



The Dynamics of the Swedish NGV Market

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”Biomethane as a fuel” Evonik conference
Berlin 30 September 2015

ELFORSK



RDD administration – Events – Consultancy work

Why biomethane in transports?

Only fully oil dependent sector in Sweden! (92 %)*

- **Full utilization of energy with solutions available now**
 - Inevitable heat losses in CHP utilization, wind & sun better alternatives
 - Commercially available solutions for oil dependent transports of all types (LDV, MDV, HDV, short, medium and long-distant), with performance on par with diesel soon to come!
 - Natural gas and biomethane: freely intermixed and interchangeable
 - Evident co-distribution and backup synergies (backup for market fluctuations, process failure) allow for 100 % utilization of your biomethane and earlier market buildup
- **Promotional value compensates for added costs**
 - Steadily increasing the renewable share gives true greening

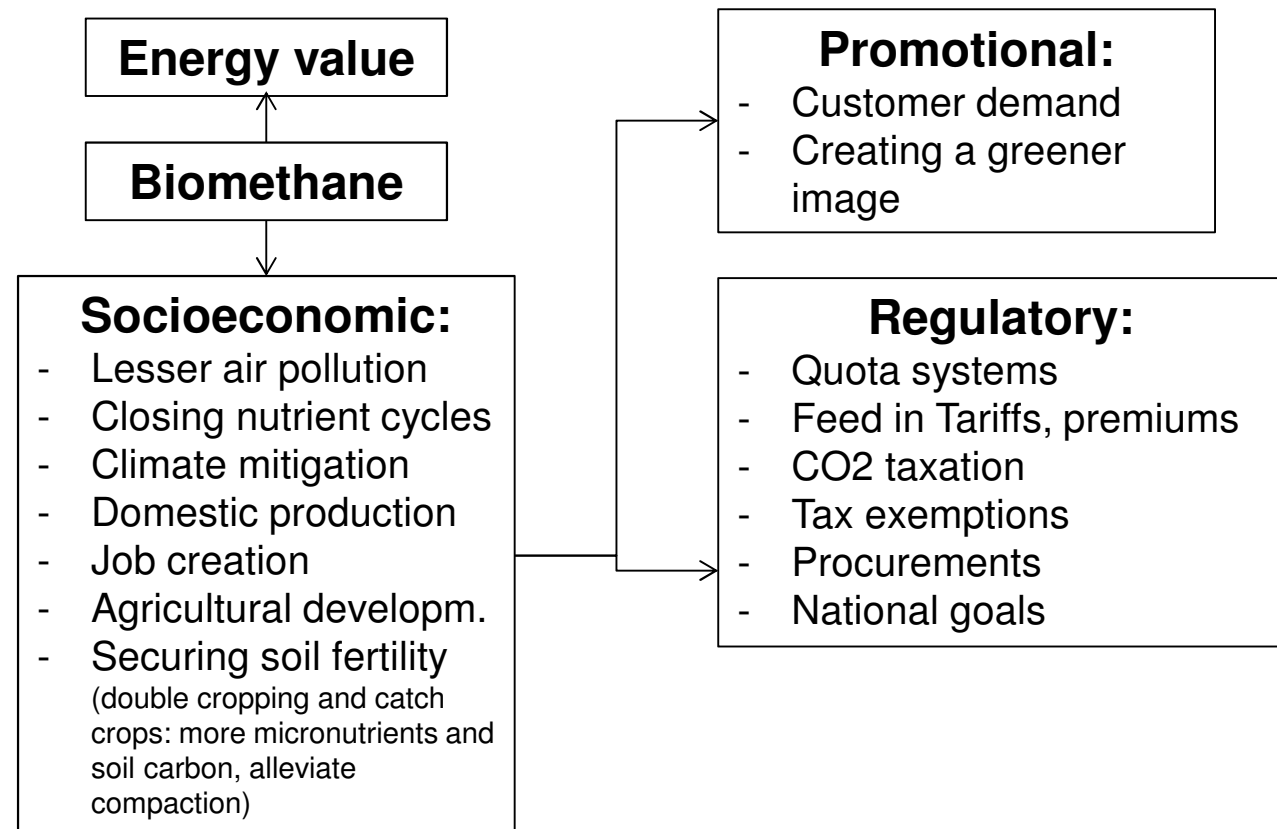
* Industry – 25 % fossil fuels (oil, coal, natural gas)

Households – 10 % fossil fuels (oil)

