RES FOUNDATION

PARTNERSHIPS FOR RESILIENCE

Res Foundation
Partnerships
for Resilience

District heating in Serbia

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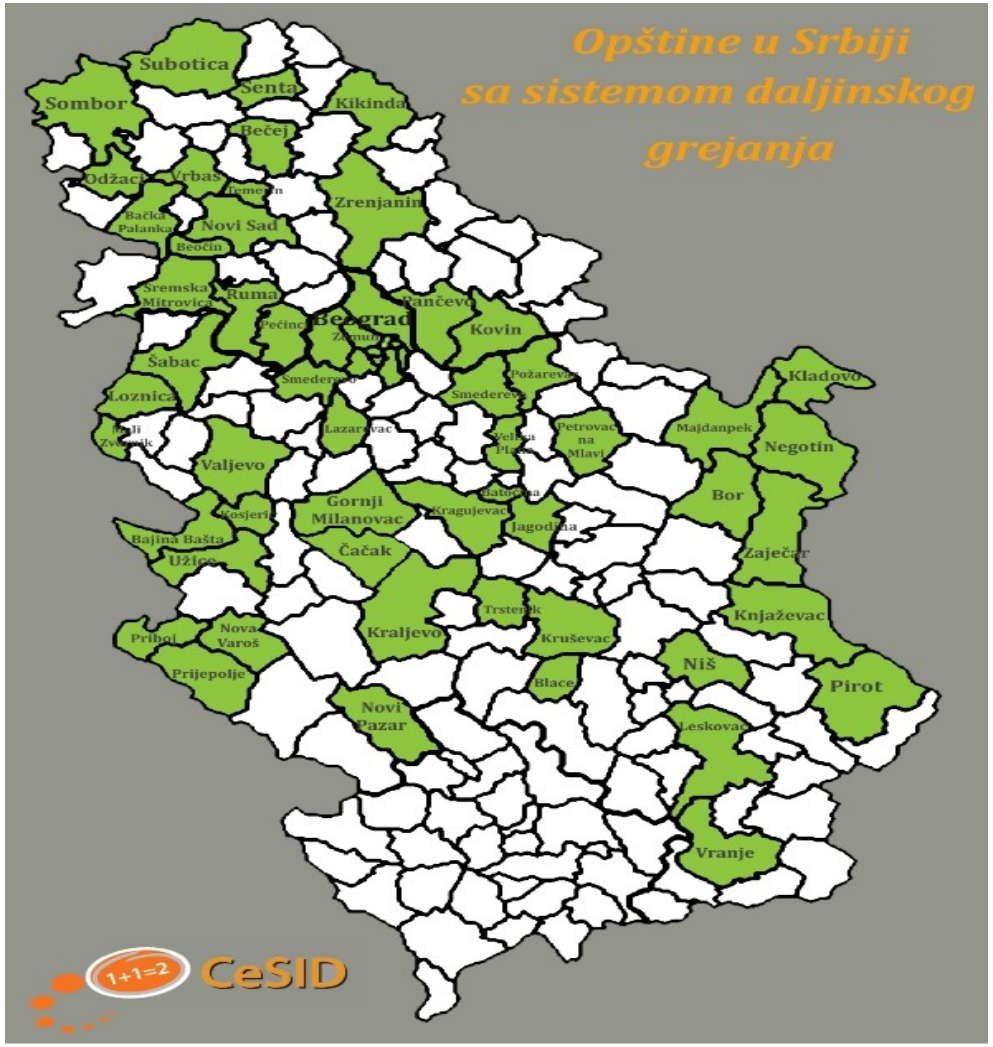
Šabac

14. March 2017.


Opštine u Srbiji
sa sistemom daljinskog
grejanja
Subotica
Sombor
Senta
Kikinda
Bečej
Odžaci
Vrbas
Zrenjanin
Bačka Palanka
Novi Sad
Beočin
Sremska Mitrovica
Ruma
Pančevo
Beograd
Kovin
Šabac
Smederevo
Požarevac
Kladovo
Loznica
Lazarevac
Petrovac na Mlavi
Majdanpek
Negotin
Valjevo
Bor
Gornji Milanovac
Kragujevac
Jagodina
Bajina Bašta
Čačak
Užice
Zaječar
Trstenik
Knjaževac
Kraljevo
Nova Varoš
Kruševac
Priboj
Niš
Prijepolje
Blace
Pirot
Novi Pazar
Leskovac
Vranje
1+1=2
CeSID

STRATEGY?

