Digitalisation in electric motor driven systems – key findings from four reports

EMSA7

Statement of Platform Objectives

The IEA 4E Electric Motor Systems Platform (EMSA) promotes the opportunities for energy efficiency in electric motor systems by disseminating best practice information worldwide. It supports the development of internationally aligned test standards and policies to improve the energy performance of new and existing motor systems with the aim of achieving 20% to 30% energy savings.

This Policy Brief summarises the key findings of the following four recent EMSA publications on digitalisation in electric motor systems:

Part I: **Findings for policy makers (includes a summary of Parts II – III - IV)**   ❯

Part II: **Technical recommendations for industrial end-users**   ❯

Part III: **Catalogue of case studies**   ❯

Part IV: **Energy consumption due to the digitalisation of electric motor systems**   ❯

Observations for Policy Makers

■ Digitalisation is an enabler to create transparency in terms of when and how energy is being used. This is a crucial first step when it comes to the optimisation of electric motor systems' operation. Policy makers can help to support the wider implementation of digitalisation in motor systems in the industrial sector in many ways (see *Part I* report).

■ Digitalisation aimed at achieving more efficient processes and work requires collecting data and information from the relevant processes/systems. The collected information needs to be analysed and interpreted to draw conclusions about potential actions that improve energy efficiency. EMSA offers recommendations for that (see *Part II* report).

■ The potential energy savings vary greatly and depend on whether the information that is provided through the digital solution is used to implement optimisation measures and to what extent systems were already optimised before that. In the cases observed, savings range from 9% to 30% of energy consumption and to over 50% of electrical base load reduction (see *Part III* report).

■ Energy savings are not always the primary driver but rather a side-effect of the motor system optimisation. Non-energy benefits often play a more decisive role (e.g. avoiding unplanned downtime, decreasing maintenance cost, increasing production efficiency, extending the lifetime of equipment).

■ The energy savings achieved through the digitalisation of motor systems far outweigh the additional energy consumption resulting from the digitalisation process. In the cases studied, the energy expenditure to facilitate digitalisation never exceeded 1% of the total energy consumption attributable to the motor system, but was rather negligible (see *Part IV* report).

MORE INFORMATION

Published August 2024

The four recent EMSA reports are available for download **here**. Further information on EMSA's work on digitalisation is available **here** and by contacting the EMSA lead on digitalisation: **konstantin.kulterer@energyagency.at.**

Key Findings

How can policy makers help?

Part I includes a summary of interviews on possibilities and barriers of digitalisation, expert inputs collected from relevant stakeholders and a detailed description of relevant policy programmes in the four participating countries of this research: Austria (lead), Netherlands, Sweden and Switzerland. EMSA's policy recommendations on how policy makers can help in a wider implementation of digitalisation:

- Define clear energy savings targets for industrial end-users.
- Motivate end-users setting up a monitoring system for the main energy consumers (e.g. via mandatory monitoring, uniform interfaces, standards for measurement, data requirements). Incentivise the appointment of one contact person at the end-user to start the implementation of digitalisation solutions.
- Subsidise installing a monitoring system or installing more sensors in smaller companies.
- Promote energy efficiency through digitalisation more broadly, e.g. via a dedicated network, or an independent institution/website.

- Set up a certification scheme for external consultants or list consultants indicating their special competencies.
- Strengthen training and capacity building measures for technicians and management level.
- Create guidelines on how to analyse and digitalise typical motor systems, such as compressed air, refrigeration, pump or ventilation systems, which are often found in all sectors (see also *Part II* report).
- Promote digitalisation audits/scans - potentially coupled with financial support - to establish end-users' readiness level for digital technologies and to set up company-specific strategies for digitalisation.

How to start? Analyse the relevant systems!

In *Part II*, technical recommendations for industrial end-users on how to digitalise their motor systems are formulated. First, there are general recommendations for the introduction of digitalisation in companies. Second, for pumping, ventilation and compressed air systems, more detailed recommendations are given. These include location of measurement points, use of sensors and monitoring recommendations.

Significant savings can be achieved

In *Part III*, EMSA presents eight concrete cases of companies who used digital solutions to optimise their processes, thereby saving energy. The case studies cover all major motor system applications, i.e. pump, ventilation and compressor systems. Savings range from 9% to 30% of energy consumption and to over 50% of electrical base load reduction.

Energy consumption during the weekend (Saturday 4 PM to Sunday 4 PM)
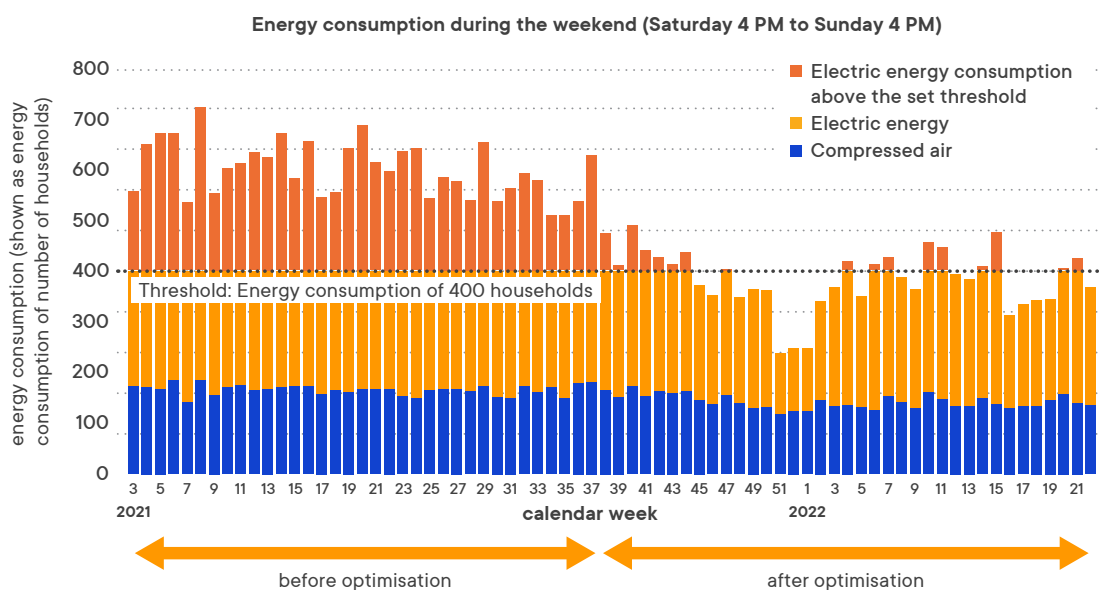
The Austrian manufacturer INNIO Jenbacher reviewed weekend energy usage, using digital solutions, and set new thresholds for electricity and compressed air demand. The interventions reduced electricity demand by 30%.