European Sustainable Energy Seminar - August 17-20/21, 2021
Venue: Nordic Folkecenter for Renewable Energy, Denmark

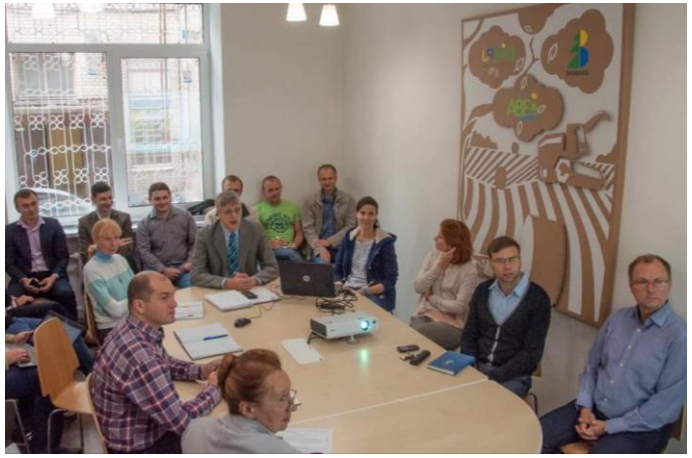
How Covenant of Mayors drive the development?

How municipalities in Ukraine are leading transition?

Oleksandra Tryboi
Renewable Energy Agency, NGO (Ukraine)
www.rea.org.ua

Seminar Proceedings: https://www.inforse.org/europe/seminar_2021_INFORSE-Europe_DK.htm

Profile: REA and its activity



- **Who we are**: Renewable Energy Agency
- **Founded:** January 2003
- **Members**: 12 persons (including 7 PhD)
- **Legal status of organization**: non-profit, non-governmental and non-party.
- **Web site**: www.rea.org.ua
- **REA's Main Goal**: contribution to the sustainable development and improvement of environment by means of introduction of renewable energy and energy saving technologies.
- **Member of the International Network for Sustainable Energy "INFORSE-Europe" and of the Bioenergy Association of Ukraine**

Covenant of Mayors – the world's largest movement for local climate & energy actions

Covenant community

10,706 Signatories

220 Supporters

230 Coordinators

53 Countries

324,804,310 Population covered

7,579 Signatories with submitted action plans

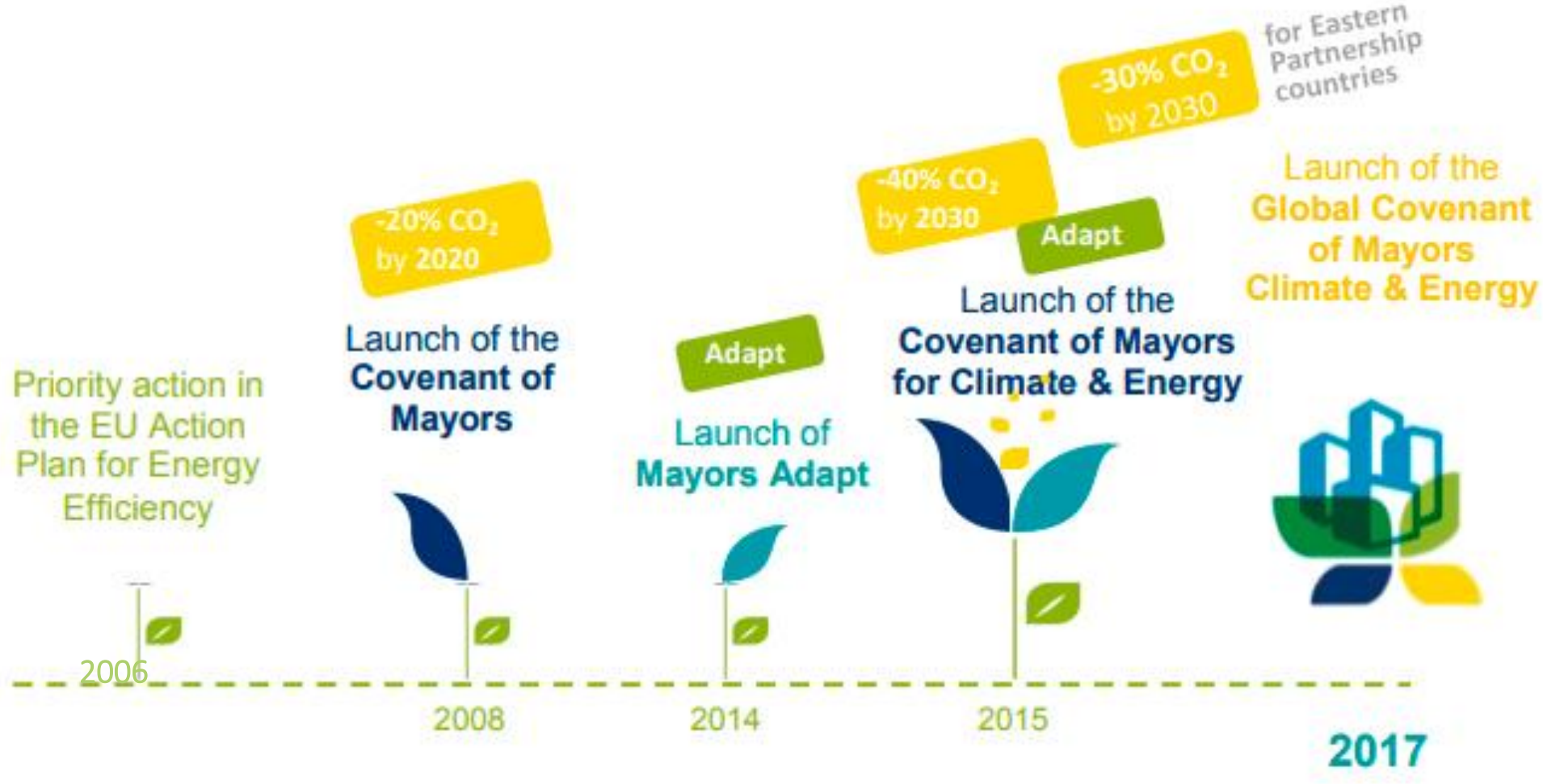
2,537 Signatories with submitted monitoring

