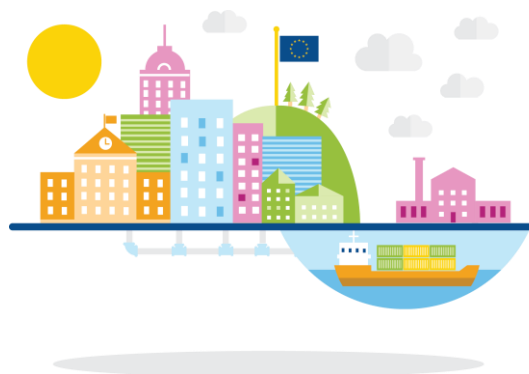


“Local Leaders on the Frontlines of the Heating and Cooling Revolution”

Wednesday June 17, 2020





Moderator:

Sofia Lettenbichler

Policy & Projects Manager
Euroheat & Power // Celsius Initiative



Emilia Pisani

Communication & Outreach Officer
Johanneberg Science Park// Celsius Initiative



Laura Uuttu-Deschryvere

Project Director of the
Helsinki Energy Challenge



Ivan Ivankovic

Head of Energy, Energy
Management and Sustainable
Energy Development
City of Zagreb



Paulius Martinkus

Chief Strategy and
Business Development Officer at
Vilnius šilumos tinklai



Lydia Hameeteman

Advisor and Project Manager at
City of Rotterdam



John O'Shea

Energy Systems Analyst at
Codema,
Dublin's Energy Agency





The Celsius Initiative

- a European project that lives on -

Our philosophy: Don't re-invent the wheel!

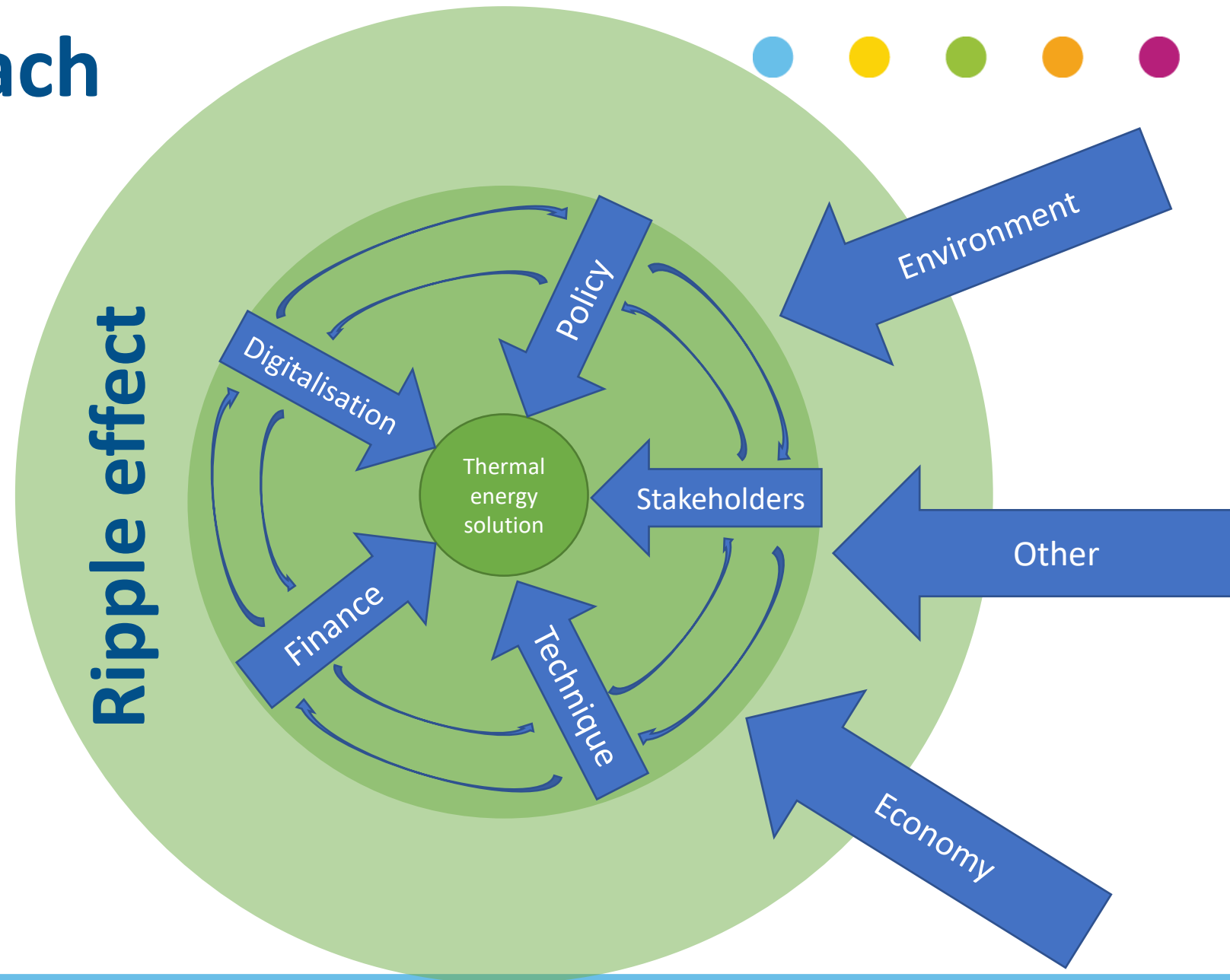
- ✓ There are many **innovative and efficient solutions** that have already been tried and tested.
- ✓ **The Celsius Toolbox assembles solutions** – including practical information, best practices & lessons learned.
- ✓ **The Celsius network** brings together cities and stakeholders to share and exchange ideas and knowledge through the forerunner groups.



A systemic approach

Crosscutting support

- ✓ **Sustainable business models**
 - ✓ Consumer pricing
- ✓ **Financial instruments**
 - ✓ Replication and scaling
- ✓ **Policy & regulations**
 - ✓ Improve air quality
 - ✓ Environmental impact
- ✓ **Integrated city planning**
 - ✓ Robust energy systems
 - ✓ Renewable energy sources
- ✓ **Stakeholder and citizen engagement**
 - ✓ Creating synergies
 - ✓ Capacity building



The Celsius Forerunner Groups



Bringing together
city representatives
and experts
to help cities overcome their
heating and cooling challenges.

A sounding board for cities



Support cities plan and implement sustainable heating and cooling solutions

- ✓ Advise & fine-tune project plans
- ✓ Provide expert support when looking at details
- ✓ Include systemic approach
- ✓ Look at replication and scalability

Helping cities implement solutions

- ✓ Knowledge sharing based the demand and needs expressed by the cities.
- ✓ Cities are co-creators and decide on the support they wish.
- ✓ Collaboration with experts from industry, research, projects and other supportive organisations.
- ✓ Matchmaking with other cities facing similar challenges.



Euroheat & Power's work with & for cities

www.euroheat.org/map

#DHCities provides a platform for cities to showcase their heating and cooling decarbonisation stories. It gathers the most ambitious cities of Europe that have already gone the extra mile.

- Join the campaign!
- Discover the success stories!





