

NOTIFICATION OF MEMBER STATES' MEASURES AND METHODS FOR IMPLEMENTING ARTICLE 8, 9 AND 10 OF DIRECTIVE 2023/1791/EU

The Republic of Croatia, in line with item 5 of Annex V to Directive 2012/27/EU, notifies the Commission on the proposed methodology for the operation of the energy efficiency obligations scheme and on alternative policy measures under Articles 7a and 7b, and Article 20, paragraph 6 of this Directive. All amendments to that Directive in accordance with proposal COM(2016) 761 have been taken into account. Ultimately, this notice is fully aligned with the provisions of Articles 8, 9 and 10 of the new Directive (EU) 2023/1791 of 13th September 2023 on energy efficiency.

1. *The calculation of the level of prescribed energy savings to be achieved over whole period from 1st January 2021 to 31st December 2030, showing how the following elements are taken into consideration:*

(a) the annual final energy consumption according to the average value for the last three years before January 1st, 2019 [in ktoe]

The calculation is based on data from energy balances for 2016, 2017 and 2018, according to the EUROSTAT method.

	2016	2017	2018
FINAL ENERGY CONSUMPTION [ktoe]	6,636.0	6,924.0	6,851.4
Industry	1,084.9	1,178.3	1,191.7
Transport	2,162.2	2,336.9	2,140.3
Households	2,392.5	2,377.1	2,284.0
Services	761.9	801.1	816.1
Agriculture and forestry	206.7	204.9	211.3
Fishing	26.8	25.7	23.7
AVERAGE [ktoe]	6,803.8		

(b) cumulative amount of energy savings in final consumption that needs to be achieved [in ktoe] in accordance with Article 8, paragraph 1, point (b) of Directive (EU) 2023/1791

Basis for target calculation (a)-(b)-(c) [ktoe]											6,803.8
Annual savings [ktoe]	0.8%	0.8%	0.8%	1.3%	1.3%	1.5%	1.5%	1.9%	1.9%	1.9%	
2021	54.4										54.4
2022	54.4	54.4									108.9
2023	54.4	54.4	54.4								163.3
2024	54.4	54.4	54.4	88.4							251.7
2025	54.4	54.4	54.4	88.4	88.4						340.2
2026	54.4	54.4	54.4	88.4	88.4	102.1					442.2
2027	54.4	54.4	54.4	88.4	88.4	102.1	102.1				544.3
2028	54.4	54.4	54.4	88.4	88.4	102.1	102.1	129.3			673.6
2029	54.4	54.4	54.4	88.4	88.4	102.1	102.1	129.3	129.3		802.8
2030	54.4	54.4	54.4	88.4	88.4	102.1	102.1	129.3	129.3	129.3	932.1
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 – 2030 [ktoe]											4,313.6
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 – 2030 [PJ]											180.6

(c) sources used in the calculation of final energy consumption, including justification for the use of alternative statistical sources and possible differences in terms of calculated quantities (if sources other than Eurostat were used)

The above data are taken from the annual energy reports "Energy in Croatia" for the years 2016 and 2017 and 2018. The reports include, inter alia, energy balances produced according to the EUROSTAT methodology. All reports are available on the Ministry of the Economy and Sustainable Development's website: <https://mingor.gov.hr/o-ministarstvu-1065/djelokrug/uprava-za-energetiku-1999/energetska-politika-i-planiranje/energija-u-hrvatskoj/5330>

2. Member States which decide to use any of the options referred to in Article 8 (6) of Directive 2023/1791/EU shall report on their calculation of the energy savings level over the whole period from 1st of January 2021 to 31st of December 2030, showing that the following elements have been taken into account:

The Republic of Croatia has not used the options under Article 7(2) of Directive 2012/27/EU, nor will it use the options under Article 8(6) of Directive (EU) 2023/1791.

Therefore, this part of the document (point 2) is not being revised. The revision of this part would not have an impact on the overall cumulative target set for the period 2021-2030 under Article 8(1b) of the revision of Directive (EU) 2023/1791.

However, certain relevant data are presented below, which illustrate the situation regarding the savings obligations.

(a) annual savings rate

An annual savings rate of 0.8% shall apply, in accordance with Article 7 (1) (b).

Point 2(c) shows the calculation of the annual savings rate that would be required if the Republic of Croatia decided to use the option from paragraph 6.

(b) amount of energy used in transport, in whole or partially, excluded from the calculation [in ktoe]

	2016.	2017.	2018.
Transport	2,162.2	2,336.9	2,140.3
AVERAGE [ktoe]			2,213.1
New baseline for calculation of target [ktoe]			4,590.7

We emphasize that the energy used in traffic is not excluded from the target calculation, but is presented here only as information. The share of traffic in the total immediate energy consumption is 32.5%.

