



Factory-level energy efficiency and its importance in power T&D

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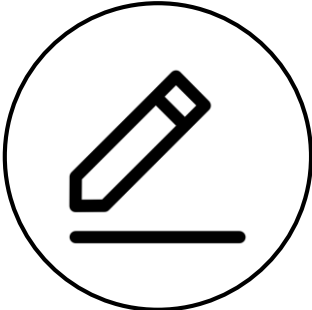
Focus on Power and Industrial markets.

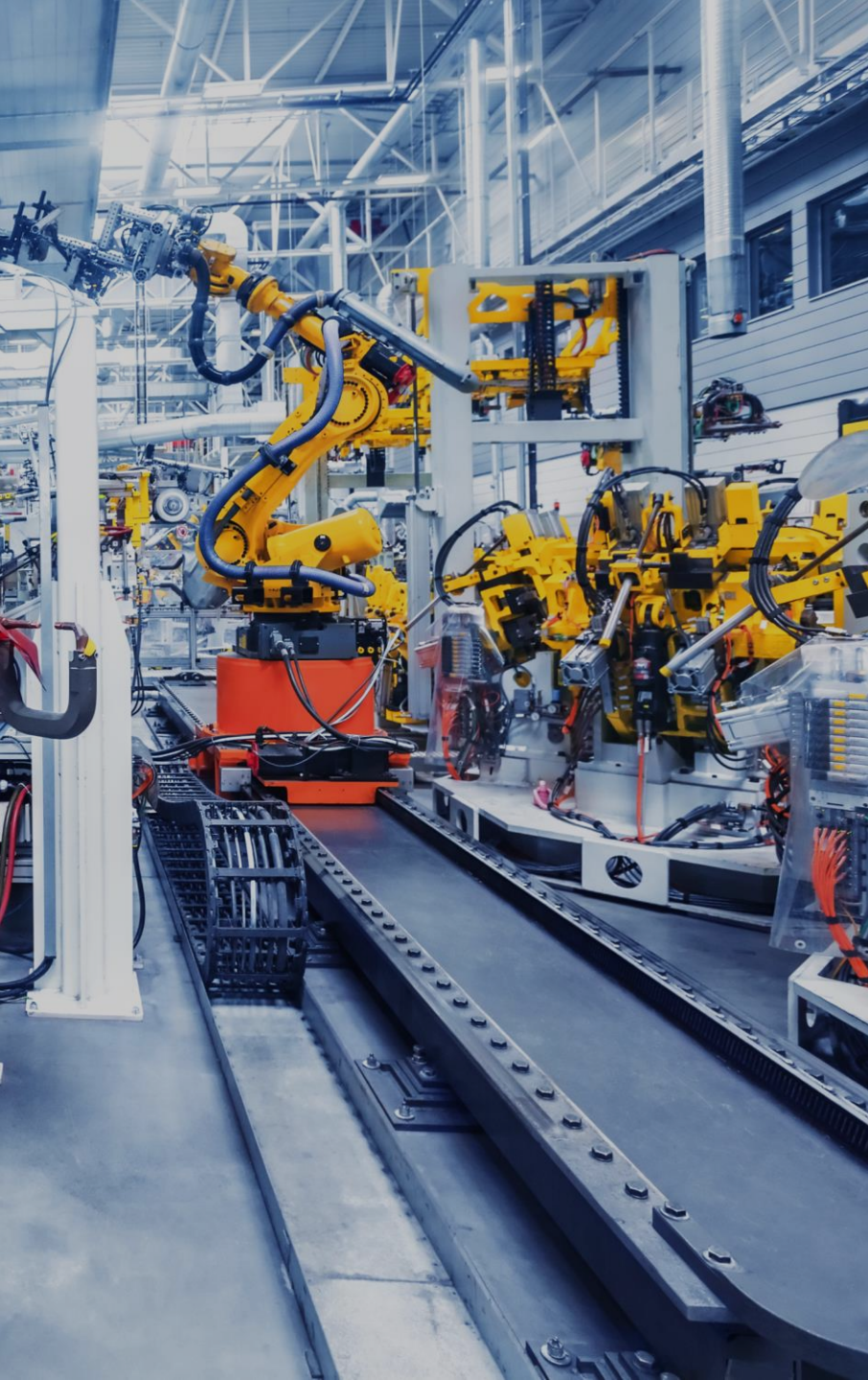
Customers are component manufacturers, OEMs, distributors, energy-focused EPCs.



