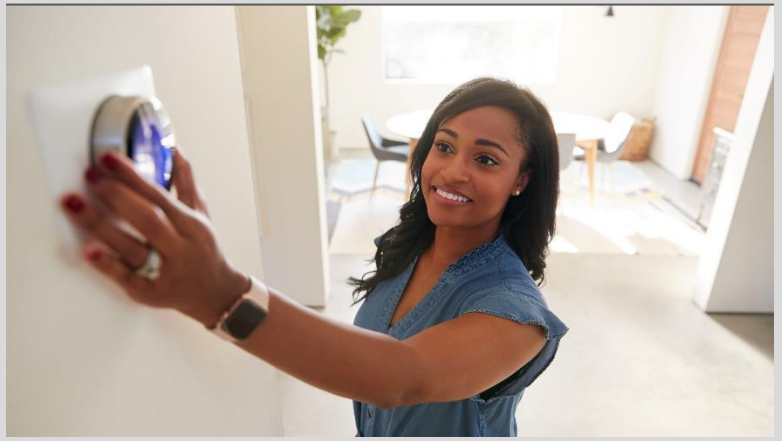


We exist to deliver safe, reliable energy that drives value to our customers



NiSource Hydrogen Pilot

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Director, Strategy



NiSource Hydrogen Pilot

Our Hydrogen Pilot is planned to be accomplished in a phased approach where each phase has a distinct learning outcome to prepare NiSource for continuation into the next phase

Phase I
Hydrogen Introduction

Goal – Learn

Procure hydrogen bottles and blend it into Pennsylvania's Safety Town to better understand hydrogen safety

Phase II
Hydrogen Production

Goal – Develop

Produce clean hydrogen using electrolyzers or pyrolysis to blend it into Pennsylvania's Safety Town

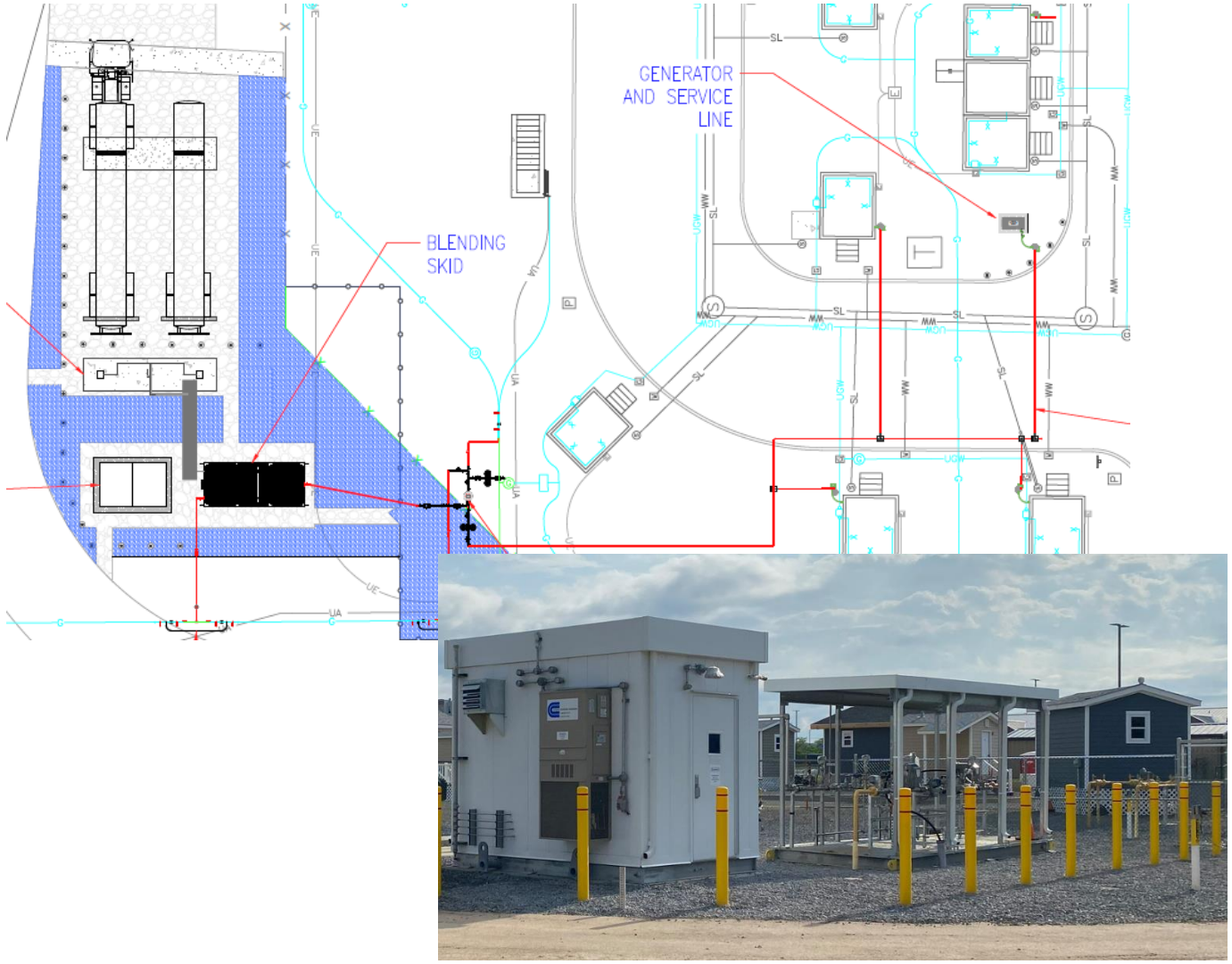
Phase III
Hydrogen Integration

Goal – Expand

Provide an opportunity for NiSource to showcase their ability to enhance sustainability for customers

