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EUropean MOtor
REnovation initiative

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Policy review and recommendations for accelerating the replacement of old and inefficient motors

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EU-MORE

EU-MORE is an acronym for
EUropean MOtor
REnovation initiative

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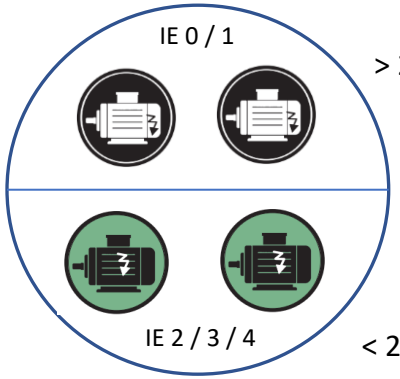
What is the problem?

Electric motors > 50% of EU electricity consumption

A total of 8 billion motors in EU

EU-MORE addresses **motors > 0.75 kW** representing a large share of the total consumption



Swiss survey: 50% of the concerned motors are > 20 y old

Figures for EU are lacking, but situation is expected to be similar

What is the opportunity?

Accelerated motor replacement

Replacing old IE 0/1/2 motors by new IE3 and above motors
+ motor system optimisation

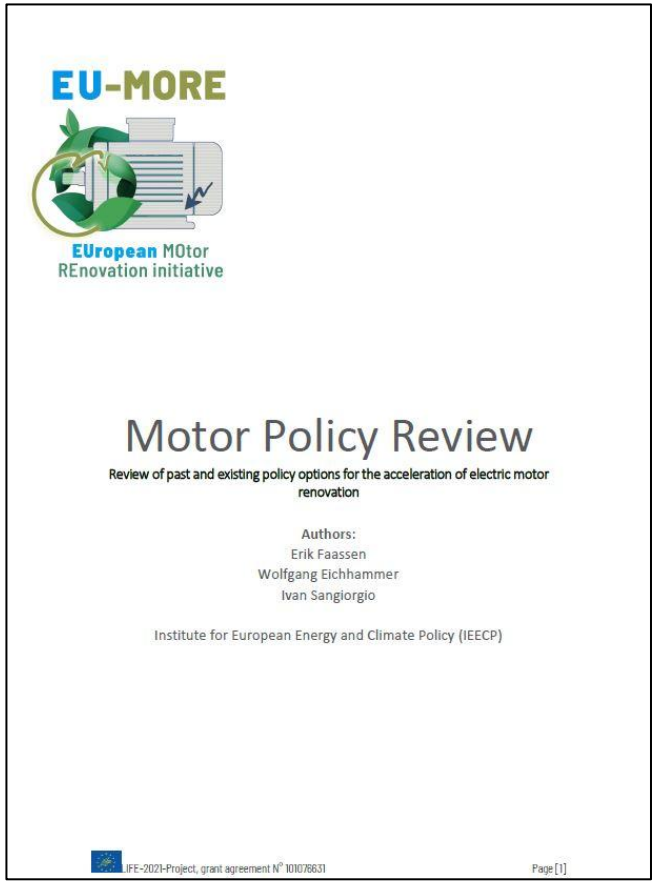
Accelerating motor renovation with motor system optimisation has an estimated energy savings potential of approximately **100 TWh/y** in the EU-27

= 55 average gas fired power plants
= close to the electricity consumption of the Netherlands (2021)
= 30% of natural gas import from Russia (08/2022)
= 25 Mton CO2e

EU-MORE Results: Motor Policy Review

- Final report on the **past, current and future policy measures addressing motor renovation**, including:
  - ➢Overview and description of the policies, for each EU Member State
  - ➢Policy impact analysis
  - ➢Identification of best practices
  - ➢Identification of barriers and shortcomings
  - ➢Overview of motor policies outside the EU

- Report available at: https://eu-more.eu/wp-content/uploads/2024/10/D2.2-Policy-Review-Report-v.1.4.pdf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Motor Policy Review

Review of past and existing policy options for the acceleration of electric motor renovation

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Policy Review - Methodology

- The review methodology adopted is based on the contribution of **several country experts** able to provide a high-level perspective on the national policies under exam.
- A total of **64 policy measures** have been analysed according to: budget/available funding, targets, eligibility criteria, general and specific impacts (on motor systems).
- Per country 'sub-reports' were produced for all 27 Member states, then collected into the final overview report

Disclaimer: the review methodology differed in each MS (depending on the reviewer), thus overall results are only indicative and not exhaustive

