



Affordability, Flexibility and Decarbonization Through Dual Fuel Technologies

October 7, 2026



Visit the event page



Department of Commerce, Division of Energy Resources - Mission and Strategic Priorities

Protect and assist
consumers

Oversight: 40+
industry areas

Engagement with all
communities

Protect the Public Interest

Trusted Resource

Reduce Economic Barriers

Climate Change Resilience

Strong, Competitive, Fair Marketplace

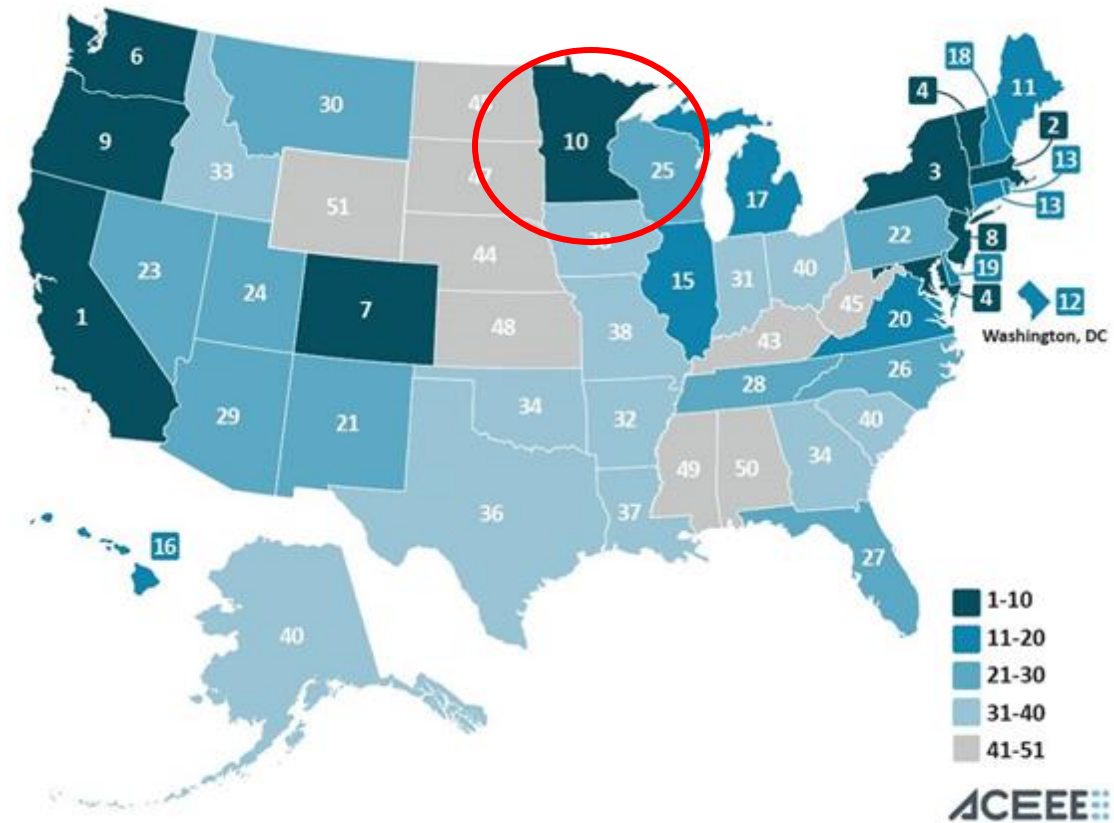
Minnesota Energy & Climate Efforts

Leading the transition to a clean, equitable, reliable, and affordable energy system

- 2040: 100% carbon free electricity
- 2050: net zero greenhouse gas emissions economy wide

Minnesota's Energy Conservation & Optimization Program (ECO)

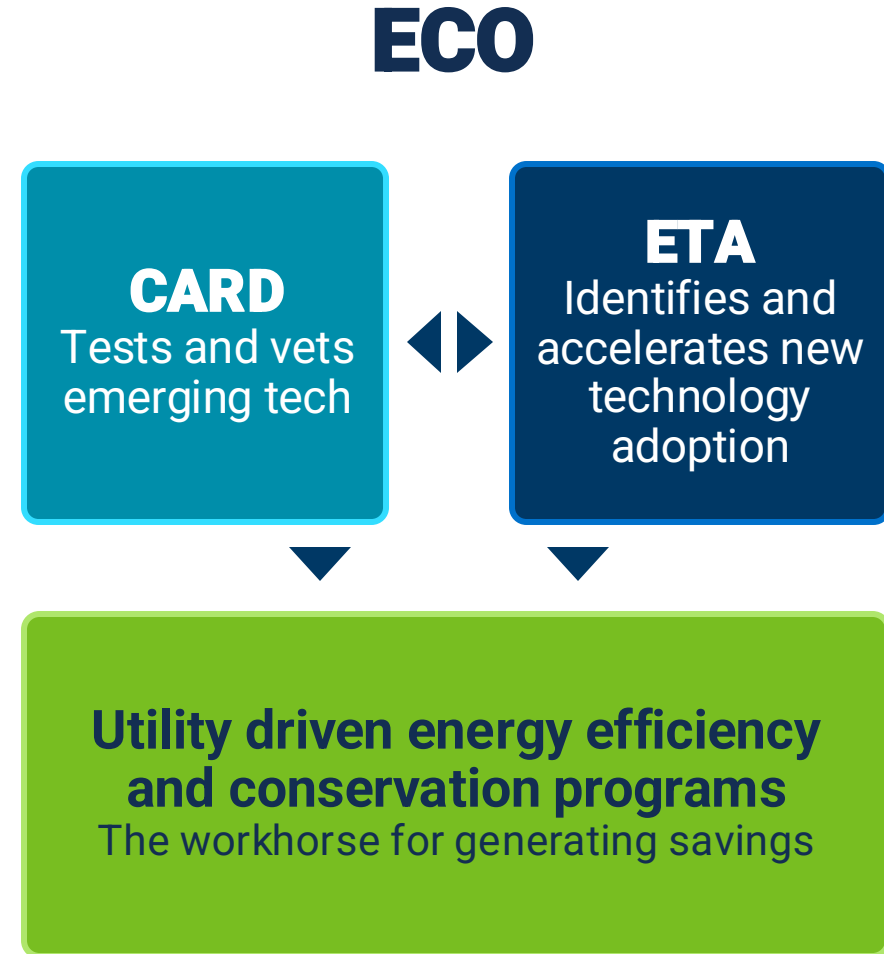
- Minnesota's Energy Efficiency Resource Standard
- ~120 electric and natural gas utilities required to participate
- Helped Minnesota achieve top 10 ranking in ACEEE state efficiency scorecard for over a decade



Role of ETA within ECO

Efficient Technology Accelerator (ETA)

- Enacted in 2021
- Launched in 2023
- Identifies promising emerging technologies and accelerates their adoption
- Boosts ECO performance over time



MN's Efficient Technology Accelerator (ETA)

Accelerating adoption of key energy efficient technologies and approaches, bringing benefits to all Minnesotans

A partnership of:

- Participating investor-owned utilities and consumer-owned utilities (funders)
- Minnesota Department of Commerce, Division of Energy Resources (administrator)
- Center for Energy and Environment (implementer)



Efficient Technology Accelerator Funders



ETA Initiatives



High-Performance Windows



Residential Air Source Heat Pumps



Next Gen Rooftop Units



Luminaire-Level Lighting Controls



Advancing Energy Codes



ETA Forum 2026

Affordability, Flexibility, and Decarbonization Through Dual Fuel Technologies

As Minnesota is preparing for unprecedented load growth alongside evolving decarbonization and efficiency goals, dual fuel and load-flexible technologies offer a powerful pathway forward.

Participants will walk away with:

- How dual fuel and load-flexible technologies can unlock system-wide benefits
- Minnesota-specific strategies and opportunities
- Emerging innovations from across North America
- Partnerships to advance collaborative solutions

Affordability, Flexibility, and Decarbonization Through Dual Fuel Technologies



2:10 – 2:30 p.m.

Keynote – Navigating the Moment: Electrification, Load Flexibility, and Affordability

John Taylor, Executive Director, Consortium for Energy Efficiency



2:30 – 2:50 p.m.

Perspectives from the Public Utilities Commission

Hwikwon Ham, Minnesota Public Utilities Commissioner



2:50 – 3:10 p.m.

A Look into Minnesota's Future – How Can We Meet the Moment?

Josh Quinnell, Ph.D., Senior Research Scientist, Center for Energy and Environment



3:10 – 3:30 p.m.

Closing the Gap: Dual Fuel and Load Flexibility in the Northwest

Becky Walker, Chief Program Officer, Northwest Energy Efficiency Alliance



3:30 – 3:50 p.m.

Énergir's Dual Fuel Model: Early Results from a Gas-Electric Partnership

Jerry Joseph, Executive Director, Énergir



Visit the event page for
agenda, bios, and resources

Housekeeping

- Reminder to silence cell phones
- No food or drink in auditorium
- Restrooms found immediately to the right upon exiting auditorium
- Lactation Room is room 217. The Lactation Room is key-code protected, please see event staff.
- Take breaks as needed
- This event will be photographed and recorded. If you have concerns, please speak with someone on staff.

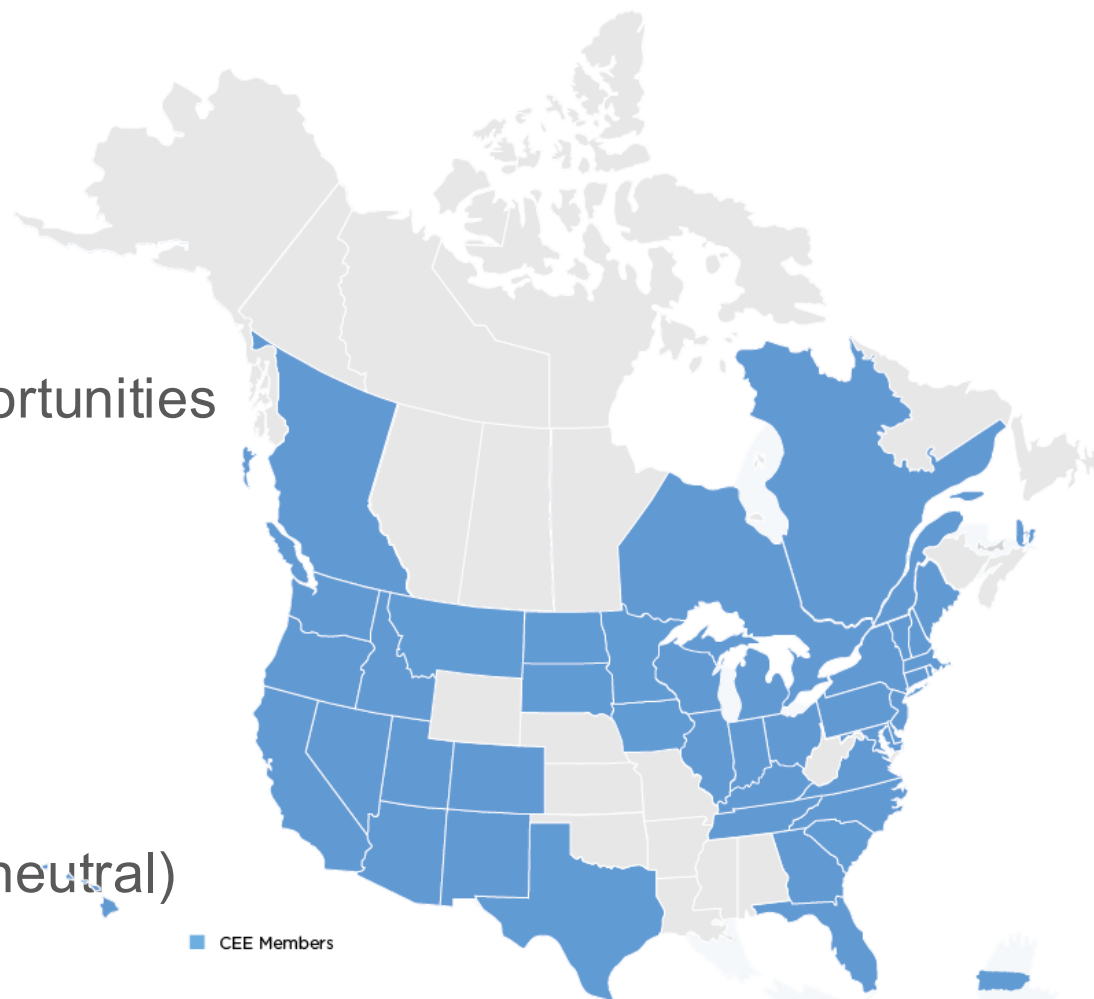
NAVIGATING THE MOMENT: ELECTRIFICATION, LOAD FLEXIBILITY, AND AFFORDABILITY

HIGHLIGHTS IN MARKET TRANSFORMATION

John Taylor
Executive Director
October 7th, 2026



- Founded in 1991
- Focused on shared member goals
 - Tackling binationally-significant barriers and opportunities
 - Facilitate utility leadership
- Representing the largest PAs
 - 65% of \$9.7 billion industry
 - 100M electric & 50M gas customer meters (fuel neutral)
- Governed by utility/administrator executives



