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Regulatory Implications of the Development of New Technologies in the Gas Supply Chain: Focus on LNG

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An EU Strategy for LNG
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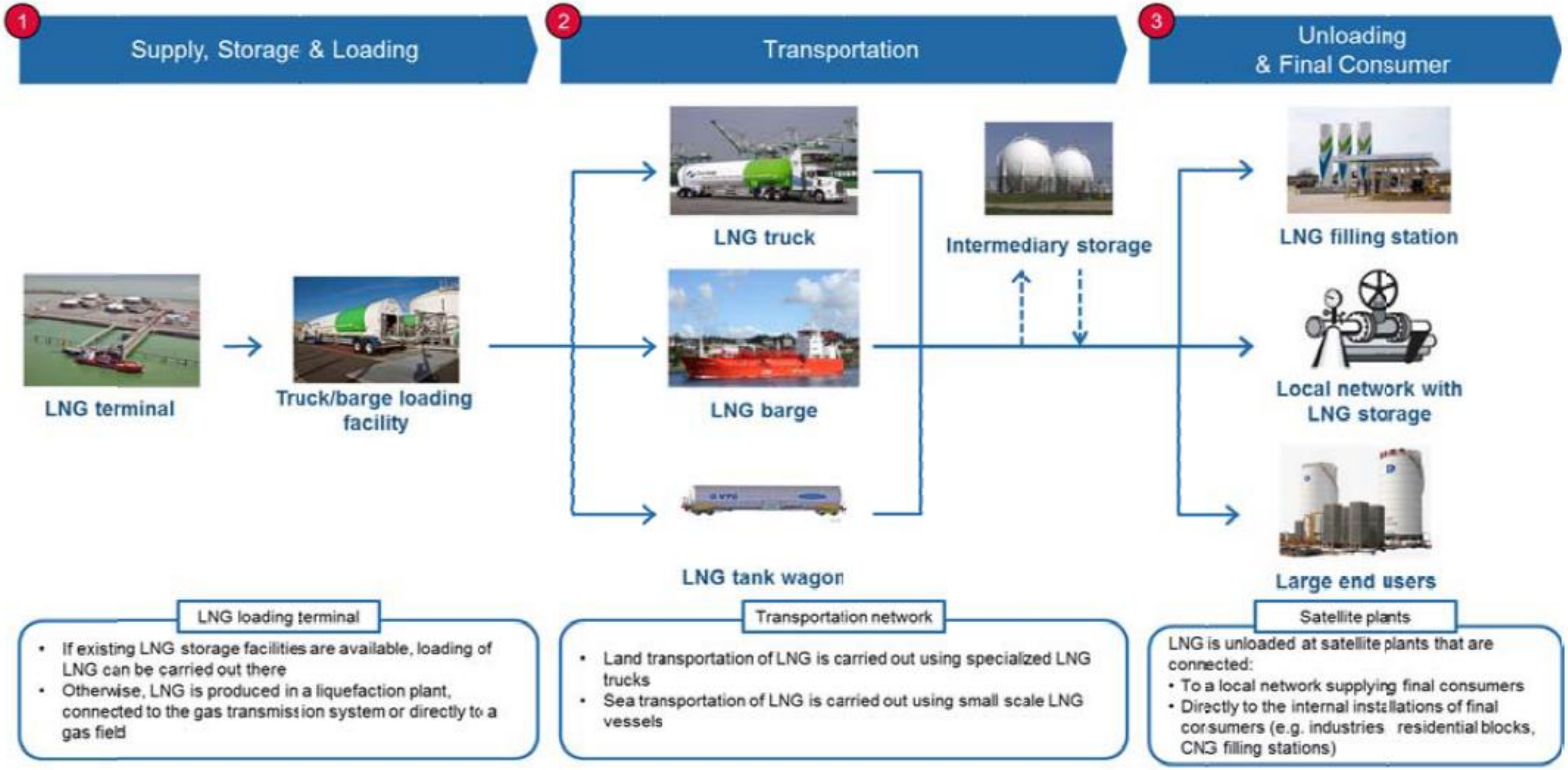
Figure 5: Overview of LNG virtual pipeline supply chain



