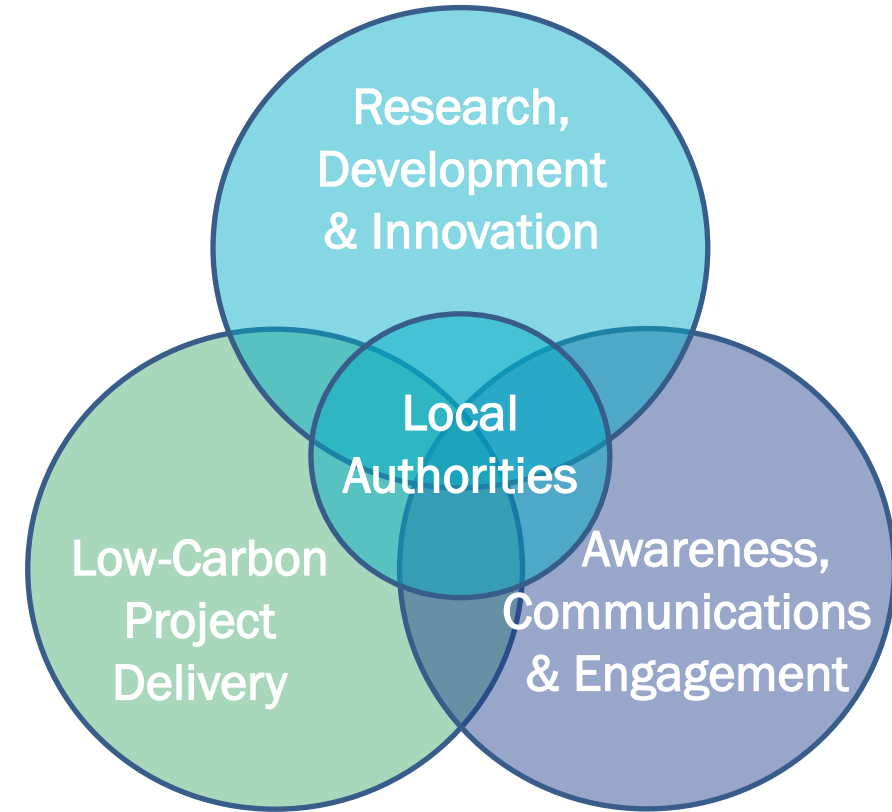


A Case from Ireland; Interactions at a community level with