Data intelligent operation of district heating and district cooling systems 03/04/19

Perspectives for the integration of the DH systems in the Eastern Europe

Asst. Prof. Goran Krajačić

KeepWarm

(Improving the performance of District Heating Systems in Central and Eastern Europe)

This project is funded by the EU's Horizon 2020 research and innovation programme under grant agreement N°784966, and lasts from April 2018 – September 2020.

This project receives co-funding from the German Federal Ministry of Economic Cooperation and Development.

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THERE ARE NO PERSPECTIVES?

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немачка сарадња

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HRT Vijesti

HRT UŽIVO | HRT NA ZA

VIJESTI | SPORT | MAGAZIN | RASPORED | HRT PRIKAZUJE | ORKESTRI / ZBOR

Putin: Rusija sprema sudjelovati u plinofikaciji hrvatskih regija

Autor: Hina/HRT
20. 10. 2017. prije 1 tjedan

Ruski predsjednik Vladimir Putin je na susretu sa sudionicima svjetskog susreta studentske mladeži u Sočiju rekao da je Rusija spremna sudjelovati u plinofikaciji hrvatskih regija čime bi se poboljšala kvaliteta zraka.

NATURAL GAS AS TRANSITION FUEL?

ZOTTE:

"Izgradnja i razvoj centralnih toplinskih sustava i proizvodnja toplinske energije u kogeneracijskim postrojenjima na visokoučinkovit način, kao i njihovo održavanje i korištenje, od interesa su za Republiku Hrvatsku".

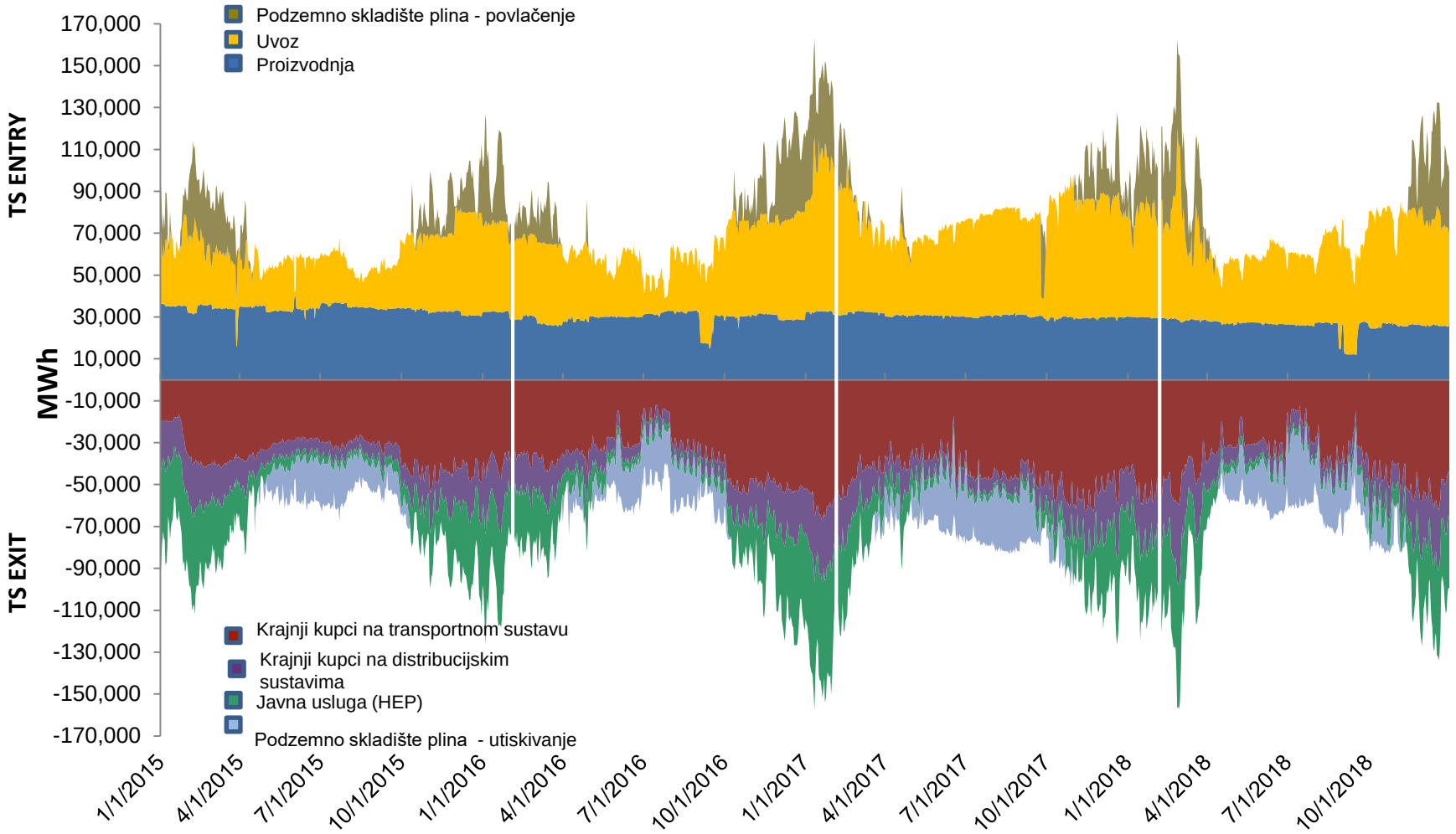
ZEU:

„ Učinkovito korištenje energije od interesa je za Republiku Hrvatsku."

