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TEMPO

REWARDHeat

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17 march 2022 | 8:30-17:30

POLICIES & INNOVATIVE SOLUTIONS FOR EFFICIENT DISTRICT HEATING

TownHall Europe, Square de Meeûs 5-6, Brussels

REWARDHeat

Policy Position Paper

17th March 2022, TownHall Europe, Brussels

Jack Corscadden, Euroheat & Power
jc@euroheat.org

The Vision

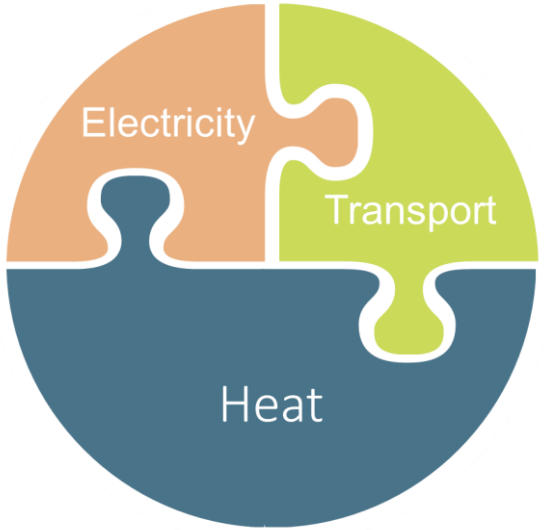
REWARDHeat

- Demonstrate DHC networks, which are able to recover renewable and waste heat available at low temperature, i.e. lower than 40°C
    - Reduce supply temperatures
    - Focus is on the exploitation of the energy sources available within the urban context

No Energy Transition without Sustainable Heating and Cooling

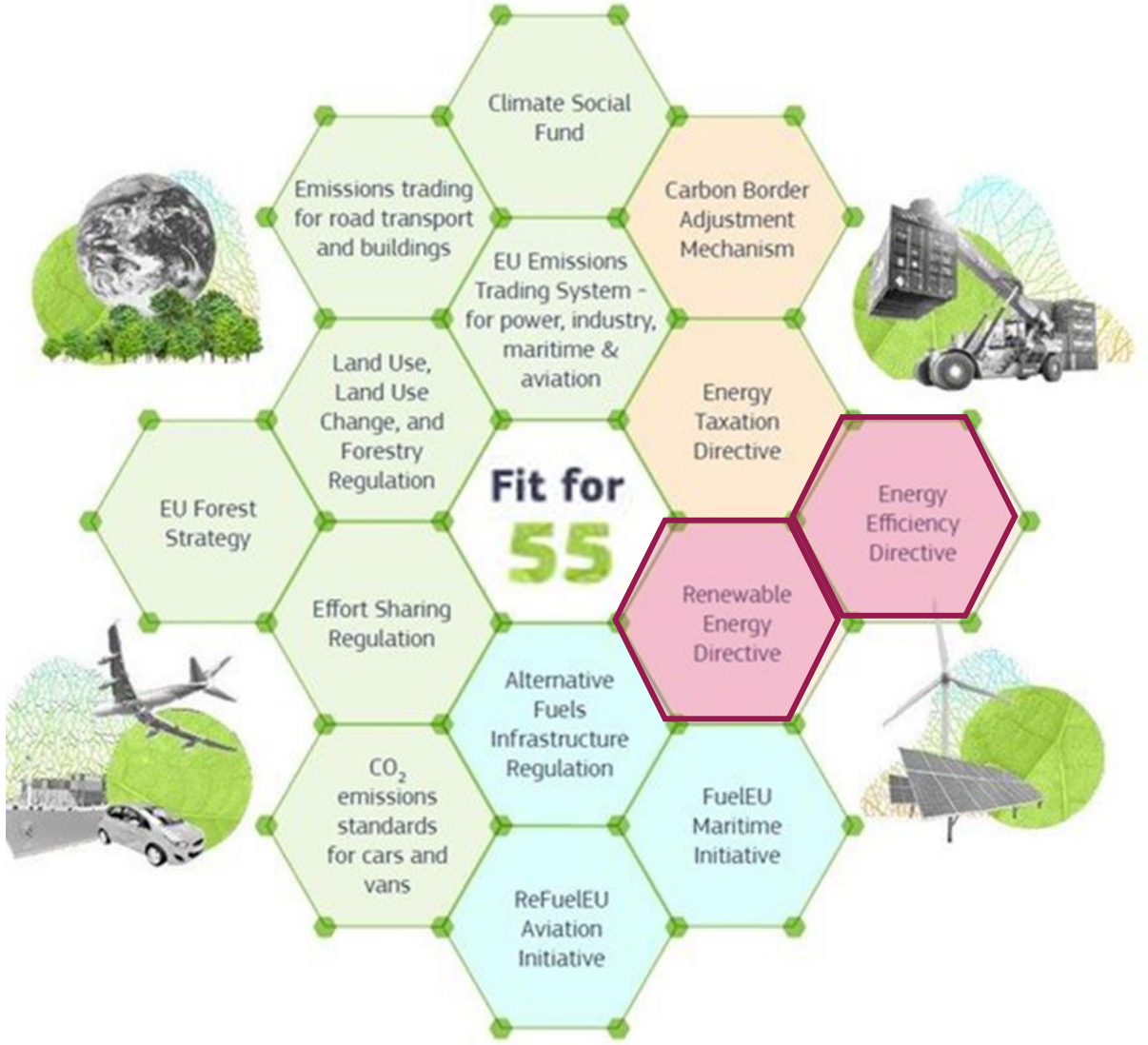
Heating & **Cooling** represents

50% of the EU total annual energy consumption



75% of EU citizens will live in urban areas in 2022, with an increase to **84%** by 2050

EU GREEN DEAL



The Fit for 55 Package

- Published on 14 July 2021
- A comprehensive and **interconnected set of proposals** to deliver the "EU Green Deal" and its climate targets for 2030 & 2050
- More emphasis on heating and cooling
- Reinforcement of existing framework, further recognition that the recovery and use of WH is key for decarbonisation
- **Main proposals relating to waste heat (and DHC):**
  - Energy Efficiency Directive (EED)
  - Renewable Energy Directive (RED)
  - EU Emissions Trading System Directive (EU ETS)

