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„ClimTrans2050"

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

Stakeholder Workshop

30. September 2015, UBA

WIFO Wegener Center UNI GRAZ umweltbundesamt PERSPEKTIVEN FÜR UMWELT & GESELLSCHAFT IIASA klima+ energie fonds

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Objective of the workshop

- **Inform about the motivation for the project**
- **Present the project framework**
- **Raise interest for extended modelling framework**
- **Involve stakeholders with respect to**
  - **The understanding of the concept of functionalities**
- **Present the web-based modelling platform**

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ClimTrans2050 project team

- **Development of an operational framework and research plan for an open source model**
- **The project team**
  - **WIFO:** Claudia Kettner, Katharina Köberl, Angela Köppl, Stefan Schleicher, Christian Hofer
  - **WegenerCenter:** Gabriel Bachner, Thomas Schinko, Karl Steininger
  - **UBA:** Jürgen Schneider, Ilse Schindler, Thomas Krutzler, Thomas Gallauner
  - **IIASA:** Matthias Jonas, Piotr Żebrowski

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Why a research plan for an open source model?

- **Policy needs guidance for long run transition**
- **Available tools to capture these processes not sufficient**
- **Application of existing economic models to the very long run faces limitations**

- **Breakthrough technologies and changes in the capital stock need to be addressed**
- **Analysis of radical vs. incremental path changes**
- **Detailed modelling of energy, emissions and economic structures – deepened structural modelling**

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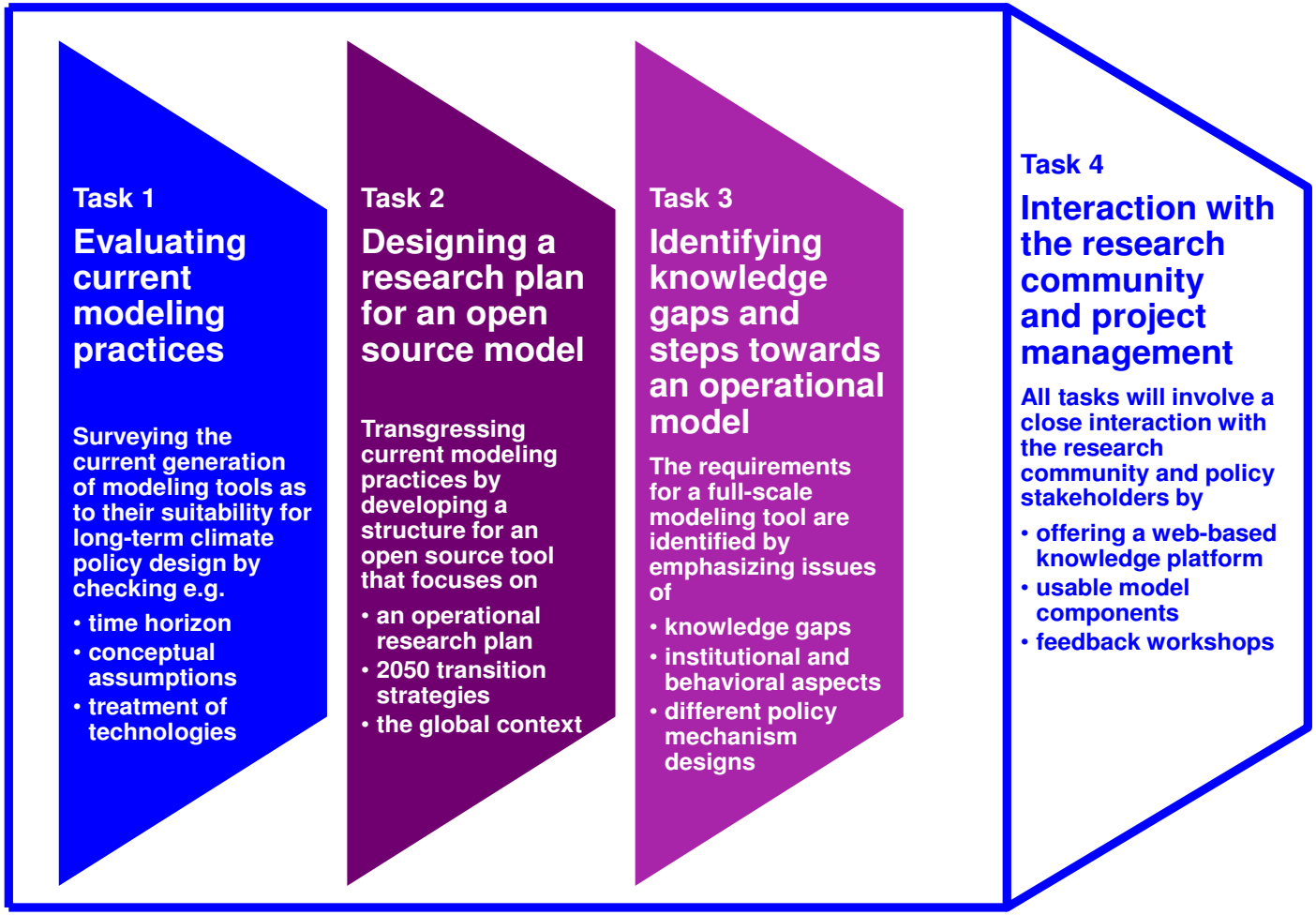
The structure of ClimTrans2050