- District heating in the Republic of Serbia exists in 57 cities/ municipalities, and their total nominal installed capacity is 6,700 MW. Average age of heating sources, heating substations and hot water distribution network is over 25 years. Rehabilitation and modernization of these systems, by renewal of heat source equipment, replacement of obsolete elements within distribution networks, as well as continuous promotion of the equipment of heating substation represents the constant priority of this sector. **For the purpose of more efficient realization of these activities and general development municipal energy on the territory of the Republic of Serbia, it is necessary to consider the possibility to institutionally connect these systems in order to achieve synergic effect in their joint and harmonized development.**

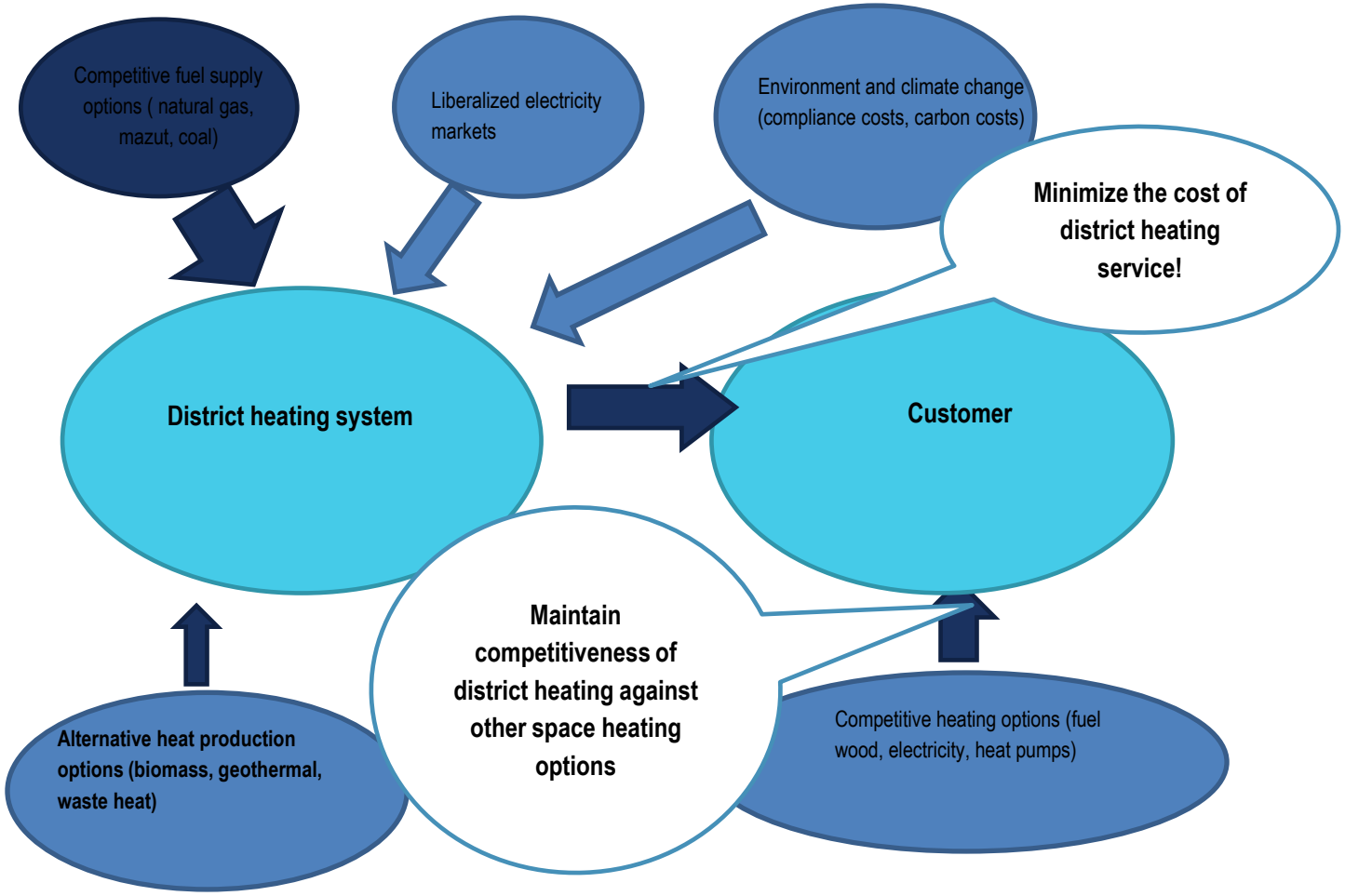
DISTRICT HEATING

District heating is a convenient way to heating space and tap water. In many processes, for example when electricity is generated or waste is burned, large parts of the energy are set free in the form of surplus heat. **The fundamental idea behind modern district heating is to recycle this surplus heat which otherwise would be wasted- from electricity production, from fuel and biofuel-refining, and from different industrial processes. Furthermore, district heating can make use of the many kinds of renewables (biomass, geothermal, solar thermal).**

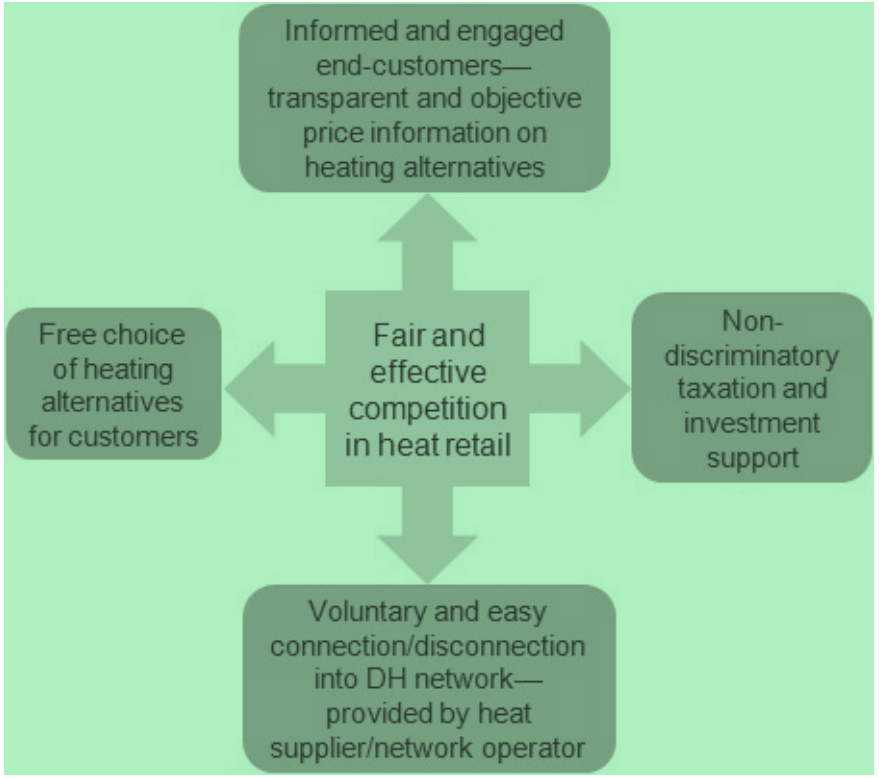
Euroheat&Power

AND THE BALL HITS THE BAR!

