

# Upgrading the performance of district heating networks in Europe: the Upgrade DH Project

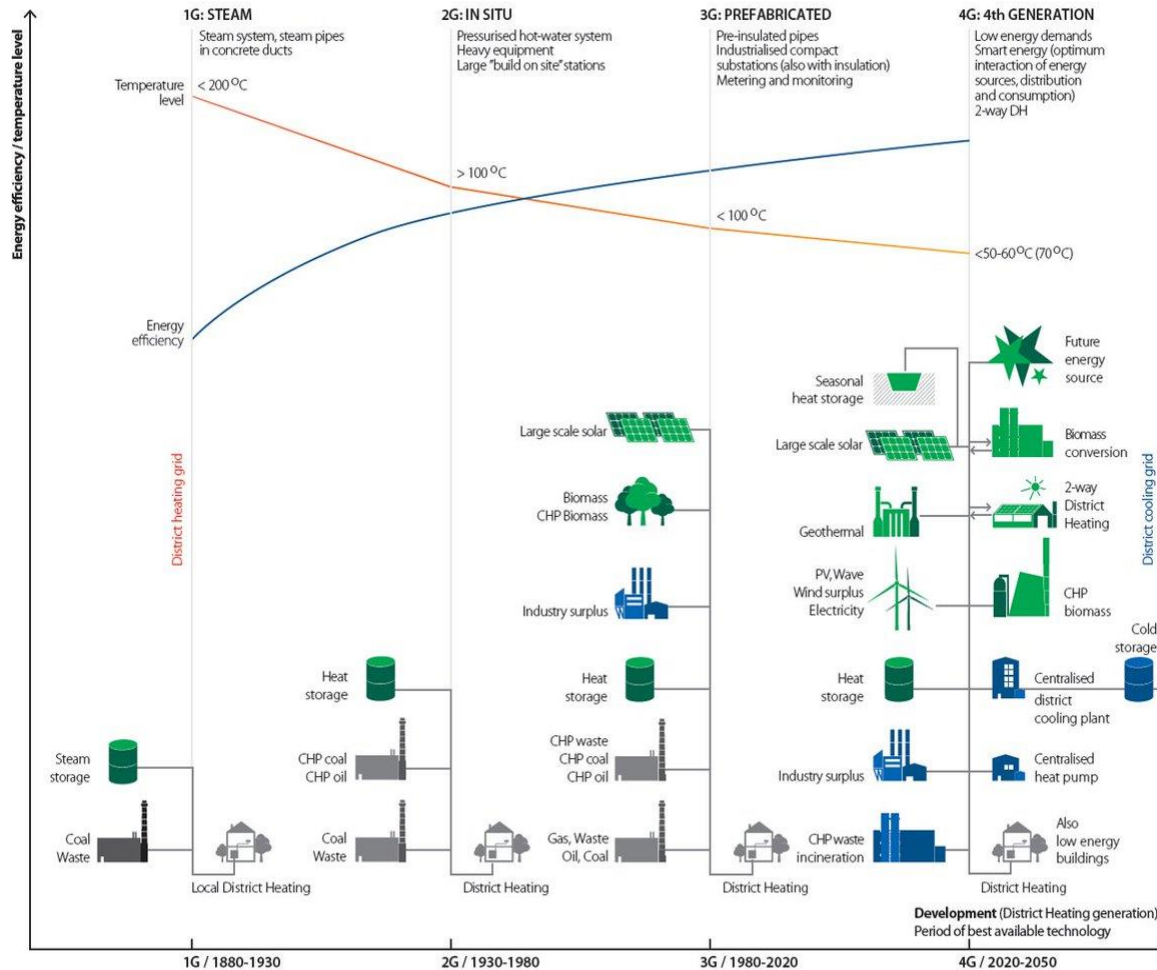
Stefano Morgione

Smart Energy Systems Conference  
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**OPTIT**  
optimal solutions



