Warsaw Energy
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URBAN LEARNING

HORIZON 2020

fall in love with Warsaw green

ACTIONS RELATED TO SMART ENERGY CITIES IN THE CITY OF WARSAW

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Growing Smart Energy Cities - Berlin, 31st May 2017

BERLINER Energie AGENTUR

The City of Warsaw

Main features of the capital city of Poland:

- administrative area: 517 km²
- inhabitants within this area: 1.7 million
- inhabitants within agglomeration: up to 3.3 million
- density of population: 3300 per km²
- registered enterprises: 360 000
- registered vehicles: 1.2 million
- budget expenditure for 2017: € 3.9 billion (PLN 16.5 billion)
- unemployment: 2.9%
- 78 universities and colleges
- 270 thousand students

Sustainable Energy Action Plan

Covenant Of Mayors initiative

Warsaw joined in 2009

Key document: *Sustainable Energy Action Plan for Warsaw in the perspective of 2020 (SEAP)*

SEAP target – improvement of energy efficiency and reduction of GHG emissions - calculated as:

- 80% of CO_2 emission in 2020 comparing to the base year,
- 80% of energy consumption in 2020 comparing to the base year,
- at least 20% of energy will be produced from RES,
- information and promotion actions regarding energy management/conservation will be implemented.

In 2015 Warsaw prepared, within the new Polish scheme, the **Low-Carbon Economy Plan**, based on SEAP and being its enhancement. It covers specific projects with secured funding, will help in getting additional funds for their implementation and will give us a general vision of low-carbon Warsaw in future.

Year	Energy consumption [MWh/year]	CO_2 emission [$MgCO_2$/year]
2007	28 394 431	12 952 984
2020	**22 715 545**	**10 362 387**

SEAP targets for 2020 compared to the base year 2007

Low-Carbon Economy Plan

Adopted by the City Council in December 2015, secures spending of € 4 billion until 2020 for investments improving energy efficiency and air quality, including also low-emission transport

Goals of the Low-Carbon Economy Plan

support in achieving the objectives set out in the climate and energy package

- **CO_2 emission reduction**
- **Reduction of energy use**
- **Increasing share of RES**
- **Increasing energy efficiency**