Kantor Consulting, 2014 - *Regulatory implications of new Developments in the gas supply chain*

Natural Gas: Global Change and Continuity

- Diversity of supply:
  - R/P > 100 years
  - Tight gas, shale gas now competitive at the wellhead
  - Liquids abundance: pressure on prices
  - Hydrates?
- Liquefaction
  - Trinidad type (single train) experience now commonplace: commoditization of liquefaction plants
  - Small-scale liquefaction plants
- LNG Transportation
  - Up by double digits per year
  - Greater flexibility in charters
  - Lower cost = extended reach
  - New, more flexible interfaces to downstream infrastructure: transshipment, FSRU, small scale LNG (inland, waterways)

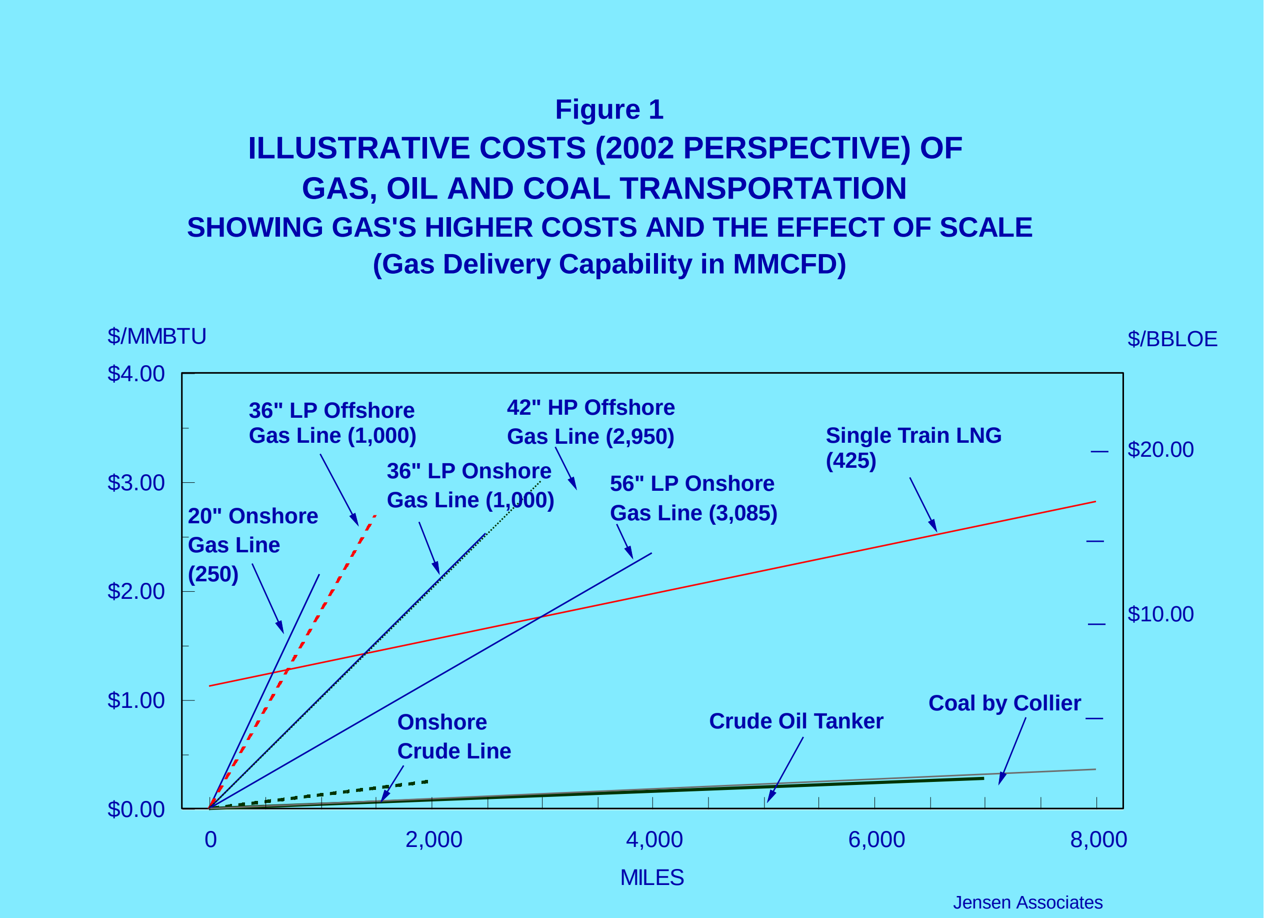
LNG Demand: New Uses, New Realities

- Substitute for oil: still the case?
  - Why oil-based P then?
- Accessibility: new delivery channels
  - Decentralisation of LNG infrastructure and distribution channels
  - Emergence of 'Virtual Pipelines'
    - Interaction/competition with traditional pipeline networks

Reaching New Markets

- Technological developments allow LNG to reach new final consumers
  - *New supply and storage practices*
- **Regasification** capacity moves inland, as does **LNG storage** (satellite storage)
- Flexible networks of trucks, light vessels and rail take the function of traditional, inflexible pipeline networks

Is Change Across the Board?

