



From Voluntary to Mandatory: Policy developments in electric motors between 2005 and 2009

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Operating Agent: Electric Motor Systems Annex EMSA

Market Transformation Process

- 2005:
Europe and Asia has no mandatory standard
USA, Canada, Australia have mandatory standard
No agreed motor test and no harmonized motor classes
- 2009:
Europe has decided on mandatory standard
IEC has provided global motor test and efficiency classes

So what was the problem?

- Controversy between the 50 and 60 Hz world
 - 60Hz motors represent about 32% of global market
 - 50Hz motors represent about 68% of global market
- Old IEC standard that rated motors as more efficient than they were (1-3%)
- IEEE (North American Institute of Electrical and Electronics Engineers) had a better testing standards
- The difference in testing methods led to market disturbance
 - Why make an efficient motor if you couldn't get paid for it because no one trusted its efficacy?

Communitcty of Practice in the Standards for Energy Efficiency of Electric Motors Systems (SEEEM)

- Global standards are needed
- Difficult to introduce without common understanding of the needs and problems
- Building a network and consensus among stakeholders
- Influencing testing standards and definitions
- Working towards a common definition of what an efficient motor is

Technical barriers and (lack of) standards perceived as the biggest problem

5

- Market survey in 2008 of the 5 largest manufacturers
- Technical product regulations, standards etc was identified as the largest barrier to trade

The process started through networks and buildings consensus form the bottom

- Various conferences and fora
- Active involvement in CIE committees to influence and argue for standards (based on outside knowledge and not only industry concerns)
- Building on the various voluntary programmes to get a gradual harmonisation of standards
- NOT the same thing as having identical minimum energy performance requirements (MEPS) – but to compare and compete with the same rules.

Motor Standards 2005

EFFICIENCY LEVELS*	Designations based on test method:		Minimum Energy Performance Standards <i>(estimated in-country % market share) (1)</i>	
	IEC 34-2	IEEE / C SA	MANDATORY	VOLUNTARY
PREMIUM		NEMA Premium		Australia (10%) Canada, USA (10%) China - 2010
HIGH	EFF 1	EP Act, the Level, JIS C 4212	Australia - 2008 Brazil - 2008 Canada, USA (54%) China - 2010 Mexico	Australia (32%) Brazil (15%) China (1%) EU (7%) India (2%) Japan (1%)
STANDARD	EFF 2	Standard	Australia (53%) Brazil (85% 20 after '08) China (88%) Canada, USA ~ 30% exempt	EU (88 non-CEMEP, 85 of CEMEP agreement members) India (88%) Japan (88%)
Below Standard	EFF 3			EU (28% non-CEMEP, 8 CEMEP) India (60%)

* Normalized, taking differences in test methods and frequencies into account.
 (1) Based on information shared at standards workshop and EEM CD S, September 2005

European Label 1999

...erfolgt durch durch geschützte, lizenzierte Logos
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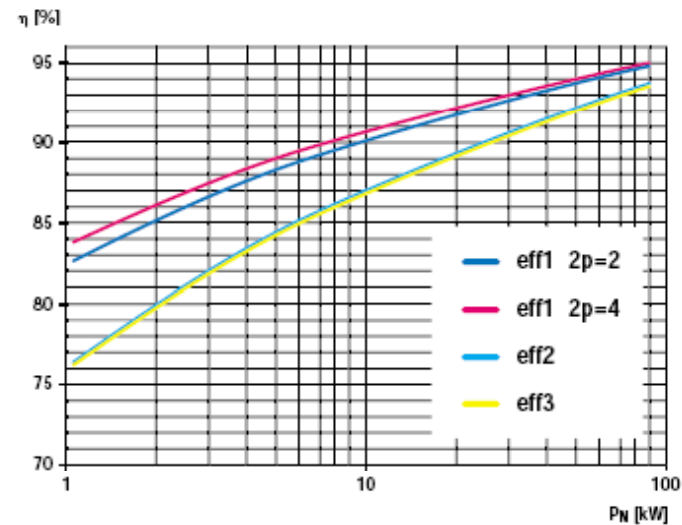
Entspricht den derzeit auf dem Markt befindlichen üblichen Wirkungsgraden (hauptsächlich < AH100)
Corresponds to currently widely available efficiencies (mainly < frame size 100)



