



HENRIK DAHLSSON & ERIK HANSSON

HOW BIOGAS SOLUTIONS CAN MAKE OUR PLANET GREAT AGAIN

SCANIA



SCIENCE BASED TARGETS INITIATIVE (SBTI)

- Aligning corporate carbon reduction targets with climate science that recognize the importance of a carbon budget as the starting point
- Scania has committed to a 20 percent decrease of CO₂-eq customer operations by 2025 compared to 2015



SCIENCE
BASED
TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

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PARTNER ORGANIZATIONS



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THREE PILLARS FOR SUSTAINABLE TRANSPORT

THE GREEN TOOLBOX



Energy
efficiency



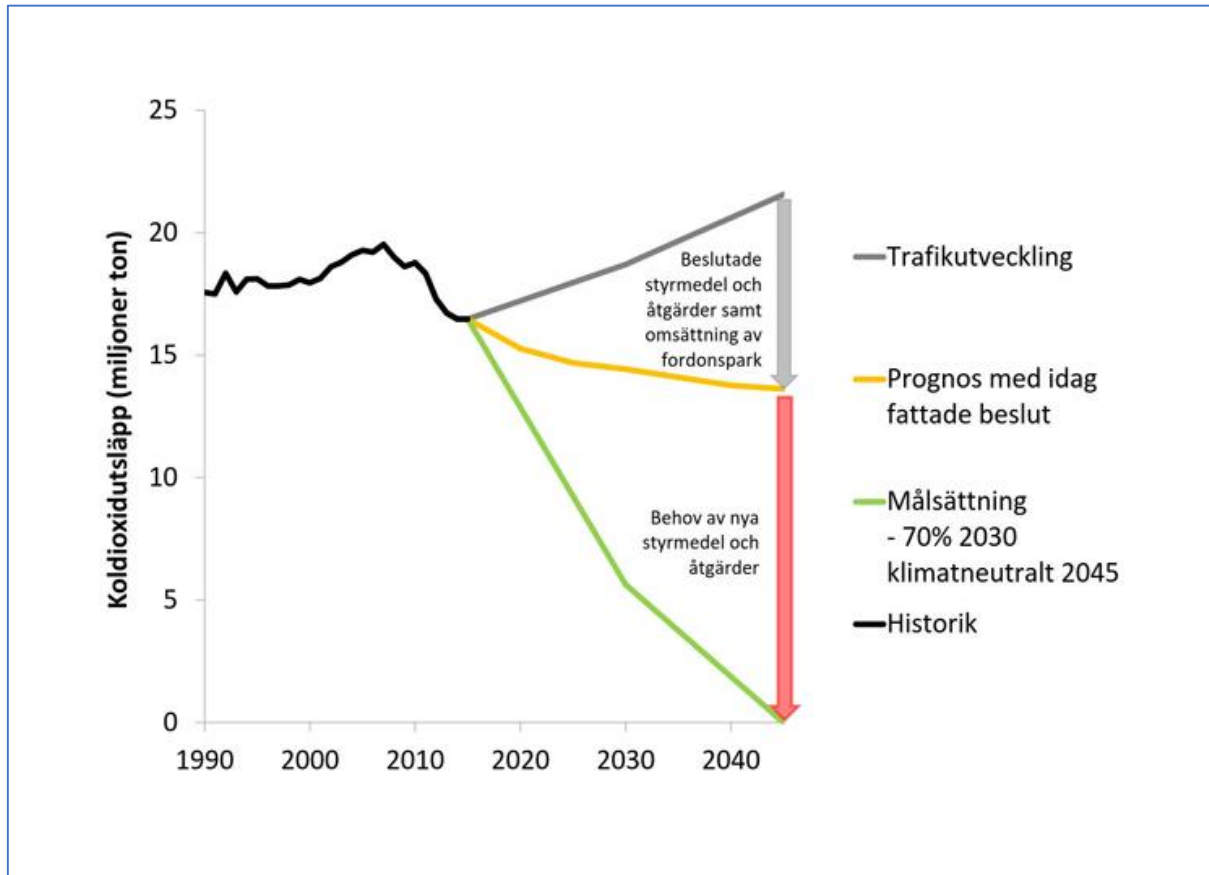
Smarter
transport



Renewable fuels
and electrification



URGENT CLIMATE REDUCTION NEEDED TO MEET 2030 TARGET

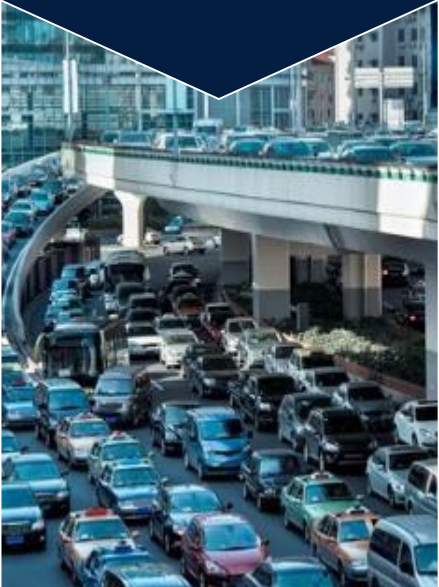


Source: Swedish Transport Administration

- Climate Law Target: 70% CO₂ reduction from road transport by 2030
- CO₂ reduction 2019: 2% (yellow line)
- CO₂ reduction needed to 2030: 8% annually (green line)
- Three actions:
 - Biofuels
 - Electrification
 - Transport efficiency

