



VaasaBall LNG Products Oy  
Kaasualan neuvottelupäivät  
22.05.2014

# Company and technology key facts

## Key facts

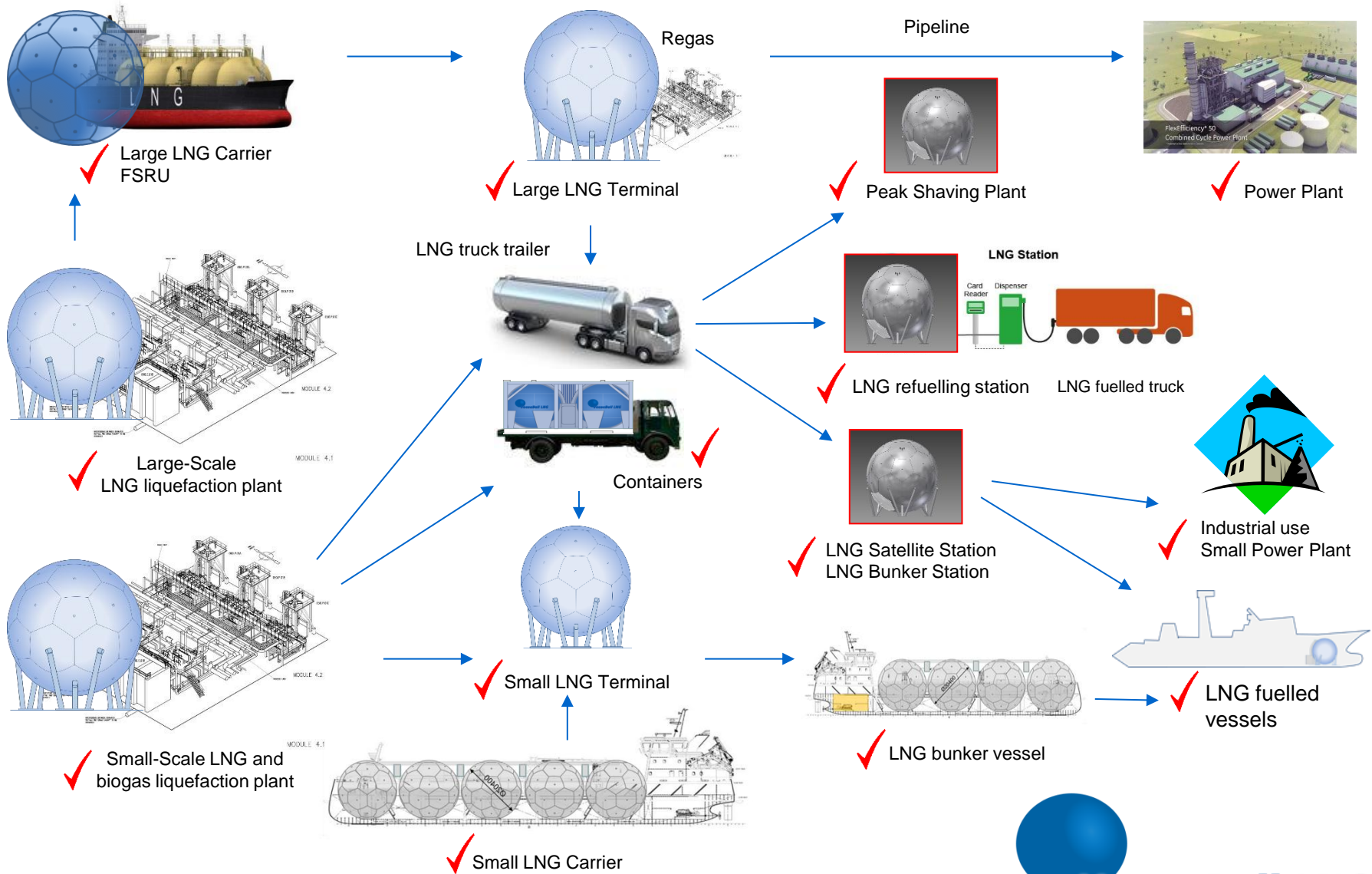
- VaasaBall LNG Ltd., established in 2010 and headquartered in Helsinki, provides services and solutions for storing, transporting, bunkering and refuelling cryogenic gases
- Currently employs 4 people
- The company's solutions are based on a new innovative state of the art sphere shaped gas storage tank and thermal insulation system suitable for variety of needs in the liquefied gas value chains
- VaasaBall's patented structure and manufacturing method provides sustainable competitive advantage
- The company cooperates closely with leading industry partners in developing its technology
- Scalability due to partner network production

