

Upgrading the performance of district heating networks

The Upgrade DH project and its framework

Upgrade DH final Conference

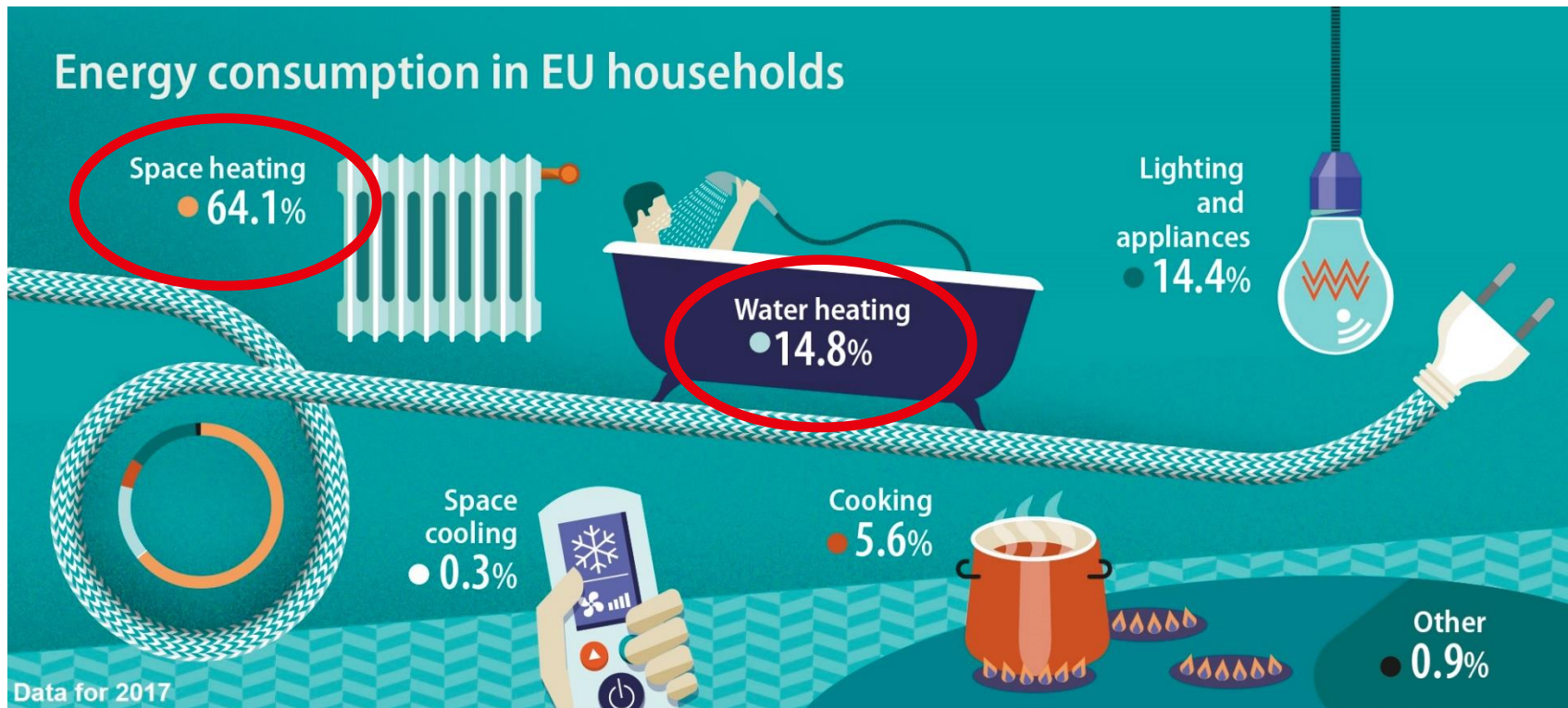
„Towards Efficient District Heating and Cooling in Europe“

15 September 2021
Dominik Rutz, Rita Mergner



-
1. **The challenge**
 2. The Upgrade DH project
 3. People
 4. Personal remarks

Heating needs much Energy!



