

26th World Gas Conference

1 – 5 June 2015, Paris, France



Natural gas and renewable gases

Sustainability of renewable gases
Economy, Environment and Society



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Presenting authors from PGC A, WG 2:

Sari Siitonen – Gasum

Milan Zdravkovic – Srbijagas

Radia Aissaoui – Credeg, Sonelgaz

Elbert Huijzer - Alliander



Agenda

- 17.15 Welcome
- 17.20 Presentation of the WG Report
- 17.45 Mattias Svensson – Energiforsk (Sw)
- 18.05 Frank Graf – DVGW (Ger)
- 18.25 David Pickering – National Grid (UK)

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PGC A.2

Sustainability of renewable gases

Sari Siitonen, Radia Aissaoui, Milan Zdravkovic





Speaker: Sari Siitonen, GASUM, Finland

Vision

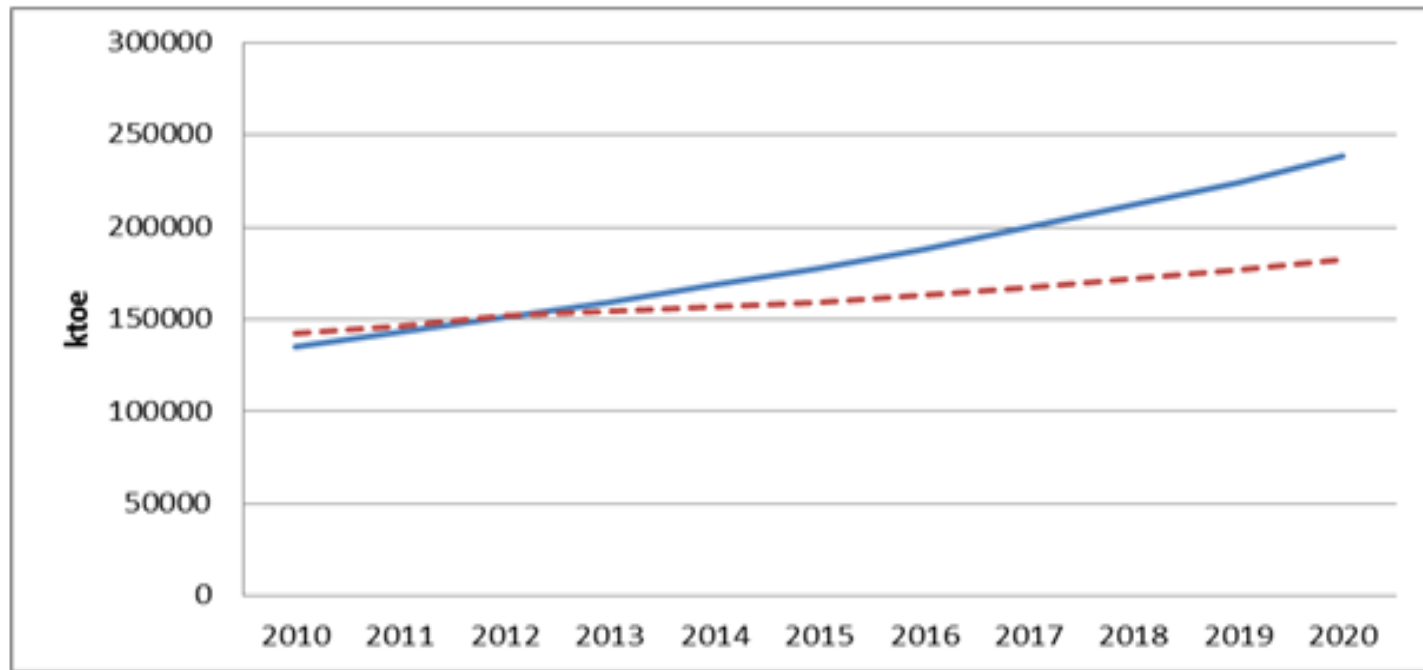


Vision

- The introduction of green gas could provide the salvation to some of the future energy solutions.

