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it's all about innovation

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Globale energikrav til elmotorer

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Globale energikrav til elmotorer

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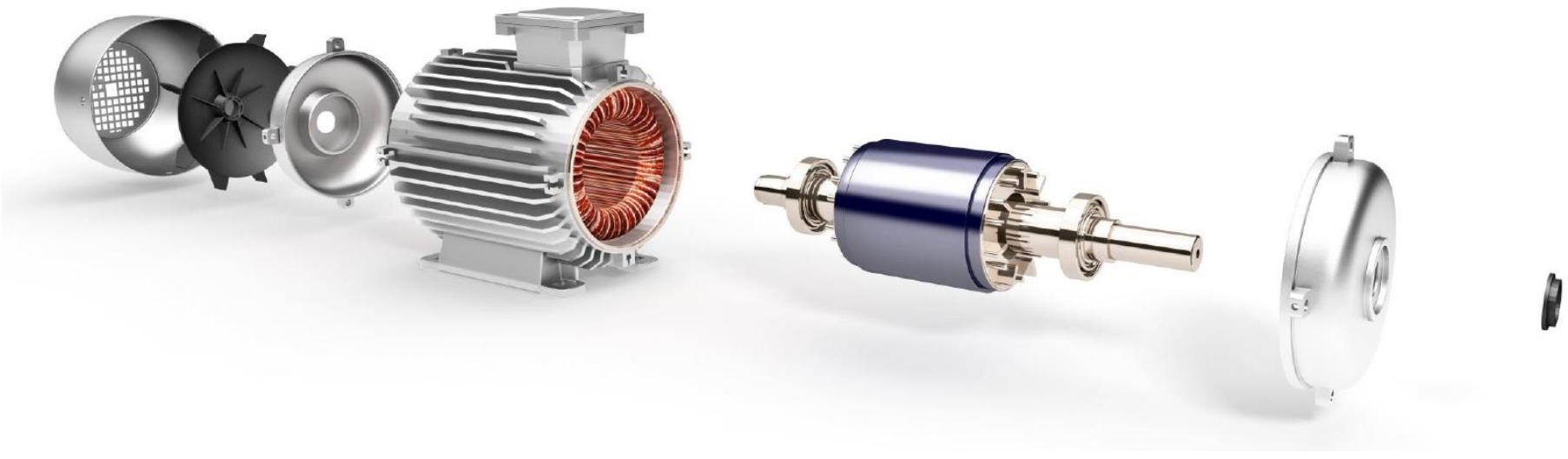
- Program
  - Intro
  - Elmotorers energikrav, historien i Danmark, EU og verden
  - Forskellige motor teknologier og fremtidens energikrav
  - IEA 4E Electrical Motor Systems Annex – 4E EMSA
    - The motor Systems Tool
    - IEC standardisering inden for motorsystemer



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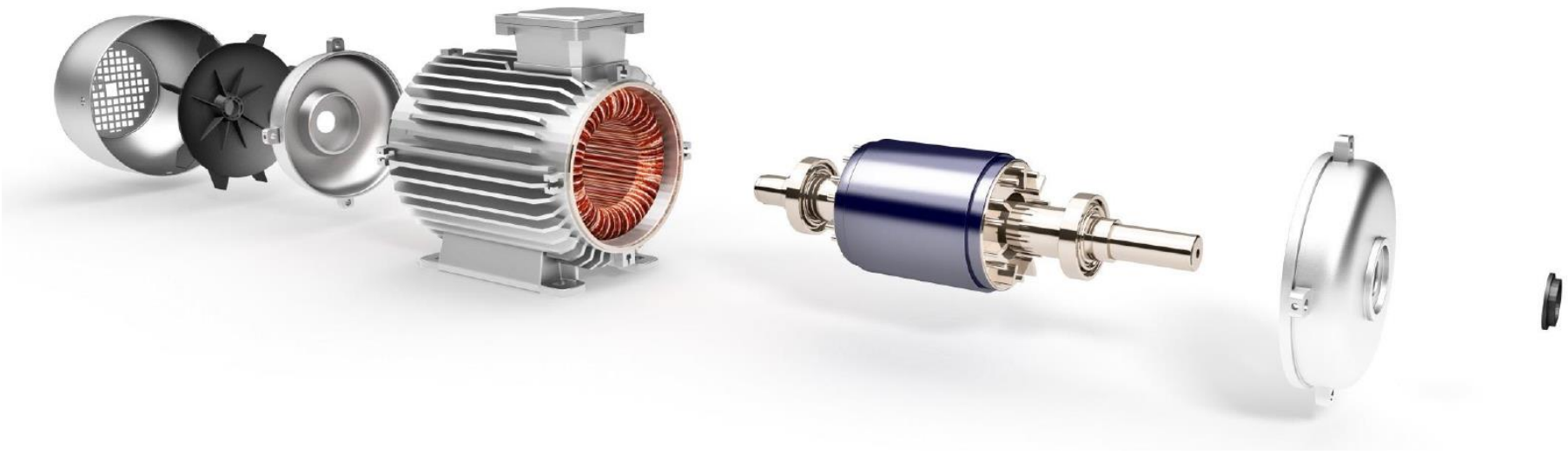
- Intro
  - Elektriske motorer og motorsystemer står for 45% af verdens elforbrug!
  - Nye og eksisterende teknologier har potentialet til at reducere dette med 20-30% frem mod 2030
  - Kræver bl.a. lovgivning og incitamenter
  - Fælles international effektivitetsklasser adopteres world-wide
    - IE1, IE2, IE3 … IEx
    - Ca. 20% færre tab pr. klasse



