



ATLANTIC HYDROGEN

The CarbonSaver™ Company

*Reducing GHG Emissions
Improving Energy Efficiency
Lowering Carbon Intensity*



February 24, 2009





Benefits of HENG

- Testing at 10% hydrogen / 90% natural gas yields impressive preliminary results:
 - CO₂ reductions ~ 4% to 9%
 - NO_x reductions ~ 25% to 50%
 - Improved reliability in lean burning combustors
- For gas suppliers and end-users:
 - Reduce emissions of both CO₂ and NO_x
 - No retrofitting, switching, change in usage
 - Leverage infrastructure

HENG from CarbonSaver™

In-line carbon capture for natural gas

No retrofitting and changes in usage

Recent Results

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™

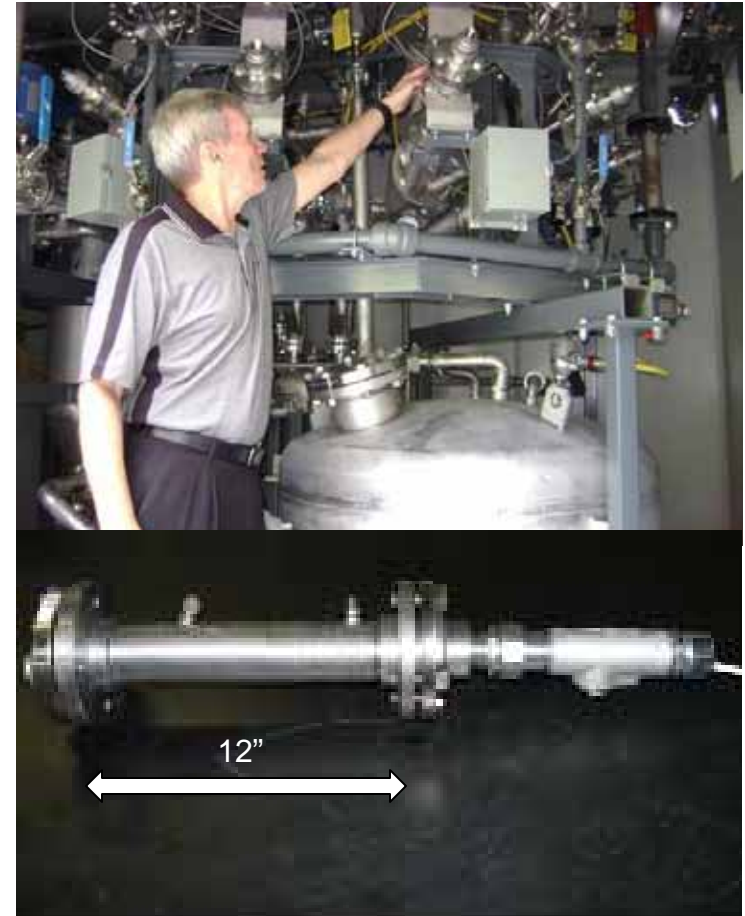
- 5% to 20% HENG to a 75 kW CHP
- Up to 60 Nm³/h (2 Dth/h)

