



PEOPLES GAS®
ENERGY EFFICIENCY PROGRAM

NORTH SHORE GAS®
ENERGY EFFICIENCY PROGRAM



2024 Energy Forum



Sept. 24, 2024

PEOPLES GAS®
ENERGY EFFICIENCY PROGRAM

NORTH SHORE GAS®
ENERGY EFFICIENCY PROGRAM



Welcome

Christina Frank

Director — Energy Efficiency and
C&I Customer Strategy





Agenda

01

Welcome

02

Introduction

03

Gas Supply

04

AMI

05

Regulatory Update

06

**Energy Efficiency
Program Overview**

07

Emerging Technologies

08

Market Transformation

09

Awards

10

Conclusion

Safety Message

- Change your furnace air filter.
- Clear dust and debris from any outdoor HVAC units.
- Clean your HVAC registers and ducts.
- Move any combustible products away from your furnace.
- Change the water panel of your home humidifier.

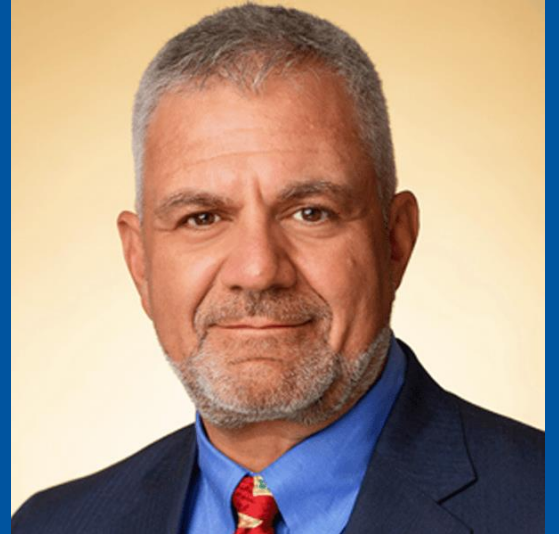




Introduction

Bill Mastoris

Interim President — Peoples Gas and
North Shore Gas



Gas Supply

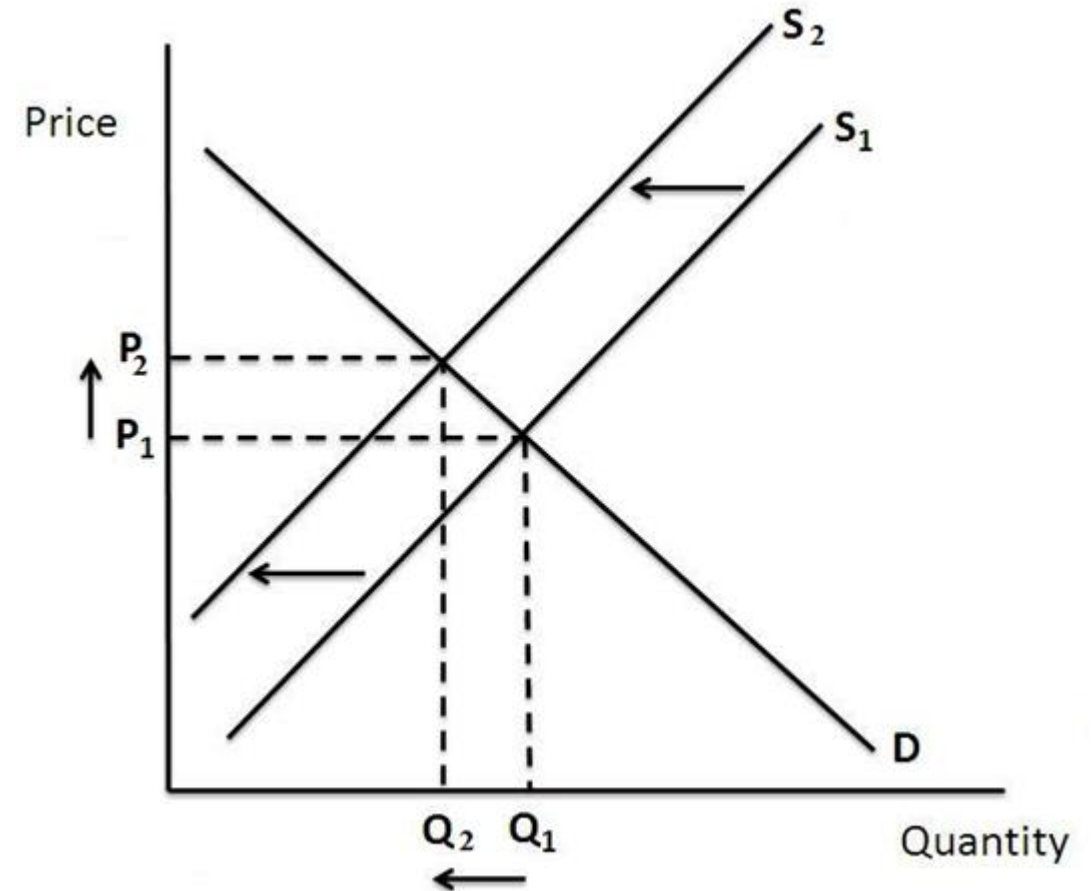
Sarah Mead

Director — Gas Supply

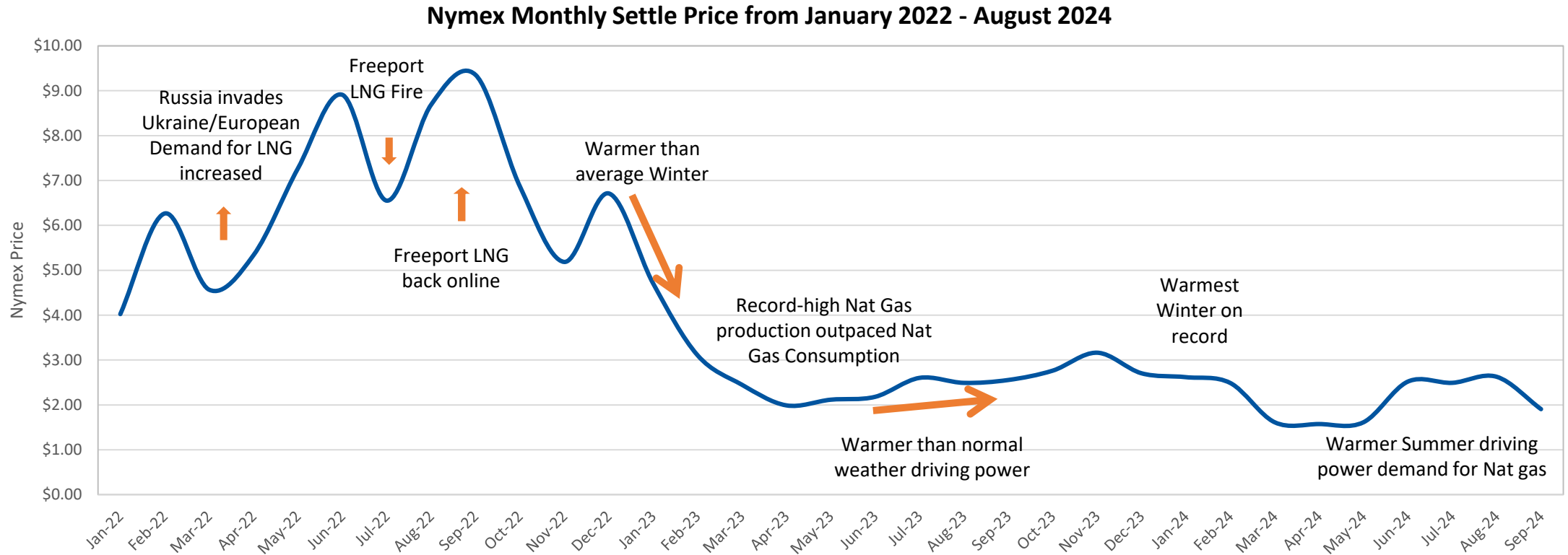


Natural Gas — Supply and Demand

- Follows the law of supply and demand — always looking for the balance
 - ✓ When supply exceeds demand, prices are lower
 - ✓ When demand exceeds supply, prices are higher
- Drivers for lower prices:
 - ✓ Increased production (Supply)
 - ✓ Adequate storage inventories (Supply)
 - ✓ Greater energy efficiency (Demand)
 - ✓ Economic down-turn (Demand)
 - ✓ Weather (Demand)
 - Warm winter
 - Cool summer
- Drivers for higher prices:
 - ✓ Production losses (Supply)
 - ✓ Low winter storage inventories (Supply)
 - ✓ Increased gas usage for (Demand)
 - ✓ Economic recovery (Demand)
 - ✓ Weather (Demand)
 - Cold winter
 - Hot summer

