# Peoples Natural Gas:
# Advancing the Future of Energy

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# Topics

- **Peoples Overview**
- **Peoples Sustainability Efforts**
- **Hydrogen Production: The Color Spectrum**
- **Current Utility Hydrogen Hurdles**
- **Peoples Hydrogen Pilot**
- **Scalable Solution?**
- **Implementation Strategy**
- **Unique Applications**

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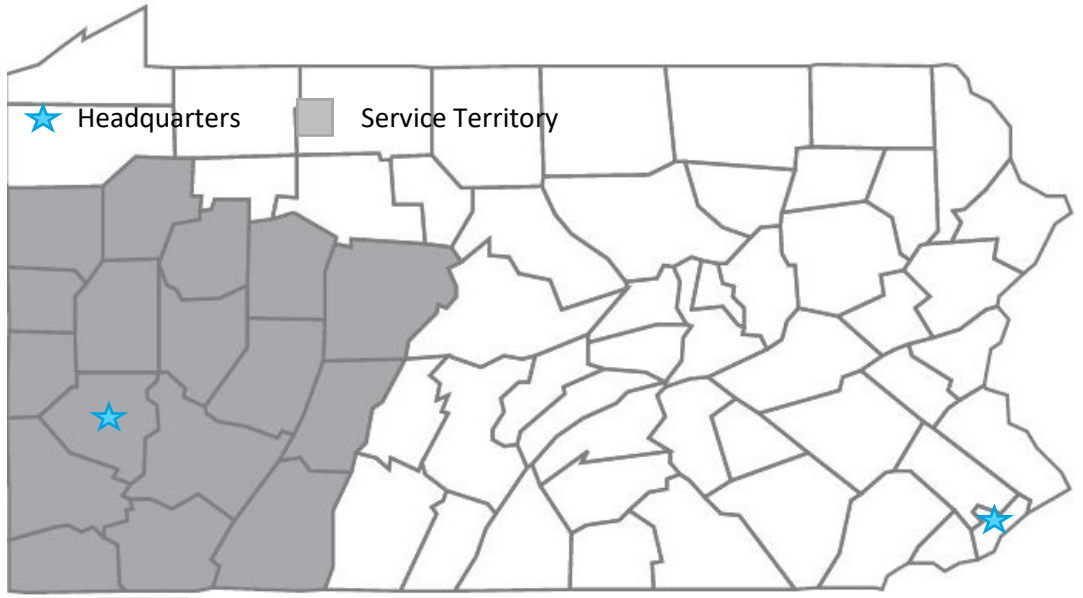
# Peoples Natural Gas: Who are We?

- **Subsidiary of Essential Utilities**
  - Peoples Natural Gas
  - Aqua America
  - Parent company to Delta Natural Gas (Kentucky)

- **Headquarters in Pittsburgh & Bryn Mawr**

- **Serving Western PA for nearly 140 years**

- **Largest Natural Gas LDC in PA**
  - 700k Customers in 18 Counties
  - 15,000 miles of pipeline

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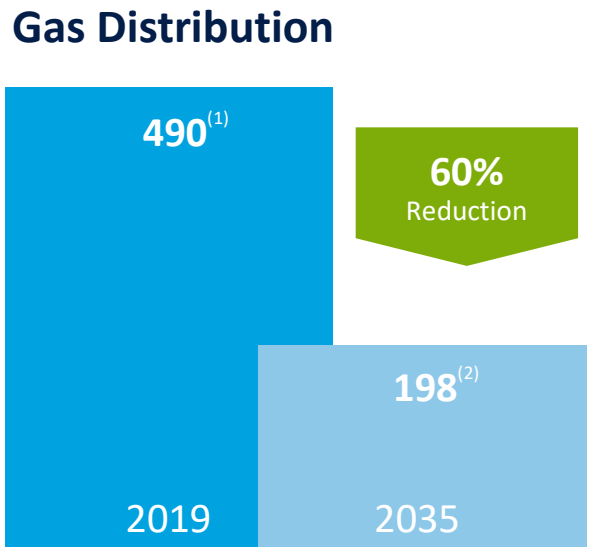
# Emissions reduction commitment

