Motors at a Pump Manufacturer

Michael Meier-Wagner, Vice President Group Motors, Zürich, 21 November 2017

MOTOR SUMMiT 2017
Switzerland

7500 Employees

12 Major Production Sites

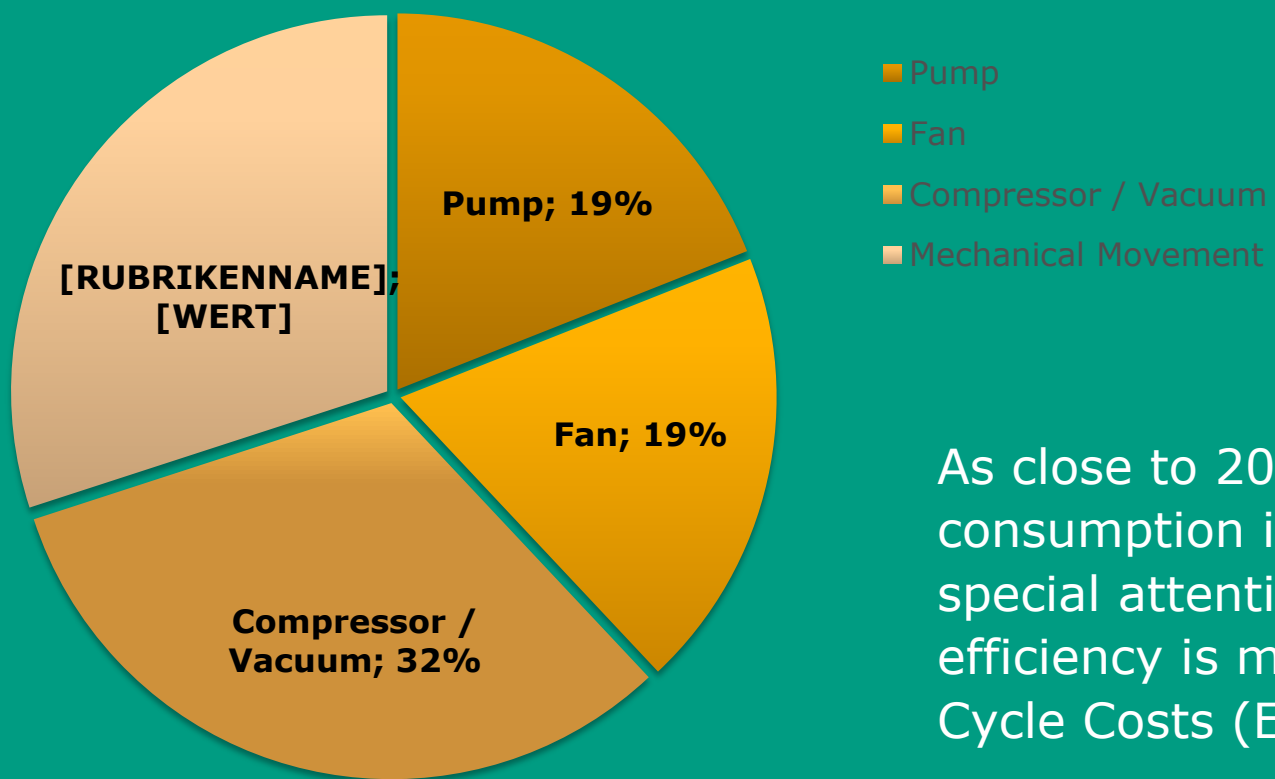
1.330.000.000 € Turnover

5 Sites for Motor Production

9.000.000 Pumps

9.000.000 Motors

Global Electric Energy Consumption by Application



As close to 20% of the energy consumption is caused by pumps, special attention on the end application efficiency is mandatory to gain in Life-Cycle Costs (Energy)

Common motor technologies in the market and at WILO

Induction Motor	Permanent Magnet Motor	Line Start Permanent Magnet Motor	Synchronous Reluctance Motor
			
	Different stator design possible		Different stator design possible

Technology history & outlook based on pumps

Best in class for constant speed applications in terms of product costs/efficiency ratio, IEx-driven

Best in class for variable speed applications in terms of life cycle costs, due to highest efficiencies at partial load, EEI-driven

*DC-Motors / Synchronous Motors (field windings) not considered in this industrial development

Efficiency requirements to Motors, Frequency Converters, Drives, Hydraulics and Pumps

