



# Gotland

Biogas on Gotland,  
a beginning of a way into a  
gas society.





# A year on Gotland, my home island



**Autumn**



**Winter**



**Spring**



**Summer**



# A Vision for the future

**Is it possible to create a “REN gas economy” in the future as sketched by Nobel prize winner George Olah ?** He had a vision about a society where the REN- gas is the main energy carrier. He wrote the book “Beyond oil and gas”.

**What steps are needed and is this the way to go?**

**In this presentation I will focus on production of REN-gas as energy source and the changes needed and also the situation today on my home island, Gotland in the middle of the Baltic sea.**



## **What is the situation today when it comes to sources for Renewable energy on Gotland?**

- **The potential of available farming waste is high, it can cover the demand from 50 % of the transports on Gotland.**
- **The areas for production of crops for energy are available, corn, beats and green biomass.**
- **Bro Gas AB produces 20 GWh biogas yearly, can increase to 40 GWh.**
- **Gotland has good locations for wind and solar power. Installed wind power is approximately 200 MW today. Solar efficiency like in Germany 1KW=1000 KWh**
- **Resonable concentrated CO<sub>2</sub> emissions can be found at the Cement works on Gotland – POWER to GAS ?? REN energy wind, solar etc.**

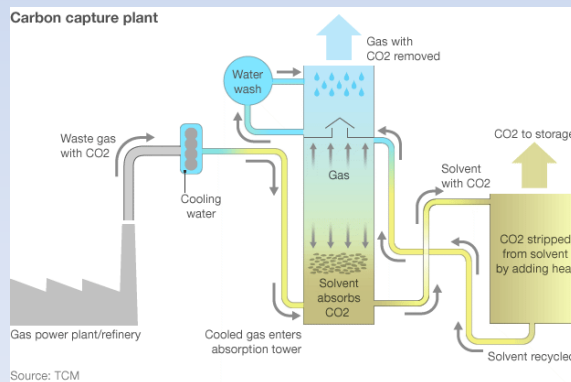
## What is needed to boost the process?

- **Political actions to enhance the incentives for a further step towards more use of biogas= methane as one energy source.** Decisions are often made and not durable over time, Ethanol came up fast but was not the best in long term.
- **Smart multi level governance to overcome bottle necks when it comes to domestic and international regulations.** A good example is the sulphur directive from 2015 for the Baltic Sea. Prohibition of crude oils and heavy diesels has created a market for new technologies like LNG ships. How about the Mediterranean and the politics ?
- **Marketing and promotion** – to the public and companies must be long term and reliable.
- **End users-** vehicles, ships and in the future even aero planes

## REMEMBER!

**The best energy is the energy (KWh) not used at all!  
Savings and more rational use of energy should always come first!**

**The future:** Energy storage has always been a problem but in the future a gas grid could be used to store excess wind and solar power by converting electricity to hydrogen. The hydrogen produced can be used for powering vehicles or used in a methanisation plant for conversion of CO<sub>2</sub> to methane. By using the CO<sub>2</sub> emission from the Cement works a big polluting source can be converted into Methane and used to propel vehicles



## The Sabatier Process:

Invented by **Paul Sabatier 1927** for which he was awarded the Nobel Prize.

**Wind power** can be used to convert electricity to **hydrogen via** electrolysis and **CO<sub>2</sub> emissions can be captured** and then turned in to **methane** using a metanisation process.

How much of the cement Industries emission is actually CO<sub>2</sub> ?

Wasted resources can be used to something good.

It is done today in test sites in but not in big scale.

Project partners on Gotland are now applying for fund to do a market analysis and a business case.



**Huge challenges lies in the future** for us to solve and effective logistic solutions without pollution of green house gases needs to be implemented. A society with a big amount of locally produced biogas is therefore favourable.

**Gotland focuses on Biogas as one source for todays and tomorrows heat production and fuel.** But we will not neglect the progress of other energy sources such as Hydrogen and Electricity. A variety of energy forms will probably be used in the future.



**Fast, smart logistic transports are needed even more in the future !**



## Biogas buses and biogas cars on Gotland



Biogas waste trucks

Filling stations are available

New gas propelled ferries are coming 2017 and 2018 for the connections between Gotland and main Sweden



Sketch of new ferries gratefully submitted by Rederi AB Gotland





**Gotland and the new cruise ship harbour which will be finalized 2018**

## **So where are we today?**

- **We have started the process**
  - **We have a political will even if more decisions needs**
  - **We have good resources when it comes to RES**
  - **We have end users**
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- **Legislation and tariffs etc. needs to be more developed**
  - **Investments from both public and private bodies are needed**



A scenic landscape photograph showing a large, gnarled pine tree in the foreground on the left, overlooking a calm blue sea. In the distance, a long, flat island with a cliff edge is visible under a clear blue sky. The text "• GOTLAND INSPIRE AND CREATE MEMORIES" is centered in the lower half of the image.

• GOTLAND INSPIRE AND CREATE MEMORIES



**Tank you for your attention!**  
**Welcome to Gotland all year!**



[www.gotland.se](http://www.gotland.se)

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