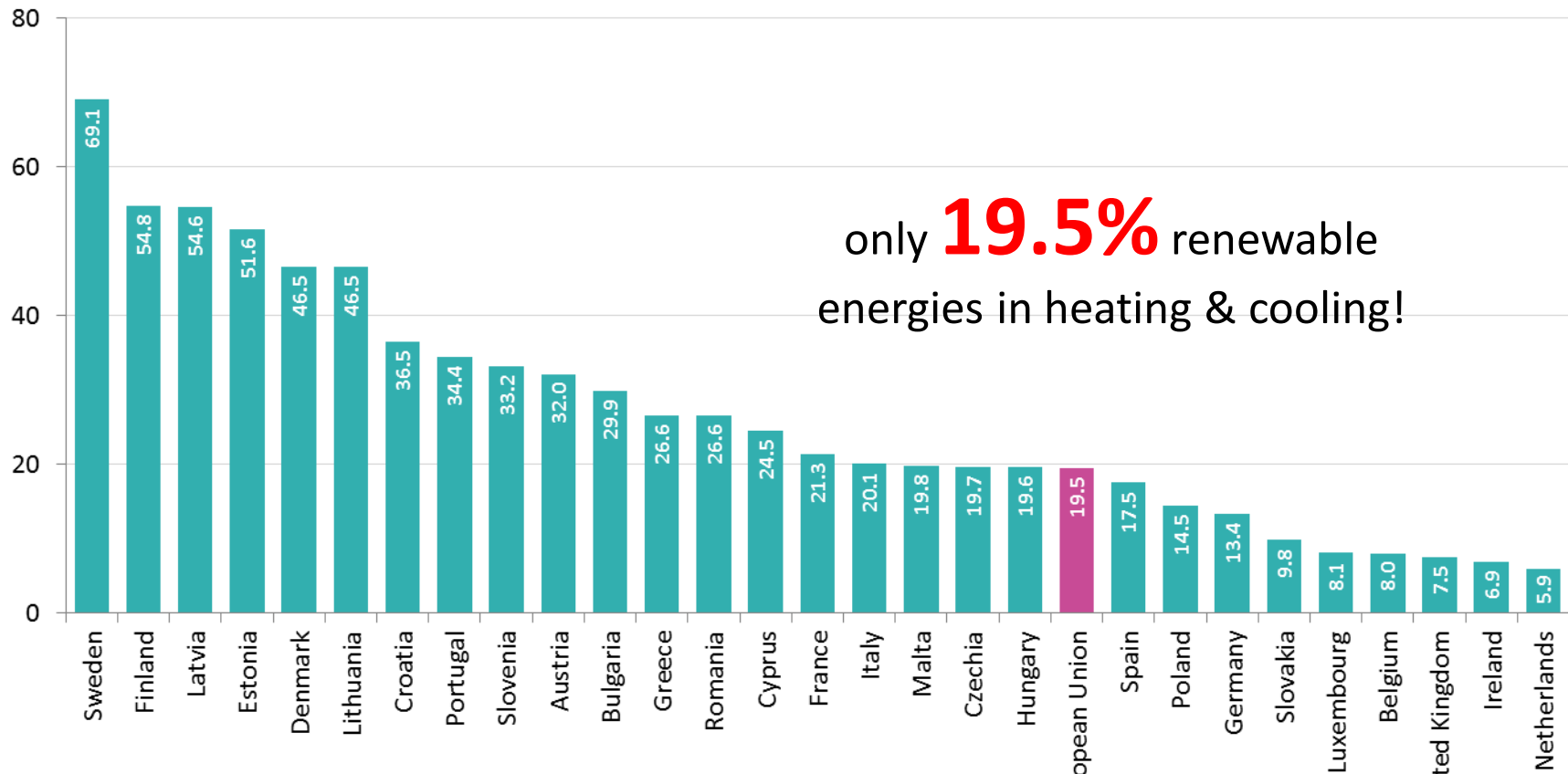
ec.europa.eu/eurostat 

<https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190620-1>

Data: 2017; Graph: 2019

Heating and cooling accounts for
around **50%**
of the final energy consumption
in Europe

Share of total energy used for heating and cooling coming from renewable sources, 2017 (%)



only **19.5%** renewable energies in heating & cooling!

The heating sector was neglected for too long!

