Presentation at the EEE 2022

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How to increase the transparency of ex-ante impact evaluations of energy efficiency and climate policies.

Illustrated by the example of a funding program for energy and resource efficiency in industry in Germany.

Starting point: Increasing requirements for reporting on targets and measures increase relevance of evaluations of energy efficiency and climate policies

Targets

Paris 2015: 1.5 degree target

EU Energy and Climate Targets 2030

Art. 3 / 7 EED: Energy efficiency targets for Member States

GER: Yearly sectoral GHG emissions reduction targets in the new Federal Climate Change Act (2019 / rev. 2021)

EED recast: enhanced energy efficiency targets

Measures and Programs

Measures in the NECP / EED

„Fit for 55“ Package

GER: Climate Action Program 2020

GER: Climate Action Program 2030

GER: Energy Efficiency Strategy / Roadmap Energy Efficiency 2045

GER: Immediate Action Programs if annual sectoral emission targets are exceeded

New Climate Action Program 2022

MONITORING and EVALUATION

EU Governance

NECP / EED Assessment

Projection report on GHG emissions

GER: Yearly reporting on Climate Actions

GER: Yearly Monitoring of the Energy Transitions

GER: Assessment of „Immediate Action Programs“ by the German Council of Experts on Climate Change

NAPE

Background and Objectives

- Ex-post impact evaluation of policies and measures is nationally as well as internationally rather well documented → https://epatee.eu/

- BUT: Ex-ante reporting processes on energy efficiency and climate policies are often inconsistent and suffer from a lack of transparency.

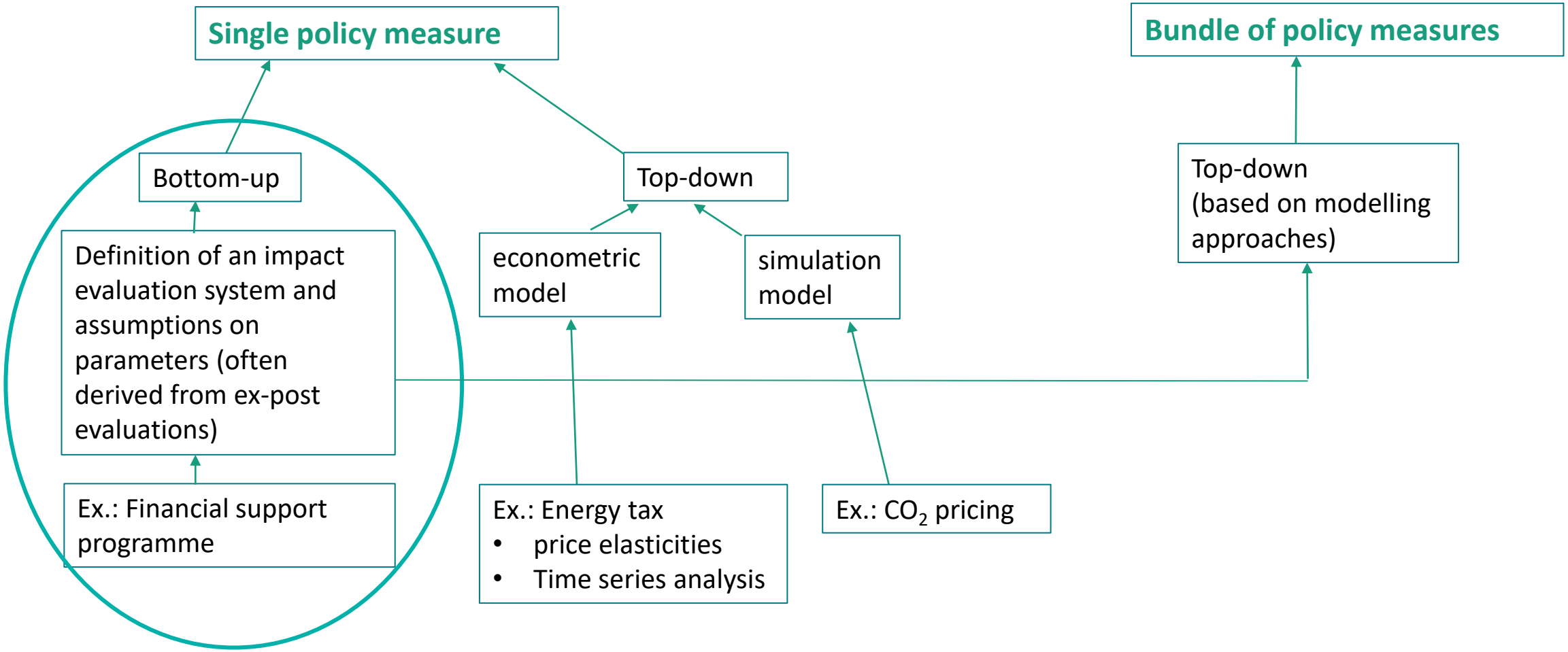
- Our approach aims at developing a consistent, transparent and homogenous guideline for ex-ante impact evaluations of energy efficiency and climate policy measures.

