



# LNG small scale and bunkering The Gothenburg Case

International LNG Congress  
14th March 2016



- 1 Who is Swedegas**
- 2 Natural gas markets**
- 3 Small scale logistic services**
- 4 LNG Bunkering logistic model**
- 5 LNG small scale in Gothenburg: GO4LNG**

1

## Who is Swedegas

2

Natural gas markets

3

Small scale logistic services

4

LNG Bunkering logistic model

5

LNG small scale in Gothenburg: GO4LNG

# 1. Who is Swedegas

- **Owns and operates the Swedish transmission system** for gas of 620 km in Southwest Sweden
- Transport gas to 33 municipalities; industries, CHP plants, households and retail gas stations
- **1bcm/a market** with CHP, Industrial and DSO customers
- **Certified TSO and System Balancing Administrator**
- **Owned by Enagás and Fluxys** as from 15th of April 2015
- **Develops new opportunities** for biogas and LNG in smart energy solutions



1

Who is Swedegas

2

**Natural gas markets**

3

Small scale logistic services

4

LNG Bunkering logistic model

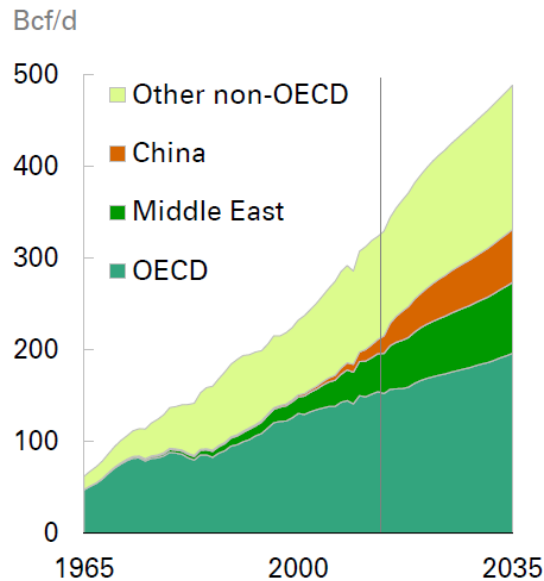
5

LNG small scale in Gothenburg: GO4LNG

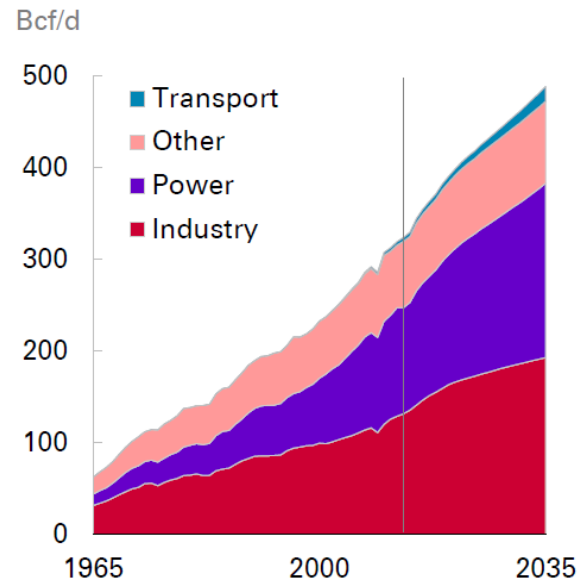
## 2. Natural gas markets

### Global Natural gas demand

Demand by region



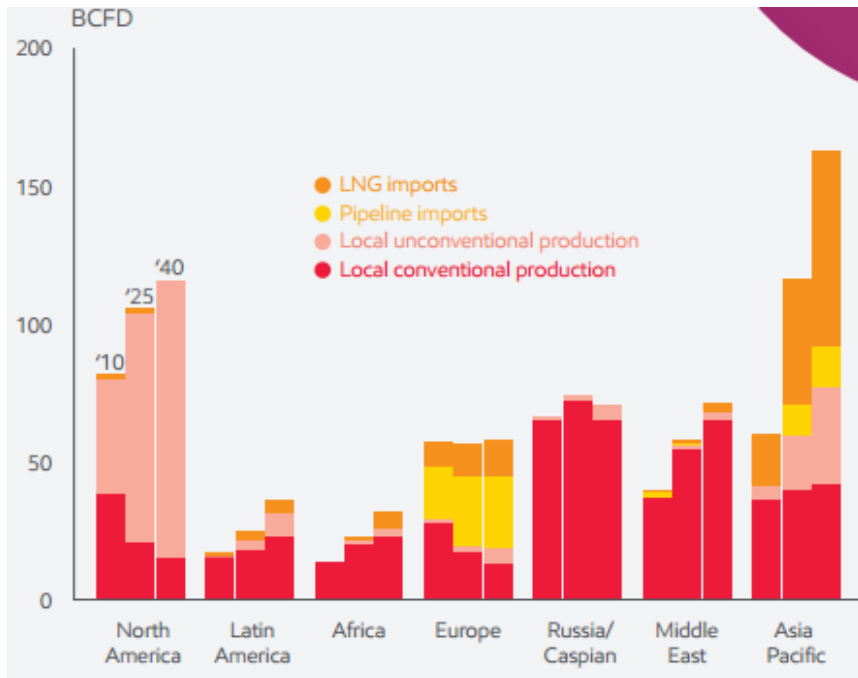
Demand by sector



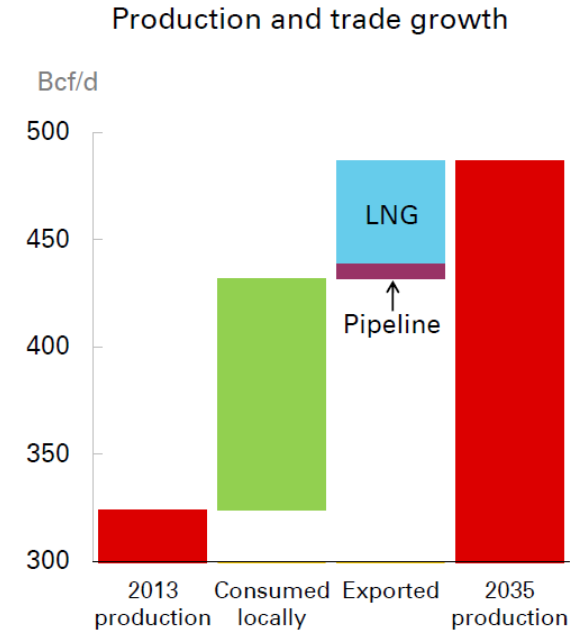
- Global demand to rise by **15% during next 6 years** and **1,9% in the next 20 years** (per average)
- Transport will be the fastest growing sector

## 2. Natural gas markets

### Natural gas production and global trade



Exxon Energy Outlook 2014



BP Energy Outlook 2035 (Feb15)

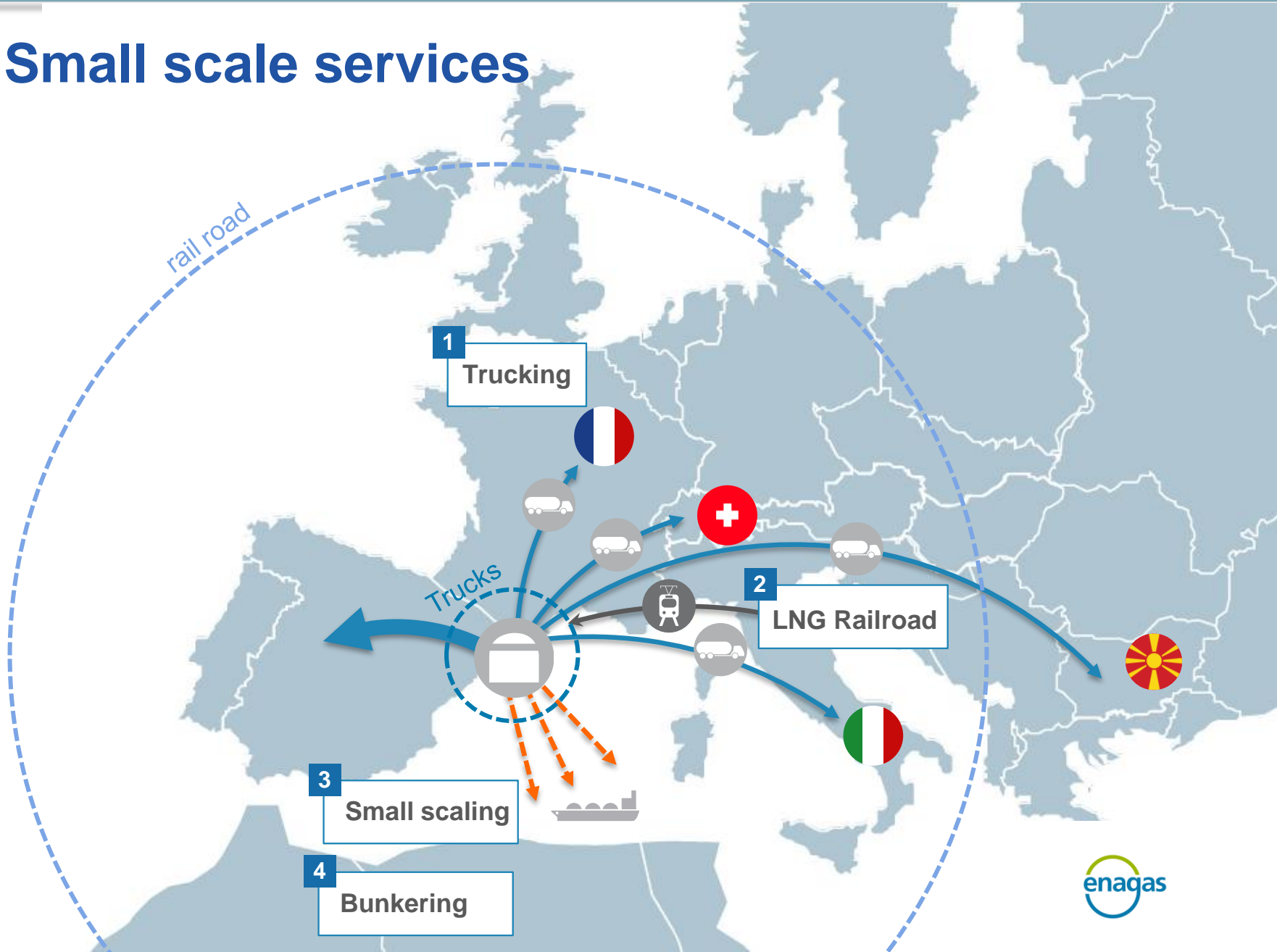
- LNG production to increase by 40% during next 4 years
- In 2040, 50% of the total demand will be covered by LNG or local production shale gas
- The majority of natural gas trade will be covered by LNG