20 years of combined experience.

Syndicated and custom research.

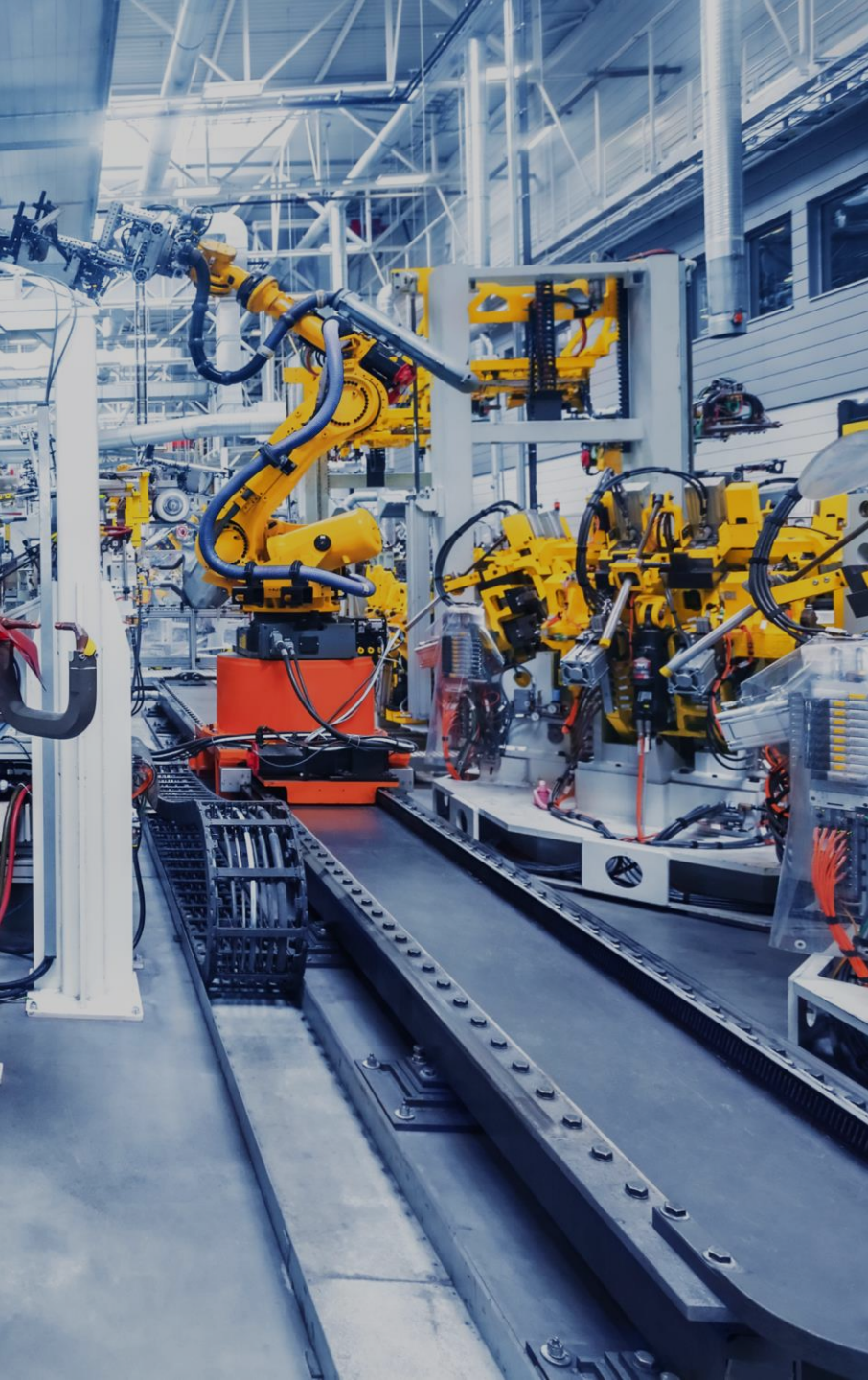




Motor-driven electricity Germany

Motor-driven machines
consume...