Laura Uttu-Deschryvere

Project Director of the
Helsinki Energy Challenge

The Helsinki Energy Challenge: Crowdsourcing for Combustion-free Solutions

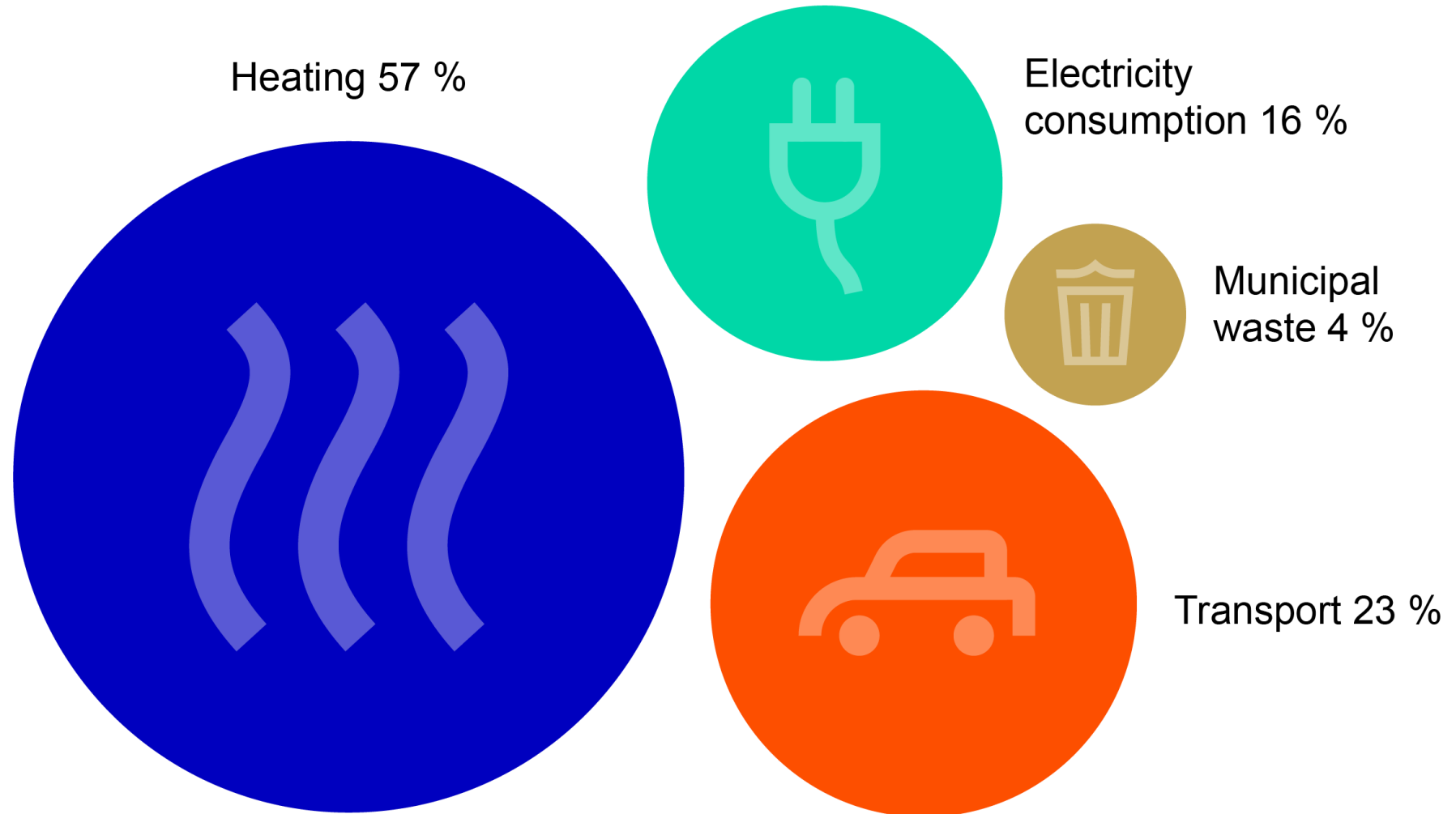




Helsinki Energy Challenge

Helsinki

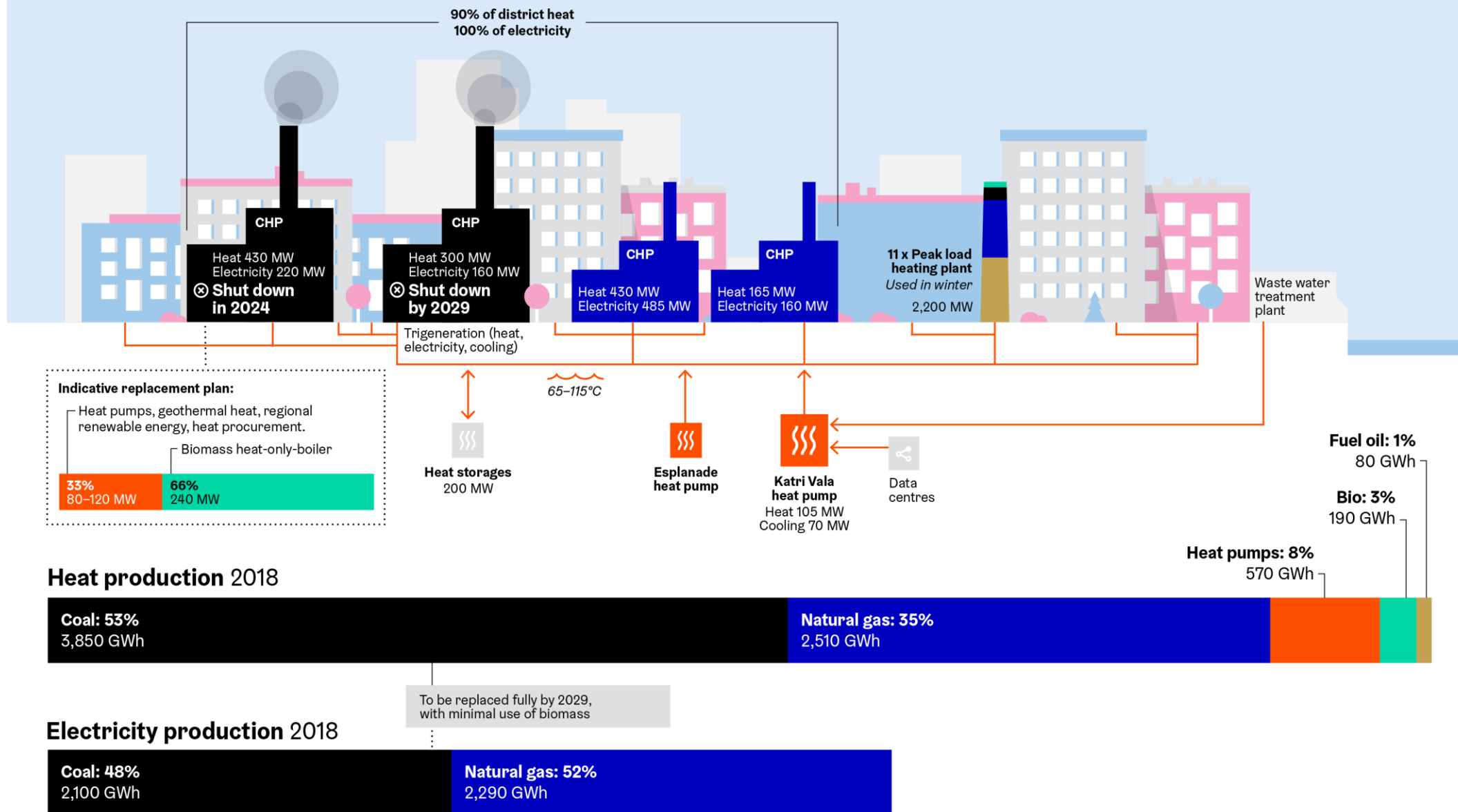
Emissions in Helsinki



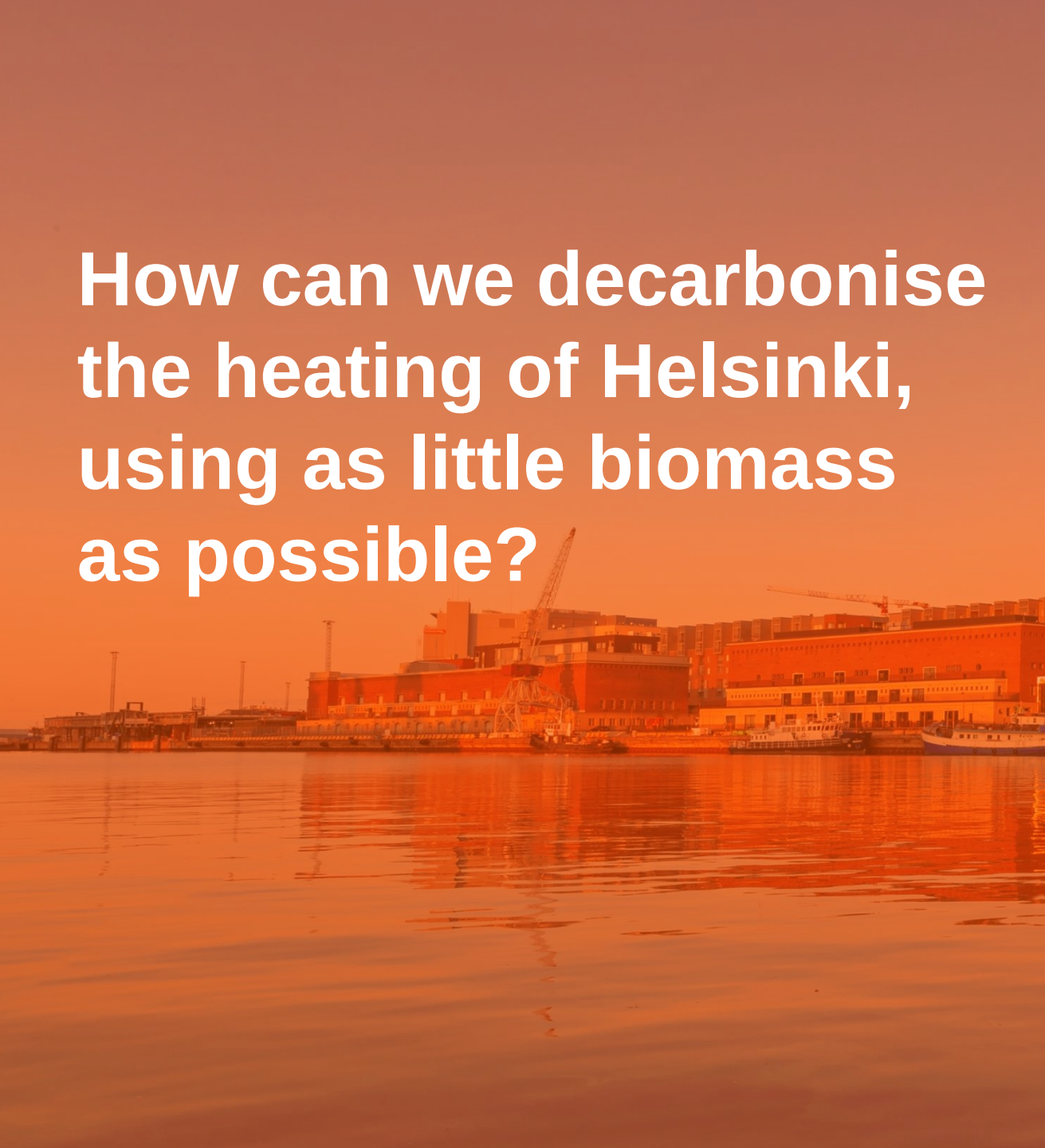
Energy system in Helsinki

operated by city-owned energy company Helen

Helsinki



How can we decarbonise the heating of Helsinki, using as little biomass as possible?



Helsinki: carbon-neutral by 2035

Finland: no coal in energy production from 2029

53% of our urban heat is now produced with coal

Creating the future of heating to fight global warming

- Find a solution for Helsinki and share with other cities
- Inviting innovators from all over the world
- 1 000 000 euro award

Helsinki





**We welcome
a diversity of
teams
and solutions**

More information:

energychallenge.hel.fi

Collaboration Platform – to support team formation
& innovator networking:

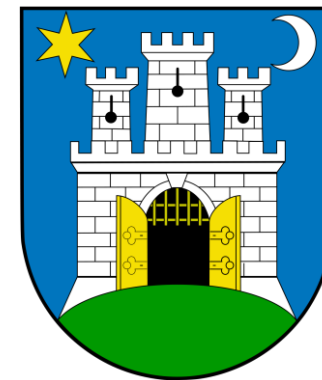
www.hec.solved.fi



Ivan Ivankovic

Head of Energy, Energy Management and
Sustainable Energy Development
City of Zagreb

Looking at Zagreb: Modernizing & Upgrading Existing Systems





City Focus: Local Leaders on the Front Lines of the Heating and Cooling Revolution

– Modernizing & upgrading existing systems in the City of Zagreb

Ivan Ivanković, M.Eng.

Head of Energy, Energy Management and
Sustainable Energy Development

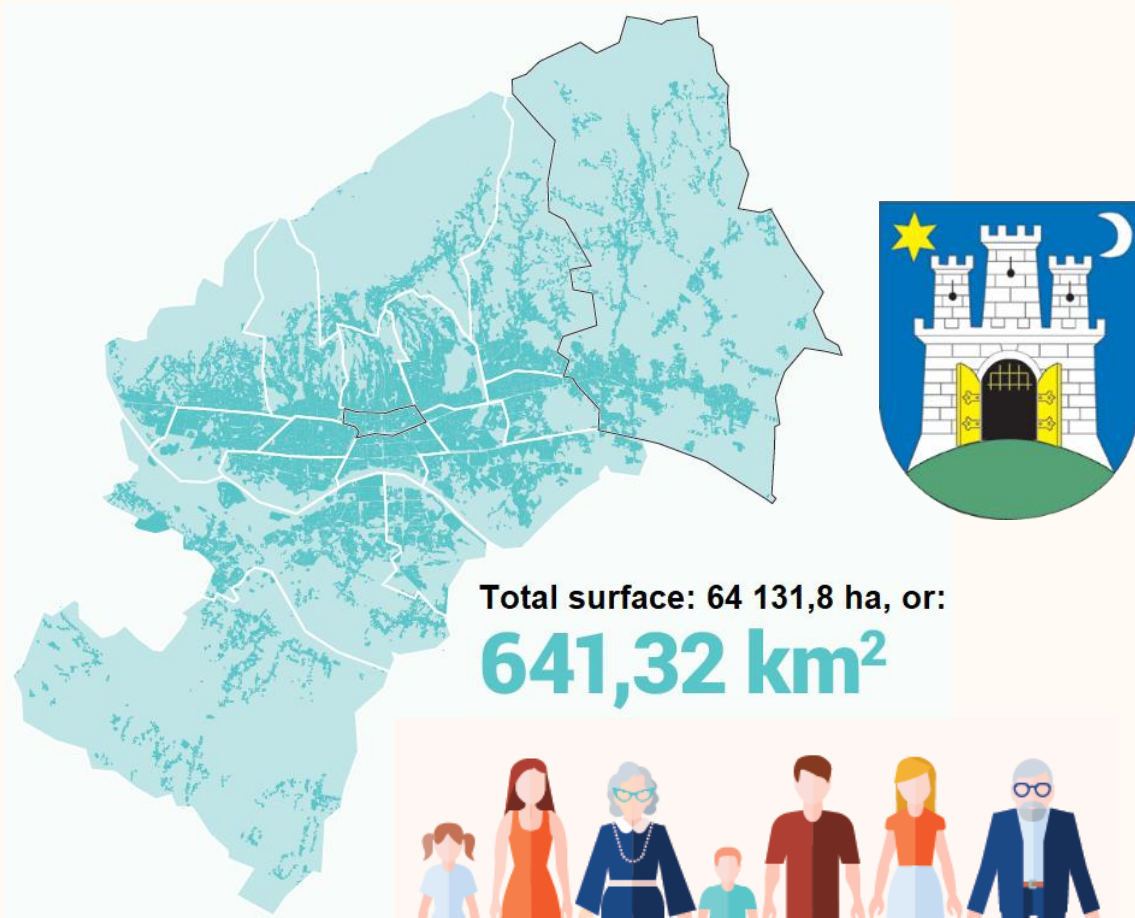
ivan.ivankovic@zagreb.hr



City of Zagreb

**City Office for Economy, Energy and
Environment Protection**

17.06.2020.