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Elmotorer – Historik i Danmark

- Starter i slut 90'erne med elselskabernes energirådgivere
  - DEFU energiteknologi skabes -> Teknologisk Institut
- Omring 2000
  - Standardløsningen (150 kr pr. kW mærkeeffekt)
  - CEMEP aftalen EU (Eff1, Eff2 & Eff3 motorer)
- 0'erne
  - ELFOR kampagner (Sparemotor, Sparepumpe, Spareventilator osv.)
- 10'erne
  - ECO-Design for elmotorer (0,75 kW – 375 kW):
    - Trin 1, 16. juni 2011:
      Minimum IE2 – hele scope
    - Trin 2, 1. januar 2015:
      Minimum IE3 – 7,5 kW og større (eller IE2 + omformer)
    - Trin 3, 1. januar 2017:
      Minimum IE3 – 0,75 kW og større (eller IE2 + omformer)
- Kommende opdatering på ECO-Design af elmotor, forslag i efteråret

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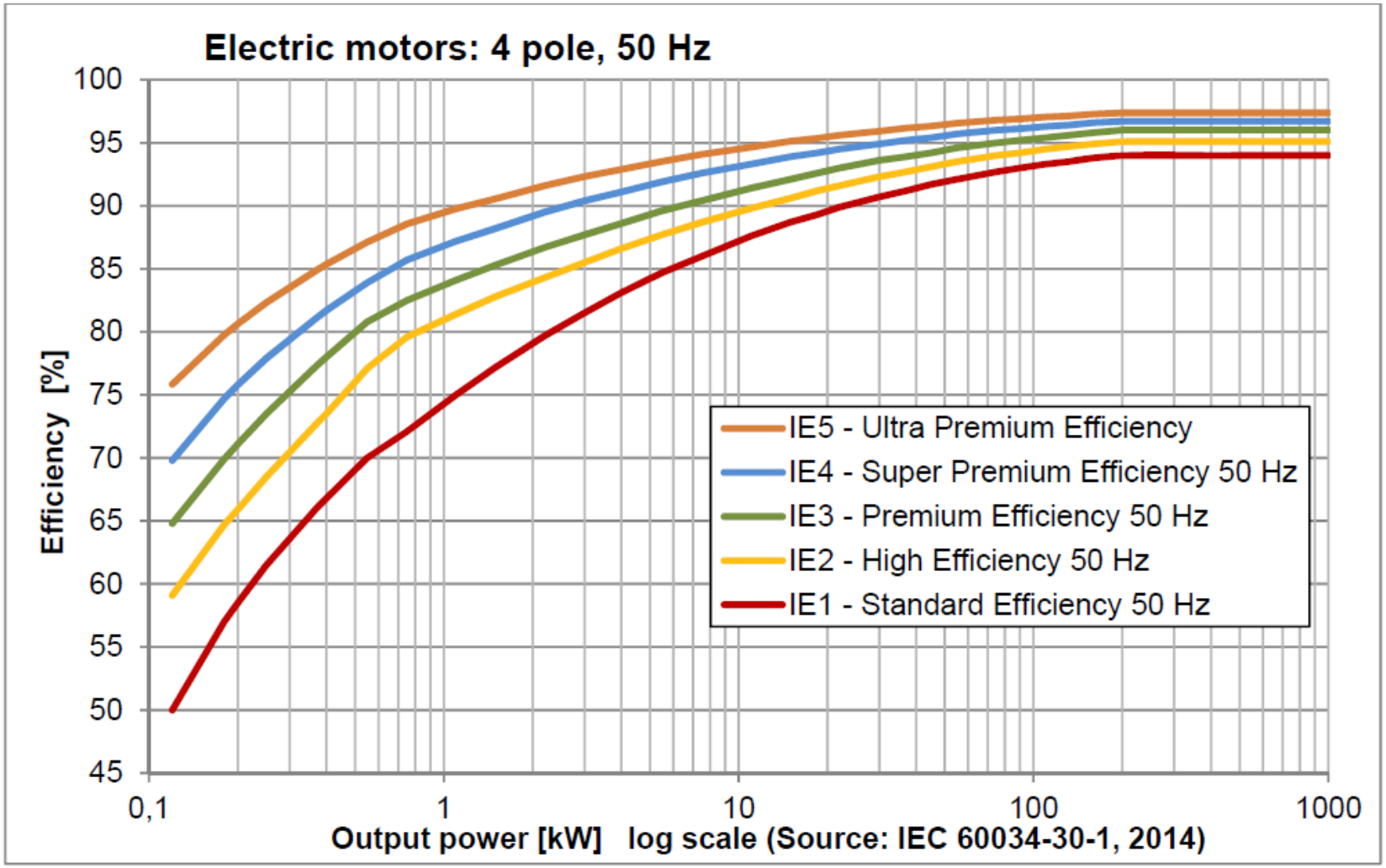

