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Energy-Efficient Electric Motors and Motor Systems Policy Guide

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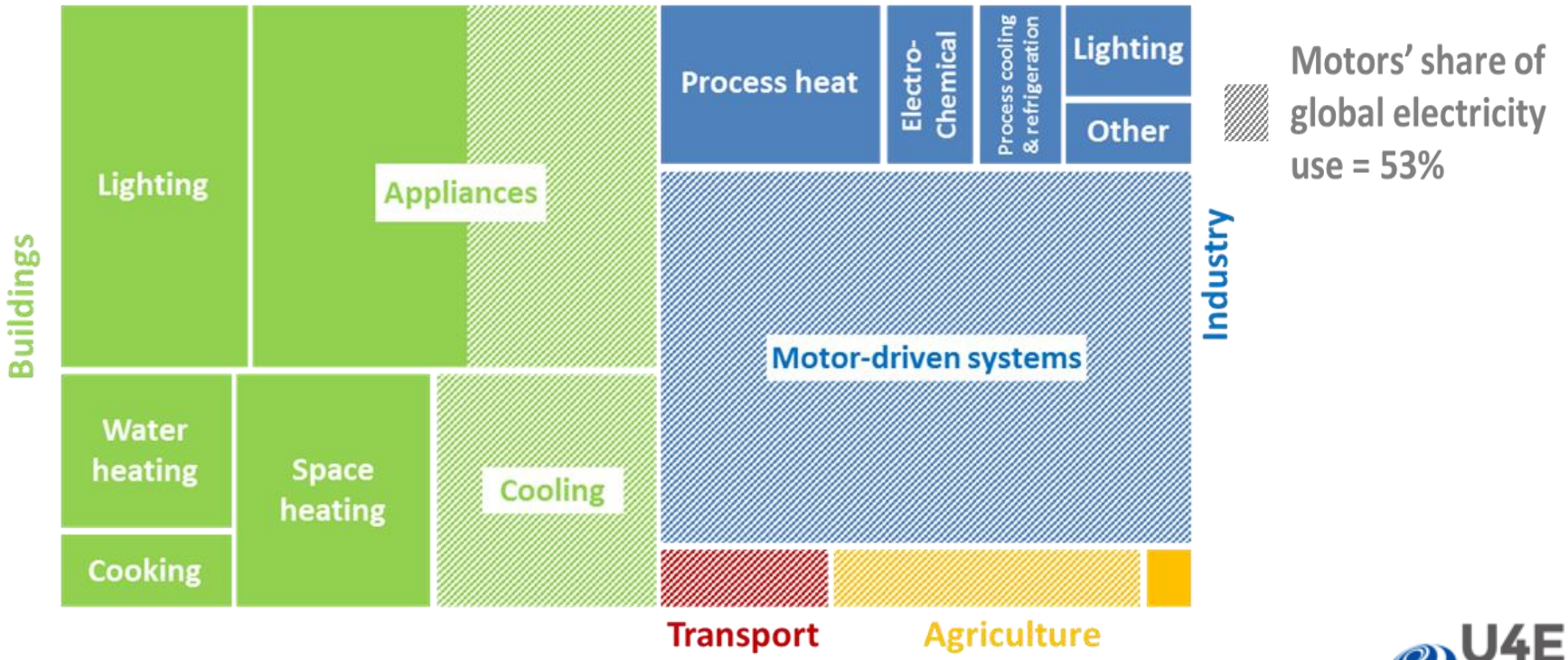
APEC Workshop, Hong Kong, 19th March 2019

