

Renewable Gas 2010 Advanced Energy Conference

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Agenda

- ◆ What is renewable gas?
- ◆ Why should it be considered?
- ◆ How does it fit in the low carbon economy of the future?
- ◆ What is National Grid doing?
- ◆ What is the potential? Vision?

What is Renewable Gas (RG)?

- ◆ Pipeline quality gas derived from biomass resources that is injected into the gas distribution network
- ◆ Produced from anaerobic digestion (AD) or thermal gasification (TG) of biomass
- ◆ Sources of biomass include waste water treatment plants, landfills, wood residues, livestock manure, municipal solid waste, agricultural residues and energy crops

Feedstock



Anaerobic Digestion / Gasification



Upgrading, clean-up, methanation



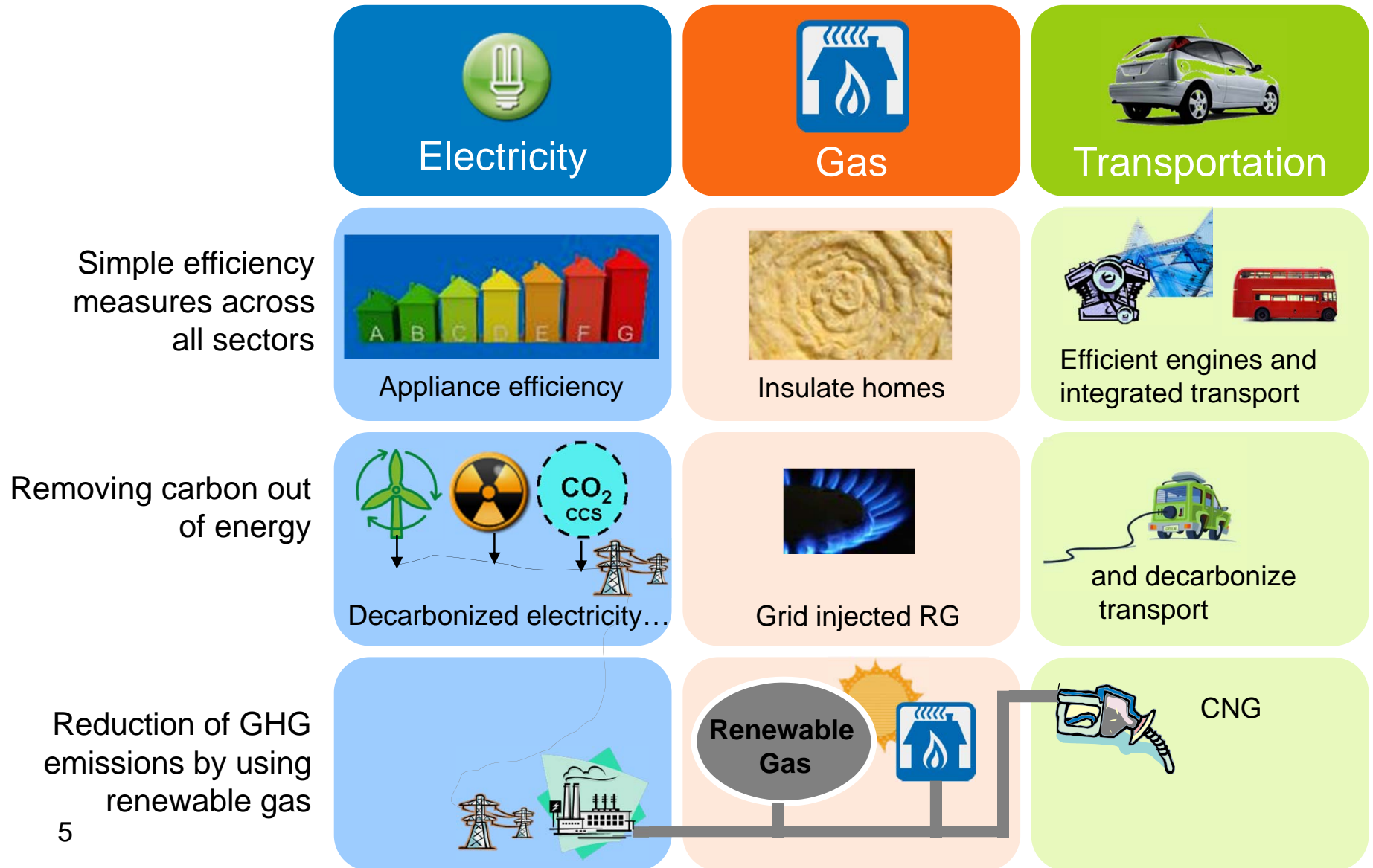
Injection of pipeline quality gas



Why should renewable gas be considered?

- ◆ Main driver: lowers greenhouse gas (GHG) emissions. It also creates other sources of value:
 - ◆ Enhances diversity of supply - local renewable source of energy
 - ◆ Stimulates local economy and creates jobs
 - ◆ Provides a real solution for using local waste resources to produce renewable energy
 - ◆ More efficient than using the gas for power generation
 - ◆ Leverages the existing gas network to deliver a renewable fuel

Role of renewable gas in a low carbon energy future



What is National Grid doing?

- ◆ Raising the profile of renewable gas
 - ◆ Education is key
 - ◆ Publish white paper
 - ◆ Engage all stakeholders



- ◆ Demonstration projects



Picture of Newtown Creek waste water treatment plant in Brooklyn, NY.
Source: New York City Department of Environmental Protection

What is the potential?