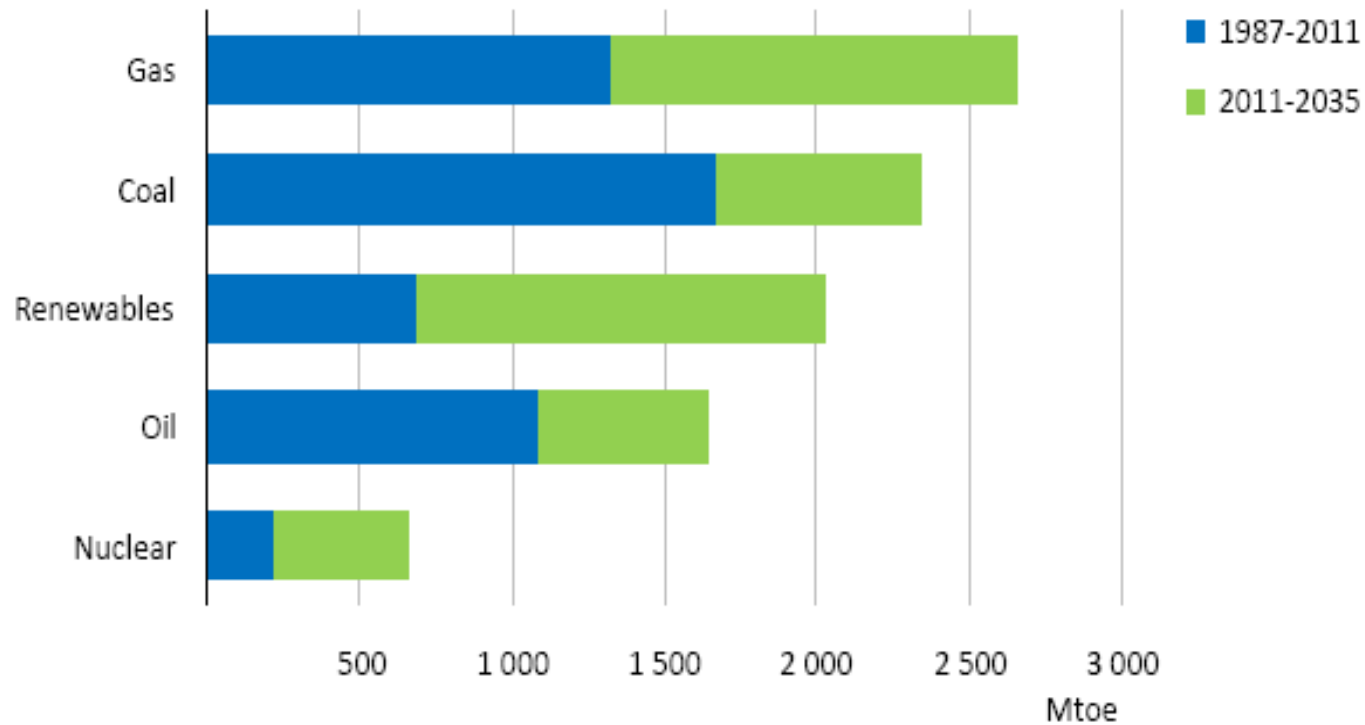


Vision



*Planned (blue) versus estimated (red/dotted) trend in EU renewable energy
(European Commission, 2013)*

Vision



Growth in total primary energy demand (Source: IEA World Energy Outlook 2013)

