



UKRAINE:

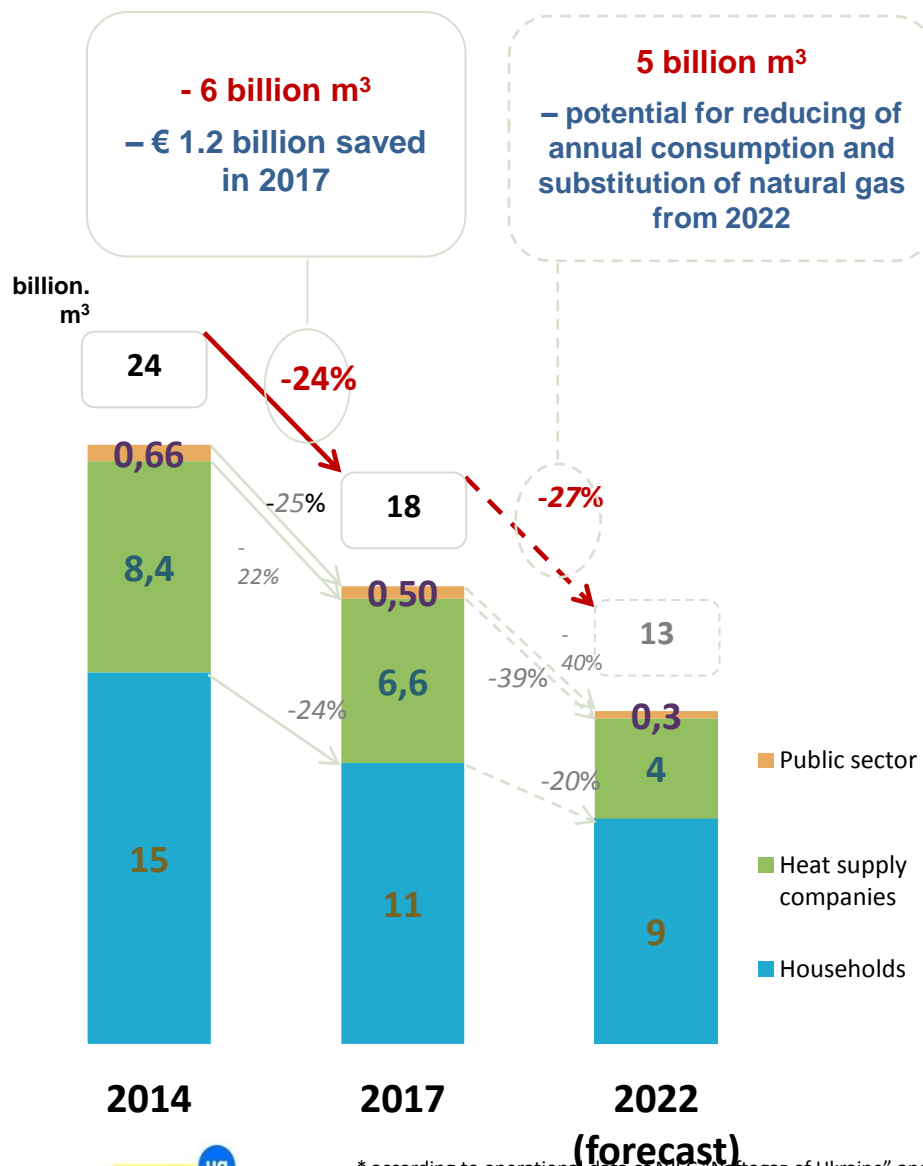
Energy Efficiency and Renewable Energy Development in Ukraine

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and Energy Saving of Ukraine



Dynamics of natural gas consumption in 2014-2017*



* according to operational data of PJSC "Naftogaz of Ukraine" and PJSC "Ukrtransgas" (without temporarily occupied territories)

Achievements of 2014 - III quarter of 2018:

Invested in Ukrainian "clean" energy projects

Σ ≈ 1,7 billion euros

IN RENEWABLE ENERGY:

2 000 MW of new heat capacities

Investments – **460 million €**

1075 MW of new renewable energy capacities

Investments – **1 billion €**, including:

6 031 of families installed SPP with total capacity - **121 MW**

Investments – **120 million €**

IN ENERGY EFFICIENCY:

523 000 of families implemented energy efficiency measures via "warm" loans in the residential sector

Investments – **220 million €**

208 ESCO-contracts are concluded in the public sector

Investments – **6,5 million €**





STATE SUPPORT PROGRAM FOR HOUSEHOLDS ("WARM LOANS PROGRAM")

Duration: Active since Oct'2014

Mechanism:

Partial reimbursement of loans got by individual households & condominiums

Financial intermediaries:

Oschadbank, Privatbank,
Ukreximbank, Ukrgasbank

Support share:

20% - for biomass boilers (**35%** for obtainers of housing subsidies)

35% - for energy efficiency measures for individual households

40% - for condominiums (**70%** for obtainers of housing subsidies)

Funding:

EUR 190 million (≈ 6,1 billion UAH) has been distributed to 523 000 households

EUR 72 million (≈2.3 billion UAH) – reimbursed by the Government (during 2014 - 2018)

+ 169 regional programs functioning in 2018 for extra reimbursement of «warm» loans

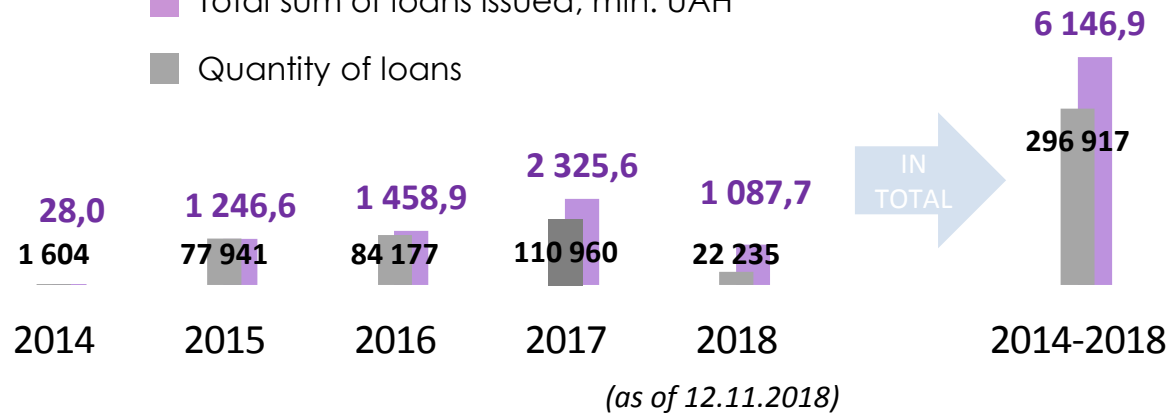
Effect: Estimated annual savings of resources in natural gas equivalent is almost **250 mln m³**.