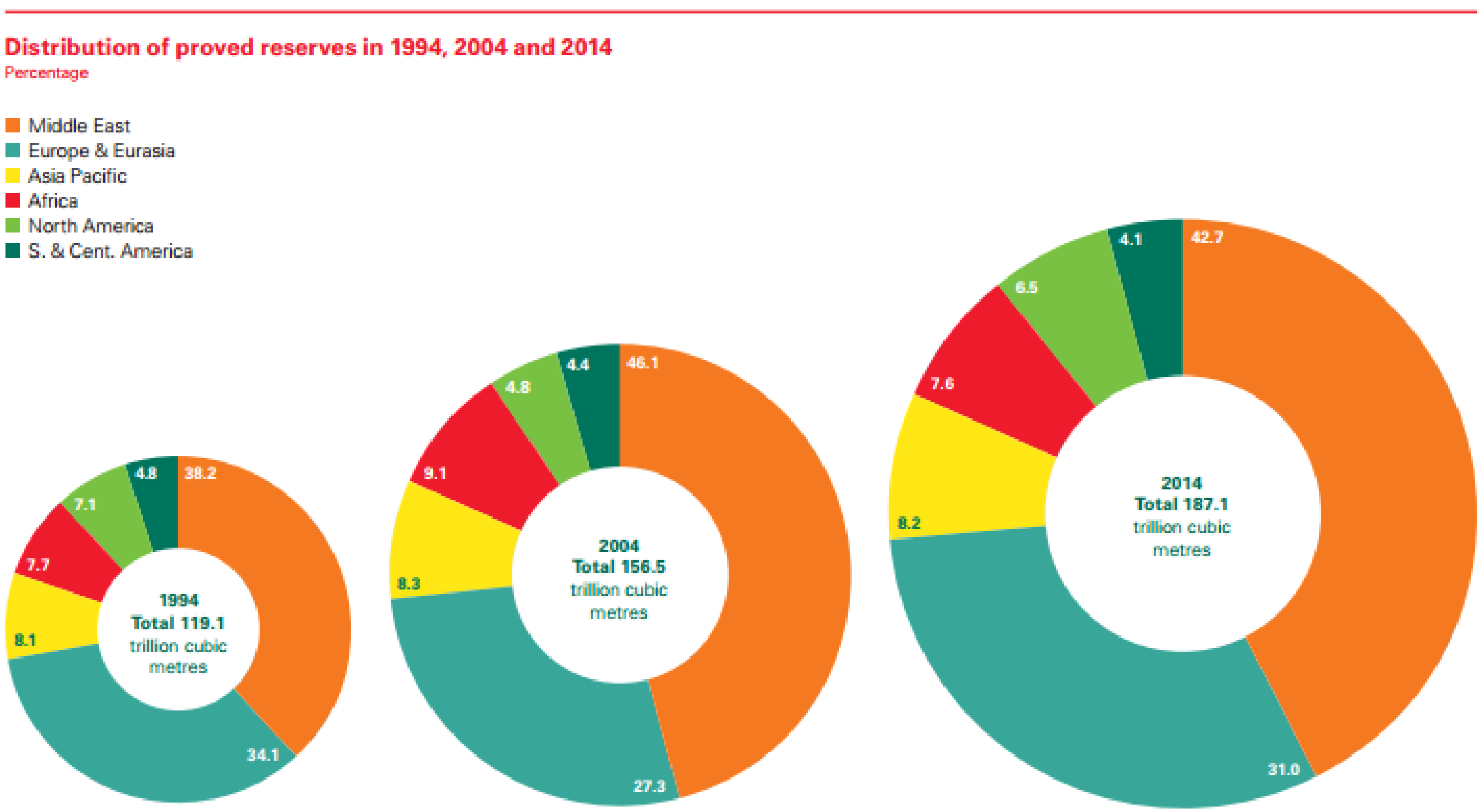


Source: Jensen Associates, Inc.

LNG vs. Piped Gas

- Penalized over short distance (higher cost)
  - But LNG _expansion_ less costly than pipe up to about 2,000 km)
- Can tap distant or stranded gas
  - Point of equilibrium depends on volume of piped gas, but LNG always wins over 5-6,000 km
- Market size, connectivity, anchors matter: scale and location really matter
- So… gas to gas (commodity) or project to project (investment) competition?

Same pattern, Just More of It?

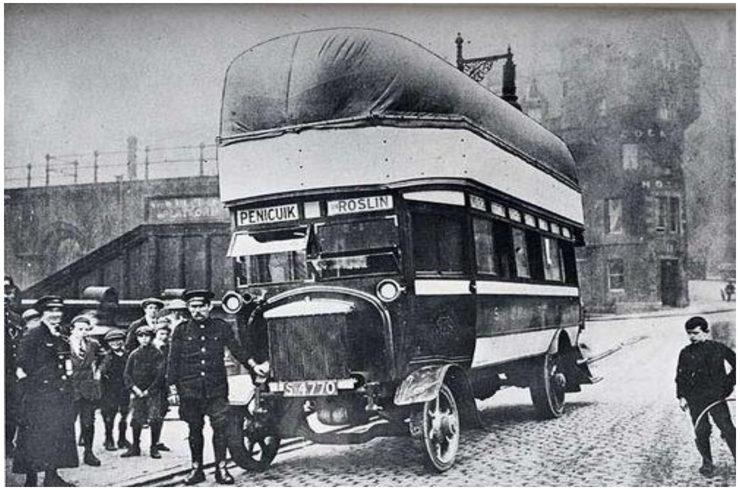


Source: BP Statistical Review of World Energy 2015

The Great Gas Divide is Still There

Source: Jensen Associates, Inc.

The Age of New Gas



Source: lowtech.org

The Real News: What Implications for Competition?

- Gas-on-gas competition
  - Overlap of transport/distribution systems
- Cross-border competition
  - Different MS regulate LNG in a consistent manner?
- Loss of Economies of Scale
  - Restrictions on maximum amount of time LNG can be stored reduces economies of scale in sourcing and distribution
  - But… what is the physical limit of LNG storage, if any?
- Regulation at the natural gas market (commodity side) or at the project (investment) market level? Balance possible? The role of infrastructure services markets for this balance?

Why Regulate?

