Recommendations for the design and establishment of an energy efficiency obligation scheme in Greece

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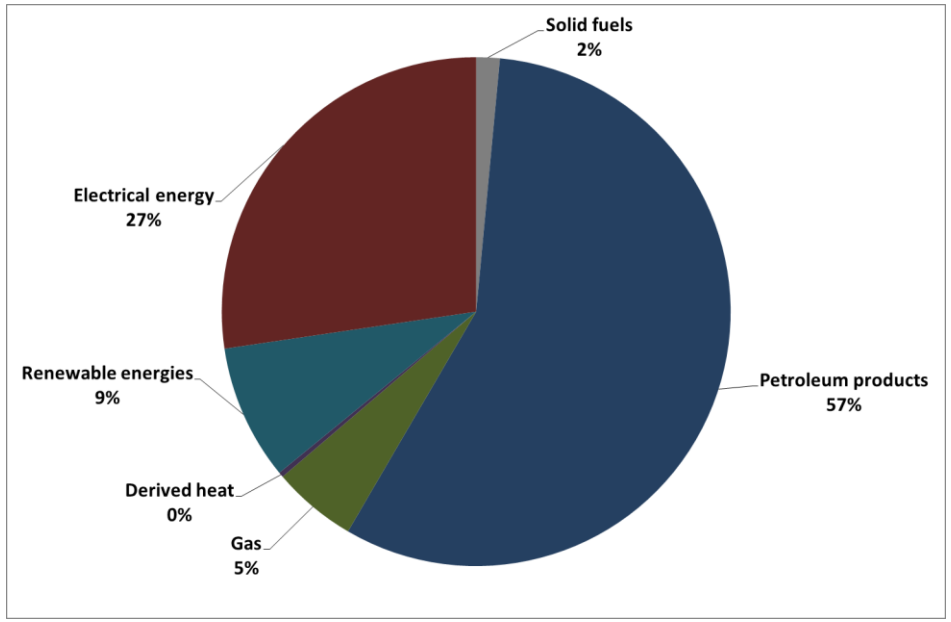
EEOS

- Energy Efficiency Obligation Schemes (EEOS), according to the requirements of Article 7 of the Energy Efficiency Directive (EED), are mandatory schemes, which can be established by Member States, setting the obligation on energy providers (energy distributors and/or retail energy sales companies) to achieve specific levels of energy savings through the implementation of energy efficiency measures in the end-use sectors.
- According to Article 9 of the Law 4342/2015 (paragraph 1), the establishment of an Energy Efficiency Obligation Scheme is foreseen from the 1st of January 2017.
- A Ministerial Decision must be prepared clarifying all the critical issues regarding the design and the operation of the EEOS.

Need for the introduction of the EEOS

- Deviation from the fulfillment of Article 7's target as outlined in the recently notified annual report.
  - Implementation of ineffective alternative energy efficiency measures.
  - Limited financial instruments and resources for the realization of additional alternative measures.
- Design and conduction of more cost-effective energy efficiency measures.
- Promotion of energy services.
- Establishment of a new perceptive regarding the relationship between customers and retail energy companies.

Identification of the potential obligated parties



- The identification of the obligated parties should be performed on the basis of objective and non-discriminatory criteria.
- The inclusion of the energy distributed or sold to the final consumers into the selection criteria is mandatory.
- Selection of the obligated parties taking into consideration the sold or distributed energy and the potential utilization of networks for the energy distribution.
- Focus exclusively on retail energy sales companies due to the structure of the energy markets in Greece.

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Allocation of the energy efficiency target

Step 1: Specification of annual energy efficiency target

Step 2: Identification of the potential obligated parties

Step 3: Selection of the obligated parties

Step 4: Allocation of the specified energy efficiency target to the selected obligated parties

YPEN should define the energy efficiency target .

Utilization of the energy data from the 2nd semester of the previous year and the 1st semester of the current year.

Energy suppliers, that represent cumulatively at least 95% of the distributed or sold energy for each type of fuel separately, should be selected.