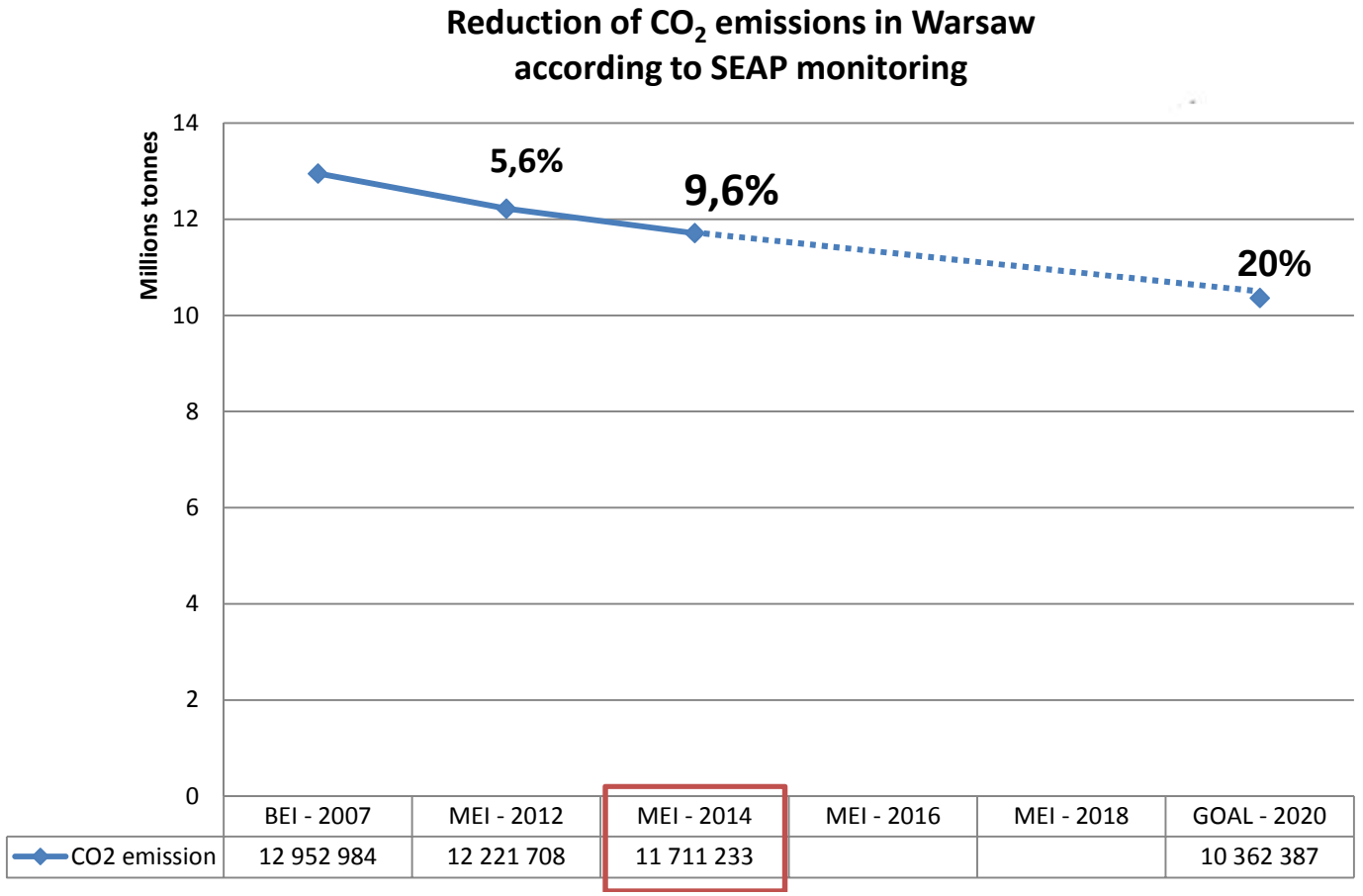
improving air quality in the City

increasing the quality of life of residents and competitiveness of the economy

SEAP– main activities on reduction of energy consumption

No.	Tasks	Planned energy savings in 2020	Reduction of CO_2	Investments
		[MWh/a]	[t/a]	[million €]
1	Complex buildings retrofit in housing sector	1 399 200	415 562	1020
2	Complex buildings retrofit in service sector	1 150 783	341 782	612
3	Complex buildings retrofit in public sector	359 718	106 836	191
4	Modernization of heating system (e.g. replacement of local heat sources with more efficient heat sources)	105 000	31 185	87
5	Retrofit of industrial buildings	185 820	55 189	49
6	Modernization of indoor lighting	85 228	83 693	9
7	Modernization of street and outdoor lighting	55 000	54 010	25
8	Replacement of old home electronic equipment	16 667	16 367	57
9	Replacement of old IT equipment	22 727	22 318	38
10	Implementation of part of tasks listed in the Strategy for the Sustainable Development of the Warsaw Transportation System to the Year 2015 and Beyond	3 268 766	843 342	964

Successful implementation of SEAP - Warsaw becoming energy smarter city



Related Warsaw activities - transformation of energy sector

- The City of Warsaw supports development of dispersed installations renewable energy sources employed by small producers both using renewable energy for their own purposes and selling it to the grid - prosumers.

- The above is connected with supporting modern electric mobility, in which vehicles and their charging infrastructure are adapted to transferring electricity back to the grid.

