



"GASUM'S EXPERIENCE WITH LNG"

BJÖRN AHLNÄS, VP NEW VENTURES

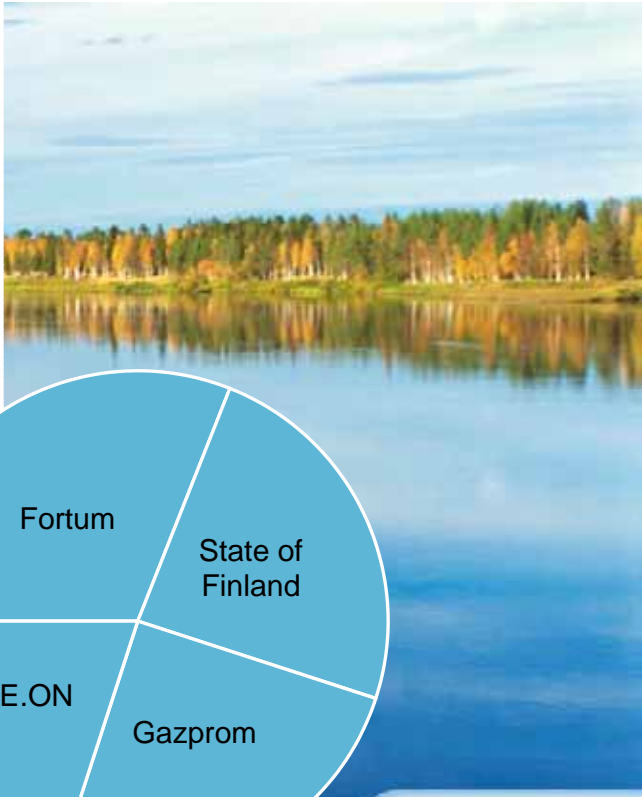
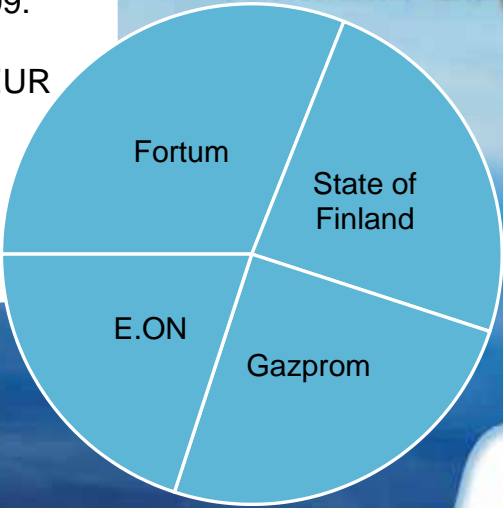
JOINT EMSA/ECSA WORKSHOP 7.9.2010 Lisbon
"Towards adequate and safe use of LNG as alternative fuel for ships"



GASUM'S BACKGROUND

- Import of natural gas to Finland began in 1974.
- The natural gas business was incorporated and Gasum Oy established in 1994.
- Sales of natural gas 2009: 40.0 TWh
- Turnover 1.058 million EUR

GASUM'S OWNERS



Natural gas transmission network in Finland



Porvoo LNG plant

First plant started in 1996
1.000 – 3.000 tn/a
Jointly with AGA

Enlarged 2008 to 5.000 tn/a

Second plant start up in July 2010



FIRST CUSTOMER WÄRTSILÄ DIESEL (TEST RUNS)



LNG MARKET

LNG as a backup- and peakshaving fuel for biogasplants

53 m3 LNG tank and evaporator at a biogasplant in Linköping Sweden

Industrial processes



THE NEW LIQUEFACTION PLANT IN OPERATION 2010

- Production capacity 20.000 tn/a
- Replaces the old plant
- Acts also as backup for the gas grid



Storages 3 x 700 m³



Liquefaction unit



Marine market starting up, several small scale projects to be launched in near future



