From laggard to World leader - the role of policies in the EU motors and drives market transformation

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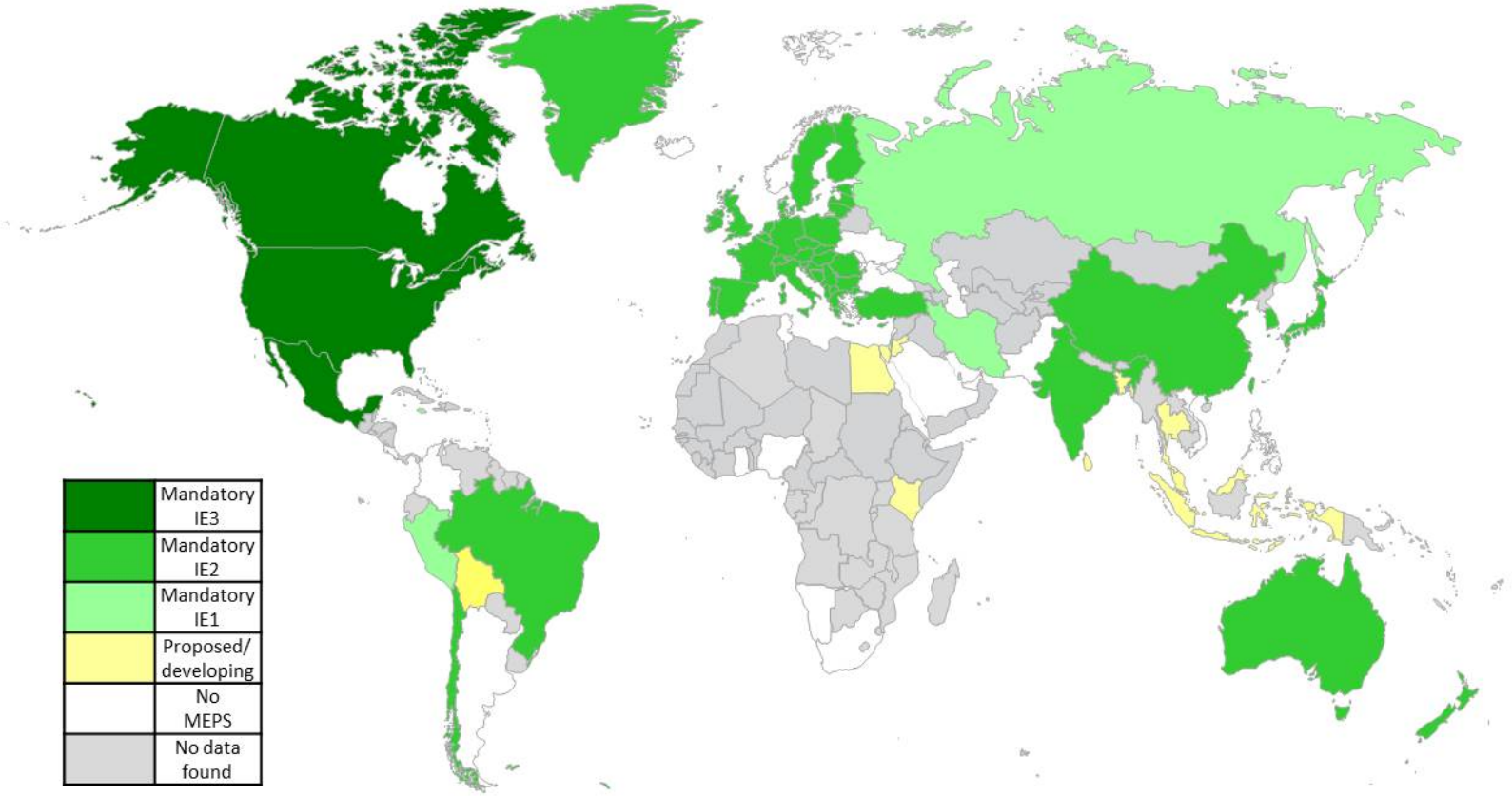
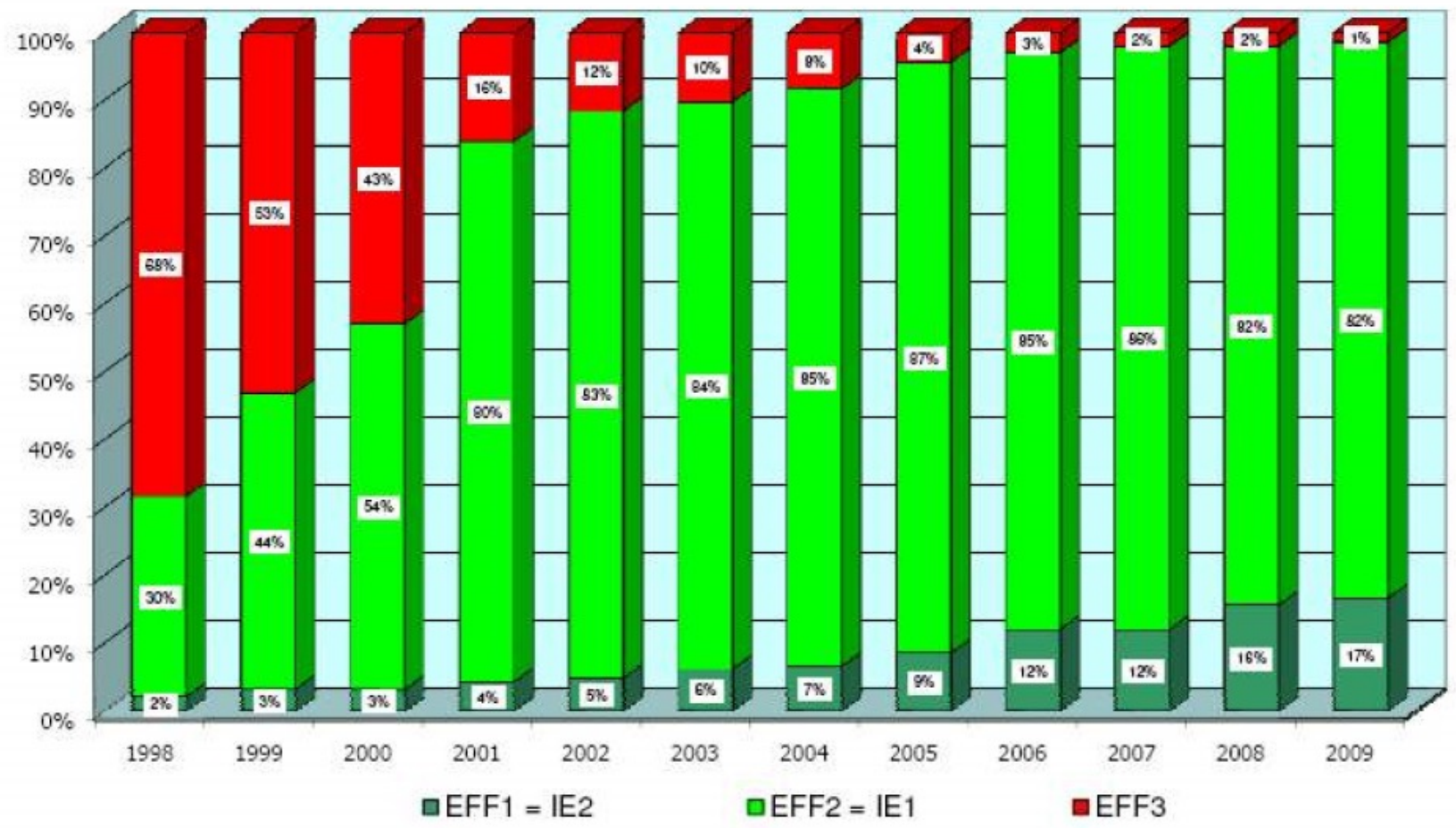
Motor MEPS Globally