Amounts of reimbursement:

- in 2014 - 2.4 million UAH
- in 2015 - 302 million UAH
- in 2016 - 861 million UAH
- in 2017 - 818 million UAH
- in 2018 - 500 million UAH

■ Total sum of loans issued, mln. UAH

■ Quantity of loans



In 2018 **640** ESCO (EPC) - tenders were announced in Ukraine

EPC plans

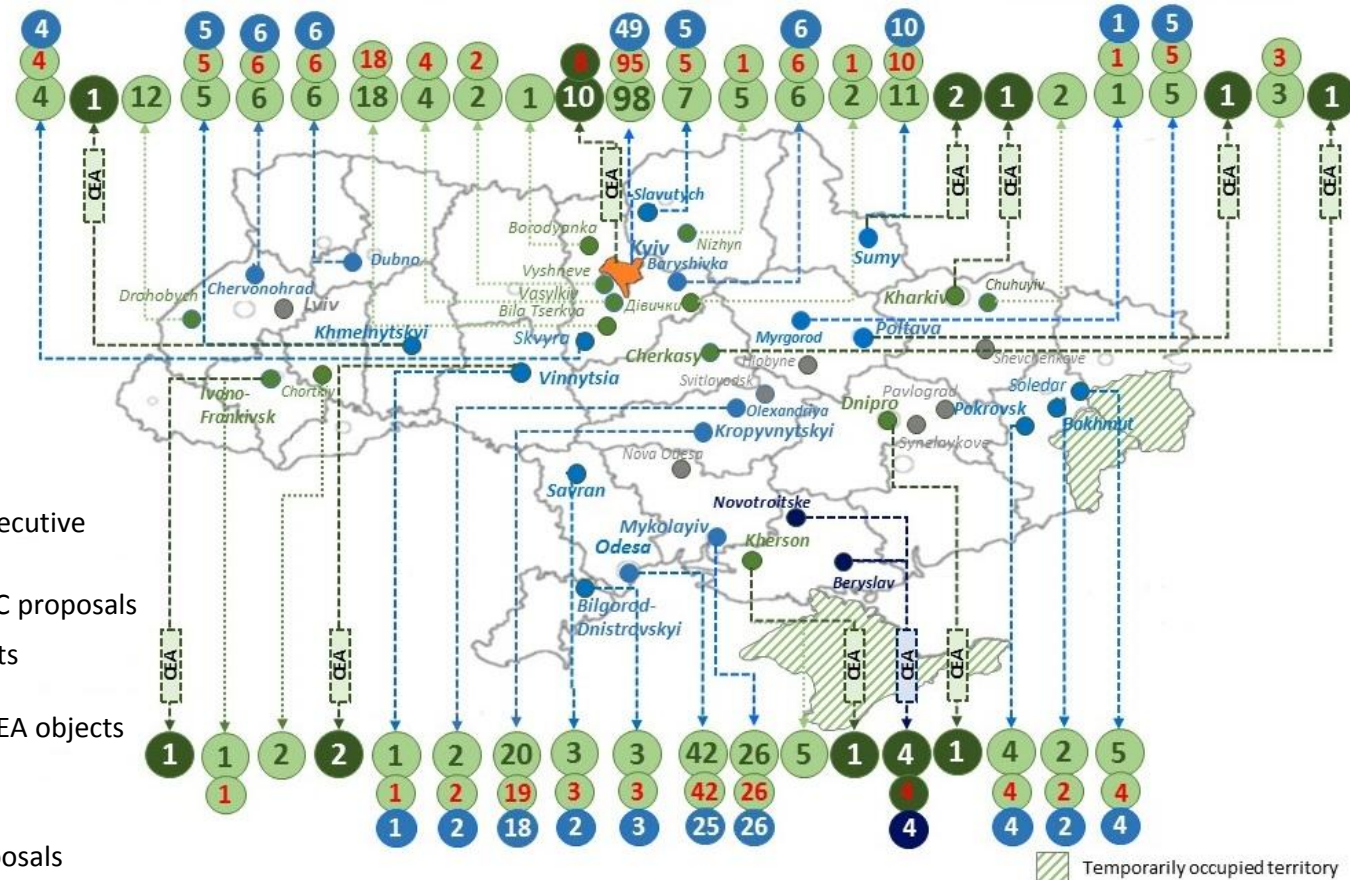
2018:

≥ 300 contracts

2016: 20 EPC contracts worth 18 million UAH were concluded

2018: 188 EPC agreements worth 190 million UAH were concluded

Tenders were held in 45 cities of Ukraine



EPC Tenders:

