

**LNG SUPPLY CHAIN IN THE  
BALTIC SEA REGION  
SDG PIEGĀDES KĒDE BALTIJAS  
JŪRAS REĢIONĀ  
ЦЕПОЧКА ПОСТАВОК СПГ В  
РЕГИОНЕ БАЛТИЙСКОГО МОРЯ**

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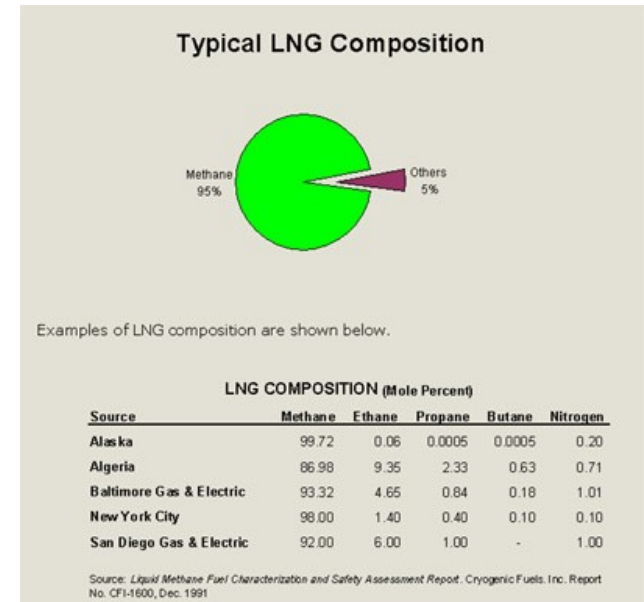
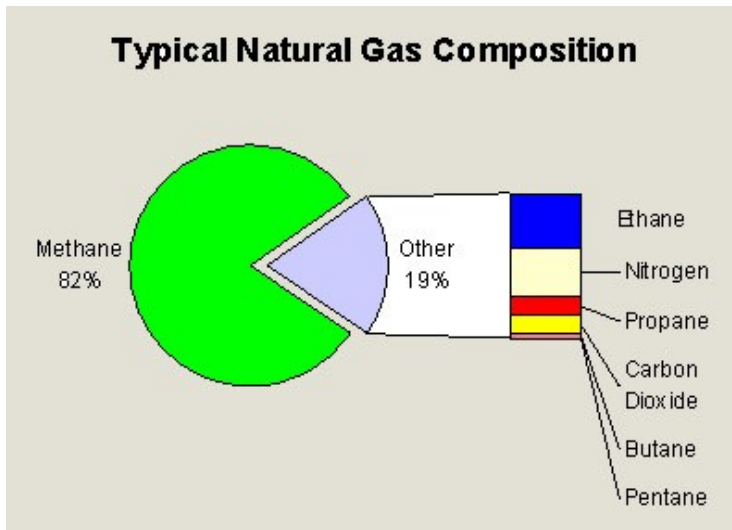
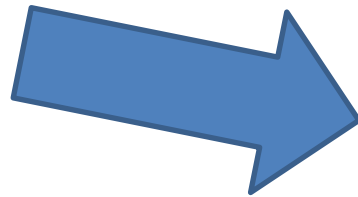
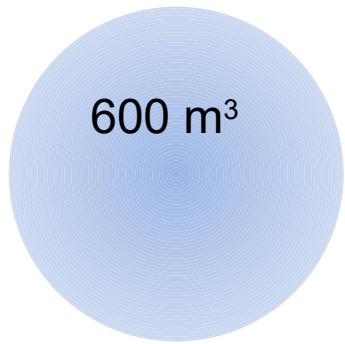
Klaipeda university, LITHUANIA



# MAIN LNG DATA

- **Density – about 400 kg/m<sup>3</sup>**
- **Composition**
- **Storage temperature - 163<sup>0</sup> C**
- **Safety first**