- ◆ Excluding demand for power generation, renewable gas has the long-term potential to meet up to 25 percent of the natural gas demand in the four states served by National Grid

Technical Potential Summary by State (Bcf = billion cubic feet)

STATE	TECHNICAL RENEWABLE GAS POTENTIAL (BCF/YR)	POTENTIAL AS A PERCENTAGE OF OVERALL DEMAND	POTENTIAL AS A PERCENTAGE OF DEMAND WITHOUT POWER GENERATION
MA	39	10%	18%
NY	193	17%	25%
NH	23	35%	100%
RI	13	15%	35%
Total	268	16%	25%

Potential by feedstock

Summary of Results by Feedstock and State

FEEDSTOCK	PRODUCTION TECHNOLOGY (TG OR AD)	ENERGY PRODUCTION POTENTIAL* (BCF/YR)				
		NEW YORK	MASSACHUSETTS	NEW HAMPSHIRE	RHODE ISLAND	TOTAL
Municipal Solid Waste	TG / AD	88.2	22.3	5.5	9.9	125.9
Wood Residues	TG	40.7	10.2	14.2	1.5	66.6
Livestock Manure	AD	27.7	1.0	0.8	0.1	29.6
Energy Crops and Agricultural Residues	TG	18.4	1.5	0.6	0.2	20.7
Landfill Gas	AD	11.4	3.5	1.7	0.6	17.2
Waste Water Treatment Plants	AD	5.4	0.5	0.05	0.2	6.2
Other**	AD	0.9	0.2	-	0.03	1.1
Total		192.7	39.2	22.9	12.5	267.3

* Represents technical potential; assumes complete utilization of all feedstocks.

** Other category includes mainly fish waste and specific waste from other industrial processes such as potato waste water and cheese whey.

Demo project - Newtown Creek

- ◆ National Grid and New York City Department of Environmental Protection are working together to deliver renewable gas from the largest waste water treatment plant in New York City
- ◆ The project will inject enough gas to provide heat to approximately 2,500 homes and reduce CO2 emissions by about 16,000 tons annually (equal to CO2 emissions of approximately 3,000 cars)
- ◆ A renewable energy project that is cost competitive with traditional supply sources

