

Second Annual Report under the Energy Efficiency Directive

UKRAINE

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

November 2018

This report was drawn up by State Agency on Energy Efficiency and Energy Saving of Ukraine (SAEE) in accordance with the decision of the Cabinet of Ministers of Ukraine No.733-p on August 3, 2011 (amended) transposing Directive 2012/27/EU on Energy Efficiency (Energy Efficiency Directive, EED).

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 the reasons for increase in energy consumption by sector that occurred in 2016, presents energy efficiency targets which Ukraine has established (drafted) 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.

A. Key statistics and indicators

Table 1: Key energy statistics data.

	Estimation of key statistics and indicators	Value		Unit	Comments/Eurostat code
		2015	2016		
(i)	Primary energy consumption	86 772	88 748	ktoe	As defined in Art. 2 EED and consistent with B_100910 definition, IEA approach
(ii)	Total final energy consumption	47 513	48 735	ktoe	Consistent with B_101700 definition, IEA approach
(iii)	Final Energy consumption – Industry	16 409*	14 955	ktoe	Consistent with B_101800 definition, IEA approach
(iii)	Final energy consumption – Transport	8 750	9 165	ktoe	Consistent with B_101900 definition, IEA approach
	Final energy consumption in pipeline transport	1 582	1 410	ktoe	Consistent with B_101945 definition, IEA approach
(iii)	Final energy consumption – Households	16 554	17 586	ktoe	Consistent with B_102010 definition, IEA approach
(iii)	Final energy consumption – Services	3 838	4 856	ktoe	Consistent with B_102035 definition, IEA approach
	Final energy consumption – Agriculture	1 957	2 136	ktoe	Consistent with B_102030 definition, IEA approach
	Final energy consumption – Other sectors	22 353	24 616	ktoe	Consistent with B_102000 definition, IEA approach
(iv)	Gross value added by sector – Industry	432 070	552 889	mIn UAH	Sections B to F of NACE Rev. 2
(iv)	Gross value added by sector – Services	1 017 511	1 190 638	mIn UAH	Sections G to U of NACE Rev. 2
(v)	Disposable income of households	1 330 089	1 526 691	mIn UAH	
(vi)	Gross domestic product (GDP)	1 988 544	2 385 367	mIn UAH	ESA 2010
(vii)	Electricity generation from thermal power plants	155 150	153 824	mIn kWh	Consistent with definitions 15_107030, 15_107031, 15_107032, 15_107033, 15_107038, 15_107048, 15_107054, 15_107039, 15_107049, 15_107055, 14_1070422, 15_107040, 15_107050, 15_107052, 15_107056, 15_107041, 15_107051, 15_107053, 15_107057, 14_1070432

	Estimation of key statistics and indicators	Value		Unit	Comments/Eurostat code
		2015	2016		
(viii)	Electricity generation from combined heat and power	12 339	15 992	mIn kWh	Consistent with definitions 15_107031, 15_107033, 15_107039, 15_107049, 15_107055, 15_107041, 15_107051, 15_107053, 15_107057
(ix)	Heat generation from thermal power generation	90 334	106 890	thousand Gcal	Consistent with definitions 15_107060, 15_107061, 15_107062, 15_107063, 15_107064, 15_107072, 15_107076, 15_107080, 15_107086, 15_107068, 15_107066, 15_107074, 15_107078, 15_107082, 15_107084, 15_107088, 15_107070, 15_107065, 15_107069, 15_107073, 15_107077, 15_107081, 15_107087, 15_107067, 15_107071, 15_107075, 15_107079, 15_107083, 15_107085, 15_107089
(x)	Heat generation from combined heat and power plants, incl. industrial waste heat	36 945	36 610	thousand Gcal	Consistent with definitions 15_107060, 15_107062, 15_107064, 15_107072, 15_107076, 15_107080, 15_107086, 15_107068, 15_107066, 15_107074, 15_107078, 15_107082, 15_107084, 15_107088, 15_107070
(xi)	Fuel input for thermal power generation	48 796	50 003	ktoe	Consistent with definitions B_101002, B_101001, B_101009 excluding B_101017
(xii)	Passenger kilometres (pkm)	97 036 395,1	102 199 392,4	thousand pkm	
(xiii)	Tonne kilometres (tkm)	334 668 706,5	344 196 150,6	thousand tkm	
(xv)	Population	42 760,5	42 584,5	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