data centres

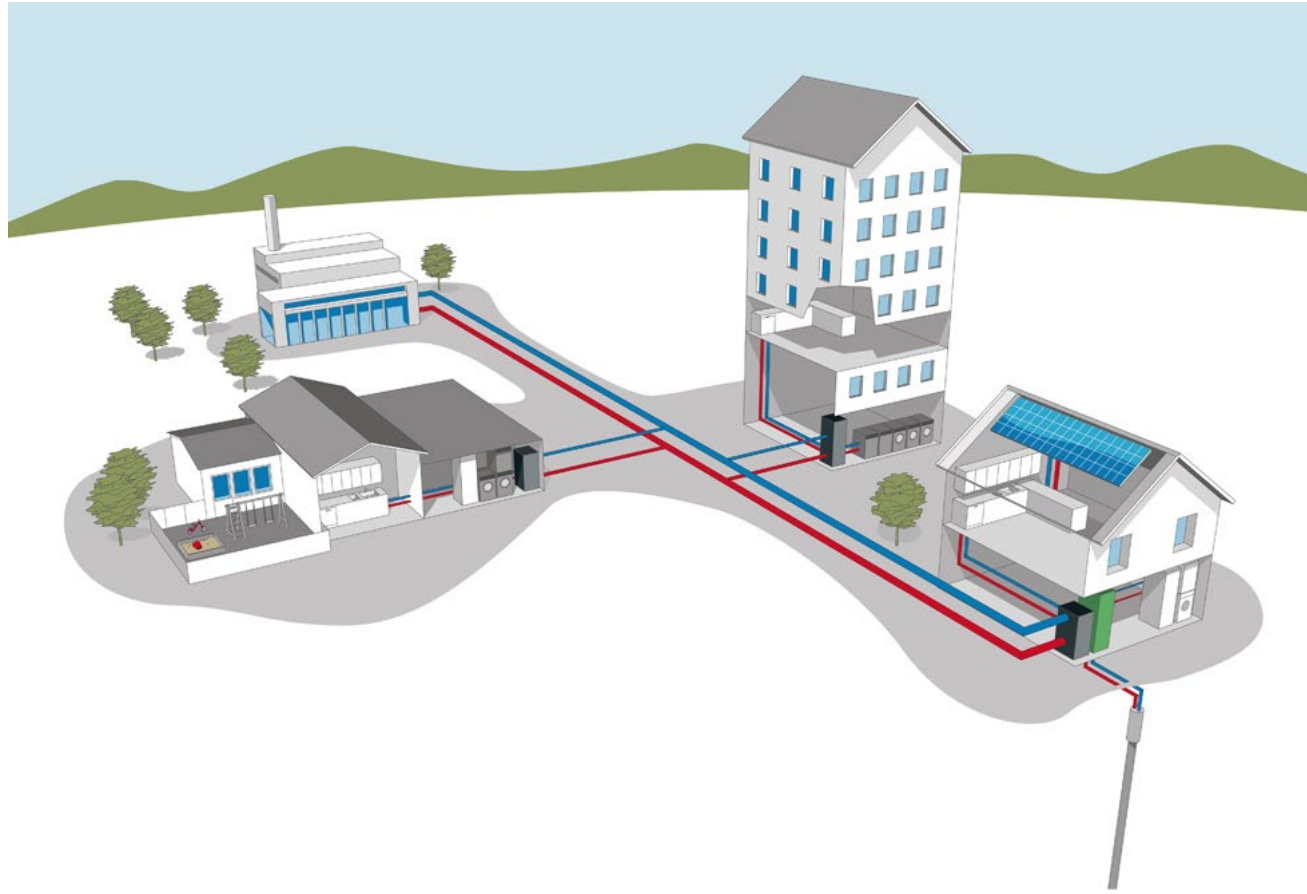
CA EED Data Centre Workshop, November 2021