66.7%¹ of all the electrical
energy used in industry.



Motor-driven electricity Germany

Motor-driven machines
consume...

66.7%¹ of all the
electrical energy used in
industry.

Motor-driven electricity USA

Within the industrial sector...

62.5%² of the total
electrical energy use is for
motor-driven equipment.



What is driving demand for energy efficient products?



Regulation/Standards

- Germany's 20-20-20
- EU's ErP 640/2009
- NEMA Premium Standard/ EISA Legislation



Pull effect

- End-user cost awareness
- Shift toward reducing ops. costs



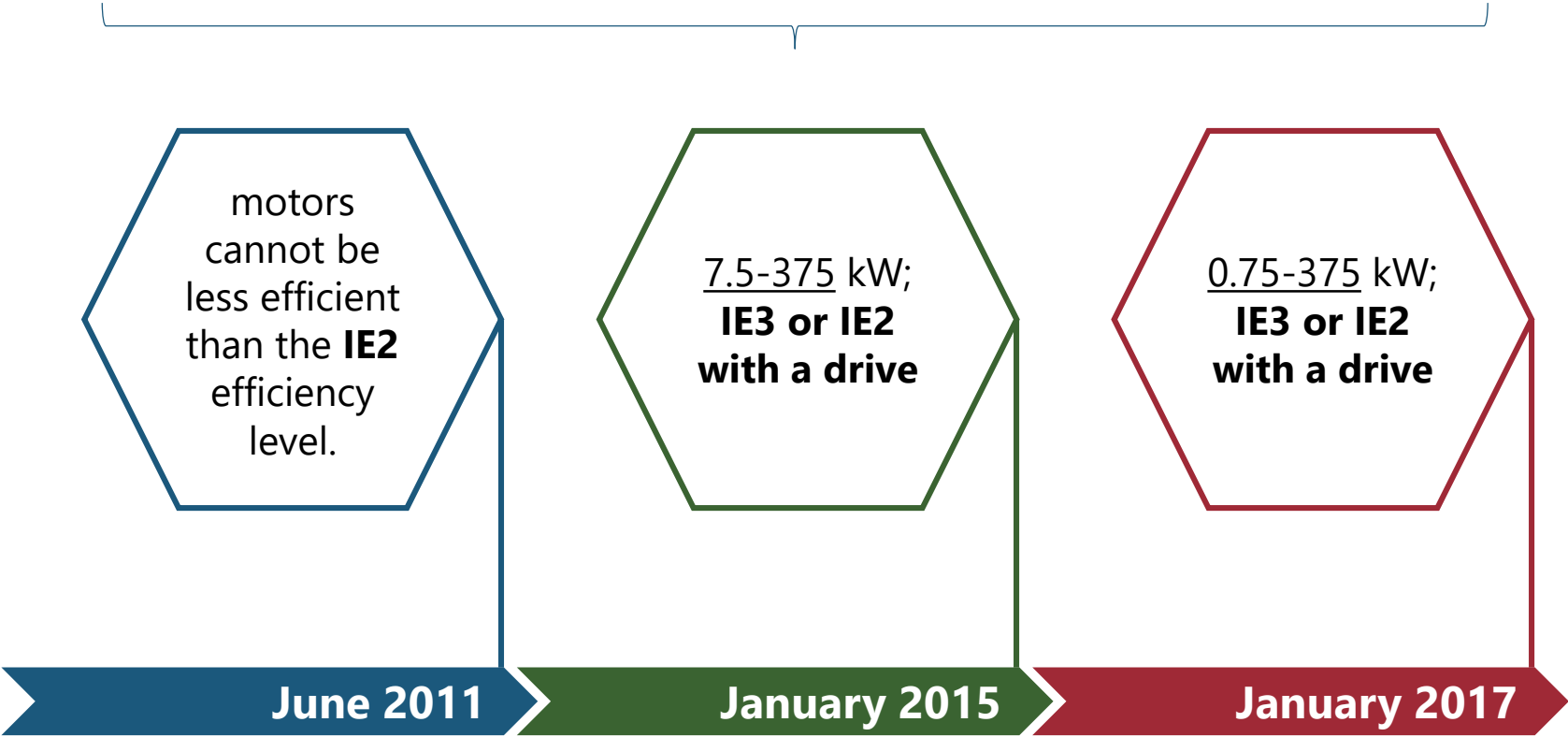
Push effect

- Product sales
- Automation suppliers can sell their new energy efficient products

