LNG AS FUEL BENEFITS

Air pollution – the invisible killer

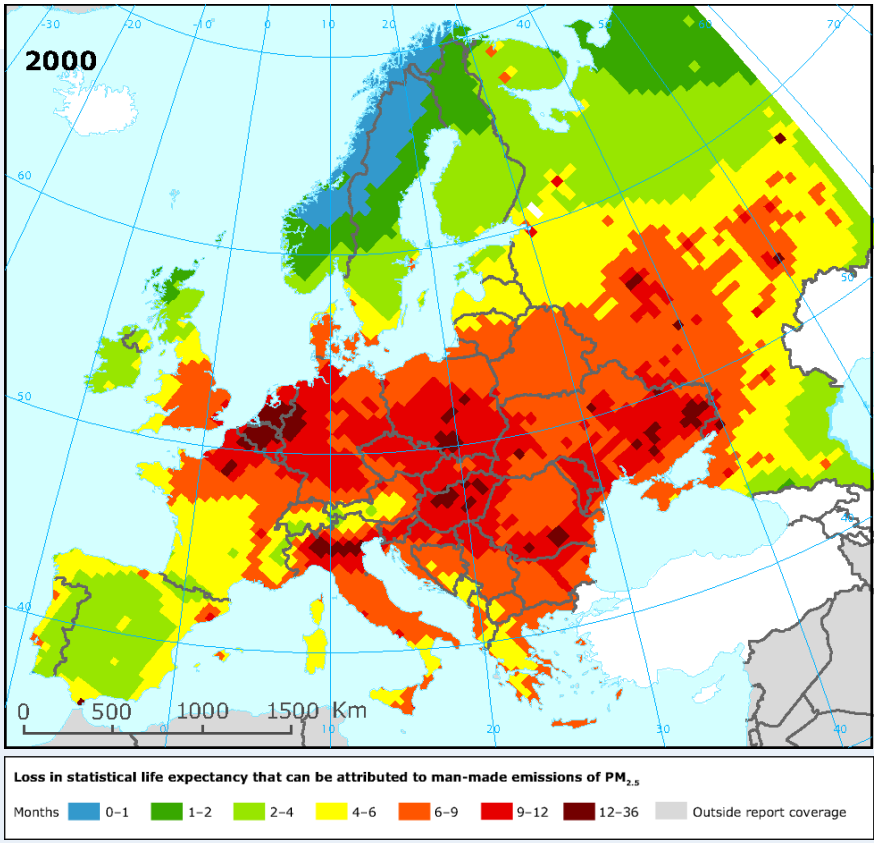
(42,000 untimely deaths in France/year !)

→ **No fine particles** emissions

→ **World Health Organization** has just classified **diesel exhausts as carcinogen substances**

World Health Organization

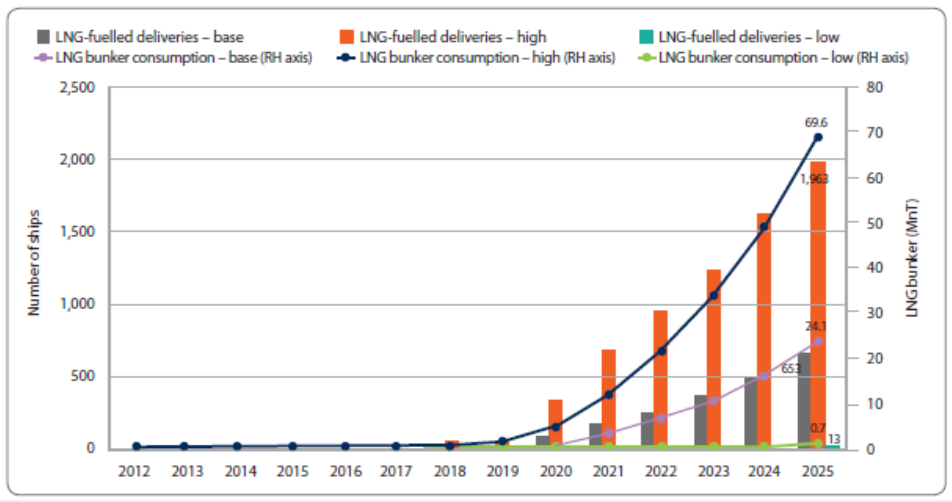
→ Practically **NO** Nitrogen Oxide **(NOx)** emissions and **NO** Sulfur Oxide **(SOx)** emissions



Decrease engine **Noise** and reduce **Vibrations** at all operating speeds

LNG AS FUEL MARKET POTENTIAL

- **Maritime LNG demand in Northern Europe:**
  "It is estimated that by 2020, the maritime LNG demand will be 2-4 million tonnes per year in SECA."
  - DMA study, October 2011
- **Maritime LNG global demand:**



Source: Lloyds register « LNG fuelled deepsea shipping– August 2012 »

- Significant growth starting in 2020
- Need for infrastructure to support shipowners' decision to build LNG fuelled vessels