# AGENDA of the meeting

- 1 Who is Swedegas
- 2 Natural gas markets
- 3 **Small scale logistic services**
- 4 LNG Bunkering logistic model
- 5 LNG small scale in Gothenburg: GO4LNG



### 3. Small scale services



### 3. Small scale services

#### LNG Trucking: Distribution of LNG by truck

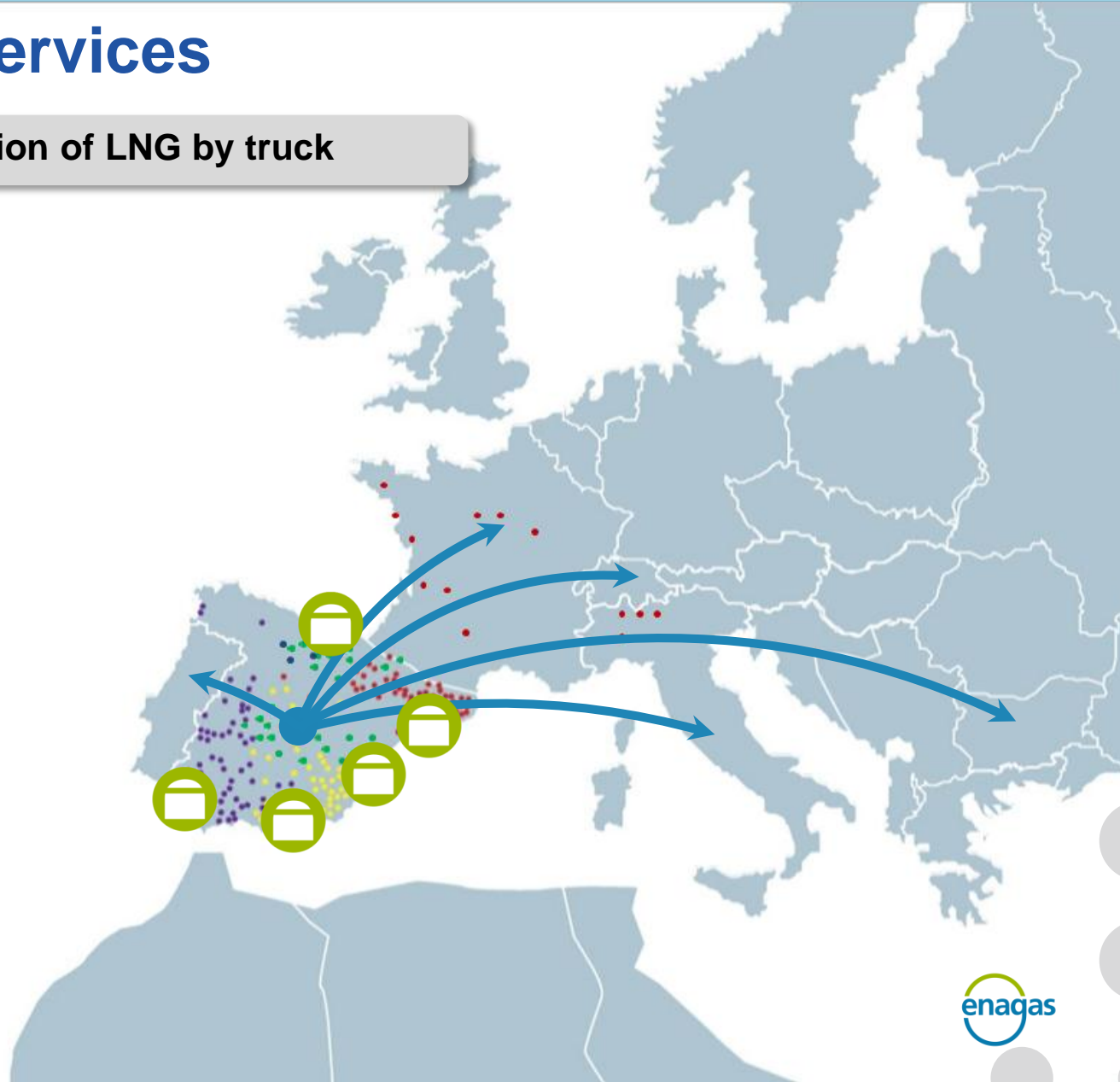
**1.067** Satellite plants

 **~34.400**

Trucks reloaded

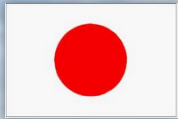
 **±12** LNG Cargos

- Destinations: around 60 in Europe (France, Italy, Portugal, Switzerland, Fyrom)