Policy Review - Discussion

- Subsidies, loans, fiscal measures and market-based instruments are predominant
- Non-subsidy policies (mandatory standards/information, informational measures) represent about 1/3 of the analysed policies
- **Informational barriers** do not seem to be adequately considered (low number of specific training/capacity building programs)

Policy Review: Discussion

- Motor replacement is generally included in **cross-cutting energy efficiency programmes**

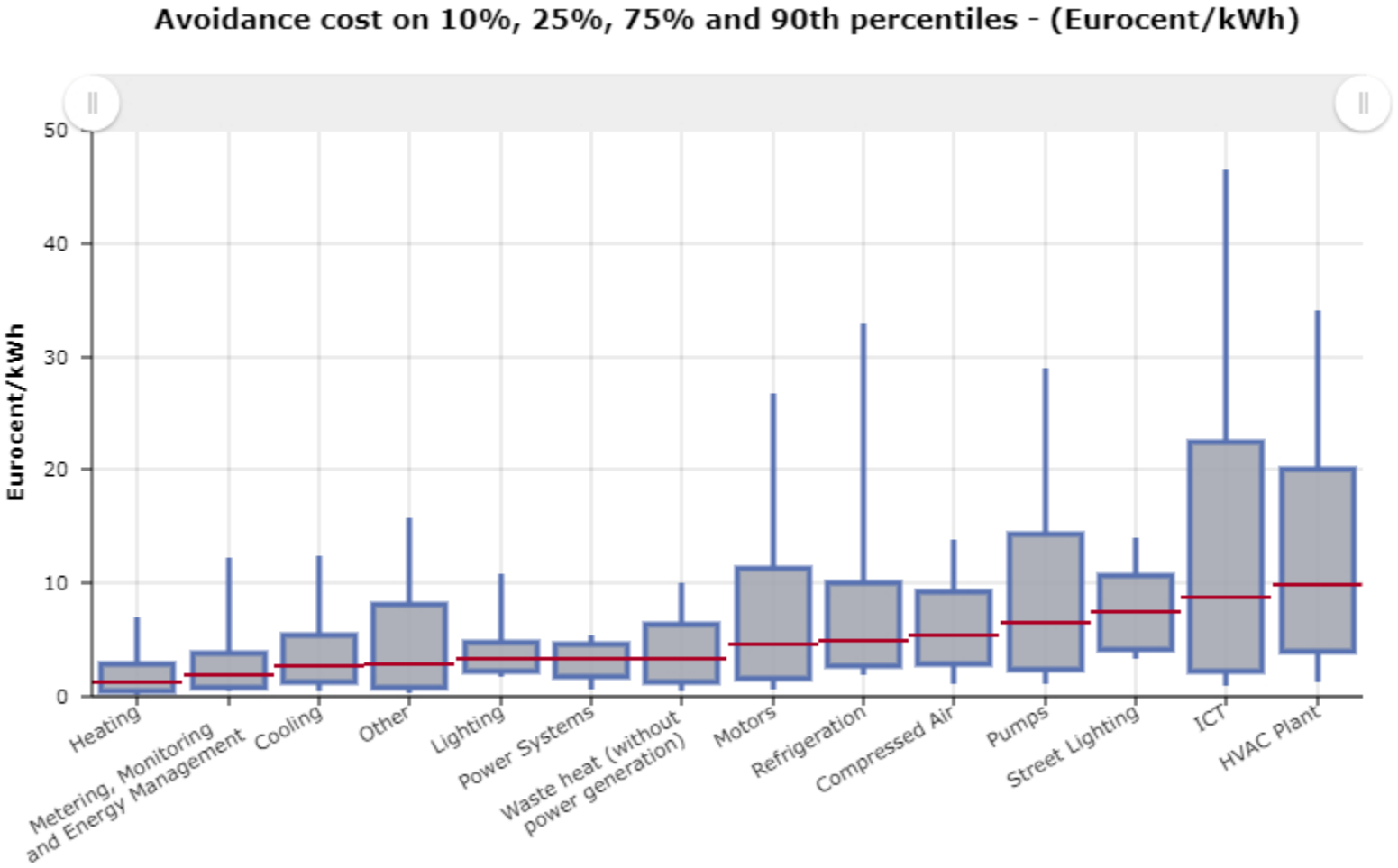
- Motor replacement is usually described as an eligible intervention, but **criteria are often fuzzy or not explicit**

- **Very few policies** include systemic approaches to **motor systems** (e.g. optimization of both supply and demand for motive power), which generate usually the highest energy savings, as evidenced from case studies.

