EU-MORE

EUropean MOtor REnovation initiative

# Greece

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

**EU-MORE**


## Authors:

Center for Renewable Energy Sources and Saving (CRES)

## List of Acronyms

| Acronym | Text |
|---|---|
| CRES | Centre for Renewable Energy Sources and Saving |
| CRM | Capacity Remuneration Mechanism |
| ERDF | European Regional Development Fund |
| ESF | European Social Fund |
| ETS | Emission Trading Scheme |
| GHG | Greenhouse Gases |
| IPTO | Independent Power Transmission Operator |
| MoEE | Ministry of Environment and Energy |
| PPC | Public Power Corporation |

EU-MORE is an acronym for
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REnovation initiative

# 1. GREECE

***Introduction and description of the national policy framework and important related national programmes, measures and/or developments:***

The Ministry of Environment and Energy (MoEE) is responsible for designing and implementing energy and climate policy. The MoEE also has responsibility for tracking progress on climate targets and reporting GHG emissions to the United Nations Framework Convention on Climate Change (UNFCCC). The Ministry of Finance is responsible for taxation and fiscal policy, including energy taxation. The Ministry of Development and Investments is responsible for investment policies in the energy sector and for financing energy innovation and research through national and EU resources.

Within the MoEE, the General Secretariat for Energy and Mineral Resources is responsible for implementing energy policy in sectors including electricity, oil, gas, renewables and energy efficiency and for disseminating energy statistics. The Directorate of Energy Policies and Energy Efficiency and the Energy Inspectorate Units of the General Directorate of Inspectors and Auditors are centrally involved in energy efficiency policy development and implementation. The Centre for Renewable Energy Sources and Saving is responsible for promoting renewable energy, rational use of energy and energy conservation. The Centre for Renewable Energy Sources and Saving is a public entity, supervised by the MoEE, but with financial and administrative independence. It implements innovative projects and promotes market penetration of new energy technologies for renewables and efficiency.

The Regulatory Authority for Energy (RAE) is a financially and administratively independent authority that oversees Greek energy markets. It has a consenting opinion on the National Gas and Electricity Grid Operation Code, the Power Exchanges Code, and the Gas and Power Distribution Network Operation Code. RAE is also responsible for licensing energy market participants and overall energy market supervision. It plays a decisive role in market reforms and needs to ensure that the behaviour of the various system operators and market participants complies with EU regulations.

The Public Power Corporation S.A. (PPC) is the historic incumbent electricity company. PPC owns the largest share of installed generation capacity, including most lignite-fired generation and associated mines, and all large-scale hydro generation. The PPC is the largest electricity supplier at the wholesale and retail level. In November 2021, the Greek state reduced its ownership share in PPC from 51% to 34% (PPC, 2022).

The Independent Power Transmission Operator S.A. (IPTO) is the Greek electricity transmission system operator (TSO), responsible for the operation, maintenance and development of the electricity transmission system and cross-border interconnections.

IPTO is owned for 76% by the Greek state and 24% by the Chinese company State Grid (ADMIE Holding, 2022). The Hellenic Electricity Distribution Network Operator S.A. (HEDNO) is the Greek electricity distribution system operator (DSO). It operates, maintains and develops the electricity distribution systems in mainland Greece and in the interconnected islands, and manages the electricity markets and distribution grids of non-interconnected islands.

HEDNO is owned 51% by PPC and 49% by the Australian private company Macquarie Asset Management (HEDNO S.A., 2022).

The government's strategic aim is that the energy and climate objectives set in the context of the NECP by 2030 should contribute substantially to the necessary energy transition in the most economically competitive manner for the national economy, should ensure a sharp reduction in greenhouse gas emissions through a comprehensive and cohesive programme of measures and policies, thus placing Greece at the core of developments in the Energy Union both for 2030 and, ultimately, for 2050. In the context of the NECP the following targets have been set for 2030:

a) Greenhouse gas emissions reduction by more than 42% compared to emissions in 1990.
b) A 35% share of RES in gross final energy consumption.
c) Final energy consumption in 2030 to be lower than that recorded in 2017.

Over the years the Ministry of Environment and Energy (MoEE) has implemented a plethora of Energy Efficiency related programs that include government financial aid such as the Green Transition program. This programme includes various energy saving eligible actions such as equipment upgrade.