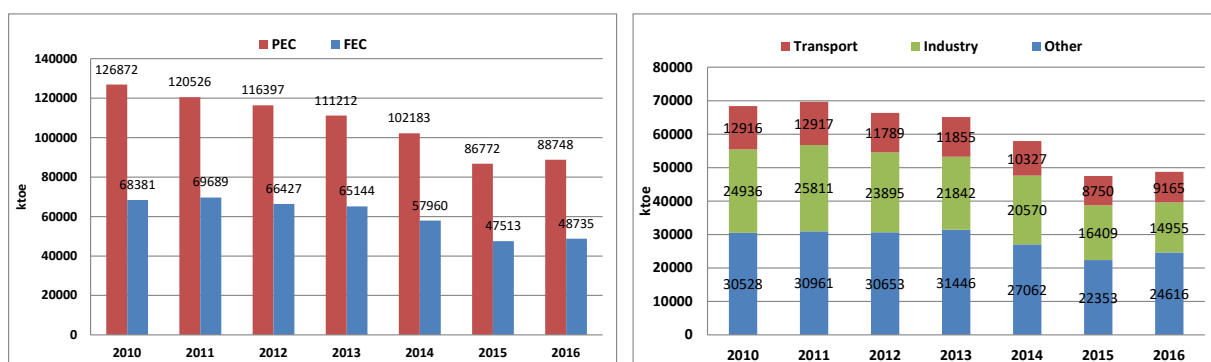


Fig. 1. Final and primary energy consumption (left) and final energy consumption by sectors (right) in 2010 – 2016.

In 2016 primary energy consumption in Ukraine has increased by 2.3%, and final energy consumption – by 2.6% (Fig. 1). Such increase took place for the first time since 2010 and should be considered through the lens of previous drop in energy consumption caused not only by implemented energy efficiency (EE) measures, but also various economic, climate and political factors. In particular, such factors include economic recession of 2013, occupation of Crimea peninsula and most of industrial zones in Donbas region and the following economic slump, restraints of energy supply provoked by the limited control of the Ukrainian Government over energy production on occupied territories, favorable meteorological conditions, energy price increases, etc. Thus increase in energy consumption observed in 2016 was mostly driven by the structural factor (Fig. 2), i.e. by the economic recovery, as well as by the normalization of energy supply to consumers that were previously constrained.

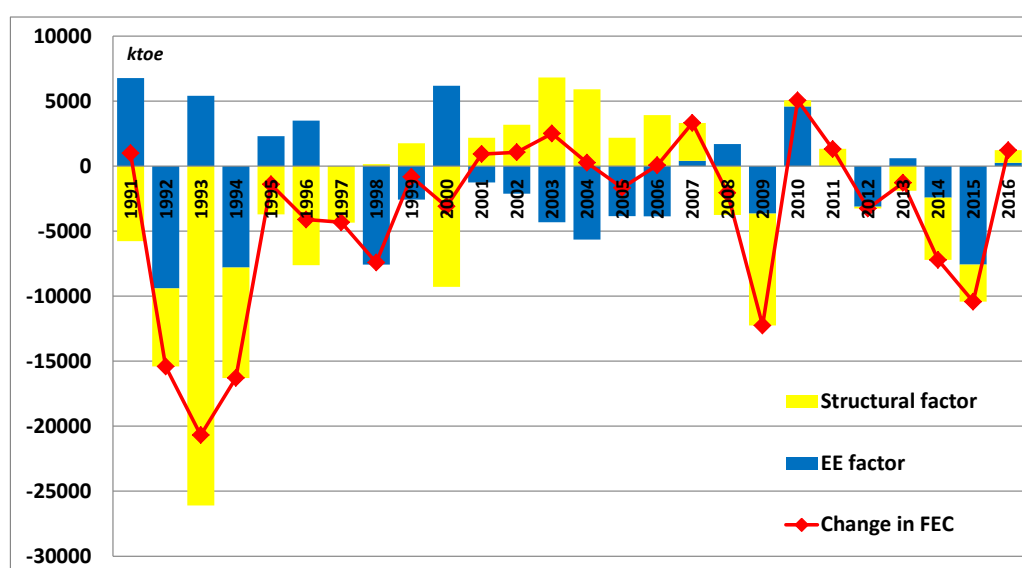


Fig. 2. Change in final energy consumption driven by structural and EE factors.