Phase I began in 2022 and will continue through mid-2024
Phase II or III could follow in later years depending on the results of Phase I

Phase I – Hydrogen Blending



- Installation of blending system into our Safety Town in Pennsylvania in spring 2023
- Able to maintain a precise blend from 0% - 20% hydrogen
- Allows long term and extensive trials and working with hydrogen blends
- Working with partners to verify gas distribution equipment & infrastructure performance with hydrogen blends

RTU building and Skid on site

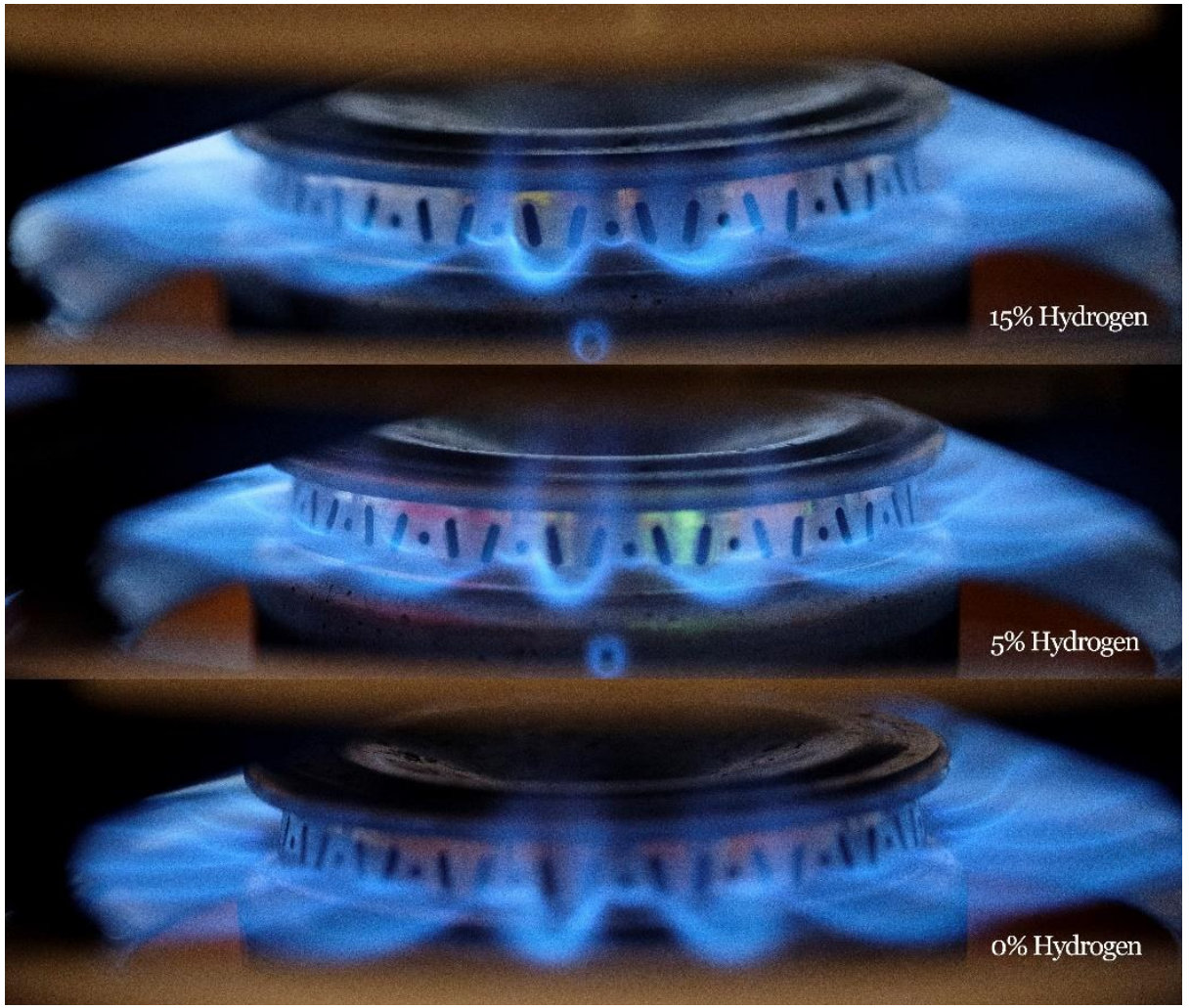
Hydrogen Tanks & Manifold

NiHome

- **Completed in September 2023**
- **Equipped with natural gas appliances to simulate everyday usage in a residential home environment**