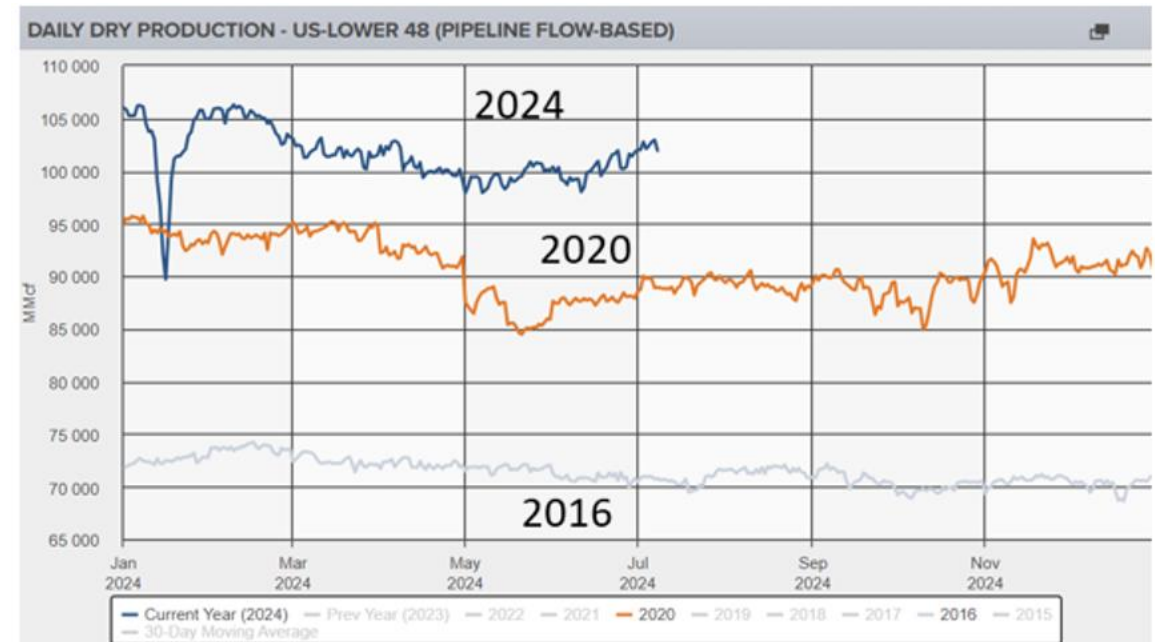


Natural Gas — How Balanced Is It?



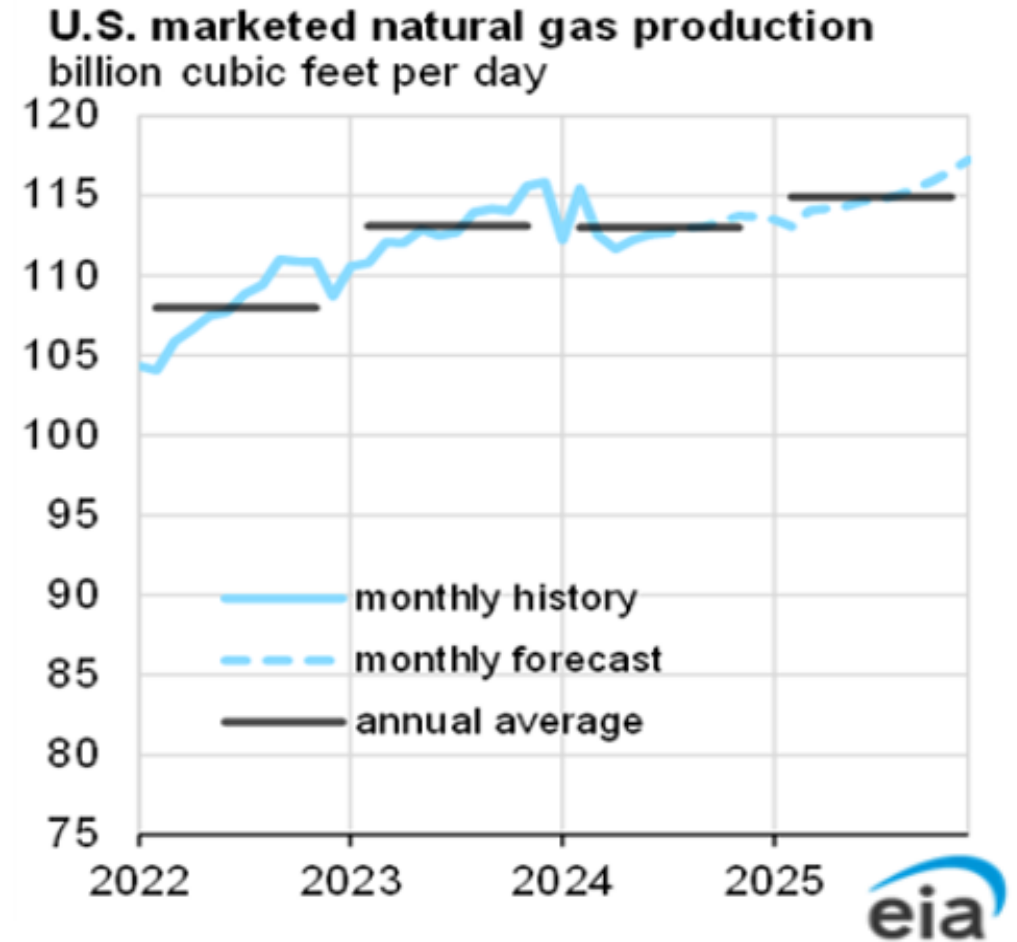
Natural Gas Supply U.S. Production

- Upward trend of U.S. natural gas production
- In 2016, average in the lower 70 Bcf/d range
- By 2020, average had increased above 90 Bcf/d until seeing a slight decrease due to demand decline during the pandemic
- Trend continues to climb to a current level above 100 Bcf/d in 2024
- What's the big drop in 2024? A downtick in production in February 2021 when, over the Presidents Day holiday weekend, extreme weather shut down production in most parts of Texas and the midcontinent
- Risk to this trend is if the price of natural gas falls to a level where it is unprofitable for the producer



Natural Gas — Production Forecast

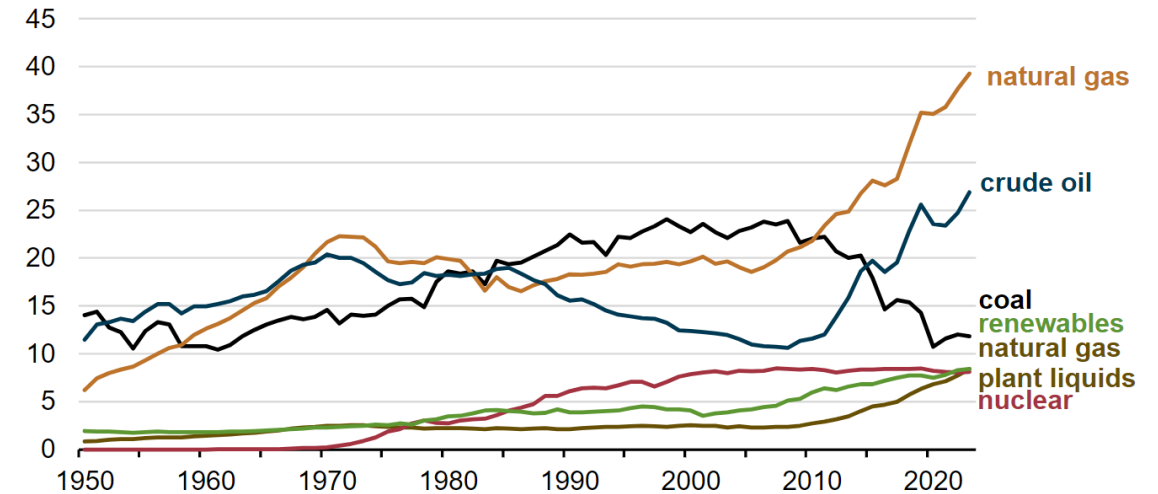
EIA is forecasting a continued increase of U.S. natural gas production over the next few years, up to the 110 to 115 Bcf/day range by 2025



Gas Supply — Energy Production by Source

- Natural gas continues to have a solid footprint in U.S. primary energy production over the last half century
- As coal decreases, increases in renewables such as solar and wind technology continue
- Natural gas has risen to fill the gap between the decline in coal and the growth in renewables