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Work Packages

- **Work Package 1 Assessing current modelling practices**
- **Work Packages 2 to 5 Designing a research plan for an open source model**
  - Work Package 2: National emissions requirements in a global context
  - Work Package 3: From functionalities for wellbeing, to capital stocks, economic activity, and useful energy up to 2050
  - Work Package 4: Revealing the cascade of the energy system and the sources of greenhouse gas emissions
  - Work Package 5: Identifying transition options and their economic implications up to 2050
- **Work Package 6: Identifying knowledge gaps and operational steps toward a fully operational open source modelling tool**
- **Work Package 7: Interaction with research community and policy stakeholders and project management**

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Functionalities and the three tier approach

- **Functionalities (e.g. Nutrition, shelter, mobility) are generated by the interaction of stocks and flows (that are relevant for well-being)**
- **The concept contains the following elements:**
  - Functionalities aim at capturing the ultimate purpose of economic activities
  - Functionalities emphasise the interaction between stocks and flows in an economy
  - Functionalities allow to capture the impact in the investment and operating phase
  - Functionalities allow to capture details in technologies
- **The concept of functionalities is made operational along three tiers**
  - Tier 1 is dealing with the physical structure of the system that finally determines the amount of emissions
  - Tier 2: techno-economic tier (capital stocks and flows; availability of technologies, costs resulting from specific capital stocks for operating)
  - Tier 3: considers the embedding of tier 1 and tier 2 into an institutional setting (instruments, mechanisms, behavioural change)

