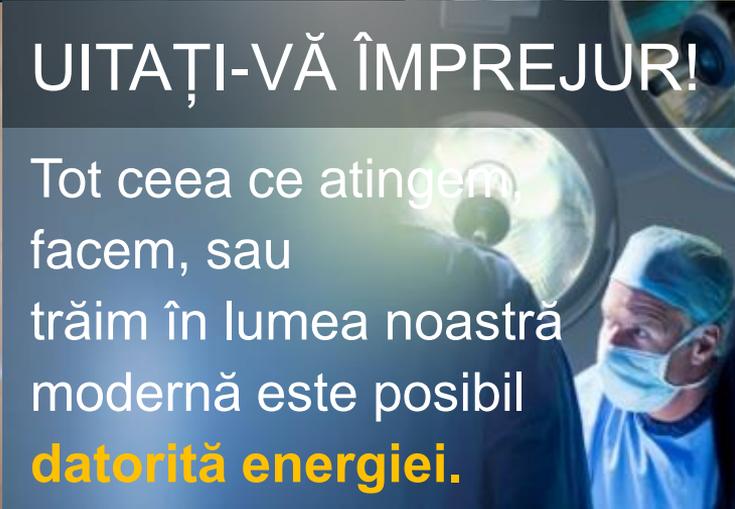


# Prezentare generală a Corporației și a Sectorului Electric

We make what matters work.\*





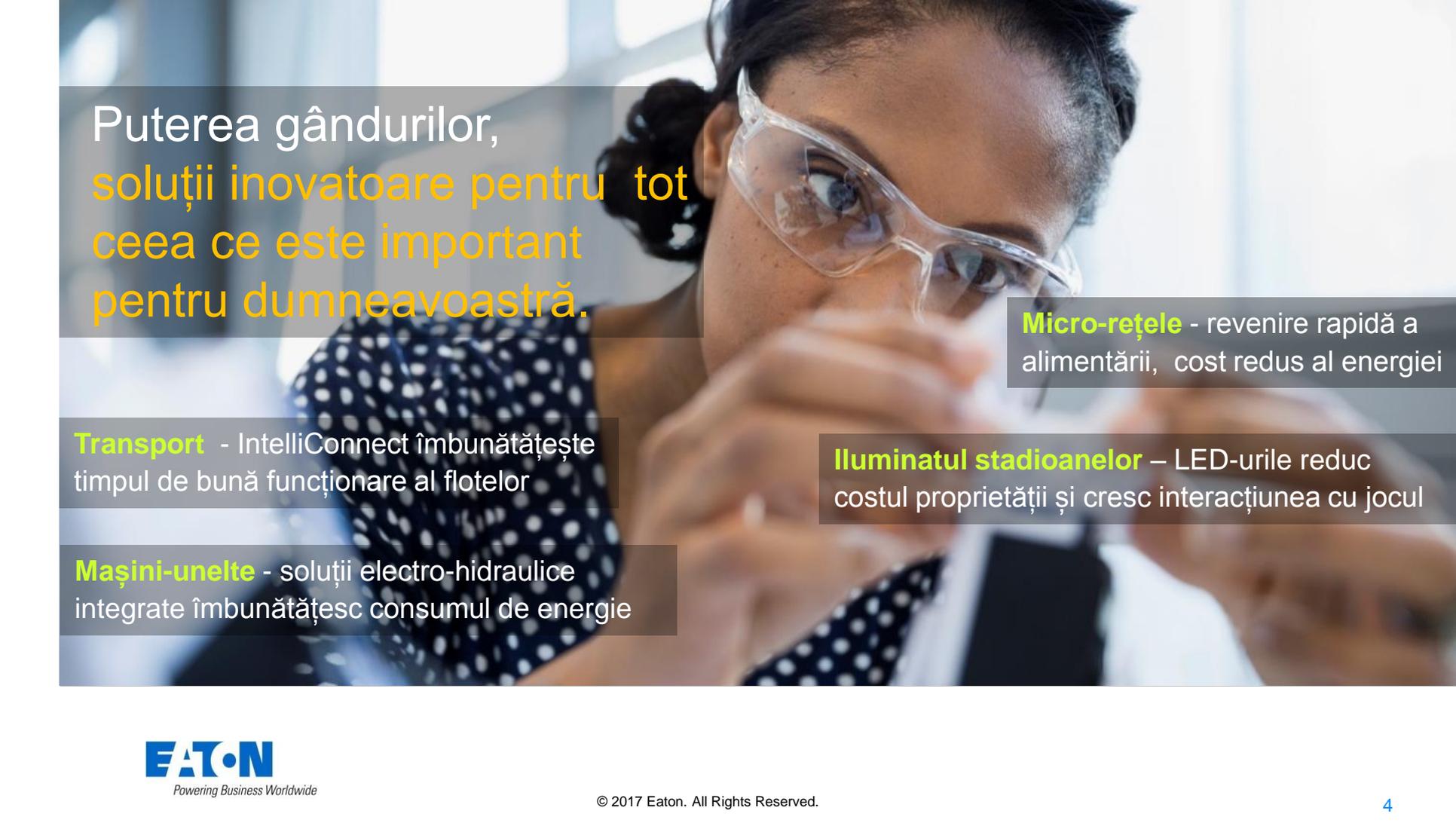
## UITAȚI-VĂ ÎMPREJUR!

Tot ceea ce atingem,  
facem, sau  
trăim în lumea noastră  
modernă este posibil  
**datorită energiei.**

An aerial night view of a city, likely Paris, showing a river (the Seine) winding through the urban landscape. The city is illuminated with warm lights, and the sky is a deep blue with some clouds. The text is overlaid on a semi-transparent dark grey box in the upper left quadrant.

Suntem dedicați îmbunătățirii  
vieții oamenilor și a mediului.

Furnizăm tehnologii de gestionare a energiei  
care sunt mai **fiabile**, mai **eficiente** și mai  
**sigure**.