THE FIVE MAIN DRIVERS OF SUSTAINABLE TRANSPORT

CONGESTION



POLLUTION



ENERGY
SECURITY



CLIMATE
CHANGE



RESOURCE
EFFICIENCY



AN URBAN WORLD

MOBILITY DEMAND WILL TRIPLE



70%
POPULATION

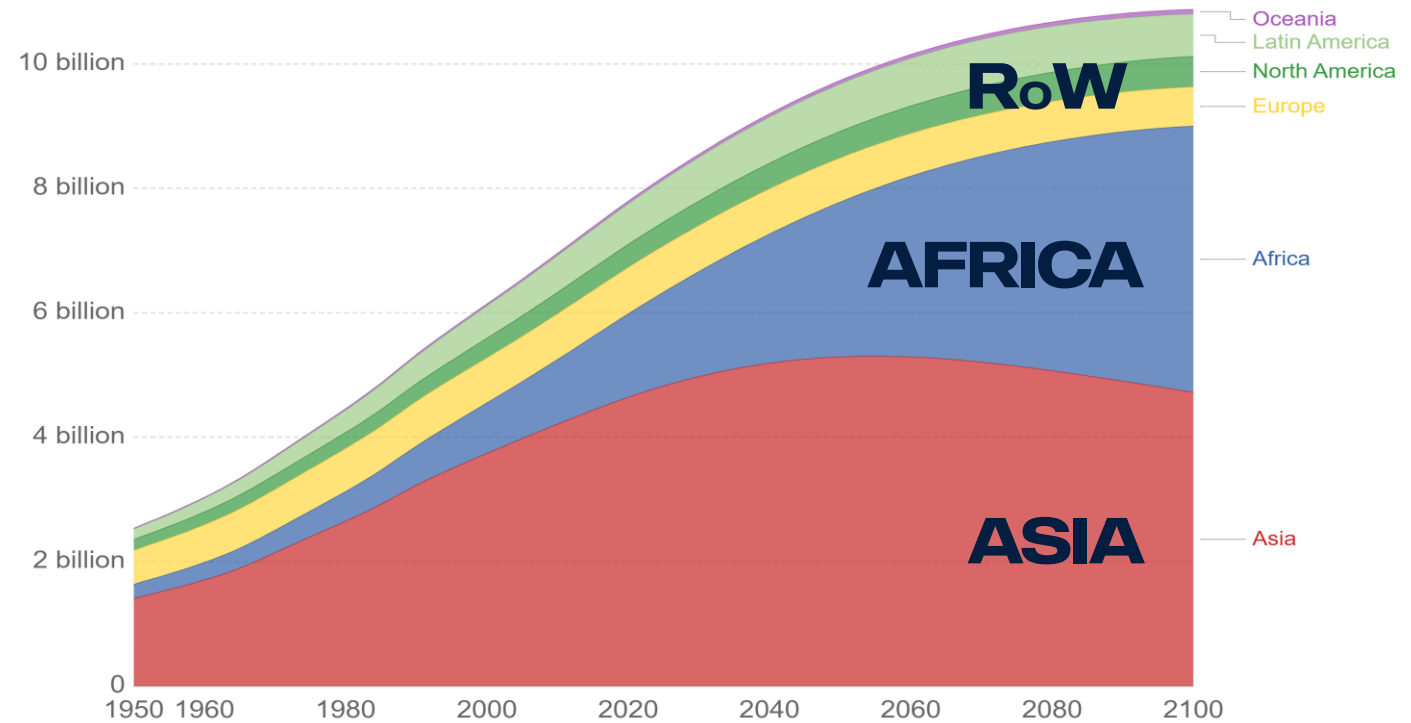
86%
GDP

80%
ENERGY USE

