

Fourth Annual Report under the Energy Efficiency Directive

UKRAINE

**Prepared by: STATE AGENCY ON ENERGY EFFICIENCY AND
ENERGY SAVING OF UKRAINE**

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This report was prepared by State Agency on Energy Efficiency and Energy Saving of Ukraine (SAEE). By submitting this report, Ukraine is supporting the Decision of the Ministerial Council of the Energy Community D/2015/08/MC-EnC and fulfilling its reporting obligation under Article 24(1) of Directive 2012/27/EU, which requires Contracting Parties to report on the progress achieved towards national energy efficiency targets.

This report provides key statistical indicators as required by Annex XIV Part 1 EED, describes tendencies in energy consumption by sector that occurred in 2018, presents energy efficiency targets which Ukraine has established by 2020, and provides an overview of the main legislative and non-legislative measures, including for public buildings with regard to Article 5 EED, energy savings with regard to Article 7(1) EED (energy efficiency obligation scheme) and Article 7(9) EED (alternative measures), which have been taken or which are planned in order to meet national energy efficiency targets. According to the EED Annex XIV the reporting period is the year 2018. Some data provided in the previous annual reports are adjusted in this report based on the recently published statistic information.

A. Key statistics and indicators

Table 1: Key energy statistics data

	Estimation of key statistics and indicators	Value			Unit	Comments/Eurostat codes
		2016	2017	2018		
(i)	Primary energy consumption	91 473	86 947*	93 165	ktoe	As defined in Art. 2 EED and consistent with B_100910 definition, IEA approach
(ii)	Total final energy consumption	48 739	47 396*	48 524	ktoe	Consistent with B_101700 definition, IEA approach
(iii)	Final Energy consumption – Industry	14 955	15 098*	16 501	ktoe	Consistent with B_101800 definition, IEA approach
(iii)	Final energy consumption – Transport	9 165	9 624*	9 633	ktoe	Consistent with B_101900 definition, IEA approach
	Final energy consumption in pipeline transport	1 410	1 643	1 485	ktoe	Consistent with B_101945 definition, IEA approach
(iii)	Final energy consumption – Households	17 588	16 487*	16 203	ktoe	Consistent with B_102010 definition, IEA approach
(iii)	Final energy consumption – Services	4 856	4 337*	4 277	ktoe	Consistent with B_102035 definition, IEA approach
	Final energy consumption – Agriculture	2 139	1 847*	1 907	ktoe	Consistent with B_102030 definition, IEA approach
	Final energy consumption – Other sectors	24 618	22 675*	22 390	ktoe	Consistent with B_102000 definition, IEA approach
(iv)	Gross value added by sector – Industry	552 889	697 318	830 236	mIn UAH	Sections B to F of NACE Rev. 2
(iv)	Gross value added by sector – Services	1 190 638	1 518 294	1 826 781	mIn UAH	Sections G to U of NACE Rev. 2
(v)	Disposable income for households	1 624 382	2 061 009	2 534 840	mIn UAH	Gross disposable income, ESA 2010
(vi)	Gross domestic product (GDP)	2 385 367	2 983 882	3 560 596	mIn UAH	ESA 2010
(vii)	Electricity generation from thermal power plants	153 824	143 794	145 550	mIn kWh	Eurostat codes: GEP // C0000X0350-0370, C0350-0370, P1000, S2000, O4000XBIO, G3000, RA410, RA200, R5110-5150_W6000RI, R5300, W6210, R5210P, R5220P, R5290, N900H
(viii)	Electricity generation from combined heat and power	15 992	12 048	15 319	mIn kWh	Eurostat codes: GEP_MAPCHP, GEP_APCHP // C0000X0350-0370, C0350-0370, P1000, S2000, O4000XBIO, G3000, RA410, RA200, R5110-5150_W6000RI, R5300, W6210, R5210P, R5220P, R5290, N900H
(ix)	Heat generation from thermal power generation	106 895*	96 687*	98 253	thousand Gcal	Eurostat codes: TO_EHG // H8000

	Estimation of key statistics and indicators	Value			Unit	Comments/Eurostat codes
		2016	2017	2018		
(x)	Heat generation from combined heat and power plants, incl. industrial waste heat	36 610	38 548	36 138	thousand Gcal	Eurostat codes: TO_EHG_MAPCHP, TO_EHG_APCHP, TO_EHG_OTH // H8000
(xi)	Fuel input for thermal power generation	50 003	46 602	47 432	ktoe	Eurostat codes: TI_EHG_E // TOTAL excluding RA100, RA500, RA300, RA420, RA410, RA200, H8000, E7000
(xii)	Passenger kilometres (pkm)	102 199 392	99 408 649	104 446 000	thousand pkm	
(xiii)	Tonne kilometres (tkm)	344 196 150,6	364 192 164	361 300 000	thousand tkm	
(xv)	Population	42 584,5	42 386,4	42 153, 2	thousand	As of January 1 the following year. Total enumerated population

Data provided by the State Statistics Service of Ukraine. Data for temporarily occupied territories of the Autonomous Republic of Crimea, the city of Sevastopol, and part of the temporarily occupied territories in the Donetsk and Luhansk oblasts is not available.

(*) *Adjusted data*

B. Overview of energy consumption trends

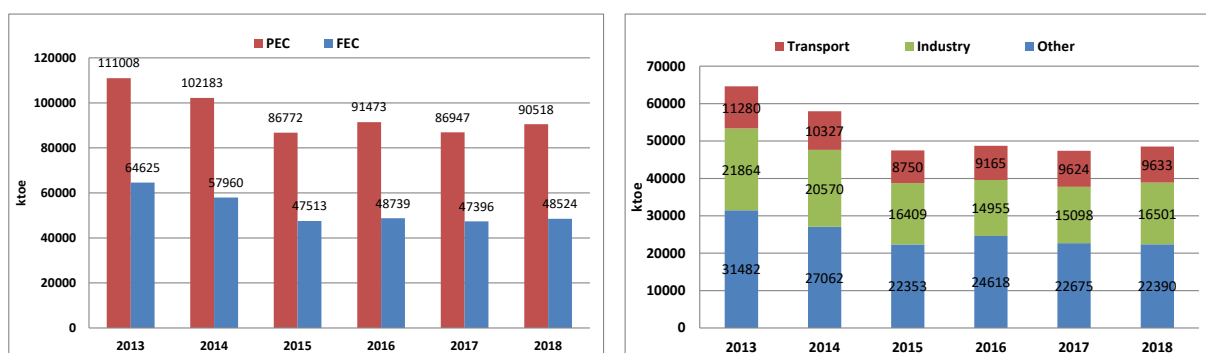


Fig. 1. Final and primary energy consumption (left) and final energy consumption by sectors (right) in 2013 – 2018