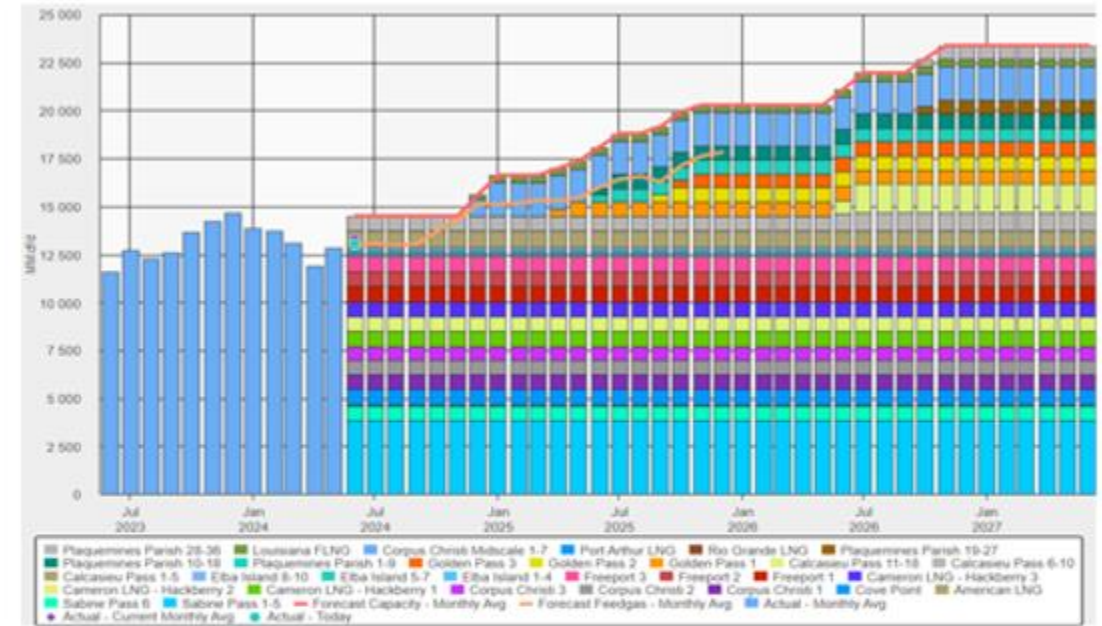
U.S. primary energy production by source (1950–2023)
quadrillion British thermal units



Natural Gas — LNG Exports

- U.S. liquefied natural gas (LNG) exports currently and planned through 2027
- Current average is 12.8 Bcf with capacity to do up to 14 Bcf/day
- More LNG facilities are expected to come online, raising exports to 23 Bcf by 2026

U.S. LNG Exports



Current LNG Facility Gas Inflows – 12.8 Bcf per day

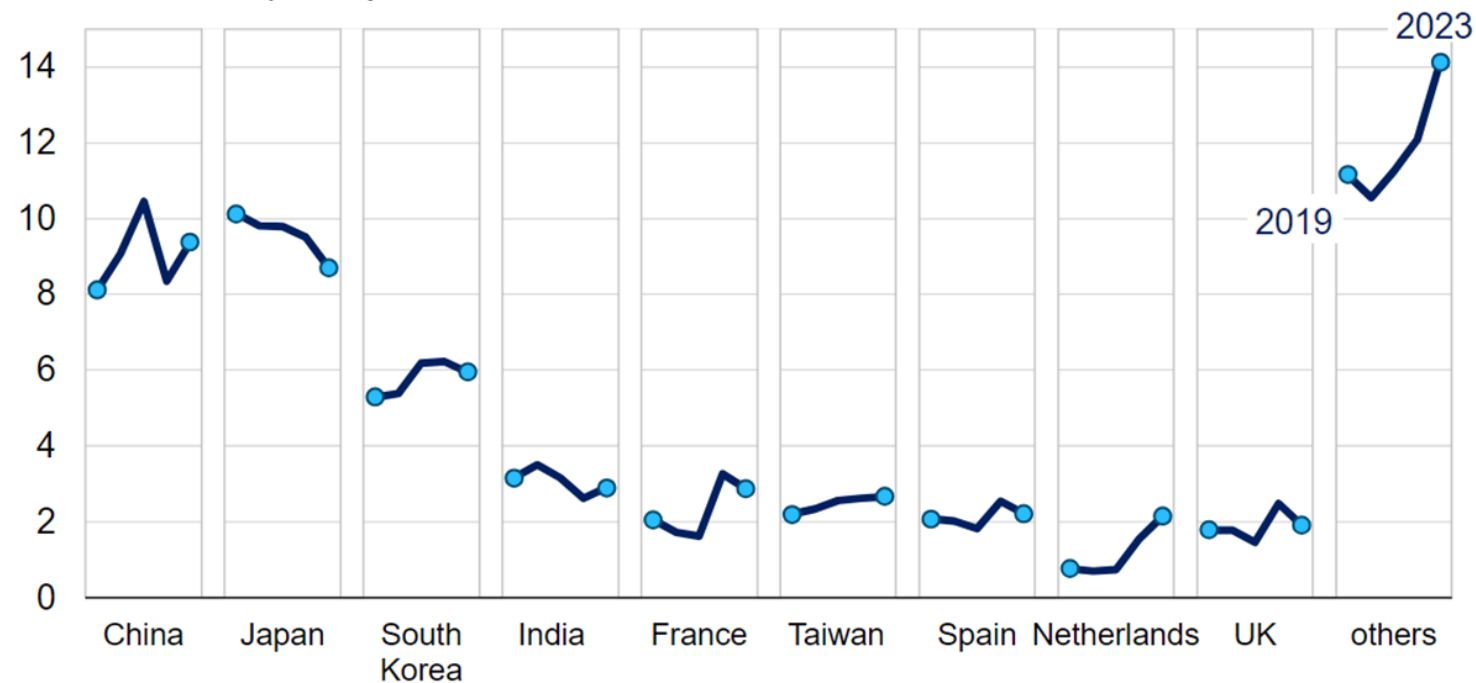
2023 WORLD LEADING LNG EXPORTERS BY COUNTRY:

1 – U.S. 4,115 BCF 2 – AUSTRALIA 3,877 BCF
3 – QATAR 3,808 BCF 4 – RUSSIA 1,529 BCF

Reuters

Natural Gas — LNG Imports

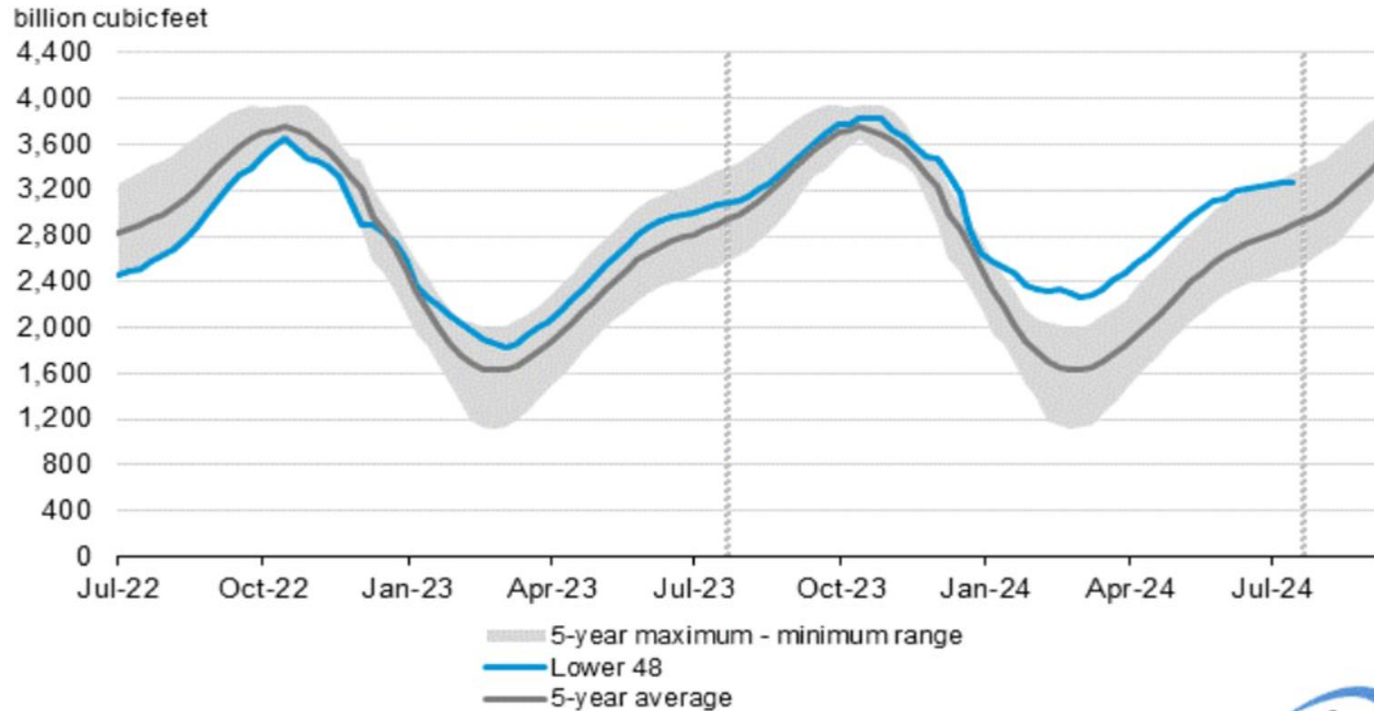
Global LNG import capacity and imports in 2023
Importers of liquefied natural gas (2019–2023)
billion cubic feet per day