A close-up photograph of a woman with dark hair tied back, wearing clear safety glasses and a dark blue polka-dot shirt. She is focused on a task, with her hands near a circuit board or similar electronic component. The background is blurred, suggesting an industrial or laboratory setting.

Puterea gândurilor,  
soluții inovatoare pentru tot  
ceea ce este important  
pentru dumneavoastră.

**Transport** - IntelliConnect îmbunătățește  
timpul de bună funcționare al flotelor

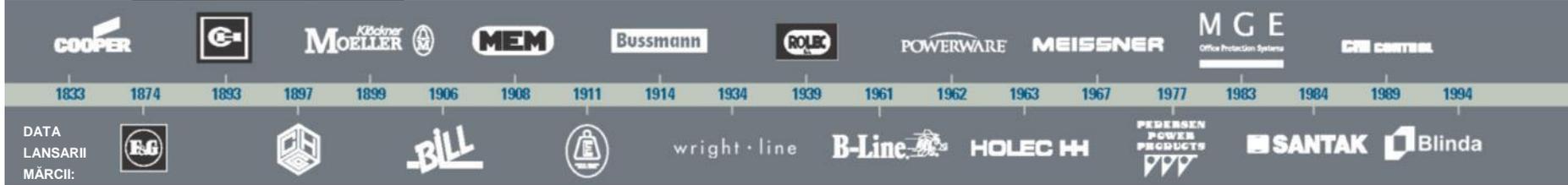
**Mașini-unelte** - soluții electro-hidraulice  
integrate îmbunătățesc consumul de energie

**Micro-rețele** - revenire rapidă a  
alimentării, cost redus al energiei

**Iluminatul stadioanelor** – LED-urile reduc  
costul proprietății și cresc interacțiunea cu jocul

METALUX MEM CUTLER-HAMMER COOPER  
 COOPER HALO ARROW HART HOLEC METALUX  
 B-LINE BUSSMANN MTL CEAG  
 HOLEC MCGRAW-EDISON ARROW HART MOELLER  
 ARROW HART MEM BUSSMANN HALO  
 METALUX POWERWARE HERNIS B-LINE  
 HALO MEM  
 MCGRAW-EDISON  
 MOELLER MTL  
 CEAG COOPER  
 MTL B-LINE  
 HERNIS BUSSMANN CEAG ARROW HART METALUX  
 COOPER HALO MCGRAW-EDISON CROUSE-HINDS

MORE POSSIBILITIES.  
 POWERFUL SOLUTIONS.



# Tehnologie globală, soluții regionale

## Standarde și certificări



America

Europa

Orientul Mijlociu

Africa

Asia

Australia

# Rezolvarea celor mai dificile provocări privind managementul energiei în întreaga lume.



Industria aerospațială



Clădiri



Centre de date



Industria alimentară



Guvern



Asistență medicală



Construcția de mașini



Maritim



Minerit și prelucrarea metalelor



Utilaje și echipamente mobile



Petrol și gaze



Industria farmaceutică



Căi ferate



Regenerabile



Rezidențiale



Utilități



Vehicule



Ape/ape uzate

# Alimentăm cu energie o lume cu nevoi în creștere

Expertiză care acoperă șapte platforme tehnologice de bază, care vă alimentează succesul pentru toate sectoarele de activitate din întreaga lume



Centre de date

Industrie

Utilități

Clădiri

Rezidențial

Construcția de  
mașini



**EATON**

Powering Business Worldwide

# Distribuția de energie electrică și protecția circuitelor

Furnizează o energie electrică fiabilă, eficientă și sigură acolo unde este nevoie



**Soluții  
de medie și joasă tensiune**



**Tablouri și cutii de  
distribuție**



**Înteruptoare  
automate**



**Siguranțe**



**Transformatoare**

# Protecție cu alimentare de rezervă

Maximizează fiabilitatea și durata de funcționare continuă pentru a preveni întreruperile în funcționare



Sisteme de alimentare neîntreruptibile



Unități de distribuție a energiei (PDU-uri)



Soluții de alimentare paralel



Comutatoare de sursă



Protecție la supratensiune și corecția factorului de

# Iluminat și securitate

Eficiență îmbunătățită, confort și siguranță în casă și la locul de muncă



**Iluminat  
ascuns**



**Iluminat  
ambiental**



**Iluminat  
de exterior**



**Iluminat  
de urgență**



**Sisteme  
antiincendiu**

# Soluții pentru medii grele și cu risc de explozie

Oferă fiabilitate și siguranță pentru a preveni întreruperile producției



Carcase



Componente și soluții pentru control industrial



Iluminat



Clădiri comerciale - cutii cabluri și fittinguri



Instrumentație



Comunicații pentru medii cu risc de

# Control și automatizare

Îmbunătățește eficiența de operare și permite echipamentelor să funcționeze cu performanțe de vârf



Centre de control motoare de medie și joasă tensiune



Aționări cu convertizoare de frecvență



Contactoare și startere



Interconectivitate și I/O



Automatizări și senzorică



Soluții de cablare a panourilor

# 3 phase UPS

## 91PS / 93PS

**8- 40 kW**

Efficiency > 96%

Modular and compact design

ESS, HS, ABM, Internal bat.

Hot swap/scale

Cloud and Virtualization ready



Premium (Modular)

## 93PM

**30- 500 kW**

Efficiency up to 97%

Modular and compact design

ESS, HS, ABM, Internal bat.