ZOOIEIVK:

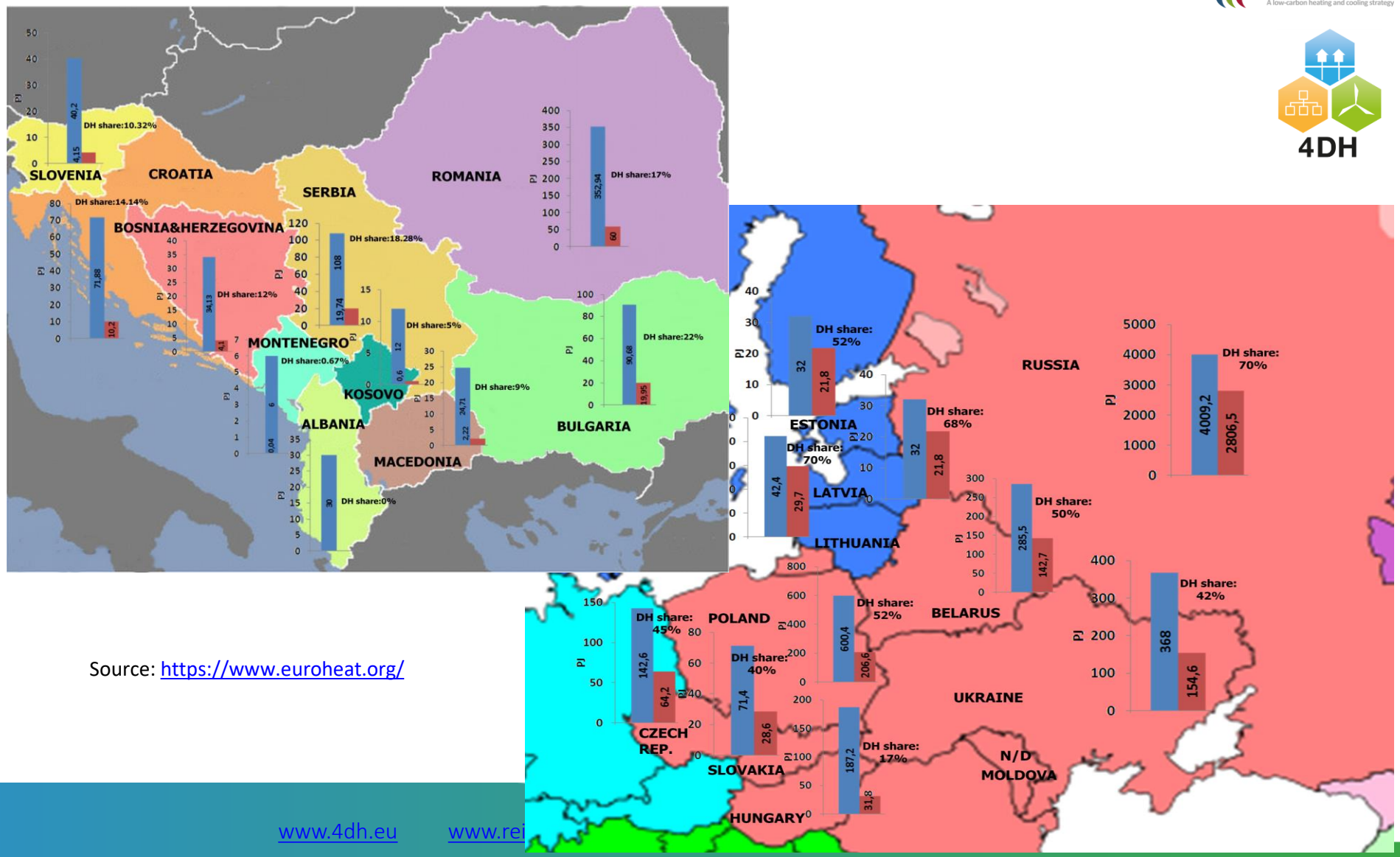
„Korištenje obnovljivih izvora energije i visokoučinkovite kogeneracije od interesa je za Republiku Hrvatsku

NATURAL GAS QUANTITIES AT CROATIAN TS



Izvor: Plinacro

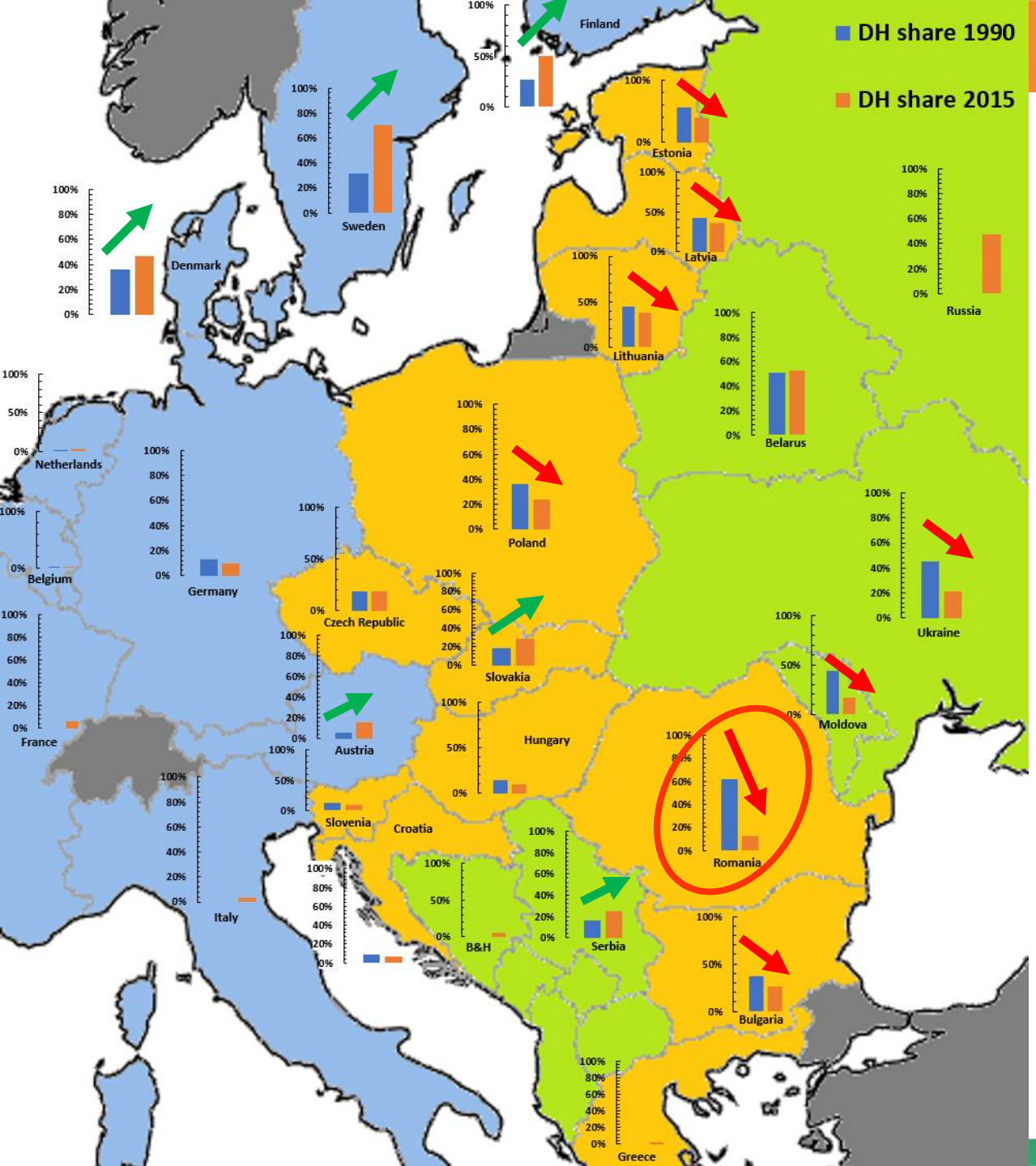
Status of district heating in Eastern Europe