(c) cumulative amount of energy savings for the whole period from 1st January 2021 until 31st December 2030 (before possibility in Article 7 paragraph 4 points b) to g) of the Directive 2012/27/EU was applied) [in ktoe]

Basis for target calculation 1.(b) – 2.(b) [ktoe]											4,509.7
Annual savings [ktoe]	0.8%	0.8%	0.8%	1.3 %	1.3 %	1.5 %	1.5 %	1.9 %	1.9 %	1.9 %	
2021	36.7										36.7
2022	36.7	36.7									73.5
2023	36.7	36.7	36.7								110.2
2024	36.7	36.7	36.7	59.7							169.9
2025	36.7	36.7	36.7	59.7	59.7						229.5
2026	36.7	36.7	36.7	59.7	59.7	68.9					298.4
2027	36.7	36.7	36.7	59.7	59.7	68.9	68.9				367.3
2028	36.7	36.7	36.7	59.7	59.7	68.9	68.9	87.2			454.5
2029	36.7	36.7	36.7	59.7	59.7	68.9	68.9	87.2	87.2		541.7
2030	36.7	36.7	36.7	59.7	59.7	68.9	68.9	87.2	87.2	87.2	628.9
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 – 2030 [ktoe]											2,910.5
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 – 2030 [PJ]											121.9
Annual savings [PJ]											2.6

If energy consumption in traffic were excluded from the calculation, the Republic of Croatia would have to apply a new annual energy savings rate of 1.82% in order to achieve a cumulative goal equal to that calculated in accordance with Article 8, paragraph 1, point b. Directive (EU) 2023/1791.

(d) application of the options referred to in Article 8(8)(b) to (g) of Directive (EU) 2023/1791:

- i. final energy consumption in industries [in ktoe] as given in Annex I of the Directive 2003/87/EZ, which is excluded from the calculation in line with Article 7 point 4(b) of the Directive 2012/27/EU

	2016.	2017.	2018.
EU ETS plants	712.8	711.7	770.1
AVERAGE [ktoe]	731.5		

This consumption represents 10.75% of total direct energy consumption in the Republic of Croatia.

- ii. amount of energy savings [in ktoe] achieved in energy conversion, distribution and transmission sectors, including infrastructure for efficient centralized heating and cooling, in accordance with Article 7 (4) (c) of the Directive 2023/1791/EU

The potential for increasing the energy efficiency of the electricity transmission infrastructure was assessed in the Ten-Year Transmission System Development Plan for the period 2022-2031 of the Croatian Transmission System Operator (CTSO) (see measure ENU-13). Based on these estimates, potential savings, i.e. reduction of losses in the transmission network, were estimated: in the period 2022-2024, it is possible to expect savings in electricity losses of around 15.1 GWh on average per year, in the period 2025-2026 around 25.6 GWh on average

per year, and in the period 2027-2031 around 31.2 GWh on average per year. These savings are not savings in direct energy consumption and do not count towards the achievement of the target under Article 8(1)(b) of Directive (EU) 2023/1791.

The potential for increasing the energy efficiency of the electricity distribution infrastructure has been assessed in the Ten-Year Distribution Network Development Plan for the period 2024-2033 by the HEP - Distribution System Operator (HEP-ODS) (see measure ENU-14). Based on these estimates, the cumulative expected energy savings due to the reduction of losses in the distribution network for the period from 2021 to 2030 amount to 284 GWh or 24.4 ktoe (1.0 PJ). These are savings due to the reduction of losses in the distribution network, and these savings are not included in the achievement of the goal according to Article 8, paragraph 1, point b of Directive (EU) 2023/1791.

- iii. amount of energy savings [in ktoe] resulting from individual measures implemented since 31st December 2008 that continue to have an impact in 2020 and beyond, in accordance with Article 8 (8) (d) of the Directive 2023/1791/EU*

The measures whose implementation started in Croatia based on the 3rd National Energy Efficiency Action Plan for the period 2014 to 2016, and which will, considering their lifetime, continue to produce impacts also in the period until 2030 are the building energy renovation programmes (for multi-apartment buildings, single family houses, public sector buildings and commercial buildings) and public lighting. Those measures' lifetime is 20 years for buildings and 15 years for public lighting in accordance with the Ordinance on the system for monitoring, measurement and verification of energy savings.

The savings achieved based on these measures in the period from 2014 until 2016, according to the data from the 4th NEEAP as well as the cumulative effect of these measures in the period from 2021 until 2030 are presented in the table below.

However, the cumulative effect of these measures, which were implemented in the previous period, does not count towards the achievement of the target for the period 2021 to 2030, in accordance with the provisions of the Directive.

Measure	Savings in the period 2014-2016 [PJ]	Cumulative savings in the period 2014-2016 [ktoe]
Apartment buildings energy renovation scheme 2014-2016	0.15	3.57
Family houses energy renovation scheme 2014-2016	0.70	16.72
Public sector buildings energy renovation scheme 2014-2015	0.18	4.23
Commercial non-residential buildings energy renovation scheme 2014-2016	0.04	1.04
Energy Efficient Public Lighting Programme	0.08	1.95
TOTAL	1.15	27.52
CUMULATIVE SAVINGS IN THE PERIOD 2021 – 2030	11.52	275.16

- iv. *amount of energy savings [in ktoe] from policy measures that result in individual actions undertaken after 1st January 2018 and before 31st December 2020, which deliver savings after 31st December 2020, in accordance with Article 8 (8) (e) of the Directive 2023/1791/EU*

