Terminology and typologies used in the EPATEE case studies

Content

Terminology

1. Distinction between "measure" and "action"

In the EPATEE case studies, we chose to make a clear distinction between the terms "measure" and "action", in order to avoid the possible confusions when "measure" is used for multiple meanings:

- "**measure**" is used when speaking of policy measures (e.g., financial incentive schemes, EEO schemes, voluntary agreements, information campaign) ;

- "**action**" is used when speaking of the actions implemented at the end-user sites, and that can be either
    - technical: e.g., replacement of a boiler, installation of insulation, replacement of lighting),;
    - organisational: e.g., implementation of an energy management system); or
    - behavioural: e.g., eco-driving, switching off equipment to avoid stand-by consumption, efficient behaviours about ventilation.

2. Use of "ex-ante" and "ex-post"

The EPATEE case studies are focused on providing details and feedback about **ex-post evaluations**, i.e. evaluations that were performed after the policy measure was implemented. We do acknowledge that an ex-post evaluation can make us of various data sources, and not only of data collected along or after the policy implementation. An ex-post evaluation can indeed use as well data that were estimated before the policy was implemented.

The minimum condition used in the EPATEE case studies to qualify an evaluation as "ex-post" is that the evaluation should take into account data monitored along the policy implementation and/or collected specifically for the evaluation about the number of actions actually implemented (and/or their effects as observed after their implementation).

At the opposite, an **ex-ante evaluation** is an evaluation that was done before the policy measure was implemented (or revised), and that by essence could not include data about the actual number of actions implemented.

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We chose to **limit the use of "ex-ante" and "ex-post" to qualify evaluations, and NOT to qualify data**. Speaking of "ex-ante data" or "ex-post data" can sometimes be confusing. A distinction between "**data specific to the actions implemented**" and "**data taken from other studies or references**" can be more explicit.

Likewise, it can be confusing to speak of "ex-ante energy savings" and "ex-post energy savings". For example, how to name energy savings that are evaluated based on the actual number of actions implemented (as monitored along the policy) multiplied by standardised energy savings ratios defined as deemed savings? In this case, the number of actions would be ex-post, but the energy savings ratios would be ex-ante…

Therefore we chose instead to speak of "**expected energy savings**" when they were clearly assessed before the policy was implemented (e.g., for an impact assessment), and of "**reported energy savings**" when the energy savings are the results reported about the policy implementation, and/or "**achieved energy savings**" when the energy savings were evaluated mostly based on data collected after the actions were implemented.

3. Other terms used in the EPATEE case studies

- "**Means**" = public budget committed, investments made by participants, costs for obligated parties and other financial means used to get the energy efficiency actions implemented.
- "**Outputs**" = number of participants, number of energy efficiency actions implemented (possibly detailed per type of action when relevant).
- "**Gross data**" = data taking into account all costs, investments, participants or actions monitored for the policy measure, and not taking into account possible free-rider or other effects related to the causality or attribution between the policy measure and the actions implemented.
- "**Net data**" = data estimated by taking into account a type of causality analysis between the policy measure and the actions implemented and/or by applying attribution rules (for example taking into account corrections for double counting between several policy measures, adjustments for free-rider effects, etc.). See below the typology and terminology used for correction and adjustment factors.

4. Frequent acronyms

The following acronyms are frequently used in the case studies:

- **Annual report for the EED**: annual reports submitted by the Member States to the European Commission in the frame of the EED (Energy Efficiency Directive, see below). See: https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans
- **Article 7 notification**: notification made by the Member States to the European Commission about the energy savings target required by the EED article 7, about the strategy to achieve this target. See: https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/obligation-schemes-and-alternative-measures
- **EED**: Energy Efficiency Directive (EU Directive 2012/27/EU)

- **EED art.7**: article 7 of the Energy Efficiency Directive (setting an energy savings target to be achieved either by the implementation of an Energy Efficiency Obligation scheme or by alternative policy measures)
- **EEO**: Energy Efficiency Obligation (as defined in the EED art.7)
- **ESD**: Energy Services Directive (EU Directive 2006/32/EC)
- **EU**: European Union
- **NEEAP**: National Energy Efficiency Action Plan (plans to be reported by the EU Member States to the European Commission every three years, according to the ESD and then to the EED). See: https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans

Typology used for policy instruments

We chose to use the same typology as defined in the MURE database (http://www.measures-odyssee-mure.eu/), to ensure consistency with already existing databased about energy efficiency policies in Europe:

- **legislative/normative** (mandatory standards, mandatory DSM, regulations on buildings, heating systems, vehicles, others)
- **legislative/information** (mandatory audits / energy managers / building certificates / labelling)
- **financial** (grants, subsidies, loans, others)
- **fiscal/tariffs** (eco-/energy-/CO2-taxes; tax exemptions / reductions)
- **information/education/training** (energy billing, information campaigns, voluntary energy audits, regional/local information centres, voluntary labelling, others)
- **cooperative** (technology procurement, voluntary agreements, voluntary DSM measures, others)
- **Market-based** (energy efficiency obligations, energy efficiency auctions/tender systems, emission trading systems, JI/CDM)
- **Infrastructure** (only relevant for transport, e.g. modal shift, urban traffic management))

Typology used for the sectors

Likewise, we chose to use the same typology as defined in the MURE database for the end-use sectors:

- **Household**
- **Tertiary** (+ possible to distinguish “public sector” or “private sector” when relevant)
- **Industry**
- **Transport**
- **General cross-cutting** (used for measures that cover all end-use sectors listed above ; for measures that cover several but not all of these sectors, then the different sectors covered are mentioned; for example: “Household + Tertiary”)

Other types of sectors were added to this typology as the case studies could have a broader scope:

- **Agriculture**
- **Energy distribution** (+ possible to distinguish "electricity distribution", "gas distribution" or "district heating" when relevant)
- **Energy transmission** (+ possible to distinguish "electricity transmission", "gas transmission" when relevant)
- **Energy generation** (used policies about energy generation plants that are not "energy generation for self-consumption" ; for example CHP in industrial sites is included in "Industry", and domestic solar water heaters is included in "Household")

Typology used for the calculation methods

Two levels of typology are used. Level 1 is used to reflect the typology defined in the Annex V of the EED. Level 2 is the typology used in the MURE database.

Level 1 (= general categories defined in EED Annex V):

Categories	Explanations
Deemed savings	"***deemed savings**, by reference to the results of previous independently monitored energy improvements in similar installations*"
Metered savings	"***metered savings**, whereby the savings from the installation of a measure, or package of measures, is determined by recording the actual reduction in energy use, taking due account of factors such as additionality, occupancy, production levels and the weather which may affect consumption*"
Scaled savings	"***scaled savings**, whereby engineering estimates of savings are used (…) or where they are carried out on the basis of nationally established methodologies and benchmarks by qualified or accredited experts that are independent of the obligated, participating or entrusted parties involved*"
Surveyed savings	"***surveyed savings**, where consumers' response to advice, information campaigns, labelling or certification schemes, or smart metering is determined. This approach may only be used for savings resulting from changes in consumer behaviour. It may not be used for savings resulting from the installation of physical measures*"
Other	When not covered by one of the categories above (for example, in case of top-down methods, or bottom-up stock modelling ; see correspondences below)

Level 2 (= types of methods used in the MURE database):

Bottom-up methods (starting from assessing unitary energy savings)		***Link with level 1 categories***
Method 1: Direct measurement	Unitary energy savings are directly measured or metered at the level of the energy-using system targeted by the energy efficiency action or project (the unit can be an action or a participant)	"metered energy savings" or "surveyed savings"
Method 2: Billing analysis	Unitary energy savings are calculated based on analysis of energy bills or similar metered data, either directly or using statistical methods to control for changes other than the ones due to the energy efficiency action(s) (the unit is usually a participant)	"metered energy savings" or "surveyed savings"

Bottom-up methods (starting from assessing unitary energy savings)		***Link with level 1 categories***
Method 3: Deemed estimates	Unitary energy savings are based on simplified engineering calculations, mostly relying on data taken from previous studies or references (apart from the number of actions or participants) (the unit is usually an action)	"deemed savings"
Method 4: Mix of ex-ante and ex-post	Unitary energy savings are determined by intermediate engineering calculations, combining data taken from previous studies or references and data collected specifically about the actions implemented (e.g., based on analysis of equipment or sales data, inspection of samples, or monitoring of equipment) (the unit is usually an action, but can also be a participant)	"deemed savings"
Method 5: Detailed engineering estimates	Unitary energy savings are determined with an engineering model, used to model a complex system (building, complex industrial process, company) (e.g., through calibrated simulation). (the unit is usually a participant, but can also be an action or project)	"scaled savings"
Mix methods		*Link with level 1 categories*
Method 6: Stock modelling	Stock modelling based on stock and market statistics, and surveys monitoring diffusion / uptake of energy efficiency solutions. This method is a bottom-up method, if the surveys enable to identify which actions were facilitated by policy measures, and by which measures. Otherwise, this is a top-down method.	other
Method 7: Diffusion indicators	Indicators of the share of specific equipment or practice in the market, combined with deemed estimates of energy savings per equipment or practice. Monitoring of these indicators is a bottom-up method, if the change in indicator is entirely due to policy measures (e.g., when a technology or level of energy performance was not available before, or had a negligible market share). If this is not the case, and a regression analysis has to be performed to identify the energy savings due to policy measures, this method is a top-down method.	other
Top-down methods (starting from data at macro level)		*Link with level 1 categories*
Method 8: Energy consumption indicators	Monitoring of energy consumption indicators for sectors or sub-sectors; or specific indicators for an end-use equipment	other
Method 9: Econometric methods	Use of econometric models or simulation at aggregated/macro level (e.g., Input/Output analysis with price elasticities, multivariate regression analysis)	other
Others		*Link with level 1 categories*
Method 10	Any type of other method that cannot be encompassed in the categories above.	other

