

Evaluation and Monitoring for the EU Directive
on Energy End-Use Efficiency and Energy Services

Measuring and Evaluating the Impacts of Energy Efficiency Improvement Measures

Formal Requirements and Basic Principles

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Contents

- Objective(s) of evaluation for the Energy Services Directive
- General Principles
- Useful Terminology
- Open Issues and how we dealt with them
- How to make bottom-up and top-down evaluations consistent when evaluating all or additional energy savings?
- Conclusions

Objectives of Evaluation for the Energy Services Directive (ESD)



ESD - the Directive on Energy End Use Efficiency and Energy Services

- The ESD sets an indicative target for EU MS to achieve **9% annual energy savings by 2016** from energy services and other energy efficiency improvement (EEI) measures.
- But until now there has not been developed a ***common methodology on how to measure and evaluate these savings.***
- The set of common and harmonised evaluation methods to be developed will ***enable the MS to report EEI activities and their impacts in a common way and with a harmonised accounting system.***
- Consequently, the methods designed by EMEEES will help the MS to prove to the Commission the fulfilment of the indicative cumulative annual energy savings target of 9 percent by 2016.

Objectives of evaluation - further considerations

- The ESD is directed towards the **Member States**
=> for one sector or type of end use, **only one aggregate figure** of energy savings from all EEI measures together (the ‚package‘) needs to be reported
- => No need to report savings for individual measures / measure operators (e.g., ESCOs, energy companies)
- ESD reporting needs **may differ** from national or other reporting needs
=> **synergies** possible (e.g., *additional* energy savings for ESD - *additional* greenhouse gas reductions from policies and measures for UNFCCC reporting),
but **conversion** may be needed (e.g., *discounted* savings in white certificates schemes - *annual* energy savings for ESD reporting)
- Evaluation **entails a cost**; but particularly **bottom-up** evaluation allows insights in **why** an EEI measure is **effective** or not, and its **costs**
=> important data for **improving processes and (cost-)effectiveness**

General Principles for the Development of Evaluation and Monitoring Methods



General principles for method development (1)

- Be **as thorough as possible in analysing** the relevance of correction factors, and the possibilities to evaluate them.
- But be **as pragmatic as possible in the methods proposed** as a result of the analysis
 - ➔ *the evaluation system has to be **applicable** (technically), **not costly** (economically) **and fair** (ethically)*
- With **as many EU-level average values as possible**
- Avoiding **double-counting**
- Estimating the **multiplier effect**, if possible
- **Enable** the evaluation of **all, additional,** and **early** energy savings
- Distinction between **bottom up** and **top down** methods

} ESD
Annex
IV(5)

General principles for method development (2)

harmonisation (between MS; between measures)

- MS will have to report energy savings based on **harmonised methods** (ESD Annex IV(1.1)) ; this harmonisation covers the following issues:
 - using the **same accounting unit**
 - using **common basic assumptions** (e.g. baseline)
 - **providing a minimum set of information** for each type of calculation
 - to the highest extent as possible, using a **consistent level of evaluation efforts**
- Member-States have **different experiences**, starting points; but they shall use harmonised requirements for reporting their results
- **EMEEES**: six bottom-up methods and 20 case applications; 14 top-down case studies: **not exhaustive, but a starting point!**
=> **General principles** for calculation and reporting to ensure comparable results

Useful Terminology for working on evaluation and monitoring methods



Bottom-up methods

- **ESD Annex IV (1)**

*“A bottom-up calculation method means that energy savings obtained through the implementation of a **specific energy efficiency improvement measure** are measured in kilowatt-hours (kWh), in Joules (J) or in kilogram oil equivalent (kgoe) and added to energy savings results from other specific energy efficiency improvement measures”.*

Top-Down methods

- **ESD Annex IV**

*“A top-down calculation method means that the amount of energy savings is calculated using the **national or larger-scale aggregated** sectoral levels of energy savings as the starting point”.*