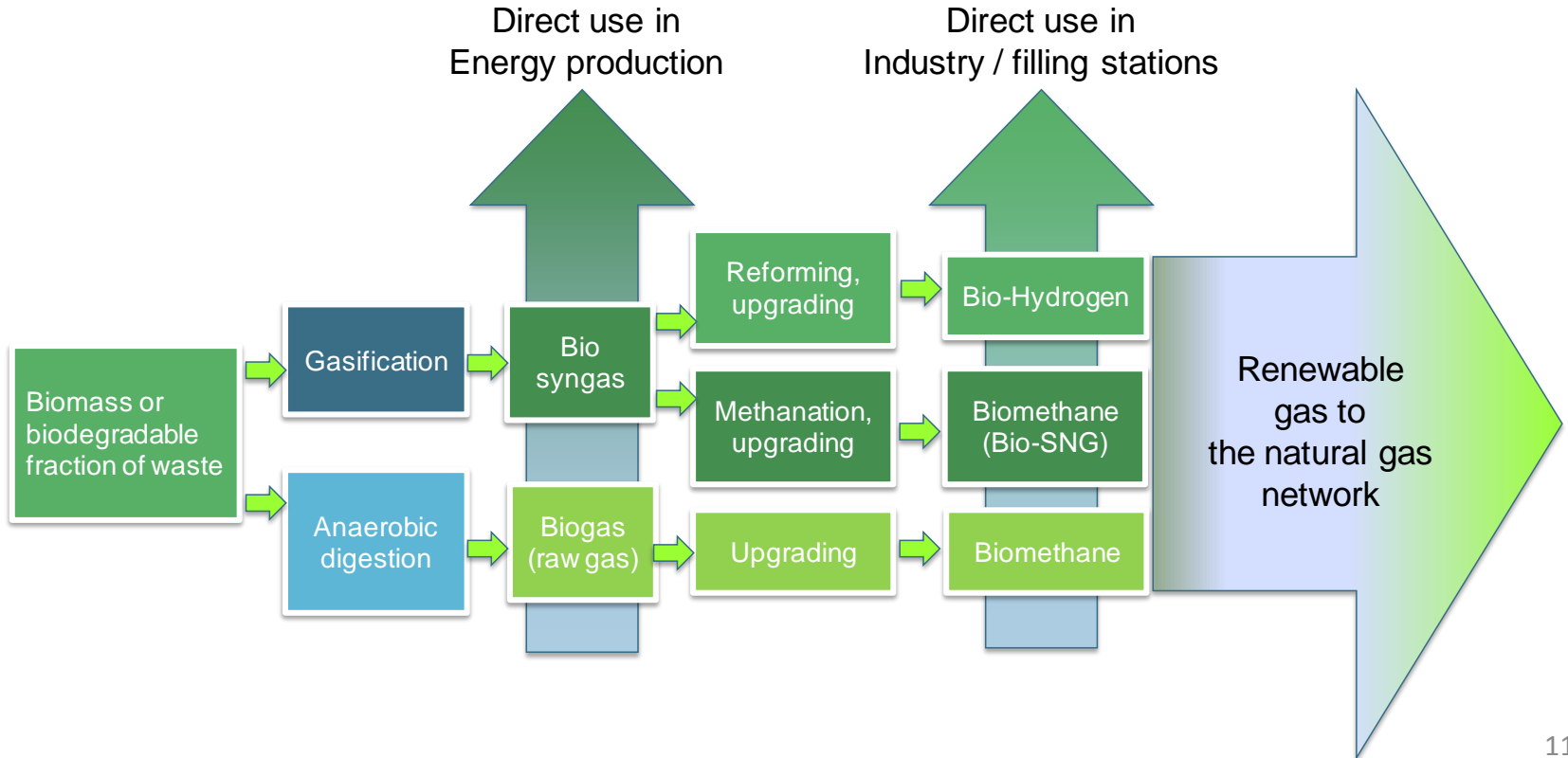
Vision

Message to the Natural Gas Transmission System Operators
to integrate renewable gas into their portfolios.

