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Energy savings in energy poor/lower income households

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Measures to tackle "Energy Poverty" in Greece

Target for the Alleviation of Energy Poverty

✓ Reduction in energy poverty indices by at least 50% by 2025 & by 75% by 2030 (Based on NECP of 2019 targets) according to Energy Poverty National Action Plan (28.09.2021)

- Baseline year — 2016
- Reduction in energy poverty by 50% — 2025
- Reduction in energy poverty by 75% — 2030

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Measures to tackle "Energy Poverty" in Greece

What do we mean by the term "Energy poverty" – Definition

Index I-II$_{eq}$

Energy poor households - simultaneous satisfaction of the two conditions

- **Condition I:** The annual cost of the total final energy consumption of the household is lower than the 80% of the minimum cost of final energy consumption, which is required theoretically.
- **Condition II:** The total normalized income of the household, based on the number of household's persons according to equivalence scale of OECD of the household is lower than the 60% of the mean income of all the households in Greece.

Source: National Action Plan for the Alleviation of Energy Poverty: Energy Poverty Indicator

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Index I-II$_{eq}$

Energy poor households - simultaneous satisfaction of the two conditions

Condition I, incorporates into the definition of energy poverty the *ability of each household to ensure a minimum level of coverage of energy needs*, which is required for its livelihood. The problem of energy poverty is obviously related to energy consumption and through this specific condition it is ensured that it is correctly covered.

However, the phenomenon of energy poverty is also affected by the disposable income of households. Therefore, the use of **Condition** II, ensures that the *inability to meet a minimum level of energy needs is due, among other things, to the lower net income that the household may have*.

It should be noted that for the first condition, the cost of the energy consumed was preferred over the energy in natural units, in order to take into account the evolution of the price of the energy products used by households.

Measures to tackle "Energy Poverty" in Greece

Monitoring of Alleviating Energy Poverty

Authorities responsible for the management and implementation of policy measures can choose between two alternative approaches for bottom-up monitoring of energy poverty

- Statistical model for identifying vulnerable households
- Alternative approach for identifying vulnerable households

Source: Energy Poverty National Action Plan

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Energy Poverty National Action Plan for the Alleviation of Energy Poverty

Statistical model for identifying vulnerable households

It includes the development of a mathematical model, a logarithmic regression equation identifying essential characteristics of vulnerable households.

Data gathered by conduction of *Household Budget Survey* is used as an input to the mathematical model (regression analysis equation)

Measures to tackle "Energy Poverty" in Greece

Energy Poverty National Action Plan for the Alleviation of Energy Poverty

Statistical model based on the characteristics of the energy poor households

Outcome of regression analysis equation based on Index I-li$_{eq}$

$$Y_{2020} = 2{,}3527 - 0{,}0028 * electricity - 0{,}4474 * year - 1{,}3452 * central - 0{,}0007 * income + 2{,}2577 * size + 0{,}5908 * tenants + 0{,}3960 * age + 0{,}0074 * area + 0{,}2976 * apartments - 0{,}5264 * kids$$

Where:

Electricity: yearly cost of electricity (utility bills)

Year: construction year

Central: use of central heating system

Income: net family income

Size: total number of occupants

Tenants: rented accommodation

Age: number of tenants over 65 years of age

HDD: Heating degree days

Unemployed: unemployed number

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Energy Poverty National Action Plan for the Alleviation of Energy Poverty

Alternative approach for identifying vulnerable households - preconditions

- The net income based on normalized number of household members (excluding any allowances) ranges at the price of about 4.400€

and

- The cost of yearly consumed electricity is lower than the price of 597€

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Measures to tackle "Energy Poverty" in Greece

Alternative measures for energy efficiency measures from 2014 – 2020 also tackling low income households

"Save Energy at Home" program (2014 – 2017, alternative measure w.r.t. article 8§3 EE 2023/955 recast)

Designed for implementing energy saving interventions in residential building sector

Aiming at reducing energy needs & consumption of conventional fuels

Operated by National Recovery & Resilience Plan with funding from EU-Next Generation EU

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Measures to tackle "Energy Poverty" in Greece

Alternative measures for energy efficiency measures from 2014 – 2020 also tackling low income households

