



MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE



Empowered lives.
Resilient nations.

KEY FINDINGS OF STUDIES ON EXPANDING AND IMPROVING THE DISTRICT HEATING SYSTEM IN THE CANTON SARAJEVO AND UTILIZATION OF RENEWABLE ENERGY IN BIH

IRENA's workshop: Renewable Energy Benefits: Can South East Europe realise the full potential of the Energy Transition?
11 June 2019, Sarajevo

Project & main reasons to conduct Studies



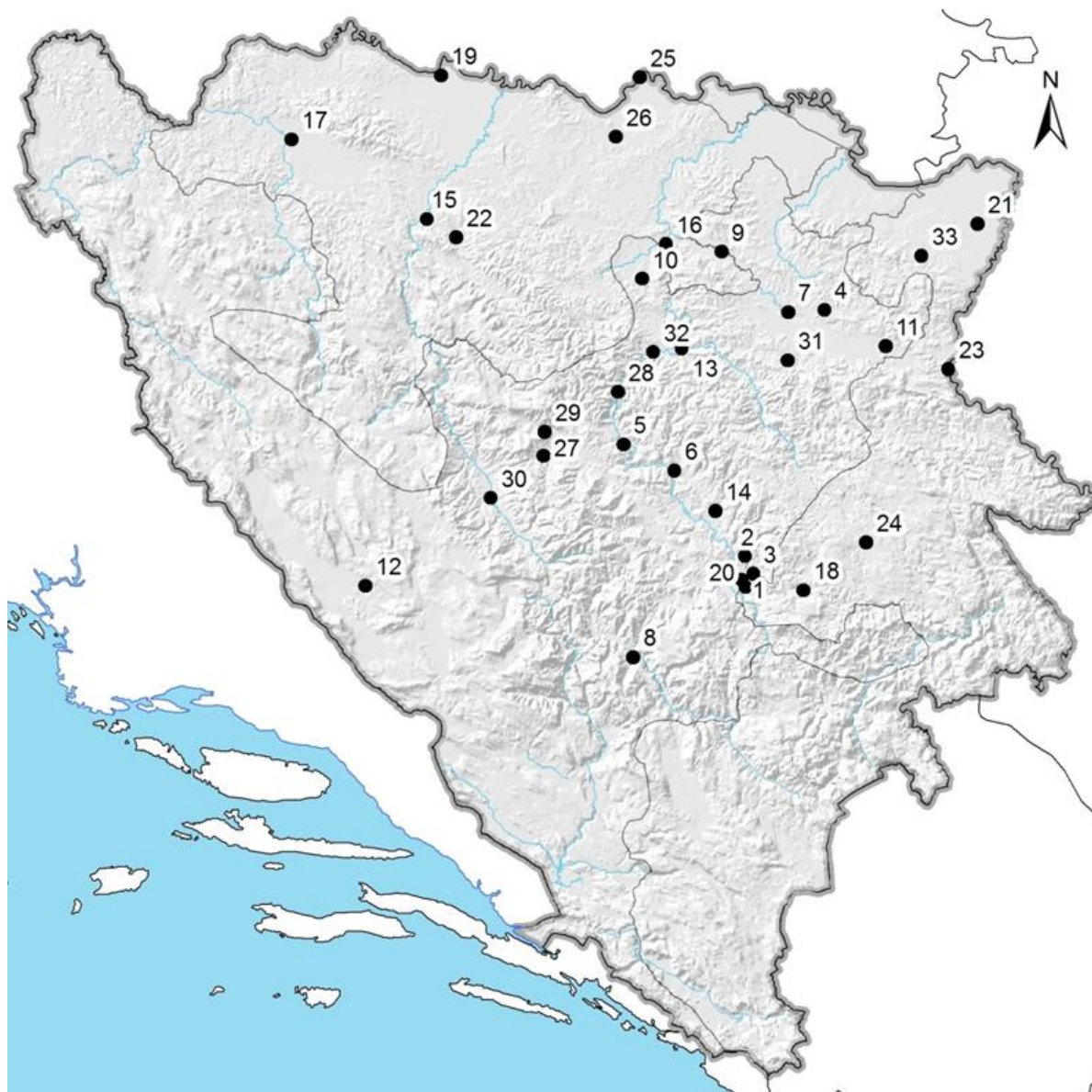
Project: Improving air quality in Bosnia and Herzegovina through renewable energy sources and improvements in district heating:

- Feasibility Study on expanding and improving the district heating system in the Canton of Sarajevo
- Study on renewable energy sources with focus on biomass, geothermal energy and solar energy in Bosnia and Herzegovina

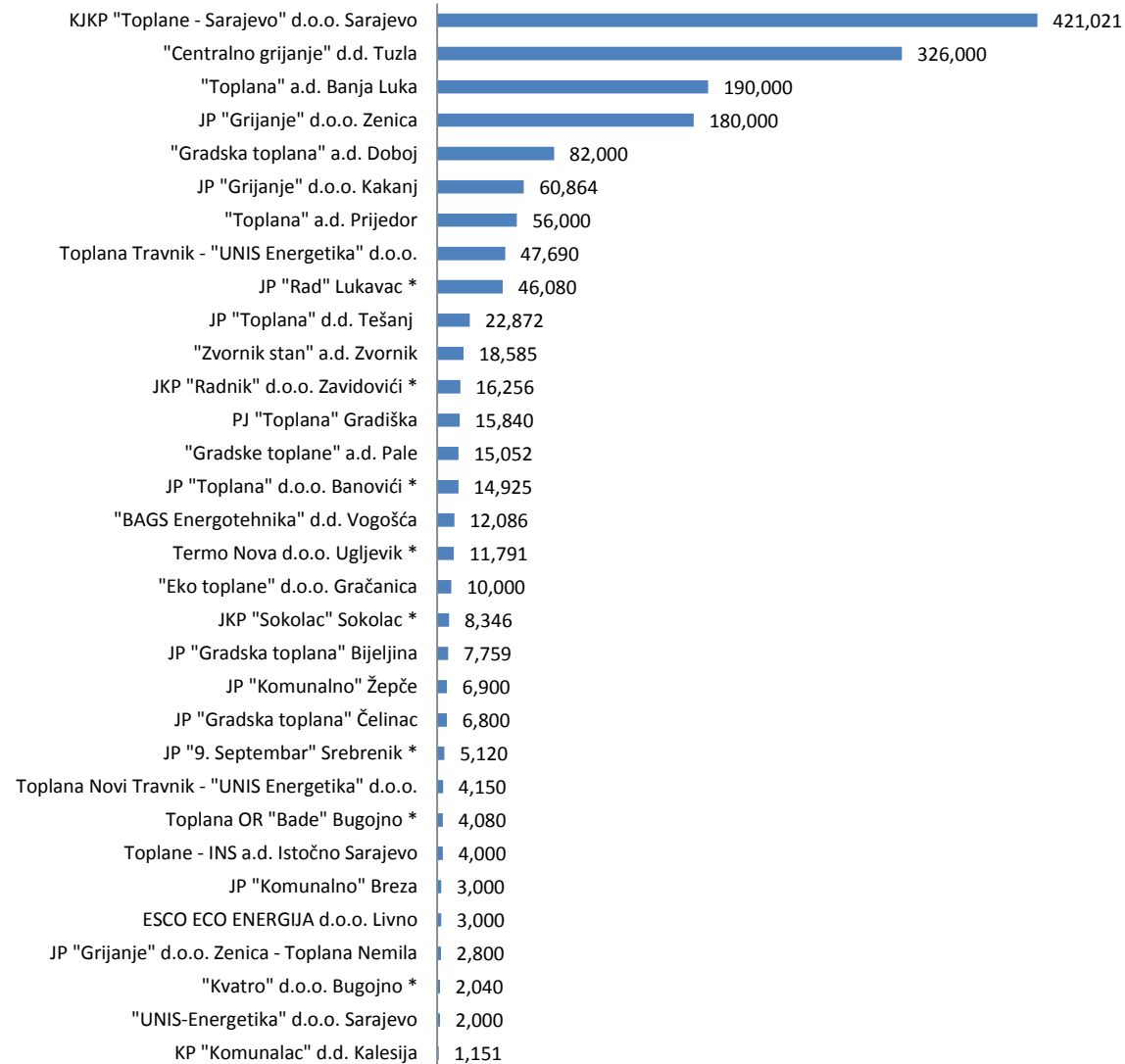
Main reasons:

- According to 2018 WHO statistics, Bosnia and Herzegovina has the **2nd highest** European mortality rate attributed to air pollution.
- **44,000 years** of life are lost each year due to air pollution in BiH (European Environment Agency).
- Losing **21.5% of its GDP** to costs associated with premature deaths caused by air pollution (WHO).

