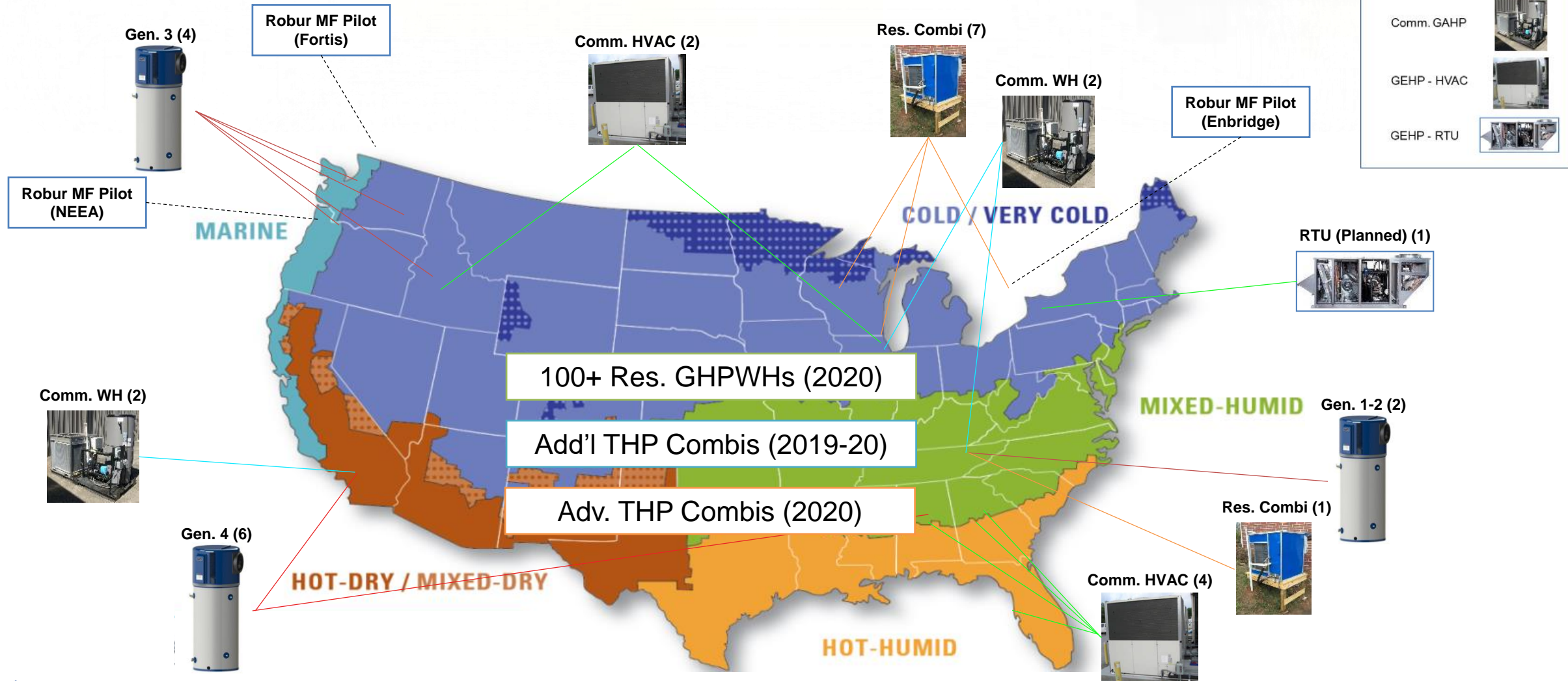


Gas HPWH operating in Los Angeles, CA



Hot HX Development for Next Generation GHP

THPs – Demos & Deployment



THPs – Industry Roadmap

- Special-Purpose Collaborative est. 2018
- Led by team of GTI + Brio Consulting
- 15 sponsors
- Technology and Market Assessment of:
 - Available or market-viable GHP products for space and water heating:
 - Residential and/or commercial applications
 - North American markets
 - Sold through standard supply chains
 - In two timeframes:
 - Near-term (<5 years)
 - Long-term (>5 years)



THPs – Industry Roadmap

THP Roadmap Overview:

Technical Assessment

- Technology/Theory Review
- GHP RD&D Catalogue, History
- Performance Comparison & SWOT by THP-type
- Barriers to Adoption

Market Assessment

- Overview of Market Participants →
- Defining Market Barriers, Risks, & Opportunities
- Review of LDC Collaboration Models

Issued 2019*

EE/Industry Partners



THP Developers



Manufacturers Interviewed to Gauge THP Interest



The new degree of comfort.™



GE APPLIANCES
a Haier company



And more....