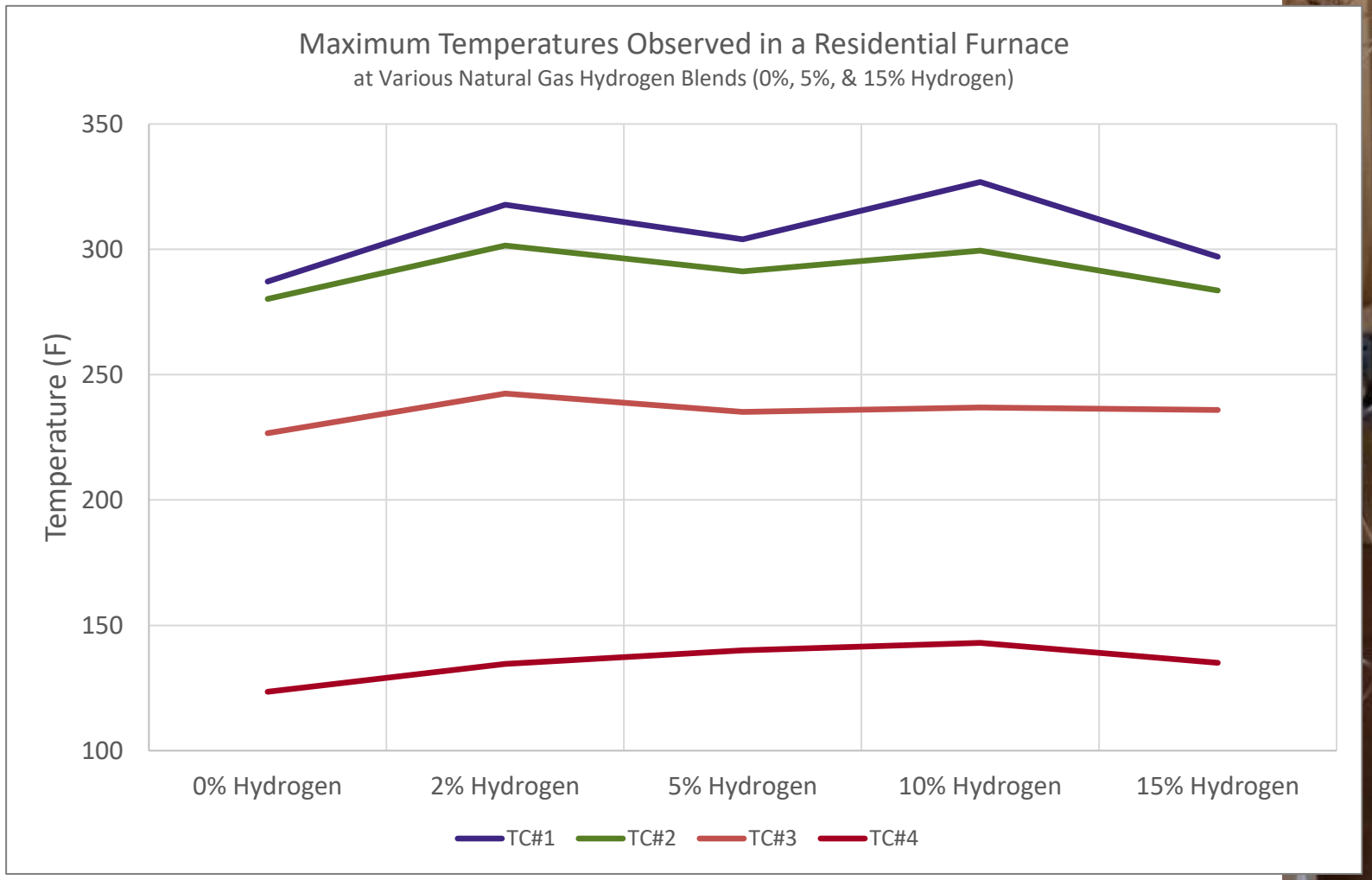
Phase I – Customer Experience evaluations to date