## Technology

- VaasaBall's utilizes a new and innovative sphere shaped design in gas tanks that provides the optimal solution for gas storage and transportation
- Thermal insulation in all tanks, consisting of readily welded inner and outer vacuum sections, additional mineral wool- and polyurethane layers in storage tanks
- VaasaBall's superior technology results into several competitive advantages compared to more traditional designs:
  - ➔ Over 30% better Boil-off rate
  - ➔ Light structure – 30-40% less materials needed
  - ➔ Minimal sloshing and thermal expansion
  - ➔ Competitive manufacturing costs due to the lighter structure
  - ➔ Short through-put time and short installation time



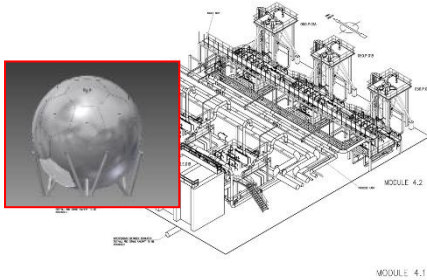
# Our concept in LNG and Bio-LNG



# Our concept in Industrial Gases



✓ Gas production and liquefaction plant



✓ Gas Tanker



Truck trailer



✓ Gas Storage / filling stations



Truck trailer



✓ Containers



✓ Truck minicontainers



✓ Large/Small Industry



Medical



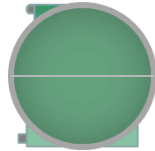
Food/beverage industry



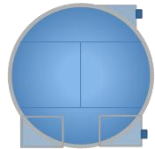
# Product range of tanks up to 36 000 m<sup>3</sup>

## 4 Product ranges

ThermoBall 5 Storage  
ThermoBall 5 Fuel  
Size: 4 – 5.6 m<sup>3</sup>  
Usage areas: Industrial gases



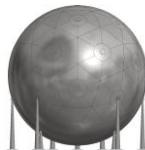
ThermoBall 34 Storage  
ThermoBall 34 Fuel  
Size: 6 – 34 m<sup>3</sup>  
Usage areas: Industrial gases,  
LNG Satellite stations



ThermoBall 400 Storage  
ThermoBall 400 Fuel  
Size: 35 – 1 000 m<sup>3</sup>  
Usage areas: LNG Fuel tanks,  
LNG Satellite stations, LNG  
Bunkering