- Demand: 1.400 GWh/year



# 3. Small scale services

## LNG Railroad



### Japanese Rail Road LNG Transport Network



Transport by rail has advantages:

- 10 times more efficient than road
- 45 times more safe (fatalities/TonKm)
- The most sustainable transport way: 80% UE net is electrified

### Transportation via Railways



# 3. Small scale services

## LNG Bunkering



Maritime



Road



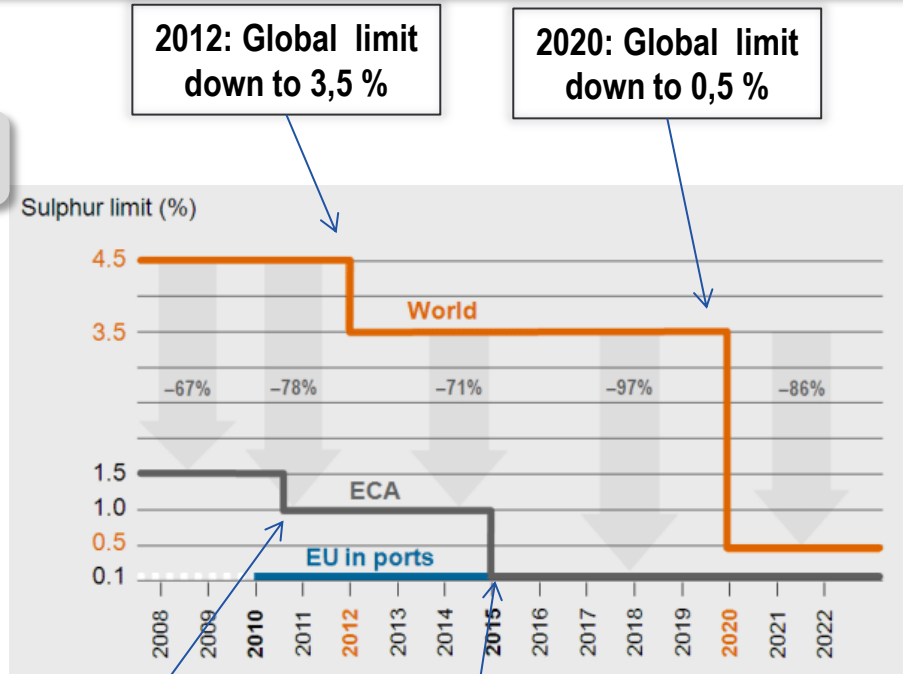
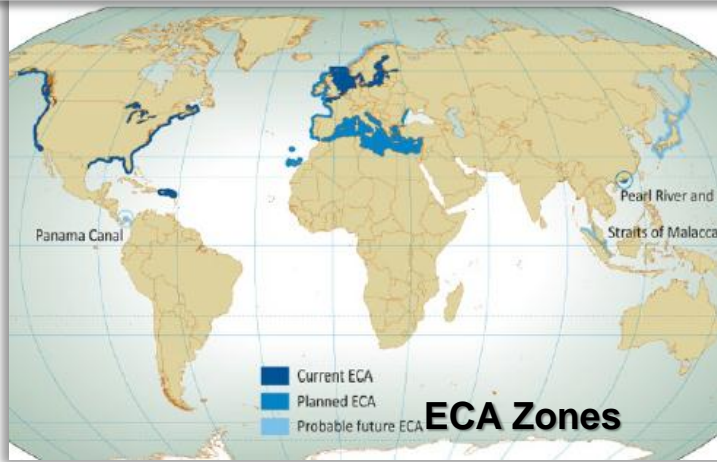
Rail