DONNA GARTLAND – CEO, CODEMA

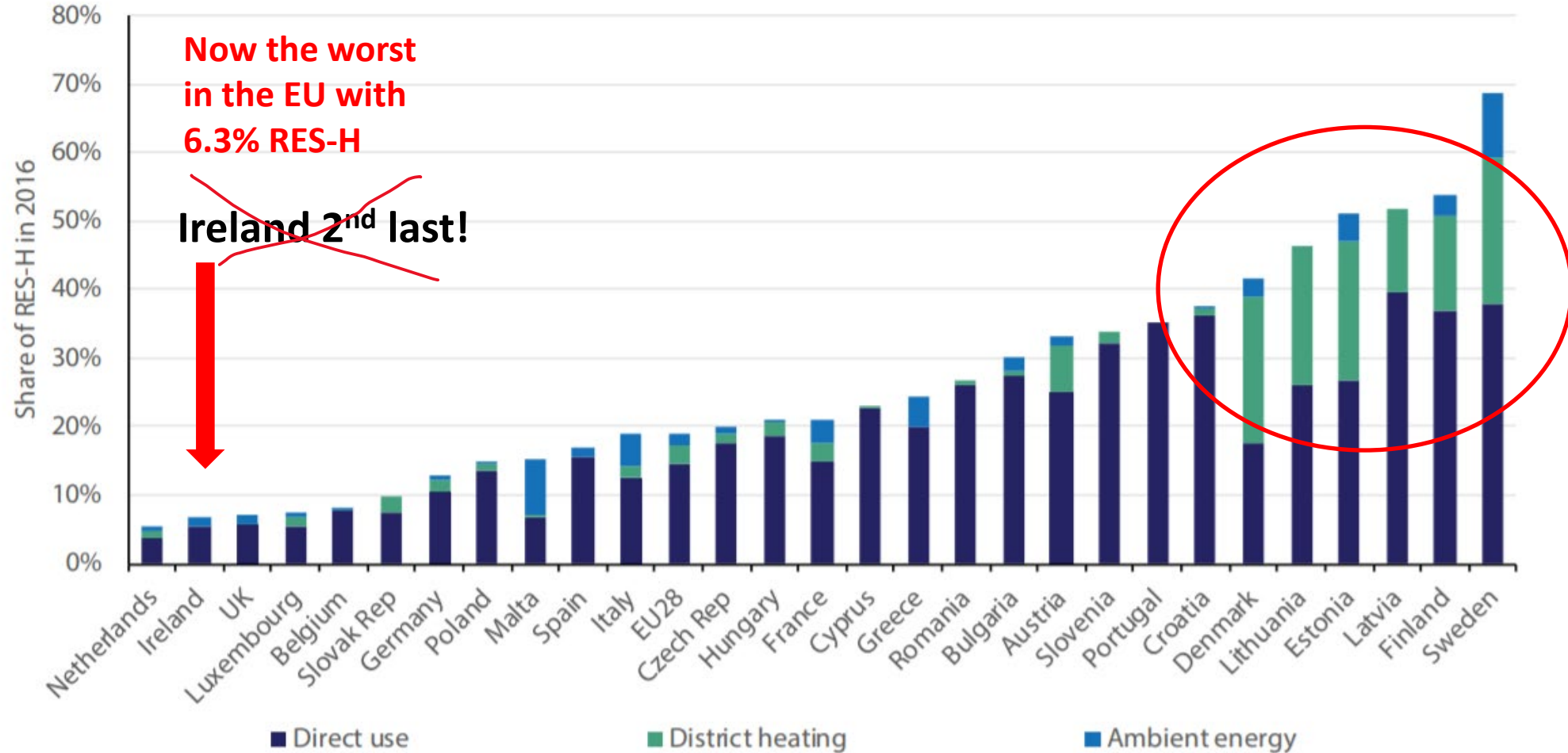
Codema – Dublin's Energy Agency