# ADVANTAGES OF GAS LIQUEFACTION

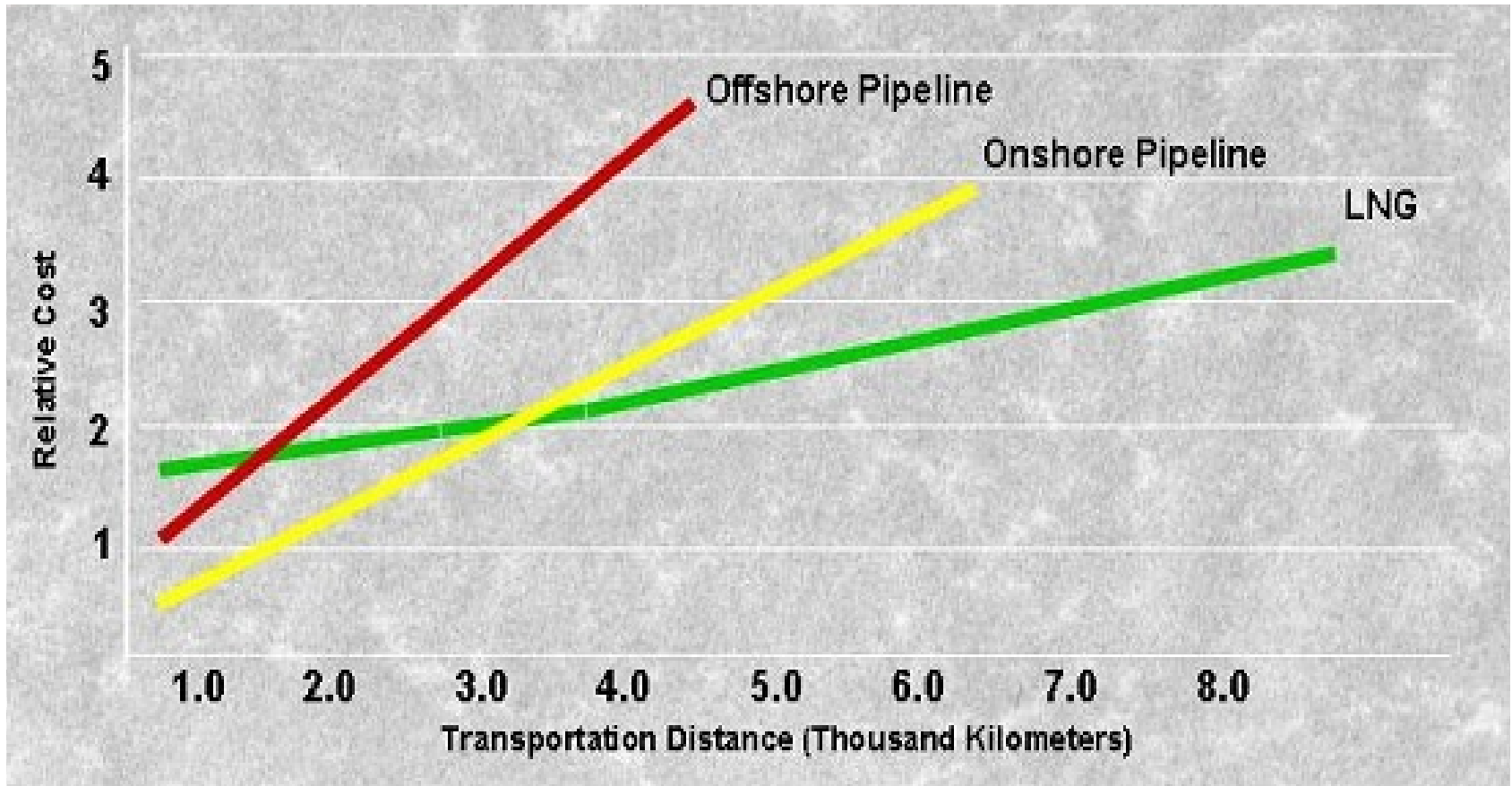


[http://www.beg.utexas.edu/energyecon/lng/LNG\\_introduction\\_07.php](http://www.beg.utexas.edu/energyecon/lng/LNG_introduction_07.php)