2 x 750 tn / a LNG

750 tn LNG = 1000 m³ LFO

TWO NEW COAST GARD VESSELS ARE PLANNED FOR LNG (BASED ON GOOD EXPERIENCES FROM NORWAY)



 Gasum

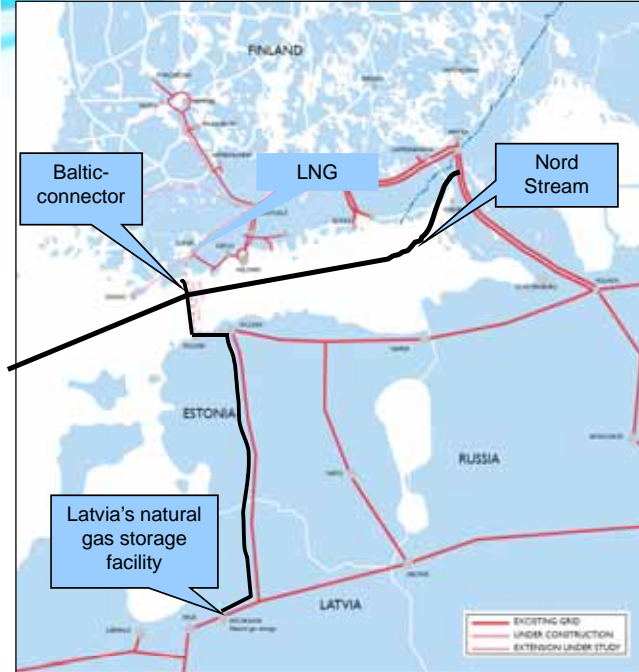
Large scale LNG import as a second source of supply to the Finnish natural gas grid ?

 Gasum

GAS INFRASTRUCTURE DEVELOPMENT PROJECTS IN NEARBY REGIONS

EU energy strategy – Baltic Energy Market Interconnection Plan: The active development of security of supply and reliability of networks is set as priority area.

- The **Balticconnector** would form a ring of integrated networks of neighboring areas enhancing reliability of natural gas system in Finland and Baltic Countries
- Gasum is co-operating with the National Energy Supply Agency in order to improve network's reliability and security of supply by securing landfalls, pipeline routes and sites for import terminals

