RAG.ENERGY.STORAGE

entsog
european network of transmission system operators for gas

7th TYNDP WS

The role of storage in a liberalized market

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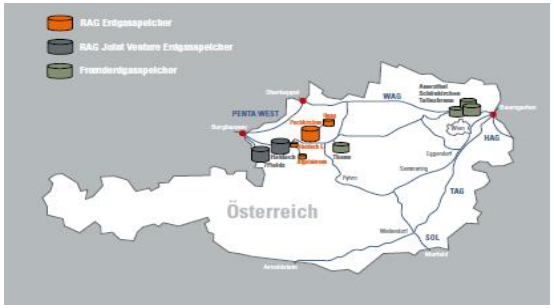
RAG.ENERGY.STORAGE

- Unbundled SSO since 1.1.2013
- Operating a storage-pool in Austria - **CEGH**
- **TOV: 13,4 TWh** / 1.196 Mio. m³
- Injection & Withdrawal capacity: 6,6 GW / 590.000 m³/h

- New capacities from 1.4.2014: **60.000m³/h**
- Connection to **CEGH and NCG**
- Further potential: 100.000 m³/h

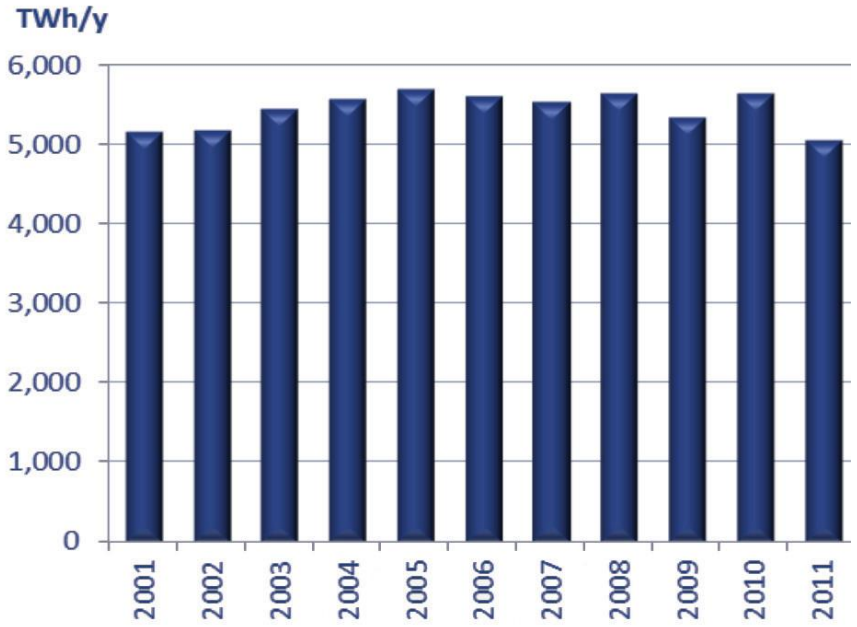


OVERVIEW

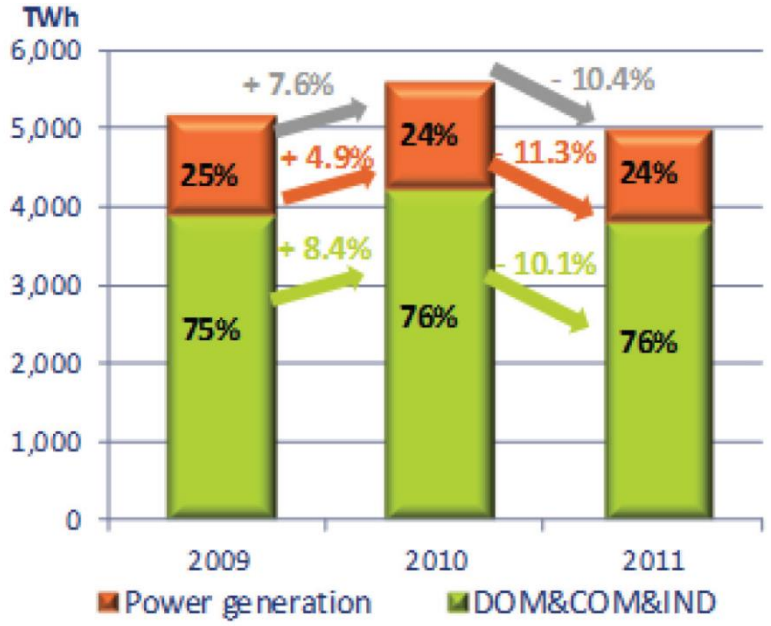
- The evermore important role of **storage in the future**
  - The EU gas market – some statistics
  - Potentials
  - Storage market & new storage products
- Market >< Storage **interconnection**
  - Need for correctly dimensioned grids
  - Role of TYNDP for storages
- **PCI status** for storage projects
  - Market integration - cross border criteria
  - TYNDP