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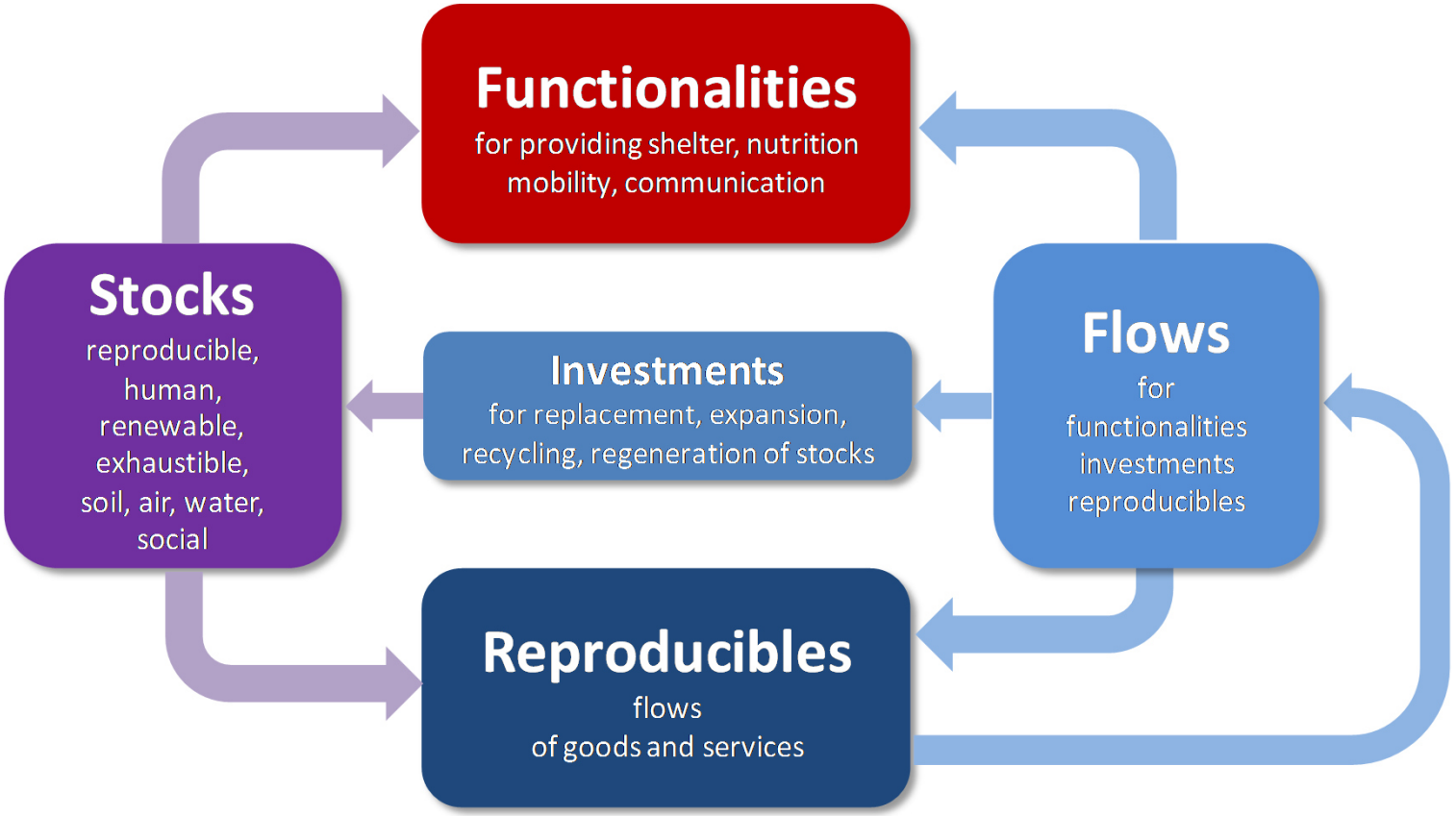
Deepened Structural Modelling for the Three Tiers Approach

Deepened structural modeling

The sGAIN approach



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Goals of the research plan for an open source model (1)

- **Develop a new perspective for modelling activities in view of a 2050 horizon**
- **Propose a modelling framework that is able to analyse transition processes**
- **Develop a new perspective on energy, emissions and economic structures**
- **Put functionalities (relating to housing, mobility, nutrition, etc.) into the centre as guiding principle for modelling**
- **Focus on stocks and flows that together supply functionalities**
- **Embed national emission target paths consistently into global context**
- **Provide a web-based platform for exchanging and disseminating relevant information with stakeholders and the research community**

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Goals of the research plan for an open source model (2)

- **Deepened structural modelling framework along a three tier approach**
  - **Tier 1: Physical dimension**
  - **Tier 2: Economic dimension**
  - **Tier 3: Institutional dimension**
- **Pilot model modules along the three tier structure as first milestones of the research steps needed for a fully operational open source model**
- **Identification and guidance for the next research steps**
  - **following the three tier approach**
- **One important research task for the open source model are the feedbacks and interactions between the tiers**

