Modelling behaviour in TIMES-VTT scenarios

ETSAP workshop on human behaviour
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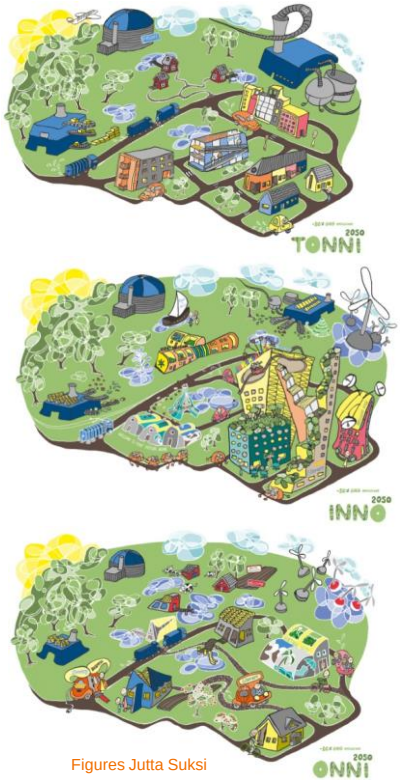
Three low carbon storylines – Tonni, Inno, Onni*

Different assumptions on Finland's economic and community structures, on new technology RD&D, energy behaviour, etc.

- The work for low carbon societies started around 2010.
- The scenarios represented alternative GHG reduction pathways.
- Already then we tried to formulate storyline "Pommi" (e.g. bomb) with a economic collapse or serious geopolitical problems but didn't succeed. Until now, we have succeeded to create "stagnate" scenario for Finland with 50% lower GDP growth.

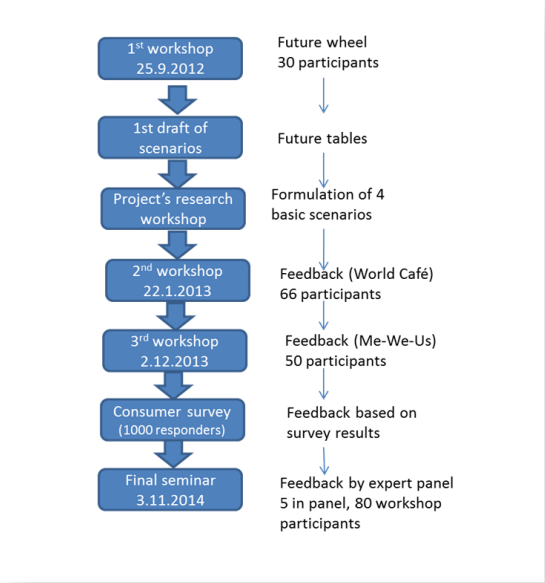


Figures Jutta Suksi

*The names "Tonni", "Inno", "Onni" are words in the Finnish language. "Tonni" means tonne (ton), "Inno" is derived from innovation, whereas "Onni" means happiness

From low carbon roadmap 2050 to low carbon strategy 2050

Example of roadmap process



Four alternative pathways up to 2050 with alternative assumptions on human behaviour:

1. **Growth**
2. **Stagnation**
3. **Save**
4. **Change**

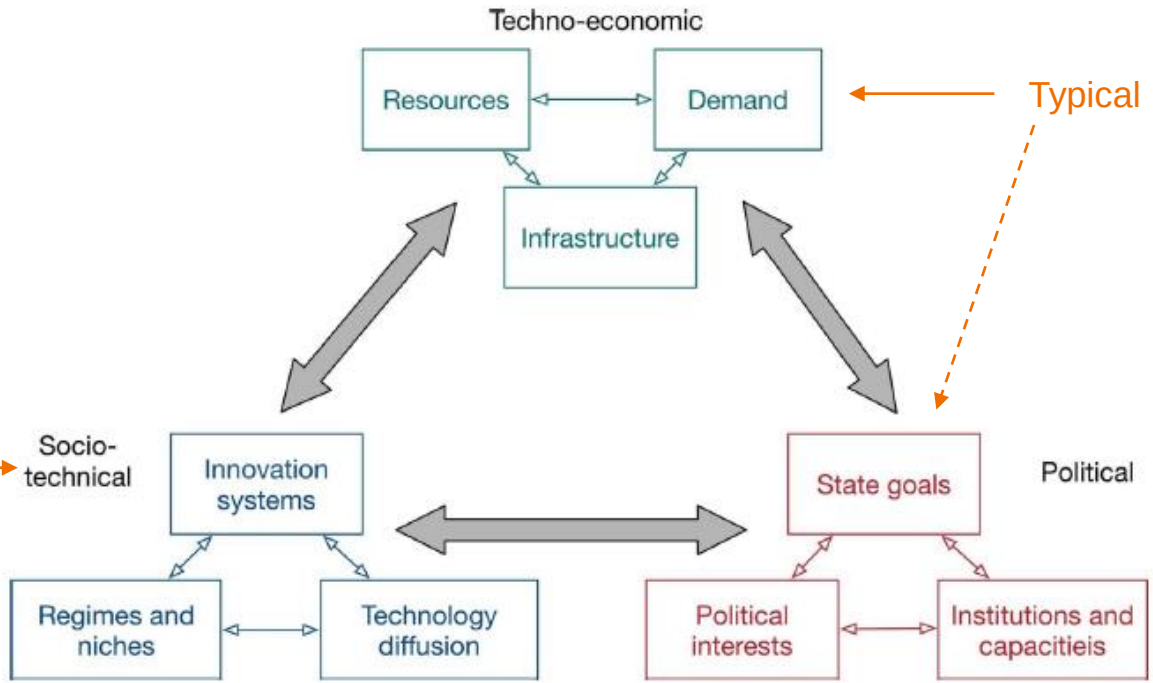
- Typically acceptance, values, norms of citizens are analysed with consumer surveys, which represents different social groups (f. ex. 1000 responders)
- In Finland, we also have long tranditions to collect data on acceptance in different energy technolgies, climate change mitigation, etc

Collaboration is a key element in scenario planning

- Ministries
- Research institutes and Universities
- Expert consultations
- Stakeholder communication
- Perspectives of private consumers/citizens

