



UKRAINE:

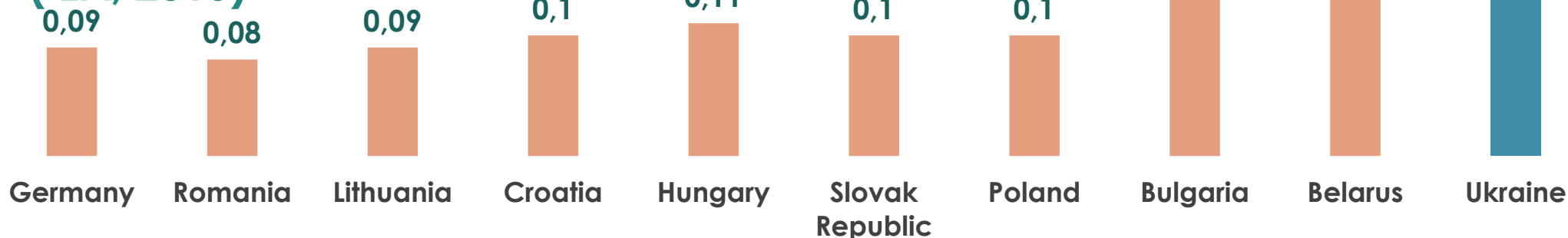
ENERGY EFFICIENCY and RENEWABLE ENERGY

State Agency on Energy Efficiency
and Energy Saving of Ukraine



ENERGY EFFICIENCY AND RENEWABLE ENERGY SECTORAL POLICIES

Energy intensity in European countries (IEA, 2016)



34%

29%

13%

18%

6%

Households

- State and local programs of co-financing of energy efficiency
- Households stimulation on installation of wind and solar plants
- Energy labelling systems
- Full metering of energy consumption
- Stimulation of recipients of subsidies to save energy

Industry

- Stimulation through energy tax
- Energy Performance Contracts

Services, Public Entities and Agriculture

- Energy Performance Contracts
- The mechanism of energy management

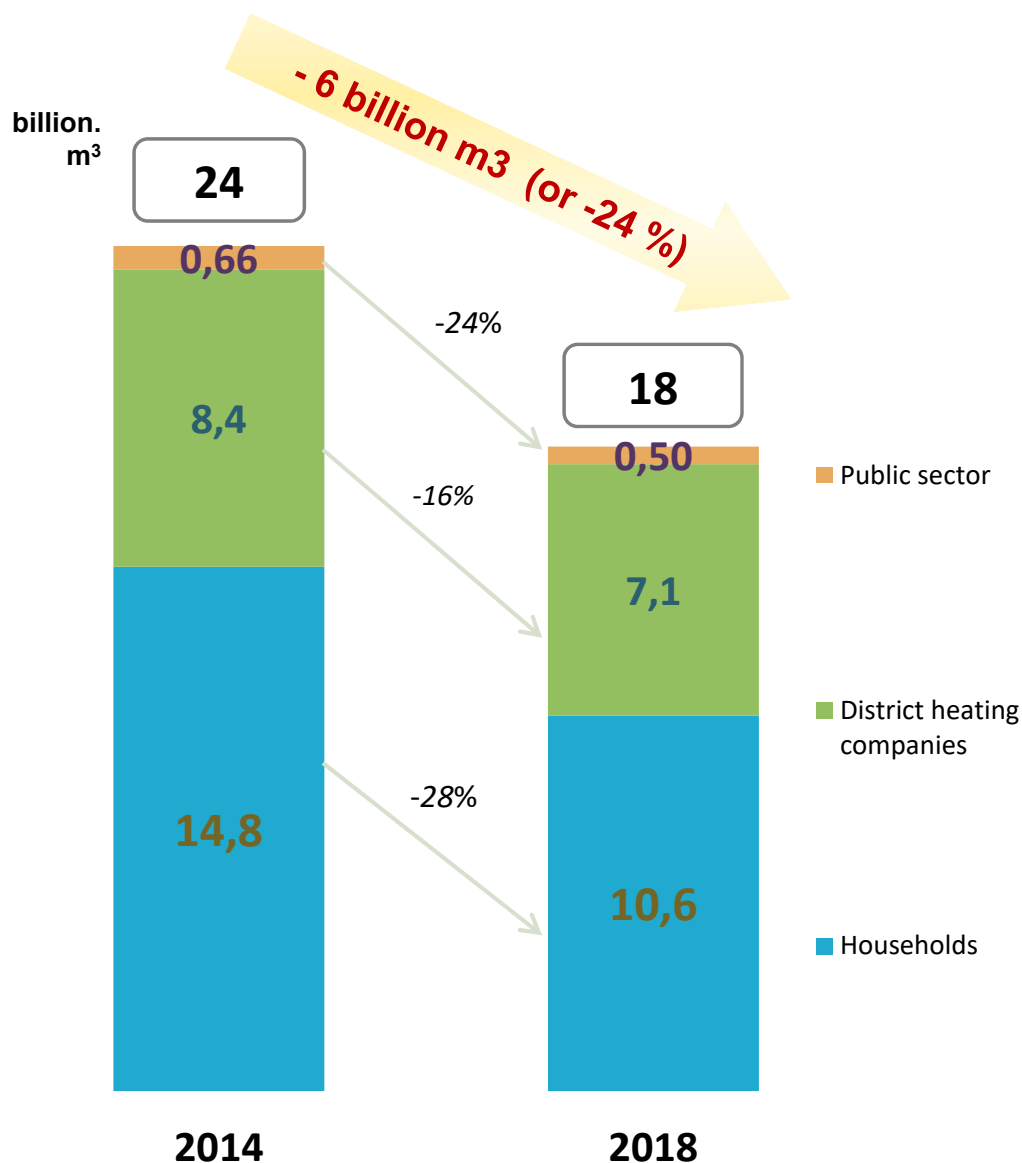
Transport and Non-energy use

- Stimulation of liquid biofuels production
- Extension of electric vehicles usage



MAIN PRIORITY: NATURAL GAS SAVING

Dynamics of natural gas consumption in 2014-2018*



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

Achievements in 2014 – Q3 2019:

Invested in Ukrainian "clean" energy projects

$\Sigma \approx 4.3$ billion €

IN RENEWABLE ENERGY:

2 282 MW of new heat capacities

Investments – **524 million €**

3 968 MW of new renewable energy capacities

Investments – **3.4 billion €**, including:

→ **14 790** of households installed SPP with total capacity – **345 MW**

Investments – **300 million €**

IN ENERGY EFFICIENCY:

712 206 of families implemented energy efficiency measures via "warm" loans in the residential sector

Investments – **300 million €**

381 ESCO-contracts are concluded in the public sector

Investments – **21,5 million €**

*Q2 2019





CURRENT STATUS OF ENERGY EFFICIENCY AND RENEWABLE ENERGY IN UKRAINE

National Renewable Energy Action Plan-2020

11% of Renewables in final energy consumption

Energy Strategy of Ukraine till 2035

25% of energy, produced from RES
in the structure of primary energy supply

€ 20 bln

Potential directions of investment attraction

Necessary investments by 2035 for:



construction of **renewable energy facilities**
(SPP, WPP, small HPP, CHP, biomass boiler station,
biogas facilities, etc.)



construction of capacities for production of
equipment for renewable energy facilities



construction of **biofuel production plants**
(solid, liquid)



growing of **energy crops**

National Energy Efficiency Action Plan-2020

of energy saving comparing to the
average final energy consumption in
2005-2009

9%

Residential sector – continuation of state program
for stimulating households to implement
energy efficiency measures

€ 44 – 74 bln – investment potential



Industry – state support for realization of energy
efficiency measures

€ 2,3 bln – investment potential



Public sector – development of EPC market

€ 8 bln – investment potential





ENERGY EFFICIENCY IN BUILDINGS



Residential buildings		Public entities
Multi-Storey	Private (Individual)	
Number of Buildings		
≈ 80 000	≈ 6,5 mln	≈ 100 000
Necessary Investment		
≈ from 50 to 85 bln USD*	≈ from 4 to 8 bln USD*	
Annual Saving Potential (in gas equivalent)		
8 bln cubic meters		800 mln cubic meters



*depending on the thermal modernization level



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 300 million (≈ 8.2 billion UAH) has been distributed to ≈ 716 000 households

EUR 100 million (≈ 2.8 billion UAH) – reimbursed by the **Government** (during 2014 - 2019)

+ **174** regional programs functioning in 2019 for extra reimbursement of «warm» loans