- ✓ Reduction of emissions
- ✓ Savings
- ✓ Security of supply

- Shipping uses about the 2,3% of the world energy supply

# 3. Small scale services

## LNG Bunkering: opportunities



EUROPEAN COMMISSION

Brussels, 22.1.2014  
COM(2014) 15 final

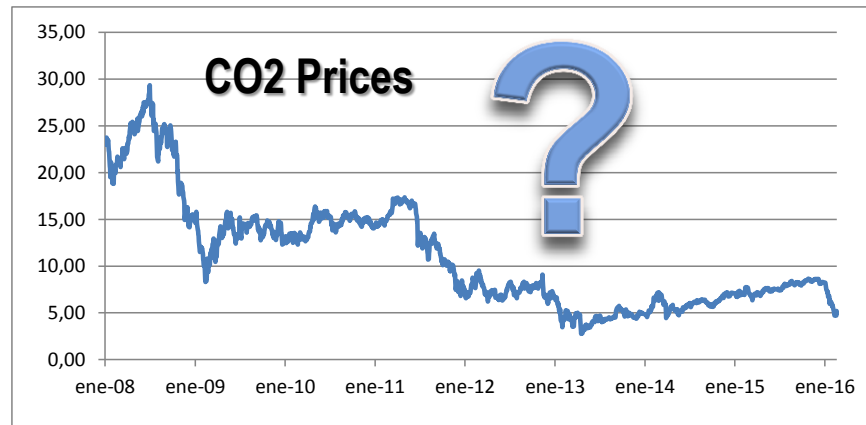
COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

A policy framework for climate and energy in the period from 2020 to 2030

(SWD(2014) 15 final)  
(TWD(2014) 14 final)

### European energy policies

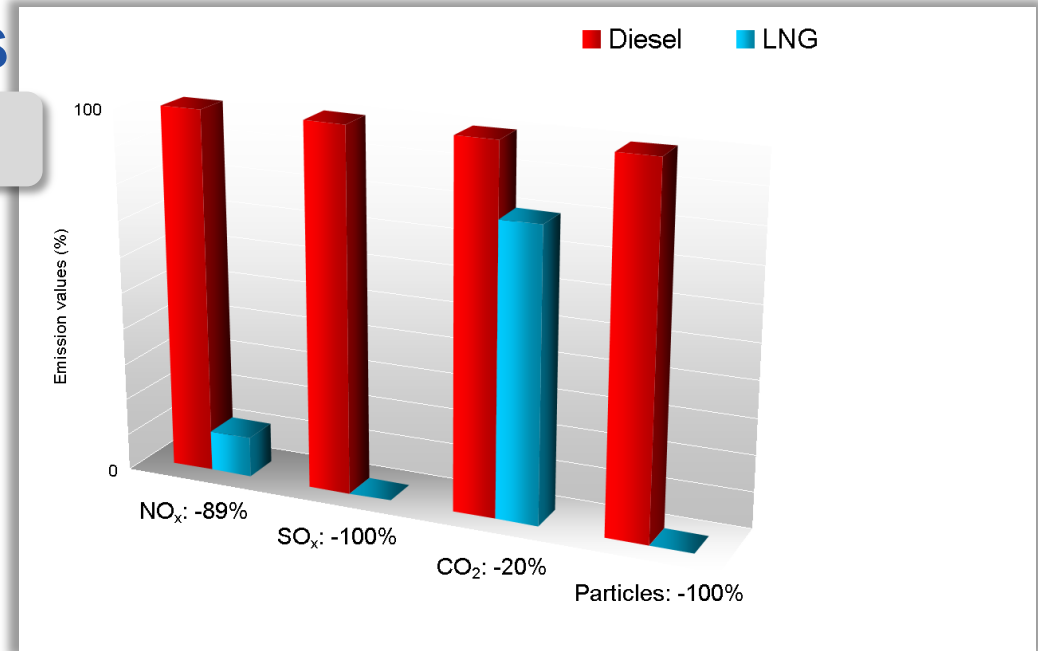
EN EN





# 3. Small scale services

## LNG Bunkering: opportunities



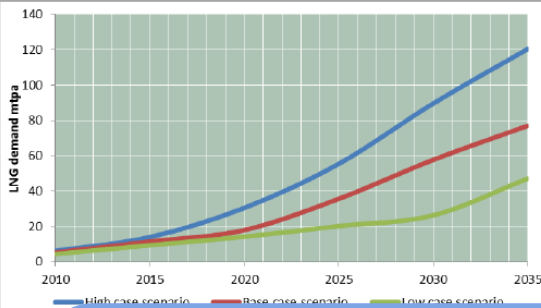
- Natural gas is the viable option in order to fulfil with the environmental criteria and the stricter regulations
- LNG is a well known, proven, available and developed technology
- Economically competitive
- Mature logistics