In the industrial sector, Greece implemented in December 2016 a requirement for large industry to either conduct an energy audit every four years or implement an energy or environmental management system in compliance with Article 8 of the EU Energy Efficiency Directive. Small to medium-sized enterprises will also have access to quality energy audits due to these policies, according to the IEA.

Energy efficiency opportunities identified and implemented within Greek industry can also contribute towards the obligations of energy suppliers and retailers under the energy efficiency obligation scheme. This represents a source of energy savings that could be exploited by parties obligated by the programme to meet legislated requirements. It is therefore of benefit to maximise the relationships among industrial energy users and energy retailers to provide mutually beneficial updates for the energy audits and obligation programme participants.

In the industrial sector, the measure for the relocation of industrial plants to industrial-business zones will be strengthened. New policy measures will support actions at an industrial-business zone level for better energy management and increased savings, such as central heat production and distribution systems, according to Greece's NECP. Furthermore, the promotion of natural gas as fuel in industries established far from the high pressure network through the transportation of liquefied natural gas is expected to be important. In the same context, the production of energy from the utilisation of waste heat and the replacement of conventional fuels with alternative ones will be promoted. Finally, special financing mechanisms will be designed to strengthen the implementation of energy efficiency improvement measures in the industrial sector through energy performance contracts, such as subsidising borrowing costs and facilitating access of energy services companies to financing.

Finally, a specific package of policy measures aimed at improving energy efficiency in the agricultural sector is currently being considered. For example, a measure to improve the energy efficiency of pumping stations, as well as new measures such as the energy upgrading of agricultural machinery and the reduction in energy consumption in greenhouses and livestock farms are being planned.

The most relevant to EU-More policy measures are subsidies related to energy efficiency investments in the industrial and public services sectors. In that context notable is the programme Antonis Tritsis which focuses on water/wastewater infrastructure and pumping equipment replacement/upgrade.

Moreover, the legislative requirement regarding Energy Efficiency Obligation Schemes is having a great impact on energy efficiency in the industrial sector. Currently, the obligated parties offset their obligations through the implementation of specific energy efficiency measures. To this direction, CRES plans to promote the replacement of old and inefficient motors in the industry by introducing new mathematical equations and offering the obligating parties, the option to offset their obligations through the replacement of such old motors.

- Improvement in Energy Efficiency through Energy Saving Companies - Expected savings 36 ktoe, 2021-2030
- Energy Upgrade of Pumping Stations Equipment– Expected savings 35 ktoe, 2021-2030
- Energy efficiency obligation schemes – Expected savings 661 ktoe, 2021-2030
- Measure M16 - Promotion of energy audits in SMEs and in households.
- Measure M17 - Financing programmes for the application of the recommendations of energy audits to obliged or non-obliged parties.
- Measure M18 - Promotion of energy management systems in SMEs.
- Measure M33 - Financing programmes for improvement in the energy efficiency of industries and processors in the context of the new programming period, including the promotion of EPCs.
- Measure M47 -Promotion of measures for modernising water supply / sewage and irrigation infrastructures, to save both water and energy.

**Brief evaluation of the overall size and scope of national actions in relation to the replacement of electric motors and the EU-MORE project as a whole**

There are various national actions related to energy efficiency which are relevant to the EU-MORE project. The most notable is the Antonis Tritsis programme and specifically its AT03 action which is aimed at energy efficiency improvement of water pumping stations by a series of measures including replacement of old pumps, adding variable speed drivers, remote monitoring and installation of PVs.

Additionally, the energy efficiency obligation scheme could be modified to further push energy suppliers and industrial partners to improve energy efficiency through the replacement of electric motors.