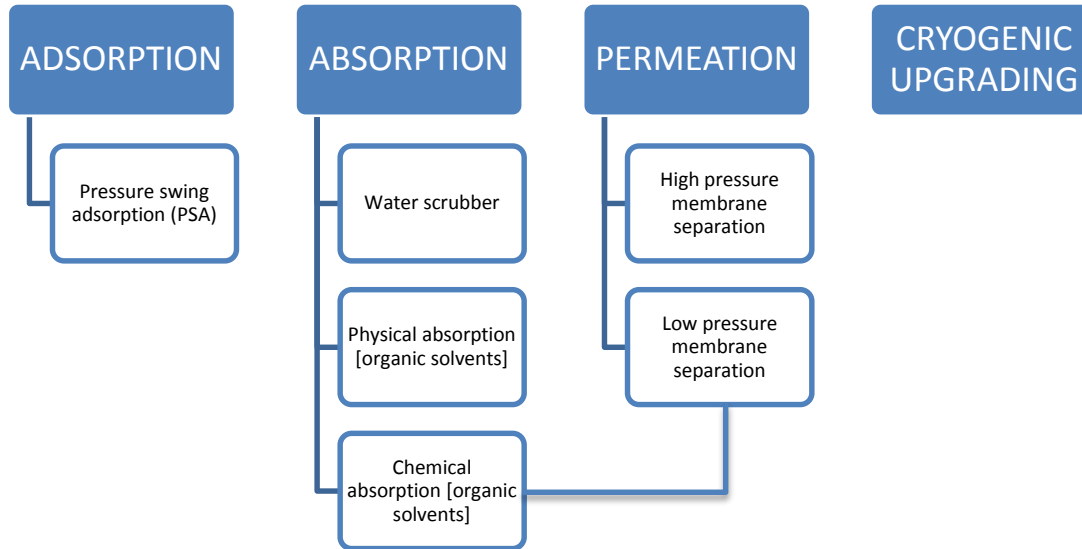


Synergy for the future

From biomass to renewable gas



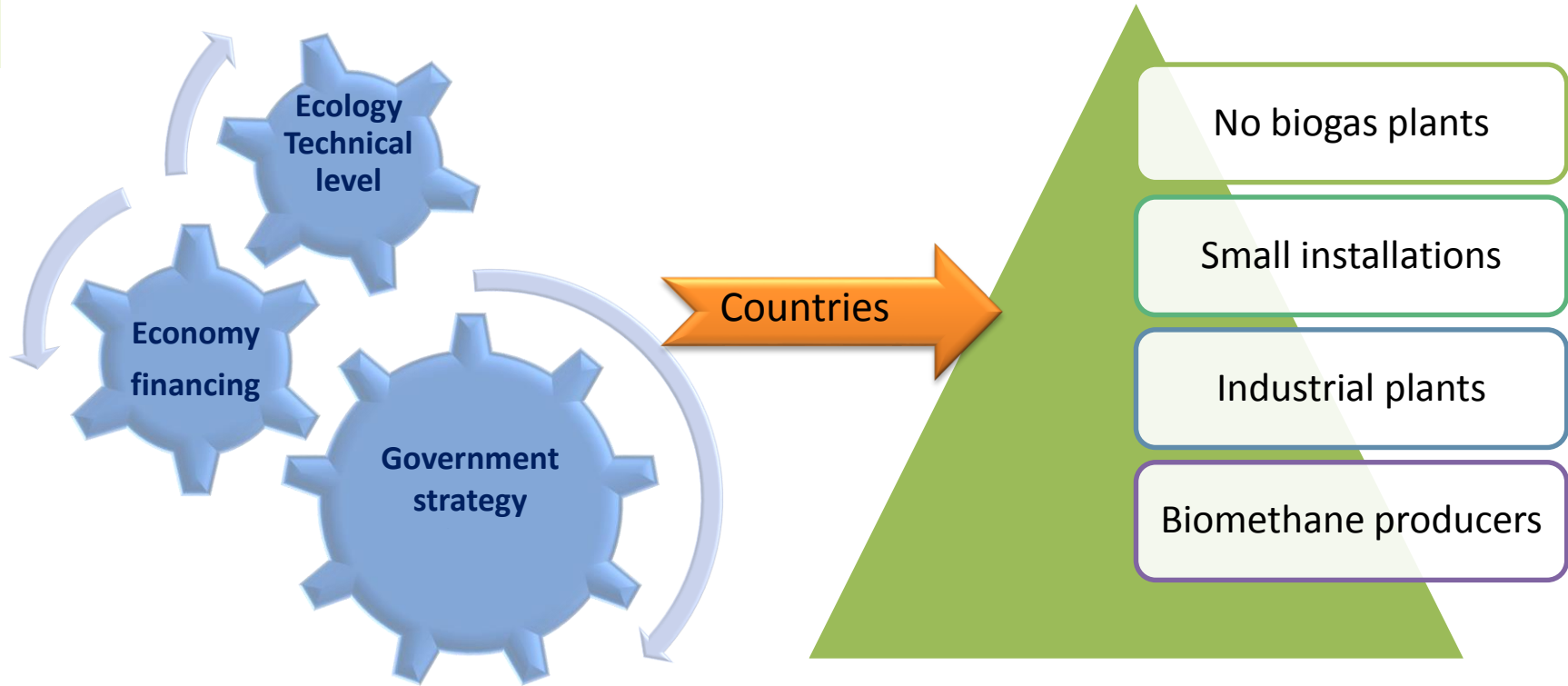
Biogas upgrading techniques



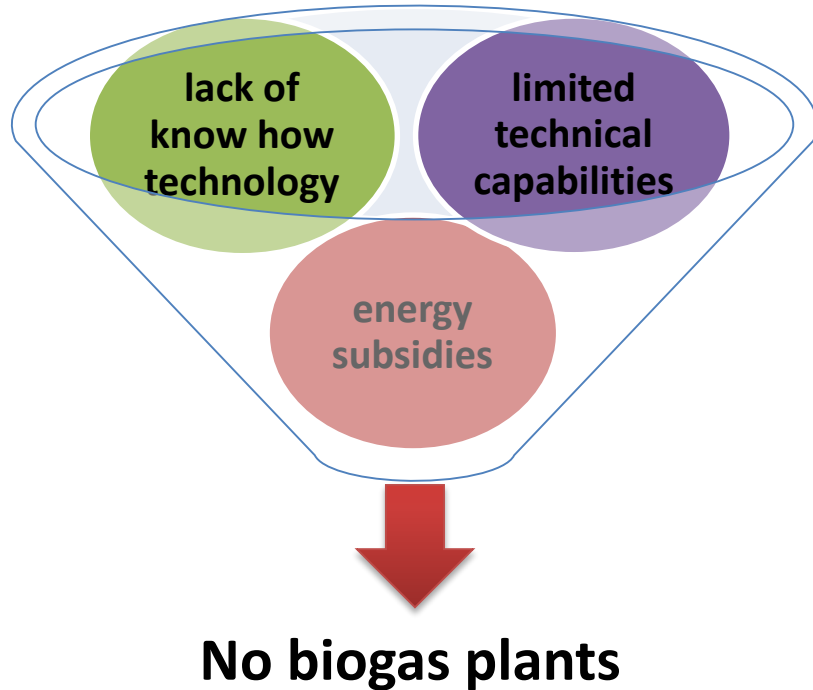
Speaker: Radia Aissaoui, CREDEG, Algeria

- Introduction
- Countries with no biogas plant
- Small and very small installations
- Small installations success
- Industrial biogas power plants
- Forerunners countries : Biomethane producers
 - Biogas resources
 - Biomethane upgrading plants
 - Biomethane use
 - Best practices

Pillars for biogas sustainable development



Countries with no biogas plant



Small and very small installations



Asian countries

Millions of family sized installations.

