

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

Methods for monitoring energy savings (1): Bottom-up evaluation methodology

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


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Implementation and evaluation of energy end-use efficiency
policies and energy services in Europe

European Expert Workshop

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Plan of the presentation

- **Bottom-up calculation approach**
- **Calculation process**
- **Methods to be developed and methodology for these examples**
- **Discussion**

Bottom-up calculation - introduction

- **EMEEES WP4** = development of concrete bottom-up evaluation methods
 - **task 4.1**: Definition of the process to develop harmonised bottom-up evaluation methods
 - **task 4.2**: Development of up to 20 concrete bottom-up methods
 - **task 4.3**: Definition of concrete default values and benchmarks for 2008 and 2009

Bottom-up calculation - harmonised methods

- MS will have to report energy savings based on **harmonised** methods
- This harmonisation covers the following issues:
 - using the same accounting unit
 - using a consistent level of evaluation efforts
 - using common basic assumptions (e.g. baseline)
 - providing a minimum set of information for each type of bottom-up calculation
- Member-States have different experiences, starting points; but they shall use harmonised requirements for reporting their results

Bottom-up calculation - harmonisation setting

- A compromise between:
 - **exhaustiveness**, to treat all relevant issues on a high(er) scientific level
 - **pragmatism**, a rather simple, cost-effective and fair evaluation system, fair harmonised over the MS
- MS should have freedom to adjust their evaluation efforts according to their own evaluation practice and ambition
- A same starting point for all MS with potential for future improvements

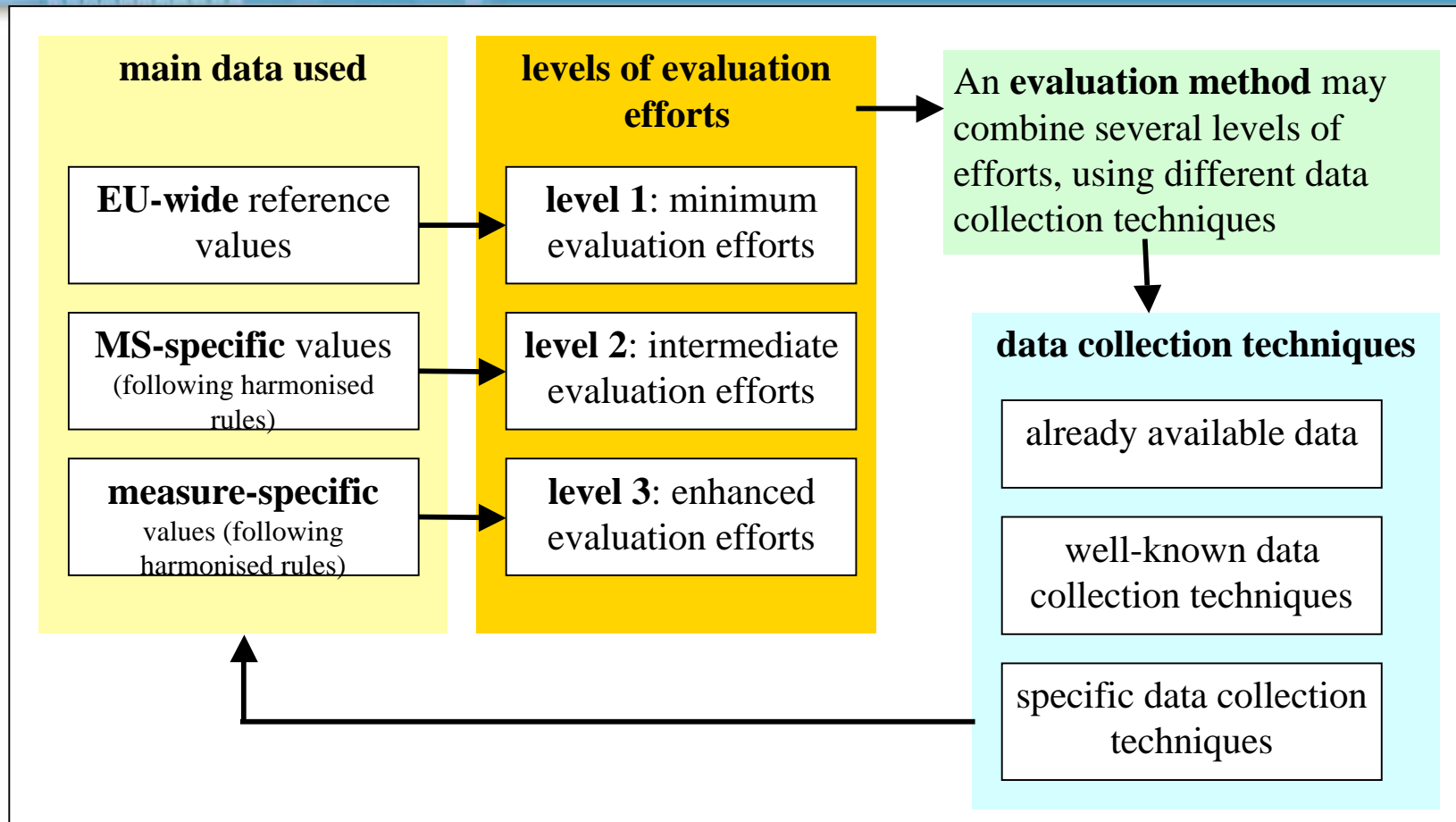
Bottom-up calculation - general approach