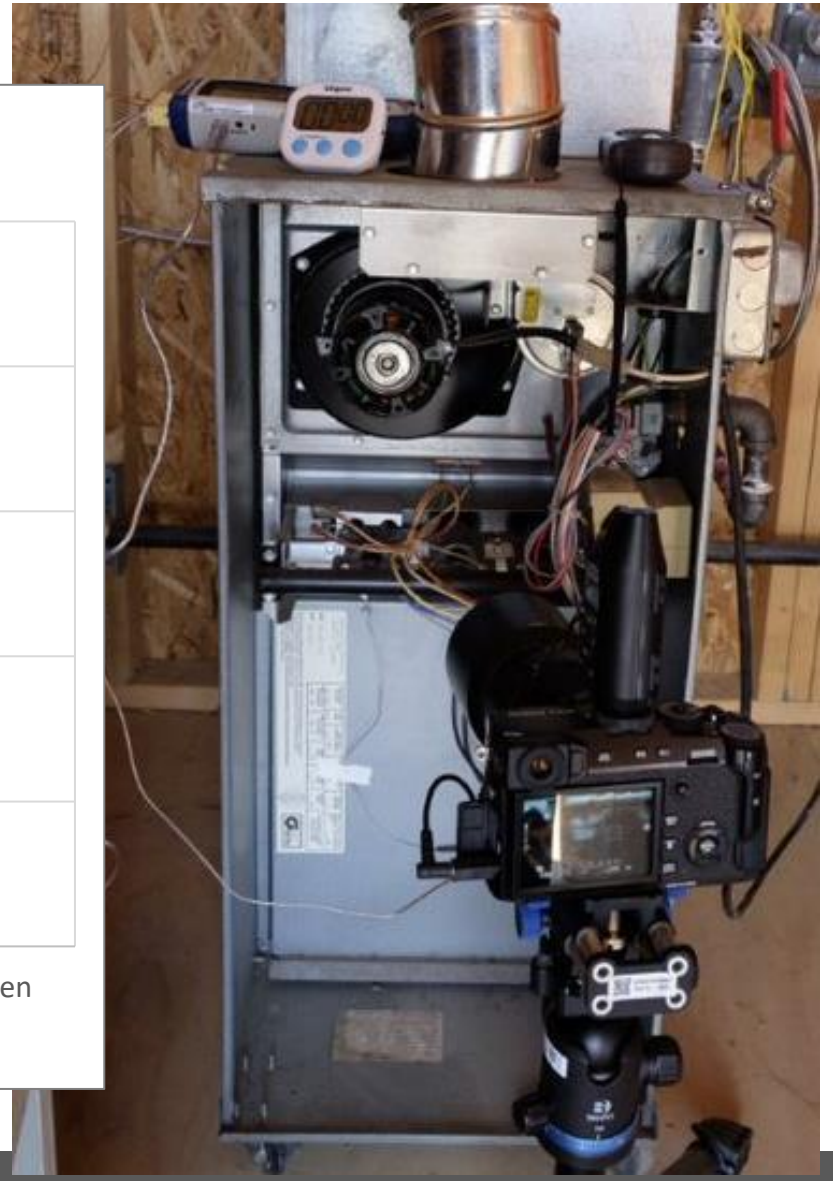
- Focused on what an average customer would see and experience, with hydrogen blends
- Appliances evaluated includes a range, a gas dryer, and a gas furnace.
- Used scientific methods but have not completed enough trial runs to confirm statistical significance.
- Indicated no noticeable difference up to a 20% hydrogen blend