80%
CO₂

World population by region projected to 2100

Projected population to 2100 is based on the UN's medium population scenario.



Source: HYDE (2016) & UN, WPP (2019)

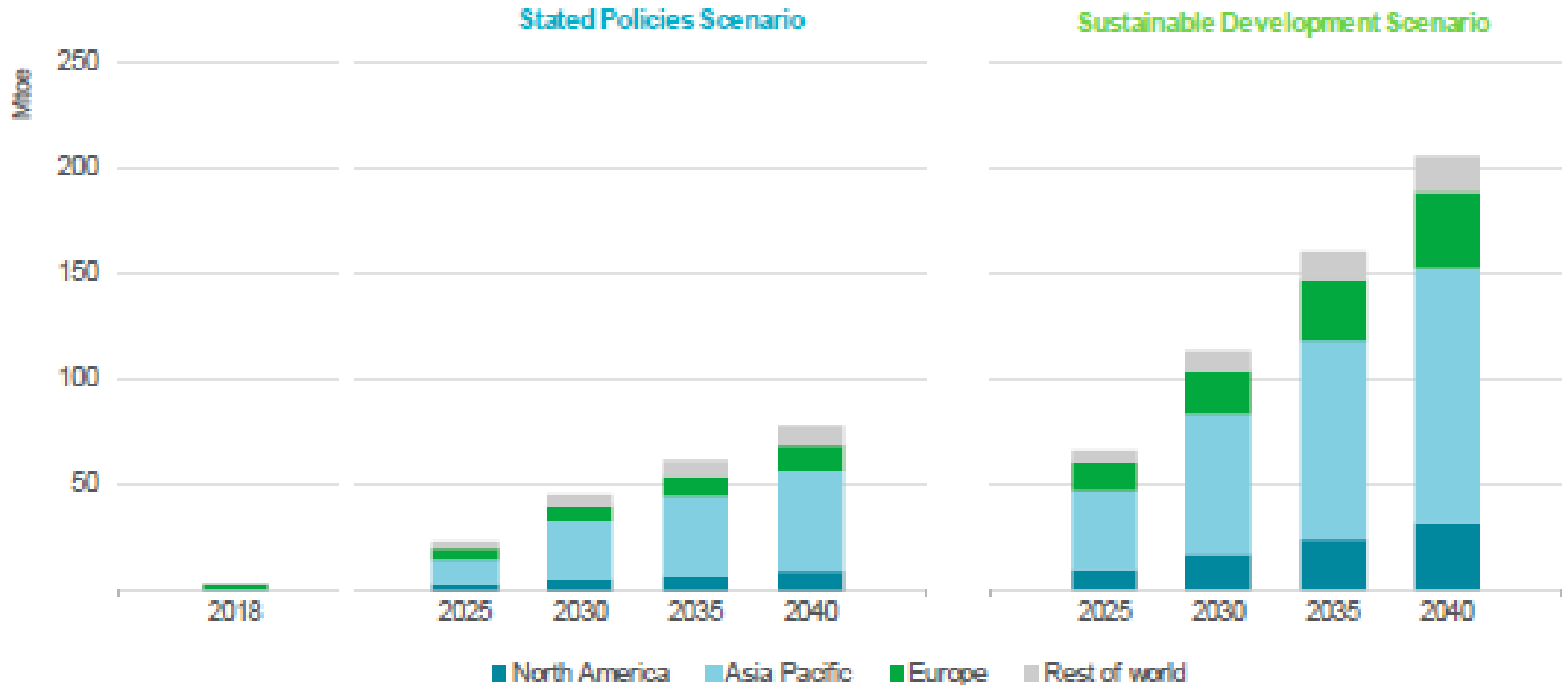
OurWorldInData.org/world-population-growth • CC BY