<https://www.euroheat.org/news/eu-statistics/>

ec.europa.eu/eurostat 



The Challenge

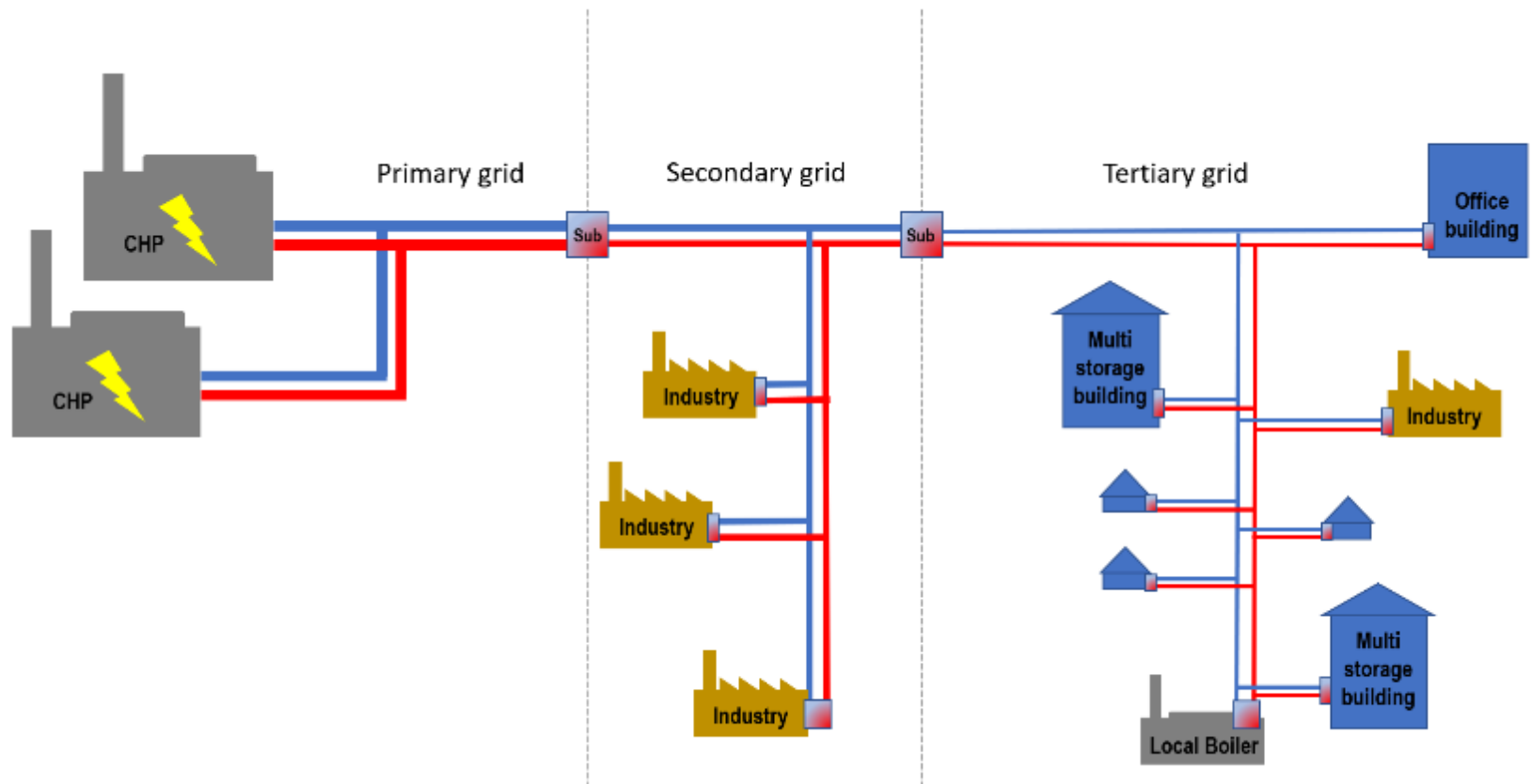
- Homeowners are often **overchallenged** how to implement 100% renewables for heating & cooling
- This applies especially to **existing buildings**

→ **modern / renewable / efficient District Heating systems have a key role in the energy transition of the heating sector!**

→ **existing DH must be upgraded**

→ **new DH must be built**

District heating: each system is individual!



1. The challenge
2. **The Upgrade DH project**
3. People
4. Personal remarks

Improve the performance of district heating networks in Europe
by supporting selected demonstration cases for upgrading, which can be replicated in Europe