- Safety, SoS, market access / integrity / competition, environmental / sustainability
- Current regulation:
  - » Services market: TPA, etc.
  - » Project market: Level playing fields with pipes, storage
  - » Objectives:
    - market integration
    - security of supply
    - competition
    - sustainability
- Main takeaways:
  - » Stakeholder market status: defining which market regulation (*needed at all*?) for which stakeholders: monitor first, assess impact
  - » Project-level: Equal regulatory conditions for various types of projects within / between MSs: Implement (CBA important)
  - » EU-wide approach to services markets: LNG storage and loading facility regulation (TPA, allowable storage time period, etc.)

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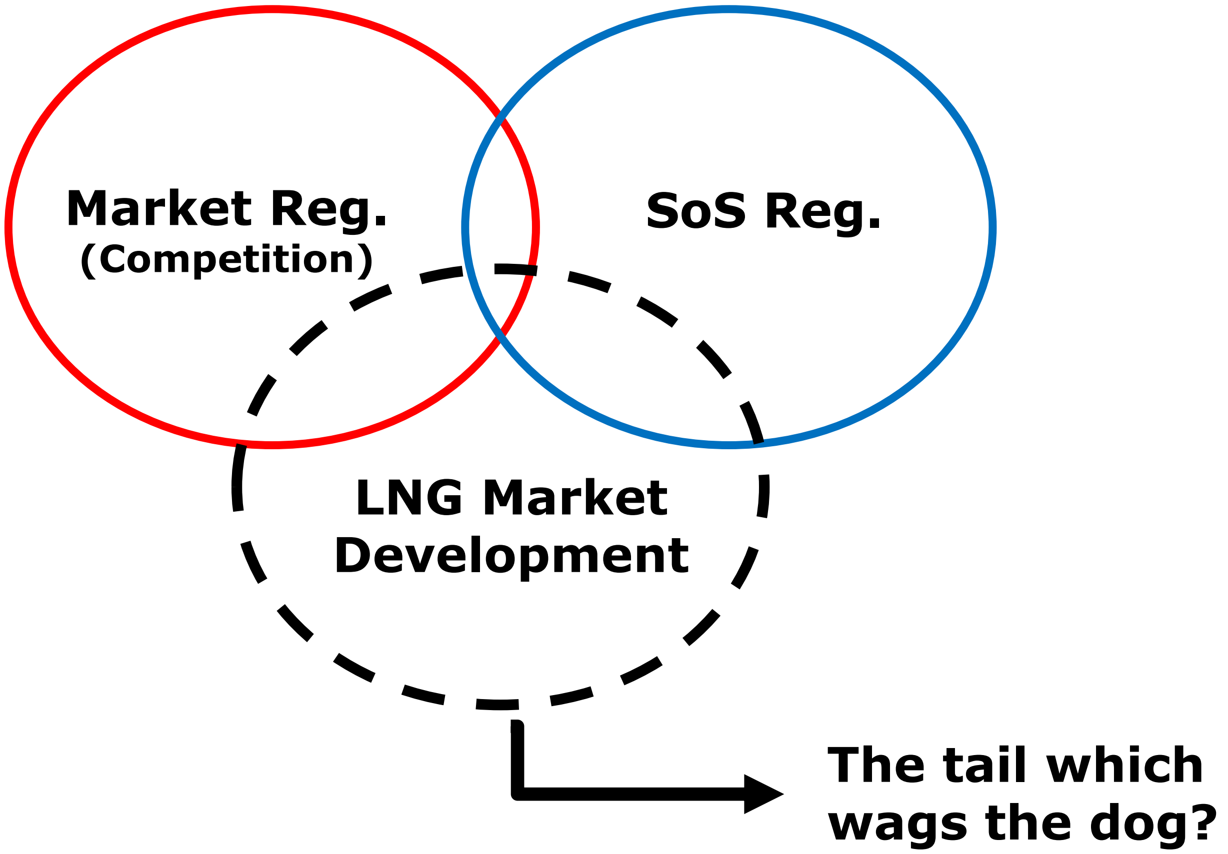
Regulation Following or Ahead of Market Development?



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