## 1.1 Measure 1: "Antonis Tritsis AT03" Programme.

| | Overview |
|---|---|
| Short Description | Interventions and actions to improve energy management and use of renewable energy in water and wastewater management infrastructure. |
| Responsible Authority | Ministry of Internal Affairs |
| Status | Submissions proposals for funding ended 31/12/2020. The project implementation is active. |
| Issue Date | 24/07/2020 |
| Start Date | 24/07/2020 |
| Ending Date | 31/12/2023 |
| Duration | ~3 years |
| Reference: | https://eyde.ypes.gr/tritsis |

### 1.1.1 Main Description

**A detailed description of the policy measure and how it relates specifically to EU MOREs topic of electric motors – including references to (if applicable) anchoring national law, EU directives, other schemes**

Antonis Tritsis Programme is managed by the Ministry of Internal affairs and is aimed at municipal water and wastewater utilities. The total budget of the 12 in total foreseen actions amounts to 2.5 bn € (funding from National Resources and the European Investment Bank).

Action AT03 is the most relevant to the project as it involves replacing old pumps, inverters for more energy efficient operation and use of RES. More specifically in the context of AT03, it is planned to finance projects related to the following actions:

1. Interventions and actions to improve energy efficiency, energy saving in energy-intensive water and wastewater infrastructures such as replacement of equipment in pumping stations, boreholes, water and wastewater treatment facilities, buildings, etc. Replacement of existing pumps with new high energy efficiency ones. Installation of frequency converters (inverters).
2. Utilization of Renewable Energy Sources (RES) (PV on the roofs of buildings, in parking areas, on the roof of closed tanks, geothermal, etc.) and intelligent energy distribution-storage-consumption systems (the utilization of RES and the management of energy are aimed at energy autonomy.
3. Supply and installation of intelligent energy management systems in existing sewage and drinking water networks, and treatment facilities. Indicative actions are the installation of energy consumption meters in energy-intensive infrastructures/equipment and their correlation with quantitative and qualitative parameters. Installation of analogue water level sensors for water reservoirs, control-monitoring and energy management systems facilities/infrastructure

The total budget for the AT03 Call for Proposals is 150,000,000 €.

There have been 139 proposals for funding exceeding the total budget by about 200 mln €. The budget of the selected 53 projects will amount to 145 mln €.

Action AT01 of the same programme is also linked to water and wastewater infrastructure and focuses solely on the aging pipework network. More specifically in the construction of new external networks and upgrading internal drinking water distribution networks through the replacement of aging pipelines, creating zones and loops.

Together the two programmes will deliver a significant upgrade to both electromechanical equipment (AT03) and pipe network (AT01) of local water companies and municipalities.

| | Characteristics |
|---|---|
| **Budget** | 150,000,000 EUR |
| **Financing of the measure** | The projected is funded from National Funds and the European Investment Bank via the Ministry of Internal Affairs |
| **Policy focus** | The policy focuses on energy saving through water/wastewater infrastructure renewal. |
| **Intervention Type** | Equipment Upgrade |
| **Key Driver(s)** | The key driver in this case is to enhance the operation of water/wastewater networks which are in many cases old and inefficient. Moreover, the increased operational cost for the utility suppliers due to the elevated electricity prices following the Russian – Ukrainian war. |
| **Replicability** | High |
| **EU Inclusion** | Yes |

### 1.1.2 Impacts

**A detailed description of the final (expected) results of the measure implementation and any achievements related to the measure implementation. Where possible specific to electric motors**

The programme is in the implementation stage and there are not many data yet regarding its impacts. However the managing authority has issued a report[1] which suggests that the total energy savings from the implemented projects so far is in the order of 28.8 GWh/year from AT03 (equivalent to the final energy consumption of 2000 homes).

| | Impacts |
|---|---|
| **Case level impact** | High |
| **Policy level impact** | High |
| **Size** | 53 selected projects |

[1] «Χρηματοδοτικά εργαλεία του ΥΠΕΣ για σχέδια ενεργειακής διαχείρισης , Ελευθέριος Παπαβασιλόπουλος Βασίλειος Σταμάτης, Ειδική Υπηρεσία Διαχείρισης και Εφαρμογής του Υπουργείου Εσωτερικών (ΕΥΔΕ ΥΠΕΣ).»

| | |
|---|---|
| **Energy** | 28.8 GWh/year energy savings from the implemented projects so far. |
| **Impact evaluation** | The measure is expected to substantially improve the efficiency of operation of water/ wastewater networks. |

### 1.1.3 Lessons Learnt

**Description of the lessons learnt and/or (initial) feedback gathered in response to the measure's implementation specific to electric motors. The main barriers that would hamper and/or the conditions that are necessary for the implementation of the measure.**