Project Context

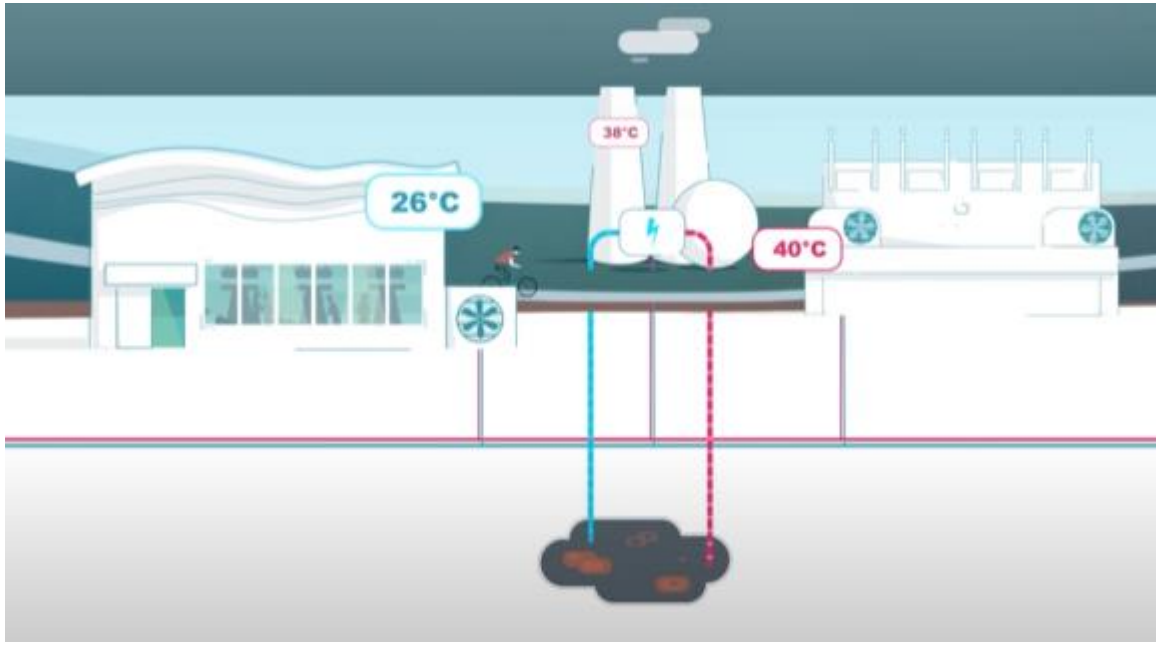
REWARDHeat

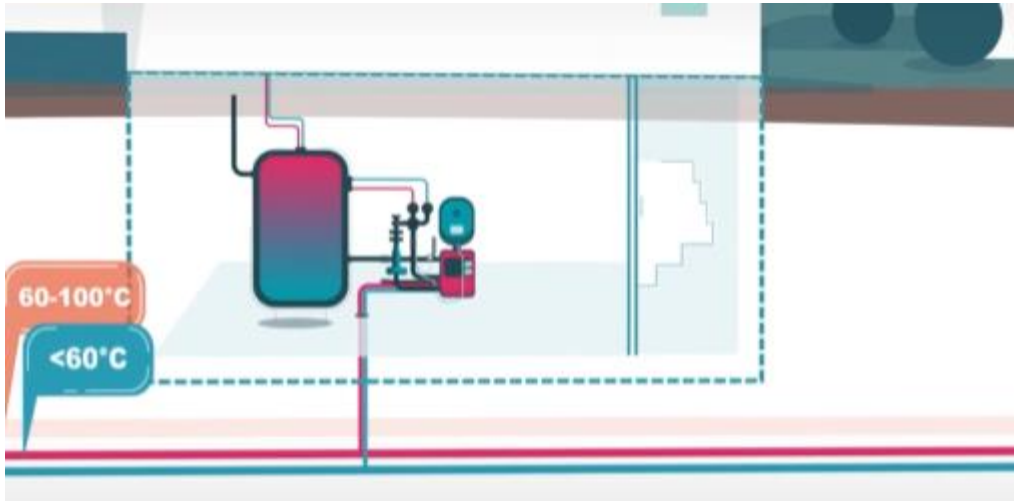
- Overview of the most relevant aspects of these proposals for the H&C sector
- Embodies the EE1st principle
  - Highly-efficient networks
  - 80% RES / WH
  - Integrate low-temp heat sources

→ Provide expert knowledge and input to the ongoing policy discussion and the revision of the chosen directives

Energy Efficiency Directive

- Applying the EE1st principle
  - Article 3 = more solid basis
  - Reducing fossil fuel consumption by lowering temperatures
    - ➢ Reduce heat losses
    - ➢ Integrate sustainable energy sources
- Energy savings obligations
  - Savings from fossil fuels excluded
  - Art 8 excludes savings in distribution
    - ➢ Focus on end-use savings

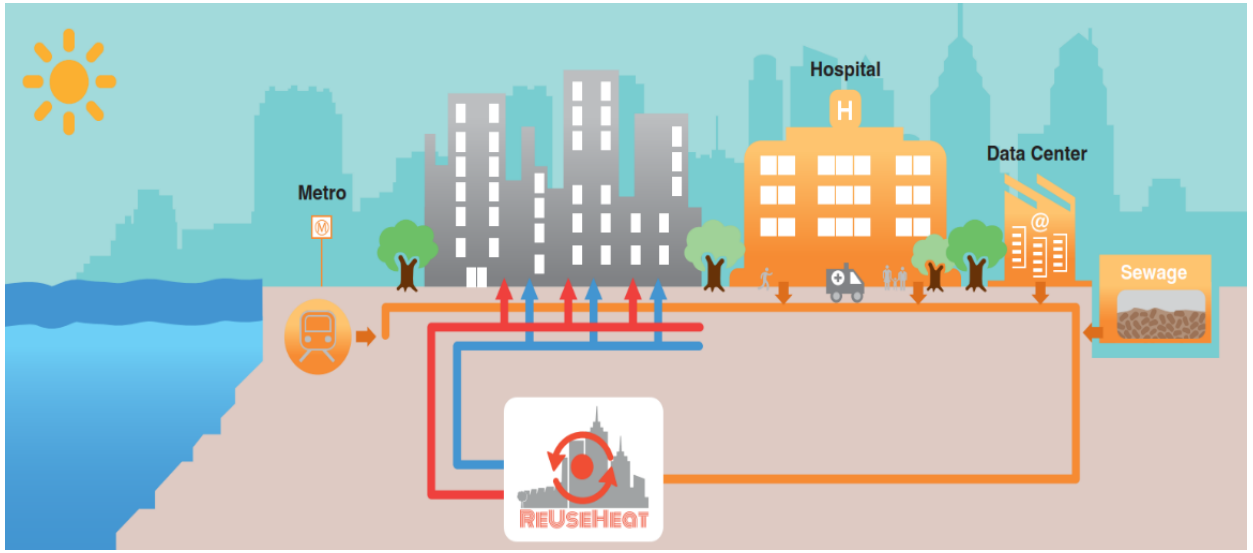




Energy Efficiency Directive

A circular approach: recovering waste heat

- **Conventional WH sources**: industrial processes
  - Potential to cover all our buildings' H&C Demand (Source: Heat Roadmap Europe)
- **Unconventional WH sources:** service/tertiary sector (metro station, data centre, sewage, hospital, supermarkets)
  - low-temperature sources (<50°C) can cover more than 10% of cities' H&C demand



Increasing interest in developing projects using waste heat from the tertiary sector

Implications for role of HP in the system

Energy Efficiency Directive

- Enabling H&C planning
  - Art 23 strengthens the Comprehensive Assessment and H&C plans in municipalities > 50,000
- Future envisaged
  - Municipalities <50,000 participate voluntarily
  - Involvement of all relevant stakeholders
  - Support from Member States and EU
    - Open-access technical tools available
    - Financing instruments

The Renewable Energy Directive (RED III)

REWARDHeat

Renewable and WH Targets
REDIII Article 15a, 23, 24

- Renewables in Buildings
- Renewables in Heating and Cooling
- Renewables in District Heating and cooling

→ Set direction for Member States and operators but remaining distinctions RES/WH

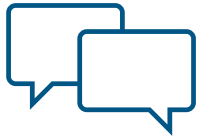
→ REDII target is not being met

→ Greater ambition & action needed in H&C decarbonisation

Toolbox for Member States
REDIII Article 23

To achieve the res-H&C targets, article 23 lists a broad range of measures:

- renewable heat planning
- capacity building for national and local authorities
- inclusion of waste heat recovery
- risk mitigation schemes



Cooperation on Waste Heat
Article 24

Member States to set **coordination frameworks between waste heat actors** to unlock potential of waste heat

- Potential for energy sector integration through digitalization and AI-management
- Coordination b/w DHC operators and TSO/DSO

EU ETS

REWARDHeat

New ETS for building and transport

- Fossil fuels used in buildings now covered in ETS 2
- Level playing field across the H&C sector
- Applies to DHC installations ≤ 20 MW

Reinforcement of "existing" ETS 1

- DHC Installations > 20 MW remain in ETS 1
- HPs users currently 'penalised' through ETS 1

Revenues & Implementation

- Easy implementation & clear scope
- Address decarbonisation of H&C and building efficiency
- Distribution should reduce fuel poverty (SCF)

Conclusions

REWARDHeat

- Make use of waste heat
- Define waste heat in legislation
- Make waste heat recovery standard
- Put a price on carbon that reflects the future damage costs

REWARDHeat

Jack Corscadden, Euroheat & Power

jc@euroheat.org

Thank you

www.rewardheat.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 857811.