Since January 2018 several energy efficiency measures have been applied in Croatia. Residential and public buildings energy renovation schemes, co-funded from ESI funds, are implemented most intensively through public calls for grants. Individual building energy renovation projects have been producing impacts since 2018 and will continue to do so until 2030, since the lifetime of the integral building energy renovation measures is 20 years, in accordance with the Ordinance on the system for monitoring, measurement and verification of energy savings. An assessment of cumulative savings is presented in the table below, and data on the savings are taken over from the following analyses: "Revision of the calculation of result indicators for the Specific Objective 4c2: Reduction of energy consumption of the residential buildings (multi-apartment buildings and family houses) under the Operational Programme Competition and Cohesion 2014-2020" (Ministry of Construction and Physical Planning, July 2017) and "Revision of the calculation of result indicators for the Specific Objective 4c1: Reduction of energy consumption in the public sector buildings under the Operational Programme Competition and Cohesion 2014-2020" (Ministry of Construction and Physical Planning, July 2017), with the fact that the savings are shown in final consumption.

Savings [ktoe/year] / Year	2018	2019	2020	2021	2022	2023
Savings in multi-apartment buildings upon first public call	53.26	53.26	53.26	53.26	53.26	53.26
Savings in family houses upon first public call				15.62	31.24	46.86
Savings in multi-apartment buildings upon second public			13.32	13.32	13.32	13.32
Savings based on the Pilot Project 4c1.2	4.30	4.30	4.30	4.30	4.30	4.30
Savings per public call 4c1.3 - 2019		29.26	29.26	29.26	29.26	29.26
Savings per public call 4c1.3 - 2020			6.89	6.89	6.89	6.89
Savings per new public calls - 2020			9.47	9.47	9.47	9.47
Savings per new public calls - 2021				12.05	12.05	12.05
Savings per new public calls - 2022					14.63	14.63
Savings per new public calls - 2023						18.07
TOTAL ANNUAL SAVINGS	57.56	86.82	116.5	144.17	174.42	208.11
TOTAL CUMULATIVE SAVINGS IN THE PERIOD 2018-2023						787.58
TOTAL CUMULATIVE SAVINGS IN THE PERIOD 2021-2030						1,983.47

The table shows only the estimates; the data on the actually achieved energy savings are collected for the purposes of reporting on the implementation of the Integrated National Energy and Climate Plan. However, these estimates are shown for the purpose of proving the implementation of measures and individual actions under these measures that could significantly affect the goal reduction for the period from 2021 until 2030.

- v. *amount of energy [in ktoe] generated on or in buildings for own use as a result of policy measures promoting new installation of renewable energy technologies in line with Article 8 (8) (f) of the Directive 2023/1791/EU*

Indeterminable.

- vi. *amount of excess energy savings [in ktoe] achieved in the period from 1st January 2014 to 31st December 2020, which member States count towards the period from 1st January 2021 until 31st December 2030, in line with Article 8, paragraph 8g of the Directive 2023/1791/EU*

Not applicable, i.e. there are no excess energy savings in the period from 1st January 2014 to 31st December 2020.

(e) total cumulative amount of energy savings [in ktoe] (after the application of the exception under Article 8 (8), from (b) to (g) of the Directive 2012/27/EU

If only exceptions (ii), (iii) and (iv) indicated under item (f) are used, the cumulative target would be significantly reduced, as shown in the table below. However, taking into consideration the provisions of Article 3(a), paragraph (b) of the Directive, according to which the reduction of energy savings target may not exceed 35 % in relation to the target calculated according to item (c), the table below determines these effects.

TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 – 2030 [ktoe]	2,993.7	Target reduction [%]
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 - 2030 after exception (ii) [ktoe]	2,845.17	4.96
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 - 2030 after exception (ii) + (iii) [ktoe]	2,570.01	14.15
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 - 2030 after exception (ii) + (iii) + (iv) [ktoe]	586.54	80.41
TOTAL CUMULATIVE TARGET FOR THE PERIOD 2021 -2030 with a 35 % reduction [ktoe]	1,945.89	35.00

Considering the provisions of the last paragraph of paragraph 5 of Article 8 of Directive (EU) 2023/1791, the Republic of Croatia shall set as a cumulative energy savings target the amount calculated in accordance with item (b) of paragraph 1 of Article 8 of the Directive, which is presented in item 1.b) of this document.

3. Policy measures in view of the achievement of the savings requirement referred to in Article 8, paragraph 1 of the Directive 2023/1791/EU

3.1. Energy efficiency obligation scheme referred to in Article 9 of the Directive 2023/1791/EU

(a) description of the energy efficiency obligations scheme

The energy efficiency obligations scheme is stipulated by the Energy Efficiency Act (OG no. 127/14, 116/18, 25/20), and its functioning is additionally explained by a special regulation (ordinance) arising from the Act – Ordinance on energy efficiency obligation scheme (OG no. 41/19). With the entry into force of amendments to the Energy Efficiency Act (OG no. 41/21), the Ordinance on the Energy Efficiency Obligation System (OG no. 41/19) ceases to be valid and the elements of the energy savings obligation system and the method of its implementation are transferred to the Ordinance on the System for Monitoring, Measurement and Verification of Energy Savings (OG no. 98/21, 30/22, 96/23). The basic provisions of the system prescribed by these documents are given below.