AC, 3-Phase Induction Motors (0,75 kW - ....)

Total motor-sales in the scope of CEMEP/ EU Voluntary Agreement



Timeline of EU motor policies

1998	• CEMEP / EU Agreement
July 2009	• **Adoption of Regulation 640/2009**, specifies requirements regarding ecodesign of motors and use of VSD
16 June 2011	• **Stage 1**: Motors with rated output 0,75 – 375 kW must meet **IE2** efficiency level
July 2014	• Adoption of Regulation 4/2014 (amendment related to the definition of operating conditions)
1 Jan 2015	• **Stage 2**: Motors with rated output 7,5 – 375 kW must meet **IE3** efficiency level or **IE2 + VSD**
1 Jan 2017	• **Stage 3**: Motors with rated output 0,75 – 375 kW must meet **IE3** efficiency level or **IE2 + VSD**

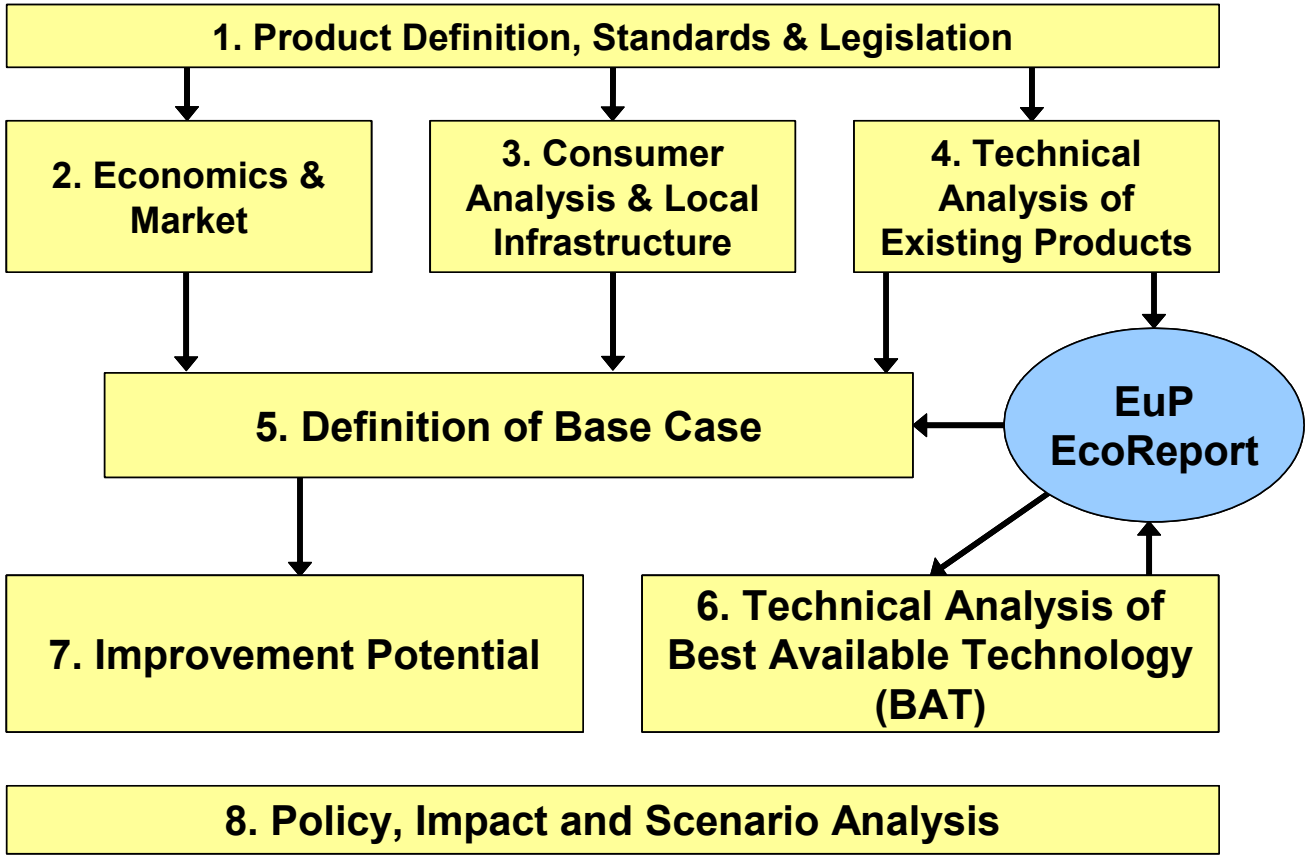
The Lot 30 Study (2012)

To evaluate the possibility of extending the scope of regulation to motors outside the current regulation.