Procedure followed:

- Submission of application electronically (program website)
- Supporting documents w.r.t type of economic viability (e.g. subsidy, equity, interest free loan)
- technical & energy data based on Energy Performance Certificates (*energy class before vs energy class after interventions*)

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Measures to tackle "Energy Poverty" in Greece

Subsidy - Economic criteria:

Category	Individual Income (€)	Family Income (€)	Basic Rate Grant (%)	Increase Grant per protected Member (%)	Maximum Rate Grant (%)
1	Up to 10.000	Up to 20.000	60	5	70
2	>10.000 - 15.000	>20.000 - 25.000	50	5	70
3	>15.000 - 20.000	>25.000 - 30.000	40	5	70
4	>20.000 - 25.000	>30.00 - 35.000	35	5	70
5	>25.000 - 30.000	>35.000 - 40.000	30	5	50
6	>30.000 - 35.000	>40.000 - 45.000	25	5	50
7	>35.000	>45.000	0	0	0

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Measures to tackle "Energy Poverty" in Greece

Policy measures for energy efficiency measures from 2021 – 2024 also tackling low income households

"Energy upgrading of residential buildings" (2021 – 2023, Feb – March 2024 second phase exclusively to energy vulnerable households, alternative measure w.r.t. article 8§3 EE 2023/955 recast)

Designed for implementing energy saving interventions in residential building sector

Aiming at reducing energy needs & consumption of conventional fuels

Operated by National Recovery & Resilience Plan with funding from EU-Next Generation EU

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Measures to tackle "Energy Poverty" in Greece

Subsidy - Economic criteria:

Individual Income (€)	Family Income (€)	Grant rate	
		Home ownership (%)	Free housing allowance /House rental (%)
<= 5.000	<=10.000	75	65
>5.000 – 10.000	>10.000 – 20.000	70	60
>10.000 – 20.000	>20.000 – 30.000	55	45
>20.000 – 30.000	>30.000 – 40.000	45	40
>30.000	>40.000	40	40

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Energy target and program requirements

Energy class	Eligible application to the program - EPC (A)	Minimum requirement for achieved energy target- EPC (B)
A+	-	
A+	-	
B+	-	
B+	-	
Γ	**Γ**	**Α**
Δ	**Δ**	**Β+**
Ε	**Ε**	**Β**
Ζ	**Ζ**	**Γ**
Η	**Η**	**Δ**

After the implementation of the energy efficiency interventions, indicative inspections will take place in order to verify the achieved energy savings as well as the minimum requirement based on the 2nd EPC (i.e. EPC – B)

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Energy savings achieved up to 2020 (savings achieved from measures and notified under Article 7(2)c) and (d) shall not be part of this table)	Policy measure (Please, specify the policy measure)	CUMULATIVE savings [ktoe] expressed in final energy							Comments on revisions in data for years previous to 2019 (when relevant)
		2014	2014-2015	2014-2016	2014-2017	2014-2018	2014-2019	2014-2020	
M22	EEOs	0,00	0,00	0,00	174,73	322,02	454,22	577,81	
M1	**'Save Energy at Home' programme**	21,98	52,14	83,84	120,83	157,83	194,83	231,83	
M2	'SAVE' Programme for Local Authorities	0,00	0,00	2,25	4,50	6,75	9,00	11,25	
M3	'SAVE II' Programme for Local Authorities	0,00	0,05	0,26	0,47	0,69	0,90	1,12	
M4	**Energy upgrade of residential buildings**	0,00	0,00	0,00	0,01	9,71	72,68	158,51	16%
M10	Developing smart metering systems	0,00	0,00	0,00	0,00	0,00	1,07	2,14	
M11	Replacing old public and private light trucks	4,17	13,46	25,89	38,32	50,75	63,18	75,61	
M12	Replacing old private passenger vehicles	28,27	86,40	161,66	236,93	312,19	387,45	462,71	
M14	OPESD Operations	0,24	1,72	14,86	34,32	53,78	73,24	92,70	
M16	Extension of Athens metro	29,30	58,60	87,90	117,20	146,50	175,80	205,10	
M17	Offset of fines on illegal buildings against energy upgrades	0,00	0,28	1,74	4,60	9,88	17,93	26,25	
M18	Energy managers in buildings of the public sector and the general government	0,00	0,00	1,19	2,80	4,81	6,98	9,34	
M19	Street lighting	0,00	0,00	0,00	0,00	0,59	1,96	5,05	
M20	Energy Performance Certificates as behavioural measure	2,09	7,69	13,47	18,20	25,27	35,96	52,69	
M21	Oil products specific consumption tax	0,00	0,00	0,00	122,47	252,03	403,29	535,65	
M23	Provision of higher depreciation in eneterprises	0,00	0,00	0,00	0,00	0,00	1,13	2,64	
Total savings		86,06	220,34	393,06	875,40	1352,81	1899,62	**2450,42**	