# Road to 4DH

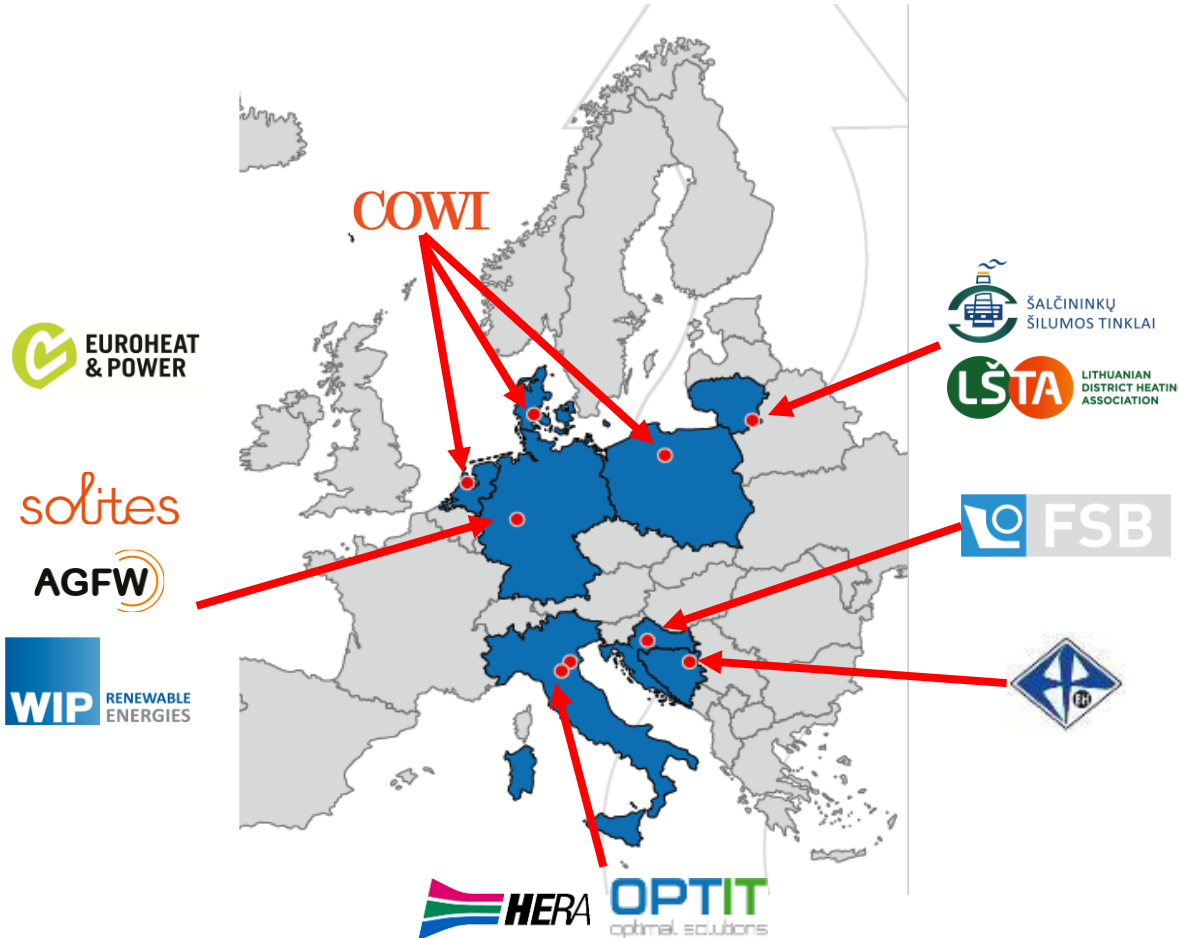


## THE CHALLENGE:

- ❑ Support incremental transition towards **4<sup>th</sup> Gen. DH**
- ❑ Provide solutions for **heterogeneous frameworks**
- ❑ Inspire regional and national **action plans**