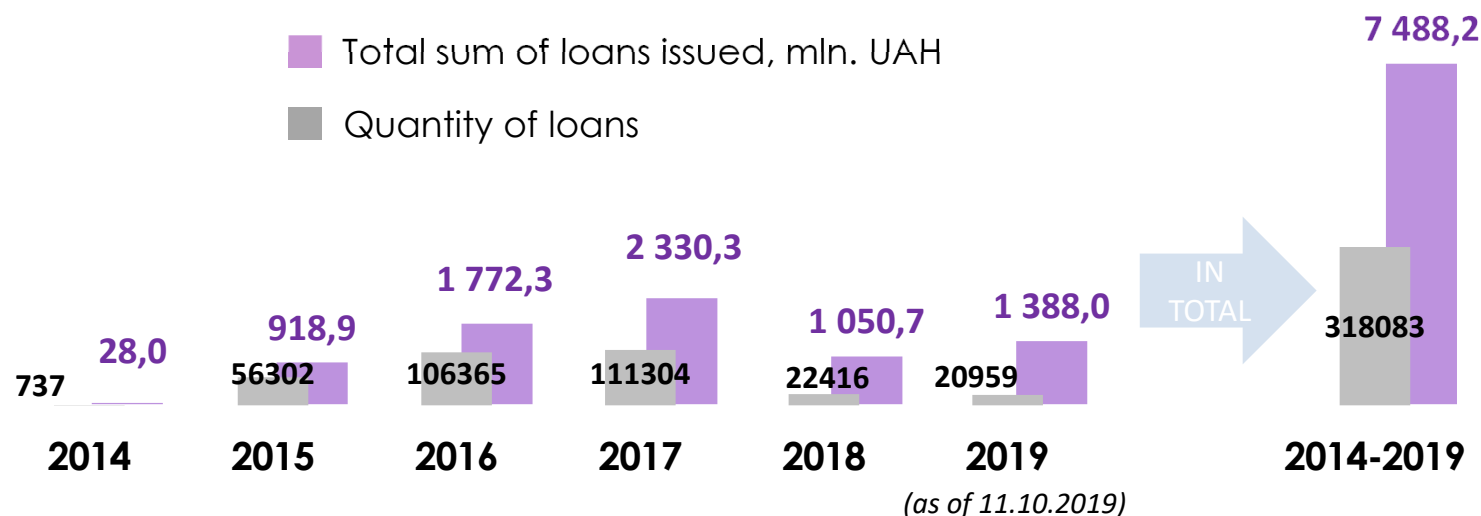
Effect: Estimated annual savings of resources in natural gas equivalent is **346 mln m³**.

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
- In 2019 - 780 million UAH (budget of 2019)

■ Total sum of loans issued, mln. UAH

■ Quantity of loans



2014-2018 – reimbursed loans (annual reports)
2019 – issued loans (operational statistics)



ENERGY PERFORMANCE CONTRACTING FOR PUBLIC SECTOR

2016:

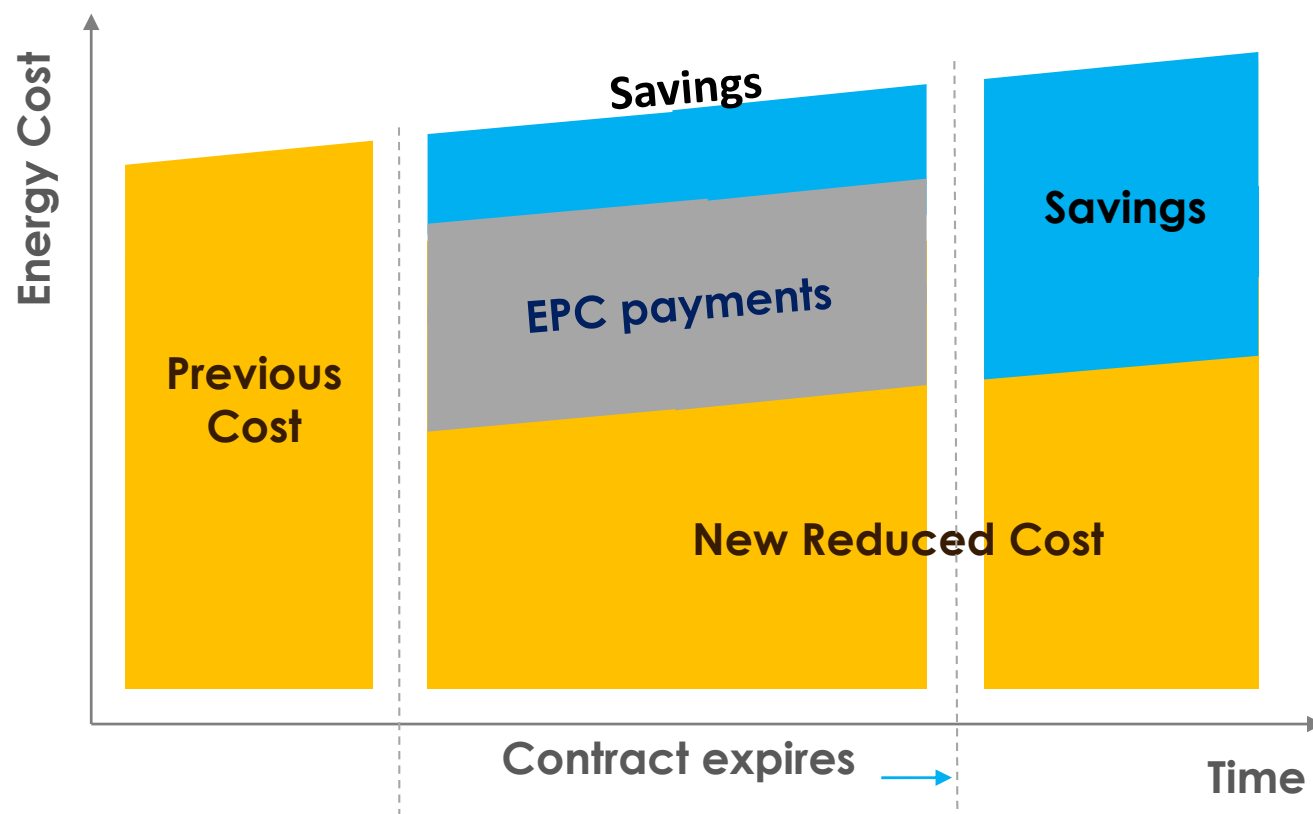
first 20 EPCs worth
18 million UAH were
concluded

2018:

210 EPCs worth
218 million UAH
were concluded

2019:

141 EPC contracts worth
306 million UAH were
concluded



The appropriate laws and regulations developed with support of EBRD have been adopted. That gives the guarantee for investments return in the framework of state budgetary commitments.



