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

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ACRP24, 03.04.2024, Wien

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

**Project duration**: 01.09.2023 bis 31.08.2025

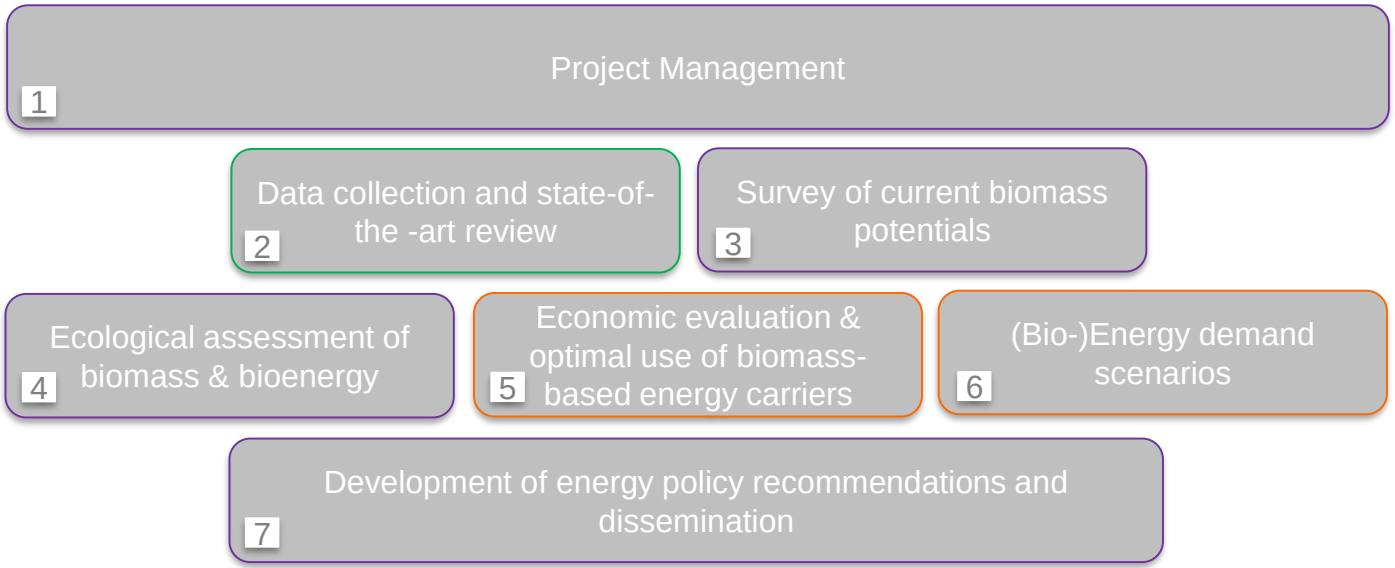
**Project partners**: BEST GmbH
Bundesforschungszentrum für Wald
Energy Economics Group, TU Wien
Subcontractor: Göran Berndes (IEA Task 45, Chalmers)


**Call:** 15th ACRP Call

**Goals:**

- …is to identify and present optimized biomass utilization pathways for 2050 by means of scenarios based on simulations, starting from the historical and current potential and cost/price developments, as well as an ecological assessment of the conversion technologies.
- **The results of this project will provide policy stakeholders with strategies in order to address the issues of tackling climate change by the decarbonization of the energy system while ensuing a sustainable use of biomass.**