Motor System: Critical to Global Energy Efficiency Goals

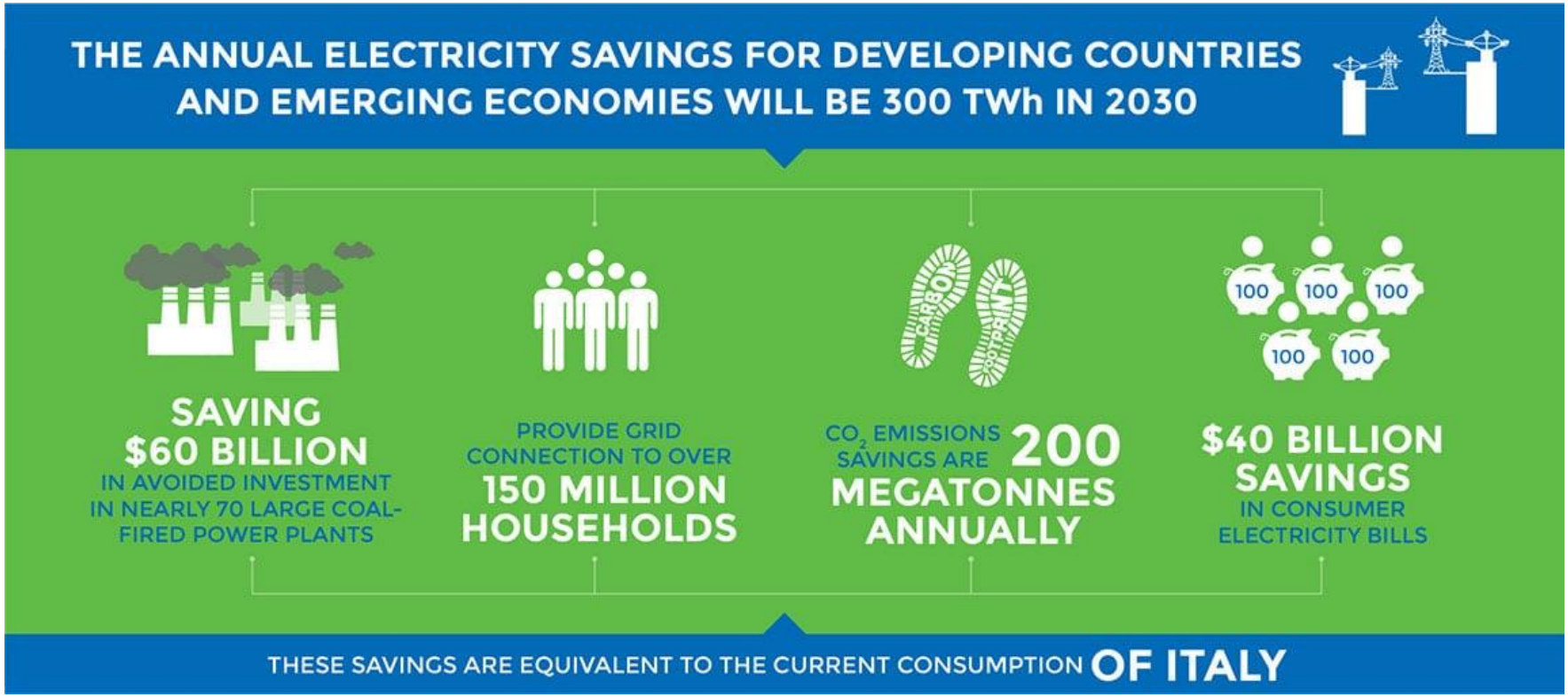
- Motors everywhere, keeping modern life in motion.
- Electric motor systems use over 50 percent of global electricity and around 70 percent of global industrial electricity.



Motor System: Critical to Global Energy Efficiency Goals

- The global market for electric motors is expected to expand by 2.5% pa, primarily driven by growth in developing countries.
- Better energy-efficiency regulations could reduce global electricity demand for electric motors by 24 percent in agriculture, buildings, and industry.
- New and existing technologies offer the potential to reduce the energy demand of motor systems across the global economy by 20 – 30 percent with short payback periods.
- By 2040, the annual global electricity savings for motors and motor systems could reach up to 3,050 TWh per year.

Motor System: Critical to Global Energy Efficiency Goals



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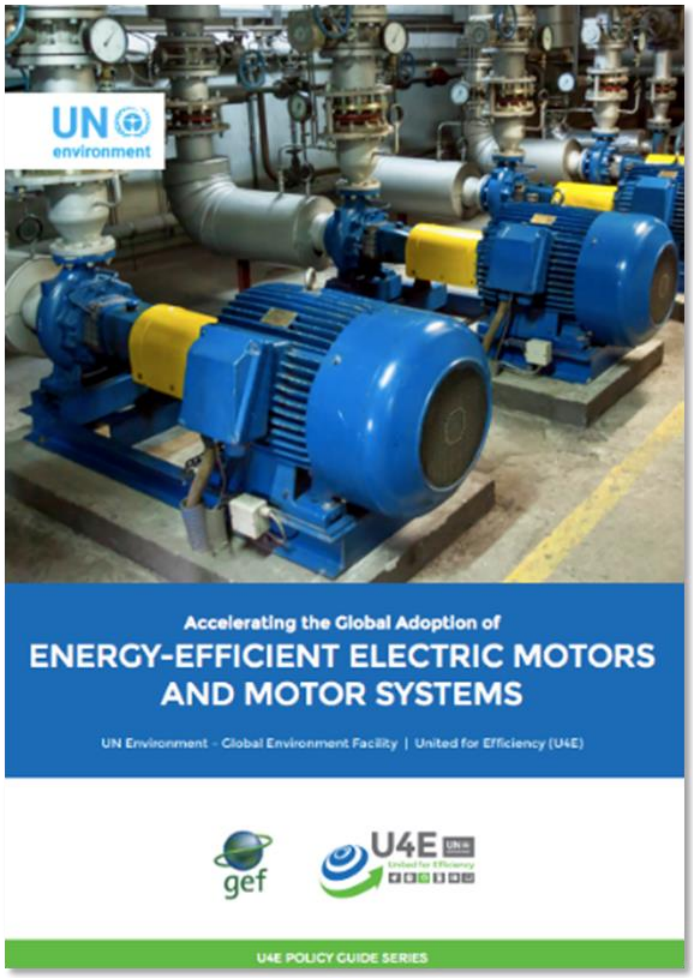


