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An energy efficiency review of the

Modelling supporting the European Commission strategic long-term vision a climate neutral economy (A Clean Planet for all)

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1. Introduction

In April 2018 we published a review of the critique by energy efficiency stakeholders on the EU's energy system modelling[1]. Following the publication of the European Commission's long-term strategic vision for a climate-neutral economy (LTS)[2], this paper reviews whether the critique has been addressed, based on the Commission's modelling work and its report on the in depth analysis of the LTS (LTS analysis)[3].

2. Transparency

2.1.Improvements in gathering input

For preparing the LTS the Commission has for the first time opened up the verification of input data by stakeholders. DG Energy and DG Climate Action held a workshop on 16 May 2018 to allow stakeholders to access and comment modelling input data.

The data presented was related to the costs of technologies, with a focus on energy generation and transformation, which was covered by several thousand data points, but with very little granularity on energy efficiency, which was covered by only several hundred data points.

Our main remarks at the time of the workshop[4] were:

→ A review of the renovation assumptions is difficult at this stage, because:

- High aggregation and only two parameters (investment costs and savings) being available (comparison: eight parameters for power and five for new fuels);

- The interaction between building envelope and heating and cooling system is unclear; and

- Data and assumptions on commercial buildings is not provided.

→ PRIMES assumes a lifetime of building envelope renovations of 20 years which is shorter than the 30 years provided by CEN workshop agreement from 2007.

→ Assumptions for household appliances are more detailed and could be reviewed.

→ For the main transport technology, vehicle technologies, no assumptions are provided. Indirectly relevant are recharging and storage technologies and new fuels, like hydrogen. For the latter detailed data are provided and appear to be optimistic, which could have impacts on energy efficiency (due to high conversion losses and reduced incentive to invest in smart solutions). For batteries and recharging points, data provided are highly aggregated and appear to be conservative.

→ Demand response, which is of increasing importance in the energy system, is not addressed in the PRIMES assumptions made available.

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[1] Stefan Scheuer Consulting, 2018, The EU's energy system modelling - critique and main elements for improvements in view of the mid-century decarbonisation strategy, http://stefanscheuer.eu/20180418%20EC%20modelling%20critique%20and%20recommendations.pdf

[2] COM(2018)733, Commission communication, A Clean Planet for all A European long - term strategic vision for a prosperous, modern, competitive and climate neutral economy

[3] In-depth analysis in support of the Commission Communication COM(2018)773 A Clean Planet for all A European long - term strategic vision for a prosperous, modern, competitive and climate neutral economy

[4] Stefan Scheuer Consulting, Note to Coalition for Energy Savings AWG from 11 May 2018

2.2. Choices unexplained and inaccessible

The Commission's energy system modelling depends for energy efficiency heavily on aggregated assumptions[5], like for renovation, equipment and vehicle replacement rates, investment needs, costs and cycles. This means that important choices and expert judgements are made upfront, which would require more transparency and explanation.

Following the workshop, the Commission did not involve stakeholders in discussing the scenario set-up and the choice of key parameters for energy efficiency. Even the final publication does not explain the choices and does not make all parameters available.

For example, the Commission states that no regret options on energy efficiency and renewable energy are the basis of all 80% GHG scenarios, suggesting policies additional to the baseline. But it does not provide information about these no regret options, making the comparison of scenarios difficult.

Further analysis is difficult. Energy-efficiency relevant numerical modelling inputs and outputs, like efficiency improvements, energy savings and final energy consumption, are not readily accessible or not available at all in the 400 pages LTS analysis.

Conclusions on transparency

The Commission started with improved transparency and stakeholder involvement initially, but it did not reveal crucial parts of its work. Important choices and assumptions are not explained and the modelling input and output concerning energy efficiency is largely inaccessible.

3. Key assumptions

3.1. Assuming 2030 target achievement

The LTS analysis provides for a new baseline considering the impacts of the 2030 Clean Energy Package on the 2016 reference projections for 2030. The main assumption here is that the EU is reaching the recently agreed 2030 energy efficiency and renewable energy targets.

3.2. No information on discount rates applied to different technologies

In the past, the Commission modelling has applied a simplified approach to mimic private investment decision-making in building renovation, appliances or cars. The approach relies on a constant discount factor of 10%, assuming that non-economic market barriers remain significant despite policies. The LTS analysis does not provide any specific information on this point.