# 3. Small scale services

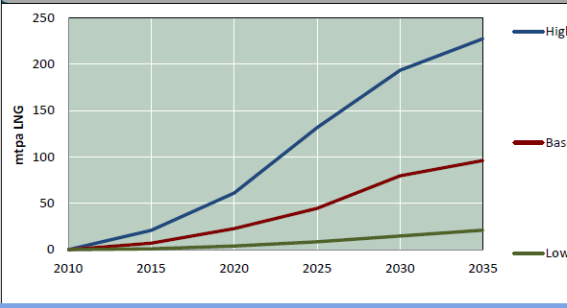
## LNG Bunkering: Challenges



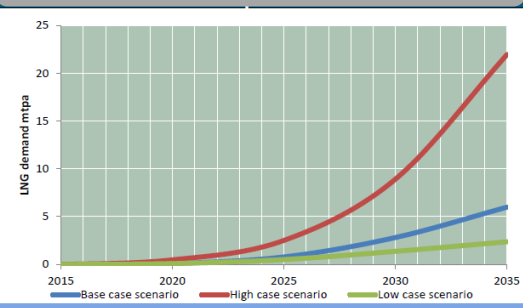
### LNG marine bunker fuels



### LNG road bunker fuels



### LNG for rail transportation



Source: CEDIGAZ

- A **close cooperation** is vital for commercial projects to succeed in this early stage
- An **stable regulatory framework** is needed to develop the market
- Technical **standards**, safety rules, etc **should be harmonized**
- **New infrastructure investment** is needed to increase the capacity

- 1 Who is Swedegas
- 2 Natural gas markets
- 3 Small scale logistic services
- 4 **LNG Bunkering logistic model**
- 5 LNG small scale in Gothenburg: GO4LNG



# 4. LNG small scale logistic model

## LNG Terminals



Trucks/rail LNG distribution

ISO containers

LNG feeder/ bunker vessel

Direct supply

Trucks

Bunker vessel

LNG rail

## LNG Satellite Plant



Trucks

Bunker vessel

ISO container

Direct supply

## Final User

Industrial consumers

Remote NG distribution networks

LNG Refuelling station

LNG Bunkering



gas

# 4. LNG bunkering logistic model

## Bunkering evolution



**BUNKERING  
GNL demand**



**TTS**  
Truck to Ship

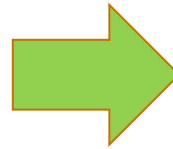
**STS**  
Ship to ship  
(from existing  
terminals)

**STS**  
Ship to ship (from  
satellite plants)

## 4. LNG bunkering logistic model

### SHORT TERM

LOADING OF LNG TRUCKS, supplying vessels and bunkering stations through LNG trucks



## 4. LNG bunkering logistic model

### MEDIUM LARGE TERM

“FEEDER” VESSELS RELOADING, Reloading of Small vessels of LNG (1000m<sup>3</sup> a 7500m<sup>3</sup>):

- Reloading at bunkering stations.
- Direct supply to vessels at Berth





1

Who is Swedegas

2

Natural gas markets

3

Small scale logistic services

4

LNG Bunkering logistic model

5

**LNG small scale in Gothenburg: GO4LNG**

## 5. LNG small scale in Gothenburg: GO4LNG



### GO4LNG as LNG distribution platform for :

- ✓ Significant LNG bunkering market in the Gothenburg port
- ✓ Main industrial end users via truck and/or rail
- ✓ Small regional grids by truck and/or rail
- ✓ Truck fuelling for heavy road transport
- ✓ Part of the Swedish pipe gas market

## 5. LNG small scale in Gothenburg: GO4LNG

- Project initiated by Swedegas and Vopak. **Swedegas recently acquired 100% of the project rights** after Vopak sold of its Swedish activities
- **Swedegas now supported by Fluxys & Enagas** to develop and realize the project
- **Highly mature project**
- **Permitting and EPC front work ongoing**
- **Negotiations regarding harbor agreement assured**
- Project is **supported by the European Commission**, has PCI status
- **Regulated, open access terminal.**



