



Stony Brook
University



Institute of
Gas Innovation
and Technology

AT STONY BROOK UNIVERSITY



ADVANCED ENERGY™
RESEARCH AND TECHNOLOGY CENTER

I-GIT Activities

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&

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<https://www.stonybrook.edu/gas-innovation/>

2021 Renewable Energy Forum Role of Hydrogen

Plumbing Foundation City of New York

November 9, 2021

I-GIT Mission Statement



INSTITUTE OF GAS INNOVATION AND TECHNOLOGY

An Integrated Gas Energy Institute

A collaboration between Stony Brook University's Advanced Energy Research and Technology Center (AERTC) and National Grid. I-GIT is a consortium composed of academic and industry leaders working together to find clean and affordable solutions to meet the nation's growing energy demands and challenges.

I-GIT is administered within AERTC, where it is housed with offices and state-of-the-art laboratories. Its expert team of researchers, educators and investigators are working closely with the clean-tech community to bring together business and government leaders, policymakers and researchers in developing innovative programs to deploy advanced energy technologies.

THERE ARE FIVE PILLARS THAT DEFINE I-GIT:

- 1. A transition to low-carbon technologies**
I-GIT will focus on hybrid fuel technologies through the introduction of various renewable sources, such as gas, hydrogen, fuel cell, geothermal and thermal heat.
- 2. Gas technology gap analysis**
Preparing and maintaining a gap analysis will provide I-GIT opportunities to support environmental, societal and economic development goals.
- 3. Workforce training**
To meet future needs, I-GIT will use AERTC's corporate training program and develop graduate certificate programs with member input.
- 4. Becoming an international consortium**
I-GIT will build upon AERTC's existing relationships with other countries, including China, Japan, Korea and the United Kingdom, to increase membership and establish a global advanced technologies exchange mechanism.
- 5. Leveraging industry funding**
To help expand its funding base, I-GIT will work with state and federal agencies.

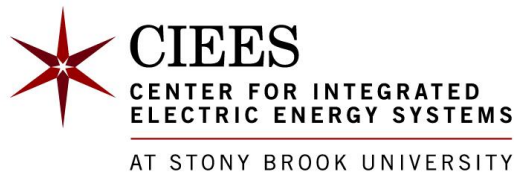
For more information about I-GIT, visit
stonybrook.edu/gas-innovation



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Use **Academic-Industry platform** to accelerate deployment of advanced energy technologies and infrastructure for gas to provide community residents and businesses with value-added services accomplished through innovative energy research, analysis, education.

