Energy Efficiency in Electric Motors

SEAD Workshop for Latin America
COP 26 Product Efficiency Call to Action

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WEG Motors & Energy
**ELECTRICAL ENERGY CONSUMPTION**

**Worldwide Energy consumption**

- **Source:** [https://yearbook.enerdata.net/electricity/electricity-domestic-consumption-data.html](https://yearbook.enerdata.net/electricity/electricity-domestic-consumption-data.html)

**Energy consumption in Latin America**

- **Source:** [https://yearbook.enerdata.net/electricity/electricity-domestic-consumption-data.html](https://yearbook.enerdata.net/electricity/electricity-domestic-consumption-data.html)
Globally, Electric Motors Account For Up To 46% Of All Electrical Consumption

The electrical energy used at the industry represents ~ 30%

The electrical motors consumption at the industry represents ~ 65%

300 Million motors installed at industry
Industrial installation average age 17 years (Brazil)
~ 40 Million industrial motors manufactured/year (IHS 2017)

Of All Electrical Consumption
10,500 TWh (World)
644 TWh (Latin America)

ELECTRIC MOTOR LIFE CYCLE

- Motor Acquisition Costs: 2.5%
- Energy Costs: 96%
- Maintenance Costs: 1.5%
- Stopping Costs: 2.5%
WORLD MEPS (MINIMUM ENERGY PERFORMANCE STANDARDS)

- **IEC 60034-30-1**
  - IE1
  - IE2
  - IE3
  - IE4

- **NEMA MG1**
  - Std
  - High
  - Premium

- **NZS 1359.5**
  - E2
  - E3

- **NBR 17094-1**
  - IR2
  - IR3

- **GB 18613**
  - GB3
  - GB2
  - GB1

- **WEG**
Average energy saving per Efficiency level:

- IE1 → IE2 = 6%
- IE1 → IE3 = 8%
- IE1 → IE4 = 10%

Manufactured motors in 2019 per efficiency level*:
- IE1 = 37%
- IE2 = 34%
- IE3 = 20%
- IE4 = 15%
- Non-classified = 8%

*IHS report 2020

The majority of world installed motors are still low eff levels as IE1
ELECTRIC MOTOR EVOLUTION

kg/kW

2021 under development in research
<table>
<thead>
<tr>
<th></th>
<th>LEGACY EQUIPMENT</th>
<th>NEW EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Fan System</td>
<td>4 X 75KW</td>
<td>4X 55KW</td>
</tr>
<tr>
<td>Starting Method</td>
<td>DOL</td>
<td>VFD</td>
</tr>
<tr>
<td>Drive System</td>
<td>Multiple V-belts</td>
<td>Polychain</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Approx. 89%</td>
<td>95%</td>
</tr>
<tr>
<td>Extract Fan System</td>
<td>8 X 18.5KW</td>
<td>8 X 15KW</td>
</tr>
<tr>
<td>Starting System</td>
<td>DOL</td>
<td>VFD</td>
</tr>
<tr>
<td>Drive System</td>
<td>Multiple V-belt</td>
<td>Polychain</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Approx 86%</td>
<td>92.5%</td>
</tr>
<tr>
<td>Running hours / year</td>
<td>4000hrs @ Hi Speed</td>
<td>2000hrs @ Hi Speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000hrs @ Low Speed</td>
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**RESULTS**

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<table>
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<tr>
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<tbody>
<tr>
<td>Energy savings 1st year</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>Total cost saving 1st year</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>ROI</td>
<td>9 months</td>
<td></td>
</tr>
<tr>
<td>Estimated cost savings 2nd Year</td>
<td>40%</td>
<td></td>
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</tbody>
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IMPROVING ENERGY EFFICIENCY LEVELS

- Optimize investments in energy generation and its infrastructure;
- Reduce CO2 emissions;
- Consume less natural resource material;
- Reduce operational costs;
- Aim at optimize eff. Performance through technology and digitalization;
- Government incentive/rebate programs to renew the installed industrial base;
THANK YOU!

Transforming energy into solutions. www.weg.net

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