CEMEP
European Committee of Manufacturers of Electrical Machines and Power Electronics

Efficient electric motor systems for energy affordability, EU's industrial leadership and resilience

Why electric motors with variable speed drives are the EU's hidden energy opportunity

Europe's energy transition faces a growing contradiction: electrification is accelerating across transport, heating, industry, buildings – yet, electricity grids are struggling to keep pace and are increasingly becoming a bottleneck. In this context, energy efficiency is no longer a climate policy tool, but an imperative to maintain Europe's industrial competitiveness, guarantee affordability and strategic autonomy, reduce energy bills for citizens and businesses and relieve the pressure on grid infrastructure.

Among all efficiency technologies already available today, **motor systems provide among the largest, fastest and most cost-effective opportunities**[1] **to help optimise our energy system**.

Electric motors might not be visible but they make the modern world work. They turn electricity into motion that drives the systems we depend on every day: from heating & cooling buildings to pumping water through treatment and distribution networks, from circulating air in ventilation systems to running compressors in refrigeration and heat pumps. In industry, they power production lines, conveyor belts and heavy machinery; in transport and logistics, they keep material handling systems and elevators moving.

Variable Speed Drives (VSDs) act as the motor's brain: they can modulate the speed of the motor to what is actually needed to perform the task. In many cases, electric motors do not need to run full speed to achieve the expected outcome, and adjusting the speed with VSDs can therefore deliver important energy savings.

Key facts & figures[2]

- Electric motor-driven applications consume around 1,300 TWh annually in the EU, representing roughly half of all EU electricity consumption.
- In industry and buildings, motor-driven systems (e.g. pumps, fans, compressors) account for around 70% of electricity use, making them the single largest source of industrial electricity demand.
- The EU has at least an estimated 380million installed industrial electric motors (2020).
- Motors often remain in operation for 30-40 years, significantly exceeding their intended lifetime. It is estimated that around 25% of motor electricity consumption could be reduced cost-effectively with existing technologies, notably by ensuring optimal speed control of the motor with variable speed drives (only around 20% of motors are equipped with variable speed drives).

[1] **International Energy Agency (IEA)**, *Energy Efficiency 2025*, IEA, Paris, 2025 – Industry chapter and analysis on motor-driven systems and variable speed drives. Available at: https://www.iea.org/reports/energy-efficiency-2025

[2] Fraunhofer ICT, *Study on the energy-saving potential of electric motors with variable-speed drives in The European Union*, Part 1-3 (2023, 2024, 2025) https://cemep.eu/wp-content/uploads/2025/12/Energy-saving-study_final_report.pdf

- The EU has a flourishing manufacturing basis (>EUR 28bn of market value and 180K employees), with roughly one in every three electric motors in the world is produced in Europe.

Efficient motor-driven systems are at the crossroads of Europe's industrial and resilience strategies. With our strong European manufacturing and solution provider presence, we represent one of Europe's largest untapped energy-saving opportunities. Efficient motor-driven systems help to reduce energy costs in energy-intensive sectors, maintain production capacity in Europe, support jobs, and reduce dependency on external suppliers.

What is holding Europe back and how to unlock the potential

The recent geopolitical instability has only exacerbated structural pressure that Europe faces from rising electricity demand, persistent grid constraints and raw material vulnerabilities. **It is high time for the EU to prioritise system-level and demand creation measures that cut electricity use in a cost-efficient manner**.

Below, we have listed some problems that our sector has been facing and regulatory solutions that would help address them.

1. Choose regulations that spark savings

Upgrading motors by one IE class can already deliver energy savings (around 10-15 TWh per year according to our estimation). However, because pumps, fans, and compressors often do not need to operate at full power, even greater savings can be achieved when motors are combined with VSDs by automatically adjusting motor speed to match demand, reducing energy waste (between 10% and 75% of energy per machine) while maintaining performance. In total, it is estimated that deploying VSDs in variable load applications could deliver up to 150 TWh/year—around 6% of EU electricity demand, more than the annual consumption of Denmark and the Netherlands combined.

Looking at motors from a component perspective is reductive and does not allow to capitalise on their potential. On the other hand, **a system approach would lead to high energy savings** with positive results for electricity bills and overall sustainable competitiveness of European industries. This system approach can be integrated into the ecodesign rules for key applications (e.g. water pumps, circulators and ventilation units) which are under preparation: by recognising the role of electric motor systems and VSDs in the respective delegated act, the Commission has the opportunity to accelerate uptake, unlock substantial energy savings and significantly reduce electricity bills for European industry.

