BIOSTRAT - Strategies for the optimal bioenergy use in Austria from societies point-of-view – Scenarios up to 2050

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Background

Biomass is the most important domestic renewable energy carrier in Austria. Bioenergy supports our transition to a low carbon economy in many ways and offers multiple benefits to society.

The capacity of biomass to replace fossil fuels in existing infrastructure and the variety of end uses bioenergy provides (e.g., for electricity, heating, and fuel for transportation), makes biomass an attractive, nationally available energy resource that can be versatile used along the pathway of decarbonization. Next to substituting fossil fuels and thus reducing GHG emissions, bioenergy and biofuel installations can act as point sources of biogenic CO_2 for carbon capture and storage or use offering the opportunity for achieving net negative CO_2 emissions.

Policy makers have a crucial role in facilitating the energy transition, through giving it priority, creating markets for sustainable, low-carbon technologies and promoting research and development.

Objective

The future role of the use of biomass for energy purposes as measure for climate protection and the decarbonization of the energy system has to be assessed in detail in order to **identify the most efficient and sustainable biomass to bioenergy utilization pathways.**

Hence, the project aim is to identify and present optimized biomass utilization pathways for 2050.

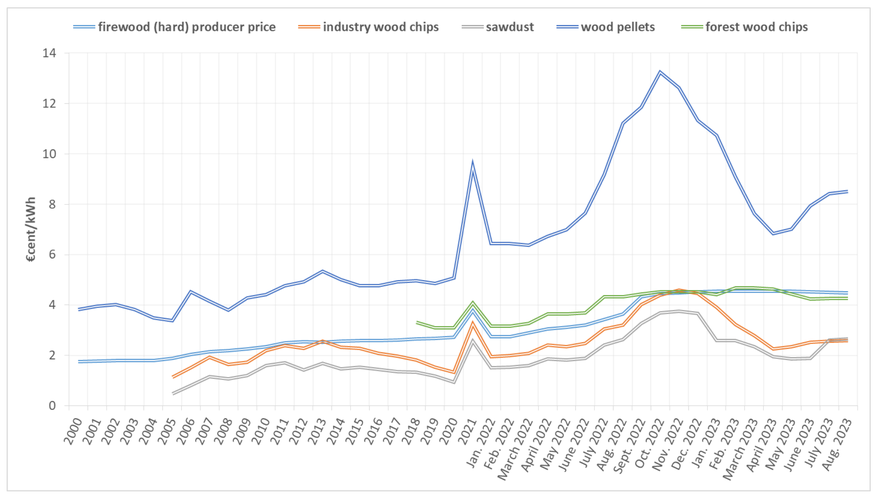
Approach

The method of approach applied is based on dynamic modelling on a yearly basis at least up to 2050. For the economic evaluation the overall costs of the individual biomass fractions are compared among each other and with conventional energy carriers as well. Life Cycle Assessment is conducted for all biomass-based energy carriers in the considered pathways in order to analyze carbon balances.

First results

Data collection and state-of-the-art review

- Literature
  - life cycle assessment of bioenergy
  - forest as carbon sink
  - economic assessment of bioenergy
- Data
  - Historic prices of (bio)energy carriers
  - Bioenergy supply and demand
  - Energy balances



Historic price data for bioenergy carrier in €cent/kWh. Own illustration.

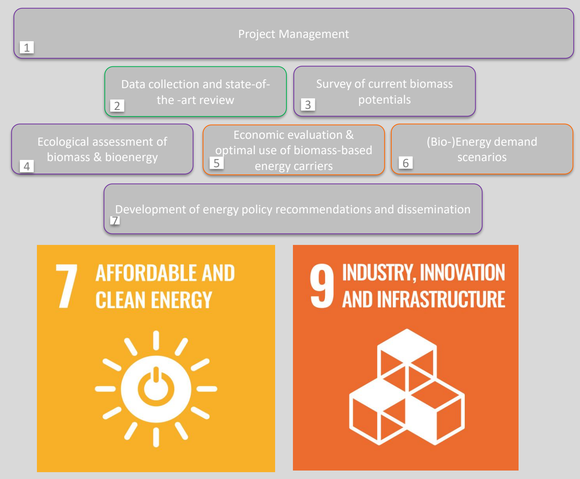
Quick Facts

Project duration: 01.09.2023 bis 31.08.2025

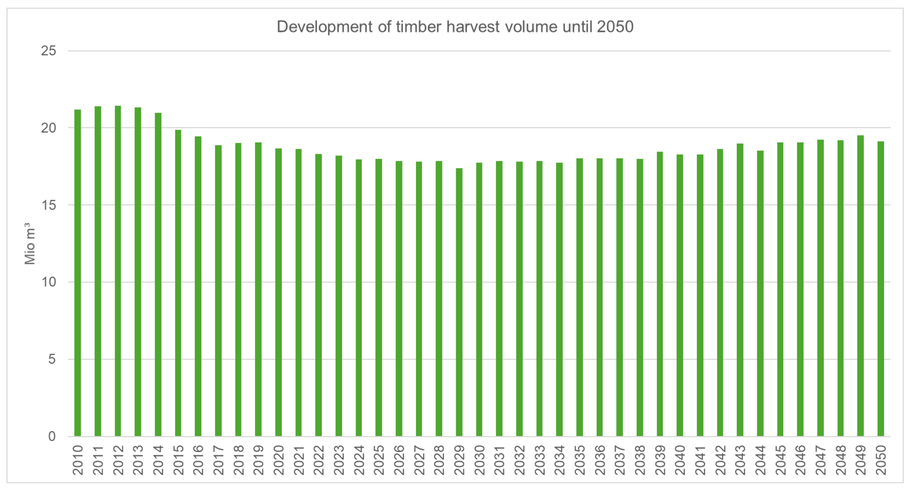
Project partners:

- BEST GmbH
- Bundesforschungszentrum für Wald
- Energy Economics Group, TU Wien
- Subcontract: Göran Berndes (IEA Task 45)

Call: 15th ACRP Call



Biomass potentials & Selected value chains



Scenario calculation for the development of timber harvest volumes until 2050 in Mio. m³. Own illustration, Data source: BFW

Biomass	Space heating	District heating	Process heat	Power	Bio-SNG	FT diesel	Biogas Power	Biogas Methan	FT diesel + BECCS
Firewood	x								
Wood chips	x	x	x	x	x				
Sawmill by-products		x	x	x	x				
Bark		x	x	x	x	x			x
Pellets	x	x	x	x					
Short rotation wood		x	x	x	x				
Energy crops			x	x					
Farm manure							x	x	
Straw									
Corn cobs									
Biogenic waste							x	x	
Sewage sludge					x		x	x	
Rejects from the paper industry					x	x			x
Post-consumer wood		x	x	x	x	x			x

Selected value chains for the economic and ecological analysis

Outlook

- Dynamic scenarios up to 2050 including
  - the economic evaluation of energy sources (incl. CO_2 costs),
  - the preferred areas of application for bioenergy sources based on biomass potentials,
  - and the preferred areas of use for bioenergy sources based on costs and possible emission savings.
- Policy strategies to gradually implement the scenario with minimized costs and greenhouse gas emissions

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