Source: Energiläget 2014, Swedish Energy Agency

Drivers spelled out: Biomethane positive externalities

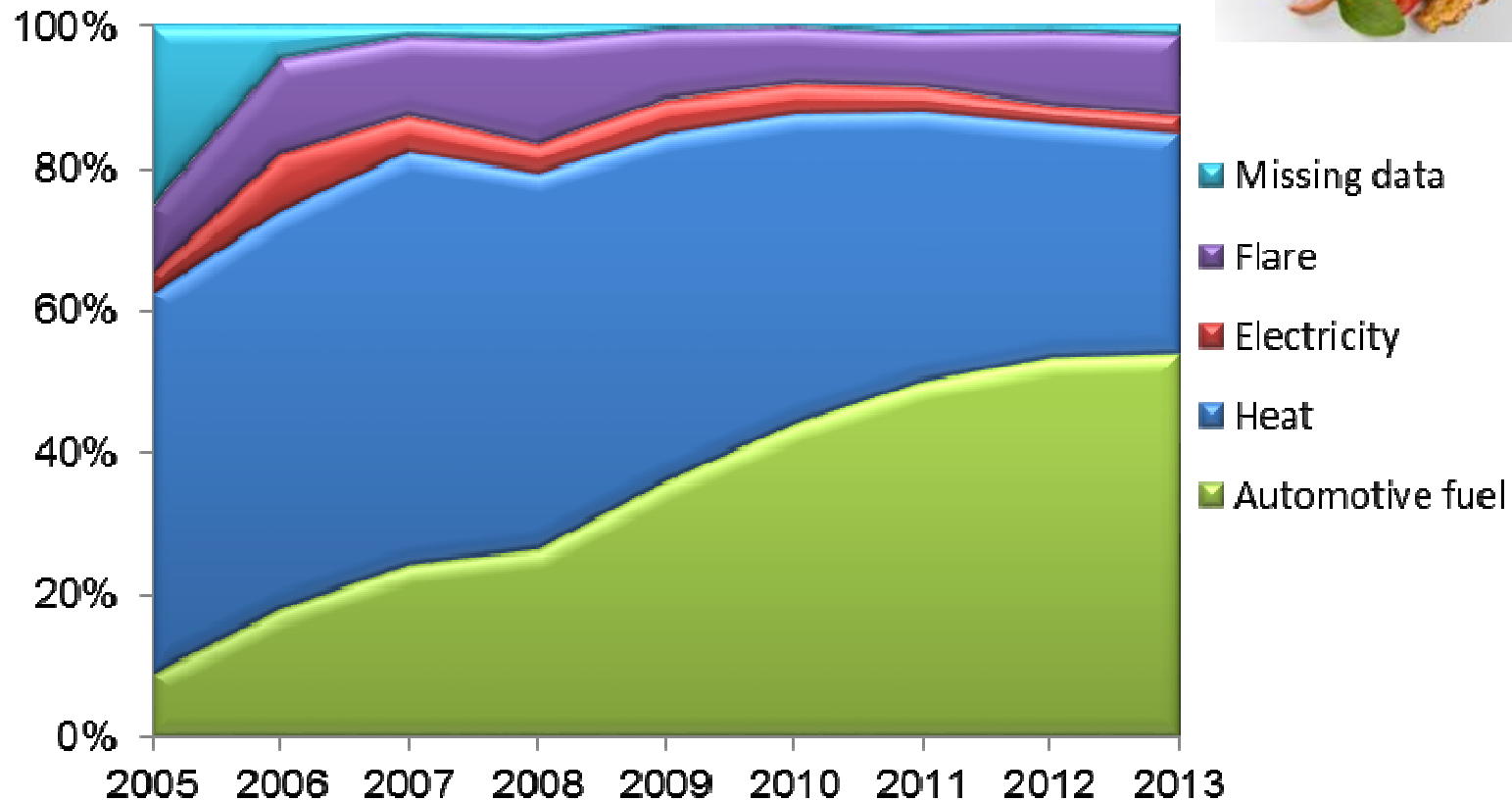
- Considering the wider picture is important in order for biomethane production to be worthwhile



Biogas utilisation 2005-2013

264 biogas plants  1.7 TWh biogas (2013)