- Thereby we want to harmonise these impact assessments both in the design phase of measures and programs and in the monitoring process (EU and national reporting).

- Our main focus is on the assessment of energy savings and GHG emission reductions.

Ex-ante Evaluation of Energy Efficiency Policies

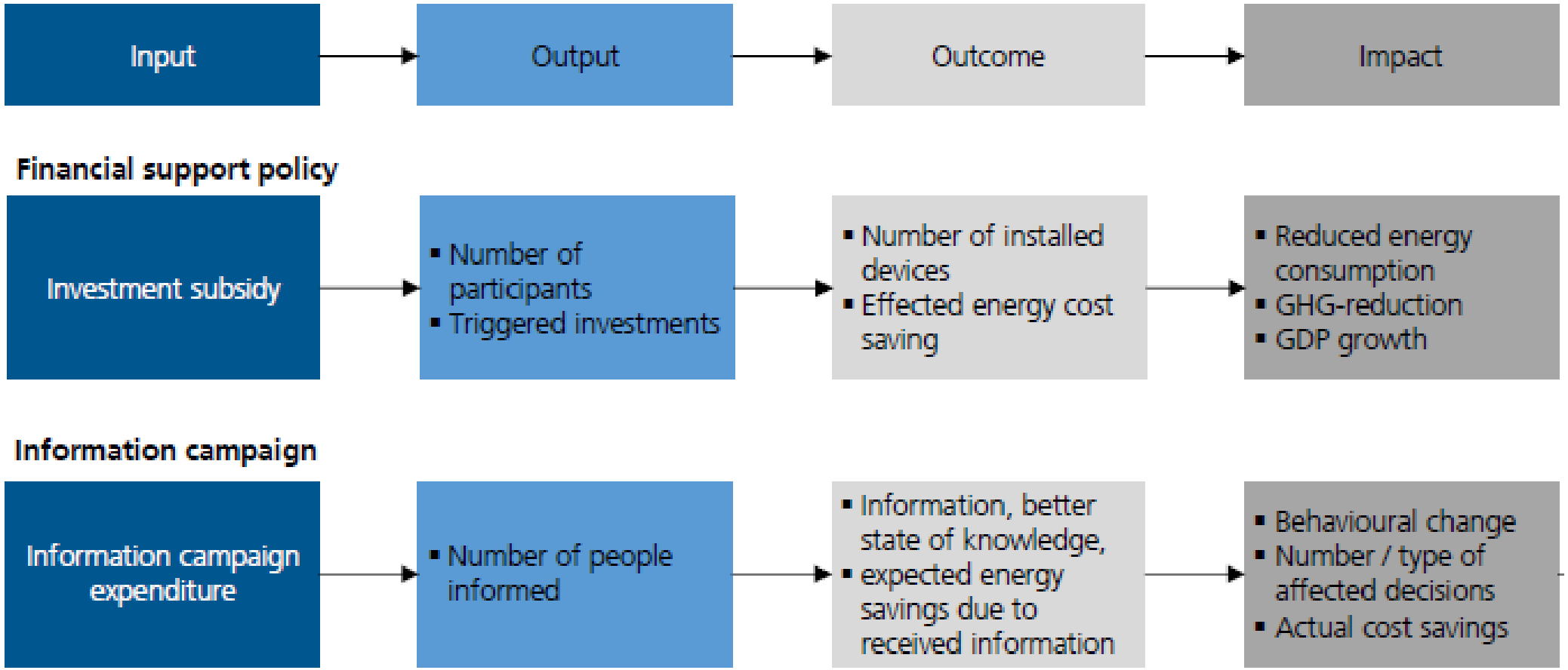
Methodological Approaches



Key factors to be taken into account for a transparent ex-ante impact evaluation of energy efficiency policies