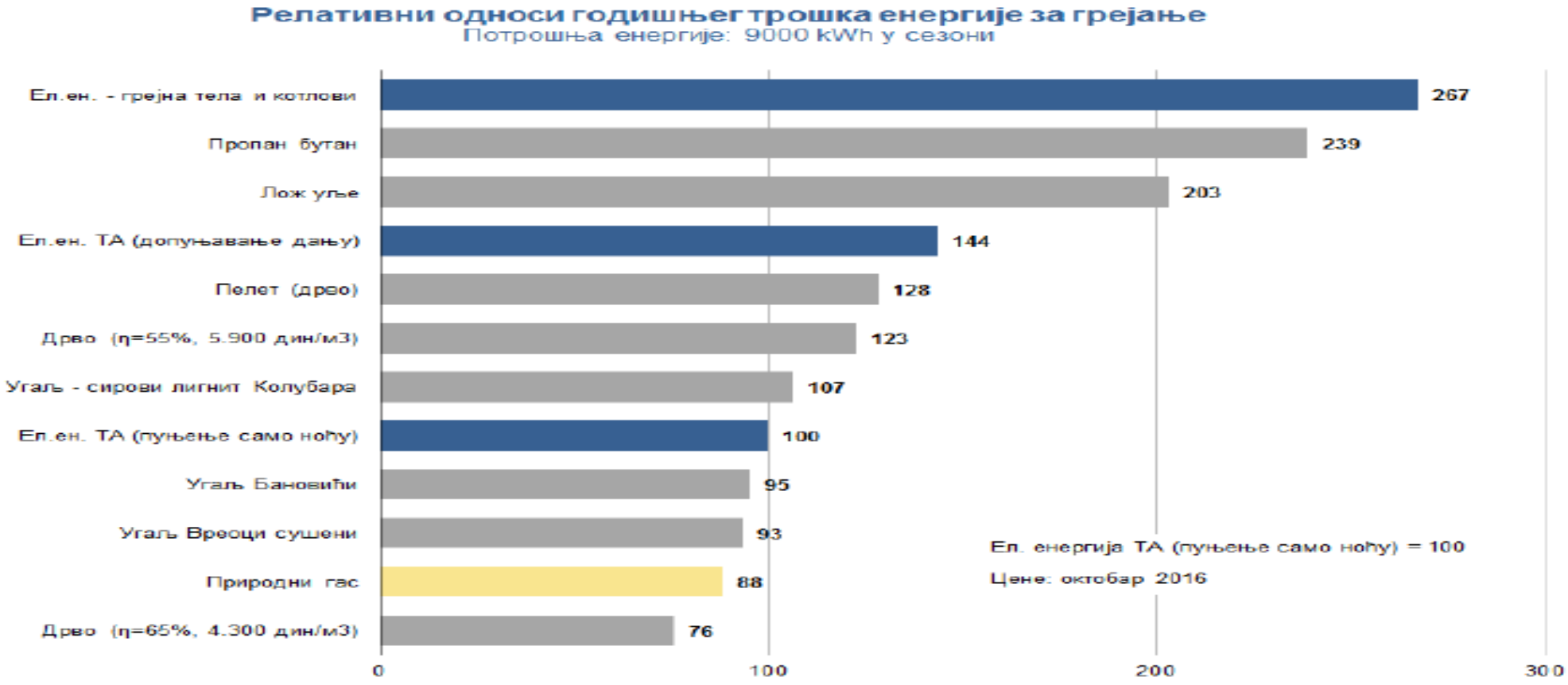
- More than 99% of production of thermal energy in district heating systems in Serbia is based on the direct use of fossil fuel. It is a process in which the energy of combustion of fossil fuel is delivered to the large amount of water which delivers heat to system consumers without electricity generation at the same time. The direct use of fossil fuel accounts for only 15% of production of thermal energy in district heating systems in 27 European countries.


Competitive fuel supply options (natural gas, mazut, coal)
Liberalized electricity markets
Environment and climate change (compliance costs, carbon costs)
Minimize the cost of district heating service!
District heating system
Customer
Maintain competitiveness of district heating against other space heating options
Alternative heat production options (biomass, geothermal, waste heat)
Competitive heating options (fuel wood, electricity, heat pumps)