640 - EPC tenders

26 - EPC tenders on Central Executive Authorities (CEA) objects

291 - Completed auctions via EPC proposals

188 - Concluded EPC contracts

4 - EPC contracts on CEA objects

24 - Nearest auctions

31 - Open tenders for EPC proposals

294 - Cancelled and unsuccessful tenders*

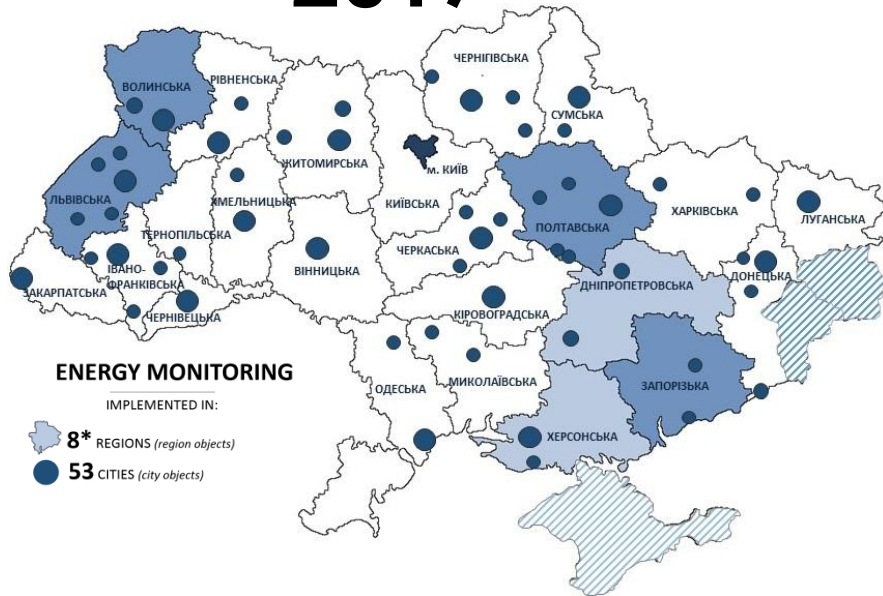
45 - Cities where tenders are announced

* - no tenders (of 1 or <participants)

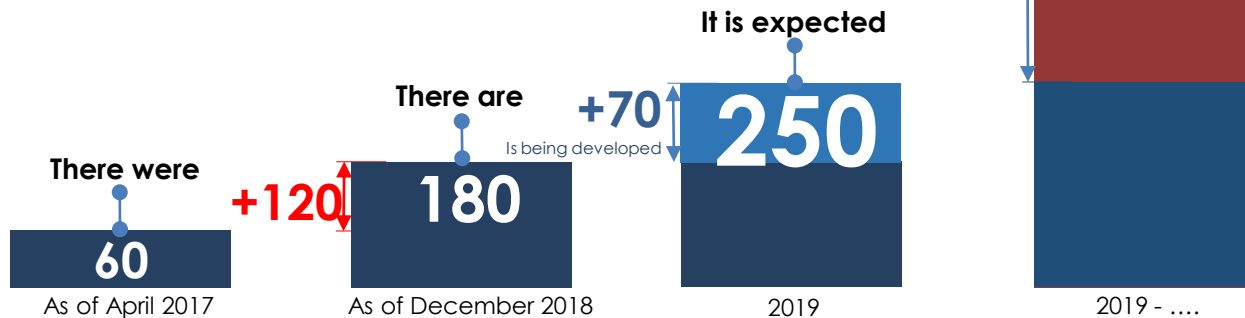
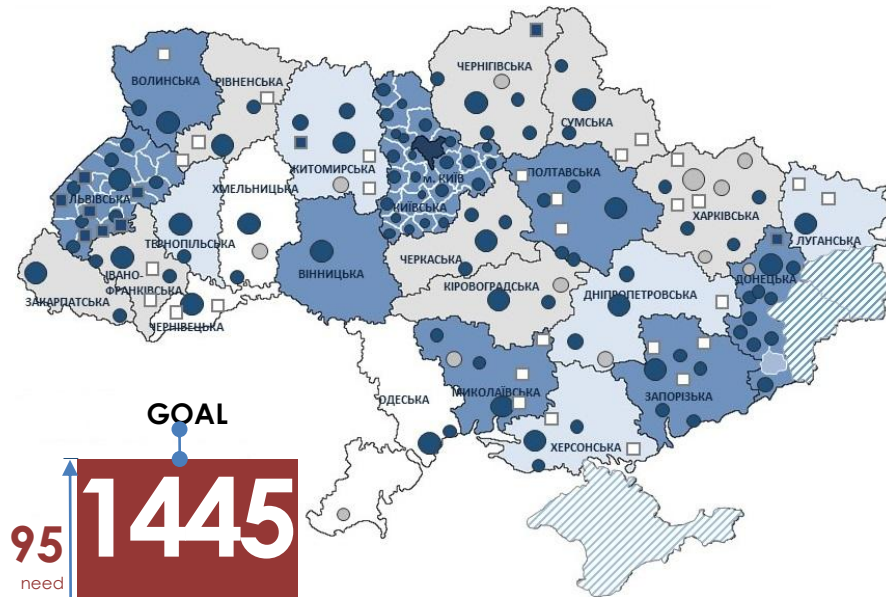


180 (12%) LOCAL AUTHORITIES HAVE IMPLEMENTED ENERGY MANAGEMENT / ENERGY MONITORING SYSTEMS

As of April
2017



As of November
2018



* - низка регіонів впровадила Енергомоніторинг лише в частині підпорядкованих ним об'єктів