WHERE ARE PROGRAM ADMINISTRATORS ALIGNED



Advance Energy Efficiency and Reduce Customer Bills



Decarbonize Buildings



Shape Electrification



Scale Capabilities for Automated Demand Response and Demand Flexibility



Strategic Scope:

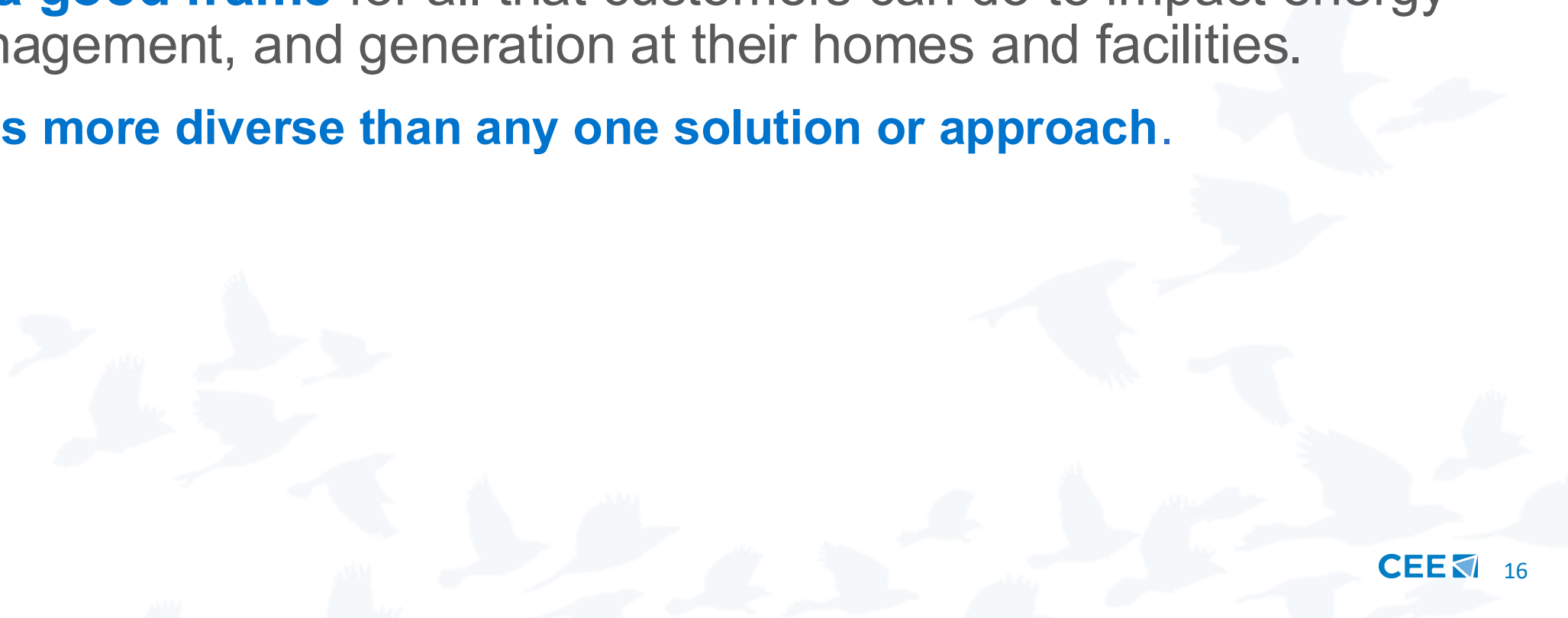
- Strategies for optimizing dual fuel system performance:
 - Lower consumer costs
 - Reduce carbon emissions
 - Increase grid benefits
 - Methods to reduce peak load impacts
- Utility cost savings and load management through TOU rates
- Coupling AHRI 1380 electric products with efficient gas systems

Technical Scope:

- Dual fuel system compatibility with existing heating systems
- Considerations specific to new and existing systems
- Various approaches to system sizing in a dual fuel scenario
- Design considerations for future equipment obsolescence
- Suggested controls, (e.g. switchover temperature)
- Considerations and differences in optimizing for comfort, efficiency, cost, and carbon



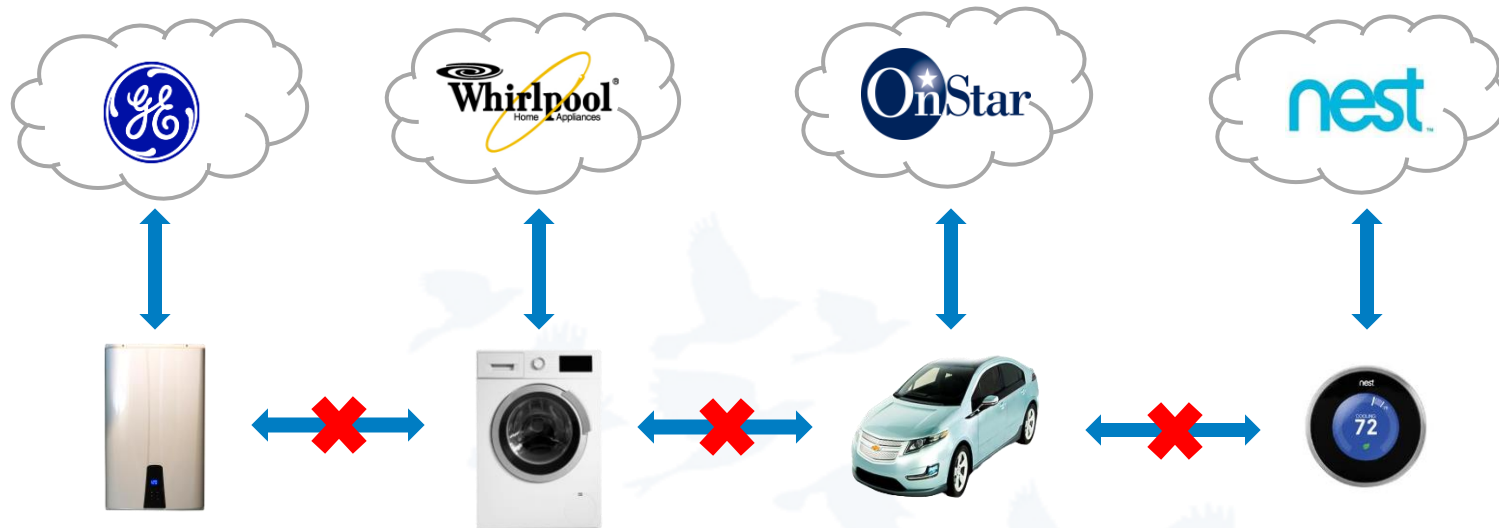
- Regulation, Policy, Funding, and Customer Need **do not always align**
 - Customer centric view is critical to achieving long-term objectives.
- IDSM is **a good frame** for all that customers can do to impact energy use, management, and generation at their homes and facilities.
 - IDSM **is more diverse than any one solution or approach.**



OPEN STANDARDS AND COORDINATION ACROSS INDUSTRIES IS ESSENTIAL

It will be difficult for most utilities to effectively manage demand response programs and maximize distribution-level optimization if doing so requires the utility to interface with multiple proprietary architectures (which may also lead to stranded or redundant systems resulting in higher costs for all customers)

- Duke Energy Managing Director and CEE Director



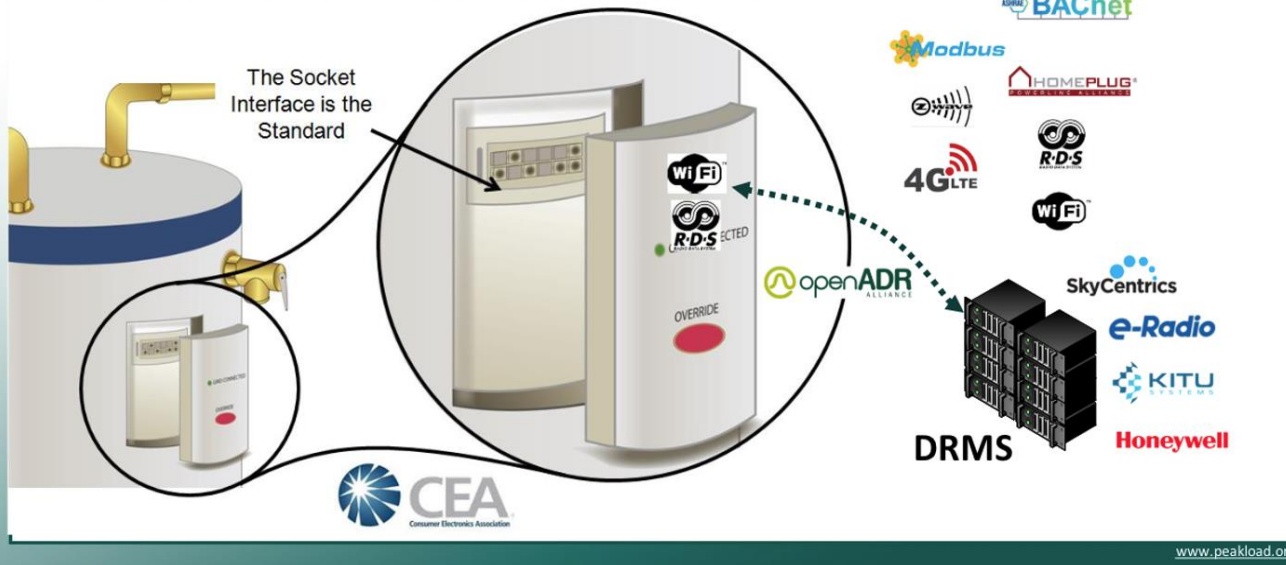
“Proprietary” architectures do not allow devices to easily “talk” with those from other brands. They also require customers and utilities to interact with multiple “clouds” or user interfaces.

EXAMPLE: AUTO-DR AND OPEN STANDARDS IN EFFICIENT HVAC



Direct Access to the Device

ANSI/CTA-2045 Modular Communication Interface Standard



www.peakload.org

CEE Directory of Efficient Equipment			
Search the CEE Tiers for efficient equipment for your home or business.	Commercial Boilers	Split or Packaged Heat Pumps	Split or Packaged Air Conditioners
	Residential Furnaces	Variable Speed Mini-Split and Multi-Split Heat Pumps	Variable Speed Mini-Split and Multi-Split Air Conditioners
	Residential Boilers	Residential Water Heaters	Commercial Water Heaters

Home
Find an Incentive Program
Why Choose ENERGY STAR
How and Why of Certified



CEE

AHRI CERTIFIED

www.ahri-certified.org

HP Search

Mostly

Expert

Double click on a row to view the AHRI certificate.

AHRI certificates are not available for Chiller AC and HP equipment.

Customer Indoor Coil Air Quantity is used for standard rating purposes only. Actual values may vary depending on the installation. Please refer to the manufacturer's installation instructions for proper setting of indoor coil air quantity.

Model Status of 'Active' means models are currently in production. 'Discontinued' means that the manufacturer has elected to stop producing, get stock is still available. 'Obsolete' means that the manufacturer is required to stop manufacturing due to a test failure in the AHRI Certification Program.