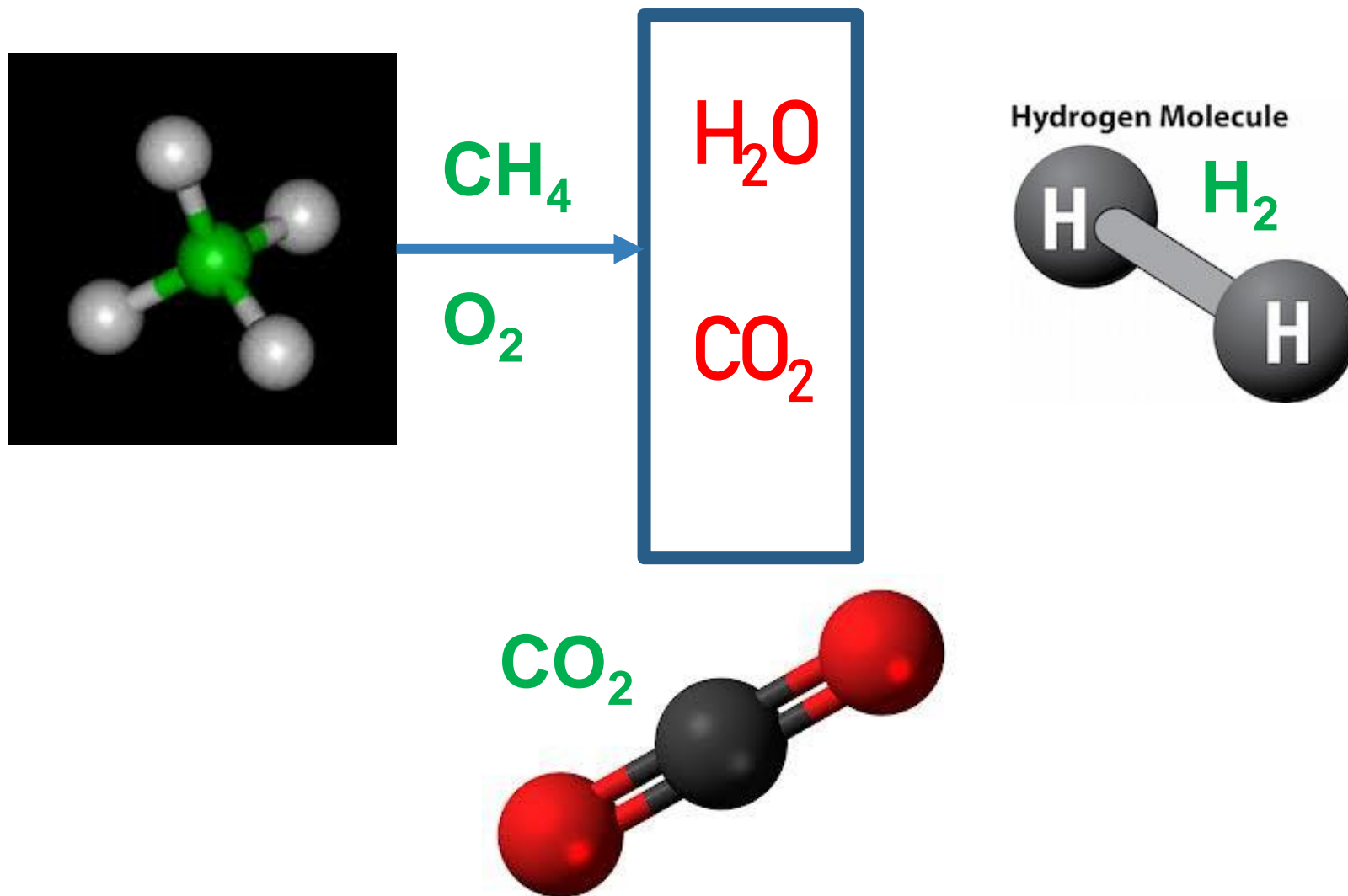
Strategic Partners/Funders



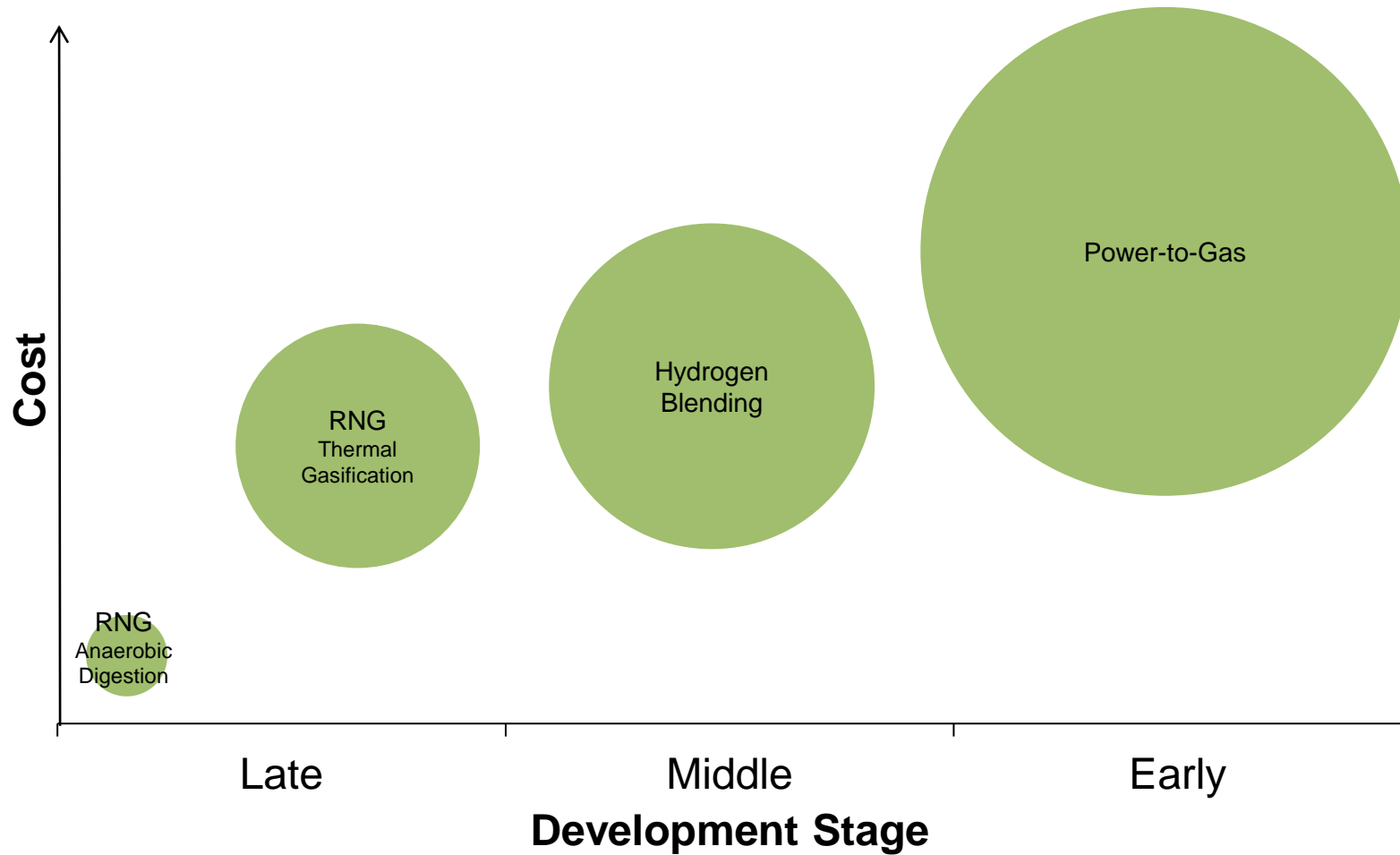
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Managing Climate Change