ErP Timeline – LV Motors & Drives



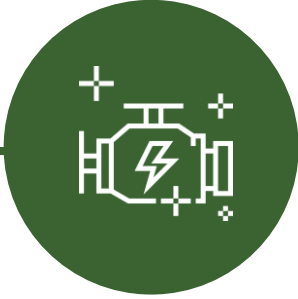
Motors with power ratings from **.75kW to 375kW** are included



ErP Exclusions for Motors



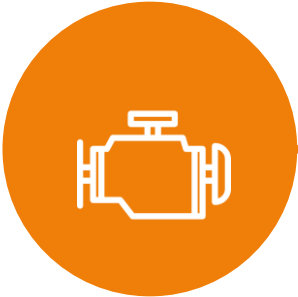
Operate in extreme temp.



Wholly immersed in liquid



Most recent amendment in January 2014



Brake motors



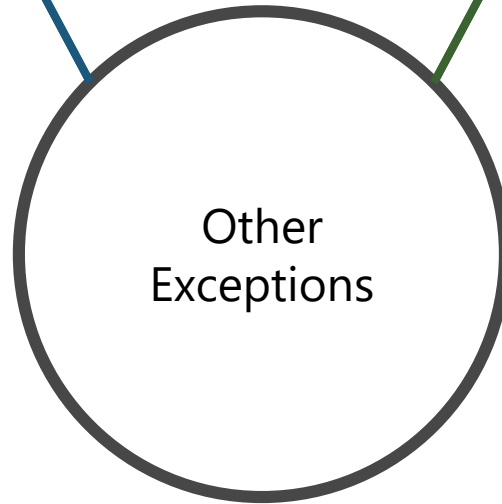
Integrated into a product

ErP Exclusions for Motors

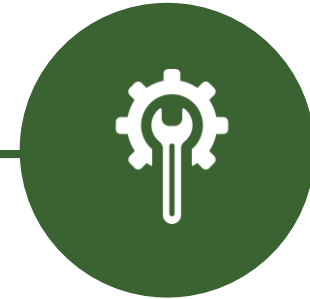


Distributor Stock

Stock acquired before enforcement date is not required to be compliant once they are sold to market



Other
Exceptions



Spare Parts

Spare parts for motors that were shipped before the enforcement date do not need to be compliant.

Is the ErP motor legislation working?

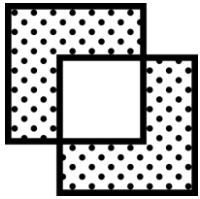


Jein
(Yes and no)

Is the ErP motor legislation working?



Short-term effects of the legislation have been dampened:



Product Exclusions;



High install-base of constant-speed motors;

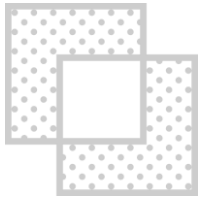


Large stockpiles of IE2 motors.

Is the ErP motor legislation working?



Short-term effects of the legislation have been dampened:



Product Exclusions;



High install-base of constant-speed motors;



Large stockpiles of IE2 motors.

But, it is absolutely driving sales for motor control electronics.

What does this mean for the equipment?