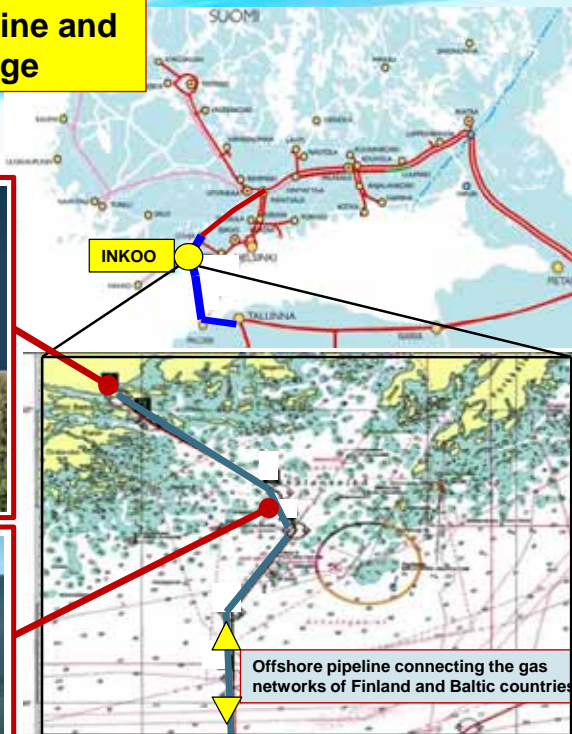


Balticconnector offshore pipeline and LNG import terminal and storage

LNG Import terminal and storage



LNG supply by a buoy and/or floating storage



Offshore pipeline connecting the gas networks of Finland and Baltic countries



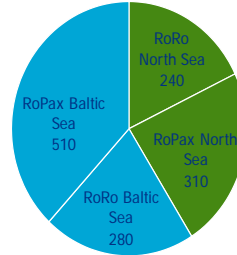
MARINE LNG MARKET DRIVERS

LNG will become a significant fuel for ships operating in Baltic and North Seas

<p>IMO regulations for ship emissions</p>	<p>International Maritime Organization (IMO) and EU have set new, extremely strict emission control targets for Baltic and North Seas beginning 2015/2016</p> <ul style="list-style-type: none"> ▪ After 2015 new ships should reach SOx-emissions equaling 0.1% sulphur content in fuel and very low NOx-emissions ▪ Changes in fuel or engine technology are needed