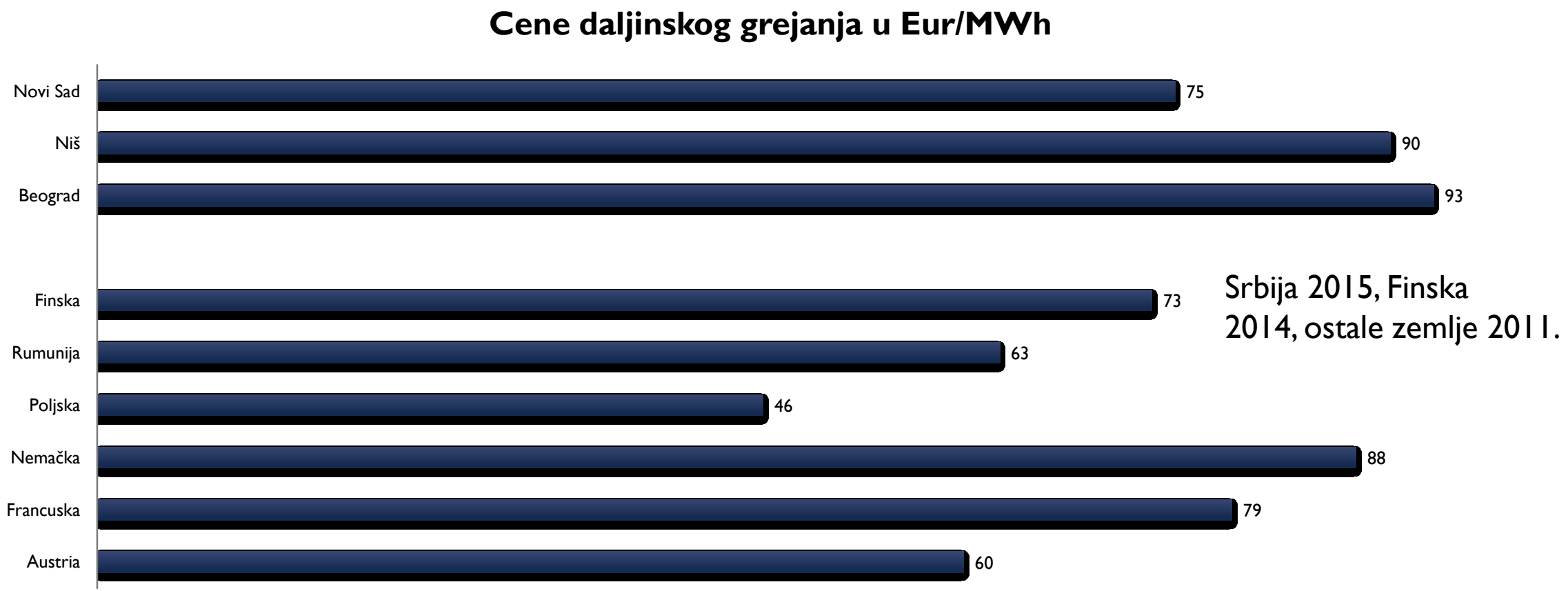
EFFECTIVE COMPETITIVE CONDITIONS IN HEAT RETAIL IN A LOCAL HEATING MARKET. SOURCE: FORTUM.