Calculation based on the annual distributed or sold energy of each obligated party as a percentage of the total distributed or sold energy of all the obligated parties.

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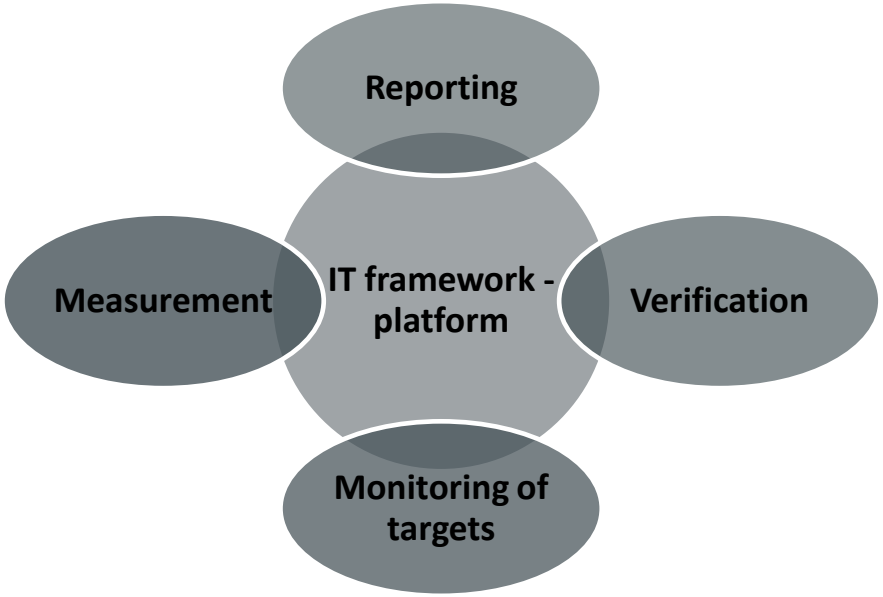
Monitoring, measurement, verification and reporting framework

- The efficient measurement of the achieved energy savings.
- The effective control and verification of the implemented energy efficiency measures.
- The precise reporting of the achieved energy savings from the implemented energy efficiency measures for all the obligated parties.
- The continuous evaluation of the obligated parties' progress towards the established energy efficiency targets and the potential imposition of penalties.



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Measurement framework

- Development of 26 bottom-up methodologies according to the requirements of the EED.
- Recommendation to utilize EPC and energy audits.
- Publication of indicative list with eligible measures.
- Proposal to use an IT-platform.

Bottom-up methods for the measurement of the achieved energy savings
BU1: Awareness raising campaigns
BU2: Energy audits for households
BU3: Smart Meters and informative billing
BU4: Energy upgrade of the building envelope in buildings of the residential and tertiary sectors
BU5: Energy upgrade of the existing cooling systems with high-efficient in buildings of the residential and tertiary sectors
BU6: Energy upgrade of the existing heating boilers with high-efficient in buildings of the residential and tertiary sectors
BU7: Production of hot water with solar energy
BU8: Energy audits of technical processes
BU9: Introduction of energy management systems
BU10: Energy efficient lighting in buildings of the residential sector
BU11: Energy efficient lighting in buildings of the tertiary sector
BU12: Efficient lighting in industrial buildings
BU13: Energy efficient street lighting
BU14: Alternative vehicle technologies
BU15: Eco-driving
BU16: Efficiency improvement through use of fuel-savings lubricants and tyres
BU17: White goods
BU18: Office equipment
BU19: Standby killer in households
BU20. Systems for heat recovery in buildings
BU21: High efficient heating circulating pumps
BU22: Improved thermal insulation of warm water tanks
BU23: Thermal insulation of pipes in the heating system
BU24: Installation of thermostatic valves on radiators
BU25: Other measures
BU26: Efficiency improvement through various energy efficiency measures in the transport sector