The EU gas market – some statistics:

- the way towards a golden age has stopped in 2010



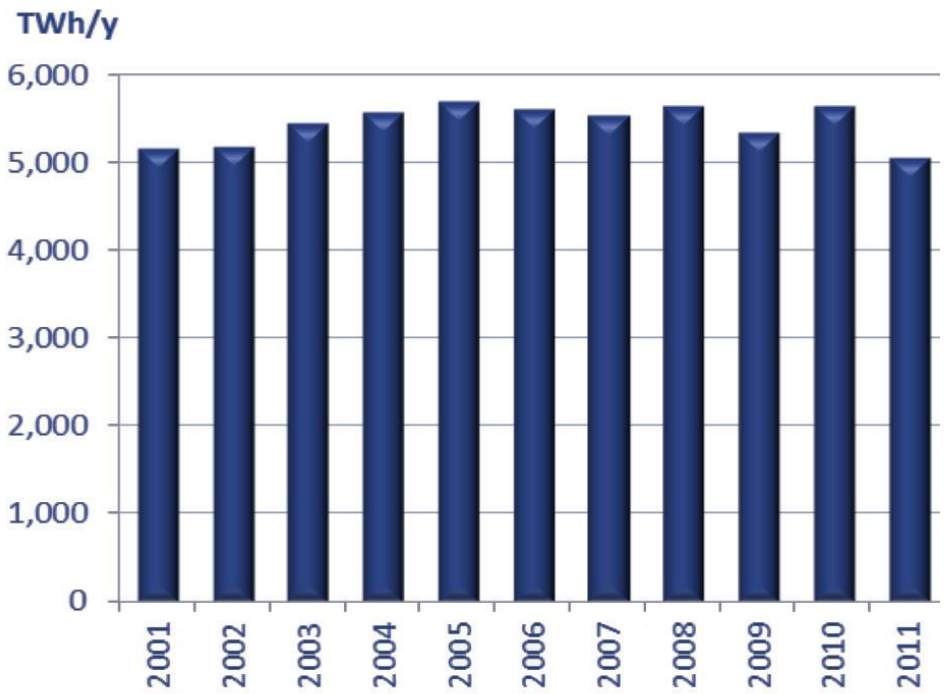
Evolution of European gas consumption (Source: ENTSOG TYNDP - Converted from Eurostat figures)



Evolution of European yearly demand and its breakdown (Source: ENTSOG TYNDP)

The EU gas market – some statistics:

- slow but steady growth, IEA even less optimistic



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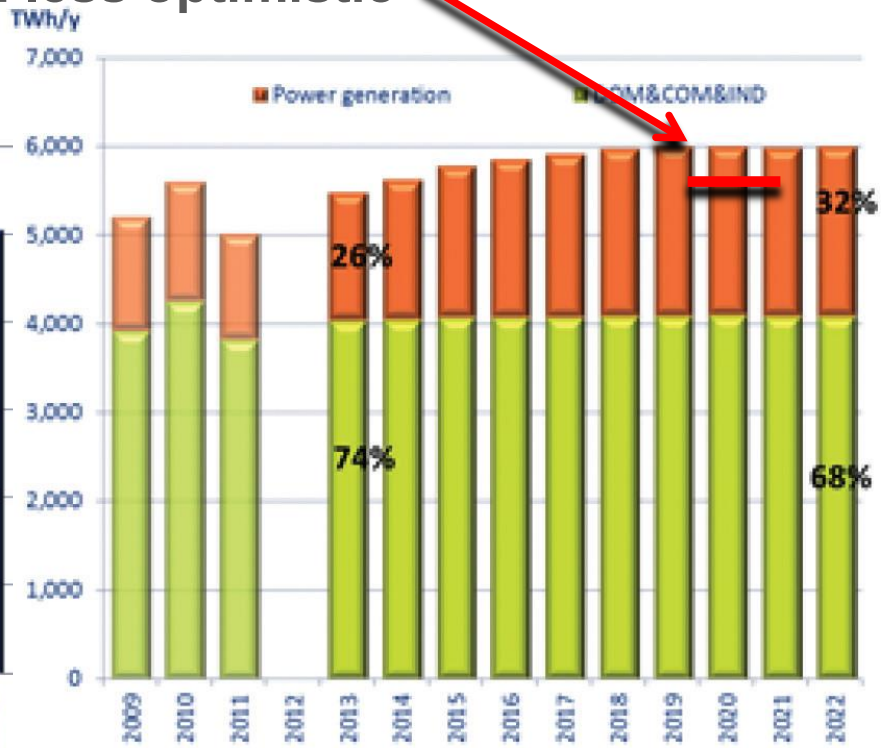
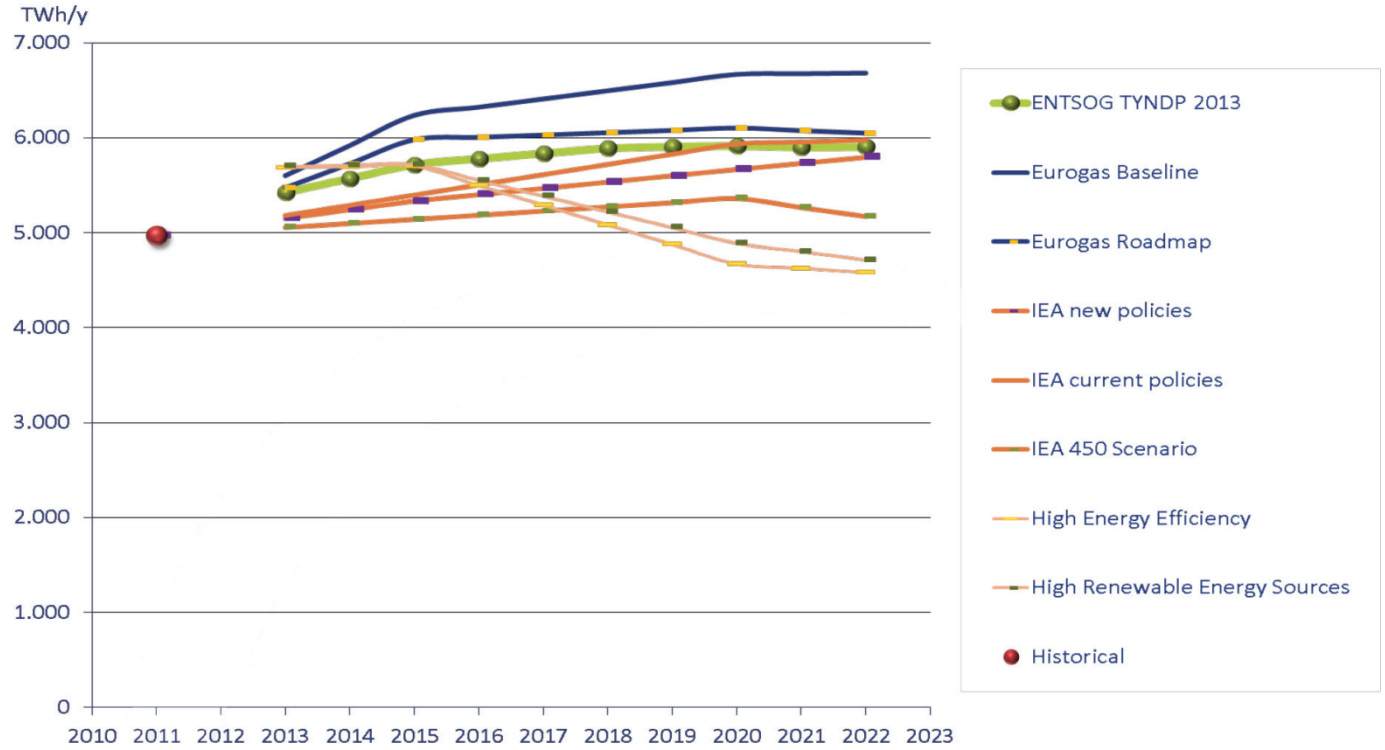


