



FLNG Global 2018

Amsterdam

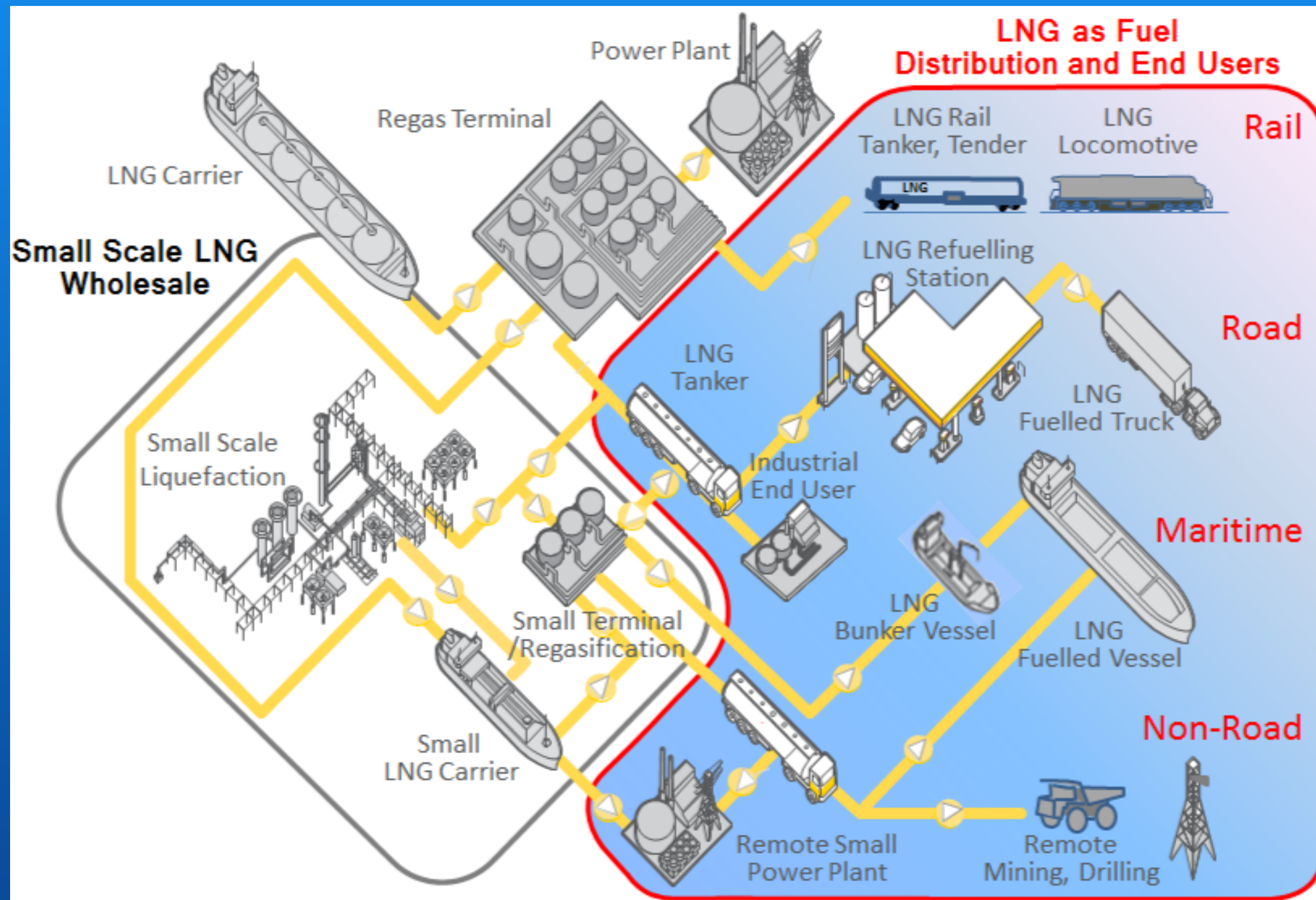
The “Firecracker Initiative”
Igniting regional LNG Development



Small Scale regional and emerging LNG markets
have not progressed as fast as we expected.

Why not ?