High end software & security



## 9395P

**250-1200 kW**

Efficiency > 96%

Modular and compact design

ESS /VMMS/HS

Distributed and Centralized topologies



## 93E

**15-80 kVA**

15, 20;30; 40, 60, 80 kVA @ pf 0,9

Efficiency up to 94%

Internal batteries

HS/ABM

Eco mode: 98%

Parall units



General purpose

## 93E

**100-200 kVA**

100,120, 160, 200 @ pf 0.9

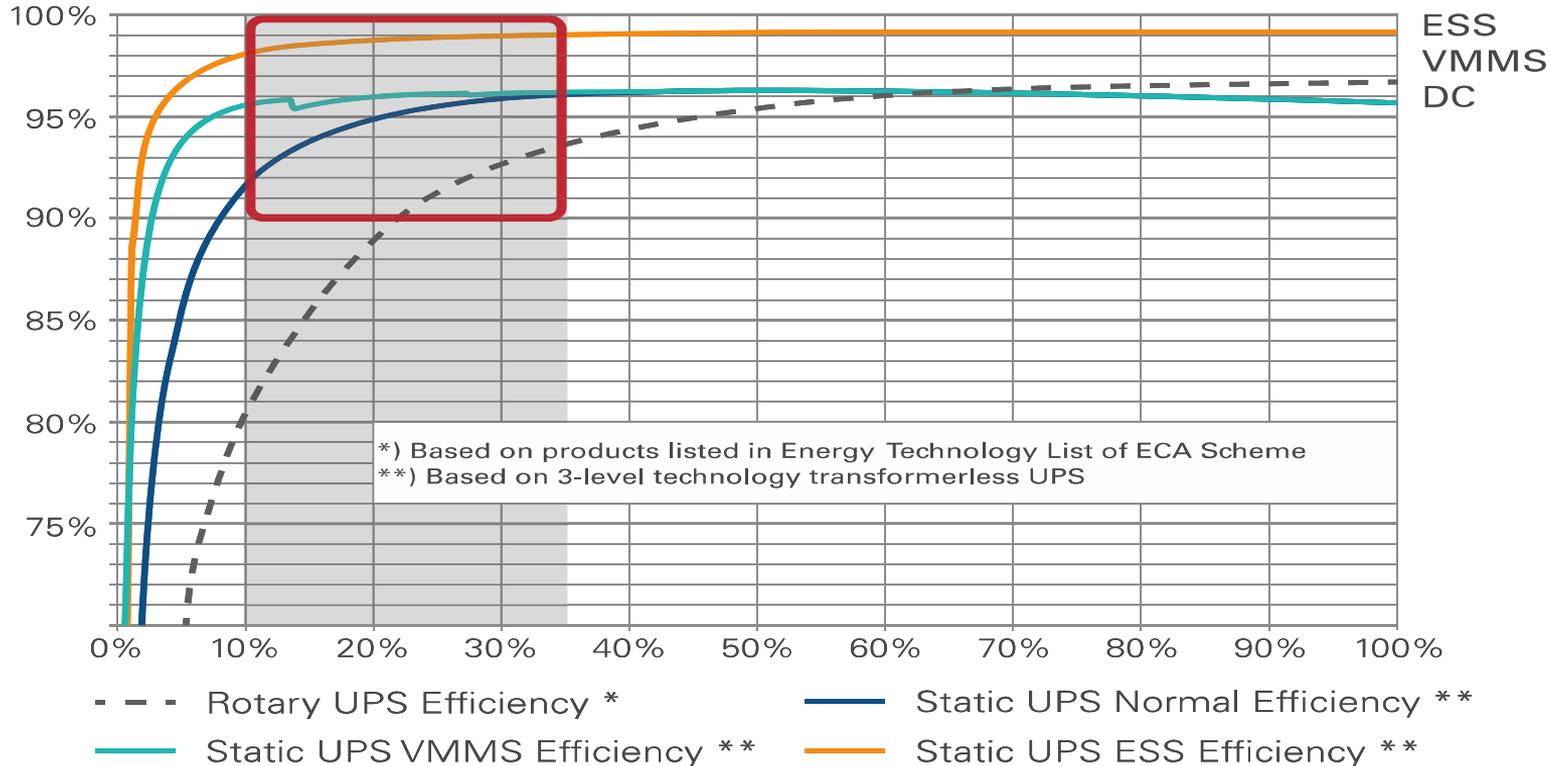
Efficiency up to 94%

High Efficiency mode →98.5%

ABM & Hot Synch up to 4 units

LCD

# Efficiency Modes Compared



# Energy Saver System (ESS) – 99%

The year  
ESS became  
available

**2009**



Amount of UPS  
capacity in kVA  
using ESS mode

**879,000 kVA**



Energy  
saved  
every day

**>348,000 kWh**



Number of UPS  
units operating  
in ESS mode

**>1,500**



Resulting overall  
availability of UPS  
units in ESS mode

**>99.999%**



Overall  
reduced CO<sub>2</sub>  
emissions

**95,000,000 kg**



Number of sites  
using ESS

**>150**



Total time  
of ESS  
operation

**>23 million hours**



Overall energy  
saved by units

**214 GWh**



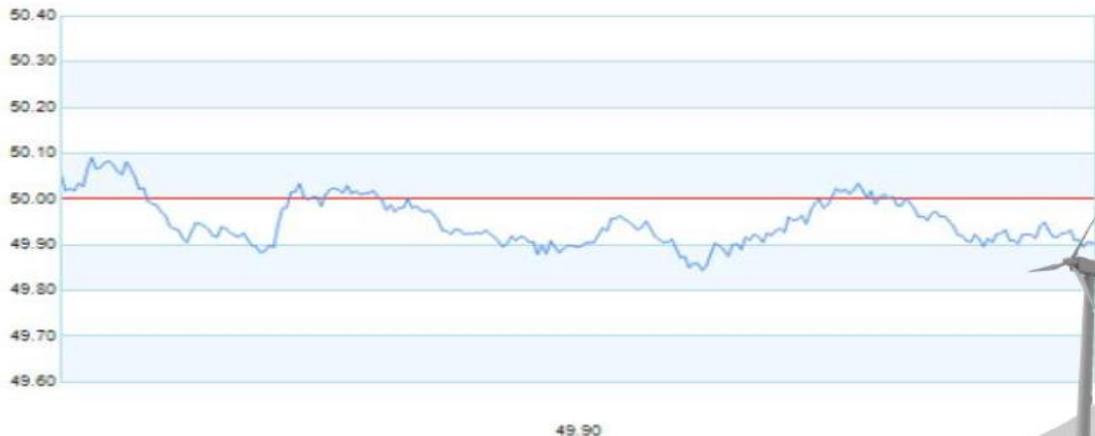
**EATON**

Powering Business Worldwide

# Future scenarios & Trends

## UPS as a reserve

Reserves are needed to supplement mandatory frequency regulation to correct deviations in grid frequency and supply-demand balance caused by forecast inaccuracy and faults