Total surface: 64 131,8 ha, or:

641,32 km²



Population:

802 762

ECONOMY

Nominal gross domestic product, 2015.



**113 199 mil.
kn**

Zagreb

141 379 kn

GDP per capita



**338 975 mil.
kn**

Croatia

80 555 kn

GDP per capita

Tourism, 2017.



2,3 mil.
tourist nights

+ 14,8%

2017./2016.



84,0%
foreign tourists



16,0%
domestic tourists

Quick overview of Zagreb's energy policy

- In effect since March 2008
- Legal mandate (*Law on Energy Efficiency*):
 - Energy efficiency plans – every year
 - Energy efficiency action plans – every 3 years
- **Covenant of Mayors framework** (2008 as baseline):
 - **Sustainable Energy Action Plan (SEAP): 2010 – 2020**
 - 21% CO₂ reduction by 2020.
 - **Sustainable Energy and Climate Action Plan (SECAP): 2030**
 - ***40% CO₂ reduction by 2030.**
 - Successful adoption in June 2019 in the City Assembly
- Since then, Croatia enacted the **Law on climate change and ozone layer protection** (Dec 2019)

**Preparation for the upcoming EU Climate Law and carbon neutral vision for 2050 under way*



District heating system (DHS) in the City of Zagreb (1)

- District heating provided by **HEPTOPL** and **NARSTVO** on a 20-year concession (valid until 2026)
- Two sources of heat energy:
 - EL-TO – western part of the city: 87.8km
 - TE-TO – eastern part of the city: 139.5km
 - **Total DHS network: 237.4km**, built mostly until 1990.
- 102.777 end users
 - 98.093 households
 - 4.684 businesses
- 2.739 substations



Delivered thermal energy in Croatia
(source: HERA, 2018)

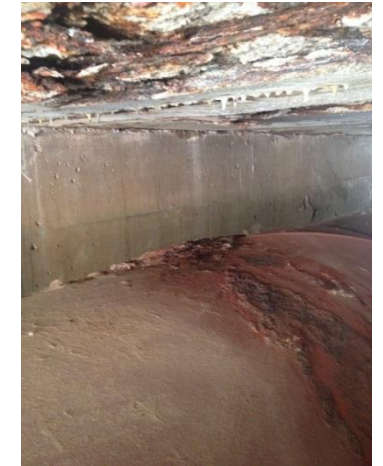
District heating system (DHS) in the City of Zagreb (2)

THE PROBLEM:

- Severe corrosion + pipe decay = ruptures of DHS pipes
 - Heat & water refilling losses in the system decreasing the efficiency of the DHS
 - Heat losses in 2017: 210.28 GWh or 15.9% of the produced thermal energy
 - 65.7% losses in TE-TO, 34.3% in EL-TO networks, respectively
 - Water refilling losses in 2017: 1,235,723 m³

THE SOLUTION:

- In order to increase the security of supply and reduce the heat and water refilling losses in the system, and consequently the number of emergency interventions, **revitalization of critical DH pipelines with preinsulated pipes is needed.**



District heating system (DHS) in the City of Zagreb (3)

- Financial overview:

Total project value: ~94m €

Eligible costs: ~73m €

Expected EU cofunding: ~56m €



District heating system (DHS) in the City of Zagreb (4)

- Current status:

- State Aid clearance successfully obtained on 28.11.2019. – case: **SA.53628 (2019/N)**
- Currently at EU DG REGIO on the Major Project application procedure
- Project documentation preparation (permits, ...)

68,5 km



2020. – 2023.

Stakeholders:



Government
of the Republic
of Croatia



EL-TO CHP modernization

- Large scale project to replace outdated oil- and gas-fired turbines and boilers
- Installation of two low-NOx gas turbines, two heat recovery steam generators and one back pressure steam turbine producing heat and electricity at the EL TO combined heat and power (EL TO CHP).
- The capacity of the new combined cycle gas turbine units will be 150 MW of electrical energy and 114 MW of thermal energy, with lower greenhouse gas emissions.
- CO2 emission of the new block are 187g/kWh compared to the current value of 682 g/kWh – a decrease of 150.000 t CO₂ p.a.
- Also, a reduction of
 - -95% SO₂, -57% NO_x & -84% PM particles





17.06.2020.

City Focus: Local Leaders on the Front Lines of the Heating and Cooling Revolution - Modernizing & upgrading existing systems in the City of Zagreb



Thank you!



Ivan Ivanković, M.Eng.

Head of Energy, Energy Management and
Sustainable Energy Development

ivan.ivankovic@zagreb.hr



City of Zagreb

**City Office for Economy, Energy and
Environment Protection**

03.04.2019.