Heat generation



Pictures: D. Rutz

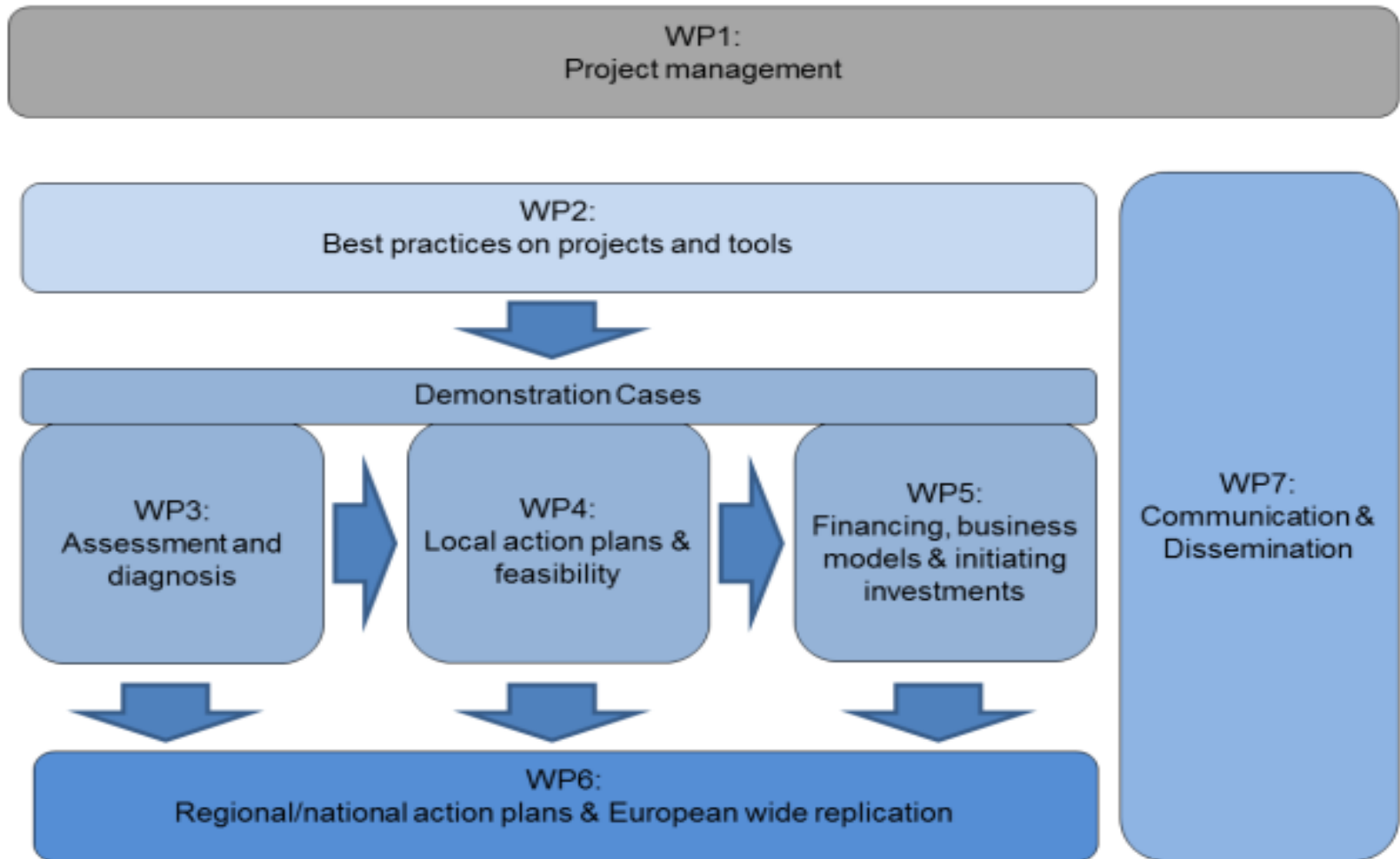
Heat distribution



Heat use



Upgrade DH project structure



Upgrade DH Consortium



WIP Renewable Energies, Germany

Dominik Rutz, Dominik.Rutz@wip-munich.de
www.wip-munich.de



AGFW-Projektgesellschaft für Rationalisierung, Information und Standardisierung mbH

Sebastian Grimm, grimm@agfw.de
www.agfw.de



Steinbeis Research Institute for Solar and Sustainable Thermal Energy Systems, Germany