[5] The PRIMES model used was described by the Commission's consultants at the 15 May 2018 stakeholder workshop as crude and simplistic regarding energy efficiency where efficiency is not an output but an input decision.

From now until 2030, the additional savings in the LTS analysis are limited to existing policies and targets for all scenarios. The latest scenarios by Fraunhofer ISI[6] and ECF's CTI 2050 Roadmap Tool Project[7], result already in 2030 in 21.5% to 34.3% savings, while the EC scenarios stay at a low level of 12.9% (see figures in the Annex). This is the result of the Commission's choice to freeze policies and confirms that discount rates remain high, hampering private investments, in particular for vehicles.

From 2030 to 2050:

The LTS scenarios "Energy efficiency" and the 1.5°TECH and LIFE reach between 36.8 and 43.4 % savings by 2050, well below the Fraunhofer ISI and ECF CTI scenarios, which reach 50.9% to 71.2%. In particular noticeable is the increase in transport savings in the EC scenarios, which reach a share of over one third of total savings. The change is mainly explained by electrification, modal shift, and a 5% reduction in activity levels in 2050 compared to Baseline.

Concerning buildings, the renovation rate increases up to 1.8%, well below the rates which were modelled in the Impact Assessment from 2016 for the EED revision. It would mean that only around 50% of the old building stock would be renovated by 2050. Nevertheless, the energy demand reduces significantly in buildings in most LTS scenarios, not very far of what Fraunhofer ISI identified as the cost-effective potential by 2050[8]. This can be explained by a significant increase in heat-pumps[9]. This was already reflected in the 2018 EC non-paper modelling for higher RES and EE targets, where a stronger emphasis on heat pumps installations was put, and it was unclear whether this is a modelling input or output.

Conclusions on assumption

The Commission kept a policy-pessimistic perspective relying on high behavioural discount rates until 2030, but assuming that targets will be reached. After 2030 new choices come in for transport allowing rapid increase in savings, and for building efficiency where there is a switch from renovation to heat pumps compared to previous modelling. Underlying assumptions are missing or not explained, which weakens the credibility of the analysis. Overall achieved energy savings in the Commission scenarios are far below other 2050 studies.

4. Presentation of results

4.1. Misleading energy system costs

In the past the Commission has presented the PRIMES modelling output on energy system costs for assessing the impact of policies, like the 2030 target. Energy investments were annualised with a 10% interest rate. From a policy-making perspective such a high value is difficult to defend, as it would downplay the role of policies to enable private investments

[6] Fraunhofer ISI 2019; Study on Energy Savings Scenarios 2050 commissioned by The Coalition for Energy Savings.
[7] ECF CTI 2050 Roadmap Tool project: https://stakeholder.netzero2050.eu/ Demand Focus Pathway compared to EUREF2016 (which resembles PRIMES 2016)

[8] Fraunhofer ISI 2019; Study on Energy Savings Scenarios 2050 commissioned by The Coalition for Energy Savings

[9] A ten-fold increase as explained in chapter 4.3.2.2 EC LTS

and present system costs in denial of a further development of the regulatory environment. At Member State level an average 5.7% for private perspective and 3.3% for macro-economic perspective is used. The only place in the EU which uses a high discount rate of 10% in impact assessments is Gibraltar[10].

