Creating an ASEAN Gas Market: Infrastructure, Interconnections, and Innovative Technological Solutions

FRANK DUFFIELD
SENIOR VICE PRESIDENT
ARGENT MARINE SERVICES
Indonesia remains a world leader in LNG

• A major experienced supplier
• New potential
• A Leading part in new generation LNG
  – Regasification conversion at Arun
  – FLNG at Abadi
  – FSRUs
  – Small scale LNG distribution
Is there a new golden era for natural gas?

• YES, there is a new era.
  – There will be more gas
  – Climate change is real
    • Natural gas is the viable pathway to a lower carbon future
  – Marine Environmental legislation is irreversible
  – New technologies are being applied now

• MAYBE it will be “golden.”
  – Much depends on how market reacts
  – And on “black swans.”
Some New Gas Infrastructure Supply and Distribution Technologies

FLNG
FLRSUs
FRSUs
Gravity based near shore terminals
Small scale Liquefaction
“LNG/CNG in a Box”
Articulated LNG Barges
Containerised LNG
CNG
CNG

- CNG = natural gas compressed at 275 BAR and ambient temperature.
- LNG  = natural gas liquefied at -162° and ambient pressure.
- LNG volume = \(\frac{1}{600}\)th of natural gas, so 2+ x energy of CNG in same fuel tank. CNG needs small volumes and short distances to market.
- No CNG ships in operation but CNG marine cargo tank and ship design now developed and has class approval.
- Challenge of financing and risk allocation along supply chain.
- Long CNG experience in commercial vehicle and car market. Ideal for short haul vehicles, with daily fuelling e.g. urban buses.
- CNG can be supplied to this market off back of LNG distribution chain.
A Schematic Infrastructure Picture
Opportunities: FLNG/FSRUS plus small ships and/or barges

• Use of small LNG ships and barges to distribute from mother vessel to local markets.
  
  – Gives scope for negotiation on domestic supply obligations

  – Avoids large scale onshore developments
    • These can be costly and create huge social, economic and political problems

  – But still enables planning of local economic development
    • Volumes supplied in manageable quantities
    • Scale up is easy as economic development progresses
Added Advantages of Barges

- Articulated barges have added advantage of cost saving and flexibility
  - Barges can act as floating storage at delivery points
  - Also as re-gas and power generation plants
  - ‘Swap and drop’ maximises use of vessel capacity
  - With multiple locations ‘hub and spoke’ operations are possible, using x barges and x-y, tugs
  - Barges and tugs can be built in local shipyards
  - Barges can be easily sized to match market
  - Scale up is easier to achieve
  - Shallow drafts
The Potential from Abadi
Opportunities for existing and new onshore plants and terminals

- LNG handling and vessel management procedures for smaller vessels and barges are being developed in Europe and US.
- Designs for barges can be made to match existing terminals with only modest terminal investment.
- Existing terminals can become hubs for regional small scale supply, e.g.
  - Arun to Western Sumatra
  - Brunei to Philippines
Opportunity for “stranded” gas field development

• LNG plants can be transported to land based isolated small gas fields that cannot support pipeline
  – LNG/CNG in a box
  – Modular LNG plants of significant size delivered by container

• LNG can be exported from field
  – In containers by truck
  – In small bulk or containers by barge
    • Designed for shallow draft inland waters.
Opportunities to develop new local power and fuel markets

• Access to modern energy is the number one aspiration of local communities affected by major energy projects
• Small scale LNG can meet this aspiration by supplying to small generators to create local electricity distribution
  – Delivery by small bulk ship or barge, especially where navigable water connects supply and off-take locations
  – Containerised LNG ideal for micro markets, shallow inland water locations and road delivery.
  – Enables substitution of diesel
    • Immediate economic, environmental and social benefits
Opportunities for gas in road transport

• Major push US for LNG as heavy road vehicle and locomotive fuel
  
  – Clean Energy is an established player liquefying supply off pipeline gas

  – Shell (and others) now entering market
    • Modular small scale LNG plants on shale gas fields
    • Working with engine manufacturers on engine designs
    • Working with fuel chains to establish filling station networks

  – LNG ideal for long haul vehicles

  – CNG better for short hauls and domestic vehicles
    • But CNG readily delivered off the back of LNG distribution network
Clean Energy’s Natural Gas Fueling Network
Marine, the biggest new market for natural gas?

- LNG as a marine fuel offers huge potential
- ASEAN region ideally located to capture a big share of this potential
- IMO and regional environmental directives are driving ship owners to assess use of LNG
- Technical and safety issues are being addressed
  - Location of fuel tanks
  - Bunkering operations
- Economics for conversion of existing ships are not clear
  - Trade off between loss of cargo space and cheaper fuel
  - Option of scrubbers to meet new emission standards
  - Uncertainty on future natural gas prices
- But new build for vessels operating entirely within emission control areas is happening
  - Baltic, North Sea, English Channel
  - European inland waterways
- Major US shipper has announced plans for four large new LNG fuelled container ships
  - Establishment of LNG bunkering in US priced off US gas prices will stimulate global LNG fuelled shipping
Conclusion

• We are in a new era for natural gas.
• To quote a major IOC, natural gas will be “available, affordable and acceptable.”
• Technologies to take advantage of this are being developed rapidly.
• This creates a wide range of opportunities.
• These opportunities include
  – New markets for gas
  – The development and export of new gas technologies
  – New options for managing resource development
  – New options for managing local and regional development
  – Environmental improvements
  – Tools to support management of climate change

• All this is good news for ASEAN and Pacific nations
  – This development provides new ways to address pressing needs
  – They are well placed to take economic advantage of market opportunities