In 2019 the State Statistics Service of Ukraine (SSSU) has revised the Energy balance for 2017 and made some adjustments.¹ The most significant changes in the Energy balance for 2017 occurred in the resource part in terms of production / mining of coal and peat (increase by 59 toe, compared to preliminary data); also some decrease could be observed in biofuels and waste production (by 43 toe), which occurred mainly due to changes in the reflection of the production of briquettes from coal waste, which were previously reflected as "biofuels and waste". Compared with operational data, imports of petroleum products decreased significantly, due to the adjustment of the calorific value of certain petroleum products by the International Energy Agency (IEA). As a result of these changes, the total primary energy supply decreased by 163.3 toe with corresponding decrease in sectors: transformation of coal used by companies which produce briquettes by 15,1 toe; petroleum products by 38,7 toe. The decrease in cross product transfers has led to an increase in crude oil used in other transformation, as well as in the final consumption. Thus, in general, the Final energy consumption decreased by 175.4 toe, 172,8 of which is petroleum products, biofuels and waste - by 57.3 toe, while the coal and its processing products increased by 55.5 toe. At the same time, a decrease in petroleum products was observed in the Transport sector for the operation of road transport (by 140.7 toe) and biofuels and waste in the "trade and services" sector (by 56.8 toe). The use of coal products increased in the Residential sector (by 52.6 toe) and Industry (by 2.6 toe).

According to the State Statistics Service of Ukraine, in 2018 primary energy consumption (PEC) increased by 4.1% compared to 2017, caused by an increase in Final energy consumption (FEC) by 2.4% (Fig. 1). Consumption growth has occurred for the second time

¹ The review of energy balance is carried out annually as provided by the Plan of the state statistical supervision, which provides distribution: regular operational data (for the previous year or T-1 year), updated data (T-2 year) and final data (T-3 year). The change in the value of energy balance indicators may be the result of the quality control of SSS data and administrative data when forming the next balance: data analysis over time (comparative analysis over a number of years), in space (by region); analysis of aggregates and data distribution, analysis of the relationship of indicators, such as the volume of individual fuels used with the estimated volumes of their supply / receipt, coordination of energy efficiency of energy transformation processes, or in case the respondents specify any of the indicators.

since 2010 and must be viewed in the context of the previous significant decline caused not only by energy efficiency measures but also by economic, climatic and political factors. Thus, the growth of energy consumption observed in 2016 and 2018 is primarily due to the **structural factor** (Fig. 2), namely economic recovery and normalization of energy supply to consumers.

One of the features of 2018 is that despite the actual growth of energy intensity of industrial production and total output of the real sector, the growth of energy efficiency in the buildings sector has reduced **the final energy intensity of GDP by 1%**. In general, this indicator has been steadily decreasing since 2010, having decreased by 27% during this time. At the same time, it is difficult to identify the main reason for the growth of primary energy intensity of GDP in 2018 - in general, the nature of fuel use in the energy sector has not changed, meanwhile the dynamics of parameters in energy balance is often more sensitive to statistical accounting than to operating mode of energy companies.

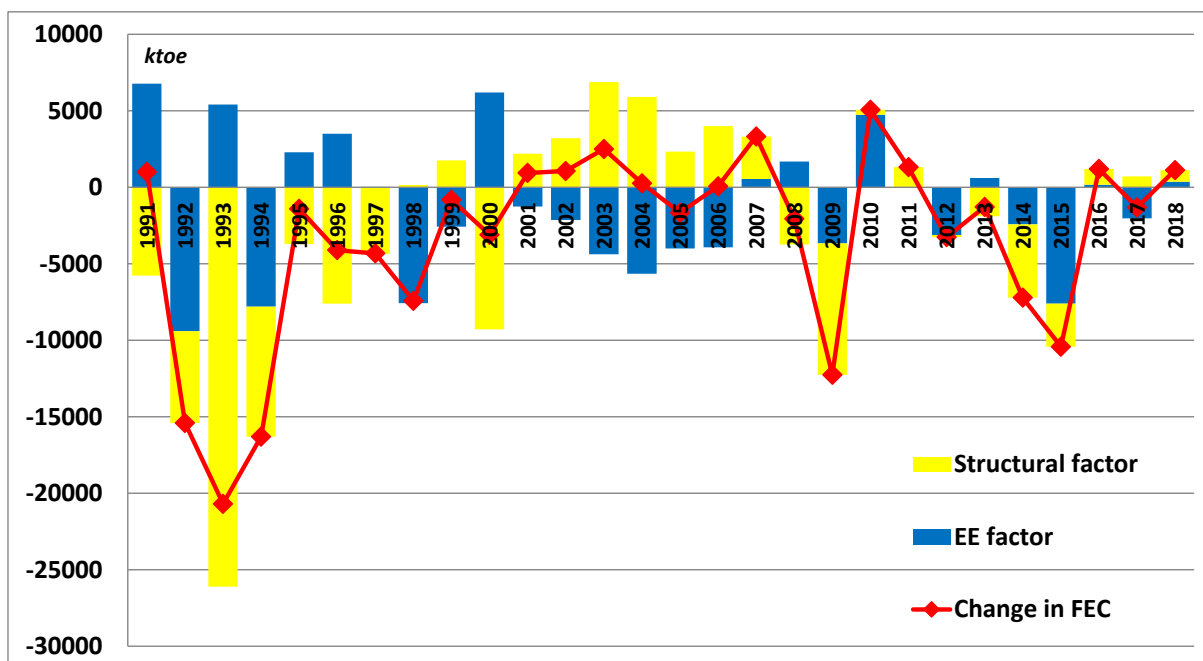


Fig. 2. Change in final energy consumption driven by structural and EE factors

The growth of the Final energy consumption was observed in almost all industries, which together with rather restrained growth of industrial production led to a significant increase in sectoral energy intensity (Fig. 3). Only in the Chemical industry the energy intensity decreased by 8%, but there was a significant increase in energy intensity in Metallurgy by 9%, Mining and quarrying and Food production by 11%, and Non-metallic mineral production by almost 20%. Two obvious reasons for this can be mentioned: market and technological transformation of the fuel structure (increase in the share of coal and crude oil, with decrease in the share of electricity and natural gas) and inconsistency in the time of annual economic and energy reporting (in the previous year, the estimated energy intensity for these industries decreased by more than 20%). Maintaining a high share of constant energy consumption in industrial production causes sharp fluctuations in energy intensity, and does not allow to confidently identify a stable trend.