IMPORT FACILITIES SHOULD NOT BE A BOTTLENECK

- **4 Mtpa in 2020 represents only 5% of the ECA LNG reception capacity**
- **Infrastructure issue is a « Small Scale Infrastructure » issue.**

THE MAIN CHALLENGES

- **Make LNG available in smaller parcels:**
  - trucks : 40 m^3
  - bunkering barge : ~1,000 m^3
  - Bunkering vessel : up to 10,000 m^3

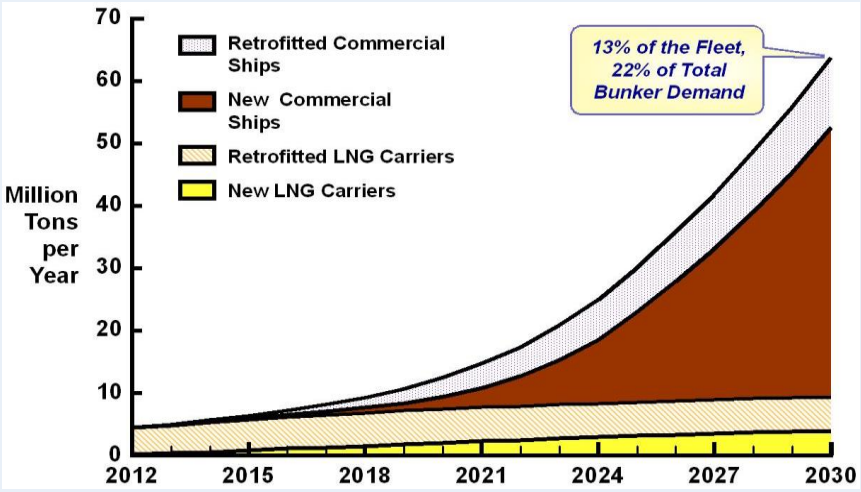
1 cargo of 160 000 m^3 = 4000 trucks

- **From very large scale facilities : Missing links**
  - bunker vessels,
  - refuelling facillities for maritime and for land transport

- **With the same safety standard**

LONG TERM POTENTIAL

- **Various estimates of market potential with a consensus on 2020 as the beginning of a significant growth period**



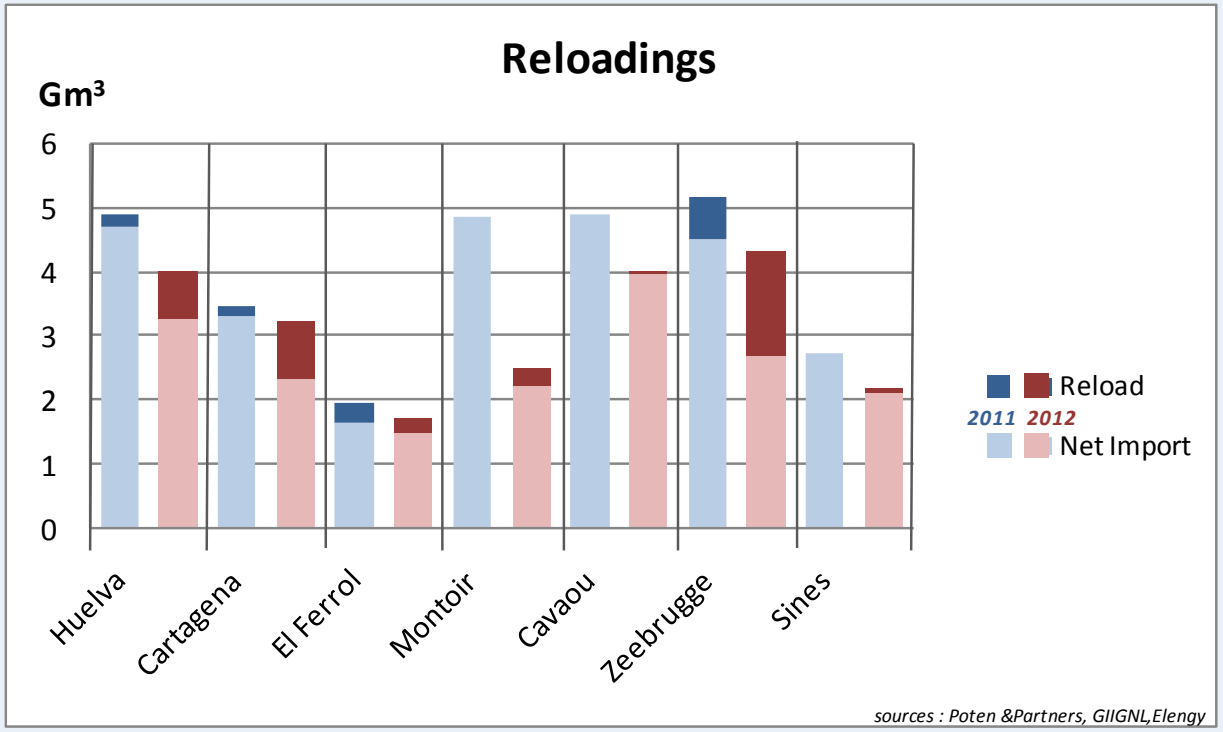
Source: IHS CERA.
10704-8_3007

- **More than 80% of the market potential materializes after 2020**

- **How to justify investing today ?**

Development of a new service: Reloading

- **3.9 bcm reloaded in 2012**
- **i.e. three times more than in 2011**
- **or about 7% of the unloaded quantities**
- **equivalent to 70% of the capacity of Snoevith liquefaction plant in Norway!**