Paulius Martinkus

Chief Strategy and
Business Development Officer at
Vilnius šilumos tinklai

Looking at Vilnius: Making the System Future Proof





Vilniaus šilumos tinklai

Building resilience in DH

Paulius Martinkus
Chief Strategy and Business Development Officer



Where we are today



In total, we serve more than **200 000** consumers



Our staff consists of **578** employees of various professions



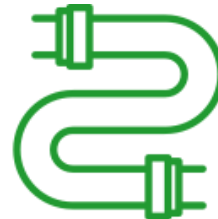
Our total heat capacity of **1 700 MW**



Total annual heat demand of **2,7 TWh** in 2019



We supply heat to more than **7200** buildings in the city



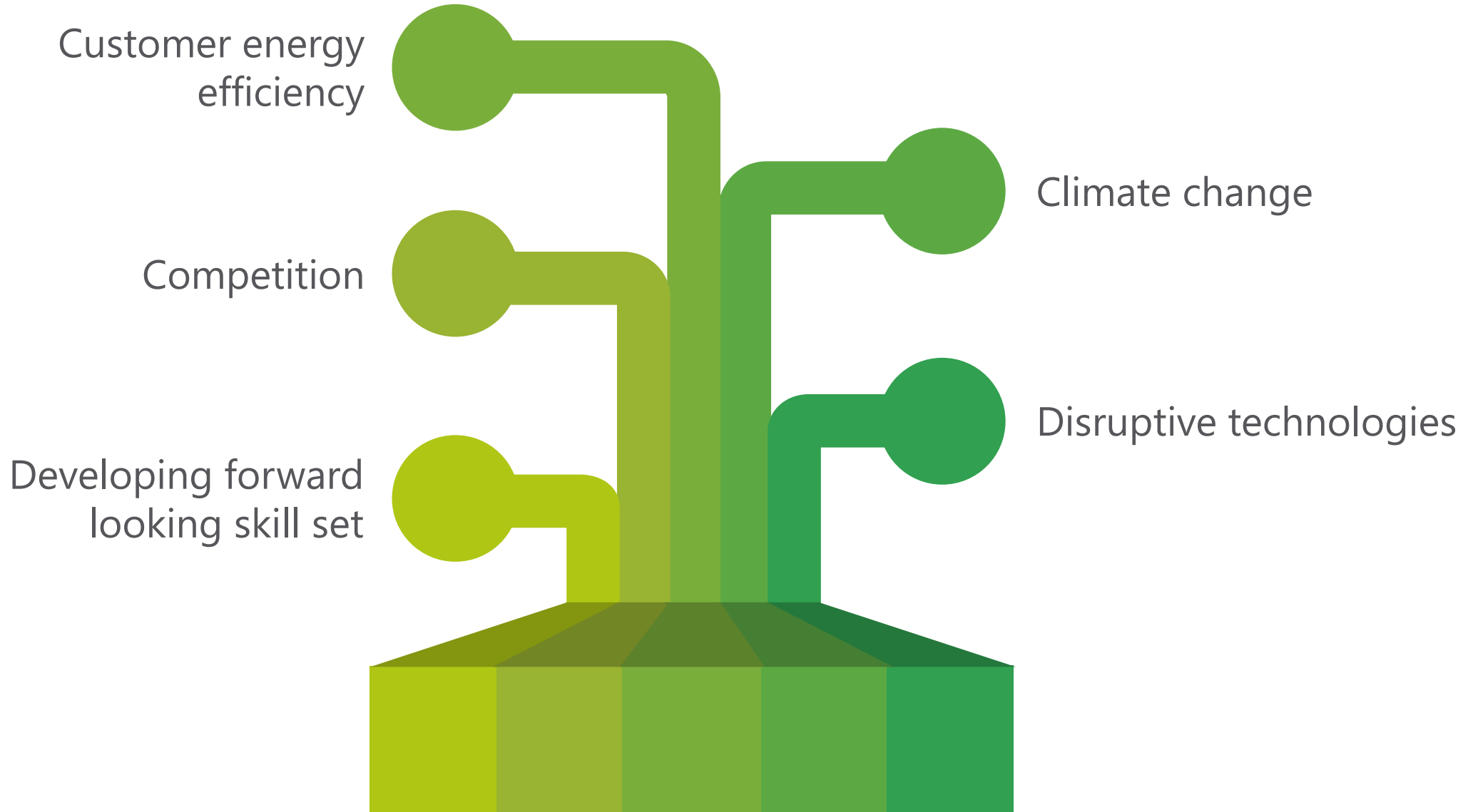
Length of the network **741 km**



54% of heat is produced from biomass



Future uncertainty



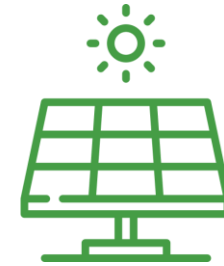
Our future priorities



Low-temperature
district heating



Waste heat



Renewable energy
sources



Centralised cooling



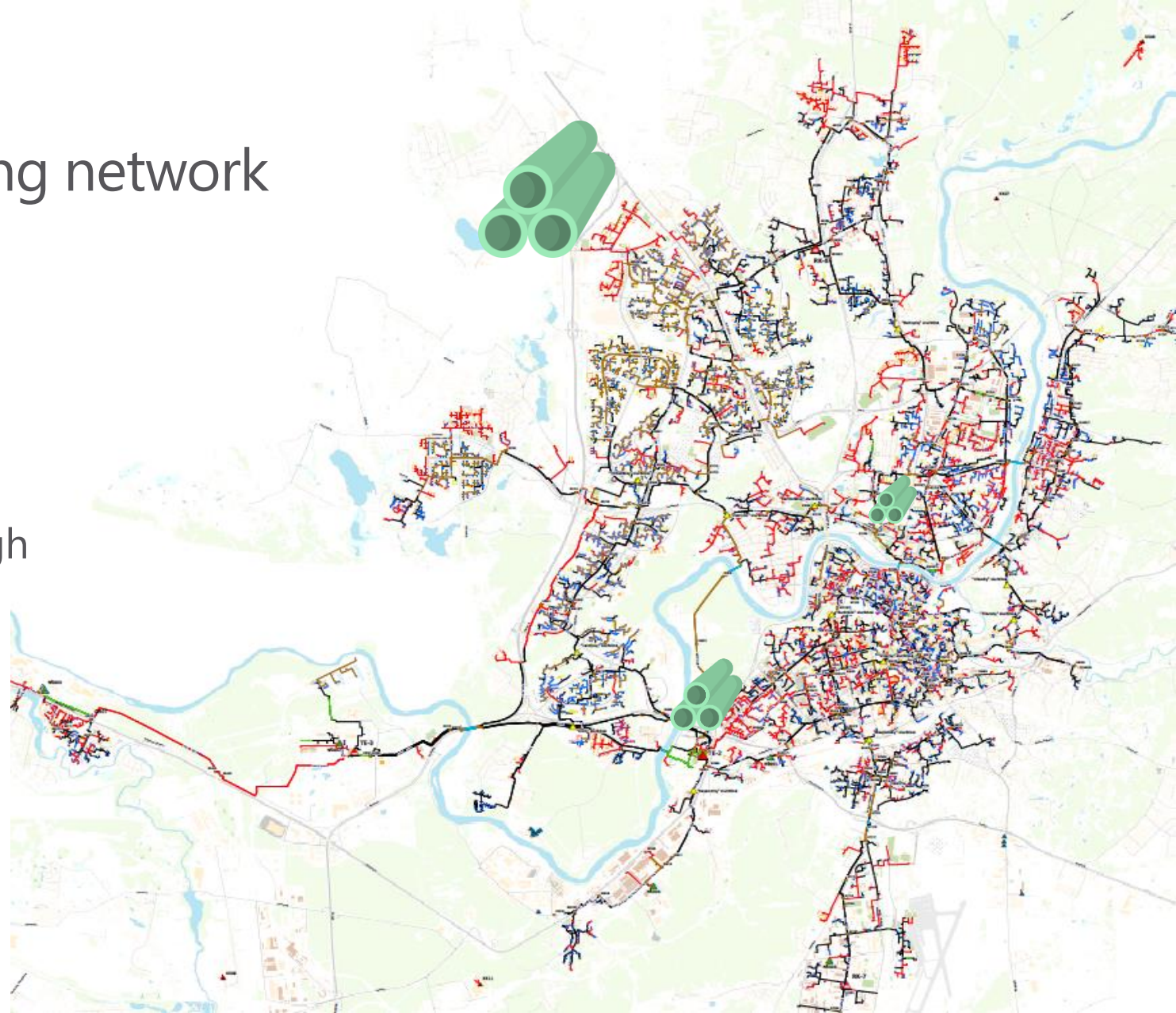
Smart technologies



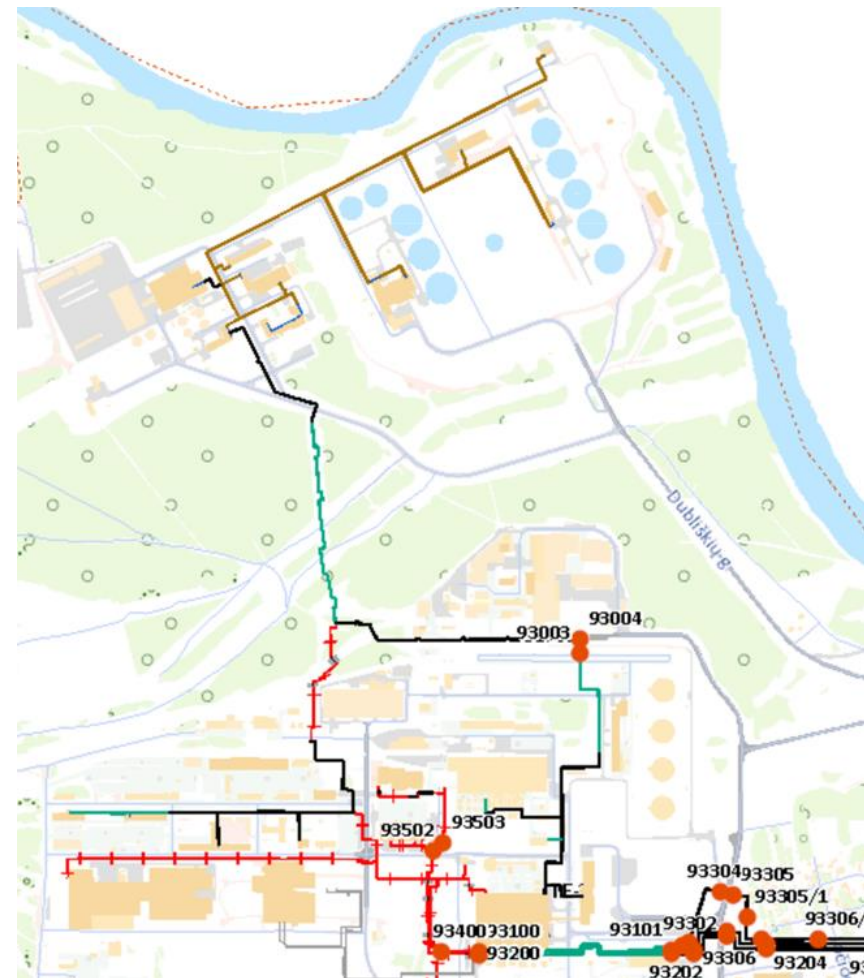
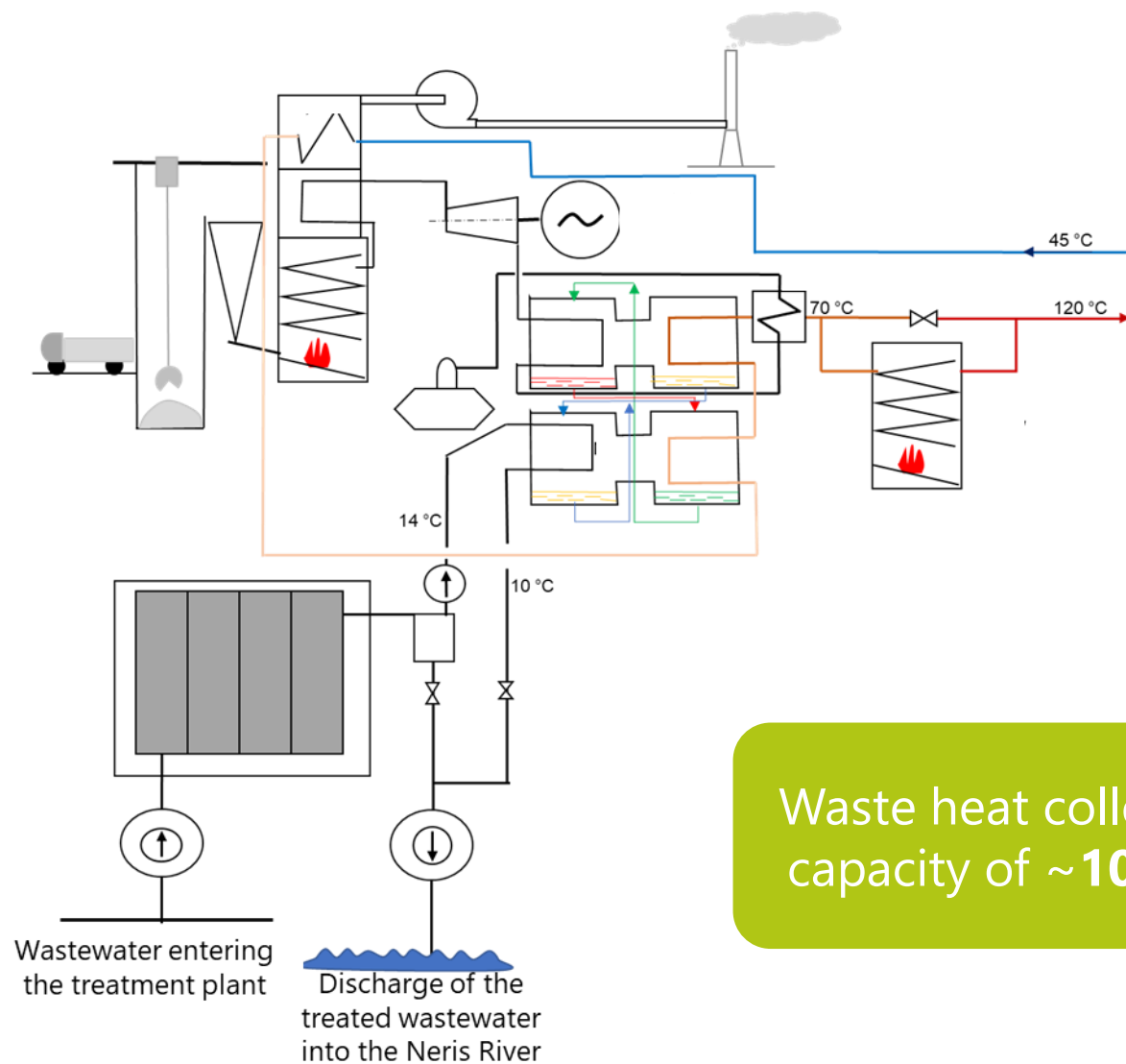
Vilniaus šilumos tinklai

Low temperature district heating network

- Supply/return temperature of **65/40 °C**
- Expected demand capacity – **64 MW**
- Connecting to the main network through the mixing units
- New opportunities for RES integration and waste heat collection



Waste heat collection from wastewater treatment process





Vilniaus šilumos tinklai

Looking forward to
further discussions!