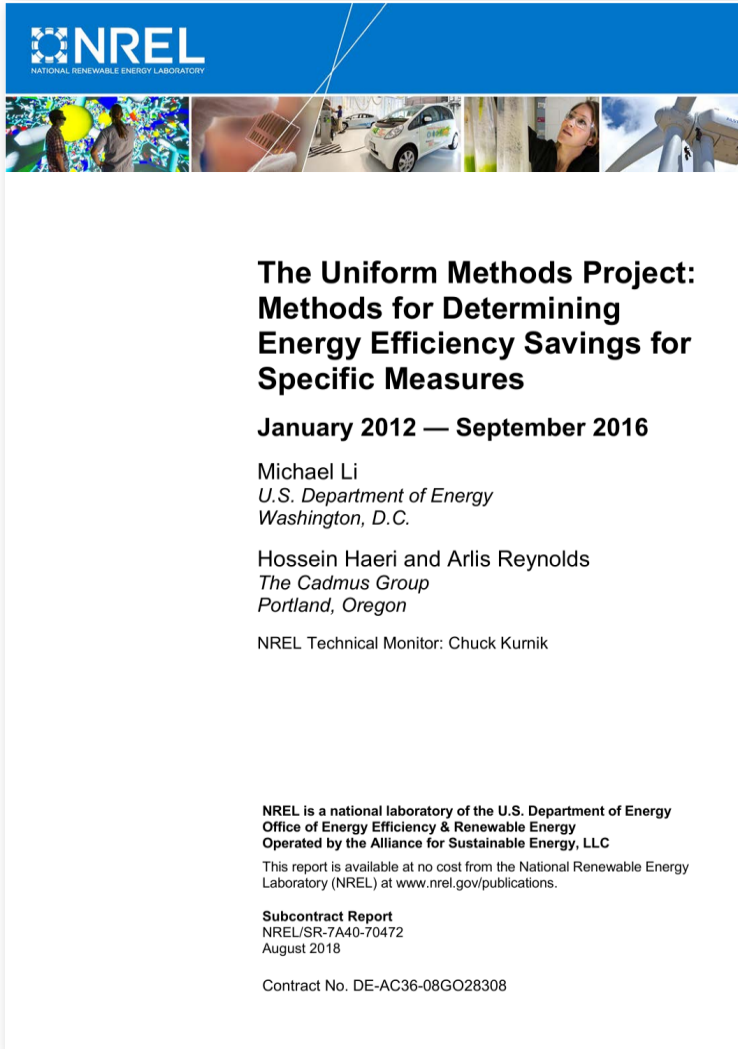
AHRI Certified Model #	Model Status	Manufacturer Type	Trade/Brand Name	Outdoor Unit		Indoor Unit		Furnace Model	Cooling		High Heating 47°F		Low Heating 17°F		CEE Tier	AHRI Type	Labelled ENERGY STAR
				Manufacturer	Model	Manufacturer (See Notes)	Model		Capacity (Btu/h)	SEER	Capacity (Btu/h)	HSPF	Capacity (Btu/h)	Capacity (Btu/h)			
5549187	Active	OEM	AAON	AAON, INC.	CB5024-107B		F18024-1***0000000**		26000	13.05	16.00	26000	9.30	15300	CEE Tier 2	VRCL	-
5549188	Active	OEM	AAON	AAON, INC.	CB5024-107B		F18036-1***0000000**		36000	12.00	15.25	37200	9.60	23400	CEE Tier 0	VRCL	-
7218971	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7219006	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7220376	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7220402	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7217713	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218234	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218765	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218842	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218955	Discontinued	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218718	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218269	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7218714	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-
7219020	Active	OEM	AC PRO	AC PRO	J148E-018KA		C78A-HMM24HC-U-A		18000	12.50	15.00	18000	8.50	9700	CEE Tier 1	VRCL	-

DIVERSE FUNDING PATHWAYS, PROGRAMS, INCENTIVES, REGULATION, BUSINESS CASES

Stand Alone Filing	REV Demonstrations	Rate Cases	Energy Efficiency Investment Plans	External Funding	Market or Supply Funding
• Allows for recovery of Capex and Opex for specific initiative with a guaranteed on return assets and in some cases financial incentives tight to performance. • This filings are above and beyond what's in the rate cases.	• Currently only available in NY and allows for up to 0.5% of revenue to be invested in innovation projects. • This allows for recovery of all incremental cost (Capex and Opex) and provides small financial incentives (beyond return on assets).	• These are projects funded through the rate base. • This allows for recovery on all incremental costs without additional incentives in most cases. • These are proposals developed that get included above and beyond base rev. requirement	• These are projects, studies, or demonstrations funded through the EE programs. • This allows for recovery on all incremental costs • If idea contributes to the cost-effective Portfolio goals then shareholder incentive can be earned.	• These are projects that are fully or partially funded by external organizations such as DOE, DOT, DOER, NYSERDA and others. • Tend only to cover certain expenses of the projects.	• Regulations require certain percentages of ratepayer support through base supply rates • RGGI • RPS/APS/CPS • SRECI/II/SMART

Source: NGRID/MassSaves Program

BETTER TREATMENT OF IMPACTS (ESPECIALLY PEAK DEMAND)

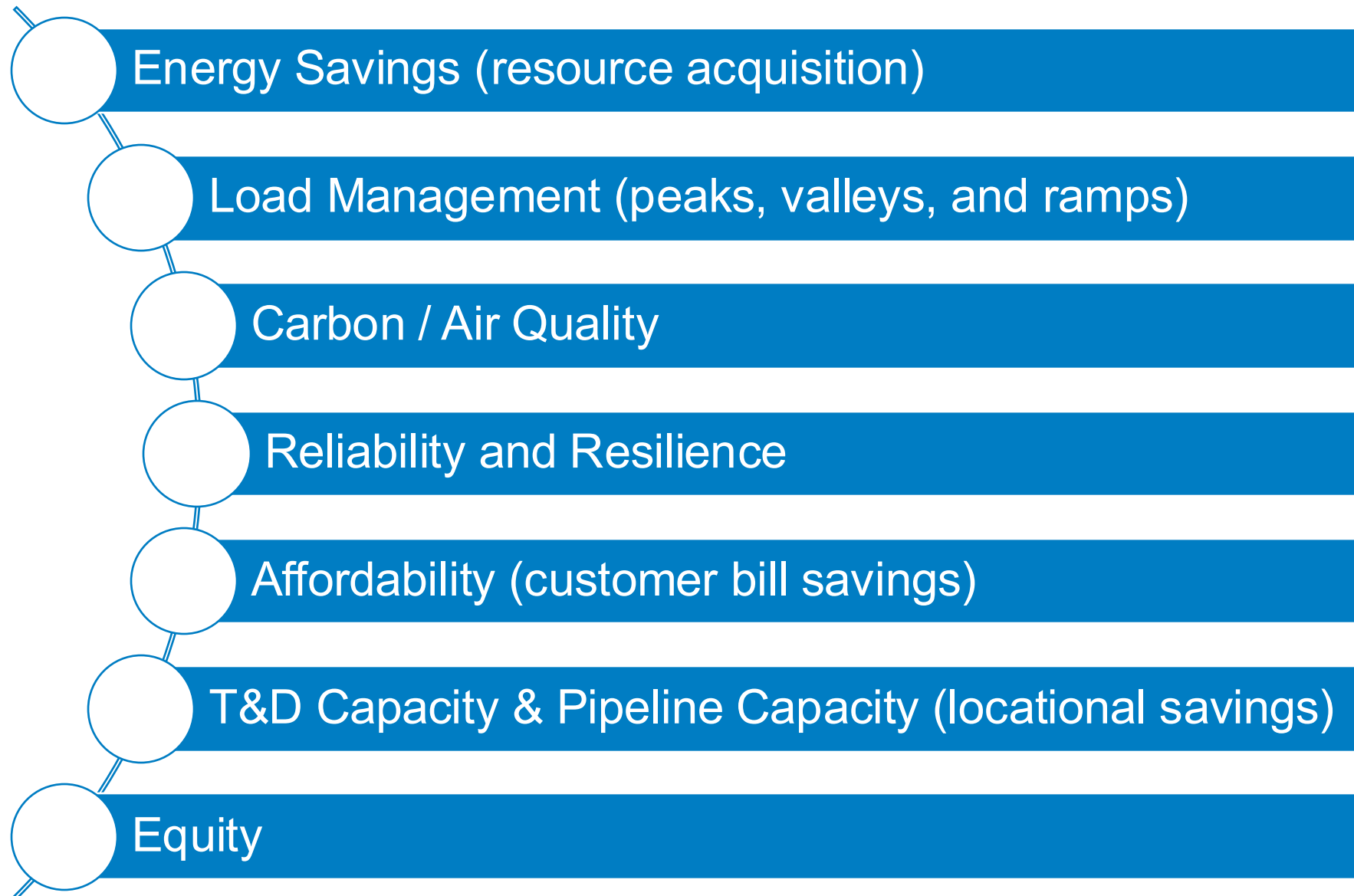


Advancing Valuation Standards at the National Level

Technical Advisory Committee Scope

- Accurately characterize kW benefits of traditional kWh measures
- **Move towards valuation of embedded capability (automated DR)**
- **Address bulk vs. distribution system peaks**

NEW METRICS AND THE INTEGRATED-DSM VALUE STACK



MARKET INFRASTRUCTURE AND ALIGNMENT

ACSmith.

Carrier LENNOX

Manufacturers

ARISTON Rheem

DAIKIN



NARUC
National Association of
Regulatory Utility Commissioners

Regulators &
Evaluators

RESNET[®]
RESIDENTIAL ENERGY SERVICES NETWORK

Standard Setting
Bodies

ASHRAE AHRI



U.S. DEPARTMENT OF
ENERGY

Federal/State/Pr
ovincial
Government



ACCA[®]
Air Conditioning Contractors of America

Retailers &
Installers



CEE

THANK YOU

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Executive Director

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Flexible Heating Pathways: Gas-Electric Coordination, Thermal Networks, and Equitable Decarbonization in Minnesota

Hwikwon Ham

Commissioner, Minnesota Public Utilities Commission

Disclaimer

The views and opinions expressed in this presentation are those of the presenter and do not necessarily reflect the official policy or position of the Minnesota Public Utilities Commission.

Minnesota's Changing Energy Landscape

- **Statutory Clean Energy Mandate:** 100% carbon-free electricity by 2040, with binding interim benchmarks of 80% by 2030 and 90% by 2035.
- **Unprecedented Load Growth:** Accelerating regional electricity demand driven by large data center interconnections, industrial electrification, and transportation.
- **Cold-Climate Space Heating:** Minnesota peak winter thermal delivery demand exceeds peak summer electric delivery capacity by more than 2x to 4x.
- **Core Regulatory Question:** Can dual-fuel and load-flexible technologies maintain reliability and affordability without massive electric grid overbuilding?

Cold-Climate Decarbonization via Dual-Fuel

⚠️ All-Electric Resistance Risks

- **Winter Peak Penalty:** Electric resistance auxiliary heat spikes demand during extreme sub-zero polar vortex events.
- **Transformer Overloads:** Local distribution circuits and neighborhood substations face severe winter capacity strain.
- **Generation Gaps:** Peak space heating demand coincides with winter lulls when regional solar and wind factors drop.

✅ Hybrid Dual-Fuel Solution

- **80%–90% Clean Hours:** Efficient cold-climate heat pumps carry bulk heating hours at high efficiency (COP 2.0–3.0).
- **Automated Switching:** Smart thermostats shift peak heating load to stored fuel or backup during severe sub-zero cold.
- **Resilient Winter Grid:** Preserves home warmth while avoiding billions in capital expenditures for peak grid capacity.

Gas-Electric Coordination & Joint Planning

Operational Interdependence

- MISO gas-fired electric generation relies heavily on pipeline firm deliverability during severe winter cold snaps.
- Dual-fuel switching relieves electric transmission lines, requiring proactive coordination with gas distribution utilities.
- Coordinated operational communications maintain essential system line-pack integrity across regional networks.

Integrated Regulatory Framework

- Gas distribution networks serve as seasonal thermal storage buffers that preserve system-wide energy reliability.
- Aligning Integrated Resource Plans (IRPs) with Natural Gas Innovation Act (NGIA) dockets under Minn. Stat. § 216B.2427.
- Joint electric-gas infrastructure modeling eliminates redundant and stranded capital investments across utilities.

Equity & Ratepayer Impact on Nonparticipants

- **The Gas Fixed-Cost Dilemma:** As high-income customers fully electrify, remaining pipeline fixed safety and operating costs are concentrated on fewer ratepayers.
- **Vulnerable Household Burden:** Nonparticipants—predominantly low-to-moderate-income (LMI) renters—face escalating per-therm gas rates without the capital to electrify.
- **Electric System Cost-Shifting:** Unmanaged peak electric heating requires expensive substation and feeder expansions socialized across all electric customers.

What Can Be the Backup Fuel?

Backup Option	Cold Reliability	Infrastructure Model	Decarbonization Role
Thermal Networks & Geothermal	Very High	Shared ambient-temperature ground loops & district loops	Eliminates sub-zero COP penalties; delivers zero-combustion thermal backup.
Industrial Recovered Heat	Continuous	Flue gas / cooling water capture piped to district thermal loops	Repurposes wasted industrial heat for community space heating during winter peaks.
Renewable & Natural Gas	Very High	Existing pipeline networks	Preserves seasonal fuel switching buffer for extreme polar vortex events.
Delivered Clean Biofuels	High (On-site storage)	On-site tanks for rural cooperatives & off-gas systems	Relieves winter electric feeders without requiring pipeline buildouts.

Minnesota Industrial Decarbonization

Essential Pillar of MN Decarbonization

- **Larger Share of Emissions:** In Minnesota, industrial gas use generates more GHG emissions than residential or commercial gas end uses.
- **Integral to 2050 Net-Zero:** Achieving Minnesota's statutory net-zero target requires tackling high-heat industrial process loads.

Anchor Tenant & Waste Heat Synergy

- **Anchor Tenant:** Ag-processing and food manufacturing provide continuous baseload demand for district geothermal loops.
- **Recovered Heat Source:** Industrial cooling loops and exhaust export thermal energy directly into neighborhood Thermal Energy Networks (TENs).
- **Statutory Pathways:** Expanding NGIA pilots (Minn. Stat. § 216B.2427) and ECO Act programs to capture industrial heat synergies.