TRANSPARENT AND OBJECTIVE



HOME MADE PRICE INFORMATION



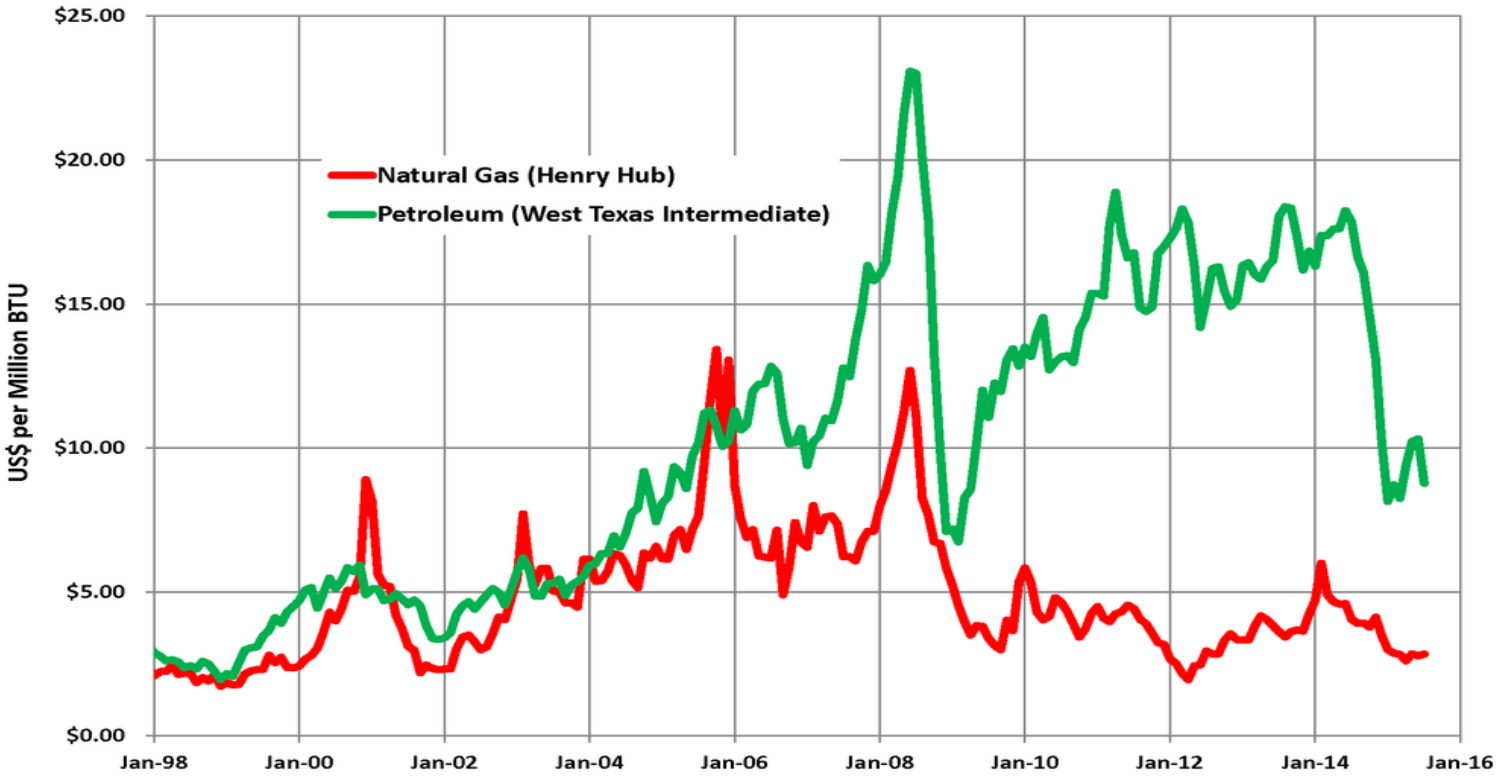
FUELS USED

- Mix depends on payment conditions and fuel availability

PAYMENTS

- "Officially utilities are organizing maintenance activities as of 01. june. Joint debt is reduced comparing to the end of the last year but has nevertheless increased recently since new credits were taken. District heating systems owe 23 billion dinars. It should however be noted that users owe 33 billion dinars which is almost twice compared to the last year. It seems as if nobody is paying." http://www.novosti.rs/vesti/naslovna/ekonomija/aktuelno.239.html:552343-Utrostrucen-dug-toplana)
- "In order to provide even more security to the bank the city has issued bonds in the same amount" http://www.novosti.rs/vesti/srbija.73.html:479864-Nis-Kredit-smanjio-dug-toplane Quotes from 2015.

ONLY 37 NUMBERS. I WILL SEE MINE ONE DAY...



HEAT SOURCES

System design	• Small number of large units designed to deliveroptimal heat quantity to the most distant consumer in the coldest day.Lack of heat storage and peak units.
Spoljne projektne temperature	• Design ambiental air temperatures from natoinal standards do not reflect real winter temperatures- inherently oversized required consumption capacity.
Reserved power	• Reserve set aside for expected additional consumption

DISTRIBUTION NETWORK

- Non-optimized distribution and heat delivery is one of the main drivers of inefficiency of heat distribution and delivery.

EVIL CITIZENS AGINST EVIL UTILITY

- **District heating bill accounts for large share of diposable income of Serbian households who use this service. Nevertheless, income of utilities is more often then not insufficient to cover the costs.**

EU AND US

- By 30. November 2018. : carry out a comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling
- Where heating and cooling or hot water are supplied to a building from a district heating network or from a central source servicing multiple buildings, a heat or hot water meter shall be installed at the heating exchanger or point of delivery.
- By 30. November2019 : In multi-apartment and multi-purpose buildings with a central heating/cooling source or supplied from a district heating network or from a central source serving multiple buildings, individual consumption meters shall also be installed to measure the consumption of heat or cooling or hot water for each unit where technically feasible and cost-efficient. Where the use of individual meters is not technically feasible **or not cost-efficient,** to measure heating, individual heat cost allocators shall be used for measuring heat consumption at each radiator, unless it is shown that the installation of **such heat cost allocators would not be cost-efficient**.

METERING

- Indtroduction of individual metering would cost more than 200 million EUR.
- Sub metering may provide for better cost identification but does not enable unit cost reduction.
- Unit cost for delivery of 1 MWh of heat in district heating systems in Serbia Srbiji threatens sustainability of this service.