<p>Environment and safety</p>	<p>LNG is the cleanest fuel option to meet the new emission requirements</p> <ul style="list-style-type: none"> ▪ No pollution in case of fuel spill on water ▪ Lowest emissions in comparison with traditional ship fuels ▪ Proven and reliable technology
<p>Steady LNG price development</p>	<p>Gas (and LNG) price is expected to decouple from volatile oil price</p> <ul style="list-style-type: none"> ▪ Growing large-scale LNG market in Europe ▪ Several LNG terminals under construction ▪ Global gas reserves larger than oil reserves

Estimated Market Size

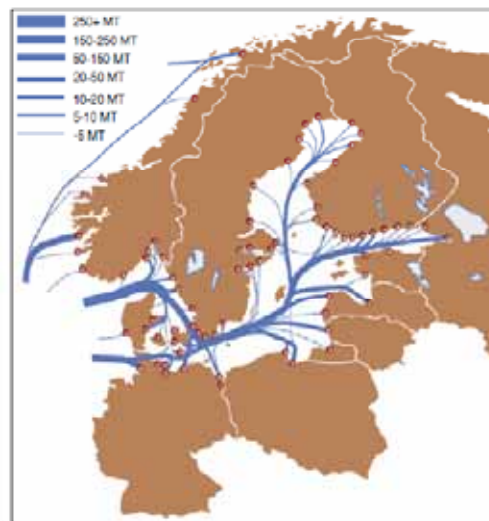
The existing route traffic fleet in the Baltic and North Seas would consume LNG worth €1.3 billion



Market size in million euro at LNG price 550 €/t (derived from price of alternative clean fuel, i.e. marine gas oil/diesel oil)



NORTH EUROPEAN MARKET



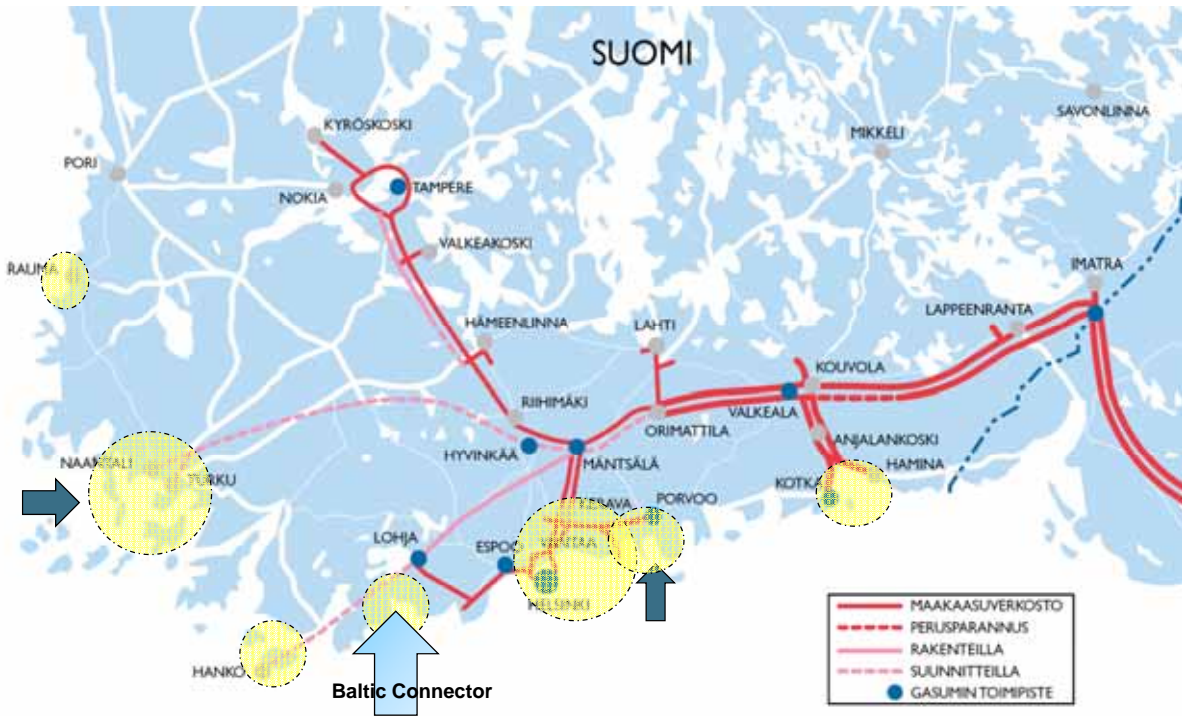
Cargo sea routes North Europe (Baltic Maritime Outlook 2006)