Source: https://www.euroheat.org/

Residential heat supplied by DH

- Falling due to increase in energy efficiency, but also due to competition from natural gas
- Romania lost most of DH



Residential DH share

- Falling due to competition from natural gas
- Romania lost most of DH to gas

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FINDING YOUNG HERO FOR DH IN EASTERN EUROPE?

Greta Thunberg wins German Golden Camera award

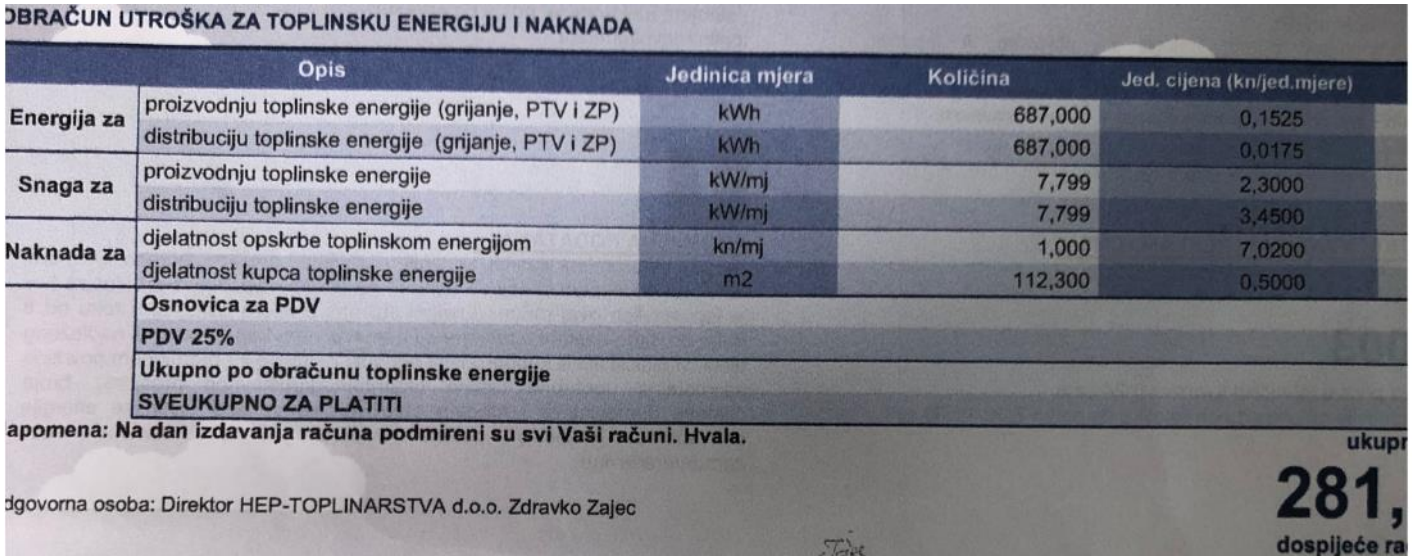
The young climate activist has been awarded a special prize during Germany's best-known media awards show. She used her speech to call on media celebrities to spread the message on climate change.

Swedish climate activist Greta Thunberg won a German Golden Camera award on Saturday.

