Future of Energy Transportation and Storage

Global role of LNG as a transition fuel

GLOBAL POWER & PROPULSION FORUM
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World Energy Consumption – Focus Nat. Gas

World energy consumption

Energy, 1000 TWh per year

Year


- Oil
- Coal
- Natural Gas
- Hydro
- Nuclear
- Other Renewable

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Natural Gas Exporters/Producers 30-40 years ago

• Major natural gas exporter were Russia (Soviet Union) – transport via pipelines to Europe (Early 1980s)

• Norway (North Sea) (Early 1980s)

• Netherland (Groningen – production start in 1963)

• United States
First LNG Plants

• Algeria - Arzew (1964)
• Alaska - Kenai (1969)
• Brunei – Lumut 1 (1972)
• Indonesia - Bontang (1977)
LNG Plants end of 1990 and early 2000

- Yemen – Yemen LNG (2008)
- Indonesia – Tangguh LNG (2009)
- Russia – Sakhalin II (2009)
Another wave of LNG Plants after 2010

- **Australia:**
  - Gorgon LNG (2016),
  - GLNG/APLNG/BGLNG (2015),
  - Ichthys (2016)

- **Algeria**
  - Skikda Train 1 & 2 (2013)

- **Indonesia:**
  - Donggi Senoro (2015)
  - Sengkang (2014)
Recent major Natural Gas Discoveries and LNG Projects

- US Shale Gas (Texas, Midwest and Alaska):
  - Dominion Cove Point LNG
  - Freeport LNG (Train 1 -4)
  - Cameron LNG (Train 1 & 2)
  - Sabine Pass LNG
  - Corpus Christi
- Africa (Mozambique and Tanzania)
- Mediterranean Sea (Levithan Gas Field)
- Russia; Yamal Peninsula (Yamal LNG & Artic LNG2)
U.S. Liquefaction Projects
Share of LNG in Global Long-Distance Gas Trade

Natural Gas as a transition fuel helps reducing CO2 Emission

• Use of Nat. Gas instead of Coal or Oil => Reduce CO2

• Replace coal fired power plants w/ natural gas fired power plants

• Emits 50-60% less CO2 when combusted in new, efficient natural gas power plants

• Use for transportation (cruise ships and other vessels)

➢ Customers are all around the world

➢ convert Natural Gas into LNG NO limit in distance for transportation
(most of the LNG plants use Gas Turbines as driver for the refrigeration compressors – efficient GTs reduce CO2 as well)
Thank You