Indicative list for residential sector

Indicative measures	Type	Bottom-up	Lifetime (years)
Insulation: Building envelope (cavity wall and other insulation such as solid, wool, etc.)	Technical	BU4	30
Insulation: Building envelope (loft/roof and floor insulation)	Technical	BU4	25
Draught proofing for increasing the air-tightness of the buildings	Technical	BU4	5
Windows/glazing with low U value	Technical	BU4	30
New hot water storage tank with foam insulation	Technical	BU22	15
Insulation of hot water pipes, with material on unexposed hot water pipes	Technical	BU23	20
Heat reflecting radiator panels: Insulation material installed between radiators and the wall to reflect heat back into the room	Technical	BU4	18
Energy efficient heating boilers irrespective of fuel	Technical	BU6	20
Heating control: Timing devices, thermostats and radiator valve thermostatic controls	Technical	BU24	10
Heat recovery systems for recovering and recirculation of heat	Technical	BU20	17
Hot water saving faucets with flow restrictors	Technical	BU25	15
Heat pumps: Air to air	Technical	BU6	10
Heat pumps: Exhaust air to water	Technical	BU6	15
Heat pumps: Ground source	Technical	BU6	25
Energy efficient (class A or above) room air conditioner	Technical	BU5	15
Connection to the district heating	Technical	BU6	30
Solar thermal collectors for hot water supply	Technical	BU7	20
Solar thermal collectors for assisting space heating and cooling	Technical	BU4	20
Energy efficient (class A or above) cold appliances (e.g. refrigerators, freezers)	Technical	BU17	15
Energy efficient (class A or above) wet appliances (e.g. dish washers, washing machines and tumble driers)	Technical	BU17	12
Energy efficient consumer electronic goods (e.g. DVD player, settop box, home computer)	Technical	BU18	3
Energy efficient compact fluorescent light bulbs for household use	Technical	BU10	6,000 hours
Luminaries with ballast systems (lighting units with dedicated efficient lamp fittings)	Technical	BU10	15
Awareness raising campaigns	Behavioural	BU1	2
Energy audits	Behavioural	BU2	2
Smart meters providing information on energy consumption	Behavioural	BU3	2
Trainings	Behavioural	BU1	2

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Indicative bottom-up

BU4. Energy upgrade of the building envelope in buildings of the residential and tertiary sectors

Description: The current method refers to the implementation of interventions in the building envelop improving its thermal quality and lowering the heating and cooling demand.

Method: Scaled method

Bottom-up formula	
$TFES = \sum_{1}^{n} A * (EPC_{before} - EPC_{after})$	
Definition	
TFES	Total Final Energy Savings [kWh/a]
A	Heated gross floor area of each refurbished building [m²]
EPC_{before}	Final energy consumption as estimated in the Energy Performance Certificate before the implementation of the interventions [kWh/m²]
EPC_{after}	Final energy consumption as estimated in the Energy Performance Certificate after the implementation of the interventions [kWh/m²]
n	Number of refurbished buildings
Baseline	
Final energy consumption prior to the thermal refurbishment of the building. The space heating demand values should be corrected with the relevant heating degree days.	

Each obligated party should provide all the necessary figures (A, EPC_{before}, EPC_{after}) for each building separately.

BU2. Energy audits for households

Description: The current method refers to the conduction of energy audits for households, which can lead to awareness raising and to the initiation of more rational energy consumption behavioural patterns.

Method: Deemed method

Bottom-up formula	
$TFES = n_Q * FEC_{HH} * S_Q$	
Definition	
TFES	Total Final Energy Savings [kWh/a]
n_Q	Number of energy audits
FEC_{HH}	Final Energy Consumption of household(s) (either for electricity or for electricity and heat) [kWh/a]
S_Q	Savings factor of an energy audit [%]
Baseline	
No conduction of energy audits	

Parameters	Value	Source
Savings factor of an energy audit at a specific quality level [%]	**10% (5%-20%)**	EEA 2013[16]
Final Energy Consumption of a household [kWh/a]	**9,671**	Eurostat (year 2014)
Final Electricity Consumption of a household [kWh/a]	**3,767**	Eurostat (year 2014)