381 EPC-contacts have been concluded on more than 21,5 million EURO (55% of which were signed last year)

EPC-contracts have been concluded in 37 cities of Ukraine

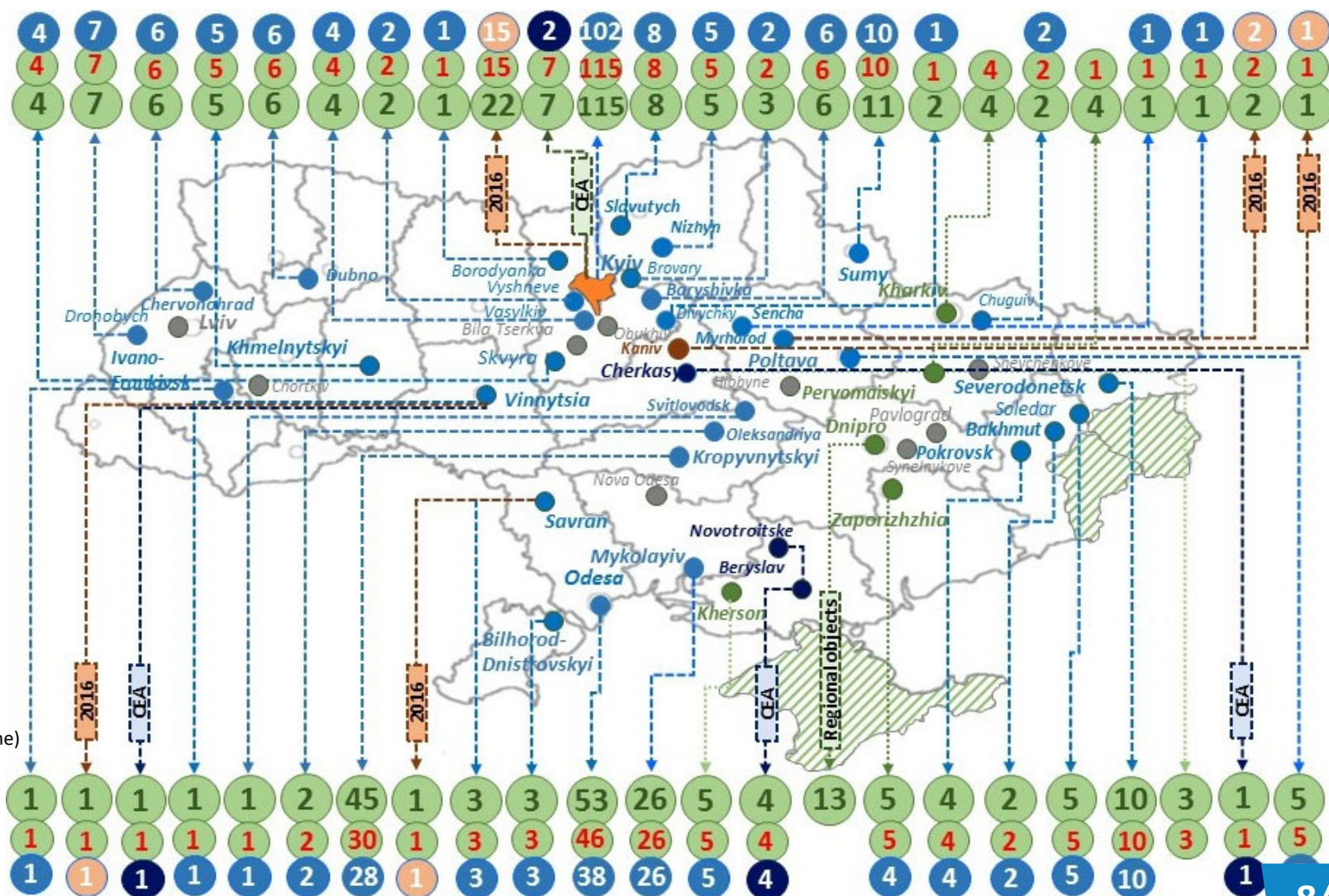
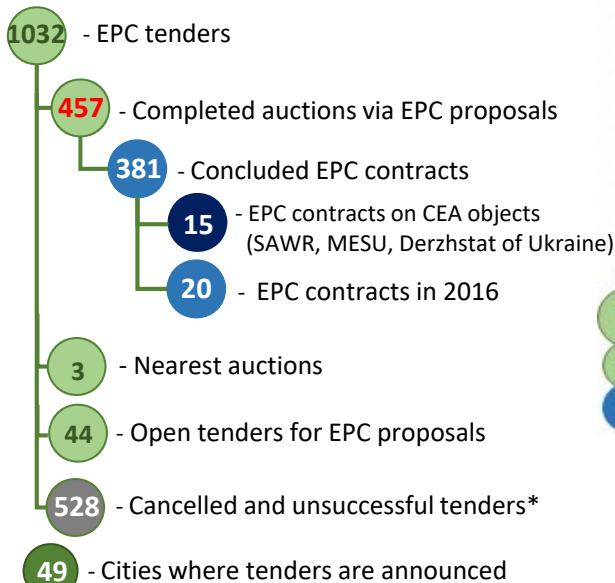
2015: Development and adoption of ESCO-legislation

2016: First 20 EPC-contracts worth 18 million UAH were concluded

2017: improvement of ESCO-legislation

2018: 210 EPC-contracts worth 218 million UAH were concluded

2019: 151 EPC-contracts worth 347 million UAH were concluded



--- 2016 ---
EPC in municipalities,
which were concluded in 2017/18/19 through
E-procurement

--- CEA ---
First EPC in municipalities,
which were concluded in 2016

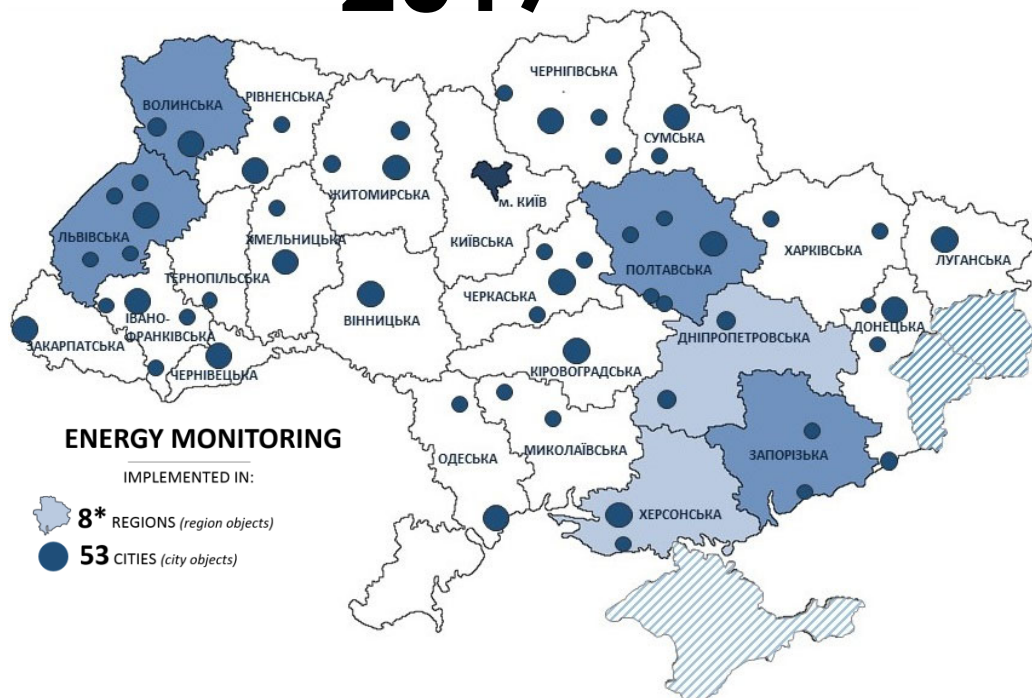
--- CEA ---
EPC in Central Government

* - no tenders (of 1 or < participants)

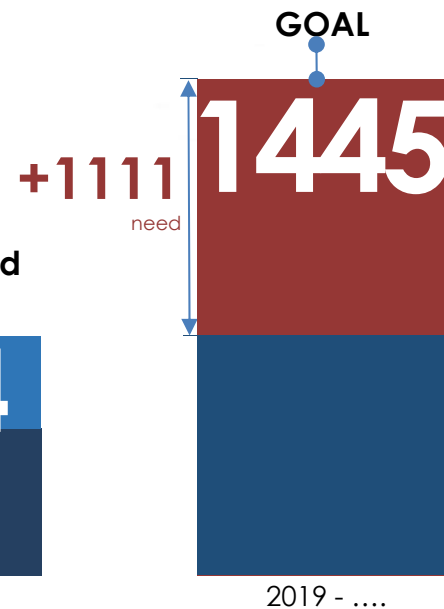
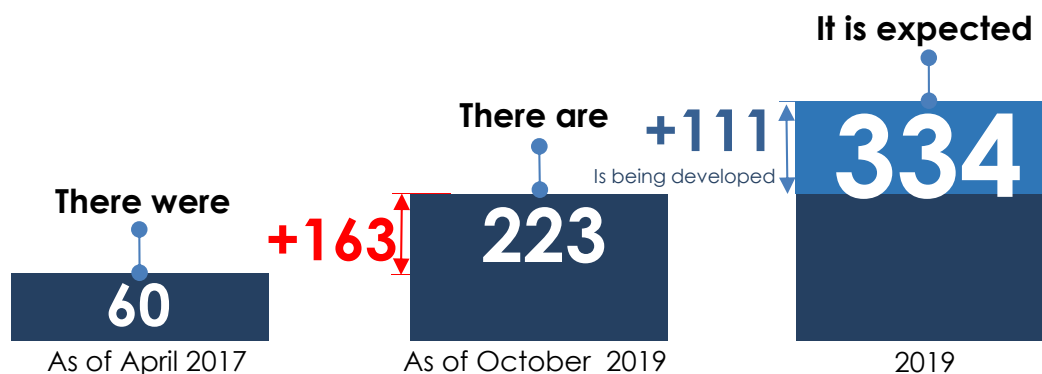
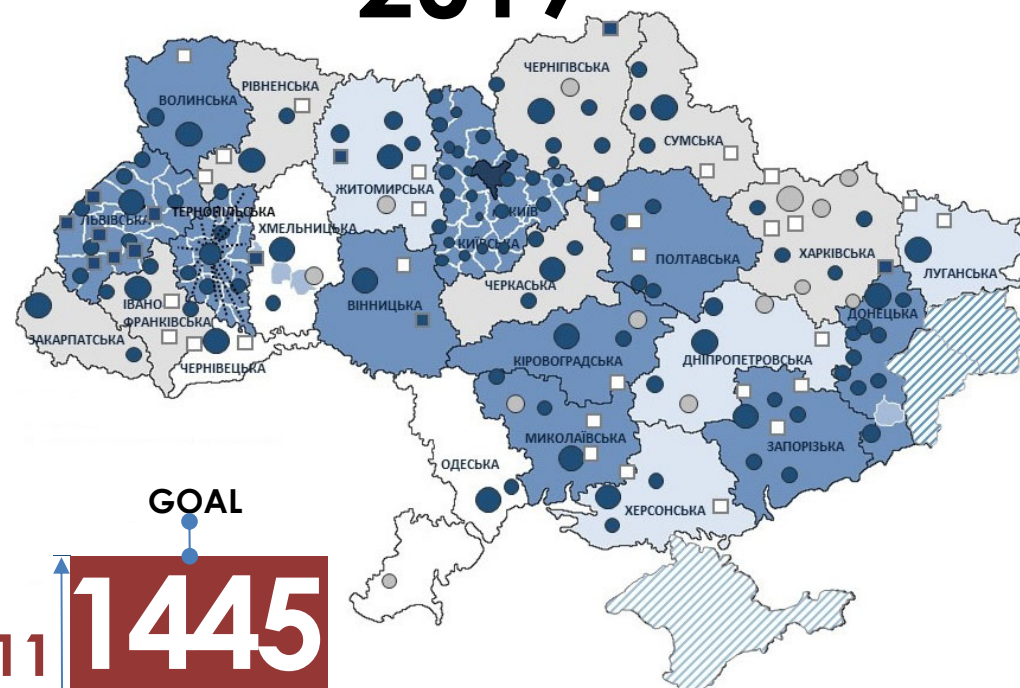