Although the overall GDP energy intensity changed insignificantly, energy intensity showed up variety of trends in different sectors. Industry turned to be the most adaptive sector with growing output in all sub-sectors (except Transport Equipment) and simultaneous reduction in energy use (except Chemical and Non-metallic minerals), as well as energy intensity of production. However Ukrainian Industry remains the most energy intensive in the region, and four times more intensive than the EU average (Fig. 3).

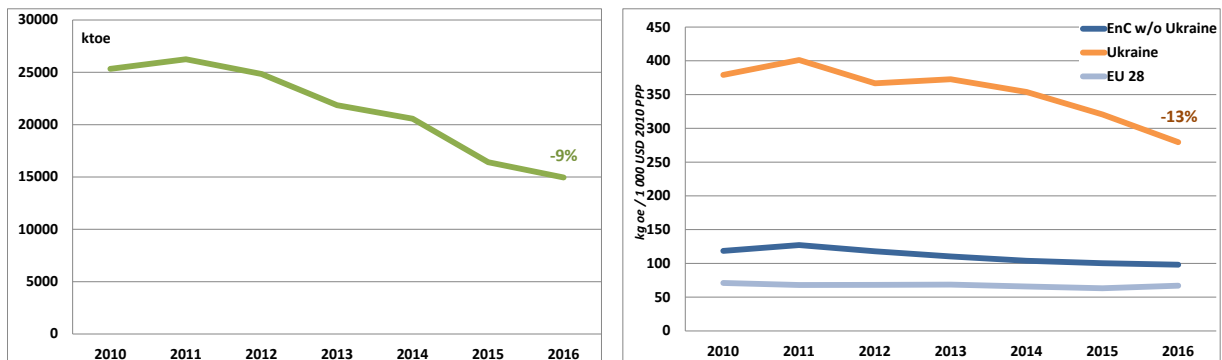


Fig. 3. Final energy consumption (left) and energy intensity (right) in Industry.

Military activities and social turbulence in Donbas region in the second half of 2016 led to the reallocation of freight and passenger traffic from the rail to more flexible, but less energy efficient road transport. Thus, even the cutback of energy consumption by other modes of transport did not compensate the increase in oil products' demand by road vehicles by 10%. This resulted in increase of the overall energy use and energy intensity in Transport (Fig. 4).

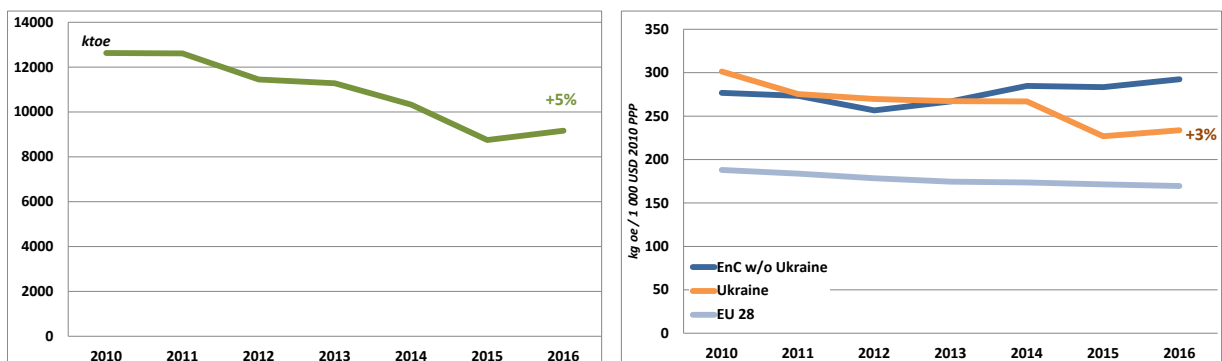


Fig. 4. Final energy consumption (left) and energy intensity (right) in Transport.

