Industrial energy efficiency: a global perspective

Kathleen Gaffney
Berlin, 11 June 2018
Industrial energy intensity is falling

Between 2000 and 2016, energy intensity in the industry sector decreased by 30% in both IEA countries and emerging economies.
Industrial energy productivity must continue to rise

Industrial energy productivity in Europe was nearly double the global average in 2016 and this trend must continue.

Industrial energy use will continue to rise

Industrial activity will increase energy use, but an increase in gas and electricity and a reduction in coal demand is required to reduce emissions intensity to required levels.
Motors account for more than half of today’s electricity consumption.
The significance of electric motors will grow

With current and announced policies, total demand for energy services from industrial motors increases by 80%, driven by increased demand from China and India.
High efficiency motors must become more common

Motors of efficiency IE2 and higher account for about 30% of industrial electricity consumption. By 2030, however, this will need to rise to over 85%.

Electricity consumption of electric motor systems by efficiency and standard level

Energy use of motor-driven systems will need to be 17% less than current projections to meet climate targets. Efficiency gains are driven mainly by other system-wide measures.
ISO 50001 certifications are growing

By the end of 2016 there were over 20 000 ISO 50001 certifications globally. Europe, particularly Germany, dominates global certification, but there is also strong growth in China.

ISO 50001 certifications have increased at rate in line with targets set by the Clean Energy Ministerial. However, certifications outside Europe will need to grow to meet the target.
Evidence of the benefits of energy management systems is growing

Verified average savings from ISO 50001 energy management system, United States

Energy management systems can achieve energy and financial savings of over 10%, as well as non-energy benefits such as better staff skills and improved management of other production inputs.

Example of energy management benefits

• Macedonian mining and power generation company – REK BITOLA
  - Meets over 70% of country’s demand for electricity
  - Implemented ISO 50001 with the assistance of UNIDO
  - In 2016, energy management systems limited to power generation facilities, but expanded to mining operations in 2017

• Savings of about 3% of total consumption, payback of less than 1 month

Source: UNIDO, 2017

<table>
<thead>
<tr>
<th>Energy Management System Implemented</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Measures/Projects</td>
<td>4</td>
</tr>
<tr>
<td>Total Capital Investment (EUR)</td>
<td>0</td>
</tr>
<tr>
<td>Gross Monetary Savings (EUR)</td>
<td>322,000</td>
</tr>
<tr>
<td>Overall Payback Period (in years)</td>
<td>0.00</td>
</tr>
<tr>
<td>2016 Energy Savings Norm. (MWh)</td>
<td>8,502</td>
</tr>
<tr>
<td>2016 GHG Reductions (tons CO₂)</td>
<td>10,528</td>
</tr>
</tbody>
</table>
Energy management systems yielded savings above target

The projects implemented by REK BITOLA could not explain all the savings obtained. Additional (unique) savings were due to organisational changes following ISO 50001 implementation.

Cumulative target and actual energy savings at REK BITOLA, 2016

Source: UNIDO, 2017
Energy management will be aided by digitalization

Energy efficiency measures relating to improved process control in small to medium US manufacturers, 1987-2015

Improvements in industrial process control have become easier and cheaper to implement because of digitalization and produce substantial energy and associated cost savings.

Source: IAC database
Summary

• Policies driving European industrial sector energy consumption toward cleaner, more efficient processes are key to:
  - Achieving climate targets
  - Sustaining improvements in productivity and global competitiveness

• Effective policies will continue to include targets, minimum energy performance standards, energy management programs, and targeted incentives to enable & accelerate innovation

• Industry-led changes will further drive progress
  - Incremental improvements in equipment and process design
  - Broader and more effective EMS implementation
  - Digitalisation and other game-changing disruptions