



**ATLANTIC
HYDROGEN**

The CarbonSaver™ Company



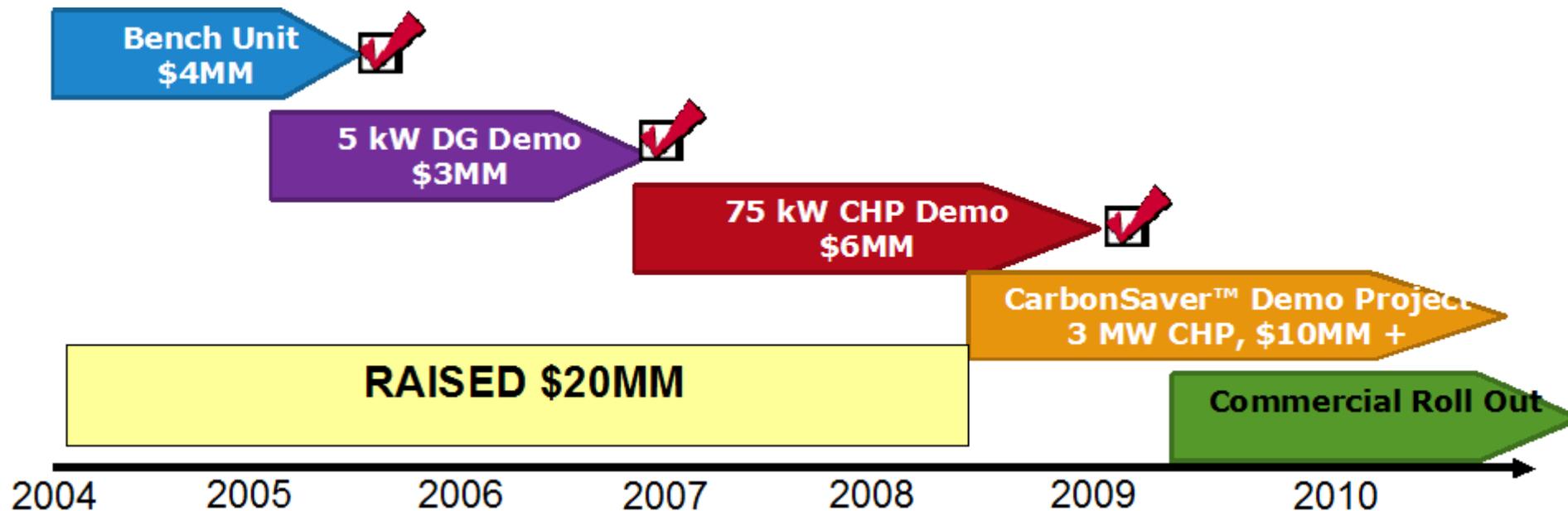
*Reducing GHG Emissions
Improving Energy
Efficiency
Lowering Carbon
Intensity*

AERTC Conference

November 18, 2009

Atlantic Hydrogen

- Privately-held clean technology company
- CarbonSaver™ removes carbon from natural gas before combustion, producing a hydrogen-enriched natural gas (HENG) and yielding ultra-low-emissions.
- CarbonSaver™ is “Carbon Capture for Natural Gas”
- Ready to begin field demos and full commercialization



CarbonSaver™

Technology Development

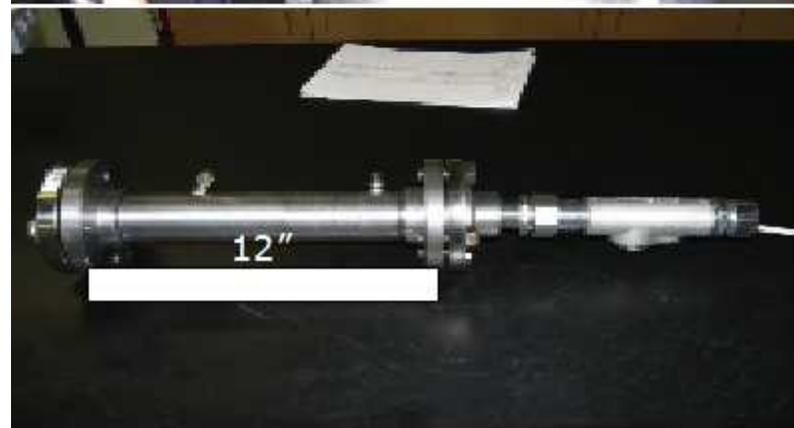
- Pulsed plasma tube reactor system
 - High Voltage: 15,000 volts
 - High Frequency: 15,000 hertz
 - No CO₂ produced in the process
- 2 patents pending
- HENG from 5% to 20%, capable of producing pure hydrogen