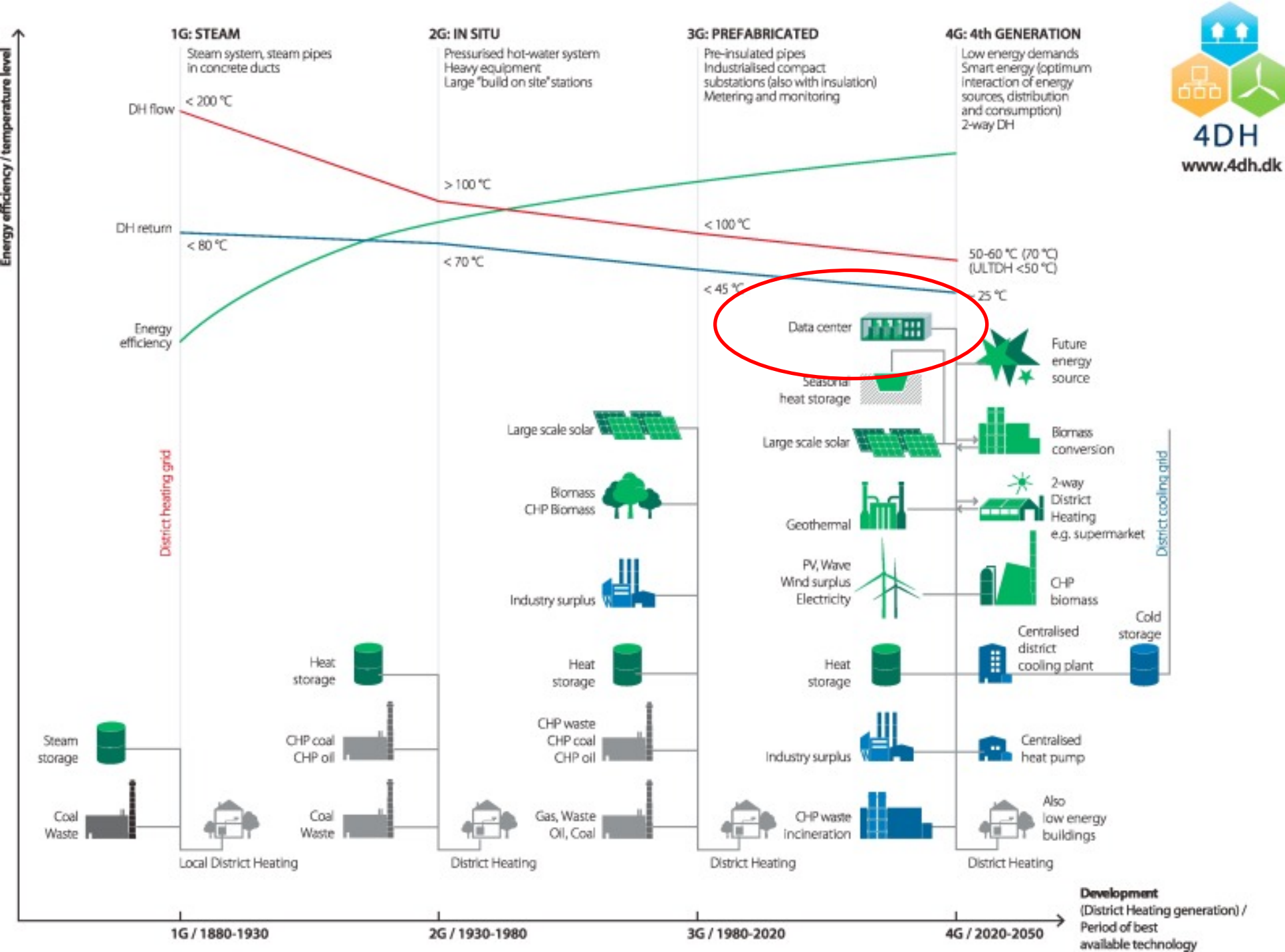


What is District Heating (DH)?