China starts in 1930



Latin America



Africa

(South Africa : the most successful case)

Small installations succes



Industrial biogas power plants

Convert biogas directly to heat or electricity – No upgrading plant

Good experience

Some Eastern
European countries

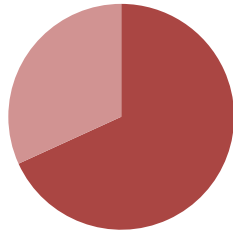
No financial incentives for biomethane

Pilot power plants

- Malaysia
- Kenya
- Jordan
- Marroco (On the way)

Forerunners countries

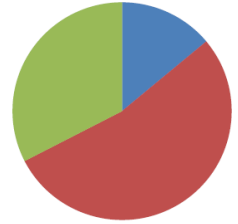
USA



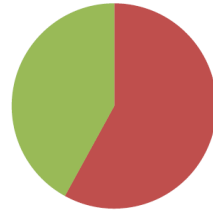
■ WWT
■



South Korea



Japan



■ Landfill gas
■ Sewage
■ Others

Biogas resource

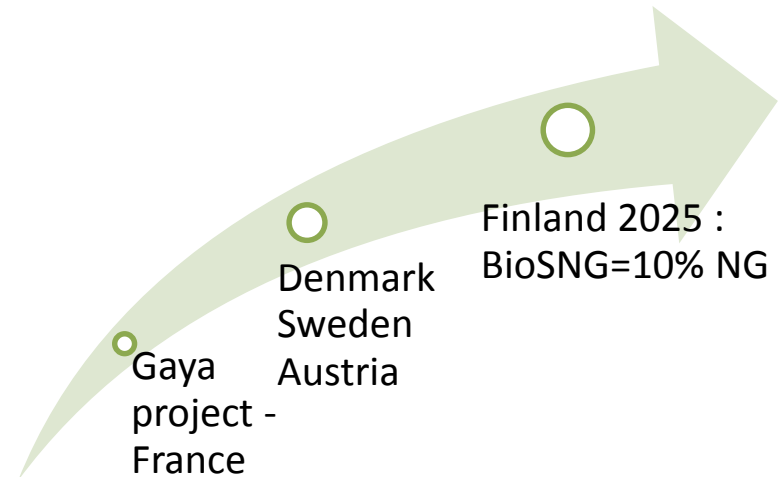
Energy crops and wood based SNG

Energy crops

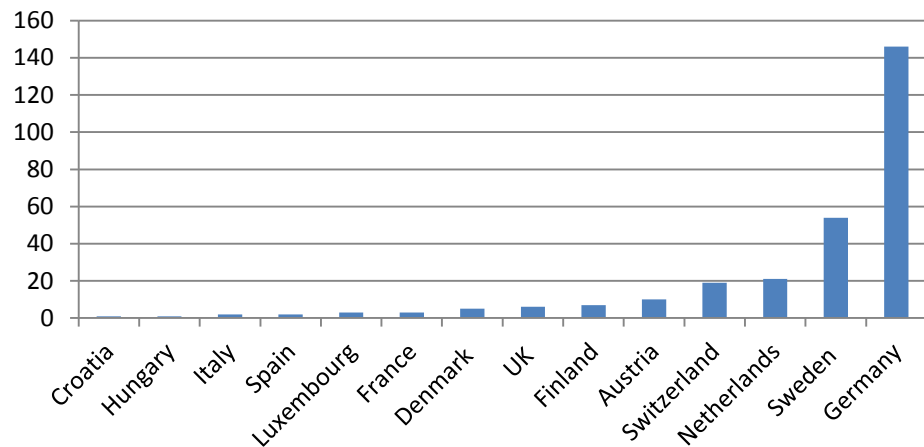
Diversify farm
income (Germany
Sweden)

EC highlight
environmental
issue

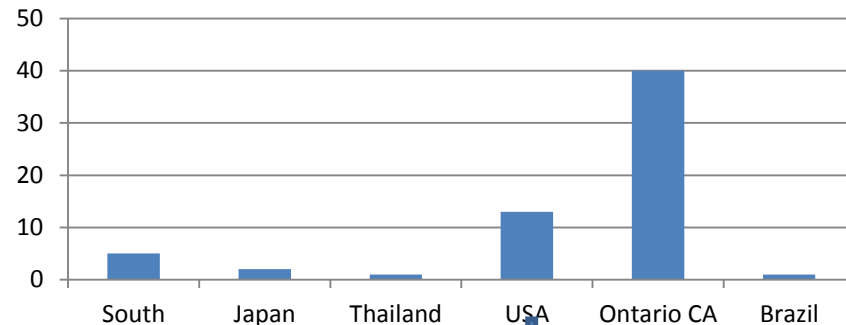
wood based SNG



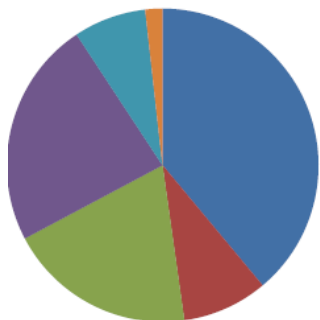
Biomethane upgrading Plants by 2013



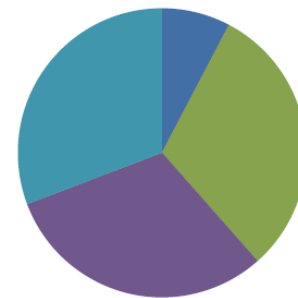
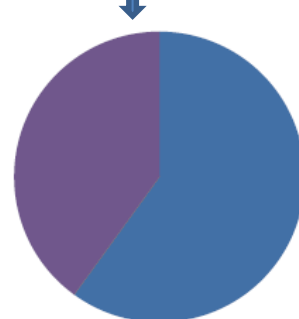
Other side of the world



