



SMALL SCALE LNG

Shell's vision on small scale LNG



Dr Gerard van der Laan (gerard.vanderlaan@shell.com)
Manager New LNG Markets, Projects & Technology

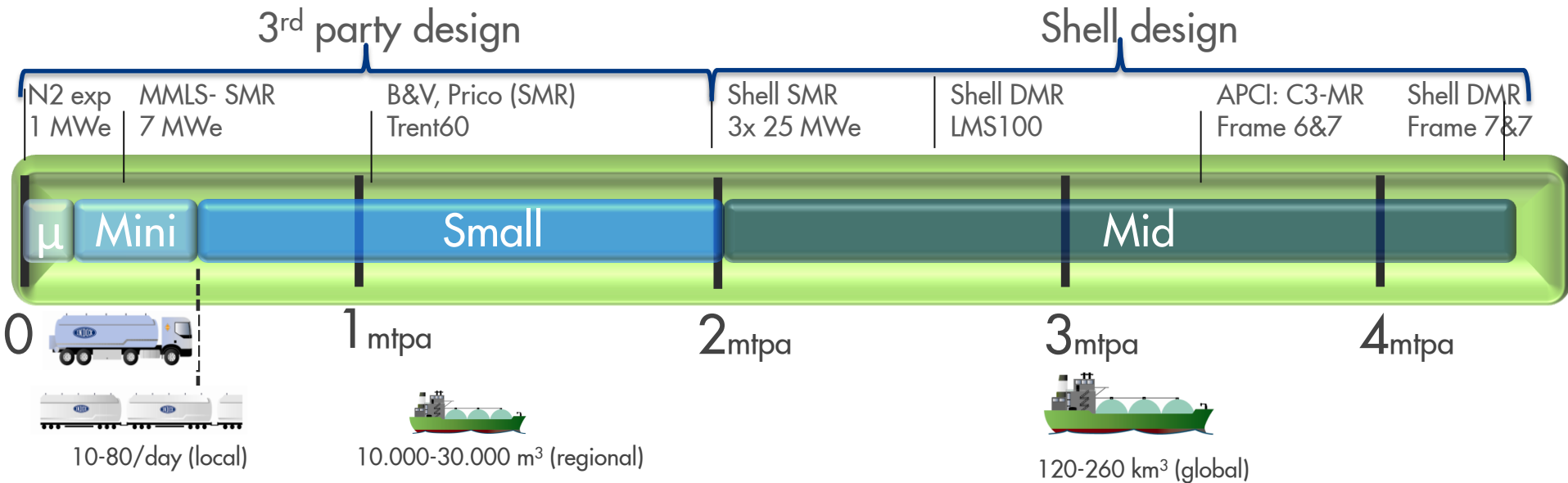
Shell's vision on small scale LNG

- LNG value chain
- MMLS liquefaction concept
- Projects
- Challenges

1.0

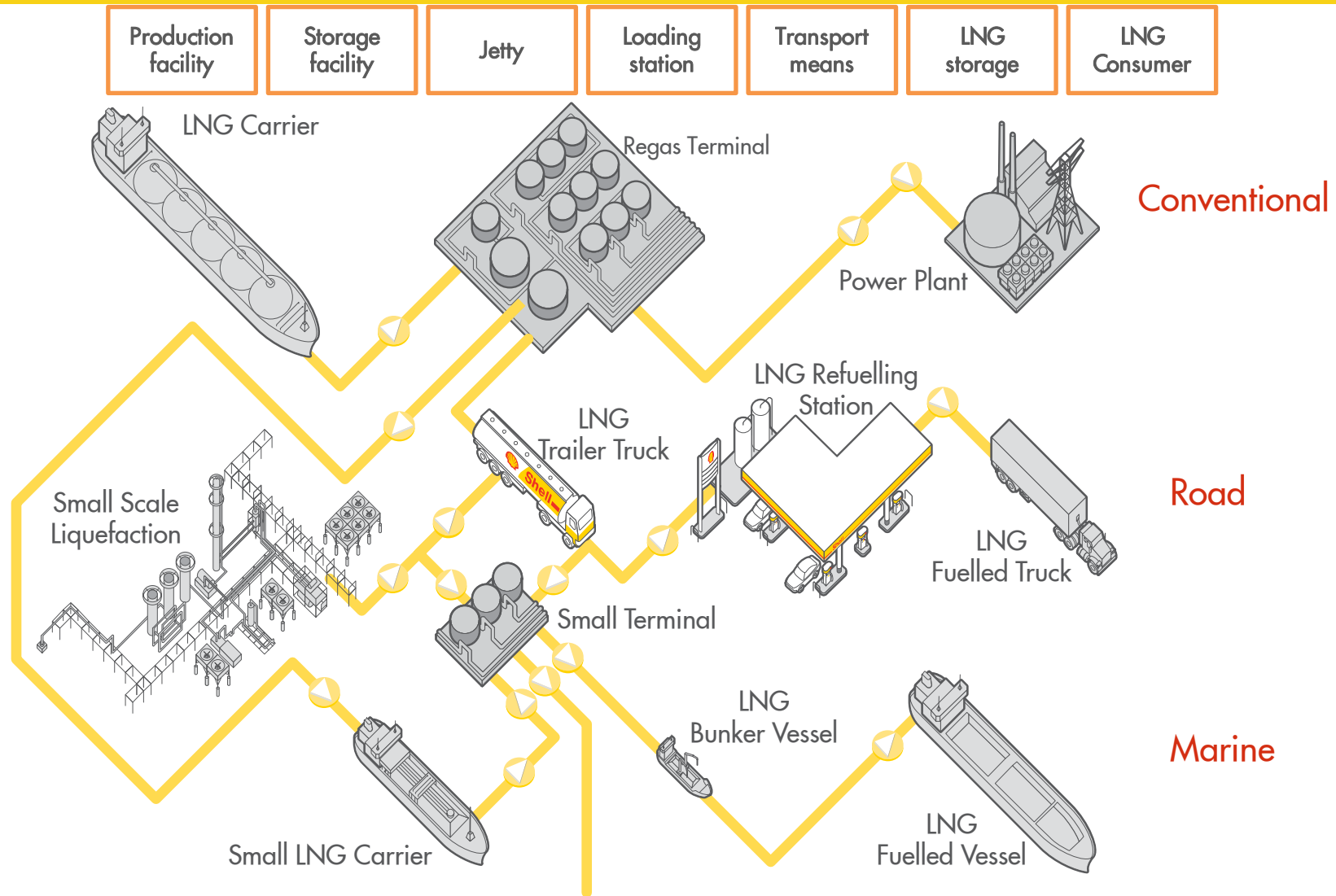
SMALL SCALE LNG VALUE CHAIN

SMALL SCALE LNG DEFINITIONS



	Concept	Technology	Transport	Purpose
Micro 0-0.1 mtpa	Simple	N ₂	Truck	Enabler of oil production, flare gas Peak shaver LNG
Mini 0.1-0.5 mtpa	Movable & Modular	N ₂ or SMR	Truck/container	Premium markets Replace marine gasoil, road diesel, naphtha, LPG
Small 0.5-2 mtpa	Minimum equipment	SMR	Small LNG carriers	Phased deployment Supply gas grid /power plants
Mid 2-5 mtpa	Economy of scale	DMR or C3-MR	Ship to terminal	Traditional base-load Supply gas grid /power plants

CONVENTIONAL VS LNG IN TRANSPORT VALUE CHAIN



There are more transport applications, such as rail, mining, etc.

A CROSS-BUSINESS MODEL WILL ALLOW SHELL TO DELIVER VALUE ACROSS THE ENTIRE VALUE CHAIN



Stranded Gas



Coal Bed Methane



Pipeline Gas



Extended Well Test



Small scale liquefaction



Existing LNG Infrastructure



Global Marine, ECA



Road Transport



Mining



Rail



Stationary Power

Upstream

Downstream

REGIONALLY DISTINCTIVE DRIVERS OFFER OPPORTUNITIES FOR INTEGRATED PROJECTS IN EACH MARKET

Regional archetypes: markets have different key drivers and thus opportunity spaces