CarbonSaver™ Demo Project

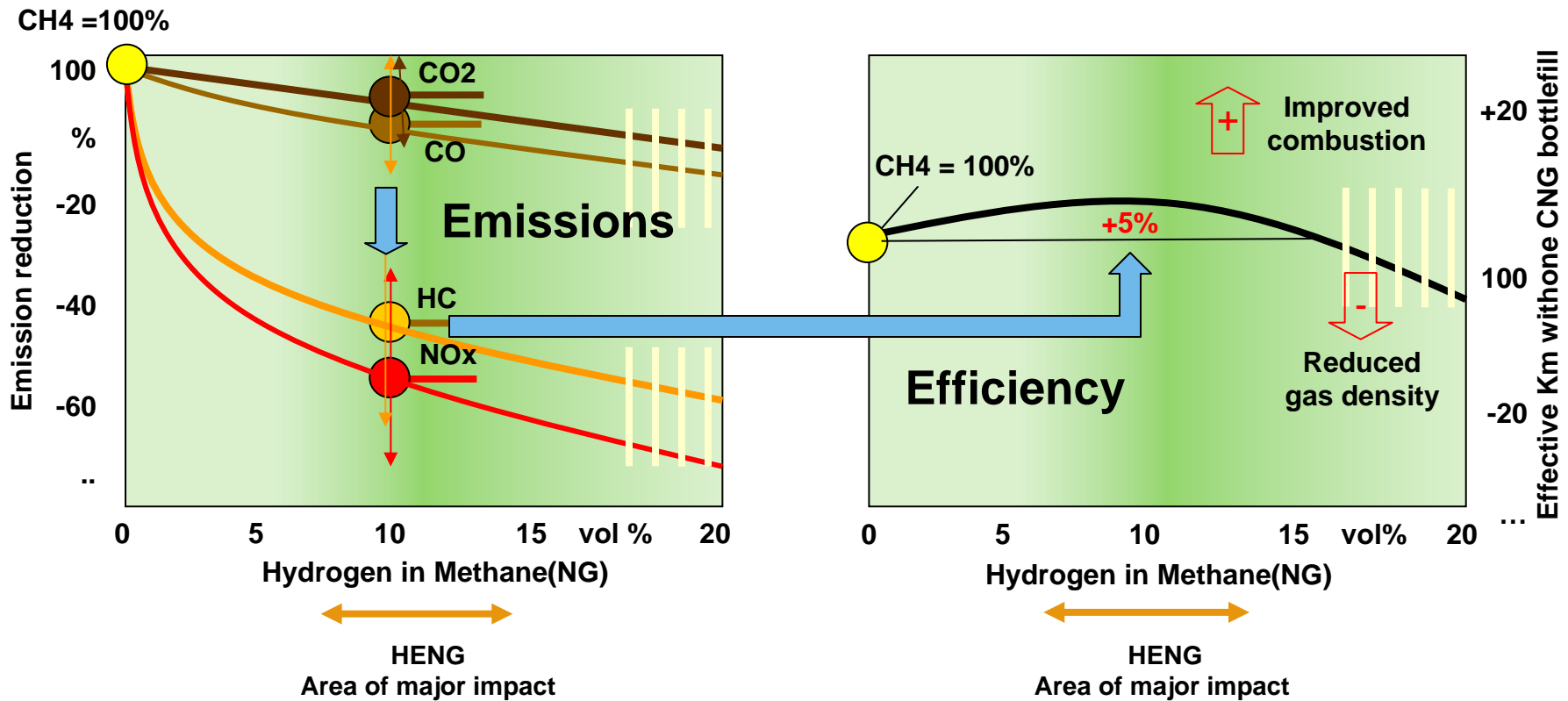
- Scale-up & field demo in progress
- Up to 3,000 Nm³/h (120 Dth/h)