European countries



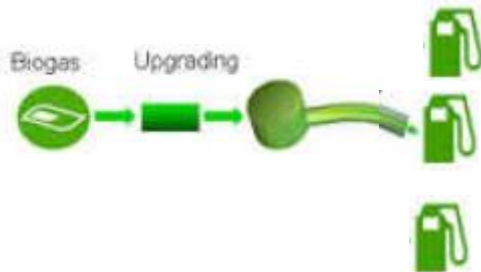
- Water scrubbing
- Organic scrubbing
- Chemical scrubbing
- PSA
- Membrane
- criogenic



Forerunners countries : biomethane use

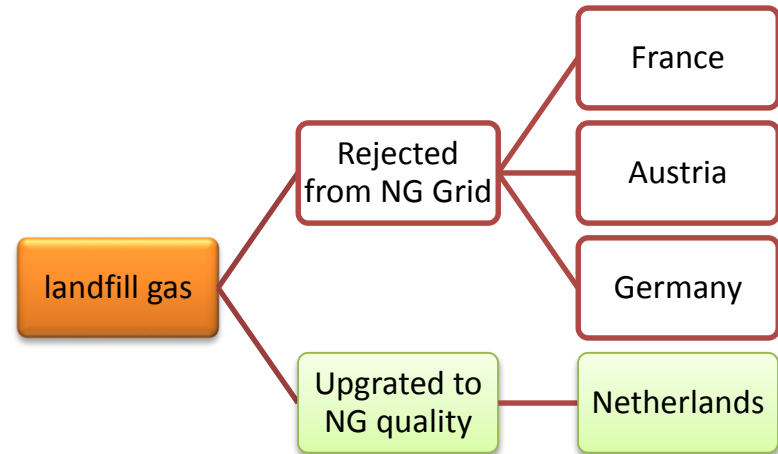
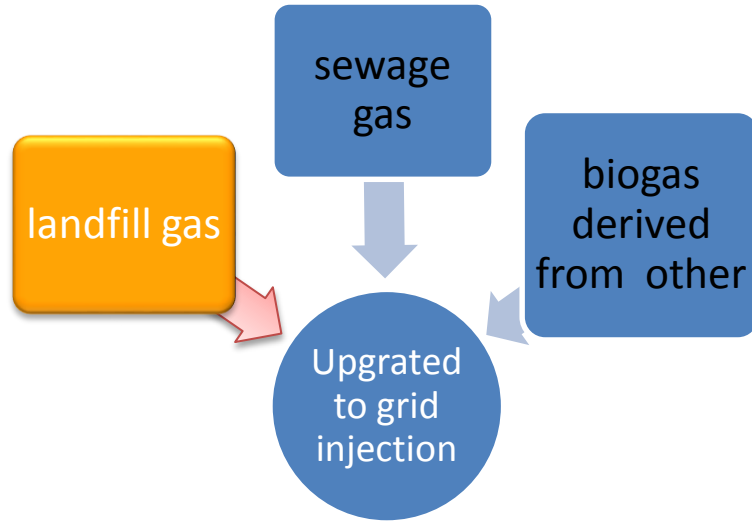