Scenario work in progress

Top level variables with the three perspectivs on energy transitions



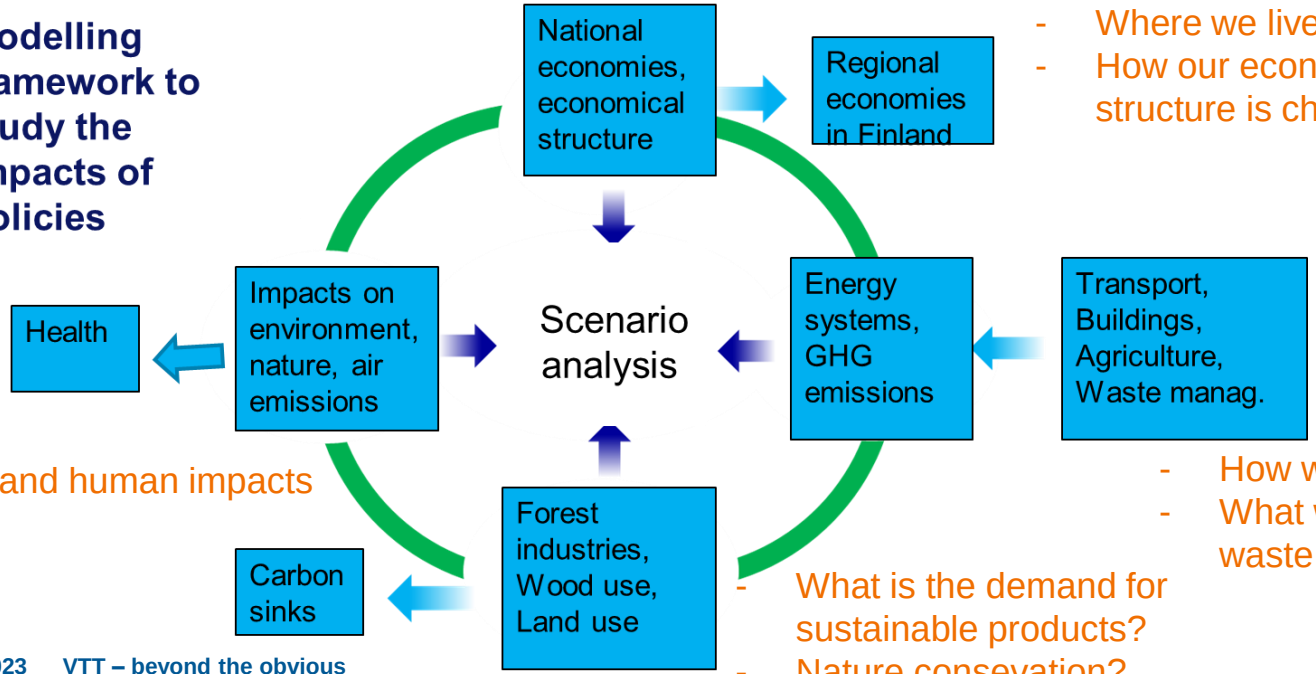
Typical IAM analysis

Storylines
Different modelling approaches
Different theoretical appriaches

Storylines

Five research organizations, 20-40 researchers, more than 10 models to analyse the impacts of the 2030 policies… and very little time …

Modelling framework to study the impacts of policies



- Where we live and work
- How our economic structure is changing?

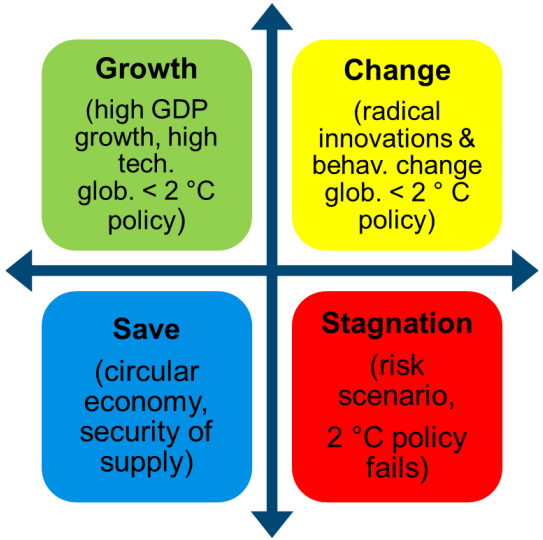
- How we move, work, live?
- What we eat, what we waste and how much?

- What is the demand for sustainable products?
- Nature consevation?

