NARUC Summer Policy Summit

Committee on Gas
Tuesday, July 16 | 2:00 – 3:00 pm ET

How to Have a Reality-Rooted Discussion about the Role of Natural Gas in Our Economy

Moderator: Hon. Lawrence Friedeman, Ohio

Panelists:
Dan LeFevers, GTI Energy
Robert Kenney, PSCo Xcel Energy
Walt Trierweiler, Florida Office of the Public Counsel
James Danly, Skadden, Arps, Slate, Meagher & Flom LLP and Affiliates

GTI ENERGY

solutions that transform

Decarbonizing the Natural Gas System

Meta-Analysis of U.S. Economy-Wide Studies & Technology Solutions

Daniel S. LeFevers, Director State & Consumer Programs

GTI Energy

dlefevers@gti.energy

We are a Top Workplace

Working across the energy value chain

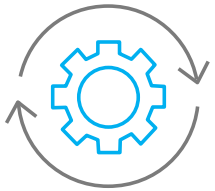
GTI ENERGY

Source

Expanding supplies of affordable, clean energy

- Subsurface production of hydrogen
- Enhanced geothermal systems
- Unconventional natural gas and oil production
- Geologic modeling and reservoir characterization
- Hydraulic fracturing diagnostics and optimization
- Hydraulic fracturing and reservoir flow modelling
- Enhanced recovery

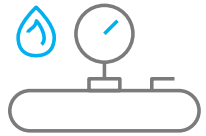
Make



Transforming natural resources into clean energy

- Hydrogen production
- Integrated biofuels technology R&D
- Syngas generation and processing
- Carbon management
- CO_2 capture and utilization
- Chemical research and process development
- Renewable natural gas and gas quality
- Gasification process development

Move & Store



Ensuring safe and reliable energy infrastructure

- Methane emissions, monitoring, mitigation, and reduction
- Data integrity and risk management
- Infrastructure rehabilitation and improvements
- Environmental matters, enabling renewable gas, and gas quality
- Smart utility information technology tools
- Materials and analytical testing
- CO_2, H_2, and natural gas underground storage

Use

Delivering solutions for efficient and environmentally responsible energy use

- Residential/commercial appliances, equipment, and building systems
- Industrial process heat and steam
- Power generation and combined heat and power
- Alternative transportation fuels
- Natural gas-solar thermal hybrid equipment
- CO_2 capture and utilization

GTI Energy's Excellence in Collaborations

GTI ENERGY

GTI ENERGY NZIP Net Zero Infrastructure Program

OTD Operations Technology Development

UTD Utilization Technology Development

GTI ENERGY SUSTAIN H_2

VERITAS

OPEN HYDROGEN INITIATIVE

GTI ENERGY S&P Global Commodity Insights

GTI ENERGY HyRes Hydrogen Emissions Research Consortium

GTI ENERGY center for METHANE RESEARCH

CH_4 COLLABORATORY TO ADVANCE METHANE SCIENCE

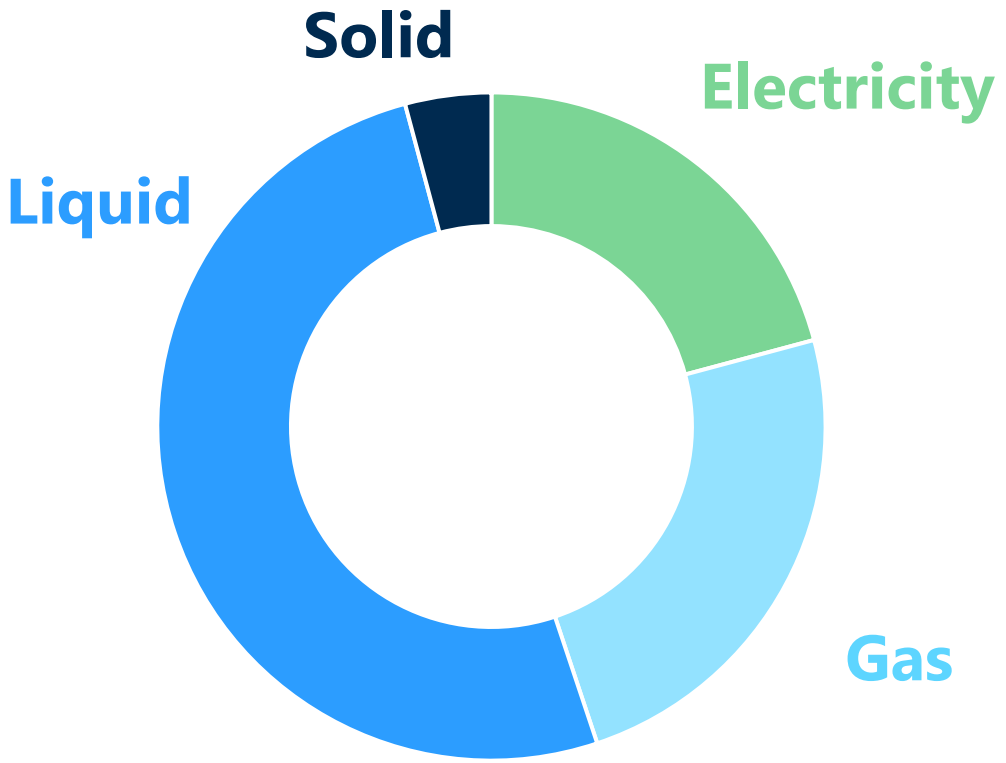
cmic carbon management information center

LCRI LOW-CARBON RESOURCES INITIATIVE

ETP Emerging Technology Program

Today's Energy System

U.S. Final End-Use Energy Consumption (2020, Quad Btu)



Based on EIA data
Excludes non-energy uses of fuels

Today's Energy System

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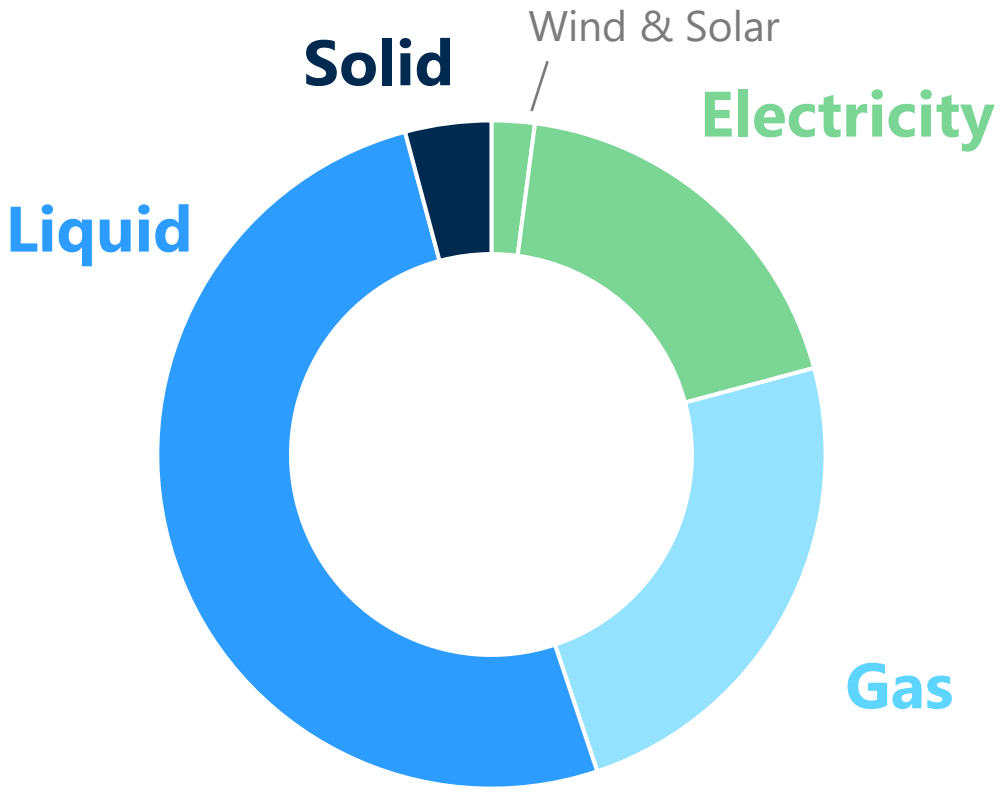