223 (15%) LOCAL AUTHORITIES HAVE IMPLEMENTED ENERGY MANAGEMENT / ENERGY MONITORING SYSTEMS

As of April
2017

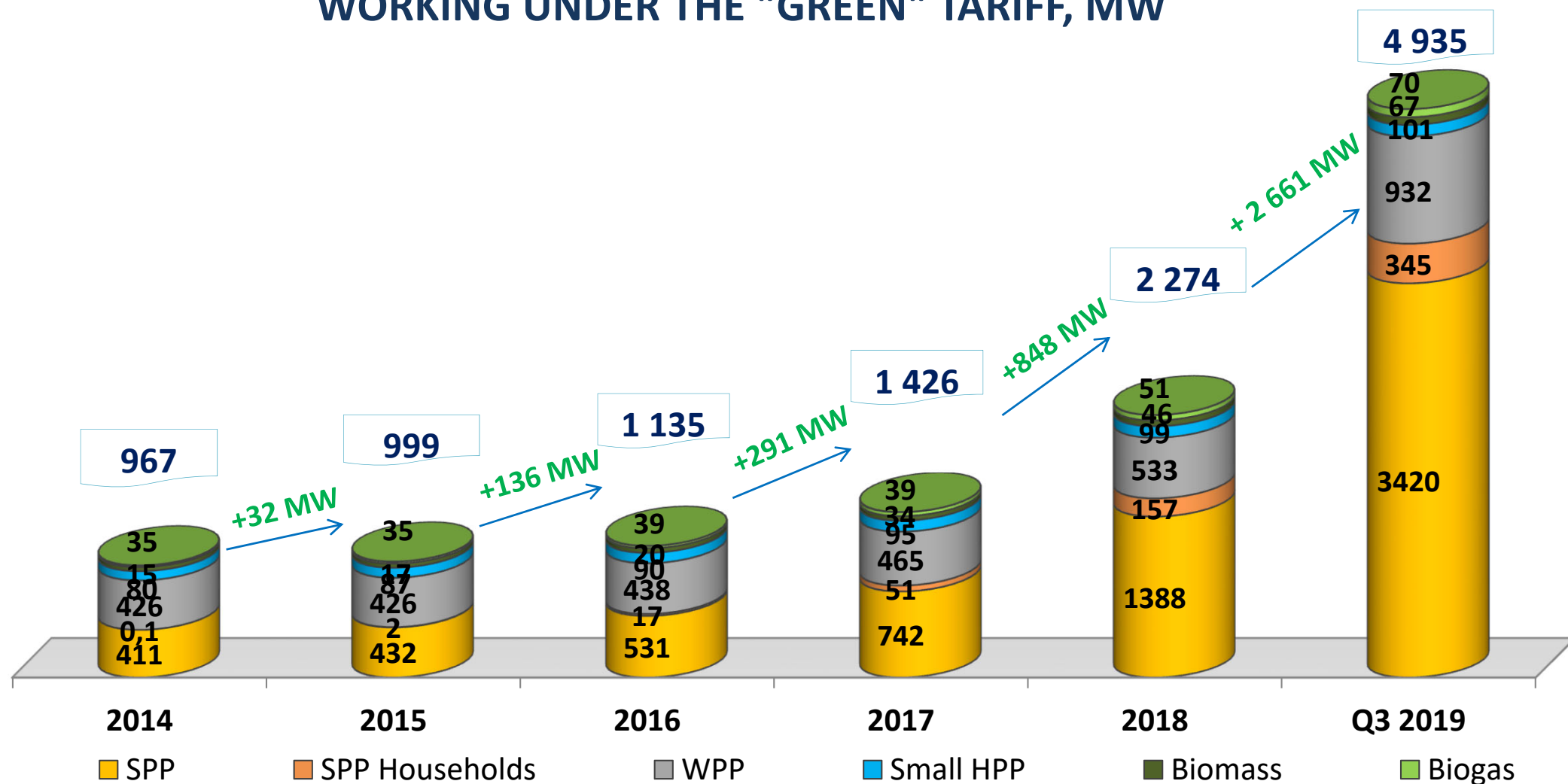


As of October
2019





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



From the beginning of 2015, 3 968 MW were introduced and around € 3.4 bln were invested.



DYNAMICS OF SOLAR INSTALLATIONS IN PRIVATE HOUSES

Number of private households

Installed capacity, MW



Around 300 mln EURO invested.

