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Energy efficiency first; sufficiency next?

3-055-19

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04/06/2019
eceee Summer Study
Belambra Presqu'île de Giens, France

The case for sufficiency

- Behavioural changes can contribute to climate protection
- Sufficiency may take burden off technological options in stringent climate protection scenarios
- Sufficiency rarely integrated in modelling yet

Thus it will be meaningful to

- Create draft guidance & raise awareness on how to include sufficiency aspects in modelling of stringent climate protection scenarios

-> Goal of *Energy efficiency first; sufficiency next?*

Methodological approach: Overview

Literature review:
- Review of modelling studies
- Selection of scenarios for in-depth analysis
- Detailed analysis of how various aspects of sufficiency are integrated in the scenarios

Expert consultation:
- Expert meeting and interviews with modellers
- Discussion of challenges for integrating sufficiency in energy models
- Identify solutions and recommendations

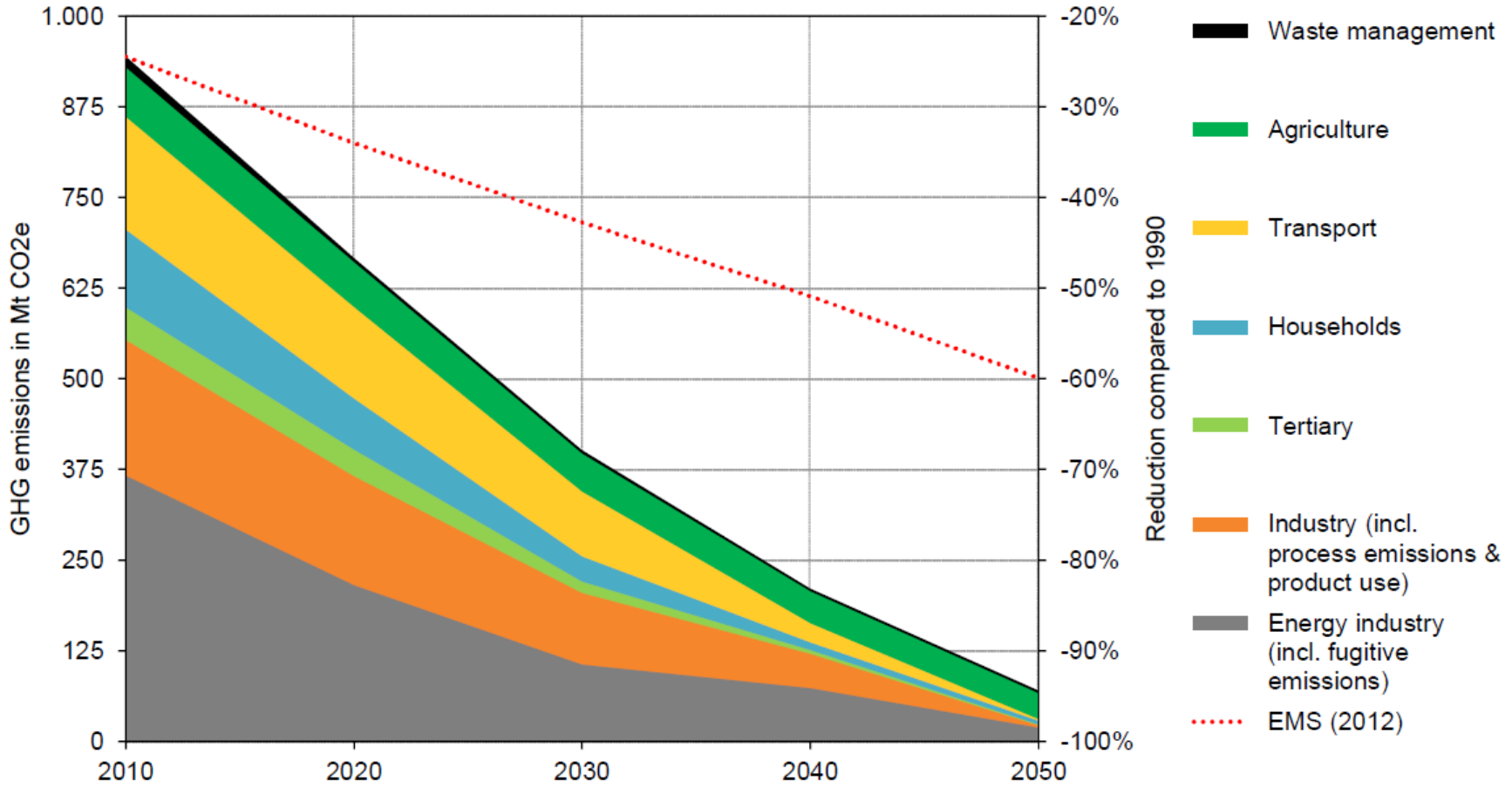
Literature review: Approach

- Literature review based on criteria
  - **Time horizon:** at least 2050
  - **Stringency:** Greenhouse gas neutrality,or, in 2050, at least 80-95% emission reduction compared to 1990
  - **Modelling** : Quantitative assessment using at least one model
  - **Sectors**: Coverage of as many sectors as possible
  - **Scenario type:** target scenario
  - **Publication date:** by the end of January 2018
- 16 studies reviewed; many contained more than 1 scenario

Key result:

Only 2 scenarios fulfilled all assessment criteria and included & documented sufficiency

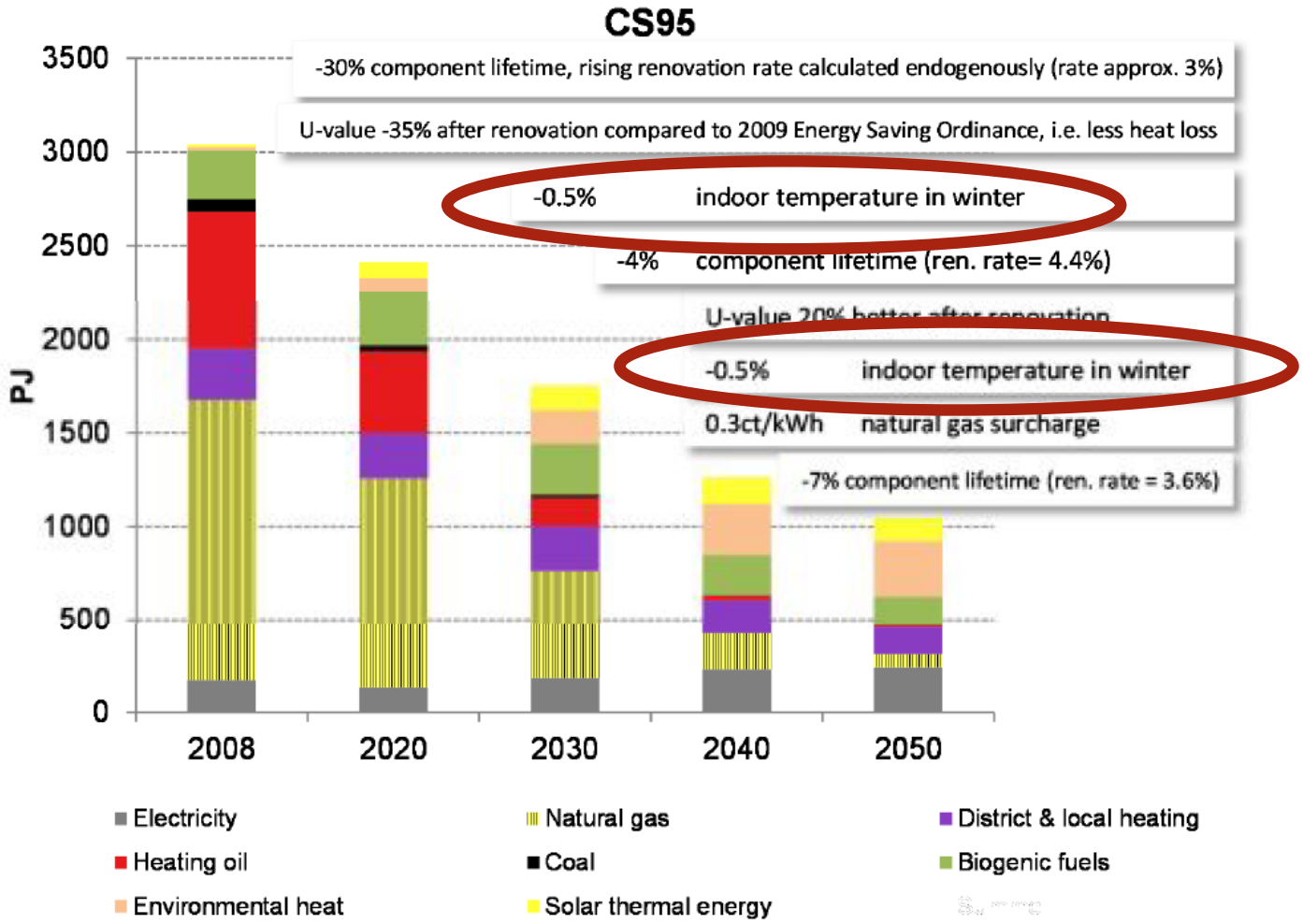
Projected GHG emissions in Germany with 95% reduction target