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# GAS TRANSPORTATION RELATIVE COST



# LNG IMPORT TERMINAL IN KLAIPEDA



# LNG IMPORT TERMINAL IN SWINOUSTJE





# LNG IMPORT TERMINAL IN KULIKOVO (Konigsberg (Kaliningrad) region)



# LNG BUNKERING FACILITIES IN BALTIC SEA (EXISTING AND PLANNING)



# LNG TANKER INSIDE OF THE PORT

(1,5 n.m. in front of LNG tanker and 0,5 n.m. astern of the LNG tanker no any ships movements)



## **MAIN LNG OPERATIONS**

- **Loading LNG from carrier to LNG storage facilities**
- **Loading from LNG storage facilities to LNG small carriers**
- **Unloading LNG from small LNG carriers to LNG bunkering stations**
- **LNG bunkering operations**

# LNG TANKER MOOVE TO FSRU

(port tugs must properly work, working language)



# LNG TANKER MOORING TO FSRU START (ISM Code, Terminal regulations)



# LNG TRANSFER FROM LNG IMPORT TERMINAL TO SHIPS AND BUNKERING STATIONS

- LNG transfer by small LNG tankers
- LNG transfer by trucks
- LNG transfer by rail tanks
- LNG transfer by LNG tank-containers



# SMALL SCALE LNG TERMINALS





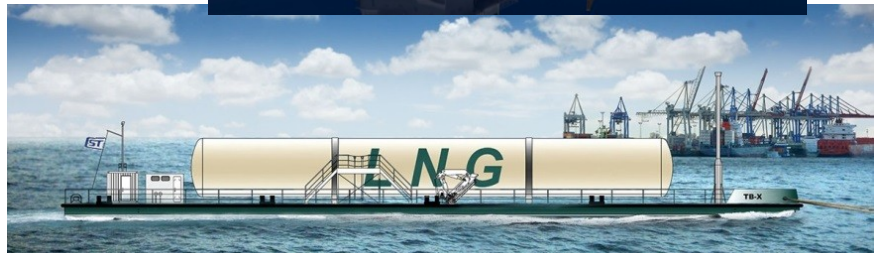
# LNG BUNKERING STATIONS



# AUTONOMOUS LNG BUNKERING STATION



# LNG SUPPLY AND PORT TANKERS



# LNG SUPPLY AND PORT TANKERS



# LNG FUEL SUPPLY OF THE EAST BALTIC PORTS MAIN CONDITIONS

- LNG fuel quantity on LNG supply vessel should be at least for the 1 – 2 ports **(at least for 4 - 6 Ro-Ro vessels in one port)**
- LNG supply vessel must have possibility fulfill at least 1 time per week on LNG terminal
- LNG supply vessel could provide LNG supply operations near quay walls or in port waters
- LNG supply vessel should be able supply LNG shore facilities

# LNG SUPPLY SHIPS FOR THE EAST BALTIC SEA MAIN PARAMETERS

- Length up to 100 - 115 m
- Width up to 12 – 16 m
- Draft up to 5,5 – 6,5 m
- Capacity (LNG) up to 5000 – 9000 m<sup>3</sup>
- **Speed up to 14– 16 knots**



# LNG SMALL SUPPLY AND BUNKERING SHIPS

- LNG small supply Sea ships (capacity from 4000 m<sup>3</sup> up to 15000 m<sup>3</sup> of LNG)
- LNG small supply IWW ships (capacity from 400 m<sup>3</sup> up to 2000 m<sup>3</sup> of LNG)
- Port LNG supply ships (capacity from 200 m<sup>3</sup> up to 1000 m<sup>3</sup> of LNG)