Im Wirkungsgrad verbesserte Motoren
Motors with improved efficiency



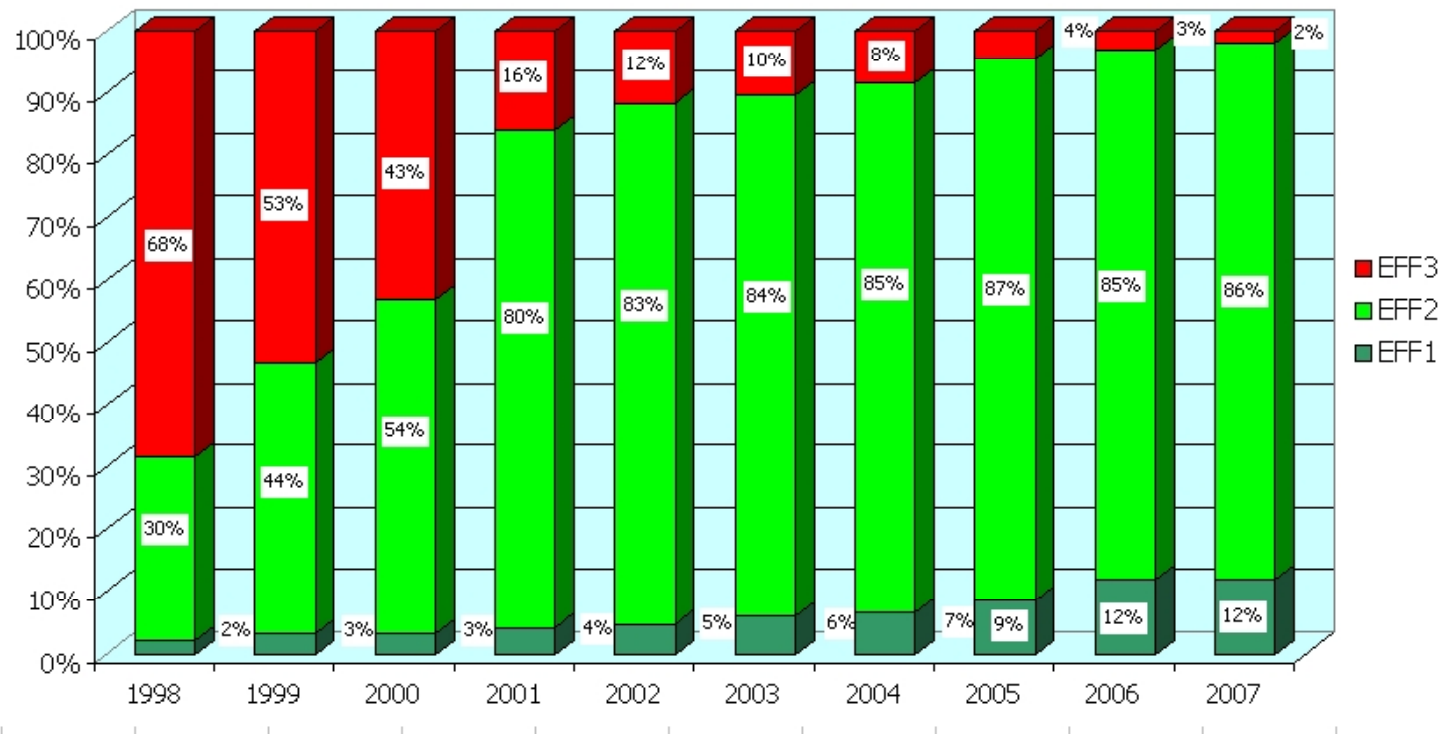
„Hocheffiziente“ Motoren, η liegt z.T. über den nord-amerikanischen Anforderungen.
„High efficiency“ motors, η often above North American requirements