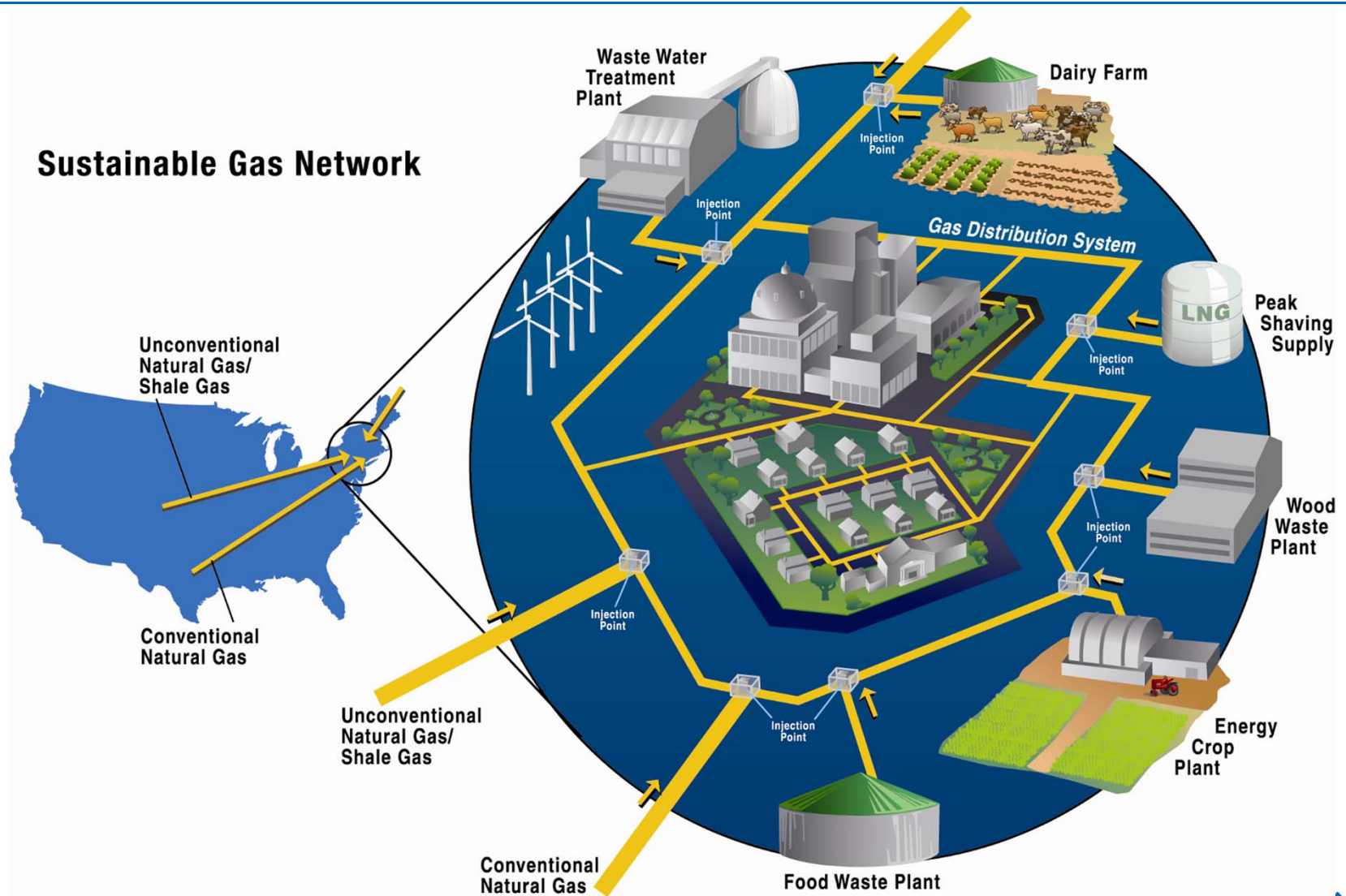


Picture of Newtown Creek waste water treatment plant in Brooklyn, NY.

Source: New York City Department of Environmental Protection

Note: the project is currently in the design phase, and is subject to regulatory approval

Vision for a sustainable gas network



Roadmap to success