Note: The absolute GHG emissions on the left axis are equivalent to the relative reductions on the right axis.

Source: https://www.oeko.de/fileadmin/oekodoc/Climate-Protection-Scenario-2050-Summary.pdf

Example for sufficiency measures in the Climate Protection Scenario 2050



Source: https://www.oeko.de/fileadmin/oekodoc/Climate-Protection-Scenario-2050-Summary.pdf

Results – literature review

Area / sector	Sufficiency parameter	Climate Protection Scenario 95	Scénario négaWatt
Dwelling	Reduce heating temperature	Yes	No
Dwelling	Reduce floor space per person	No	Yes
Dwelling	Reduce warm water use	No	Yes
Dwelling	Reduce warm water temperature	No	No
Dwelling / consumption	Reduction of multiple equipment; sharing of appliances; reduction of size of appliances; Reduction of usage rate	Yes	Yes
Dwelling / consumption	Reduction of electric drying, reduction of TV usage	No	Yes
Mobility	Less demand for individual transportation; more use of public transport	Yes	Yes
Mobility	Use of smaller cars	No	Yes
Mobility	Reduction of kilometres travelled by car	No	Yes
Mobility	Reduction of private and business air-travel	No	Yes
Nutrition	Reduction of meat consumption	Yes	Yes
Nutrition	Reduction of food waste	No	Yes

- Climate Protection Scenario 05: Oeko-Institut; Fraunhofer ISI (2015): *Klimaschutzszenario 2050 – 2. Endbericht.*
- Scénario négawatt: Association négaWatt (2018): *Energy sufficiency. Towards a more sustainable and fair society*

Expert meeting

- 12 institutions represented
- experts that are involved in modelling
- discussion of hypotheses regarding hurdles of integrating sufficiency in these areas:
  - Legitimacy and acceptance
  - Modelling

Key result:

Sufficiency important element to be considered in modelling but more exploration space, documentation , data and communication needed

Overall key results: Methodological draft guidance

- **Formulate and document justification** and derivation for sufficiency in all areas considered. In particular, consult the scientific literature for this purpose where available.
- **Identify relevant parameters for each sufficiency measure** and document why they are relevant and which direction of change is necessary. In addition, possible data sources for the parametrisation should be identified and documented.
- Integrate sufficiency measures in the model by either **calibration** or by **addition of parameters** into the models functional relationship.
- Where possible, **justify the level of change of the parameters on the basis of scientific literature**. It may also be possible to derive a calibration from policy objectives. If neither is possible, determine the level of change using expert judgement and document the implementation transparently.
- **Establish and describe impact chains** per measure and document the model parameters settings including their temporal development.

Strategic recommendations

- **Recommendation 1: Exploration of possibility spaces**
  Climate protection modelling should be free to explore the effects of different combinations of measures in all areas combined: efficiency, consistency and sufficiency.

- **Recommendation 2: Base parameterization on adequate groundwork**
  For this purpose, we suggest to develop an open-source database with relevant data to be used and shared among researchers.

- **Recommendation 3: Factual and positive communication**
  Improve: the understanding of sufficiency, the reduction of prevailing reservations and obstacles and the creation of public acceptance for sufficiency. The latter should also be understood as a design and translation task from science to public.

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