- High level of participation in the programme as total requested funding from all applications exceeded the available budget.
- Simple process aimed directly to water/wastewater authorities or municipalities that managed water networks.
- From discussions with stakeholders involved in the implementation of the programme, the main barriers that would hamper the energy (and water) savings achieved from the interventions and actions described by the programme are the lack of monitoring and servicing of the newly installed equipment.
- The project is still ongoing so detailed feedback or data of are not available.

| | Lessons Learnt |
|---|---|
| **Key takeaways** | Project aims at water/wastewater equipment renewal. Substantial energy savings potential from renewing old and inefficient pumping equipment. 150,000,000 EUR budget. High participation by municipal water and wastewater utilities. Energy savings in the order of 30 GWh/yr |
| **Recommendations** | In line with the National Actions implemented on Energy Efficiency |
| **Linked measures** | • Antonis Tritsis AT01 aimed at replacing old water networks.<br>• Older programme named "Filodimos I" (Φιλόδημοσ Ι) finished in 2019. |
| **Reference(s)** | https://eyde.ypes.gr/tritsis |
| **Other** | Ministry of Internal Affairs, Municipal water and wastewater utilities.. |
| **Thoughts, comments, considerations ...** | Perhaps the total available budget should be increased to cover all water/wastewater utilities in Greece. Such interventions greatly contribute to the reduction of operational cost / energy saving / emissions reduction, especially considering that the during the last years, the electricity cost for the utilities operation has become unbearable. Such measures should also be preferably coupled with other interventions including the upgrade of the water supply network to minimise water (and energy) losses and the integration of smart metering and monitoring devices. |

## 1.2 Measure 2: Green transition SMEs

| | Overview |
|---|---|
| Short Description | The "Green Transition SME" package encourages investment projects aiming at the exploitation and development of modern technologies, the upgrading of the products and/or services produced and their activities in general, favoring actions that exploit modern technologies, infrastructures and best practices in energy upgrading and circular economy. |
| Responsible Authority | Ministry of Development & Investments |
| Status | Ongoing |
| Issue Date | 01/2023 |
| Start Date | 03/2023 |
| Ending Date | Until budget exhaustion |
| Duration | - |
| Reference: | https://21-27.antagonistikotita.gr/prasini-metabasi-mme/<br>http://21-27.antagonistikotita.gr/prokiryxi-desmis-draseon-prasini-metavasi-mme/ |

### 1.2.1 Main Description

**A detailed description of the policy measure and how it relates specifically to EU MOREs topic of electric motors – including references to (if applicable) anchoring national law, EU directives, other schemes**

The programme encourages SMEs to invest in projects that aim to exploit and develop modern technologies, to upgrade the products and/or services produced and their activities in general, by rewarding actions that exploit modern technologies, infrastructure and best practices in energy upgrading and circular economy.

Minimum/maximum subsidised budget: Category A: 30.000€ up to 200.000€, Category B: 200.001€ up to 1.000.000€

Total budget: €700 000 000

Until mid July 2023, more than 6500 applications were submitted with public funding 700,000,000€ leveraging total budget of 1.5 bln €

Funding rate: up to 40% (plus a bonus of 10% in case GREEN actions are included)

The public expenditure is co-financed by the European Regional Development Fund (ERDF) of the European Union and by National Participation. For reasons of greater complementarity, funding is provided using the Common Support Framework (Article 25 C(EU) 2021/1060) to finance interventions falling within the scope of ESF+.

Eligible expenditure

- Buildings, facilities and surrounding area
- **Machinery - Equipment (procurement of new and efficient manufacturing equipment)**
- **Equipment to improve energy efficiency, energy saving, circular economy, e-vehicles (GREEN)**
- Certification of Products - Services - Processes
- Packaging Design - Labeling - Branding Services
- Promotion and Promotion Expenditure
- Participation in trade fairs
- Technical Studies & Consulting Services

| |
|---|
| - Means of transport (GREEN) - Mandatory electric<br>- Salary costs of new employees - (new staff from 1 to 3 FTEs)<br>- Indirect costs |

| | Characteristics |
|---|---|
| **Budget** | Total Funding: 700.000.000€ |
| **Financing of the measure** | The Public Expenditure is co-financed by the European Regional Development Fund (ERDF) of the European Union and by National Funds. For reasons of greater additionality, funding is provided using the Common Support Framework (Article 25 C(EU) 2021/1060) to finance interventions falling within the scope of ESF+. |
| **Policy focus** | Physical and Soft interventions |
| **Intervention Type** | Equipment upgrade<br>Energy Efficiency |
| **Main Barriers Addressed** | |
| **Key Driver(s)** | Need for Innovation, Sustainable development of companies |
| **Replicability** | High |
| **EU Inclusion** | Yes |
| **Related Characteristics** | |