- **Main principle of our methodology:**

1) a progressive approach based on three levels of evaluation efforts
(data sources, processing and documenting)

2) breaking down the whole calculation process into four main steps
→ making the calculation work easier

Bottom-up calculation - three levels of efforts



➔ an evaluation method may combine different levels of efforts, according to the parameters needed

Bottom-up calculation - three levels of efforts

▪ Level 1 evaluation efforts

- either EU harmonised or default values (**conservative to avoid overestimations** and to encourage level 2 and 3 efforts)
- **main data sources**: existing European regulation, studies and statistics + compromise between concerned stakeholders
- **data processing**: standardised calculations using default values
- **data documenting**: no need for level 1 values
- not for all measures harmonised or default values are available (e.g., savings lifetime values dealt with in the CEN Workshop Agreement)

Bottom-up calculation - three levels of efforts

▪ Level 2 evaluation efforts

→ MS-specific values = based on data representative at national scale

→ **possible data sources**: national statistics, surveys, samples, registries

→ **data processing**: well known standardised calculations using mix of default and national values

→ **data documenting**: requirements = minimum set of information and justifications to be reported (data, explanations about calculations, etc.)

Also be used in case there are no EU default values available
Source for future EU harmonised or default values

Bottom-up calculation - three levels of efforts

▪ Level 3 evaluation efforts

→ measure-specific values = based on data specific to the reported measure

→ **possible data sources:** monitoring systems, registries, surveys, measurements

→ **data processing:** measure-specific and well known standardised calculations for a measure

→ **data documenting:** requirements to report on the specific data and justifications in detail (standard report at least available)

The source for future improvement on methodologies

Bottom up - Calculation process

+ *number of participants or units*

+ *double counting, multiplier effect, + other gross-to-net correction factors (e.g. free-rider effect)?*

+ *timing and lifetime, + performance degradation (?)*

Step 1: unitary gross annual energy savings (in kWh/year per participant or unit)

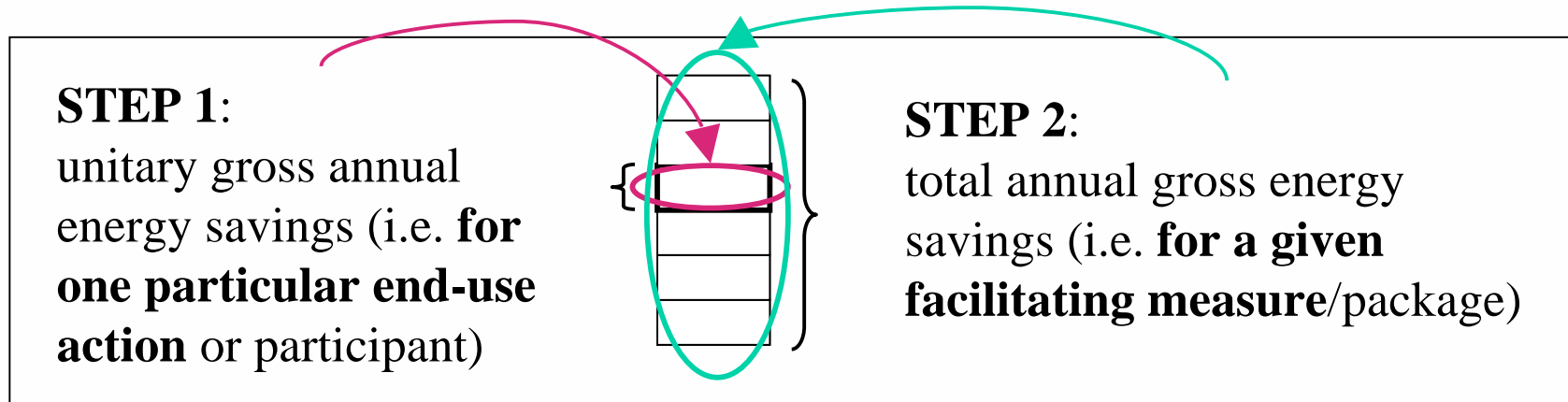
Step 2: total gross annual energy savings (taking into account the number of participants or units, in kWh/year)