<http://www2.nationalgrid.com/uk/services/balancing-services/frequency-response/>



# Future scenarios & Trends

## UPS as a reserve

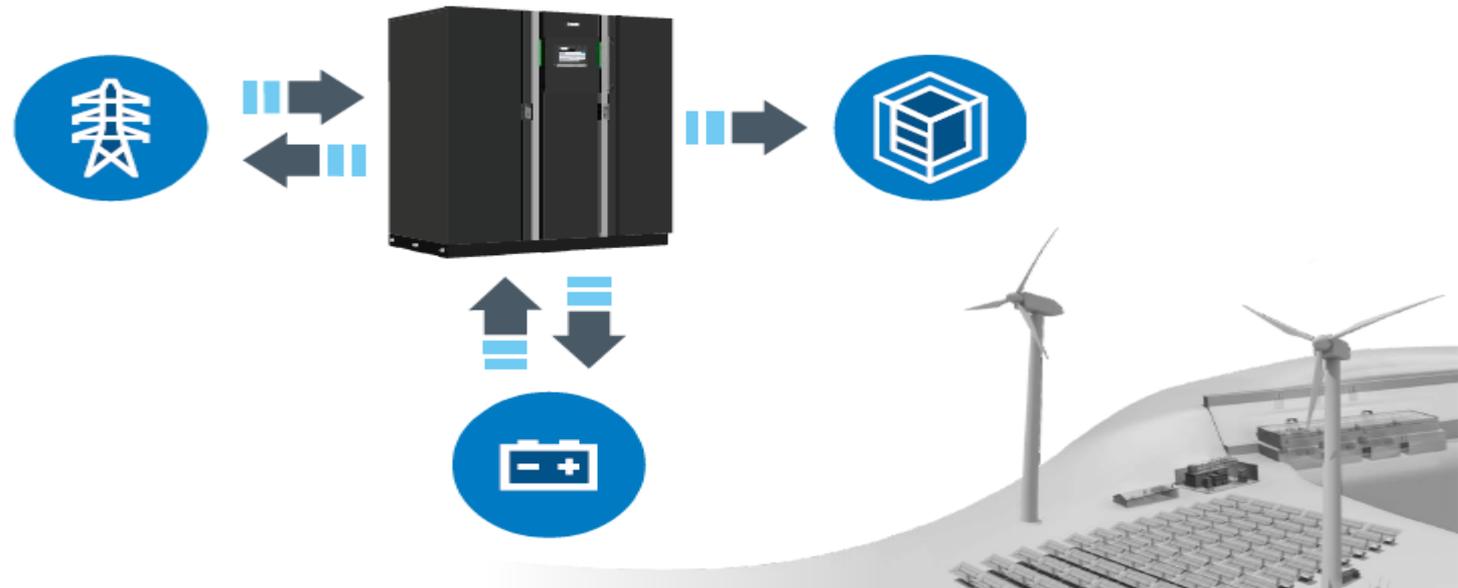
The frequency in the grid can be controlled by increasing/decreasing production or consumption to/from the grid.



# Future scenarios & Trends

## UPS as a reserve

UPS with batteries are a great reserve in providing an impact to production or consumption to/from the grid.



# Future scenarios & Trends

## UPS as a reserve – Data Center Contribution

UPS-as-a-Reserve enables a data center to increase its competitiveness by turning its necessary investments into a revenue stream:

- Value of **1 MW** in the market has been approx. **50 k€**; paid for availability, possibly for use as well

Data center has control of their energy, choosing how much capacity to offer, when, and at what price.



# Future scenarios & Trends

## Energy Storage - Global Challenge



**INTEGRATION** :The share of renewable energy in global power generation will be rising to over 26% by 2020

# Global aim: Build a sustainable energy system

**CUT**

**40%**

in greenhouse gas emissions  
compared to 1990 levels

**SHARE**

**27%**

of renewable consumption

**SAVE**

**27%**

Energy savings compared with  
business as usual scenario

**INVESTMENT**

**€1,000,000,000,000**

needed in power generation and the grid to meet these targets



Powering Business Worldwide

# A partnership of environmental excellence

Powered by  
**NISSAN**  
MOTOR CORPORATION

**EATON**  
*Powering Business Worldwide*

By partnering with **Nissan** amongst others, we provide energy storage solutions in the full range of energy capacity.