Data source: International Group of Liquefied Natural Gas Importers (GIIGNL), *The LNG Industry* annual reports (2020–2024)

Natural Gas — U.S. Storage

Working gas in underground storage compared with the 5-year maximum and minimum



Data source: U.S. Energy Information Administration

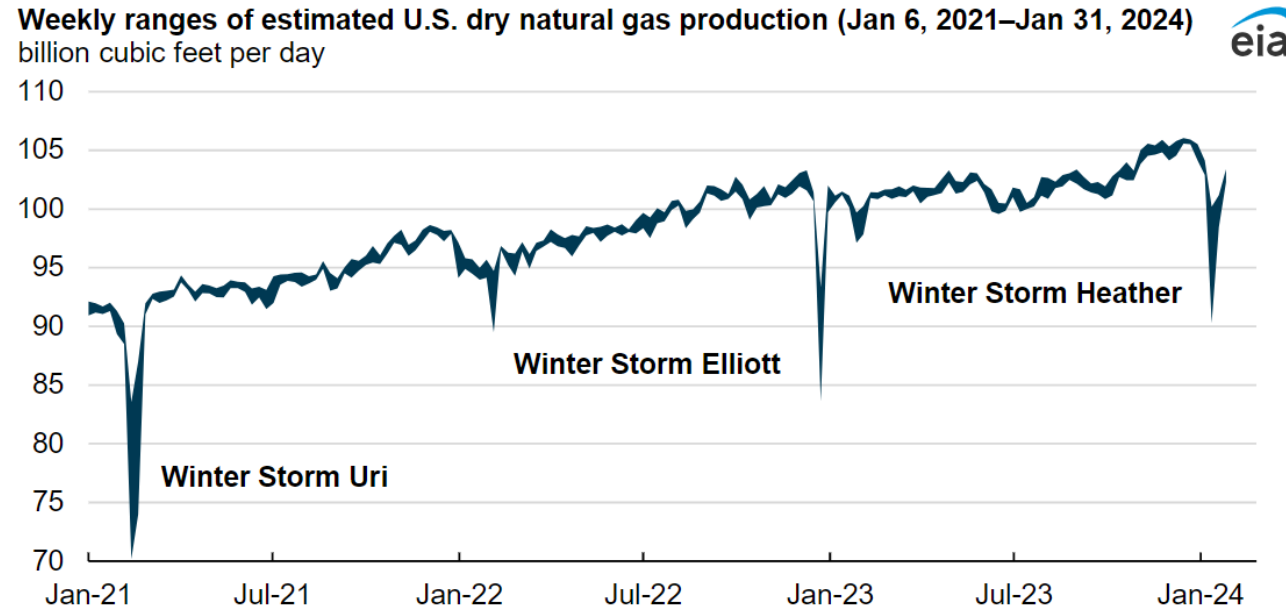


Note: The shaded area indicates the range between the historical minimum and maximum values for the weekly series from 2019 through 2023. The dashed vertical lines indicate current and year-ago weekly periods.

Natural Gas — Weather Impacts

Natural gas production has been affected negatively over the last couple of years by some severe winter storms, sometimes taking several days or weeks for production to come back on.

Winter storms have disrupted U.S. natural gas production



Data source: S&P Global Commodity Insights

Farmers' Almanac Winter Forecast Released Mid- August 2024



PEOPLES GAS®

NORTH SHORE GAS®



Thank you!

Questions and Discussion

Advanced Metering Infrastructure (AMI)

Liz Nielsen

Manager — Special Projects



Advanced Metering Infrastructure (AMI)

- New, advanced meter data transmission process for Peoples Gas and North Shore Gas customers
- North Shore Gas is substantially complete, and Peoples Gas is scheduled for completion by end of 2025
- Benefits:
 - ✓ Leveraging existing ComEd infrastructure in an industry-leading model for utilities working together to efficiently utilize resources
 - ✓ Reduced vehicle emissions
 - ✓ Operational cost savings passed on to customers
 - ✓ Enhanced customer service
 - ✓ Better analytics to inform and enhance customer savings and conservation efforts
 - ✓ Reduced costs for commercial customers through elimination of Demand Device charges and phone line costs

Regulatory Updates

Tom Aridas

Director — Gas Regulatory
Planning Policy



Regulatory and Governmental Affairs Overview

- Future of Gas (FOG) Illinois Commerce Commission (ICC) proceedings
- Integrated Resource Planning (IRP) ICC proceedings
- ICC's Safety Modernization Program (SMP) Review proceeding
- Green Era Biodigester Interconnection UPDATE
- Clean and Affordable Buildings Ordinance (CABO) UPDATE

Future of Gas and IRP Commission Proceedings

- Future of Gas
 - ✓ Initiated via order March 2024
 - ✓ Objective
 - ✓ Two phases and timeframe
 - ✓ National developments
- Integrated Resource Planning Commission proceedings
 - ✓ Ordering point for all Illinois utilities in last year's rate reviews
 - ✓ Objective
 - ✓ Time frames
- Public involvement

Other Significant Regulatory/Governmental Matters

- ICC's 12-month SMP Review proceeding
- Peoples Gas and Green Era biogas interconnection
- Chicago government: update on Clean and Affordable Buildings Ordinance



Thank you!

Questions and Discussion



Energy Efficiency Program Updates

Jean Gibson

Manager — Energy Efficiency Programs





Environmental and Community Impact

ENVIRONMENTAL IMPACT (since 2012)

150,500,000

**Net energy savings
(therms)**

796,000

**Carbon reduction
(tons)**

929,000

Acres of trees planted

189,000

**Cars removed from
the road**

103,000

**Homes' energy use
offset**

COMMUNITY IMPACT (since 2017)

772,000

Residential homes served

209,000

Income-qualified homes served

4,600

Businesses served

471

Direct portfolio jobs

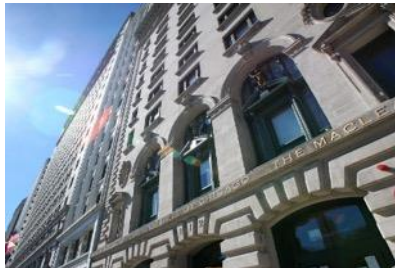
25%

Diverse spend (2022-2023)



Who We Serve and How

- Privately owned business customers
 - ✓ Manufacturers, office buildings, hotels
 - ✓ Small businesses like dry cleaners, restaurants, churches and nonprofits
- Public buildings
 - ✓ Schools, transit and hospitals





Energy advisors and EEP team



Principal account managers



Paul Flerick



Dan McGowan



John McKendry



Thank you!

Questions and Discussion

Emerging Technologies

Ryan Kerr

Director — Emerging Technologies
GTI Energy

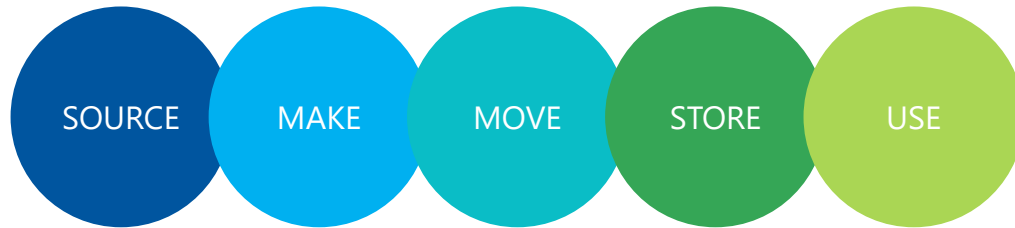




Emerging Technologies

Ryan Kerr, Director of Emerging Technologies
GTI Energy

We develop and deploy solutions in the transition to low-carbon, low-cost energy systems



490+
Employees



We work collaboratively to address critical energy challenges impacting gases, liquids, efficiency and infrastructure