Prof. Duic's (http://powerlab.fsb.hr/neven/) Conclusions on DH status in the Eastern Europe

- Ageing of energy generation infrastructure requires large investments in rehabilitation of existing district heating systems
- Low DH efficiency and high emissions
- Negative media coverage
- Customer dissatisfaction with heat distribution systems which reduces total heat demand from DH systems and revenue
- Biomass is the most ready for district heating, while readiness of geothermal and solar energy is limited
- Natural gas better organised competitor using hidden subsidies
- Orientation to local resources leads to job creation in local communities

DH Zagreb vs. NG Zagreb



OBRAČUN UTROŠKA ZA TOPLINSKU ENERGIJU I NAKNADA

	Opis	Jedinica mjera	Količina	Jed. cijena (kn/jed.mjere)
Energija za	proizvodnju toplinske energije (grijanje, PTV i ZP)	kWh	687,000	0,1525
	distribuciju toplinske energije (grijanje, PTV i ZP)	kWh	687,000	0,0175
Snaga za	proizvodnju toplinske energije	kW/mj	7,799	2,3000
	distribuciju toplinske energije	kW/mj	7,799	3,4500
Naknada za	djelatnost opskrbe toplinskom energijom	kn/mj	1,000	7,0200
	djelatnost kupca toplinske energije	m2	112,300	0,5000
	Osnovica za PDV			
	PDV 25%			
	Ukupno po obračunu toplinske energije			
	SVEUKUPNO ZA PLATITI			

apomena: Na dan izdavanja računa podmireni su svi Vaši računi. Hvala.

ukupr

dgovorna osoba: Direktor HEP-TOPLINARSTVA d.o.o. Zdravko Zajec

281,

dospijeće ra

Obračun potrošnje plina 191 za razdoblje 01.12.2018-28.02.2019.

Datum	Ind.	Broj plinomjera	Stanje	Volumen (m^3)	Faktor korekcije	Korigirani volumen (m^3)	Hds (kWh/m^3)	Energija (kWh)	Cijena (kn/kWh)	Iznos (kn)
1	2	3	4	5	6	7 = 5 x 6	8	9 = 7 x 8	10	11 = 9 x 10
30.11.18	2		644							
31.12.18	1		759	115	1,006981	116	9,662954	1121	0,239400	268,36
03.02.19	3		825	66	1,006981	66	9,662954	638	0,242000	154,39
28.02.19	3		878	53	1,006981	53	9,662954	512	0,242000	123,91
	Naknada - Ts2									42,00
	Porezna osnovica									588,66
	PDV 25%									147,17
	Obračunati iznos:					235		2271		735,83

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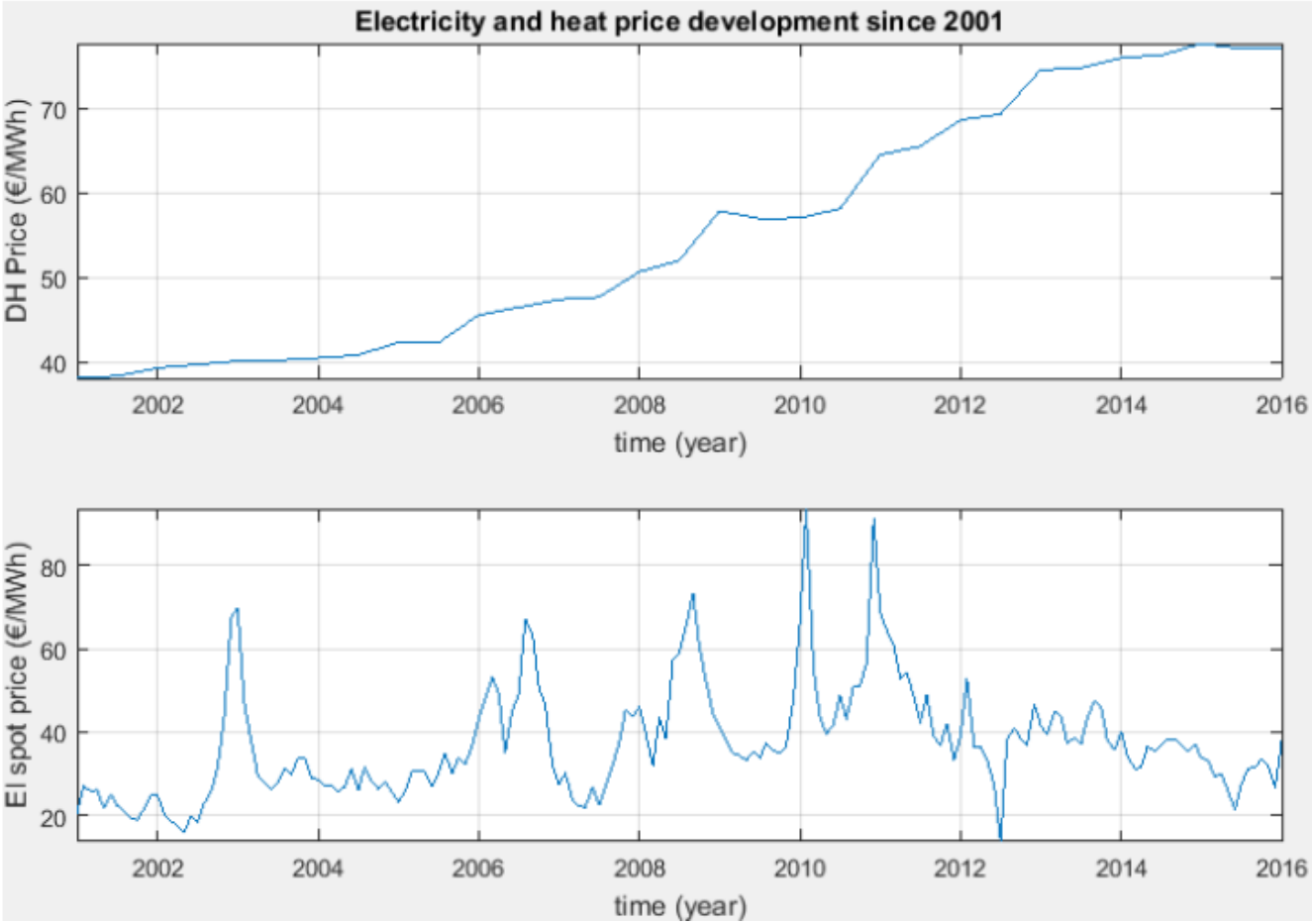
GO WEST!