Commercialization

- Focus on industry partnerships in targeted markets



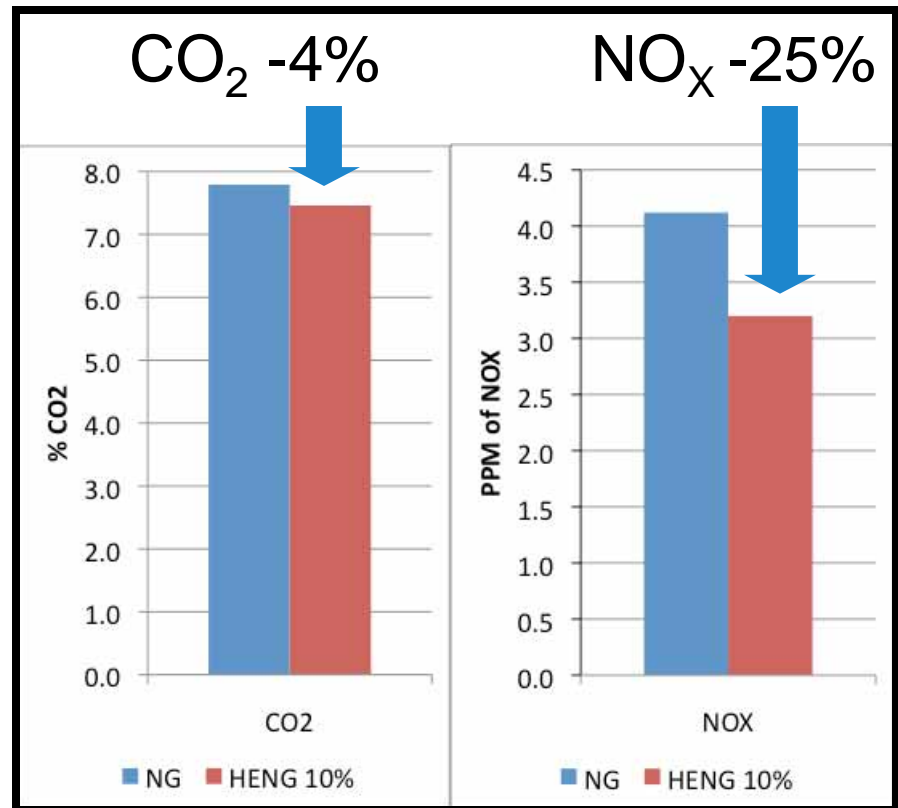
HENG & ICEs



HENG (5% to 15% H₂ by volume)
Reduces emissions & improves engine efficiency

HENG & Boilers

- Preliminary results of ~10% HENG in small condensing boiler¹
- Improved reliability²



For Retrofit Residential / Commercial Boiler Market

HENG = Efficiency Gain + Lower Carbon Intensity + Emissions Reductions

HENG & Gas Distribution

- **40+ years of H₂-methane in gas distribution system**
- The Gas Company 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

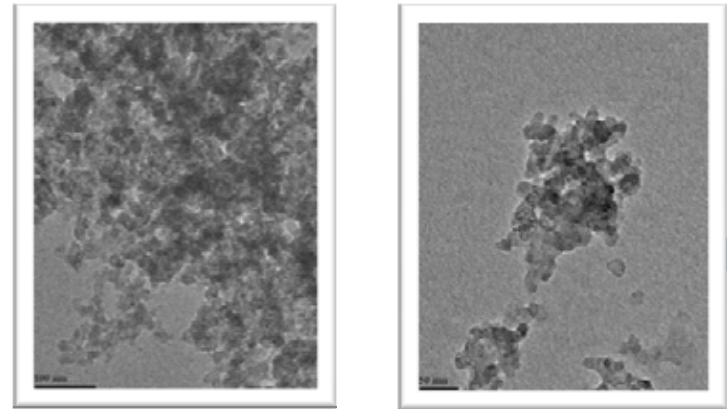


TGC serves industrial and commercial customers with SNG from its 16.7 MCF manufacturing plant in Oahu. An pipeline provides majority of customers in Oahu directly. Gas is used for cooking, water heating, drying and lighting. Some of the emerging uses cars and truck and cogeneration systems.

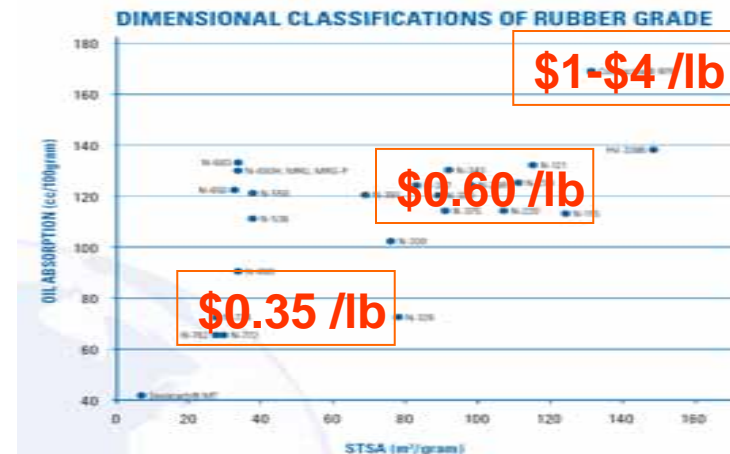
HENG & Carbon Black

**1 ton of carbon removed =
3.7 tons of CO₂ saved**

- Initial evaluation demonstrates potential of value-added carbon nanostructures
- Possible uses:
 - Inks, dyes, tints
 - Composite fillers
 - Conductive polymers
 - Batteries and super-capacitors
- R&D led by Dr. Felipe Chibante, UNB
- Validation and feedback provided by Columbian Chemicals