The study addressed:

- Motors outside the scope of Regulation 640/2009
  - Extended Power range
    ≥0.12 up to 0.75 kW
    >375 up to 1000 kW
  - Other motor technologies
  - Exclusions (break motors, explosion proof)
- Motor controllers:
  - VSDs
  - Soft-starters

Methodology for the Ecodesign of EuP (MEEuP – VhK, 2005)



*Tries to identify a **list of suitable policy options** that will lead to the reduction of environmental impacts with consideration to LCC and the BAT in the market.*

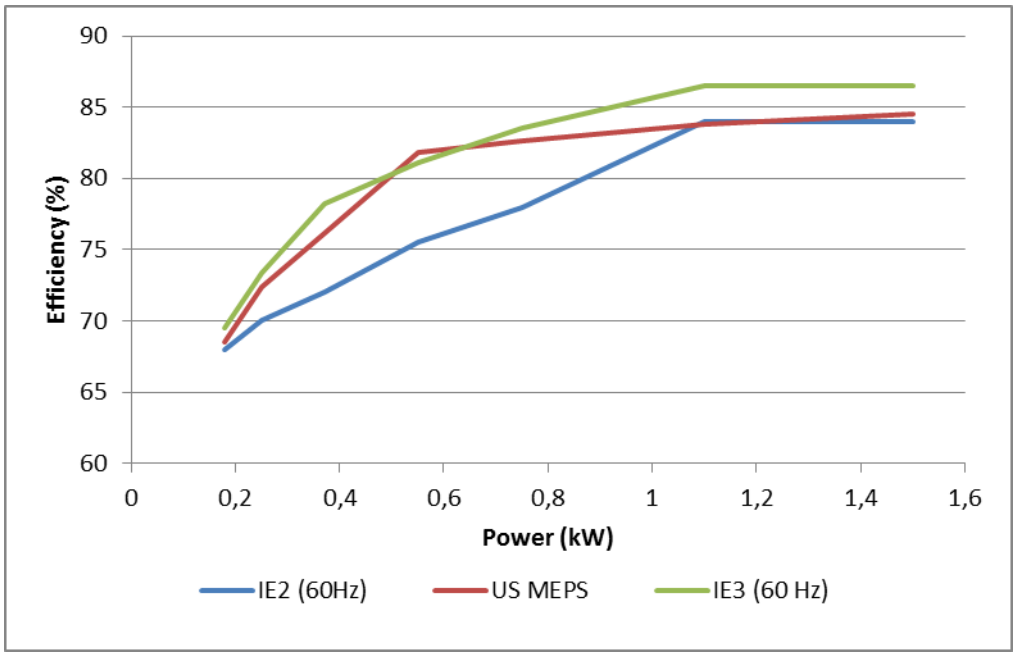
Identified Policy Options and Implementation Date Proposed

PO1a 1 Jan 2018	• Single Phase Motors (≥0.12kW) - MEPS of **IE2**
PO1b 1 Jan 2018	• Small (≥0.12 to <0.75 kW) Three Phase Motors - MEPS of **IE2**
PO1c 1 Jan 2018	• Large motors (>375kW to 1,000kW) LV and MV - MEPS at **IE3**
PO2 1 Jan 2022	• Remove IE2+VSD option – all motors ≥ 0,75kW **IE3**
PO3 1 Jan 2018	• Include explosion proof and brake motors
PO4 1 Jan 2018	• Mandatory Information Requirements for motors and VSDs
PO5 1 Jan 2018	• VSDs to meet **IE1** (Class 1) performance as MEPS
PO6a 1 Jan 2022	• Medium (≥0.75kW to 375kW) motors – MEPS at **IE4**
PO6b 1 Jan 2022	• Large (>375kW – 1,000kW) motors – MEPS at **IE4**

Policy Option 1a
1 Jan 2018

*All **single phase** motors with a rated output of greater than or equal to **120W** shall not be less efficient than the **IE2** efficiency level*

4,6 TWh



US MEPS (Jan-2015) for small 1-phase motors VS. IEC 60034-30-1 efficiency levels

Policy Option 1b
1 Jan 2018

Three-phase *motors with a rated output of* ***≥120W to <750W*** *shall not be less efficient than the* ***IE2*** *efficiency level*

9,9 TWh

- Of all the possible measures evaluated, **this leads to the highest energy savings.** The preparatory study has identified **IE2 level as cost effective and widely available efficiency level for these motors**.

