Intergovernmental Ninth Regional Environmentally Sustainable Transport (EST) Forum in Asia

Regional Seminar on Safe, Climate and Disaster Resilient Transport for Sustainable Development"

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EST Plenary Session 5

Funding Resilient Transport Infrastructure and Services

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ANGVA
ASIA PACIFIC NATURAL GAS VEHICLES ASSOCIATION

Sustainable Transport

Transport:

- Movement of goods and products.
- Mobility of people

Vehicles:
- Cars
- Buses
- Trucks
- Trains
- Etc

Fuels:
- Gasoline
- Diesel
- LPG
- **Natural Gas**
- Electric /Batteries
- Hydrogen
- Others

Sustainable Transport

- ✓ Safe
- ✓ Clean
- ✓ Affordable
- ✓ Accessible
- ✓ Climate and Disaster Resilient

- Economic Growth
- Environmental Quality
- Social Equality

Sustainable Development

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs" *(Brundtland Commission, 1987)*

Natural Gas Vehicles Worldwide

- **Natural gas was first used as a transportation fuel in Italy in the 1930s after World War II.** ~ 80 years ago.

- **Worldwide, 83 countries have natural gas vehicles.** ~ half of NGVs in the world are located in the Asia Pacific region.

	Natural Gas Vehicles	NGV Stations
World	~22.4 million	~26,740
Asia Pacific	~12.4 million	~13,600

Natural Gas Vehicles In Asia Pacific Region

No.	Country	Total Vehicles	No. of Stations	Remarks
1	IR of Iran	3500000	2186	May '14
2	China	3000000	5320	June '15
3	Pakistan	2790000	2997	Mar '13
4	India	1800000	903	Nov '13
5	Thailand	468,850	497	May '15
6	Uzbekistan	450000	213	June '13
7	Bangladesh	220000	585	Apr '13
8	Malaysia	74100	178	'Aug 15
9	Japan	42590	314	Mar '13
10	Korea	40222	191	Mar '14
11	Myanmar	27756	45	June '14
12	Tajikistan	10600	53	Dec '07
13	Kyrgyzstan	6000	6	Dec '07
14	Indonesia	6366	14	Jan '14
15	Singapore	4618	3	Oct '13
16	Australia	3110	52	June '13
17	United Arab Emirates	4174	19	Dec '14
18	Afghanistan	1701	2	Aug '13
19	Vietnam	462	7	July '12
20	New Zealand	201	14	Dec '10
21	Qatar	76	1	Sept '13
22	Philippines	20	1	Nov '13
23	Kazakhstan	20	1	Nov '13
		12,451,466	13,602	

Renewable Natural Gas Fuel for Vehicles

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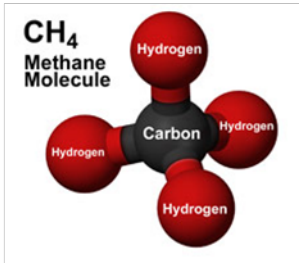
Fossil Natural Gas

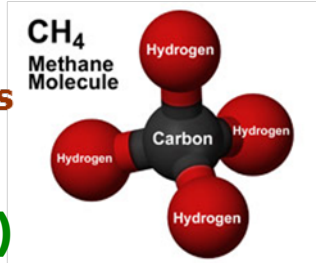
Source:
Gas & oil fields



Biomethane

Source:
Upgraded Biogas

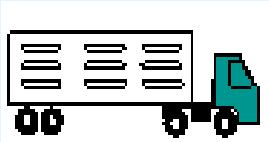
(Renewable Natural Gas)



Transportation & Distribution

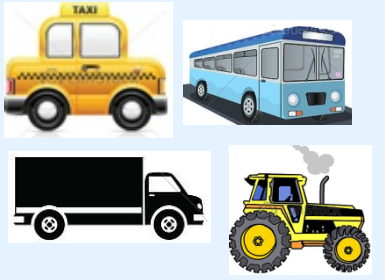
Natural gas pipeline distribution system /grid

Trailers (mother – daughter system)



Usage

NGV Refueling Stations



Vehicles (NGV)

‘Poo Bus’ set to go into regular service on the roads of Britain. 16th March 2015

Bus powered by Renewable Natural Gas (Biomethane) generated from treatment of human and household waste set to go into regular service on the roads of Britain.