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Today's Energy System

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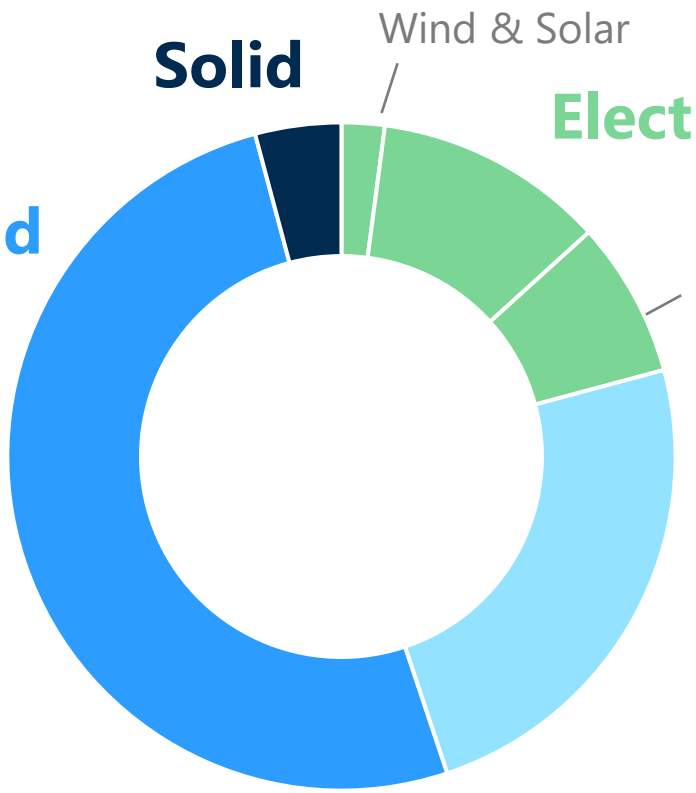


Liquid storage capacity is capable of meeting average demand for **~7 weeks**

Gas storage capacity is capable of meeting average demand for **~8 weeks**

Based on EIA data
Excludes non-energy uses of fuels

Meta NZ Study

5
independent, economy-wide studies

23
scenarios for least cost paths to net-zero

Meta-Analysis of Leading U.S. Economy-Wide, Net-Zero Studies

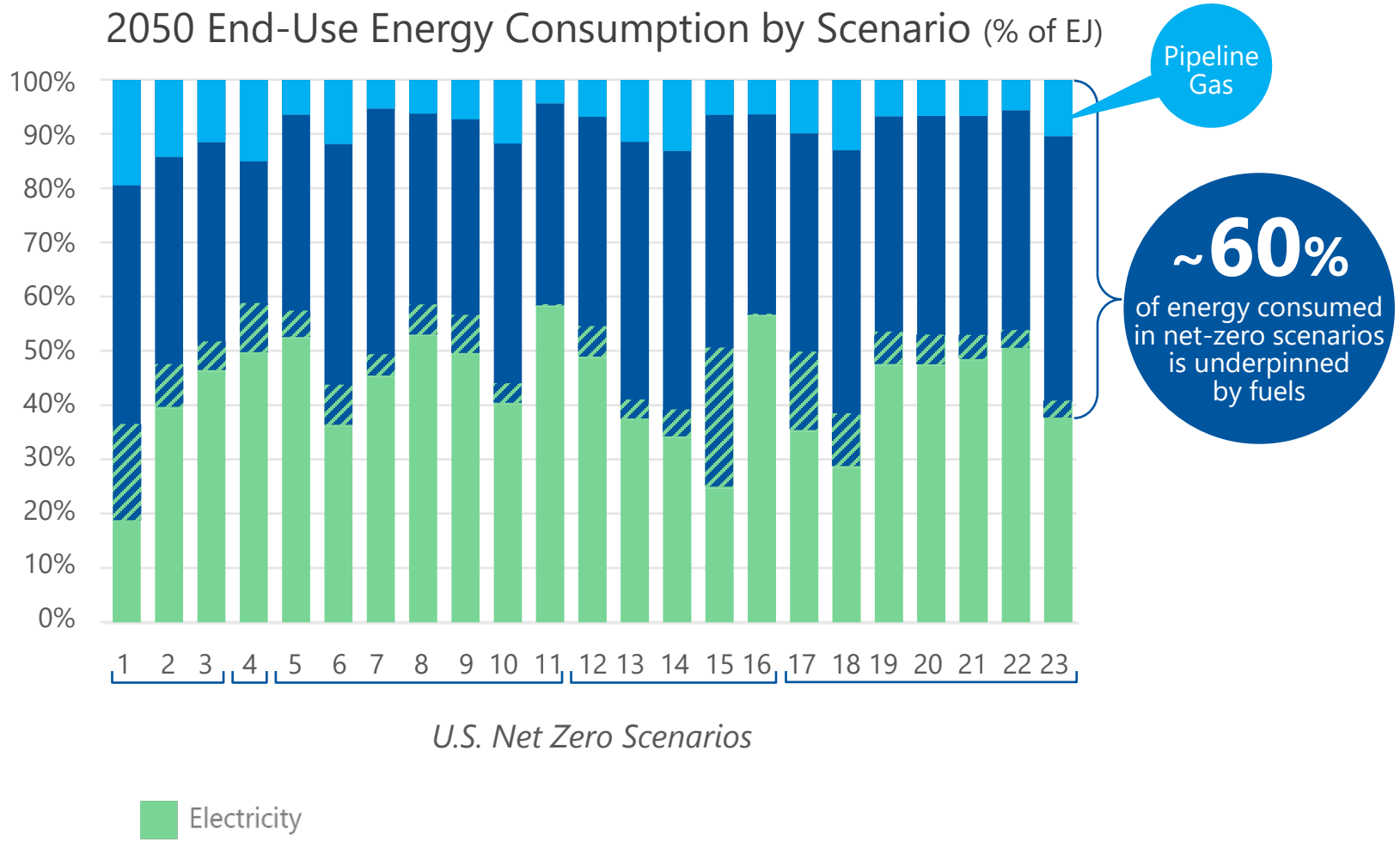
1. Low Carbon Resources Initiative (*EPRI, GTI Energy*)
2. Open Energy Outlook (*Carnegie Mellon University, NC State*)
3. Evolved Energy Research
4. Princeton University
5. Decarb America (*Bipartisan Policy Center, Clean Air Task Force, Third Way*)

ALL scenarios achieve net-zero by leveraging:

- Low-carbon fuels
- Expanded electrification
- Renewable energy
- Pipeline gas
- Existing infrastructure

full report available at: gti.energy/meta-nz/

The Enduring Role of Fuels in Net-Zero Systems



Pipeline Gas in Net-Zero Energy Systems

- **low-carbon molecules** are blended into the gas supply in **every** net-zero scenario
- **carbon capture and sequestration** is coupled with gas-fired activities to **abate** emissions
- **carbon dioxide removal** is leveraged to **balance** remaining positive emissions

Why Pipeline Gas?

Infrastructure

today, gas underpins **one third** of total U.S. final **end-use energy consumption**

gas **storage capacity** capable of meeting average U.S. demand for **8 weeks**

3 million miles of gas **pipelines**

Residential Space and Water Heating: **Hybrid or Dual Fuel Heat Pumps**

- **"Hybrid" space conditioning systems**

  1. Replace conventional air conditioner with electric heat pump (electric EE programs)

  2. Retain/use high-efficiency gas furnace as appropriate (natural gas EE programs)

  3. Smart thermostat chooses electric or gas space heating depending on outdoor temperature, operating cost, or other factors

- **"Hybrid" space conditioning systems** create opportunities for consumers to improve efficiency and reduce costs and emissions.