72.66% Signatories supported by coordinators and/or supporters

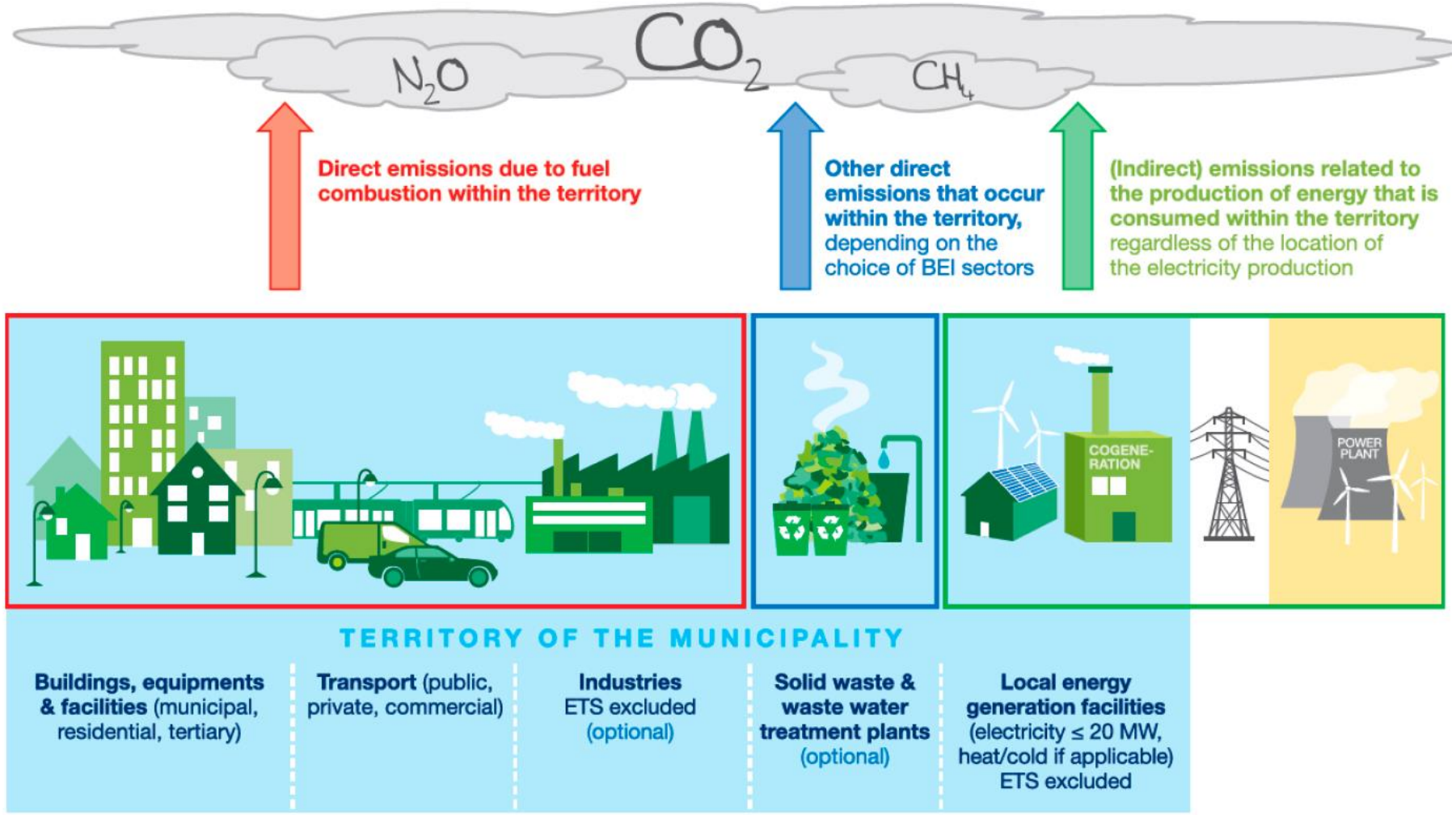
By joining the Covenant of Mayors, a local authority voluntarily commits to reducing greenhouse gas emissions and improving climate resilience through the implementation of a Sustainable Energy (and Climate) Action Plan.