By 2035, Peoples Gas will reduce its annual Scope 1 and 2 emissions by 60% from its 2019 baseline

*As of 12/31/2023, we have achieved a 17% emissions reduction from our 2019 baseline*

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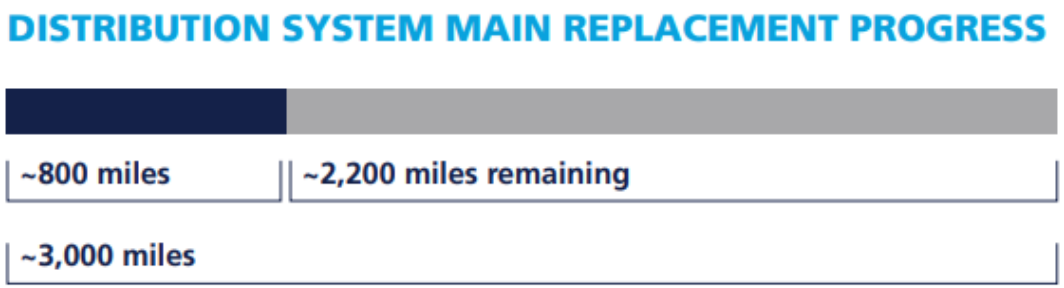
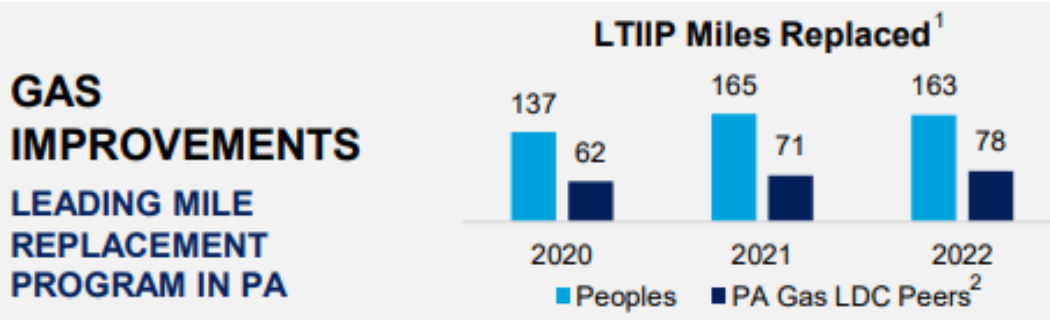
(1) Baseline Scope 1+2 Emissions (metric tons of CO2e)
(2) Targeted Scope 1+2 Emissions (metric tons of CO2e)

## LTIIP Pipeline Replacement Program




Source: Pennsylvania Public Utilities Commission (PA PUC), Annual Asset Optimization Plan reports.
(1) LTIIP stands for Long-Term Infrastructure Improvement Plans.
(2) Represents the average of similar size Gas LDCs in Pennsylvania.

# Promoting Alternative and Innovative Energy

## Hydrogen Initiatives

- H2 Summit: Peoples has co-hosted this regional energy industry conference to discuss opportunities around hydrogen and federal research hub funding
- Member of the ARCH2 hydrogen hub consortium

## Other Strategic Partnerships

- Southwestern Pennsylvania Energy Efficiency Roundtable
- University of Pittsburgh Center for Sustainable Business
- Pittsburgh Region Clean Cities
- Energy Innovation Center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# Promoting Alternative and Innovative Energy

## Renewable Natural Gas

- 6 landfills that deliver RNG directly into our pipeline system
- 1.4 BCF, or about 1%, of the total system gas throughput
- 56% transported to interstate pipeline and 44% blended and delivered directly to our customers

## Watt Fuel Cell Program

- Partnership with Watt Fuel Cell Corp to launch pilot program offering Watt's solid oxide fuel cell (SOFC) system through territory
- SOFC power management system create small-scale power (500 W to 1.5kW from natural gas or hydrogen through electrochemical reaction with low direct emissions