LEO LAAKKONEN
PREDICTIVE SUPPLY TEMPERATURE OPTIMIZATION OF DISTRICT HEATING NETWORKS

Master of Science thesis

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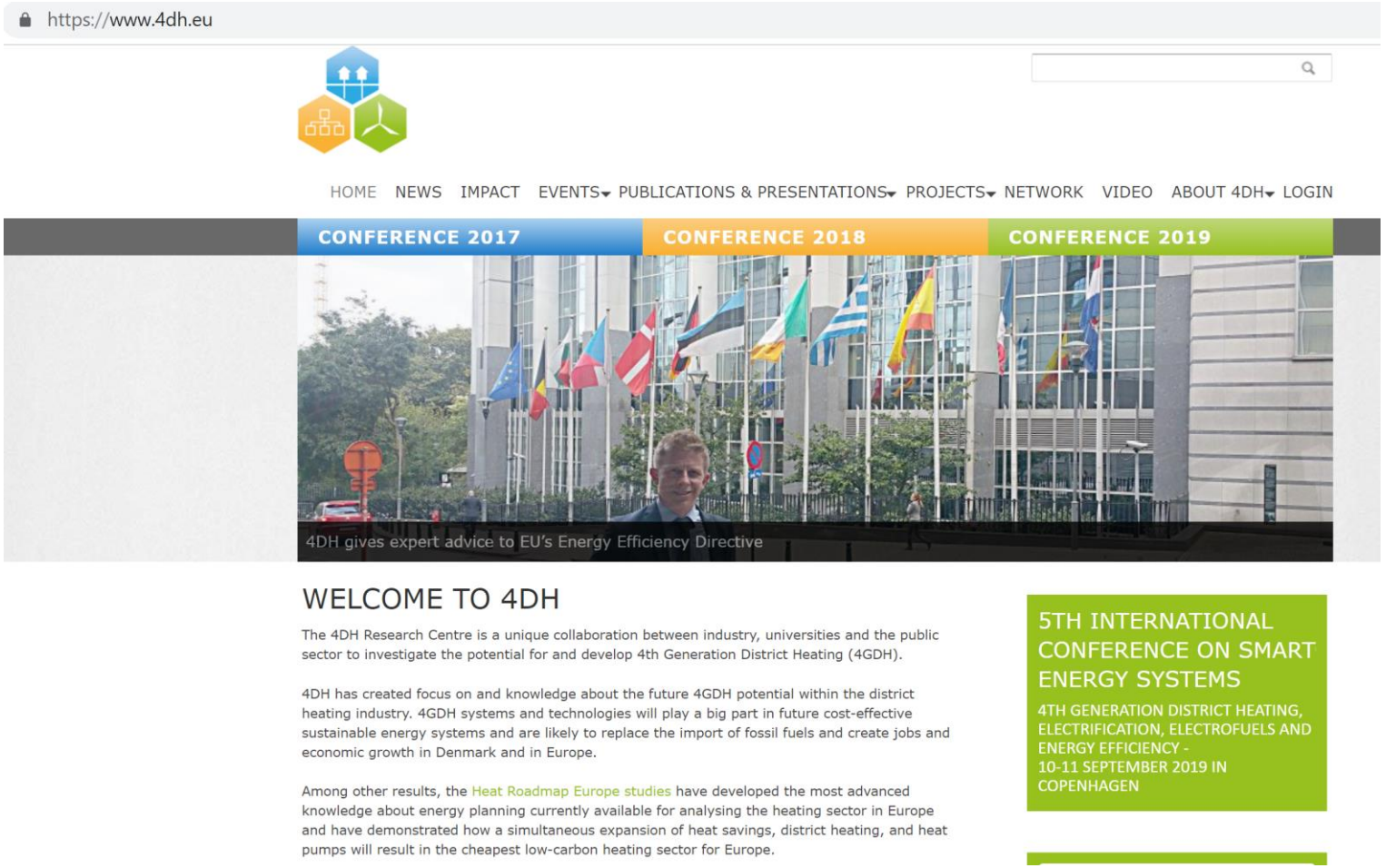
4DH project 2012-2018



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Interreg
EUROPEAN UNION
Danube Transnational Programme
Seed Money Facility

DHswitch

Switching to district heating systems for diversification of supply, reducing gas dependency and increasing the use of locally available renewable sources