< 1kV

LV Motors & Control

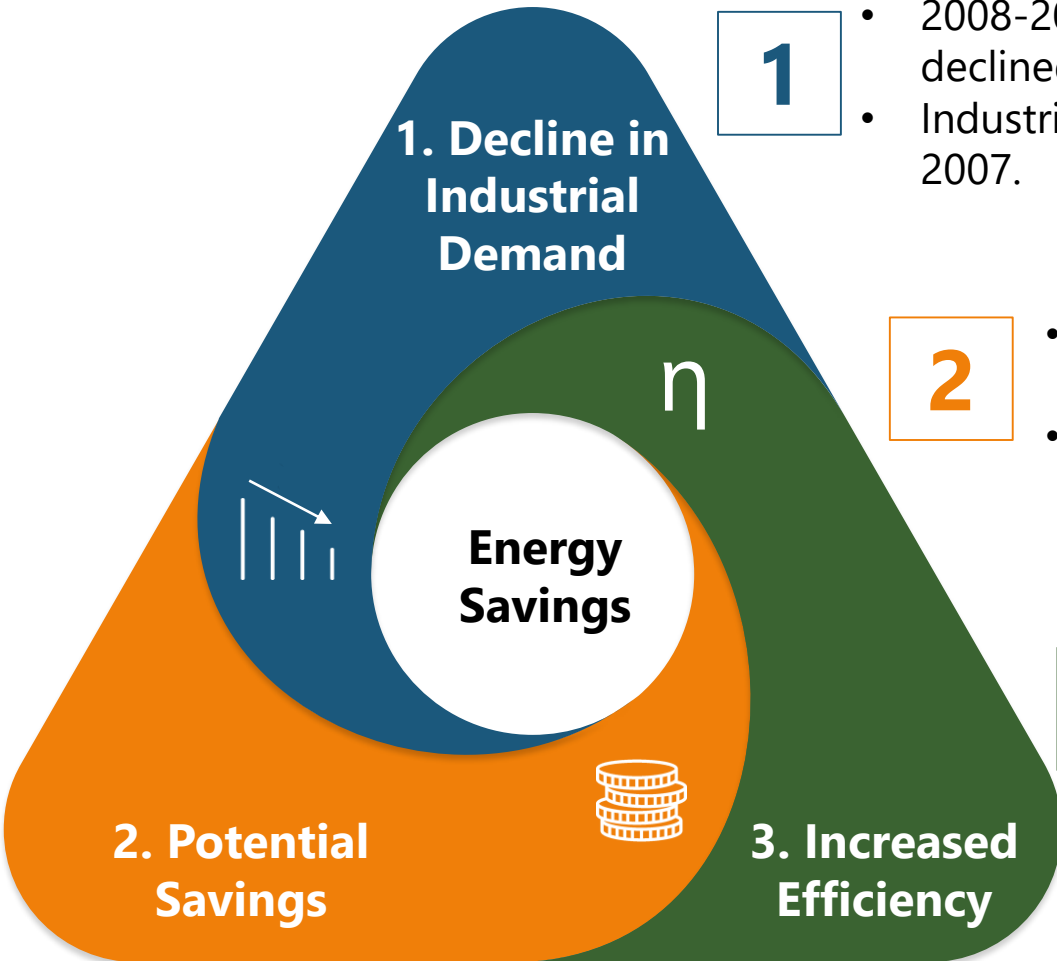
- ErP is driving VFD installations and other equipment, such as soft starters, in Europe
 - Increased installation of high-efficiency motors
-

≥ 1kV

MV Motors & Control

- High efficiency standards due to level of electricity demand
- Energy-awareness has led to IE2, IE3 and IE4 MV Motors.
- IE3 and IE4 motors draw a higher in-rush current on the power grid when started DOL; up to 10-15x nominal rating

Energy savings



1

- 2008-2015, gross electricity consumption declined by ~4%.
- Industrial consumption declined by 0.4% since 2007.

2

- 66% of industrial demand. 10-30% potential energy savings achievable.
- ~8 TWh/yr could be saved with the use of energy-efficient products at a factory.

3

In 2014, 7.8% more goods and services were produced per unit of final energy than in 2013.