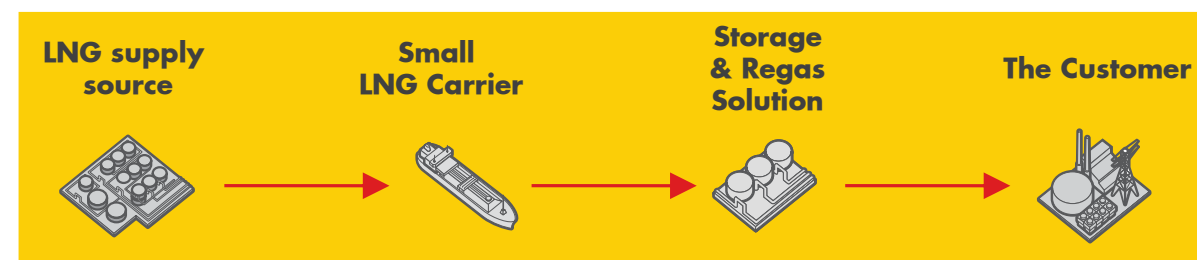
Small Scale LNG - many different pieces



The Shell view - multiple alignments needed

Unlocking the Small Scale LNG Puzzle

Serving a new customer segment



- **High novelty factor for customer**

LNG often seen as more **complex** than current (diesel, fuel oil) solution

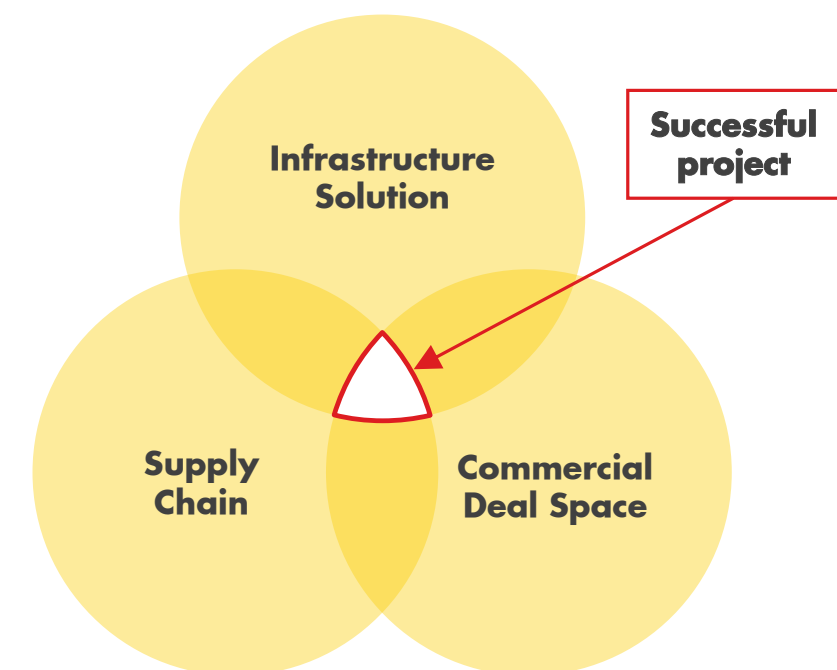
- **Unit cost**

Every touch point adds supply chain cost

- **Maturity**

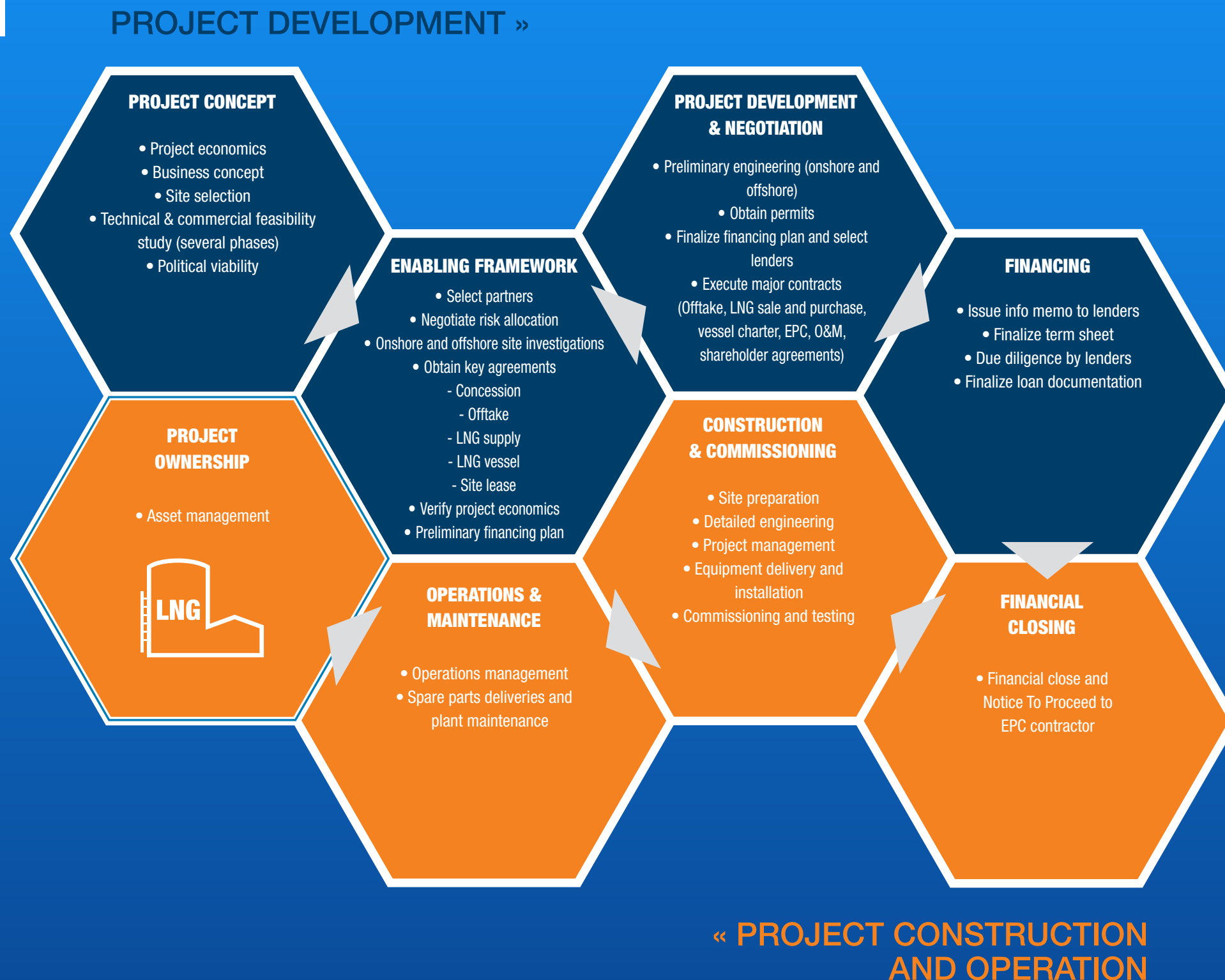
Supply chain, infrastructure solution and commercial models are under development