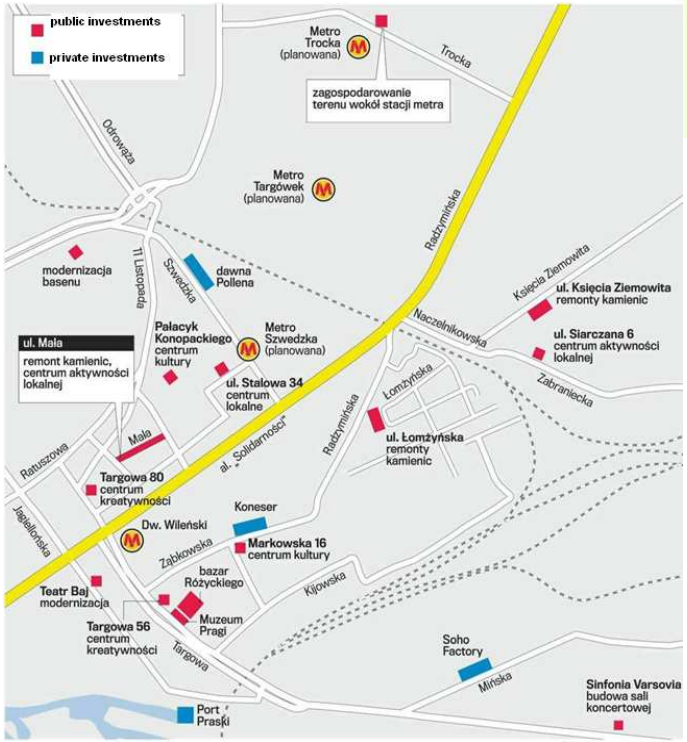
- We are developing *waste-to-energy* as well. Extension and modernization of the ZUSOK Solid Waste Incineration Plant (up to 2019, >300 000 tonnes of incineration capacity) and construction of another incineration plant in cooperation with private partner after 2018, shall result in share of energy from waste increased from <1% in 2009 to 4% around 2020.

- All these actions implemented and planned for next years in our city – differentiating fuel mix (biomass, gas – with recently opened large block utilizing biomass in Warsaw CHP), utilizing e-vehicles as backup reservoirs of electricity and reducing energy consumption by various methods (e.g. by changing consumers behaviour or introducing smart metering) are improving energy security of the City of Warsaw and its adjacent municipalities.

Related Warsaw activities – second phase of revitalization programme in years 2015-2022

>250 million euro for Praga districts of Warsaw

- Housing policy is the largest part of the Programme.
- Construction of new blocks of flats and renovation of old ones with total investments equal to € 130 million.
- 5 000 flats will be connected to district heating.
- Level of investment in this project - € 17 million.
- The historical area of Praga (located, unlike the rest of the City, on the right bank of the Vistula River) is divided into 3 districts: Praga Północ, Praga Południe and Targówek.
- The state of housing and energy solutions in the area requires huge improvements.

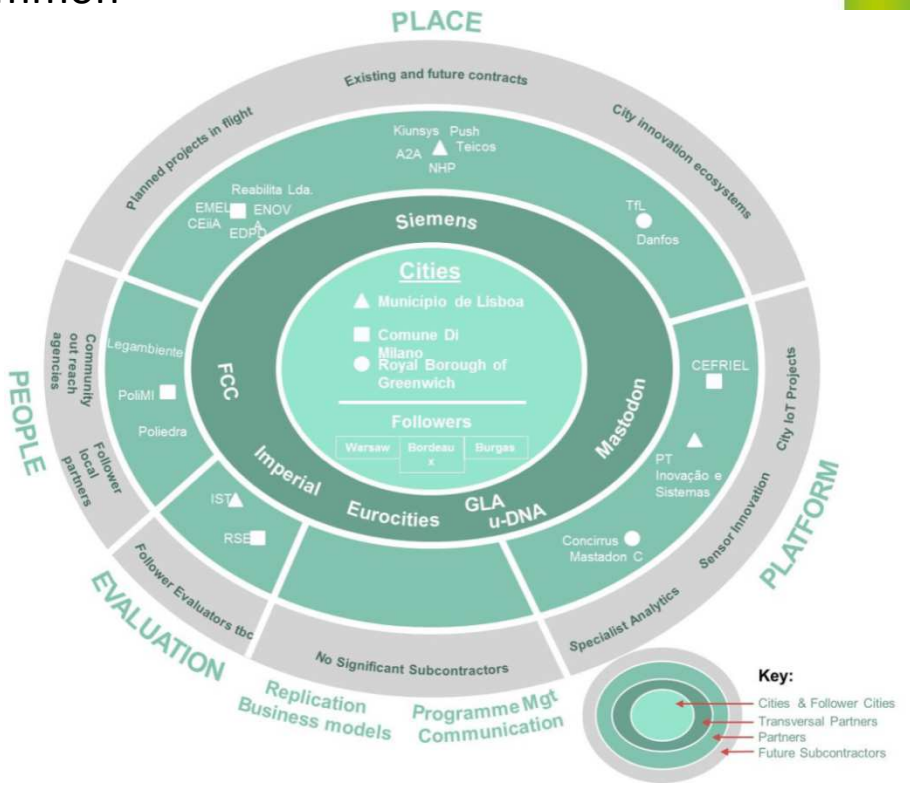


- Possible enhancement of existing plans with **integrative planning and smart cities solutions**.