The Covenant of Mayors was launched in 2008 in Europe with the ambition to gather local governments voluntarily committed to achieving and exceeding the EU climate and energy targets.

The evolution of the Covenant of Mayors



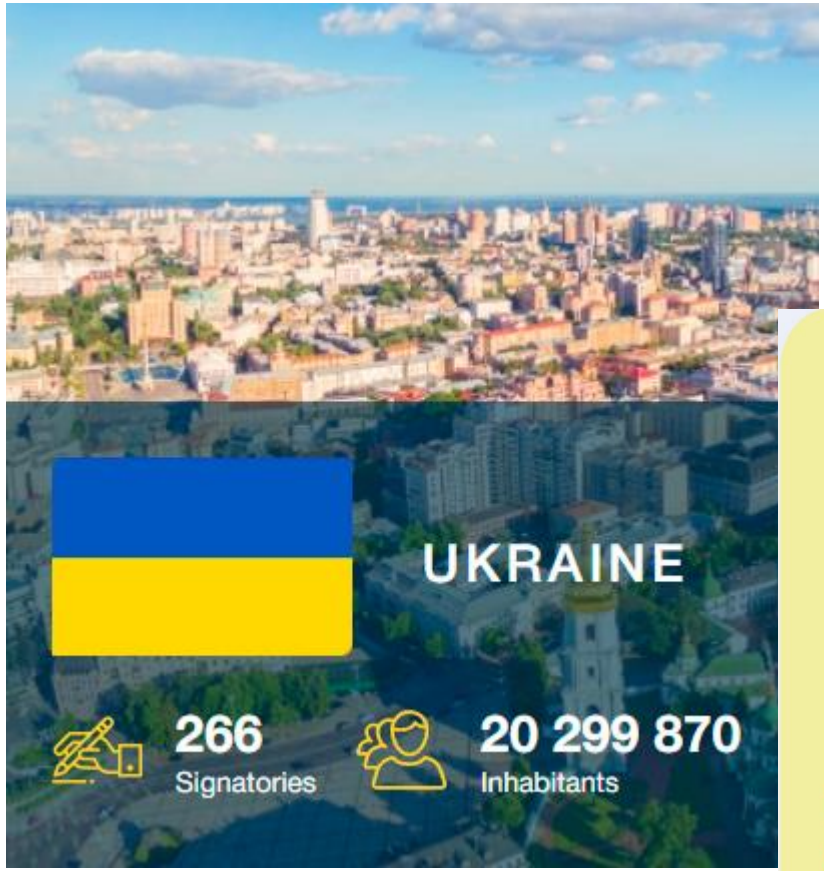
The Covenant of Mayors territorial approach for energy and climate mitigation