2. Increase awareness to address information gaps

Electric motor value chains are complex, with products delivered via machine builders and system integrators before reaching end users—who often have limited influence on design and low awareness of efficiency potential and its effect on total cost of ownership. At the same time, the expertise to optimise energy performance sits with different actors than those holding investment power and decision-making authority, creating a critical misalignment.

Public authorities and industry share a clear strategic interest in accelerating the uptake of high-efficiency motor systems. The objective must be to elevate electric motor efficiency from an operational

consideration to a strategic priority. This requires building high-level political and market awareness, ensuring that efficiency is recognised not only as a technical feature but as a key lever for competitiveness, energy security, and decarbonisation.

Consistent policy signalling matters. Recent initiatives, including the AccelerateEU communication (April 2026)[3], are important steps in raising visibility. The next phase should ensure that motor system efficiency is fully embedded within Europe's Post-2030 Climate and Energy Framework—providing clear direction to the market and supporting accelerated actions.

When it comes to data transparency and awareness, a **focused, value-adding Digital Product Passport (DPP) will be a key tool to enable better access to energy performance data** (incl. information across different load points). Over time, the DPP can be used to demonstrate the value of motor-driven systems.

3. Enforce "energy efficiency first" principle to streamline fragmented decision-making

The cleanest and most secure energy is the energy that is not consumed. This is why it is so important that **the "energy efficiency first" principle is reflected across public policy initiatives, not just as a theoretical principle, but an operational one that can drive decisions and investments**. Public authorities have a duty to be front-runners in this context. The upcoming revision of public procurement rules is an occasion to update public tenders so that non-price criteria and lifecycle costs are properly implemented. For large projects, rules should require that tendering authorities automatically request a quote for the "*most efficient option*" so to facilitate comparisons among similar offerings and better implement energy efficiency.

Public authorities also have a duty to enforce energy efficiency rules, especially the Energy Efficiency Directive (EED) and Energy Performance of Building Directive (EPBD). The energy management system and technical building system rules should be implemented so that inefficient products are removed and enterprises and non-residential buildings are equipped with electric motors and VSDs. For example, national rules shall require energy audits to assess whether enterprises falling under Article 11 of the EED are equipped with electric motors and VSDs and what energy savings could otherwise be achieved.

The energy efficiency policy framework post-2030 should ensure energy efficiency remains a core pillar of the EU's resilience and competitiveness strategy. EU policy makers should maintain the level of ambition and build on the existing legislation and provisions that have proven to unlock investments and support scaling up the technologies that we need, like electric motors and VSDs.

4. Attract investments to create scale and reduce upfront costs

The payback time of our solutions is short: often between a few months to 2 years. In particular, the EU Taxonomy can play a key role in mobilising private capital. As highlighted by Orgalim[4], recognising "*manufacturing of energy efficiency equipment in industrial processes*" in the Taxonomy Regulation

[3] Accelerate EU Catalogue, May 2026 https://energy.ec.europa.eu/strategy/accelerateeu-strengthen-eu-energy-resilience/accelerateeu-catalogue_en

[4] Orgalim Statement, 27 April 2026, EU Taxonomy Climate Delegated Act: Why we need to include energy efficiency in industrial processes https://orgalim.eu/resource/eu-taxonomy-climate-delegated-act-why-we-need-to-include-energy-efficiency-in-industrial-processes/

would help drive investments in proven energy efficiency solutions, such as electric motors and variable speed drives.

By channelling investments into these solutions, regulators have an opportunity to further support our European industrial and service base, as well as enabling other sectors to effectively address their energy price, sustainability and industrialisation challenges.

Adequate financing to support the upfront investment costs will also help scale up efficient technologies at the pace needed to boost the EU's security and resilience.

Conclusion

Electric motor systems are one of the greatest and most cost-effective opportunities for reducing Europe's electricity demand. The technology is already available, the economics are strong, and the potential is significant.

The next step is clear: shift from component-level improvements to system-level deployment, coherent policy signals, strong implementation, and investment frameworks can accelerate uptake of energy-efficient electrical motor systems across Europe.

About us

CEMEP is the European Committee of Manufacturers of Electrical Machines and Power Electronics, representing an industry with a market value of more than EUR 28bn and around 180,000 employees. The full members of CEMEP are 13 national associations and 7 corporate members in Europe, representing manufacturers of electric motors, variable speed drives and uninterruptible power supply (UPS) industries.