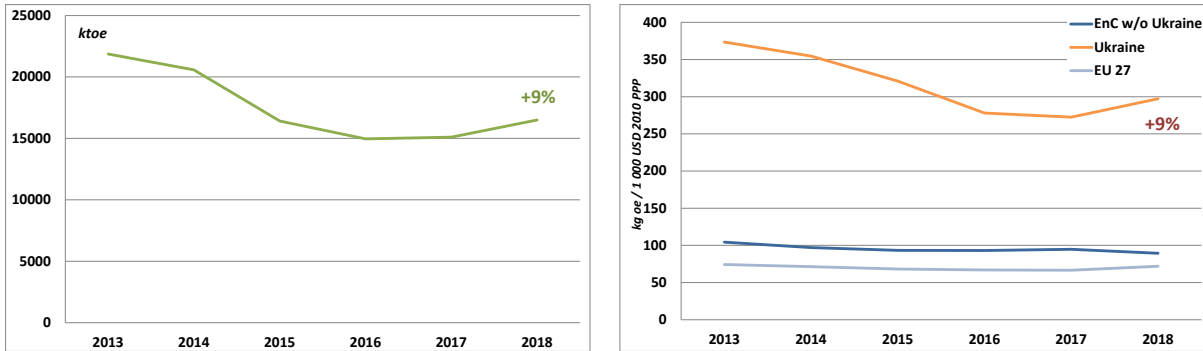


Fig. 3. Final energy consumption (left) and energy intensity (right) in Industry

Although the volume of freight traffic decreased slightly in 2018, the volume of road traffic continued to grow, and its share in freight turnover reached 20%. The increase in passenger traffic was mainly due to the growth of air traffic, primarily due to the introduction of visa-free travel between Ukraine and the EU, increased market saturation and a corresponding drop in ticket prices. Passenger turnover of air transport reached a record 26 billion passenger-kilometers for Ukraine and was almost equal to rail transport. Under these conditions, the reduction of the estimated energy intensity of road traffic by 7-11% led to a reduction of the total energy intensity of the Transport sector with constant volumes of final energy consumption (Fig. 4).

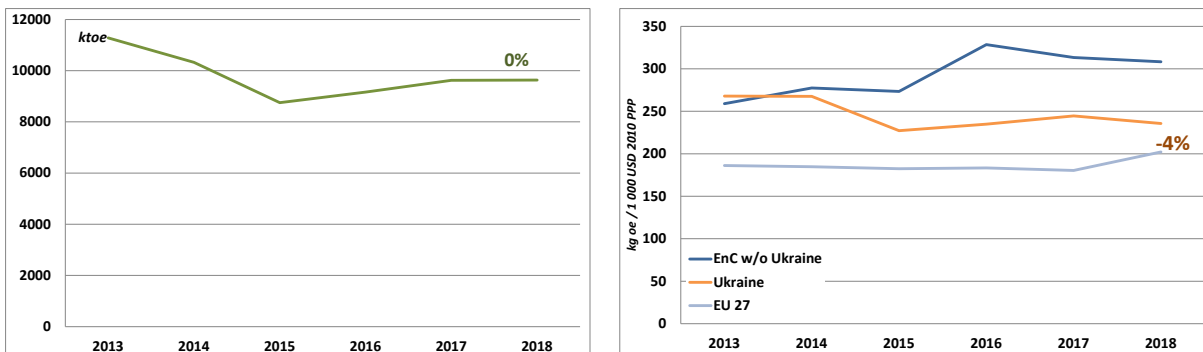


Fig. 4. Final energy consumption (left) and energy intensity (right) in Transport

The commercial sector is a clear example of market-driven rationalization of the structure of final energy consumption: since 2015, the share of natural gas has increased from 5% to 20%, replacing the centralized supply of electricity and heat by 15%. With relatively stable consumption, the main factor in changing the energy intensity is productivity - in 2018 the value added of the services sector increased by 4%, which determined the dynamics of indicators (Fig. 5). Although there are still no sufficient mechanisms for monitoring energy efficiency in the buildings sector, it can be indirectly assumed that energy efficiency policy is beginning to determine the nature of energy consumption in this sector.

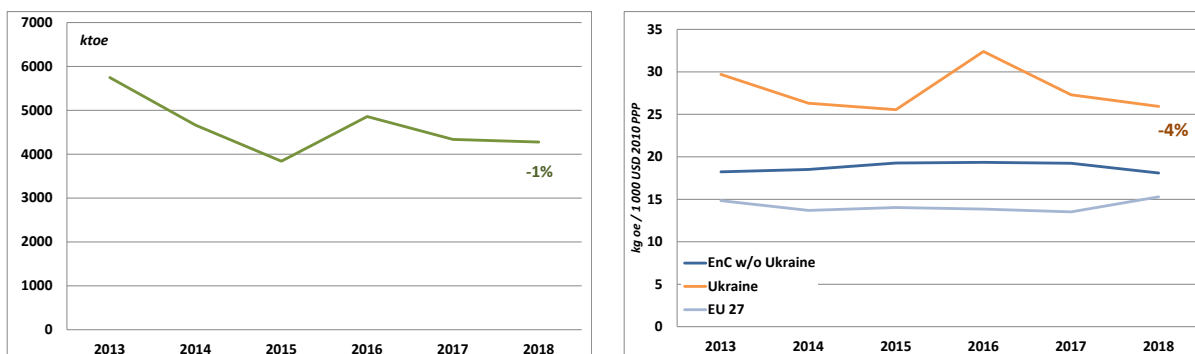


Fig. 5. Final energy consumption (left) and energy intensity (right) in Commercial and Public sector

Production of the main types of livestock in 2018 remained at the level of the previous year, while for crop production, 2018 was quite successful: with an increase in crop areas by about 1% grain harvest increased by 7%, sunflower - by 16%, soy - by 14%, rapeseed - by 25%. At the same time, the growth of final energy consumption due to increased demand for diesel fuel did not affect the energy intensity of production (Fig. 6).