Thank You

Hwikwon Ham

Commissioner

Minnesota Public Utilities Commission



A Look Into Minnesota's Future

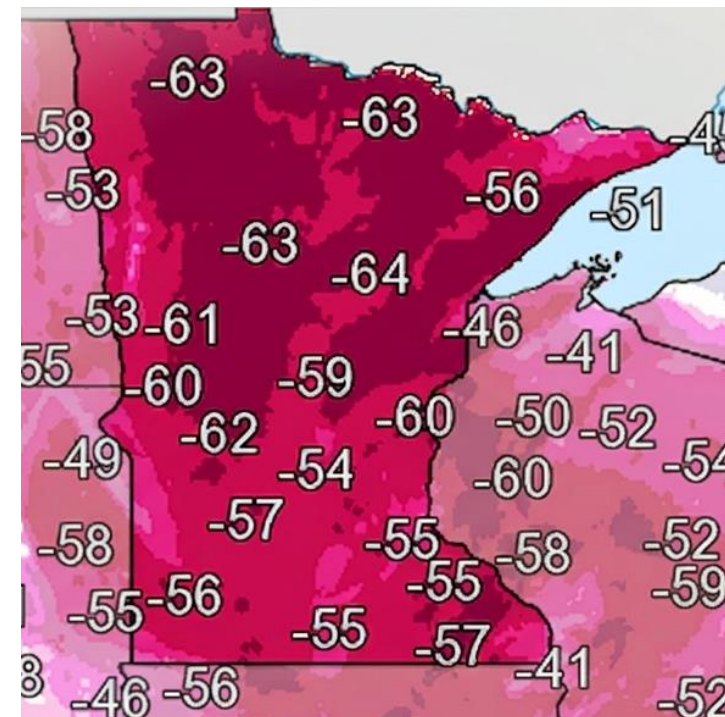
How Can We Meet the Moment?

Josh Quinnell, Ph.D. | Center for Energy and Environment



Jan 30th 2019: A peak story

- 2-days below the 99.6% design temperature
 - MN grid ~10 GW
 - ~1.5 million single family homes with fossil heat
 - And they were mostly still cycling
 - Right sized units should nonstop and miss setpoint
- A future with 1.5m heat pumps
- Winter peak jumps +16GW to ~26 GW
 - ~2X current summer peak
 - No other new load contributions



National Weather Service, Jan 30 2019 5AM CST

What's it take to meet peak

Oversized furnaces meet cold snap peaks; ccASHPs collapse that free margin into coincident electric load

	What it takes	Peak it removes	Unserved peak	Failure
STAY ON GAS	nothing	no new peak	–	Effectively abandons emission goals
STORAGE cover the 2-day event	~30 batteries per home	13 GW	–	Preposterous
STORAGE shave 30% off design day	2 batteries per home	3 GW	7 GW	Doubles equipment cost to meet peak, doesn't resolve problem
WEATHERIZE everything	10–30 % of design heating load	1 – 5 GW	8 – 12 GW	~Order of magnitude too small
BUILD IT and serve the peak	14 GW of firm new capacity, extensive distribution & transmission upgrades	–	–	<4% fleet capacity factor (0.6-22%)

A ccASHP powered by a gas turbine at design load produces (20-120%) more emissions than an 80% furnace

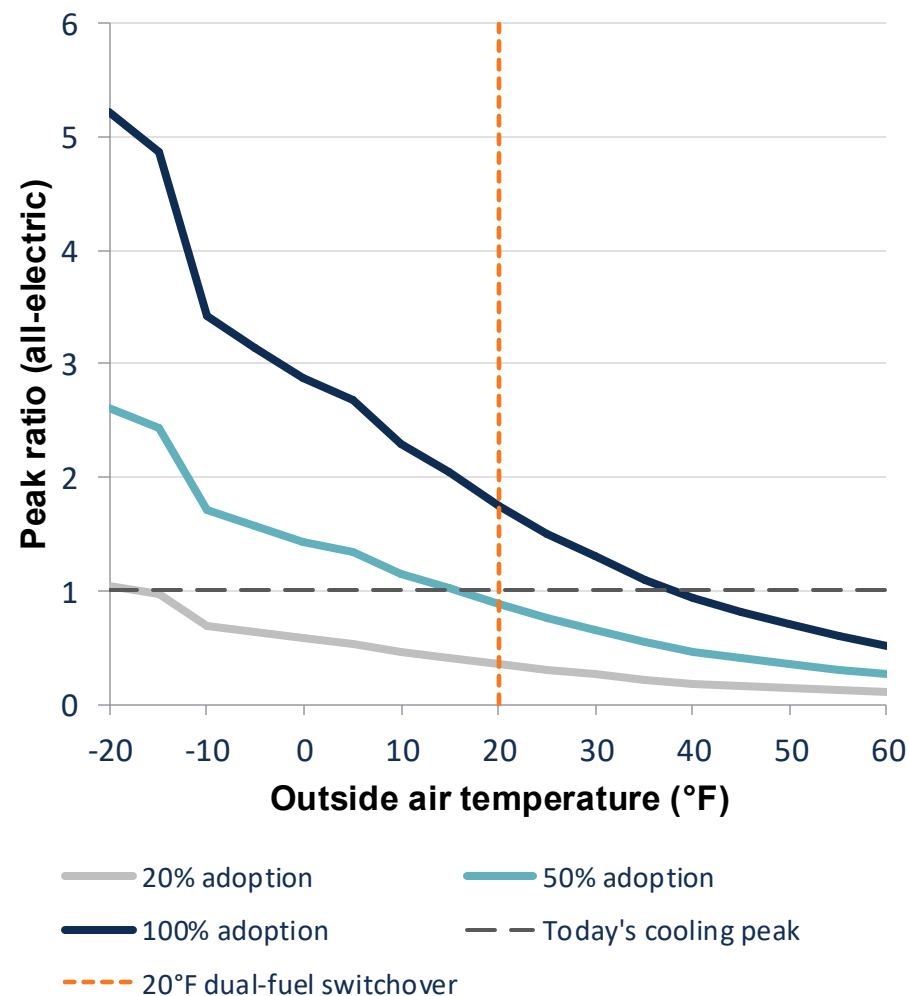


**The best way to decarbonize heating in
Minnesota is to keep some gas.**



Switchover sets the peak we're ready to meet

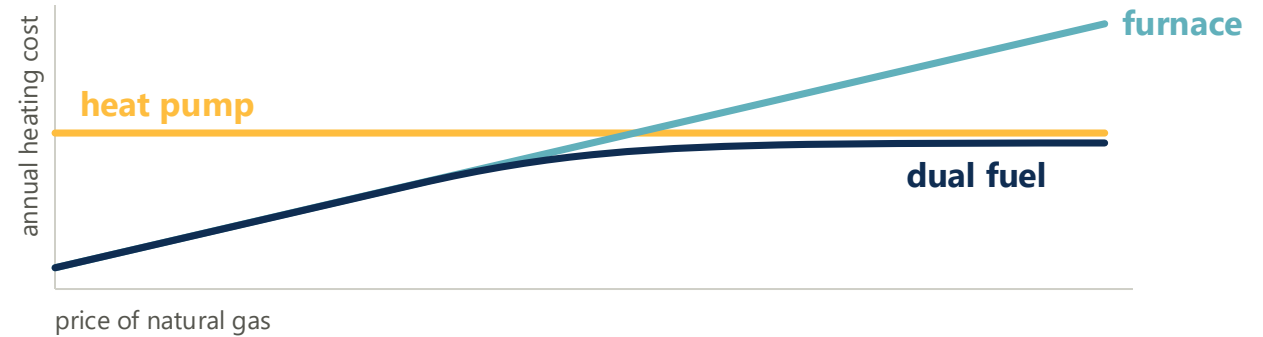
- The switchover temperature is a software decision
- This is ground zero for setting the time, frequency and magnitudes of winter peak
- Crucially, we can use it directly or representationally to dynamically manipulate winter peaks



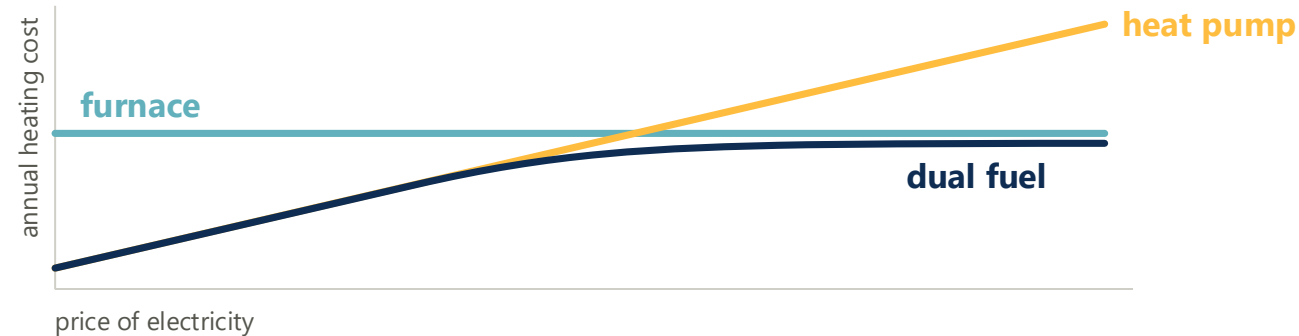
Dual fuel hedges an unknown spark gap

- Shaves winter peak, lowers emissions against both gas-only and all-electric on today's grid, and delivers the lower operating cost
- Customer gets the lower of the two energy costs without requiring a correct price forecast

If natural gas gets expensive

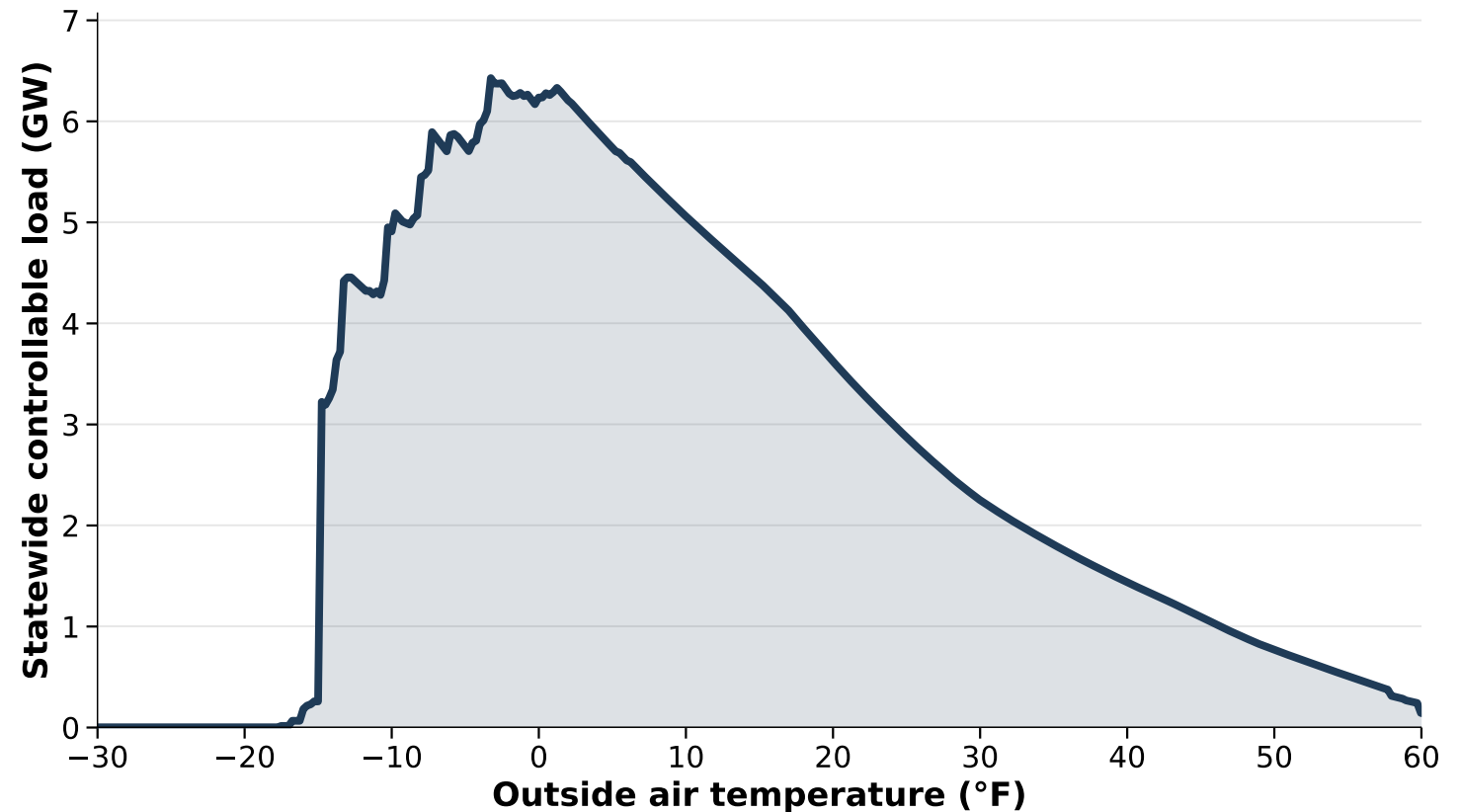


If electricity gets expensive



Peak Avoidance, Customer Hedge, and DR?