Residential Space and Water Heating: **Gas Heat Pumps**

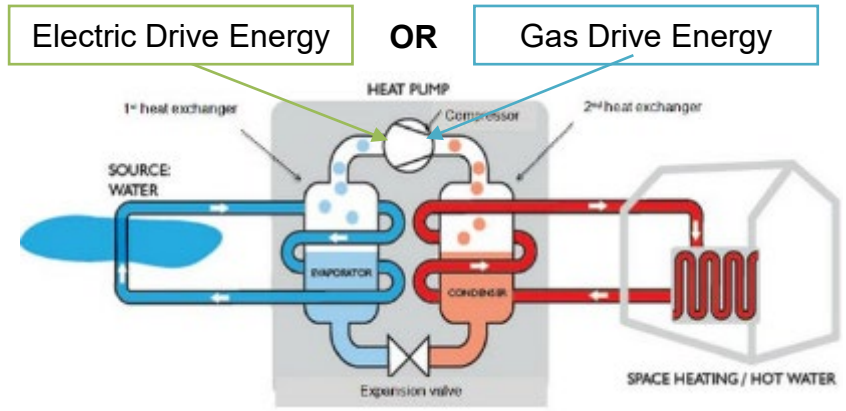
GTI ENERGY

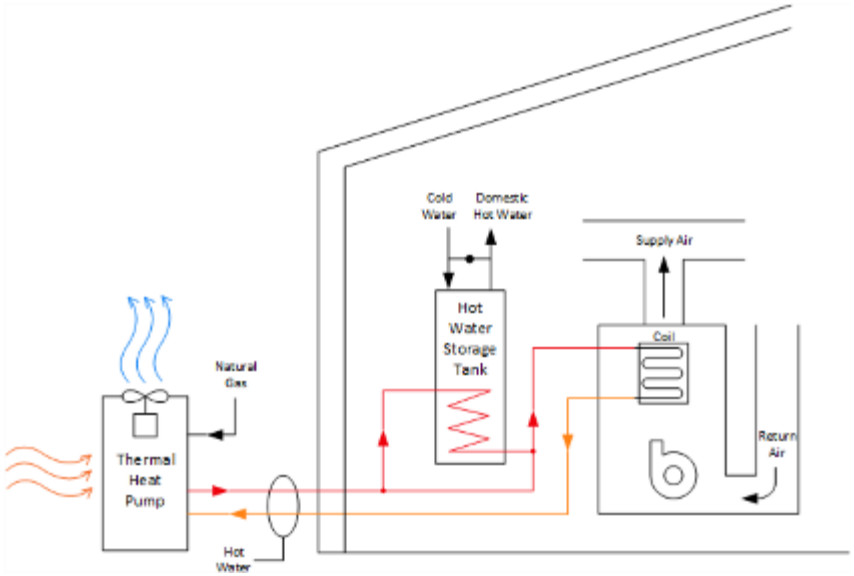
What is a Gas Heat Pump?

- Just like an electric heat pump, it sits outside and extracts heat from the outside air.
- The difference, it uses heat instead of an electric compressor to drive process

Why do we need Gas Heat Pumps?

- *Best-in-class operating efficiency*
  - Condensing furnace is 95-98 AFUE vs GHP is 140 AFUE
  - GTI Energy field demos showed 33-46% therm savings (space and water heat)
- Systems operate during the coldest days, meeting the heating load without back-up resistance heating
- Commonly use natural refrigerants with low/no GWP
- 30-50% reduction in operating GHG emissions, with combustion outside

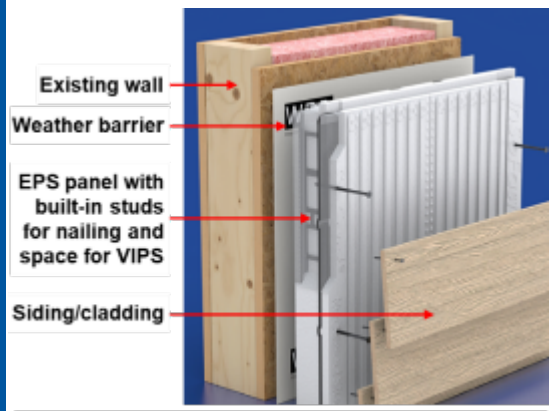




Typical Residential Installation

Image Source: Ninikas, Konstantinos & Hytiris, N & Emmanuel, R & Aaen, Bjorn & McMillan, S. (2014). A renewable heat solution for water ingress in the Glasgow subway tunnel system. 161-171. 10.2495/ESUS140141.

Building Space Conditioning Energy Use: **Envelopes**



Courtesy of InSoFast

Skinny R30 Wall Retrofit Systems - InSoFast

- (NYSERDA, UTD, NEEA)
- Taking existing commercialized ICF panel and fabricating with R-50 VIP inserts for area-weighted R30 in 3.5" thick retrofit
- Advancing from feasibility testing to prototype development; demonstration in NY planned late 2024

Comm-INDOWS

- Advanced secondary window system (SWS) (CEC, NEEA, SoCalGas)
- Targeting commercial buildings
- Laboratory testing with field validation
- Triple-pane, aerogel, and vacuum glass options
- Alpen, Inovues, AeroShield, V-Glass, LBNL

Robotics in Deep Energy Retrofits

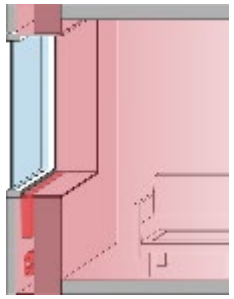
- NYSERDA, National Fuel
- Increase cost-effectiveness with robotics
- Reduce time for panelized retrofits

USACE – Advanced Glazing Systems

- Evaluating commercialized products working with Alpen and Inovues
- Testing both double-pane and vacuum glass

Solar Cogeneration

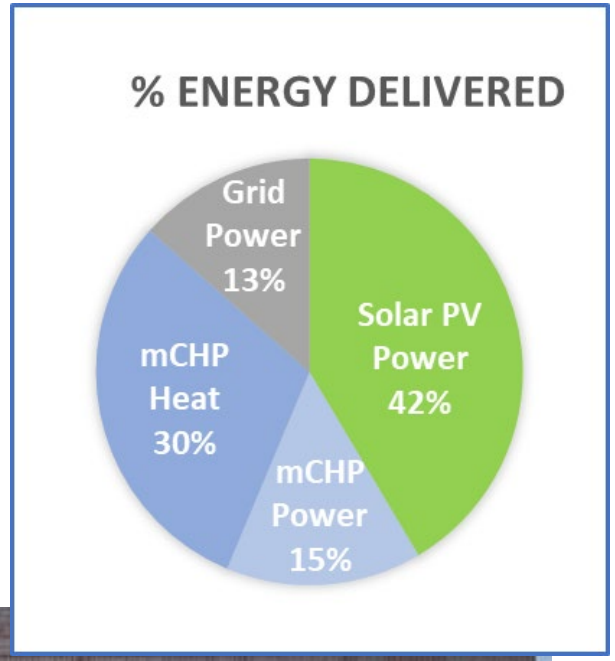
- Solar thermal behind PV (PVT)
- Heat sink improves kWh generation (perhaps ~5% / yr)
- PVT + heat pumps can assist cold-climate capacity
- Capable of nighttime heat rejection for cooling savings