Business Case

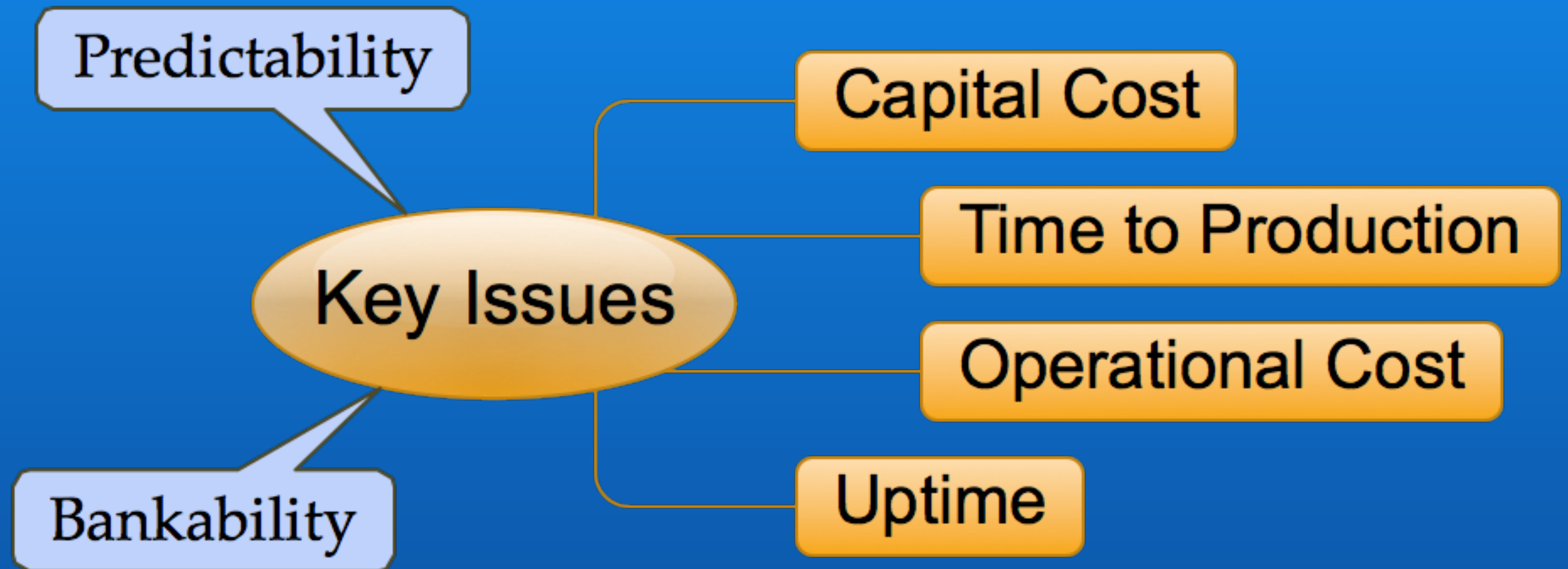


Successful Project = Commercial deal space met by an economically & technically feasible supply chain and storage & regas solutions