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

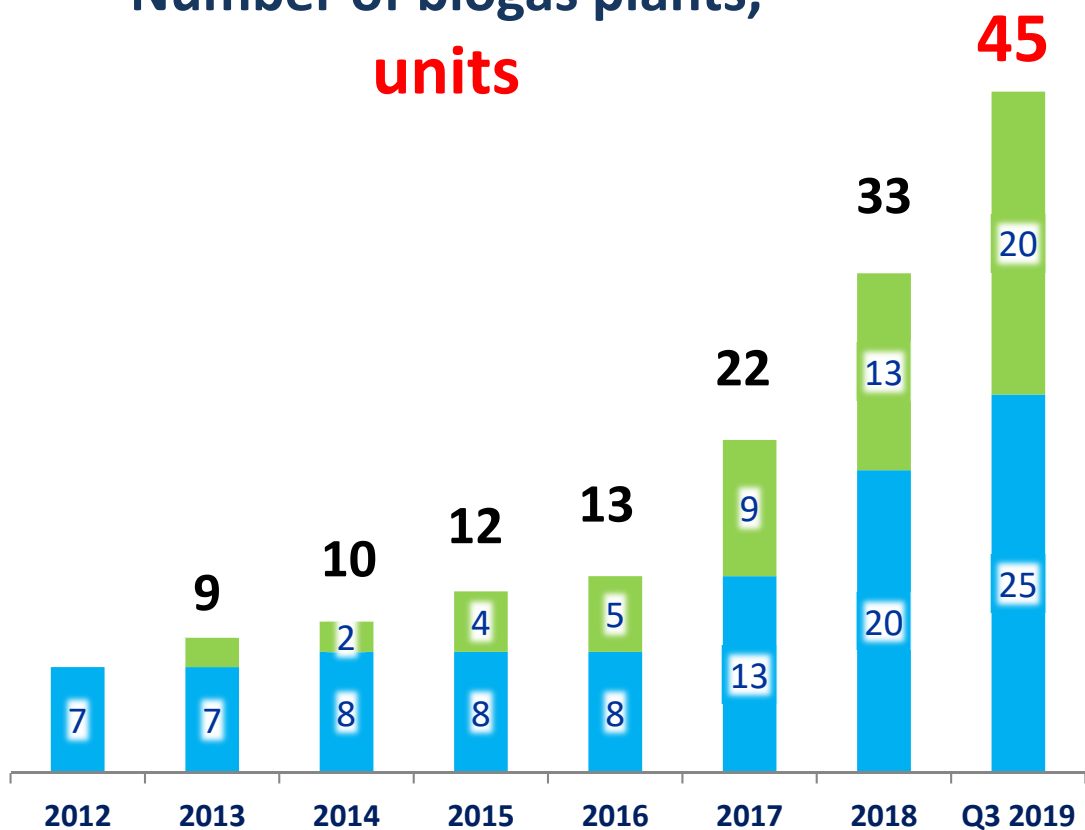




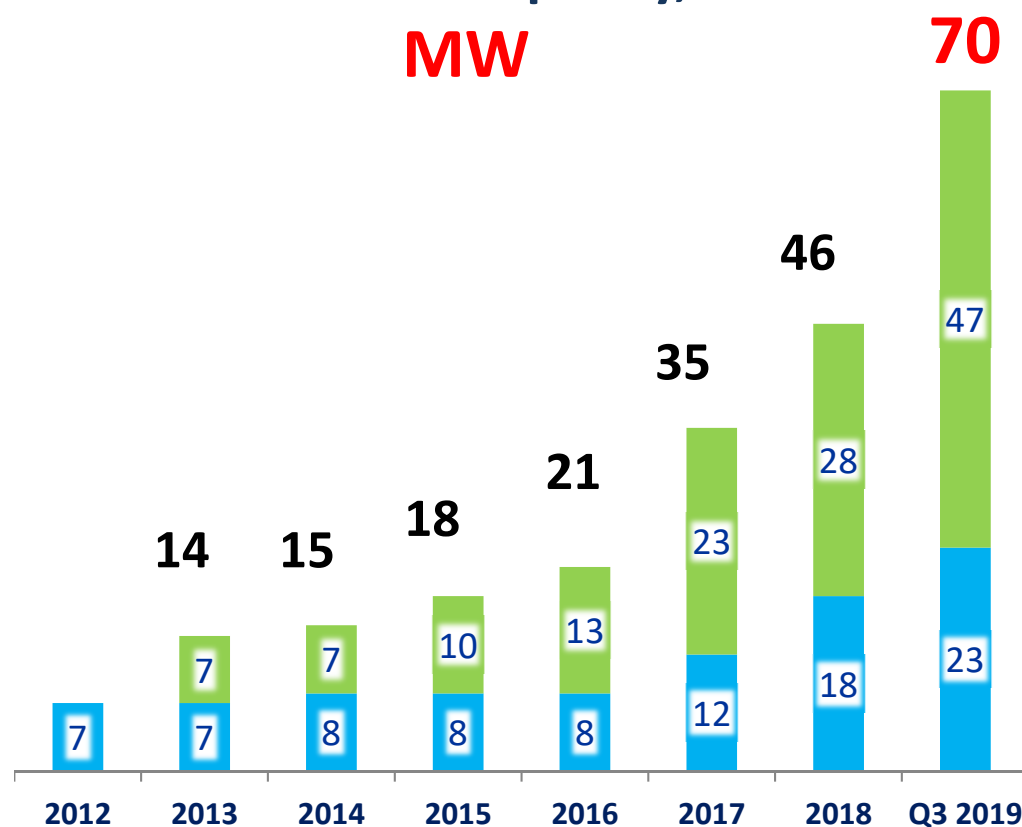
BIOGAS CAPACITY INCREASE IN UKRAINE

(biogas plants operating under the feed-in tariff)

Number of biogas plants,
units



Installed capacity,
MW



- biogas from
agricultural waste



- biogas from landfills





NEW RENEWABLE ENERGY INCENTIVES INTRODUCTION

Conducting pilot
auctions

Revision of the auctions
conducting order

Auctions holding
period

07.2019

Law
adoption

2020

2030



PPA terms
20 years



Obligatory participation:

from 2020:



SPP ≥ 1 MW;



WPP ≥ 5 MW;

Other key points:

All types of RES
will participate
in auctions

Electronic Trading
System
PROZORRO

Bank guarantee
15 000 € for 1 MW
Land and
Specifications for
accession

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

Specifications are valid:
SPP – up to 2 years;
WPP, CHP on biomass,
small HPP – up to 3
years



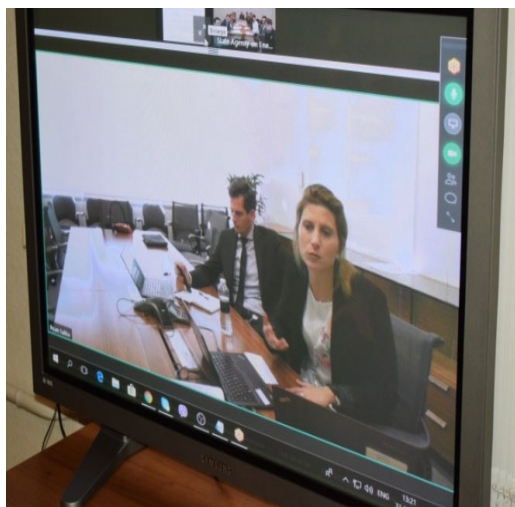
«FEED-IN» TARIFF

€ct/kW*h

	2019	Law 2712-VIII			
		2020	2021	2022	2023
SPP (ground based)	15,02	11,26 (-25%)	10,88 (-2,5%)	10,50 (-2,5%)	10,12 (-2,5%)
WPP (> 2,0 MW)	10,18	9,05 (-10%)	-	-	-
SPP households	18,09	16,26 (-10%)	-	-	-
Hybrid (SPP+WPP) households	-	Introduction of "feed-in" tariff (12,28 €ct/kW*h)			
Biomass	12,39	The tariff is unchanged and stays at the fixed level of 2019 (12,39 €ct/kW*h)			



WEBINAR with IRENA
on the introduction of an auction system
to support renewable energy



Joint International Conference
«Auction Support Scheme in Ukraine for
Renewable Energy Deployment»



Date: October 31, 2018

Date: February 21, 2019

The result: the proposals made by IRENA experts with appropriate practical advice are sent to the Verkhovna Rada Committee on Fuel and Energy Complex for consideration during drafting the Law



On February 24, 2018, Ukraine became a member of the International Renewable Energy Agency (IRENA)



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 set.

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



16



DRAFT LAW OF UKRAINE ON DEVELOPMENT OF THE PRODUCTION OF LIQUID BIOLOGICAL FUELS SPHERE

GOAL:

Creating legislative basis for liquid biofuel production and its use in transport

Draft Law provides :

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

For Gasoline

From January 1, 2021 after the adoption -

not less than **5 %** volume

From January 1, 2023 after adoption -

not less than **7 %** volume

From January 1, 2025 after adoption -

not less than **10 %** volume

Responsibility for non-compliance with quotas

From January 1, 2022 after the adoption, biocomponents must meet sustainability criteria

The issue of stimulating the market for liquid biofuels by abolishing excise tax on the share of liquid biofuels in motor fuels is currently being considered

Import of crude oil and refined products*

4,2 bln \$

5,5 bln \$

+31 %
+1,3 bln \$

2017

2018

Prices for traditional gasoline and with the addition of bioethanol in October 2019 **

1,21 \$

-30 %
(-0,37\$/L)

0,85 \$

\$/L

A-95

A-95 E40

(traditional gasoline) (40 % bioethanol)