Michael Kübler, Kuebler@solites.de
www.solites.de



University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture, Croatia

Tomislav Pukšec, tomislav.puksec@fsb.hr
www.fsb.unizg.hr



Lithuanian District Heating Association, Lithuania

Evaldas Čepulis, evaldas@lsta.lt
www.lsta.lt



COWI A/S, Denmark

Reto Michael Hummelshøj, rmh@cowi.com
www.cowi.com



Salcininku Silumos Tinklai, Lithuania

Elena Pumputienė, elena.pumputiene@sstinklai.lt
www.sstinklai.lt



OPTIT Srl, Italy

Matteo Pozzi, matteo.pozzi@optit.net
www.optit.net



Gruppo Hera, Italy

Alessandra Fornasier, alessandra.fornasier@gruppohera.it
www.gruppohera.it



JP Elektroprivreda BiH d.d., Bosnia and Herzegovina

Anes Kazagic, a.kazagic@epbih.ba
www.elektroprivreda.ba

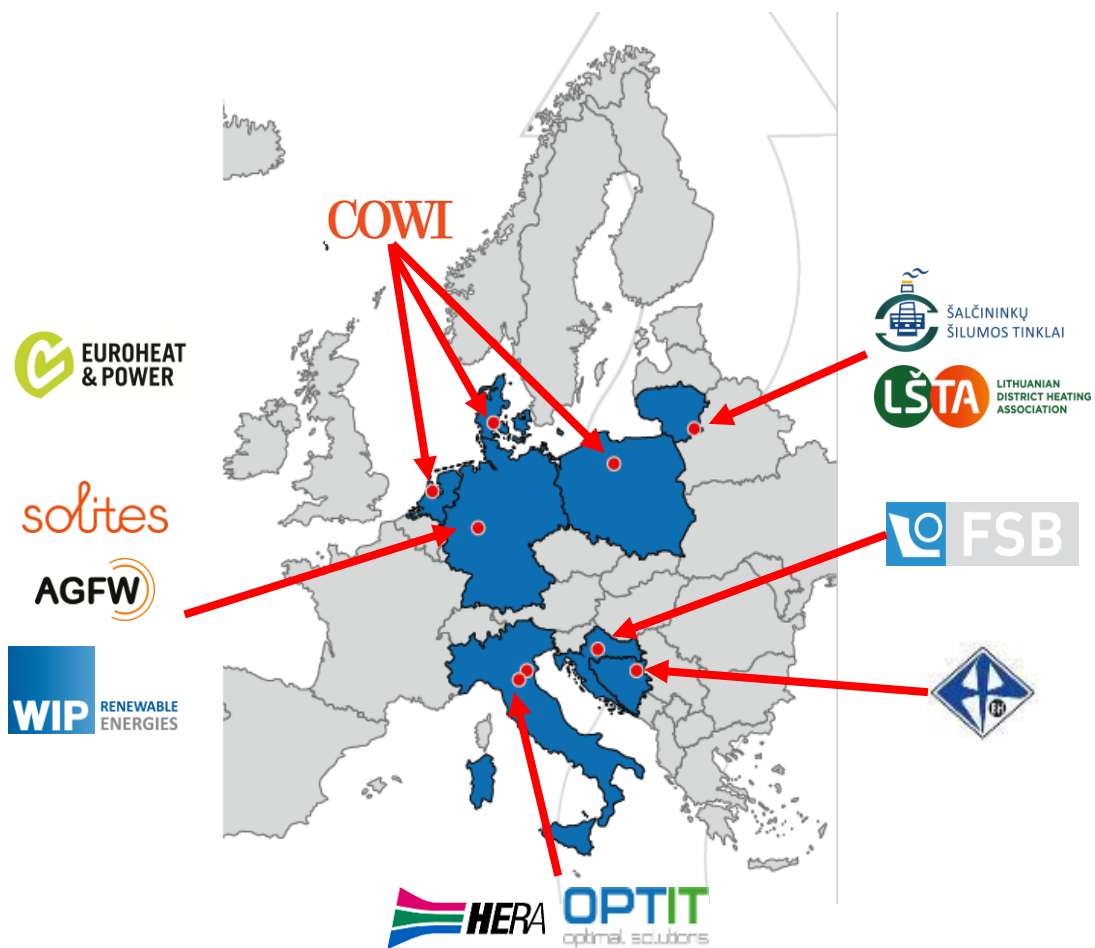


Euroheat & Power – EHP, Belgium

Alessandro Provaggi, ap@euroheat.org
www.euroheat.org



Upgrade DH case studies



Demo cases

- Tuzla
Bosnia and Herzegovina
- Middelfart
Denmark
- Sisak
Croatia
- Marburg
Germany
- Ferrara and Bologna
Italy
- Salcininkai
Lithuania
- Grudziadz
Poland
- Purmerend
the Netherlands



Results (selected ones)

- Many upgrading options identified, promoted and some already implemented!
- 4 study tours and site visits, 10 webinars, many working group meetings
- Exchange of knowledge and experiences among experts
- National District Heating & Cooling Action Plans for all target countries
- Campaign: Become a #DHCitizen!



