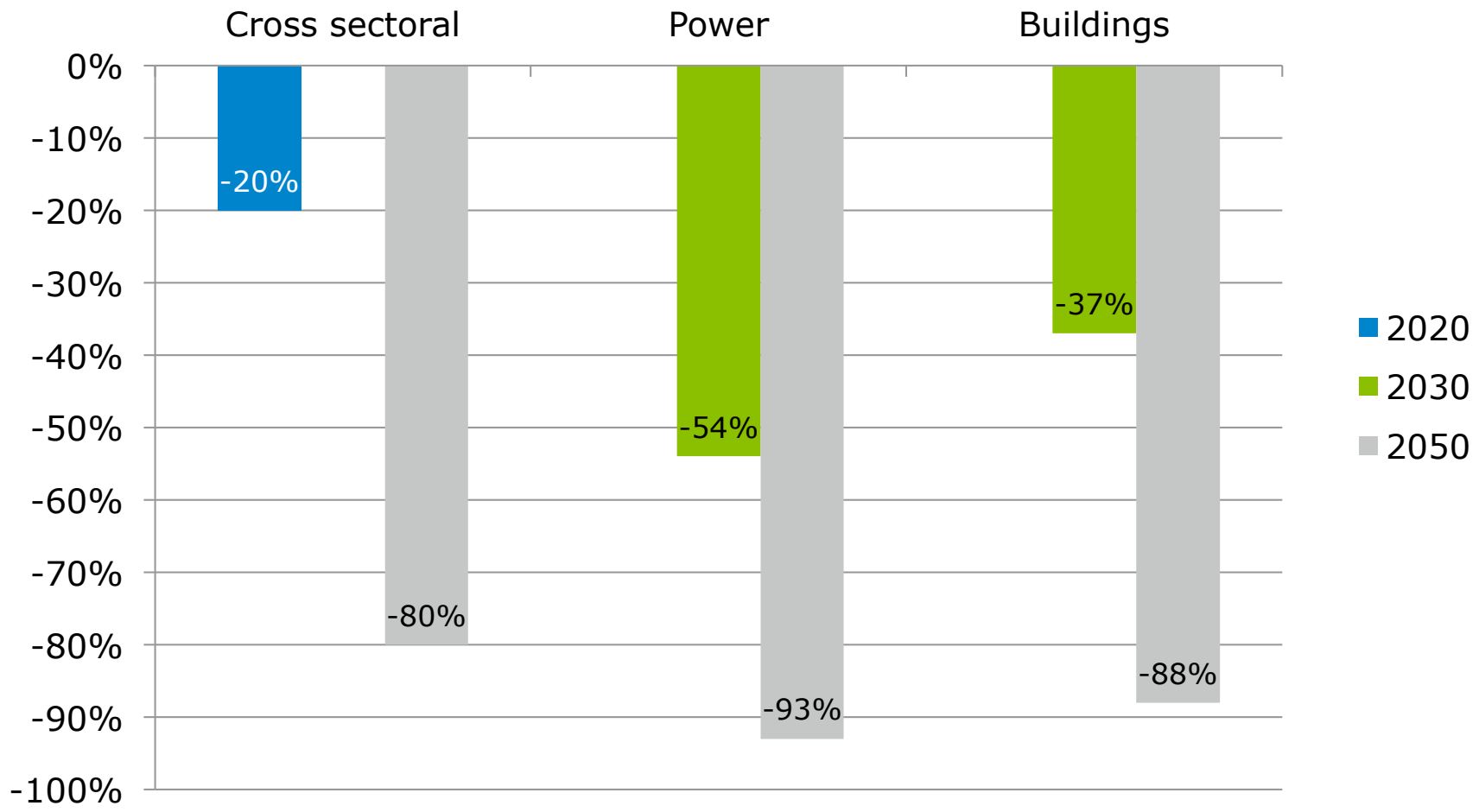
ENGINEERING
TOMORROW

Optimising the control of energy use in technical building systems

Why energy and climate policies should fill regulatory gaps – eceee June 2017

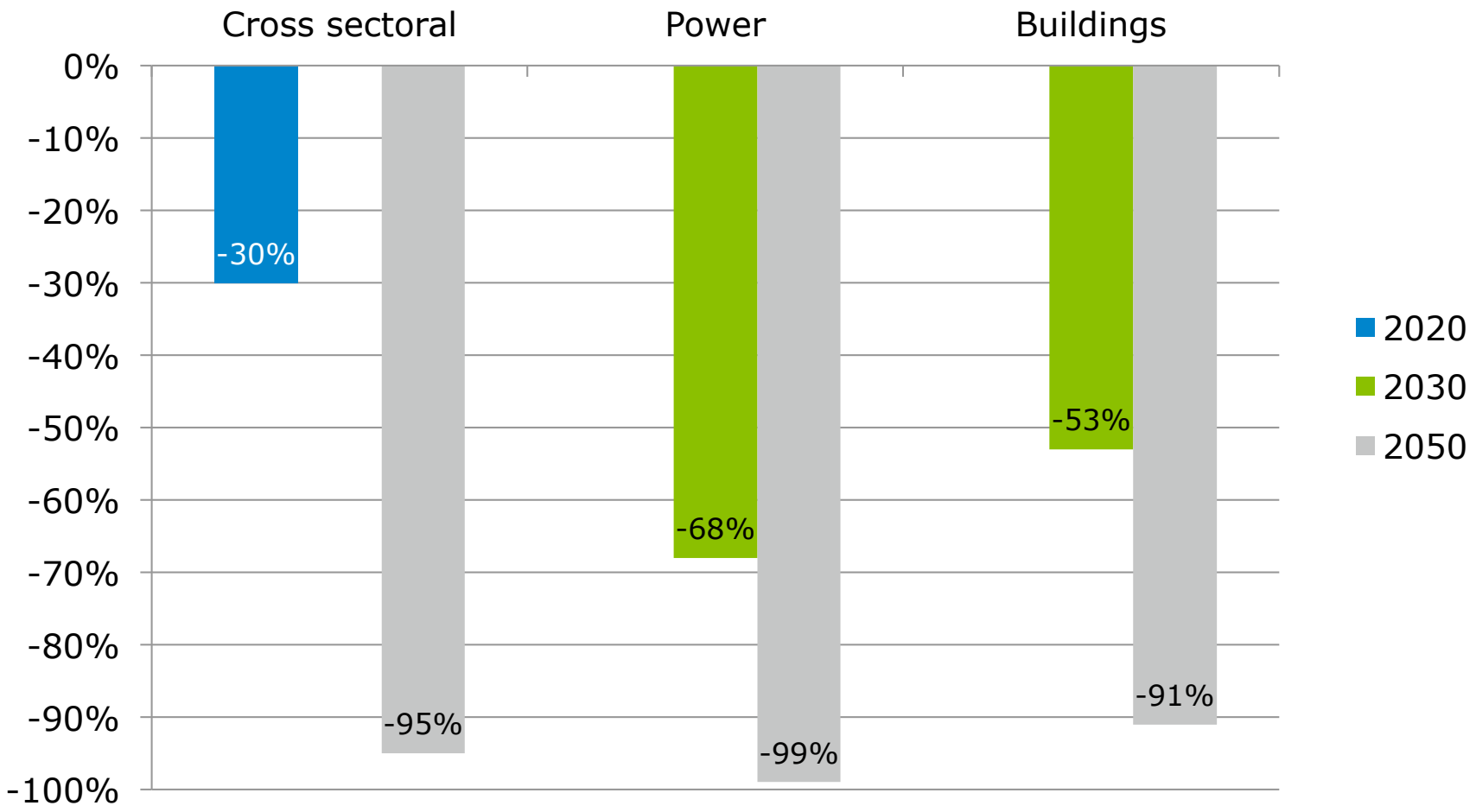
The overarching target: 2°C

EC Roadmap to 2050 (2011), Minimum GHG Reduction vs. 1990



The overarching target: well below 2°C

EC Roadmap to 2050 (2011), Minimum GHG Reduction vs. 1990



Where European regulation addresses TBS

EPBD

- Article 1 c (iii): "application of minimum requirements to the energy performance of … **technical building systems whenever they are installed, replaced or upgraded**"
- Article 2: definition for technical building systems *„technical equipment for the heating, cooling, ventilation, hot water, lighting or for a combination thereof, of a building or building unit*"