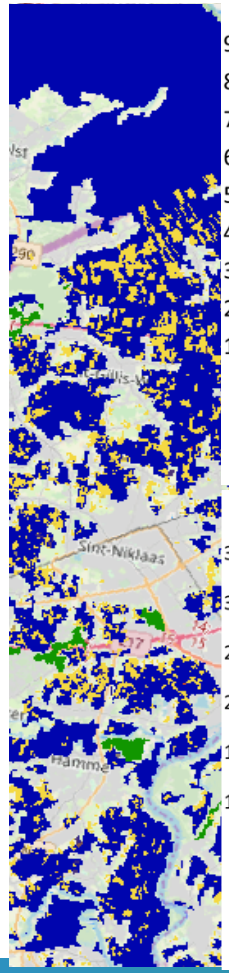
Seed money facility project

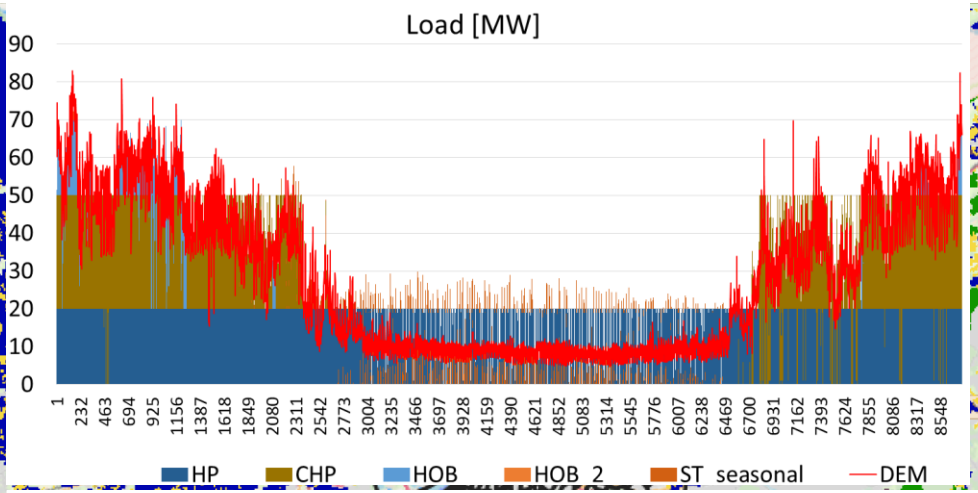
- Contact:
- hrvoje.dorotic@fsb.hr
- borna.doracic@fsb.hr

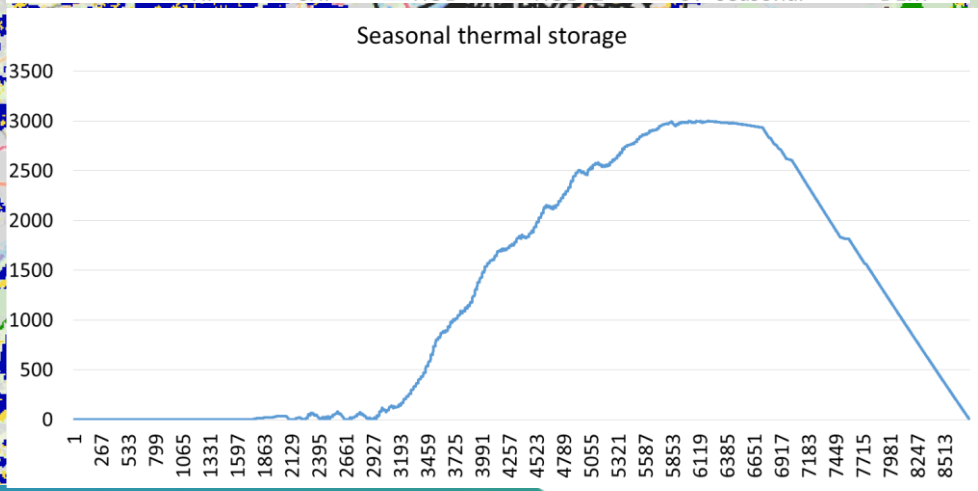
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723757.

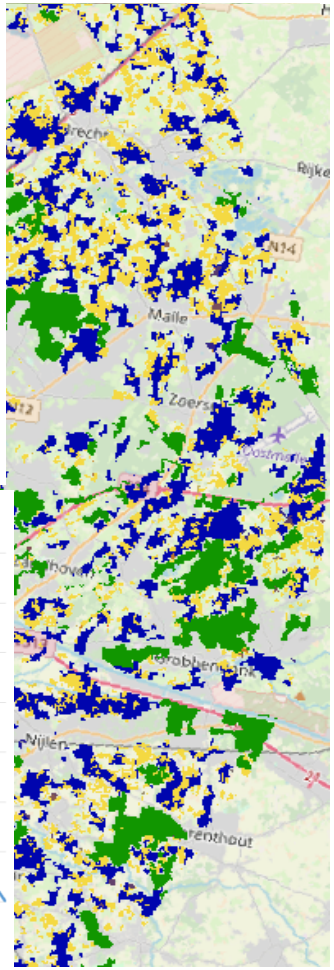
Contact:
hrvoje.dorotic@fsb.hr

PLANHEAT TOOL









- Bottom-up mapping
- Top-down mapping
- Supply mapping
- Hourly simulation

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Projects at http://www.het.hr/
CROATIAN ENERGY TRANSITION

fosterREG

Stratego
ENHANCED HEATING & COOLING PLANS

Bin2GRID

Beyond Energy Action Strategies
BEAST

Interreg Mediterranean
PRISMI

CoolHeating.eu
CoolHeating

Heat Roadmap Europe 2050
A low-carbon heating and cooling strategy
HRE

AGROCYCLE
for a circular economy
AGROCYCLE

PLANHEAT
PlanHeat

Interreg Mediterranean PELAGOS
Pelagos

Interreg Danube Transnational Programme ENERGY BARGE
ENERGY BARGE

Supported by: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety; European Climate Initiative EUKI
SEEETD

PENTAHELIX
Pentahelix

PROSEU
PROSEU

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Who? 11 partners from 8 countries

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

ICLEI Local Governments for Sustainability

ASSOCIATION FOR DISTRICT HEATING of the Czech Republic

lk Landwirtschaftskammer Steiermark

KSSENA

Jožef Stefan Institute, Ljubljana, Slovenia
Energy Efficiency Centre

REGIONALNA ENERGETSKA AGENCIJA
NORTH-WEST CROATIA
SJEVEROZAPADNE HRVATSKE
REGIONAL ENERGY AGENCY

FSB University of Zagreb
Faculty of Mechanical Engineering
and Naval Architecture

ZREA
ZEMGALES REĢIONĀLĀ ENERĢĒTIKAS AĢENTŪRA

KT-ENERGY

VINČA
INSTITUTE OF NUCLEAR SCIENCES
University of Belgrade
NATIONAL INSTITUTE OF THE REPUBLIC OF SERBIA

Where? KeepWarm countries

KeepWarm will be mainly active in Central and eastern Europe, notably:

- Austria
- Croatia
- Czech Republic
- Latvia
- Serbia
- Slovenia
- Ukraine

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Why? Challenges to overcome

- Old and inefficient district heating systems, often using obsolete technology
- Poor maintanance, inadequate management and lack of investments
- Dominance of (imported) fossil fuels
- Low heat production efficiency and sustainability
- High costs for heat production
- High transmission losses
- Oversized coverage of network