Energy supply to Commercial and Public sectors was administratively constrained over the heating period in 2015, so the highest relative increase of energy use occurred in these sectors in 2016 should be first of all considered as normalization of supply. Besides, the share of primary energy sources for space and water heating reached 20% that affected the level of energy intensity (Fig. 5).

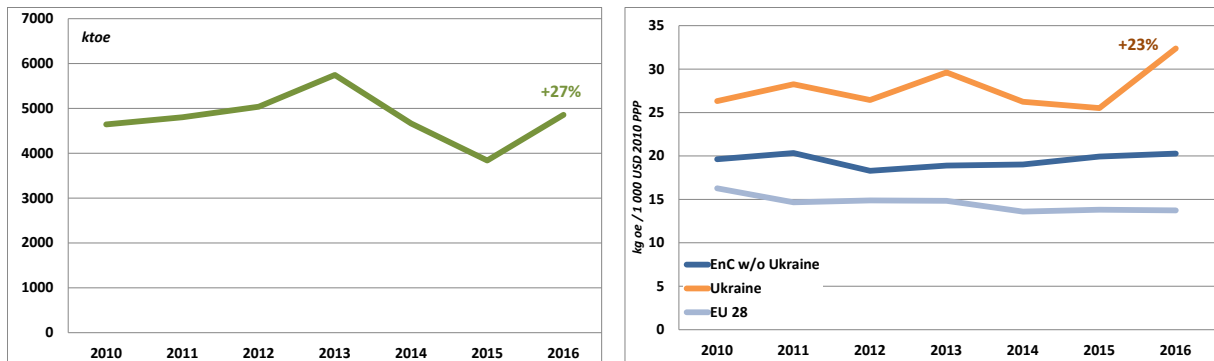


Fig. 5. Final energy consumption (left) and energy intensity (right) in Commercial and Public sector.

As agricultural output was modestly affected by external factors, energy consumption in Agriculture in 2016 reflected regional meteorological conditions rather than specific economic trends. Although as far as the hand labor and the share of households in sectoral production is consistently declining (since 2010 the share of households in agricultural production decreased from 52% to 43%), it could be expected that the energy intensity in Agriculture in Ukraine would approach the average EU level (Fig. 6).

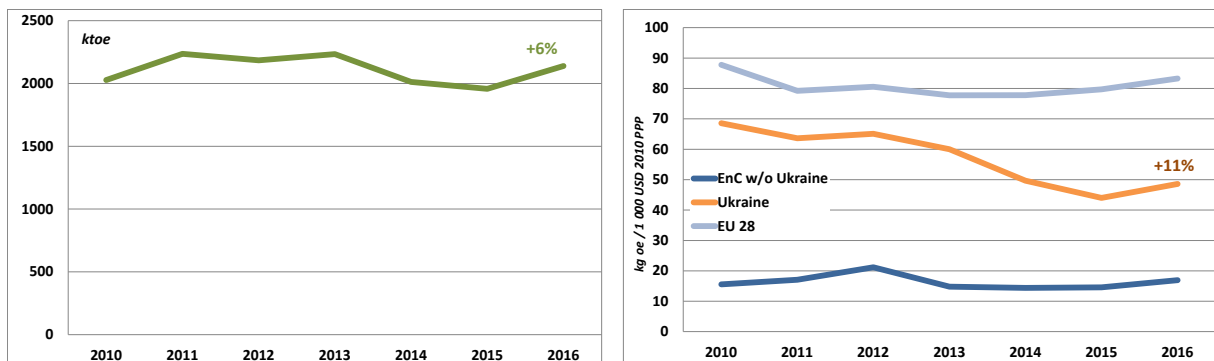


Fig. 6. Final energy consumption (left) and energy intensity (right) in Agriculture.

The effect of energy efficiency measures implemented by households following 1.5-3 times increase in energy prices during 2015-2016 was somewhat leveled out by the increase in heat consumption by 15% in 2016 (although being still far from pre-crisis levels) (Fig. 7). In the coming years two opposite tendencies will determine energy use in the Residential sector: renovation of residential buildings will take advantage of energy efficiency potential and should reduce the energy use per square meter (currently – 20% higher than the EU average), while the increase in living standards would increase energy use per person (currently – 26% lower than in the EU).