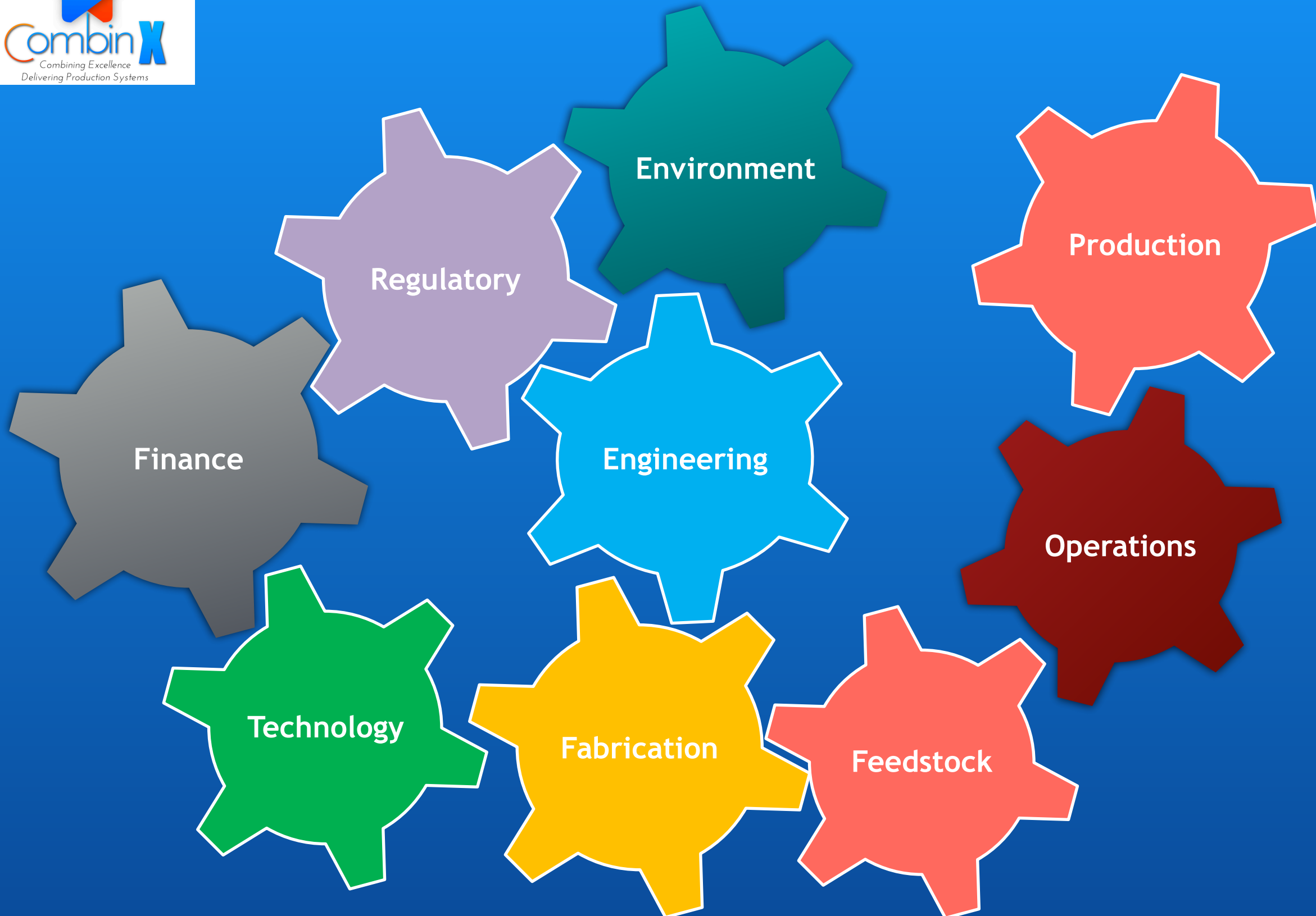
The Wärtsilä view - all pieces must mesh



Driving factors



Combining the right parts in the right ways





The “Firecracker Initiative” A Lean Delivery Framework

- Industrial Plant as a Service
- Amazon for Infrastructure
- Outsourced Ownership & Operation
- Buying Throughput not Steel
- Real Time Remote Monitoring
- Blockchain Transaction Ledger