# Upgrade DH Consortium

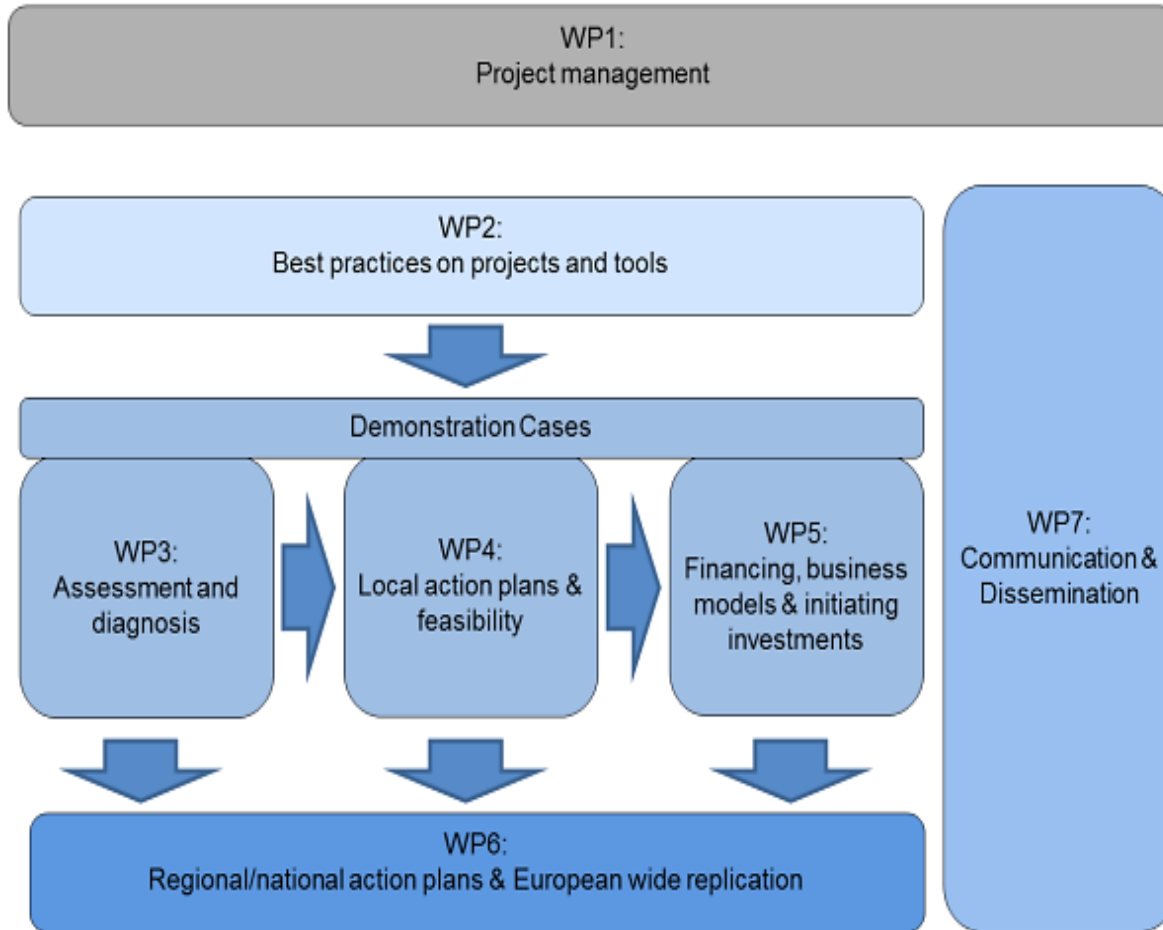


## THE DEMO CASES:

- Tuzla (**BIH**)
- Middelfart (**DEN**)
- Sisak (**CRO**)
- Marburg (**GER**)
- Ferrara & Bologna (**ITA**)
- Salcininkai (**LIT**)
- Grudziadz (**POL**)
- Purmerend (**NED**)