- Static switchover mitigates the peak, but dispatchable switchover provides a resource
- DR resources usually exhaust a “budget” that caps frequency and duration
- Dual fuel heat pumps don’t have that kind of budget; comfort is uninterrupted



MN has world class DR resources



- 27+ yr dual fuel program
- Dispatched DF resource at **>300MW** during the Jan 2019 event



- Restructured residential dual fuel rates into two tiers
- Recently activated **dozens of times** for **hundreds of hours**



- Long standing DLC AC cycling program
- Growing **smart thermostat** based peak control

Dual fuel isn't backsliding

➤ Lower Emissions

- Today cold weather grid emissions are higher than can be overcome by heat pump efficiency
- Through 2040 if new winter peaks cannot be met by solar and wind

➤ Lower Costs

- Today dual fuel systems are generally cheaper to operate than all electric heat pumps
- Through 2040 they can uniquely hedge against a changing spark gap

➤ Reliability

- Dual fuel systems retain the cheap and invisible benefits of oversized fossil fuel heating systems

The downside is capped at high AFUE furnace for *N* high emission/cost marginal hours while the upside continues to get better as we build the grid to support it.



We do not have to know who is right to start.





Thank You!

Josh Quinnell, Ph.D.
Senior Research Scientist
Center for Energy and Environment
jquinnell@mncee.org





Closing the Gap: Dual Fuel and Load Flexibility in the Northwest

Becky Walker

Chief Program Officer, NEEA

Date 2026





The Northwest Energy Efficiency Alliance



14.5 million energy consumers



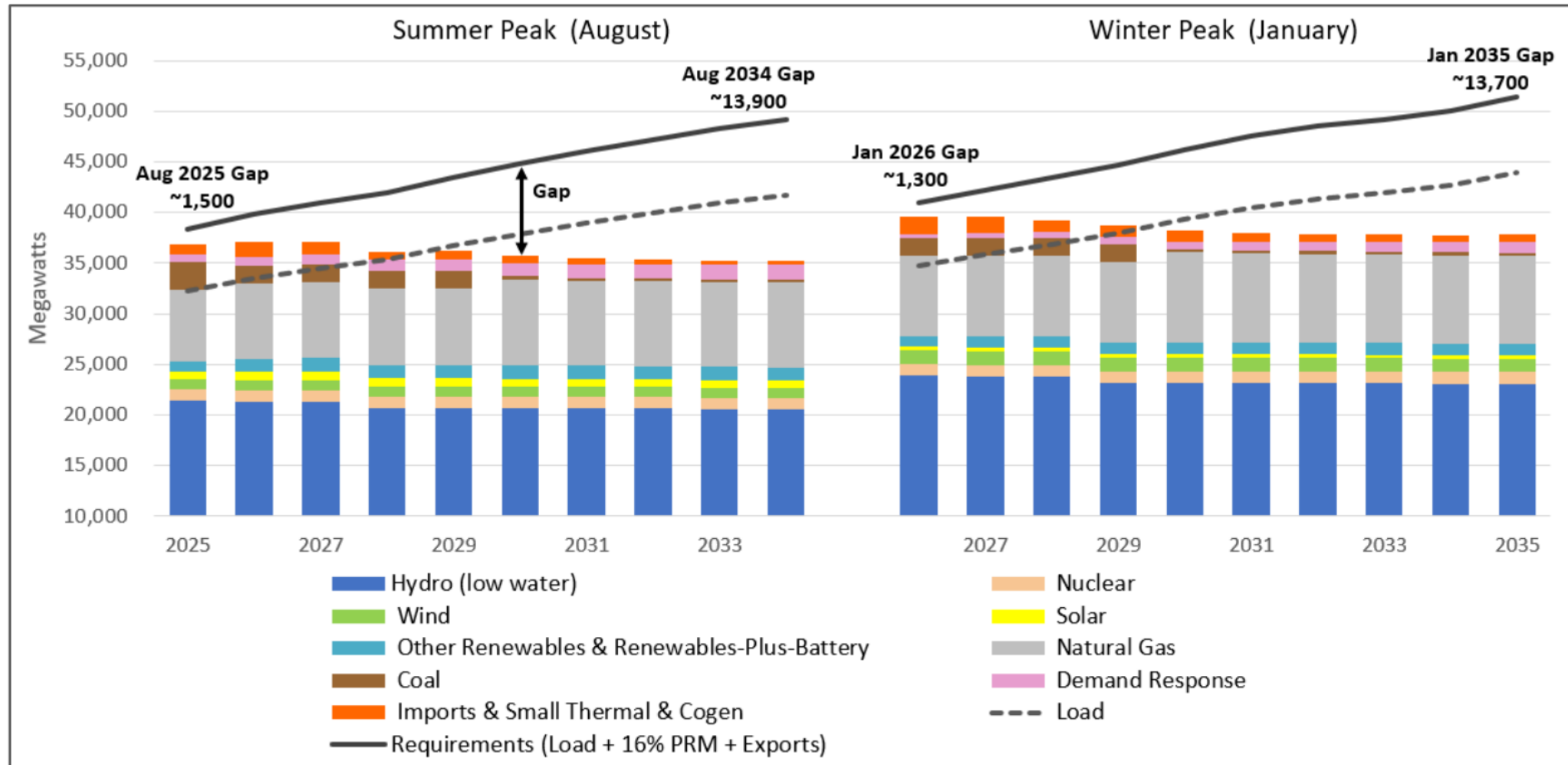
Electrification and Decarbonization Are Reshaping the Northwest Grid

Impacts + Opportunities





Northwest Challenge: Gap widening between resources and loads



Source: [2025-PNUCC-Northwest-Regional-Forecast-final.pdf](#)

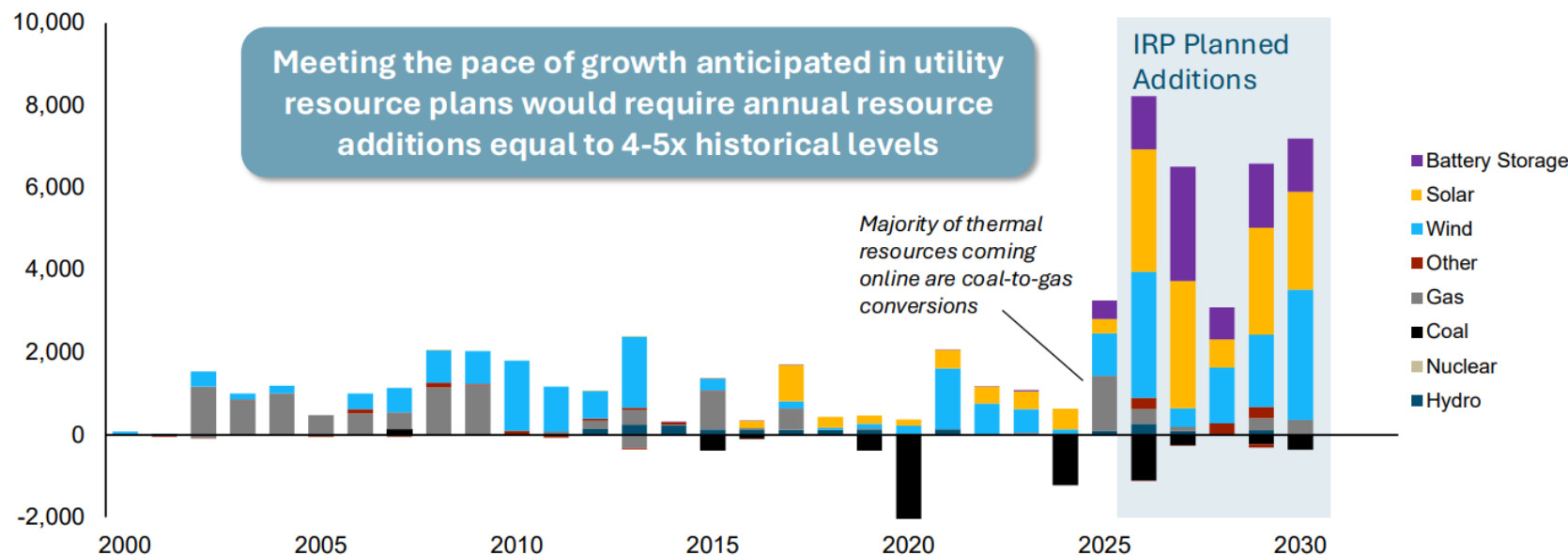


Northwest Challenge: How much can we build?

Planned additions would meet need through 2030, but require an unprecedented pace of resource development

Retirements and New Installed Capacity Additions by Year

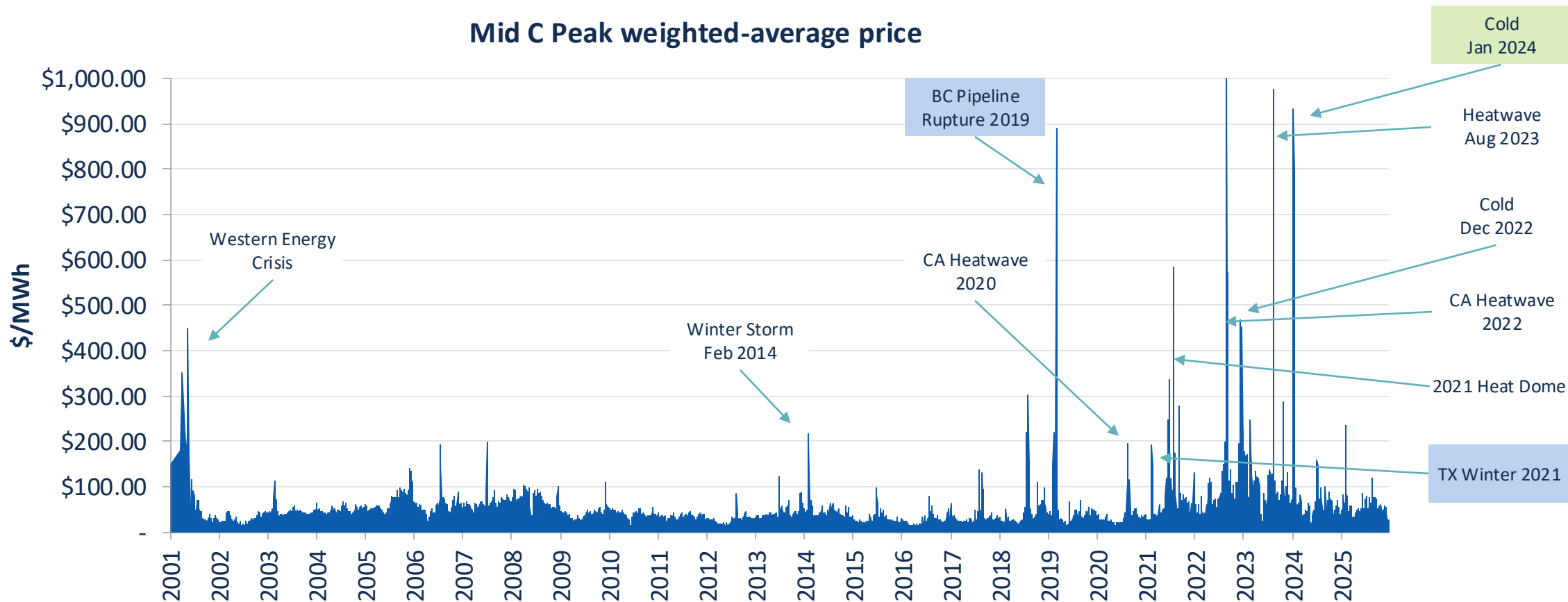
Annual Additions (Nameplate MW)
Greater NW





Northwest Challenge: The economic consequences are significant

Historical View, Northwest Wholesale Power Markets



Jan 2024 Cold Snap event cost NW Utilities ~ \$500 Million *for four days*

Implications for Demand-Side Resources

- **Energy efficiency** investment is foundational
- **Dual-fuel** heating can significantly reduce resource adequacy needs
- **Load flexibility** is needed at scale
- **Affordability** is critical

Expanding Focus:
Load Flexibility
Dual Fuel



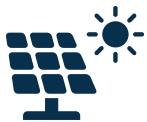
Load Flex Value Streams



Reduced peak pricing
and price variability



Meet resource
adequacy requirements



Renewable resources
integration



Lower operating costs



Reduced reliance on
emitting resources



Non-wires alternative
and T&D life extension



Improved grid reliability



Revenue opportunities
through arbitrage



Load Flex Focus Areas

Making the Business Case

Demonstrating a clear and consistent business case for utility investment through establishment of grid-value benefits and delivery of cost-effective solutions.

Increasing Product Availability

Driving broad market availability of connectable technologies that respond to utility-grid needs in a predictable and consistent manner.

Ensuring Connectability

Ensuring utilities have secure, reliable access to connected technologies through deployment of non-proprietary, open standards.