Related Warsaw activities - EU projects

Sharing Cities – SHAR-LLM *(on smart cities)*

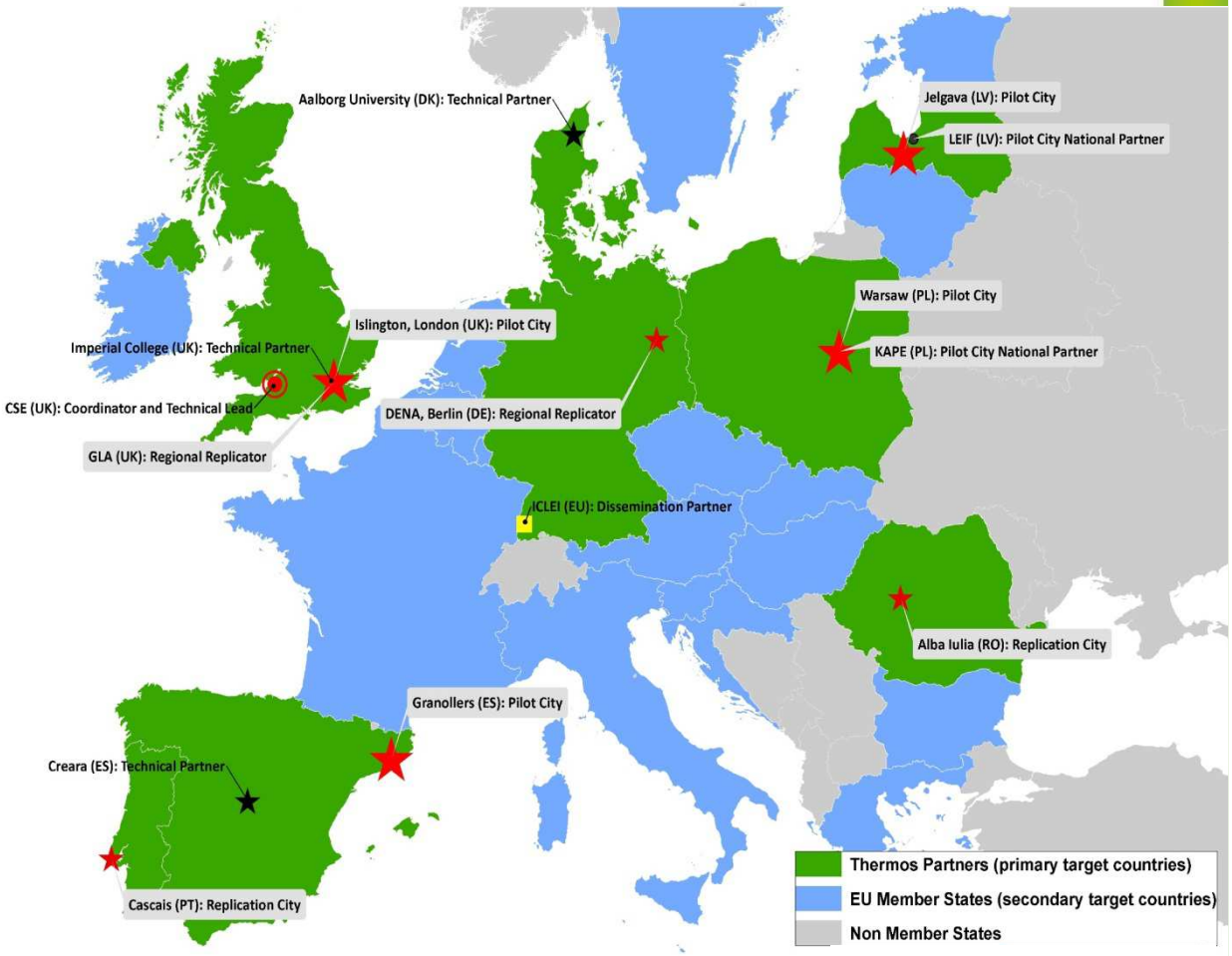
- Call SCC-01-2015. The largest H2020 Warsaw's project (35 partners, EU financing - € 25 million, total budget - € 28 million). Lighthouse cities – London (coordinator), Milan, Lisbon. Follower cities – Bordeaux, Burgas, Warsaw.
- SHAR-LLM is a proving ground for better, common designs which cause industry and cities to collaborate internationally; which will result in affordable solutions; which help cities and society collaborate locally and build more trusting relationships.
- 3 demonstrator areas (Greenwich, downtown Lisbon, Milan's Porta Romana) with implementation of smart cities solutions (energy management systems, RES, e-mobility, urban data platform…).
- **Follower cities analyze these solutions and adapt to their local planning processes**.