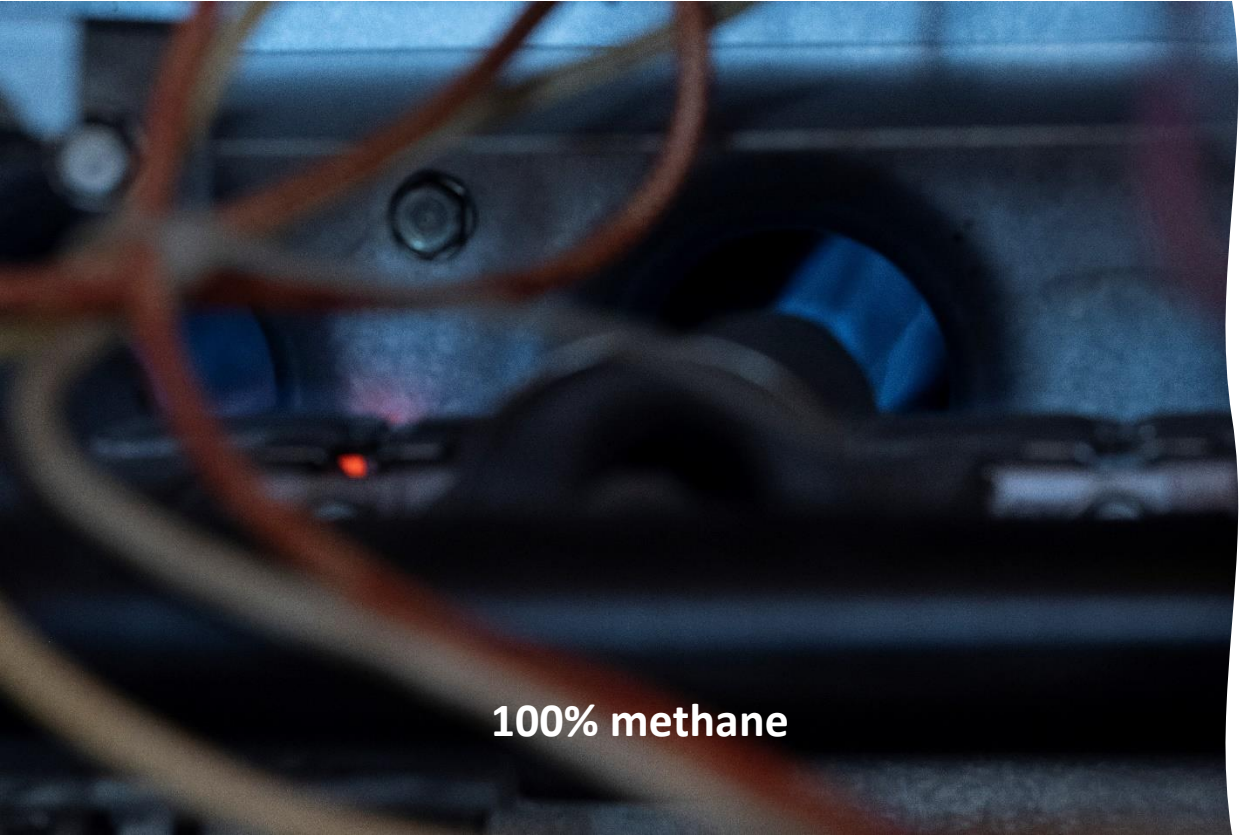


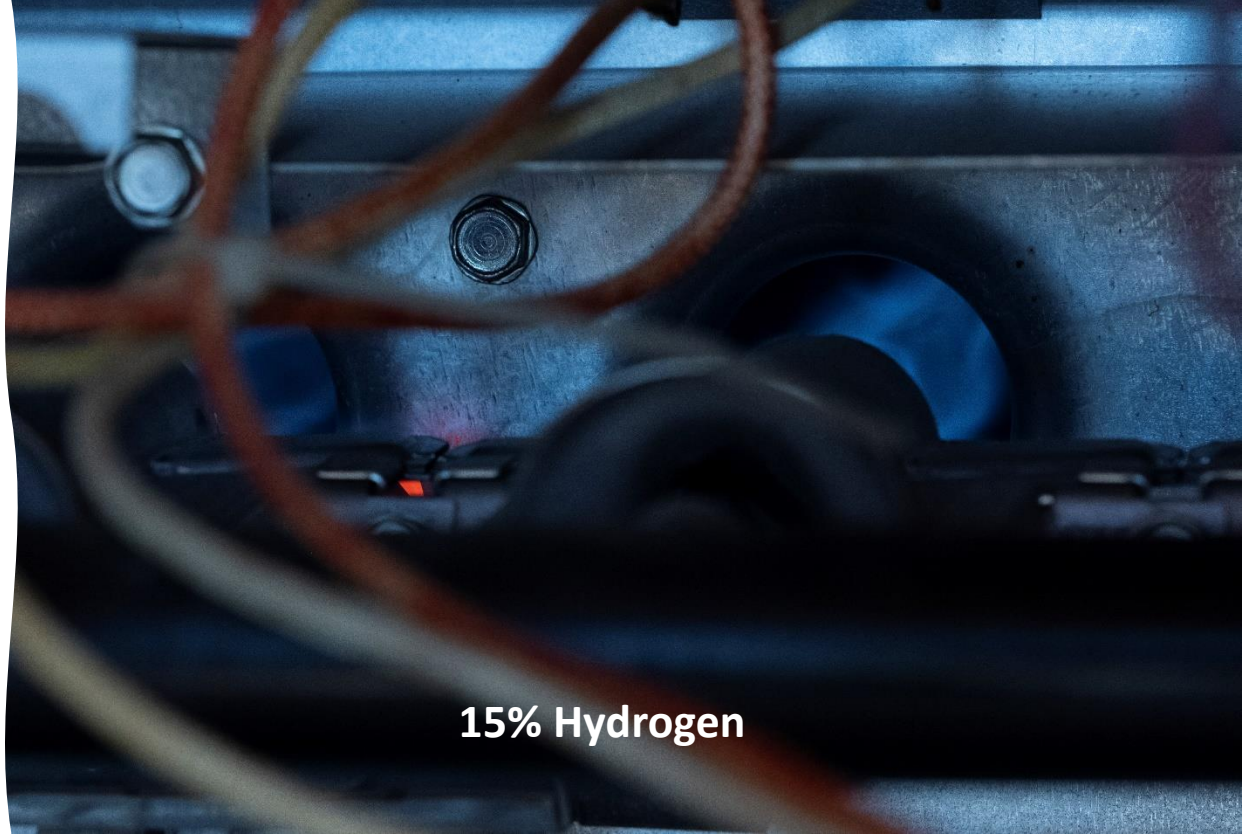
Natural Gas & Hydrogen Blending – Gas Furnace