# 5. LNG small scale in Gothenburg: GO4LNG

## Design and progress

- Storage concept not yet decided: **full containment tank** (25.000m<sup>3</sup>) or **bullets** (7.500m<sup>3</sup> LNG)
- EPC tender and environmental permit allow for both, while choice will depend on client bookings
- Expansion possibilities possible w.r.t. ship size, storage volume, number of truck loading bays depending on market evolution
- **The final configuration of the terminal will depend on market needs**
- **FID envisaged: 2016**



The terminal will be located in Skarvik 4 close to the oil harbor in Port of Gothenburg



## 5. LNG small scale in Gothenburg: GO4LNG

### Bunkering in Gothenburg



- ✓ Gothenburg is the **largest port in the Nordic region** and also Scandinavia's main bunker hub with 1,5 Mtonne oil bunkered.
- ✓ **11 000 vessel calls/yr** - energy, container, cars, roro and passenger cruises
- ✓ **9 ordered LNG driven ships** with expected frequent calls in the port
- ✓ Extensive liner services to key import and export markets throughout the world and a large number of point-to-point **connections within the SECA zone**
- ✓ **LNG is part of both the City of Gothenburg's and Port of Gothenburg's environmental program** Incentives in the port dues, 30 percent discount

# 5. LNG small scale in Gothenburg: GO4LNG

## LNG evacuation trucks

- ✓ **Truck loading station** will be installed on-site
- ✓ GO4LNG as **operator** of the truck loading station
- ✓ Gothenburg is **well connected via highway** to the country's production/consumption centers
- ✓ Given the country's size and the dispersion of industry production/consumption centers, there is a **large number of isolated customers which are currently running on oil-based fuels**
- ✓ Opportunity for **regional off-grid networks** (e.g. Scania in southern sweden)



**Up to ~7000 trucks/yr**  
(avg.50m<sup>3</sup> each)

*Sweden allows 80 m3 LNG trucks*

# 5. LNG small scale in Gothenburg: GO4LNG

## LNG evacuation trucks / Rail

- ✓ **Railcar loading station** will be installed on-site
- ✓ GO4LNG **as operator** of the railcar loading station
- ✓ **Operating rules** already in place.
- ✓ Large number of industries in **North & Mid Sweden** get their **current oil/LPG-based fuel supply delivered via rail** (= substitution potential in e.g. steel & mining sector)
- ✓ The LNG supply can make use of Sweden's **extensive rail grid connecting the country's import/export points** with its industrial production and consumption centers



**Up to 1850 railcars/year**  
of 110m<sup>3</sup> each

swede  
gas

# 5. LNG small scale in Gothenburg: GO4LNG

## Regasification

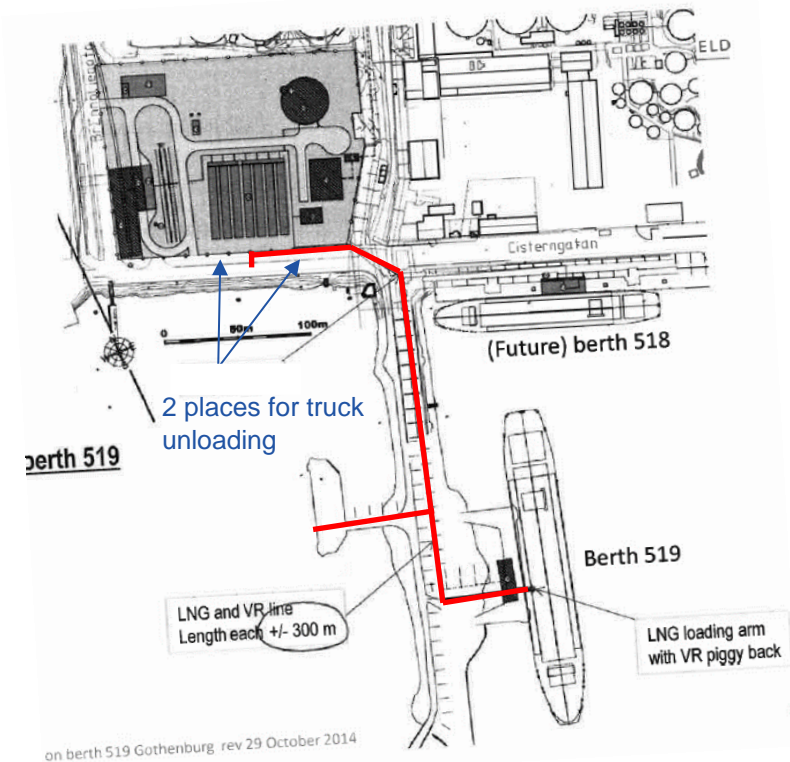
- ✓ **Send-out possibility** to Swedish gas grid up to 90.000 m<sup>3</sup>(n)/h
- ✓ **3km connection distance** to nearby Swedegas grid
- ✓ Feasibility study concluded, **concession application started**
- ✓ Opportunity **to capture part of the c. 1bcm/a market**
- ✓ Growing gas demand in the chemical cluster north of Gothenburg
- ✓ The connection to the grid **would promote competition in the gas wholesale market**, potentially attracting new gas suppliers