- **Article 8 "Technical building systems"**: system requirements for technical building systems "which are installed in ***existing*** **buildings**"
- Article 14 and 15: requirements for the inspection of heating systems and air conditioning systems

Ecodesign: efficiency requirements for products like boilers / pumps

Energy labelling: e.g. space heaters

State of implementation of Art. 8 EPBD

Rather than for all existing buildings, TBS system requirements are set only for new buildings or (major) renovations requiring a building permit

System performance only exists on overall building rather overall TBS level

In many Member States no system requirements at all, but rather requirements for elements

Requirements are only applied when “main parts” are installed/replaced

Lists illustrating Art. 8 measures only cover individual measures

Why Member States do not implement Art. 8 EPBD

Lack of awareness about Article 8 scope: "**whenever** TBS in **existing** buildings are newly installed, replaced or upgraded"

"System requirement for the *overall* energy performance"

- overall system performance: too difficult to determine in existing buildings
- System requirements: too difficult for replacing single components

Differentiation between "system" and "component" unclear

"Technical and economical feasibility": may be used as excuse for not acting

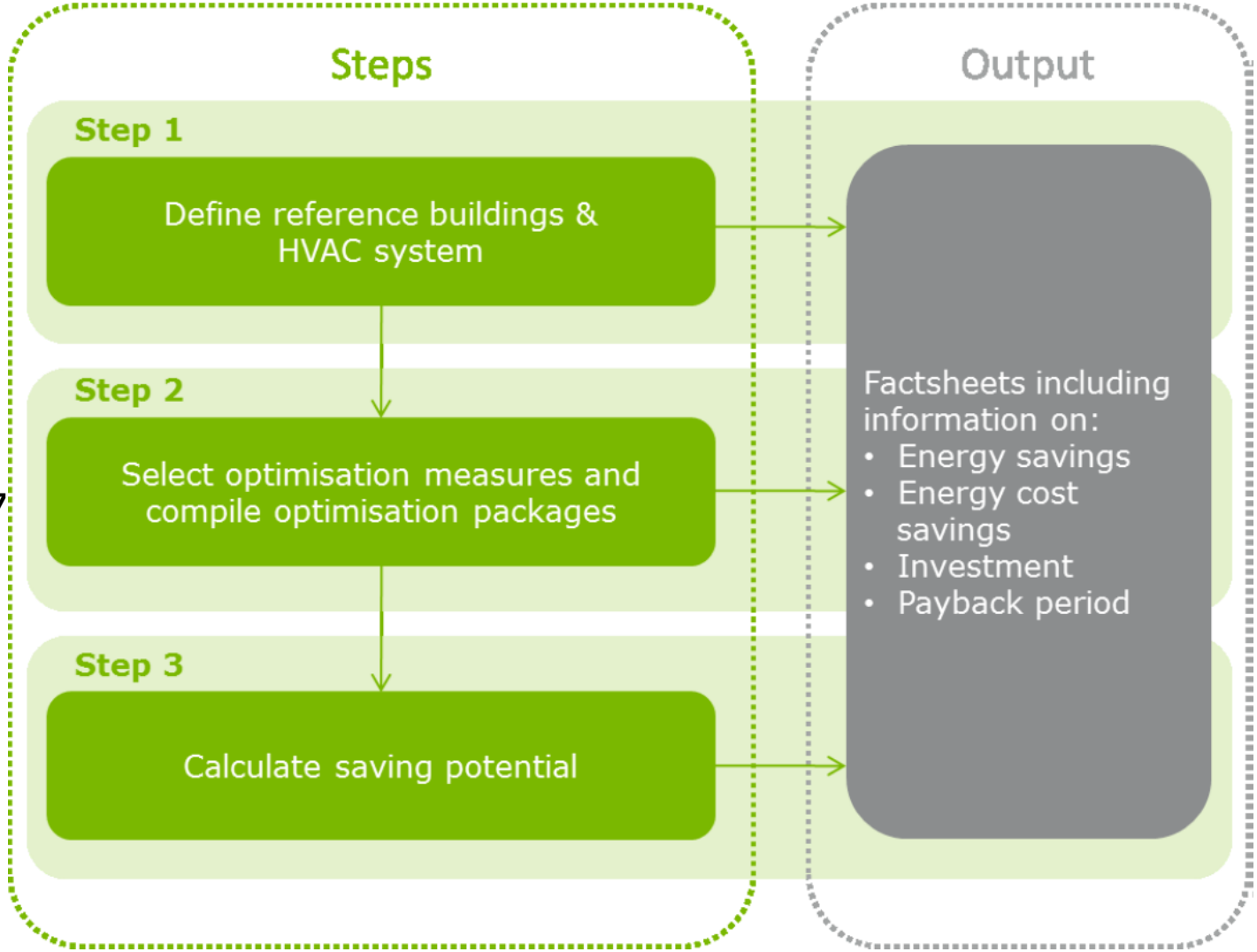
Effects of the optimisation packages on reference case level