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What could this mean for the energy system

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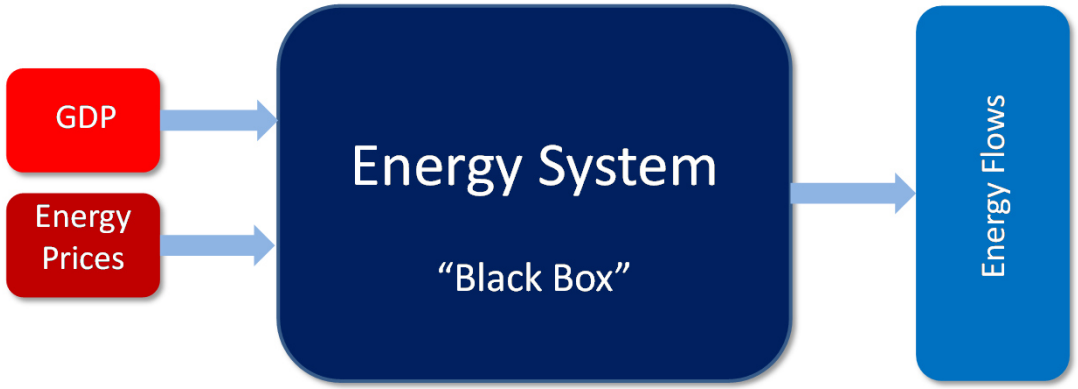
The energy System: The conventional "black box" approach

- **Presumed causalities between economic activities/prices and energy flows**
- **Typically poor representation of technologies, behaviour**



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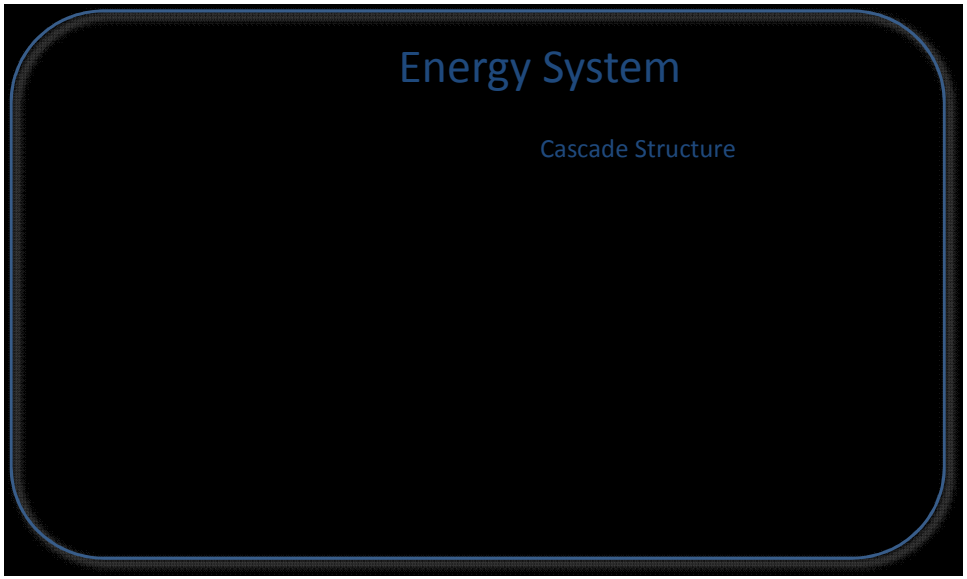
A deepened structural modelling of the energy system

- **Modelling the whole energy chain**
- **Starting from functionalities provided by the interaction of stocks and flows**



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Summary of the potential merits of ClimTrans2050

- **Developing a research plan for a new modelling perspective in view of a 2050 horizon**
- **An open source approach should generate synergies within the research community**
- **National emission target paths consistently embedded into global context**
- **Providing a web-based platform for exchanging and disseminating relevant information with stakeholders and the research community**

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Thank you for your attention