Definition of relevant assessment criteria	▪ Energy savings, GHG emission reductions ▪ Economic impacts: energy costs, investments, employment, value added ▪ Distributional impacts (e.g. energy poverty) ▪ Acceptance, diffusion of efficient technologies
Assumptions on key framework data	▪ Energy prices, lifetimes, emission and primary energy factors ▪ Underlying reference development (baseline) ▪ In ex-ante evaluations often taken from most recent scenarios
Methodological approach for determining gross impacts	▪ Gross impacts are the indicator values "influenced" by the measure ▪ Basis: definition of the impact model for a policy measure ▪ Concrete method chosen depends on the specifics of each policy measure
Effect adjustment: calculation of net impacts	▪ Effectiveness of a measure: was the measure "causal" for the gross impact? Were the savings "additional“? ▪ Adjustment of gross values for effects (free rider, rebound, interaction...)
Transparent handling of uncertainties	▪ Uncertainties appear at all stages of an ex-ante evaluation ▪ Trade-off between reduction of uncertainty and loss of information

Impact Model to determine gross savings



Calculation of the net impact

Effects	Description
Gross impact	Direct comparison of energy consumption/GHG emissions before and after implementation of the policy measure
- Baseline	Savings relative to reference development (e. g. reference scenario)
Gross impact: Baseline adjusted	
- Free-rider effect	Savings that would have occurred without the policy
- Deadweight and substitution effects	Effects due to the deadweight loss of subsidies and early replacement (corresponds to delayed deadweight loss)
+ Spill-over effect	Effects through spill-over (transfer) to third parties and other areas not directly credited to the measure
+ Lag effect	Effect due to delayed onset of measures
x - Structural effects	Effects due to changes in central structural variables (e.g. different weather conditions)
x - Rebound effects	Effects due to increased energy use as a result of energy cost savings/increased emissions due to lower unit costs
= Net effect (individual measure level)	Effect after effect adjustment
x - Interaction effect	Effects through interactions between different measures
= Net effect (level of measure bundle)	Effect after adjustment for interactions

The issue of uncertainties

Reasons for uncertainties	... and how to deal with it
Methodological and data uncertainties within the impact model	➢ Refer to results of comparable ex-post evaluations or other study results on effects ➢ Use of margins for input data and/or results
Political uncertainties	➢ Precisely formulated and transparently communicated description of measures ➢ Corridor for impact (high/low variant, static / dynamic development)
Technological uncertainties	➢ Additional technical analysis or model data
External or market uncertainties	➢ Expert interviews

Experience from a recent case study

Ex-ante evaluation of a large financial support programme for energy and resource efficiency in Germany

- The ex-ante impact assessment was done both for the NECP and a national Climate Action Program
- The assessment could be based on a recent ex-post evaluation of the programme
- The assessment followed the methodological approach proposed here
- Gross savings could be estimated based on the funding efficiency (PJ/€ funding) found in the ex-post evaluation and the expected budget of the new program
- Free-rider and spill-over effects could also be taken into account from the ex-post evaluation.
- The interaction factor was based on an expert estimation.

Positive aspects and challenges identified in the case study

Positive aspects

- The detailed ex-post evaluation of a predecessor programme was a valuable and most important basis for the ex-ante assessment.
- In principle, the proposed methodological approach could be applied rather well.

Challenges

- Gross savings: the funding efficiency calculated in the ex-post evaluation worsened significantly between the first and the second evaluation year → this led to an overestimation of the impact if it was only calculated based on the results for the first year.
- Net savings: only free-rider and spill-over effects could be taken into account (no rebound!). The interaction factor applied was not empirically founded but an expert guess.
- Uncertainties were only taken into account qualitatively.

Some Conclusions and some Questions

- Independent ex-post evaluations of policy measures are a very important basis for ex-ante assessments → they should be done on a regular basis at least for high impact policies.
- There are still high uncertainties and ranges with regard to the size of effects for adjustment (esp. rebound, but also free-rider, spill-over etc. How can we still improve here?
- Inherent uncertainties cannot be completely avoided in ex-ante impact assessments → it is important be as transparent as possible at all steps of the evaluation process.
- Our main focus was on the impact of policies on energy savings and GHG emissions. But further economic, social and ecological impacts should also be considered.
- Our approach is regarded as a “living” methodology which is regularly improved and completed as soon as new knowledge is available (e.g. as from the EEE 2022).

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