Law of Ukraine
«On energy efficiency of buildings»
of 22.06.2017 № 2118-VIII

introduces mandatory energy efficiency certification
from July 01, 2019

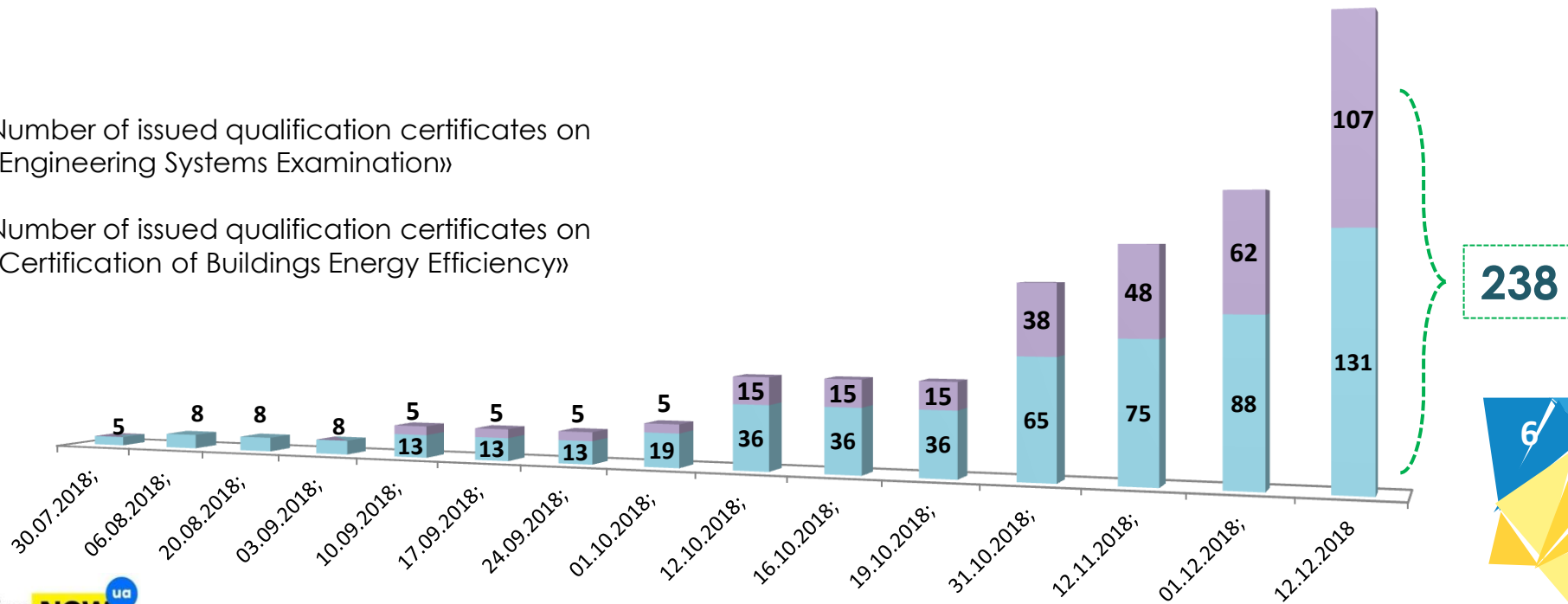


Implementing
Directive 2010/31/EU is
a commitment of
Ukraine to the Energy
Community

DYNAMICS OF ENERGY AUDITORS AND EXPERTS CERTIFICATION

■ Number of issued qualification certificates on
«Engineering Systems Examination»

■ Number of issued qualification certificates on
«Certification of Buildings Energy Efficiency»



238

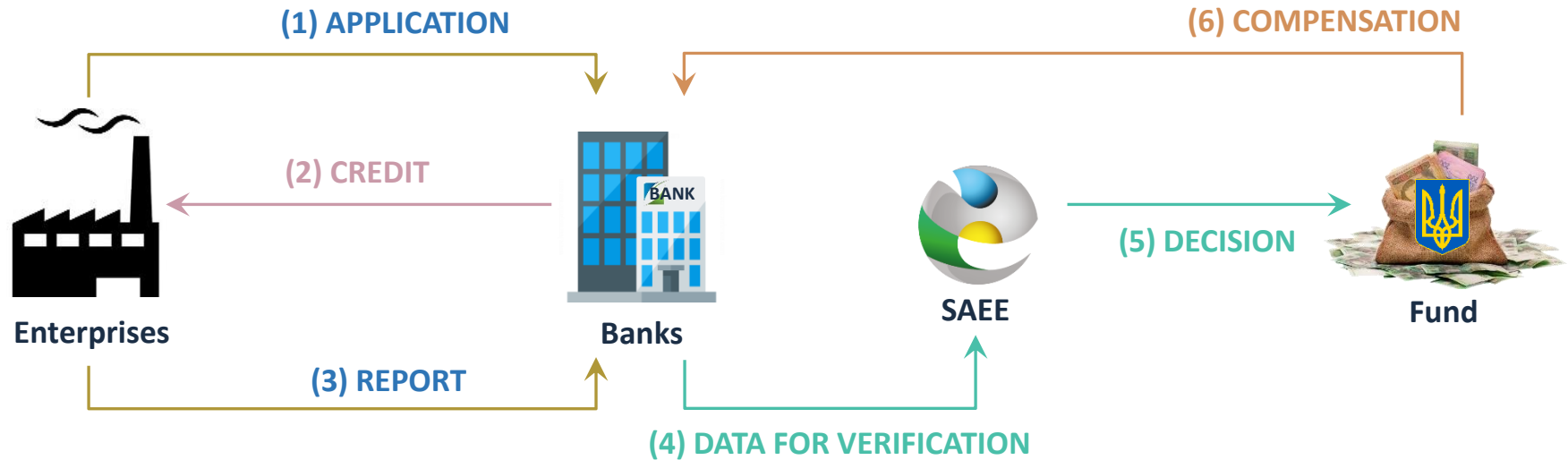




ENERGY EFFICIENCY IN INDUSTRY: THE CONCEPT OF A SUPPORT MECHANISM

State support mechanism:

Enterprises receive **compensation** for the implemented projects with EE and RES



Types of measures for EE and RES :

- production and use of electric vehicles;
- substitution of fossil fuels with renewable energy sources and alternative fuels;
- installation of energy efficient equipment;
- implementation of measures of the energy management system;
- introduction of highly effective engineering systems, metering systems and resource management;
- thermal sanitation of buildings, bringing them to the minimum requirements of the class of energy efficiency.

Funds to support enterprises:

Funds are accumulated in a separate **State Budget Target Fund** (without separate administration)