KeepWarm in Croatia

- UNIZAG FSB
- capacity building of DHS operators support to pilot projects in Croatia.
- tailor made trainings for DH operators – HEP Toplinarstvo
- training package

- REGEA
- Support for pilot projects in all countries, as well as the Croatian DHS pilots.
- feasibility studies for pilot Cities (Velika Gorica, Zaprešić, Samobor)

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How? Actions planned

1st
- Retrofitting and optimising DHS networks for grid efficiency

2nd
- Accelerating the use of nearby renewable energy in heat production

3rd
- Integrating sustainable excess heat from industrial/commercial facilities

4th
- Using waste-to-energy solutions in line with waste-reduction strategies

5th
- Deploying smart heat distribution and control management systems

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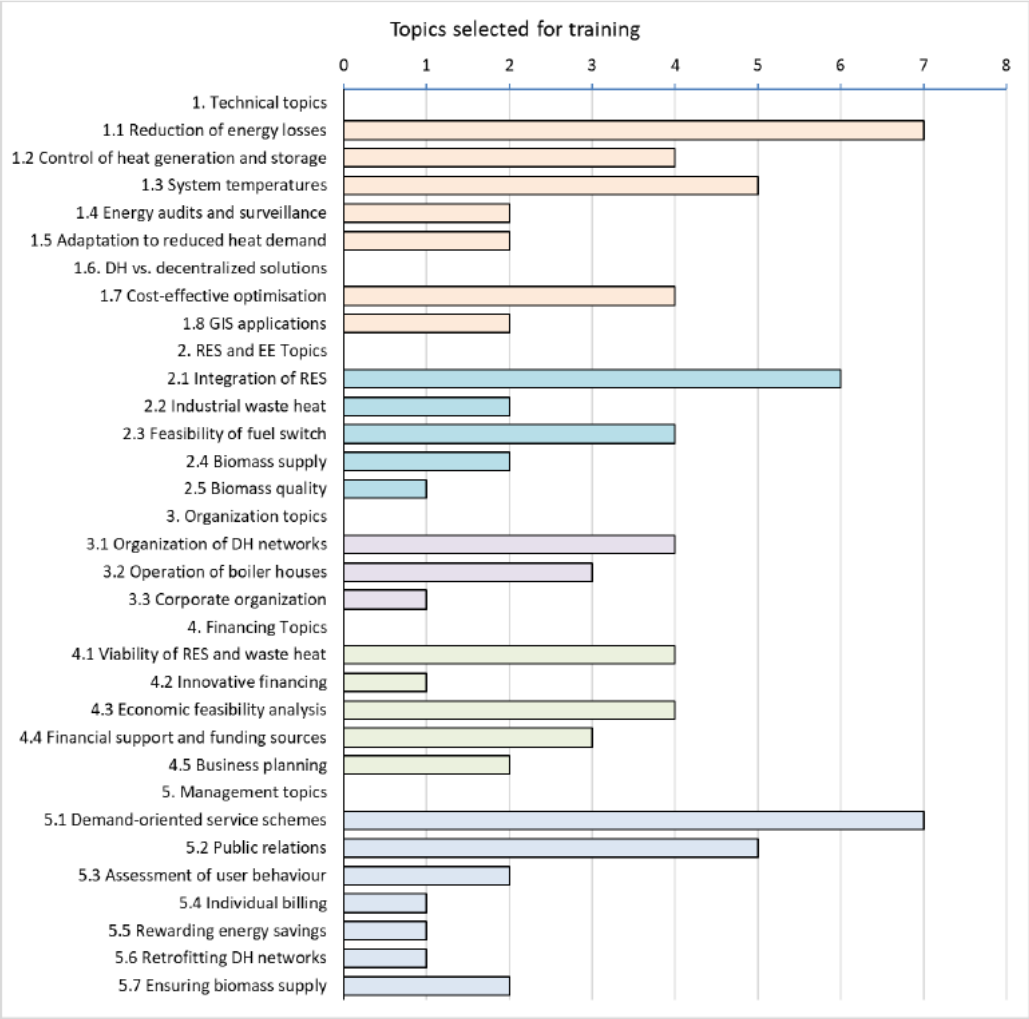
Training needs assessment and training plan