Yearly demand, evolution and breakdown (Source: ENTSOG TYNDP)

The EU gas market – some statistics:

How predictable are policy makers



Evolution of European gas consumption
(Source: ENTSOG TYNDP - Converted from Eurostat figures)

No golden age for gas in EU - the arguments:

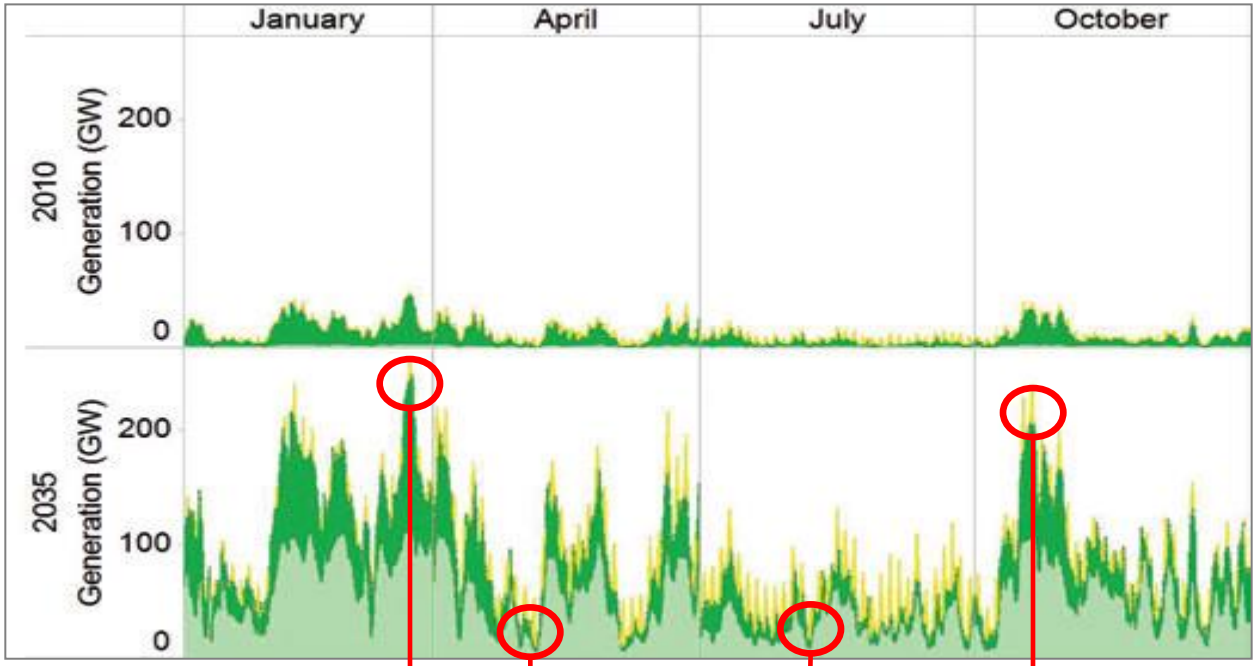
- Gas prices too high/low
  - **cheap coal** will be the winner
  - **LNG ships** deviated to Asia
- **CO2 prices** are too low - ETS is not working properly
- EUs` gross domestic product **(GDP) growth** below 2%
- **Wind and solar** are heavily subsidised to further increase

It is the reality today ! – but self-fulfilling prophecy ?

- There is still **substantial demand**
- **Demand ≠ Capacity** – Flexibility needs will challenge infrastructure
- Technology potential and **R&D** – shale gas, what`s next?
- **Policy options**…what about renewables 10 years ago?

Potentials:

Integrated view with electricity – Renewables as stand-alone?