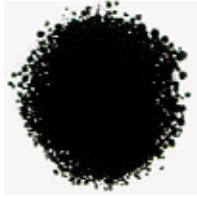


TEMs of the carbon produced in CarbonSaver™. Particle size is 100 nm (left) and 50 nm (right).



Near & Longer Term Markets

Market Segment	Installed Units	Location	Typical Pressure PSI	Typical Volume Dth*
Commercial Boilers	105,000	US	25	10
NGV Stations	10,500	Worldwide	75	20
Compressors	68,000	US	75	20
Combined Heat & Power	3,000	North America	75	40
Industrial Boilers	34,000	US	100	150
LDC Gates	14,000	US	100	400
Gas-Fired Generators	5,470	US	250	800
Gas Plants	700	North America	750	3,500



C
1 lb/Dth

CarbonSaver™

H2
10%
Vol.

Industrial &
Commercial



CarbonSaver™

Residential



CarbonSaver™

Power
Generation



CarbonSaver™

Natural Gas
Vehicles



Natural Gas
Production

CarbonSaver™

Processing Plants



CarbonSaver™

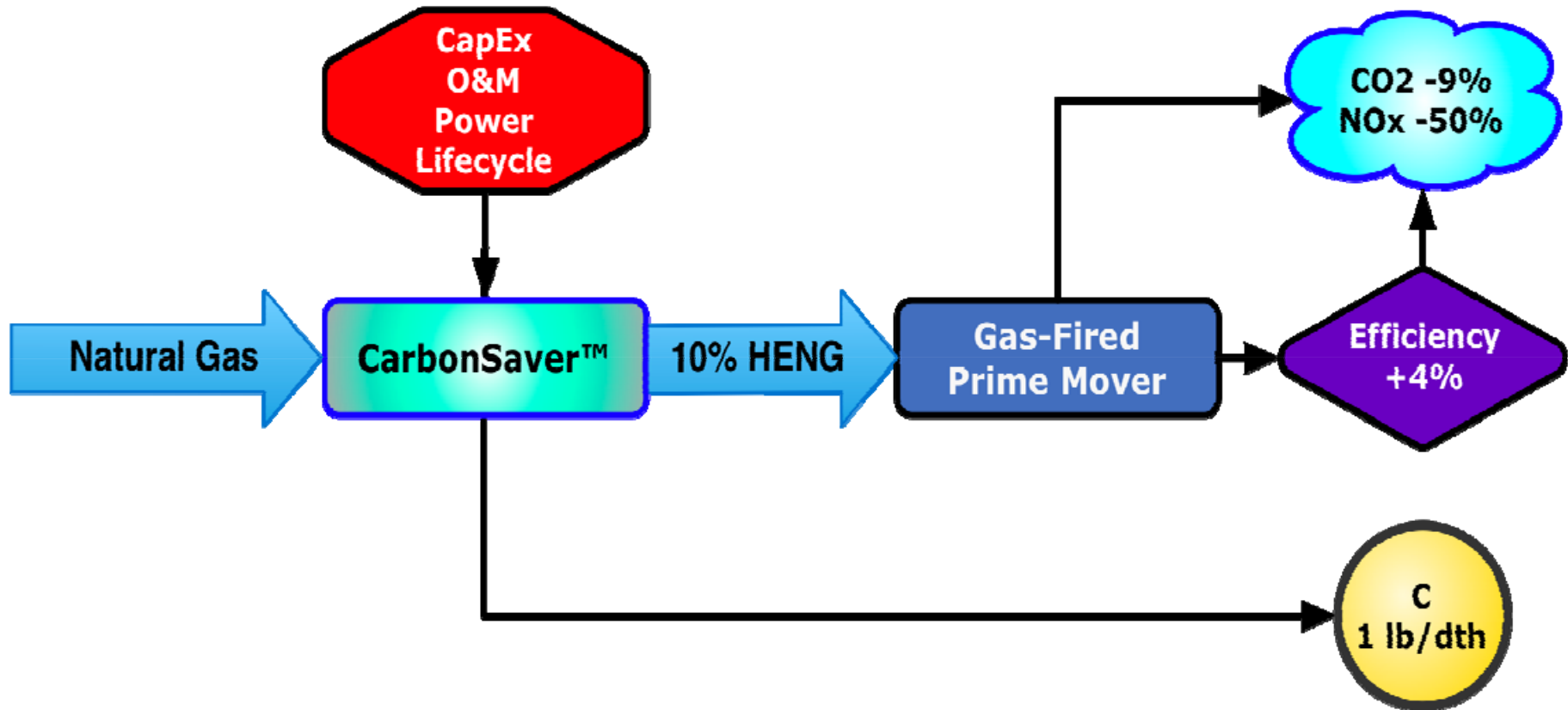
Compressors



ATLANTIC
HYDROGEN

The CarbonSaver™ Company

CarbonSaver™ Flows



HENG 10% in a CHP

ANNUAL ESTIMATES CARBONSAVER™		3 MW	4,020 HP
Lean Burning Engine		26 Dth/h	0.6 MMCFD
Capital Cost		\$ 500,000	\$ 160 per kW output
Annual Surplus/(Costs)		Average (10YR)	Dth Input MWh Output