Lydia Hameeteman

Advisor and Project Manager at
City of Rotterdam

Looking at Rotterdam: Impactful Solutions through Collaboration



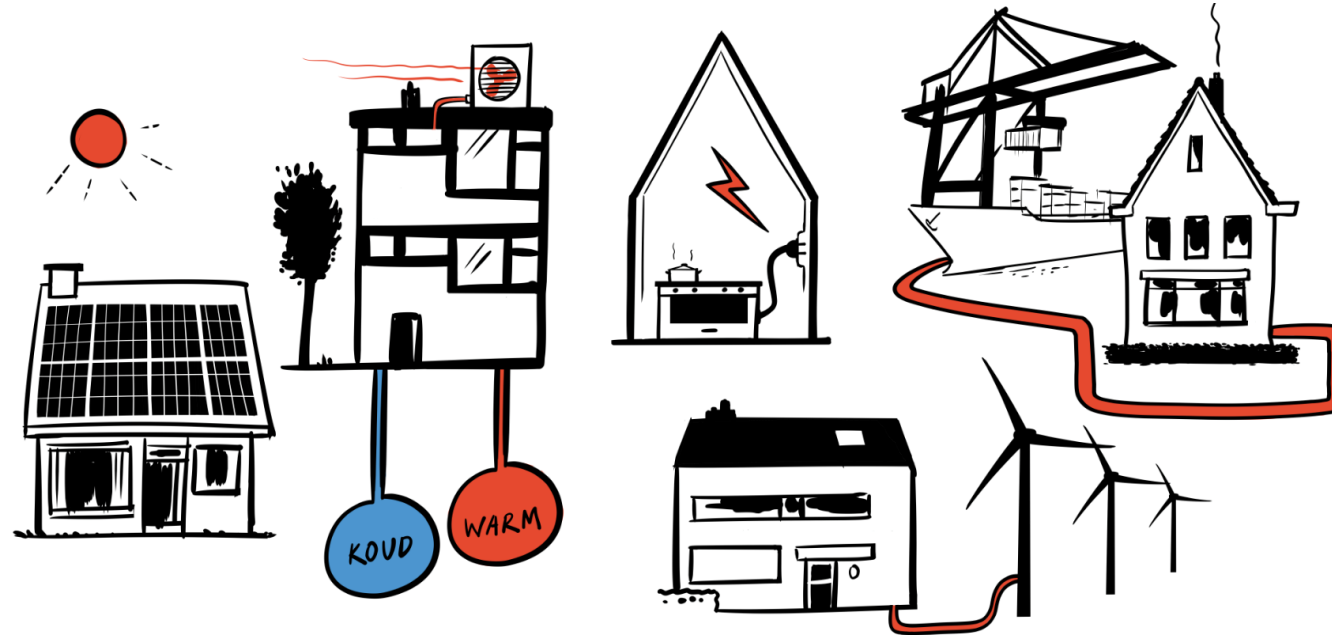
ENERGY TRANSITION ROTTERDAM

LYDIA HAMEETEMAN

clean, safe, reliable and
affordable energy supply for
everyone

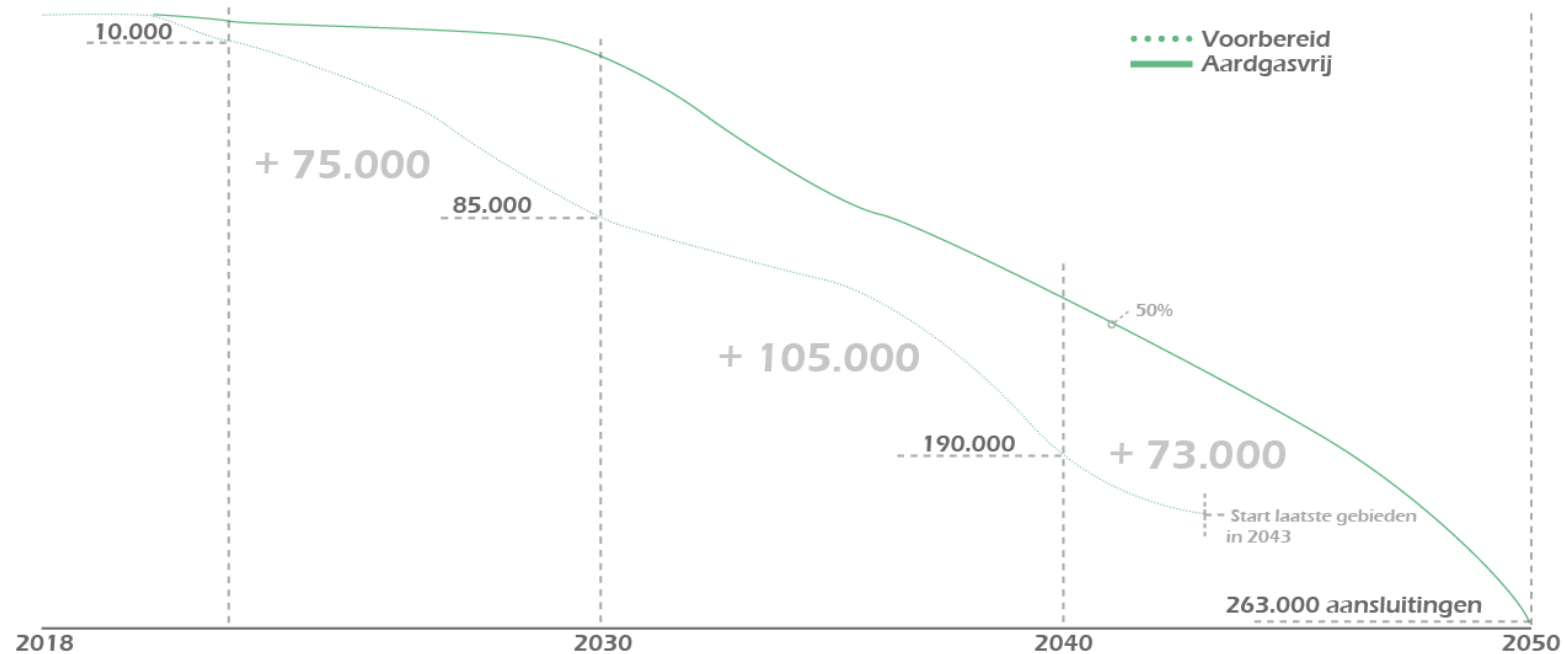
**ROTTERDAM.
MAKE IT
HAPPEN.**

OUR GOAL

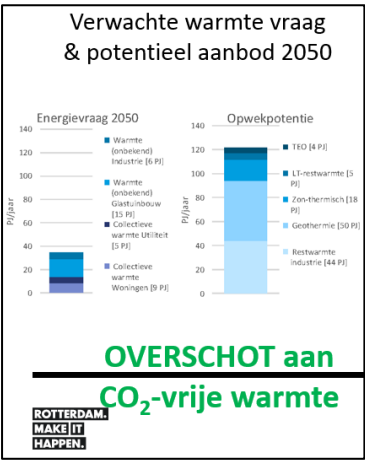
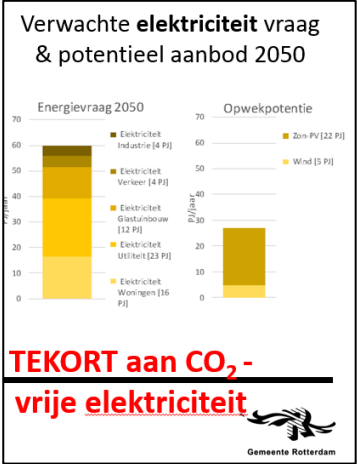
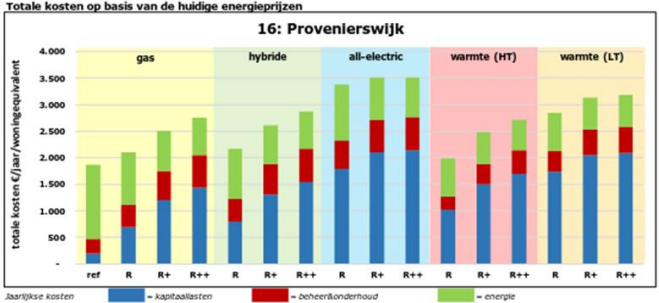
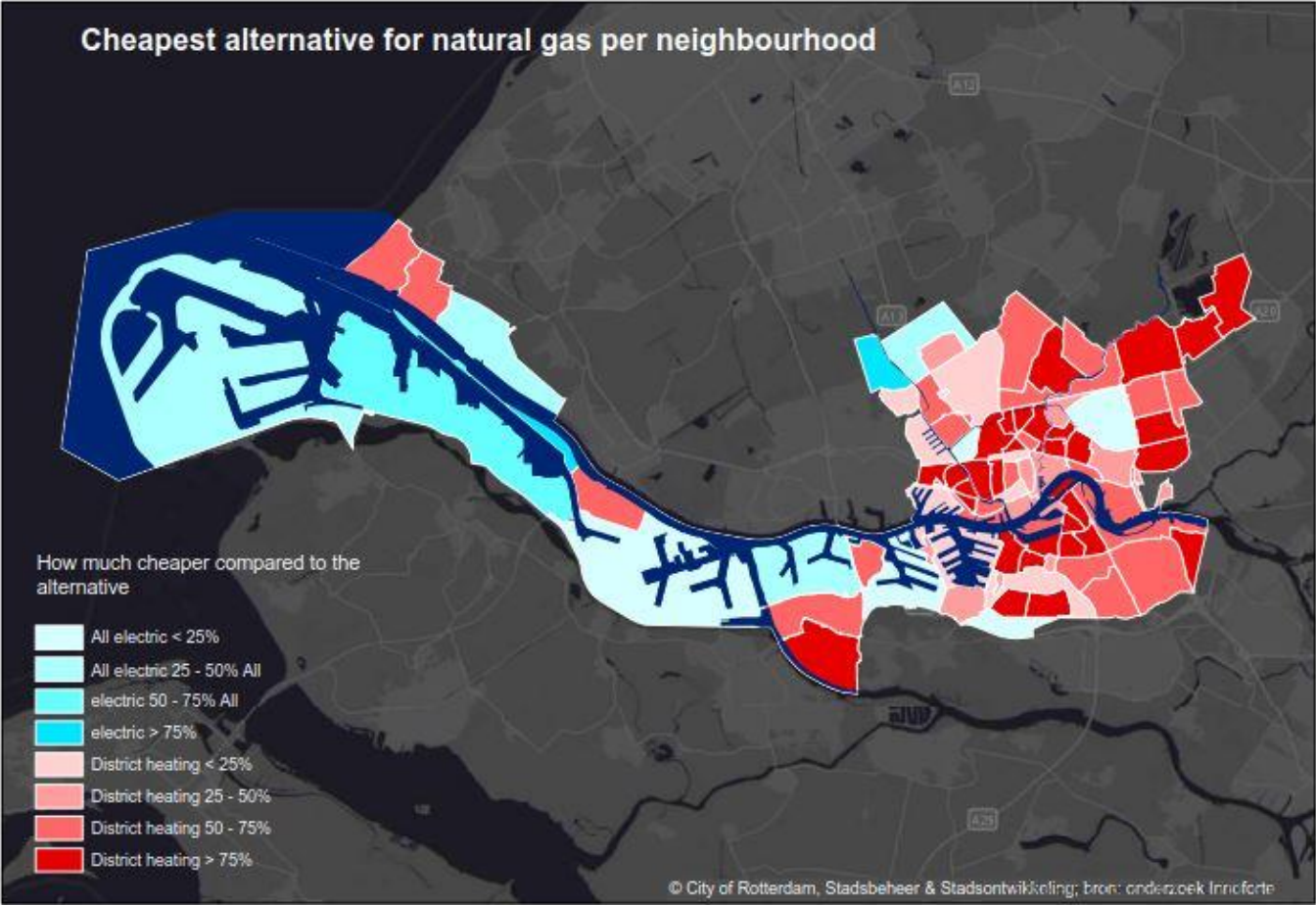


**Working towards a clean, safe, reliable
and affordable energy supply for
everyone in 2050**

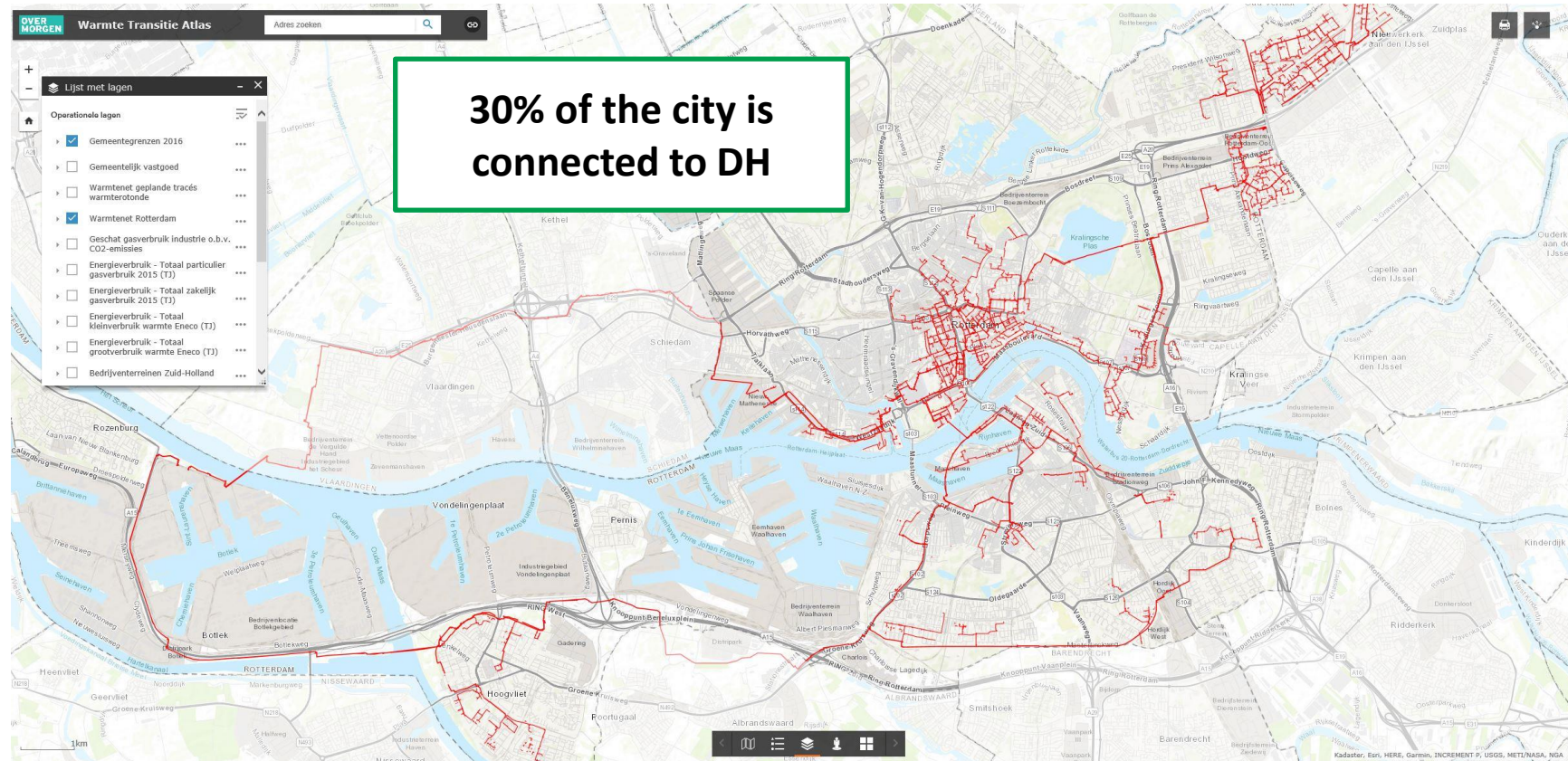
263.000 GAS CONNECTIONS



3. COST EFFICIENCY



DISTRICT HEATING ROTTERDAM



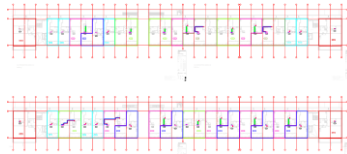
ROTTERDAM
MAKE IT
HAPPEN.