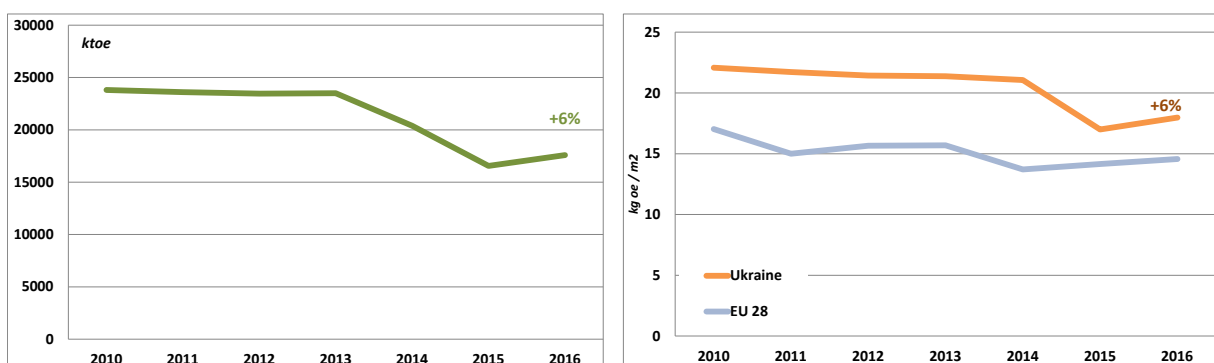


Fig. 7. Final energy consumption (left) and energy intensity (right) in Residential sector.

C. National energy efficiency targets

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

TARGETS	2016	2017	2018	2019	2020
EED ARTICLE 3 [ktoe or other unit]					
EED ARTICLE 5 [ktoe or other unit]					
EED ARTICLE 7 [ktoe or other unit]			652 ²	978 ²	1 304 ²
PEC [ktoe]					101 316 ²
FEC [ktoe]					55 507 ²
FEC - BUILDINGS [ktoe]		2 160 ¹			3 226 ¹
FEC - INDUSTRY [ktoe]		581 ¹			1 610 ¹
FEC - TRANSPORT [ktoe]		274 ¹			624 ¹
FEC – OTHERS [ktoe]		598 ¹			1 041 ¹

¹ First National energy efficiency action plan

² Draft of the new energy efficiency target calculation according to EED

D. Update of measures implemented in last year

• Legislative measures

During the reported period secondary legislation for the Law of Ukraine "On Commercial Metering of Heat and Water Supply", adopted by the Parliament of Ukraine on June 22, 2017 (No. 2119-VIII) (11 legislative acts) and the Law of Ukraine "On the Energy Efficiency of Buildings", adopted by the Parliament of Ukraine on June 22, 2017 (No. 2118-VIII) (13 legislative acts) were developed and adopted.

The following important regulatory documents were adopted:

- **Resolution "On Approval of the Monitoring Procedure for the state of equipment with nodes of commercial accounting and information exchange between the State Agency on Energy Efficiency and Energy Saving and State Service for Food Safety and Consumer Protection in violation of the requirements of the legislation in terms of conformity of metering equipment of commercial accounting nodes to technical regulations, timing for their establishment or replacement"**, adopted by the Cabinet of Ministers of Ukraine on July 26, 2018 (No. 603)
<https://www.kmu.gov.ua/ua/npas/pro-zatverdzhennya-poryadku-zdiysnennya-monitoringu-stanu-osnashchenosti->