# 5. LNG small scale in Gothenburg: GO4LNG

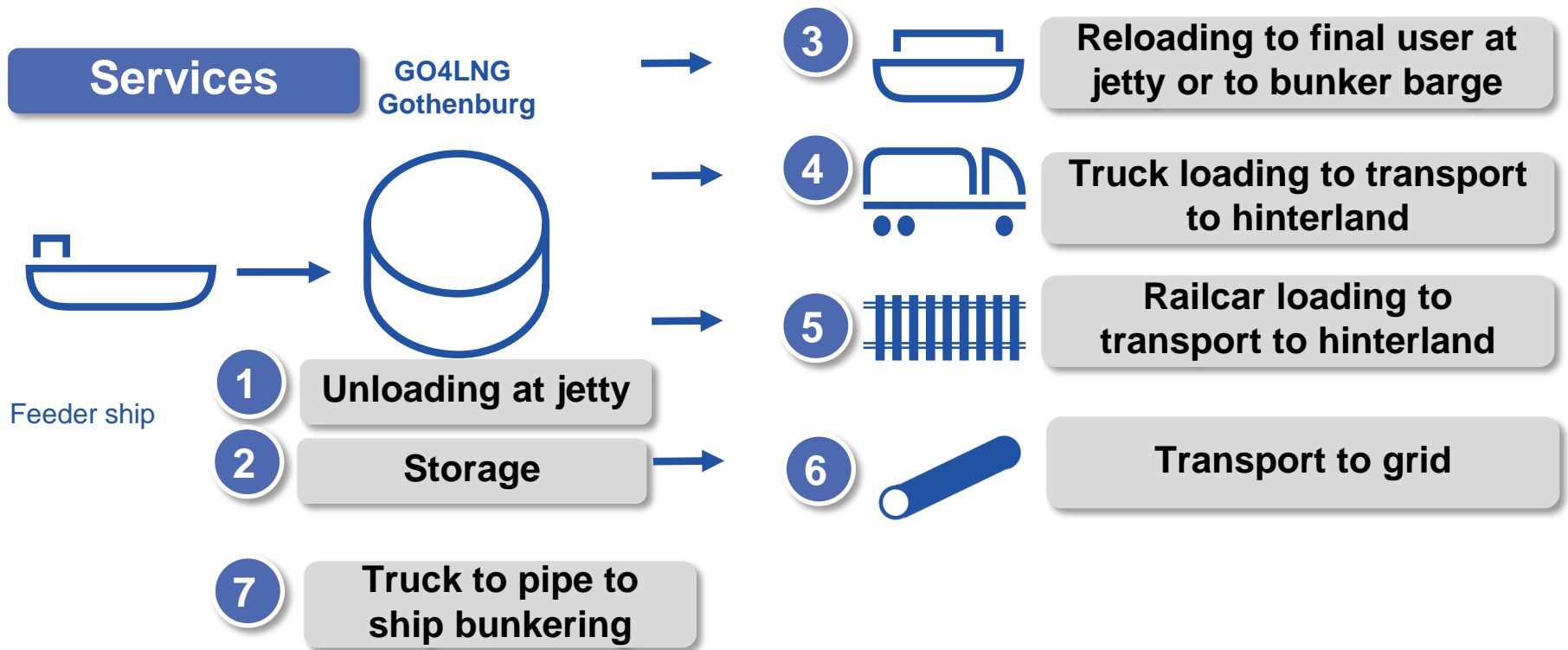
## Cryo pipe to jetty 519

- ✓ First start-up solution: **Truck-to-pipe-to-ship**, (trucks cannot access the jetty)
- ✓ **Connected to the LNG terminal at a later stage** allowing tank-to-ship services also for continuous operations
- ✓ **Around 30.000 m<sup>3</sup> of demand of already contracted** dual fuel ships, mooring at these jetties
- ✓ Follows the **open access principle**
- ✓ **Co-operation between Swedegas and Port of Gothenburg**
- ✓ **Operational early 2017**





## 5. LNG small scale in Gothenburg: GO4LNG



Negotiations ongoing with key potential customers which are trying to aggregate enough volume to be able to take position in terminal.

Current focus for Swedegas to further discuss with parties interested in taking position in terminal

# LNG-TERMINAL GÖTEBORG

**THANKS FOR YOUR ATTENTION**

Elena Fernández Ordás  
Key account Manager  
[efernandezo@enagas.es](mailto:efernandezo@enagas.es)