According to
DIN V 18599
(energy quantities necessary)

EN 15232: 2012
(Impact of BAC's)

EN 15316-2:2007
(Impact of hydronic balancing – heating system)

Excluding change of the heat generator!!

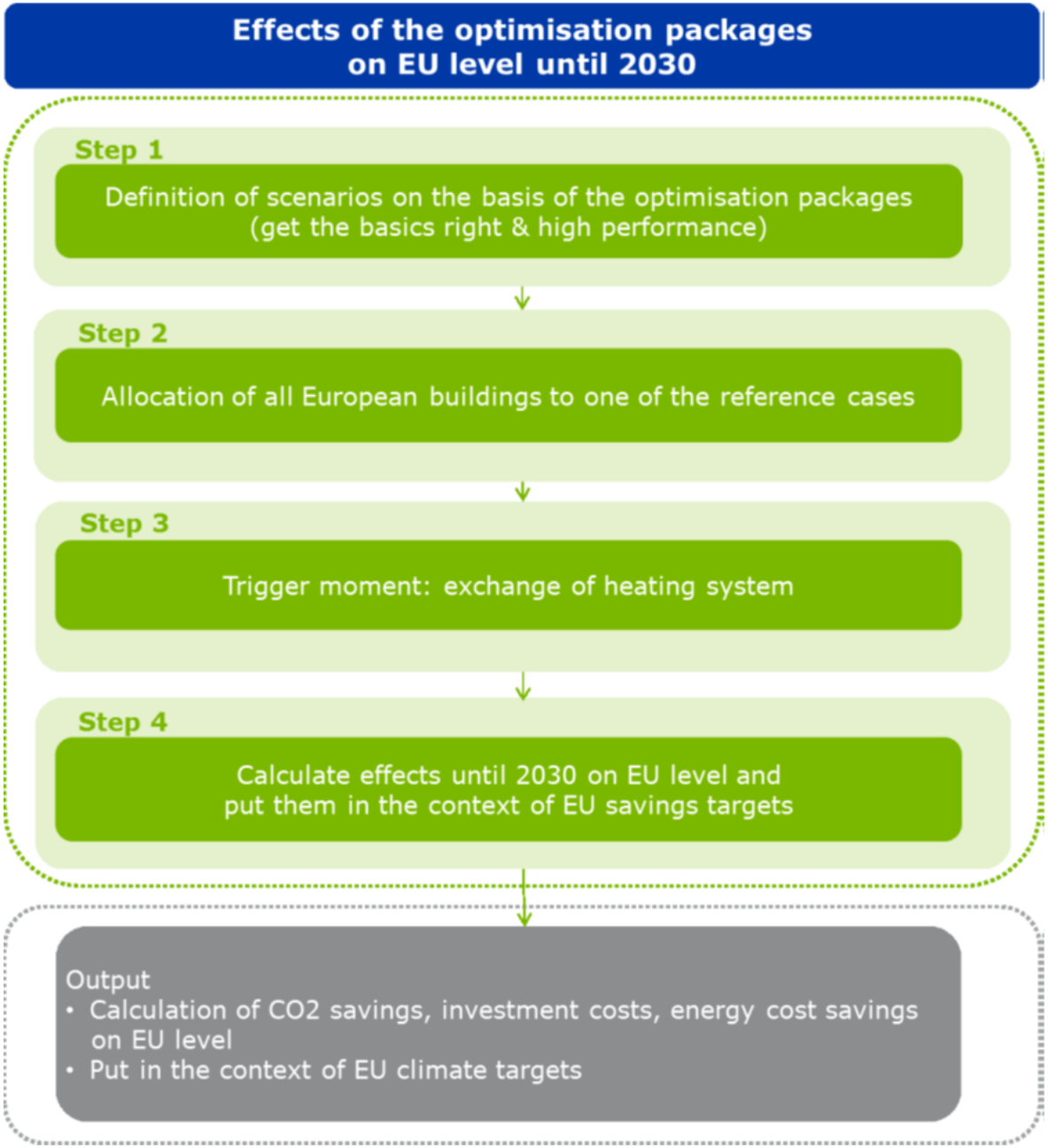


Implementation rate

3.6% per year

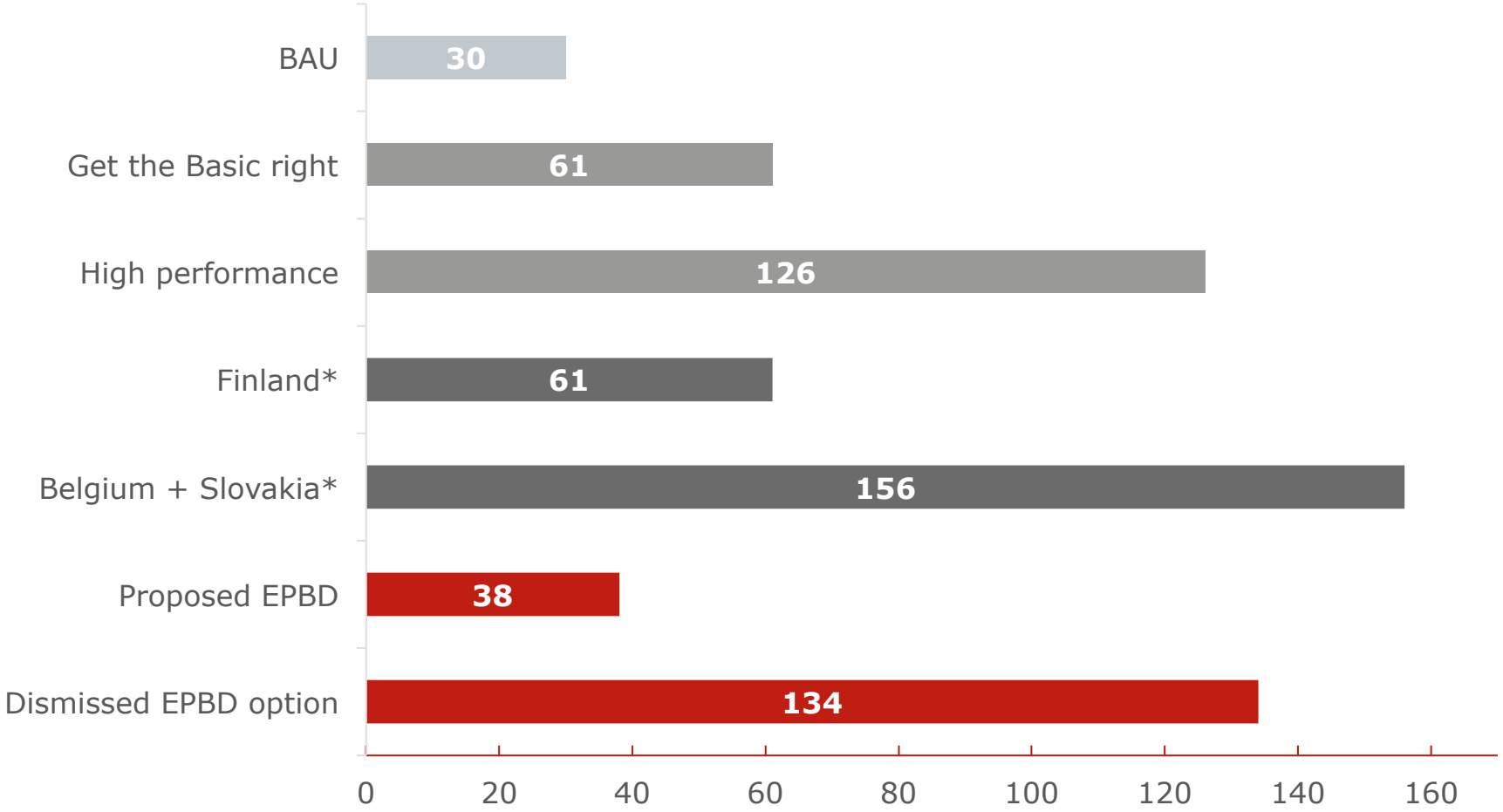
(EU average of the exchange of heating systems)