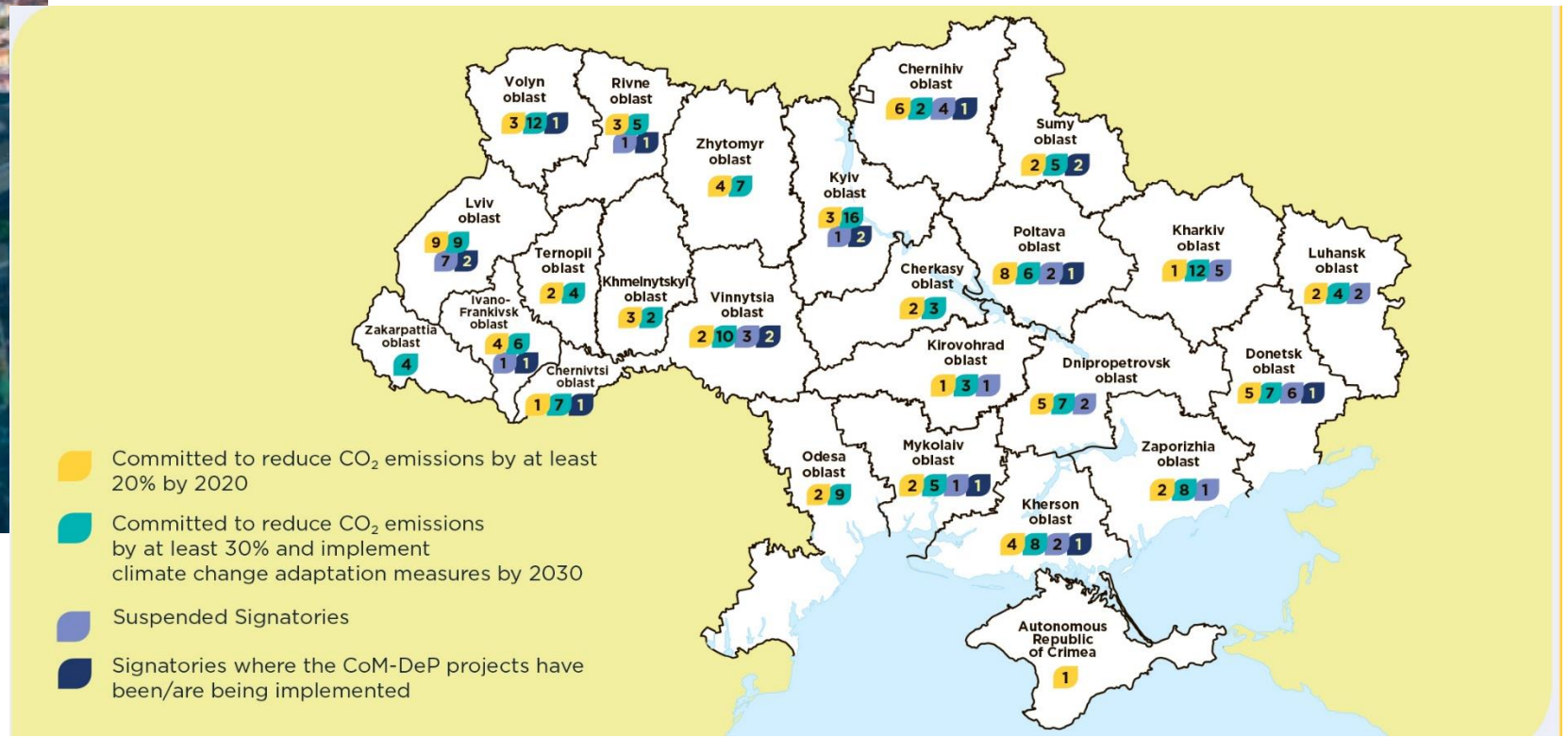


Covenant of Mayor's in Ukraine

EU4Energy

Covenant of Mayors for Climate & Energy in Ukraine

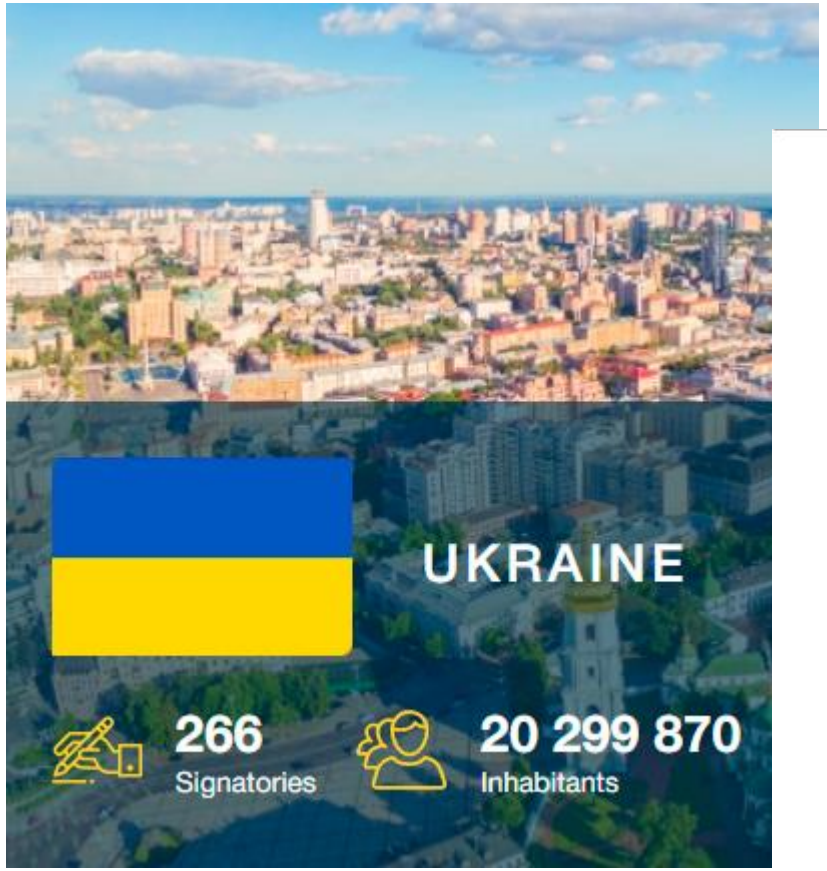




Covenant of Mayor's in Ukraine

EU4Energy

Covenant of Mayors for Climate & Energy in Ukraine



COUNTRY FIGURES & TARGETS*

Total number of Signatories: 277

77	161	39
Committed to 20% by 2020	Committed to 30% and climate change adaptation measures by 2030	Suspended

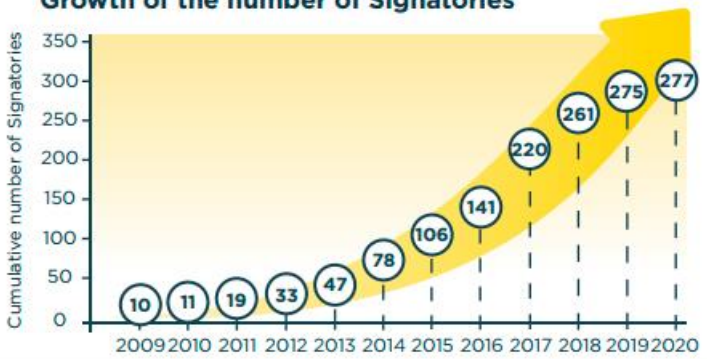
Population

21.5M

each **2nd** citizen lives on the territory of the CoM Signatories

51% of the total country population

Growth of the number of Signatories



Sustainable Energy (and Climate) Action Plans (SE(C)APs) **submitted**:	156
Sustainable Energy (and Climate) Action Plans (SE(C)APs) **accepted**:	67
Monitoring reports submitted:	41

Expected results of implementing 156 submitted SE(C)APs

Commitments related to CO_2 emission reduction:

24.8M tCO_2/a

= annual emissions of **17.1M** new cars

= planting **1.1Bn** trees

= replacing **895M** old bulbs with LEDs

Energy savings to be achieved:

42K GWh/a

= annual gas consumption of **3.8M** households in 2019

www.com-east.eu

* as of April 1, 2020

/CovenantOfMayorsEast

Covenant of Mayor's in Ukraine

The EU4Energy Initiative covers all EU support to improve energy supply, security and connectivity, as well as to promote energy efficiency and the use of renewables in the Eastern Partner countries Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova and Ukraine.

It does this by financing projects and programmes that help to reform energy markets and to reduce national energy dependence and consumption.

Over the longer term, this makes energy supply more reliable, transparent and affordable, thus reducing energy poverty and energy bills for both citizens and the private sector.