Ties to Distribution Equipment

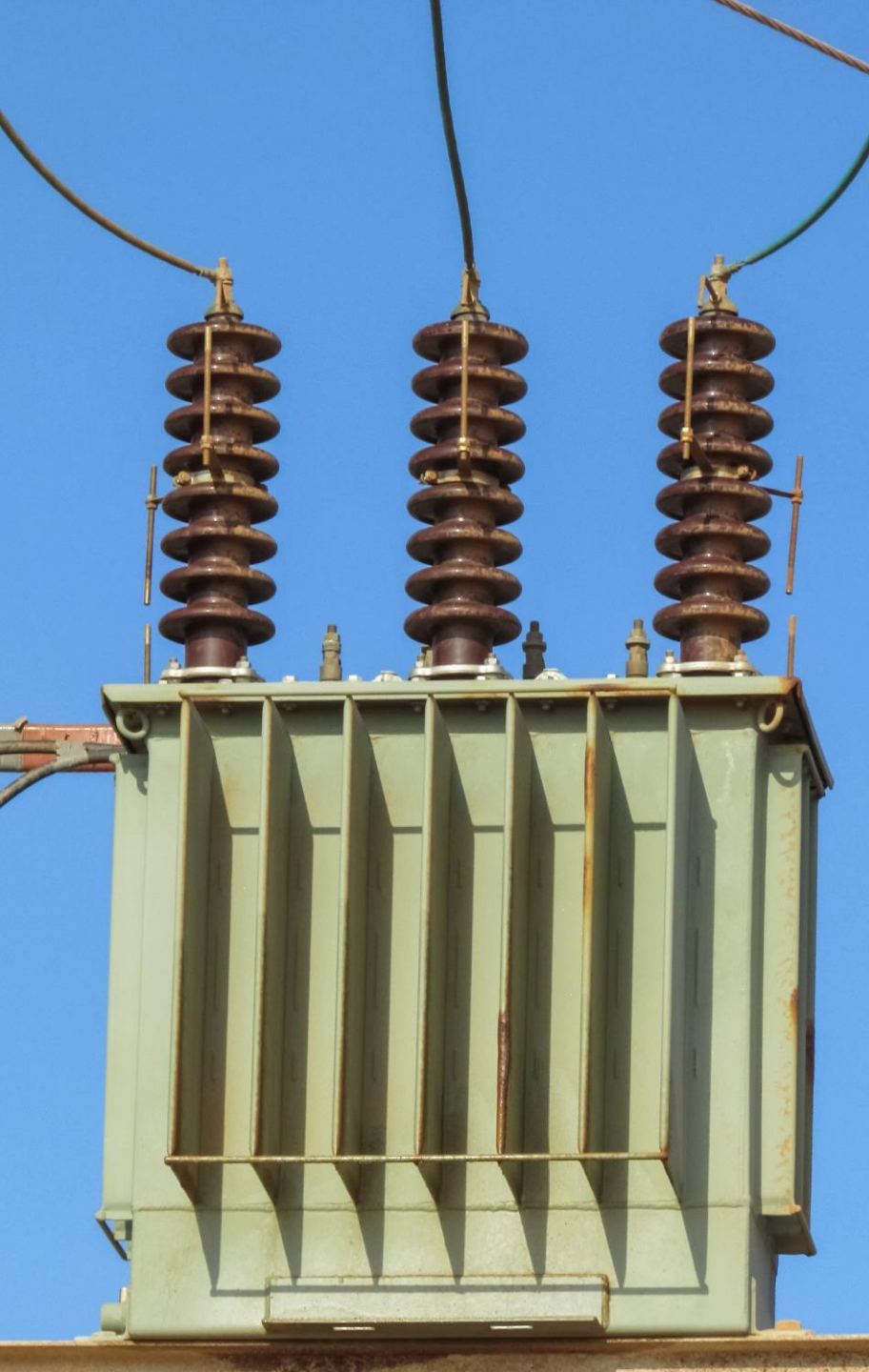
Required retrofitted harmonic filters, AFE drives or other “industrial” equipment, such as VSD transformers