Related Warsaw activities - EU projects

THERMOS

- Call EE-05-2016: **Models and tools for heating and cooling mapping and planning.** THERMOS=THermal Energy Resource Modelling and Optimisation System.
- Poland - one of 4 countries represented in the partnership – with a focus on testing new heat mapping tools at city level in Warsaw.
- Cooperation of Warsaw with Polish energy agency KAPE.
- Coordinator: Centre of Sustainable Energy (UK). Other partners: Imperial College of Science, Technology and Medicine, Aalborg University, Deutsche Energie-Agentur, ICLEI.



Related Warsaw activities – other actions on smart cities

- The City of Warsaw has been participating in the main EU tool in the field of smart cities - **European Innovation Partnership on Smart Cities and Communities** (EIP SCC) - for years. It has included participation of Mayor Hanna Gronkiewicz-Waltz and me (in cooperation with EUROCITIES) in its High-Level Group and work on Strategic Implementation Plan and Operational Implementation Plan.

- Warsaw representatives from Infrastructure Department are also present in City Advisory Board of **European Energy Reseach Alliance Joint Programme on Smart Cities**.

- An example of practical implementation of smart cities ideas is **Virtual Warsaw** project on using beacons and smartphone applications to facilitate mobility for the visually impaired (winner of the Bloomberg Philanthropies 2014 Mayors Challenge).

Related Warsaw activities – energy management in buildings

Demand Side Management for energy efficiency improvement

From 2009 Infrastructure Department carries on the **monitoring of electricity, heat and gas consumption and expenditures** in educational units of the City of Warsaw.

1191 educational units (760 locations) with 922 electricity meters, 520 heat meters and 583 gas meters are included in the programme.

As a result of activities carried out under the programme the following have been achieved:

- Reduction of expenditures for ordered capacity;
- Reduction of electricity and heat consumption, resulting in CO_2 emissions reduction.

Savings potential:

- Electricity – € 1,3 mln,
- Heat – € 1,9 mln.

The next, already launched step, is facilitating **smart metering** in the Warsaw municipal buildings.

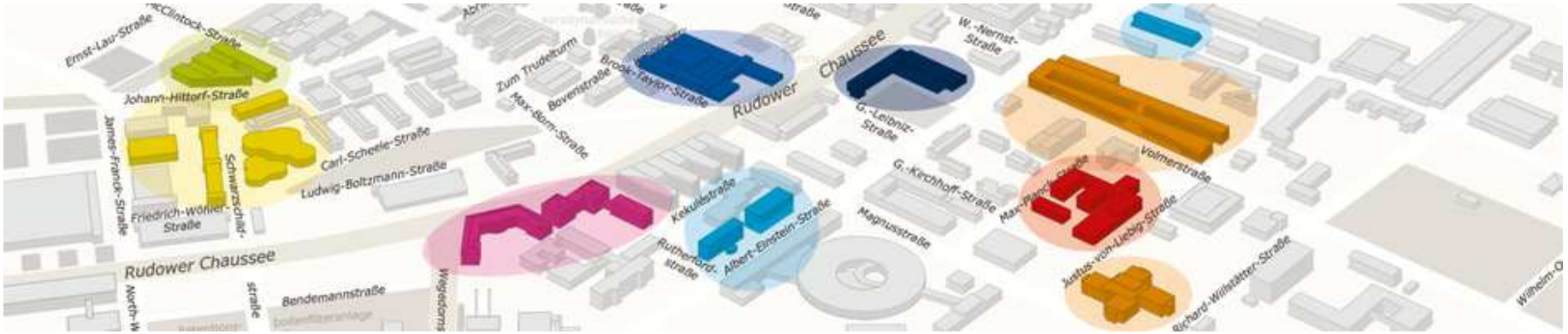
Related Warsaw activities – pilot area for future urban development