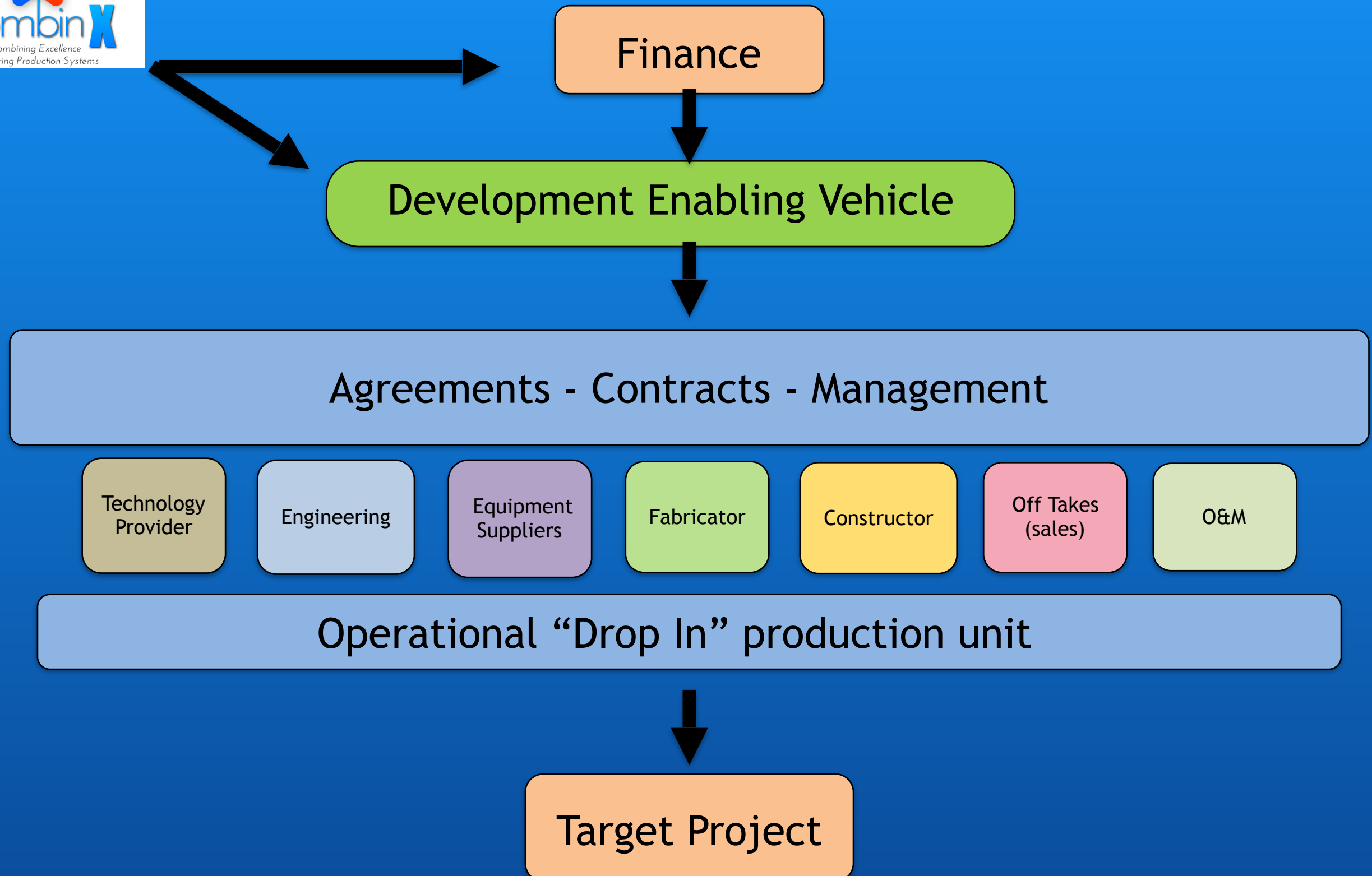
A focussed “Product” Range

Repeated use of Primary Partners & Technology

- LNG Import & Distribution - Jetty Less
- Power Generation - Jetty Less
- LNG Production - Jetty Less
- Waste Biomass Gasification - Torrefaction
- Battery Minerals Upgrading - Torrefaction
- Hydrogen Production - Torrefaction
- Cannabis Refining



Structural Overview





Development Approach

Development Enabling Vehicle

Development Enabler

- Manages framing and development of opportunities
- Facilitates relationships, agreements and project equity
- Leverages risk reducing strategies

Capability Providers

Capability Providers

- Selected partners & participants for streamlined (LEAN) project delivery
- Technology
- Finance
- Fabrication
- Operation