* According to the State Fiscal Service of Ukraine

** 23 of October 1\$=24,8500 UAH



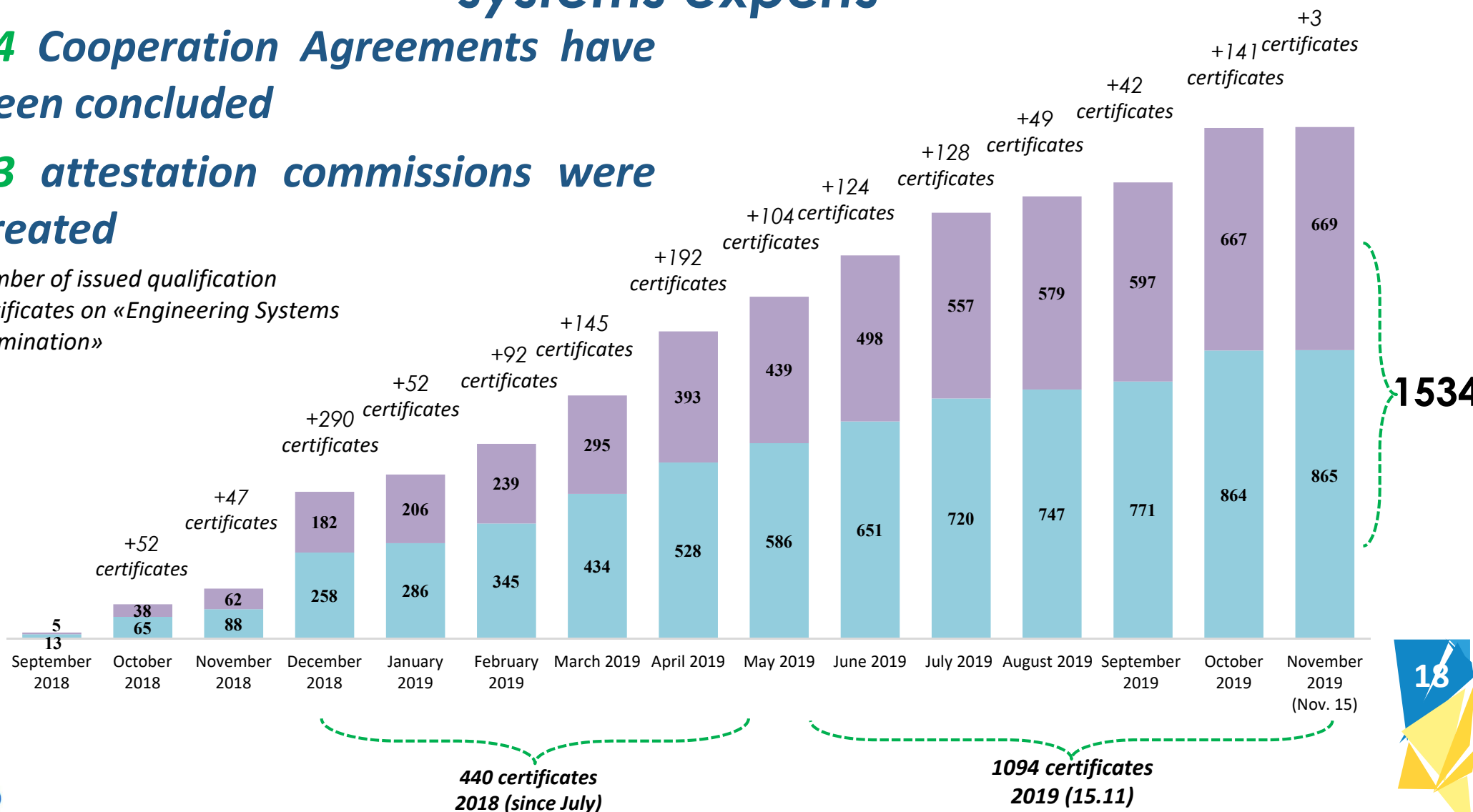
ENERGY EFFICIENCY CERTIFICATION

More than **1500** qualification certificates were issued by for energy auditors and engineering systems experts

✓ **44** Cooperation Agreements have been concluded

✓ **43** attestation commissions were created

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



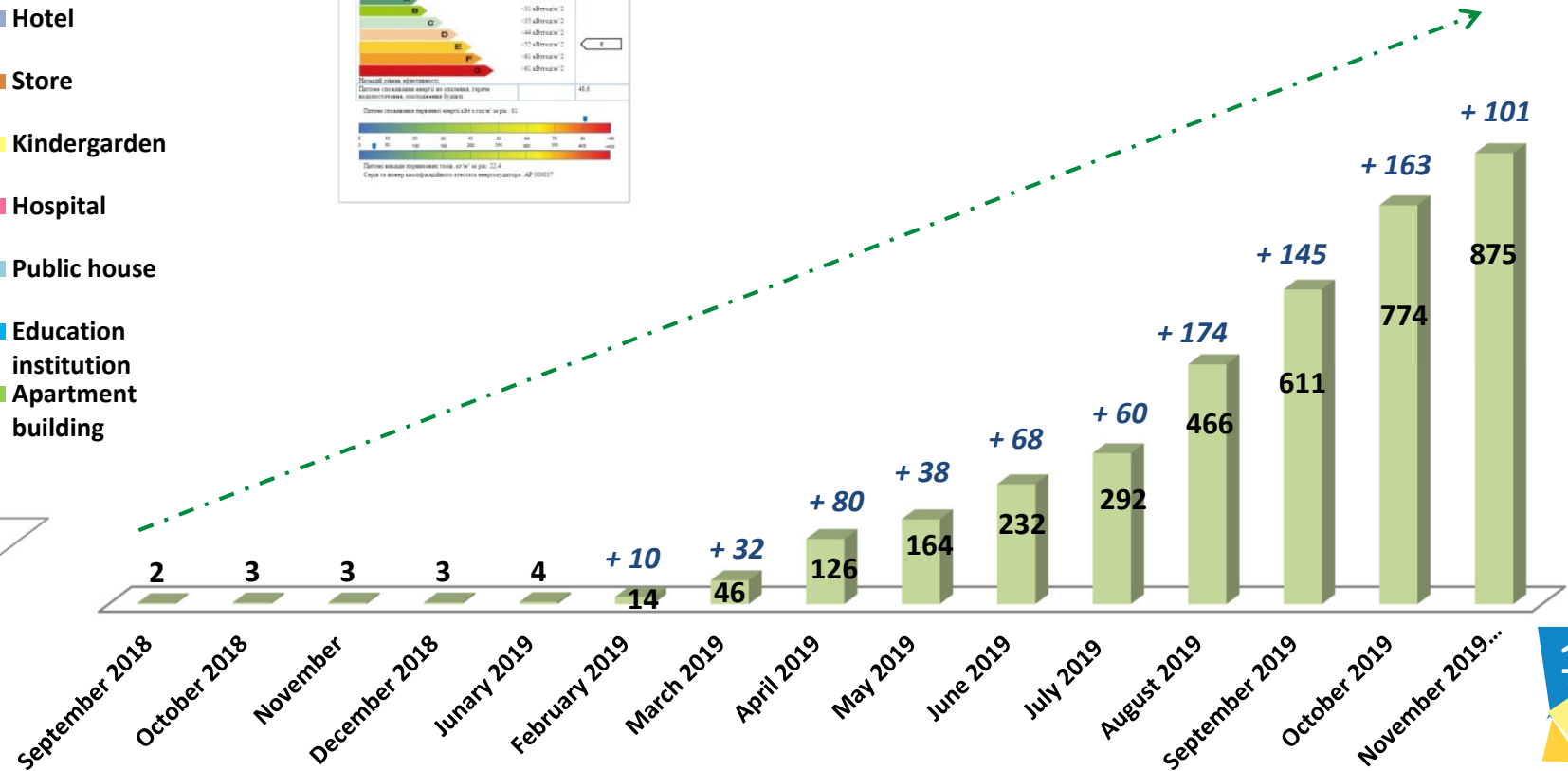
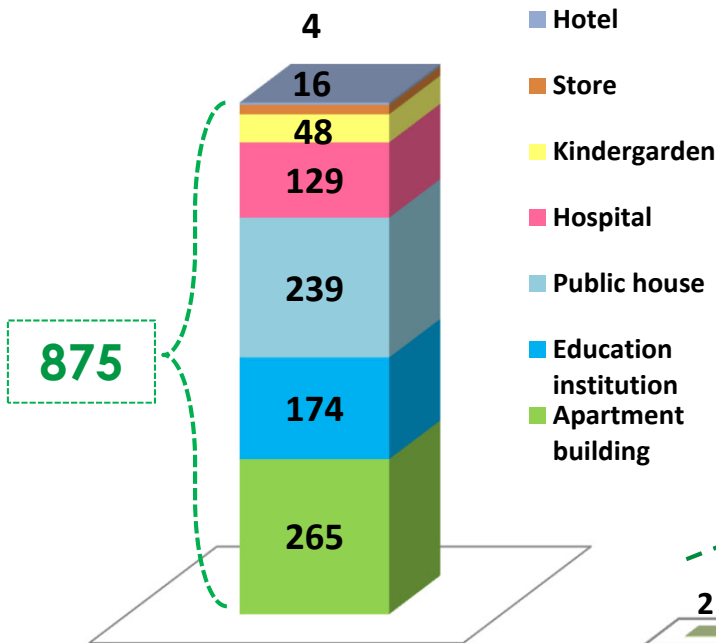
Law of Ukraine
«On energy efficiency of buildings»
of 22.06.2017 № 2118-VIII

introduces mandatory energy efficiency certification
from July 01, 2019

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

*Performed exclusively by a
qualified energy auditor*

***Today certification
of energy efficiency of buildings
is carried out on a voluntary basis***





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-Podilskyy**

Capacity: **45 MW** including:
15 MW – solid bio fuel boiler (5 and 10 MW);
1,8 MW – turbine with ORC module (solid bio fuel);