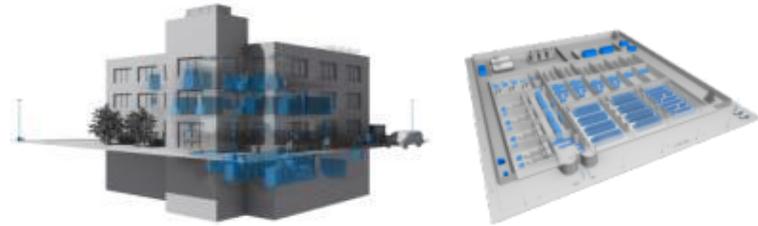
**RESIDENTIAL**



**COMMERCIAL**



**INDUSTRIAL**

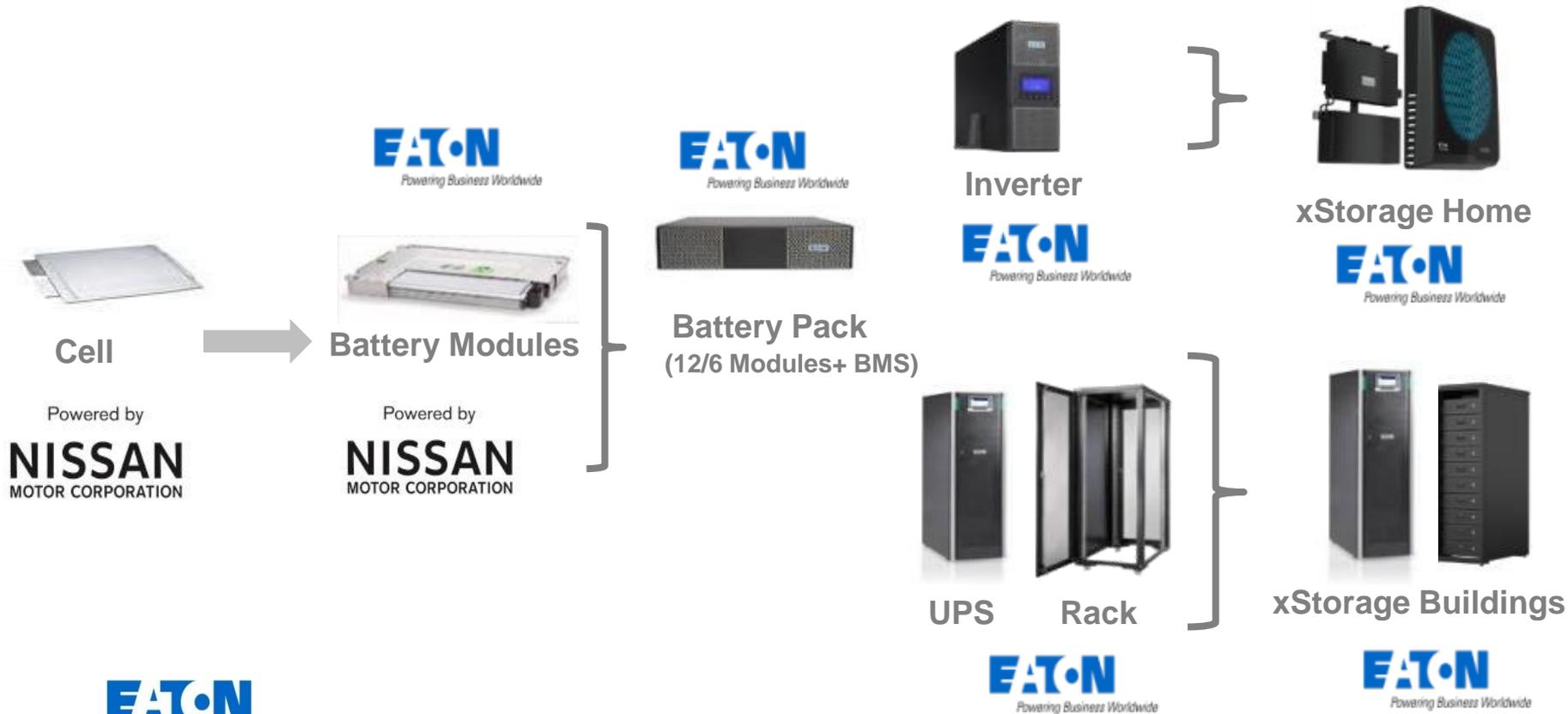


**Expertise - Reach - Dependability - Diversity - Footprint - Portfolio**

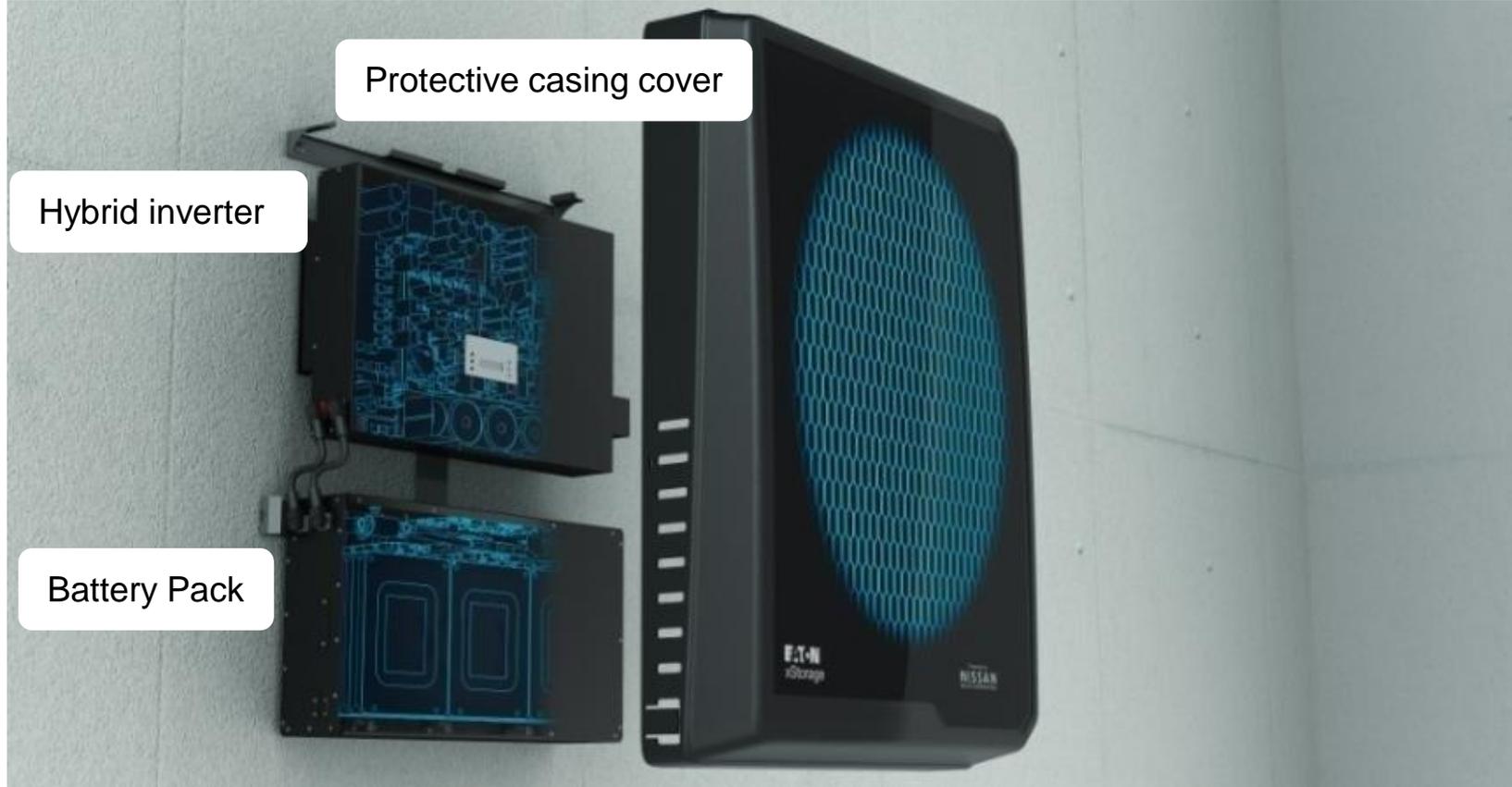
**Eaton can partner with you to help you achieve substantial benefits.**