Step 3: total ESD annual energy savings in the **first year** (taking into account double counting, multiplier effect, and other gross-to-net correction factors (e.g. free-riders) ?, in kWh/year)

Step 4: total ESD annual energy savings achieved in the year 2016 (in kWh/year, taking account of the timing of the end-use EEI action, its lifetime and eventual performance degradation)

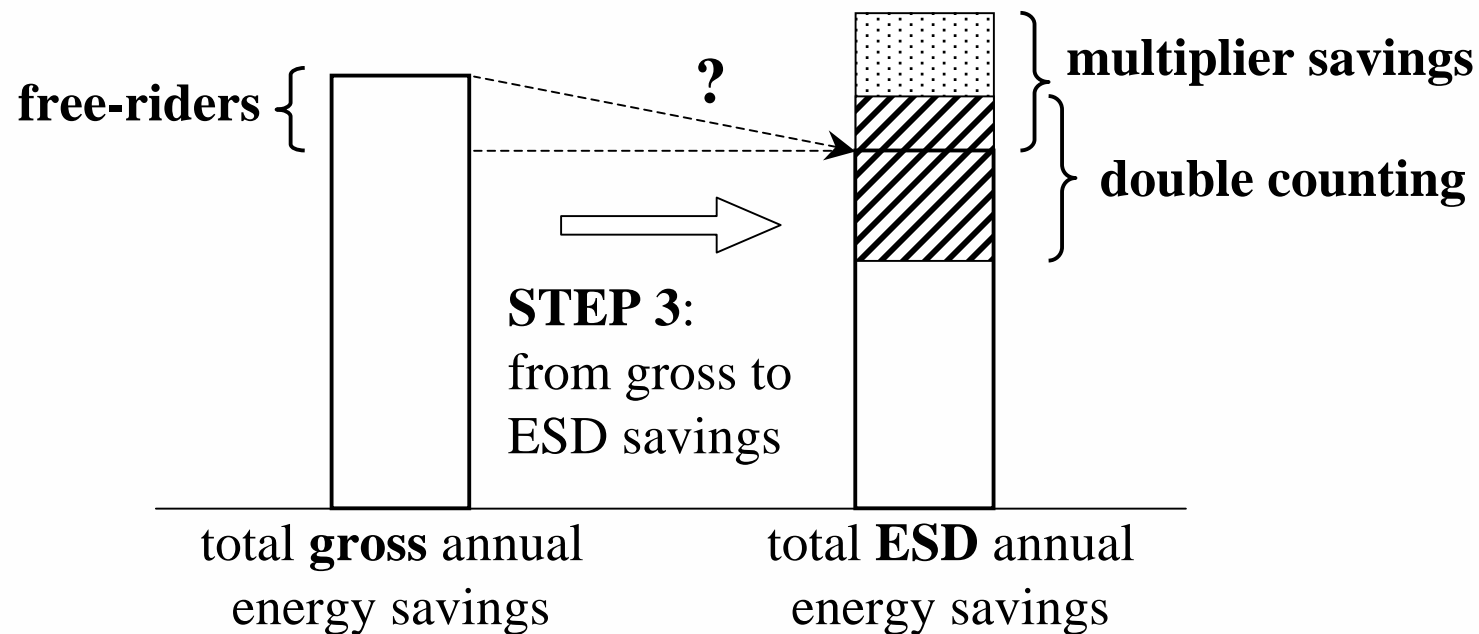
Calculation process

- **step 1: unitary gross annual savings** → defining a calculation method (with normalisation factors)
- **step 2: total gross annual savings** → defining an accounting method