More information:
<http://eee.org.ua/>

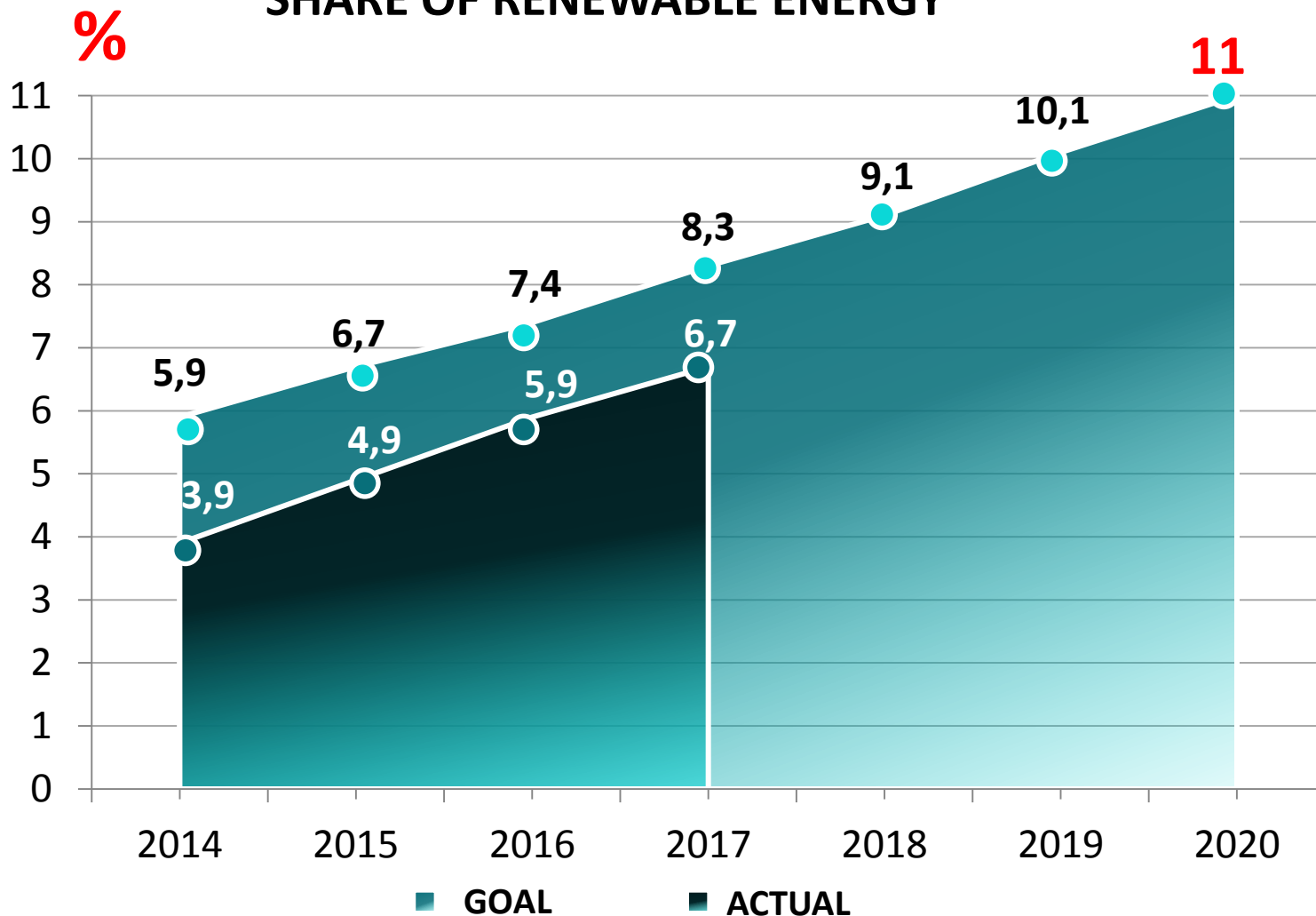




GOAL NREAP 2020



SHARE OF RENEWABLE ENERGY



- calculated according to the Directive 2009/28/EU

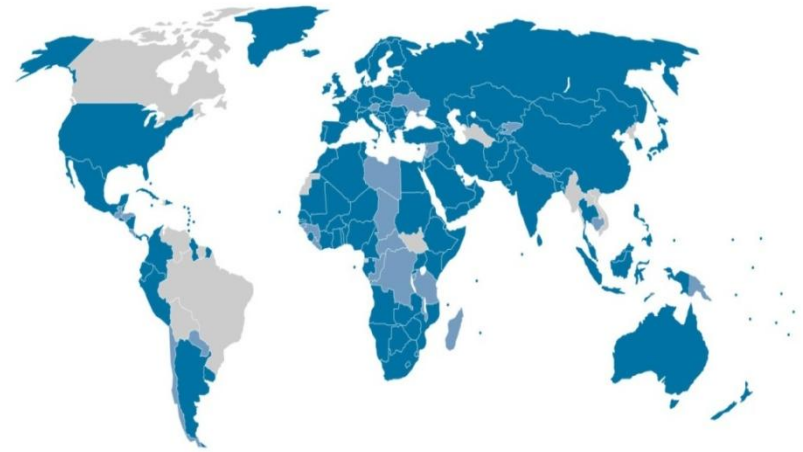


LAW OF UKRAINE «ON UKRAINE'S ACCESSION TO THE STATUTE OF THE INTERNATIONAL RENEWABLE ENERGY AGENCY (IRENA)» (REG. № 2222-VIII AS OF 05.12.2017)

On February 24, 2018 Ukraine officially became IRENA's member!

Ukraine's membership at IRENA:

- ✓ renewable projects financing by the Abu Dhabi Fund for Development (ADFD) under 1-2% for up to 20 years;
- ✓ legislation improvement;
- ✓ "green" investment attraction;
- ✓ additional guarantees to investors;
- ✓ cooperation with development countries in renewable energy;
- ✓ access to the IRENA's database.