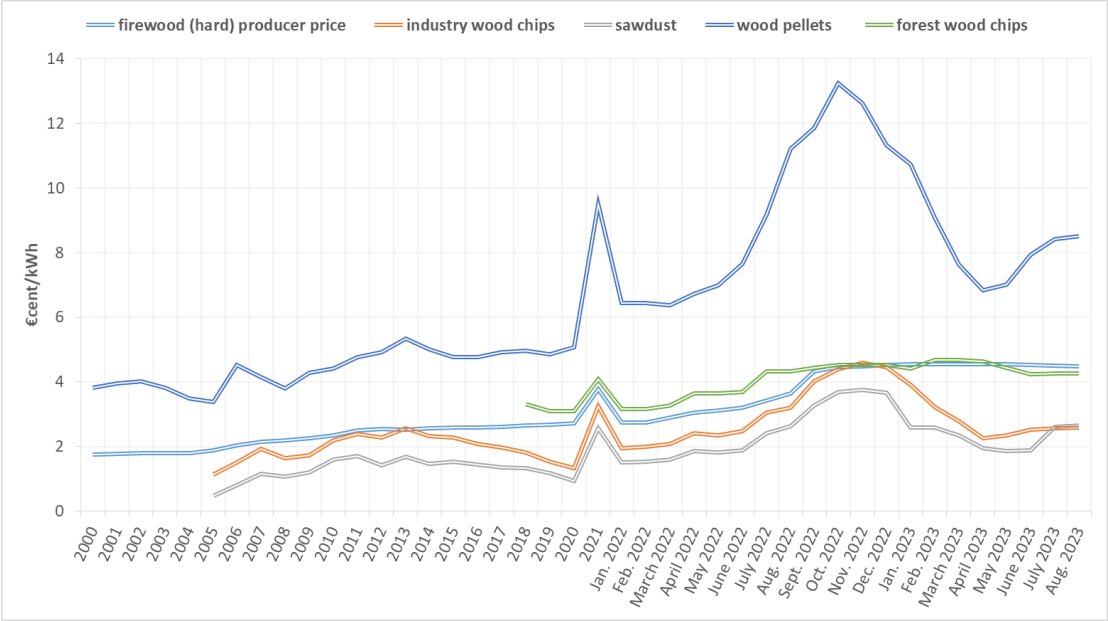
# Workplan




finalized – ongoing – not yet started

# Data collection and state-of-the-art review

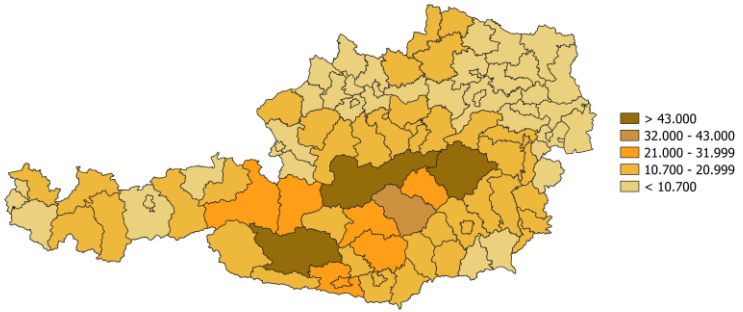
- Literature
  - Life cycle assessment of bioenergy
  - Forest as carbon sink
  - Economic assessment of bioenergy
- Data
  - Historic prices of (bio)energy carriers
  - Bioenergy supply and demand
  - Energy balances



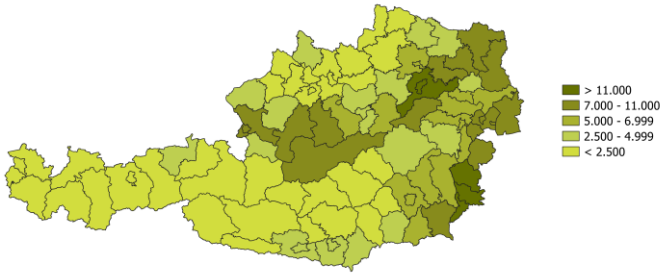

Historic price data for bioenergy carrier in €cent/kWh. Own illustration.