IES D
Drive Efficiency

IE M
Motor Efficiency

IE C
Converter Efficiency

MEI
Hydraulic Efficiency

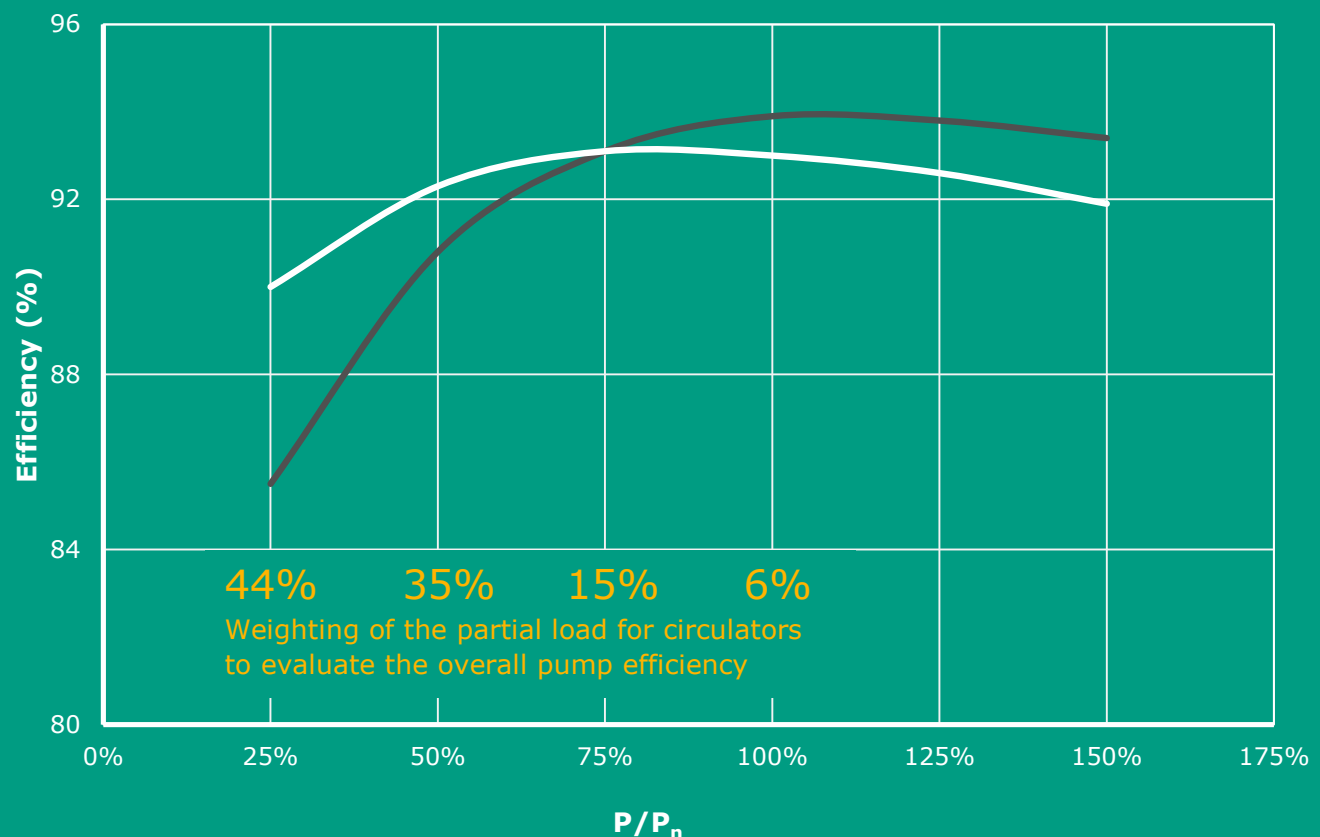
EEI
Pump Efficiency

Global and Local Standards, Regulations, Legislations

IEC 60034-30-1, Efficiencies for fixed speed, motors as IM or LSPM
IEC 60034-30-2, Efficiencies for variable speed, motors as PM or SynRM

EU 547/2012, Legislation for hydraulic efficiencies of water pumps
EC 640/2009, Legislation for IE-Class for electric motors
EC 641/2009, Legislation for EEI for circulators,
system or end application approach