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4E EMSA Global overview as pr. August 2015:

Efficiency Levels 3-phase induction motors (Low Voltage < 1000 V)	Efficiency Classes IEC 60034-30-1, 2014 Global classes IE-Code *	Testing Standard IEC 60034-2-1, 2014 incl. stray load losses	Performance Standard Mandatory MEPS *** National Policy Requirement
Super Premium Efficiency	IE4	Preferred Method **	
Premium Efficiency	IE3	Summation of losses with load test:	Canada (< 150 kW) Mexico (< 150 kW) USA (< 150 kW) South Korea Switzerland Japan (Toprunner) EU 28**** (> 7.5 kW) *China****** (> 7.5 kW; 2016)*
High Efficiency	IE2	Additional losses P_{LL} determined from residual loss	Australia***** Brazil Canada (> 150 kW) China Mexico (> 150 kW) South Korea New Zealand Turkey USA (> 150 kW)
Standard Efficiency	IE1		Costa Rica Israel Taiwan
Below Standard			

"italic" means in effect in 2016

17 08 2015
Impact Energy Inc.

*) Output power: 0.12 kW - 1000 kW, 50 and 60 Hz, line operated 2-, 4-, 6- and 8-poles

**) for 3-phase machines, rated output power < 1000 kW

***) Minimum Energy Performance Standard

****) European Union: IE3 or IE2 + VFD; 2017 above 0.75 kW

*****) Australia adoption of IE Standards

******) China: 2017 IE3 also < 7.5 kW

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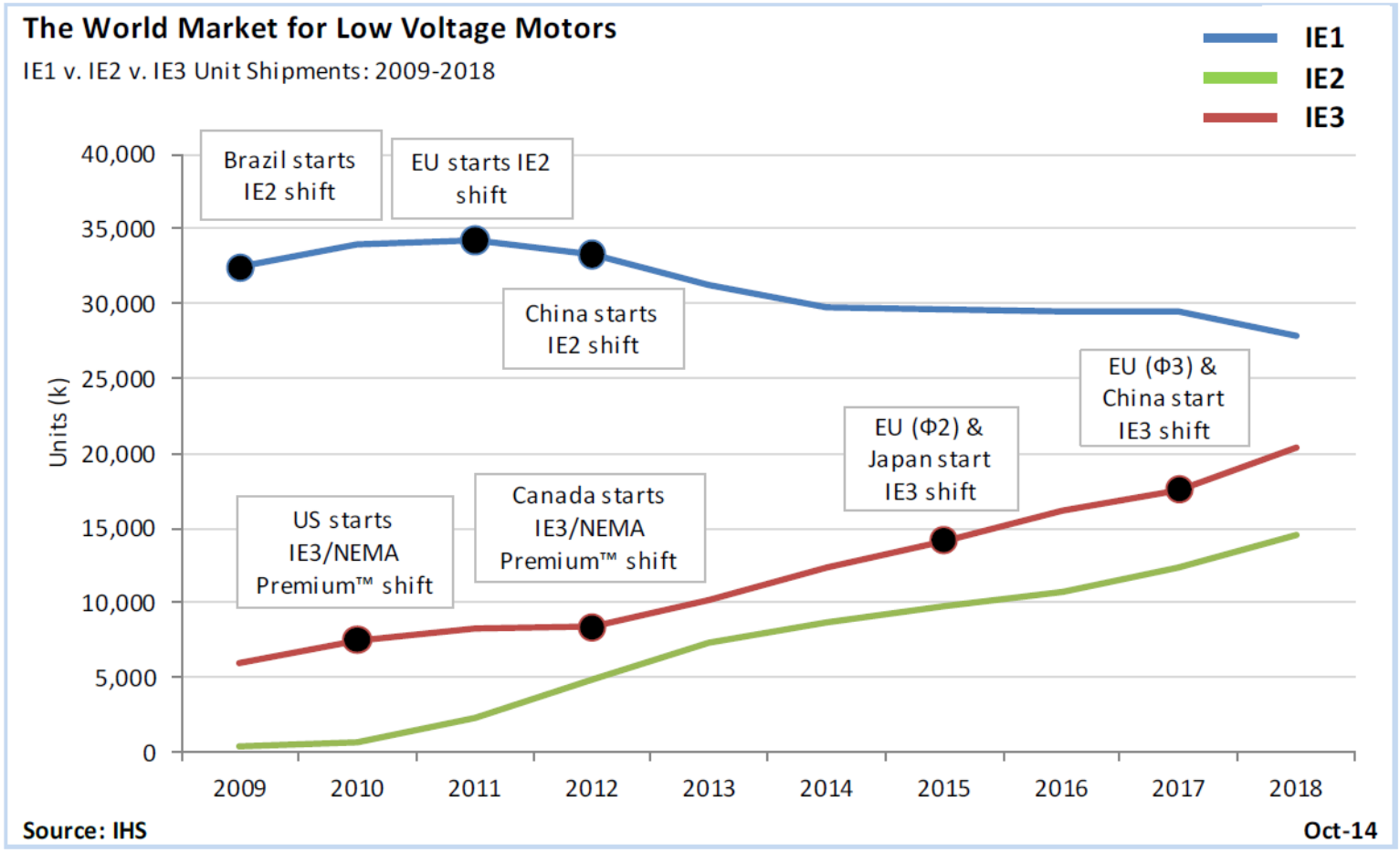
MARKET TRANSFORMATION



Motor teknologier

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- Std. asynkron induktions motor
  - Kendt teknologi
  - Billig, Måske alt for driftssikker?
  - Begrænsning i effektivitet
- Permanent magnetmotor
  - Høj effektivitet
  - Kompakt, højt moment
  - Prisfølsom pga. magneter
- Synkron reluktans motor
  - Gammel kendt teknologi - opdateret
  - Høj effektivitet – som PM (> 11 kW)
  - Driftssikker, robust, nem service
  - Ikke prisfølsom pga. ÷magneter
- PM assisted SynRM motor
  - Det bedste af to verdener
  - Ferrit magneter ikke ”rare earth”
  - Let vedligehold
  - Meget høj effektivitet – IE5 forventet!