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Roundtable 1: Realising the potential of renewable DHC through European policy

Pauline Lucas
Policy Manager
Euroheat & Power

Ralf-Roman Schmidt
Senior Research Engineer
Austrian Institute of Technology

Amélie Ancelle
EU Policy & Project Officer
Energy Cities

Technology Panel - District Heating & Cooling and Thermal Storage

Strategic Research Priorities

Ralf-Roman Schmidt (Chairman)
(AIT, Austrian Institute for Technology GmbH)

EUROHEAT & POWER | DHC+ TECHNOLOGY PLATFORM

RHC Renewable Heating & Cooling
European Technology and Innovation Platform

Policies and Innovative Solutions for Efficient District Heating
17 March 2022, TownHall Europe, Brussels, Belgium

Research Priorities

- Waste Heat
  - Boost the recovery and use of waste heat in DH networks, to help decarbonise cities
  - Develop new technologies for utilization of high and low temperature waste heat in industrial systems

- District Cooling
  - Develop cooling networks' design and solutions integrating recovered and renewable energy sources and exploiting synergies with existing heating infrastructure
  - Support R&D to test innovative concepts (such as hybrid systems) and technologies

Research Priorities

- Thermal Energy Storage
  - Improve the performance of above ground and underground energy storages
  - Enable TES technologies for a large variety of heat sources and to adjust them to a large range of DH characteristics
  - Boost the market deployment of large and cost-effective sensible TES in DH systems
- Low-temperature DHC
  - Minimise the operating temperature in DHC networks by developing multi-source district heating, higher temperature district cooling and optimization of building heating systems
  - Reduce the return temperatures in existing DH networks

Research Priority Objectives

- Energy System Integration
  - Increase the short-term flexibility of DH and DC networks and enable its efficient utilization
  - Develop innovative business models that enable energy systems integration, favourable to all involved stakeholders
  - Study innovative market designs and support schemes towards energy systems integration
- Digitalisation
  - Generation and update mechanisms for digital twins on the basis of digital information to replicate real-life plants accurately.
  - Approaches to realize a data market and data governance models
  - Integration of production, distribution and consumption to exploit flexibility potentials

Thank You

Contact:
Ralf-Roman.Schmidt@ait.ac.at

EU policies & potential of DHC

Towards 100% emission-free DH systems

ENERGYCITIES

Speaker:
Amélie Ancelle –
amelie.ancelle@energy-cities.eu

Event:
REWARDHeat & Celsius Policy Workshop

ENERGYCITIES

14

- First district heating in Chaudes-Aigues (FR)
- Major developments started mid 20th century

50

- % of heat demand which could be covered by DH by 2050
- Current % of heat demand covered by DH = 12%

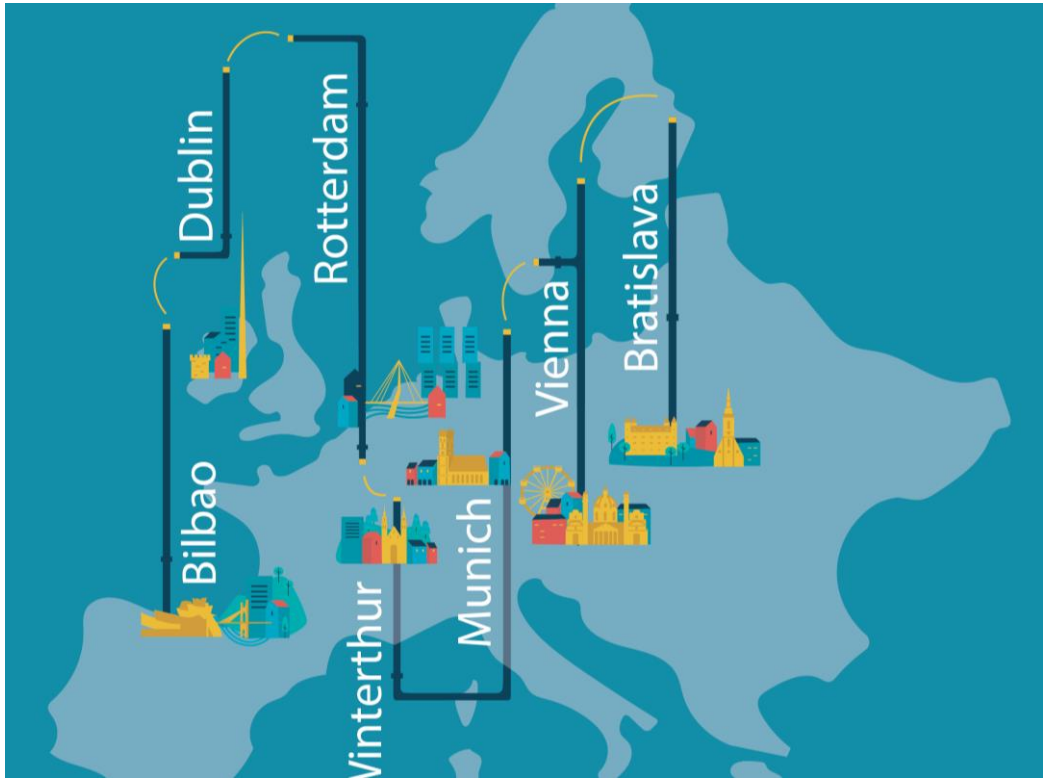
100

- Goal: only renewable and waste heat by 2050
- Currently, disparities from 0% to 80%

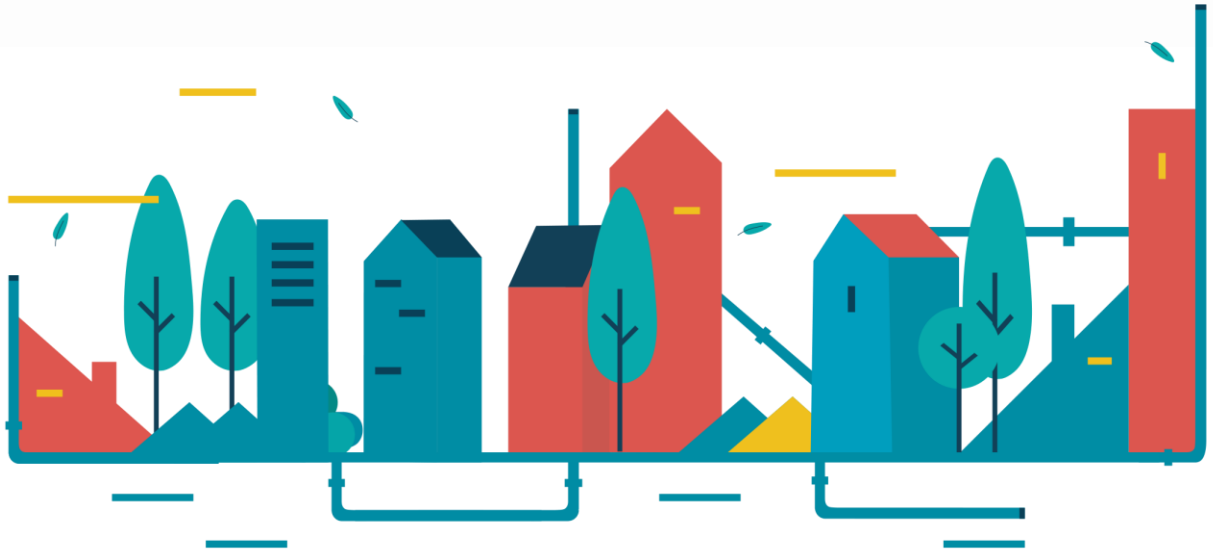
Roadmaps towards fossil-free H/C systems

Decarb City Pipes 2050

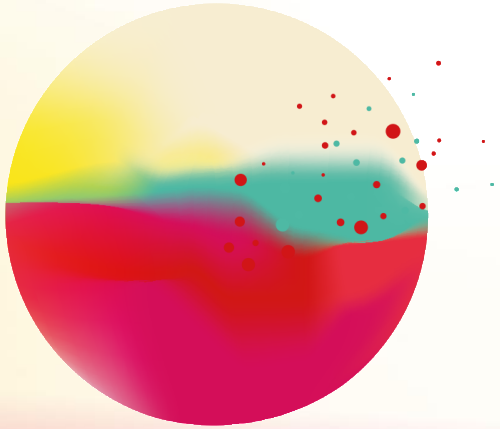
- **7** cities
- **7** with gas grids
- **7** including DH as a solution
- **2** without existing DH networks
- **6** roadmaps
- **100%** decarbonised urban H/C systems
- **2050** the latest for net-zero emissions



CHALLENGES TO OVERCOME



1. Mapping & Planning
2. Renovation & Urban development
3. System integration & Waste heat



ENERGY**CITIES**

Amélie Ancelle
Amelie.ancelle@energy-cities.eu

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Roundtable 2: Local actions for a sustainable heat supply

Riccardo Battisti
Senior Project Manager
Ambiente Italia

Aksana Krasatsenka
Head of Knowledge Transfer
DHC+ Platform

Matteo Pozzi
Partner and General Manager
Optit

Stakeholder Survey – Urban Heating and Cooling Transition

Aksana Krasatsenka,
Euroheat & Power / DHC+

Policy workshop
17 March 2022

The Celsius Initiative

Accelerate the **energy transition** through the deployment of **smart and sustainable heating and cooling solutions** in **cities** and accelerating their **market uptake**.