Capital Recovery		(58,730)	(0.28) (2.48)
Maintenance		(14,782)	(0.07) (0.62)
Efficiency Gains/(Losses)		93,280	0.44 3.94
Power		(86,604)	(0.41) (3.66)
		(86,856)	(0.31) (2.83)
Offset Revenues			
CO2 Credits		40,355	0.19 1.71
Carbon Black		114,131	0.54 4.83
		154,487	0.73 6.53
Annual Surplus/(Cost)		87,631	0.41 3.71
EMISSIONS REDUCED		Tonnes	
Carbon Black		116	
NOX Reduced		79	
CO2 Reduced			
CO2 Reduced from De-Carbonization	9.0%	425	
CO2 Reduced from Efficiencies	4.0%	189	
Less CO2 from Input Power	-4.8%	(226)	
TOTAL CO2 Reduced	8.2%	388	
Surplus/(Cost) per tonne of NOX after offsets		\$ 1,105	
Surplus/(Cost) per tonne of CO2 after offsets		\$ 226	



Estimated installed cost is \$160 per kW. Operating capacity is 90%. Capital recovery is 10% over 20 years. O&M is 3% of capital cost. Efficiency gain is 4%. Gas is \$10 per Dth. Power is \$0.07 kWh from the CHP with a GHG intensity of 0.2 tCO₂e/MWh. CO₂ credits are \$60/t. Carbon black is sold at \$900/t. Escalation is 2% pa. NOX reductions are 50% from baseline; CO₂ reductions are 3.67X mass of carbon black. Carbon black production is approx. 1 lb / Dth.