Identified upgrading measures A)

Heat use

- Smart substations analytics
- Connection of potential new low-enthalpy customers
- Replacement of local gas boilers for hot water with DH hot water units
- Expansion strategies
- Replacement of local gas boilers with DH
- Sanitary water delivery and/or cooling services
- Energy efficiency measures at residential buildings

Heat distribution

- Heat loss reduction by better supply and return temperature management with temperature optimization
- Increase the number of pre-insulated pipes in the system
- Lowering the return temperature
- Lower the electrical demand by optimising the pump operation
- Optimise grid maintenance
- Hydraulic optimisation of the main DH line
- Introduction of SlimNet (twin pipes) instead of traditional single pipes
- Network optimization in order to reduce operational costs
- Replacement of the existing main circulation pump with new electronic frequency regulated circulation pumps for each DH system separately
- Replacement of existing hot water pipeline (DN600) with a pipeline of a larger diameter, solving hydraulic problems

Identified upgrading measures B)

Heat production

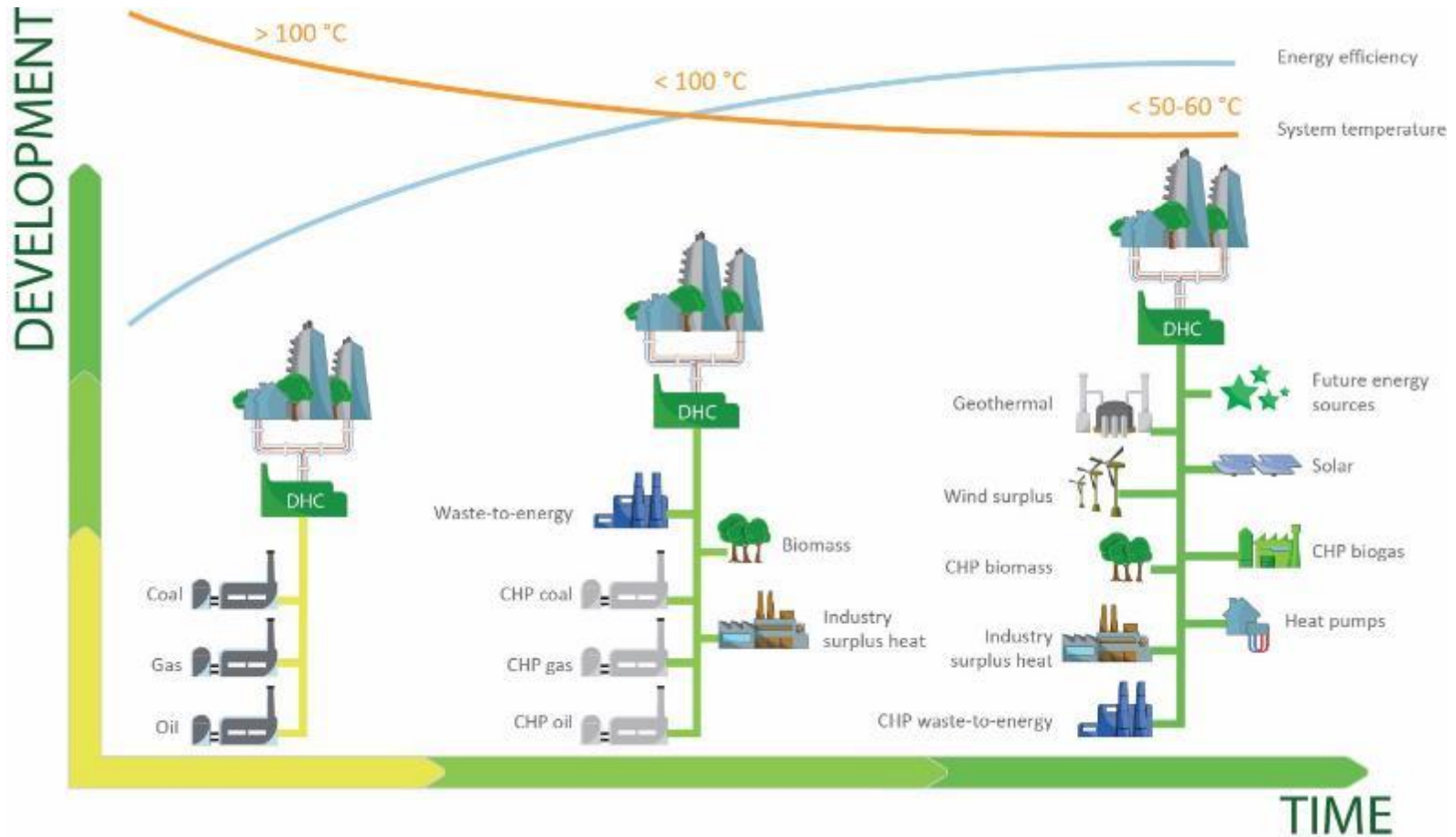
- Further development of the energy production optimization
- Installing of heat pumps
- Heat accumulator tank for load levelling
- Optimising the heat plant operation
- Calculating the economic feasibility of a P2H unit
- Convert CHP plant from coal to biomass
- Setting up a new biomass plan
- Integration of solar energy (thermal collectors and PV) in the heat production mix
- Solar thermal implementation in a small system which can operate during summer months as a heating source
- Installation of thermal heat storage to increase flexibility
- Heat recovery from the flue gas
- Waste heat utilization from the condensate for the technological purposes in the system
- Operation optimization of two coal cogeneration units
- Installation of a waste incineration facility