New motors investments

According to the De-risking Energy Efficiency Platform (DEEP), investments for energy efficient motors have a **median avoidance cost of 4,63 c€/kWh and a median payback time of 4 yrs** (based on 1263 projects).

So, why old and inefficient motors are not replaced by new and efficient ones;



Source: De-risking Energy Efficiency Platform (DEEP)

Policy Recommendations

The following are general guidelines to have in mind when developing motor replacement policies:

❑ Follow an integrated approach

Successful outcomes require integrated sets of measures that reinforce each other, including baseline data collection, information campaigns and capacity building, encouraging the implementation of measures identified by energy audits, subsidies or tax relief where appropriate, and a system for impact reporting.

❑ Follow a stick-and-carrot approach

Incentives should be combined with penalties for non-compliance. Financial incentives should be carefully designed to ensure that participation is worth the effort and that free-riders are deterred.

❑ Plan long-term

A programme should run long enough to become familiar to market participants, but financial incentives should not apply for so long that they distort market price mechanisms.

Policy Recommendations

general guidelines

❑ Keep it clear, simple, and transparent

Subsidies should be clearly specified, including variations based on product specifications or usage. Selection procedures should be transparent, to stimulate participation and build mutual trust.

❑ Build on best practices

There is no need to re-invent the wheel. Learn from the success or failure of past or existing programmes and best practices, and adapt them to the specifics of your country, region, or sector.

❑ Integrate calculation tools that follow a life-cycle approach

Appropriate calculation tools, including the tool developed by EU-MORE, combined with information and training campaigns, can stimulate the adoption of a life-cycle approach, which can be a strong driver for early replacement of inefficient motors.

❑ Adopt a system approach

The benefits of replacing an old motor can be enhanced by addressing the entire motor system rather than the individual motor alone. Such an approach can lead to a re-engineering project to allow for proper dimensioning of the motor and efficiency upgrades of the associated process equipment.

Policy Recommendations

general guidelines

❑ Take non-energy benefits (NEBs) into account

Raising awareness about NEBs and aligning policy frameworks with NEB-centric approaches can help to make motor replacement investment more attractive to industrial decision makers.

❑ Consider material availability and circularity

Programmes for accelerated motor replacement should be aware of the life-cycle material balance, including the material savings in power generation triggered by energy savings. They should run alongside measures stimulating recyclability and minimising the use of critical raw materials.

❑ Keep up with technological innovations

Smart, innovative technology (digitalisation, artificial intelligence, etc.) can be coupled with robust and mature products to optimise energy efficiencies and monitor the resulting energy savings.

Discussions with Stakeholders

Indicative feedback from National and Co-Creation Workshops

- "The **baseline for the energy savings calculation** of early motor replacement will be the efficiency of the old motor until the end of the normal service life, … but **what is the 'normal service life**'? We need standardised values for this, as well as a standardised method for calculating the energy savings of early motor replacement." (Co-creation Workshop Austria, 27 August 2024)

- "A **mandatory inclusion** of motor system assessments in energy audits risks being counterproductive, since it will make the audit more complex. A better idea would be to **include examples of motor replacement projects in audit handbooks**." (Co-creation Workshop Austria, 27 August 2024)

- "**SMEs** could use a one-stop-shop for all **information and support** regarding motors, including **free audits** as well as a website with **examples of best-practice**." (Co-creation Workshop Germany, 3 December 2024)

- "Although profitability and climate protection are high on the agenda of industrial companies, **they will not go for anticipated motor replacement without subsidies**, even if it pays off in terms of life cycle cost and carbon emission reduction." (Co-creation Workshop Germany, 3 December 2024)

Discussions with Stakeholders

Indicative feedback from National and Co-Creation Workshops

- "Given the **limited financial resources of SMEs** and semi-public enterprises, they **rely on the support of public financing programmes for their investments**. Measures that are beyond the scope of these programmes will not be implemented, even if they have a high rate of return." (Co-creation Workshop Greece, 19 November 2024)

- "Motor replacement programmes can only be successful with a **participatory approach**, involving relevant ministries, managing authorities of energy efficiency programmes, industry associations, research centres, and market players." (National Workshop Greece, 19 November 2024)

- "**Technical training and awareness campaigns** are more important than creating additional regulations. **The entire value chain should be addressed**, including production line and motor system designers, since they're key in the decision-making process." (Co-creation Workshop Portugal, 27 November 2024)

- "Energy efficiency measures with a **pay-back time of more than three years** should receive some kind of **financial support** to improve their profitability." (Co-creation Workshop Portugal, 27 November 2024)

Policy recommendations for EU Member States

❑ Initiate a data collection programme

Use energy audits to collect baseline data on motor stock, including power rating, efficiency, age, and average load. This will lead to policy measures being designed and monitored more efficiently and could help companies optimise their investment decisions. Motor system assessments made by energy audits should be reported to the managing authority.