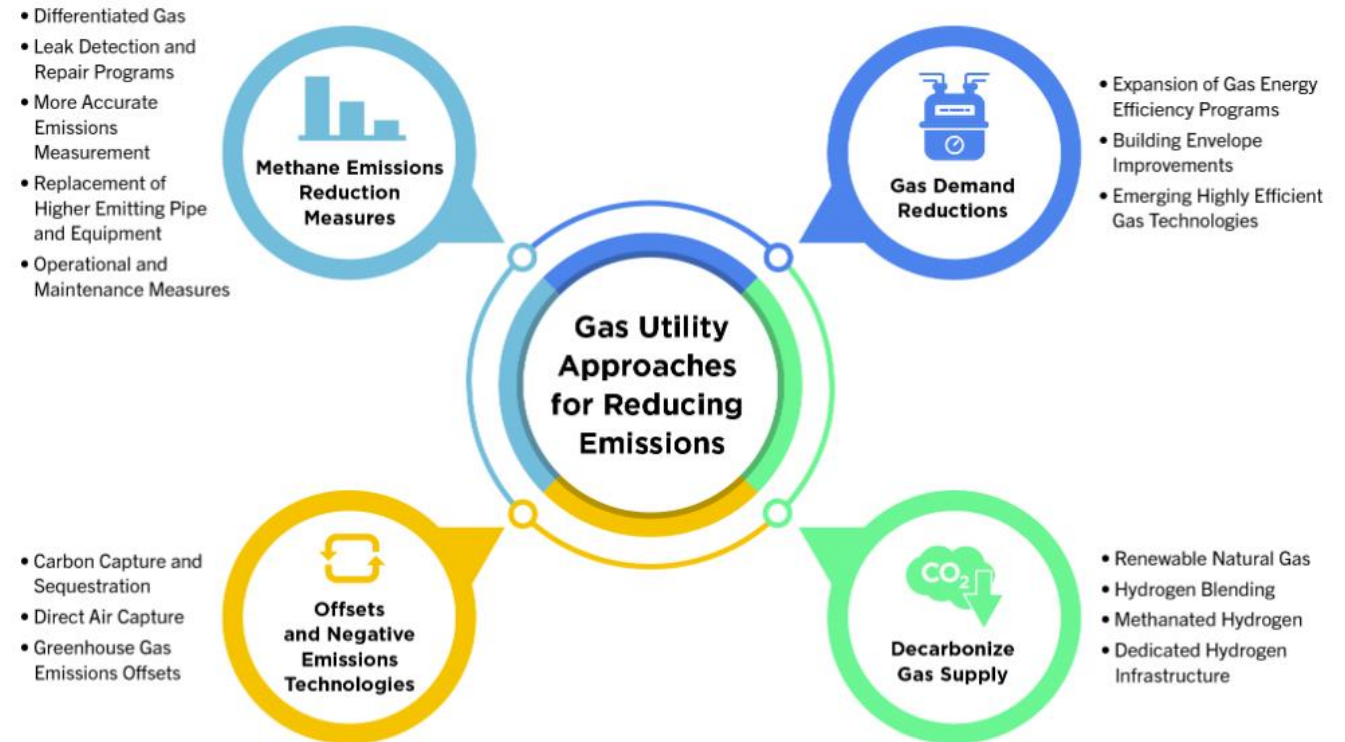
Naval Station Great Lakes: ET Viewpoint

- Responding to recent federal directives for reducing carbon and improving resilience
- Completing their long-term plan to transition from central steam to distributed gas-fired equipment
- Economics are important as well as low maintenance, reliability, long equipment life
 - Typically, do not use external service agreements; low tolerance for complex maintenance/service
- Facilities must be operational 24/7 to serve the mission



Decarbonization Pathways

- Efficient food service equipment
- Advanced water heating
- Hybrid/dual-fuel space heating
- Distributed generation/microgrid
- Distributed carbon capture
- Green hydrogen



Galley Demonstration

Existing steam-driven baseline equipment installed 2004



- > **Main Ware Washer** Insinger Conveyor Model Super 106-2 RPW (277 racks per hour)
- > **Pot and Pan Washer** Insinger Model DA-3 (50 24"x28" racks/hour)
- > **Steam Kettles** Groen Models GT-40 and GT-60

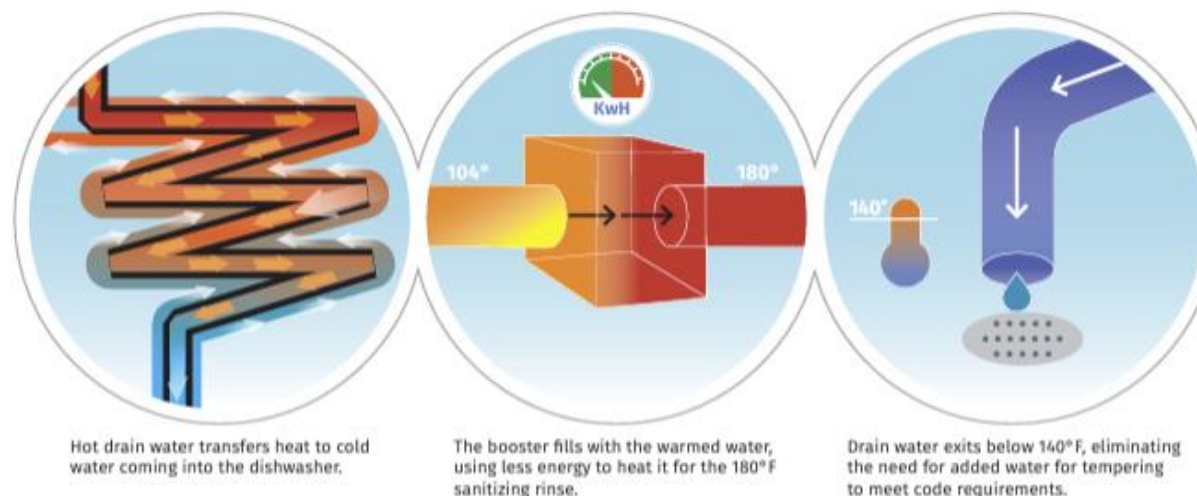
Demonstration heat recovery gas-fueled equipment



NORTH SHORE GAS®
ENERGY EFFICIENCY PROGRAM

- > **Main Warewasher** Hobart Model CLPS86eN-EGR Gas; Hatco Gas Booster PMG-200 (342 racks/hour)
- > **Pot and Pan Warewasher** Hobart Model CL44eN-EGR Gas; Hatco Gas Booster PMG-200 (202 standard racks/hour)
- > **Steam Kettles** Groen Models AH/1E-40 and AH/1E-60

Heat Recovery Warewashers



Challenge: Daily meal preparation and cleanup in large military dining facilities waste significant amounts of energy and water.

Solution: High-efficiency, natural gas warewashers with waste heat recovery replaced steam-driven units, reducing water use by 92% and energy use by 83%. These galley equipment upgrades reduced annual costs by \$38,500 and lowered GHG emissions by 200 metric tons/year, equivalent to removing 51 gasoline vehicles.

One unit saves 1,250,000 gallons per year

Water Heating

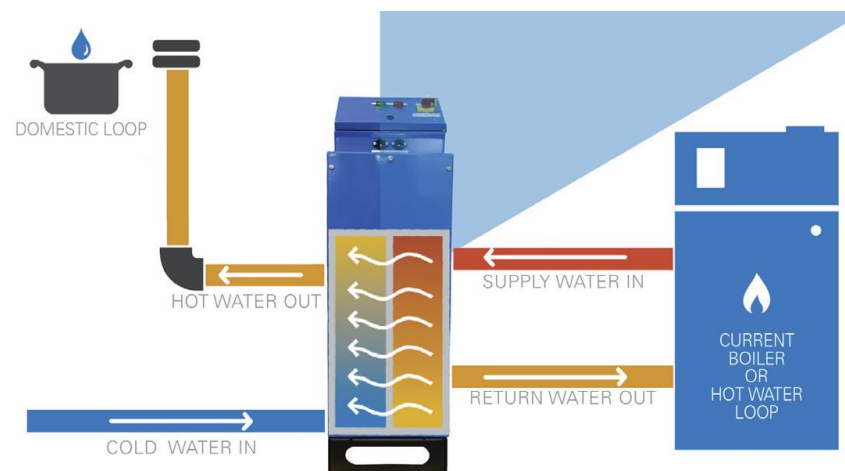
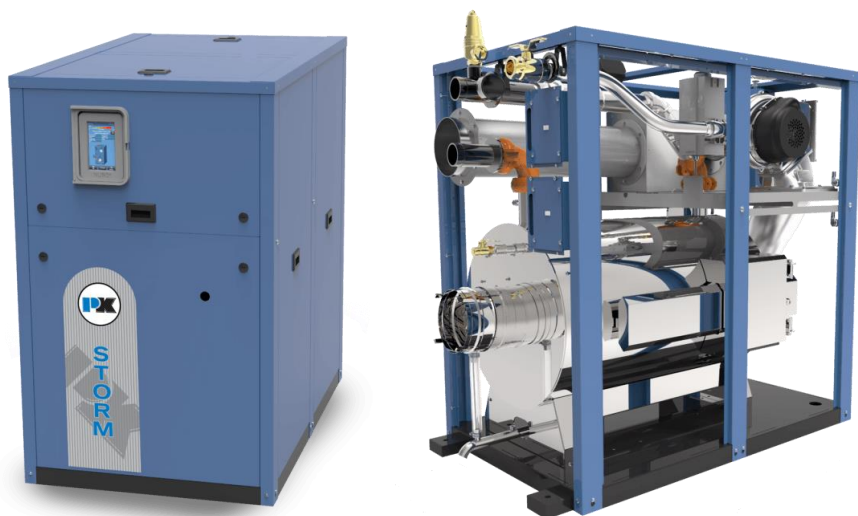
Existing steam-driven storage water heaters



High-efficiency gas-fueled tankless water heaters

- Tankless design eliminates storage/distribution losses
- Modular design (N+1 redundancy) reduces capital costs and optimizes part-load performance
- Steam costs (\$16.857/MMBtu) over 3x natural gas (\$5.606/MMBtu)

Indirect Water Heaters



NORTH SHORE GAS®

USE YOUR
CURRENT BOILER
OR EXISTING HOT
WATER LOOP
RATHER THAN
INSTALLING
ANOTHER SYSTEM.