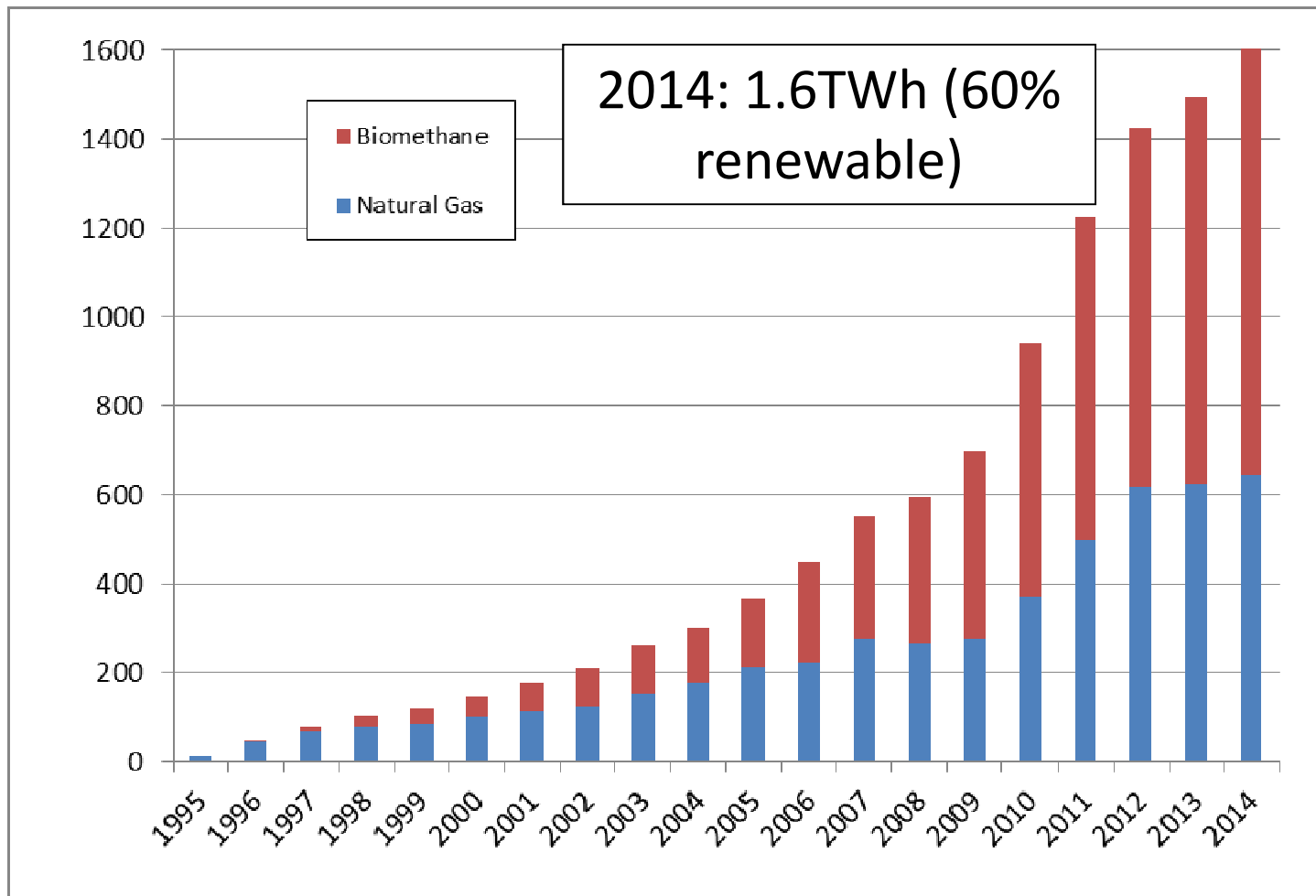
Food waste collection in 190 of Sweden's 290 municipalities
30,000 ton 2005 → 307,000 ton 2013 (1/3 of potential)