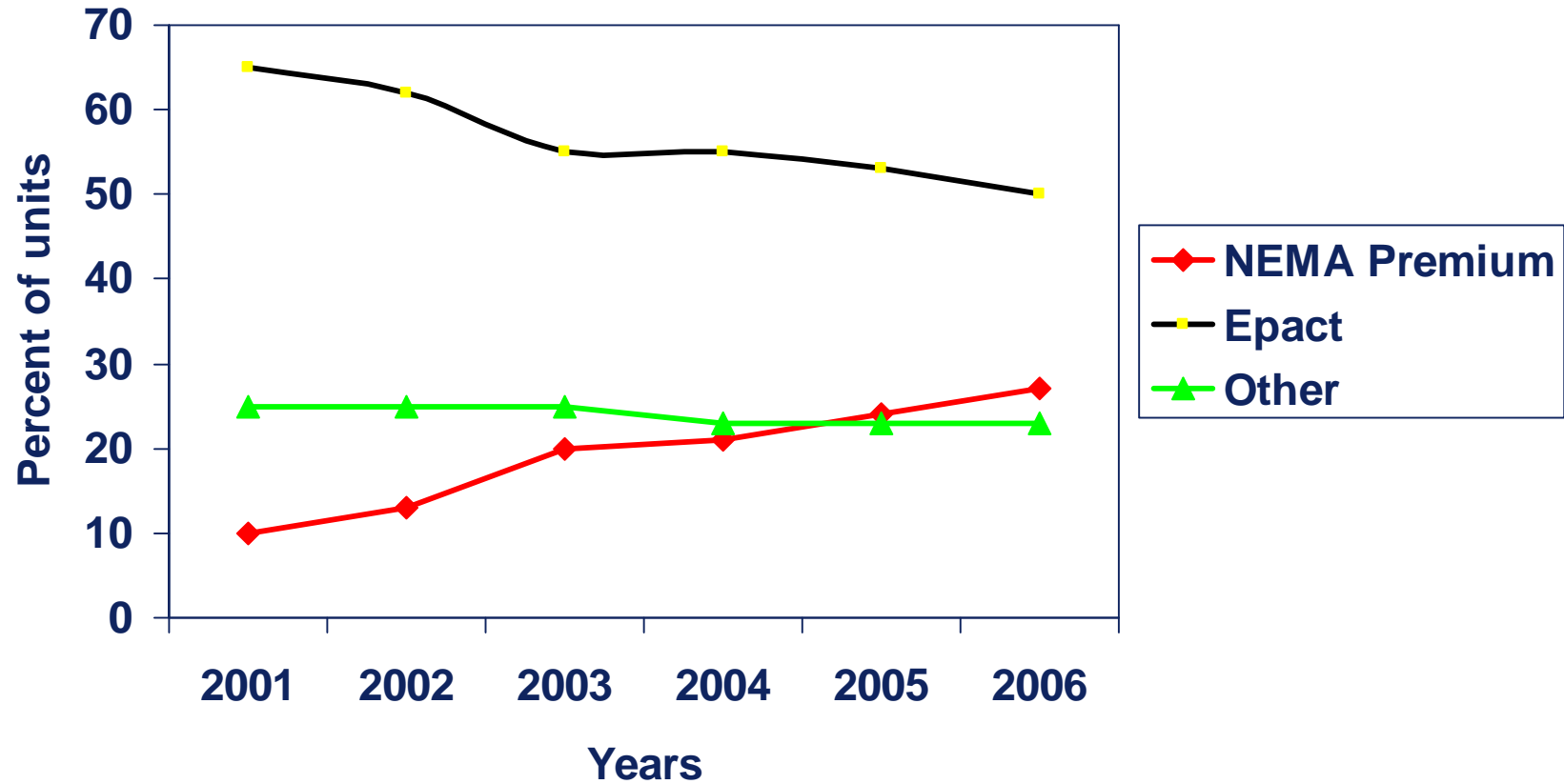
¹⁾European Committee of Manufacturers of Electrical Machines and Power Electronics

Europe Motor Sales 1998 - 2007

Market share of EFF-motors under the scope of the Voluntary Agreement of CEMEP



US Motor Sales 2001 - 2006



US – Europe Comparison Sales of efficient motors

- US 75%
IE2 (mandatory: 50%) and IE3 (voluntary: 25%)
- Europe 12%
(voluntary: 12%) and IE3 (voluntary: 0%)
- Voluntary measures are too slow