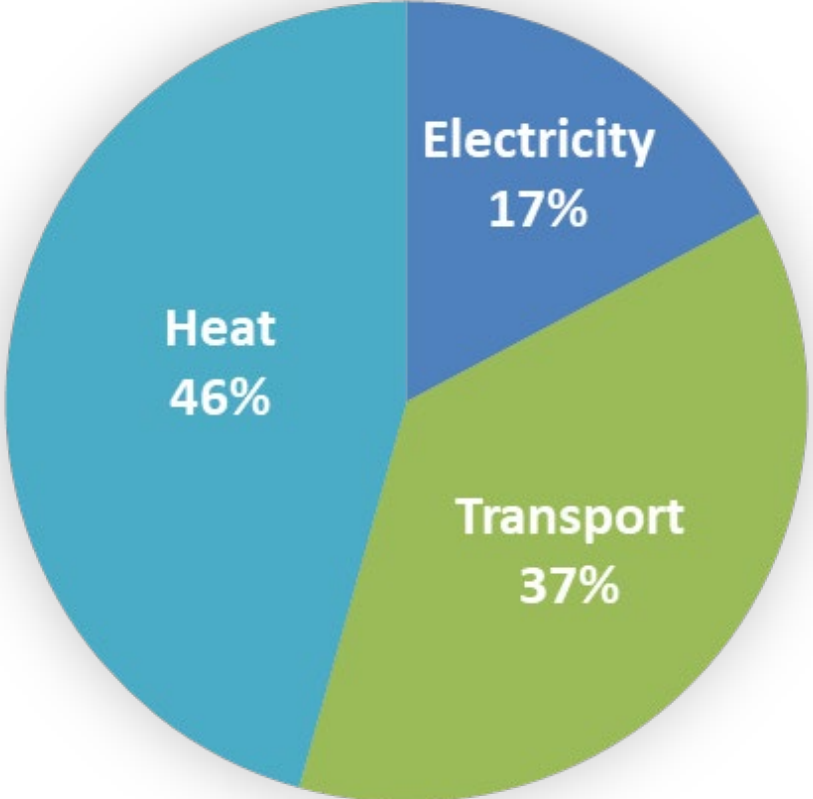
Renewable Heating & DH in the EU



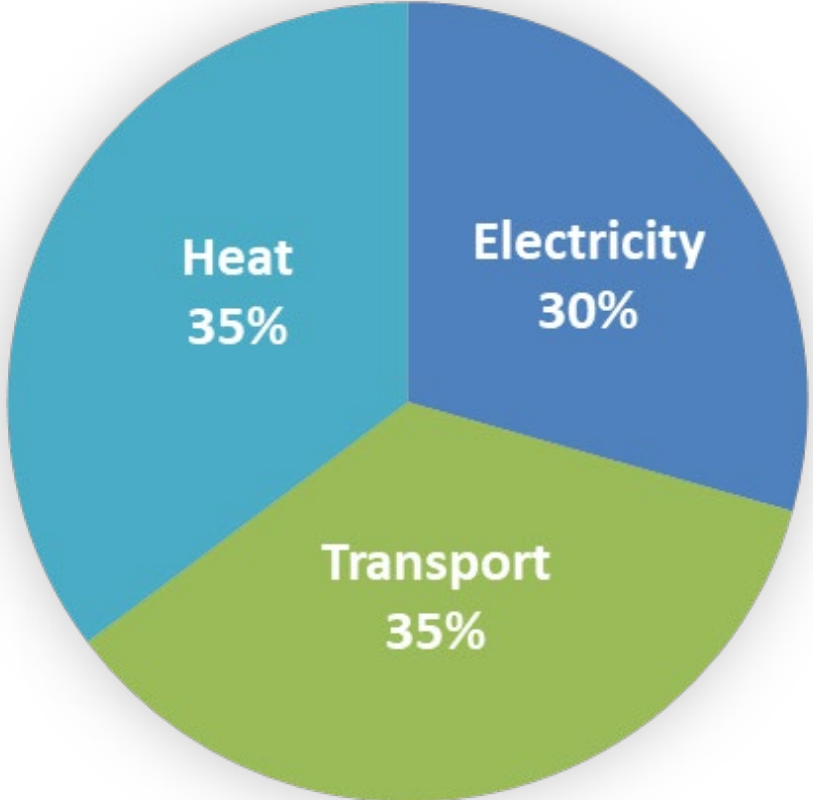


WHY ARE WE TALKING ABOUT HEAT?