Background

- Developed with input from experts from around the world (manufacturers, universities, environmental groups, policymakers)
- Includes an Integrated Policy Approach to transition to energy-efficient motors and motor systems

https://united4efficiency.org/resources/accelerating-global-adoption-energy-efficient-electric-motors-motor-systems/

Motor Systems







POWER SUPPLY	Power Equipment	Controls	Motor	Coupling/ Mechanical Transmission	Driven Equipment	Mechanical Controls & Process Components	MOTION FLOW
	• Transformer • Switchgear • Cables	• Contactor • Soft-starter • Variable Speed Drive		• Coupling • Gear • Belt + Pulley • Chain + Sprocket • Clutch • Brake	• Pump, Fan, Compressor • Conveyor • Production Machinery	• Throttles • Valves • Dampers • Pipes	

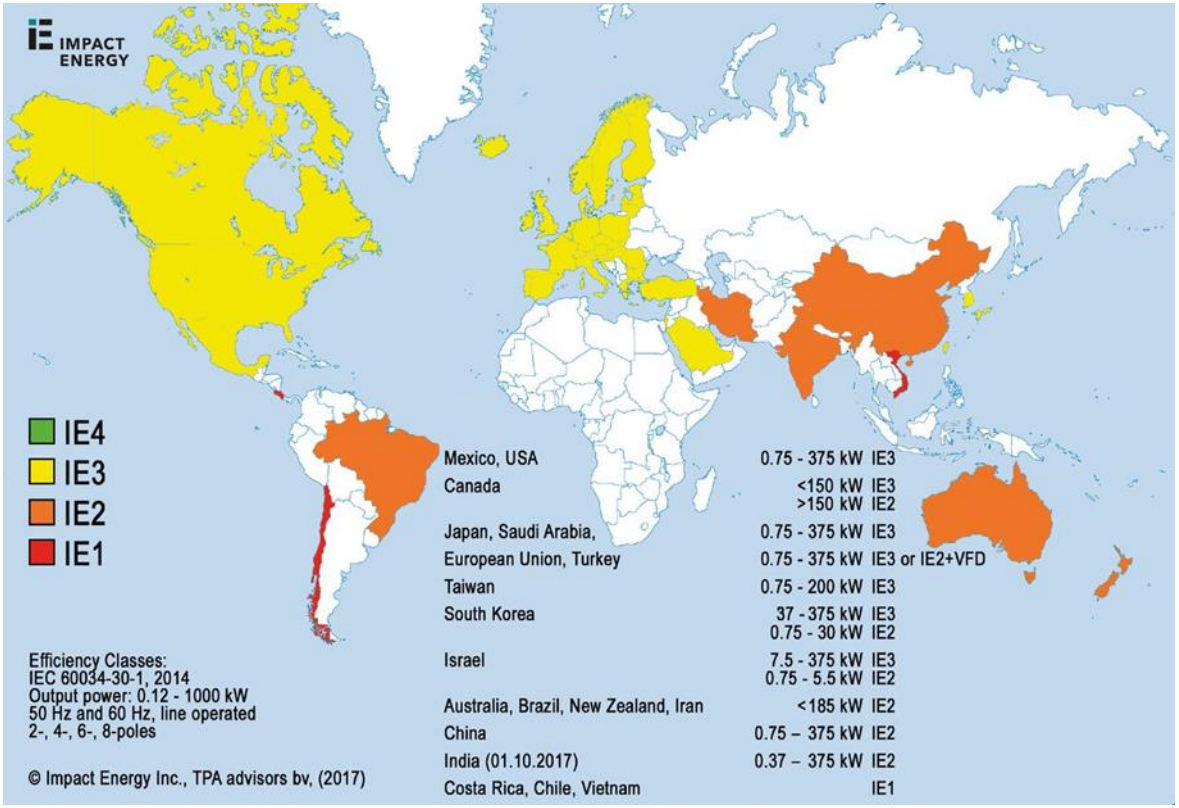
MOTOR-DRIVEN UNIT

MOTOR SYSTEM

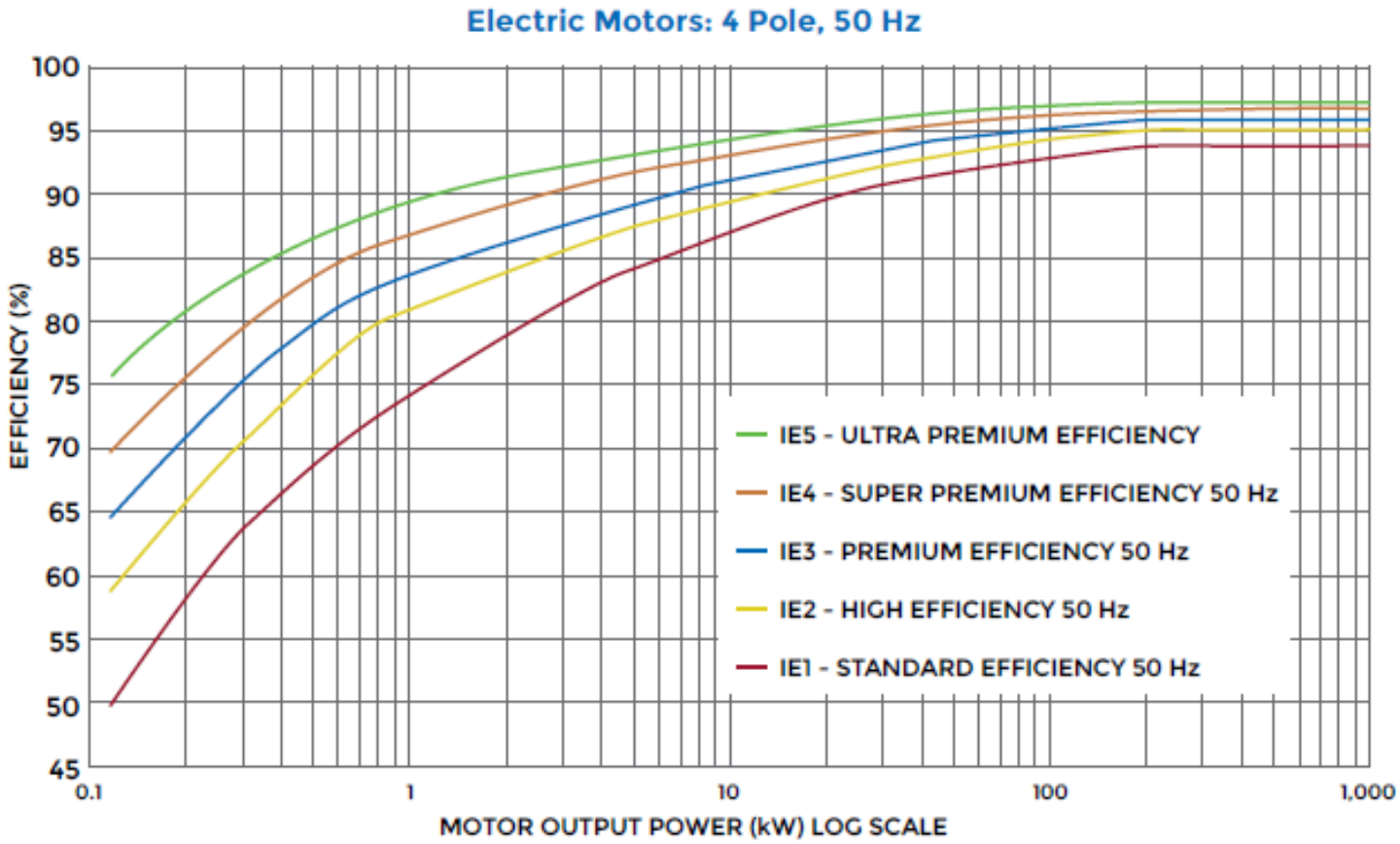
$$\eta_{system} = \eta_{power\ equipment} \times \eta_{controls} \times \eta_{motor} \times \eta_{transmission} \times \eta_{driven\ equipment} \times \eta_{components\ and\ controls}$$

