streamSAVE methodology for energy efficiency measures to alleviate energy poverty

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Context

- More attention for energy poverty in context of energy savings
  - Article 7 EED: in designing policy measures to fulfil their obligations to achieve energy savings, Member States shall take into account the need to alleviate energy poverty
  - Article 8 proposal recast EED: "Member States shall achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers and, where applicable, people living in social housing"
  - Governance regulation: in reporting MS shall include information on the amount of savings achieved by policy measures aimed at alleviation of energy poverty in line with Article 7(11) EED.
- Survey streamSAVE 2021-2022: clear interest

Introduction to scope

- Energy Poverty and Energy Efficiency policy
- Current practices of savings estimations often attribute identical savings as average households

→ multiple reasons why not reflecting actual savings

- Scope : Measures improving EE, more specifically illustrated for:
  - Renovation (insulation) to improve heating demand
  - Heating installation (start with RES)
  - Behaviour measures
- Focus: what is **different** for energy poor households compared to average households

→ NOT: definition of energy poverty!

Renovation and RES: Formula

- Article 7: $TFES = \{A*[((SHD_{Ref}+HWD)*EF_{Ref})* f_{prebound\ EP} - (SHD_{Eff}+HWD)*EF_{Eff}]\} * f_{BEH\ EP}$

TFES	Total Final Energy Savings (kWh/a)
A	Conditioned gross floor area of the refurbished building (m^2)
SHD_{Ref}	Specific space heating demand of the reference building ($kWh/m^2/a$)
SHD_{Eff}	Specific space heating demand of the efficient building ($kWh/m^2/a$)
HWD	Specific domestic hot water demand ($kWh/m^2/a$)
EF_{Ref}	Expenditure factor of the heating system in the reference building [dmnl]
EF_{Eff}	Expenditure factor of the heating system in the efficient building [dmnl]
$f_{prebound\ EP}$	Factor for adjusting consumption of average household to energy poor household [dmnl]
$f_{BEH\ EP}$	Factor to calculate a rebound effect [dmnl]

Renovation & Space heating : Indicative values

- Prebound: Quantifies energy underconsumption due to self-rationing

  - n = 9 studies ; effect not always specified -> what is an energy poor household?

- Rebound: factor to consider overconsumption patterns following renovation

  - n = 13 studies ; again, large variability -> 23,94

Space heating – EF : Indicative values

- Difference heating characteristics between EP and average households

	EP households		Average households	
	Type	Efficiency	Type	Efficiency
Heat source	Central heating, low efficiency boiler, fireplace, stove	0.75, 0.15, 0.80	High efficiency boiler, electric panel heater	0.84, 1.1
Energy carriers	Electricity, oil, firewood	0.67	Gas, electricity, derived heat	0.75

D2.2: Standardized saving methodologies Energy, CO2 savings and costs

$EF_{Ref} = 0.734$

- Large variability between EU member states

Slovenia  87% central heating (9% gas)

Portugal  46% heating equipment (90% elec.)

Ref. Primc et al., 2019, Gouveia et al., 2018

Behaviour changes: Formula

Methodology name: **“Feedback and tailored advise in residential sector”**

- Article 7
- *Initial idea*

$$TFES = \mathrm{N} \times \mathrm{UFEC} \times \mathrm{S}_{\mathrm{specific}} \times \mathrm{dc}$$

TFES	Total final energy savings [kWh/a]
N	Number of participants [dmnl]
UFEC	Unitary Final Energy Consumption [kWh/a]
$S_{specific}$	Energy saving factor specific for energy poor [%]
dc	Double-counting factor [%]

- *alternative*

$$TFES = \mathrm{N} \times \mathrm{UFEC} \times \mathrm{f}_{\mathrm{prebound}} \times \mathrm{S} \times \mathrm{dc}$$

TFES	Total final energy savings [kWh/a]
N	Number of participants [dmnl]
UFEC	Unitary Final Energy Consumption [kWh/a]
$f_{prebound}$	Factor for adjusting consumption of average household to energy poor household
S	Energy saving factor [%]
dc	Double-counting factor [%]

Behaviour changes: indicative values

- UFEC: from Odyssee-MURE
  2019 values per EU country

Country	UFEC Electricity per household [kWh/a]	UFEC Electricity for heating per household [kWh/a]	UFEC Gas for heating per household [kWh/a]

- $f_{prebound}$: for heating (30%)
  for electricity (?)

- Savings factor:

Final use	Type of measure	Energy Savings factor (S) [%]
Electricity	Feedback	2.30%
	Feedback including tailored advice	3.50%
Electricity for heating	Feedback	2.00%
	Feedback including tailored advice	3.00%
Gas for heating	Feedback	3.40%
	Feedback including tailored advice	3.05%

Questions?

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Thank you

Get in touch for more information!

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