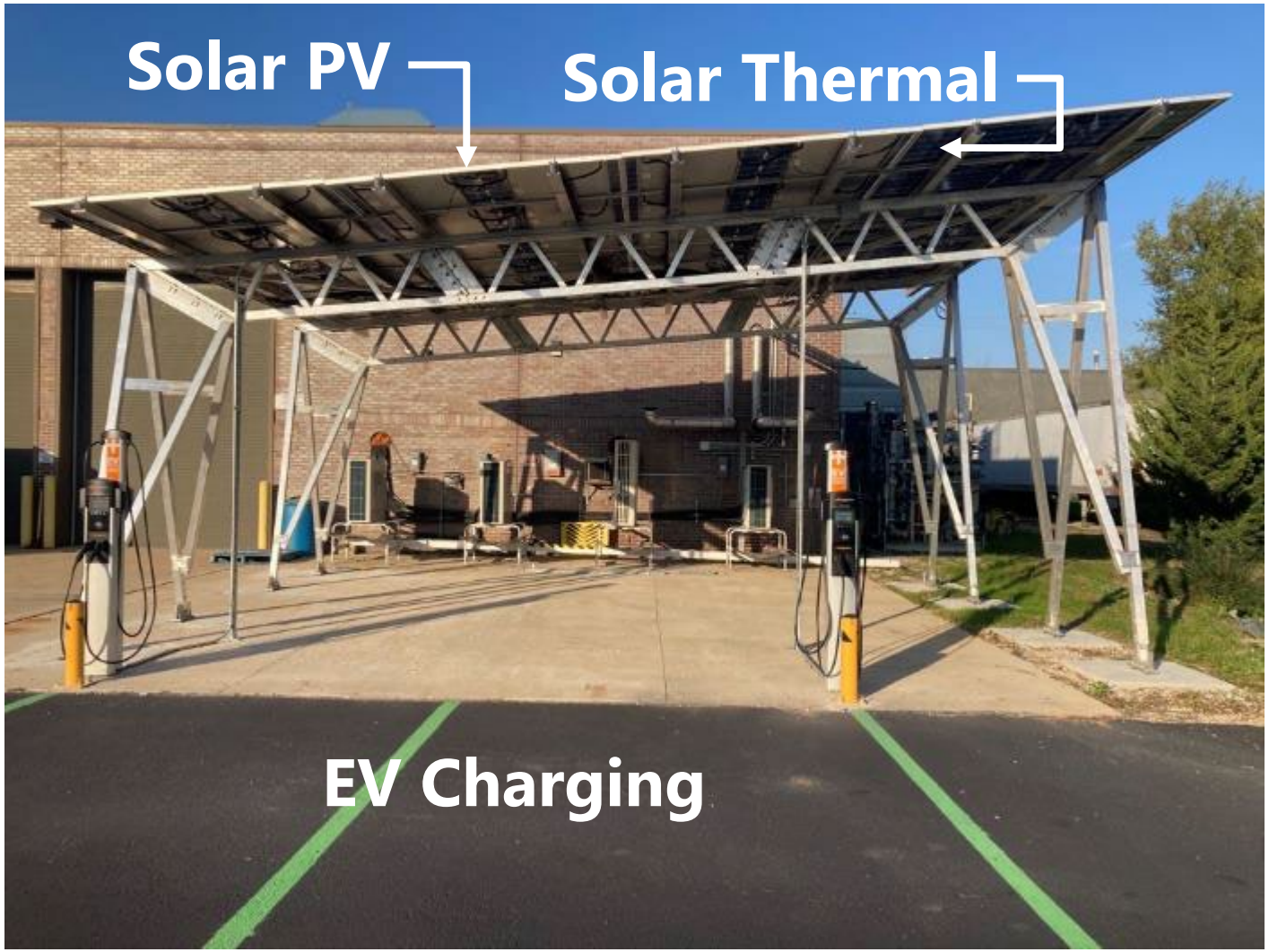


Integrated Envelope+Mech - Hydronic Shell

- Water-based heat/cooling/vent
- Paired with rooftop A2W heat pump
- Non-invasive install w/ R30 wall retrofit

Whole Building Integrated Solutions:
GTI Energy's Microgrid Test Bed





Decarbonizing Pipeline Gas

Using Renewable Gas or Clean Hydrogen

RNG and clean hydrogen can have carbon intensities (CI's) that are low, zero or negative depending on production process and feedstocks

- *Landfill gas (LFG)*
- *Animal manure*
- *Water resource recovery facilities (WRRF)*
- *Food waste*

- *Agricultural residue*
- *Forestry and forest product residue*
- *Energy crops*
- *Municipal solid waste (MSW)*

- *Renewable electricity*

Renewable gases can be used to decarbonize gas space heating or gas power generation and production processes can be coupled with CO2 sequestration to achieve negative CI's

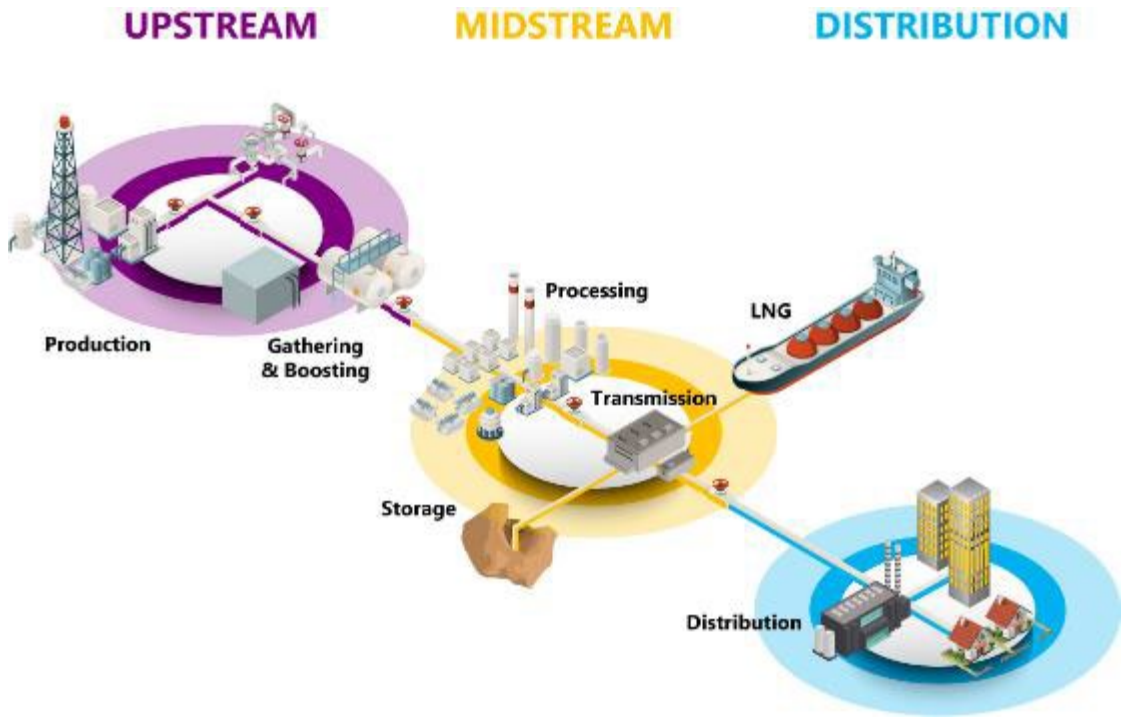
Veritas: Measurement to Reduce Methane Emissions