IEC Efficiency Classes 2008

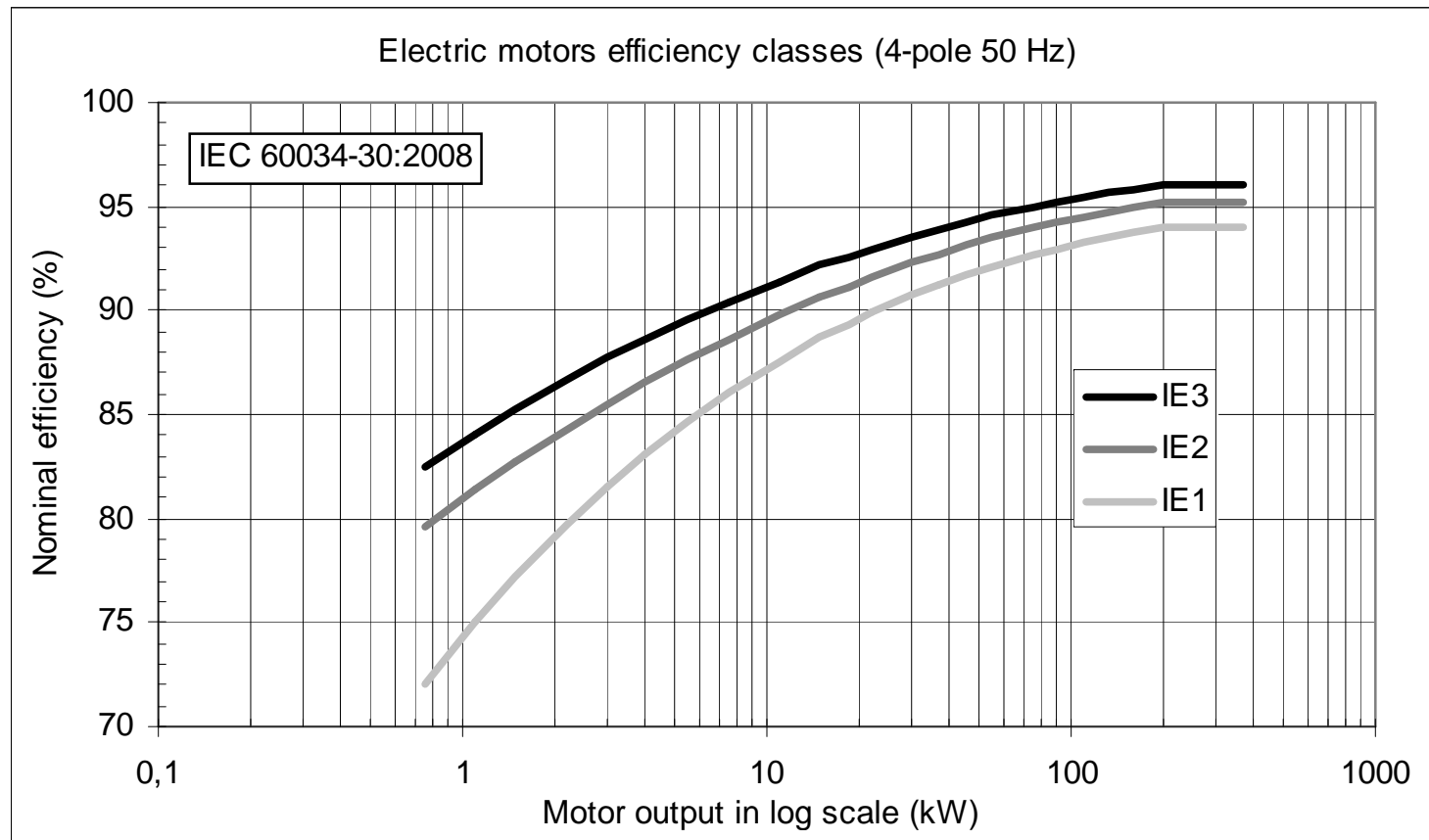
	IEC 60034-30
Premium Efficiency	IE3
High Efficiency	IE2
Standard Efficiency	IE1