The energy efficiency obligation system is subject to obligations by energy suppliers (electricity, heat, natural gas and petroleum products). The system has been operational since 2019, when it includes suppliers who delivered more than 300 GWh of energy to the market in 2017. In 2020, the obligation system includes suppliers who delivered more than 100 GWh of energy to the market in 2018, and from 2021 onwards, all suppliers who delivered more than 50 GWh of energy to the market in the year before last compared to the relevant year are subject to obligations. From 2021 to 2030, the goal is to achieve cumulative energy savings in final consumption in such a way that new annual savings are achieved every year. According to Directive 2018/2002, which amends Directive 2012/27/EU on energy efficiency, the system is set up so that it is necessary to achieve savings of 0.8% of annual final consumption every year. This goal was revised into law in the Integrated National Energy and Climate Plan in accordance with the new Directive (EU) 2023/1791 on energy efficiency from 2023. In the process of transposition of the Directive, the Act on Energy Efficiency will be amended.

The Ministry responsible for energy shall, by a special decision, determine for each obligated party in the current year the exact annual amount of the energy saving obligation in kWh for the following year, based on data on the energy delivered by the obligated party to end customers or to distribution stations that sell energy to end customers in the year before last. The annual obligation shall be reduced by:

- energy from biofuels, which entities (who are also parties to the bond) that place diesel fuel or motor gasoline on the market for motor vehicles were obliged to place in a certain percentage in accordance with a special regulation governing the use of biofuels for transport
- energy delivered by an energy supplier to a customer who is a producer, distributor or supplier of thermal energy
- energy delivered by an energy supplier to an industry that is obligated under the regulation that prescribes the method of trading greenhouse gas emission units

- energy taken from the network for charging technologically different energy storage devices (energy for pumping, charging battery storage devices with electricity, charging heat accumulators, electricity for operating high-voltage electric water heaters)
- electricity consumed by the auxiliary service provider that is activated at the request of the network operator and enables the provision of regulation services
- part of the energy supplied by the supplier for charging electric vehicles.

The bondholder may request a different time distribution for achieving the cumulative target in the report on achieved energy savings, provided that it achieves at least 30% of the annual target on the annual basis set in the manner prescribed by the Act (0.8% per year in accordance with Article 7 of the Directive) and that it achieves the determined cumulative savings on a three-year basis.

For the unrealized part of the obligation from the previous year that exceeds 10% of the obligation, the Ministry will by official duty determine the amount that the bondholder is obliged to pay as a one-time payment to the Environmental Protection and Energy Efficiency Fund for unrealized savings.

Bondholders are obliged to submit to the Ministry once a year, by February 15th of the current year, a report on achieved savings for the previous year, according to the prescribed form.

(b) expected cumulative and annual amount of savings and duration of the obligation period(s)

The Energy Efficiency Act, in Article 12 (a), paragraph 1, establishes that the cumulative energy savings target for the period from the beginning of 2021 to the end of 2030 is 2,993.7 ktoe, and in paragraph 3 of the same article it is established that at least **70% of the target**, which amounts to 2,095.6 ktoe (87.7 PJ) cumulatively over the entire period, or 38.1 ktoe (1.6 PJ) annually, will be achieved through the energy efficiency obligation system. The targets for each subsequent cumulation period are set in the Integrated National Energy and Climate Plan.

Important notice: The new distribution of the target between the energy efficiency obligation system and alternative measures (50% - 50%) for the new target under Directive (EU) 2023/1791 was determined in the NECP revision process and was included in the proposal for amendments to the Energy Efficiency Act, which are in the parliamentary procedure (December 2024).

(c) obligated parties and their responsibilities

The parties to the bonds are energy suppliers, and from 2021 and for all years thereafter, all suppliers who delivered more than 50 GWh of energy to the market during the year before last.

(d) target sectors

Target sectors for achieving energy savings are not prescribed, i.e. savings can be achieved in any sector of direct consumption, not excluding investments in equipment for electricity production and energy self-supply, small and micro cogeneration, advanced meters for reading energy consumption by end customers and all other investments in energy efficiency improvement measures for which the bondholder proves the achievement of new savings.

Savings from investments in energy efficiency improvement measures in the energy conversion and distribution sectors, including district heating and cooling infrastructure, are also eligible.

(e) eligible actions foreseen under the measure

The obligated parties fulfil their obligation by:

- investing in and stimulating energy efficiency improvement in final consumption so as to achieve these investments as new energy savings, not excluding investments in electricity production and selfconsumption, small and micro CHPs, advanced meters at final consumers/energy buyers and all other investments and incentives for which obliged party can prove new energy savings;
- investing in measures to improve energy efficiency in the energy conversion and distribution sectors, including infrastructure for district heating and cooling
- buying off determined energy savings;
- paying in a certain fee into the Environment Protection and Energy Efficiency Fund;
- investment and stimulation resulting in an effect greater than that of any measure effected in regular market conditions
- investing and stimulating measures or activities which, at the time when the investment is contracted or starts running (whichever comes later), are not encompassed by other policy measures for achieving energy savings, in order to avoid double calculation of savings

(f) information on the application of the following provisions of the Directive 2023/1791/EU

- (i) if applicable, specific actions for achieving a part of the savings in households affected by energy poverty in line with Article 8. paragraph 3.*

With the aim of reducing energy poverty, it is encouraged to increase energy efficiency in the living spaces of beneficiaries of the fee for vulnerable energy buyers in accordance with the social welfare regulation and in households in areas with development specificities in accordance with the provisions of the law regulating regional development, in the following ways:

- Calculated savings resulting from measures taken in households in areas with development specificities are increased by 10% for the savings holder.
- Calculated savings resulting from measures taken in households of beneficiaries of the fee for vulnerable energy customers are increased by 20% to the holder of the savings.
- Calculated savings resulting from measures taken in households of beneficiaries of the fee for vulnerable energy customers in areas with development specificities are increased by 30% for the beneficiary of the savings.