Biomethane Vehicle fuel

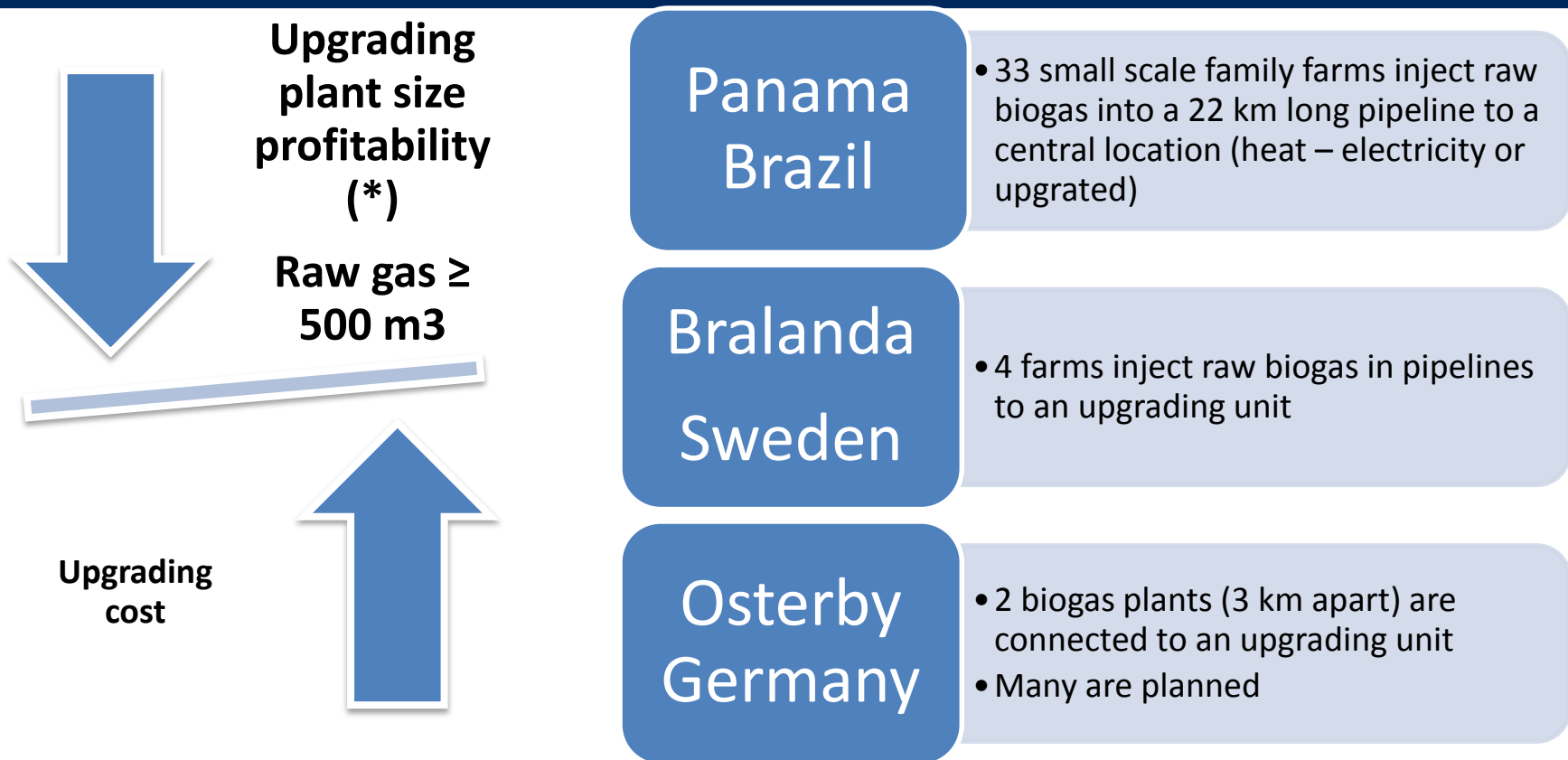


Sweden : biomethane is mainly transported in compressed state in mobile storage units but also in liquefied state and in local gas grids