# LNG LOADING ON LNG SUPPLY TANKER





# SUPPLY SMALL SCALE LNG TERMINAL IN KLAIPEDA



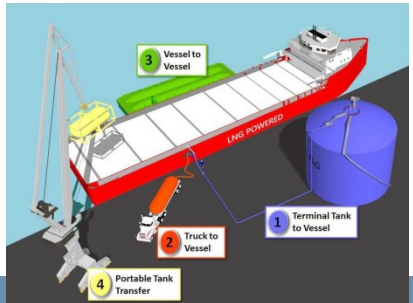
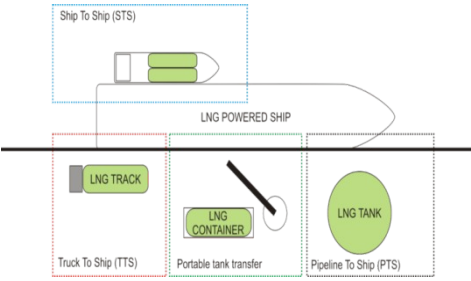
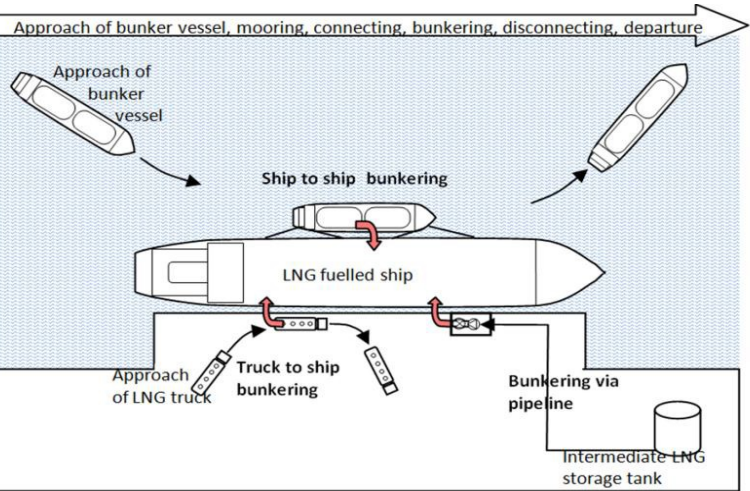
# FIRST EVER TRUCK LOADING AT THE LNG RELOADING STATION