**EATON**  
*Powering Business Worldwide*

# Eaton with Nissan Technology Partnership



# The xStorage Home system





*The impact of ErP Directive on electrical switchgear and how to ensure compliance by using variable speed starters*



Powering Business Worldwide

# Energy Efficiency



- Legislation
- ErP Directive

## The goals behind ErP Directive

Protect people, assets and reputation for business continuity

**Design / build for functionality, sustainability and aesthetics**

Lower risk with on-time project execution and expertise

- Creating a framework for defining ecodesign requirements for "energy-related products"
- Identifying product groups with a high potential for lowering greenhouse gas emissions cost-effectively
- Examples of product groups that are important for Eaton:
  - Electric motor systems
  - Pumps
  - Fans
- The requirements for these product groups are defined in the corresponding regulations. For example: EC 640/2009 for electric motors (= motor regulation)

## Implementation Guidelines / Regulations

Protect people, assets and reputation for business continuity

**Design / build for functionality, sustainability and aesthetics**

Lower risk with on-time project execution and expertise

		<b>Ecodesign</b>	<b>Energy Labelling</b>
<b>Air conditioners</b>	Air conditioners and comfort fans	(EU) No 206/2012	EU No 626/2011
<b>Circulators</b>	Circulators and glandless circulators integrated in products	(EC) No 641/2009	
<b>Dishwashers</b>	Household dishwashers	(EU) No 1016/2010	(EU) No 1059/2010
<b>Electric motors</b>	Electric motors	(EC) No 640/2009	
<b>Fans</b>	Fans driven by motors	(EU) No 327/2011	
<b>Lamps (directional and LED)</b>	Directional lamps, light emitting diode lamps and related equipment	(EU) No 1194/2012	(EU) No 874/2012
<b>Lamps (household)</b>	Non-directional household lamps (including amendment on ultraviolet radiation)	(EC) No 244/2009 (EC) No 859/2009	(EU) No 874/2012
<b>Lamps (fluorescent)</b>	Fluorescent lamps without integrated ballast, for high intensity discharge lamps and for ballasts and luminaries able to operate such lamps (including amendment)	(EC) No 245/2009 (EU) No 347/2010	(EU) No 874/2012
<b>Power supplies</b>	External power supplies	(EC) No 278/2009	
<b>Refrigerating appliances</b>	Household refrigerating appliances	(EC) No 643/2009	(EC) No 1060/2010
<b>Set-top boxes</b>	Simple set-top boxes	(EC) No 107/2009	
<b>Standby and off mode</b>	Electric power consumption standby and off mode of electrical and electronic household and office equipment	(EC) No 1275/2008	
<b>Television</b>	Television	(EC) No 642/2009	(EU) No 1062/2010
<b>Tumble driers</b>	Household tumble driers	(EU) No 932/2012	(EU) No 392/2012
<b>Washing machines</b>	Household washing machines	(EU) No 1015/2010	(EU) No 1061/2010
<b>Water pumps</b>	Water pumps	(EU) No 547/2012	

## Impact on the Market

Protect people, assets and reputation for business continuity

**Design / build for functionality, sustainability and aesthetics**

Lower risk with on-time project execution and expertise

### **In order to meet the corresponding requirements:**

- the relevant products (keyword: IE2 / IE3 motors) need to be modified
- even entire processes need to be modified (keyword: regulating flow rates with valves vs. variable pump speeds)

### **Eaton has responded to the changes in the market with two main approaches:**

- Switchgear and protective devices must be IE3-ready
- Developing a new device category, easy to use like switchgear but with variable speed → Variable Speed Starter

# Switchgear ready for IE3 motors



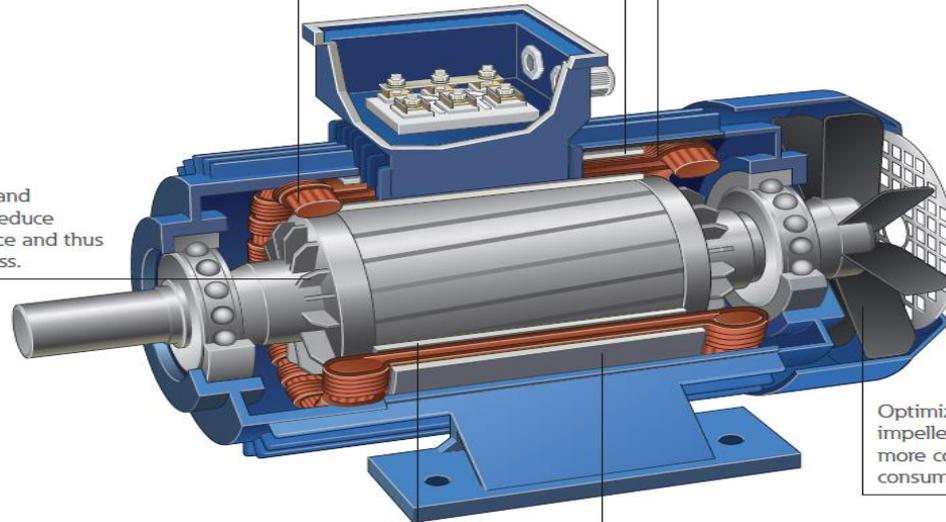
## Improvement and changes at motors to achieve higher energy efficiency

Thicker stator windings reduce the ohmic resistance and thus the current heat losses. This is the most important measure for high efficiency.