NEW DEMOGRAPHICS

NO SUSTAINABILITY WITHOUT SOLUTIONS FOR ASIA AND AFRICA



IEA sees that the use of biogas will increase and it will increase mostly outside Europe



FUNCTIONAL DEMANDS IN TENDERS IS KEY

VALUE FOR MONEY? AN EXAMPLE FROM THE UK



	FUNDING	BUSES	CO ₂ REDUCTION	PM REDUCTION	
CITY 1	3,3	24	559	1,1	Electric
CITY 2	4,7	110	5059	5,16	Biogas
	<i>£ million</i>	<i>Number of</i>	<i>Tonnes</i>	<i>Factor of</i>	

- 86 more Euro III-IV diesel buses replaced by clean Euro VI biogas buses in city 2 for a similar investment.
- 10x more CO₂ and 4x more PM reduced in City 2!
- Value the taxpayer's money and prioritise what is best for the people and the planet! Focus on real reductions of both local emissions and CO₂



28 August 2017 — News story

Cleaner journeys as government commits £11 million to greener buses

Bus users will benefit from cleaner and greener journeys with roll out of low emission buses in major cities across England and Wales.

10X
CO₂ cuts

4X
PM cuts

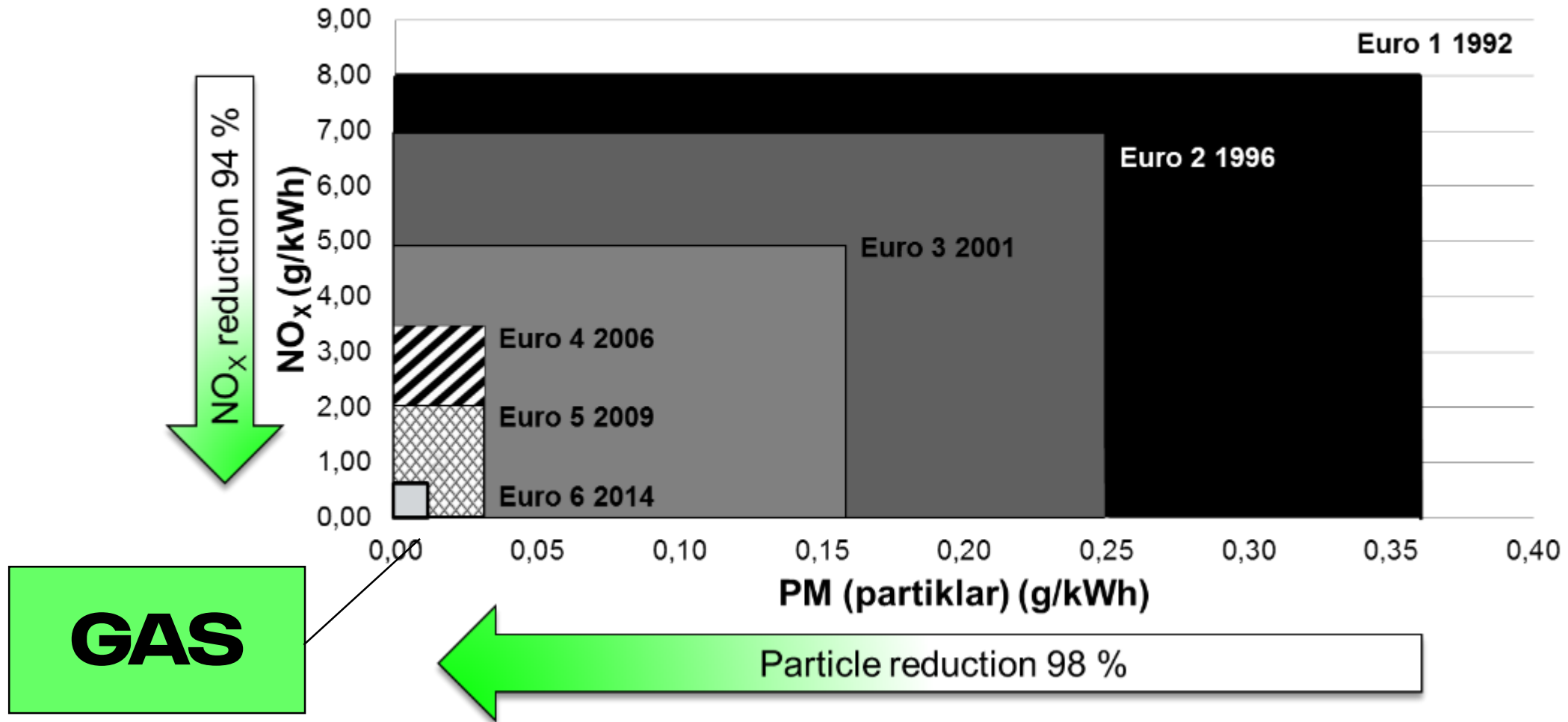


INTEREST OUTSIDE NORTHERN EUROPE

- 18 waste management facilities in Morocco – attempt to use Smart City Sweden.
- Big bus deal in Abidjan looking at 50 biogas buses – partnering with Swedfund.
- Pre-study with the world's finest BRT system in Bogota.
- Huge potential in Italian market but upgrading is a bottleneck.