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Swedish Energy Agency

Celsius Stakeholder Survey

- ✓ Analyse stakeholders' **awareness and understanding** of **DHC and its role** in realising the **EU's climate and energy objectives**
- ✓ **Relevant stakeholders** include the European institutions and the wider EU policy community, representatives of civil society, industry and academia

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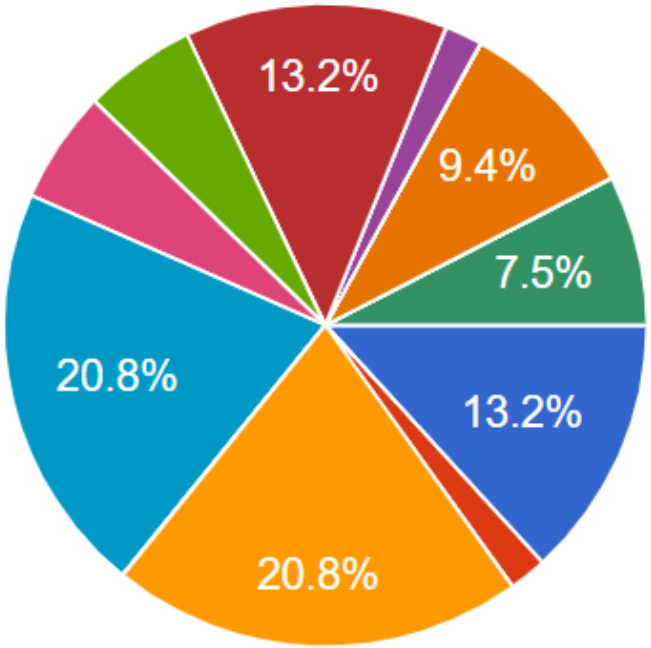
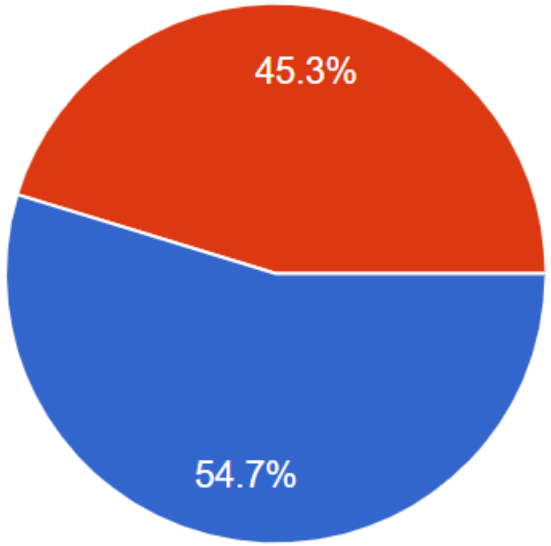
Organisation type

53 responses



- Academic - University / Institute / Res…
- Consultancy - Engineering / Design /…
- Utility / Operator
- Association / Federation
- Municipal Sector - City / County

How much do you know about district heating & cooling (DHC)?



- I am an expert
- I know a bit
- I don't know anything about DHC

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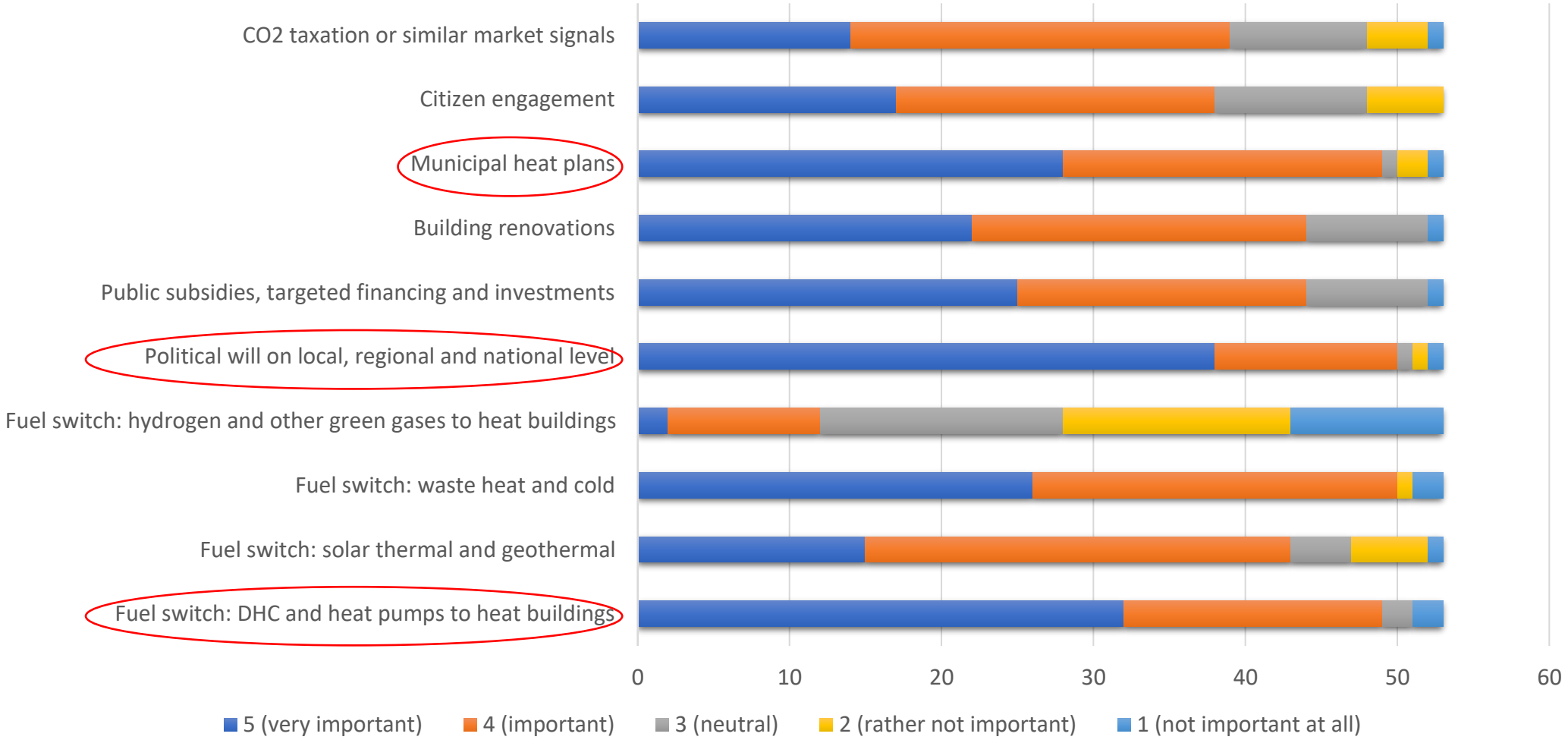
Topics Important to Achieve a Fast Heat Transition in Cities