Typology used to describe the baselines

This typology was slightly adapted from the one defined in the MURE database:

- "**actual before**" energy consumption = metered energy consumption for the site, equipment, etc. where the energy efficiency action was implemented ;

- "**stock average**" = statistics available about the stock of buildings, equipment, etc. that make possible to estimate an average energy consumption of buildings, equipment, etc. in the stock ;
- "**before**" energy consumption = when the baseline can be either "actual before" energy consumption or "stock average"
- "**market average**" = statistics available about the buildings, equipment, etc. sold on the market and that make possible to estimate an average energy consumption of buildings, equipment, etc. sold on the market ;
- "**control group**" = energy consumption of households, companies, etc. that form a control group for a statistical analysis
- "**trend**" = e.g. consumer behaviour, autonomous technical progress, "business as usual" scenario
- "**minimum or performance standards**" = only savings exceeding standards are accounted
- "**other**" = in case the baseline used does not correspond to any of the types listed above (then provide a definition of this type of baseline in the case study)

Note: several types of baselines may be combined depending on the evaluation method used.

Typology used for adjustments, correction and other factors

Whenever possible and needed, the terms and definitions used in the evaluation reports are mentioned in the case studies. In addition, the following typology was used to provide a common basis for the analysis of the case studies, and for consistency with the terminology used in the EPATEE Knowledge Base:

- **Free-rider effect**: a free-rider is an end-user who beneficiated from the support (energy advice, financial incentives, etc.) provided by the measure, but who would have implemented the energy efficiency action in the absence of the measure[1].
- **Spill-over effect**: energy savings caused by the measure and other than those resulting from participants implementing energy efficiency actions promoted by the measure[2].
- **Direct rebound effect**: "Improved energy efficiency for a particular energy service will decrease the effective price of that service and should therefore lead to an increase in consumption of that

[1] Several types of free-rider effects may be distinguished when considering the time when the end-user would have implemented the action in the absence of the measure ("deferred free-ridership") and/or the level of energy performance of the action that the end-user would have implemented in the absence of the measure ("partial free-ridership"). For more details, see SRCI, NOVEM, Electricity Association, MOTIVA, et al., 2001. A European Ex-Post Evaluation Guidebook for DSM and EE Service Programmes. SAVE Project No. XVII/4.1031/P/99-028, April 2001. (p.66)
http://www.evaluate-energy-savings.eu/emeees/downloads/Ex-post_Eval_Guidebook_DSM.pdf

[2] Several types of spill-over effects may be distinguished, in particular participants' spill-over (when participants implement other energy efficiency actions than the ones promoted by the measure) and non-participants' spill-over (when the measure has influenced end-users to implement energy efficiency actions, but who did not receive support from the measure). For more details, see SRCI et al., 2001 (p.69) (see complete reference in previous footnote)

service. This will tend to offset the reduction in energy consumption provided by the efficiency improvement"[3].

- **Indirect rebound effect**: "The lower effective price of the energy service may lead to changes in the demand for other goods, services and factors of production that also require energy for their provision. For example, the cost savings obtained from a more efficient central heating system may be put towards an overseas holiday"[3].
- **Prebound effect**: cases where, before implementing an energy efficiency action, end-users tend to consume less energy than estimated by engineering models[4].
- **Performance gaps**: cases where the observed energy performance of the energy efficiency action installed is lower than the expected energy performance, for example due to differences in operating conditions or due to quality issues like defects when installing the action.
- **Multiplier effects**: imitators inspired by the facilitating measure but not benefiting from it.
- **Double-counting / measure interaction**: measures aiming at the same target can interact; i.e., one end-use action can be influenced by two or more energy efficiency measures.
- **Non-compliance**: stipulations are not fulfilled (esp. in case of regulatory instruments).
- **Others** (please specify)

[3] Sorrell, S., Dimitropoulos, J., 2008. The rebound effect: Microeconomic definitions, limitations and extensions. *Ecological Economics*, 65(3), 636-649.

[4] See for example: Sunikka-Blank M, Galvin R., 2012. Introducing the prebound effect: the gap between performance and actual energy consumption. *Building Research & Information*, 40(3), 260-273.