INNOVATION - LOCAL EMISSIONS

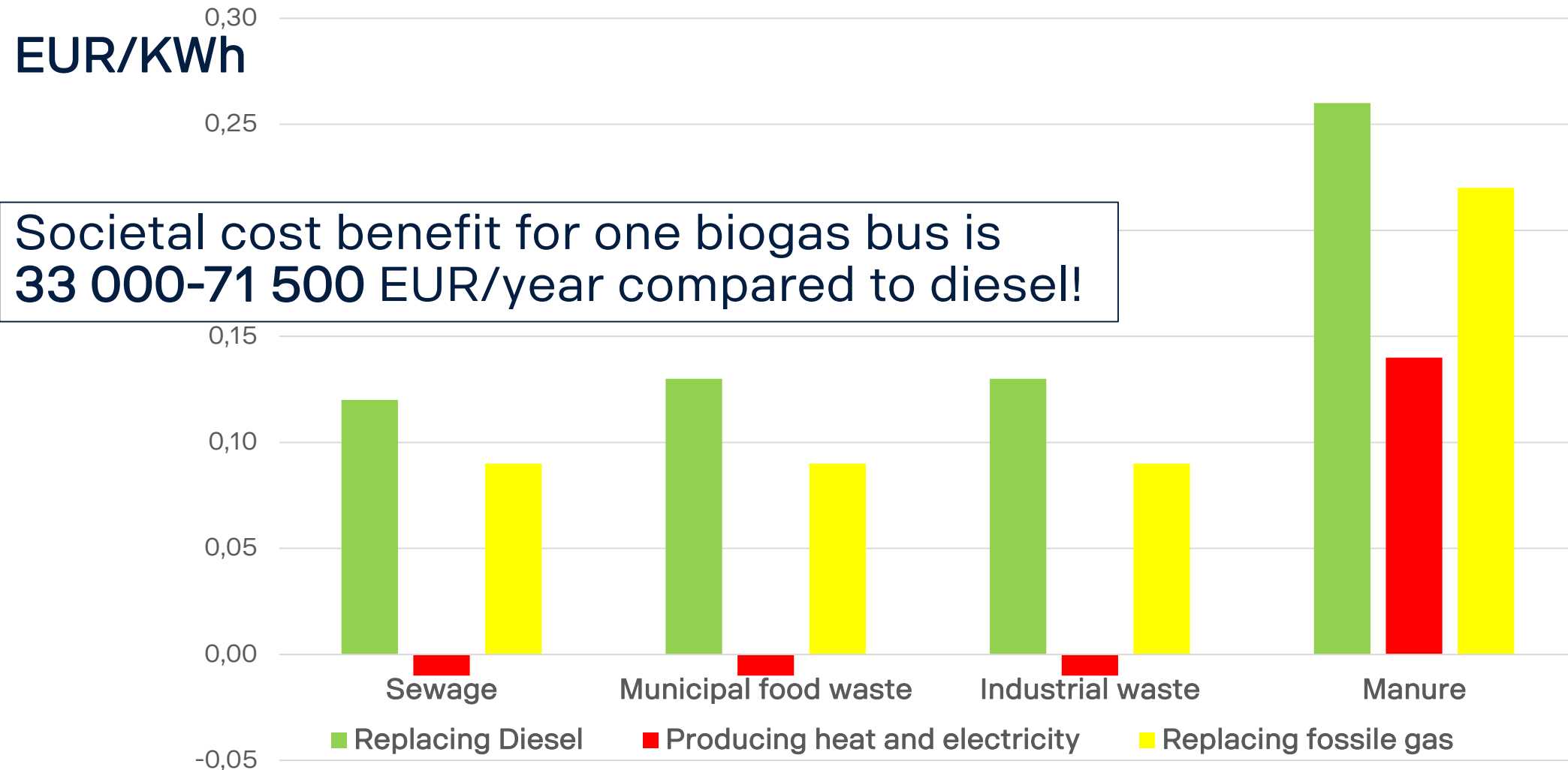
WITH BIOGAS YOU GO DIRECTLY TO EURO 6



A CLEAN BIOGAS BUS – THE BEST DEAL FOR SOCIETY



Societal cost benefit for producing and using biogas taking acidification, particle emissions, GHG emissions and overfertilization into account





BIOGAS GENERATES A LOT OF WORK

- Employment potential for biofuels is 100 times higher than for fossile counterparts. (Renner & McKeown, 2010)
- In EU it is estimated that 275,000 direct jobs and 400,000 will be created by the biogas sector until 2050 (Guidehouse Inc., 2019)
- In Sweden one bus generates one additional full time employee. (KanEnergi, 2012)
- In South Africa the figure can be as much as 2,5 full time employees. (IVL, 2015)
- ALL these jobs are local.



KALMAR – A REGIONAL DEVELOPMENT STRATEGY



<https://www.youtube.com/watch?v=cp1zq2WF0s>



KALMAR – A REGION POWERED BY WASTE

130 GWH REGIONAL BIOGAS, POWERING BUSES AND TRUCKS

LOCAL CO-OP CITIES – AUTHORITIES – BIOGAS PRODUCERS – FARMERS

LOCAL ENERGY, JOBS AND PROFITS FOR THE REGION

BIOMETHANE IN SWEDEN

- Number of vehicles 2019:
 - Total: 54 000 approx; Buses: 2 600; Trucks: 1 000; Personal cars and vans: 50 400
- Bus procurement:
 - Driving market development of biomethane historically (use 50% of produced biogas)
- More initiatives in truck market:
 - Dairy producer Arla: Production of biogas at 80 farm, set target 30% of fleet on biomethane
 - Food industry, as well as waste and recycling industry leads development



GAS INFRA-STRUCTURE AND BIOMETHANE IN SWEDEN

- Filling stations for CNG/CBG:
 - 190 public, 60 non-public.
- Filling stations for LNG/LBG:
 - 18 public, about 10 more stations in 1-2 years.
- High percentage of biomethane:
 - 94% in CNG vehicle gas mix, 100% possible.
 - 50% in LNG vehicle gas mix, 100% possible.

Source: Energigas Sverige/Swedish Gas Association



GAS ENGINES – NOTHING NEW...?