GTI ENERGY

Veritas has four Technical Protocols

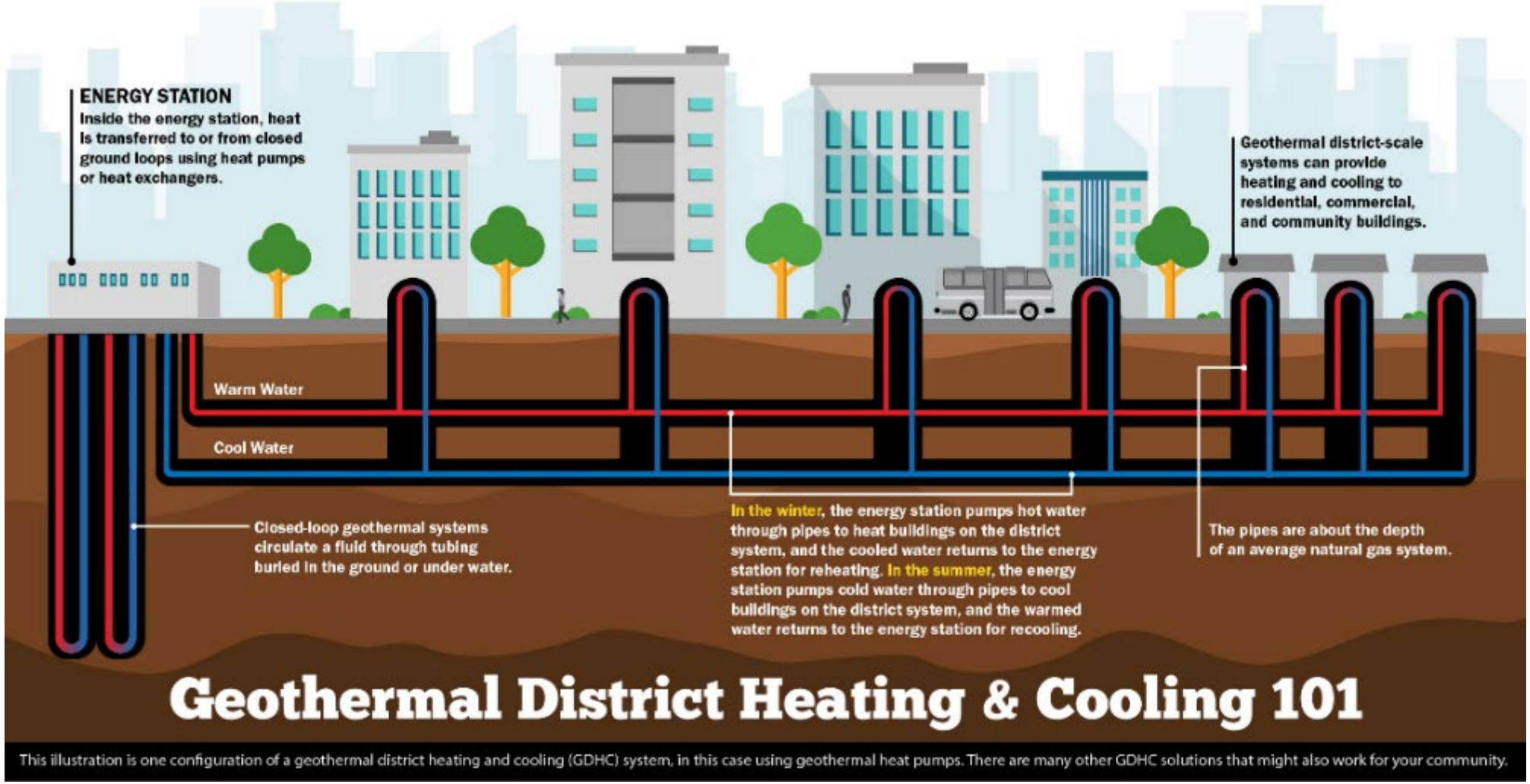
- **Measurement & Reconciliation:** Describe how to take measurements and reconcile emission-factor inventories with actual measurements
- **Methane Emissions Intensity:** Define methane intensities
- **Value Chain Summation:** Add multiple segments to reach a total emissions intensity
- **Assurance:** Provide guidance for verifying emissions inventory

Veritas covers **six segments** of the natural gas supply chain:



https://veritas.gti.energy/

What is Network Geothermal?



Source: U.S. DOE

Hydrogen Pathways for Gas Decarbonization

GTI ENERGY

Centralized Hydrogen Production

Blending into Current Grid

How do H_2/NG blends impact existing **customer gas assets and gas-fired equipment?**

Studying the blended hydrogen safety/efficiency/emissions impacts

Convert to Hydrogen Dist.

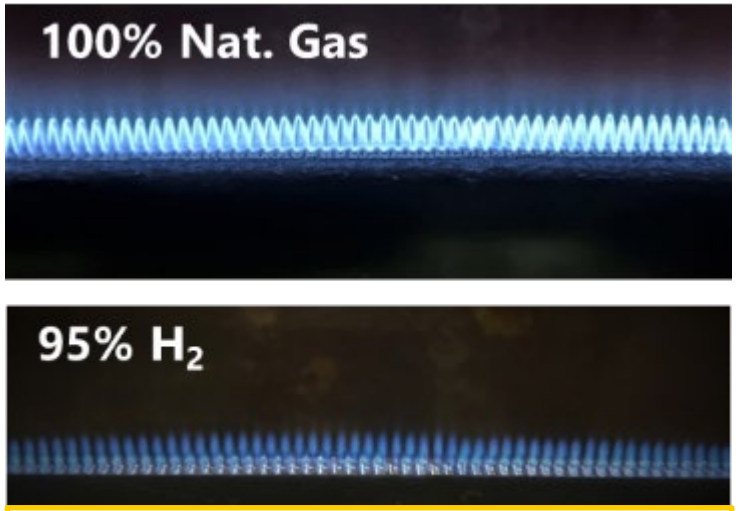
How can we assure that new gas equipment and retrofits are **hydrogen-ready?**

RD&D/Tech Transfer with equipment and sensors for hydrogen end use

Dist. H_2 Generation

Hydrogen Microgrids

How do we design and prepare for **hydrogen fuel-flexible systems?**

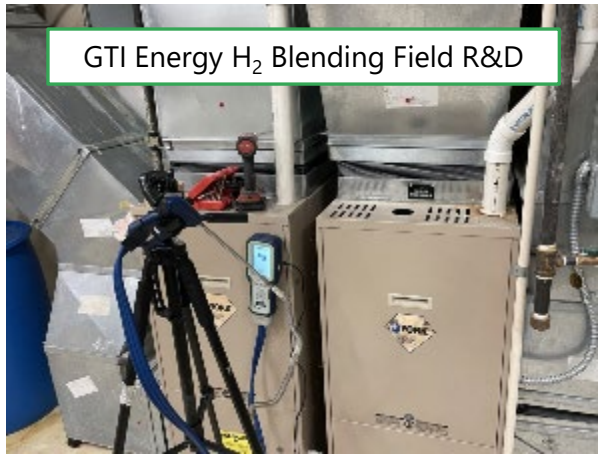


Developing and demonstrating fuel-flexible combustion/CHP systems

Hydrogen Economy – Utility Investments

- RNG/Biomethane, Bio-LPG, available in many markets to reduce GHG emissions
- SNG/E-methane projects underway, H_2 with captured CO_2
- Numerous States/Provinces have one or more H_2/NG blending demo projects in planning/underway
  - Several involving 100s – 1,000s of utility customers
- H_2 distribution projects are ramping up in US/Canada

Many North American natural gas companies have active H2 demo projects



GTI Energy H_2 Blending Field R&D

CenterPoint Energy

Oklahoma Natural Gas

Nicor Gas

Dominion Energy

NW Natural

TECO Peoples Gas

Southwest Gas

ENBRIDGE Life Takes Energy

nationalgrid

SoCalGas

PG&E

Buildings – Project Portfolio by GHG Savings

Near-Term (25-50+%)

Expanded use of high-efficiency gas equipment

Hybrid natural gas furnace/ boilers and electric heat pump systems

Building envelope improvement

Next-Gen (40-60+%)

Heat pumps for space & water heating

Micro CHP systems

Deep building retrofits

Renewables (Added 10-30%)

Renewable gas blends (bio-methane, hydrogen)

Solar thermal/natural gas space & water heating systems

Lower Methane Emissions (5-10%)

Reducing full-cycle natural gas methane emissions

Summary

- Meta NZ analysis shows gases and fuels will be used in 2050 net zero scenarios
- Natural gas is a very large portion of our nation's energy mix
- All decarbonization solutions have costs
  - Which ones will be most cost effective in short, medium and long term?
  - Continued analysis and R&D needed
- Decarbonization opportunities
  - Hybrid natural gas/electric space heating systems
  - Thermal heat pumps
  - Building envelope & deep EE retrofits
  - Micro CHP – onsite renewables and power
  - Decarbonizing pipeline gas (renewable gas, H_2, CO_2 capture)
  - Network or community geothermal
  - Reduction of upstream methane emissions

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Xcel Energy®

How to Have a Reality-Rooted Discussion about the Role of Natural Gas in Our Economy