RoRo and RoPax lines North Europe (Baltic Maritime Outlook 2006)



Potential LNG:n bunkering areas and places for LNG import terminals (hubs)



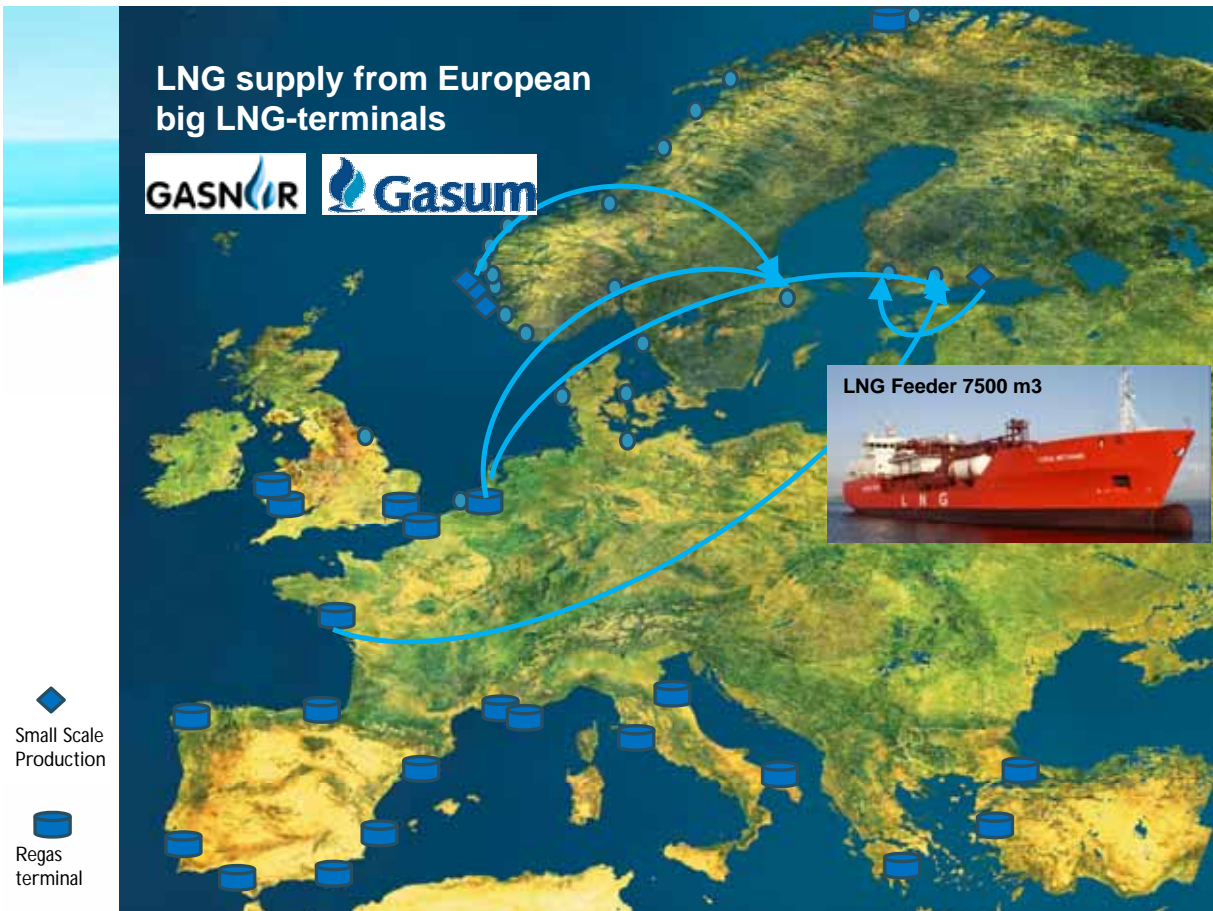
TOLKKINEN AREA IN PORVOO



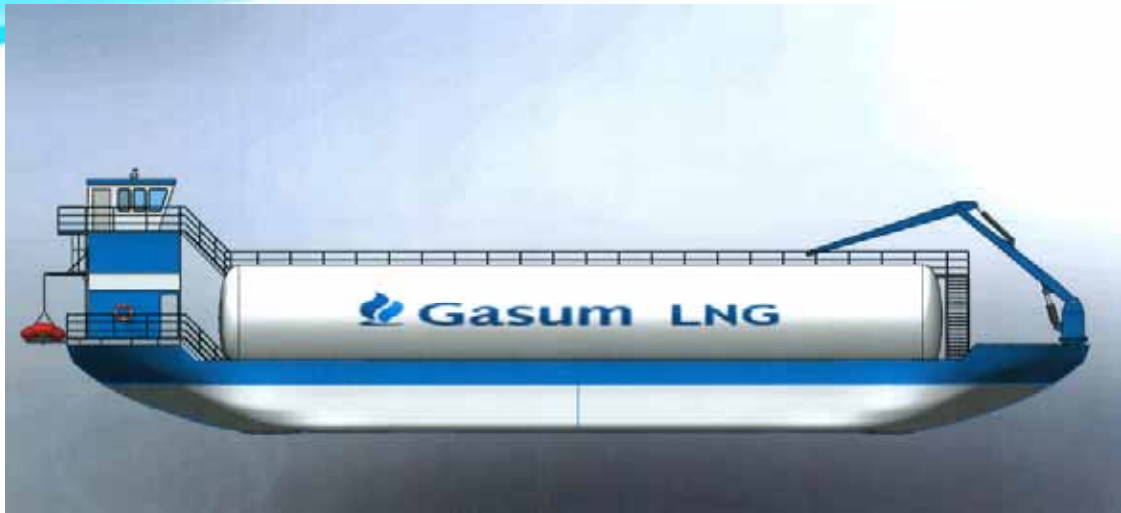
80 ha land
 128 ha water



Additional LNG volumes for growing marine market needs to be supplied from European LNG-terminals with small LNG shuttle tankers



BUNKERING BARGE OPERATING IN THE PORT,
BARGE FILLING FROM TERMINAL OR SEMITRAILERS



**BUNKERING DIRECTLY FROM
SEMITRAILERS 53m³ 21 t**



**2 new RoPax ferries Stockholm - Turku
2 x 23.000 tn/a LNG**

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THANK YOU FOR YOUR ATTENTION !