"Alpha" CarbonSaver™

- 5% to 20% HENG to a 75 kW CHP
- Up to 60 Nm³/h (2 MCF/h)

Demonstration & Commercialization

- Scale-up & field demo in progress
- Focus on industry partnerships in targeted markets



Hydrogen-Enriched Natural Gas (HENG) is a mixture of natural gas and hydrogen. HENG with up to 15% hydrogen maintains an acceptable Wobbe Index and calorific values for natural gas interchangeability.¹

Plasma arc dissociates methane (CH₄) into carbon (C) and hydrogen (H₂) without generating CO₂



Carbon is removed and the hydrogen is left in the natural gas and delivered to end-users as an ultra-low carbon fuel

5 tonnes of CO₂ saved per MMCF of gas consumed

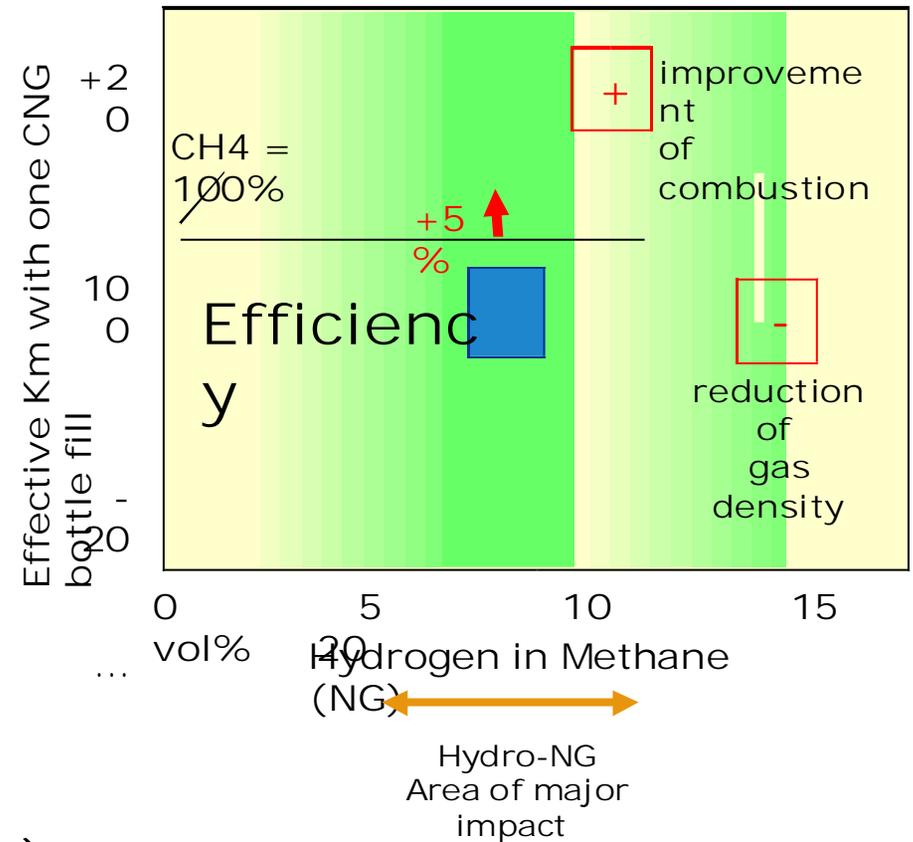
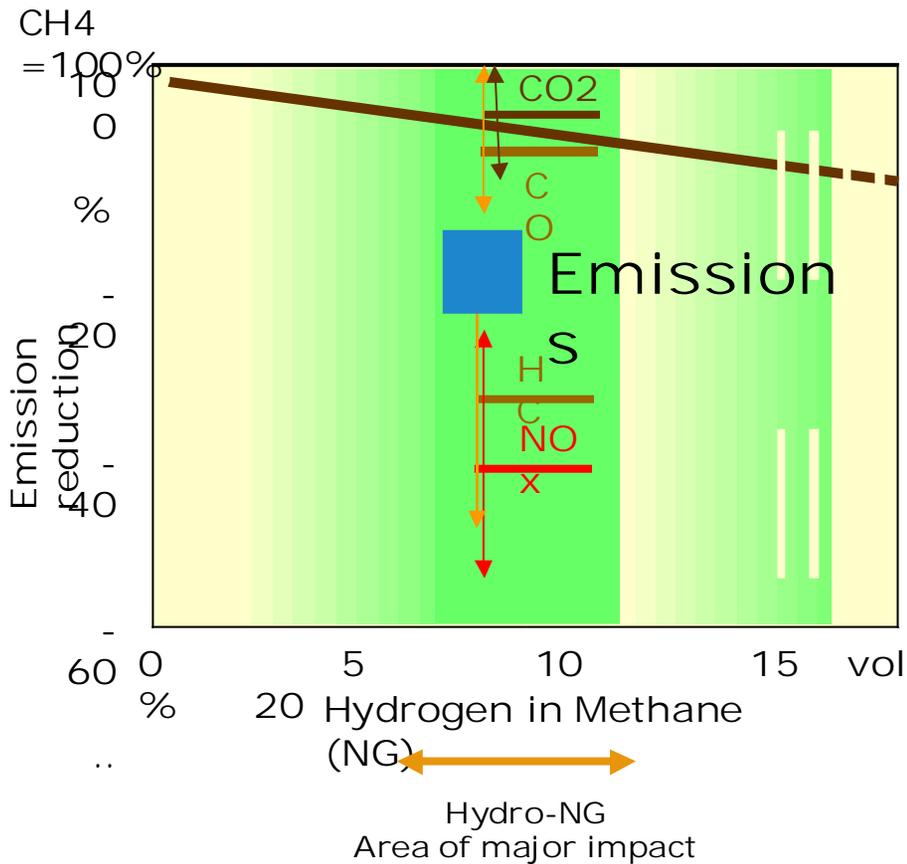
(1 MMCF is equivalent to the gas consumed by a 100 MW turbine in one hour)