Volumes of CNG/biomethane in Sweden

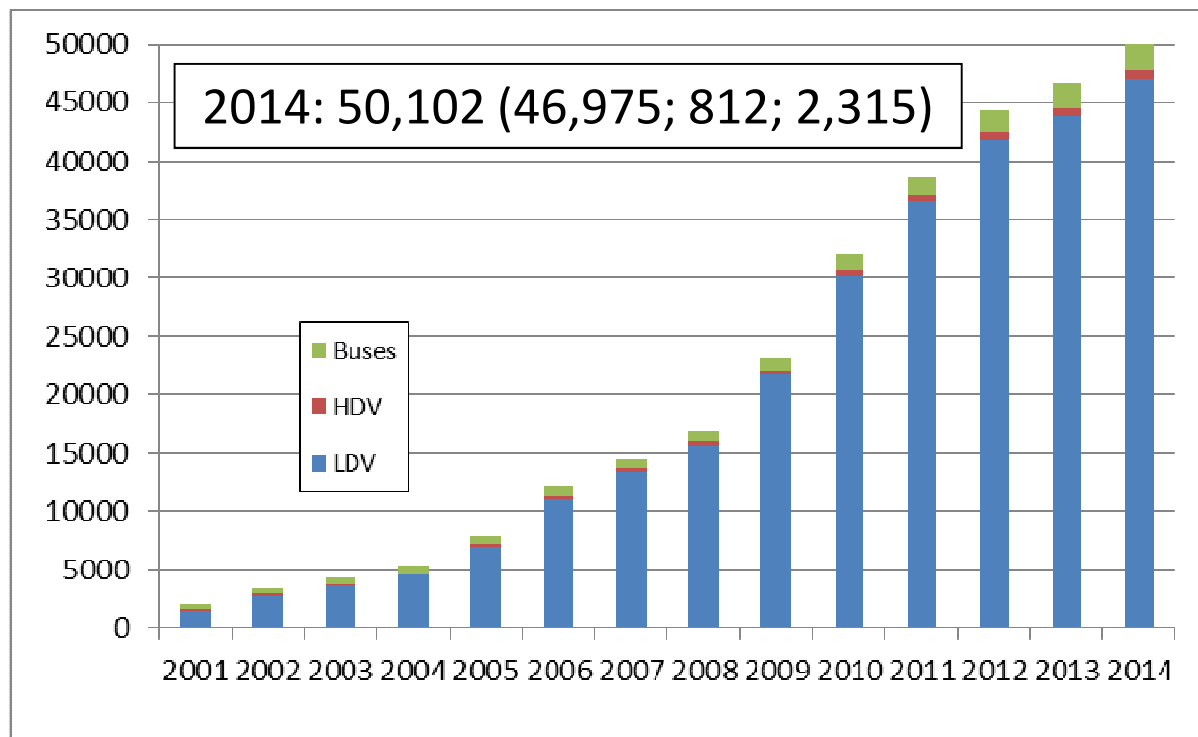
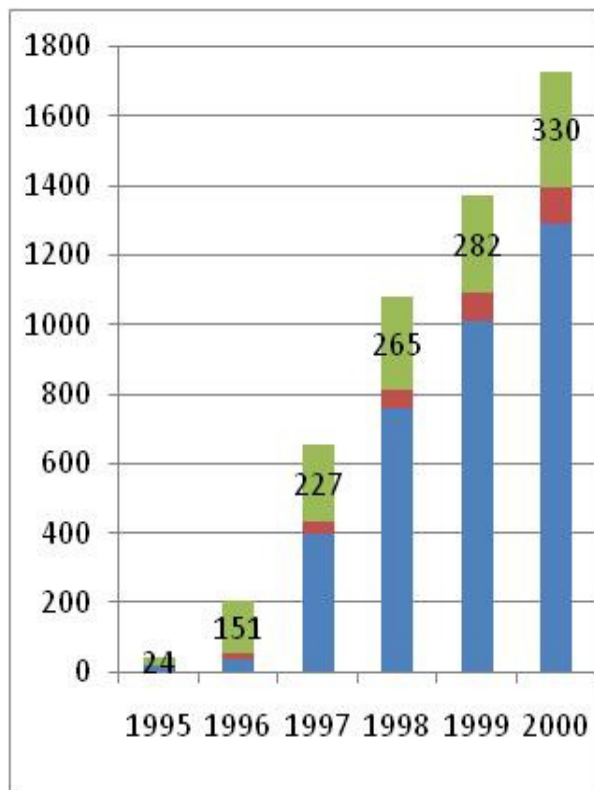
Evidence of a fruitful interplay between the use of natural gas and biomethane

[GWh]



No. of NGV's in Sweden

The NGV market base: Captive bus fleets (1 bus \approx 20-30 LDV's)



155 public refuelling stations

In total 218, and 5 supplying LNG/LBG



NGV market dynamics of Sweden

Local pollution problems + no grid access = biomethane buses

- **Converting to NG buses to solve local pollution problems**
 - Grid connected cities of Malmö and Gothenburg
 - NG companies searching for a new market segment