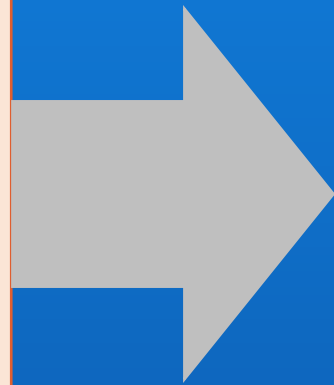
Project Company

Project Company

- Onsite entity
- Local connections
- Regionally focussed business

A “Productized” approach for a new generation of LNG customers

Standardization
and
Modularization



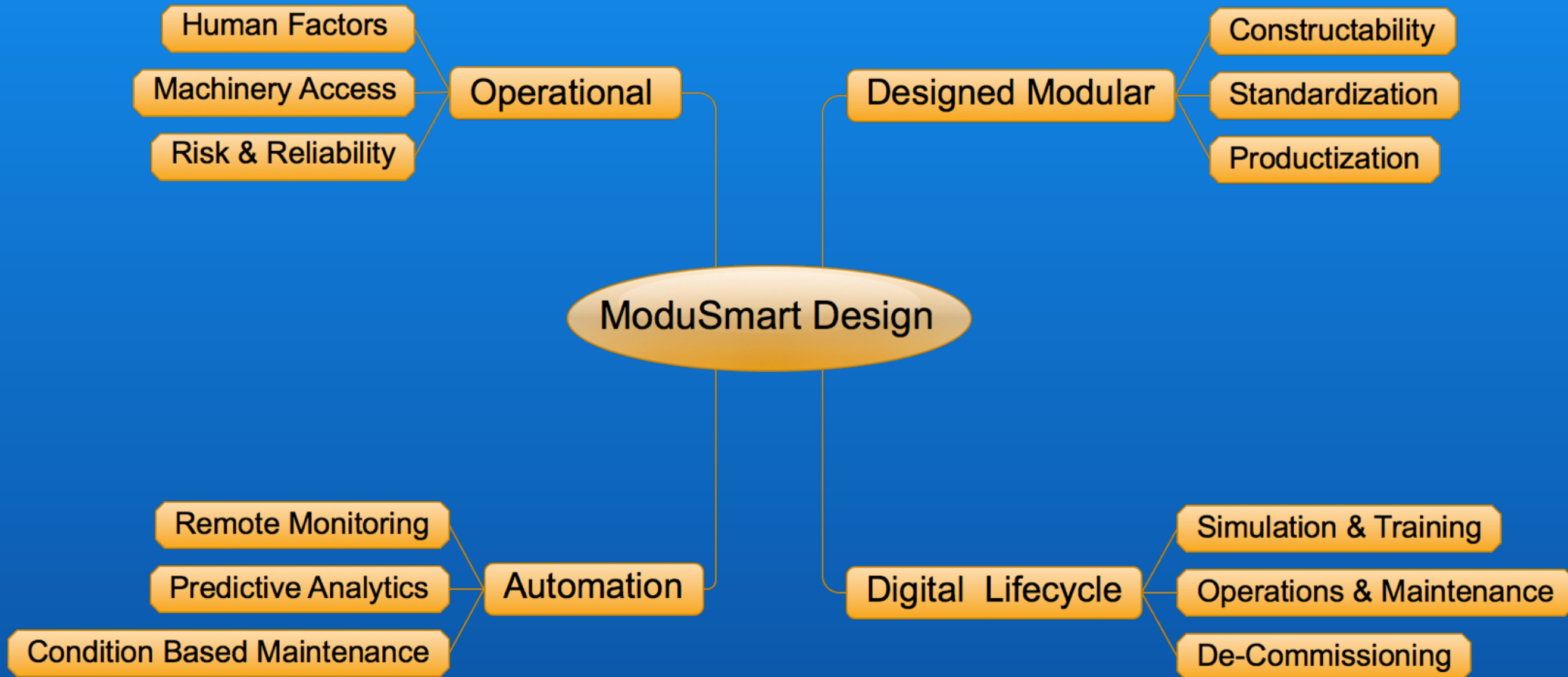
- **Schedule** – earlier delivery & cash flow
- **Scalability** – assets developed in line with demand
- **Flexibility** – Mix & Match standard modules
- **Cost** – standardized equipment & technology cuts costs
- **Reliability** – standardization enables repeatability
- **Financeability** - proven designs & relocatable assets



Smart Modularization & Standardization

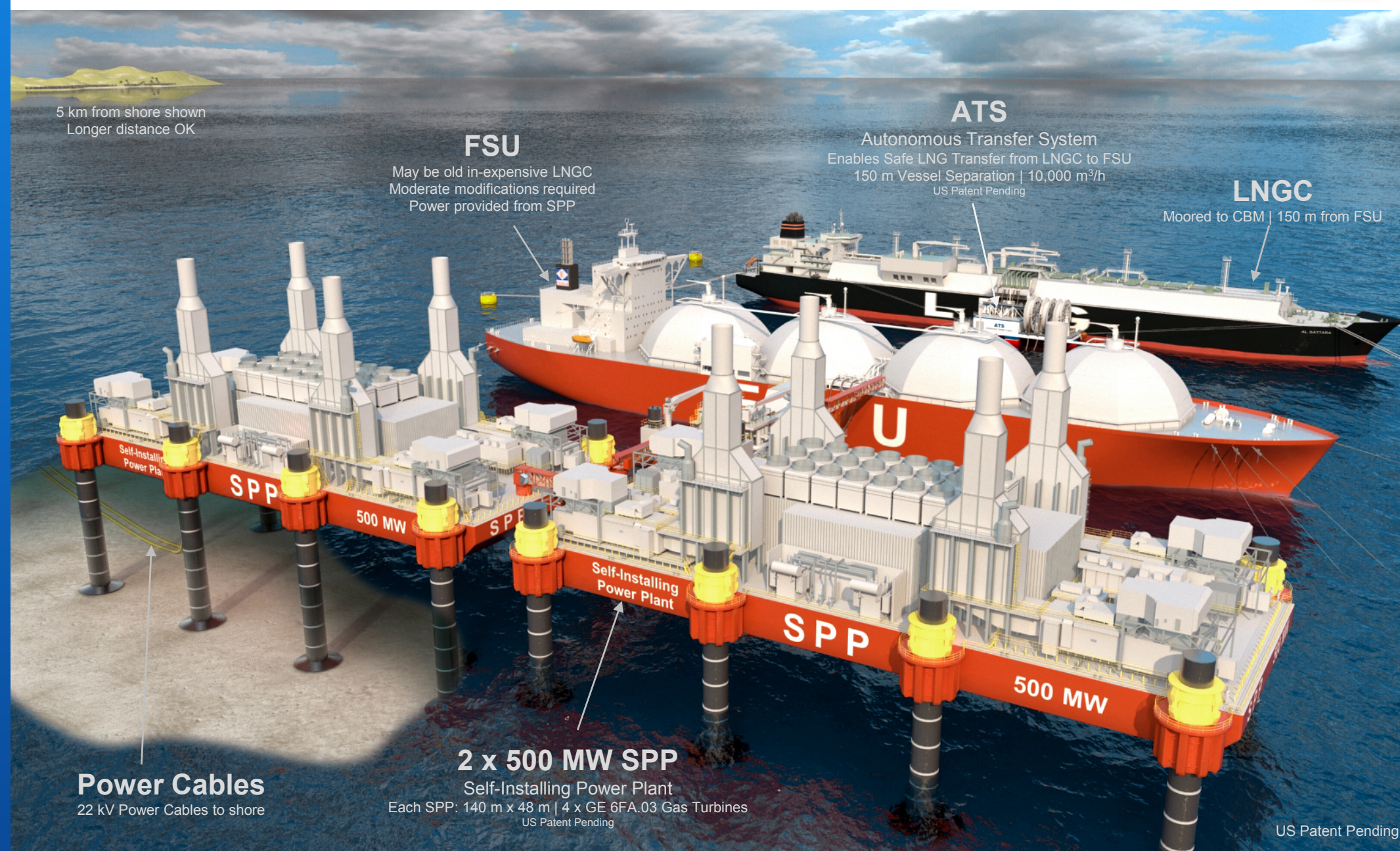
- Define, locate, modify - don't invent
- Characterize Components - Interchangeability
- Vendors, Procedures, Jobs are Components
- Components build Sub-Assemblies
- Sub-Assemblies build Systems
- Systems are Components of larger Networks