### 1.2.2 Impacts

**A detailed description of the final (expected) results of the measure implementation and any achievements related to the measure implementation. Where possible specific to electric motors**

| |
|---|
| It is expected that thousands of Greek SMEs will be financed through the plan. Specific data about the program's impact is not yet available. |

| | Impacts |
|---|---|
| **Case level impact** | Medium |
| **Policy level impact** | High |
| **Energy** | Evaluation about the project's impact on energy saving will be available by end of the year 2023. |
| **Impact evaluation** | |

### 1.2.3 Lessons Learnt

**Description of the lessons learnt and/or (initial) feedback gathered in response to the measure's implementation specific to electric motors. The main barriers that would hamper and/or the conditions that are necessary for the implementation of the measure.**

- Despite the relatively low funding rate (40-50%) there has been an extremely high level of participation in the programme from SMEs – meaning that the expected savings seem to be quite big
- Public spending is a great tool to leverage private investments regarding energy efficiency
- Still quite early, we need to see if bureaucracy for the projects' implementation remains an issue

| | Lessons Learnt |
|---|---|
| **Key takeaways** | |
| **Recommendations** | |
| **Linked measures** | |
| **Reference(s)** | |
| **Other** | |
| **Thoughts, comments, considerations ...** | |

## 1.3 Measure 3: Energy efficiency obligation scheme

| | Overview |
|---|---|
| Short Description | Energy Efficiency Obligation schemes are a mechanism that places requirements on 'Obligated Parties' (OPs) to meet quantitative energy savings targets across their customer portfolio. OPs may be retail energy sales companies, energy distributors, transport fuel distributors, and/or transport fuel retailers. |
| Responsible Authority | Ministry of Environment and Energy<br>Administrator: CRES |
| Status | Ongoing |
| Issue Date | 09/11/2015 |
| Start Date | 01/01/2017 |
| Ending Date | Ongoing |
| Duration | |
| Reference: | https://ypen.gov.gr/energeia/energeiaki-exoikonomisi/metra-politikis/kathestota/<br>http://www.cres.gr/obs/index.html |

### 1.3.1 Main Description

**A detailed description of the policy measure and how it relates specifically to EU MOREs topic of electric motors – including references to (if applicable) anchoring national law, EU directives, other schemes**

The Energy Efficiency Obligation Scheme was introduced on January 1, 2017, in accordance with Article 9(1) of Law 4342/2015 (Government Gazette, Series I, No 143, 9.11.2015). The Obligation Scheme ensures that energy distributors and/or retailers, which are defined as obligated parties operating in the Greek territory, achieved a specific cumulative final energy saving target by December 31, 2020.

Additionally, Ministerial Decision No 174063/11.4.2017 (Government Gazette, Series II, No 1242) established the Operation Regulation of the Energy Efficiency Obligation Scheme including, inter alia, the list of obligated parties, the exact allocation of the final energy saving target, the procedures required for its implementation and the measurement, control and verification system for the implemented energy efficiency measures. The Centre for Renewable Energy Sources and Saving (CRES) has been designated as the Operator of the Calculation, Monitoring, Control and Verification of the Energy Efficiency Obligation Scheme.

The obligated parties are the suppliers of electricity, natural gas and petroleum products (excluding aviation fuels). The obligated parties in each individual year for each energy product selected to be the energy providers that account for at least 95% of the energy sold for final consumption, and have an energy market share of more than 1% of the energy sold.

The obligated parties can implement all kind of measures (whether technical or behavioral) that can lead to final energy savings. The list of indicative measures to improve energy efficiency in the residential, tertiary, transport and industrial sectors is available on the Operator's website.

