ClimTrans2050:

Expert Workshop, March 4th, 2016

Protocol

Umweltbundesamt

ClimTrans2050: Open source model for analysing Austria’s transition to a low carbon society by 2050 – A research plan

Project team

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# Agenda

10:30 Welcome & project overview (update) (A. Köppl)

10:45 Research Plan (Draft), short review (~10’ per module)

* Austria in the context of global emission reduction targets (P. Zebrowski)
* The physical layer of a deepened structural modeling approach
  + Functionality focused modeling of **energy-related** emissions(A. Köppl),  
    Implementation on a web platform (C. Hofer)  
    <http://5.196.4.156/en/energymodel.html>​
  + Functionality focused modeling of **non-energy related** emissions(T. Krutzler)
  + The techno-economic layer (K.W. Steininger)

11:45 Subgroup discussion  
 **Table 1**: Physical layer – energy (Moderation: A. Köppl)

**Table 2**: Physical layer – non-energy (Moderation: J. Schneider)

**Table 3**: Economic and institutional layers (Moderation: K.W. Steininger)

Discussion questions:

How do the concept of functionalities and the 3 tier approach fit into you work?

How could further model modules look like?

What data is missing for the implementation of new modules?

What data is available?

13:00 Lunch

13:45 Reporting to plenary (by table; max. 5 min. each)

Feedback round: “how this concept could impact my work?”

(Moderation: K.W. Steininger)

14:15 Outlook & closing (A. Köppl)

14:30 End of meeting

# Participants

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+ Project team

# Results of the subgroup discussions

The following questions have been provided as an impulse for discussion:

* How do the concept of functionalities and the 3 tier approach fit into you work?
* How could further model modules look like?
* What data is missing for the implementation of new modules?
* What data is available?

## Table 1: Physical layer – energy

* Fundamental problem: Missing of stocks in models
  + The interaction of stocks and flows should be at the center 🡪 changes 🡪 investment requirements need to be revealed
* Operational model should reflect all the emissions; this requires a mapping of the current GHG inventory to functionalities
* When analyzing the implementation of technologies, also the ecological point of view is crucial
* A flexible modeling approach is needed
* Also capture import and export patterns and how they might change (e.g. less demand for oil)
* The model framework should not only capture the techno-economic sphere, but also social and policy aspects
* Critical issues:
  + How do models feed back?
  + We don’t know the real changes in 2020/2050
  + How to define the transformation in current models

## Table 2: Physical layer – non-energy

### How does the concept of functionalities and the 3 tier approach fit into you work?

* Current models focus mainly on supply side – link to demand side should be via link to a global (or at least European market) model, in order to include imports and exports
* Incomplete picture if you look only at Austria
* plea for consumption based approach – “nearer” to concept of functionalities; in principle supply chain more appropriate, linkage between functionalities and inventory encounters problems
* Functionalities very important concept; activities causing emissions, activities are aggregated to sectors
* LCA – problem of allocation and weighing; could be similar for functionalities (which part is accounted to where)
* Distinction between functionalities still flexible; no conveniences yet
* Trade-off between level of detail in production and demand in a model
* Modelling experiences: How is functionality reacting on price changes? Impact on future work: More detailed reaction in modelling

### How could further model modules look like?

* Look at climate change, sustainable production, change of environmental system
* Is Autarchy more sustainable than import/ export systems? probably not – simply not realistic
* How to deal with non-nutrition agriculture and forestry (biomass to products (e.g. bio-plastics), biomass to energy)?
* Technological factors could be in analogy to the energy sector (like t fertiliser/ m2; emission per cow)

### What data is missing for the implementation of new modules?

* Dealing with uncertainties; e.g. N2O emissions 100%; how to include drastic changes, where uncertainties are higher than the actual amount
* Drastic changes: e.g. Switching to algae and insects; artificial food production
* Food sources for the future: insects, algae (start-up at Bruck/ Leitha) are more efficient than conventional food sources

### What data is available?

* GLOBIOM (IIASA) Petr Havlik (at global level, aggregated, possibly available)
* Hermann Schmidt Data on biomass, global simulation for GLOBIOM

Downside is that it makes everything more complicated

## Table 3: Economic and institutional layers

* Detailed background modules suggested 🡪 open question: how can they be linked at a more abstract level?
  + Communication tool between areas?
* Harmonized scenario assumptions are necessary
  + e.g. shared socio-economic pathways
* Functionalities are a good predictor for transition analysis
* “Behavioral” module (e.g. for mobility) is needed
* What is important is a ranking of functionalities (“basic needs”) 🡪 maybe create sub-functionalities
  + We need a comprehensive list of functionalities (e.g. for the attribution of GHG emissions)
  + Participatory approaches are needed here
* The functionality approach is rather novel for economists
* Storyline/scenarios would be a way for explorative analysis using the functionality concept
* Emphasis has to be put on the interaction of functionalities and of the three tiers

# Reflections

1. How can the ClimTrans concept impact my work?

🡪 Highlighted in green

1. What would I need to be able to make my low-carbon transition work more “effective”/ easier enabling it to be linked up?

🡪 Highlighted in blue

The following answers were given by the participants:

Impact on the way of asking questions

Impact on the perspective of looking at things

Ask: Is there another way? (even if there is a commonly applied convenient system)

Understand how current models work

🡪 how to improve them regarding the concept of functionalities?

🡪 how to link them?

🡪 do we need (fundamentally) new models

Impact on work:

- Same concept for energy, nutrition, production

- 3 tiers

Needed:

- Ideas for model feedback (technical + socio-economic)

- Ideas for realistic world 2050 (socio-economic)

1) Assessment / Evaluation of impacts on measures based in functionalities may be an interesting option

2) Changes in behavioral patterns, in preferences etc.

Definitions of functionality

🡪 link to energy/carbon footprinting

🡪 biophysical stock-flow modelling; Bridging concept

Methodology for optimal choice of correct model resolution (w.r.t. data available) and treatment of uncertainty in linking the modeling modules

Impact on work: another view on projections – not focused on production but demands

Need: Impact on national production  changes of behavior, consumption patterns

1) if mobility (goods + passengers) own functionality; if sub functionality 🡪 difficult to compare it to work in connection with projections

2) cost-benefits of low-carbon technologies in transport

If not planned yet, an explicit representation of distributional effects of climate policy scenarios 🡪 relevant for participation/institutional approach

1) Put more focus on the demand side + drastic changes

2) module integration

Being open about model assumptions

Impacts: my current activities on energy and env. Forecasting at city and regional level

Need: land use + social + health modelling impact (when , how)

Testing assumptions on topics that I do not model so explicitly 🡪 clear assumptions + possibilities of changing them

Developing policy advice/support/toolbox

Dilemma: Open code ⬄ current research finance structure

Idea: Low-carbon transition modeling hub (functionalities definitions etc.)

Credible commitment for financing this kind of modelling work (interdisciplinary)