Each obligated party should provide only the number of the conducted energy audits (n_Q).

multEE facilitating multi-level governance for Energy Efficiency

Source: multEE, 2016. General Formulae of Bottom-Up Methods. Report available on multee.eu

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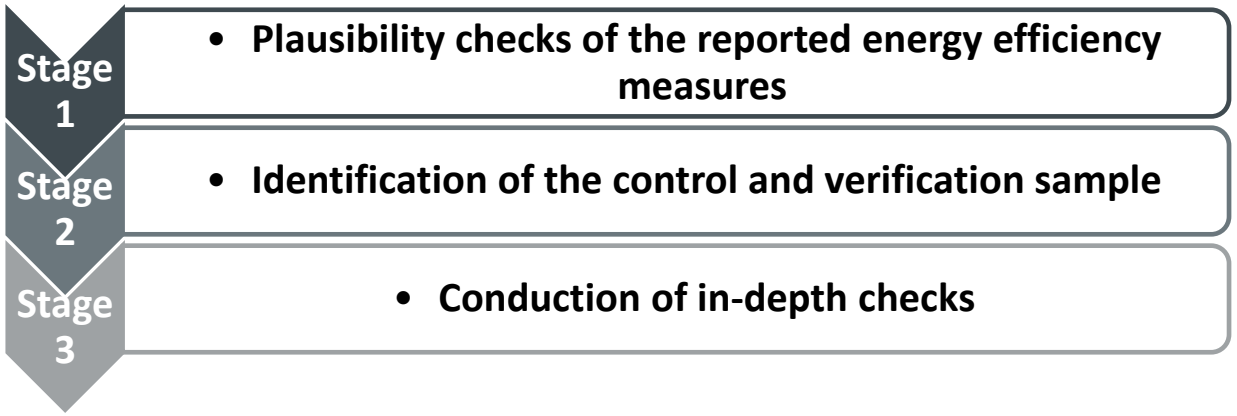
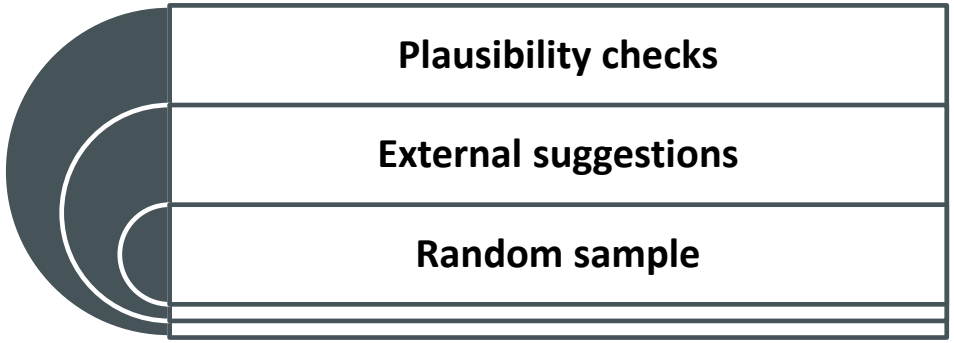
Control and verification framework

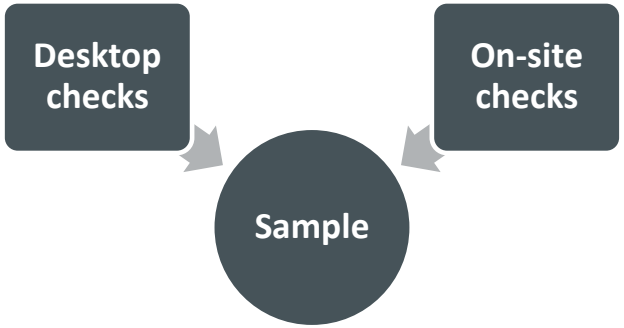
Proposed methodological approach



Stage 2



Stage 3



Source: multEE, 2016. Data Collection Process: Bottom-up Monitoring. Report available on multee.eu

Procedure for non-compliance

I. Extrapolation of the control and verification results to the total number of energy efficiency intervention for each energy efficiency measure separately in order to assign the real levels of the achieved energy savings.