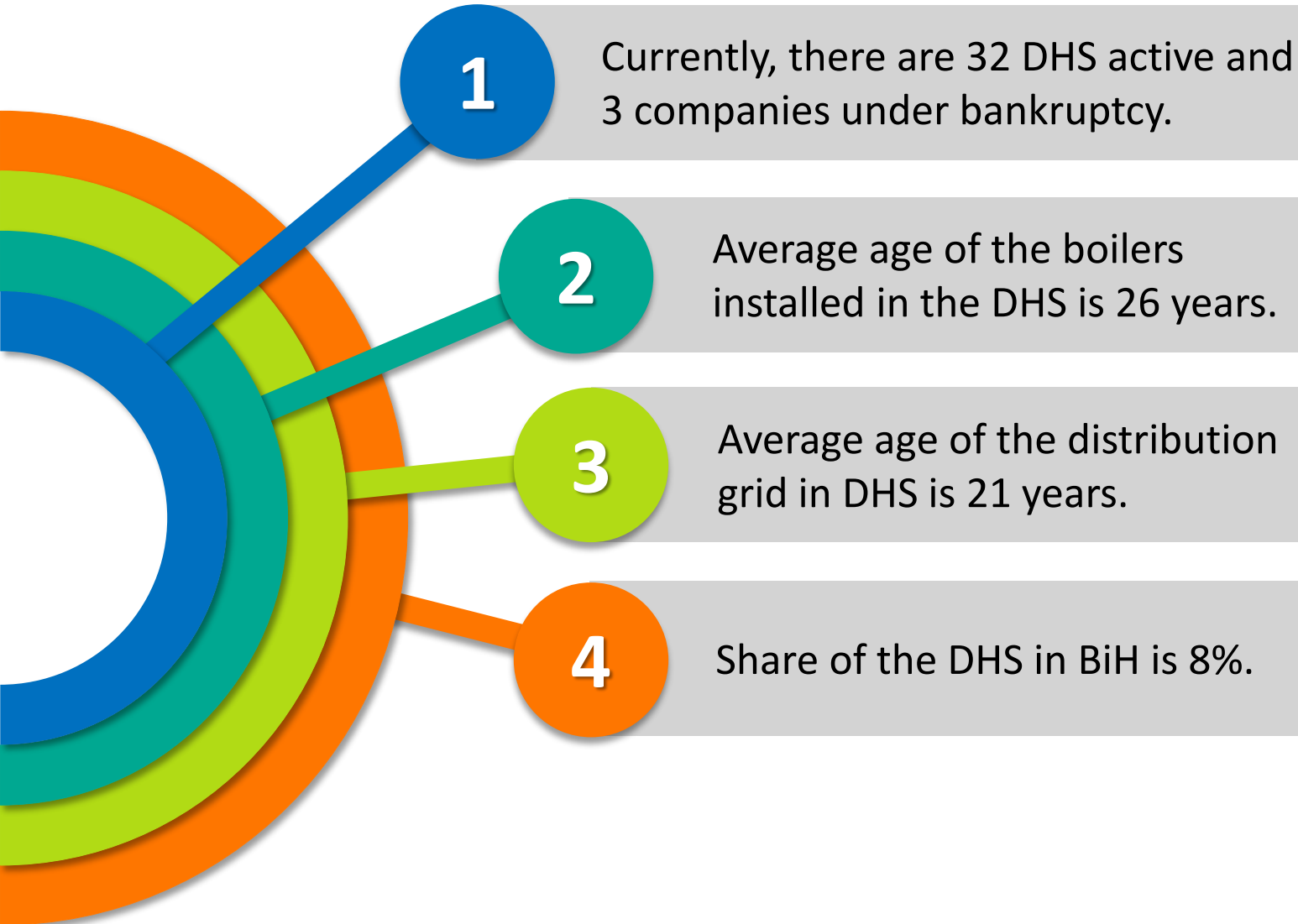
District heating systems in BiH



■ Annual production of the heat energy (MWh)

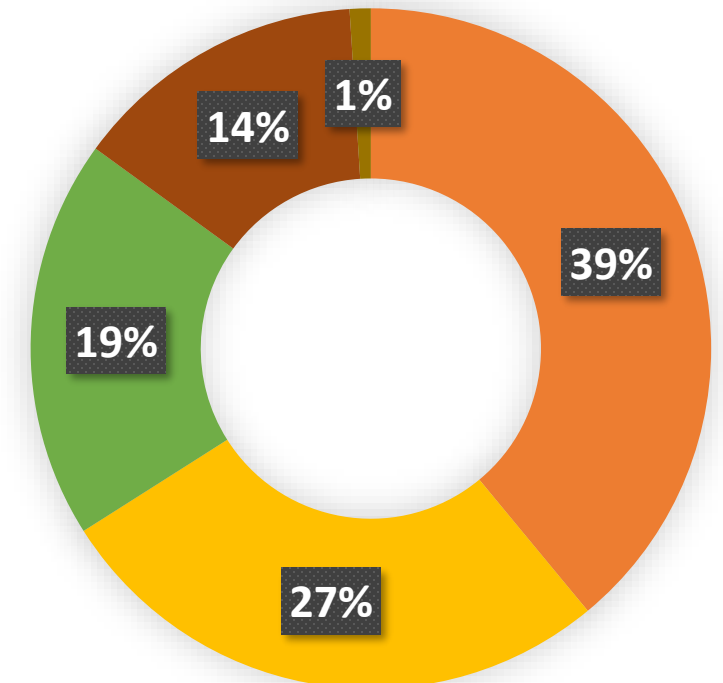


District heating systems in BiH



Share of fuels in DHS

- Heat; 39%
- Natural gas; 27%
- Woody biomass; 19%
- Coal; 14%
- Heavy fuel oil; 1%