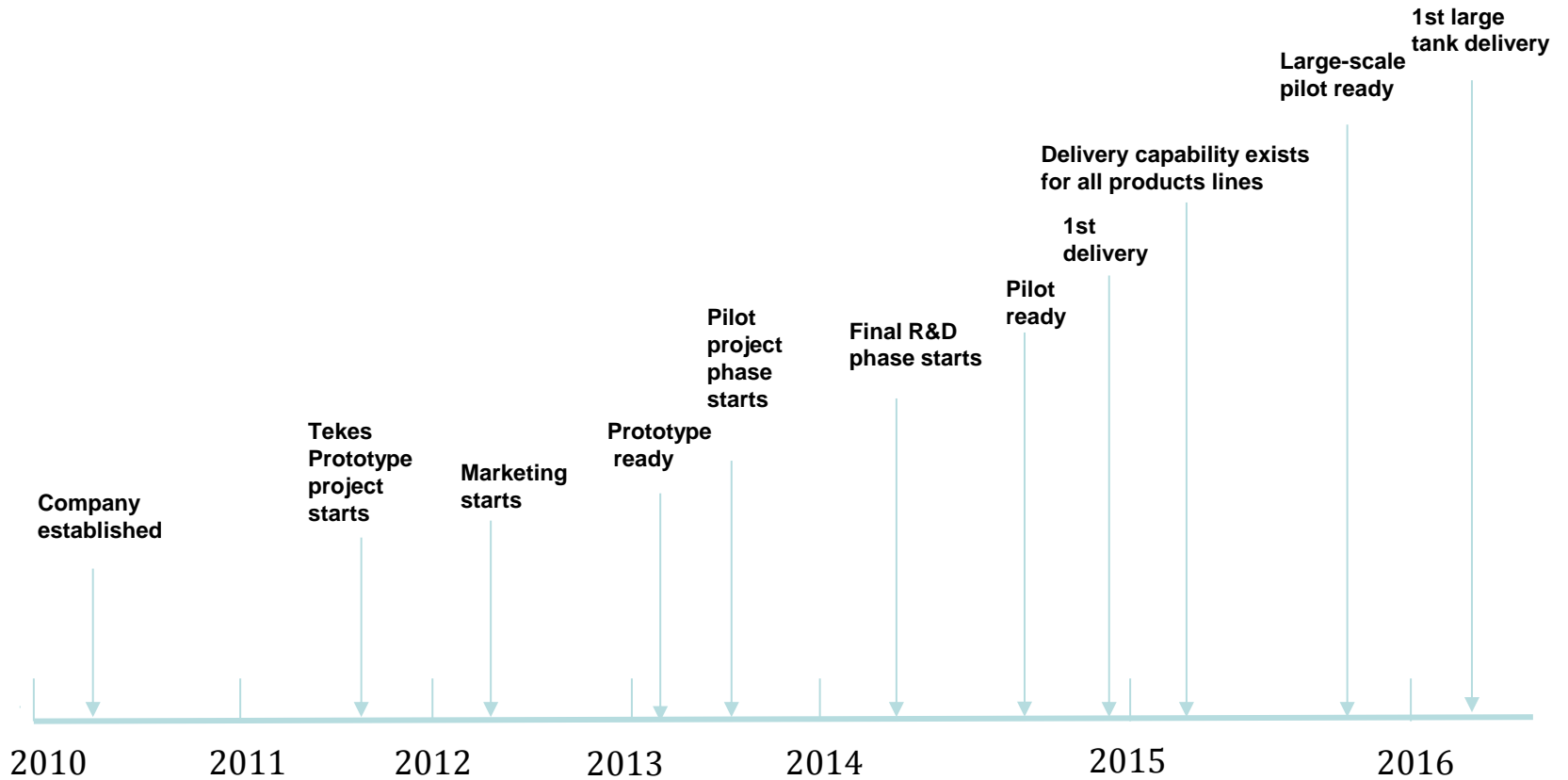
MaxiBall 36000  
Size: 1 000 – 36 000 m<sup>3</sup>  
Usage Areas: LNG Terminals,  
LNG Carriers, FPSO, Power  
Plants