# LNG STATION (POLAND)



# SHIPS LNG BUNKERING SYSTEMS



# SAFETY FIRST (at least 2 persons must be on important operations, but???)



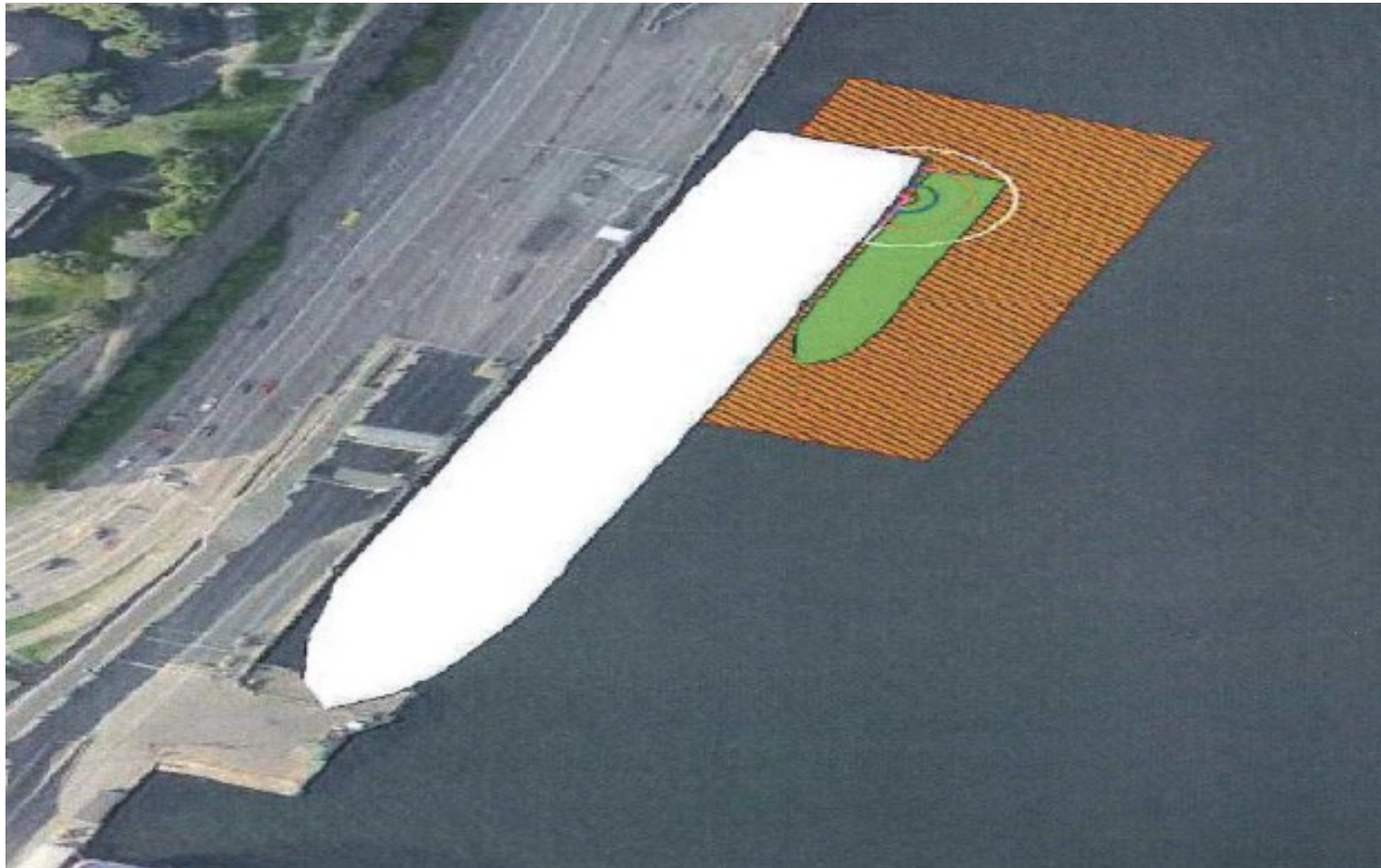
# LNG AUTONOMOUS BUNKERING OPERATIONS



# SAFETY DURING LNG TRANSFER AND BUNKERING

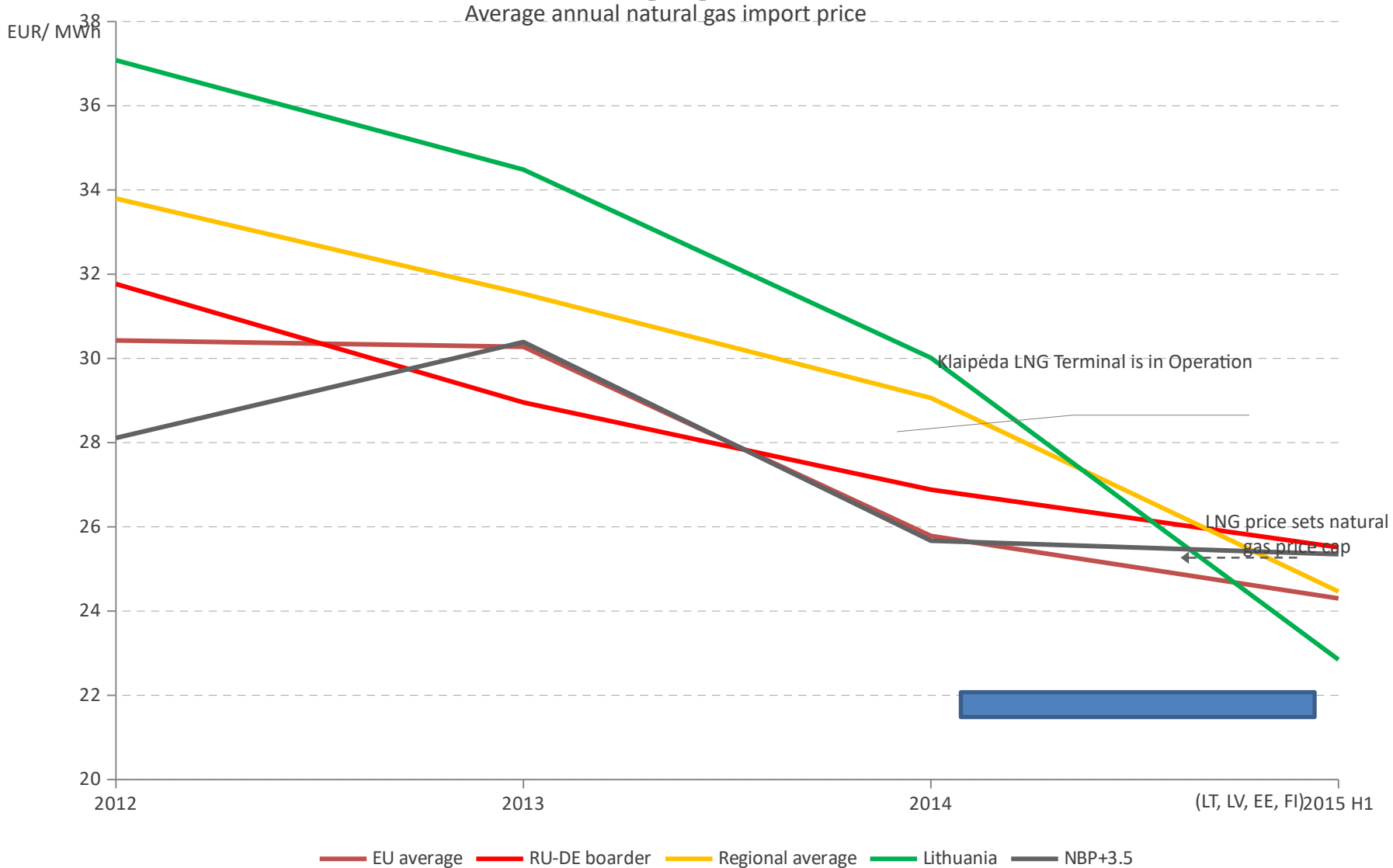
- Legal basis of the safety during LNG transfer **(Countries Administrations Regulations)**
- Safety zones **(Countries Administrations regulations)**
- Actions in emergency situation **(Must be prepared in advance)**

# LNG BUNKERING STS SAFETY ZONE





# A CAP FOR NATURAL GAS PRICES IN THE REGION



# LNG PRICE EUR/Mwh (2018)

**LNG from Norway – 18 – 20**

**USA – 18,6**

**Angola – 17,6**



# LNG AND NATURAL GAS PRICES (EUR /MWh)

Year	2012	2013	2014	2015	2016	2017	2018	2019
NG Regional Price (LT, LV, EE, FIN)	33	31	29	25	25	25	25	23
NG Price (LT)	38	35	30	25	23	23	23	20
LNG direct price	-	-	-	21	20	20	20	16
Gas price with LNG terminal costs, inc. quality recalculation	-	-	-	22	21	21	21	18

# CONCLUSIONS

- LNG in Baltic Sea region play more and more important
- LNG supply chain in Baltic Sea region is very important not just for the stable supply gas but as well as market price regulator
- Safety during LNG transportation, storage and transfer operations must be provide by accurate fulfil IMDG Code, ADR Agreement, etc. basis and requirements
- **LNG ships and terminals personal education and train is the main way minimize non standard situations.**

**THANK YOU FOR YOUR ATTENTION**