The methodology for assessing the potential of RES in DHS in BiH



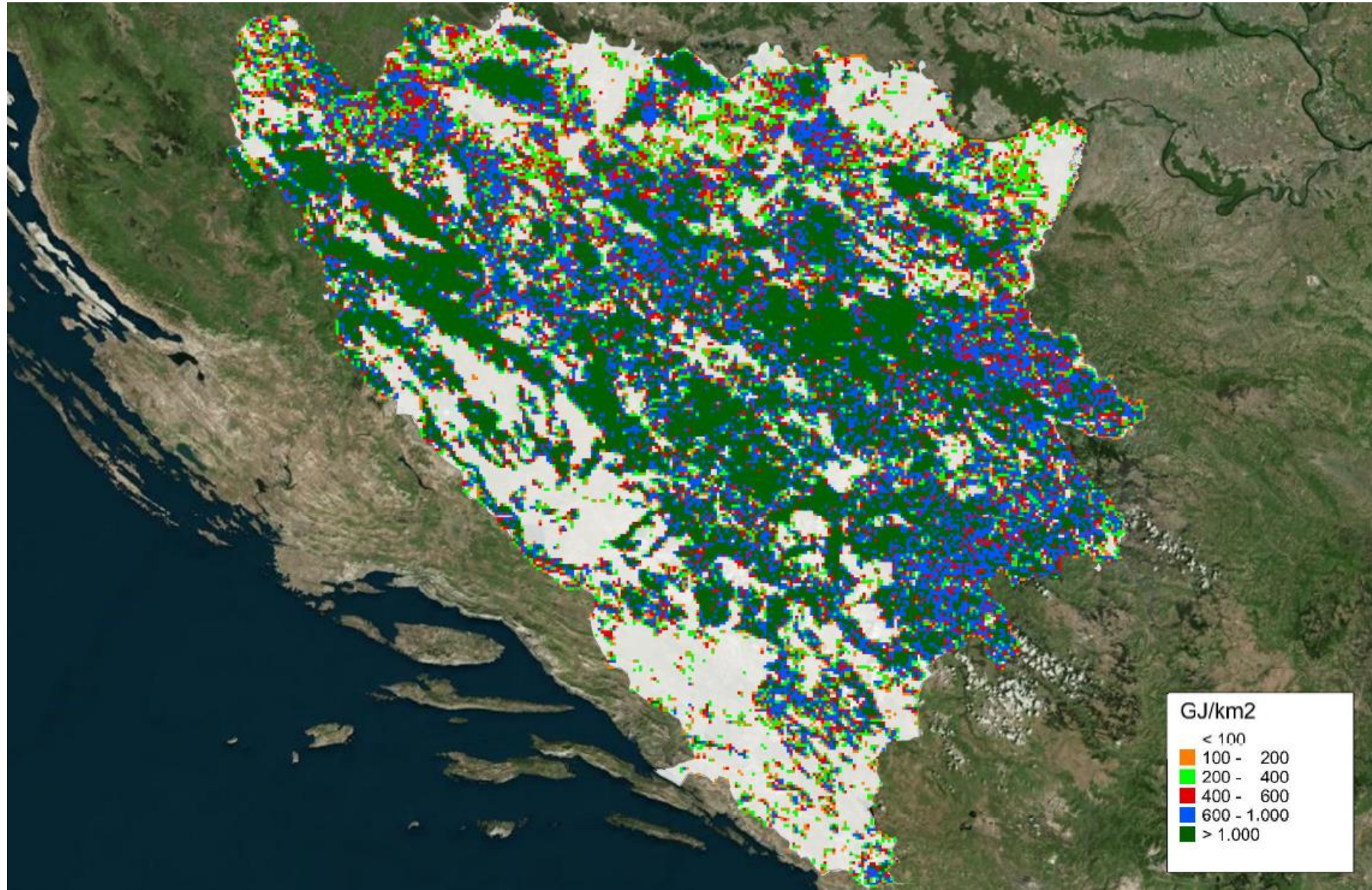
Proposal of conceptual solutions for 20 district heating systems.

Areas that meet at least one of the following criteria were analysed:

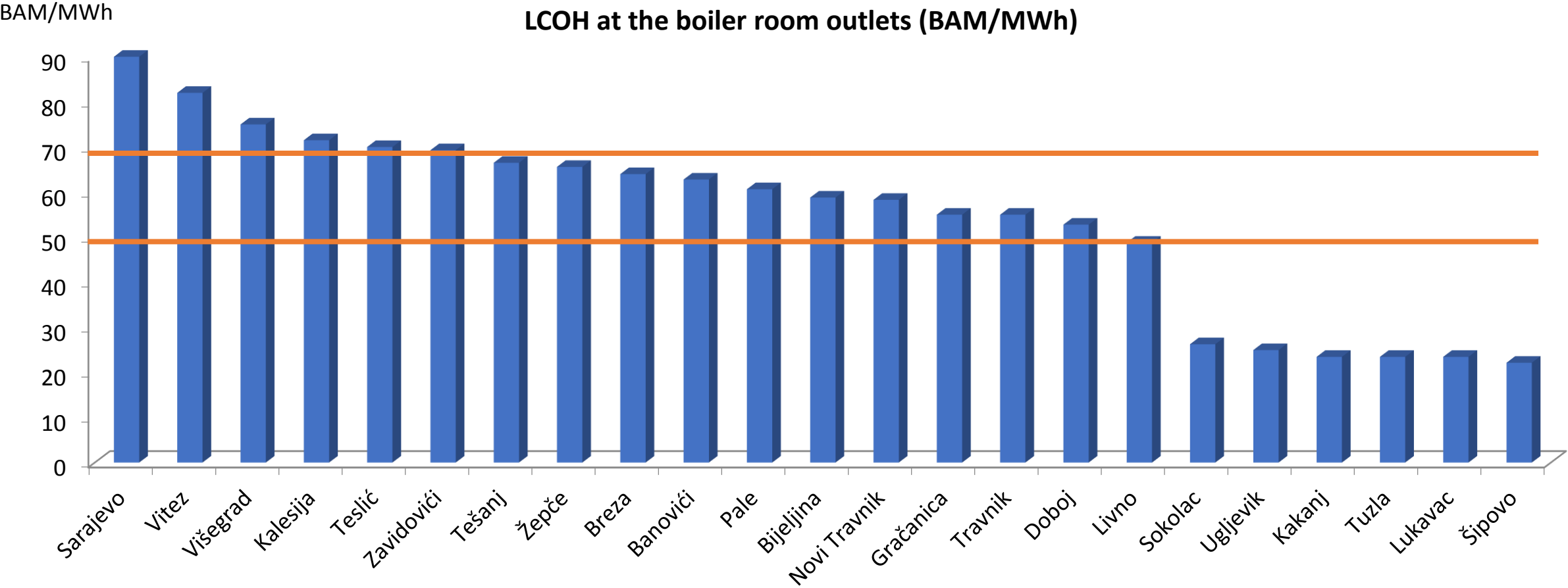
- In the present state they use fossil fuels in DH,
- Have potential to expand the heat demand/heat distribution network
- Use outdated technology (even though using RES)
- There is no district heating, but there is a clear plan for its construction (feasibility studies, etc.).

For each analysed location, solar energy, biomass and geothermal energy are estimated.