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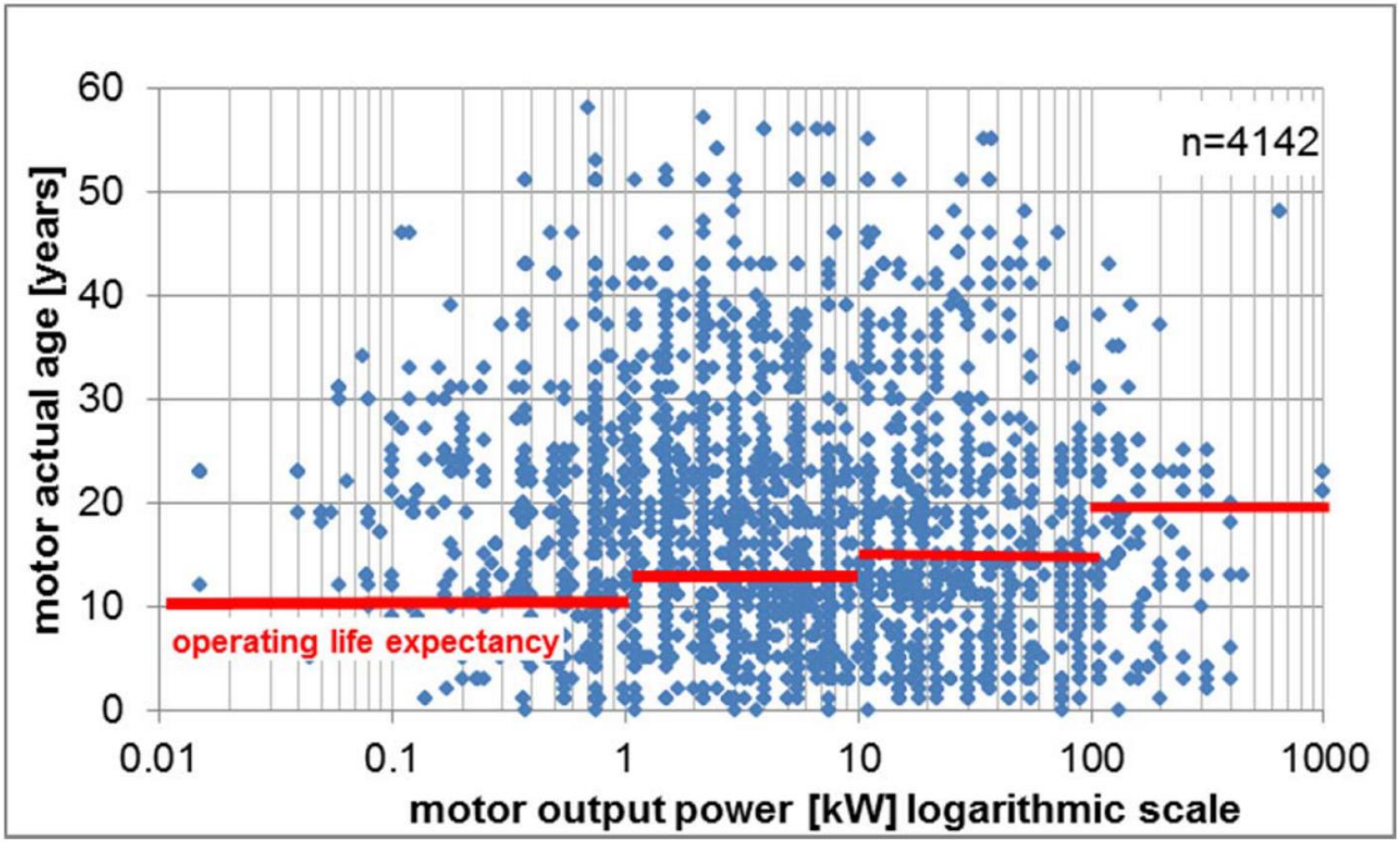