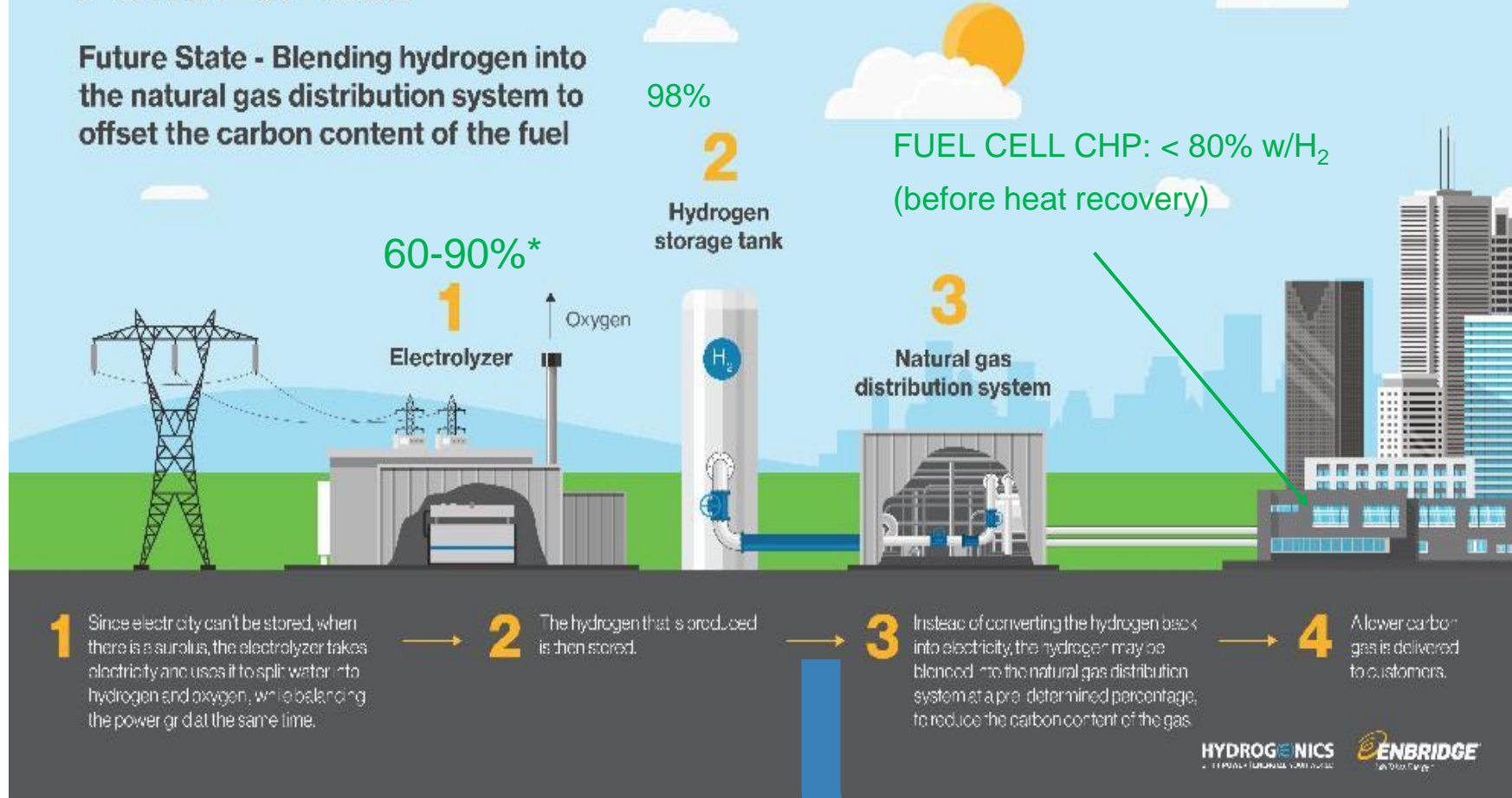
Decarbonization Pathways



Hydrogen Economy Concept

Power-to-Gas

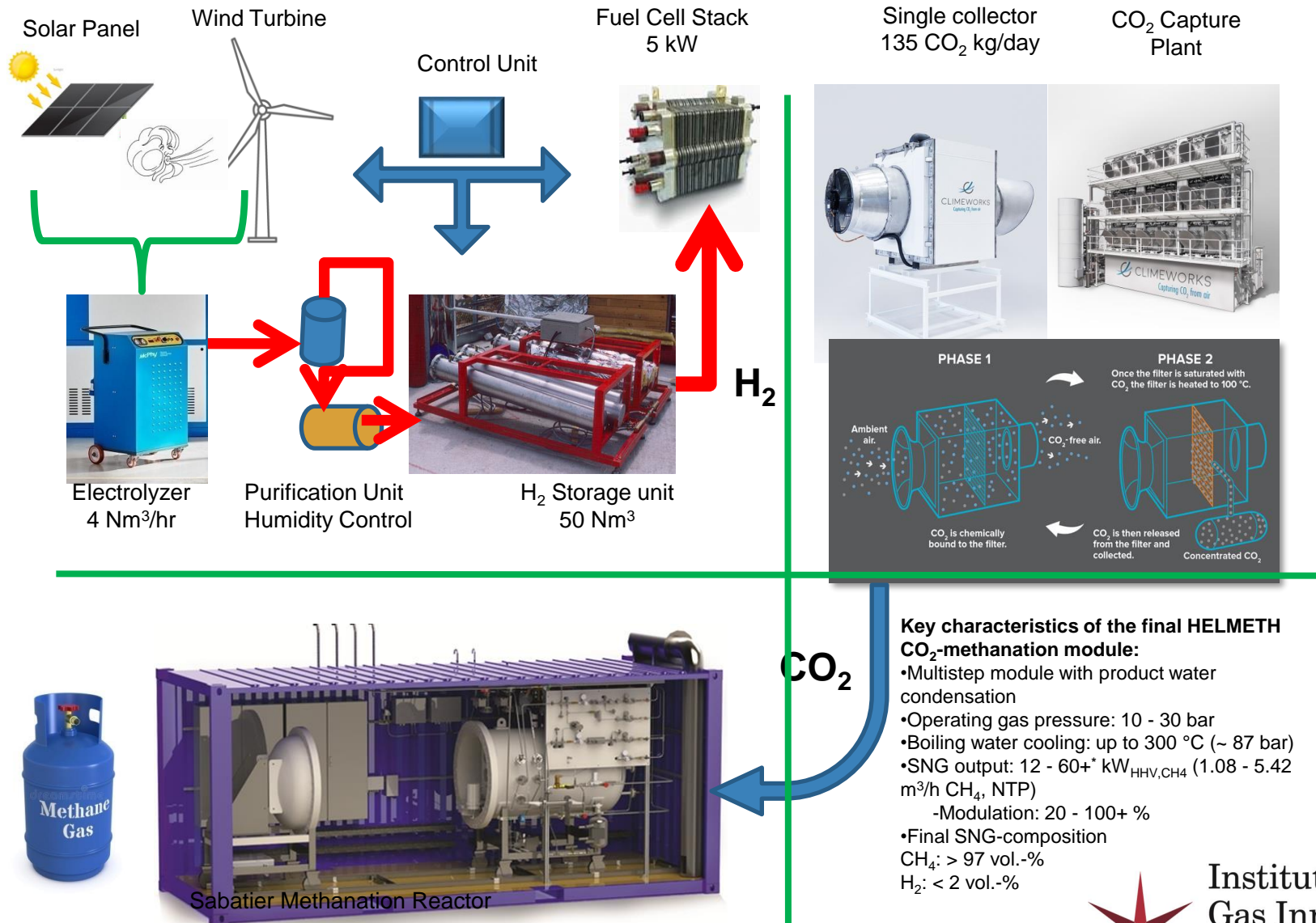
Future State - Blending hydrogen into the natural gas distribution system to offset the carbon content of the fuel