Technical potential of wood biomass for district heating (GJ/km²)

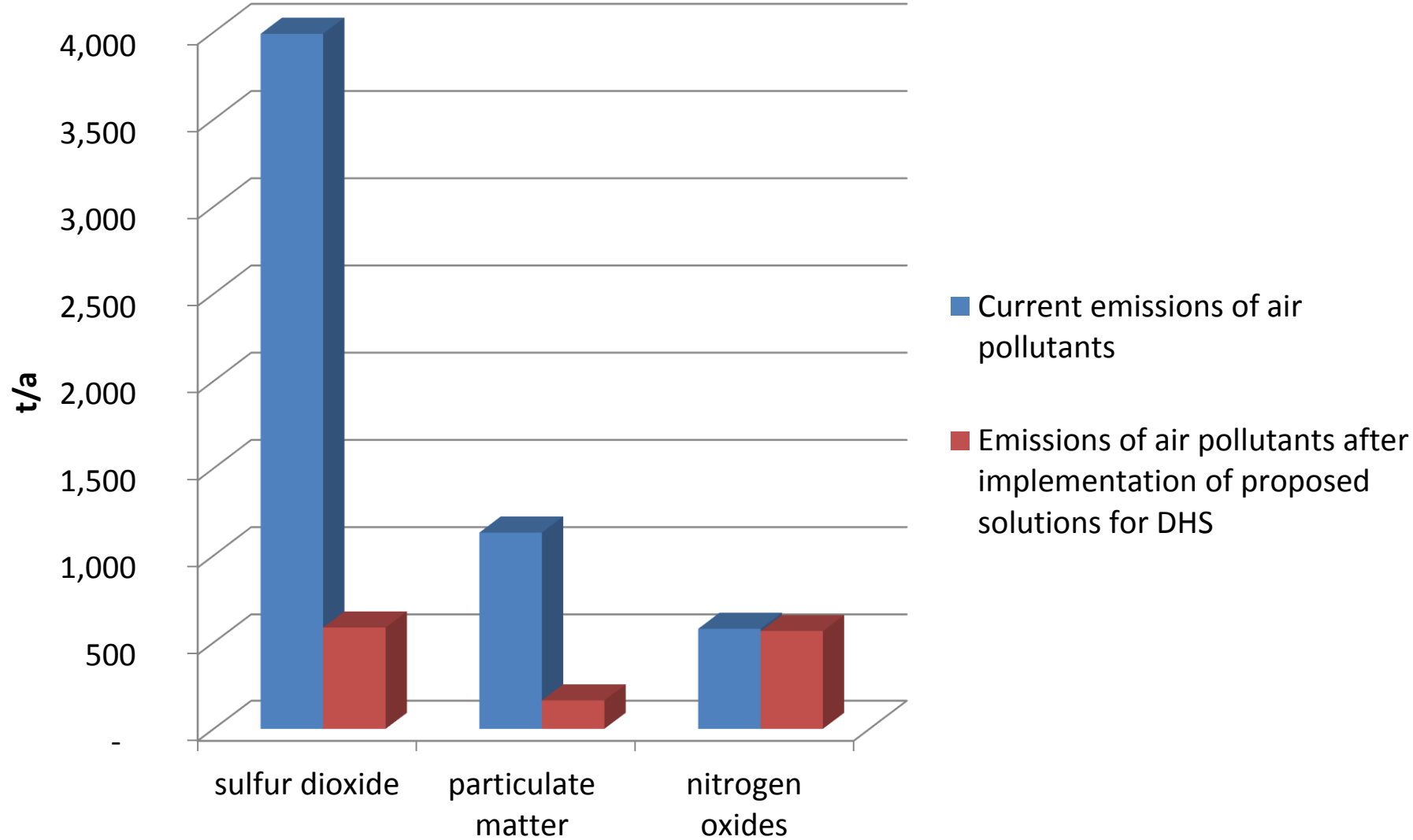


Levelised cost of heat - LCOH



Estimated reduction of emissions of air pollutants

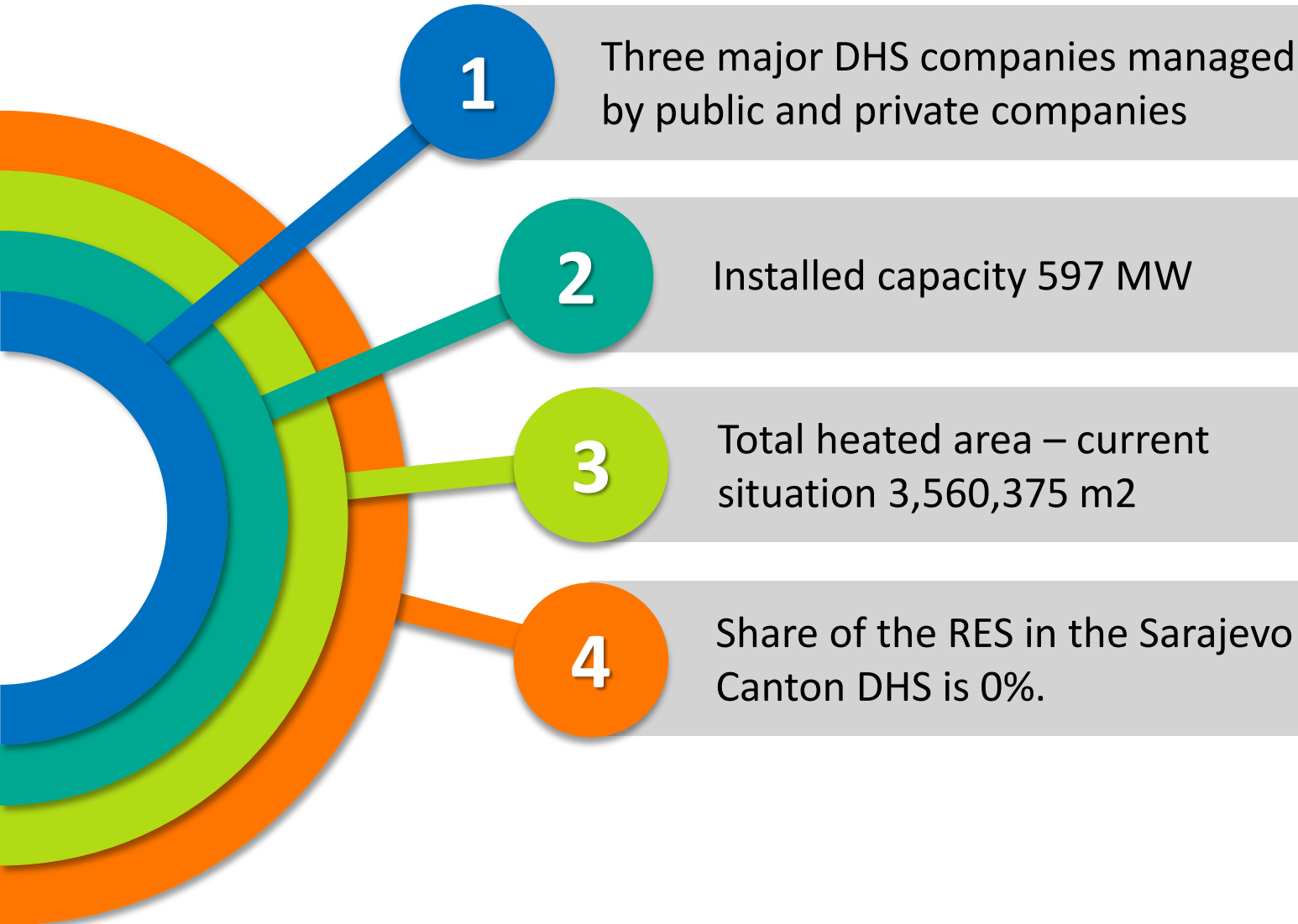
Caused by the implementation of all recommended conceptual solutions.