- MEPS (Jan-2015) approved in the US at IE3

Policy Option 1c
1 Jan 2018

Three-phase, LV and MV *motors with a rated output of* ***>375kW to 1000kW*** *shall not be less efficient than the* ***IE3*** *efficiency level*

4,2 TWh

- Even if a relatively small numbers of motors between 375 kW and 1 000 kW are placed on the market each year, they **operate a large number hours** making them an important energy consumer. Removing the least efficient motors from the market would have important impacts.
- China has already put in place minimum requirements for medium and high voltage large motors.
- The efficiency classification standard IEC 60034-30-1 needs to be extended to MV motors.

Policy Option 2
1 Jan 2022

Remove the" IE2+VSD" alternative to the mandatory purchase of an IE3 motor

Options for an 11kW motor (example)	
IE3 Motor	**690 €**
OR	
IE2 Motor	600 €
+ VSD	1 200 €
+ VSD Installation	200 €
Total	**2 000 €**

2,7 TWh

- on the basis of economics alone, the existing concession will not be sufficient to induce users to specify a VSD
- **A delayed implementation date of 2022 is suggested in order to give 7 years for the existing policy to be used for the promotion of VSDs.**

Policy Option 3
1 Jan 2018

*Include **Explosion proof** and **brake motors** in the scope of regulation.*

0,9 TWh

No technical or commercial reason why the exemption would need to be maintained.

USA also removed these exemptions.

Policy Option 4
1 Jan 2018

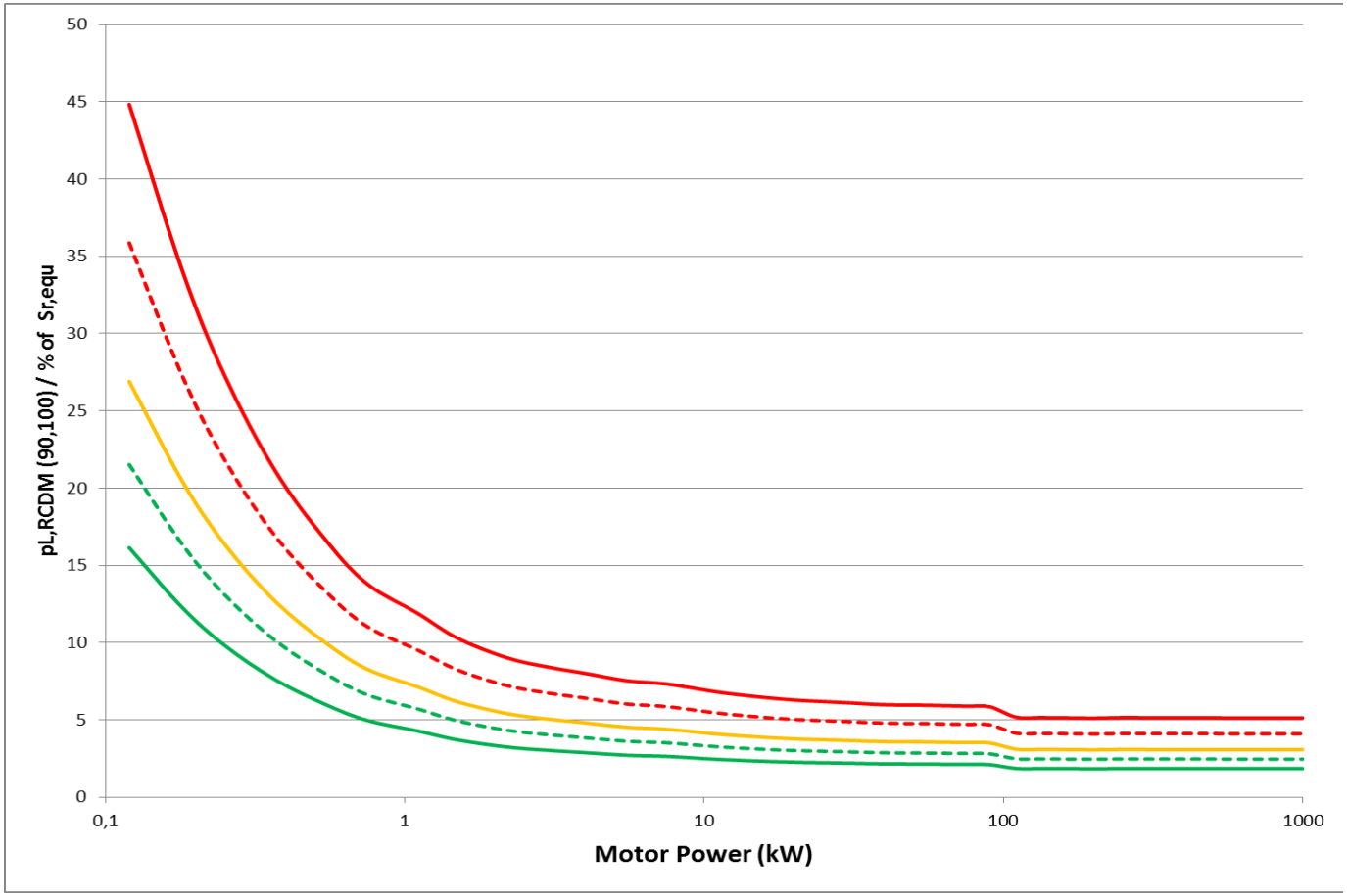
*The existing **Product Information requirements** within 640/2009 should be extended to include all products in the new scope*