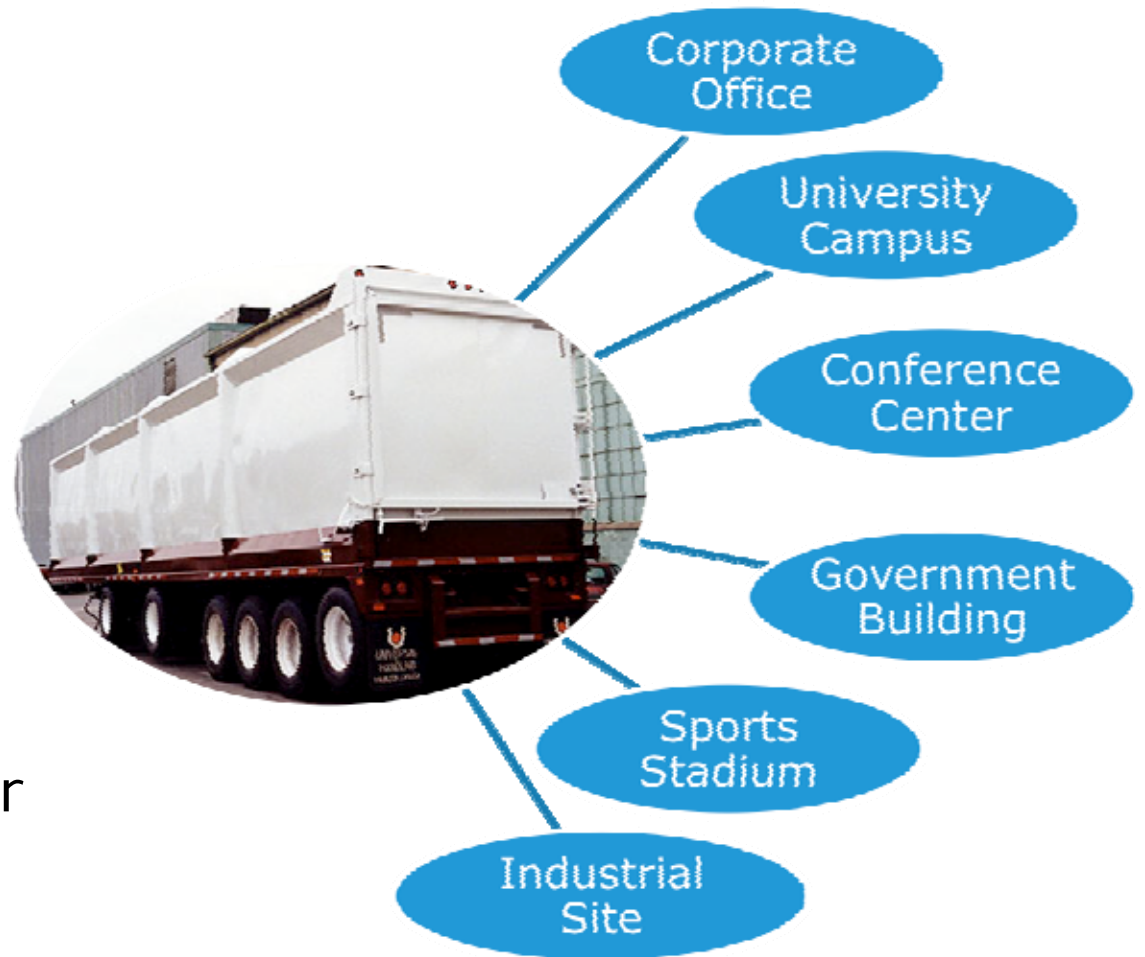
The Market Challenge

How do we realize the potential for HENG to reduce emissions within the context of applications today and tomorrow?



Demonstration & Commercial Projects

- CarbonSaver™ demo trailer for temporary use at customer's site
- HENG generated onsite by AHI
- Supply HENG behind the meter, directly to high-profile, visionary gas customers
- Collect real-life data and customer feedback



Next Three Months

Project	Partners	Structure	Work In Progress
CarbonSaver Demo Project	<ul style="list-style-type: none"> EnCana 	Development & Option	<ul style="list-style-type: none"> Scale-up R&D Site selection
Rosetti Hydro-Methane	<ul style="list-style-type: none"> Rosetti Marino 	Development & License	<ul style="list-style-type: none"> Design drawings Budget proposal
Carbon Black	<ul style="list-style-type: none"> UNB Columbian Chemicals 	Collaborative R&D	<ul style="list-style-type: none"> Characterization Application analysis
Commercial Advisory Committee	<ul style="list-style-type: none"> EnCana National Grid Rosetti Marino Columbian Emera 	Collaboration	<ul style="list-style-type: none"> Annual seminar
Joint Working Group on HENG	<ul style="list-style-type: none"> National Grid 	Collaboration	<ul style="list-style-type: none"> White paper



Discussion

David Wagner
President and CEO
506 458 1820
david.wagner@ah2inc.com

Joshua Samuel
Director of Business Development
506 458 1823
joshua.samuel@ah2inc.com