- **Resolution "On Approval of the Procedure for conducting professional attestation of persons intending to carry out activities on certification of energy efficiency and inspection of technical systems"**, adopted by the Cabinet of Ministers of Ukraine on July 26, 2018 (No. 605)
<http://zakon2.rada.gov.ua/laws/show/605-2018-n>
- **Resolution "On approval of the Procedure for sharing of information between central executive authorities, attestation commissions in the process of independent monitoring, professional attestation and maintenance of databases of certificates, specialists and reports"**, adopted by the Cabinet of Ministers of Ukraine on July 26, 2018 (No. 602)
<http://zakon2.rada.gov.ua/laws/show/602-2018-n>
- **Order "On approval of the Methodology for estimation of the energy efficiency of buildings"**, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on July 11, 2018 (No. 169)
<http://zakon2.rada.gov.ua/laws/show/z0822-18>
- **Order "On approval of the Methodology for estimation of the cost optimal level of energy efficiency of buildings"**, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on July 11, 2018 (No. 170)
<http://zakon2.rada.gov.ua/laws/show/z0823-18>
- **Order "On approval of the Procedure for the use of calculation elements of the software for estimation of the energy efficiency of buildings"**, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on June 11, 2018 (No. 171)
<http://zakon2.rada.gov.ua/laws/show/z0824-18>
- **Order "On approval of the Procedure for the certification of energy efficiency, form of energy certificate"**, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on June 11, 2018 (No. 172)
<http://zakon2.rada.gov.ua/laws/show/z0825-18>
- **Order "On approval of the Methodology of technical systems' inspection"**, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on June 11, 2018 (No. 173)
<http://zakon5.rada.gov.ua/laws/show/z0826-18>
- **Resolution "On approval of the List of buildings for industrial and agricultural use, energy, transport, communications and defense facilities, warehouses, which are not subject to minimum requirements for energy efficiency of buildings and which are not subject to certification of energy efficiency of buildings"**, adopted by the Cabinet of Ministers of Ukraine on April 11, 2018 (No. 265)
<http://zakon0.rada.gov.ua/laws/show/265-2018-n>
- **Order "On approval of the procedure for maintaining databases of energy certificates, reports on technical system inspections, energy auditors, specialists"**

on inspection of technical systems", adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on March 21, 2018 (No. 62)

<http://zakon5.rada.gov.ua/laws/show/z0457-18>

- ***Plan of measures for implementation of energy management systems in budget institutions***, adopted by the Cabinet of Ministers of Ukraine on April 26, 2017 (No. 732)
<http://zakon.rada.gov.ua/laws/show/732-2017-p/>
- ***Technical regulation on energy efficiency labeling of domestic ovens and range hoods***, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on February 07, 2018 (No. 28)
<http://zakon5.rada.gov.ua/laws/show/z0568-18>
- ***Technical regulation of energy labeling of vacuum cleaners***, adopted by the Cabinet of Ministers of Ukraine on May 31, 2017 (No. 381)
<http://zakon.rada.gov.ua/laws/show/381-2017-n>
- ***Technical regulation for the energy labeling of household drum dryers*** adopted by the Cabinet of Ministers of Ukraine on May 31, 2017 (No. 380)
<http://zakon.rada.gov.ua/laws/show/380-2017-n>
- ***Technical regulation of energy labeling of air conditioners*** adopted by the Cabinet of Ministers of Ukraine on May 24, 2017 (No. 360)
<http://zakon.rada.gov.ua/laws/show/360-2017-n>
- ***Technical regulation for energy labeling of televisions*** adopted by the Cabinet of Ministers of Ukraine on May 24, 2017 (No. 359)
<http://zakon.rada.gov.ua/laws/show/359-2017-n>
- ***Order "On determining buildings which are frequently visited by the public"***, adopted by the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine on October 06, 2017 (No. 267)
<http://zakon.rada.gov.ua/laws/show/z1329-17>

In October the new version of the Draft Law of Ukraine "On Energy Efficiency" was resubmitted to Ministries for inter service consultations.

The Draft government resolution on new energy efficiency target according to Art.3 EED submitted to the Government (September) – as for November-2018 the consideration is expected.

The Draft Law "On Amendments to the Law of Ukraine "On Combined Production of Thermal and Electric Energy (Cogeneration) and Utilization of Waste Energy Potential" in February, 2018 was recommended for adoption by the Parliament Committee on Fuel and Energy Complex, Nuclear Policy and Nuclear Safety and the 1st reading was planned for the September session.

- **Non-legislative measures**

The Energy Efficiency Fund was registered as a legal entity on the June 24, 2018, and necessary secondary legislation for Fund launching was passed. The Fund is registered as a legal entity according to Ukrainian legislation.

