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# Challenges and innovation opportunities in the biogas industry

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IN+ GET TOGETHER

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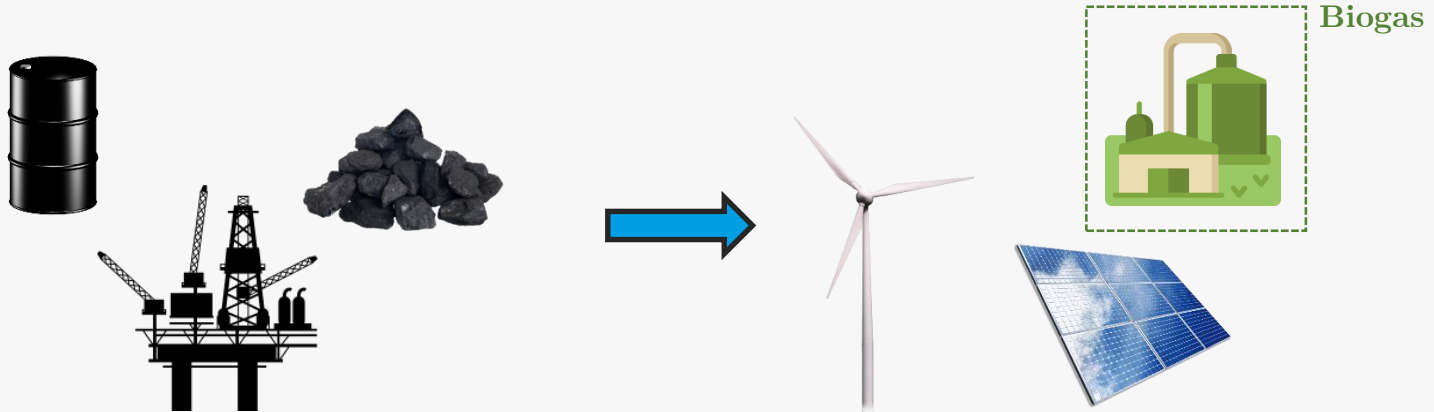


# Energy Transition

Currently the world is moving from fossil fuel towards renewable energy sources.

## Global climate target:

- limit global warming prior to pre-industrial levels to 2 °C;
- current fossil-fuel share indicate that this limit might be surpassed in 20 years.



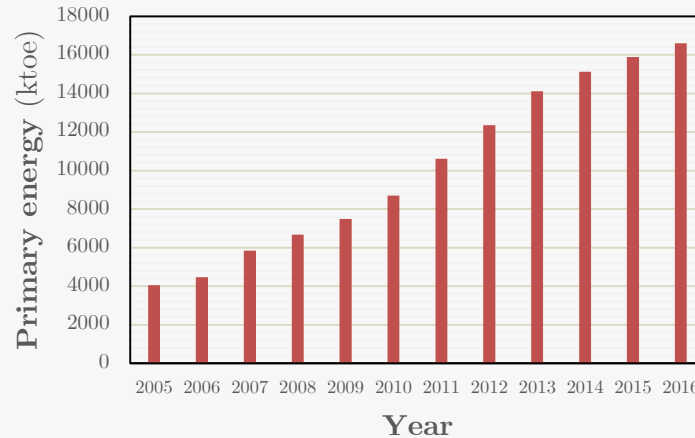
Meinshausen, Malte, et al. "Greenhouse-gas emission targets for limiting global warming to 2 C." Nature 458.7242 (2009): 1158.

A.S. Denning. Combustion to concentration to warming: What do climate targets mean for emissions? Climate change and the global carbon cycle. In Dominick A. Dellasala and Michael I. Goldstein, editors, Encyclopedia of the Anthropocene, Elsevier, Oxford, pages 443-452., 2018.

# Biogas

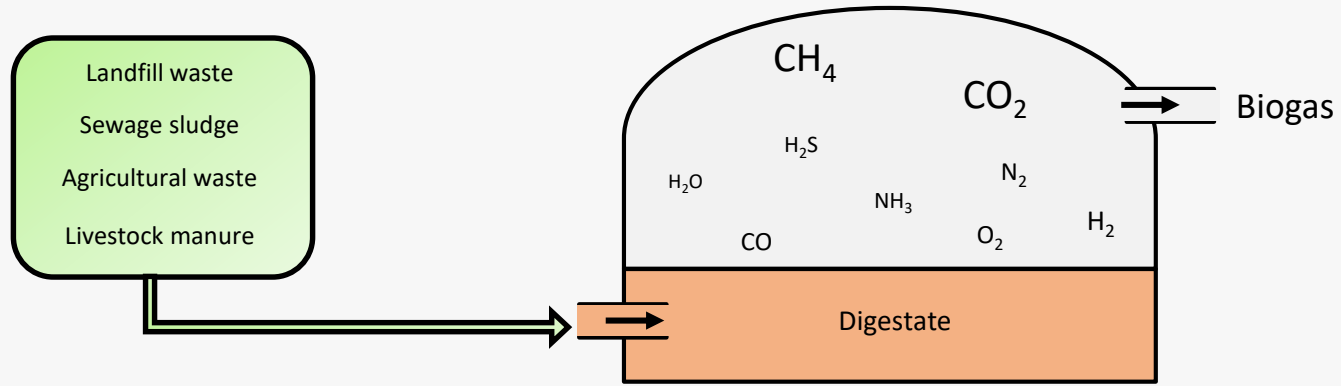
Biogas energy in the world is far from homogenous and most developments have taken place in the European Union (EU)

The **European Union** accounts for more than **half of the total primary energy** of biogas production in the world and has the most developed biogas industry.



**Fig:** Biogas primary energy production in the European Union from 2005 to 2016.

# Biogas



# Challenges & Opportunities



Organic waste for biogas production can have a **double impact on GHG emission**.



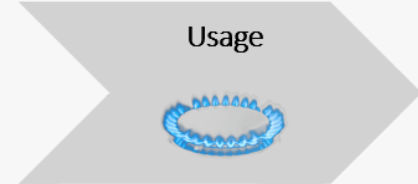
**Social awareness** for the advantages of anaerobic digestion.



**Valorization of side-products:**  
- **Digested substrate** can be used as fertilizer;



Production at a **quality level** to supply end applications in a large scale.



Use of **biogas** will be **galvanized by the growth of the NG market** (e.g. transportation sector).



**Electricity generation** from biogas is not an adequate use of its value.

THANK YOU FOR YOUR ATTENTION!

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