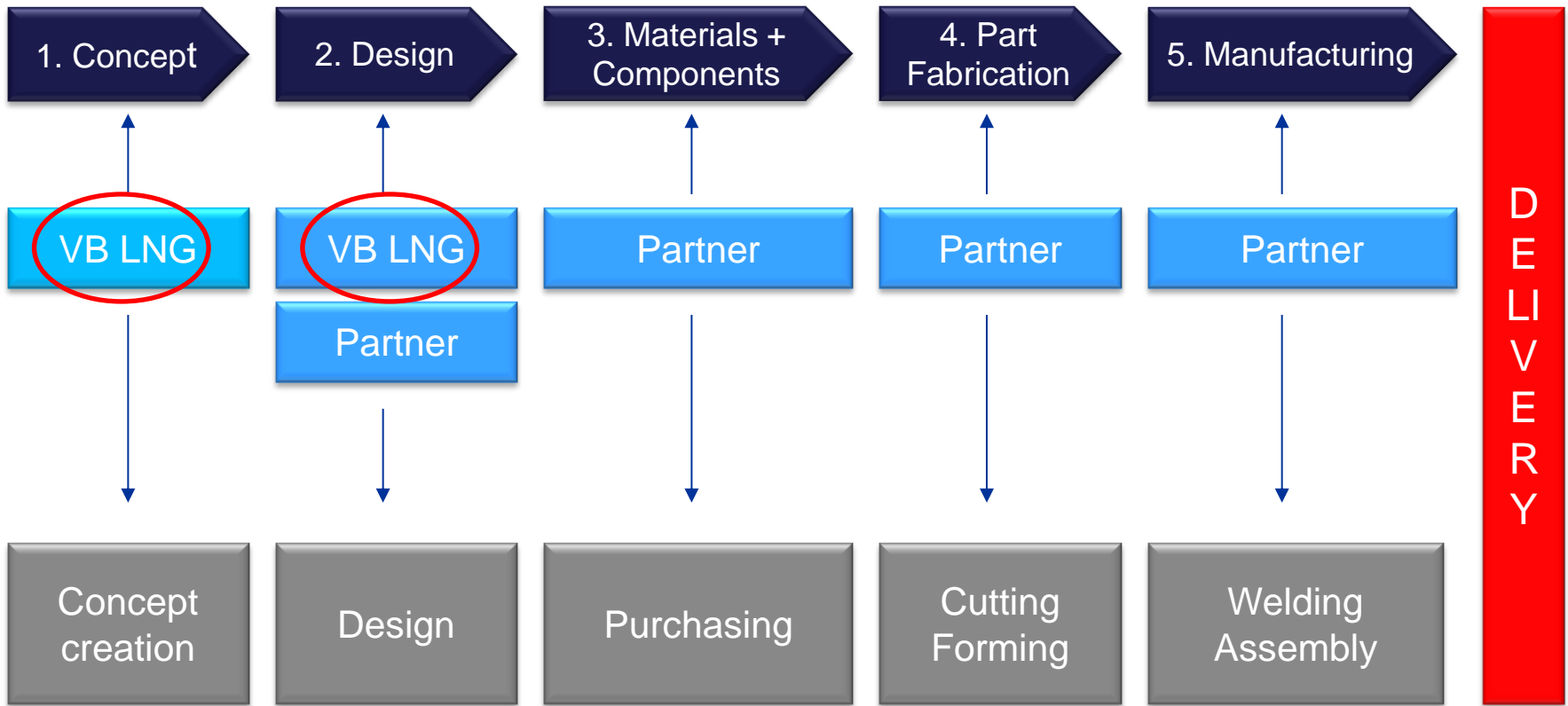
## Products usage

Business usage / VB LNG Product series	Small tanks 4-34 m <sup>3</sup>	Medium tanks 35-1000 m <sup>3</sup>	Large tanks 1000-36000 m <sup>3</sup>
LNG Terminal storage			✓
LNG carrier / shuttle / barge storage		✓	✓
FPSO			✓
Power plant storage		✓	✓
Gas pipeline usage		✓	
Industrial LNG usage	✓	✓	
LNG fuelled ships	✓	✓	
LNG bunkering		✓	✓
LNG truck transport	✓		
LNG refueling station storage	✓	✓	
Storage of industrial gases	✓	✓	
Truck transport of industrial gases	✓		

# Company Profile



# Manufacturing Strategy



# Lessons learned – The challenge

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- ✓ Manufacturing strategy of our company is based on being physically close to customers to ensure short delivery times and to avoid supply chain disruptions.
- ✓ Partner network in Finland have many skills, knowledge and production capabilities to deal with the technological requirements of cryogenic equipment design and manufacturing.
- ✓ The challenges that we have identified
  - ✓ Planners should have more knowledge of cryogenic gases in general
  - ✓ Planners and designers should have more knowledge of standards and classifications concerning cryogenic gases
  - ✓ Planners and designers should have more knowledge of LNG facility design and operation



# Lessons learned – The way forward

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- ✓ A training program should be considered – it could cover e.g. following topics:
  - ✓ LNG - what is it how is it used?
  - ✓ LNG – legislation, authorities, main standards and classifications
  - ✓ How to design a LNG facility
    - ✓ Approvals and permits required and how are they applied for
    - ✓ LNG facility design
    - ✓ Standards: onshore and offshore
    - ✓ Basics of process and control engineering, PI diagrams
    - ✓ Structural design including
      - ✓ Components
      - ✓ Safety issues to consider through the life-cycle of a LNG facility
      - ✓ Safety issues in layout and area classification
    - ✓ Risk evaluation and modelling of accidents
  - ✓ Operating a LNG facility



**Thank You for Your Attention!**

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