- Information requirements under the existing Regulation 640/2009 can reasonably be extended to all types of motors and VSDs within the proposed extended scope of this Regulation.

- Include **other relevant information, such as VSD stand-by power** (some VSDs have a 500W stand by power!)

Policy Option 5
1 Jan 2018

*Mandatory MEPS for **VSDs** at **IE1** (EN50598-2 Draft)*



It would be beneficial to remove from the market VSDs with performance below IE1, **mostly being imported into the EU.**

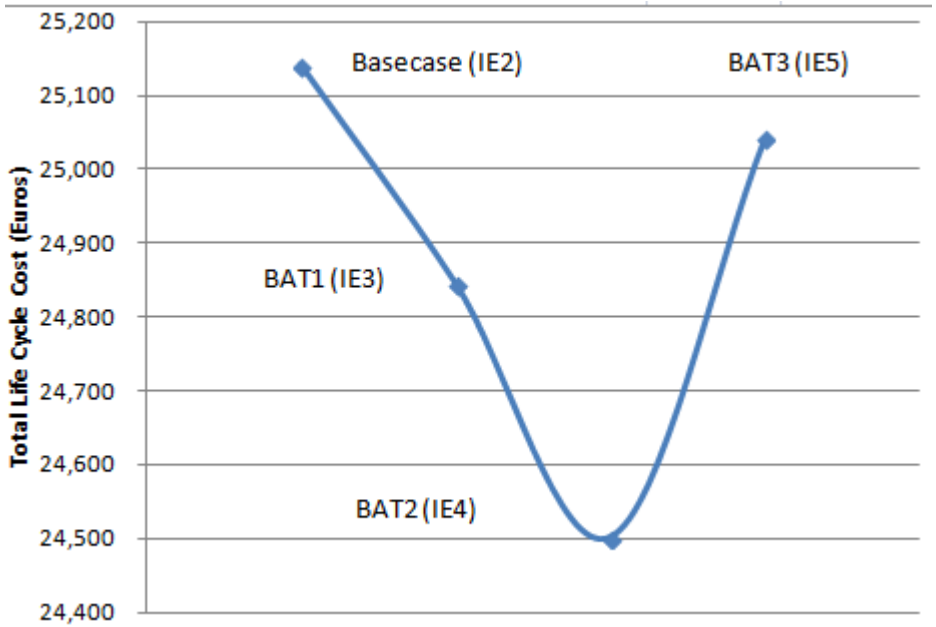
IE1 Reference Value

IE2 Reference Value (estimated)

Policy Option 6
1 Jan 2022

Raising of MEPS from IE3 to **IE4**
medium (≥0.75kW-375kW) and large motors (>375-1000kW)