- **Sewage and inedible food waste from more than 32,000 households in Avonmouth and Bristol will be converted into Renewable Natural Gas (Biomethane).**

Ref: www.automotive-bussiness-review.com

Example of Renewable Natural Gas (Biomethane) in USA & Europe

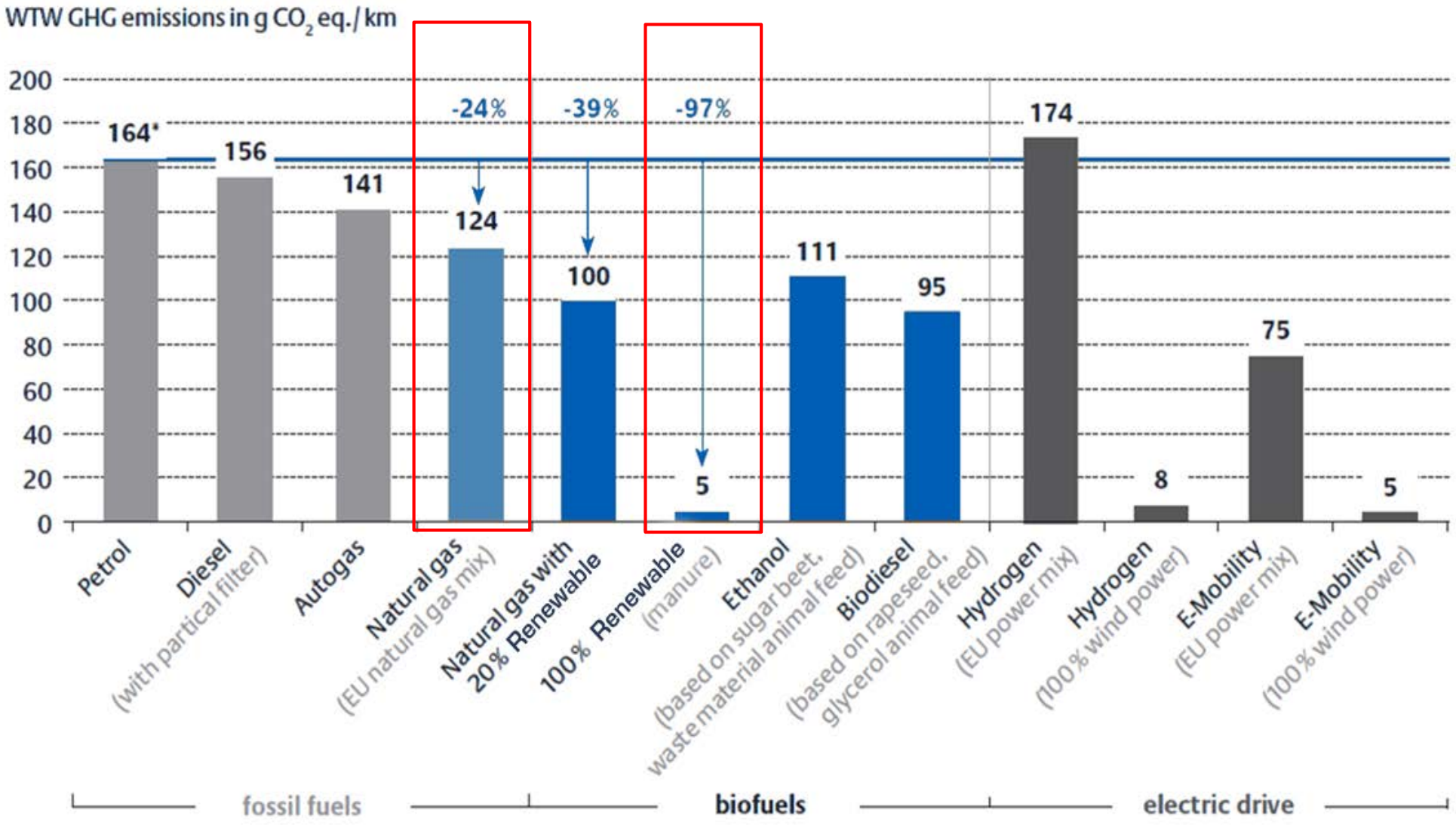
USA

- Clean Energy Fuels Company in USA is developing a nationwide infrastructure for NGV/CNG from both fossil and renewable sources. The company's Clean Energy Renewable Fuels subsidiary markets biomethane fuel called **Redeem.**

Europe

- Biomethane accounted for 30 % of natural gas sold at Finnish NGV Fueling Stations. All biomethane for transport in Finland originated from local biowaste.
- Sweden and Germany boast NGV/CNG markets comprised of 60% and 25% biomethane, respectively.

Renewable Natural Gas (Biomethane) Has Low Well-To-Wheel GHG Emissions



*reference vehicle: gasoline engine (induction enginge), consumption 7 l per 100 km

Proposition

- **Natural Gas Vehicles (NGV/CNG), through the use of Renewable Natural Gas (Biomethane), offers a new area / scope for a Resilient Transport System and Sustainable Transport.**

  - **Private sector are known to be major custodian of both funds and technologies, but they would only take up investments or development /application of technologies if there are business cases for such projects. There must be an attractive returns on investment (ROI) for them.**

  - **Cooperation between Private and Public sectors are needed to explore the technical and commercial viabilities of Renewable Natural Gas (Biomethane) as one of the options for a Resilient Transport System and Sustainable Transport.**

THANK YOU