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# The Hydrogen Color Spectrum

| | Terminology | Technology | Feedstock/ Electricity source | GHG footprint* |
|---|---|---|---|---|
| PRODUCTION VIA ELECTRICITY | Green Hydrogen | Electrolysis | Wind \| Solar \| Hydro Geothermal \| Tidal | Minimal |
| | Purple/Pink Hydrogen | | Nuclear | |
| | Yellow Hydrogen | | Mixed-origin grid energy | Medium |
| PRODUCTION VIA FOSSIL FUELS | Blue Hydrogen | Natural gas reforming + CCUS Gasification + CCUS | Natural gas \| coal | Low |
| | Turquoise Hydrogen | Pyrolysis | Natural gas | Solid carbon (by-product) |
| | Grey Hydrogen | Natural gas reforming | | Medium |
| | Brown Hydrogen | Gasification | Brown coal (lignite) | High |
| | Black Hydrogen | | Black coal | |

*GHG footprint given as a general guide but it is accepted that each category can be higher in some cases.

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# Hydrogen and Utility Hurdles

## Regulatory and Economic Hurdles

- PUC: Section 1307(f) sets forth the requirement for Natural Gas LDC's to procure the least cost fuel for customers
- Hydrogen costs significantly more than traditionally produced natural gas. This additional cost cannot be passed onto the customer, creating a difficult environment to reduce system emissions
- Creates a difficult environment to reduce not only Peoples' emissions, but the ability to allow customers to reduce their individual carbon footprint

## Safety and Reliability

- Questions still need to be answered on how to safely and reliably transport H2 through existing infrastructure
- Ideal pipe material?
- H2 / Methane Blend %?
- Leak and leak detection
- How does H2 impact end-user appliances?

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# Peoples Hydrogen Pilot

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University of Pittsburgh
Swanson School of Engineering

HQuest

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**Phase I**

- **conduct bench-marking and research of existing information and data related to the distribution of hydrogen, focusing on technical issues involved with using natural gas pipelines to transport hydrogen or a blend of hydrogen and natural gas**

**Phase II**

- **Establish pilot project to test the impacts of H2 of Peoples distribution system as well as pyrolysis H2 production, leak detection, and long-term impact of H2 on end-use appliances**

# Peoples Hydrogen Pilot

Carbon Black (C)

Peoples Pilot Program Encompasses the Full H2 Lifecycle

Electricity

Natural Gas


Hydrogen (H2)

Closed Loop Testing System

5-20% H2 Blend

Home Appliances

Natural Gas

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# Distributed Pyrolysis: The Solution?

## Problem 1

- Hydrogen is expensive and Utility must source least cost fuel for customers (PUC Reg)

## Solution?

- Turquoise hydrogen is made using a process called pyrolysis to produce hydrogen and carbon black
- Carbon black can be monetized as a commodity, allowing hydrogen to be purchased at or below cost of natural gas

## Problem 2

- Pipeline infrastructure is not ready for implementation of hydrogen fuel at scale

## Solution?

- Distributed pyrolysis technology provides the ability to locate units in strategic pipeline locations OR directly at end-user to avoid infrastructure upgrades

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# Scalable Distributed Decarbonization

## Solution Highlights

- 4x less energy than electrolysis
- Zero water consumption
- Zero CO2 emissions
- Low-cost, scalable, and modular
- Deployable anywhere