Fuel: **wood chips, pellets**
Substitution: **8,4 mln m³** of natural gas annually
Investments: **8,2 mln EUR**

Solar panel production plant



The largest solar panel production plant in Ukraine

City: **Vinnytsia**

Power: **200 MW** - 1st stage
(total - 400 MW)

Put into operation: **2019**

New working places: **120**

Investments: **5 mln EUR**

Investor: **KNESS Group**

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**



EXAMPLES OF SUCCESSFUL RENEWABLE PROJECTS

Teofipol biogas complex 15 MW



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)**

Plant for landfill gas degassing



City: **Khmelnitskii**

Start of operation **2017**

Capacity: **659 kW**

Electricity production:

5,13 kWh/year

Investments: **34 mln UAH**

(1,1 mln EUR)

Investor: **Biogas Energy (Ukraine)**

Energy willow (SALIX energy)



Region: **Volyn and Lviv**

Company: **«SALIX energy»**

Plantations area: **1 700 ha**

Crop capacity: **20 t/ha**

Annual growth: **34 000 t/year**

Crop capacity cycle: **25 years**

Heat of combustion:

17,3-18,0 MJ/kg



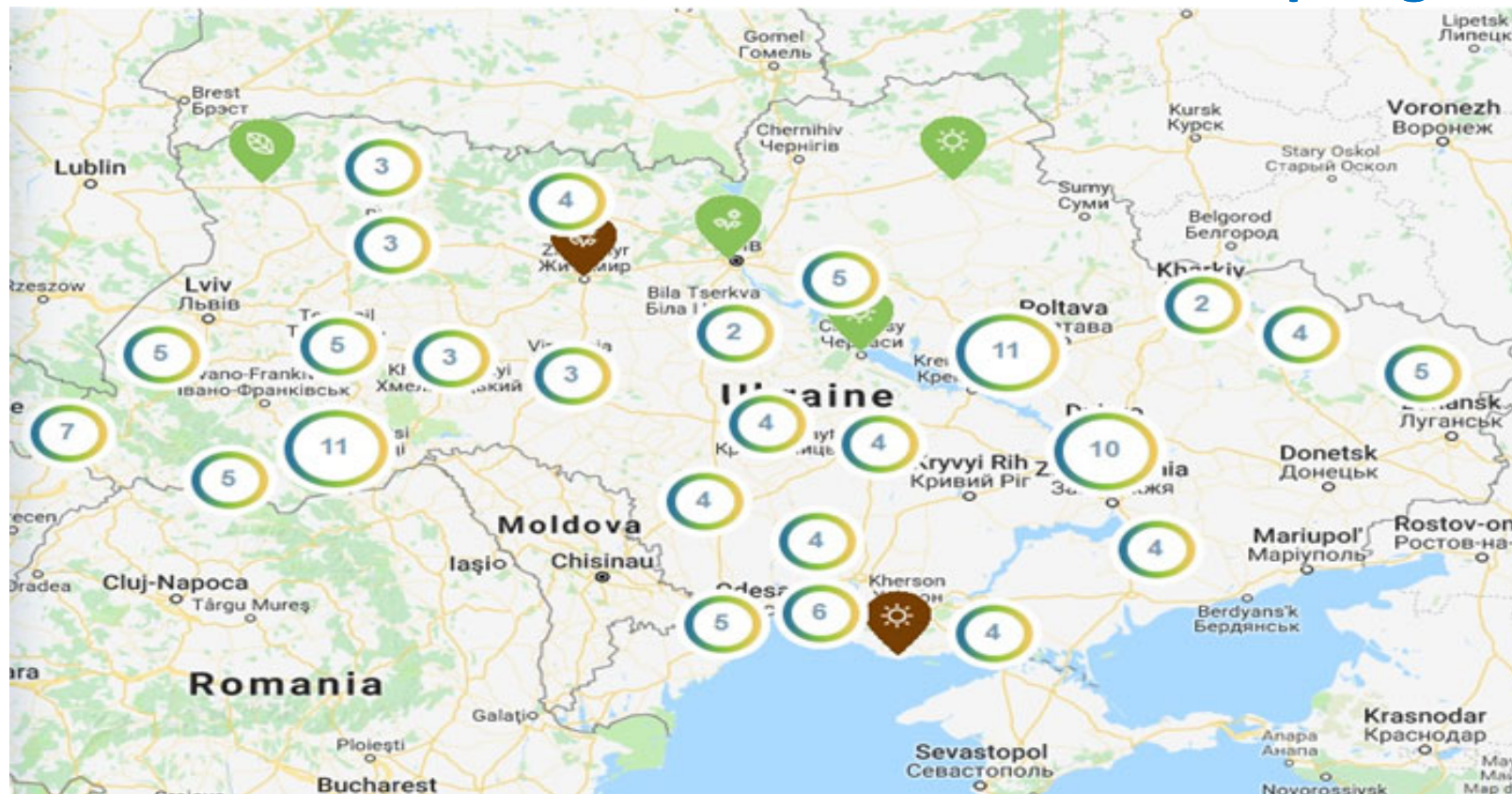
UAMAP comprises detailed information on

103 implemented and
112 potential projects that require
investments & soft loans more than

€ 4,2bln

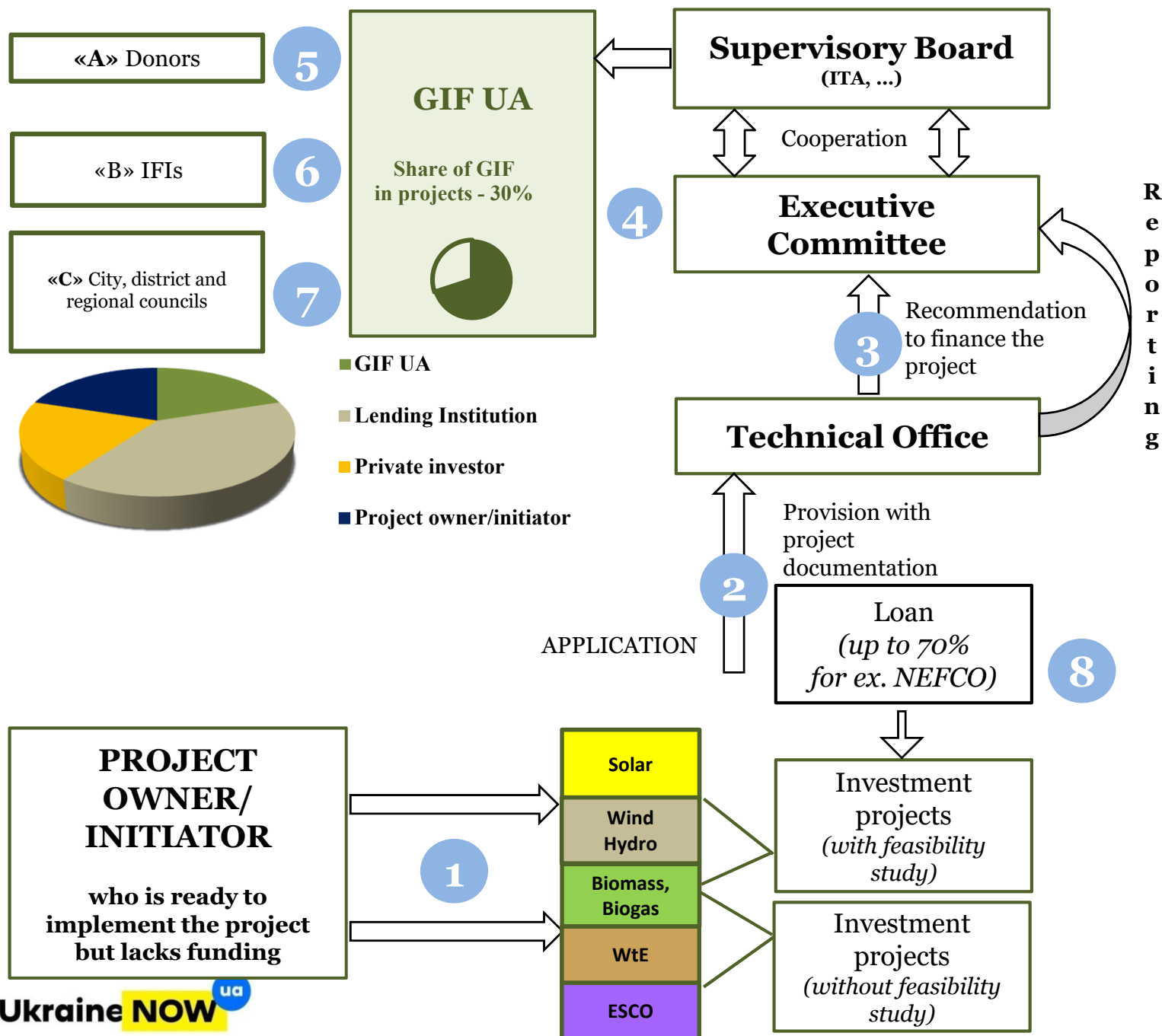
www.uamap.org.ua

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	Biomass	<input checked="" type="checkbox"/>
	Biogas	<input checked="" type="checkbox"/>
	Solar power	<input checked="" type="checkbox"/>
	Wind power	<input checked="" type="checkbox"/>
	Energy efficiency	<input checked="" type="checkbox"/>
	Waste energy	<input checked="" type="checkbox"/>
	Other	<input checked="" type="checkbox"/>