Reduction of eddy currents by thin magnetic plates.

Longer stator allows a low magnetic flux density and therefore a lower flux density in the iron. In addition, more heat losses can be dissipated to the housing.

Thicker rotor bars and short circuit rings reduce the ohmic resistance and thus the current heat loss.



Optimized metal cutting geometry reduces the stray magnetic losses and provides more space for the stator winding.

High quality magnetic sheet reduces the hysteresis losses.

Optimized shape of the impeller's blades delivers more cooling air and consumes less drive power.

# Motor Regulation

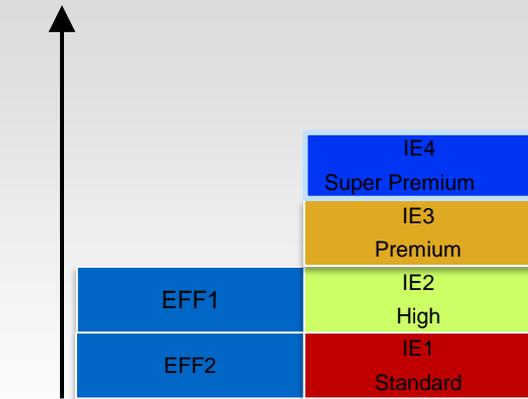
## Efficiency Classes on Motors

Protect people, assets and reputation for business continuity

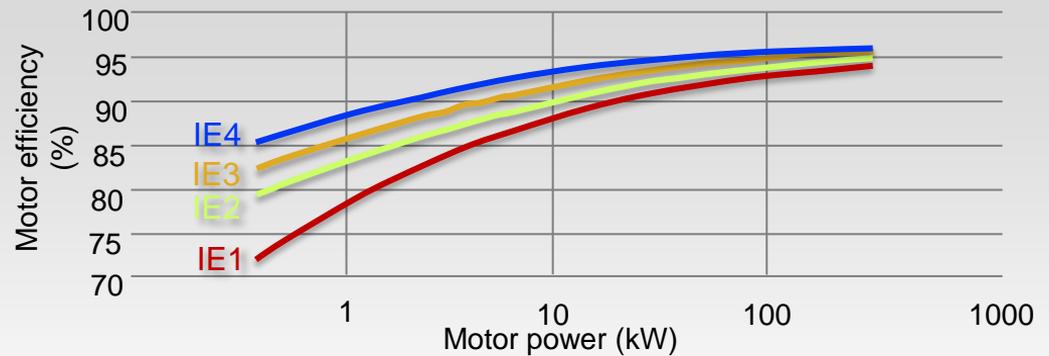
Design / build for functionality, sustainability and aesthetics

Lower risk with on-time project execution and expertise

Higher efficiency



Lower efficiency



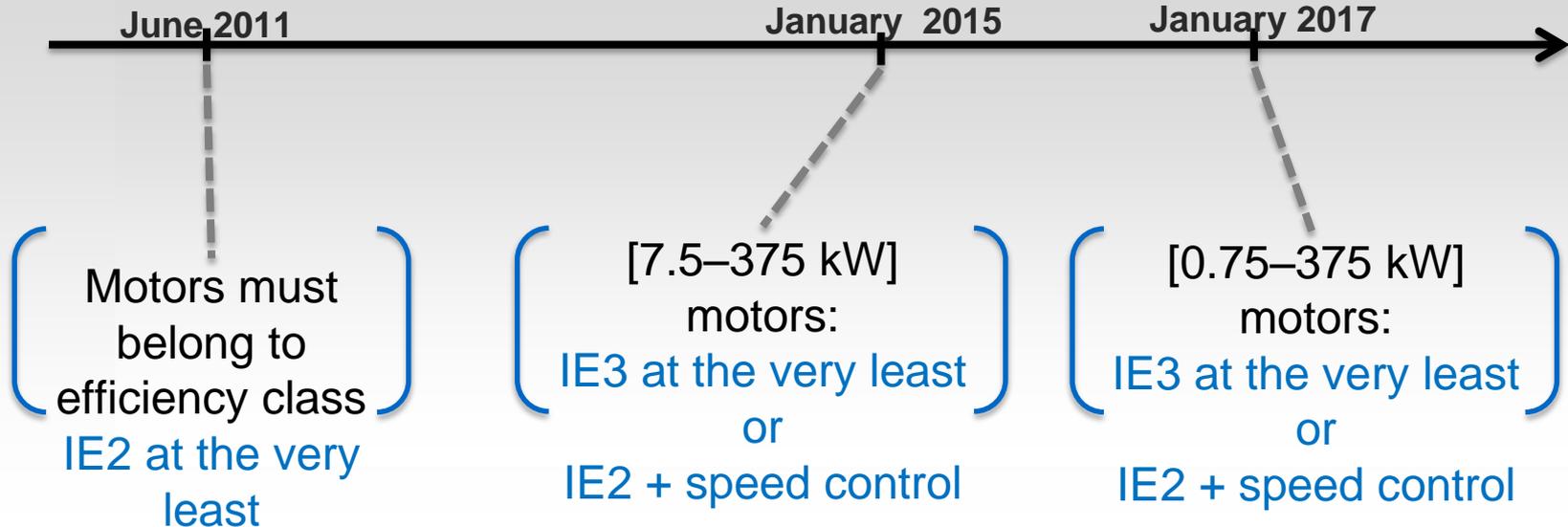
Class	Classification speed (1/min)	Continuous duty torque (Nm)	Classification power (kW)	Nominal efficiency (%)	Energy loss (W)	As per IE1
IE1	1.500	35	5.5	87.4	693	
IE2	1.500	35	5.5	87.7	676.5	-2.4%
IE3	1.500	35	5.5	89.6	572	-21.2%
IE4	1.500	35	5.5	92	440	-57.5%