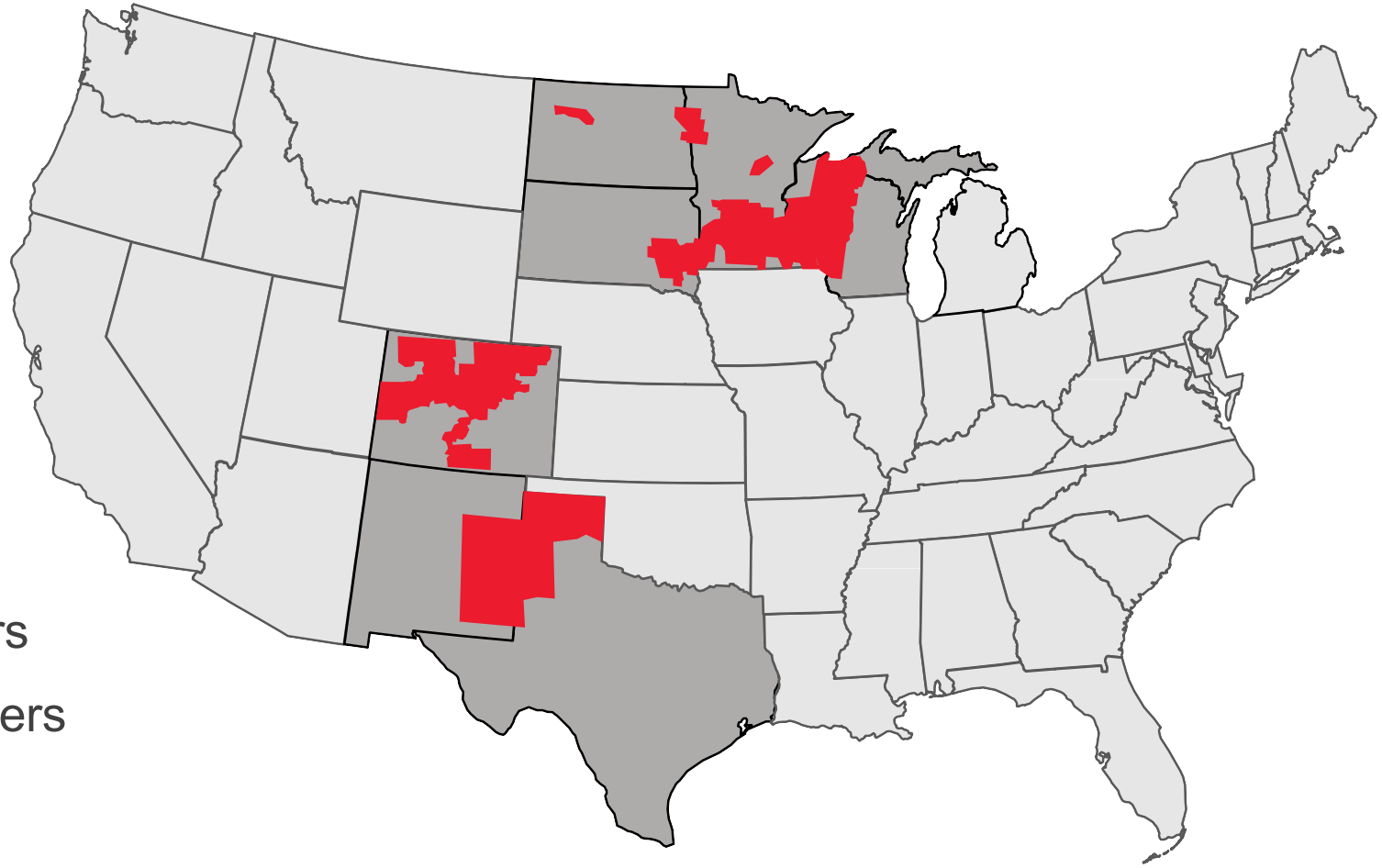
NARUC Summer Policy Summit

Robert S. Kenney | President, Xcel Energy, Colorado.

JULY 16, 2024

NATIONALLY RECOGNIZED LEADER

- Wind energy
- Energy efficiency
- Carbon emissions reductions
- Innovative technology
- Storm restoration