- In other words, top-down methods rely on **energy efficiency indicators** calculated from national statistics (also called “top-down indicators) (e.g. ODYSSEE indicators)

Baselines and reference trends

- Unlike energy, **energy savings** can usually **not directly be measured**, but **in relation to a reference situation**
- ESD Annex IV: “*Energy savings shall be determined by measuring and/or estimating consumption, **before and after** the implementation of the measure,...*”
- For bottom-up methods, the reference situation ‘before’ the measure is called the **baseline**.
- For top-down methods, energy savings are calculated from the difference between the actual value of an indicator and the value for the same year that would have materialised in a **reference trend**.

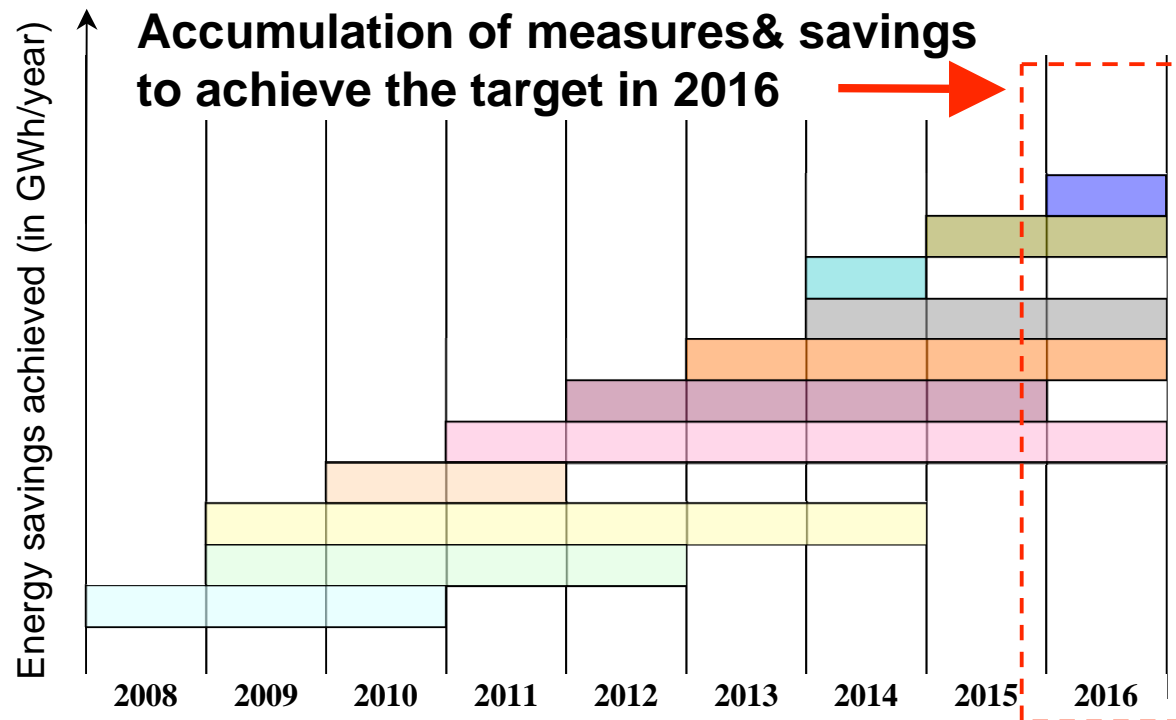
Analytical clarification: what is the subject of monitoring and evaluation?

				(EEI) Facilitating measures		
				Example 1: energy performance contracting	Example 2: white certificate schemes	Example 3: energy taxation
End-use (EEI) actions	Sector	Energy end-use	Efficient Solution			
	Residential	example 1: heating	efficient boiler s		B 1	C
			heat pump s		B 2	
			etc.			
		example 2: lighting	CFL		B i	
		etc.				
	Tertiary	example 1: heating	efficient boilers, pumps, etc.	A1	B j	
			example 2: lighting	CFL	etc.	
			efficient ballasts	A2		
			etc.			
	etc.					