- (ii) savings achieved by energy services providers or other third parties in accordance with Article 9, paragraph 11, item (a);*

Bondholders can meet their obligations in the energy savings market, but the regulations do not limit the market only to bondholders and energy savings providers. The Ordinance on the System for Monitoring, Measuring and Verification of Energy Savings establishes that the evidence of achieved energy savings is an energy savings study. The study is a concise document that systematizes information and evidence on the implemented energy efficiency

improvement measure, and contains the following elements: data on the holder of the savings, the type of measure implemented, the location of the measure implementation, the amount of new annual and cumulative savings with the calculation of these savings, and evidence that the measure has been implemented and evidence of the input data used to calculate new annual energy savings. The study is prepared and signed by an authorized person for design in the field of architecture, construction, mechanical engineering and electrical engineering or for conducting energy audits and energy certification of buildings or large enterprises. Authorized persons must be from the profession to which the energy efficiency improvement measure for which the study is being prepared applies, and if it is a complex measure, all relevant professions participate in the preparation of the Study.

(iii) *“banking and borrowing” in accordance with Article 9, paragraph 11, item (b)*

The bondholder may request in its report on achieved savings that the savings or part thereof that the bondholder has achieved over the amount of the obligation achieved in previous years be calculated in one of the following years within the cumulation period. The bondholder may present the new annual energy savings achieved in a given year as if they had been achieved in any of the four previous or three following years within the same cumulation period, taking into account the lifetime of the measure.

(g) *information on trading of energy savings (if relevant).*

The obligated parties may trade in savings, i.e. an obligated party may achieve its obligation also by buying off the saving from another obligated party or third party.

3.2. *Alternative measures referred to in Article 10 and Article 30, paragraph 14 of the Directive 2023/1791/EU (except taxation):*

(a) *type of policy measure*

(b) *brief description of the policy measure including the design features per each policy measure notified*

(c) *expected total cumulative and annual amount of savings per each measure and/or amount of energy savings in relation to any intermediate periods*

(d) *implementing public authorities, obligated parties or entrusted parties and their responsibilities for implementing policy measure(s)*

(e) *target sectors*

(f) *eligible activities foreseen under the measure*

(g) *special policy measures or individual actions focused on energy poverty*

The above required data for all the foreseen alternative measures are indicated in the table below.

Id.	Name of measure	Type of measure (a)	Brief description of the measure (b)	Annual savings (c)	Implementing authority (d)	Target sector (e)	Eligible activities (f)
ENU-3	<i>Mult-partment buildings (MAB) energy renovation programme</i>	<i>Financial</i>	<i>Grants for MAB/SFH energy renovation aimed at achieving a reduction of thermal requirements of a building of at least 50 %: for SFH with a satisfactory condition of the external</i>	<i>2.16 ktoe 0.09 PJ</i>	<i>Ministry of Construction and Physical Planning (MCPP) – Programme adoption EPEEF - implementation of the call; technical assistance</i>	<i>Households</i>	<ul style="list-style-type: none"> ▪ <i>Energy audit and energy certification before and after renovation</i> ▪ <i>Preparation of design documentation (if necessary)</i> ▪ <i>Energy renovation equipment and works (envelope, joinery, HVAC, RES, indoor lighting, etc.)</i> ▪ <i>Professional and designer supervision (if necessary)</i> ▪ <i>Technical assistance</i>
ENU-4	<i>Single family houses (SFH) energy renovation programme</i>	<i>Financial</i>	<i>envelope, co-funding of individual energy efficiency and renewable energy sources measures; intensified stimulation up to the nZEB standard</i>	<i>5.16 ktoe 0.22 PJ</i>	<i>MCPP – Programme adoption EPEEF - implementation of the call; technical assistance</i>		
ENU-5	<i>Public sector buildings energy renovation programme</i>	<i>Financial</i>	<i>Grants for public buildings energy renovation or ESCO model for buildings demonstrating high cost-effectiveness of EE measures; intensified stimulation up to nZEB standard</i>	<i>4.04 ktoe 0.169 PJ</i>	<i>MCPP – adoption and implementation of the Program EPEEF – implementation of the call APN - ESCO model</i>	<i>Services sector (public services)</i>	<ul style="list-style-type: none"> ▪ <i>Energy audit and energy certification before and after renovation</i> ▪ <i>Preparation of design documentation</i> ▪ <i>Energy renovation equipment and works (envelope, joinery, HVAC, RES, indoor lighting, etc.)</i> ▪ <i>Professional and designer supervision</i> ▪ <i>Technical assistance</i>
ENU-6	<i>Energy renovation program of buildings that have the status of cultural property</i>	<i>Financial</i>	<i>Grants for energy renovation of buildings that have the status of cultural property</i>	<i>2.74 ktoe 0.11 PJ</i>	<i>MCPP – adoption and implementation of the Program EPEEF – implementation of the call</i>	<i>Services sector (public services)</i>	<ul style="list-style-type: none"> ▪ <i>Energy audit and energy certification before and after renovation</i> ▪ <i>Preparation of design documentation</i> ▪ <i>Energy renovation equipment and works (envelope, joinery, HVAC, RES, indoor lighting, etc.)</i> ▪ <i>Professional and designer supervision (if necessary)</i> ▪ <i>Technical assistance</i>
ENU-7	<i>Systematic energy management in the public sector</i>	<i>Mandatory information</i>	<i>Improving the ISGE system and its application throughout</i>	<i>2.39 ktoe 0.10 PJ</i>	<i>APN</i>	<i>Services sector (public services)</i>	<ul style="list-style-type: none"> ▪ <i>Improvement of ISGE functionality</i>