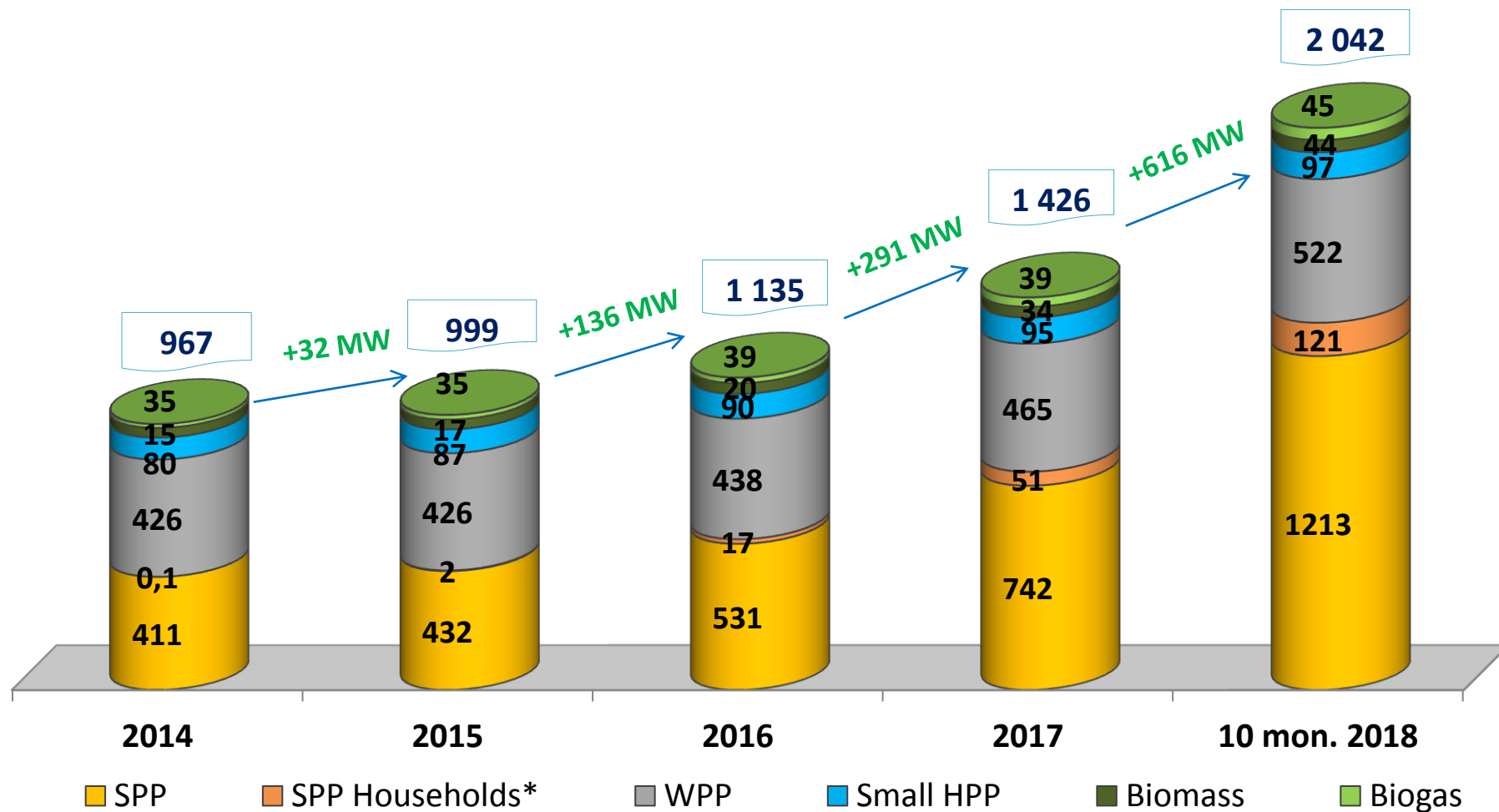


- **159** IRENA's members
- **24** countries started the accession procedure





INSTALLED CAPACITY OF RENEWABLE ENERGY OBJECTS WORKING UNDER THE "GREEN" TARIFF



From the beginning of 2015, 1075 MW were introduced and around € 1 bln were invested.

*Data about rooftop solar panels are given as of the end of 3rd quarter 2018

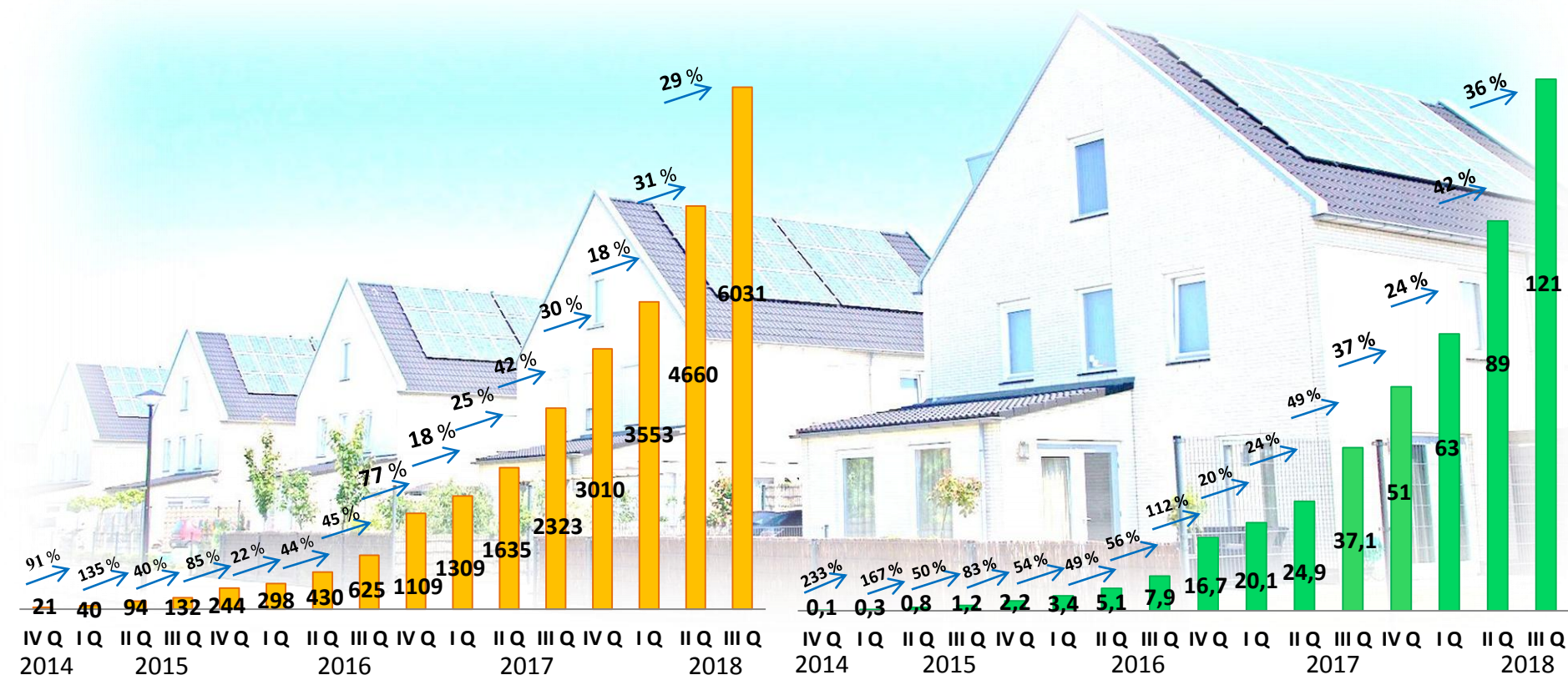




DYNAMICS OF SOLAR INSTALLATIONS IN PRIVATE HOUSES

Number of privat households

Installed capacity, MW



Around **120 mln EURO** invested.

The number of private houses eligible
for solar panels installation is 6,5 mln.