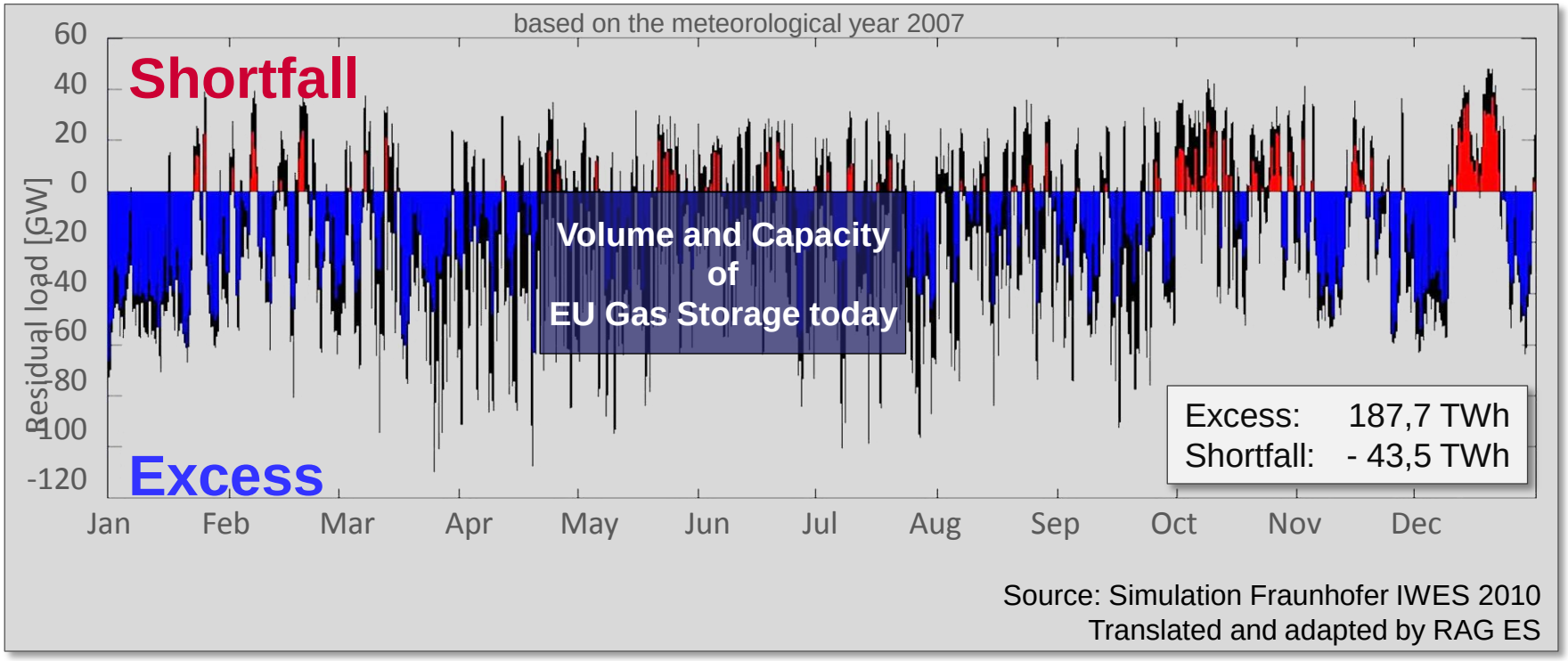
Aggregate hourly output across North Europe for four months (GWh) Source: Pöyry

- wind and sun will not balance themselves
- triggers massive shortfalls and overproduction

Potentials:

Integrated view with electricity – where will Flexibility come from

Simulation: German electricity grid at **600 TWh/a** with a **78% share of Renewables** and **residual load** (after consumption and balancing) at **ideal grid development**



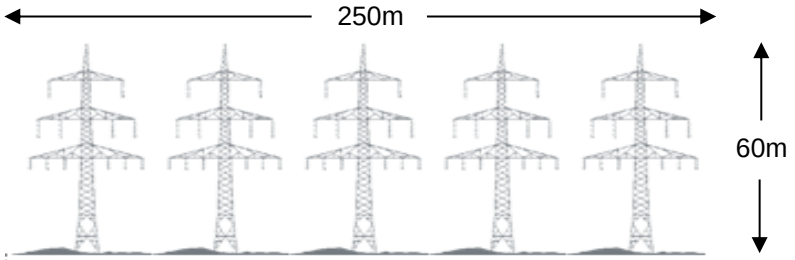
- **Gas storages will ensure efficient flexibility !!!**

Potentials:

Technology innovation, Renewable Gas: POWER2GAS

- Allows the efficient diversification of gas and electricity infrastructure
- Enables the use of existing gas infrastructure for electricity (storage and pipeline)

Transport of 14.000 MW electrical Energy



5 pylons 380kV - Power Transmission Line

vs.