Estimated cost of abatement to the end-user is economical

\$12 per tonne of CO₂
or

\$70 per MMCF of gas

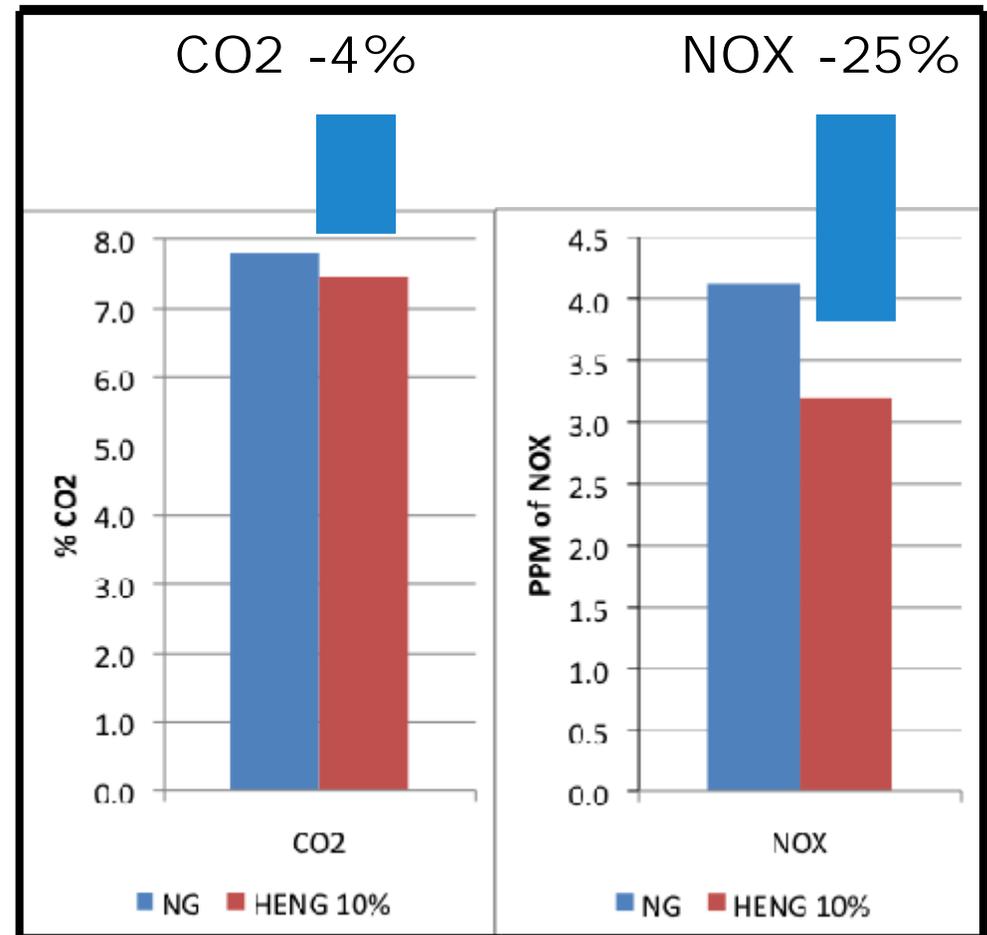
HENG & ICEs



HENG (5% to 15% H₂ by volume)
 reduces emissions and improves engine efficiency

HENG & Boilers

- Preliminary results of ~10% HENG with small condensing boiler1
- Improved operational