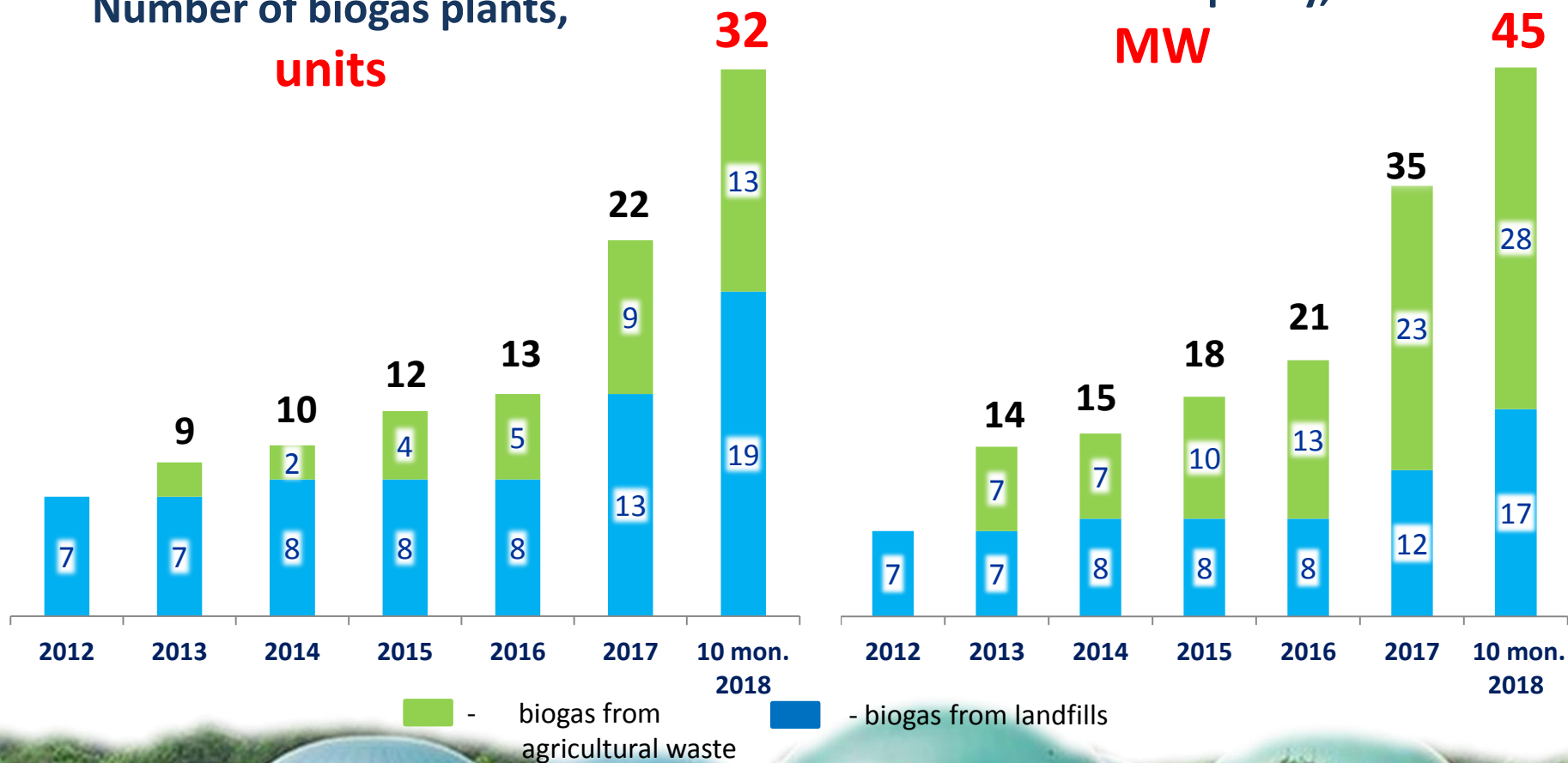


BIOGAS CAPACITY INCREASE IN UKRAINE

(biogas plants operating under the feed-in tariff)

Number of biogas plants,
units

Installed capacity,
MW





NEW RENEWABLE ENERGY INCENTIVES INTRODUCTION

Developing the
auctions procedure

Pilot auctions
conduction

Auctions
holding period

2018

till
1 July
2019

2020

2030



PPA terms
20 years



Obligatory participation:

- from 2020: SPP ≥ 10 MW; WPP ≥ 20 MW;
- from 2021-2022: SPP ≥ 5 MW; WPP ≥ 20 MW;
- from 2023: all types of RES ≥ 1 MW; WPP ≥ 3 MW.

Other key points:

All types of RES will
participate in
auctions

Capacity of
households SPP will
be increased
from **30** to **50** kW

Simplified procedure
for installing FIT for
rooftop SPP
up to **500 kW**

Premium for the use
of Ukrainian
equipment **5% - 10%**
(current law)



DRAFTING LAW ON SOLID BIOFUEL MARKET DEVELOPMENT

GOAL

CREATING LEGISLATIVE BASIS FOR SOLID BIOFUEL MARKET ESTABLISHMENT

MAIN PROVISIONS:

- creating a market mechanism for biofuels trading (electronic system for biofuels trading);
- assigning the obligation to trade through the electronic system for biofuels trading on designated entities;
- administrative responsibility for non-compliance of obligations on trade in biofuels.

EXPECTED RESULTS FROM THE LAW ADOPTION:

Transparent biofuel market



Lower prices on biofuels



Creating new jobs



Growth of the solid biofuel volumes production



Fuels provision for generating facilities



Attracting investments for biofuel production





DRAFT LAW OF UKRAINE ON DEVELOPING LIQUID BIOFUELS PRODUCTION SPHERE

GOAL:

Creating legislative basis for liquid biofuel production and use in transport

Draft Law provides :

➤ Obligatory quotas on the biocomponent share in the volume of sold motor fuel:

For Gasoline

From January 1, 2019 - not less than **5 %** (volume)

From January 1, 2020 - not less than **7 %** (volume)

For Diesel

From January 1, 2019 - not less than **3%** (volume)