Total investment for recommended designs and share of RE in DHS by scenarios

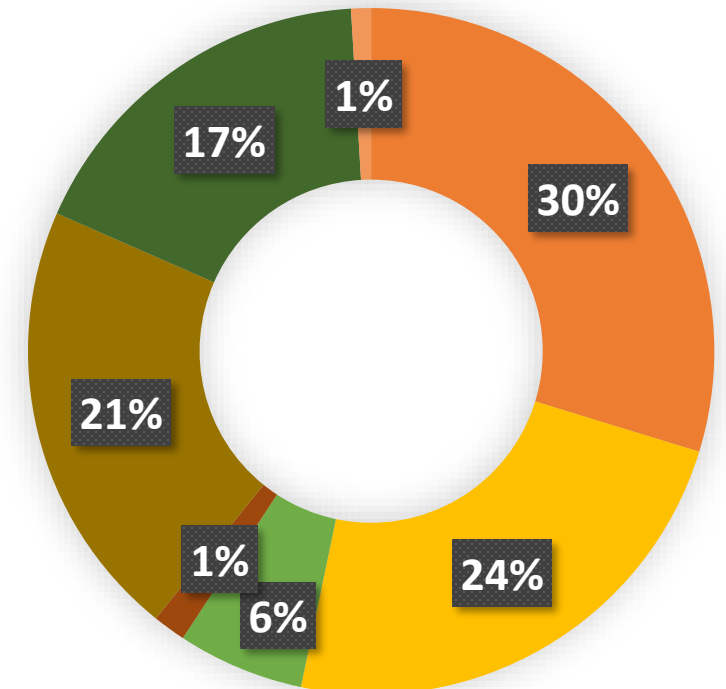
Energy source	Investment (x 1.000 BAM)	Scenario	Used potential of biomass and geothermal energy [PJ/a]	Share of DHS in the total consumption of energy for the heating
Biomass	182.930	20% of use of the technical potential of biomass and geothermal energy (S1)	4.67	14 %
Geothermal energy	12.800			
Solar energy	24.500			
Natural gas	58.000	50 % of use of the technical potential of biomass and geothermal energy (S2)	11.67	24 %
Fuel oil	6.520	100 % of use of the technical potential of biomass and geothermal energy (S3)	23.34	41 %
Total	284.750			

District heating systems in Sarajevo Canton



Energy consumption in SC

- NG (DHS); 30%
- NG (individual); 24%
- Electricity; 6%
- LFO; 1%
- Coal; 21%
- Firewood; 17%
- Pellet & Bricket; 1%



Analised scenarios



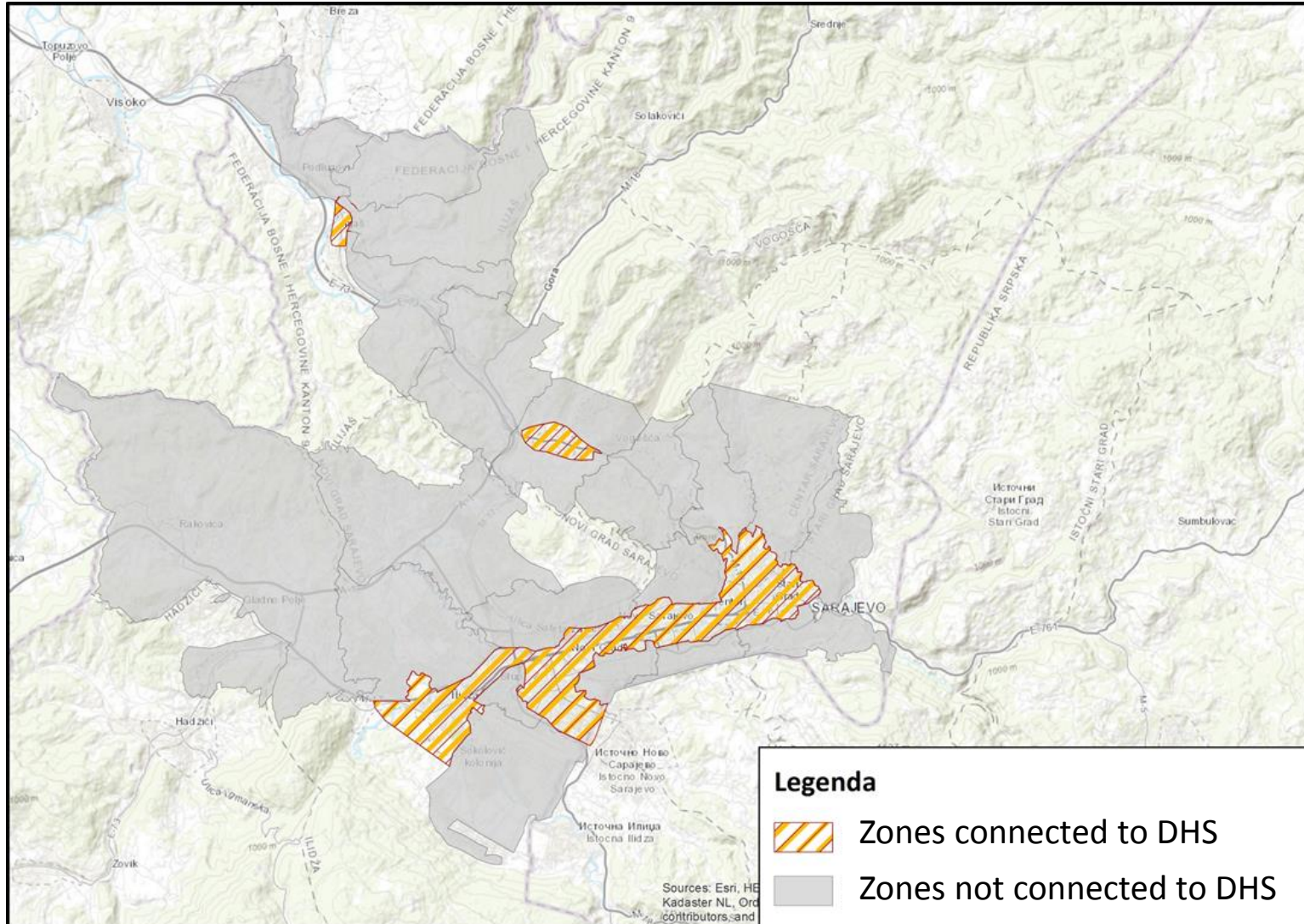
- Increased efficiency and environmental performance of the current DHS
- Expansion of the DHS
- **Natural gas**
- **RE share 0%**
- **Investment: 146.612.129 BAM**

- Increased efficiency and environmental performance of the current DHS
- Expansion of the DHS
- **Natural gas + RES**
- **RE share 13.6%**
- **Investment: 171.568.799 BAM**

- Increased efficiency and environmental performance of the current DHS
- Expansion of the DHS
- **Hot water from TPP Kakanj**
- **Natural gas**
- **RE share 0%**
- **Investment: 368.305.835 BAM**