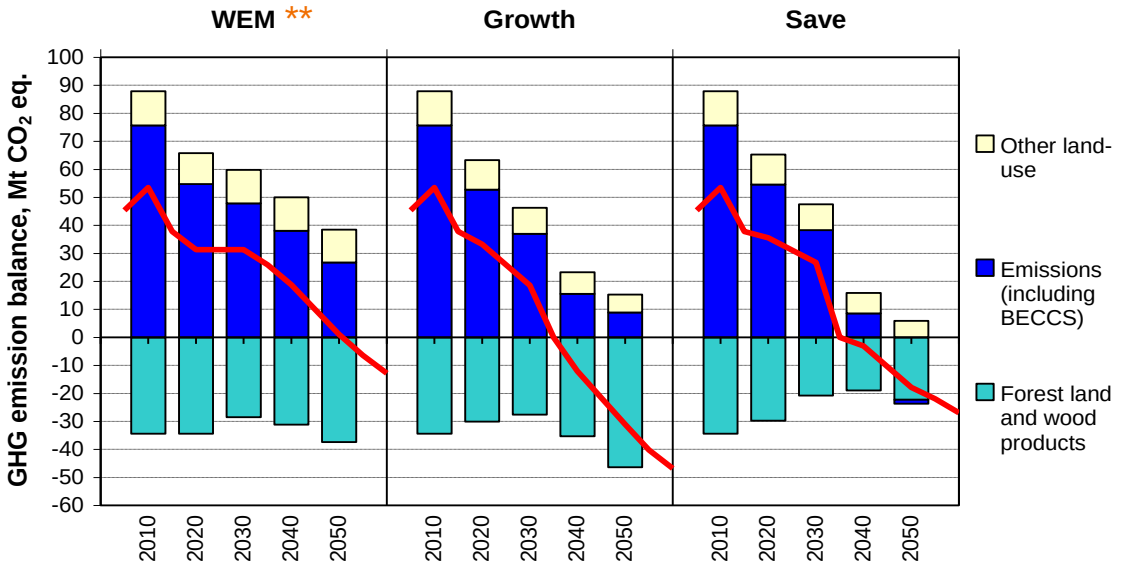
- Social and human impacts

Alternative storylines to study both GHG mitigation and LULUCF*

PITKO storylines



PITKO-jatko storylines

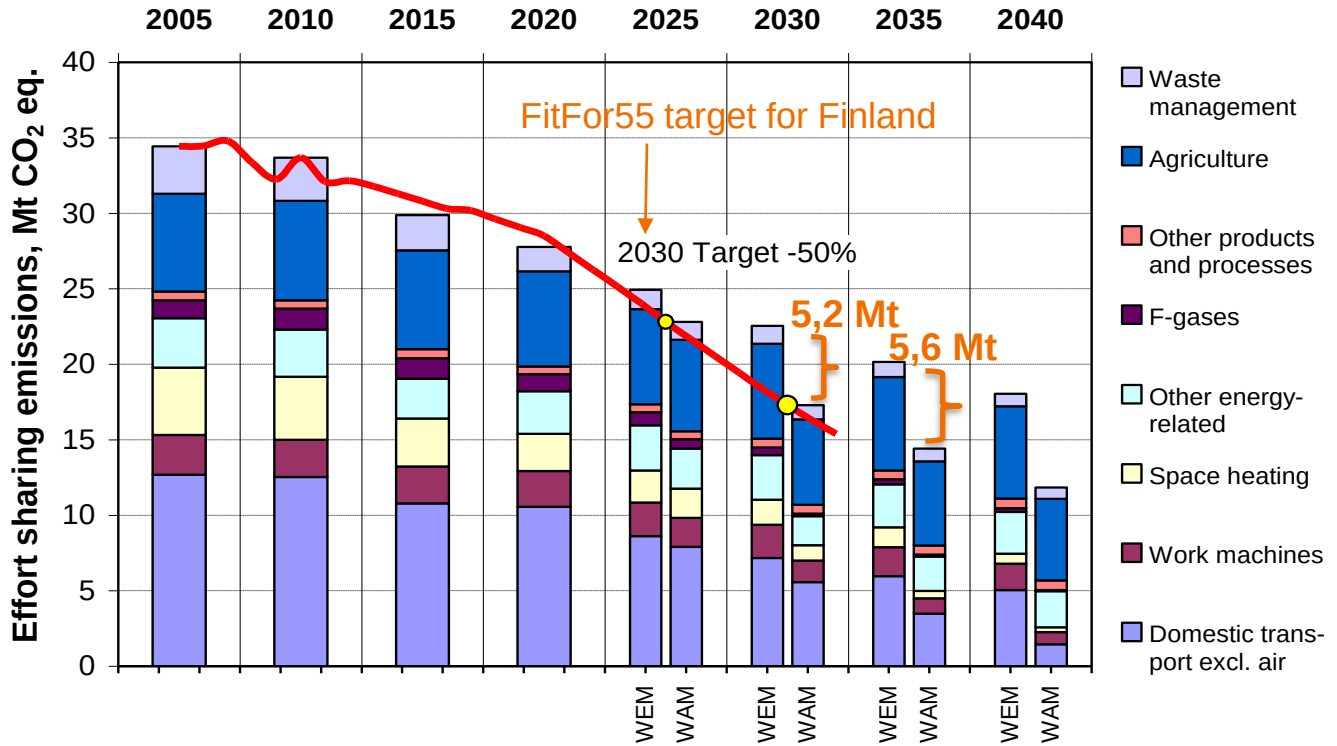


*Land Use, Land Use Change and Forestry

** With Existing Measures

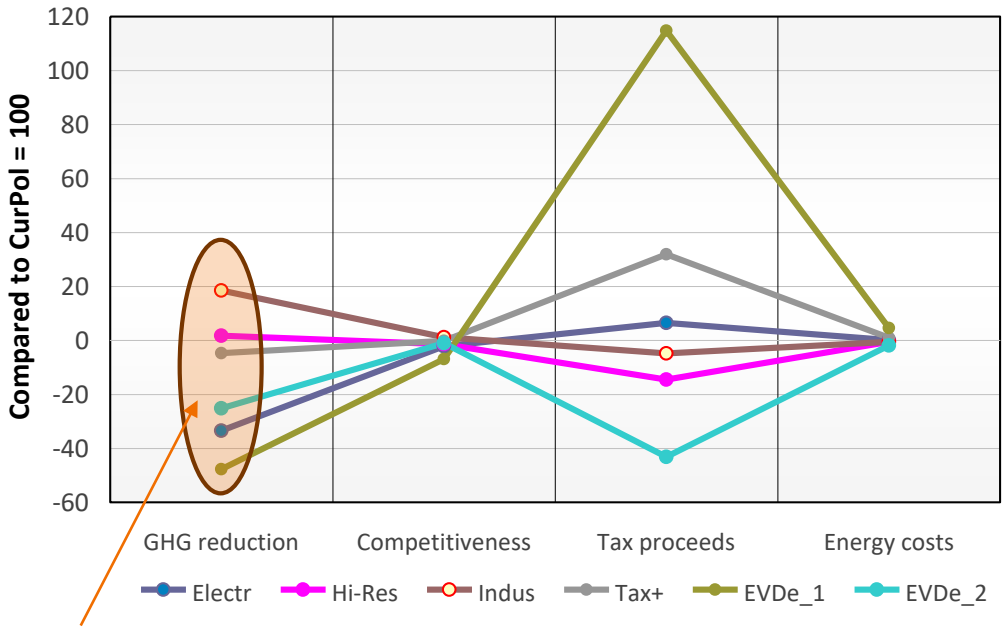
Example: GHG emissions of the effort sharing sector

Transport sector has a domestic target of -50 % GHG reduction (compared with 2005 level) by 2030, which is fulfilled in WAM
=> Peoples behavior should be changed to achieve the targets



Example: Comparison of energy tax models with 4 criteria => final decisions made by policy makers are dependent on their norms, values, etc.

- Different Governments have give different weights and have different opinions on energy and other taxes
  - Impacts on GDP and employment
  - Regional impacts
  - Impacts on export industries
  - Consevation of nature, mitigation policies
  - Fair transition, social equality
  - Branding
  - Believes about the future, motivation
  - Etc.



Different scale for GHG emissions

Conclusions and next steps

- So far energy behaviour has been exogenously assessed in different energy and GHG sectors
  - Transport and mobility demands with modal shifts
  - Changes in building stock and specific heating energy consumption
  - Changes in industrial structures
  - Acceptance/non-acceptance of technologies (CCS, nuclear, biomass fired energy, wind power, etc.)
  - Dietary changes (including also producing food without fields).
- Some efforts to link with innovation theories and/or socio-psychological theories on decision making but systematic IAM modelling has not yet realised.
- No exact efforts have been done so far to play with hurdle rates (or other TIMES parameters) to mimic human behaviour.

Taking new approaches can help forward!

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