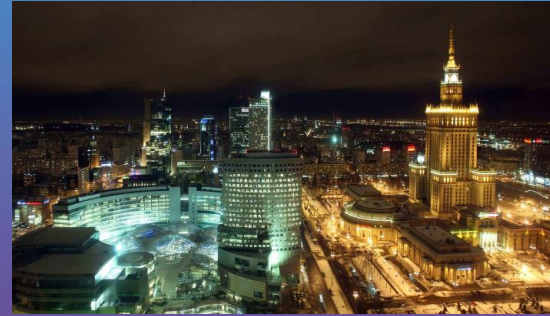


**SET  
PLAN**  
Conference  
2015

Research, innovation  
and competitiveness  
for the Energy Union



**THE ENERGY SYSTEM OF THE FUTURE:  
SOCIETAL CHALLENGES AND OPPORTUNITIES**

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**SESSION 1**

Accelerating the energy system transformation  
Monday 21 September 2015



# SET PLAN Conference 2015

## WARSAW - LOCAL CIRCUMSTANCES

Research, innovation and competitiveness  
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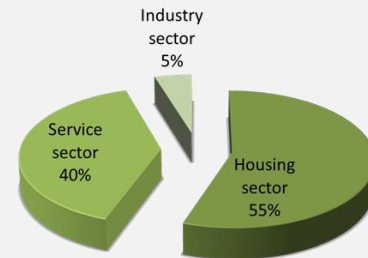
### 1 SUSTAINABILITY LEADER IN THE CENTRAL-EASTERN EUROPE

- One of **2 largest district heating networks** in EU - **78%** city demand's fulfilled by cleaner energy produced in co-generation
- **60%** of travels - made by public transportation
- Large investments in public transport - e.g. 2nd line of **metro** and the largest European purchase of **261 trams**, capable of recovering energy from braking
- **14 electric and hybrid buses** already in regular use, **130** - until 2020
- **Green areas and arable lands** - cover **47%** of the city area
- **Modernization and extension of the Czajka WWTP**, with installation of a **sludge thermal incineration plant** - the largest proenvironmental investment in Europe (>800 million euro), allowing to treat 100% of Warsaw wastewater and reduce amount of connected nitrogen released via Vistula River to the Baltic Sea by 74%, while in case of phosphorus - by 84%



## 2 YET SIGNIFICANT CHALLENGES AHEAD

- Electric energy and heat still predominantly produced from **coal**
- **Small number** of citizens producing energy from RES and in distributed co-generation
- **Growing number** of private cars (~600 per 1000 inhabitants) increases emissions from transport
- **Polish legal provisions and assistance schemes** on energy efficiency and RES were amended, but still need work to be more effective
- Despite thermal retrofits conducted since the 90s, still **large potential of reducing heat consumption** in Warsaw by thermal retrofits: housing sector - 2.09 TWh, service sector - 1.5 TWh, industry sector - 0.18 TWh, Warsaw overall - 3.77 TWh
- **High energy consumption** in municipal buildings
- **Not fast enough progress** of smart grid and smart metering solutions



### 3 ACCELERATING THE ENERGY TRANSFORMATION IN THE CITY

- **Warsaw Sustainable Energy Action Plan (2011):**
  - ✓ 80% of CO<sub>2</sub> emission in 2020 compared to 2007
  - ✓ 80% of energy consumption in 2020 compared to 2007
  - ✓ at least 20% of energy will be produced from RES

Year	Energy consumption [MWh/year]	CO <sub>2</sub> emission [MgCO <sub>2</sub> /year]
2007	28 394 431	12 952 984
2020	<b>22 715 545</b>	<b>10 362 387</b>

- **Warsaw Low-Carbon Economy Plan (2015):**
  - ✓ within the new Polish legal scheme
  - ✓ based on the SEAP and being its enhancement
  - ✓ will cover specific projects with secured funding, help in getting funds for their implementation and give us vision of a low-carbon Warsaw in future



No.	Tasks	Planned energy savings in 2020	Reduction of CO <sub>2</sub>	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





#### 4 OTHER SELECTED ACTIONS OF THE CITY AND OF THE WARSAW STAKEHOLDERS

- **Changing energy mix** in Warsaw CHPs due to introducing gas and biomass blocks by PGNiG TERMIKA, **smart grid solutions** like the Veolia's project of intelligent heating network and introducing **smart meters** by RWE will improve efficiency, reduce emissions (also from transport, thanks to popularization of **e-mobility**) and limit costs for users
- Expansion of the municipal **waste incineration** plant ZUSOK and construction of next such plant in cooperation with private partner, giving the city additional renewable heat and electricity
- Already completed **EU-funded R & D projects** (OPEN HOUSE, E3SoHo, Cities on Power...) gave the City the knowledge on how to reduce energy consumption, promote RES and cooperate with citizens in these fields
- **Low-Carbon Area** - a pilot for further actions in Warsaw - will feature solutions on behalf of energy efficiency, natural environment and low GHG emissions, both in the field of spatial planning, energy networks, buildings construction, transport, waste management and water and wastewater management
- Current EU projects (like the **Horizon 2020 URBAN LEARNING** on integrated energy planning) will help us in planning and implementing the Low-Carbon Area: Warsaw also in a smart cities H2020 application **SHARING CITIES**
- **PPP/Energy Performance Contracting** projects being developed by Warsaw (like on modernization of street lighting) will facilitate energy transformation
- **Revitalization programme** starting this year: 250 million euro for Praga districts of Warsaw, including construction of new buildings, thermal retrofits and connections to district heating
- **Monitoring of electricity, heat and gas consumption and related expenditures** in educational units of the City of Warsaw by the Infrastructure Department, currently being extended to other categories of municipal buildings







5 SUMMARY OF WARSAW'S VISION ON HOW TO TRANSFORM THE LOCAL ENERGY SECTOR

- **Enhancing cooperation** with citizens and other stakeholders (including energy companies), including information and dissemination activities, **smart grids/smart metering** and financial support for **RES**, on behalf of reducing energy consumption, and thus tackling energy poverty
- Increasing number of projects in **public-private partnership and/or in Energy Performance Contracting** (until recently extremely rare in Poland)
- Supporting development of **e-mobility** with electric vehicles capable of transmitting energy back to the grid, what helps to stabilize energy demand and improves local energy security
- Utilization of **new schemes available in the current 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)
- Cooperation with different stakeholders and using different forms of financial montage to implement an ambitious project of the **Low-Carbon Area**
- **Improving energy performance of school and other municipal buildings** and using resulting cost savings for other energy-related investments (cost savings to be obtained also thanks to joint purchases of electricity by different units and departments of the City of Warsaw and our municipal companies)

## 6 WARSAW AND OTHER SELECTED PARTICIPANTS OF ENERGY INNOVATION ACTIONS IN POLAND







## THE ENERGY SYSTEM OF THE FUTURE: SOCIETAL CHALLENGES AND OPPORTUNITIES

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This conference has received funding from the European Union Horizon 2020 research and innovation programme under the grant agreement No 681163