❑ Initiate a subsidy scheme to replace old, inefficient motors

Provide appropriate subsidies to industrial companies for investing in motor systems identified by energy audits as having a high energy saving potential but where the investment is not sufficiently attractive from an economic point of view. Set the subsidy rate carefully to deter free riders. The subsidies can also be connected to the scrappage of the old motor, confirmed by certification.

❑ Initiate a tax incentive scheme combined with voluntary agreements for 'low-hanging fruit'

Provide appropriate tax incentives combined with voluntary agreements for those investments identified by energy audits as having a high energy saving potential and that are economically attractive (i.e., payback <4 years and/or sufficiently high IRR) but which have not been implemented due to organisational barriers.

Policy recommendations for EU Member States

❑ Update existing energy efficiency obligation schemes (EEOSs) to finance energy audits

By updating the national or regional EEOSs, obligated parties can be given the opportunity to meet their obligations through financing their clients' energy audits. This will stimulate high quality energy audits and can also serve to collect baseline data.

❑ Provide free energy audits and capacity-building activities for SMEs

SMEs are often unaware of the potential multiple benefits of motor investment and may not have the necessary resources to undertake high quality energy audits or implement energy management systems. Free energy audits and capacity-building activities could help to fill this gap.

❑ Initiate information and training programmes

Initiate information campaigns targeting every stakeholder involved in motor investment decisions in industry and the tertiary sector. Develop training programmes for energy auditors to keep them up to date with technological innovations and assure the quality of energy audits.

❑ Attract private capital by aligning policies with the EU's Sustainable Finance Framework

The EU Taxonomy Regulation, part of the EU's sustainable finance framework, could be updated to include replacing old motors as a dedicated green, or 'environmentally sustainable', economic activity. This can stimulate private capital companies to finance such investments.

National Policy recommendations

Austria

- **Explicitly mention motor replacement and VSD installation** on motor systems with varying loads as eligible measures under the **Austrian subsidy scheme** for energy efficiency in industry.

- **Raise awareness** about the potential benefits of motor replacement and motor system optimisation via *klimaaktiv*, the Austrian climate protection initiative mainly focussing on promoting climate-friendly technologies and services. In a further step, specifications for high-efficient motors could be included in the description of measures that can be implemented by ***klimaaktiv*** partner companies.

Germany

- **Incorporate a motor replacement initiative in the Federal Funding for Energy and Resource Efficiency in the Economy programme (EEW)**, an initiative aimed at private companies, municipal companies, freelancers, and contractors. Create a two- or three-year focus within the EEW on replacing old, inefficient industrial motors with sufficiently long runtimes.

National Policy recommendations

Greece

- Take advantage of the established **energy efficiency obligation scheme** to further enable the obligated entities (energy suppliers) in Greece to partially meet their obligations by directly funding their clients' necessary studies or energy audits related to motor systems improvement. In this win-win situation, **obligated parties could offer free energy audits to their SME clients**.

The Netherlands

- Maintain but **finetune the Energy Investment Allowance (EIA)**, a programme granting tax deductions to industrial companies investing in energy efficiency. A **lower deduction rate is suggested** (e.g. 40%) to limit the number of **free riders** while maintaining the **attractiveness of the scheme**.

National Policy recommendations

Portugal

- Set **more ambitious mandatory targets for energy savings**. The current target for companies with low consumption (<1000 toe/year) is 4% over eight years – a commitment that could be strengthened. This could be **complemented by financial support** for energy efficiency investment for SMEs (e.g., subsidies or tax benefits).

- Install a **financial support mechanism** (e.g., tax benefits, low interest loans, or subsidies) **for companies exceeding their energy and greenhouse gas emission targets**.

Policy recommendations – Circularity of materials

- ❑ Support EU-based **motor recycling** through **financial incentives** and **penalise waste export** through taxation.
- ❑ **Promote end-of-life treatment by certified waste companies**, as well as issuing environmental and destruction reports to motor end-users.
- ❑ **Stimulate design-for-recycling and design-for-disassembly**, e.g., through motor production standards, among other strategies.
- ❑ **Stimulate the research and development** of rare earth **recovery technologies** and support rare earth **recycling practices**.
- ❑ Conduct **studies** to map end-of-life motor material flows and recycling processes.