* DOE Target < 80% before heat recovery

SNG from methanation
is also an option

Project#3: 5kW Power-to-Gas Demo Project

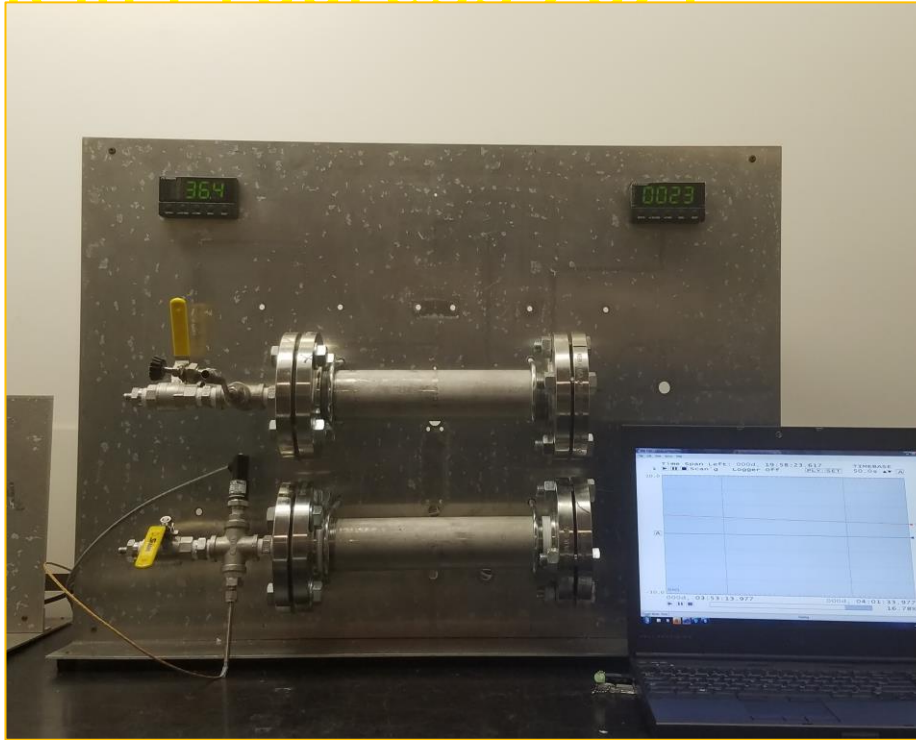


Key characteristics of the final HELMETH CO₂-methanation module:

- Multistep module with product water condensation
- Operating gas pressure: 10 - 30 bar
- Boiling water cooling: up to 300 °C (~ 87 bar)
- SNG output: 12 - 60+* kW_{HHV,CH₄} (1.08 - 5.42 m³/h CH₄, NTP)
 - Modulation: 20 - 100+ %
- Final SNG-composition
 - CH₄: > 97 vol.-%
 - H₂: < 2 vol.-%

Hydrogen in Pipeline Project Update

Work in Progress 2021



Test Unit: Effect of Hydrogen in Natural Gas on Pipelines

Characterization of Pipeline Samples:

Facilities at AERTC/BNL: Measure both Physical and Chemical effects of hydrogen.

PRESS RELEASES

- Hydrogen Blending Research for a Net Zero Future.
<https://www.nationalgrid.com/us/cop26/hydrogen-vision/stony-brook-case-study>
- “The Hydrogen Race”: American Gas Magazine, April 2021 issue.
https://read.nxtbook.com/aga/american_gas_magazine/american_gas_april_2021/american_gas_april_2021.html
- Hydrogen Heats up in New York, March 17, 2021.
<https://www.politico.com/states/new-york/albany/story/2021/03/17/hydrogen-heats-up-in-new-york-1368604>
- National Grid sees hydrogen as a lynchpin, joins utilities **targeting net zero carbon by 2050** | Utility Dive.
<https://www.utilitydive.com/news/with-hydrogen-as-lynchpin-strategy-national-grid-joins-other-utilities-i/586386/>
- **Natural Gas Goes to College. AGA Magazine– August/September 2019 issue.**
https://read.nxtbook.com/aga/american_gas_magazine/american_gas_aug_sept_2019/natural_gas_goes_to_college.html