

LNG and LBG

How do we introduce a new fuel in the marketplace?



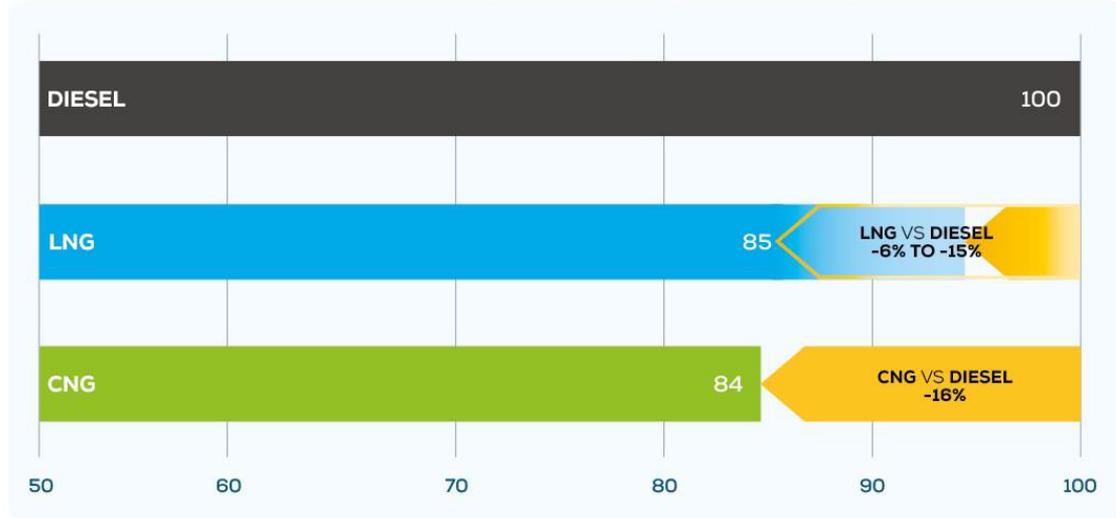
Agenda

1. First a reminder – Why?
Is there a need for a new fuel?
2. Experiences from light vehicle introduction in Sweden
Going from grey to green in a decade
3. Current situation - Sweden
Policy under construction...



Why do we need another heavy duty fuel?

WELL-TO-WHEEL HDV VEHICLES-GHG INTENSITY (RELATIVE EMISSIONS)

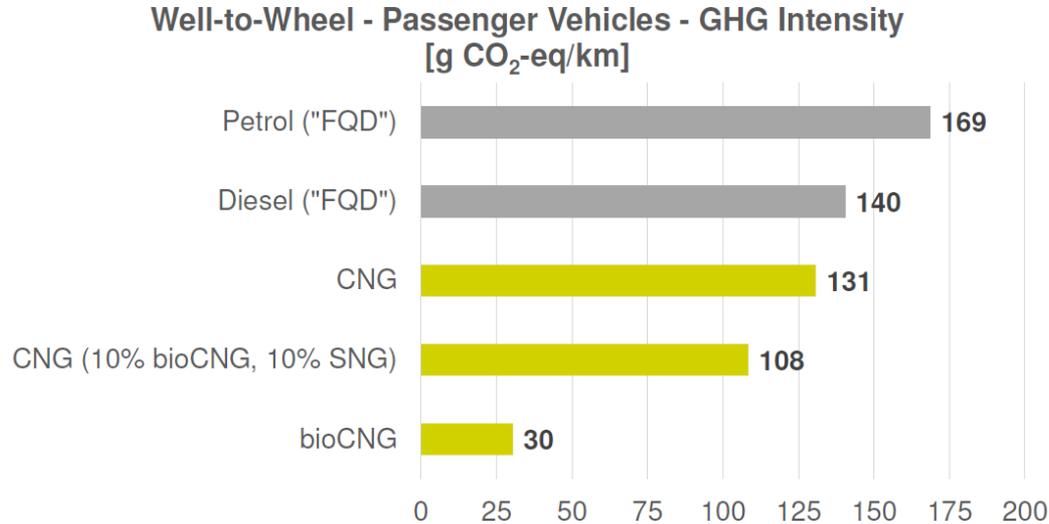


Source: "Greenhouse Gas Intensity of Natural Gas" Study- thinkstep, May 2017

- Time is short, CNG/LNG is available now
- Supply of alternative fuels are short – the dominating renewable fuel in Sweden is HVO, where our small Nordic country use a fifth of the world's production!

All alternatives are needed – both current and future ones.

And a current one could also be the future!