1920 Sweden - about 5-8 m³ at atmospheric pressure, similar to 5-8 litres of petrol.



Stockholm 1929



London 1939





SCANIA EURO 6 GAS ENGINES

THE MOST ENERGY EFFICIENT WAY TO USE YOUR GAS

Otto engine with outstanding efficiency

40% thermal peak efficiency

Diesel torque levels

Scania modular system – Scania quality

Less than 40 parts differ from diesel engine

Excellent service and spare part availability

All types of applications

280 hp (Bus, Truck, 1350 Nm)

320 hp (Bus, 1500 Nm)

340 hp (Truck, 1600 Nm)

410 hp (Truck, 2000 Nm)

Range 1 100-1 600 km

Other features

Less sensitive to gas quality

100% operability on 2 000 m+

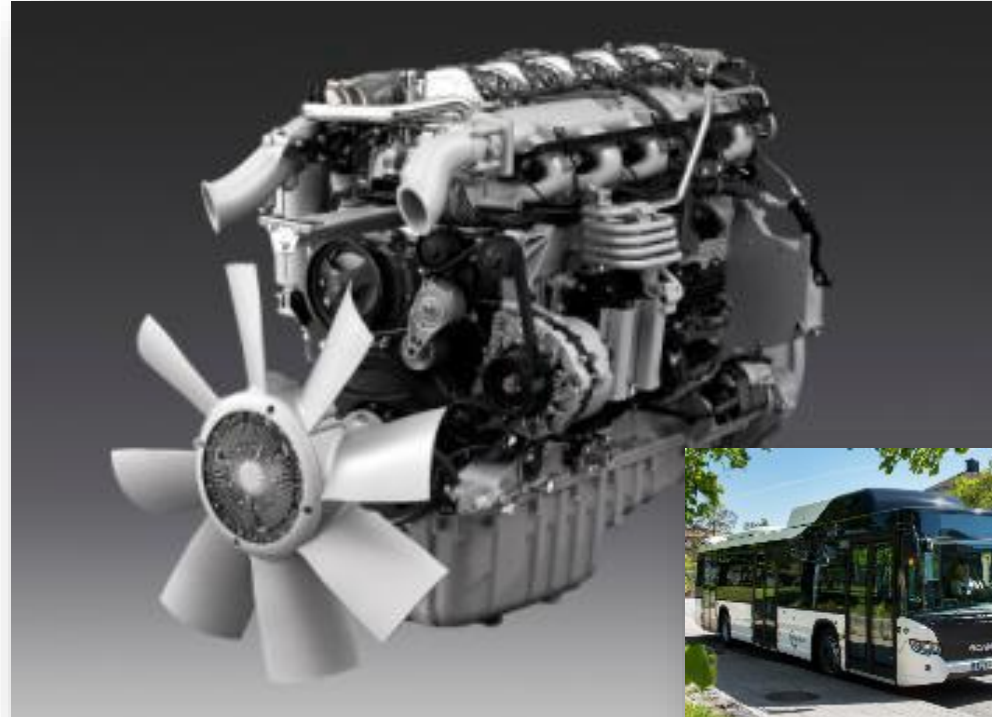
Both CNG/CBG and LNG/LBG tanks

No complex after-treatment/SCR/AdBlue necessary

Only 3-way catalyst necessary to reach Euro 6

Up to 90% CO₂ cuts with biogas (~10-20% with CNG)

Quiet – half the noise of a diesel engine.



LEARNINGS FROM SWEDEN

- Local decision makers leading the way – biogas as a regional development strategy
- Goals and political commitment – over time
- Government commission on biogas:
 - Production target 2030: From 2 TWh to 10 TWh
 - Support for production, distribution and use
- Pre notification to EU Commission:
 - Tax exemption to 2030



OPPORTUNITIES

Europe

- The infrastructure is there – use it!
- In many places there is a huge amount of waste costing money. Turn it into energy!
- Challenge – develop synergies and joint strategies to meet Corona crisis and climate challenge through EU Green Deal.

Globally

- Cheap, clean technology and more reliable than developing countries electric grid.
- Will the post-corona economy lead to increased focus on local economy, energy and jobs?
- Could be the next big swedish export – we need a "Biogas Sweden AB" for joint export ventures.





THANK YOU FOR YOUR ATTENTION

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