The future: 24 m biomethane powered hybrid bus in Malmö from 140601 – most frequent commuter line, BRT concept



NGV market dynamics of Sweden

Local pollution problems + no grid access = biomethane buses

- **Environmental state funding to municipals decisive (1998-2010)**

- Non-grid cities upgraded to biomethane to fuel their buses – grid cities followed
- Captive bus fleets shown* providing the essential niche of the emerging NGV market in Sweden

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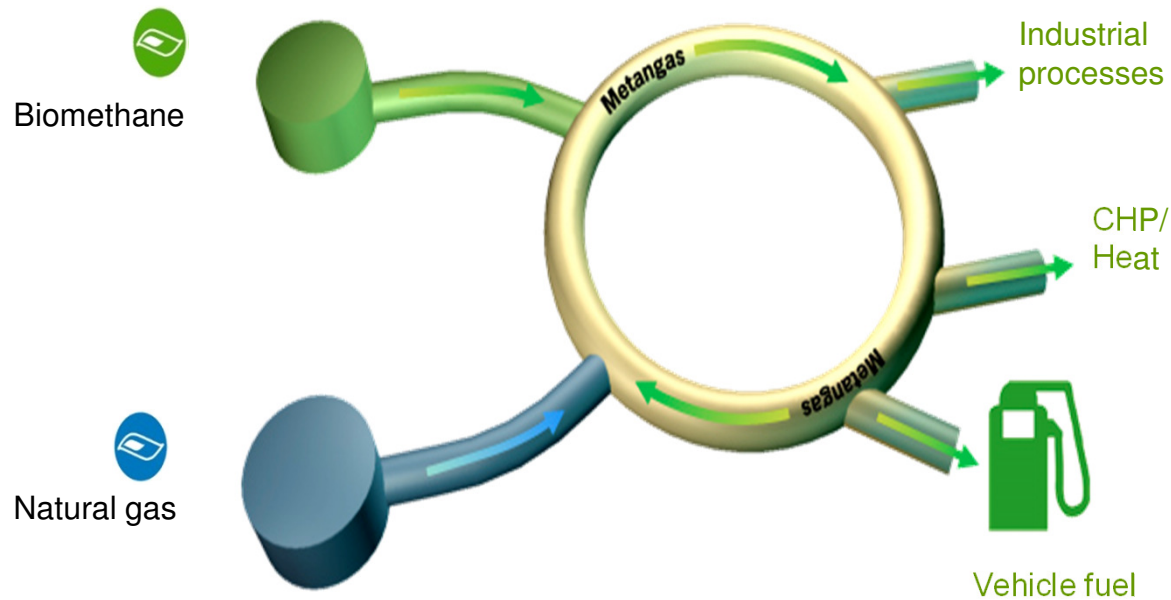


The intercity bus sector is also under "gasification" in Sweden

*Sandén, B., Jonasson, K. Variety Creation, Growth and Selection Dynamics in the Early Phases of a Technological Transition: The Development of Alternative Transport Fuels in Sweden 1974-2004. pp. 76, 2005.
<http://publications.lib.chalmers.se/cpl/record/index.xsql?pubid=12635>)

Swedish visions and goals

- **The Swedish Gas Industry's visions are:**
 - 100 % biomethane in the vehicle gas in 2030
 - 100 % biomethane in the gas grid in 2050



Swedish visions and goals

- **Vision of the state: Fossil free vehicle fleet in 2050, through the following measures:**
 - ↓ Needs for transports
 - ↑ Energy efficient vehicles
 - ↑ Proportion of electricity and bio-fuels
- **But no mid-term goals or incentives/regulations in place to reach the vision!**