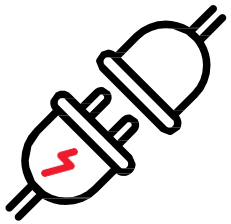
SERVING EIGHT STATES

- **3.7 million** electricity customers
- **2.1 million** natural gas customers

Xcel Energy®

XCEL ENERGY

Colorado



1.6 Million
Electric Customers

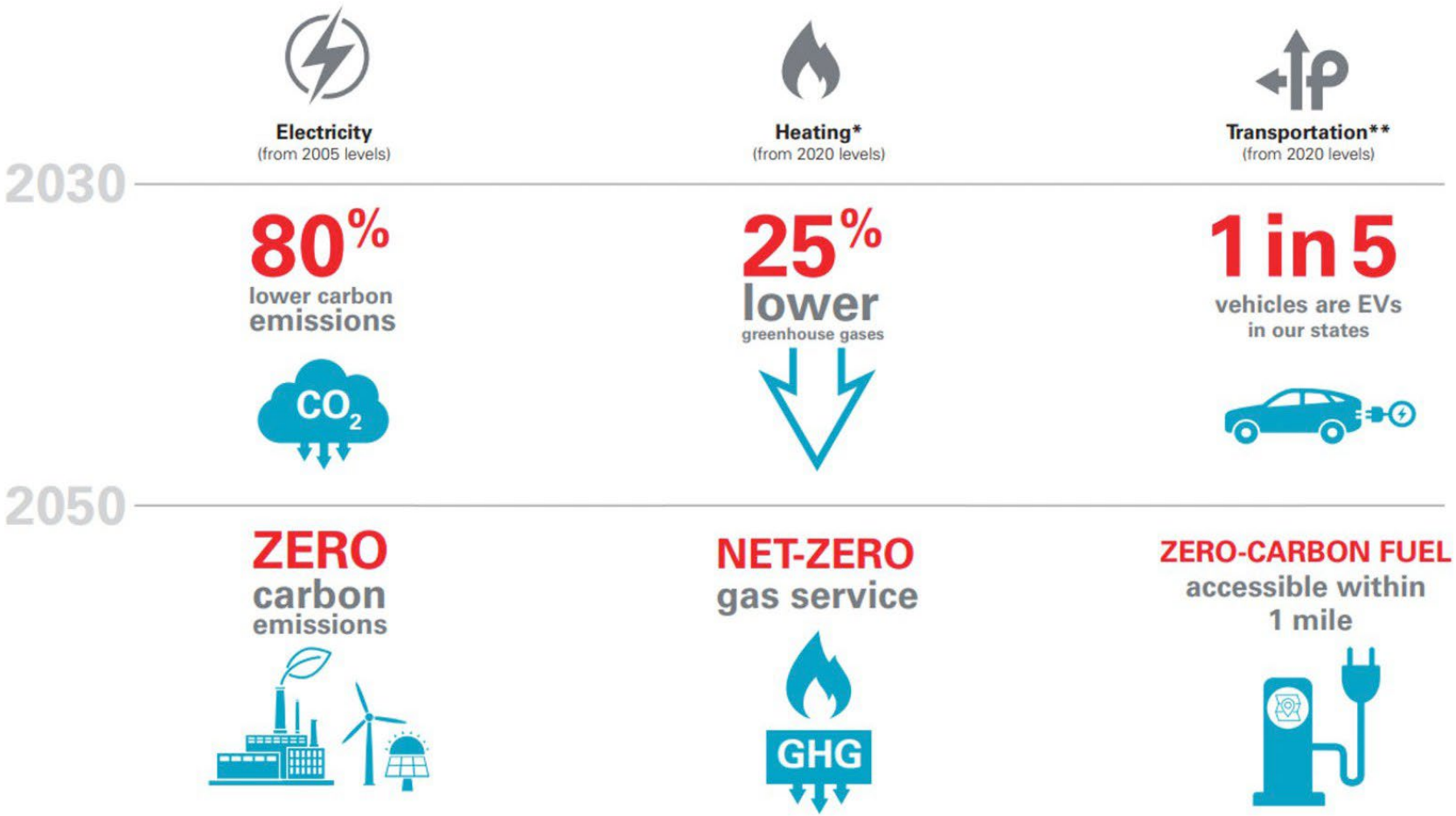
1.5 Million Natural
Gas Customers

99.98% Electric
Reliability

Xcel Energy®

NET-ZERO ENERGY PROVIDER BY 2050

Goals that cover all the ways our customers use energy



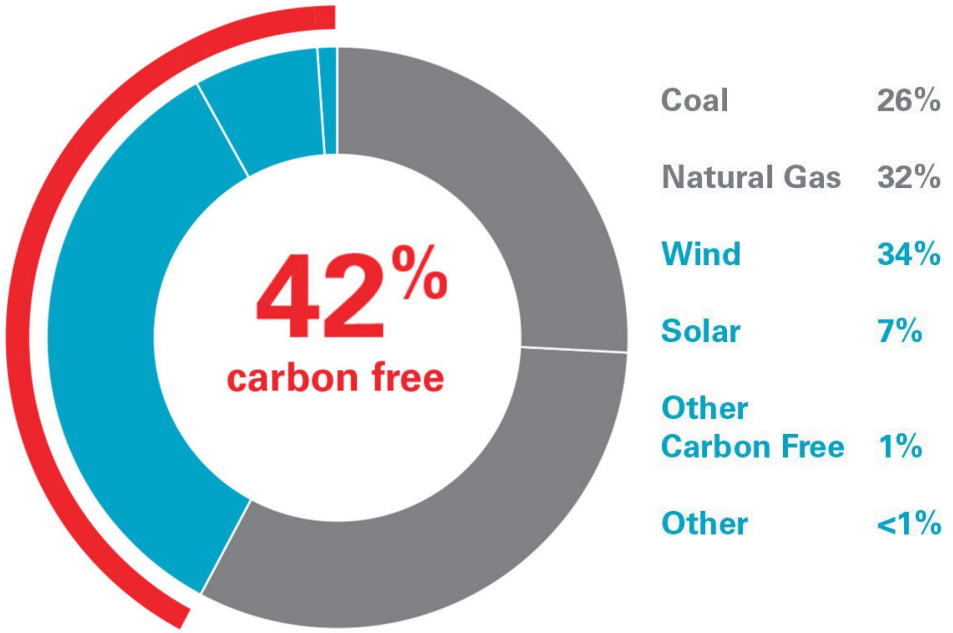
*Spans natural gas supply, distribution and customer use

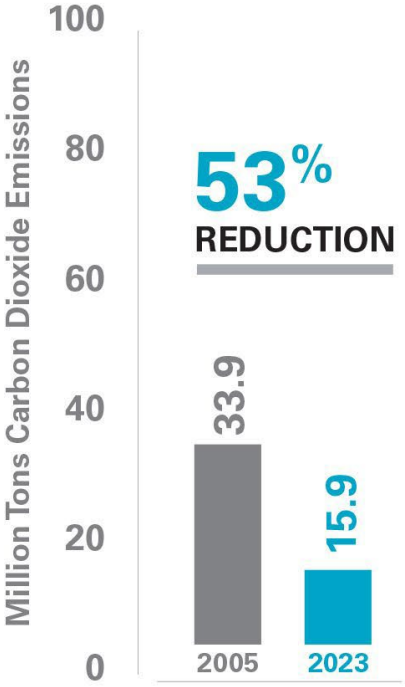
**Includes the Xcel Energy fleet; zero-carbon fuel is electricity or other clean energy

Xcel Energy®

COLORADO'S CHANGING ENERGY MIX

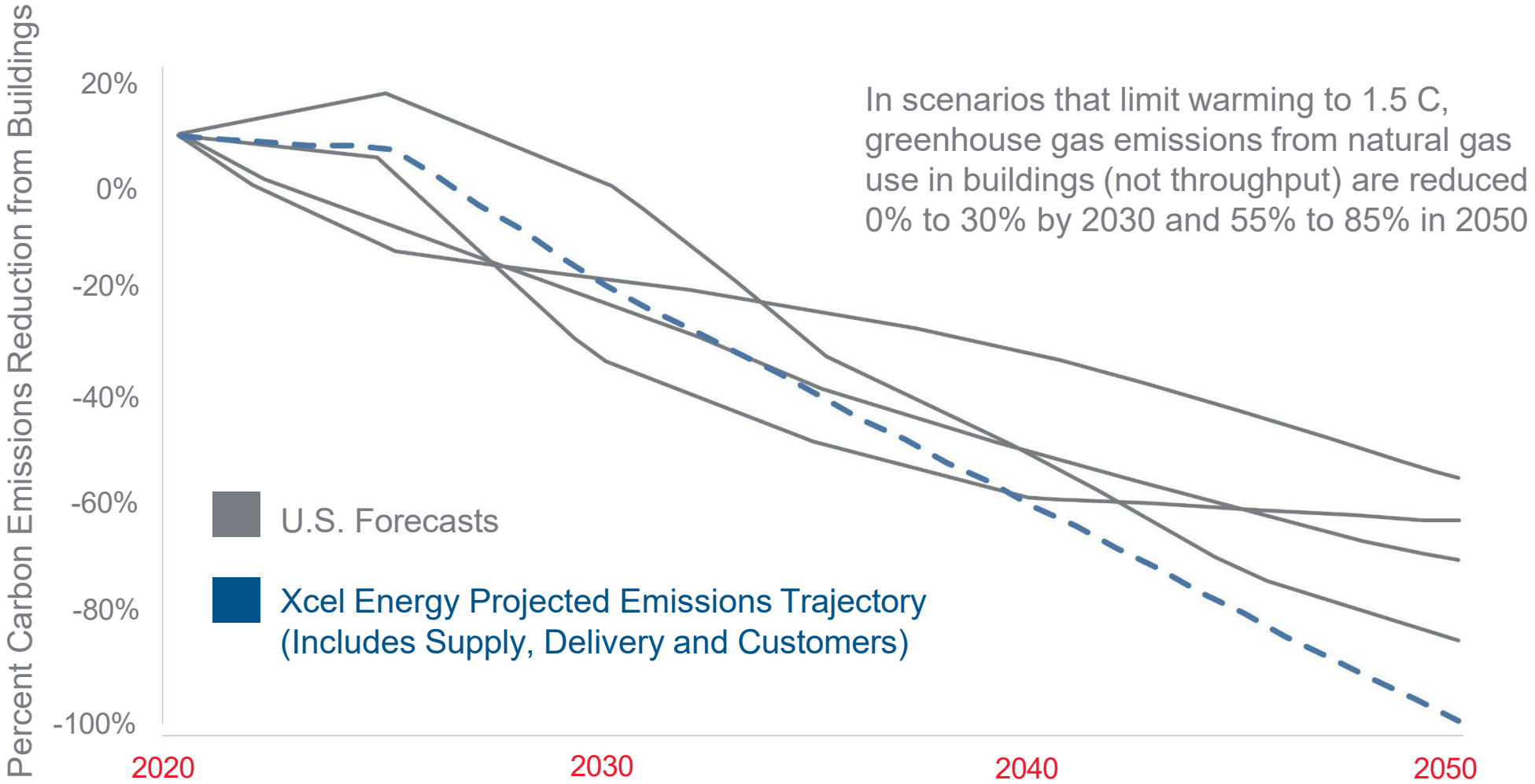
2023 Energy Mix – PSCo





ALIGNED WITH THE CLIMATE SCIENCE

Our net-zero vision for natural gas is consistent with scenarios likely to limit warming to 1.5 degrees Celsius

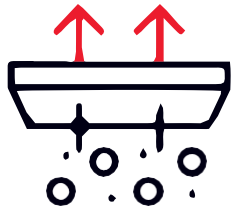


GHG POLICY, APPLIED IN COLORADO TO LDCS

	Source	Baseline Year	2030 Reduction Target	2050 Reduction Target
Colorado economy-wide GHG targets	HB19-1261; SB23-016	2005	50%	~~90%~~ 100%
Colorado gas LDC GHG targets	SB21-264 ("Clean Heat" statute)	2015	22%	TBD, set by PUC by 12/1/2032
Xcel Energy gas LDC Net Zero Vision	Company strategy, 2021	2020	25%	100% (net)

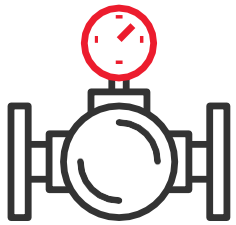
CLEAN HEAT PLANS AND GAS INFRASTRUCTURE PLANS

Over the past two years, Colorado policymakers have implemented requirements for new regulatory filings (Clean Heat Plans and Gas Infrastructure Plans) to provide additional transparency and oversight into how Gas IOUs plan for and operates its Colorado gas LDC system.