II. Constitution of a new sample for further control and verification probably with the adoption of a specific rule such as if the non-effective cases are higher than 3% the sample must be doubled for further control and verification.

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Reporting framework

- Each obligated party has to submit after the starting of the EEOS within the first semester an implementation plan to YPEN analyzing the necessary energy efficiency measures for the fulfillment of the allocated energy efficiency target.
- Each obligated party should regularly submit specific information about the implemented energy efficiency measures possibly through the IT platform.
- A maximum of 25% of the energy efficiency measures in any one year can be submitted until the end of November and December separately.
- Each obligated party should provide until the end of January of the next year the required statistical information about their final customers.
- YPEN should publish an annual report on the progress and the effectiveness of the EEOS until the end of March and impose the potential penalties until the end of April.

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Compliance cost

- It is recommended for the obligated parties to have the right to buy out a portion of the allocated energy efficiency target.
- For the initial phase of EEOS, the option of buyout is proposed to be allowed up to a maximum of 100% of the allocated energy efficiency target.
- The price of the buyout should be equal to the compliance cost in order to achieve equivalent energy savings.
- The compliance cost is recommended to be estimated on the basis of the weighted unitary cost as derived by a portfolio with the most cost-effective alternative energy efficiency measures.
- The energy efficiency measures were selected taking into account, except from their cost-efficiency, the priorities and the aims as outlined by the EED.

Penalties

- Imposition of a penalty twice the compliance cost for the achievement of equivalent energy savings.
- The provision of a relative flexibility is suggested through the transfer or buyout option.
- It is recommended not allowing the option to transfer for two consecutive years.
- The imposition of a penalty ranging from 5,000 € to 50,000 € according to Article 14 of the Law 4342/2015 (paragraph 2) is foreseen in the case that the obligated parties deny to provide the required statistical data.

Deviation from the annual allocated target	Payment as a percentage of the compliance cost	Type of compliance
0%-10%	100%	Transfer or Buyout
11%-20%	100%	Transfer or Buyout
21%-30%	100%	Transfer or Buyout
31%-40%	100%	Transfer or Buyout
41%-50%	100%	Transfer or Buyout
51%-60%	120%	Penalty
61%-70%	140%	Penalty
71%-80%	160%	Penalty
81%-90%	180%	Penalty
91%-100%	200%	Penalty

- The payment of the penalties is recommended to be transferred to the Energy Efficiency Fund.

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Flexibility options

- It is recommended to allow obligated parties to count savings obtained in a given year as if they had instead been obtained in any of the four previous years.
- It is proposed to permit obligated parties to obtain energy savings from energy service providers or third parties.
- The permission of the trading option is not suggested especially for its initial phase of the EEOS.
- Nevertheless, it is considered as a possible option for the upcoming phases for increasing the degree of flexibility of the obligated parties.

Other issues

Issue	Action
Double counting	– Detection of the double counted energy efficiency measures through the establishment of the monitoring, measurement, verification and reporting framework.
Materiality	– Signature of joint declarations/contracts between the obligated parties and the involved customers for all the energy efficiency measures specifying the type of work and the actual contributions for each participant in the scheme separately. – The signed joint declaration/contracts should be sent to the administrator of the monitoring and verification scheme.
Additionality	– Each obligated party must be able to demonstrate within the implementation plan that the achieved energy savings are additional to the applicable EU requirements. – Ministry of Environment and Energy should confirm the compliance of the obligated parties.
Quality standards	– The obligated parties must prepare and deliver to the administrator of the monitoring and verification scheme a robust quality assurance scheme with strict specifications for the implemented energy efficiency measures. – Confirmation of the implementation of the scheme through the control and verification mechanism.
Energy poverty	– None obligation initially because the potential imposition will increase the transaction cost of the obligated parties and the Action Plan for the confrontation of the energy poverty has not been finalised.

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Thank you for your attention!!!

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