OUR APPROACH



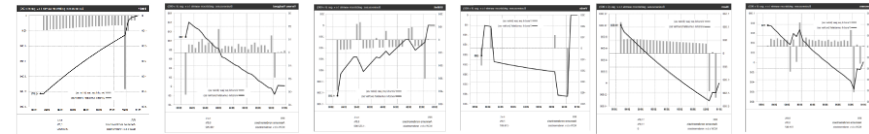
Technical: What is possible and what is needed?



IMPORTANT:
Involving the
end user

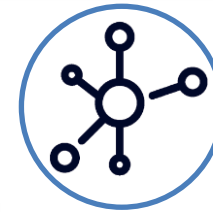


Financial: Transparency in the business case of the district heating company



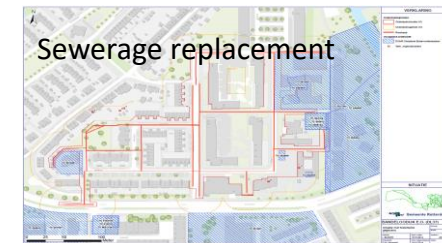
Social: Understand the end user

Informed choice
decision: personal
approach



Opportunity: how to add value to the transition to DH

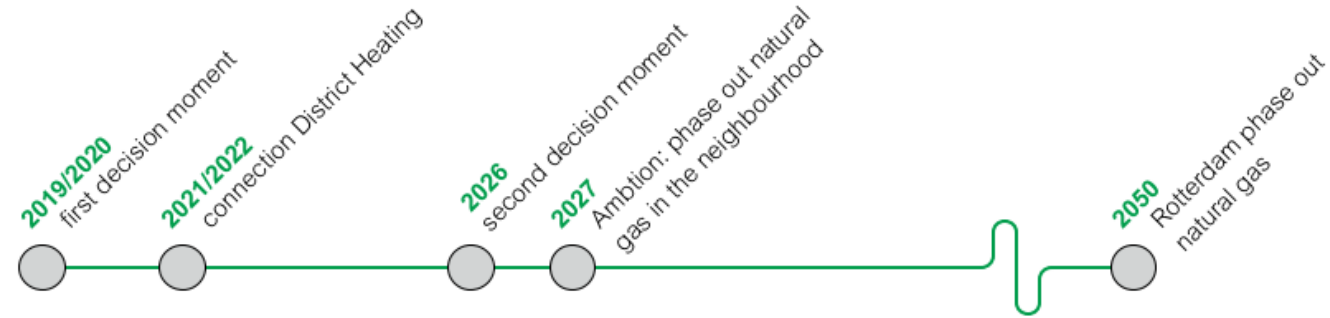
Combining with sewerage replacement and adaptation measures with more playing opportunities



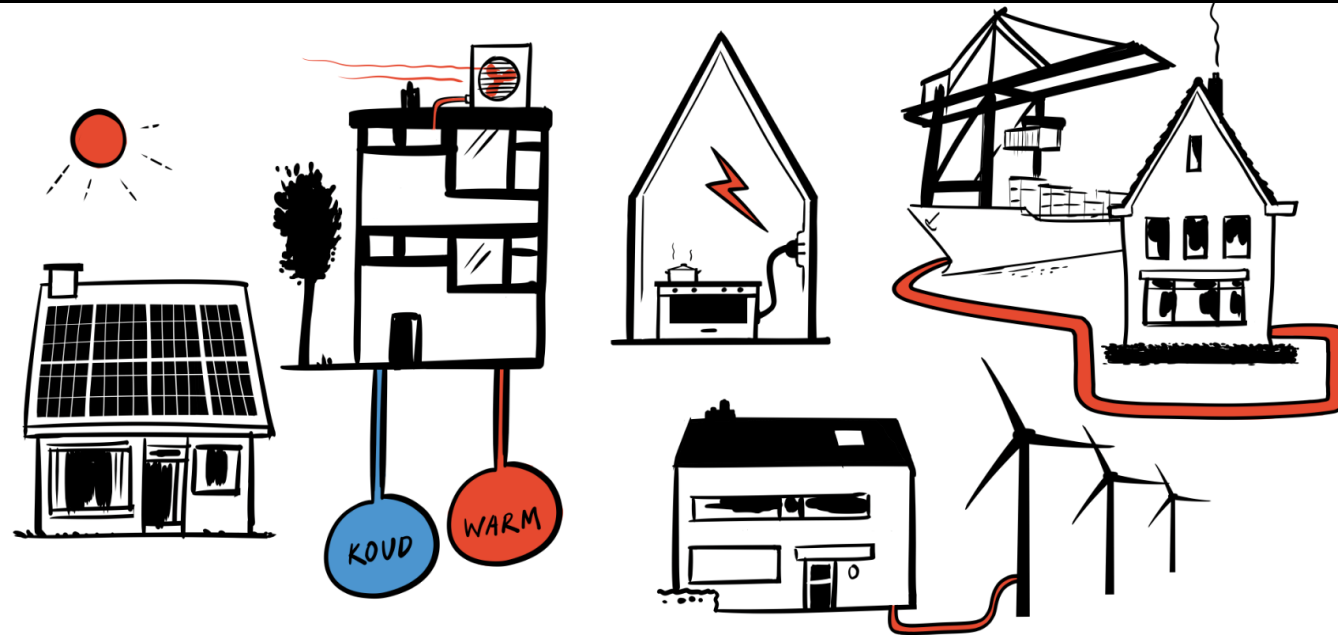
**ROTTERDAM.
MAKE IT
HAPPEN.**



THE RESULTS



- Around 60 % in the neighbourhood is going to be connected to DH in 2021/2022
- 1 social housing company (30%) will be connected in 2027
- A few don't want to connect to district heating (2-3%)
- The others are waiting for the next moment to make a decision (2027)



MAKE IT HAPPEN.

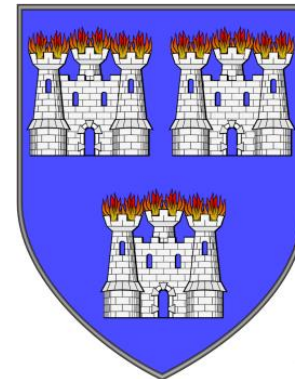
Lydia Hameeteman
Lc.hameeteman@rotterdam.nl

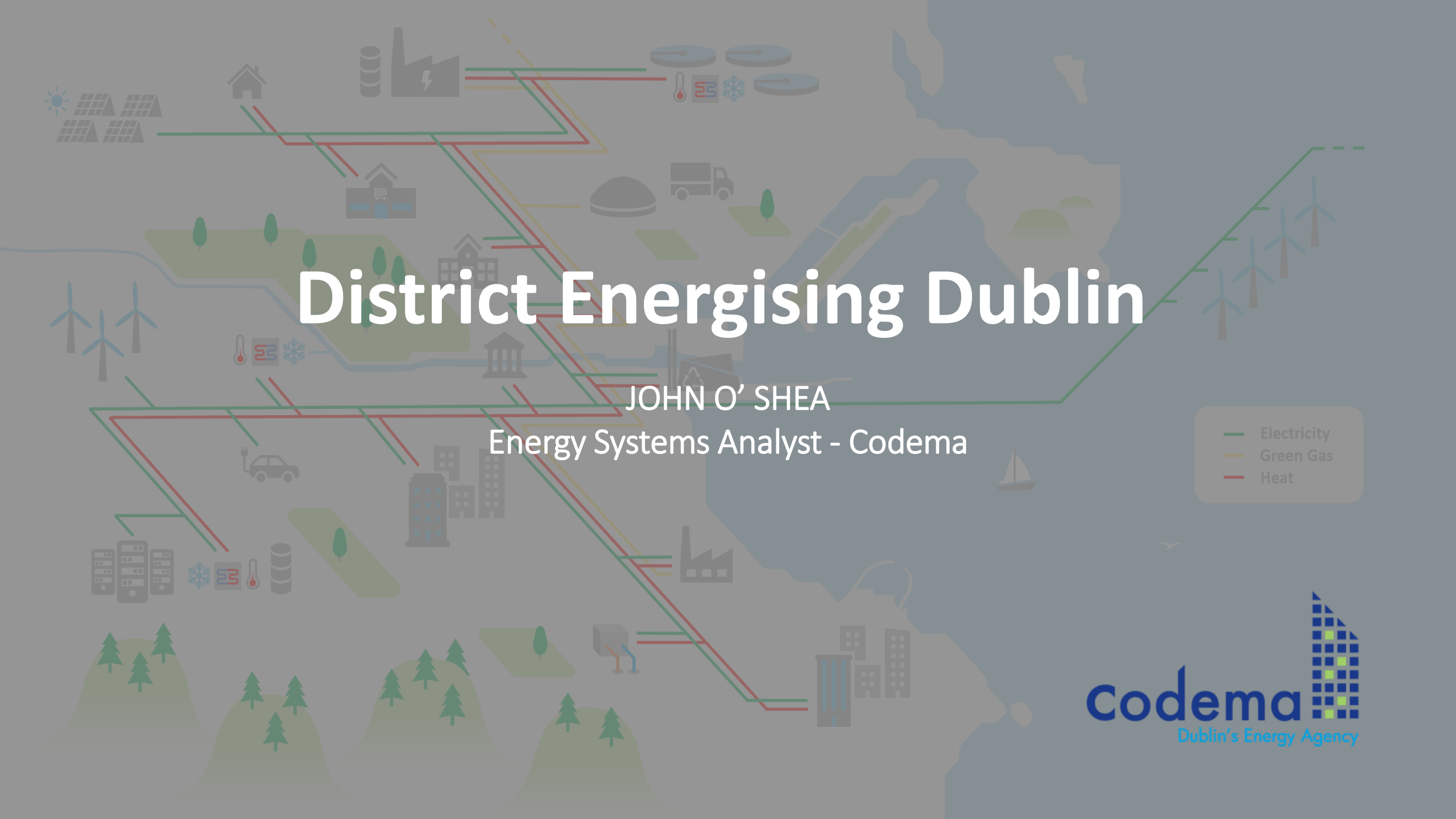


John O'Shea

Energy Systems Analyst at Codema,
Dublin's Energy Agency

Starting at the Top: New Networks with New Solutions for Dublin



The background is a stylized map of Dublin, Ireland, overlaid with a complex network of colored lines representing energy infrastructure. Green lines represent electricity, yellow lines represent green gas, and red lines represent heat. The map includes various icons for energy sources and consumers: solar panels, wind turbines, a factory, a house, a school, a hospital, a car, a truck, a boat, and various buildings. A legend in the bottom right corner identifies the line colors: green for Electricity, yellow for Green Gas, and red for Heat.