# Motor Regulations Efficiency

Protect people, assets and reputation for business continuity

Design / build for functionality, sustainability and aesthetics

Lower risk with on-time project execution and expertise



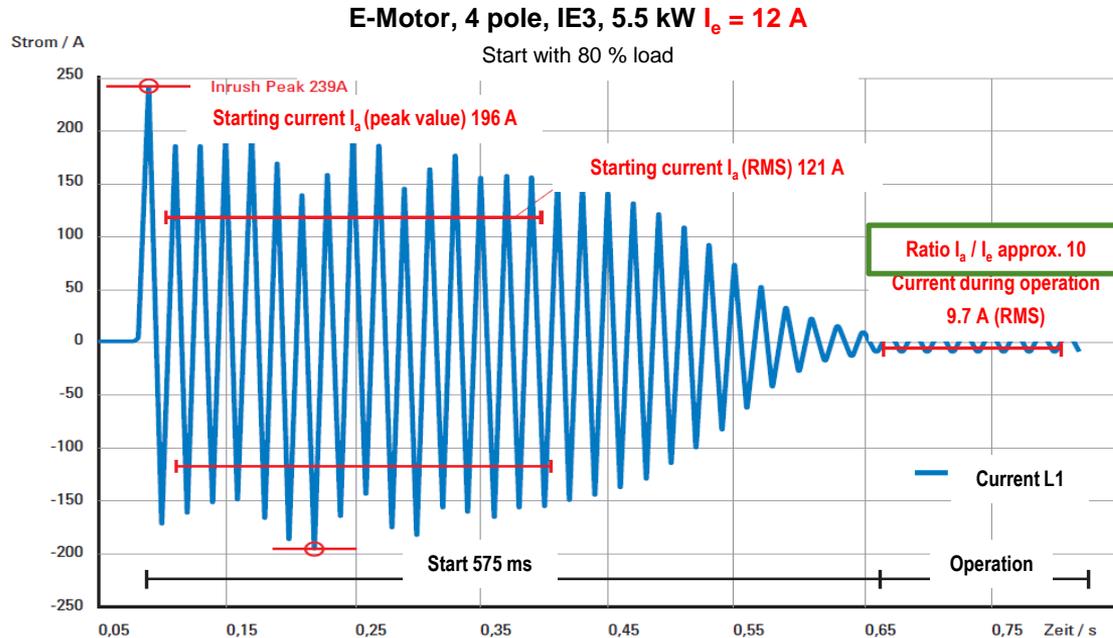
# Motor Regulations

## Technical Consequences

Protect people, assets and reputation for business continuity

Design / build for functionality, sustainability and aesthetics

Lower risk with on-time project execution and expertise



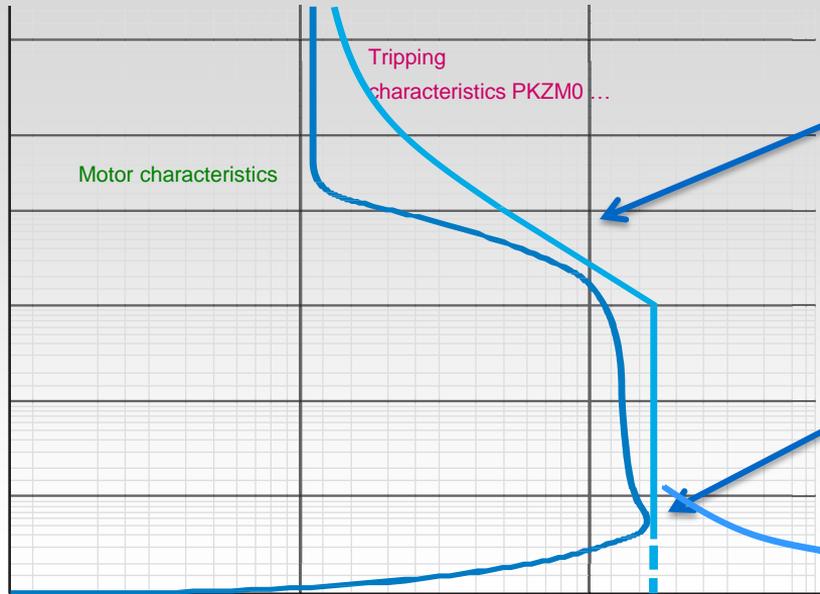
# Motor Regulations

## Example: Modifying Motor Starters

Protect people, assets and reputation for business continuity

Design / build for functionality, sustainability and aesthetics

Lower risk with on-time project execution and expertise



The current when the motor is started and the inrush peak current both fall below the trip characteristic.

However, magnetic release tolerances must be taken into account within the inrush peak current range, as nuisance tripping may occur due to these tolerances.

Instantaneous release response current increased from  $14 \cdot I_n$  to  $15.5 \cdot I_n$ .

# Motor Regulations

## Motor Starter “IE3 Ready”

Protect people, assets and reputation for business continuity

Design / build for functionality, sustainability and aesthetics

Lower risk with on-time project execution and expertise

DIL ....



PKE ....



PKZM .....



Eaton Motor starters are the most simple, ready to use and reliable way to run IE3 motors

**EATON**

*Powering Business Worldwide*

[www.eaton.com](http://www.eaton.com)