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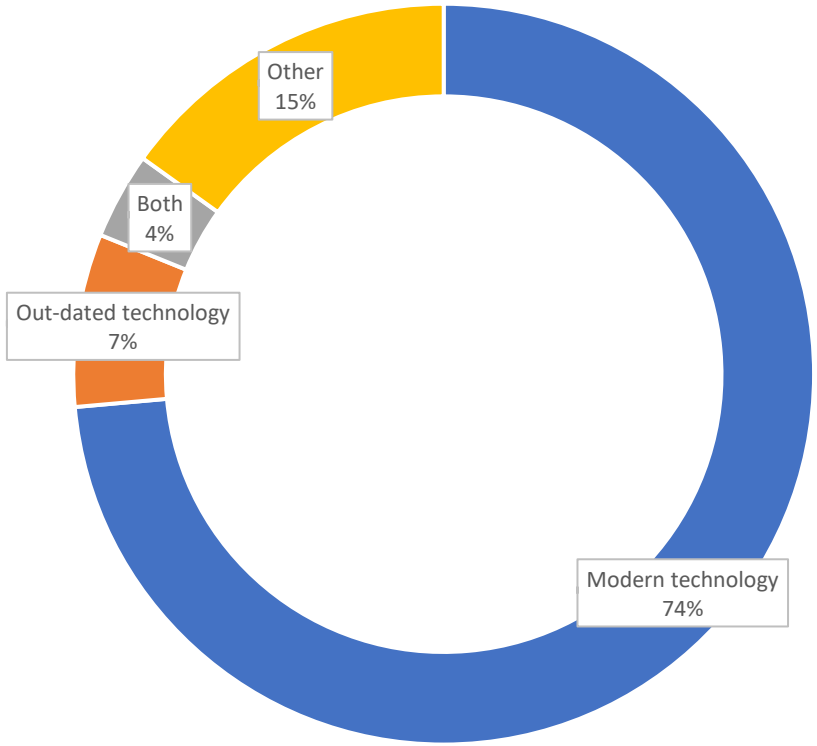
District Heating and Cooling Networks are…



- *A well-known technology that requires modernisation*
- *an established and future-proofed technology in urban areas*
- *It's an old technology that is still improving with different generations*
- *an old and well tested method to achieve system efficiency*
- *an important technology that can be modern (4GDH) but also out-dated (1GDH)*
- *A key to a successful Energy Transition of the heating sector*
- *promising*

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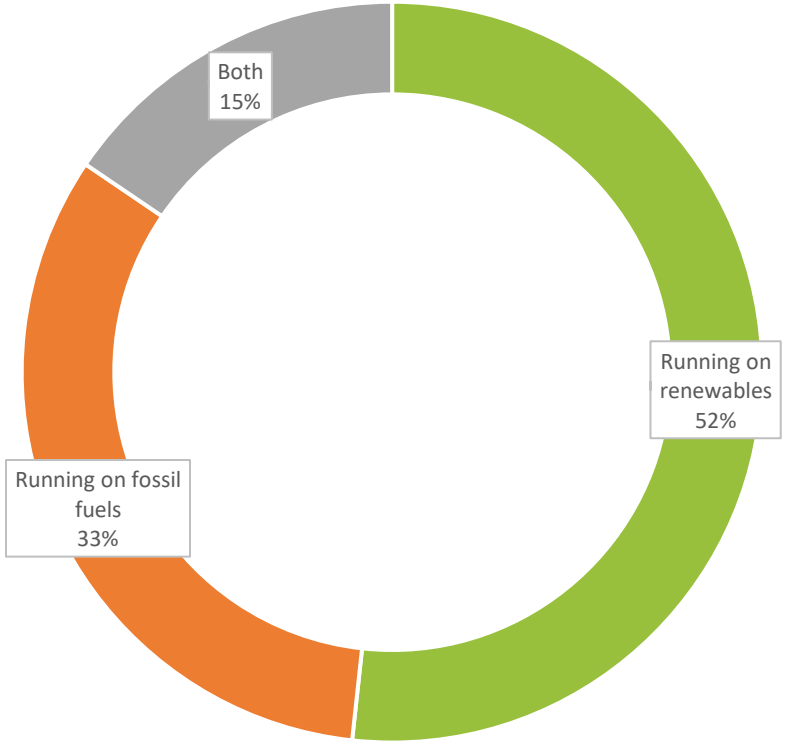
District Heating and Cooling Networks are…

- *Depends on the local conditions*
- *should be running on renewables but they need to transition like all other energy systems*
- *must be transformed to low-temperature distribution systems with high shares of waste heat or renewable heat*
- *Currently not good enough but have a large potential for decarbonisation*



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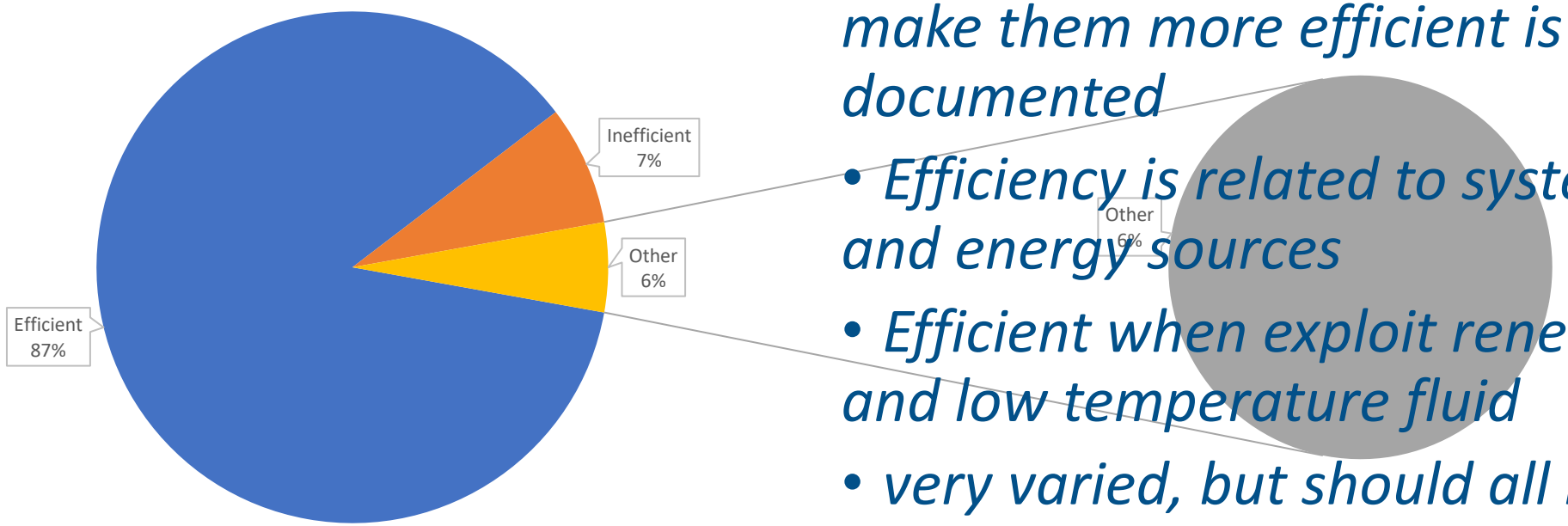
District Heating and Cooling Networks are…



- *some are inefficient but the path to make them more efficient is well documented*
- *Efficiency is related to system age and energy sources*
- *Efficient when exploit renewables and low temperature fluid*
- *very varied, but should all be brought to high performance*

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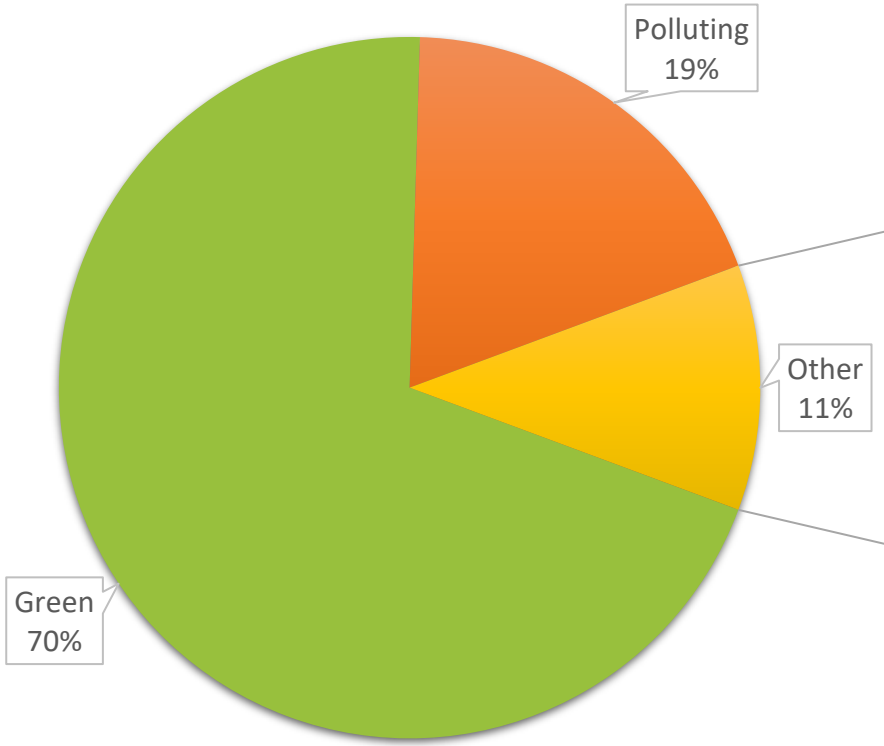
District Heating and Cooling Networks are…