Valuing and Measuring

Developing robust datasets and analysis, resource planning inputs, and evaluation and value metrics that can be tailored to each funding utility.

Testing and Refining

Investigating several potential Market Transformation programs and prioritizing those of highest value for advancement.

Scaling and Adapting

Bringing scale to utility load-flex programs by codifying best practices and providing tools to support market awareness, recruitment and ongoing engagement.



Load Flex Program Concepts

Residential

Storage Water Heaters

HVAC

Batteries

Electric Vehicles

Multi-family

Central HPWH
(also Commercial)

C&I

Small/Med Commercial
LLC + HVAC

Med/Large Commercial
EE + Load Flex

Evolve codes, standards, and voluntary standards



Dual-Fuel Benefits



Increased energy efficiency



Support decarbonization goals



Lower operating costs



Improve customer resiliency to energy costs



Improve resource adequacy



Provide load flexibility



Improved grid reliability

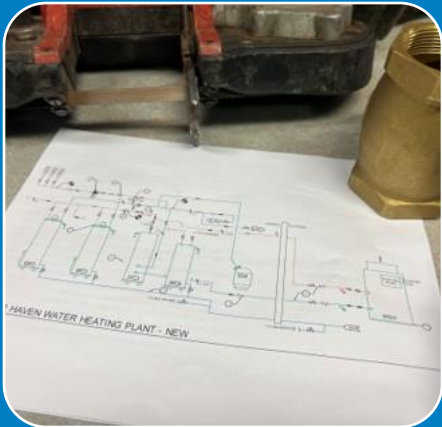


Dual-Fuel Program Activities



Residential HVAC

- Equipment: furnace + HP or integrated systems
- Key issues: sizing, switchover temp, controls, installation
- **Pilot with Clark PUD & NW Natural**



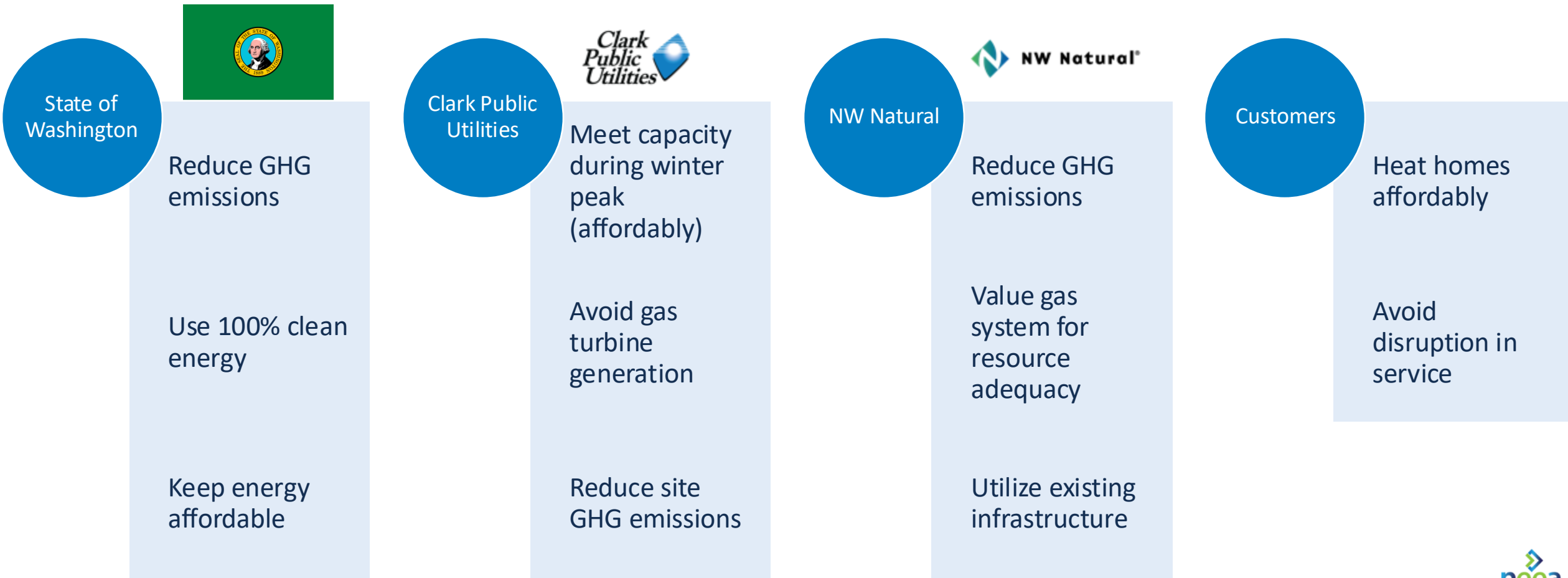
Commercial Water Heating

- Equipment: adding HPs to boiler systems
- Key issues: sizing, configuration, controls optimization
- Field tests ongoing

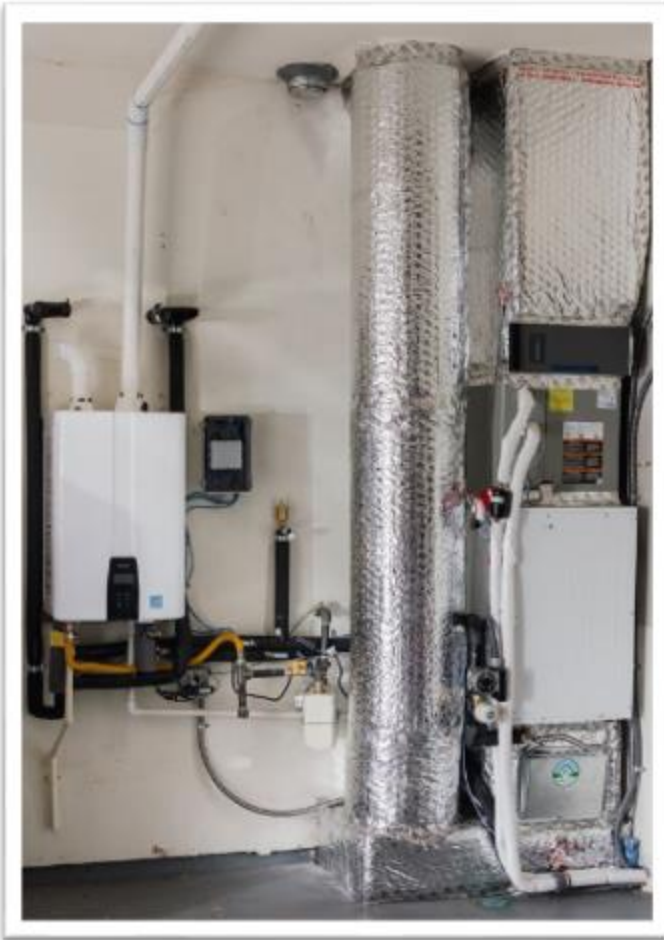


Bringing It All Together: Dual-Fuel & Load Flex Pilot

- How can we balance all our needs?



Dual-Fuel & Load Flex Pilot



Hydronic air handler + gas tankless water heater + electric air source heat pump + remote controls



Bringing It All Together: Dual-fuel and load flex pilot





Key Takeaways from the NW

- Growing loads, electrification and decarbonization are putting **significant stress** on legacy grid infrastructure
- ***Coordinated gas/electric*** planning, collaboration is essential for affordability and reliability
- ***Hot water and space heating*** choices directly affect winter peaks and infrastructure costs.
- ***Dual-fuel and load-flexible technologies*** can reduce system stress, support reliability, and enable decarbonization

Thank You!





Énergir's Dual-Fuel Model

Jerry Joseph, Executive Director - Geothermal and Customer Relations
October 7, 2026



Our Energies are Widespread



Natural Gas in Québec's Energy Landscape*

- 15% of primary energy consumption
- 14% of greenhouse gas (GHG) emissions

Énergir in Québec

- Delivers 97% of Québec's natural gas
- 1,600 employees
- Service footprint across
- 330 municipalities
- 11,000 km of underground pipelines
- 17,000 MW of equivalent energy capacity

Énergir in Vermont

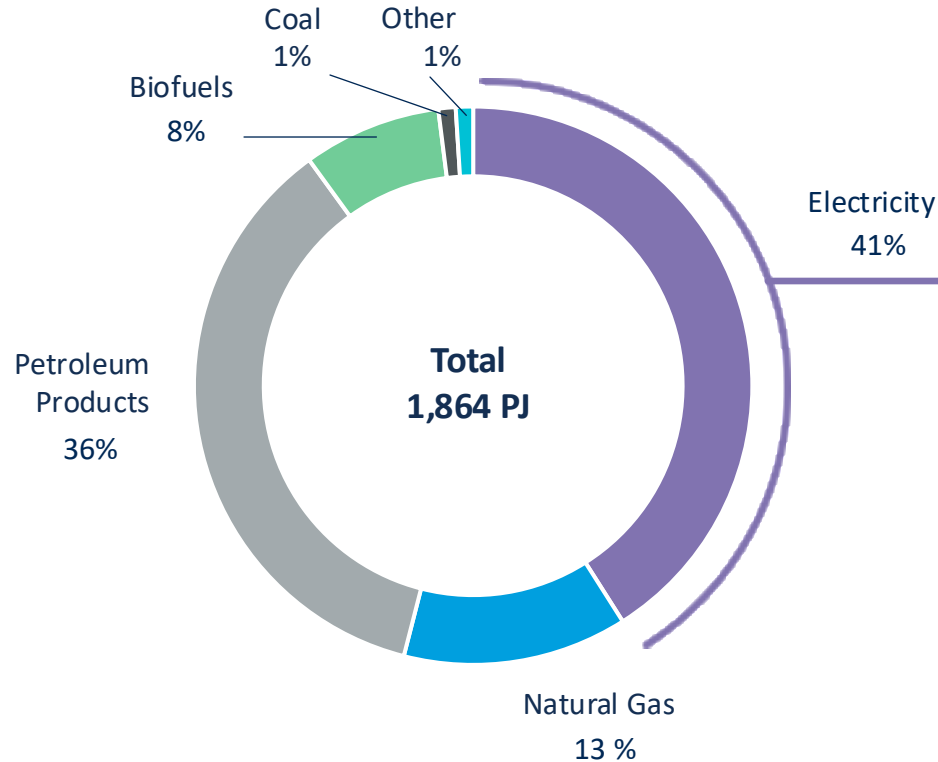
(Subsidiaries & Investments)

- Renewable electricity generation (hydro, wind, and solar)
- Leading electric utility
- Vermont's only natural gas utility