Practical Residential Impact Exploratory Demonstrations





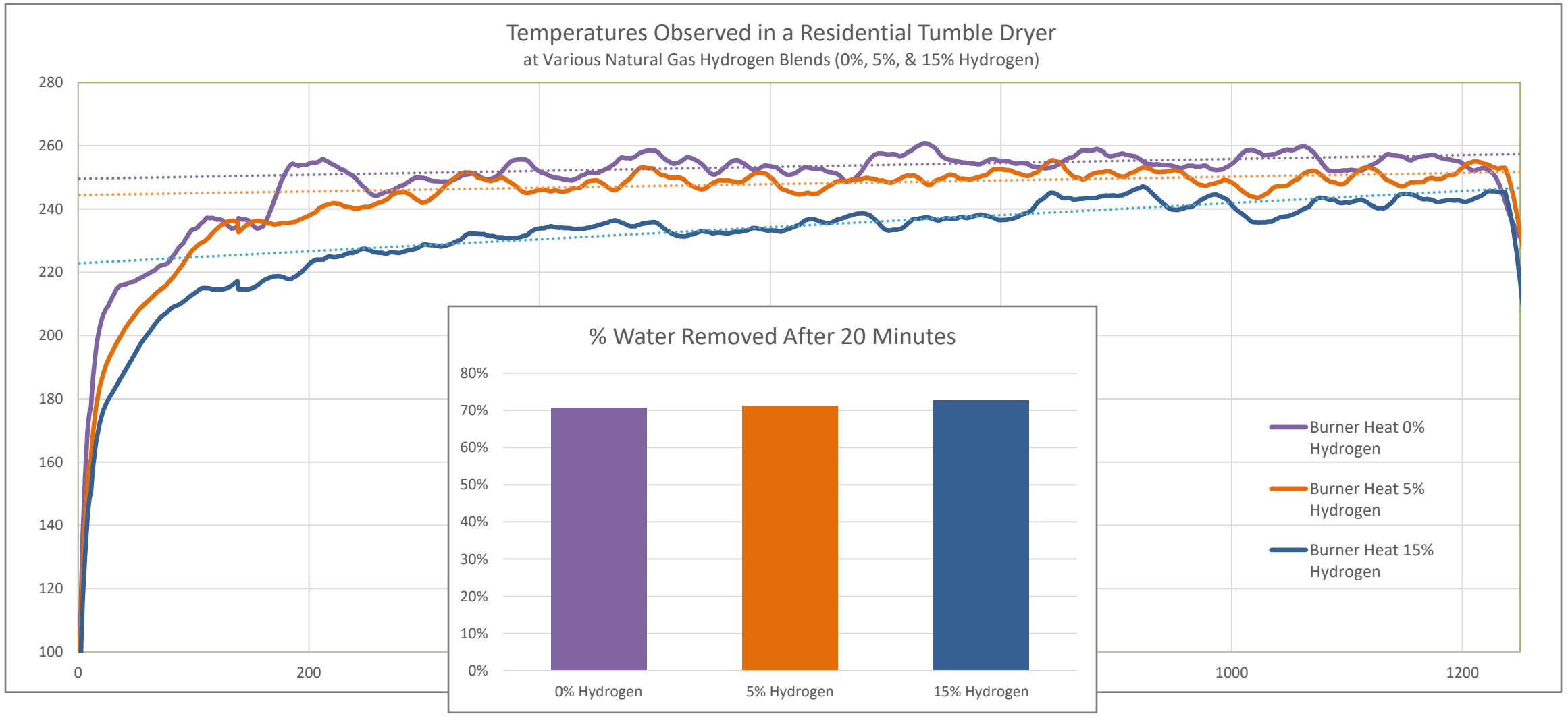


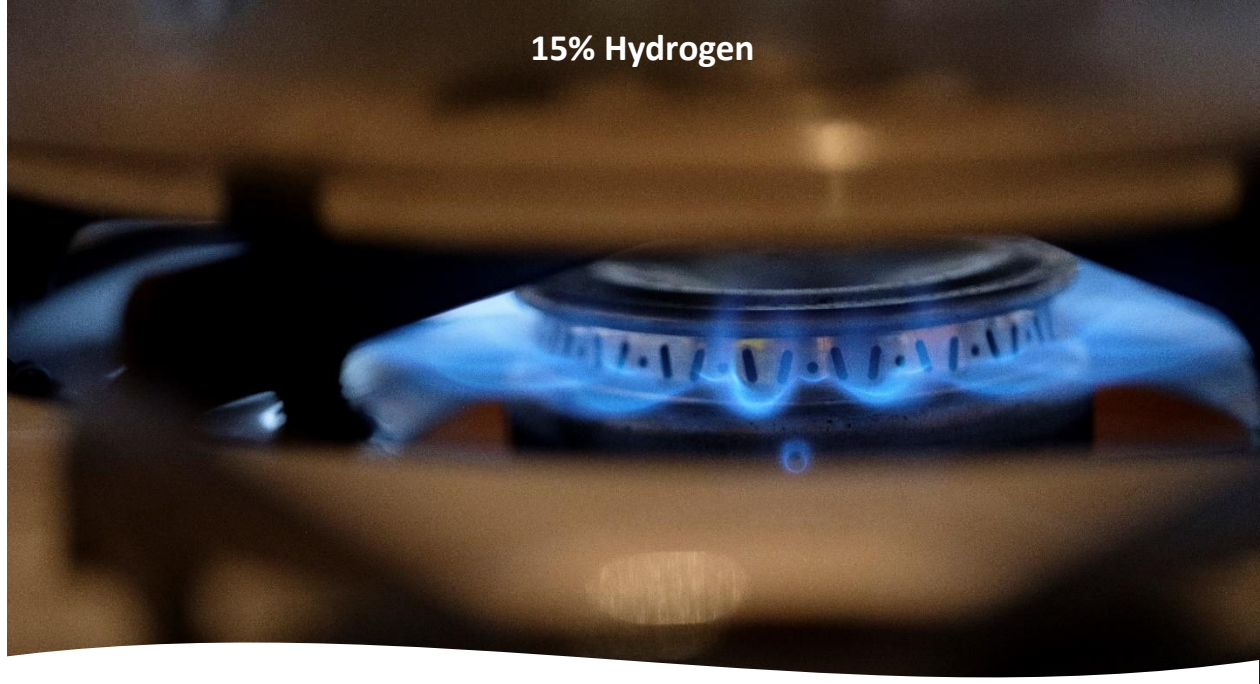


- Furnace test were performed first, moving from 100% methane and progressing from 2% hydrogen to 15% hydrogen
- At 10% and 15% hydrogen, the sound of the furnace changed. No “roar” of the gas burning in the furnace

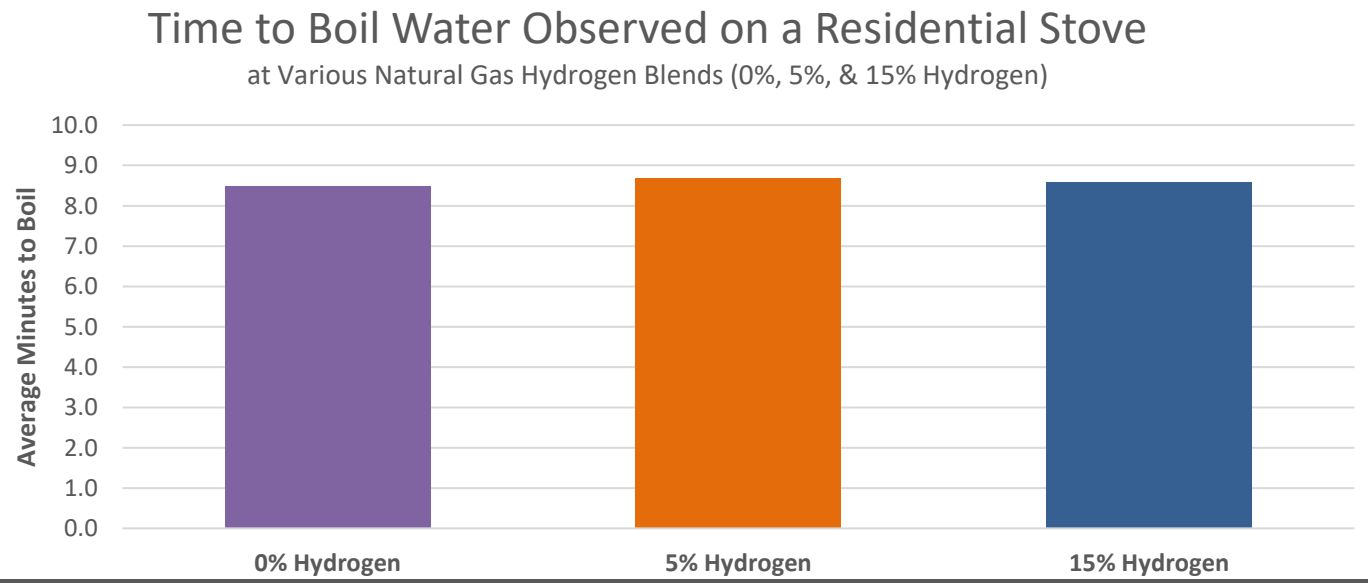
Natural Gas & Hydrogen Blending – Gas Dryer

Practical Residential Impact Exploratory Demonstrations





- Gas range tests were performed with 100% methane, then 15% hydrogen, then 5% hydrogen
- At 15% hydrogen the color of the flame was notably lighter in color
- No noticeably significant difference in sound
- The heat given off was less with the 15% hydrogen blend, but no significant difference in how fast water boiled