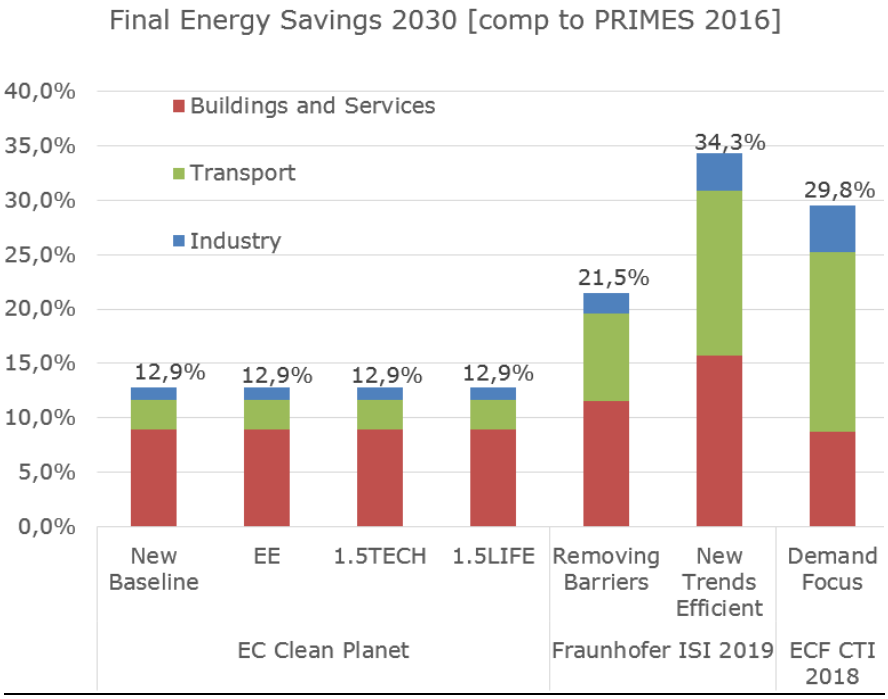
For presenting the LTS modelling results on energy system costs the Commission kept the 10% rate, which means that energy system costs are exaggerated by ignoring the role of future policies and regulations and are essentially bound to grow no matter whether the efficiency investments are cost-effective over their lifetime or not.

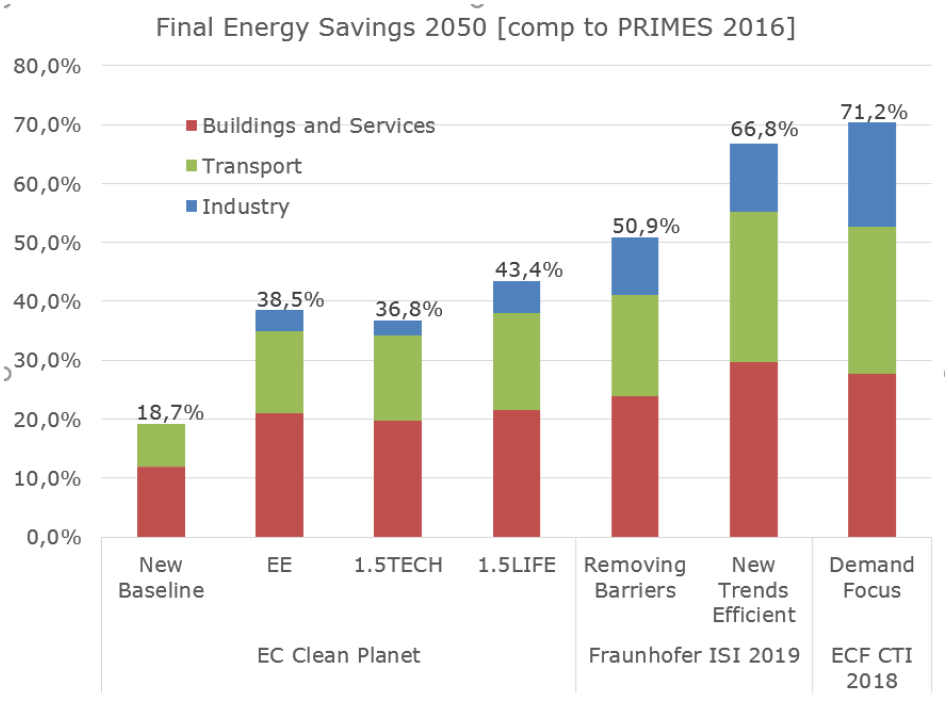
Conclusion on presentation of results

The Commission kept an unrealistic high private discount rates to present costs of policy scenarios which contradicts the intention of long-term public policy making to address future societal needs.

[10] ECEEE 2015

5. Annex





Data Sources for Figure 1 and 2:

- LTS analysis, Figure 19 was used to derive savings compared to PRIMES 2016
- ECF CTI 2050 Roadmap Tool project: https://stakeholder.netzero2050.eu/ Demand Focus Pathway compared to EUREF2016 (which resembles PRIMES 2016)
- Fraunhofer ISI 2019; Study on Energy Savings Scenarios 2050 commissioned by The Coalition for Energy Savings