District Energising Dublin

JOHN O' SHEA

Energy Systems Analyst - Codema

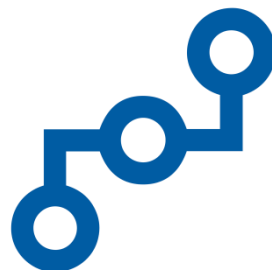
— Electricity
— Green Gas
— Heat

OUR TEAM

- Founded in 1997 as **not-for-profit** organisation
- Leading the **Energy Transition in Dublin**
- Energy Advisers to the **four Dublin Local Authorities**



ENERGY
AWARENESS

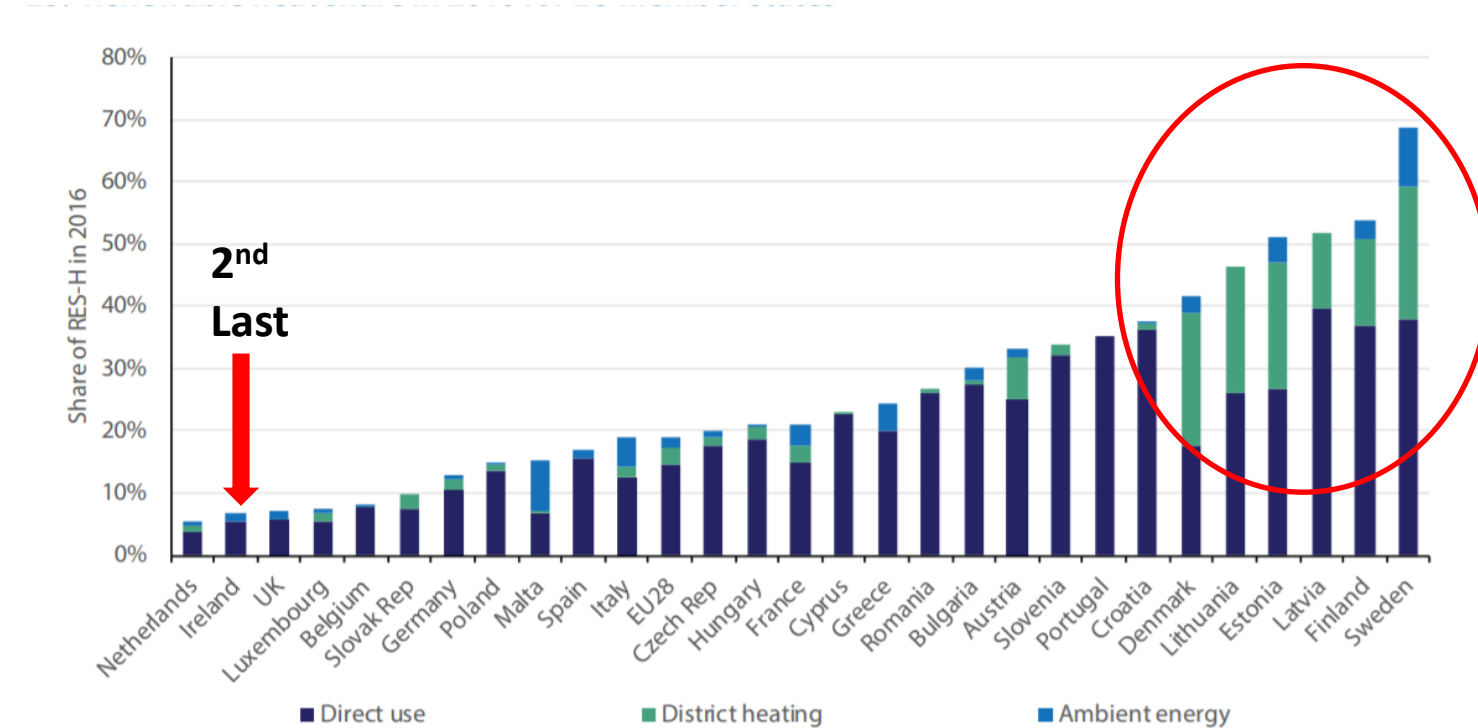
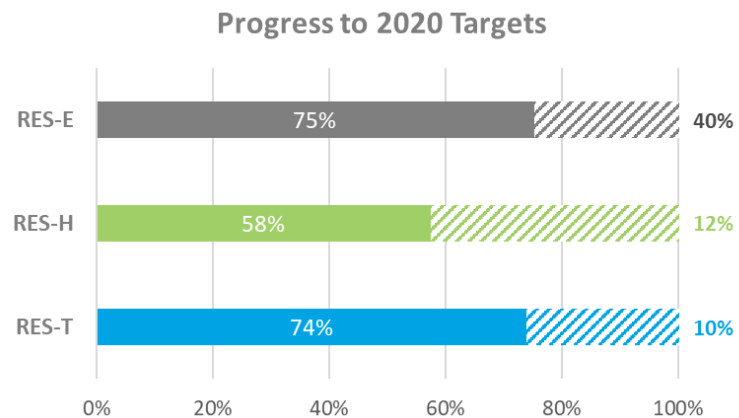
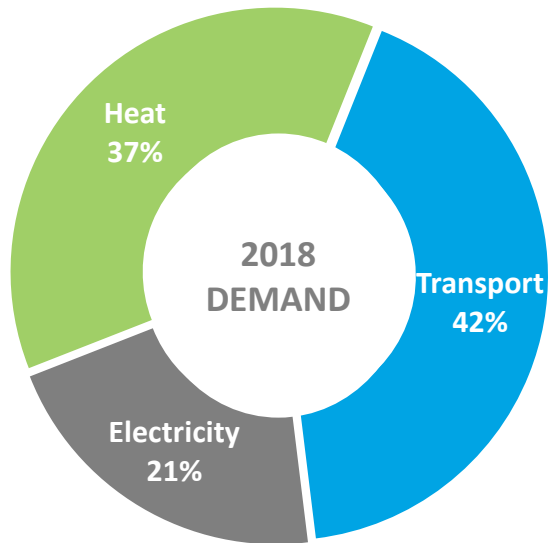


PROJECT
MANAGEMENT



MATCH
FUNDING

Renewable Heat in Ireland



Source: Eurostat

EU & National Support



**Approx. €25M secured
for DH last year**



■ Energy Efficiency Directive:

- Article 14 – Comprehensive assessment of potential for DH
- Article 14(4) – Adequate measures be taken to develop DH if cost effective

**Involved through
steering group.
Submission 28th Feb**

■ Recast Renewable Energy Directive:

- Acknowledges the contribution of DH to increasing the share of renewable heat

**Low enthalpy
geothermal resource**

■ Project Ireland 2040

■ DCCAE Climate Action Fund

■ Climate Action Plan 2019:

- Action 70 – DH Policy framework
- Action 53 – Assessing financing
- Action 151 – 3rd level campus DH
- Action 133 - Geothermal where DH seen as key enabling infrastructure

Heat Source Legend

- Cold Storage Warehouses (kW)**

 - 40 - 1000
 - 1000 - 10000
 - 10000 - 100000
- Electrical Transformer Waste Heat (kW)**

 - 0 - 100
 - 100 - 250
 - 250 - 504
- Power Stations (MW)**

 - 90 - 242
 - 242 - 324
 - 324 - 512
- Biomass Heat Sources (kW)**

 - 50 - 1000
 - 1000 - 10000
 - 10000 - 50000
- Industrial Waste Heat (kW)**

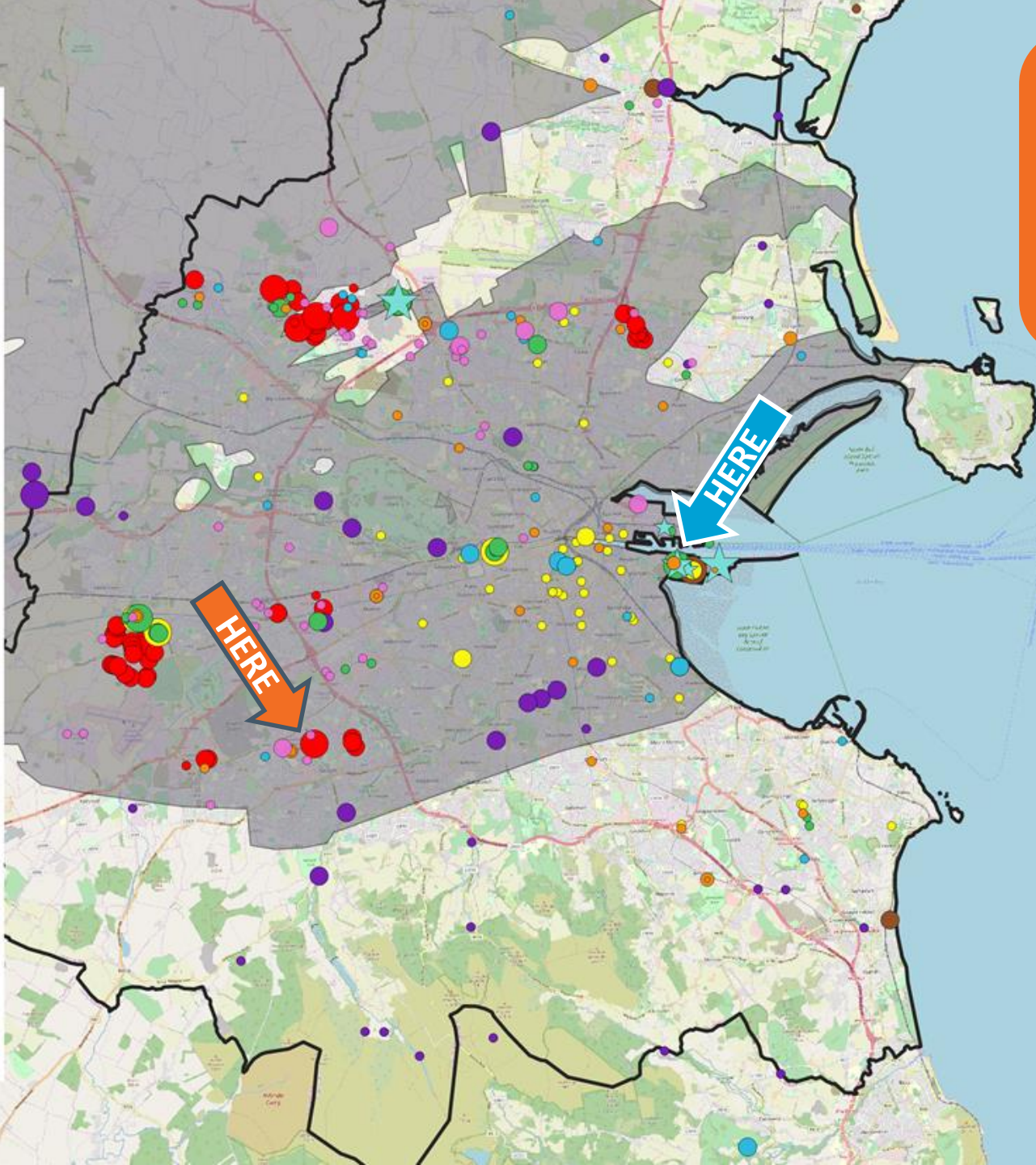
 - 50 - 1000
 - 1000 - 10000
 - 10000 - 52200
- Combined Heat and Power(kW)**