Reactor sales are expected to increase along with the sales of VFDs

Ties to Distribution Equipment

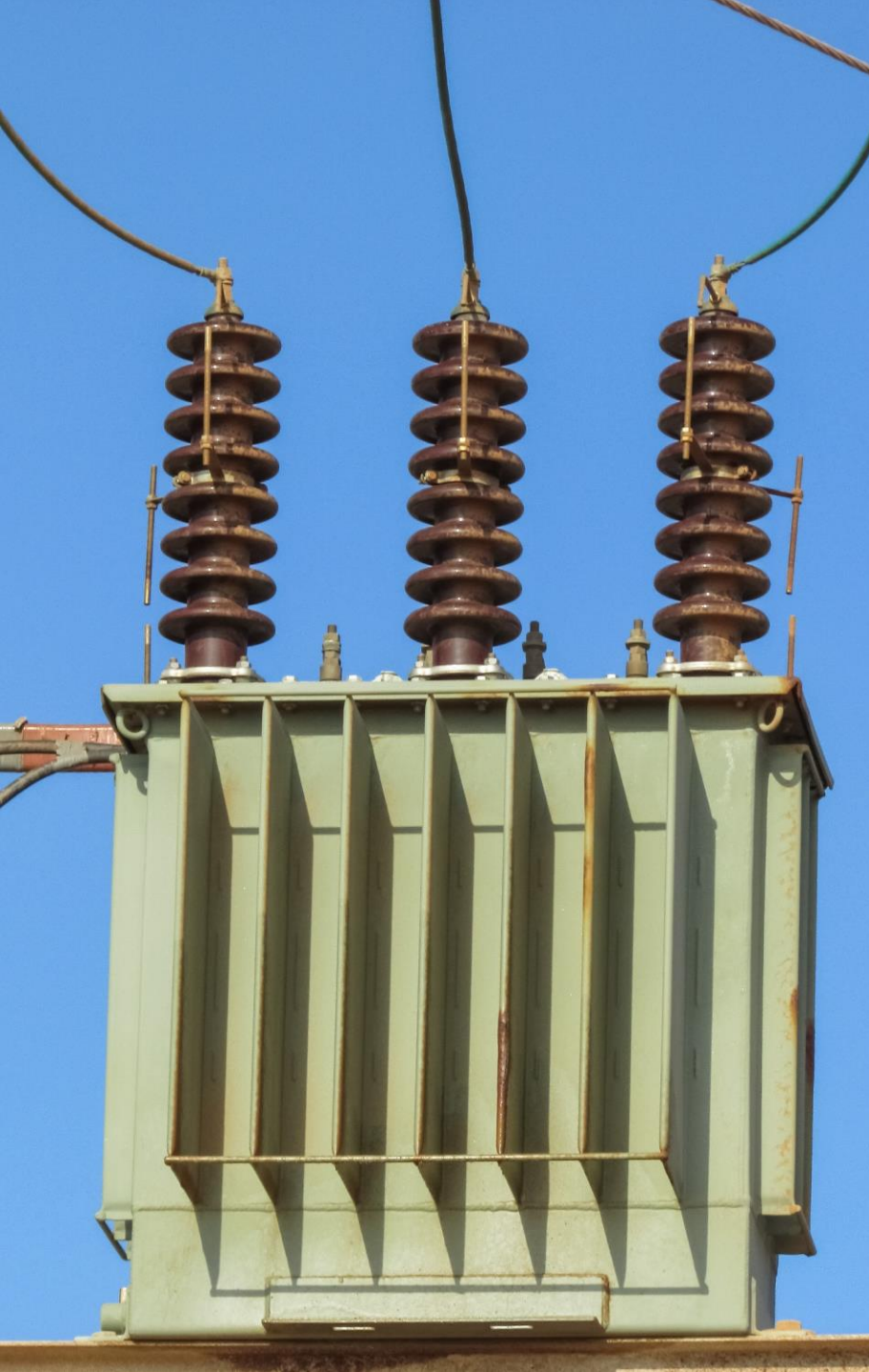
Transformers are often oversized...

to accommodate for the increased harmonic interference from the drives.



Ties to Distribution Equipment

8 TWh energy reduction would correspond to 7,300 industrial transformers per year



In Summary



- Overall energy efficiency is driving demand for motor control electronics, such as VFDs and soft starters
- This will require additional sales of filters or reactors to compensate for harmonic disturbances
- Industrial electricity demand is declining, which could impact new installations for added power distribution capacity
- Grid consideration will become a significant factor in new manufacturing facilities

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