			<i>the public sector and implementing organizational and educational measures to reduce energy consumption in public sector buildings</i>				<ul style="list-style-type: none"> ▪ <i>Introduction of remote measurements in all public sector buildings</i> ▪ <i>Connection of ISGE with other systems</i> ▪ <i>Implementation of organizational and educational activities</i>
ENU-8	<i>Energy renovation program for public lighting</i>	<i>Financial</i>	<i>Establishment of a financing model that will enable the implementation of projects according to the ESCO and PPP models</i>	<i>2.15 ktoe 0.09 PJ</i>	<i>ME - adoption of the Program</i> <i>JLP(R)S</i> <i>ESCO</i>	<i>Services sector (public services)</i>	<ul style="list-style-type: none"> ▪ <i>Energy audit and energy certification before and after renovation</i> ▪ <i>Preparation of design documentation</i> ▪ <i>Energy renovation equipment and works (light bulbs, lamps, protection and control equipment, cabling, poles, etc.)</i> ▪ <i>Professional and designer supervision</i> ▪ <i>Technical assistance</i>
ENU-17	<i>Increasing energy efficiency and use of RES in manufacturing industries</i>	<i>Financial</i>	<i>Grants and financial instruments for EE and RES measures in manufacturing industries</i>	<i>28.99 ktoe 1.21 PJ</i> <i>The average annual savings are stated, because the dynamics of savings is not uniform over the period</i>	<i>ME</i>	<i>Industry</i>	<ul style="list-style-type: none"> ▪ <i>Measures to improve energy efficiency in production facilities and buildings in the industrial sector</i> ▪ <i>Systems for the use of RES</i>
ENU-18	<i>Increasing the energy efficiency of public water supply, drainage and wastewater treatment systems</i>	<i>Financial</i>	<i>Grants and financial instruments for EE and RES measures</i>	<i>0.72 ktoe 0.03 PJ</i>	<i>ME</i>	<i>Water supply</i>	<ul style="list-style-type: none"> ▪ <i>Measures to improve energy efficiency in water supply systems</i> ▪ <i>Systems for the use of RES</i>
TR-2	<i>Program for co-financing the purchase of new vehicles running on alternative fuels and the development of infrastructure for alternative fuels in road transport</i>	<i>Financial</i>	<i>Co-financing the purchase of vehicles powered by electricity, compressed and liquefied natural gas and hydrogen</i>	<i>1.20 ktoe 0.05 PJ</i>	<i>EPEEF</i>	<i>Transport</i>	<ul style="list-style-type: none"> ▪ <i>Vehicle purchase</i>
TR-3	<i>Improving the public transport system and promoting</i>	<i>Financial</i>	<i>Co-financing sustainable transport solutions in cities</i>	<i>1.20 ktoe 0.05 PJ</i>	<i>EPEEF</i>	<i>Transport</i>	<ul style="list-style-type: none"> ▪ <i>Sustainable transport solutions in cities</i>

	<i>sustainable integrated transport</i>						
UET-10	<i>Implementation of the Program for Combating Energy Poverty, which includes the use of renewable energy sources in residential buildings in assisted areas and areas of special state concern for the period until 2025</i>	<i>Financial</i>	<i>Co-financing of energy renovation, including the use of RES, in buildings managed by the Central State Office for Reconstruction and Housing Care in Areas of Special State Concern</i>	<i>1.33 ktoe 0.06 PJ The average annual savings are stated, because the dynamics of savings is not uniform over the period.</i>	<i>MCPP CSORHC</i>	<i>Households</i>	<ul style="list-style-type: none"> ▪ <i>Measures for the integral energy renovation of buildings, which include the use of RES</i>

The table below shows the expected cumulative savings based on alternative measures in the period from 2021 to 2030