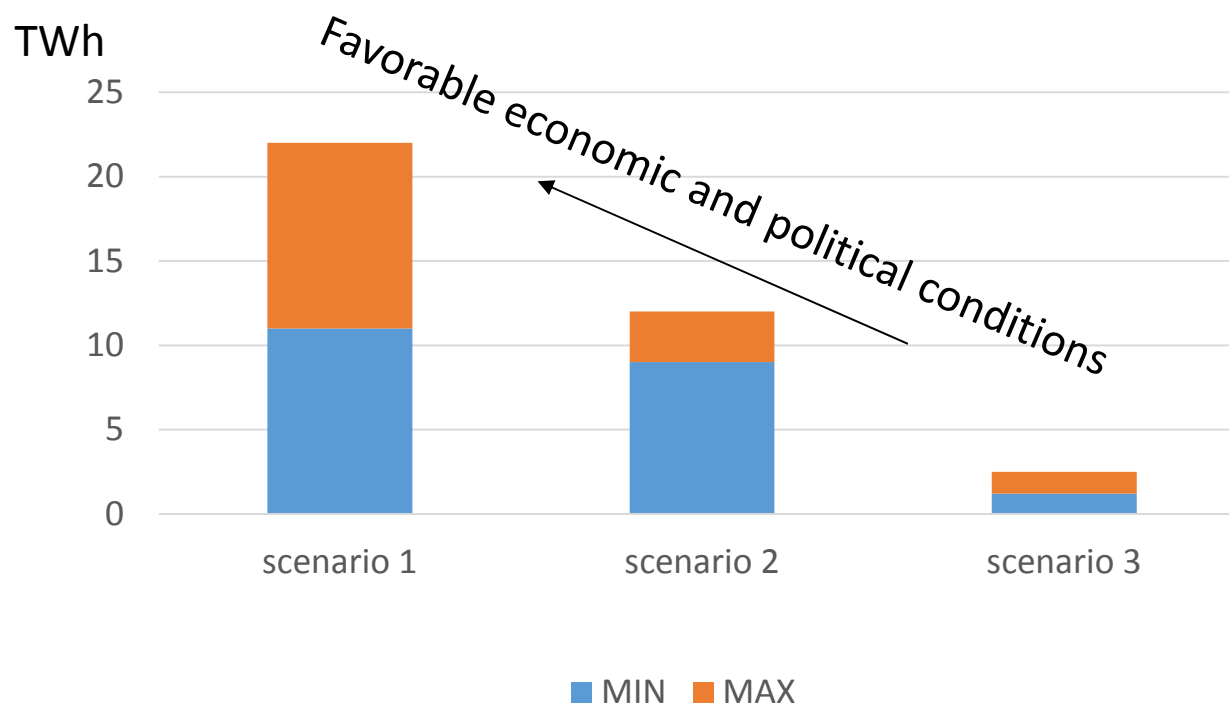


Biomethane in Sweden today

Capital intensive business with still small profit margins need additional drivers and good framework conditions

- **Tax exemption + high fossil fuel taxes most important driver**
 - Retail at approx. 2 EUR/kg (9SEK/€)
 - Fringe benefit tax reduction on company cars 40 % / max 1.100 EUR
- **Long-term high-volume contracts securing the market**
 - Waste management + procurement of public transport
- **Challenges ahead**
 - Missing: Extension of existing policies, no new ones to facilitate production growth (tax exemption ruled unlawful by the EU, 2016 → ?? certificate system, continued exemption for biomethane only?)
 - Competition in the bus segment (HVO, electrification, diesel hybrids)
 - Low oil prices

The realizable biomethane potential for the vehicle fleet in Sweden 2030



Conclusions

The driving forces that co-create NGV markets

- Oil-dependent transport identified as a major challenge
- Corporative: Gas companies looking for new markets, clients wanting renewable transport products
- National, regional and local interest and policy making
 - National policies, regional public procurement and long-term commitments to fulfill environmental goals
- → Public-private partnerships and supportive national policies are key in building a biomethane powered NGV market!
 - Long-term policy commitment, preferably % market size!
 - The whole value-chain need to be involved from the beginning!
- More commercial competence building needed!
 - Customer oriented approach, making gas powered transport more “sexy”

Natural gas and biomethane are complementary fuels – developments in Sweden

Thank you for your attention!

Any questions?