ESD energy savings and targets

What does “*cumulative annual energy savings*” mean?

- ⇒ sum of the annual energy savings (kWh/year) from the different EEI measures, but **only in 2010 and 2016**



Open issues and how we dealt with them

evaluate
energy savings^{EU}

Additional or all energy savings?

- **ESD does not mention** that energy savings counting towards the 9 % target must be **in addition** to energy savings from autonomous changes
- But policy-makers and businesses usually want to know (but maybe not report) what is the additional impact of their measures
- **EU Action Plan for Energy Efficiency** obviously expects strong contribution from ESD (and other recent Directives):
„new policy“ leading to **new and additional** energy savings compared to autonomous changes and even previous policy
 - EU Action plan requires 1.5 % per year of primary energy efficiency improvement; „new policy“ to bring 0.7 % per year (equivalent to 1 % per year in non-ETS sectors)
 - autonomous changes: “brought about by natural replacement, energy price changes, etc.” (EU Action Plan)

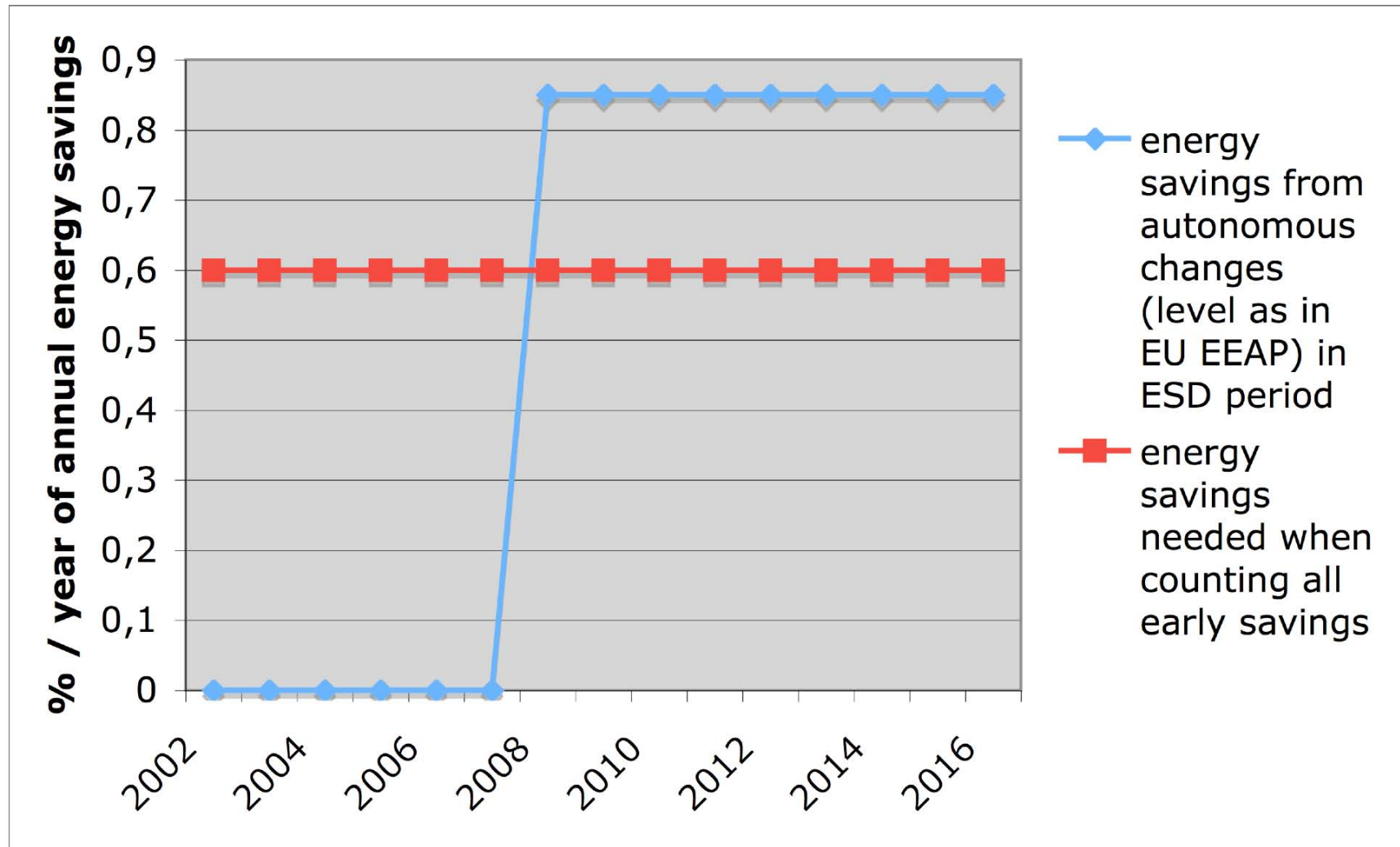
„Early Action“

- ESD Annex I: “**Energy savings** in a particular year following the entry into force of this Directive that result from energy efficiency improvement **measures** initiated in a previous year not earlier than 1995 and **that have a lasting effect** may be taken into account in the calculation of the annual energy savings.“
- “... that have a lasting effect”: Interpretation unclear!
 - ‘**Early measures**’?
(e.g., building code from 2005 and still in force in 2008 - 2016)

Or

- **‘Early energy savings’?**
(e.g., from energy-efficient building constructed in 2005)

Potential consequences of admitting both autonomous and early energy savings: in the extreme case, no new energy savings needed at all



Conclusions on autonomous and early energy savings

- **Enable both** the evaluation of **all** energy savings (including autonomous savings) **and** energy savings additional to autonomous changes (**additional** energy savings)
- **Enable** the evaluation of **early energy savings**, if the Commission with the ESD Committee and/or a Member State decides to allow these to be counted towards achieving the ESD target