Below Standard Efficiency

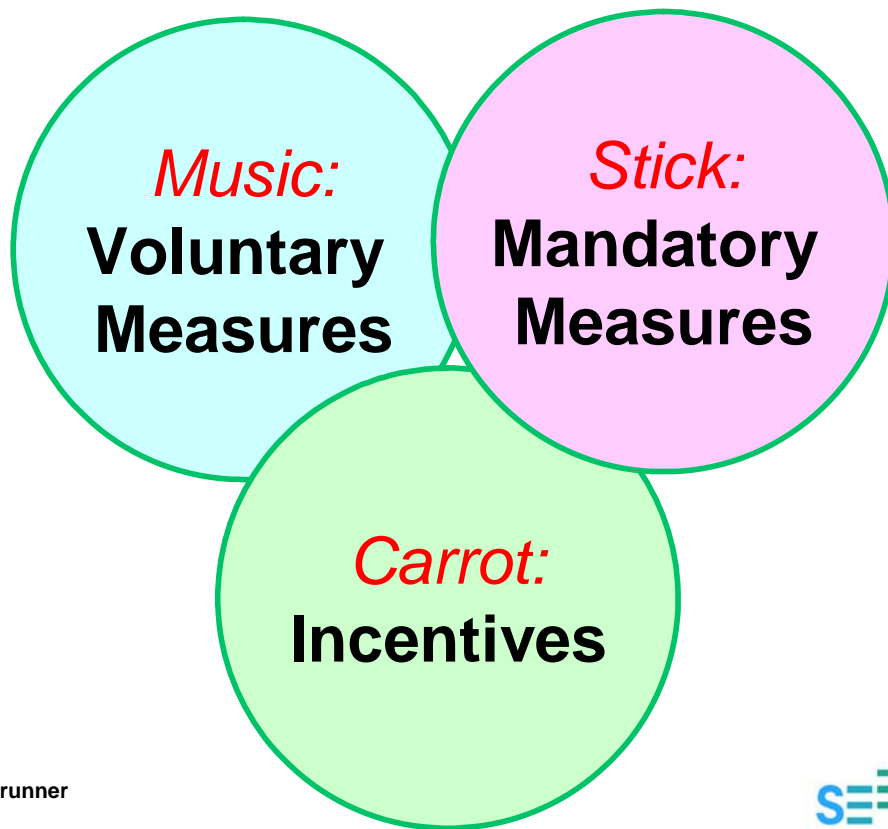
CEMEP/EC
Eff1
Eff2
Eff3

USA/NEMA
NEMA Premium
EPAct

IEC Motor Classes 2008



Instruments



Conrad U. Brunner



SEEM 2006 - 2008

15

Standards for Energy Efficiency of Electric Motor Systems

Community of Practice

Stakeholder Process

Supported by some countries and some industrial partners

IEA 4E Efficient Electrical End-Use Equipment

16

- Hans-Paul Siderius, NL Chairman
- Shane Holt, Australia Vice Chairman
- Annexes
 - Mapping & Benchmarking
 - EMSA – Electric Motor Systems Annex (lead country Switzerland)
 - Standby
 - Set Top Boxes



EMSA Goal

- Promote high efficient electric motors systems in industrial and developing countries
- Dissemination of best practice on technical and economical experience
- Lessons learned for coherent motor policy
- Minimum energy performance standards & labels

In order to:

- Energy efficiency improvement
- Lower emission of greenhouse gases

MENU

- News
- EMSA Tasks
- Motor Events
- Downloads
- Links
- Contact
- EMSA Newsletter
- SEEM Archive
- Sitemap

4E Websites

- IEA 4E Main Site



You are here > Home

4E - Electric Motor Systems Annex EMSA

Electric motor systems use 40% of global electricity. They drive pumps, fans, compressors and traction systems in industry, infrastructure and buildings. With using best practice energy efficiency can be improved by 20% to 30% on average. Most improvements have a pay back time of 1 to below 3 years. This means a big potential impact on reduction of global greenhouse gas emissions.

In order to gain fast and efficient access to the large potential of energy efficiency improvements of motor systems the 4E Electric Motor Systems Annex EMSA is organized in tasks that will each contribute to a coordinated effort towards rapid transformation of global markets by:

- Spreading good practice,
- New improved technology,
- Positive policy experiences.

EMSA will be treated in 8 tasks from A to H. The overall coordination will be the duty of the Operating Agent as coordinator and manager. Every task identifies its scope and states its individual deliverables at the end.

Task A is the basic implementation work, external communication and outreach to be done under EMSA. The decision on selecting the following tasks B to H, detailing and modifying the tasks and adding other new tasks will be taken jointly by the participants.

- A. Implementation support & outreach
- B. Technical guide for motor systems
- C. Testing centers
- D. Instruments for coherent motor policy (start later)
- E. Training & capacity building
- F. Energy management in industry
- G. New motor technologies
- H. Total motor systems integration (start later)

Download the EMSA Fact Sheet here.

News

EMSA Newsletter in Chinese
中文版

12 May 09 - Motor Systems

Europe goes MEPS

14 Apr 09 - Motor Systems

IEC Motor Guide Published

6 Apr 09 - Motor Systems

www.motorsystems.org

Conclusions 1

- 1 Harmonized international standards for testing, efficiency classifications and labels are necessary.
- 2 The selection of active and competent IEC WG members is important for broad country representation.
- 3 Neither traditional Euro-centricity nor American hegemony attempts can reach international harmonization.
- 4 Government representatives are key to make pressure for energy efficiency (not just industry sales).
- 5 Senior academia members as independent council can bring factual explanation instead of controversy

Conclusions 2

- 6 Select a product and not a system to start with.
- 7 An international testing campaign - Round robin - gathers new evidence to change barriers of preconceived notions and experiences.
- 8 Harmonization goes in four distinct steps in this sequence: 1) testing standards, 2) efficiency classes, 3) marking scheme and labels and 4) MEPS.
- 9 MEPS involve regulations on national levels. Many countries first have to prepare their legal system.
- 10 Decide on definitive efficiency goal with early announcement in order to give industry ample time to adapt production.