More information on:
www.EU4Energy.eu

EU4Energy

Covenant of Mayors for Climate & Energy in Ukraine

Demonstration Projects Eastern Partnership

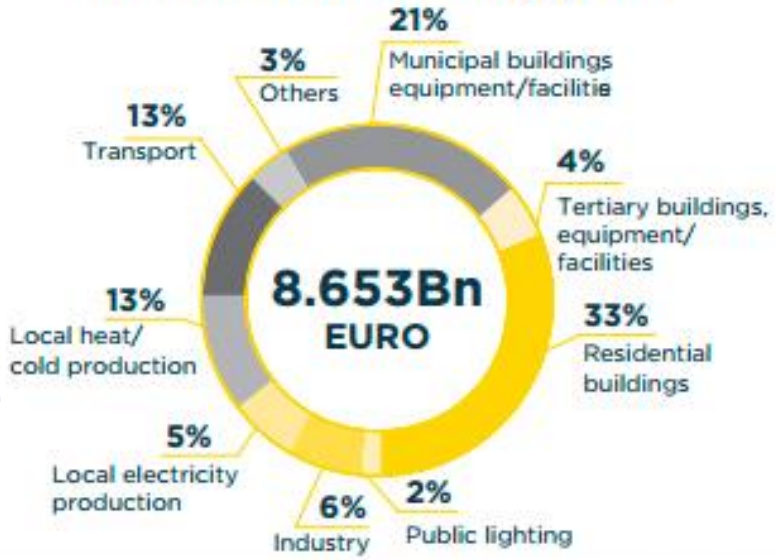
17 Demonstration Projects have been/ are being implemented in Ukraine:

PHASE I	PHASE II
DOLYNA	CHERNIVTSI
HOLA PRYSTAN	DUBNO
KONOTOP	HNIVAN
KRAMATORSK	MYRHOROD
MENA	SUMY
NOVOVOLYNSK	UKRAINKA
SAMBIR	
SLAVUTYCH	
VOZNESENSK	
ZHMERYNKA	
ZHOVKVA	

More information on: http://com-dep.enefcities.org.ua/

Total investments planned in 156 submitted SE(C)APs

PHASE II



www.com-east.eu

* as of April 1, 2020

Cities of Ukraine with ambitious goals for the transition to RES

City	Population, thousand people	Targets		
		RES	Energy Efficiency	CO_2 Reduction
Bakhmut	80,5	20% until 2020*	-21% in 2020 compared to 2012	-21% in 2020 compared to 2012
Kyiv	2 954,7	27% until 2020*	-21% in 2020 compared to 2013	-34% in 2020 compared to 2013
Zhytomyr (100 RES)	264,3	n/a	n/a	-21.4% in 2020 compared to 2010
Kamianets-Podilskyi (100 RES)	97,9	20% in 2020 (GFEC)	-20% in 2020 compared to 2012	-20% in 2020 compared to 2012
Lviv (100 RES)	717,5	11% in 2020 (GFEC)	-20% in 2020 compared to 2007-2009	-21% in 2020 до 2009
Poltava (100 RES)	283	n/a	n/a	-22.4% in 2020 compared to 2010
Chortkiv (100 RES)	28,4	3% in 2030 (GFEC)	-28% in 2030 compared to 2013	-32% in 2030 compared to 2013
Trostianets (100 RES)	20,6	28% in 2030 (GFEC)	-42% in 2030 compared to 2013	-58% in 2030 compared to 2013
Korosten	63,3	12.6% in 2020 (GFEC)	-22% in 2020 compared to 2012	-21% in 2020 compared to 2012

* For the heating and cooling sector (DH and individual) and transport

Analysis of Korosten SECAP till 2020

Location: Zhytomyr region

Established: 705

Population: 63,3 thousand people

Strengths and weaknesses of SEAP-2020 of Korosten (Zhytomir region, Ukraine)

STRENGTHS	WEAKNESSES
Availability of transparent data on the **energy balance** for the period 2008-2014	Insufficient justification for **choosing the base year** (2012)
Quite **ambitious goals** given the relatively limited local budget and the basic state of RES use	Lack of transparent division of energy types into 3 types according to the principle of final consumption: **electricity, heat (heating) and cooling, transport**.
Setting goals for three components - RES, energy efficiency, reduction of CO2 emissions in relative and absolute terms	Sometimes **contradictions between relative and absolute goals** (for example, 12.6% RES)
The right priority of the goals is to focus on the cheapest measures with the maximum effects in the sectors with the highest energy consumption (90% of all measures (on energy) concern the heating and cooling sector)	In some cases, the **mixed use of the terms** "final energy consumption (FEC)" and "total primary energy supply (TPES)"
The use of biomass energy is a major measure in the heating and cooling sector	**Imbalance of measures in some sectors**, as well as the lack of a description of tools (at the local level) that will help their implementation (67% of all RES is occupied by one measure - gas replacement in domestic boilers)
Detailed definition of indicators for each activity, subsector, consumer category, and for the city as a whole	Minor inaccuracies in the determination of CO_2 emissions / reductions
Applying an integrated approach to planning activities that complement each other	Lack of comparison of measures according to relative indicators (**eg "investment / CO_2 reduction"**)
Ability to **transparently monitor the results** in accordance with the defined indicators for each event	**Insufficient information on sources of financing** (investment plan) and terms of implementation of measures
The city's persistence in **working with international financial institutions** to attract external funding for SECAP activities	

Energy balance of Korosten according to SEAP

Table 3.2.