Québec Stands Out from the Rest of the World

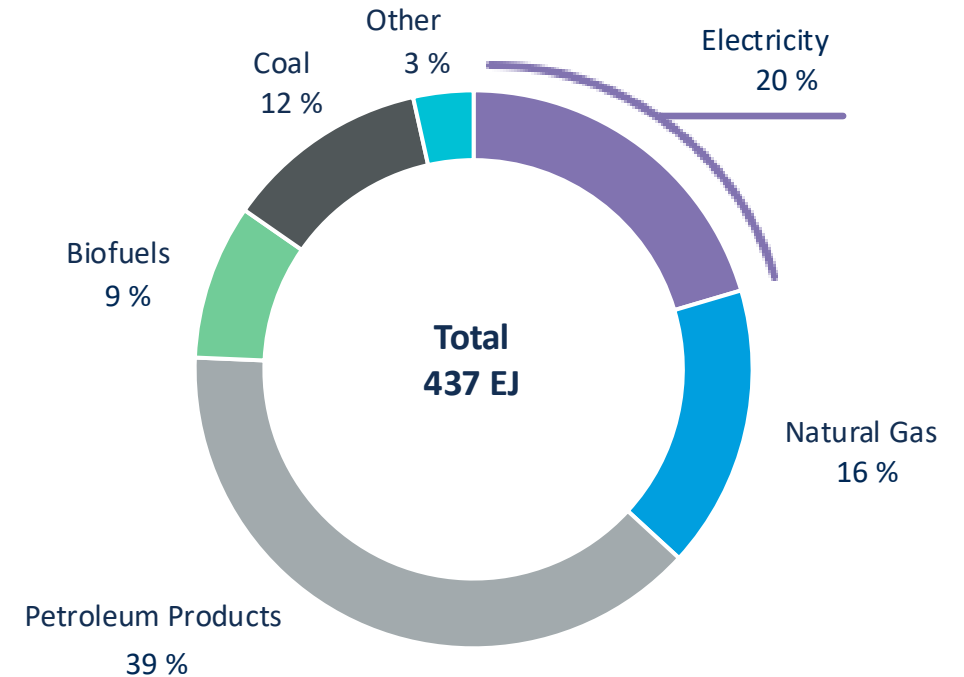
Energy Consumption in Québec

Source: Québec Energy State 2025, HEC Montréal Energy Sector Management Chair



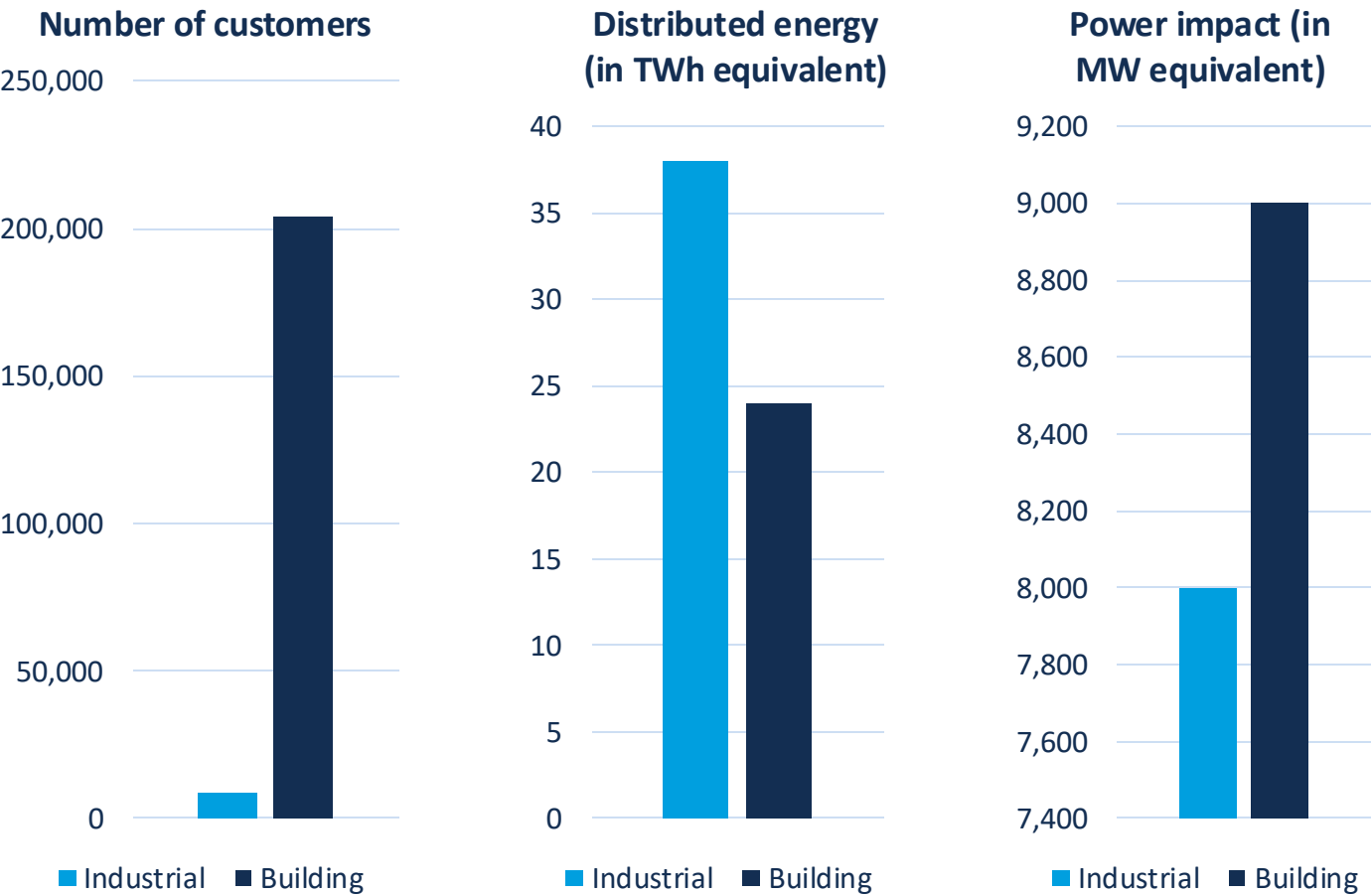
Global Energy Consumption

Source: IEA, World Energy Outlook 2024 Dataset



Québec has a significant advantage: its energy consumption relies much more heavily on electricity than the global average, and that electricity is almost entirely decarbonized.

The Scale of Énergir's Energy Contribution



30%
of energy
distributed
by Hydro-
Québec

40%
of Hydro-
Québec peak
requirements

Each year, Énergir distributes energy equivalent to 62 TWh. The power impact of converting natural gas uses to electricity is estimated at 17 GW, equivalent to 10 La Romaine complexes.

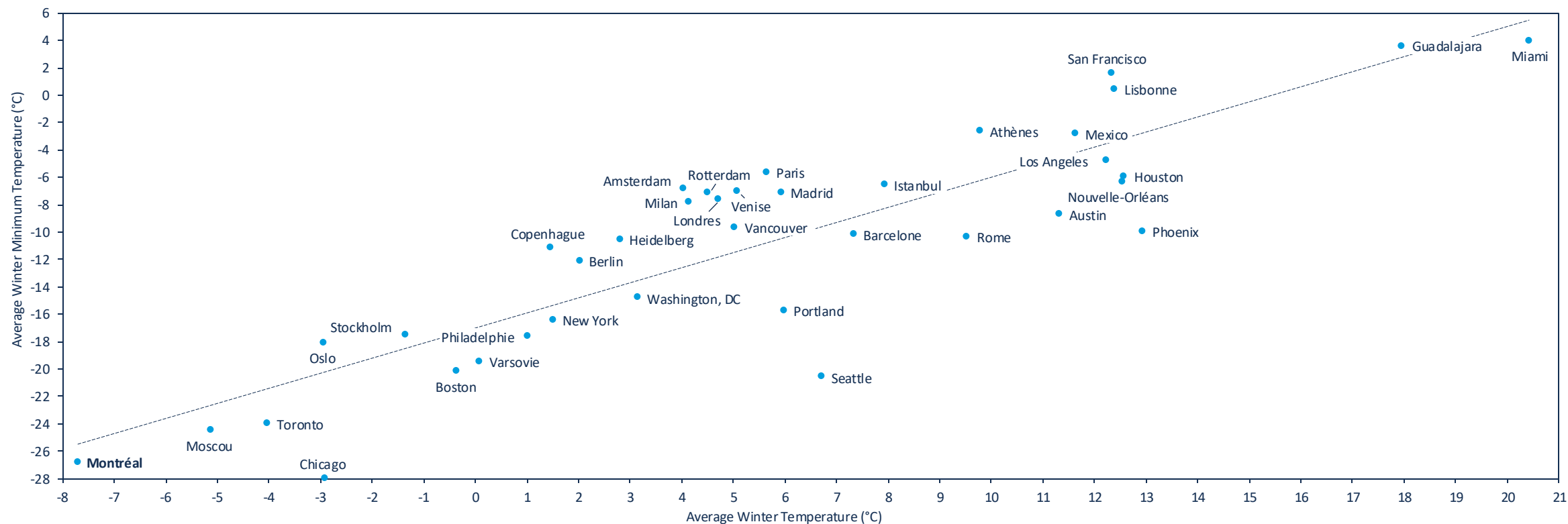


Notes: Estimated equivalent electrical power/energy based on the natural gas profile of Énergir's customers billed in 2022, taking into account the gains in efficiency from switching from natural gas to electricity.

Montréal: The Coldest-Winter City in the C40 Network

Comparison of Weather Data Across C40 Cities in Europe and North America

Based on average hourly data for December, January, February, and March from 2010, 2015, and 2020



Montréal faces the coldest temperatures among the cities united in climate action.

Source: ERA5 database, Copernicus Climate Change Service Observatory.



Québec's Electricity Challenge

Rapid Electrification is Increasing Both Energy and Winter Capacity Needs

- Why Québec is different
 - Québec already relies heavily on electricity for space heating.
 - Demand peaks on the coldest winter mornings and evenings.
 - Electrifying more buildings increases both annual electricity use and winter capacity requirements.
- Hydro-Québec has stated that electricity demand could grow by approximately **60 TWh between 2022 and 2035**, before additional efficiency efforts, and that winter peak demand could exceed **48,000 MW by 2035**. Its public 2035 Action Plan also identifies major investments in efficiency, new generation and grid infrastructure.



Potential Growth in Electricity Demand
+60 TWh by 2035



Peak Demand Pressure
45 GW by 2032
(capacity requirements)



Energy Efficiency
21 TWh targeted by 2035

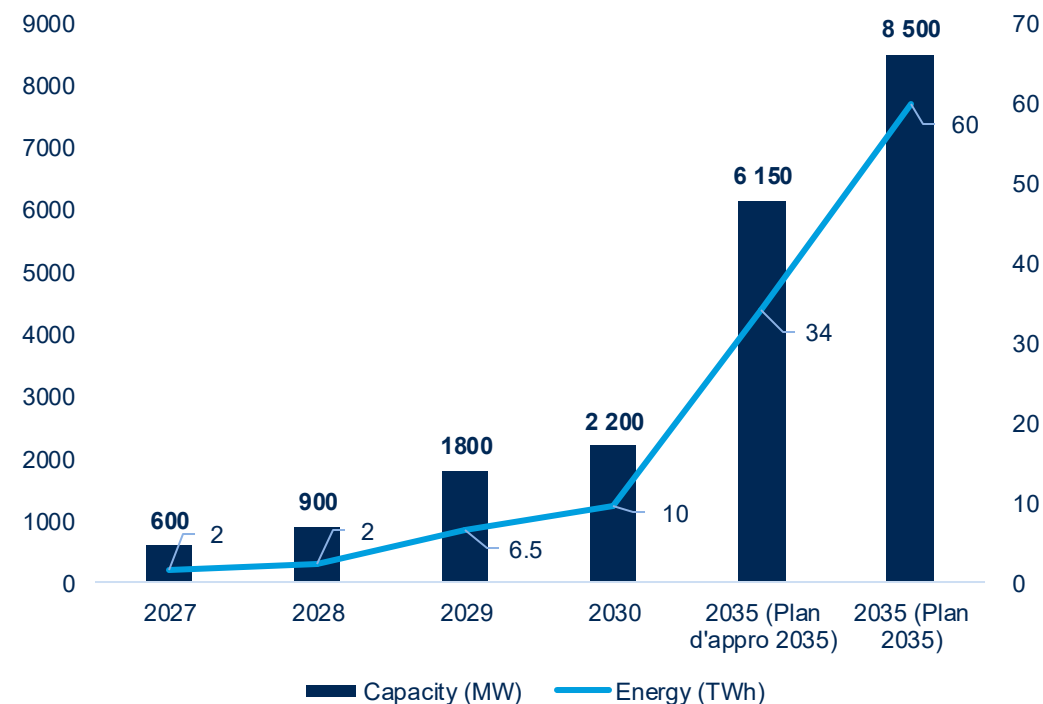


Relevance of Geothermal Energy
Building + peak demand reduction

1. Hydro-Québec, 2025 Progress Update on the 2023-2032 Supply Plan and Hydro-Québec 2035 Action Plan.

* Marginal capacity cost = \$248.80/kW; marginal energy cost = \$0.118/kWh (Source: HQ R-4270-2024, Avoided Costs).

Additional energy and capacity required by Hydro-Québec by 2035¹



The challenge is not only how much electricity Québec will need, but when it will be needed



Natural Gas Conversion to Electricity Scenario

Winter Peak Challenges for Hydro-Québec

Current winter peak challenges for Hydro-Québec

- In Québec, more than 80% of households use electricity for their main space-heating system.
- Hydro-Québec peak hours are driven by space heating needs, and occurs between 6-9 AM and 4-8 PM.

Significant winter peaks increase expected in the next decade

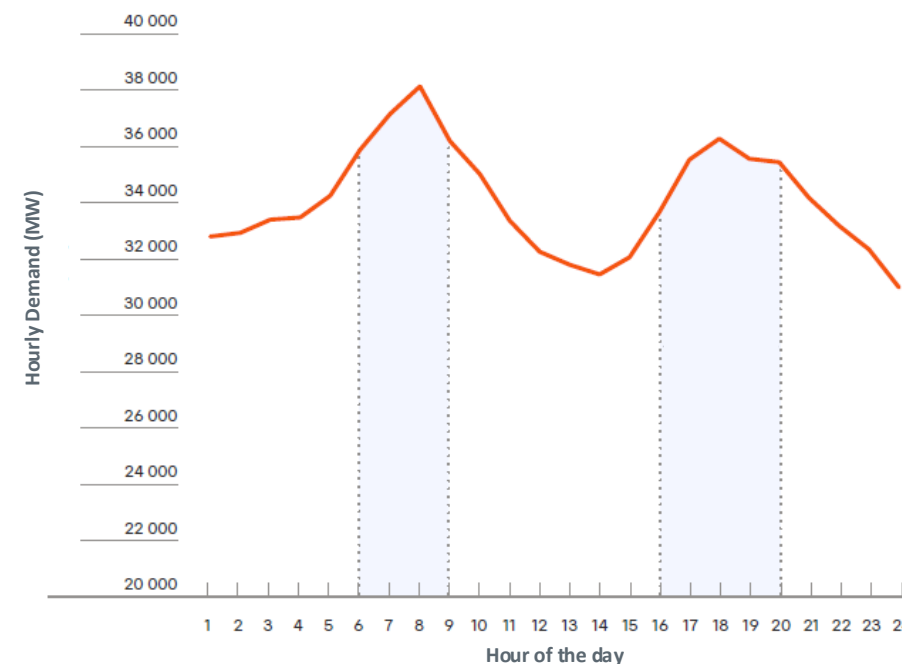
- Winter peak power needs are expected to increase to more than +2,600MW in 2029, compared to 2020 levels, not taking into account any natural gas conversion.
 - Electrification of transportation, oil product conversion and economic growth are the main driver of increase load during winter.
- Energir's customers targeted by the decarbonization initiatives in the building sector are also winter peaker, leading potentially to an even larger increase.