How to make bottom-up and top-down evaluations consistent when evaluating all or additional energy savings?



Elements for calculating ALL energy savings

Bottom-up	Top-down
<ul style="list-style-type: none"> • use stock / 'before' situation as baseline in all cases • Corrections of gross energy savings: <ul style="list-style-type: none"> ✓ multiplier effects ✓ avoid double-counting (including for technical interaction) 	<ul style="list-style-type: none"> • use adequate reference trend (,frozen' indicator value? Meaningful only in ca. 60% of cases) • Corrections for reference trend or energy savings: <ul style="list-style-type: none"> ✓ hidden structure effects ✓ avoid double-counting between indicators

Elements for calculating **ADDITIONAL** energy savings

Bottom-up	Top-down
<ul style="list-style-type: none"> • use adequate baseline for replacement or new equipment (cf. Bottom-up presentation to follow) • Corrections of gross energy savings: <ul style="list-style-type: none"> ✓ multiplier effects ✓ avoid double-counting (including for technical interaction) ✓ free-rider effects ✓ direct rebound effects 	<ul style="list-style-type: none"> • use adequate reference trend (with two additional corrections given below) • Corrections for reference trend or energy savings: <ul style="list-style-type: none"> ✓ hidden structure effects ✓ avoid double-counting between indicators ✓ autonomous progress ✓ increases in market energy prices

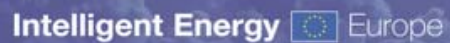
Conclusions

- Having talked about **principles** ...
- ... **available data and** monitoring/evaluation **costs** determine what is feasible in practice.
- => See in the next presentations what **pragmatic** solutions we propose
- E.g., in practice, we might assume that multiplier and free-rider effects will cancel each other out and might just neglect both, unless a measure saves more than 50 million kWh/year* or more than 10 % of a Member State's target
 - * for measures saving more than this threshold, costs of evaluation of these two effects are likely to be less than 1 % of the total costs of the measures

Thank you very much for your attention !



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