Consumption of energy resources by selected sectors in 2008-2014, in aggregated units, MW*hour

#	Sectors included into BEI	2008	2009	2010	2011	2012	2013	2014
1. Municipal buildings, equipment/facilities								
1.1.	Natural gas	2 325,2	2 102,7	2 144,5	1 443,4	296,1	746,3	579,2
1.2.	Electricity	2 434,8	2 524,6	2 268,3	2 345,7	2 230,6	2 036,4	2 179,4
1.3.	Water supply and sewerage	162,5	207,1	170,4	166,9	131,0	147,7	159,2
1.3.1.	Water supply	81,7	123,8	103,7	102,8	77,3	86,9	89,4
1.3.2.	Sewerage	80,8	83,3	66,7	64,1	53,7	60,7	69,8
1.4.	Heat	18 026,5	16 282,0	18 866,2	18 049,8	17 420,6	18 162,6	13 524,5
1.5.	Coal	0,00	0,00	1 259,28	35,28	36,00	37,44	36,00
1.6.	Wood	0,00	0,00	34,84	0,00	34,84	0,00	17,42
Subtotal		**22 949,0**	**21 116,4**	**24 743,5**	**22 041,0**	**20 149,1**	**21 130,3**	**16 495,7**
2. Residential buildings								
2.1.	Natural gas	242 637,0	237 143,1	241 767,2	236 141,9	248 099,3	242 392,5	229 471,1
2.2.	Electricity.	41 574,0	43 624,0	49 659,0	46 848,0	52 199,0	54 257,0	53 771,0
2.3	Water supply and sewerage	2 330,4	2 861,6	2 785,5	2 756,0	2 664,9	2 894,4	3 025,4
2.3.1	Water supply	1 238,2	1 803,4	1 798,1	1 760,8	1 640,2	1 778,4	1 795,3
2.3.2	Sewerage	1 092,3	1 058,2	987,4	995,1	1 024,7	1 116,0	1 230,1
2.4.	Heat	102 526,9	114 562,0	131 411,3	126 237,3	143 581,5	129 694,5	109 246,8
Subtotal		**389 068,4**	**398 190,7**	**425 623,0**	**411 983,2**	**446 544,8**	**429 238,4**	**395 514,2**
3. Municipal street lighting								
3.1.	Electricity	1 132,90	1 131,70	1 323,90	1 476,40	1 423,80	1 156,50	1 118,20
Subtotal		**1 132,90**	**1 131,70**	**1 323,90**	**1 476,40**	**1 423,80**	**1 156,50**	**1 118,20**
4. Transport								
4.1.	Liquefied gas	734,3	1101,5	1285,0	1468,6	1468,6	2478,3	2478,3
4.2.	Diesel fuel	4948,6	4398,7	4398,7	4178,8	4178,8	2199,4	2199,4
Subtotal		**5682,9**	**5500,2**	**5683,8**	**5647,4**	**5647,4**	**4677,6**	**4677,6**
5. Industries outside ETS								
5.1.1	Heat	18 229,8	20 945,3	23 782,2	22 858,3	24 270,1	21 930,8	17 239,0
5.1.2	Water supply	457,9	714,1	673,6	715,1	667,1	710,5	686,5
	Subtotal	**18 687,73**	**21 659,40**	**24 455,78**	**23 573,46**	**24 937,20**	**22 641,37**	**17 925,59**
	Total	**437 520,92**	**447 598,38**	**481 829,98**	**464 721,37**	**498 702,26**	**478 844,26**	**435 731,40**

The problem of the target of 12.6% RES

1. It is unclear from which base 12.6% is deducted. If the base is in 2012, then the absolute value of production should be 62,000 MWh. This is clearly an unattainable goal.
2. The indicated figure of 18,752 MWh with RES is 3.7% (from the level of 2012) and 5% (from the level of 2020 -22% reduction of energy consumption);
3. It is unclear what is the base share of RES in 2012.
4. The amount for different RES measures does not match

Measures for the use of RES in the SEAP

# (SEAP)	RES type	Energy production, MW*h/a (heat)	CO_2 reduction, tCO_2	Вартість заходів, thousand UAH
2.4	Re-equipment of domestic boilers on RES	12,404	2,505	16,500
2.5	Biomass boilers in District Heating	3,486	704	26,986
1.7	Biomass boilers (budgetary sector)	1,540	311	440
1.6	Solar collectors (budgetary sector)	85	18	1,424
1.5	Heat pumps (budgetary sector)	207	48	1,383
ВСЬОГО		17,722*	3,586	46,733