Id.	2021.	2022.	2023.	2024.	2025.	2026.	2027.	2028.	2029.	2030.	Energy savings [ktoe]
ENU-3	2.16	4.28	7.74	11.15	15.81	20.35	26.06	31.60	38.19	44.55	201.90
ENU-4	5.16	10.27	18.56	26.72	37.89	48.76	62.46	75.73	91.52	106.78	483.85
ENU-5	4.04	8.08	12.12	16.16	20.20	24.24	28.28	32.32	36.36	40.40	222.20
ENU-6	2.74	5.49	8.23	10.98	13.72	16.47	19.21	21.96	24.70	27.45	150.95
ENU-7	2.39	4.78	4.78	4.78	4.78	4.78	4.78	4.78	4.78	4.78	45.41
ENU-8	2.15	4.30	6.45	8.6	10.75	12.9	15.05	17.2	19.35	21.5	118.25
ENU-17				10.32	30.95	65.35	99.74	134.14	168.53	202.92	711.95
ENU-18						0.72	1.43	2.15	2.87	3.58	10.75
TR-2	1.20	2.40	3.60	4.79	5.99	7.19	8.39	9.59	10.79	11.99	65.92
TR-3	1.20	2.40	3.60	4.79	5.99	7.19	8.39	9.59	10.79	11.99	65.92
UET-10		1.11	2.22	3.33	13.27	13.27	13.27	13.27	13.27	13.27	86.28
TOTAL CUMULATIVE SAVINGS IN THE PERIOD 2021 –2030 ACHIEVED THROUGH ALTERNATIVE MEASURES [ktoe]											2.163.38
TOTAL CUMULATIVE SAVINGS IN THE PERIOD 2021 –2030 ACHIEVED THROUGH ALTERNATIVE MEASURES [PJ]											90.58
THE SHARE OF SAVINGS ACHIEVED THROUGH ALTERNATIVE MEASURES [%] IN THE NEW OBJECTIVE ACCORDING TO DIRECTIVE (EU) 2023/1791											50.15

3.3. Information on taxation measures:

- (a) *brief description of the taxation measure;*
- (b) *duration of the taxation measure;*
- (c) *implementing authority*
- (d) *expected cumulative and annual amount of savings per measure;*
- (e) *target sectors and the taxpayer segment;*
- (f) *additionality of energy savings by describing the approach to savings calculation, including the price elasticity used in accordance with Annex V, item 4 Directive 2012/27/EU*

In the National Energy and Climate Plan, two fiscal measures are foreseen for stimulating energy efficiency: ENU-10-Systematic energy management in the business sector (target sectors: industry and commercial services). This measure requires a detailed analyses to establish the methodology of monitoring and calculation of savings resulting from these measures.

4. Calculation methodology for measures notified under Articles 9, 10 and Article 30, paragraph 14 of Directive 2023/1791/EU (except taxation measures):

(a) *applied measurement methods under item 1 of Annex V to Directive 2023/1791/EU*
For calculating the savings, assessment methods are used as per Annex III of the Ordinance on the system for monitoring, measurement and verification of energy savings (OG no. 98/21, 30/22, 96/23). These are bottom-up measures used for assessing energy savings achieved through the application of individual energy-efficiency improvement measures (in line with item 1 (a) of Annex V).

The Ordinance also allows determining the savings by measuring physical items, i.e. by calculating the difference between actual and reference energy consumption (in line with item 1 (b) of Annex V).

The methods and prescribed reference values used were revised in 2021 - the new version of the Ordinance on the system for monitoring, measurement and verification of energy savings entered into force in September 2021. Annex III was additionally regulated through amendments to the Ordinance in March 2022, and minor changes unrelated to the calculation methodology were made in August 2023.

(b) *method to express energy savings (primary or final energy savings)*
Savings are reported as immediate (final) energy consumption. Primary energy savings are calculated using the primary energy factors prescribed in Annex I of the Ordinance on the system for monitoring, measurement and verification of energy savings.

(c) *lifetime of the measures, the rate of reduction of savings over time and the approach that is used to take into account the lifetime of the savings*
The lifetime of the measures is prescribed by Annex III of the Ordinance on the system for monitoring, measurement and verification of energy savings (OG no. 98/21, 30/22, 96/23). The values of the lifetime of the measures are taken over from the European Commission recommendations, back from the period of the Directive 2006/32/EC on energy services.

The savings established by assessment are monitored from the day of the entry of the evidence of savings into the Measurement and Verification System (SMIV), whereas for measures whose savings are established by measurement, the start is set to the beginning of the measurement, in accordance with the Ordinance on systematic energy management.

When calculating cumulative savings, discount factors are used (with a discount rate of 4%) to consider the reduction of savings over time.

(d) brief description of the calculation method, including how additionality and materiality of savings are ensured, and which methodologies and benchmarks are used for deemed and scaled savings

The methodology for calculating savings from individual measures is based on the bottom-up method, i.e. on mathematical equations calculating the difference in energy consumption before and after the implementation of the energy efficiency improvement measure. The calculation allows for the use of predefined (reference data) or actual data for each project.

The proof of achieved energy savings is an energy savings report. An integral part of the report is evidence that the measure has been implemented, and evidence of the input data used to calculate new annual energy savings. For energy efficiency improvement measures that are being designed, regardless of whether they are defined in Annex III of the Ordinance, which is an integral part of it or not, the proof of the implemented energy efficiency improvement measure is considered to be the project, signed by an authorized designer of the profession to which the energy efficiency improvement measure relates, and the final report on the work performed, signed by the supervising engineer. For energy efficiency improvement measures that are not being designed, the documentation listed for the individual measure in Annex III of the Ordinance is considered to be evidence of the implemented measure, or for measures that are not defined in Annex III of the Ordinance, all documentation on the basis of which it can be unequivocally determined that the measure has been implemented, and which is approved by the National Coordination Body, is considered evidence.