Management

- Merging the business with the neighbouring utility
- Setting up an energy demand prognosis 2018 -2030
- Plan for increased share of renewables

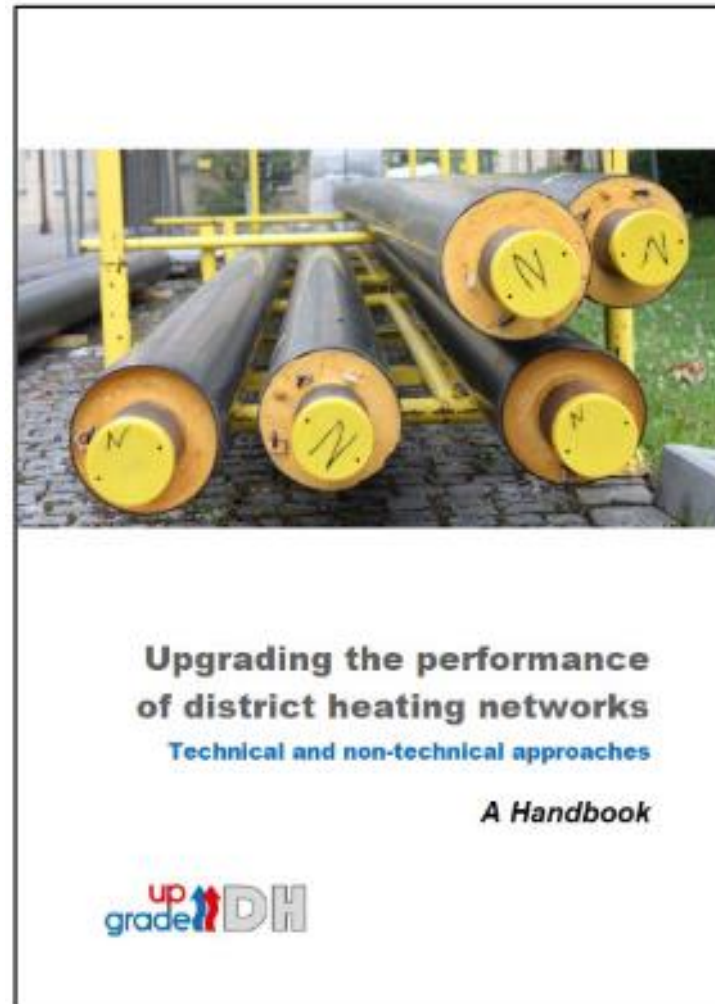


Development of DH!



The handbook is available in the following languages:

- English
 - Bosnian
 - Croatian
 - Danish
 - Italian
 - Lithuanian
 - Polish
-
- As hardcopy/ pdf
 - See www.upgrade-dh.eu