Smart Modularization



Fully integrated “Drop In” solution

Self-Installing Power Plant (SPP) | 2 x 500 MW



Vessel supply - Conversion - Operation



LNGC to FSU
Conversion



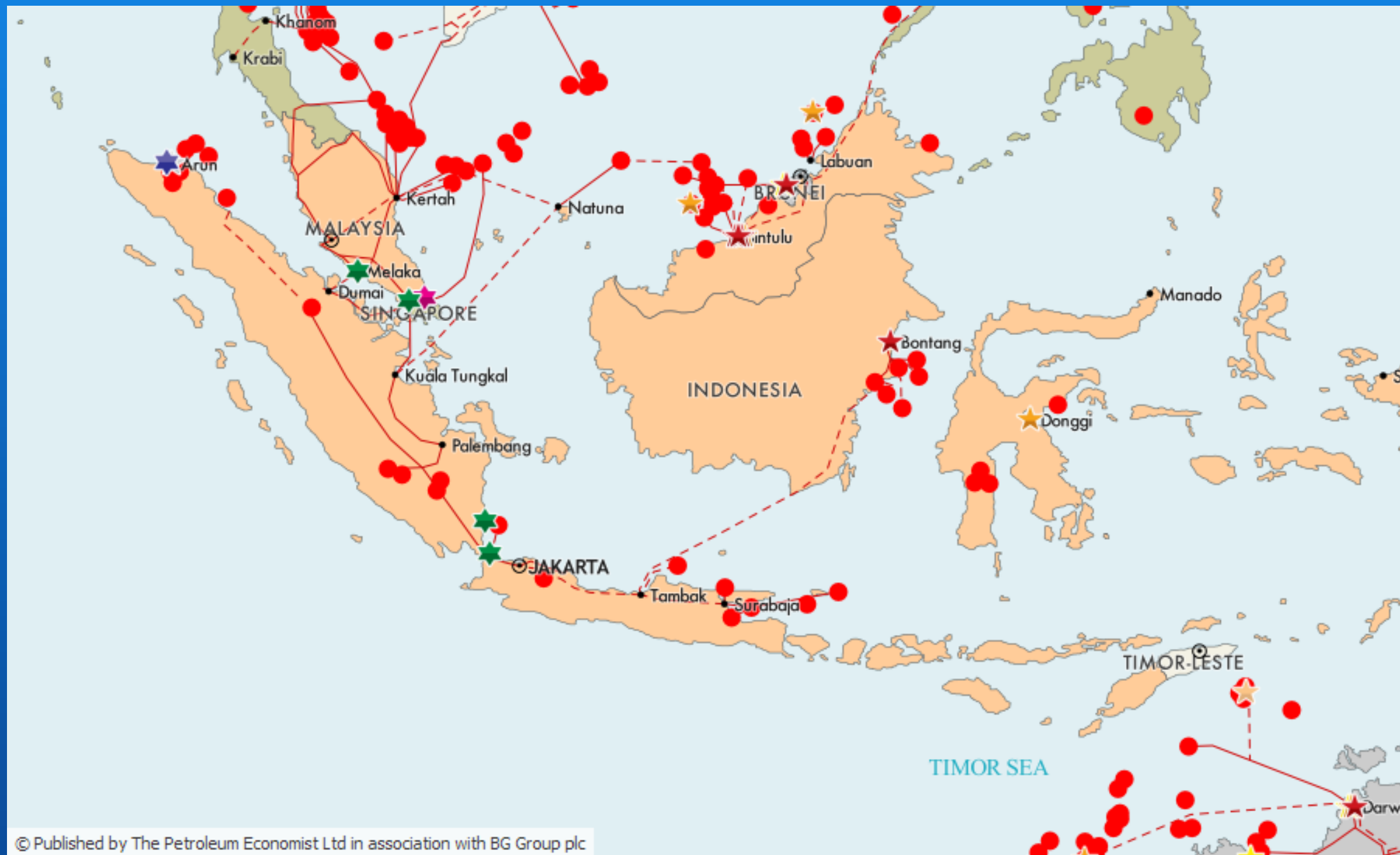
Cost effective storage & transport a key factor