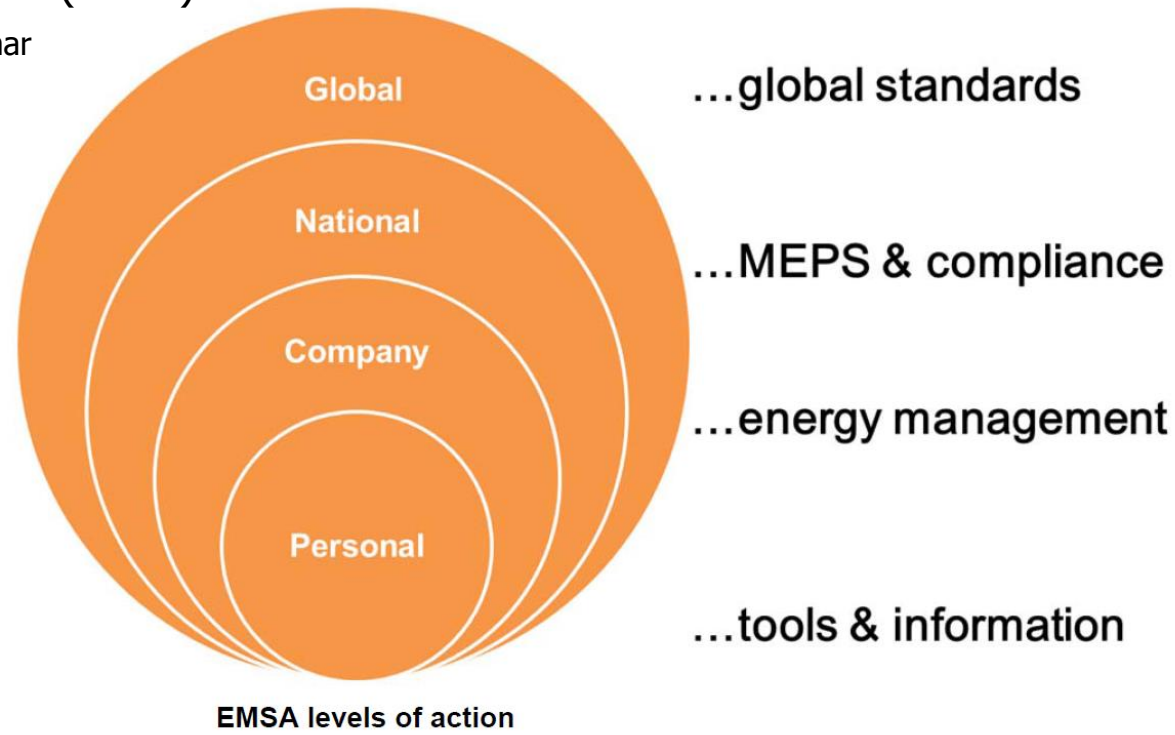
Source: Swiss S.A.F.E. 2013:



IEA 4E EMSA

4E EMSA – Electrical Motor Systems Annex:

- Blev defineret i efteråret 2008
  - AUS, AUT, DK, NL, UK & CH
- Første officielle møde CPH foråret 2009
- DK har været med fra starten (EUDP)
  - Sandie B. Nielsen, Ture Hammar
  - Første EUDP runde?
- 2 årlige møder
  - Forår:
    - Relevant begivenhed
  - Efterår:
    - EEMODS/Motor Summit



EMSA levels of action

IEA 4E EMSA

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4E EMSA – Publications:

IEA 4E EMSA

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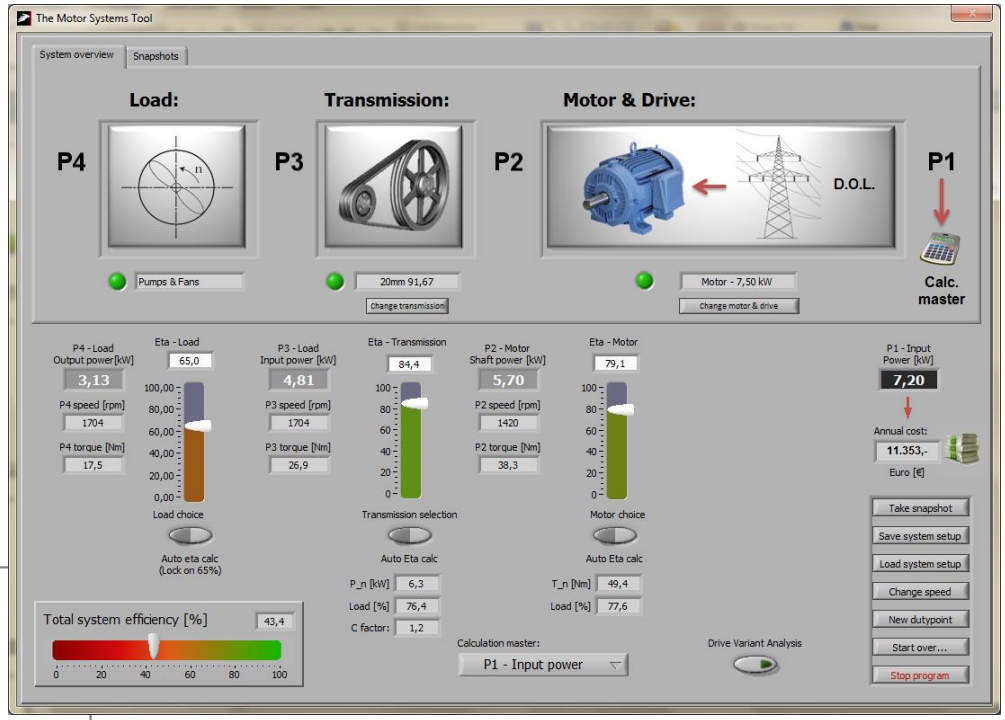
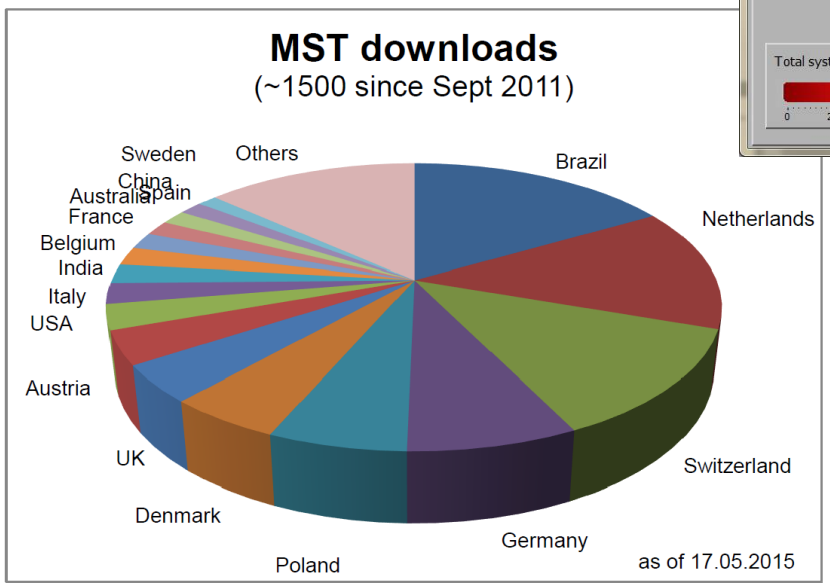
4E EMSA – The Motor Systems Tool:

- Danmarks primære bidrag til EMSA
- Publiceret i EMSA regi i 2011
  - +1500 unikke downloads
  - Artikel i Brasiliansk elektromagasin
- Workshops afholdt i
  - Danmark, Holland & Schweiz

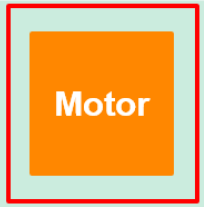
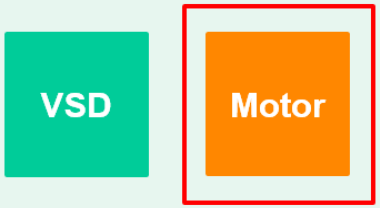




I efteråret 2015 afholdes flere webinars i EMSA regi herunder:

- MST-Tool, Pumper, Ventilator, Køling

IEC standards for motor systems

		Scope	Testing	Efficiency Classification
1		Motor	**IEC 60034-2-1** Ed. 2 published 06 2014	**IEC 60034-30-1** Ed. 1 published 03 2014
2		Motor, driven by VSD	**IEC/TS 60034-2-3** Ed. 1 published 11 2013	**IEC 60034-30-2** First CD April 2014
3		VSD	**IEC 61800-9 series** IEC 61800-9-1 Extended Products IEC 61800-9-2 Test, Calc & Classification CDV vote 09 2015 – meeting 11 2015 *(Based on EN 50598)* IEC 61800-9-3 Enviromental impact etc.	
4		PDS (Motor+VSD)		