The Governmental program on "Warm loans" remains effective. During over four years more than 500 000 households participated in this program and implemented energy efficient measures worth 6,7 bln UAH (212 mln EUR¹), 2,3 bln UAH (70,1 mln EUR) of which were reimbursed by the Government. These measures will annually save 230 mln q.m³ of gas equivalent. During 2018 particularly high interest in this program has been observed by home owners' associations (HoAs). During five months of 2018 about 1200 HoAs benefitted from "Warm loans". Total sum of investments accounted for 400 mln UAH (12,2 mln EUR), which is twice as much as in the relevant period in 2017 (about 600 HoAs got loans for 140 mln UAH (4,3 mln EUR)).

In October Government allocated additional 100 mln UAH for (HoAs).

In cooperation with the GIZ Project on "Energy efficiency reforms in Ukraine" the "Argumentarium" on EED was prepared. It contains experts' comments and a list of economic and social benefits arising from the proper implementation of EED in Ukraine. This document was composed to provide substantive information on the provisions of the Directive, and expectations of stakeholders and other parties of the policy dialogue in the scope of its implementation.

Introduction of the electronic government procurement system (PROZORRO) for the energy services' purchase in public sector resulted in 184 energy performance contracts (EPCs) (EUR 5,7 mln) concluded in 2018 by November 12, and 204 EPCs in total since 2016 (EUR 6,3 mln). EPCs concluded in 2017-2018 will lead to 110 GWh savings during implementation period of contracts and afterwards generate at least 20 GWh of savings annually after their expiration. 4 EPCs were concluded by the State Agency of Water Resources of Ukraine totaling EUR 1,1 mln and provide modernization / reconstruction of pumping equipment in water supply stations that will save almost 14,4 GWh of electricity during the contract period (12 years on average) and 1,5 GWh annually after expiration.

EPC principles are beginning to be implemented in the residential sector. As of August 12, 2018 6 EPCs were concluded in two cities in Ukraine. In this context, in order to expand the positive experience of ESCO-mechanism implementation for energy efficiency improvement in the housing sector, SAEE has conducted eight regional awareness-raising workshops in partnership with Friedrich-Ebert-Stiftung Office in Ukraine (FES). More than 700 participants took part in these events, including 350 homeowners associations. SAEE has begun to form the national database of potential objects for energy services in multi-story buildings. This database already includes information on energy consumption of 100 buildings and simplifies the search for objects by ESCOs.

SAEE, in partnership with the UNDP Project "Removing Barriers to increase investment in Energy Efficiency of Public Buildings in Ukraine through the ESCO modality in Small and Medium Sized Cities" and other partners, has established the Consultation Centre to support scaling-up of budget sector, aimed at energy renovation of buildings, by

¹ Hereinafter exchange rate by the National Bank of Ukraine as of 12.11.2018.

disseminating ESCO-mechanism and energy management systems. SAEE has also held the 4th Energy Efficiency Partnership Forum'18 "ESCO: successes and prospects. New mechanisms for sustainable financing of energy efficiency of local communities" and developed amendments to the Law "On introduction of new investment opportunities, guaranteeing the rights and legitimate interests of business entities for large-scale energy modernization" (on September 4, 2015, No. 327-VIII). UNDP project finalized the selection procedure of pilot municipalities to promote there EPC model.

The Ministry of Education and Science of Ukraine also joined the implementation of ESCO mechanisms in public buildings. In particular, Ministerial Order specified the procurement of energy services for implementation of energy efficiency measures in 19 facilities belonging to the T. Shevchenko National University in Kyiv and the National University of Food Technologies in Vinnytsia. This includes several educational buildings, dormitories and other premises. The work with other central government bodies to promote EPC model is ongoing.

With regard to implementation of Directive 2010/31/EU on the energy performance of buildings, SAEE has signed voluntary cooperation agreements with 34 universities. The agreements' aims include training energy auditors and establishment of a certification committee for expert's accreditation. As a result, in November 2018, first 123 specialists were entitled to carry out energy certification of buildings and inspection of engineering systems. Also, first three energy efficiency certificates for residential buildings were issued.

In 2018 OECD carries out the monitoring of policy framework for ESCOs in Ukraine. The aim of the monitoring is to assess the progress made by Ukraine in the implementation of the 2015 OECD recommendations for developing a sustainable energy savings market with ESCOs in Ukraine. For this purpose two workshops were held.