- *we need to be aware that not all are operating in a green way - coal, gas and out of date and inefficient systems*
- *This is dependent upon the energy sources and system efficiency*
- *Highly efficient with the potential to be green*
- *a key infrastructure in cities*

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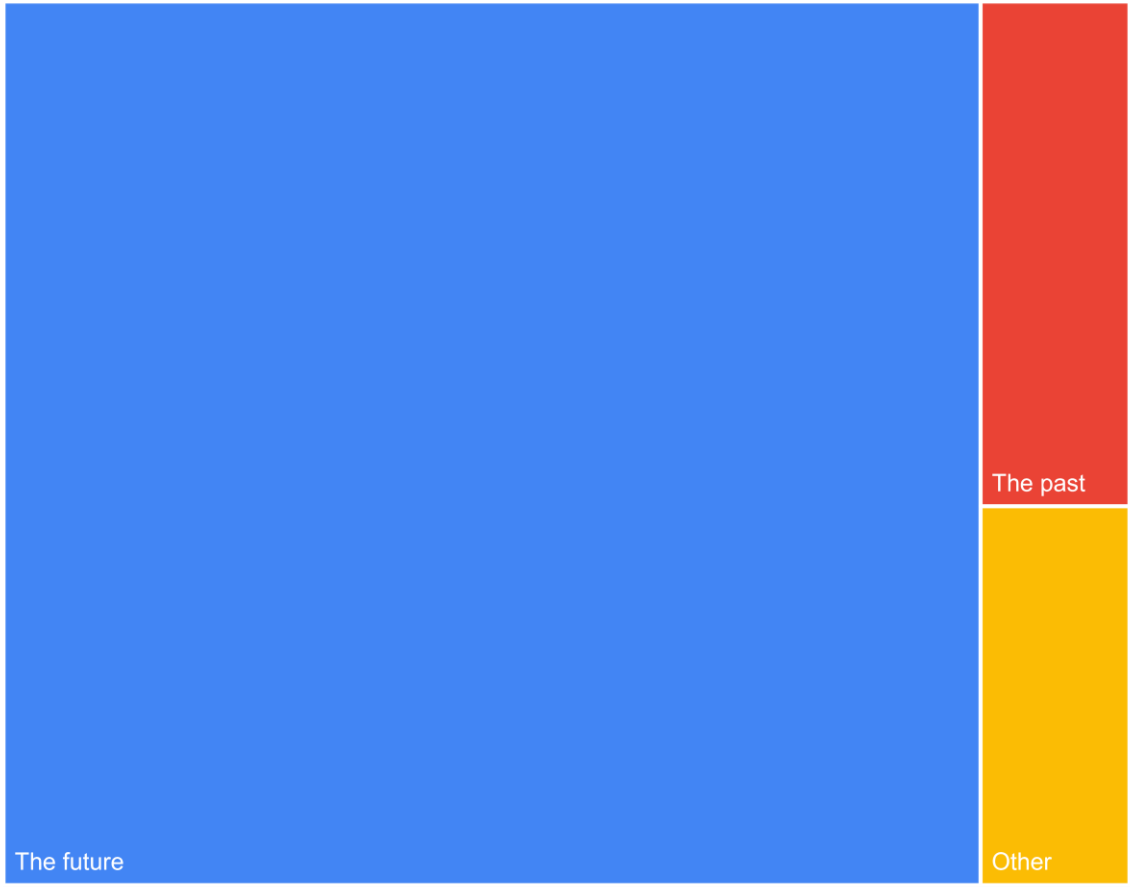
District Heating and Cooling Networks are…

- *there will be the future only if the boundary conditions allow in some countries*
- *part of an integrated fully electrified (renewable) energy system*
- *important not to forget the past (especially all the warmth DH brought, even if not done in a most efficient way)*



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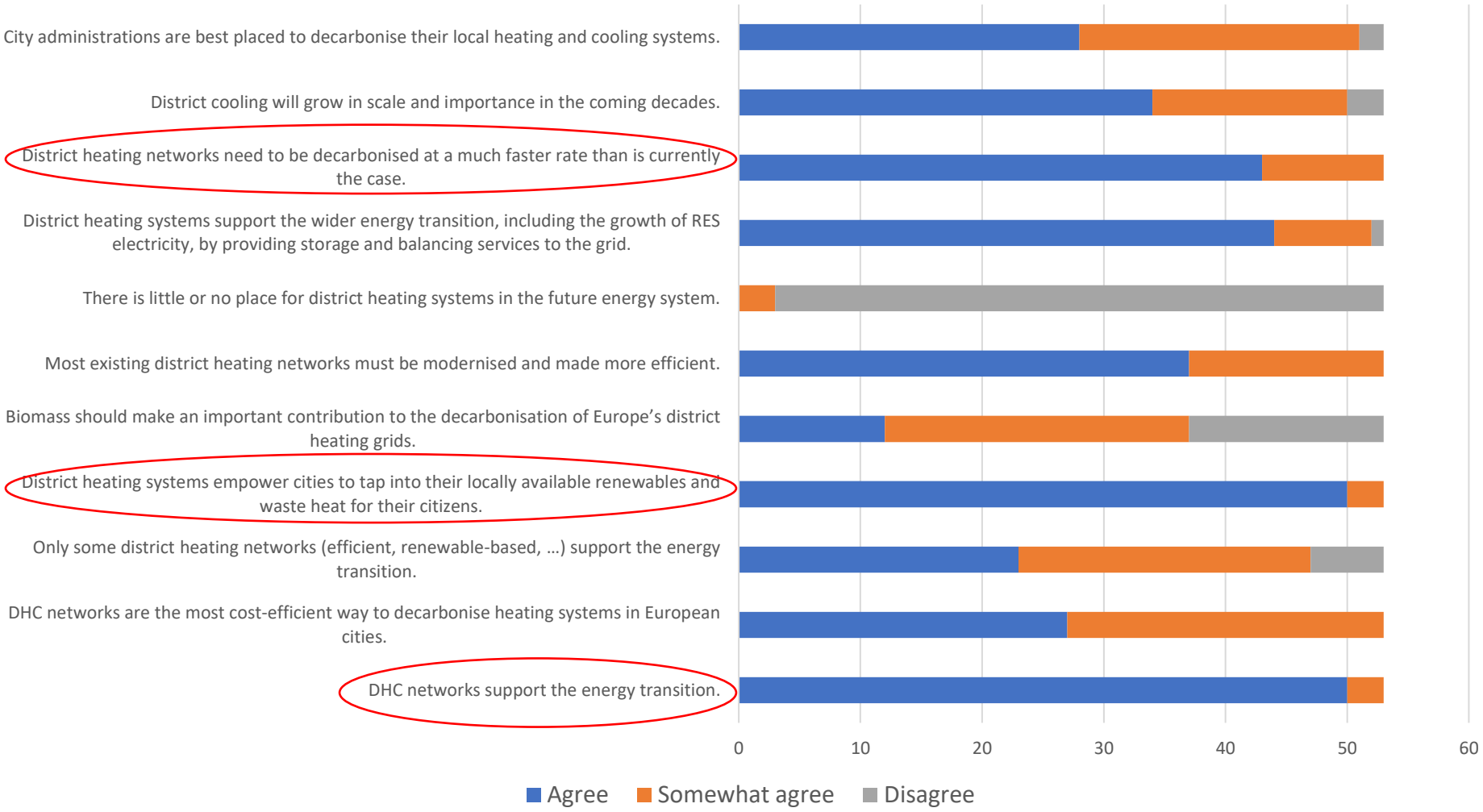
Rate the Statements