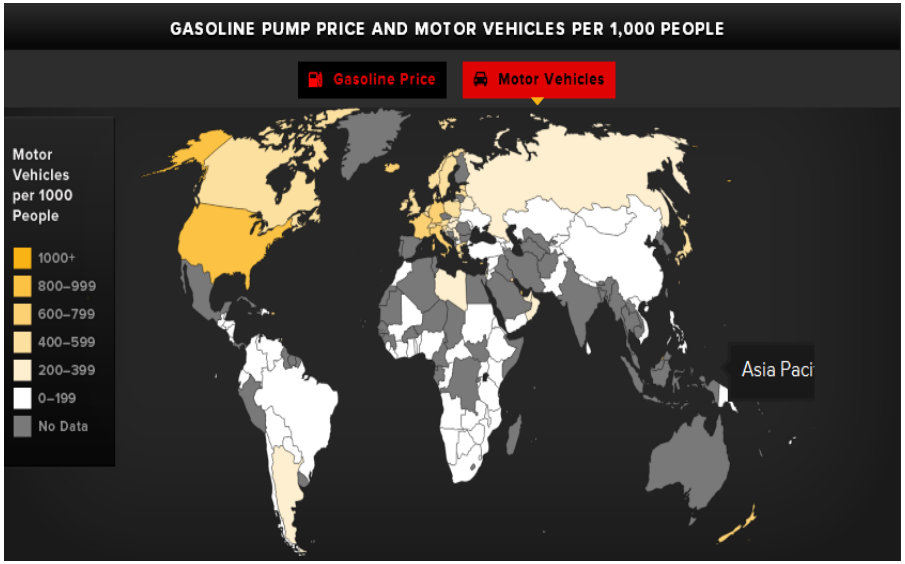
1 invisible Gaspipeline DN900

Source: IGU Sept. 2010 adapted by RAG ES

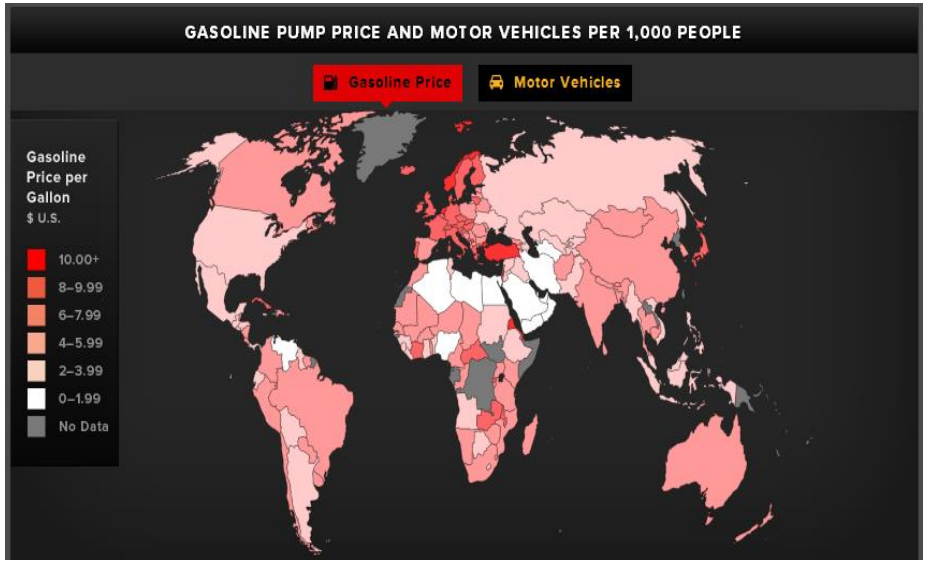
Potentials:

CNG Mobility – EU is an attractive market:

- AAA technology – Available, Affordable, Accessible
- Supported by ECs` “Clean Fuel Strategy”
- A real policy-initiative is needed!