Efficiencies and the importance of partial load

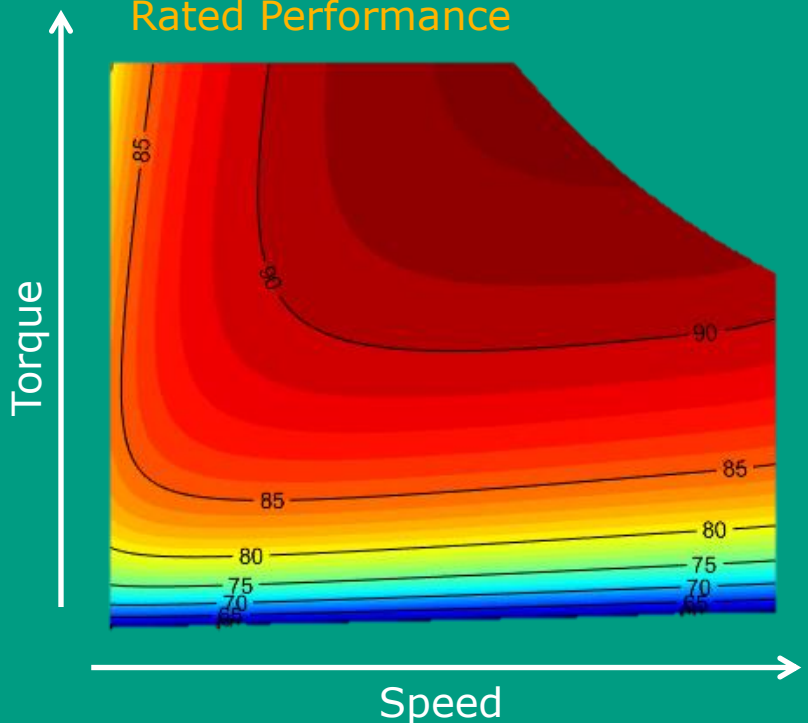


Nominal power designed for maximum efficiency, no partial load considerations. Competition in efficiency classes IEx

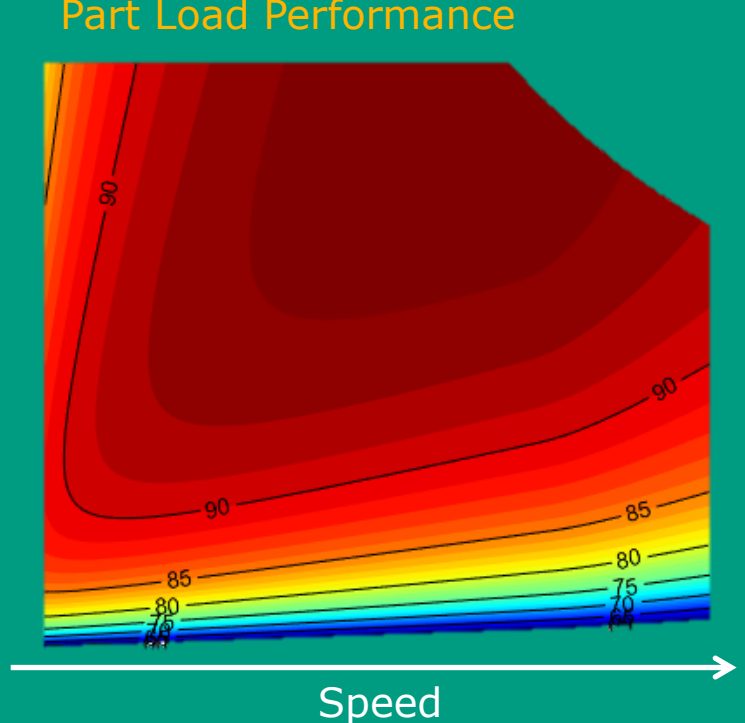
Partial load as main driver for system efficiency improvement and overall energy savings.

Further Potential in Variable Speed and Partial Load Improvement

Rated Performance



Part Load Performance



Energy savings with variable speed far higher than fixed speed
PM-technology can be derived when variable speed becomes mandatory

Widening the field of high efficiency to lift partial load efficiency will be essential for future developments

Future Outlook, Trends and Opportunities

… Megatrends …

Digitalization

Use of electronics
predictive maintenance
online MES-systems
remote control
innovation
…

Energy Shortage

High efficient motors
end-application efficiency
Green Energy Sector
…

E-Mobility

New motor application
innovation.
Push on competitiveness
…

Frequency Converter

Enabler:
Digitalization
Connectivity
Energy Saving
…

Current and Mega Trends are indicating PM-motors as the future opportunity for highly integrated products;
standard motors will decrease in the market.

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