Biomethane grid injection Best practice



Centralized upgrading of biogas from small scale plants



Speaker: Milan Zdravkovic, Srbija Gas, Serbia

Environmental aspects

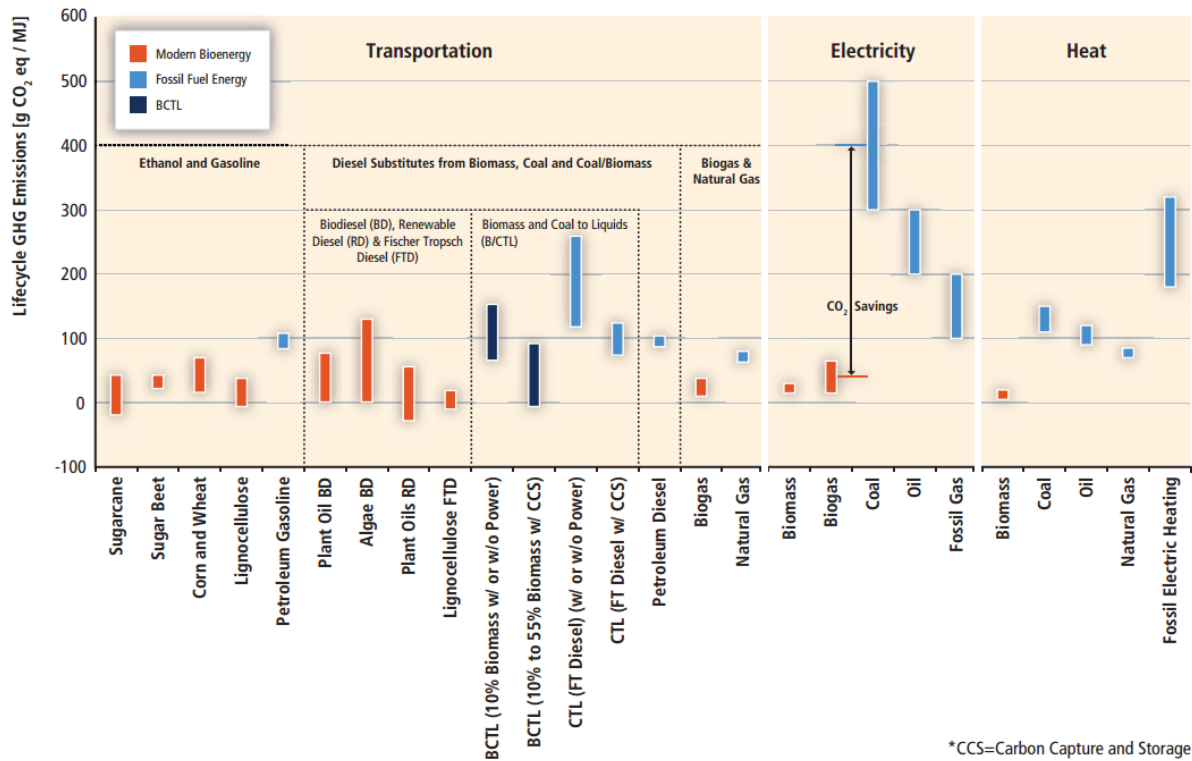
Greenhouse gas emissions indicator



- One of the most obvious reasons to use bio-energy is the decreasing effect on greenhouse gas emissions compared to fossil fuels.



Environmental aspects



Ranges of GHG emissions per unit energy output (MJ) from major modern bioenergy chains

Social aspects



Social aspects

Glocalization

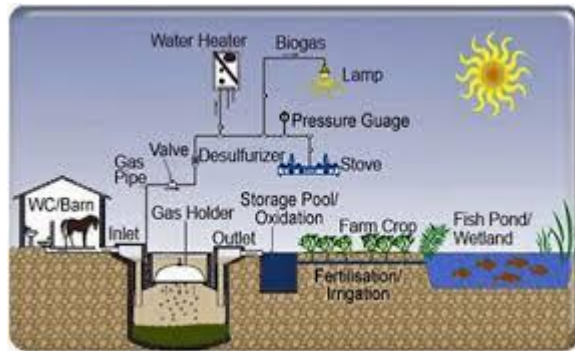


Self supporting energy neutral small communities



Social aspects

Rural areas and renewable gas



Nepal

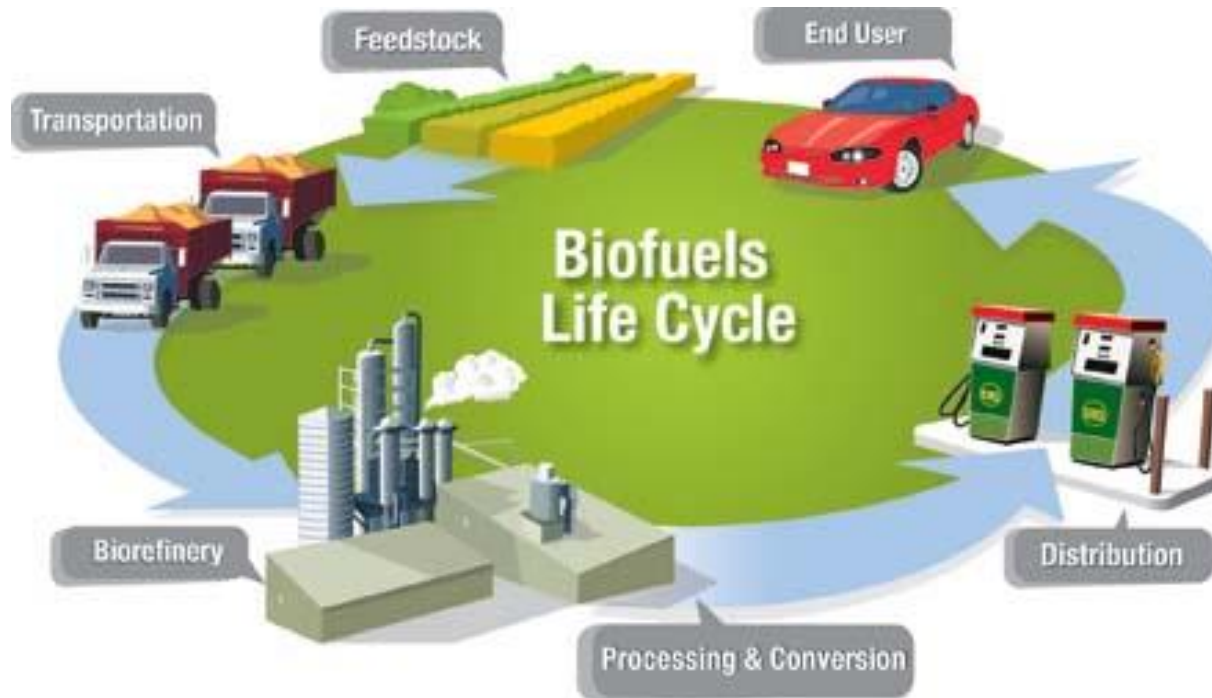
Social aspects

Improved indoor air quality when replacing firewood or kerosene



Social aspects

Employment and knowledge transfer



Conclusions

Because:

- The natural gas industry is in the position to help renewable gases to become viable, because of her knowledge and market power;
- The natural gas industry needs renewable gases to retain the position as most sustainable hydrocarbon energy source;

The conclusion is obvious:

- Stimulate, integrate and develop renewable gases as part of the portfolio in the gas industry