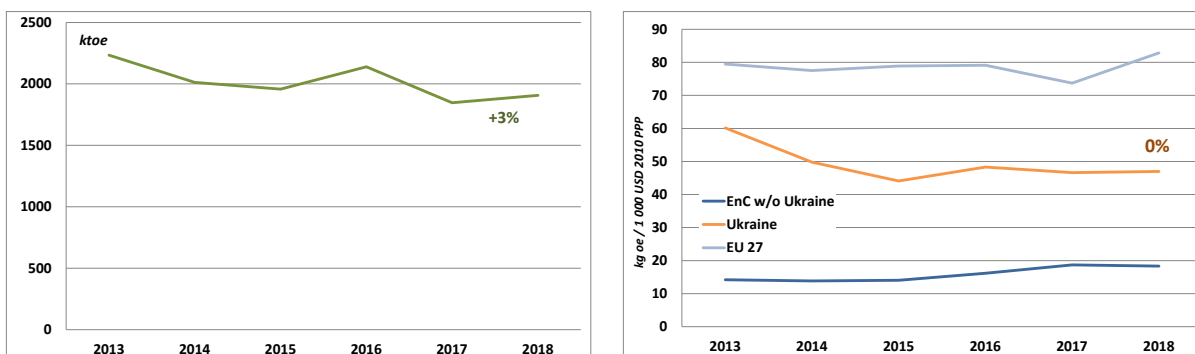


Fig. 6. Final energy consumption (left) and energy intensity (right) in Agriculture.

As expected, the Residential sector continued to reduce energy consumption in response to the preservation of market prices and the gradual reduction of energy subsidies - their share in the structure of total household resources decreased from 4.7% to 2.8%. New historically lowest level of unit energy consumption of about 16.3 kg oe per square meter of heating space in residential buildings observed in 2018 was now almost identical to the EU27 average (Fig. 7). We expect the current trend to continue, even with the accelerating pace of residential construction and the growth of the housing stock.

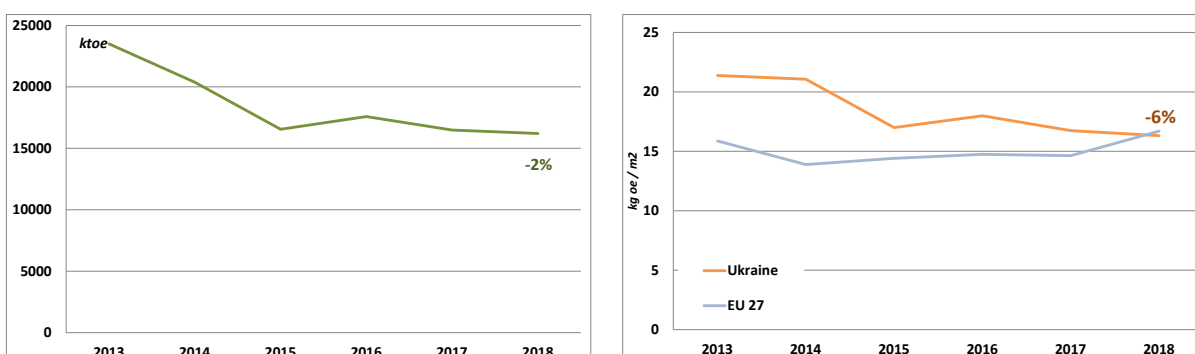


Fig. 7. Final energy consumption (left) and energy intensity (right) in Residential sector

C. National energy efficiency targets

Table 2: Division of targets per sectors and per EED articles

TARGETS	2018	2019	2020	2021	2025	2030
EED ARTICLE 3 [ktoe or other unit]						
EED ARTICLE 5 [ktoe or other unit]						
EED ARTICLE 7 [ktoe or other unit]	652 ³	978 ³	1 304 ³			
PEC [ktoe]			101 316 ²	88 983 ⁴	90 820 ⁴	91 468 ⁴
FEC [ktoe]			55 507 ²	49 253 ⁴	50 518 ⁴	50 446 ⁴
FEC - BUILDINGS <i>Residential Sector Commercial and public services</i> [ktoe]			4 267 ¹ 3 226 ¹ 1 041 ¹			
FEC - INDUSTRY [ktoe]			1 610 ¹			
FEC - TRANSPORT [ktoe]			624 ¹			

¹ Cumulative savings for 2016-2020, First National Energy Efficiency Action Plan

² Absolute targets, Resolution of the Cabinet of Ministers of Ukraine on August 14, 2019 No. 607-p

³ Absolute targets, EnC study on EED targets for Ukraine

⁴ Absolute targets, Daft Second National energy efficiency action plan till 2030

D. Update of measures implemented in last year

• Legislative measures

After preparation of the 3rd annual report the following important regulatory document were adopted.

Regulations directly related to the energy efficiency

- **State Strategy for the Regional Development for 2021-2027**, adopted by the resolution of the Cabinet of Ministers of Ukraine on August 5, 2020 №695
<https://zakon.rada.gov.ua/laws/show/695-2020-%D0%BF>
- **Order “On approval of the Concept for the implementation of state policy in the field of energy efficiency of buildings in terms of increasing the number of buildings with nearly zero energy consumption and approval of the National Plan to increase the number of buildings with nearly zero energy consumption”**, adopted by the Cabinet of Ministers of Ukraine on January 29, 2020 №88
<https://zakon.rada.gov.ua/laws/show/88-2020-%D1%80#Text>

- **Resolution “On approval of the Technical regulation on ecodesign requirements for space heaters and combined heaters”**, adopted by the Cabinet of Ministers of Ukraine on December 27, 2019 №1184
[“https://www.kmu.gov.ua/npas/pro-zatverdzhennya-tehnichnogo-regla-a1184](https://www.kmu.gov.ua/npas/pro-zatverdzhennya-tehnichnogo-regla-a1184)