HENG & Gas Distribution

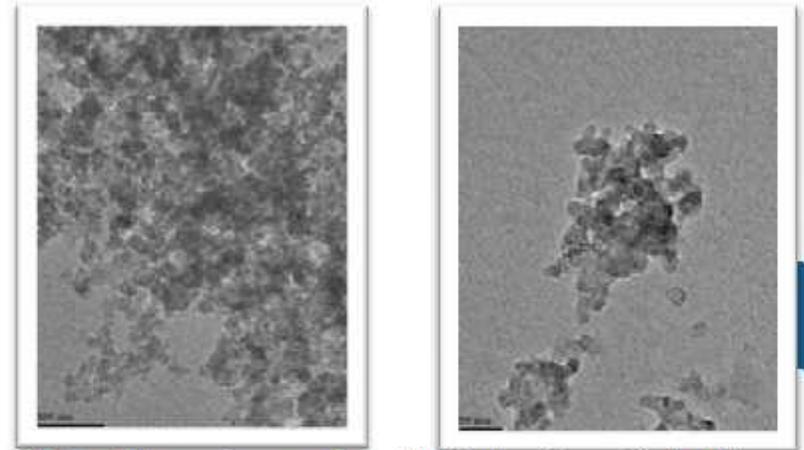
- The Gas Company (TGC) in Hawaii has made synthetic natural gas (SNG) for Honolulu since 1967:
 - 77% methane / 11% H₂ / 6% butane / 6% CO₂
- Customers are resorts and hotels using standard appliances
- TGC supplies SNG through a 1,100-mile pipeline network to over 28,000 commercial and residential utility customers
- Transported by 16" steel lines at 450 psig, stepped down to HDPE lines for local delivery
- No leakage & No embrittlement



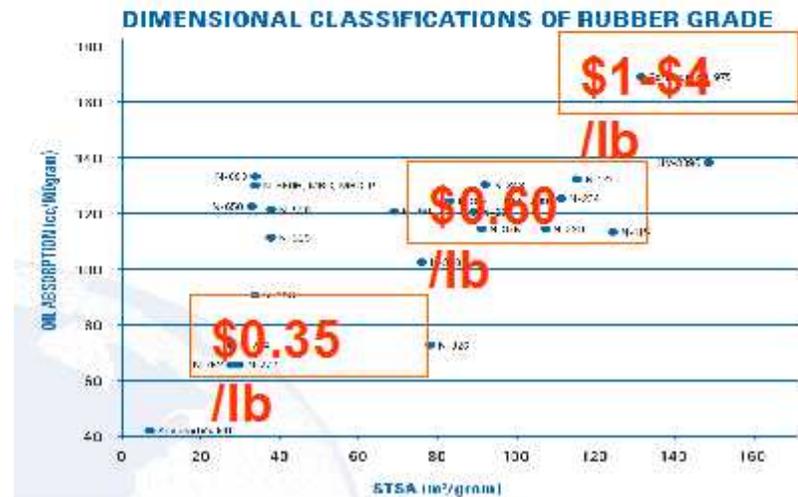
TGC serves industrial and commercial customers with SNG from its 16.7 MCF manufacturing plant in Oahu. An pipeline provides majority of customers in Oahu directly. Gas is used for cooking, water heating, drying and lighting. Some of the emerging uses cars and truck and cogeneration systems.

HENG & Carbon

- Initial evaluation demonstrates potential of value-added carbon nanostructures
- High surface (>150 m²/g) with highly branched aggregates & graphitic sheets
- Possible uses:
 - Inks, dyes, tints
 - Composite fillers
 - Conductive polymers
 - Batteries and super-capacitors



TEMs of the carbon produced in CarbonSaver™. Particle size is 100 nm (left) and 50 nm (right).



Strong Partnership Agreements

	Project	Progress
	Gas Transmission	Phase 2
	Power Generation	Feasibility Study
	Carbon	Phase 1
	Gas Distribution	Feasibility Study
	Industrial Scale-up	License and Development
	Advisory Partner	
	Advisory Partner	

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UK

Italy

White Paper

HYDROGEN-ENRICHED NATURAL GAS BRIDGE TO AN ULTRA-LOW CARBON WORLD

A Paper by National Grid and Atlantic Hydrogen Inc. for Gas Industry Executives, Utility Regulators, Policy Makers and Energy Administrators

www.atlantichydrogen.com

Thank you

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