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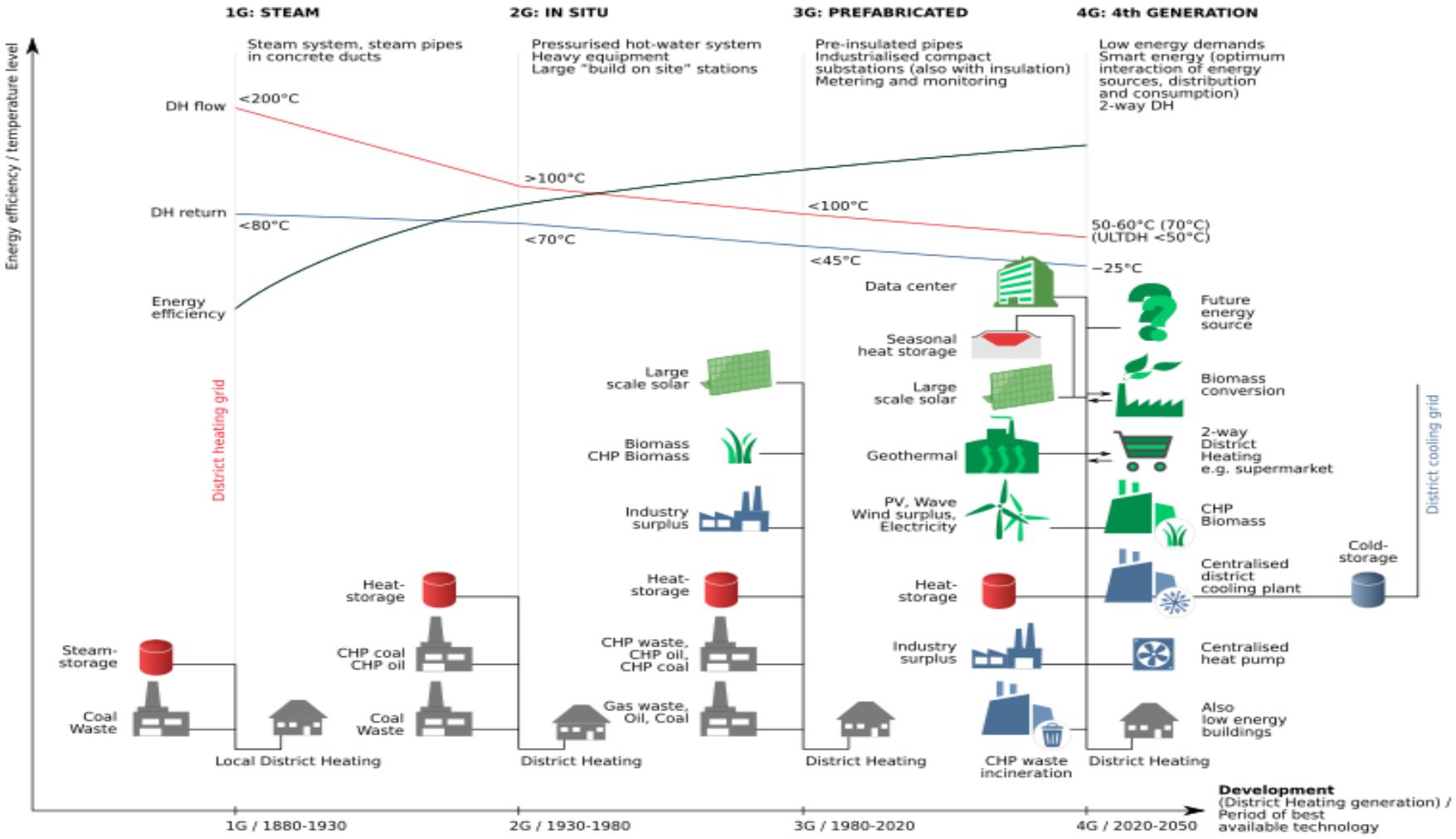
Generations of DHS plants



For whom? Target groups

Primary target group:

- **DHS owners and operators**

Secondary target groups

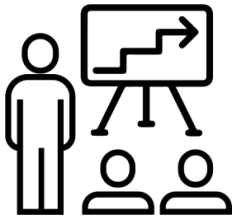
- Other actors already or potentially involved in the provision of RES/excess heat
- Regulatory and energy agencies at all levels (local, regional, national, EU)
- Policy-makers and public authorities at all levels (including municipal authorities)
- Real-estate developers/ town planners/ technical planning offices
- Financial institutions, investor groups, banks, etc.

Tertiary target group

- Civil society, NGOs, (trade) associations, networks, etc.
- Scientific community, higher education and research
- Consumers, end-users and the general public
- Stakeholders in other EU or non-EU countries
- Media

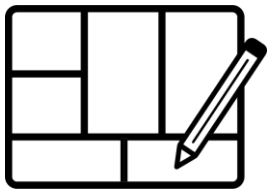
What can we do for them?

To overcome barriers to district heating deployment in CEE, KeepWarm works in a multi-stage approach to conduct the following activities:



Increase the capacity of specialists working in DHS companies by offering training workshops

Support them with the development of viable business plans



Advise them on how to mobilise funding for bankable pilot projects

Exhibit replicable DHS demo cases

Facilitate the multi-level integration of DHS retrofits into key strategies and plans

Replicability

- Strong emphasis on dissemination and exploitation through the twinning of district heating systems throughout Europe.

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Objectives we want to reach

1. At least 450 relevant stakeholders capacitated, including 150 DHS operators with increased skills on technical, organisational, financial and managerial aspects.
2. At least 95 operators are able to develop business plans and to identify the most suitable financial model for modernisation of DHS.
3. a) At least 23 Business plans for the modernisation of DHS have been developed and sources for investment identified.
   b) At least 15 plans will have reached investment stage. (together 5,6M €)
4. DHS network retrofitting is addressed in at least 10 local energy plans and 5 regional or national strategies or plans.
5. At least 23,300 relevant stakeholders (directly) and 125,000 (indirectly) reached across Europe to replicate the project outputs in primary and secondary target regions.

Expected outcome: Efficient DHS

↳ Accelerate cost-effective investment in the modernisation of district heating systems.

Make them:

- Economically viable (robust business model)
- Affordable prices for heating
- Stable and resilient supply
- High quality service
- Mid- to long-term adaptability of the service
- Low CO_2 emissions and environmental footprint

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Expected impact of the project

- Primary energy savings
- Increased RES production
- Greenhouse gas emission reductions
- Increased share of renewable sources of heat
- Improved scale of their replicability potential
- Number of retrofitting approaches

What you can do

- Implement a pilot project to demonstrate your ambitions
- Become a Twin to exchange experiences with peers
- Participate in training sessions in your country
- Attend, or even host, a KeepWarm event near you
- Browse www.KeepWarmEurope.eu for news and other info
- Learn more about DHS at your country page online
- Consult the training materials available on our website
- Follow us on Twitter @KeepWarm_EU
- Feel free to contact us

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Thank you!

goran.krajacic@fsb.hr

For more information,
visit KeepWarm website
www.KeepWarmEurope.eu
or contact the project coordinator
stefanie.schaedlich@giz.de
or follow us on Twitter:
@KeepWarm_EU

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