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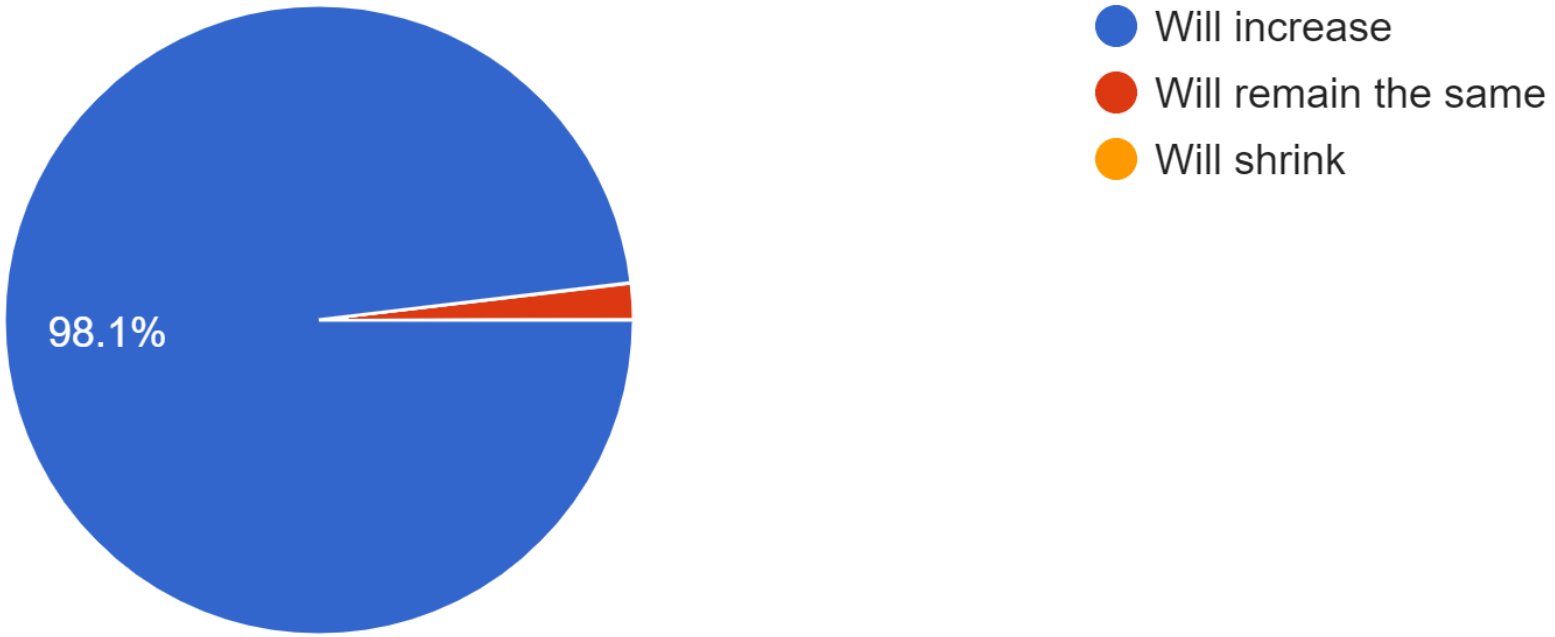
Today, DH accounts for about 13% of the heating and cooling in Europe. According to you, which role will district heating and cooling networks play in the future energy system, especially in cities?

53 responses



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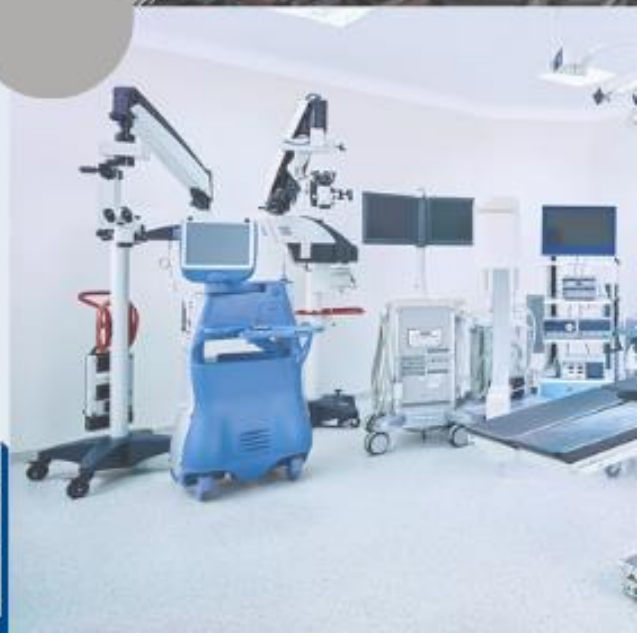
Save the date for the Joint ReUseHeat-Celsius Final Conference!

7 September 2022

L42 Business Center, Brussels, Belgium



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Join us!

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www.celsiuscity.eu

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@celsiuscity Celsius Initiative

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OPTIT
optimal solutions

Local actions for a sustainable heat supply

Policy workshop - roundatble

17th March 2022 - Brusses

REWARDHeat

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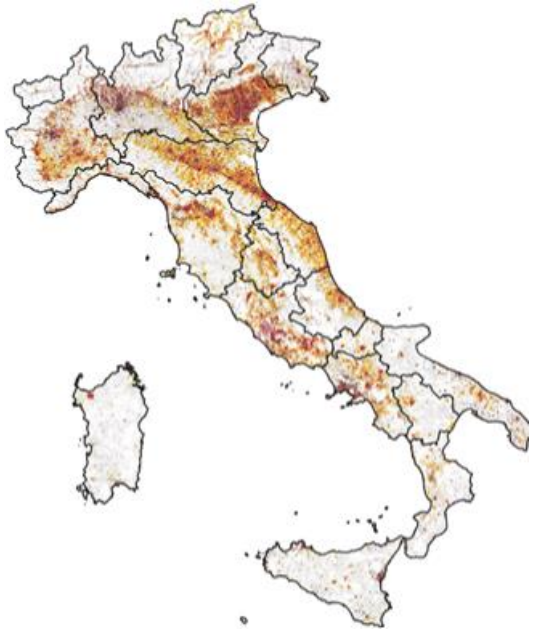
A multi-faceted perspective on local action planning and implementation

Provision of Decision Support Systems based on Mathematical modelling and Advanced Analytics to optimize DHC plant & network operations and development

Best practices and demo case experience in several countries aiming to upgrade and modernise DH systems across the whole value chain

Support to the Secretariat as Vice-Chair of the DHC+ platform, with particular focus on digitalization and sector integration

Getting the basics right: the regulatory framework



As part of the "National and Regional Action Planning" activity included in the UpgradeDH project, the Italian Association for Urban Heating (AIRU) presented at a large web conference in October 2020 the study of the Politecnico of Milan and Turin regarding the potential for DH in Italy (currently 3% of Heat Demand). This research showed:

- **DH is the most viable/valuable option for 12% (x4) of current demand, leveraging on geothermal, waste heat, solar thermal and CHP**
- **DH is technically applicable to 35% of total demand (x10+)**

Effective uptake is made difficult by several national regulations that distort the market:

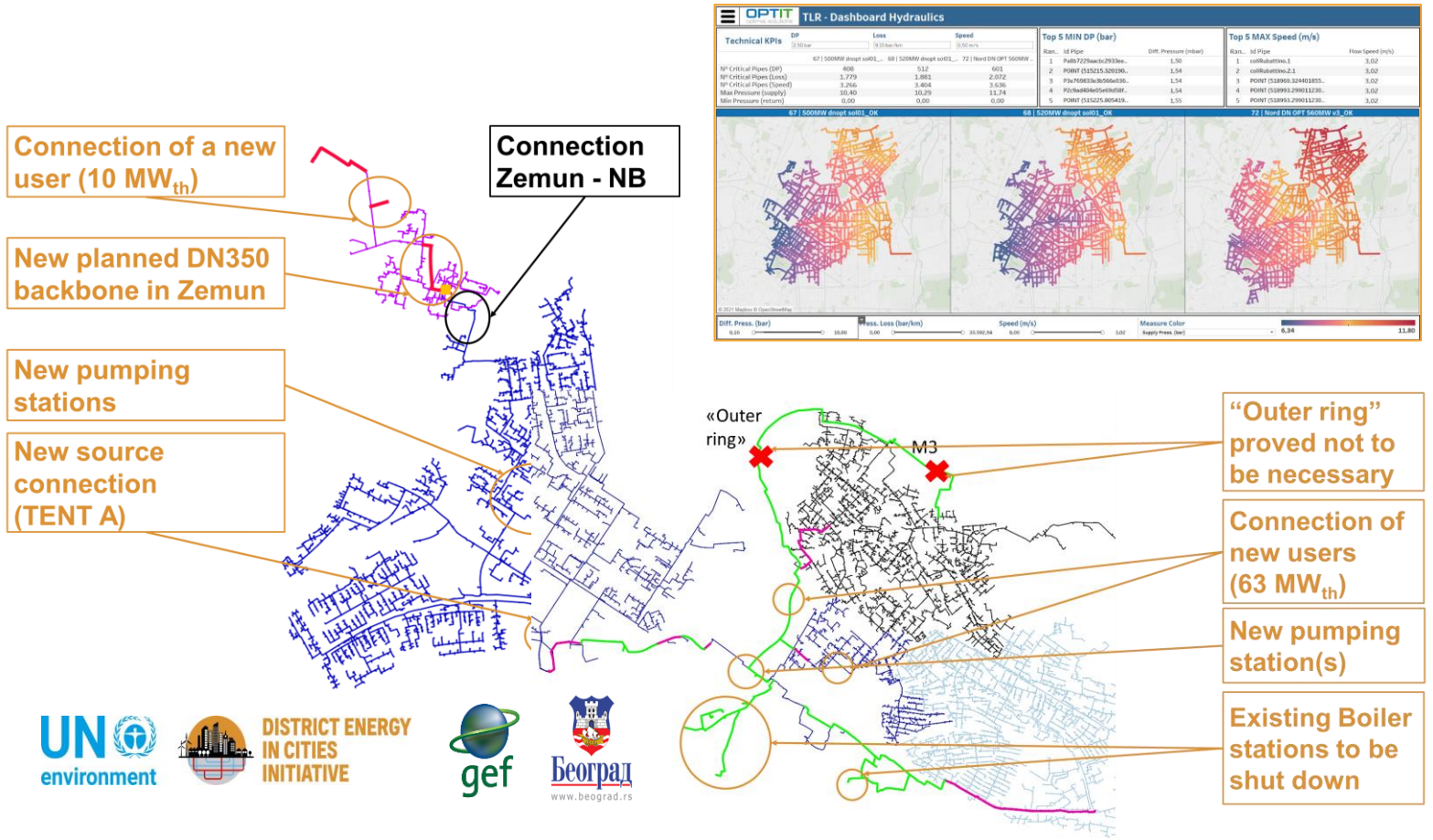
- **DHC not included as part of "super-bonus" incentives, that distorts the market favouring (for instance) local gas-fuelled condensing boilers**
- **DHC excluded from measures to support customers in view of the increasing energy costs (VAT reduction)**

Planning the right investments to balance future demand and supply

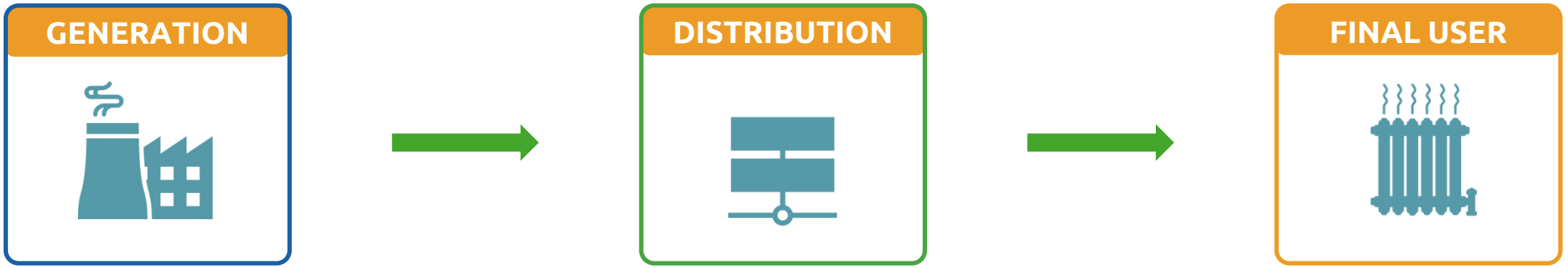
Several Utilities are investing on **integrating new local heat resources** to decarbonise the energy mix, through a combination of:

- Waste heat recovery from thermal plants, industry, WTE, data centres, …
- Heat Pumps installation to exploit (green?) electric energy at low price
- Adapt/expand the network to exploit this extra capacity

Planning should account for **technical-economic optimisation**



Digitalisation is becoming a key enabler for Operational efficiency



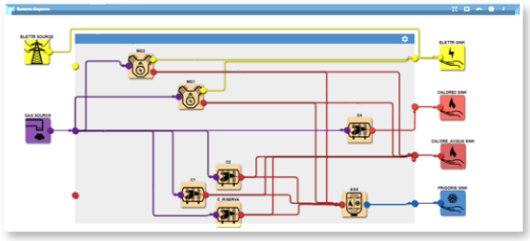
Plant optimisation
Sector integration

Network management
Maintenance optimisation

Customer involvement
Multi-Energy community

Optimizing production mix with increasing RES and sector integration

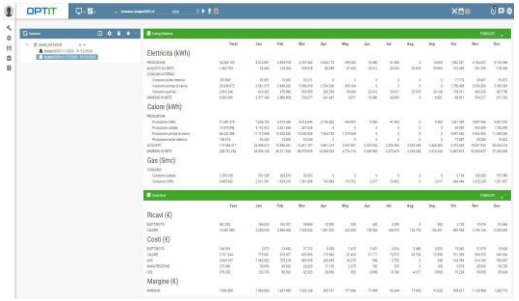
PLANT CONFIGURATION



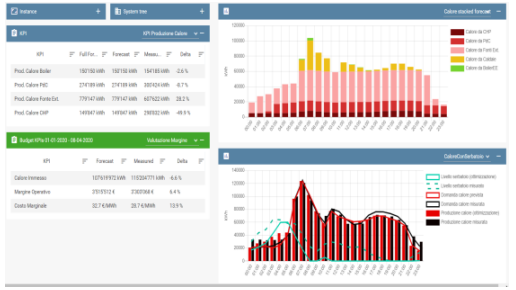
SYSTEM INTEGRATION

- Field data
- Market data
- Price estimates
- Economics
- Weather forecasts

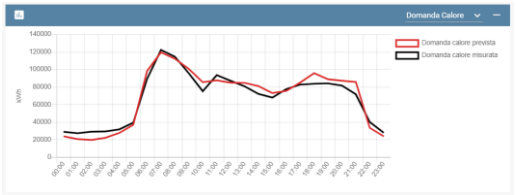
LONG TERM (YEAR)



SHORT TERM (NEXT DAYS)



FORECASTING



TRADING (SAME DAY)

STRATEGIC DECISIONS

- Investments
- Sensitivity (what-if)
- Budgeting

OPS DECISIONS

- Unit commitment
- Margin optimisation
- Automatisation

TRADING DECISIONS

- DA/SD adj. Trading
- Capacity markets
- XBID

Via Mazzini, 82 - 40138 Bologna (BO) Tel: +39 051 4381574
Via Ravennate, 959 - 47522 Cesena (FC) Tel: +39 0547 385703
www.optit.net
info@optit.net
@optitsrl_en
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