➤ Responsibility for non-compliance with quotas

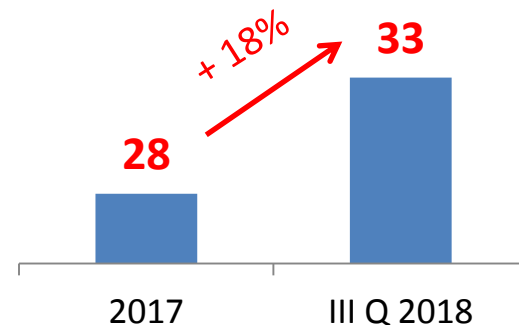
➤ From January 1, 2020 biocomponents must meet sustainability criteria

In 2017 Energy Resources Import - **8 bln \$**:

- Oil products – **4,2 bln \$**;

- Natural gas – **3,8 bln \$**

Gasoline A-95, UAH/L



source: <https://index.minfin.com.ua>



CURRENT SITUATION IN UKRAINE WITH GENERATION OF HOUSEHOLD SOLID WASTE (HSW)

Annually:

300 – 350 kg
of household solid waste



is produced by one
person in Ukraine

10 mln tons
of household waste



removed to the landfills in Ukraine

gas equivalent
≈ 1 bln m³



3,5 mln Gcal
of thermal energy



1,2 billion kWh
of electric energy





EXAMPLES OF SUCCESSFUL RENEWABLE PROJECTS

Combined Heat & Power (CHP) on renewable fuels



CHP provides heat and electricity:

190 residential buildings (**22 000** dwellers); **3** kindergartens; **5** schools.

City: **Kamyanets-Podilskyi**

Capacity: **45 MW** including:

15 MW – solid fuel boiler (5 and 10 MW);

1,8 MW – turbine with ORC module (on solid fuel);

Fuel: **wood chips, pellet**

Investments: **8,2 mln EUR**

Substitution: **8,4 mln m³ of natural gas annually**

Teofipol biogas complex 15 MW (PJSC “Orel-Lieder”)



Town: **Teofipol, Khmelnytskii region**

Type of fuel: **sugar beet pulp, corn silage**

Electricity production: **15 MW**

- 5 MW (first line working on sugar beet pulp);

- 10 MW (second line working on corn silage).

Heat production: **15 MW**

Investments: **40 mln EUR**

Equipment: **Jenbacher (Austria)**

Wind power turbines production plant



Under license of German company **Fuhrlaender AG**

City: **Kramatorsk**

Power of turbines: **2.5 - 3.2 MW**

Planned: **4.1-4.5 MW**

Built: **77 turbines in Ukraine**
and 22 turbines in Kazakhstan



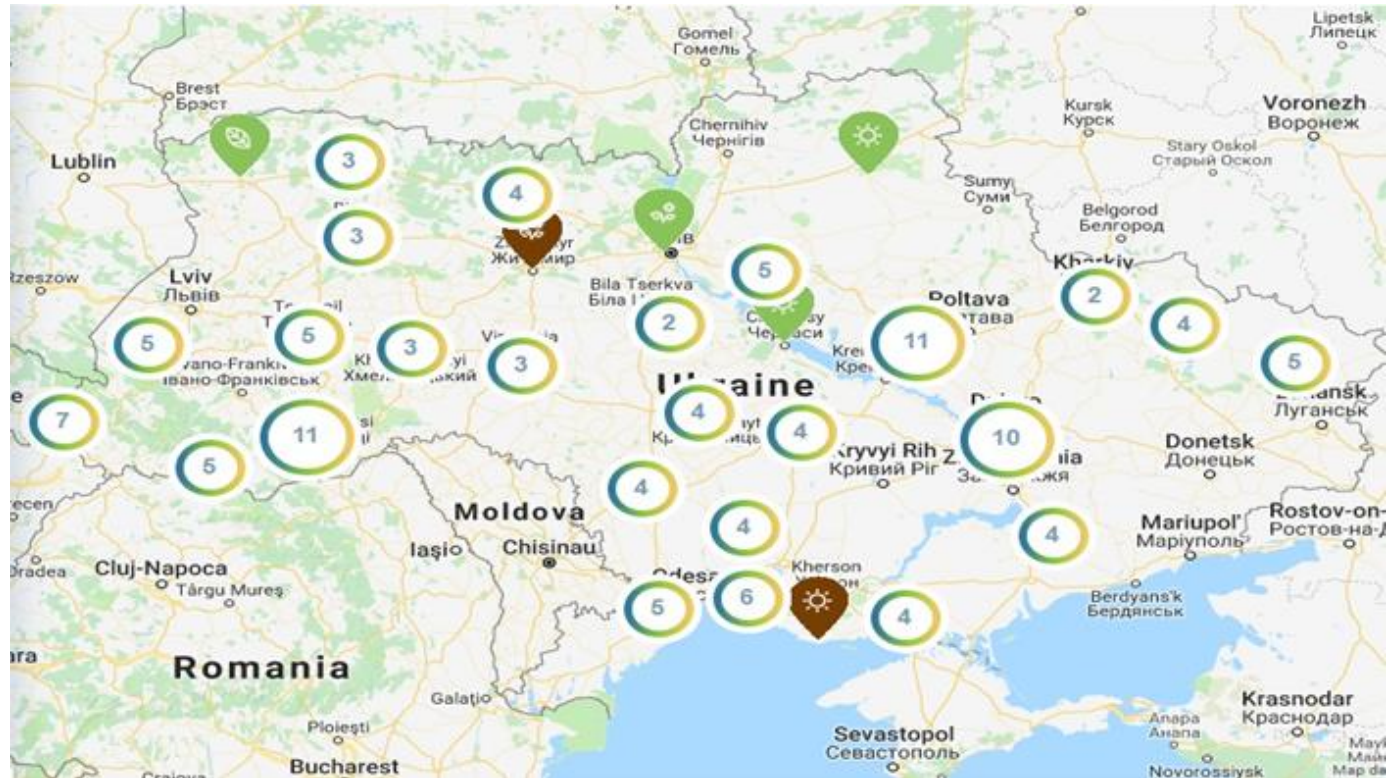
UAMAP comprises detailed information on

83 implemented and
118 potential projects that require
investments & soft loans in amount of

Σ € 4 bln

www.uamap.org.ua

- Hydropower ☒
- Biomass ☒
- Biogas ☒
- Solar power ☒
- Wind power ☒
- Energy efficiency ☒
- Waste energy ☒
- Other ☒



On behalf of:





INVEST in UKRAINE!