IEC = International Electrotechnical Commission VSD = Variable Speed Drive

IEA 4E EMSA

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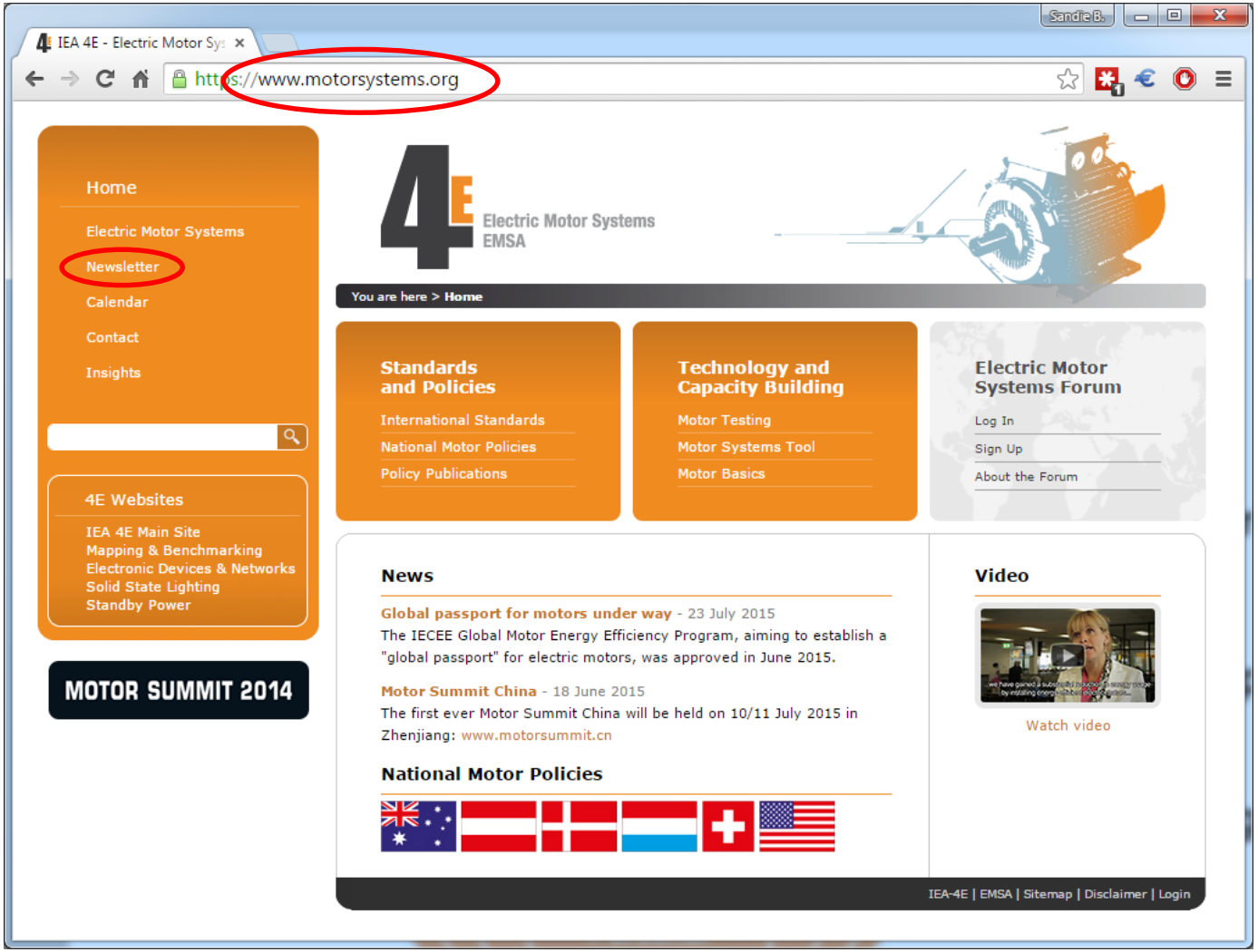
4E EMSA – Electrical Motor Systems Annex:



IEA 4E EMSA

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4E EMSA – Electrical Motor Systems Annex:

- EMSA Nyhedsbrev:

Global Motor Systems Network

4E Electric Motor Systems EMSA

EMSA Newsletter July 2015 - www.motorsystems.org

Dear Sandie,

Welcome to the latest edition of the Electric Motor Systems Annex (EMSA) Newsletter. The number of our readers has reached 4'512 people from 76 countries.

Events

2015国际高效电机大会
MOTOR SUMMIT CHINA '15

Motor Summit China
The first Motor Summit China was held on 10/11 July 2015 in Zhenjiang, Jiangsu province, with 250 participants from industry, university, government and NGOs. Both the public and the Chinese government officials were interested in the results of the Zhenjiang Topmotors pilot projects presented by Chinese factories for cement and chemistry. International experts reported on new technology development and new policies from Japan, USA and Europe.
See conference proceedings, photos and summaries on www.motorsummit.cn.

Photos International Day 10 July 2015

Photos Chinese Day 11 July 2015

Photos PM Workshop 11 July 2015

ACEEE Summer Study on Energy Efficiency in Industry
The 11th Summer Study on Energy Efficiency in Industry will be held on 4

Tak for opmærksomheden

Og tak til 

for støtten ☺

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