Clean Heat Plans

- Source: SB 21-264
- Focused on reducing emissions from end use combustion and leakage (4% by 2025, 22% by 2030)
- Filed no less than every four years
- Filed as an Application (subject to discovery, hearing, etc.)



Gas Infrastructure Plans

- Source: PUC Rulemaking
- Focused on new gas infrastructure investments (e.g. new business and capacity expansion projects)
- Filed every two years
- First plan will be filed as an informational plan, subsequent plans filed as Applications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2024 NARUC SUMMER POLICY SUMMIT

HOW TO HAVE A REALITY-ROOTED DISCUSSION ABOUT THE ROLE OF NATURAL GAS IN OUR ECONOMY

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(850) 717-0326

FLORIDA OFFICE OF PUBLIC COUNSEL

IMPACT OF NATURAL GAS ON FLORIDA'S ECONOMY

- 100% GROWTH BETWEEN 1997-2018 AND ACCELERATING
- 44K NEW JOBS ANNUALLY
- 735K HOMES & 68K COMMERCIAL/INDUSTRIAL ACCOUNTS
- ECONOMIC IMPACT=$3.5B, $1.9B WAGES, $317K IN TAXES
- SAVES AVERAGE HOUSEHOLDS ABOUT $1K PER YEAR
- RESILIENCY: BACK-UP ENERGY SOURCE FOR APPLIANCES AND FUEL FOR GENERATORS

FLORIDA'S REGULATORY FRAMEWORK

- REGULATED BY THE PUBLIC SERVICE COMMISSION
- NATURAL GAS: NOT ESSENTIAL, NO DUTY TO SERVE
- GROWTH HISTORICALLY A RESPONSE TO SPECIFIC INDUSTRIAL AND COMMERCIAL DEMAND
- UTILITIES HAVE A RIGHT TO SERVE TERRITORY TO RECOVER COSTS FOR INSTALLED INFRASTRUCTURE

SOURCE: FNGA

CLASH OF THE TITANS

PEOPLES GAS SYSTEM vs. SOUTH SUMTER GAS COMPANY, LLC

Florida Division of Administrative Hearings Agency Case No. 20180055-GU

- RACE TO SERVE LITIGATION BETWEEN INCUMBENT PUBLIC GAS UTILITY, AND AN INNOVATIVE RESIDENTIAL DEVELOPER (THE VILLAGES)
- THE VILLAGES' PLAN: ESTABLISH THEMSELVES AS THE LOCAL UTILITY AND SPECIAL TAXING DISTRICT
- PEOPLES' RESPONSE: CONTINUE TO SERVE THIS TERRITORY AND REMOVE VILLAGES UNSAFE DISTRIBUTION LINES WHICH CROSSED EXISTING LINES
- NEGOTIATIONS FAILED, LITIGATION ENSUED

WHEN THE STATUS QUO AND THE FUTURE COLLIDE

BEFORE ENGAGING IN LITIGATION:

- EXAMINE THE CONFLICT
- DEFINE THE PROBLEM
- IDENTIFY THE ACTORS
- CONDUCT RISK/BENEFIT ANALYSIS
- ESTABLISH YOUR DESIRED END STATE
- NEGOTIATE ALTERNATIVE RESOLUTION WHEN POSSIBLE

CASE STUDY: RNG

UNDER A NEW TARIFF, PGS PROPOSED 3 INNOVATIVE RNG PROJECTS IN THEIR 2023 RATE CASE

OPPORTUNITY:

- 2022 PERMISSIVE FLORIDA STATUTE ENCOURAGED THE DEVELOPMENT AND USE OF RENEWABLES

RISK:

- THIS IS FLORIDA. LDCs HAVE NO DUTY TO SERVE. NO CARBON MANDATE.
- THE ENABLING LEGISLATION FAILED TO PROVIDE FINANCIAL BENEFITS OR CREDITS TO OFFSET INCREASED PLANT COSTS

3 RNG PROJECTS

- NEW RIVER RNG PROJECT-INTERCONNECTION
- BRIGHTMARK RNG PROJECT-BIO CONDITIONING AND INTERCONNECTION
- ALLIANCE DAIRY RNG-MANURE TO METHANE DEVLOPMENT FUNDED BY THE CREDIT MARKET
- 2023 STIPULATION: UTILITY TOOK THE FIRST 2 RNG PROJECTS ABOVE THE LINE, THE DAIRY PROJECT BELOW THE LINE, AND ALL FUTURE RNG PROJECTS LIMITED TO INTERCONNECTS

THE SHIFTING REGULATORY LANDSCAPE

FLORIDA'S NEW ENERGY LAW, EFFECTIVE JULY 1, 2024:

- PROHIBITS COMMUNITY LIMITATIONS ON TYPES OF FUEL
- INCREASED PLACEMENT OF NATURAL GAS RESILIENCY FACILITIES
- INCREASED MINIMUM CERTIFICATION LENGTH OF NG PIPELINE
- INCREASED CRIMINAL PENALTIES FOR DAMAGE TO PIPELINES

- REPEALED: RENEWABLE ENERGY & ENERGY-EFFICIENT TECHNOLOGY PROGRAMS, GREEN GOVERNMENT GRANTS, ENERGY ECONOMIC ZONE PILOT PROGRAM, AND QUALIFIED ENERGY CONSERVATION BONDS PROVISIONS

FLORIDA'S NEW ENERGY LAW 2024

The purpose of the state's energy policy is to ensure an adequate, reliable, and cost-effective supply of energy for the state in a manner that promotes the health and welfare of the public and economic growth.

WHAT CHANGED IN FLORIDA'S ENERGY POLICY GOALS?

NEW FOCUS ON COST-EFFECTIVENESS AND AFFORDABILITY

IMPACT: UNKNOWN

CHANGE IS THE ONLY CONSTANT

- ARTICULATE A VISION THAT IS STRONGER THAN THE SUM OF ANTICIPATED RISKS AND UNCERTAINTIES
- WE ARE ROME!
- TALENT: RECRUIT, ENTRUST, EMPOWER, AND REWARD
- FORGE ADAPTIVE TEAMS OF SUBJECT-MATTER EXPERTS
- SECURE ALLIES AND FORM COALITIONS
- POSITIVELY ENGAGE WITHIN YOUR SPHERE

CONTINUE THE MISSION

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NARUC Summer Policy Summit

Committee on Gas
Tuesday, July 16 | 2:00 – 3:00 pm ET

How to Have a Reality-Rooted Discussion about the Role of Natural Gas in Our Economy

Moderator: Hon. Lawrence Friedeman, Ohio

Panelists:
Dan LeFevers, GTI Energy
Robert Kenney, PSCo Xcel Energy
Walt Trierweiler, Florida Office of the Public Counsel
James Danly, Skadden, Arps, Slate, Meagher & Flom LLP and Affiliates

NARUC Summer Policy Summit

This session has concluded.

The general session begins at 3:30 pm in the Grand Ballroom.