Regulations non-directly related to the energy efficiency

- **Resolution “On Amendments to the Regulations on Imposing Specific Duties on Natural Gas Market Participants to Meet General Public Interests in Course of Natural Gas Market Performance”**, adopted by the Cabinet of Ministers of Ukraine on July 01, 2020 №542, that launches the retail market for natural gas supply and creates incentives to change the behavior of natural gas consumption by households through the implementation of energy efficiency measures
<https://www.kmu.gov.ua/npas/pro-vnesennya-zmin-do-polozhennya-pro-pokladennya-specialnih-obovyazkiv-na-subyektiv-rinku-prirodnogo-gazu-dlya-zabezpechennya-zagalnosuspilnih-interesiv-u-procesi-i010720-542>
- **Order “On approval of the List of activities, which are a part of maintenance service of internal systems of gas supply in residential buildings”**, adopted by the Ministry of Energy and Environmental Protection of Ukraine of May 27, 2020 №342, which regulates the maintenance of internal gas supply systems in residential buildings, responsibility for their state and creates incentives to reduce losses in the gas supply system
http://search.ligazakon.ua/l_doc2.nsf/link1/RE34987.html
- **Law of Ukraine "On amendments to some legislative acts of Ukraine to simplify investment attraction and introduction of new financial instruments"**, adopted by the Parliament on June 19, 2020 №738-IX, which introduces green bonds as a separate subspecies of securities and establishes rules for market participants
<https://zakon.rada.gov.ua/laws/show/738-IX#Text>
- **Law of Ukraine “On verification and monitoring of public payments”**, adopted by the Parliament on December 03, 2019 №324-IX, which increases the targeting of public payments, contributes to the development of the social security system, as well as ensures the efficient use of budget funds, which in the future subsidizers can invest in energy efficiency measures
<https://zakon.rada.gov.ua/laws/show/324-20#Text>
- **Resolution “On Amendments to the Resolutions of the Cabinet of Ministers of Ukraine of October 21 1995 №848 and July 27 1998 №1156”**, adopted by the Cabinet of Ministers of Ukraine on October 20, 2019 №878 on simplification of conditions for assigning housing subsidies to family-type children’s homes, military

personnel, married citizens over 60 years of age, which updates the mechanisms for calculating subsidies in cash for vulnerable consumers

https://www.kmu.gov.ua/npas/pro-vnesennya-zmin-do-postanov-m878kabinetu-ministriv-ukrayini-vid-21-zhovtnya-1995-r-848-i-vid-27-lipnya-1998-r-1156?fbclid=IwAR2OEw1j7aOhY_OfdTnCM2-7_Zzfv4vOGSXW5mbcVlhpeG35wQnhakUfEww

- **Resolution “On approval of Amendments to the Order of control over observance by licensees, operating in the fields of energy and utilities, of the legislation in the corresponding spheres and license conditions”**, adopted by the National Commission for state regulation in the energy and utilities on September 13, 2019 №1952, according to which the monitoring of licensees, engaged in economic activities in the fields of energy, utilities, and the procedure for resolving disputes between consumers and suppliers are regulated
<https://zakon.rada.gov.ua/laws/show/v1952874-19#Text>
- **Resolution “On Amendments and Repeal of Certain Resolutions of the Cabinet of Ministers of Ukraine”**, adopted by the Cabinet of Ministers of Ukraine on August 14, 2019 №807, which provides a mechanism for the use of funds for the payment of benefits and subsidies to citizens to pay for housing and utilities in cash, the conditions and the procedure for providing citizens with such housing subsidies.
http://search.ligazakon.ua/l_doc2.nsf/link1/KP190807.html

In September the interservice consultations with Ministries on draft Energy Efficiency Law were renewed. The final version of the draft in general meets the latest comment of Energy Community Secretariat and local experts and stakeholders. EED NEEAP-2030 were developed with assistance of EU4Energy Governance project and submitted to the ministries. The document also includes the 2030 energy efficiency targets mentioned in section C of this Report.

- **Non-legislative measures**

Certification of buildings, energy audit, energy management and training. The State Agency on Energy Efficiency and Energy Saving of Ukraine (SAEE) takes measures to train relevant professional staff to introduce the market in the field of energy efficiency and to increase the capacity of market participants to apply energy efficiency measures. In order to support the implementation of Article 8 «Energy audits and energy management systems» of the Directive 2012/27/EU on energy efficiency, with the support of the GIZ Project "Energy Efficiency Reforms in Ukraine", for the reporting period was developed:

- Energy Manager's Guide: How to reduce energy consumption in government buildings;
- Recommendations on the procedure for auditing (monitoring) compliance with obligations for the implementation of energy management systems in companies;

- Proposals for the development of requirements for qualification of employees, engaged in energy audits. This requirements will serve as a basis for the formation of professional qualifications of these employees in accordance with the National Qualifications Framework;
- Proposals to the Procedure for certification of qualification of employees, who intend to carry out energy audit activities;
- Draft of the Sectoral Qualifications Framework in the field of energy audit;
- Draft of the Professional Standard "Energy Auditor";
- Draft of the Professional (Certification) Program "Energy Audit";
- Conceptual proposals for professional development and activities of energy auditors;
- Minimum criteria for educational and professional training programs for energy auditors and energy managers have been prepared as a basis for the formation of educational (certification) training programs for energy auditors based on the professional standard and sectoral qualifications framework for energy auditors.

For 2020, there are 43 qualification commissions in higher education institutions and self-regulatory organizations that carry out professional certification in the field of energy audit of buildings. Also special training programs in the areas of "Certification of energy efficiency of buildings" and "Inspection of engineering systems of buildings" have been approved in 30 institutions of higher education. As of 2020, 2300 qualification certificates were issued, in particular:

- 1306 on certification of energy efficiency of buildings;
- 994 on inspection of engineering systems.