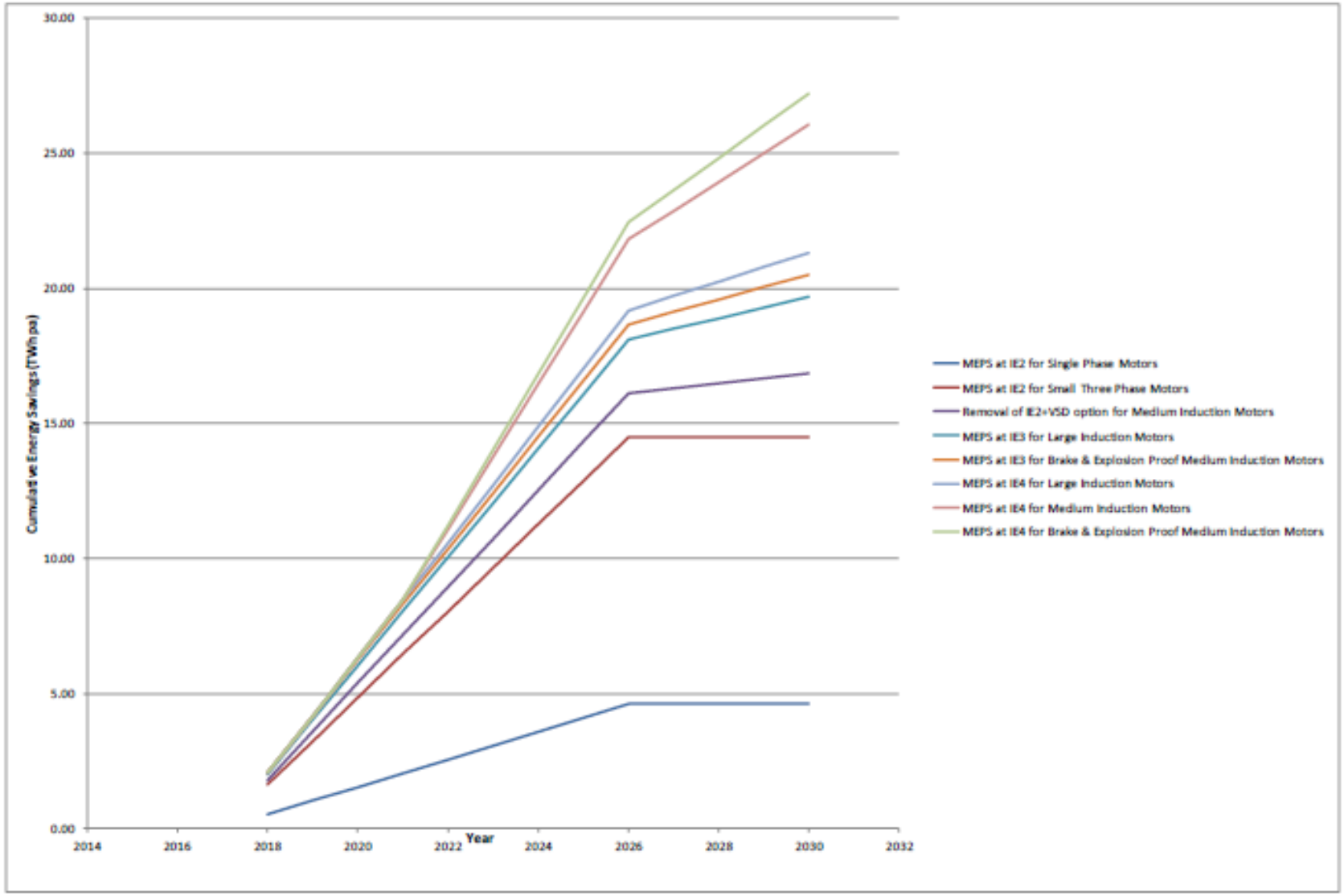
7,9 TWh



11 kW induction motor
15 years lifetime
3000 hours/year

IE4 induction motors are already available over a wide power range, although so far with limited manufacturer availability and very low sales.

Energy Savings



EC Proposed Measures and Timeline

1 Jan 2018

- Small single phase motors (120 W – 750 W) - IE2
- Small three phase motors (120 W – 750 W) - IE2
- Large low voltage motors (375 kW – 1 000kW) - IE3
- Explosion proof and brake motors in the scope of the Regulation
- VSDs - IE1

1 Jan 2020

- Large medium voltage motors (375 kW – 1 000kW) - IE3
- Removal of option to use an IE2 motor where a VSD is used

To be considered

- Medium motors (750 W – 375 kW) - IE4

Exclusions

- Motors with mechanical commutators (such as DC-motors);
- Increased safety motors;
- Motors in cordless or battery operated equipment (off-grid applications);
- Motors in hand-held equipment whose weight is supported by hand during operation.
- Motors completely integrated into a machine (for example pump, fan and compressor) that cannot be practically tested separately from the machine even with provision of a temporary end-shield and drive-end bearing.