1. The challenge
2. The Upgrade DH project
3. **People**
4. Personal remarks



Germany



Lithuania



15-09-2021





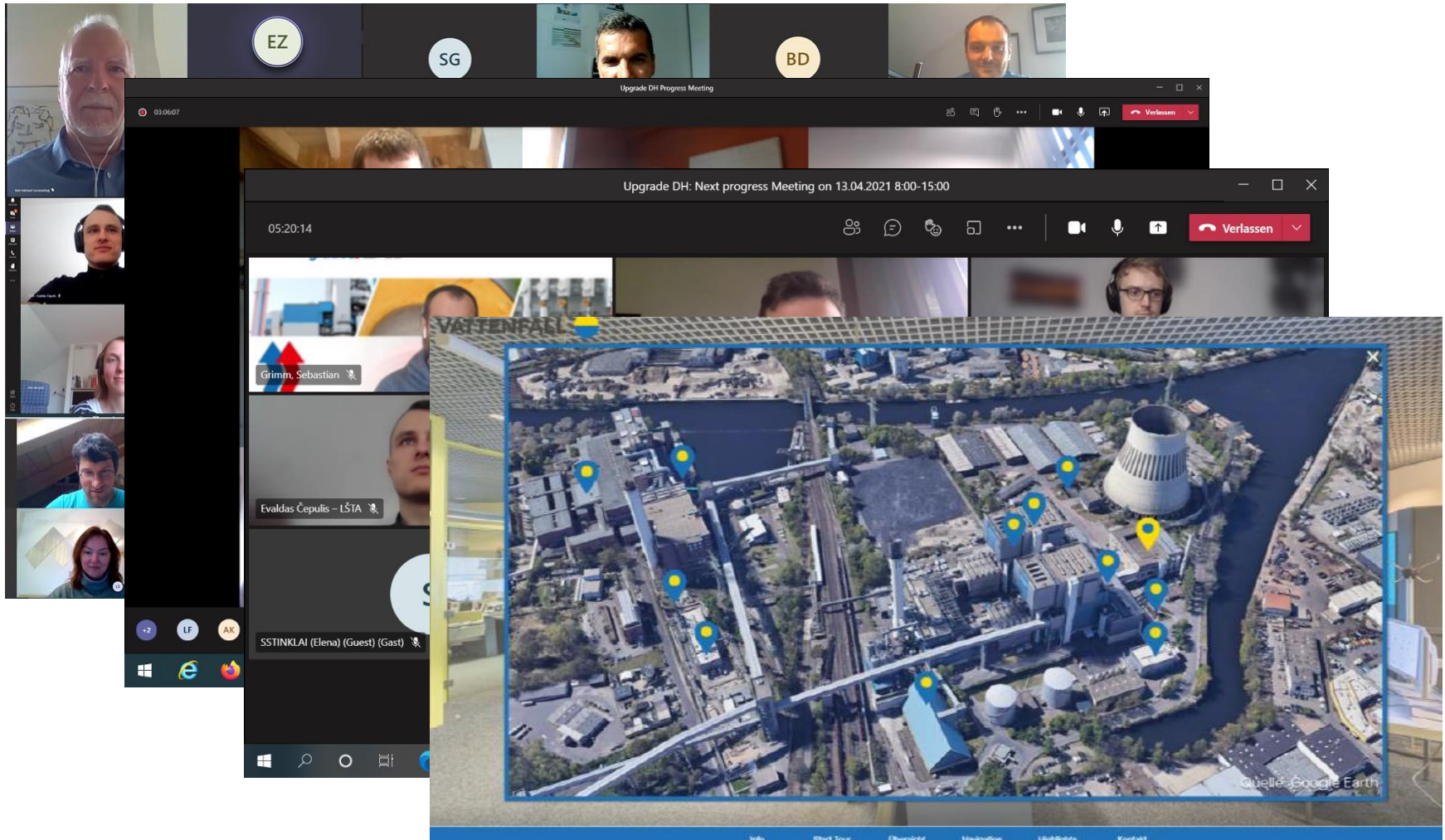
Bosnia & Herzegovina



15-09-2021



COVID-19 Homeoffice



Upgrading DH needs...

1. Technical solutions & good planning (tools)

People:

2. Skilled planners and workers
3. Politicians at national and EU levels that enact suitable & fast legislation
4. Politicians at the local level that implement projects at local level



I urgently call all project partners and conference participants to:

- Further use the personally gained knowledge for continuously informing policy makers at any levels
 - Get involved in local politics to stimulate changes
- ... according to your possibilities

1. The challenge
2. The Upgrade DH project
3. People
4. **Personal remarks**

-
- DH networks provide **great services** for consumers
 - DH networks must be fully carbon neutral to meet climate targets – much work has to be done to be **100% renewable!**
 - Large **energy efficiency** gains are possible for many DH systems
 - Hot debate at EU level on **forest based biomass** for energy purposes

BIG THANKS to:

- **All project partners** for the great work and friendship
- **Stavros Stamatoukos**, our project officer at CINEA for the support
- **Aksana Krasatsenka** for the organisation of this event
- My colleagues **Rita Mergner, Cosette Khawaja, Christine Meyer-Häge and Rainer Janssen** for all contributions



Thank you for your attention !!

Dominik Rutz, Rita Mergner

Dominik.rutz@wip-munich.de

www.upgrade-dh.eu