* The amount does not coincide with 18,752 MWh (difference in the sector "Municipal buildings")

1 EUR = 32 UAH

Minor errors in the calculation of CO_2 reduction

1. Specific (per unit of reduced energy consumption) CO_2 reductions from thermal modernization and conversion of non-biomass boilers are correlated as 1.64; they should not be so different;
2. A non-conservative CO_2 emission factor is used (for measures aimed at replacing electricity); We propose to use the approved calculated coefficient with reference to official sources, for example :

Lahmeyer, 2010:
http://encon.sumdu.edu.ua/doc/methodics/Baseline_Study_Ukraine_Final_English.pdf
EBRD, 2008: https://www.ebrd.com/downloads/about/sustainability/cef.pdf
Latest Resolution of National DFP (2011, valid):
http://search.ligazakon.ua/l_doc2.nsf/link1/FIN64245.html
List of JI projects: ttps://ji.unfccc.int/JI_Parties/DB/E6OJWRL8OP3UCSQ2FVQZX7TT3CL1PV/viewDFP

An example of the disproportion of one of the SEAP measures

SECAP component	Cost, thousand UAH	Reduction of energy consumption, MW*h/a	Energy production from RES, MW*h/a	CO_2 Emission reductions (t/a)
The absolute contribution of the “Residential buildings” sector to the SEAP	163,316.20	84,956.89	15,891.88	24,238.01
All SEAP sectors	222,104.24	111,251.50	18,752.29	30,815.24
Relative contribution of the "Residential buildings" sector to the SEAP	73.5%	76.4%	84.7%	78.7%

Fulfilment of SEAP goals as of the end of 2018

SEAP goals	Plan(2015)	Fact(2018)	Difference Fact - Plan	Fact / Plan ratio
REA, MW*h	18,752	2,746*	-16,006	15%
Energy efficiency, MW*h	111,251	121,518	10,267	109%
CO_2 reduction, t CO_2	30,815	26,710	-4,105	87%

* - achieved by one measure "Conversion of boilers from gas to alternative fuels in the DH" (Municipal utility "Teplozabezpechennia")

Reasons of the reported situation of the RES targets' underachievement

- SEAP planning mistakes, leading to lack of diversity of measures contributing to cumulative RES target: reclining too much on one single measure in one single subsector "Replacement of natural gas with alternative fuels in residential buildings", overestimation of the effect, which does not happen;
- Opposition and unconfidence of population to replace their existing boilers with new technology – small-scale biomass household boilers, which require more action and knowledge of operator;
- Practical absence of forceful instruments of municipality to make population to implement the measure;
- Strong initiative and priority of individuals (population) to implement energy efficiency measures at first, and switching to renewable energy sources only after the effect from energy efficiency measures will arise;
- Lack of investments for implementation of all measures planned in SEAP;
- Peculiarities of investment management of municipal and state funding with prioritizing of available funds direction on energy efficiency, while financing of renewable energy on "residual principle";
- Lack of cooperation with international financing programmes, which has main focus on increase of the renewable energy share. The existing programs (EU/UNDP/GIZ/E5P) have main focus on energy efficiency in all sectors and renewable energy in district heating only, but not on renewable energy for individual heating.

SECAP-2030 (project) - main goals

Components of SECAP goals - 2030	Goal (%)	Goal (absolute values)
RES	"...increase in the share of renewable energy sources by 20% compared to the base year 2012"	10 726 MW*h/a
Energy efficiency	Reduction of energy consumption by **~ 36%** compared to 2012 (own calculation)	158 550 MW*h/a
CO_2 Reduction	**30%** compared to 2012	47 703 t $CO_{2\text{-eq.}}$/a

Total investments by 2030: UAH 931 million

Error corrected: clear division by type of energy, final energy balance, transparent information on financing, justification of CO_2 emission factors for different sectors.
Migrating errors: definition of the base year, imbalance of measures, lack of relative indicators of comparison, unclear definition of the target of RES.

European Sustainable Energy Seminar - August 17-20/21, 2021
Venue: Nordic Folkecenter for Renewable Energy, Denmark

ORGANISERS:

Thank you for your attention!

More about SELNEE project:
https://rea.org.ua/projects/472/
https://www.inforse.org/europe/SELNEE.htm

SELNEE project partners:

The project is financially supported by the Civil Society Fund of CISU – Civil Society in Development, Denmark.