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.

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 traditions to collect data on acceptance in different energy technologies, 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
Top level variables with the three perspectives on energy transitions

- Typical IAM analysis
- Storylines
- Different modelling approaches
- Different theoretical approaches

Diagram:
- Techno-economic:
  - Resources
  - Demand
  - Infrastructure

- Socio-technical:
  - Innovation systems
  - Regimes and niches
  - Technology diffusion

- State goals:
  - Political interests
  - Institutions and capacities
Five research organizations, 20-40 researchers, more than 10 models to analyse the impacts of the 2030 policies… and very little time …

- 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 conservation?
- Social and human impacts
- Health

Modelling framework to study the impacts of policies

16.1.2023 VTT – beyond the obvious
Alternative storylines to study both GHG mitigation and LULUCF*

PITKO storylines

Growth
(high GDP growth, high tech. glob. < 2 °C policy)

Change
(radical innovations & behav. change glob. < 2 °C policy)

Save
(circular economy, security of supply)

Stagnation
(risk scenario, 2 °C policy fails)

PITKO-jatko storylines

![Graph showing GHG emission balance, Mt CO₂ eq.](image)

*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
  - Conservation of nature, mitigation policies
  - Fair transition, social equality
  - Branding
  - Believes about the future, motivation
  - Etc.
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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