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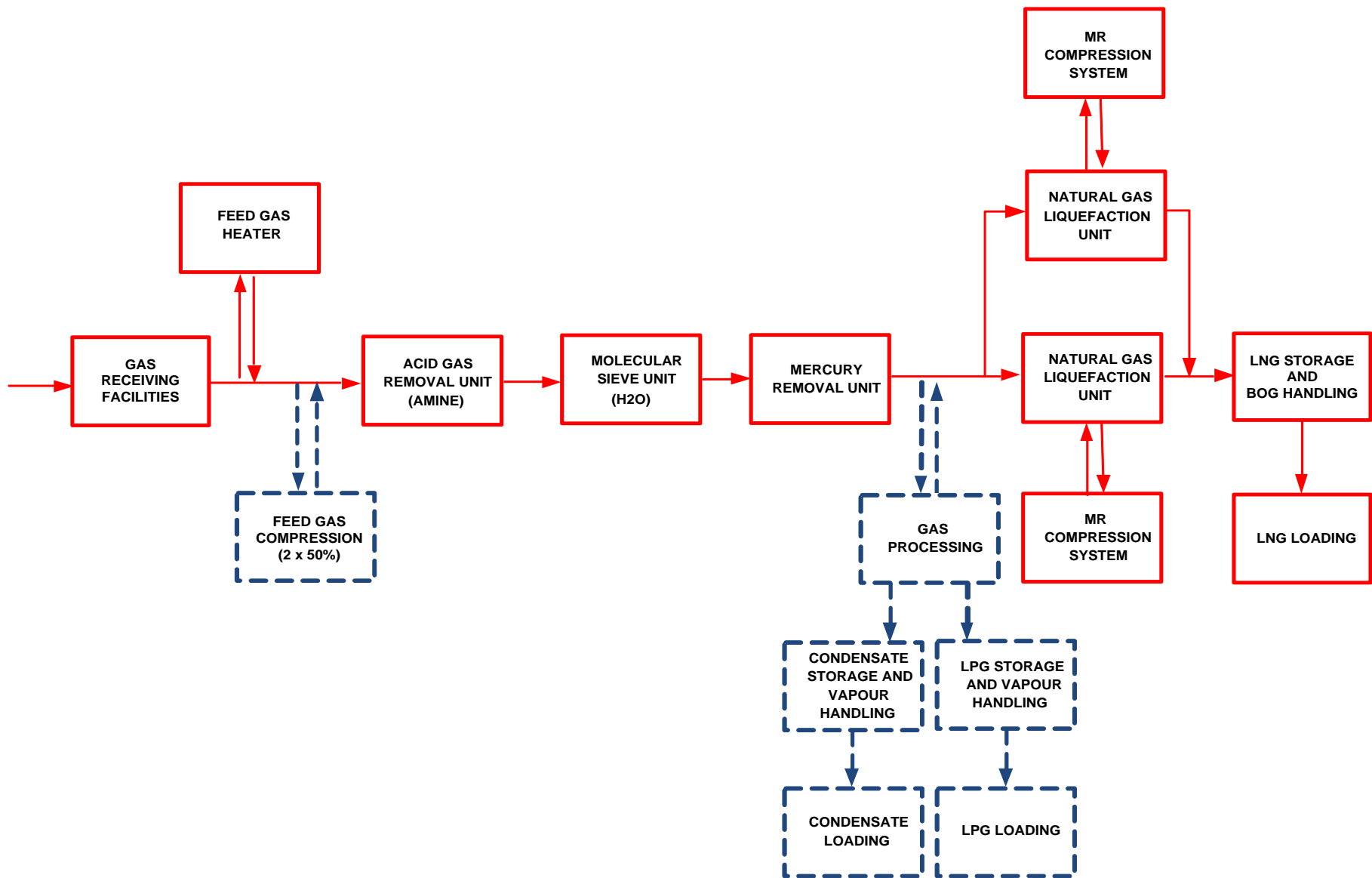
SMALL SCALE LIQUEFACTION - MMLS

MMLS - MOVABLE MODULAR LIQUEFACTION SYSTEM



■ MMLS animation

MMLS PROCESS OVERVIEW



SMALL SCALE LNG BUSINESS OPPORTUNITIES

- **Opens up new DS/LNG markets.** Supplying selected customers in local markets traditionally dependent on oil-based products including transportation sector (Naphtha, LPG, Diesel or HFO). Export is a possibility depending on marine infrastructure, storage and logistics.
- **Early gas and stranded gas monetization:** UCG, flared gas, smaller gas fields, appraisal wells
- **Enhances project economics.** Significantly improves project economics due to:
 - lower unit cost
 - faster construction times
- **Domgas & Environment.** Complements domestic gas supply, produces clean fuels and local power production requirements (as compared to traditional LNG export plants), which represents a strong CVP to governments.

3.0

SHELL SMALL SCALE LNG PROJECTS

SHELL PROJECT IN CANADA

GREEN CORRIDOR - CANADA



- Shell's 1st large scale LNG for transport project
 - Ft. McMurray - Calgary - Vancouver
 - 1st phase: 0.25 mtpa LNG plant
 - FID 2011



LNG POWERED TRUCK



CANADA: JUMPING POUND GAS PLANT

OTHER SHELL PROJECTS IN SMALL SCALE LNG

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Business Tax Season

Shell plans Calgary LNG

CBC News Posted: Sep 7, 2011 2:26 PM ET | Last Updated: Sep 8, 2011 4:34 PM

Dutch oil giant Royal Dutch Shell plans to make a plant near Calgary to process natural gas as a fuel for heavy duty vehicles.

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New LNG Powered Tank Barges to Join Shell Rhine Fleet

Posted on Sep 5th, 2012 with tags [europe](#), [fleet](#), [join](#), [LNG-powered](#), [New](#), [News by topic](#), [Rhine](#)



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Shell Boosts LNG Marketing With \$750 Million Gasnor Purchase

By Eduard Gismatullin - Jul 11, 2012 2:21 PM GMT+0530



0 COMMENTS

Royal Dutch Shell Plc (RDSA) will buy Norwegian liquefied natural-gas supplier Gasnor for \$750 million to target marine customers before new environmental regulations are in

4.0

KEY CHALLENGES

KEY CHALLENGES FOR SMALL SCALE LNG

- Standards & regulations (especially marine sector)
- Tax regimes/uncertainty
- Gas quality variation
- Cost of cryogenic equipment