New expensive long term winter peak contracts and infrastructure needed

- Peak-power contracted are very expensive and serve only for few hours per year.

Given the increasing costs and infrastructure needs for HQ, the network complementarity focused on solutions that could alleviate the pressure during the winter period.

Winter Peak Period



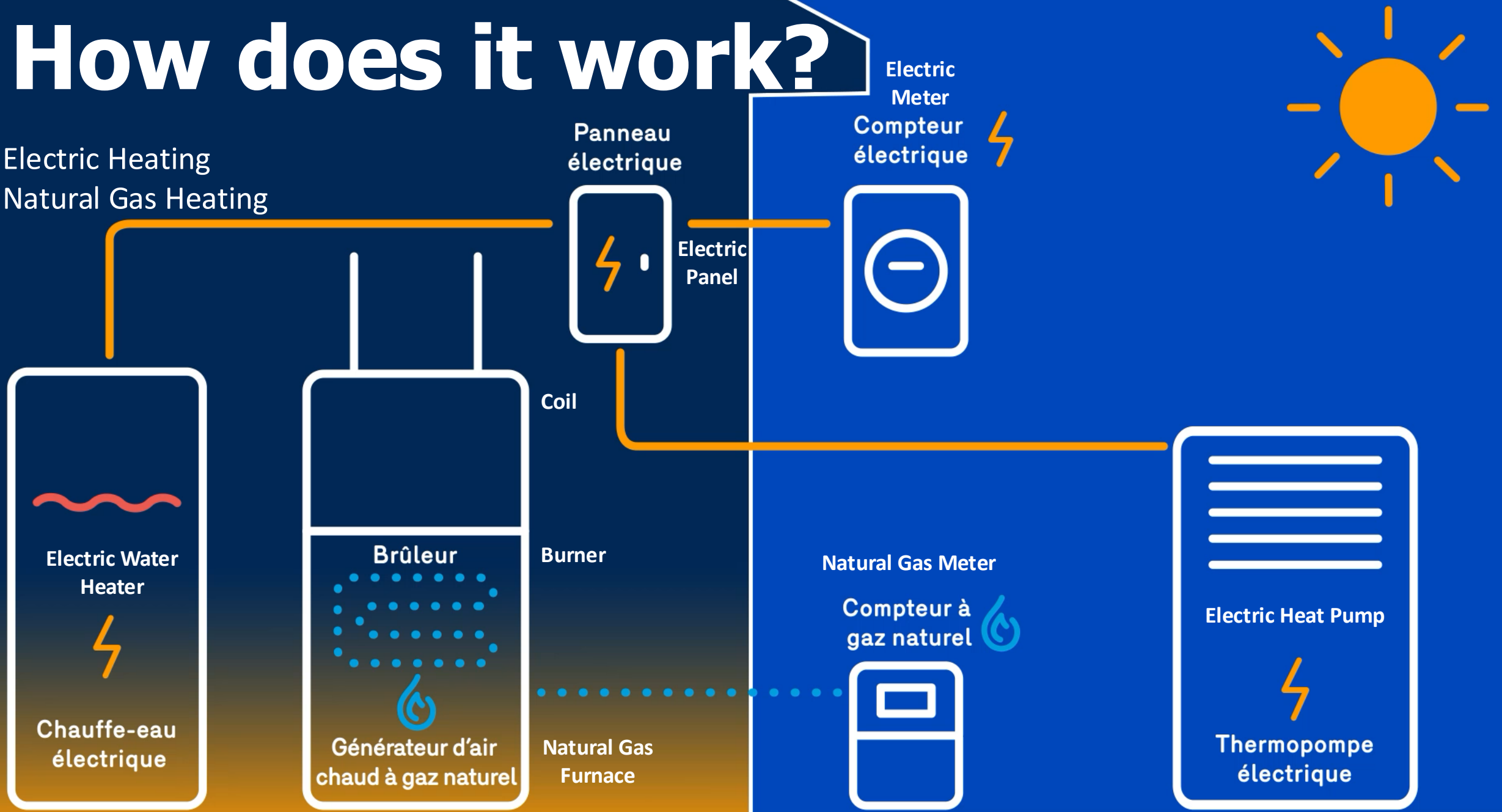
One Shared Challenge, One Coordinated Solution

- Hydro-Québec and Énergir are pooling their efforts around a shared solution for the heating of residential, commercial and institutional buildings: **electricity-natural gas dual energy**.
- Based on a strong complementarity between the gas and electricity networks, dual energy is positioned as **an efficient and practical solution** in the face of rising demand for electricity while limiting the need for adding new infrastructure.



How does it work?

Electric Heating
Natural Gas Heating



What Does the Dual-Fuel Offer Include?

Dual-fuel heating system

Electricity provides most heating. Natural gas automatically takes over during extreme cold or high demand. The switching threshold is -12°C in most regions.

Preferential electricity rate

Attractive pricing encourages electricity use outside constrained winter periods.

Conversion grants

Grants can cover up to 80% of eligible incremental conversion costs and can be paid directly to certified partners.

Guided implementation

Customers are supported by Énergir, certified partners or consulting engineers through eligibility assessment, installation, commissioning and grant applications.

- One coordinated offer designed for customers and the energy system.

From Concept to Market in Four Steps

Define the system opportunity

- Identify building segments where electrification is practical and creates the greatest system value.

Align assumptions and economics

- Agree on avoided costs, rate impacts and a contribution mechanism that shares value between the utilities.

Design the customer offer

- Combine a dedicated tariff, customer incentives, equipment requirements and delivery processes.

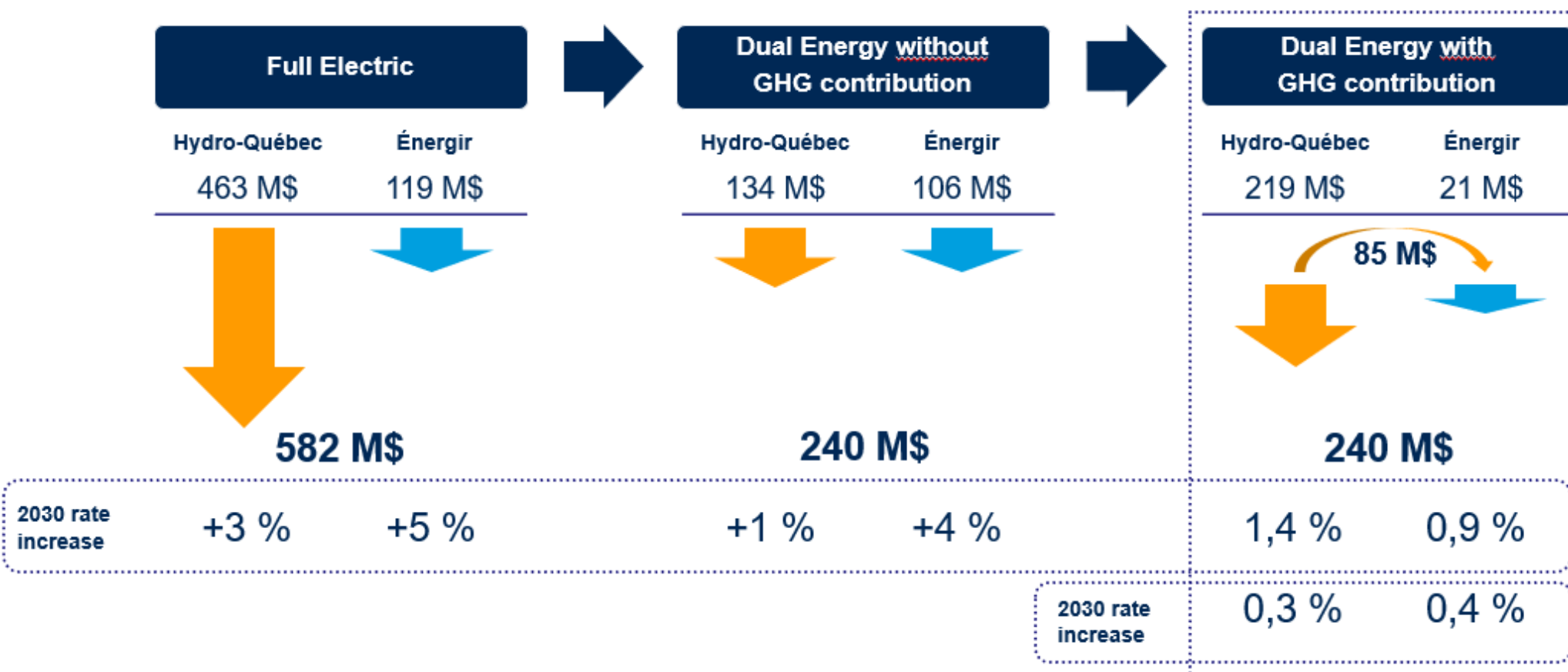
Secure approval and launch

- Launch the residential offer in 2022, followed by commercial and institutional customers in 2023.

- Cross-utility alignment made it possible to reduce emissions while limiting
 - winter capacity and rate impacts.

Economic Impact Analysis

Comparing Full-Electric Conversion to the Dual Energy Initiative and their impacts on rates



The **GHG Contribution** ensures a balance of rate impacts for the Distributors' customers





Results at Scale

Residential Customer

Launched in June 2022

Completed and paid projects: **10,525**

30,078 tCO₂e Annual GHG emissions
avoided

Over \$72.5 million

in grants paid

Business Customer

Launched in November 2023

Completed and paid projects: **651**

22,586 tonnes of GHG emissions
avoided

Over \$57 million

in grants paid

11,176 completed projects | 52,664 tCO₂e avoided annually | CA\$129.5 million in grants paid.



Learning & Challenges

Clarify the customer value

- Make dual energy easier to compare with other technologies, rates and incentives.

Align incentives with efficient technologies

- Support high-efficiency options while simplifying subsidy requirements and payments.

Strengthen partner capacity

- Expand certified expertise and improve lead and project management.

Simplify the customer journey

- Reduce complexity, automate key steps and limit reliance on sales teams.

Learning & Challenges

Simplicity drives conversion

Streamlined eligibility criteria and centralized grant processing by Énergir reduce administrative steps and create a smoother conversion journey.

Targeted, recurring campaigns

Ongoing sales efforts, particularly when equipment is due for replacement, support results; the program's maturity also increases the confidence of teams and partners.

Dependence on funding and partner decisions

The program's long-term viability and appeal depend on the availability of funding, financial assistance programs, and changes to rate structures and technical requirements.

The technology works. Scaling depends on a simpler offer, aligned incentives and a strong partner network.

Challenge: Finding a Balance

Minimize **costs**



1. Cost

Minimize energy costs and ensure equity in sharing the financial burden of decarbonization to encourage behavioural changes

2. Resilience

Guard against climate, physical or human risks with an impact on continuity and service reliability

3. Decarbonization

Minimize GHGs as quickly as possible by minimizing impacts on biodiversity

Ensure the **resilience**
of the energy system



Maximize **decarbonization**



This balance will require the right energy, used in the right way, at the right time and at the best price.

The Four Pillars of Our Decarbonization Vision

Reduce natural gas consumption

①

Increase our energy efficiency efforts



②

Develop a strong complementarity between the gas and electricity networks



③

Accelerate the injection of renewable natural gas



④

Diversify into new vectors of growth



Increase renewable energy solutions

The right energy, at the right place, at the right time, and at the best price.

The Three Key Strengths of Gaseous Energy

Contributes to meeting seasonal energy needs

Existing infrastructures make it possible to meet peak demand



Decarbonizes uses that are difficult to electrify

Gases from renewable sources (GRS) displace fossil natural gas while minimizing new infrastructure



Ensures energy resilience

Well-maintained network with low sensitivity to extreme weather events



Flexibility of energy in a gaseous state



Renewable liquefied natural gas (RLNG) helps displace energy sources that pollute more



Energy security: crucial for ensuring the resilience of economies



Thank you!



Panel Discussion



Moderator| Isaac Smith
Director, Market Transformation
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John Taylor
Executive Director
Consortium for Energy
Efficiency



Hwikwon Ham
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Commissioner



Josh Quinnell, Ph.D.,
Senior Research Scientist
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Becky Walker
Chief Program Officer
Northwest Energy
Efficiency Alliance



Jerry Joseph
Executive Director
Énergir



Thank You!



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