PK Duration heat exchanger modules provide tankless domestic water heating paired with high-efficiency condensing boilers (Total system 7 MMBtu/hr)

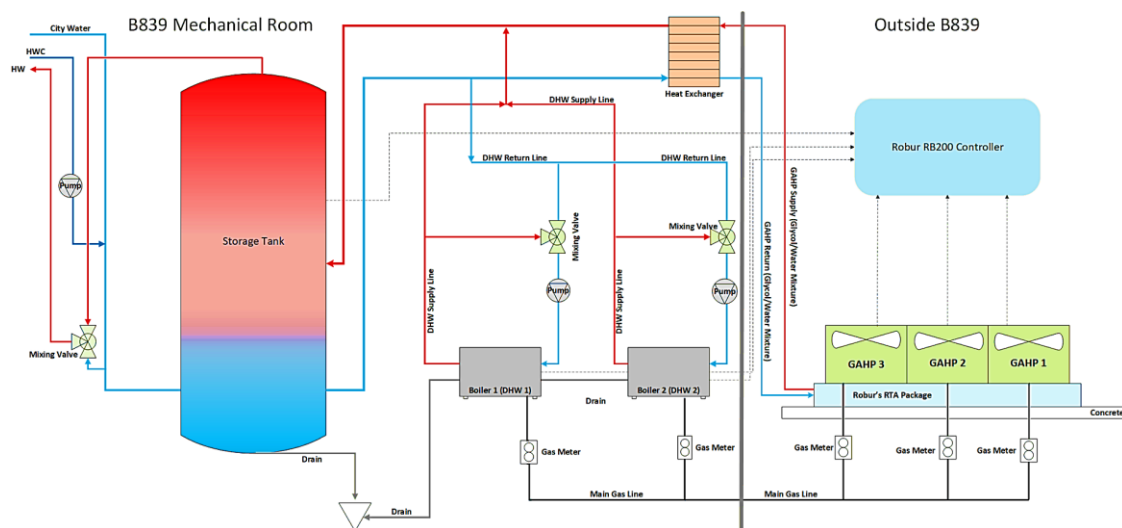


Challenge: Military barracks have large hot water demand that varies with occupancy. Traditional storage water heaters result in costly energy losses and depend on high-maintenance steam distribution systems.

Solution: Gas-fired tankless water heaters can replace conventional storage water heaters saving 24% energy use (15,000 therms/year, \$8,000/year), reducing greenhouse gas emissions by 23% with longer equipment life.

Robust reliable solutions to reduce energy use by 24%

Gas Absorption Heat Pump (GAHP)



Existing gas-fueled DHW system

- > Lochinvar Power Fin II non-condensing water heaters with one 750-gallon storage tank (600-gal usable)
- > Boiler setpoint is 140°F; DHW reduced to 125°F at mixing valve
- > Sized for peak flow rate for max 228 residents to shower in 45 minutes
- > Installed with AL29-4C category IV vent and condensate drains as a precaution

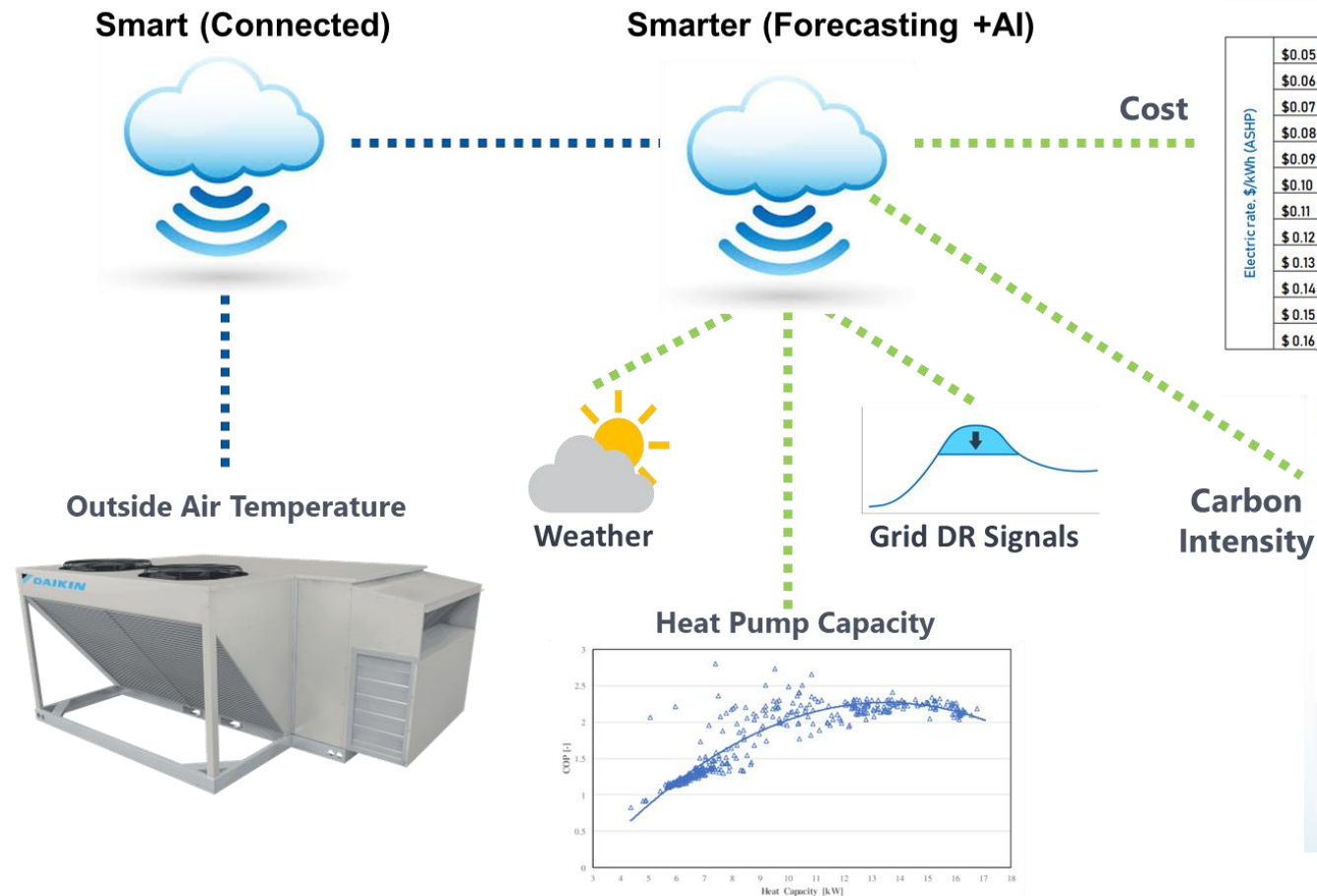


Demonstration GAHP water heating

- > GAHP added to existing DHW boilers
- > Storage tank added between boilers and GAHPs
- > Unit capacity: 123.5 MBH
- > Installed outdoors; requires new concrete pad and advanced site approval

Hybrid (Dual-Fuel) RTUs Concept

- **Concept:** Rooftop units with heat pump AND gas furnace heating option
- **Key point:** Cutoff point for fuel crossover



Natural gas rate, \$/therm, (furnaces and boilers)