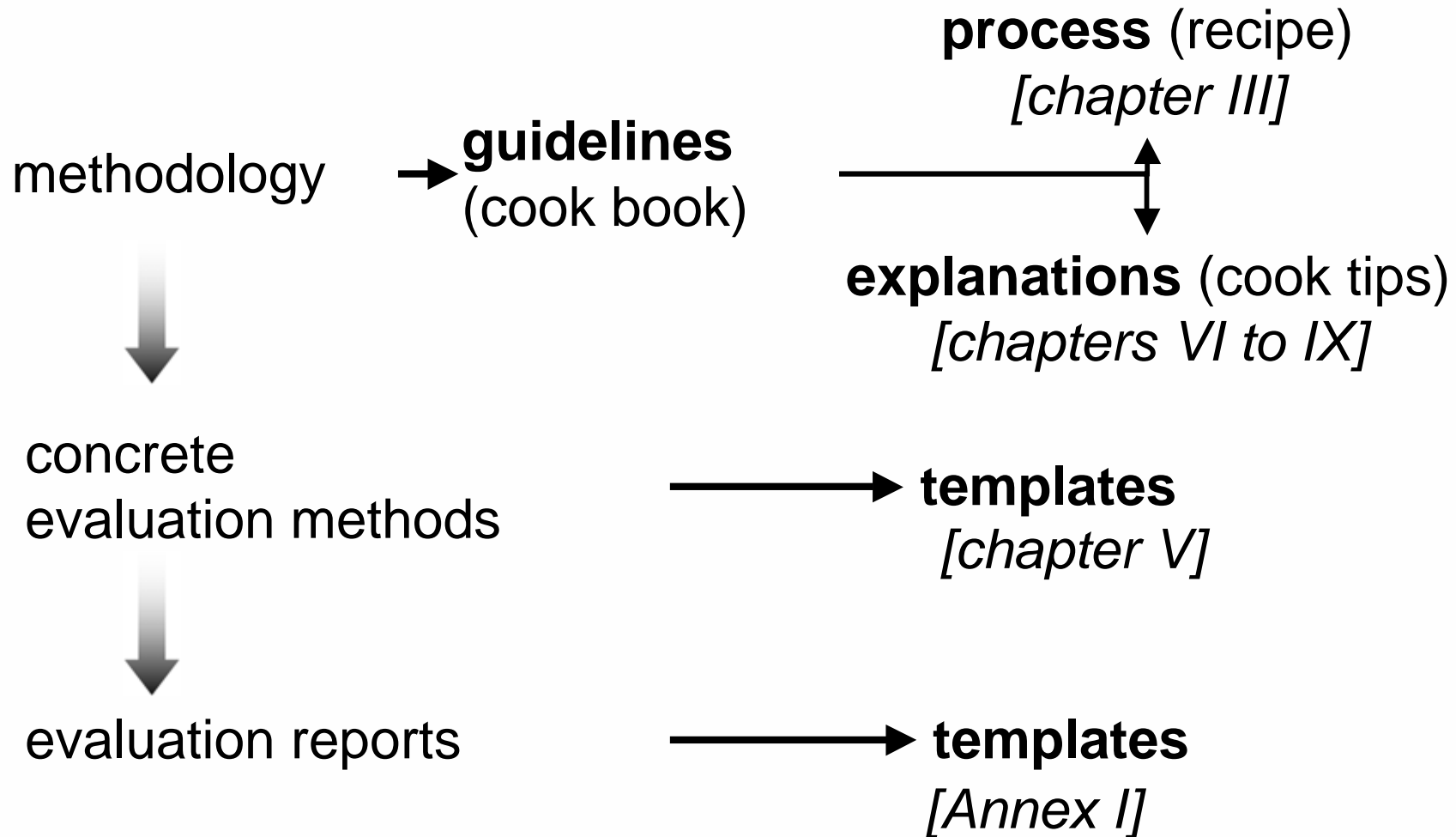


A four steps calculation process

- **step 3: from gross to ESD savings** → applying gross-to-net correction factors



Composition of the methodology



Methods to be developed, residential

Responsible organisation	end-use or end-use EEI action
SenterNovem	1 Energy performance of new buildings
A.E.A	2 Building envelope improvement
AGH-UST	3 Improvement of heating system
Armines	3b: Condensing Boilers
Ademe	4 Energy-efficient white goods (appliance purchased anyway)
<i>AGH-UST</i>	<i>5 Hot water: solar water heaters, heat pumps, water-saving faucets</i>

Methods to be developed, tertiary & industry

Organisation	end-use or end-use EEI action	sector
SenterNovem	6 Energy performance of new non-residential buildings	tertiary
eERG	7 Heating system circulators	tertiary
eERG	9 Improvement of lighting system	Tertiary (industry)
Armines	10 Improvement of ventilation/air conditioning system, including heat recovery, free cooling	Tertiary Industry
Fraunhofer	11 Office equipment	tertiary
ISR-UC	13a High efficiency electric motors	industry
ISR-UC	13 b Variable speed drives separate, including for industrial pumping systems	industry
Motiva	20 Energy audit programmes (or as commercial energy efficiency service)	Tertiary industry
SenterNovem	21 Voluntary agreements with end use sectors	Tertiary industry
Stem	19 Energy performance contracting	Tertiary industry

Methods to be developed, transport

Responsible organisation	end-use or end-use EEI action
<i>Stem</i>	<i>18 traffic reduction</i>
Wuppertal Institute	15 Vehicle (car, bus, truck) energy efficiency (engines, tyres, lubricants)
<i>SenterNovem</i>	<i>17 Eco-driving</i>
Wuppertal Institute	16 Modal shifts in passenger traffic, including towards non-motorised traffic

**Thank you for your attention.
Comments and questions are welcome !**

A four steps calculation process

- step 4: considering the timing and lifetime of the end-use actions