- **Low-Carbon Area** - following such world-leading projects as Stockholm's Hammarby district, we plan to create city area, which will feature solutions on behalf of energy efficiency, natural environment and low GHG emissions, both in the field of city planning, energy networks, buildings construction, transport, waste management, and water and wastewater management – with utilization of various sources of EU co-financing, PPP and other sources.

  Among the currently analyzed locations the most probable is Targówek Przemysłowy (Industrial Targówek – part of the Targówek district), where the major RES source will be available in form of the expanded ZUSOK waste incineration plant.

- We want our Horizon 2020 projects to assist us in this task.
  It concerns in particular URBAN LEARNING and SHAR-LLM – Sharing Cities.

- Recently Warsaw University of Technology , supported by City of Warsaw, launched similar **Kampus+** project, patterned after e.g. Berlin's Adlershof. Its physical implementation already started. The new innovation area will include for instance developments created in living lab, in the fields of smart home, smart grid and e-mobility, including vehicle-to-grid.



Related Warsaw activities - sustainable transportation

- Improvement of public transport network.
- Replacement of rolling stock, including recent total purchases of:
  - ✓ *261 new trams capable of recovering braking energy,*
  - ✓ *35 six-coach energy efficient underground sets ,*
  - ✓ *19 units for Rapid City Train,*
  - ✓ *273 modern buses including EVs, HEVs and LNG buses ,*
  - ✓ *combined 160 municipal EVs, HEVs and CNG/LNG vehicles.*
- Extension of second metro line (the central stage with 7 stations operational since March 2015).
- Setting bus-only lanes.
- Development of P&R car parking lots (currently 14).
- Expansion of the bicycle paths system (now >500 km).
- Veturilo public bike (now 300 stations with 4600 bikes, including first 100 e-bikes, tandem bikes, or kids bikes).
- Training of drivers in eco-driving.
- Promotion of public transport.

Related Warsaw activities - development of low-emission bus fleet by the MZA company (Warsaw municipal bus operator)

- Purchase of bus fleet that reduces emissions of pollutants and utilizes modern technologies.
- Operation of **4 hybrid** 18-metre Solaris buses since 2011.
- **35 gas buses** joined the Warsaw fleet in 2015.
- **10 12 m e-buses** purchased in 2014, next **10** in 2016, **10** to be added soon.
- Application submitted for EU co-financing of **130 18 m e-buses** with associated charging infrastructure.
- Warsaw signed the C40 Clean Bus Declaration in 2015. In accordance with the Declaration, MZA shall operate **130** electric and hybrid buses until 2020. But we should have at least **164** such vehicles: even more if the current governmental programme on Polish e-bus succeeds.
- Massive development of e-mobility requires **integration of transport planning with energy planning** (e.g. as to forecasting increased demand for electricity).

Warsaw approach for next years
Summary

- Increasing number of projects in public-private partnership and/or in Energy Performance Contracting (until recently extremely rare in Poland).
- Utilization of schemes available in the new EU financial perspective: operational programmes, dedicated funding for smart cities (Horizon 2020), regional funding schemes.
- Utilization of new financial schemes of the Polish environmental fund NFOŚiGW (including those using funds from selling Polish emission rights).
- Using different forms of financial montage to implement an amibitious project of Low-Carbon Area.
- Improving energy performance of school and other municipal buildings and using resulting cost savings for other energy-related investments.
- Moreover, last but not least: learning from and together with our valuable partners from URBAN LEARNING, EUROCITIES and other international and Polish frameworks, in order to deliver the Low-Carbon Area and other smart, sustainable solutions for Warsaw in future!

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Thank you!

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