 - 50 - 1000
 - 1000 - 10000
 - 10000 - 73600
- Surface Water Sources (kW)**

 - 42.0 - 1000
 - 1000 - 10000
 - 10000 - 31080
- Data Centre Waste Heat (kW)**

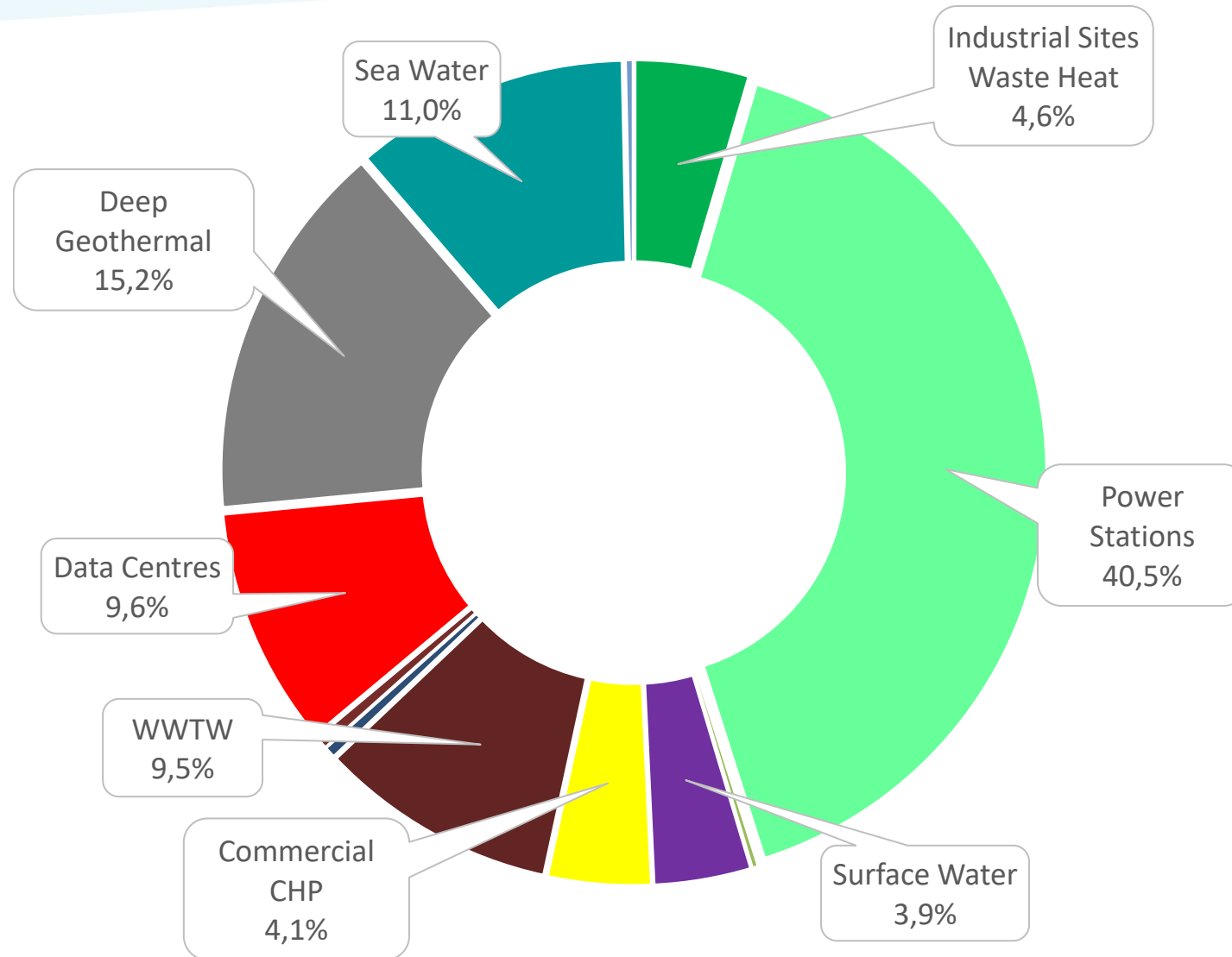
 - 50 - 1000
 - 1000 - 10000
 - 10000 - 15246
- Wastewater Treatment Plants (kW)**

 - 120 - 2689
 - 2689 - 55762
 - 55762 - 311220
- Area of High Deep Geothermal Potential**
- Dublin County Boundary**



~ 3000 MW of heat available in Dublin
Enough to heat >1 million homes

Available Heat Sources in Dublin



Where Codema Supports Local Authorities

Planning & Policy:

1. Energy Master-Planning (demand, sources, constraints) - Identifying Opportunity Areas
2. Planning policy to promote DHC & low-carbon heat
3. DHC national steering group
4. Transition roadmap

Business Case Development:

1. Techno-economic analysis (CBA, WLC etc.)
2. Business model options
3. Outline design & early optimisation

Stakeholder Engagement:

1. Identifying stakeholders (roles)
2. Effective communication (drivers)
3. Communication materials – Brochures, website etc.
4. Data sharing

Procurement & Contracting:

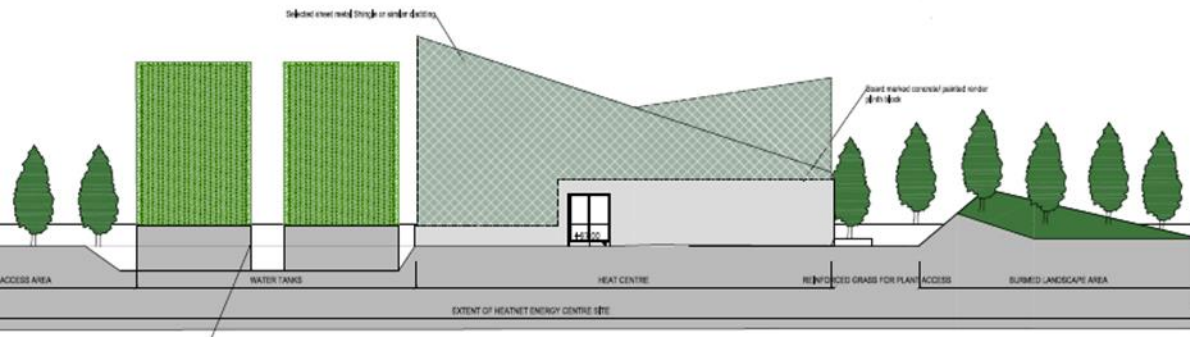
1. Technical advisors
2. Procurement strategy to leverage capacity & allocate risk – output based
3. Development of client requirements & standards
4. Bid evaluation

Project Delivery & Capacity Building:

1. Pipes in the ground
2. Workshops with planners
3. Working with 3rd level Institutions
4. Best practice

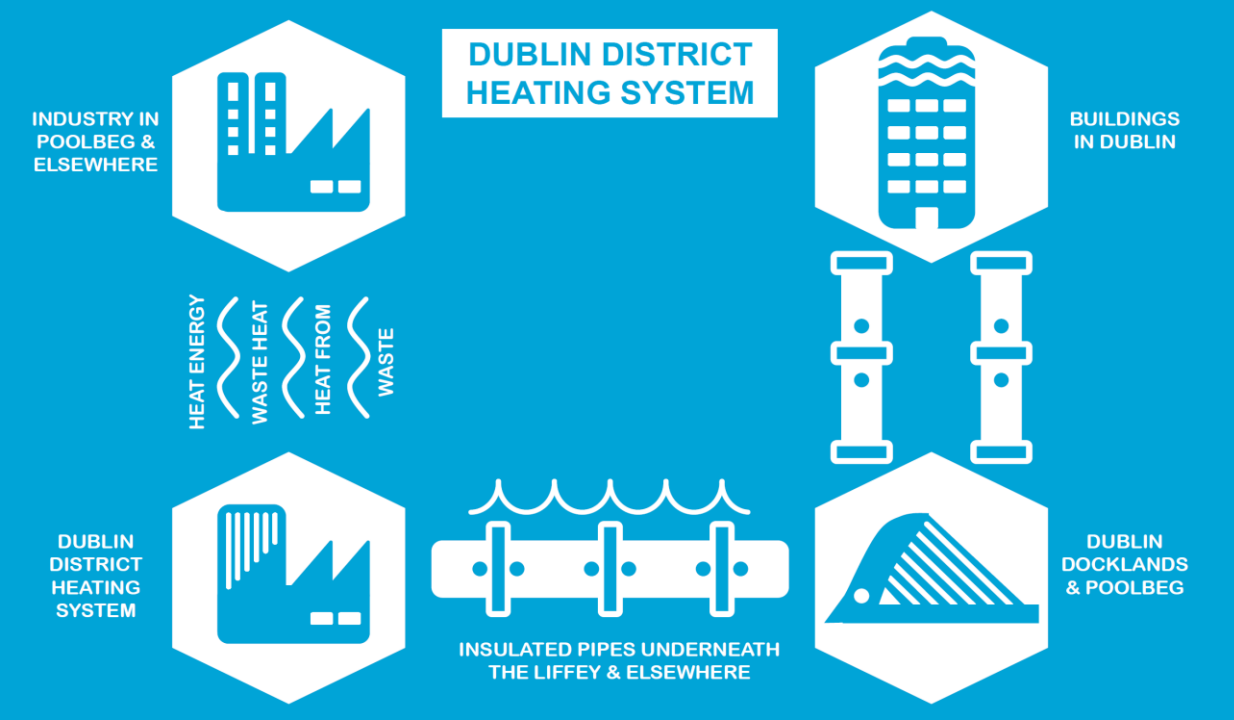
Tallaght District Heating Scheme

Heat Source: Data Centre Waste Heat



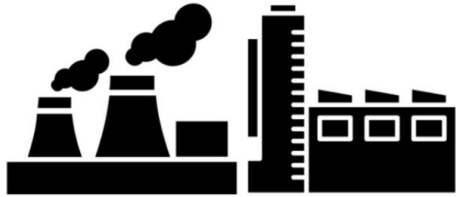
Dublin District Heating Scheme

Heat Source: Dublin Waste to Energy (DWtE)

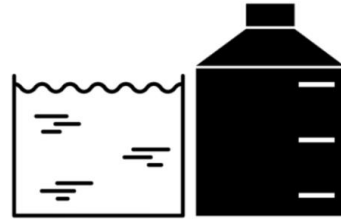


Comhairle Cathrach
Bhaile Átha Cliath
Dublin City Council

Benefits of DH – Not Just for Heating



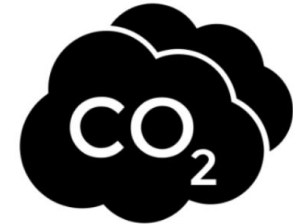
Industrial Waste Heat –
increasing plant efficiency



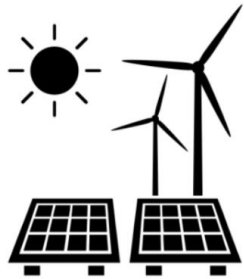
Thermal Storage – Cheap
Energy Storage for Large Scale
Demand side Response



Customer Safety – no
onsite combustion or fuels



Low-carbon & lower
local air pollution



Integrate more Renewable
Electricity – Large scale Heat
Pumps & Electric Boilers &
RE CHP



Less Fossil Fuel Imports –
increased security of supply



Low-cost heat – utilises
waste and renewable
sources of heat



New market – new
local employment

Email john.oshea@codema.ie

Phone (+353) 01 707 9818

Web www.codema.ie



Break-out sessions

- ❖ Select a group by writing the name of the city in the chat
 - ❖ Zagreb – Vilnius – Rotterdam – Dublin
- ❖ Turn camera on – microphone off!
- ❖ Raise your hand to ask a question or write it in the chat
- ❖ If called upon, start by introducing yourself (name & company)



Laura Uttu-Deschryvere

Project Director of the
Helsinki Energy Challenge



Ivan Ivankovic

Head of Energy, Energy
Management and Sustainable
Energy Development
City of Zagreb



Paulius Martinkus

Chief Strategy and
Business Development Officer at
Vilnius šilumos tinklai



Lydia Hameeteman

Advisor and Project Manager at
City of Rotterdam



John O'Shea

Energy Systems Analyst at
Codema,
Dublin's Energy Agency

Thank you!

www.celsiuscity.eu - [@celsiuscity](https://twitter.com/celsiuscity)

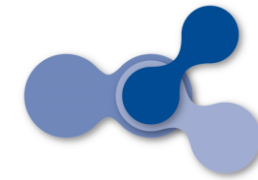
<https://www.euroheat.org/top-stories/ehp-webinars>



City of
Gothenburg



Gemeente Rotterdam



Johanneberg
Science Park