Moreover, with the support of the GIZ Project "Energy Efficiency Reforms in Ukraine", three centers in the field of energy efficiency were established: Energy Innovation Hubs at institutions of higher education in the cities of Chernivtsi, Dnipro and Kharkiv (Kharkiv O. Beketov National University of Municipal Economy, Chernivtsi Y. Fedkovych National University and Prydniprovaska State Academy of Civil Engineering and Architecture with relevant agreements entered into), which will become a platform for cooperation between representatives of secondary schools, vocational schools, universities and business. The purpose is to create educational space at Universities for implementation of initiatives in the field of energy efficiency, also to develop educational materials on energy efficiency for secondary schools, vocational schools and universities based on best international practices. Technical equipment for the Energy Innovation Hubs was purchased transferred to and installed at the respective universities.

Materials developed for educational institutions:

- Methodical and didactic materials on the topic "Energy efficiency and energy saving" have been developed and adapted as a crucial element of the bigger educational topic "Environmental safety and sustainable development".
- Five innovative educational technologies and tools have been developed and implemented: Mobile Application "Climate Drops", Energy Modeling Technology "SMART ENERGY", Building Typology for Ukraine, Building Renovation Logbook

- Six interactive training courses and modules have been developed with the focus on energy efficient technologies. European and national experts were involved. For example – 4 courses for vocational institutions: "Flat roof insulation", "Installation of windows", "Thermal modernization of building facades", "Thermal insulation of pipes". Taking into account the competency approach Certification programs have been developed for the modules in accordance with the requirements of drawing up training work programs; 1 for technical universities "Supervision of construction works" involving European architects. The working curriculum for the course has been created within the framework of the master level education; 1 module "Fundamentals of energy efficiency of buildings" for integration into any technical course
- The Study "Gender aspect of professions in the field of energy efficiency" was conducted; "Gender aspect and motivation to receive vocational education".
- 20-page energy efficiency information booklet has been developed for school students.
- Demonstration training model "Energy efficient city-GREEN PARK" based on six types of buildings in Ukraine has been developed.

Since August 2020, mandatory energy certification of buildings has been introduced in Ukraine. The database has already included 4536 energy efficiency certificates for buildings.

All energy certificates that have been submitted to the Certificate Database passed the initial verification and were distributed according to the level of reliability and functional purpose of the building, in particular:

- 2027 residential buildings;
- 731 public buildings;
- 803 educational institutions;
- 475 hospitals;
- 286 kindergartens;
- 195 trade enterprises;
- 19 hotels.

As of August 27, 2020, according to the Independent Monitoring (Verification), which was carried out on the 120 energy certificates:

- 85 energy certificates – do not meet the requirements of the legislation.
- 35 energy certificates – successfully passed verification

In the residential sector, the "Warm Loans" program continues to be implemented. Since the beginning of the Program, namely from October 2014 to mid-2020, 838 thousand households have become its participants, which have attracted more than UAH 8.5 bln for energy efficiency measures, of which about UAH 3.2 bln has been reimbursed by the Government. The annual energy savings of the program participants in natural gas equivalent are estimated at 439.2 million cubic meters.

The budget for 2020 provides UAH 400 mln for warm loans. The distribution of funds is planned in the following areas:

- UAH 200 million for house insulation for individuals;
- UAH 8 million for “non-gas” boilers for individuals;
- UAH 190 million for the needs of condominiums for energy efficiency measures.

At the same time, over the 8 months of 2020 banks issued more than UAH 1.0 bln of "warm loans", in particular: UAH 589.8 million for insulation of private houses; almost UAH 333.7 mln were allocated for condominiums; about UAH 21.1 mln were granted to cheapen the purchase of solid fuel boilers.

Since 2016, SAEЕ has been conducting an annual evaluation of the effectiveness and efficiency of warm loans. The assessment is based on a specially developed scientifically based methodology. This unique methodology makes it possible to study the impact of energy efficiency measures on energy consumption in subsequent heating periods, taking into account various factors, namely - temperature regimes of heating seasons, household income and more. This cannot be traced if energy audits are conducted before and after the events.

Thus, the generalized data of the conducted assessments show that the program of warm credits allows to save on the average annually 20% of heat energy in condominiums and 30% of natural gas in households.

The latest estimate shows that 99.9% of condominium borrowers are satisfied with it, 57% said they have used it more than twice, and 88% plan to use the program again. Among households, 99% are satisfied with the program and 96% plan to take a loan again. Evaluation link: https://sae.gov.ua/sites/default/files/Otsinka_TK_15_06_2020.pdf

This indicates both the public's trust in the program and its effectiveness. The program of warm loans allows both to save energy consumption, and promotes increase of comfort in houses.

Concept of the new 5-year energy efficiency Programme is drafted and is under approval procedure. Simultaneously the prolongation of the state support for households for the next year (2021) is prepared and submitted to the Government.

Energy efficiency awareness campaigns. Activity of the “Energy Innovation Hubs” includes signing of memoranda of cooperation between energy innovation hubs and leading business companies. Also 4 founding conferences were held and various online events such as "Hub Opening", "Jobs Fair", "Energy Days".

In cooperation with the GIZ Project "Energy Efficiency Reforms in Ukraine", various social studies in the field of energy efficiency were conducted: "Study of job creation in the fields of energy efficiency and renewable energy in Ukraine", "Opinions and views of the people of Ukraine on energy efficiency and energy saving", "Opinions and views of Ukrainian

business representatives on energy efficiency and energy saving", "Estimate of the effectiveness of the state program" warm loans".

To strengthen the cooperation between industrial enterprises, in collaboration with the Ministry of Economy, Learning Energy Efficiency Network – LEEN was introduced in Ukraine. In such a network, companies work together on a partnership basis to learn from each other and achieve agreed energy saving goals. In addition, they agree on common energy efficiency goals. Two networks have already signed their commitments: by the end of 2020, the 24 companies involved want to save 10,500 MWh of energy and reduce CO₂ emissions by 61010 tons.

Metering. Currently, residential buildings do not provide 100% metering for utilities, despite the requirements of the Law of Ukraine "On Commercial Metering for Heat and Water Supply". According to the State Agency on Energy Efficiency and Energy Saving, in Ukraine buildings are equipped with:

- heat meters –81.5% of residential and 81.6% of non-residential buildings;
- cold water meters – more than 74.5% of residential and 95.2% of non-residential buildings;
- hot water meters –16.9% of residential and 54.2% of non-residential buildings.