Challenges

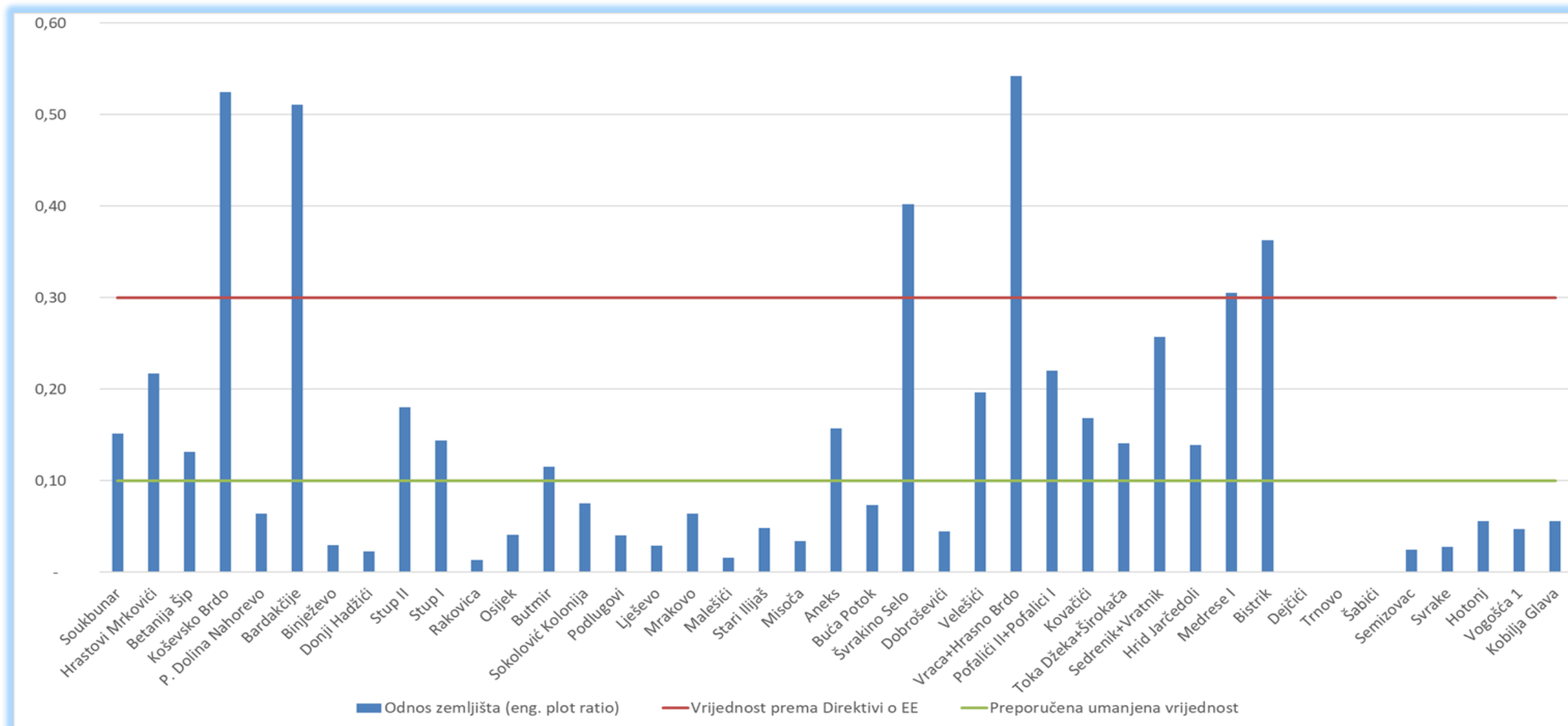
Providing heating in areas with individual houses in Sarajevo Canton



- 49 settlements in 9 municipalities
- 75.057 individual houses
- 162.230 inhabitants

Value according to the Guidance of the Energy Efficiency Directive 2012/27/ EU

Recommended reduced value *

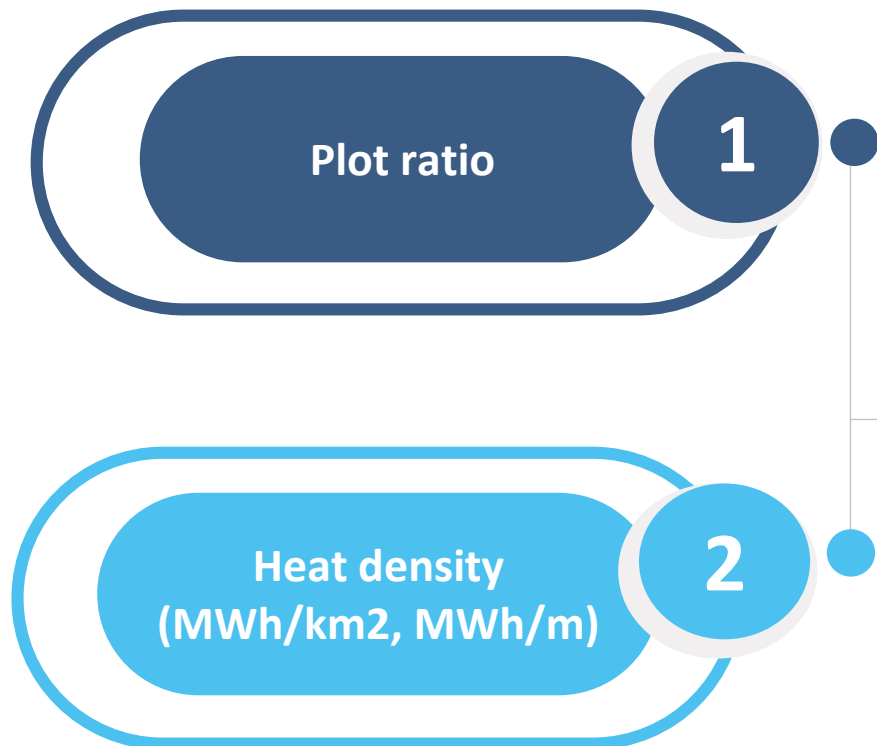


* Comprehensive Assessment of the Potential for Efficient District Heating and Cooling and for High-Efficient Cogeneration in Austria, 2016

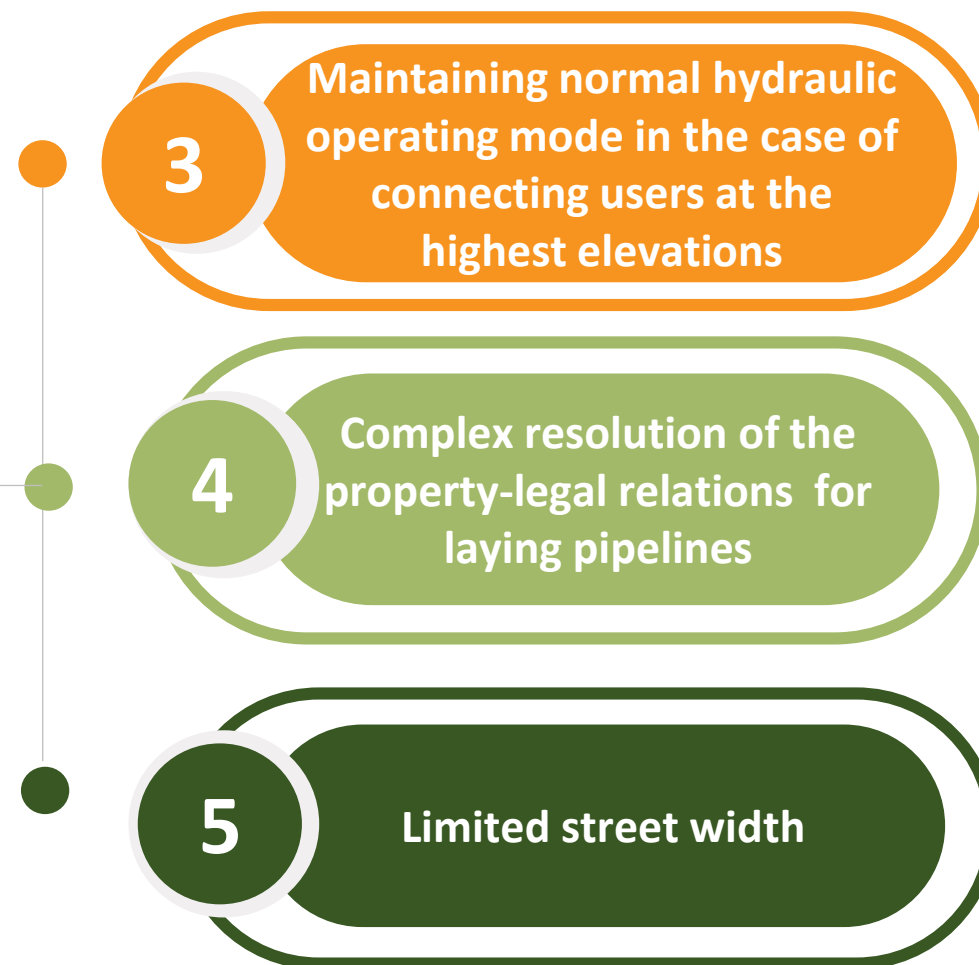
Challenges

Providing heating in areas with individual houses in Sarajevo Canton

Criteria according to the Guidance of the Energy Efficiency Directive 2012/27/ EU