The additionality of measures is achieved by prescribing and achieving technical conditions surpassing the minimum conditions prescribed by the relevant legal regulations.

All evidence of the implementation of the measure must be an integral part of the energy savings study, prepared by an authorized design or energy audit person, who is independent of the savings holder.

(e) information on how the possible overlaps between policy measures and individual actions are addressed to avoid double counting of energy savings

Double calculation of energy savings is avoided by:

- 1) defining measures, making sure they do no overlap
- 2) defining who is obligated to enter data into the SMIV: entities obligated to plan (large cities and counties); subsidy providers and energy services providers

The SMIV enables an overview of entered data and quick detection of any double entries of measures and their savings. The vast majority of measures in Croatia are implemented with the financial assistance or participation of the Environmental Protection and Energy Efficiency Fund (either as a subsidy provider or an intermediary authority in the ESI funds system).

Therefore, such centralized entry also largely contributes to avoiding double entries and calculation of energy savings.

Bondholders cannot attribute to themselves the savings that occurred through the implementation of alternative measures, which is clearly established by the Energy Efficiency Act and the Ordinance on the system for monitoring, measurement and verification of energy savings.

(f) climatic variations and approach used (if relevant)

Two climate regions are distinguished in Croatia: continental and coastal Croatia. This has already been taken into consideration in establishing the reference values used in savings assessment methods, in accordance with the Ordinance on the system for monitoring, measurement and verification of energy savings.

5. Monitoring and verification

(a) brief description of the monitoring and verification system and the process of the verification

The energy savings monitoring and verification system was established by the Energy Efficiency Act and the Ordinance on the system for monitoring, measurement and verification of energy savings, and it is based on the SMiV information platform. The legally defined savings holders are obligated to enter data on the implemented energy efficiency measures into this platform which, based on the assessment methods or measured data, calculates achieved energy savings resulting from these measures. Savings holders are counties, large cities (with a population exceeding 35,000), subsidy providers and energy services providers.

The verification of savings is done through the SMiV based on evidence entered into the system, indicated under item 4 (d) of this document.

(b) implementing public authority and its main responsibilities in terms of the monitoring and verification system in relation to the energy efficiency obligations scheme or alternative measures

The savings verification is carried out by the National Energy Efficiency Authority, which is a special organizational unit at the Ministry of Environment and Energy. The EE Authority is responsible for managing the entire energy savings monitoring, measurement and verification system, for maintaining and developing the SMiV and reporting on the achieved savings at the annual level.

(c) independence of monitoring and verification from the obligated, participating or entrusted parties

Since monitoring and verification is the responsibility of the Ministry or the EE, independence from the bond parties and other savings holders is ensured. Additionally, independence is achieved through an energy savings study, which proves the savings achieved, and which is prepared by an authorized person, independent of the savings holders.

(d) statistically significant proportion of energy efficiency improvement measures and proportion and criteria used to define and select a representative sample

The verification of savings according to the currently valid Ordinance on the system for monitoring, measurement and verification of energy savings is carried out based on studies on energy savings and through SMiV. EE verifies all entries in SMiV.

(e) reporting obligations for obligated parties (savings achieved by each obligated party or each obligated party's sub-category, and in total under the scheme)

The manner of reporting on annual energy savings by obligated parties is prescribed by the Energy Efficiency Act, of which the reporting form is an integral part. Total savings under the obligation system are an integral part of the Annual Report on Progress in Achieving National Energy Efficiency Goals (see item (f)).

(f) publication of energy savings achieved (each year) under the energy efficiency obligation scheme and alternative measures

According to the Energy Efficiency Act, the ministry responsible for energy, together with the ministry responsible for construction and the National Energy Efficiency Authority, drafts the Annual report on the progress made towards achieving the national energy efficiency targets,

which is adopted by the Croatian Government by the 15th March of the current year for the previous year. According to the Act, the report is published on the national energy efficiency portal.

(g) information on Member States legislation on penalties to be applied in case of non-compliance

The Ministry shall, *ex officio*, determine by decision the amount that the bond party is obliged to pay to the Fund for Environmental Protection and Energy Efficiency as a one-off payment for unrealized savings, with a payment deadline of 30 days from the enforceability of the decision. The calculation of the amount that the bond party is obliged to pay to the Fund is based on the unit fee prescribed by the Act and the amount of unrealized savings. The unit fee in 2021 was 1.2 kn/kWh (0.16 €/kWh) and is adjusted each year by multiplying it by the consumer price index published by the Central Bureau of Statistics for the previous year.

(h) information on policy measures foreseen if the progress is not satisfactory

There are currently no specific measures foreseen that would have to be undertaken in case of unsatisfactory progress in achieving the targets. The corrective measures must be applied both to the obligation scheme and the alternative measure. In the obligation scheme, one of the corrective measures can be the increase of the fee to be paid by the obligated parties into the Fund, which should be incorporated into the future Ordinance on the energy efficiency obligation scheme, if it is determined that the system is not functioning. In the alternative measures part, corrective activities include the increase of the scope of activities, more efficient implementation by adjusting administrative procedures and increasing of available funds for co-financing of the measures.