Natural Gas & Hydrogen Blending – Metering

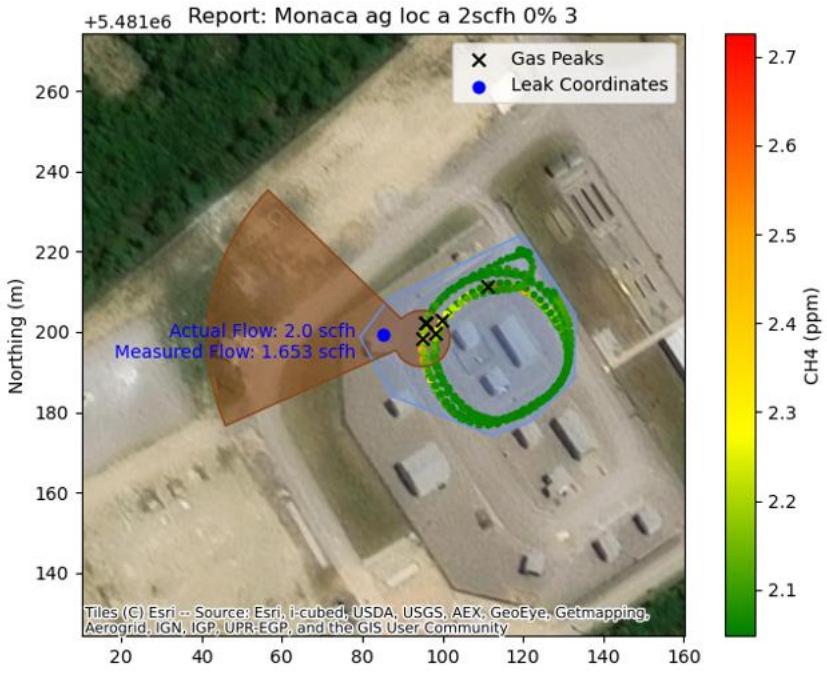
	AC250 Meter volume	Ultrasonic meter volume	Volume Difference	% Difference
Blend 1	2.0 cf	2.0 cf	0.0	0.00%
Blend 2	20.0 cf	19.7 cf	0.3	1.50%
Blend 3	50.0 cf	49.6 cf	0.4	0.80%
Blend 4	10.0 cf	10.0 cf	0.0	0.00%

- Performed trials with a standard diaphragm meter (AC250) and a new ultrasonic meter
- Set up in sequence (gas flowed through one meter then the next) to eliminate any variables
- Results showed some difference, but well withing the margin of error for any meter

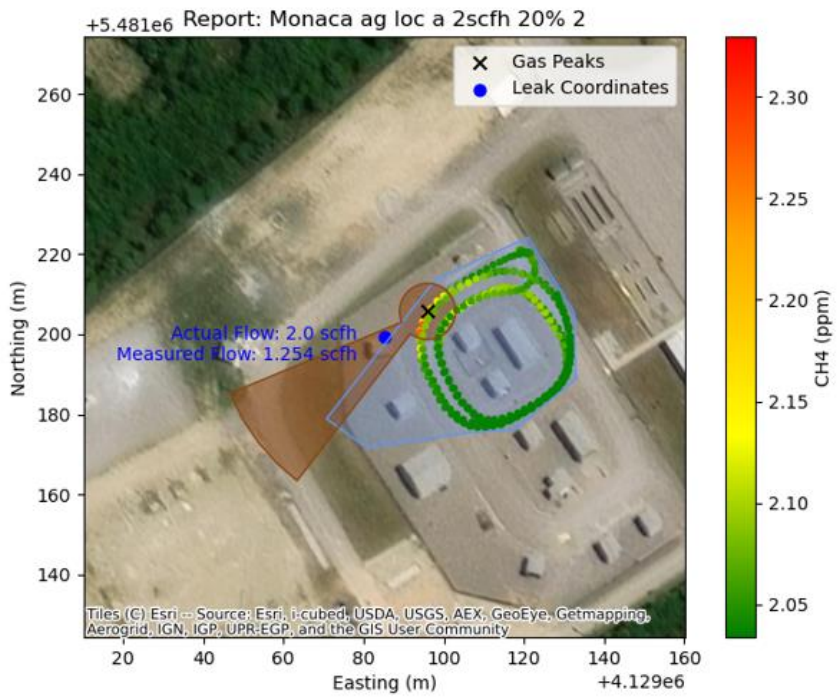
Picarro Results

- **Representatives from Picarro were on-site to evaluate any impact on the Picarro system detecting leaks in hydrogen blended systems.**
- **They determined that the “detection rates and emission quantification results suggest that hydrogen blends do not significantly impact the performance of Picarro technology”.**

100% Natural Gas



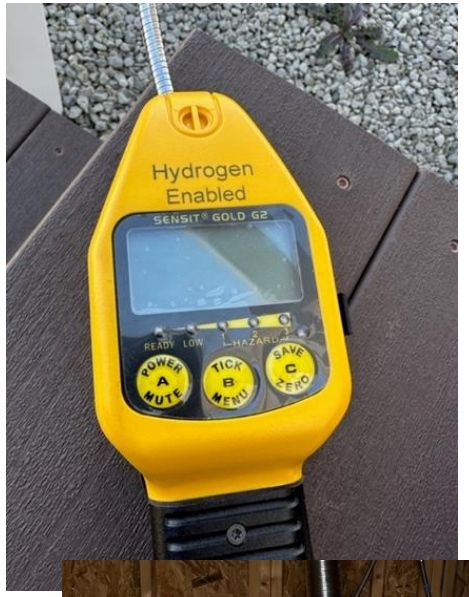
80% Natural Gas/ 20% Hydrogen



Picarro did note two issues that prevented confirming statistical significance:

1. The blending skid emits some gas during normal operations. That emission required testing in an area as far away as possible to prevent contamination
2. Wind at the training center in Monaca was significant

It was recommended that additional testing be done in another location to prove statistical significance. This could be part of additional phases of the NiSource pilot



Thank you

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