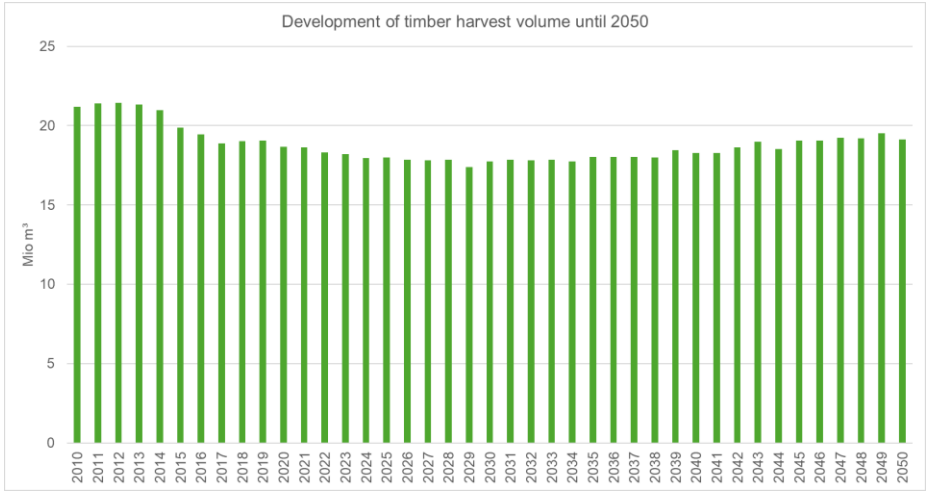
# Forest biomass potentials

Coniferous wood growing stock
in 1000 m³




Non-coniferous wood growing stock
in 1000 m³



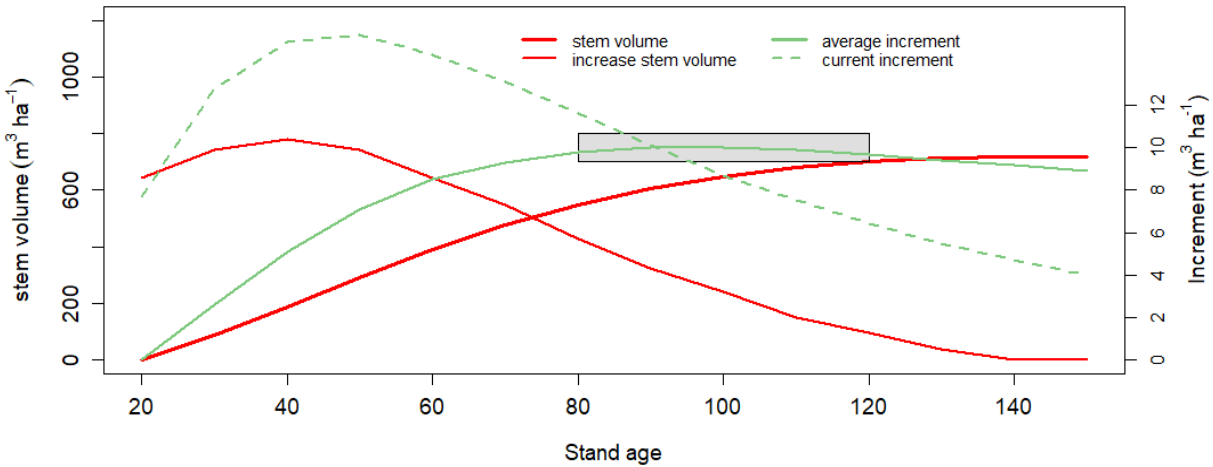




Scenario calculation for the development of timber harvest volumes until 2050 in Mio. m³. Own illustration, Data source: BFW

# Ecological assessment of biomass & bioenergy

- Effects on tree growth
  - In Europe, the general rise in temperature is likely to extend the growing season and thus increase forest productivity BUT also to cause drought and increase in calamities
- Climate-related changes in productivity will have different effects on individual species
  - In general, spruce and pine are considered "losing" tree species, as they have low drought tolerance
  - Beech, fir and oak, on the other hand, are considered more resistant

# Ecological assessment of biomass & bioenergy – the forest as carbon sink




Source: BFW. The data source is a Yield Table for Norway spruce (Fichte Bayern).

The graph shows stem volume in m3. The conversion factor for Norway spruce (specific wood density) would be around 470 kg / m3.

The conversion factor for biomass to carbon mass is 0.5

# Selected value chains for the economic and ecological analysis

| 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 |

# Outlook and Challenges

- 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

- Scenarios = “what if” analysis
- Uncertainties in the scenario assumptions, e.g.
  - $CO_2$ costs,
  - energy demand,
  - development of CAPEX and OPEX (technological learning)
  - …

# Dissemination activities

- Oral presentation - EnInnov24 - 18. Symposium Energieinnovation 2024, 14.02.2024-16.02.2024
- Oral presentation - 32nd European Biomass Conference and Exhibition, 24 - 27 June 2024
- 1st Stakeholderworkshop with NGOs will take place on 19 June 2024
- Further planned:
  - 2nd Stakeholderworkshop *(April 2025)*
  - 2 Paper Submissions *(until August 2025)*

## Kontakt

www.best-research.eu

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