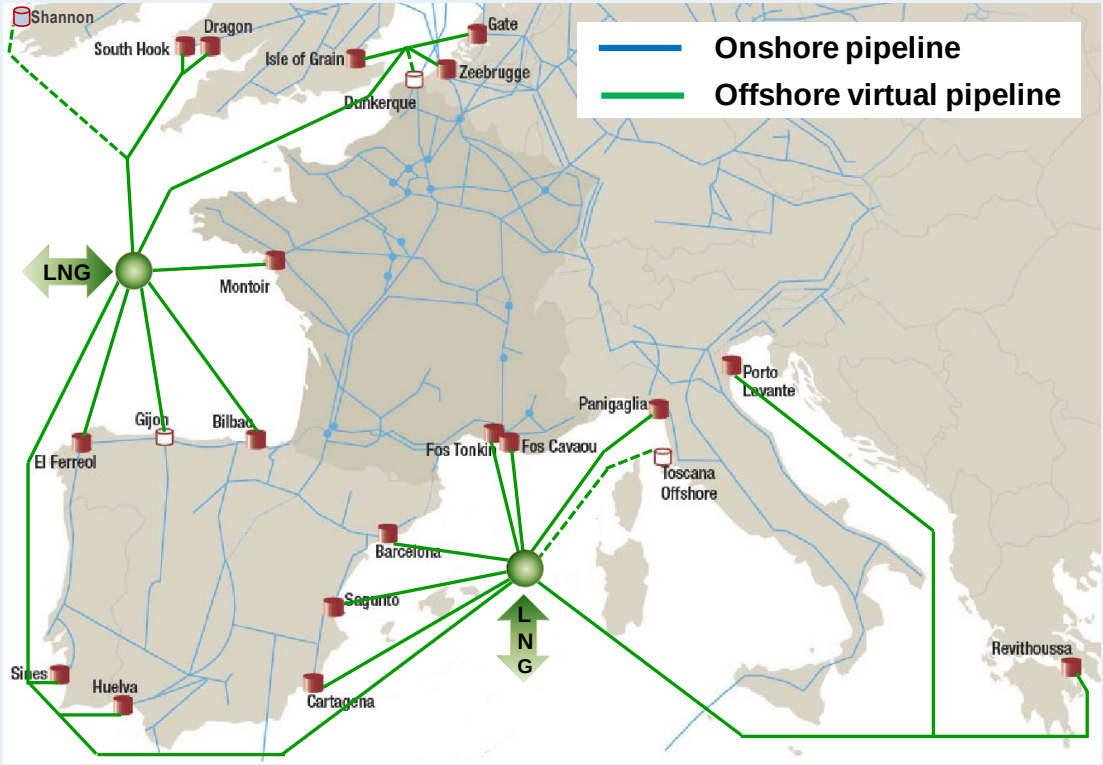
Elengy and Fosmax:

- **start up of the service in 2011**
- **about 10 operations already**

LNG ships, an efficient alternative to pipeline...
... between European countries

- **In addition to directly diverted LNG quantities**
- **1/3 of the reloaded quantities in 2012 stayed in Europe;**

  Main flows:
  - **from Belgium to Spain and Portugal**
  - **from Spain to Italy and Greece**



- **This confirms the LNG advantage of being able to be delivered closest to where it is the most needed**

LNG as a genuine alternative to pipeline

- **Confirmation that LNG shipping reloading & diverting**
  - **is not only a simple tool for importing LNG, but is also a genuine alternative to pipeline transportation**

    ⇒ Virtual offshore pipeline
  - **contributes to reduce investment risks, by avoiding expensive pipeline that may rarely or even never be used !**

The role of the economic situation

The role of the economic situation

Don’t forget: The evolutionary Principles of Darwin apply to all of us – including the Gas market – only the fittest survive, and fit means fit for the environment in which we live (operate)

RWE
The energy to lead

RWE Supply & Trading 17th April 2012 PAGE

CHICKEN AND EGG PROBLEM ?

- **Just before WWI, Churchill decided to convert the Navy fleet from coal to oil**
- **Several hurdles had to be tackled:**
  - **New technology uncertainty**
  - **High retrofit cost**
  - **Dependance on foreign resources**
  - **Very unpopular decision**
- **… but was the decision process simpler ?**

Thank you for your attention

IT STARTED WITH SMALL SCALE

- **1965 :**
  First LNG from Algeria to France
  - LNG terminal in Le Havre
  - Jules Vernes Tanker
  - Camel plant in Arzew (0,9 Mtpa)
- **1969 :**
  Alaska-Japan
  - Kenai LNG : 1,5 Mtpa