**Total Emissions Reduction: 1 Ton H2/day = ~5,000 Ton Co2/year**

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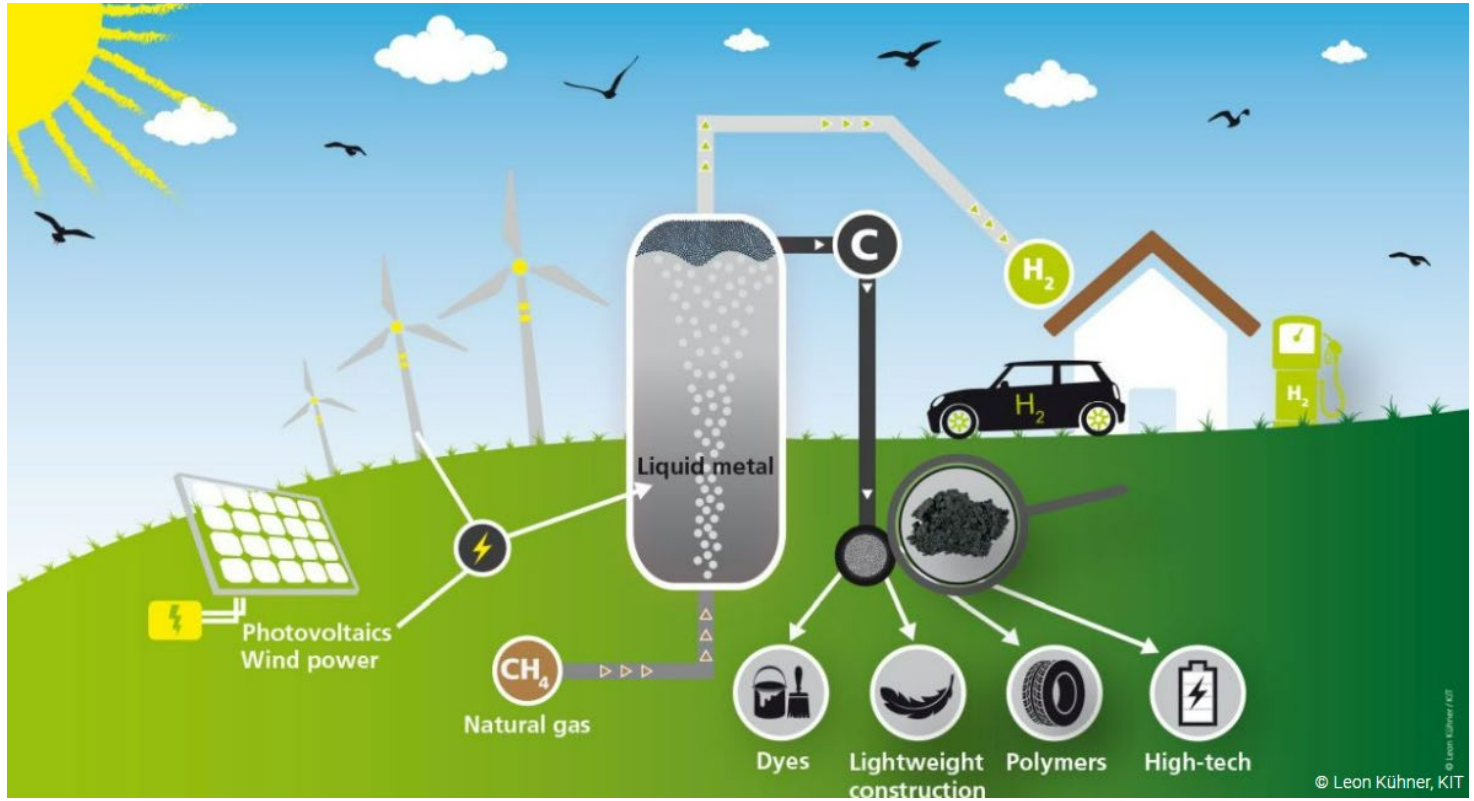
# Alternative Fuels – RNG and Hydrogen

- RNG with renewable credits is much more expensive than typical supply
- Peoples must source least-cost fuel for customers
- Distributed pyrolysis allows utility to bring pure hydrogen onto system using RNG. Further reducing emissions upstream and downstream

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# Distributed Energy – Microgrids & CHP


- The energy transition and push for electrifications is an opportunity for natural gas and hydrogen fuel
- Distributed pyrolysis is a perfect fit for immediate emission reduction in microgrid, CHP and district energy systems
  - Microgrids: Critical Infrastructure
  - CHP: Hospitals and other high energy users
  - District Energy Systems – Large steam and heat users

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# Distributed Energy – Other Applications

- **Electric Vehicle Charging**
  - Use hydrogen fuel for microgrid systems at EV charging stations
  - Inadequate infrastructure and power supply (CAISO restricted EV charging during heat wave in ’23)
  - Microgrid systems can accelerate development and adoption by circumventing high costs associated with utility power infrastructure upgrades
- **Hydrogen Refueling Stations**
  - Electric vehicles have a range issue that hydrogen vehicles can solve
  - Use existing natural gas infrastructure to produce hydrogen directly on-site at hydrogen refueling stations. Cutting out all inefficiencies of fuel delivery and logistics
  - Long-haul trucking is an example of potential application
  - Locomotives could replace diesel

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# THANK YOU!

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