Motor Vehicles per 1,000 People
(Source: STATOIL)



Gasoline Pump price
(Source: STATOIL)

Storage market & new storage products:

- **Growth** – even on a low level – and
- **Flexibility needs** combined with
- **Innovative gas technologies**

indicate an **increasing demand for gas storage** on a technical level

BUT…

- **Market interventions,** especially on the **electricity side** have **eroded market signals**

NEW PRODUCTS … WHO WILL PAY FOR WHAT?

- **SOS** is almost no motivation any more
- **Flexibility and balancing** are seen rather virtual than physical
- **“New products”** are mostly defined by their **price**
- **Transport and related costs** are becoming more and more important

Market >< Storage interconnection

The reality is based on physical flows though!

Need for ideally dimensioned grids

- Real life shows need for improvement:
  - Cold snap in Feb. 2012:
    in South Germany interruption of transports from storages

- How to mitigate that evolving situation:
  - Firm capacities for storage transports are needed!
  - National development plan 2013 under progress, but…

    TSO-argument: "*costs are not justified under the assumption of declining demand*"!

Market >< Storage interconnection

Role of TYNDP:

- Highlighting bottlenecks regarding storage deliverability
- Need for right assumptions in network development
  - Demand ≠ Capacity
  - Typical flow scenarios from/to storages (summer, winter)
  - ENTSO`s Integrated view for electricity and gas

➢ Potential for TYNDP

PCI Status for Storage Projects

What are the benefits:

- Permitting : non-binding guidance, reversal of responsibility
  public interest for non-PCIs ?
- Financing : meeting with the EIB

…it‘s all a bit vague, obligations are manifold

The Process, so far:

- Criteria – mostly designed for pipeline projects
- evaluation of criteria within groups seems tricky

Role of ENTSOG:

- Fair evaluation of all kind of projects
- Taking into account storage specifics

THANK YOU
FOR YOUR KIND ATTENTION!

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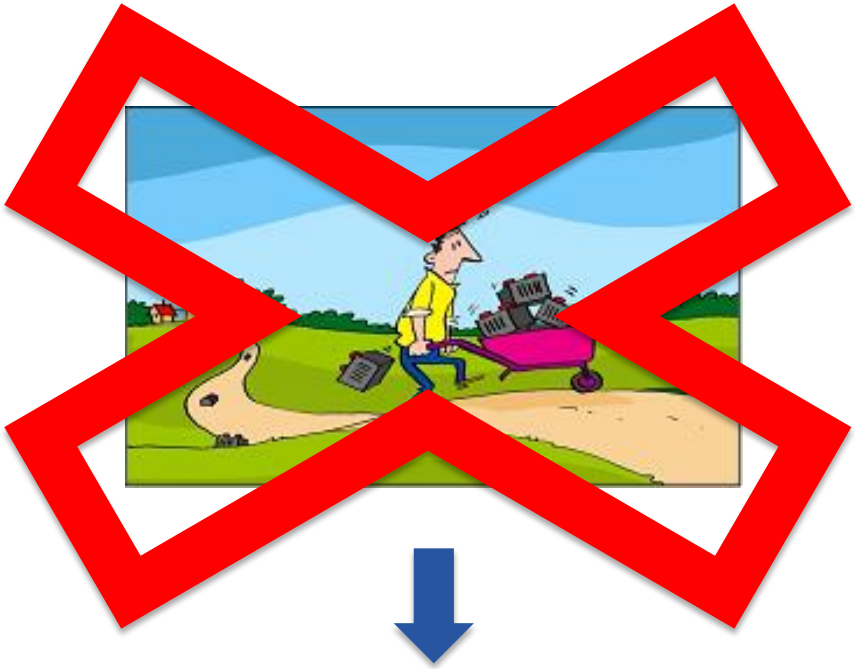
Are batteries an alternative?

~67 bn Car batteries are needed to substitute the capacity of RAG Storage

~800 Mio
Tons of lead would be needed

>200 years to produce it



~Vienna
6 layers with batteries or

~350x around the globe battery next Battery

No solution for a sustainable world of renewable energy!!!