

**PROJECT ON DISTRICT ENERGY, DEEP  
IMPROVEMENT OF ENERGY EFFICIENCY,  
UTILISATION OF RENEWABLE SOURCES  
AND DISTRIBUTED ENERGY GENERATION  
AS A STRATEGIC ANSWER OF BELGRADE  
AND UNEP ON CLIMATE CHANGES**

Miodrag GRUJIĆ, Secretariat for Environmental  
Protection of the City of Belgrade

Petar VASILJEVIĆ, Bojan BOGDANOVIĆ  
PUC "Beogradske elektrane", Belgrade

# Air Quality in Belgrade

Three categories

## **Belgrade - Third category**

(together with Bor, Pancevo, Smederevo)

**main causes: heat sources and traffic**

18 fixed measurement stations in Belgrade

Excess emissions of harmful substances (average 10-year values) – SO<sub>2</sub> (2 places), NO<sub>x</sub> (2), particulates (mostly),

**but soot nowhere, mainly thanks to shutting down boiler rooms, development of DHS and reduction of use of fuel oil**

# District Heating System (DHS) in Belgrade

## Main data

- 58 heat sources, installed capacity 2,850 MW-50% of the City
- Nearly half of the total capacity of heat plants in Serbia
- 90 % of the heat production from natural gas  
(DH Company – the biggest consumer of gas in Serbia)
- The rest mostly from the heavy fuel oil, 0.5% RES (pellets, briquettes)
- 1,460 km heating pipes, 8,600 substations
- 10 % (31,000) consumers have domestic hot water (DHW)
- Residential : commercial consumers = 4 : 1
- Consumption based billing for 20,000 flats

# District Heating System (DHS) in Belgrade

## Modernization of DHS – positive facts

1. Four biggest plants (2,000 MW) were completely modernized from 2003 to 2011
2. All substations (8,600) were modernized from 2005 to 2013
3. Energy efficiency improvement from 0.78 (2003) to 0.88 (2014)
4. SCADA System installed in the biggest plants

# District Heating System (DHS) in Belgrade

## Hot points

- Rehabilitation of distribution network (losses 14-16%)
- Old heat sources (averagely 30 years)
- NOx emissions
- Air pollution from the old boiler rooms
- Lack of renewable energy sources (solar, biomass, geothermal, waste)

# Energy Efficiency in Buildings in Belgrade

- >700,000 flats, half of them connected to DHS
- Average heat consumption 150 kWh/m<sup>2</sup> per year
- In buildings connected to DHS 10% lower
- 1/3 residential buildings don't have insulation
- There are no thermostatic valves in most flats
  
- Good insulation in new buildings – up to 60 kWh/m<sup>2</sup>
- There are good examples, but not enough
- Great potential for investments, improvement of air quality and energy and cost savings

# Existing strategic documents

- Belgrade Air Quality Plan + Action Plan
- Environmental Protection Program + Action Plan
- Belgrade Energy Strategy
- Belgrade Development Strategy
- Strategy of DHC - PUC “Beogradske elektrane”
- Climate Change Adaptation Action Plan

# UNEP + City of Belgrade Partnership

## 1. District Energy in Cities – DES

Belgrade - “Champion City”

## 2. Buildings Efficiency Accelerator – BEA

“deep dive” (World Resource Institute also partner)

Belgrade is the only city in the world with this status

Both projects are included in global **SEE4ALL** (Sustainable Energy for All) which goals are doubling energy efficiency and the share of RES



# District Energy in Cities - DES

three years project

## Main goals:

- Integration of urban planning, policies and investments in district energy systems,
- Development of district energy systems in cities,
- Creating conditions for investments in district energy systems
- Replication of projects at the regional level

# District Energy in Cities - DES

## Main activities:

- Steering and Working group
- Collecting documents and data
- Rapid and Deep Assessment of existing situation, potentials for modernization, barriers, demands, legislation
- Focus on RES and new technologies bearing in mind great potentials of Belgrade

## Main expected result:

- A concrete Investment plan – Action plan in DES

# Buildings Efficiency Accelerator - BEA

## Main goals:

- Assessment and prioritization of local policies and activities
- Applying activities adapted to urban demands

## Main activities:

- Coordination group
- Defining buildings energy efficiency policy
- Monitoring activities with knowledge exchange
- Demonstration project

# Buildings Efficiency Accelerator - BEA

- Kick of meeting - October 31, 2016
- Technical advisor chosen
- Stakeholders:
  - Ministries
  - City institutions and PUC
  - Suppliers, manufacturers, investors
  - University of Belgrade
  - International financial organizations, consultancies
  - Embassies
  - NGOs
  - Media

# Belgrade – DHS Challenges

## Focus on:

- Heat networks supplied from CHP - 600 MW th from TPP Obrenovac
- Waste heat incineration 80 MW th – Vinča landfill
- Development of Solar DH
- Provision of District Cooling in Belgrade
- Biomass – a few HOB plants
- CHP

## Target:

***increase the security of energy supply and air quality***

# Thank you!

[p.vasiljevic@beoelektrane.rs](mailto:p.vasiljevic@beoelektrane.rs)

[b.bogdanovic@beoelektrane.rs](mailto:b.bogdanovic@beoelektrane.rs)

[miodrag.grujic@beograd.gov.rs](mailto:miodrag.grujic@beograd.gov.rs)