# Upgrade DH project structure



## THE APPROACH:

- ❑ Develop **Upgrading Projects** for each Demo Case
- ❑ Cover the **whole supply chain** (Generation, Distribution, Consumer)
- ❑ Promote **multi-stakeholder engagement**
- ❑ Assess scalable solutions for **wide replication potential**



# Upgrading: Generation

## Optimization & Advanced Analytics



- ❑ CHP Scheduling Optimization in Tuzla (BIH)

## Flexibility enhancement technologies



- ❑ Heat Storage integration in Sisak (CRO)
- ❑ Heat Pumps installation in Bologna (ITA)

## Transition to RES



- ❑ Biomass plants in Purmerend (NED) & Grudziadz (POL)
- ❑ Solar Thermal in Tuzla (BIH) & Salcininkai (LIT)



# Upgrading: Distribution

## Lower Temperature Technologies



- ❑ New piping for lower temperature Ops in Middelfart (DEN)

## Operational Network Optimization



- ❑ Thermal-hydraulic simulation modelling in Purmerend (NED)
- ❑ Hydraulic scenarios analysis in Marburg (GER)

## Refurbishment & Expansion Strategy



- ❑ Long-term network refurbishment strategy in Salcininkai (LIT)
- ❑ Network expansion strategy in Grudziadz (POL)



# Upgrading: Consumer Side

## Consumer Engagement



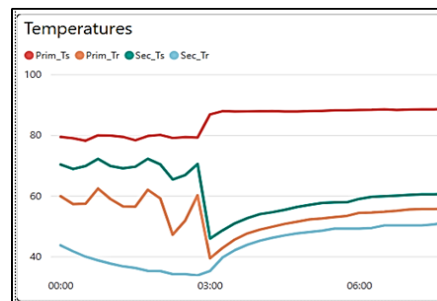
- ❑ Switch to consumption-based billing in Tuzla (BIH)
- ❑ Cooperation with prominent consumer in Marburg (GER)

## Regulation & Control Strategy



- ❑ Expert Coaching on Substations' design in Tuzla (BIH)

## Digitalization & Analytics



- ❑ Smart Substation Analytics in Ferrara (ITA)
- ❑ Thermostatic valves at the users in Tuzla (BIH)



# The expected impacts

The implementation of the assessed **upgrading measures** are expected to yield significant results, in terms of **energy saving, emissions reduction, RES and Waste Heat integration increase**

PROJECT KPI	BASELINE	AFTER UPGRADING MEASURES	EXPECTED IMPACTS	
PRIMARY ENERGY DEMAND (GWh/y)	1,451	1,206	-245	(-17%)
GHG EMISSIONS (ton <sub>CO2</sub> /y)	290,661	145,687	-144,974	(-50%)
SHARE WASTE HEAT (%)	8%	10%	+2%	(+25%)
SHARE RES (%)	30%	51%	+21%	(+70%)





Necessary to support & develop the **non-technical framework**

## Know-How

- ❑ Public **Webinars** and **Workshops**
- ❑ **Expert support** for replication cases

## Institutions

- ❑ **Policy-makers** engagement



“**The Future of DH in Italy**” involved institutional, academic and industrial parties

## Public reception

- ❑ **Image raising** campaign



Campaign webpage  
[dhcities.eu/DHC+ Citizen](https://dhcities.eu/DHC+ Citizen)



## WEBSITE



- HANDBOOK
- BEST PRACTICE & TOOLS CATALOGUE
- MUCH MORE..

<https://www.upgrade-dh.eu/en/home/>



**Upgrading the performance of district heating networks**  
Technical and non-technical approaches  
*A Handbook*



**Upgrading the performance of district heating networks**

**Best practice instruments and tools for diagnosing and retrofitting of district heating networks**



**Upgrading the performance of district heating networks**

**Good/ best practice examples on upgrading projects**



Thank you for the attention

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