The Ministry of Regional Development is working on the possibility of amending the legislation and receiving funds from the state budget to finance the installation of commercial metering units in those buildings where they are absent. Thus, a detailed analysis of the situation with commercial metering units for heat and hot water in each region of Ukraine is carried out and the need for funds for their installation during 2020-2021 is determined.

Energy service market and Energy Performance Contracts. Due to a large-scale information campaign by the authorities and the creation of the necessary tools for implementation, the energy service market continues to grow. According to SAEE as of September 2020, the ESCO budget mechanism is being implemented in 21 regions and 511 EPC contracts have been concluded for a total amount of contracts exceeding UAH 1.1 bln.

On average EPCs concluded for 7.5 years with average energy savings at the level of 24%.

At the moment SAEE completed the verification of around 242 EPCs (48% of the total amount) that passed the heating period of 2019/2020. The results of the verification show that 36 cities from 20 regions saved during the heating period 2019/2020 4.3 million m³ of natural gas or 60 million UAH.

The average energy savings for the heating period 2019-2020 were about 35%. Similar figures were demonstrated by the results of the previous verification of ESCOs (conducted in 2019). The analysis of savings indicators showed that 87% of EPCs (211) reached or exceeded the planned indicators of energy savings in the heating period 2019/2020. In particular, under 153 contracts the actual savings are 2 times greater than planned, under the remaining 58 contracts the fact is equal to the plan.

At the moment 85% of EPCs are implemented in cities. The city of Kyiv is the leader in the number of EPCs and implements 2 times more contracts than the nearest city in the ranking (Odesa). More than 90% of EPCs are implemented in educational institutions (schools and kindergartens).

SAEE with Ministry of Energy prepared further legislative changes to remove barriers for EPC development. These amendments include extension of ESCO-model for energy efficiency measures in district heating, water supply and other sectors and subsectors consuming energy.

Eco-design and energy labeling. In 2020, as part of the implementation of Directive 2010/30/EU, a technical regulation, concerning the labeling of space heaters, combined heaters, sets of space heaters, thermostats and solar equipment and sets of combined heaters, thermostats and solar equipment, was finally adopted and implemented.

In general, within the framework of Ukraine's international obligations, SAEE have developed 40 technical regulations, of which 23 are technical regulations on eco-design and 17 on energy labeling.

Energy efficiency in industry. The Ministry of Energy of Ukraine together with the State Agency on Energy Efficiency and Energy Saving, the Ukrainian-Danish Energy Center and other partners have developed a draft Law of Ukraine, which provides for amendments to the Budget Code of Ukraine to ensure a guaranteed source of funding for energy modernization of Ukrainian enterprises. Draft Law provides for the introduction of a mechanism for the use of CO₂ tax funds as a source of co-financing of energy efficiency measures at enterprises. To implement this initiative, it is proposed to create within a state budget the State Fund for Energy Efficient Modernization of Enterprises, which can:

- accumulate revenues from the CO₂ tax, which is about UAH 900 mln, which currently have no purpose and go annually to the general fund of the state budget;
- use the abovementioned revenues to provide enterprises with compensation for part of loans for the purchase of energy efficient equipment.

Programs of central authorities in the field of energy efficiency measures. In order to ensure the implementation of Directive 2012/27/EU on energy efficiency in the framework of the Energy Community Treaty ratified by the Law of Ukraine of December 15, 2010, N 2787-VI "On Ratification of the Protocol of Accession of Ukraine to the Energy Community Treaty" and in cooperation with the Eastern Partnership Assistance Division of the Energy Community Secretariat, a working group was formed and work began on a new National Energy Efficiency Action Plan for the period up to 2030. At the time of writing of the 4th Annual Report there was no officially approved National Energy Efficiency Action Plan until 2030, but a draft version has been developed and is pending approval by the central authorities.

At the beginning of 2020, the Government approved the Concept for the implementation of state policy in the field of energy efficiency of buildings in terms of increasing the number of buildings with nearly zero energy consumption and the National

Plan to increase the number of such buildings. The plan envisages measures aimed at stimulating developers and building owners to move to the construction of new and reconstruction of existing buildings in compliance with high energy efficiency standards during 2020-2030 - buildings with nearly zero energy consumption (ZECB). The Concept identified the main barriers that prevent the construction of buildings with nearly zero energy consumption and the direction of state policy to eliminate them.

At the end of 2019, the Ministry for Communities and Territories Development presented the ministry's action plan for 2019-2024. According to this document, the Ministry of Regional Development plans to develop a Strategy for thermal modernization of buildings by the end of 2020. This strategy should cover both residential and public buildings. At the same time, at the time of the release of the 4th annual report, the Strategy has not yet been adopted and has not been submitted for public discussion.

E. Central Government buildings (Article 5)

Specific target(s) with regard to Article 5 EED are not defined.

For the last 3.5 years, thanks to the implementation of SAEE measures, the number of local authorities, where energy management / energy monitoring systems were introduced, has increased almost 4 times (from 60 in 2017 to 223 in 2020).

Thus, energy management / energy monitoring systems are currently implemented in 223 local authorities (84 cities, 15 regions (at the level of regional facilities), 69 districts and 55 amalgamated territorial communities) and are being developed in 77 more (7 regions, 25 districts, 66 ATCs and 17 cities).

Ministry for Communities and Territories Development of Ukraine with the support of GIZ Project "Energy Efficiency Reforms in Ukraine" launched a pilot project to automate databases of energy and performance characteristics of buildings in 12 regional state administrations of Ukraine. The database includes those buildings that are maintained at the expense of the regional budget. Based on the results of cooperation between the Ministry for Communities and Territories Development, pilot regional state administrations and technical experts of the GIZ Project, a database of energy and operational characteristics of buildings has been formed. Local responsible persons were given the opportunity to receive relevant training from the GIZ Project and then apply knowledge during the formation of buildings database, it also helps to track the energy consumption of buildings. Today the database includes 6293 objects from 408 settlements according to the lists provided by the regional state administrations. The Ministry for Communities and Territories Development is working out mechanisms to improve the building database, to expand the coverage of public buildings, to add new categories.