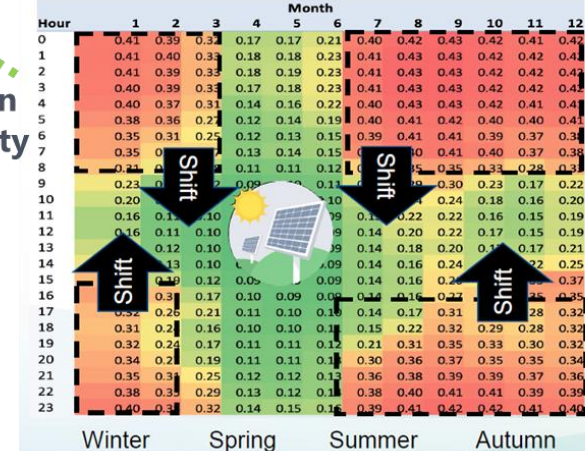
	\$0.80	\$0.85	\$0.90	\$1.00	\$1.15	\$1.33	\$1.50	\$2.00	\$2.50	\$2.75
\$0.05	4°	0°	-5°	-10°	-10°	-10°	-10°	-10°	-10°	-10°
\$0.06	17°	13°	9°	1°	-10°	-10°	-10°	-10°	-10°	-10°
\$0.07	26°	23°	19°	12°	2°	-10°	-10°	-10°	-10°	-10°
\$0.08	34°	31°	27°	21°	12°	1°	-10°	-10°	-10°	-10°
\$0.09	41°	38°	34°	28°	19°	10°	1°	-10°	-10°	-10°
\$0.10	48°	44°	41°	34°	26°	17°	9°	-10°	-10°	-10°
\$0.11	53°	50°	46°	40°	32°	23°	15°	-7°	-10°	-10°
\$0.12	59°	55°	52°	45°	37°	28°	21°	1°	-10°	-10°
\$0.13	60°	60°	57°	50°	42°	33°	26°	7°	-10°	-10°
\$0.14	60°	60°	60°	55°	46°	37°	30°	12°	-5°	-10°
\$0.15	60°	60°	60°	59°	50°	41°	34°	17°	1°	-7°
\$0.16	60°	60°	60°	60°	54°	45°	38°	21°	6°	-1°

Electric rate, \$/kWh (ASHP)

Source: MN ASHP Collaborative

Propane rate, \$/gallon, (furnaces and boilers)

	\$1.22	\$1.37	\$1.83	\$2.29	\$2.52
\$0.05	4°	0°	-5°	-10°	-10°
\$0.06	17°	13°	9°	1°	-10°
\$0.07	26°	23°	19°	12°	2°
\$0.08	34°	31°	27°	21°	12°
\$0.09	41°	38°	34°	28°	19°
\$0.10	48°	44°	41°	34°	26°
\$0.11	53°	50°	46°	40°	32°
\$0.12	59°	55°	52°	45°	37°
\$0.13	60°	60°	57°	50°	42°
\$0.14	60°	60°	60°	55°	46°
\$0.15	60°	60°	60°	59°	50°
\$0.16	60°	60°	60°	60°	54°



Micro Combined Heat and Power (CHP)

- New 24kW CHP is a scalable technology solution for water heating and power generation
- Greater reliability than diesel engines
- Cost-effective energy efficiency with savings in life cycle costs
- Reduction in GHG emissions



- Technical and economic assessment of existing CHP systems at three **Maine Army National Guard** facilities

mCHP system operating in GTI's CHPRE Lab

Distributed Carbon Capture Demonstration

- CleanO2's CarbinX™ unit captures carbon from distributed sources of CO₂
 - Installed in mechanical/boiler room and tied to venting of Cat. I/III venting appliances
 - Exploring powered damper solution to mitigate condensate accumulation in reaction chamber
 - Heat recovered will be used to preheat feed water to adjacent DHW system
- Pearl ash collected and replaced with fresh hydroxide every two weeks



DOE Hydrogen Hubs: Overview (Zoom Out)

Government investments

- DOE H₂ Hubs (\$7B, 7 awards)
- GTI Energy major participants in



Appalachian Regional Clean Hydrogen Hub (EQT, Battelle, NETL) focus on H₂ + CCUS - <https://www.arch2hub.com/>



Midwest Focused Hydrogen Hub (Nuclear Operator, Utilities, Ind. End Users) - <https://machh2.com>



Gulf Coast H₂ Hub (Ports, Chem. Industry/Refiners) - <https://www.hyvelocityhub.us/>

Source: DOE - OCED



Name/Federal Cost Share	Location	Production	Midstream	End Uses
Midwest Hydrogen Hub (MachH2) Up to \$1 billion	Illinois, Indiana, Michigan	Electrolysis, hydrogen produced from natural gas, with carbon capture and storage	Hydrogen refueling stations	Steel and glass production, power generation, refining, heavy-duty vehicles, sustainable aviation fuel

Blending-to-H₂ Ready: Collaborative Effort

Large effort to quantify the potential of hydrogen to decarbonize **large buildings and industry in California**:

- Develop techno-economic roadmap to decarbonize ~**50%** of CA's natural gas use
- Large effort across diverse team to:
 - Develop CA-specific TEA for H₂ use, quantify potential/costs of conversions to H₂
 - Test/model H₂ tolerance of wide range of large equipment categories (e.g., boilers)
 - Material testing for long-term impacts
 - Air quality simulation on regional impacts
 - Stakeholder outreach and engagement

Decarbonizing Large Commercial and Industrial Equipment with Hydrogen (PIR-22-001)

Reviewed
in Fall '23



CALIFORNIA
ENERGY
COMMISSION



GTI ENERGY



UCIRVINE



ELECTRIC POWER
RESEARCH INSTITUTE



AIR-CONDITIONING, HEATING,
& REFRIGERATION INSTITUTE



Pacific Gas and
Electric Company



SOUTHWEST GAS



Utilization Technology
Development



LOW-CARBON
RESOURCES INITIATIVE

Test Equipment Selection

- 2+ units per equip. category
- Finalized after Preliminary TEA

Commercial Examples:

- Furnaces/Weatherized HVAC
- Water Heater/Hot Water Boilers
- Cooking / Catering Equipment

Industrial Examples:

- Steam Boilers / Process Heaters
- Ovens / Dryers / Kilns
- Heat Treating / Furnaces



Hydrogen-Ready Heating

- > Laboratory assessment of heating equipment with hydrogen blends
 - Assess typical DoD equipment for compatibility with hydrogen blends <50%
 - Assess hydrogen-ready equipment with hydrogen blends 20-30%
- > Field demonstration of H₂-ready heating equipment (2025)
 - Decentralize drill hall space and water heating with gas equipment
 - If approved, demonstrate H₂ blends compatible natural gas boilers and water heater
- > Near-future hydrogen economy assessment
 - Barriers and opportunities for H₂ utilization at DoD facilities
 - Energy modeling and techno-economic analysis



Drill Hall Camp John Paul Jones

Summary

- We're working with Naval Station Great Lakes and North Shore Gas to decarbonize their campus energy systems while reducing operating costs and improving resilience.
- These projects are a great opportunity to better understand how to deploy emerging technologies in the real world with real world requirements and constraints.
- Projects reviewed:
 - Efficient Foodservice Equipment
 - Advanced Water Heating
 - Hybrid/Dual-Fuel Space Heating
 - Distributed Generation/Microgrid
 - Distributed Carbon Capture
 - Hydrogen-Ready Boilers