GIF UA: SCHEME OF OPERATION IN BRIEF

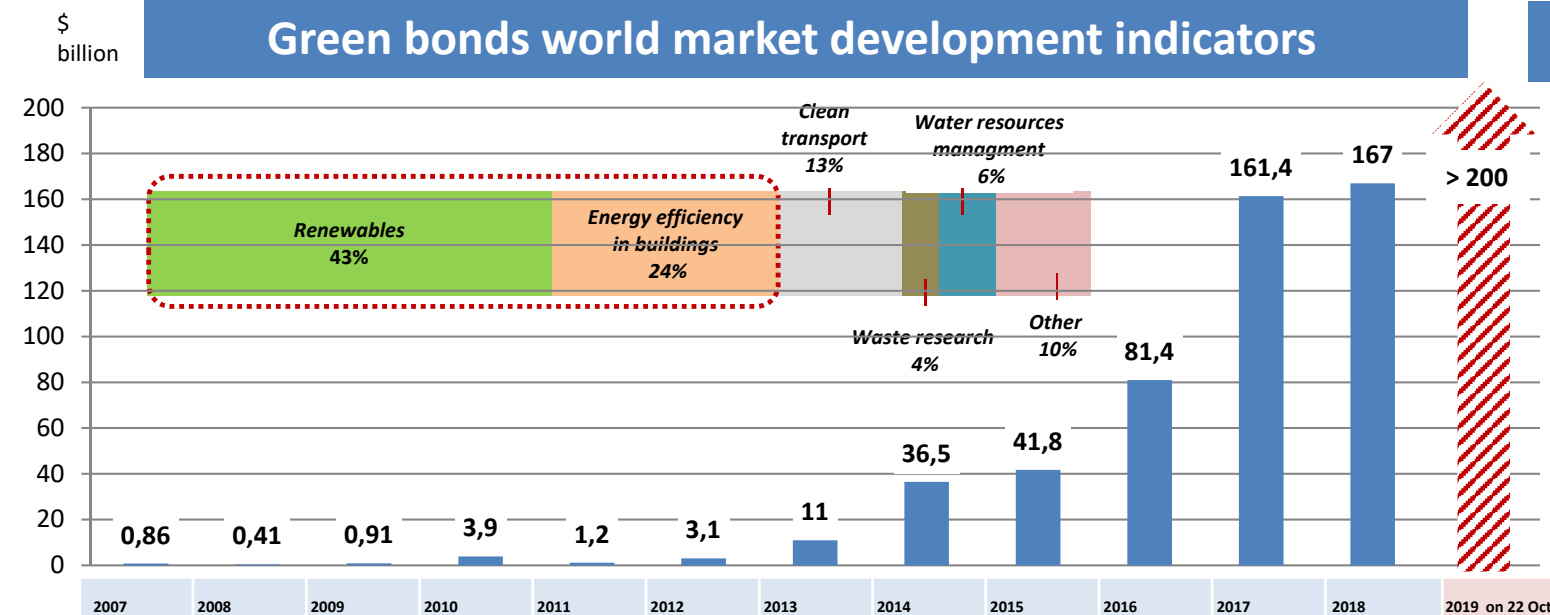


- 1** Customer appeals to GIF and selects interesting project(s) or offers his own.
- 2** Application Form is processed by Technical Office of GIF
- 3** Decision on the type of financing and interaction model with a project
- 4** GIF assesses and offers its equity share in RES project
- 5-6-7** Stakeholders invest in GIF UA
- 8** Banks give loans to the new projects

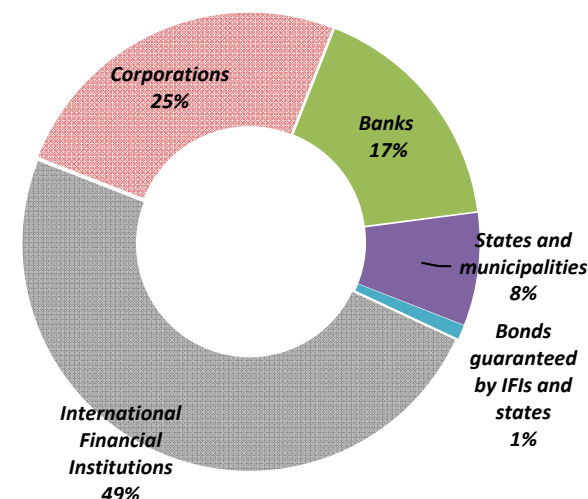


CREATION OF CONDITIONS FOR GREEN BOND MARKET INTRODUCTION IN UKRAINE

Green bonds world market development indicators



Key world issuers



Creation of conditions for implementation of green bonds market

**Draft of Resolution of Cabinet Of Ministers Of Ukraine
«To approve Concept of Green Bond Market Introduction in
Ukraine and Affirm Action Plan of Its Implementation»**



Establishing legal preconditions for
green bond market introduction



Attracting investments to the
green bond market



Contributing green bond
market development

Next stages

Introduction of guidelines key procedures
and incentives for the green bonds market
(in accordance with international)

preparation and implementation of
pilot projects for the issue of green
bonds by different issuers

arranging information campaigns and
attracting stakeholders on Ukrainian
green bonds market



«ON AMENDMENTS TO CERTAIN LEGISLATIVE ACTS OF UKRAINE ON SIMPLIFICATION OF INVESTMENTS ATTRACTION AND INTRODUCTION OF NEW FINANCIAL INSTRUMENTS» DATED 17.10.2019

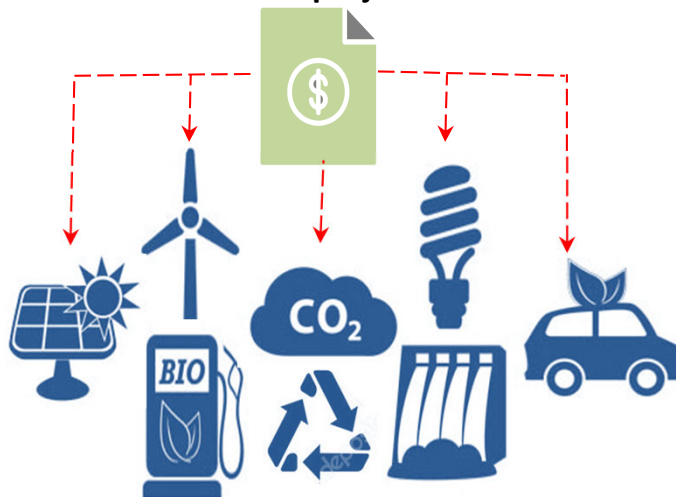
1

Putting green bonds into circulation as a separate class of securities



2

Linking green bond issues to the implementation or financing of an eco-friendly projects, setting specific directions for such projects



3

Establishing a circle of issuers of green bonds and the legal regime for their issue



4

Protection of creditors' rights investing in green bonds

ISSUERS ARE NOT AUTHORIZED TO COMMIT THE FOLLOWING :

X

early termination

X

cancellation

X

another loss of rights to the eco-friendly projects, as well as their encumbrance

5

The principle of targeted use of resources involved from green bond issues



THE ISSUERS ARE OBLIGED TO PROVIDE:

purposeful use of proceeds to finance and / or refinance the costs of eco-friendly projects

6

The principle of information disclosure on the implementation and financing of eco-friendly projects



ISSUERS' ADDITIONAL INFORMATION:

1

REGARDING THE EMISSION

on project characteristics, impact assessment

2

IN THE ANNUAL REPORT

on the use of borrowed funds

26



INVEST in UKRAINE!

State Agency on Energy Efficiency and Energy Saving of Ukraine

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