The Evolution of BeWhere Austria
A shift from demand to supply side modeling

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The start: model demand side in detail
Figure 3. Number of times plant locations were selected in 1000 model runs.

Figure 4. Power production potentials and heat utilization depending on power price.
But: Competition along the whole supply chain!

*Feedstock*

*Conversion*

*Demand side utilization*

Model supply side & competing technologies with more detail
Δ Aggregated Energy Land

Δ Aggregated Food and Feed Land
Still very stylized overall picture, spatial resolution limited.

So model everything but restrict regionally...
Fig. 9. Land use (left) and annual crop production (right) in the 8 scenarios.

Fig. 10. Relative changes in producer rents and subsidies between the baseline scenarios S1–E1 and S1–E2 and the autarky scenarios.
But: No closed economies!
CAFEE

• Application of BeWhere in Climate Change context
  – Effects of climate change and agricultural policies (CAP reform etc.) on agriculture and forestry
  – Triggers which changes in bio-energy system?
  – Trade considered through trade supply curves
  – Coupling with I/O model to account for employment and GDP effects
Supply

Climate Scenarios

- Small Forestowners
- Large Forestowners
- State Owned Forests
- Joint Supply Curve
- Observed Price and Quantity
- Maximum Sustainable Yield

Graphs showing the relationship between quantity of biomass produced (TWh) and agricultural production (Mt) for different types of forest owners and climate scenarios.
Preliminary results

Provisioning

BAU

Balanced

09_residualIndustry
08_fuelwoodForest
07_residualImport
04_woodA
00_SRCAgriculture
BeWhere: Wrap Up (I)

• **Strength**
  – Modeling competition along the whole supply chain
  – High resolution bottom up representation of underlying system and representation of transportation costs => **technical limitations of bioenergy** well represented
  – Zooming into and out of parts of supply chain, depending on research question
    • Feedstock
    • Transportation
    • Conversion
    • Final product
BeWhere: Wrap Up (II)

• Weakness
  – Limited representation of overall energy system => coupling with other energy system models to derive boundaries for bio-energy production
  – Demand side reactions not endogenous => coupling with other energy system models or inclusion of elastic demand within model
  – Feedstock fundamental issue in bio-energy models => Coupling with regional or global Partial Equilibrium Models of Agricultural/Forestry Sector (i.e. GLOBIOM) to model impact of bio-energy provision on upstream sectors and to show competition for biomass uses