MAP TO TAKE ALONG ON A JOURNEY
SOURCE: C.A.R.M.E.N

- at least 2.500 h full load for the biomass boiler
- more than 80 % heat production from biomass
- total invest < 7,5 * the current receipts for heat p.a.
- minimal proportion of heat demand to pipe length: 1,5 MWh/(m*a)
- example: 1 km of heat pipe should transport at least 1.500 MWh of heat to the clients

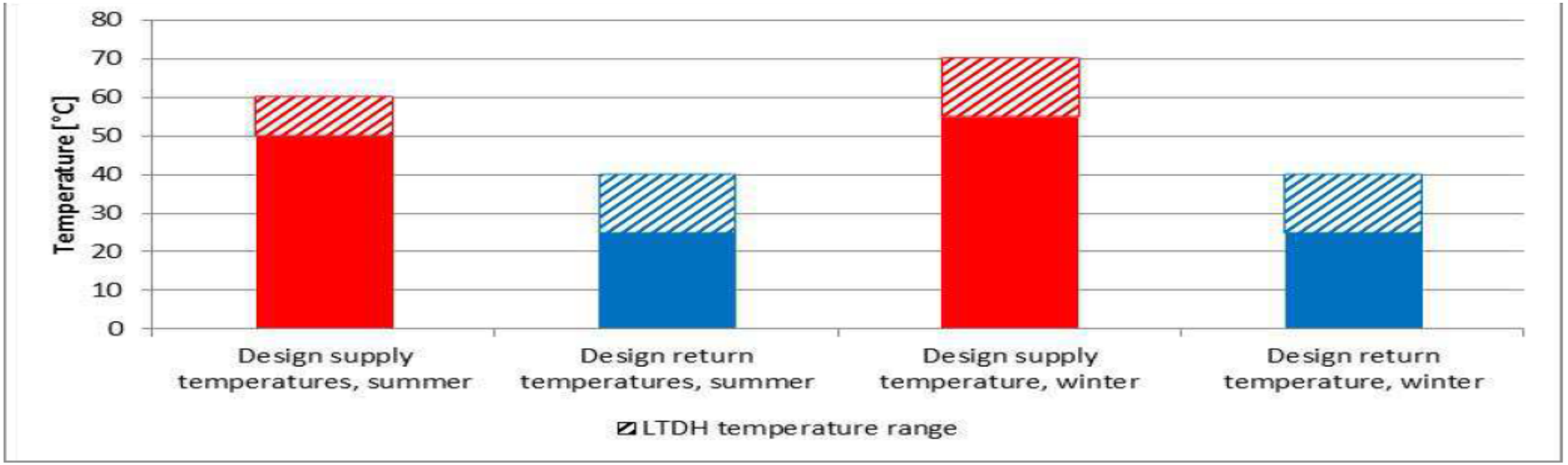
MAP TO TAKE ALONG ON A JOURNEY

SOURCE : DEA AND ENERGINET

Technology	District heating boiler, wood-chips					
	2015	2020	2030	2050	Note	Ref
Energy/technical data						
Generating capacity for one plant (MJ/s)	1 - 12	1 - 12	1 - 12			1
Total efficiency (%) net	108	108	108			1
Availability (%)	96-98	96-98	96-98			2
Technical lifetime (years)	20	20	20			1
Construction time (years)	0.5 - 1	0.5 - 1	0.5 - 1			2
Environment						
SO_2 (g per GJ fuel)	1.9	1.9	1.9	1.9		4;3;3;3
NO_x (g per GJ fuel)	81	81	81	81		4;3;3;3
Unburned hydrocarbon, UHC (g per GJ fuel)	6.1	6.1	6.1	6.1		4;3;3;3
N_2O (g per GJ fuel)	0.8	0.8	0.8	0.8		4;3;3;3
Financial data						
Nominal investment (M€ per MJ/s)	0.5 - 1.1	0.5 - 1.1	0.5 - 1.1			1
Total O&M (€/MWh)	5.4	5.4	5.4			1

MAP TO TAKE ALONG ON A JOURNEY

SOURCE: EUDP 2010-II: FULL-SCALE DEMONSTRATION OF LOW-TEMPERATURE DISTRICT HEATING IN EXISTING BUILDINGS



PRIDRUŽITE NAM SE I IVI

Partnerstva

www.resfoundation.org