Author:
see Energy Efficienc
Action Plan 3,4

Author:
Adding up:
231,83+158,51=390,34
i.e the 3rd higher (16%)
of all alternative

Table 1: M1 & M4- Energy savings achieved (Alternative measures) up to 2020 – Article 7 of Directive 2012/27/EU

Years of implementation	A/A	Policy Measure	Number of interventions	Final energy savings (ktoe)	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total - new Energy Savings	Total cumulative - Energy Savings	Percentage of cumulative Energy savings
10	1	Energy upgrade of residential buildings	400.000	523	52,3	52,3	52,3	52,3	52,3	52,3	52,3	52,3	52,3	52,3	523	2877,5	39%
10	2	Energy upgrade of public buildings	3.000	38	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,8	38	208,5	3%
10	3	Energy upgrade of tertiary sector buildings & of industrial units	7.500	78	7,8	7,8	7,8	7,8	7,8	7,8	7,8	7,8	7,8	7,8	78	427,2	6%
10	4	Energy efficiency improvement using ESCOs	3.500	36	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	3,6	36	195,7	3%
3	5	Energy managers in public buildings	25.000	116	38,6	38,6	38,6	0,0	0,0	0,0	0,0	0,0	0,0	0,0	116	1042,3	14%
3	6	Energy efficiency improvement of pumping stations		35	11,7	11,7	11,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	35	315,0	4%
3	7	Energy upgrade of street lighting		20	6,7	6,7	6,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0	20	180,0	2%
10	8	Infrastructure development in trasport sector		48	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8	48	264,0	4%
10	9	Promotion of alternative fuels in transport sector	200.000	60	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	60	328,8	5%
10	10	Energy Efficiency Obligation Schemes	20%	265	66,1	66,1	66,1	66,1	66,1	66,1	66,1	66,1	66,1	66,1	661	1459,7	20%
	Total amount of final energy savings from the implementation of policy measures (ktoe)			1.218,4	201	201	201	144	144	144	144	144	144	144	1614	7299	100%

Table 2: (Alternative measures) NECP plan 2021 – 2030

	PaM number	Unit	Vulnerable households addressed ([2])	Final energy savings achieved through national EEOs referred to in Article 7a of Directive 2012/27/EU or alternative measures adopted in application of Article 7b of that Directive (excl. Article 7(4), point (c) of that Directive)			Of which final energy savings achieved by PaMs aimed at alleviation of energy poverty in line with Article 7(11) of Directive 2012/27/EU		
2021				Total annual end-use savings achieved in Year X-2 ([3])	Thereof, savings achieved in Year X-2 only from new actions that were implemented in Year X-2	Total cumulative end-use savings achieved from 2021 to Year X-2	Total annual end-use savings achieved in Year X-2 ([3])	Thereof, savings achieved in Year X-2 only from new actions that were implemented in Year X-2	Total cumulative end-use savings achieved from 2021 to Year X- 2
	M		M	M	M	M	Miap	Miap	Miap
	No1	ktoe	2.321	31,34	31,34	31,34	4,92	4,92	4,92
	No5	ktoe		0,18	0,18	0,18			
	No7	ktoe		1,09	1,09	1,09			
	No9	kt		1,96	1,96	1,96			
	No10								

Haris:
New entry in 2024

Haris:
No of Vulnerable households

Haris:
Referering to new measures (adding up No1) "Energy savings at home" & "regulatory" (tab: monitoring 2021-2030): For initial year 2021