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October 2016



SGC International Seminar on Gasification

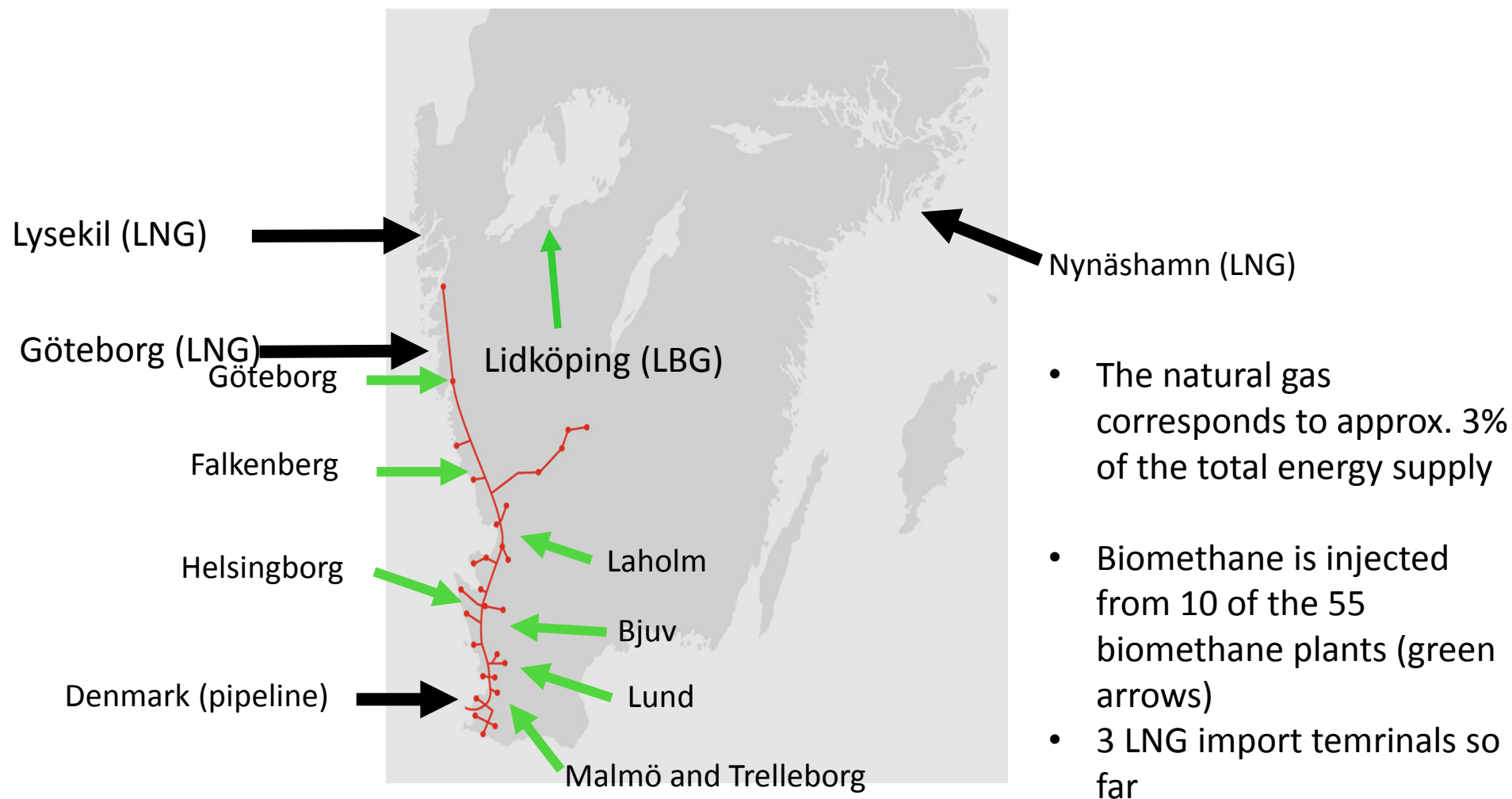
– An annual venue since 2007

www.nordicbiogas.com
Finland (Sthlm-Turku LNG
ferry!) 7-10 Sep 2016

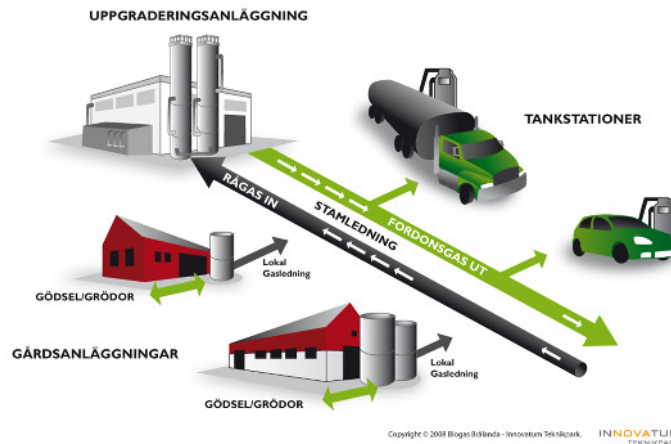
Nordic Biogas Conference



Limited national gas grid in Sweden



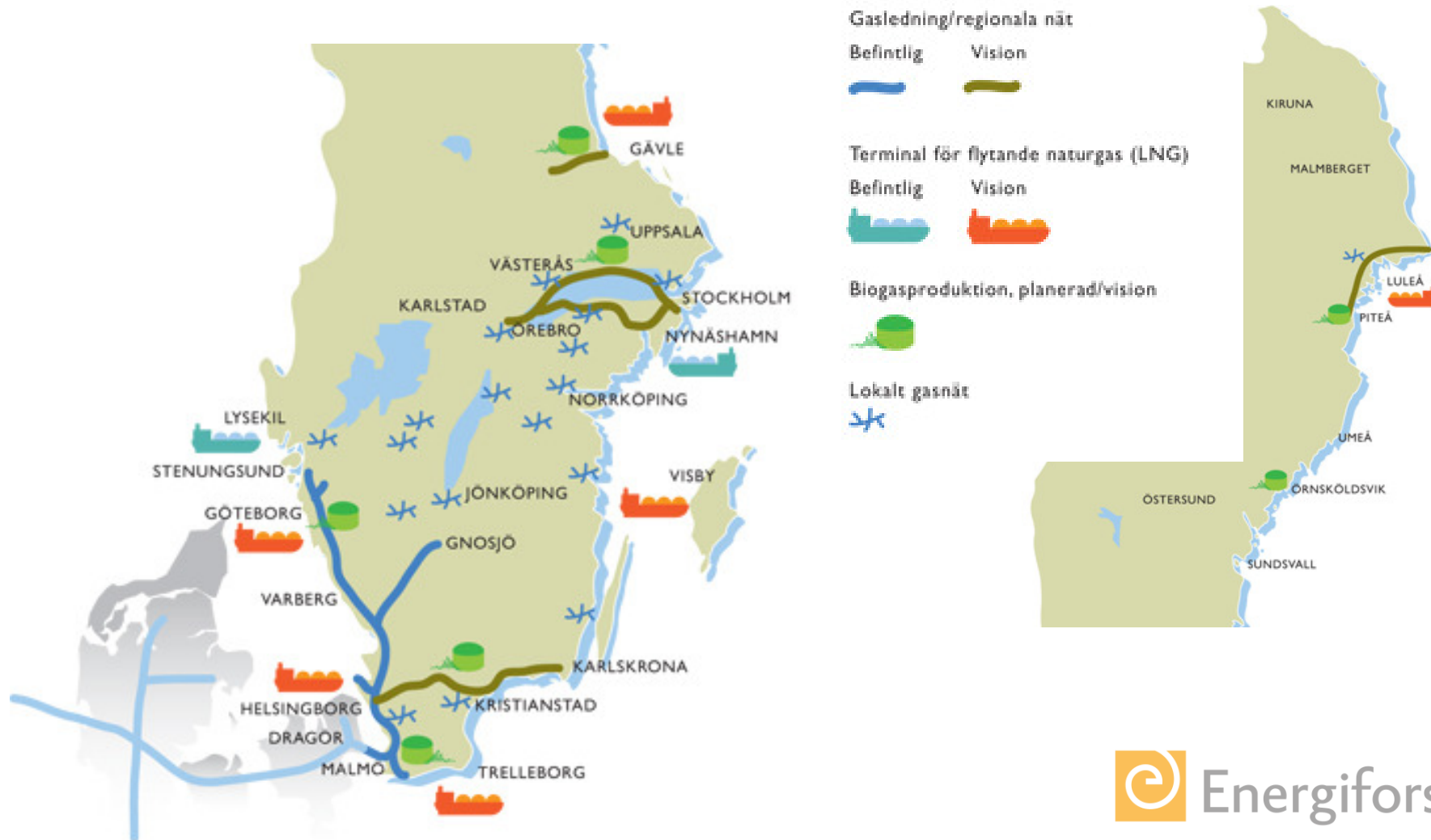
Sweden is world leading in transporting gas off-grid



Read more in case story from IEA Bioenergy Task 37:
Non-grid biomethane transportation in Sweden

The future: Regional grids

- The idea is to connect production units, refuelling stations and customers to an LNG terminal



Biomethane trade in Sweden

National trade

- Similar to certificate trading but in most cases without third party control.

International trade

- The Swedish Energy Agency claims that imported biomethane has to fulfil traceability on mass balance level. Not possible through the European gas grid. Decision is appealed.
- However: One company (Mody) is certified through REDcert, recognized by the European Commission, and is allowed to import biomethane to Sweden