Technical feasibility criteria:



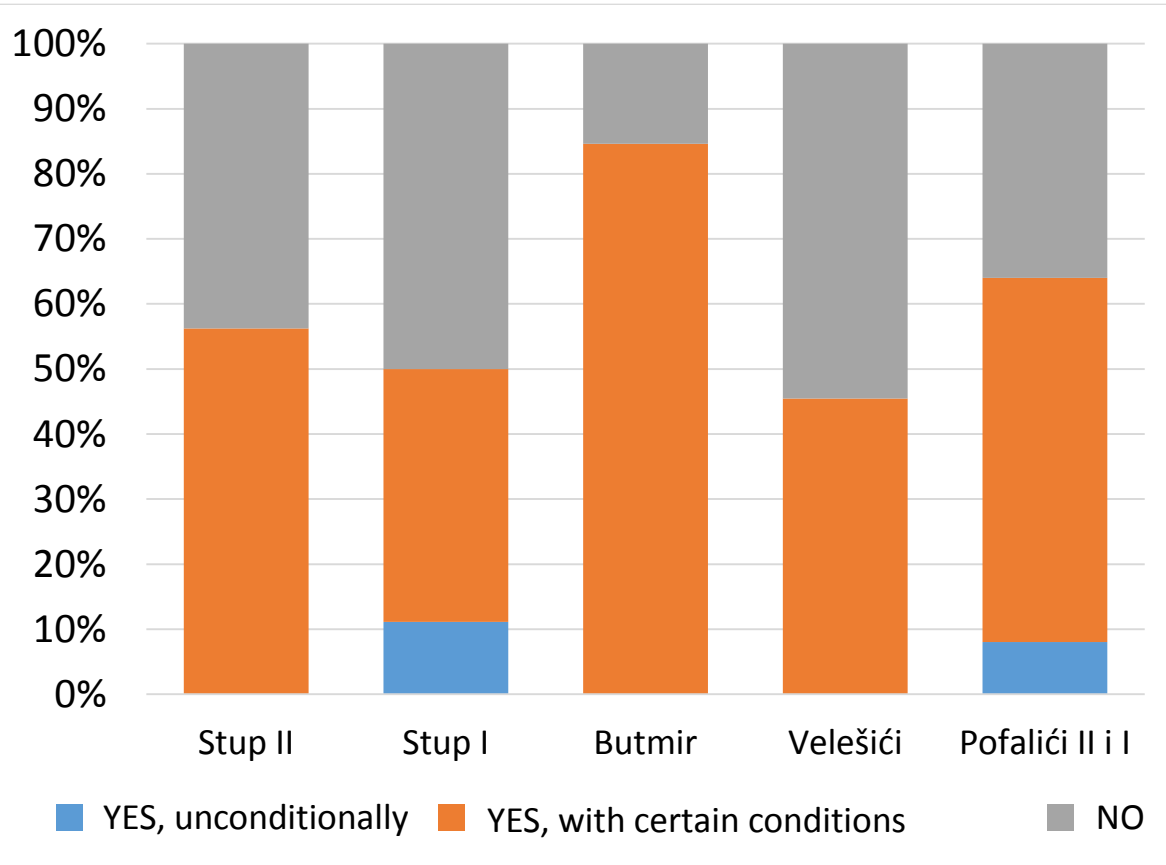
Challenges

Citizens are ready to change the heating source under certain conditions

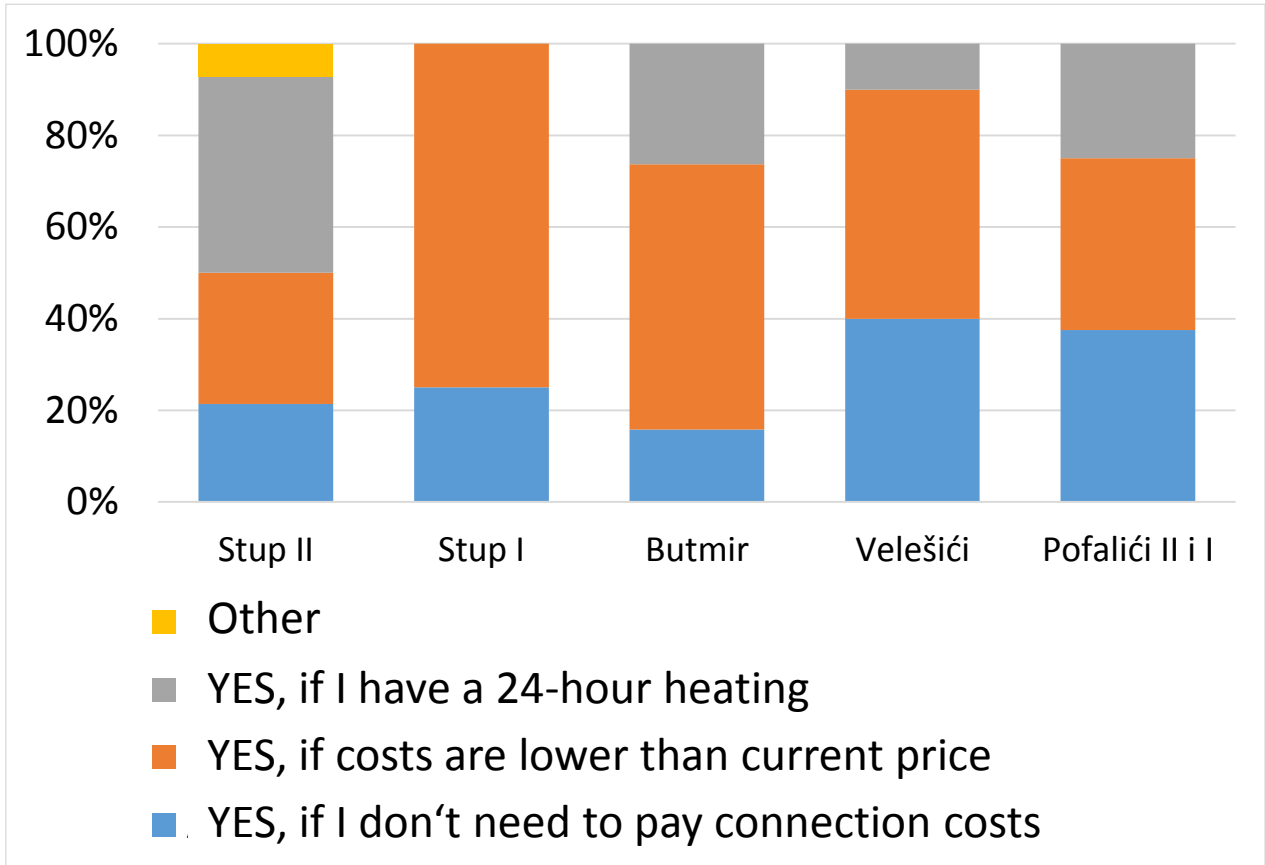


Poll survey in Sarajevo Canton

Willingness to switch to the DH



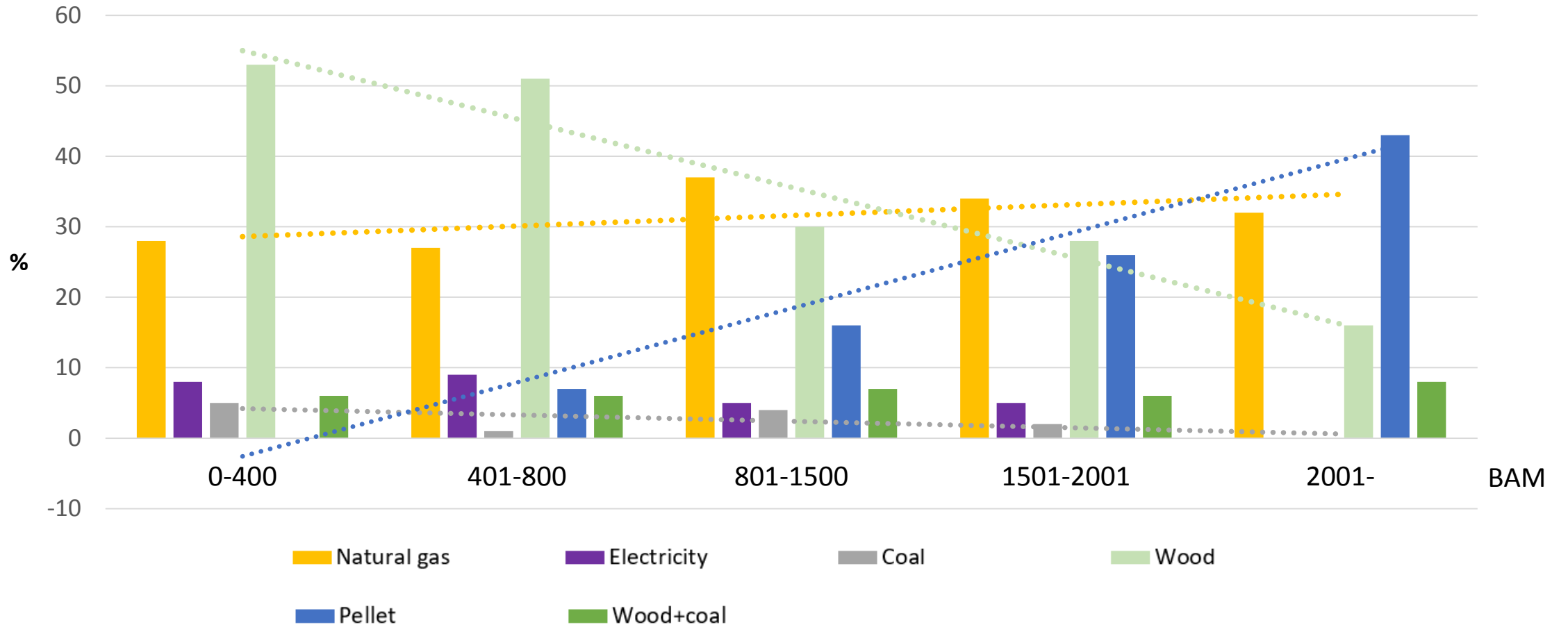
Conditions for switching to District Heating System



Challenges

Households income have an impact on the choice of energy sources in Sarajevo Canton

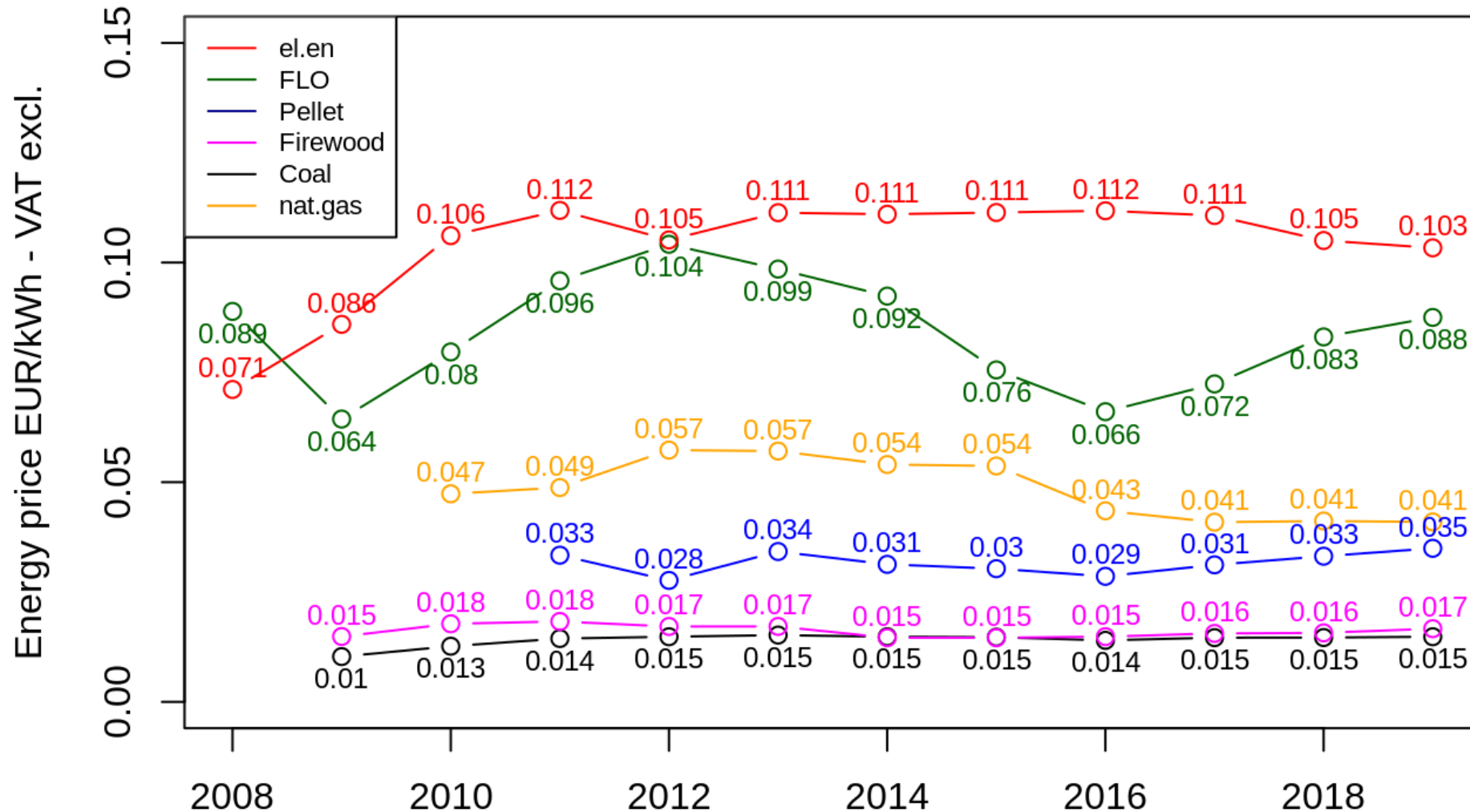
Poll survey in Sarajevo Canton



Challenges

Citizens are ready to change the heating source under certain conditions

Data from EMIS, UNDP



Thank you for your attention

More info at:

http://www.ba.undp.org/content/dam/bosnia_and_herzegovina/docs/News/E&E%20Sector/DistrictHeating/Summary%20Feasibility%20Study%20District%20Heating%20Canton%20Sarajevo.pdf

About: Feasibility study on the expanding and improving of the district heating system in the Sarajevo Canton - Summary

http://www.ba.undp.org/content/dam/bosnia_and_herzegovina/docs/News/E&E%20Sector/DistrictHeating/Summary%20Study%20Renewable%20Energy%20Sources%20in%20Bosnia%20and%20Herzegovina.pdf

About: Study of renewable energy sources with focus on biomass, geothermal energy and solar energy in Bosnia and Herzegovina - Summary

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