Haris:
Total annual (**2021**) end-use savings achieved.
Referering to new measures (adding up No1) "Energy savings at home" & "regulatory" (tab: monitoring 202 2030). Initial 2021 30,34+1=**31,34**
Values in X-2 (i.e for year 2022) will change in 2024

Table 4: Reporting of final energy savings achieved through national EEOs or alternative measures adopted in application of Article 7 of Directive 2012/27/EU and savings aimed at alleviation of energy poverty in line with Article 7(11) of Directive 2012/27/EU

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Calculation methodology of energy savings of low income/vulnerable households

DIRECTIVE (EU) 2023/1791 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 13 September 2023

on energy efficiency and amending Regulation (EU) 2023/955 (recast)

(Text with EEA relevance)

ANNEX V

COMMON METHODS AND PRINCIPLES FOR CALCULATING THE IMPACT OF ENERGY EFFICIENCY OBLIGATION SCHEMES OR OTHER POLICY MEASURES UNDER ARTICLES 8, 9 AND 10 AND ARTICLE 30(14)

(d) when calculating the energy savings for the purpose of Article 8(3) that can be counted to fulfil the obligation in that Article, Member States may estimate the energy savings of people affected by energy poverty, vulnerable customers, people in low-income households and, where applicable, people living in social housing on the basis of engineering estimates using standardised occupancy and thermal comfort conditions or parameters, such as parameters defined in national building regulations. The way comfort is considered for actions in buildings should be reported by the Member States to the Commission together with explanations of their calculation methodology.

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Calculation methodology of energy savings of low income/vulnerable households

Conduction of energy inspection and issuing Energy Performance Certificate (EPC) in order to classify the building based on A-H energy class - prior to energy efficiency interventions

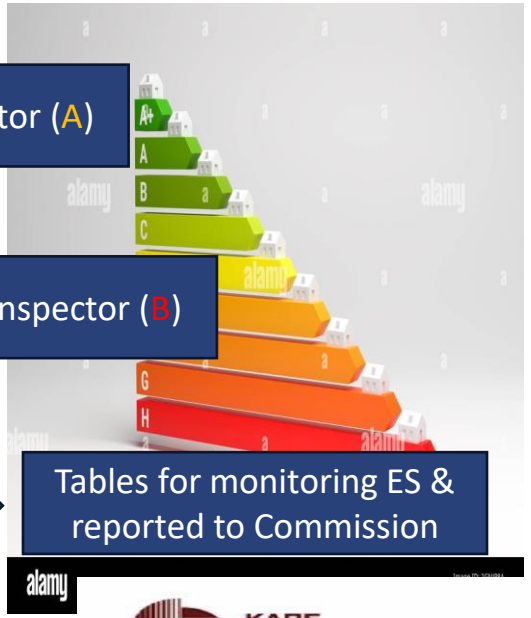
By whom → Energy inspector (A)

Conduction of energy inspection and issuing Energy Performance Certificate (EPC) in order to classify the building based on A-H energy class after the energy efficiency interventions

By whom → Energy inspector (B)

Calculation of yearly Primary Energy Consumption (kWh/m^2) and then converted to yearly Final Energy Consumption (kWh/m^2) - FEC_{before} and FEC_{after}

Input data → Tables for monitoring ES & reported to Commission



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Measures to tackle "Energy Poverty" in Greece

Monitoring and Verification of energy savings

Effective monitoring, timely monitoring, effective and reliable verification of the implementation of the energy efficiency measures/interventions by *Technical Chamber of Greece*.

Verification methodology of energy savings

- Conduction of preliminary audit for the whole set of interventions based on specific documentation
- Selection of sample of energy efficiency interventions and then on-site detailed inspections (also taking into account the issuing of EPC prior to and after the energy efficiency interventions by two independent Energy Auditors)

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Authorities responsible for Monitoring and Verification of the policy measure

Strategic Unit of MoEE is responsible for the monitoring & verification mechanism of the policy measures, planning & issuing instructions and directions to all involved parties

The *Strategic Unit of MoEE* in charge of undertaking the procedure of the Monitoring and Verification mechanism will be *independent* of those carrying out the monitoring and verification.

ENSMOV Partners

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Our Platform: energysavingpolicies.eu

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