Need to leapfrog to EE Motors

- 41 countries (81% of global electricity use in motor systems) have steered their markets toward higher efficiency motors
- Significant risks of inaction
  - Motors can last 20+ years, locking-in electricity waste
  - Become destination for inferior motors not accepted elsewhere

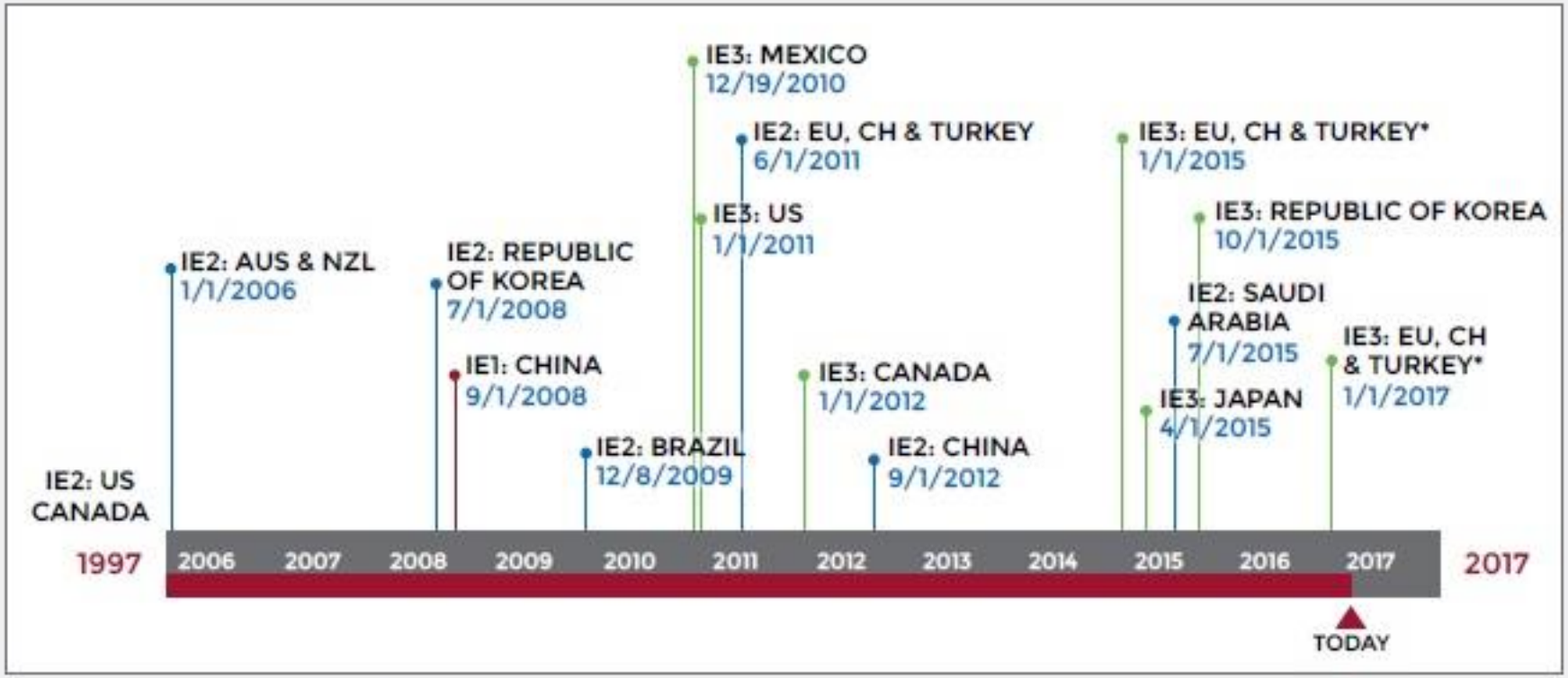


Motor - Energy Efficiency Standards



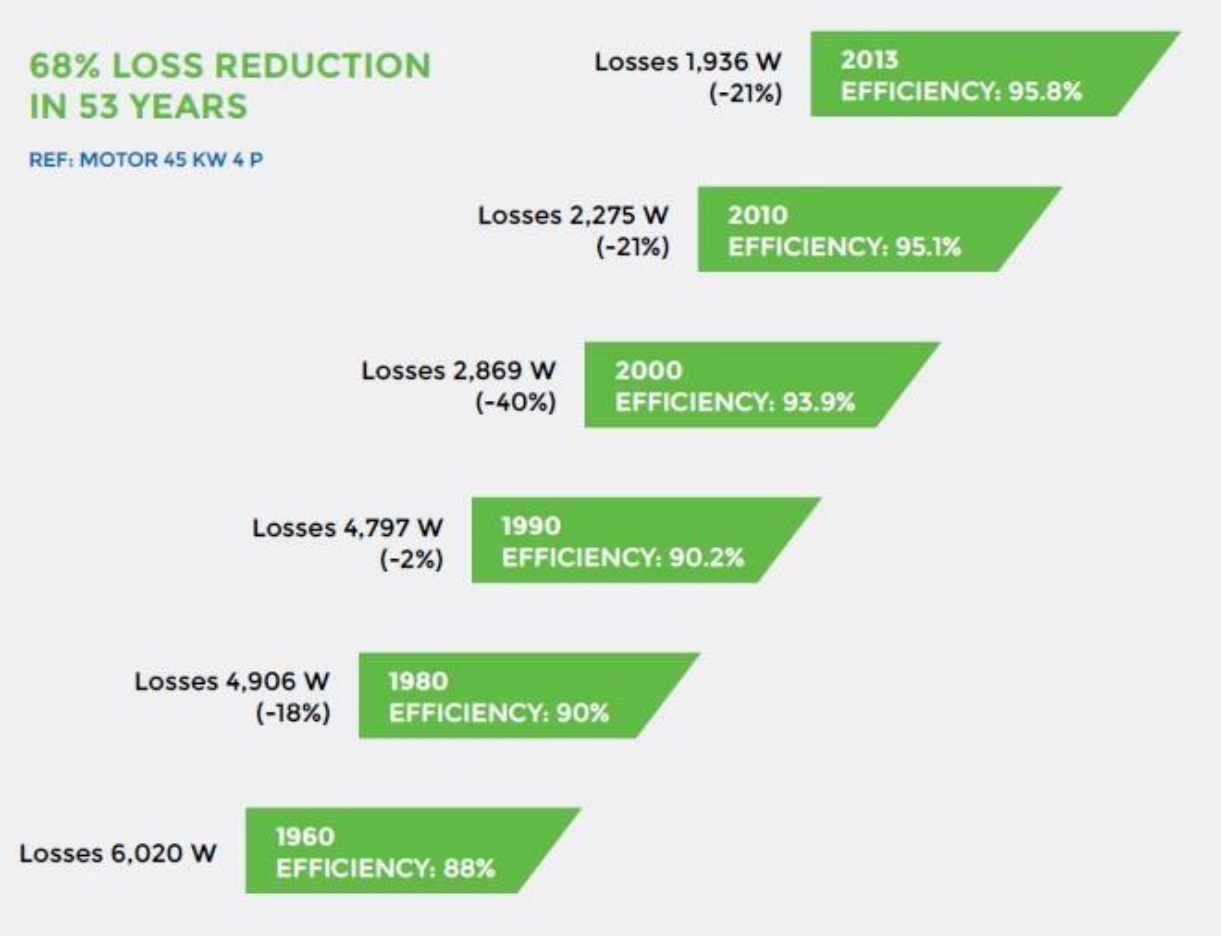
IEC Standard 60034-30-1

Global Overview of Motor MEPS



* 7, 5-375 kW – IE3 efficiency level or IE2 + VSD | ** 0,75-375kW – IE3 efficiency level or IE2 + VSD

Old Installed Motors – Energy Guzzlers



Induction motor energy efficiency improvements over years – Example 45 kW 4 pole design

Recommendations to Policy Maker

- Standards
  - Domestic motor manufacturing / imports: adopt MEPS at IE2 and timetable for graduating to IE3
- Supporting policies
  - Professional motor repairs per ANSI/EASA AR100
  - IEC 60034-30-1 nameplates on all motors
- Monitoring, verification & Enforcement
  - Implement MVE in national legal framework in time for the adoption of MEPS
  - Measure motor efficiency per IEC 60034-2-1
- Financial Mechanism
  - Assess existing finance sources and conduct analysis to understand financial barriers so applicable delivery mechanisms can support voluntary actions
- Environmentally Sound Management
  - Collect and process cast iron, steel, aluminium, copper, stainless steel and brass parts (98% of motor content) that are fully recyclable

Thank you

For more information please contact
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