Source: "Greenhouse Gas Intensity of Natural Gas" Study- thinkstep, May 2017

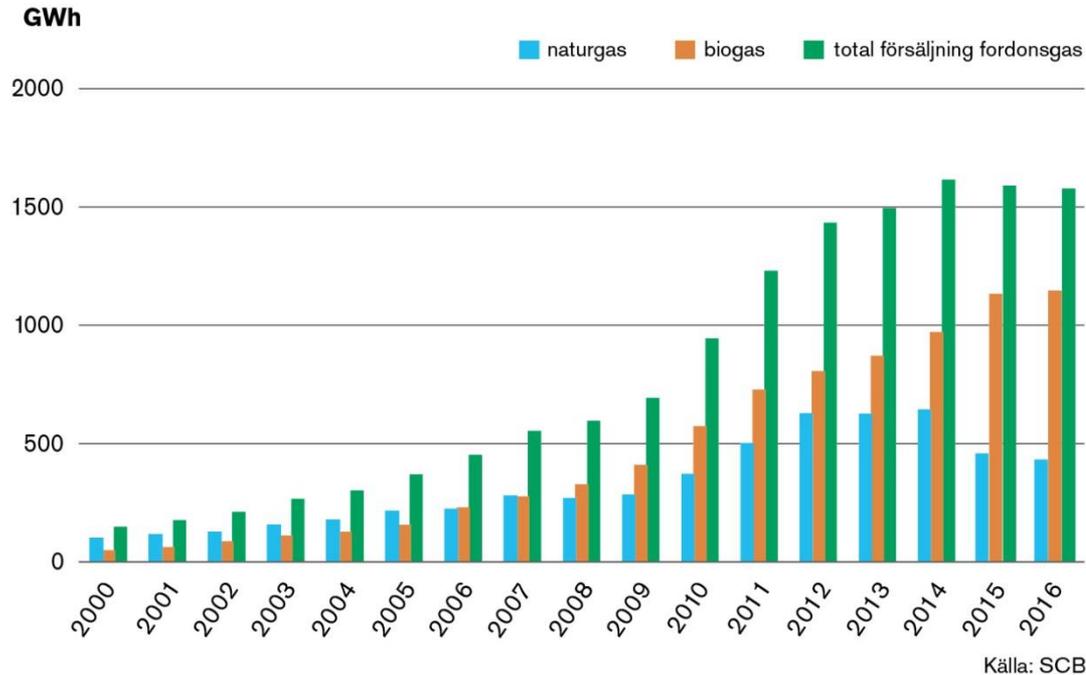
With biofuels generally being short in supply, the opportunity of replacing them is bigger if there are alternatives making use of different raw materials – not only sugar/starch/oil based plants

CBG/LBG can be made of organic wastes, straw and manure via fermentation

CBG/LBG can be made of woody residues via gasification

- CBG/LBG can be made of renewable electricity via electrolysis for easy storage

Experiences from the CNG introduction



- In 15 years the growth has been 10-fold
- In 2012 governmental policies for car incentives changed to promote BEV and PHEV, with NGV's getting the same incentives as small diesel vehicles
- Renewable gas share has continued to increase and been more than 50% since 2008
- A new policy proposed for 2018 will likely create a new push for CNG/CBG

Experiences from the CNG introduction

– lessons learned

- Incentives must be long-term
Both for ethanol vehicles and biogas vehicles the end of the period with incentives resulted in a fall-back to more fossil vehicles and fewer subsidised in the beginning
- Growth for fuelling stations is sustainable if volume is sufficient
Many smaller CNG/CBG stations still do not have enough volume to be economically sustainable.
- Fleets a key to success
Larger vehicle fleets is the natural entry market to guarantee a volume heads up – which of course is identified by other fuels as well. For CNG/CBG the key segments has been buses, taxis and company cars.



The Sweden case – policy under construction

- Bonus-malus incentive for light vehicles
Incentive system taking higher fees from less carbon efficient vehicles to be able to give bonuses for more efficient vehicles. Do not take renewable fuels in consideration – only tailpipe emissions. None for heavy duty vehicles – except a premium for electric buses.
- Reduction quotas for fossil fuels
A mandatory reduction of CO₂ in fossil fuels is proposed. Separate quotas for petrol and diesel. High blend renewables exempted until 2018/20. Beyond 2020 uncertainty prevails. Whether a quota for LNG/LBG mix could pave the way for an introduction is yet to be seen?
- Environmental zones for light vehicles
New environmental zones are being proposed to curb emissions of nitrous oxides and particles in cities. Details are still under discussion but early proposals would actually prohibit gas vehicles in the most severe zone, not directly helping the introduction of alternative fuels...



Concluding remarks

1. LNG/CNG are alternative fuels with a lower footprint than the dominating fossil fuels
2. The renewable versions LBG/CBG has the potential to be part of the long-term sustainable solution for transports
3. It is important that not only the best solution is allowed when all good solutions are needed to curb an accelerating climate effect
4. For a new fuel, policies must likely consider both the fuel, the distribution and the vehicles



Thank you!

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