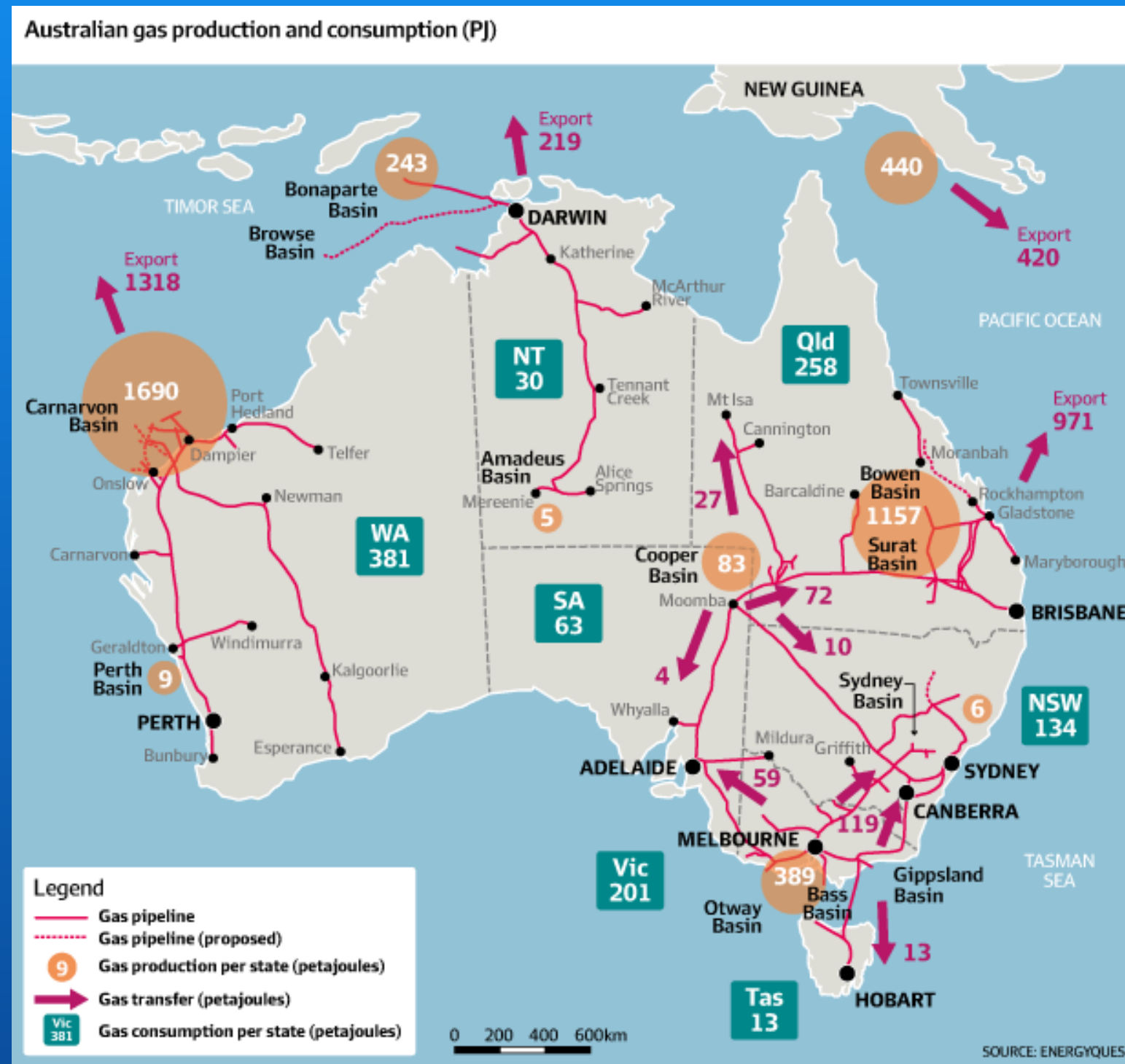
LNG Target Regions

- Lack of internal gas distribution network
- Gas production not co-located with consumption
- Lack of integrated power distribution grid
- Increasing energy demand
- Distributed Industrial Clusters

Small Scale Hub & Spoke Distributed Power & Local Industrial Clusters Break Bulk - Reloading - Bunkering



- Gas production not co-located with consumption
- Lack of internal gas distribution network





Derek Thomas

Derek.Thomas@AGP-AU.com

Derek.Thomas@WindandSea-Research.com

| | |
|------------------|-----------------------------|
| USA | <i>+1 808-725-3379</i> |
| Australia | <i>+61 (0) 481-472-668</i> |
| UK | <i>+44 (0) 7408-809-360</i> |