In addition, with the support of the GIZ Project "Energy Efficiency Reforms in Ukraine" the following documents were developed to support the implementation of Article 5 for the reporting period:

- Support of the development of the Draft Law of Ukraine “On Energy Efficiency”, analysis of its regulatory impact, expert discussion of the Draft Law (12.2019);
- White Book on implementation of Article 5: Exemplary role of public bodies' buildings of Directive 2012/27/EU;
- Draft Strategy for thermal renovation of the central government buildings (as an integral part of the Strategy for thermal modernization of buildings - MinRegion is the main developer, currently under development);
- Comprehensive analysis of approaches to data collection for the formation of the database on energy performance of buildings;
- Analysis of automated energy monitoring information systems implemented in Ukraine;
- Analysis of best practices for the renovation of CEB buildings in European countries;
- Recommendations on the procedure for creating and maintaining the database of energy data of buildings in accordance with Directive 2012/27/EU
- Methodological Recommendations on the introduction of the form for preparing reports on improving the energy performance of CEB buildings
- Methodology of installing solar power plants on CEB buildings in Ukraine.

The following was conducted to support practical implementation of Article 5 of Directive 2012/27/EU with the support of GIZ Project “Energy Efficiency Reforms in Ukraine” technical study and report on «Financing low-cost measures in the buildings of the Central Executive Bodies (CEBs)» and support of the development of measures and preparation of budget requests. The report provides practical recommendations for the list of low-cost energy efficiency measures in the CEB buildings (State Regulatory Service of Ukraine, State Service of Ukraine on Medicines and Drugs Control, State Agency for Forestry Resources, Ministry of Environment and Energy, State Commission for Regulation of the Markets of Financial Services, Cabinet of Ministers of Ukraine, State Agency for Energy Efficiency and Energy Saving, State Committee for Television and Radio, Ministry of Economy, Ministry of Foreign Affairs, Ministry of Social Policy, Ministry of Finance, MinRegion), recommendations for resolving the problem of their financing. For the budget planning purposes, CEBs developed budget requests with the Project’s support in order to provide for the funds in the State Budget of Ukraine for the year 2020 to implement the proposed low-cost energy efficiency measures in specific buildings.

With the support of the GIZ Project "Energy Efficiency Reforms in Ukraine", the principles of the new state policy in the field of energy efficiency of buildings have been incorporated in the draft Strategy for thermal modernization of buildings (in part of central government buildings) (main developer - Ministry for Communities and Territories Development). In addition, in order to support the development, for the first time in Ukraine, the accurate data on energy consumption of public buildings were obtained. It will help with further implementation of the Strategy of thermal modernization of buildings.

F. Energy efficiency obligations (Article 7)

Ukraine has not introduced an EEO scheme yet, in the meantime alternative measures are going to be implemented according to Article 7(9) EED, such as operation of the Energy Efficiency Fund as it is provided by the draft Law on Energy Efficiency. Despite the lengthy process of drafting the Law, it has not yet been adopted.

Today the share capital of the Fund is fully formed in accordance with the resolution of the Cabinet of Ministers of Ukraine №1099 of December 20, 2017 (as amended in accordance with the resolutions of the Cabinet of Ministers №665 from 26.07.2018, №29 from 16.01.2019, №921 from 06.11.2019) and the Law "On amendments to the Law of Ukraine "On the State Budget of Ukraine for 2020" dated 13.04.2020. It amounts to UAH 2,719,329,220.00.

Since the beginning of 2019, the pilot program of the Energy Efficiency Fund "First Swallows" has been operating, within which 15 condominiums were selected to implement EE measures. As of July 6, 2020, only 10 condominiums continued to operate in the program. The total cost of projects for 6 condominiums, which have already completed its modernization, amounted to UAH 10.208 million, and the total amount of grants - UAH 5.953 million. Another 4 condominiums are pending approval to begin modernization.

In accordance with the Law of Ukraine "On the Energy Efficiency Fund", dated June 8, 2017 (No. 2095-VIII), the State Institution "Energy Efficiency Fund" has developed a Program of partial reimbursement of energy efficiency measures in apartment buildings – "Energodim" (hereinafter - the Program) which determines the conditions and procedure for providing grants to beneficiaries to partially reimburse costs related to the implementation of energy efficiency measures.

The program was approved by the Supervisory Board of the Fund on August 16, 2019 and is valid until December 31, 2023 throughout Ukraine, except for the temporarily occupied territories. Together with the Program, the Supervisory Board approved the Fund's Strategy and other documents necessary for the launch of the Program "Energodim" and on September 3, 2019, the Program was officially launched.

On August 21, 2019, the Energy Efficiency Fund and JSB "UkrGasbank" signed an agreement on cooperation in the implementation of the Energy Supply Modernization Support Program "Energodim". Later, on June 24, 2020, JSC "Kredobank" also signed a financial partnership agreement with the Fund.

In November 2019 the share capital of the Energy Efficiency Fund was increased from 1 billion 600 million UAH to 2 billion 719.3 million UAH. The relevant Resolution "On increasing the share capital of the state institution "Energy Efficiency Fund" and amending the Resolution of the Cabinet of Ministers of Ukraine of December 20, 2017 № 1099" was adopted by the Cabinet of Ministers of Ukraine on January 30, 2019 (No. 63).

In 2020, the Program underwent some changes:

- starting from February 18, 2020, the procedures for submitting applications and their consideration were significantly simplified;
- on April 21, 2020, significant changes were made to the grant policy and procedures, which reduced the financial burden on condominiums and helped optimize payment processes for works and services of the house energy modernization project;
- on July 30, 2020, in addition to further simplifications of the procedure of interaction between condominiums and the Fund new amendments created completely new opportunities for quality management of energy modernization projects (updates came into force on August 4, 2020).

Over the first year of the program, starting from September 3, 2019 to August 25, 2020, the Energy Efficiency Fund received 178 applications from all over Ukraine (of which 100 have already been approved). The estimated cost of the projects exceeded UAH 1 bln. In total, more than 16.5 thousand families are already involved in energy modernization projects.

Also, Energy Efficiency Fund actively involves cities and regional territorial communities from all over Ukraine in the partnership deals. As of August 20, 2020, more than 90 Memorandum of Cooperation have been signed between the Fund and municipalities. In addition, the specialists of the Energy Efficiency Fund help to change and improve local programs that provide support to condominiums that carry out energy modernization of their buildings. Currently, 14 local programs to support condominiums participating in the Program “Energodim” have been approved by deputies of the respective councils and another 22 local programs are pending approval.