The Operator has developed and implemented a Control and Verification Mechanism, which aims at the effective control and reliable verification of the actual implementation of the energy efficiency improvement measures implemented by the obligated parties. The Control and Verification Mechanism consists of a procedure of three stages. In the 1st stage, preliminary controls are carried

out, in which the obligated parties have to submit separately for each energy efficiency improvement measure that has been implemented, specific documents and data to substantiate their implementation. In the 2nd stage, the Operator determines the sample for more extensive control and verification procedures, whereas in the 3rd stage the Operator will perform thorough checks of the selected sample for each measure separately. The quality standards are set by the obligated parties and are verified by the Operator.

Currently the list of available to the obligated parties measures include:

- Awareness raising campaigns
- Energy upgrade of the building envelope in buildings
- Energy efficiency measures in technical and industrial processes
- Introduction of energy management systems - Energy audits
- Promotion of fuel additives
- Energy upgrade of heating/cooling systems

Within this framework, CRES will try with the assistance of EU-MORE to add other measure(s) specifically targeting the replacement of old and inefficient electric motors.

| | Characteristics |
|---|---|
| **Budget** | - |
| **Financing of the measure** | Through organization's own financing schemes |
| **Policy focus** | Energy Saving |
| **Intervention Type** | Equipment upgrade, capacity building, awareness raising |
| **Main Barriers Addressed** | - |
| **Key Driver(s)** | Initial law N.4342/2015, later modified by law 4843/2021 that incorporates DIRECTIVE (EU) 2018/2002, Directive 2012/27/EU |
| **Replicability** | High |
| **EU Inclusion** | YES, Directive 2012/27/EU |
| **Related Characteristics** | General programme - General energy efficiency programme<br>Mandatory standards - Service obligations for supply distribution/transmission companies |

### 1.3.2 Impacts

**A detailed description of the final (expected) results of the measure implementation and any achievements related to the measure implementation.**

Annual savings target 2017-2020: 333 ktoe / Actual savings: 598 ktoe (or 6.9 GWh)
A much greater impact is expected in the next decade (2020 – 2030) due to the implementation of the Obligation Schemes in Greece.

| | Impacts |
|---|---|
| **Case level impact** | High |
| **Policy level impact** | n/a |
| **Size** | |
| **Energy** | |
| **Impact evaluation** | |

### 1.3.3 Lessons Learnt

**Description of the lessons learnt and/or (initial) feedback gathered in response to the measure's implementation specific to electric motors. The main barriers that would hamper and/or the conditions that are necessary for the implementation of the measure.**

- The Energy Efficiency Obligation Scheme is being regarded as very successful, as the actual energy savings exceeded the target by far
- One of the success factors was the very good communication and mutual agreement on the methodology for the implementation of the Scheme, by all involved parties (implementing authorities and obligated parties)
- To further increase the savings, the Scheme will allow non-direct obligated parties to participate and transfer energy savings to the direct obligated parties
- CRES is considering to use the results of the EU-MORE project to further increase the energy savings in the industry through the addition of a measure targeting directly the replacement of old and inefficient electric motors. To this direction the calculation tool/model that will be produced during the EU-MORE timeline is expected to greatly assist to the development of such calculation methodology.

| | Lessons Learnt |
|---|---|
| **Key takeaways** | |
| **Recommendations** | |
| **Other** | |

Table 1: National Policy Measure Overview - GREECE

| # | Measure Title | Short Description | Type of Measure | Start Year | End Year | Duration | Target Groups | Source link / Reference | Case Level Impact of the measure |
|---|---|---|---|---|---|---|---|---|---|
| **1** | "Antonis Tritsis AT03" | Interventions and actions to improve energy management and use of renewable energy in water and wastewater management infrastructure. | Grants-Subsidies | 2020 | 2023 | ~3 years | Public Bodies | link | High |
| **2** | "Green transition SMEs" | Support for investments from SMEs for modern technologies, energy upgrade and circular economy. | Financial support | 2023 | - | - | SMEs | link | High |
| **3** | "Energy efficiency obligation scheme" | Energy companies are obligated meet energy targets. | Energy saving | 2017 | 2030 | - | Energy distributors and retailers | link | High |