47% of the EU building stock optimized in 2030



Impact on EU building stock until 2030

Reduced greenhouse gas emissions [$MtCO_2$] per year in 2030



*156 Mt CO2: total CO_2 emissions of Belgium & Slovakia in *2014*

*61 Mt CO2: total CO_2 emissions of Finland in *2014*

Individual room temperature control

500 million radiators in Europe's homes are still fitted with simple radiator valves

10-15 bln EUR energy cost saving potential

31 $MtCO_2$ emission reduction

Payback time **2 years** or less

Digital, connected TRV's deliver additional savings and comfort

Installed	Saving up to	Replaced
New TRV 	36%	Simple valve 
	8%	Old TRV 
New electronic TRV 	46%	Simple valve 
	23%	Old TRV 

Automatic hydronic balancing

More than 80% of the EU building stock currently without hydronic balancing

6 bln EUR energy cost savings

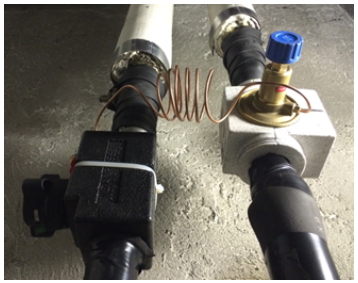
15.9 $MtCO_2$ emission reduction

Payback time **2 years** or less

Please join the presentation of paper *5-235-17 Osojnik* on Thursday 11-12:30:

"Hydronic balancing and control – how to overcome the global challenge of reducing energy use in multifamily housing"

Automatic balancing valves (ASV-M and ASV-PV)



Shut-off valve (ASV-M) in the flow pipe

Differential pressure controller (ASV-PV) in the return

Policy recommendation – key steps to make it happen…

Enforcement of existing requirements

- Enforcement of existing provisions such as Art. 8 of the current EPBD
- Guidance to member state on implementation of the EPBD, supported by best practice examples for different building types
- Enforcement should be simplified by adopting at least binding requirements on key functionalities like **control of energy generation, distribution and emission**

Push for implementation

very short payback, no-regret options

- e.g. individual room temperature control and automatic hydronic balancing
- Suggest to be made mandatory
- deadline for implementation

Policy recommendation – key steps to make it happen…

Invite

Please join our workshop on **Wednesday from 2 to 3 pm**

Danfoss workshop on barriers
and
policy recommendations
on TBS

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Many thanks for your time and attention !

Acknowledgements:

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http://www.danfoss.com/buildingefficiency/