E. Central Government buildings (Article 5)

The latest version of the Draft Law of Ukraine "On energy efficiency" opts for an alternative approach to paragraphs 1 to 5 of this Article.

With the technical assistance from the GIZ project, the SAEE developed an inventory template of heated and/or cooled central government buildings to implement para 5 of Article 5 of the Directive. The central executive bodies have already filled out this template and it is expected that these templates would be publically available on the SAEE web-site.

The Laws, aimed at implementation of Article 5 EED (except the Law of Ukraine "On the Energy Efficiency of Buildings"), were put in force. In particular, the Law "On introduction of new investment opportunities, guaranteeing the rights and legitimate interests of business entities for large-scale energy modernization" (on September 4, 2015, No. 327-VIII) and the Law "On amendments to the Budgetary Code of Ukraine (regarding the introduction of new investment opportunities, guaranteeing the rights and legitimate interests of business entities for large-scale energy modernization)" (on September 4, 2015 No. 328-VIII). These laws provide an opportunity for public institutions to conduct energy service agreements for the period of more than one year and define guarantees for investors in remuneration for the achieved energy savings in the framework of the energy service agreement. Another significant contribution of these documents is a transparent mechanisms for public procurement of energy saving performance contracts through the electronic government

procurement system (PROZORRO). Methodologically, this is the most difficult auction in Ukraine, because the main selection criterion for choosing a winner is not the price, but the net present value – the indicator of the investment projects efficiency. Since the introduction of the special module for ESCO-tenders in the “PROZORRO” system from October 2017 up to now 609 auctions have been announced and 184 contracts have already been concluded (total amount of concluded EPCS is 186,5 million UAH ≈ 6 mln Euro).

The Memorandum on partnership with a purpose to introduce energy services and increase the energy performance of premises that belong to the State Statistics Service of Ukraine was signed during the reporting period. Under this Memorandum SAEI will provide the State Statistics Service with clarification of legislation on ESCO, as well as consultations on procedures for the conclusion of ESCO contracts, estimation and approval of the basic level of energy consumption, preparation of tender documentation and draft contracts.

The central executive authorities start being involved in the legislative initiative to introduce energy efficiency measures in budget sector buildings. In particular, the Ministry of Finance of Ukraine approved the first essential conditions of ESCO-contracts for facilities of the central executive authority, namely for 4 pumping stations in Beryslav and Novotroitske owned by the State Agency of Water Resources of Ukraine. Pumping stations will be modernized at the expense of private ESCO investors, contract values range between 7,5 and 10 million UAH (230 – 310 thous. EUR).

F. Energy efficiency obligations (Article 7)

Ukraine still does not have an EEO scheme in place. The last version of Draft Law “On Energy Efficiency” introduces alternative measures (Article 7(9) EED), such as:

- 1) development and implementation of State target programs in the field of energy efficiency;
- 2) improvement of the legal framework for taxation of energy use in accordance with the EU legislation including carbon emission tax;
- 3) provision of State aid (support) to stimulate the introduction of energy-efficient technologies and reduce the consumption of energy by consumers;
- 4) conclusion of voluntary agreements aimed at introduction of energy-efficient technologies that lead to reduction in energy consumption;
- 5) approval of production standards, provisions and rules for improvement of energy efficiency of goods and services, including buildings and vehicles (except cases when the adoption of such standards, provisions and rules is mandatory in accordance with requirements of Energy Community legislative acts);
- 6) introduction of energy labeling (except cases of energy labeling implementation in accordance with requirements of Energy Community legislative acts);
- 7) energy efficiency education and consultations, stimulating introduction of the energy efficient technologies and reducing energy consumption;
- 8) other measures resulting in the provision of annual energy savings by consumers.

Experts of the Institute for Economics and forecasting of the National Academy of Sciences of Ukraine under support of the EU4Energy Governance project by extrapolation of Article 7 requirements and gradual annual increase of energy savings by 0.7% estimated and formulated targets for 2020 and 2030 as follows:

- in 2020: FEC reduction by 1 304 ktoe relative to the new BAU Scenario (the case when no EE measures are implemented);
- in 2030: FEC reduction by 4 565 ktoe relative to the new BAU Scenario.