Market Transformation

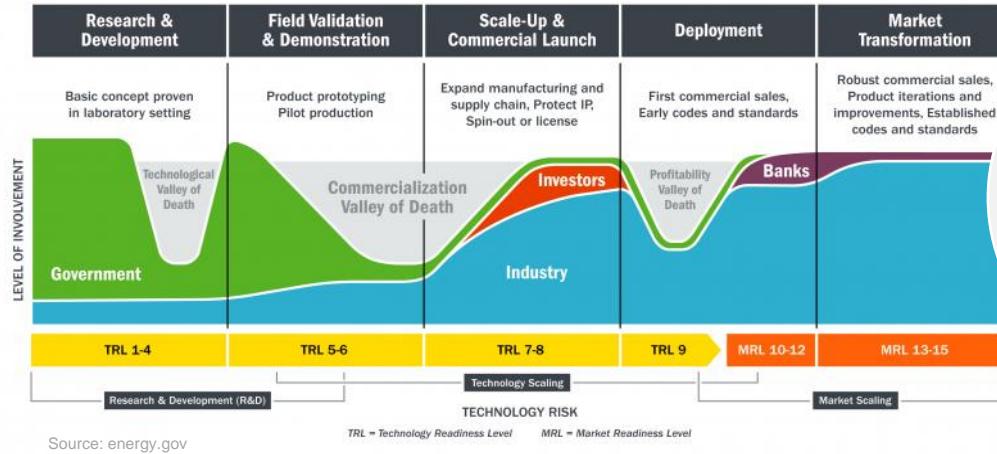
Thomas Manjarres

Technical Lead — Energy Efficiency Programs

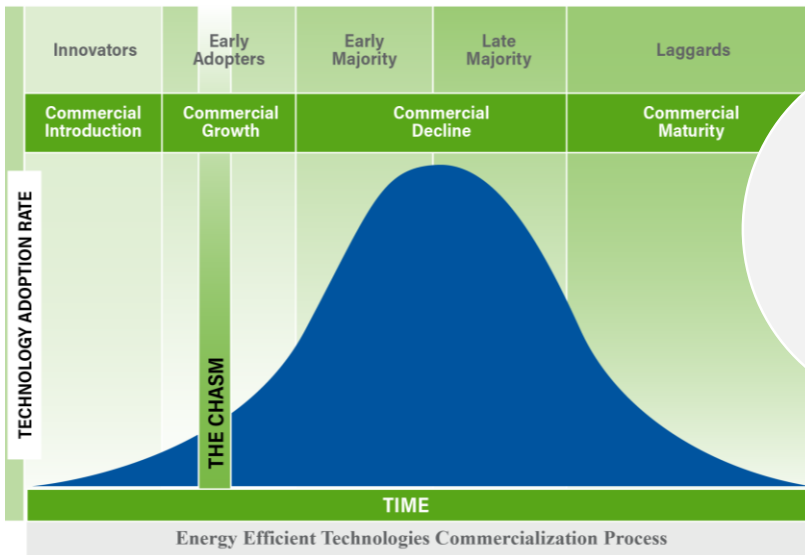




Market Transformation: Overview



Strategically intervene in markets to reduce barriers and accelerate widespread adoption of energy-efficient products, services and practices



Accelerate adoption of promising energy-efficient technologies that offer customers pathways to decarbonize



Market Transformation: Overview

How the research and development (R&D) program and the market transformation (MT) program create sustainable energy efficiency programs



Driving innovation

R&D fuels the development of breakthrough equipment, devices and solutions that keep us ahead and meet customer needs with energy-efficient solutions



Accelerates adoption

MT speeds up the process of bringing advanced technologies to market, overcoming barriers for wider use



Ensures long-term impact

Investing in R&D and MT ensures lasting energy savings and drives continuous improvement in energy efficiency



Market Transformation: Key Initiatives

Initiative	Barriers addressed		
	Gas Heat Pump at Peoples Energy Training Center	Gas Heat Pump Customer Demonstrations	CarbinX Customer Demonstrations
	<ul style="list-style-type: none">• Distributor and installer lack of awareness• Distributor and installer lack of confidence to sell• Incomplete understanding among EE implementers and Peoples Gas and North Shore Gas staff on benefits of GHPs now and into the future	<ul style="list-style-type: none">• High unit costs• High installation costs• Performance concerns• Lack of supply chains for servicing and replacement parts	<ul style="list-style-type: none">• High unit cost• Hesitation to invest in unfamiliar technologies• Customer lack of awareness• Lack of infrastructure and support network (e.g., maintenance services, parts availability)



Success Stories



PEOPLES GAS®
NORTH SHORE GAS®
ENERGY EFFICIENCY PROGRAMS

SET YOURSELF APART

Offer your customers the most energy-efficient cold-climate heating solution.



Heat Renewable Energy from Air Heat Natural

GAS HEAT PUMPS

Ask us about our rebates and FREE training opportunities.

Scan the QR code to learn more.



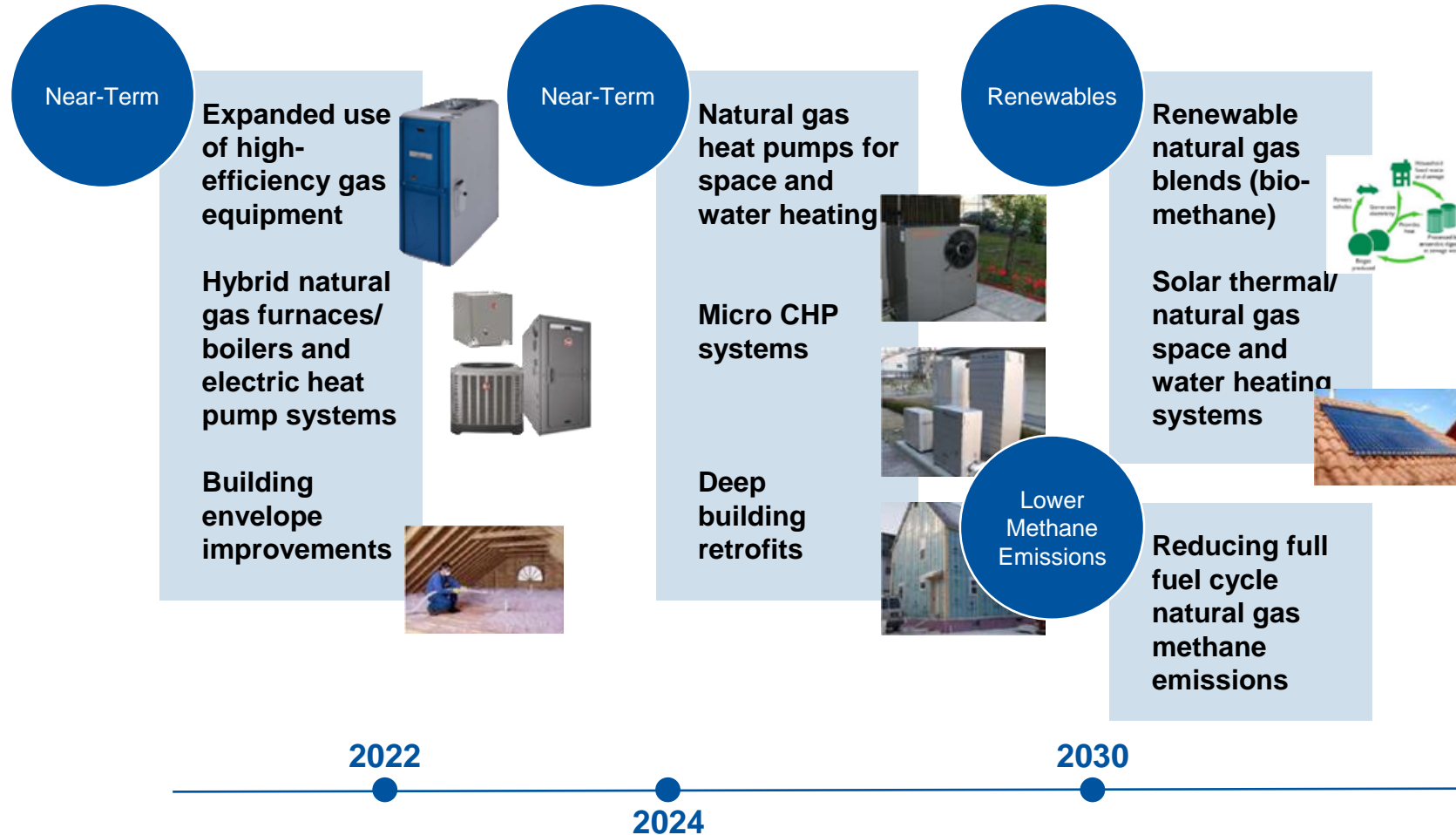
Trade and Learning Center Program is a collaborative effort between Peoples Gas and North Shore Gas. Rebates and training opportunities are available to qualified customers. See website for details.

TradeAllyCenter.com/GHP





Future Outlook: R&D Strategies for Building Decarbonization





Future Outlook

We are investing in the development of new technologies AND doing the important market transformation work to get that technology into the hands of our customers



Low-Carbon Resources Initiative (LCRI)

Accelerate the development of low- and zero-carbon energy technologies



North American Gas Heat Pump Collaborative

Accelerate the adoption of gas heat pump technologies in North America



Operations Technology Development (OTD)

Accelerate the development of low- and zero-carbon energy technologies



Emerging Technology Program (ETP)

Accelerate the commercialization of energy efficient technologies



Utilization Technology Development (UTD)

Research projects that maximize the environmental, affordability and efficiency of equipment



Awards



Honor Roll

Peoples Gas

Commitment to Efficiency

South Chicago Packing

Columbia College Chicago

Recognition in Innovation

The University of Chicago Medical Center

Cook County Department of Corrections

Newly Engaged Customers of the Year

The Merchandise Mart

Lincoln Park Zoo

North Shore Gas

Newly Engaged Customer of the Year

College of Lake County

Ivanhoe Industries Inc.

Commitment to Efficiency

Zion Elementary School District 6



Most Innovative Project: **Ogden Avenue Materials Inc.**





Commitment to Efficiency:

Golub & Co.

680 N. Lake Shore Drive





Partner of the Year: **Hilton Chicago**





Most Innovative Project:

Grayslake Community High School District 127





Commitment to Efficiency:

Captain James A. Lovell Federal Health Care Center





Partner of the Year: **Roquette Corporation**





Conclusion



Thank you



PEOPLES GAS®
ENERGY EFFICIENCY PROGRAM

NORTH SHORE GAS®
ENERGY EFFICIENCY PROGRAM