Dublin's Final Energy Use

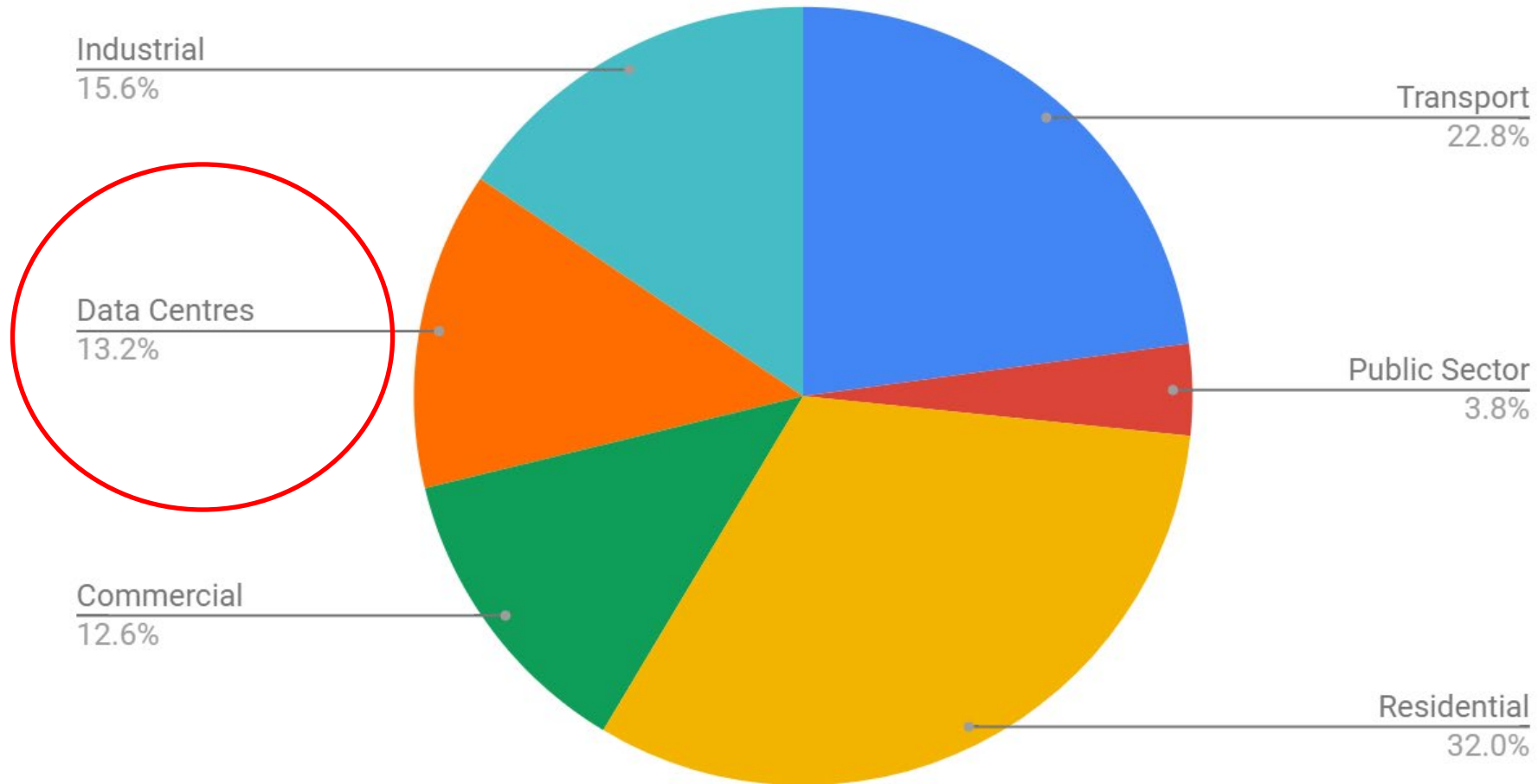


Dublin's Energy Emissions

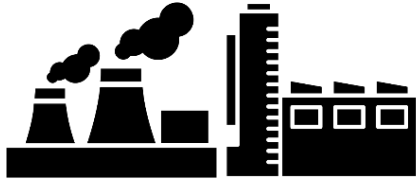


SECTOR BREAKDOWN OF ENERGY USE

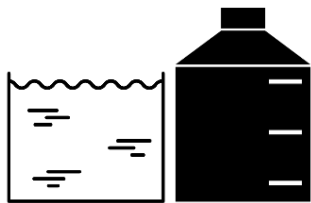
Dublin Region Annual Energy Demand



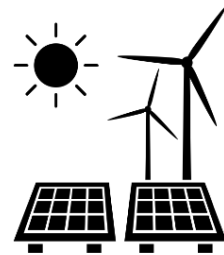
WHY DISTRICT HEATING?



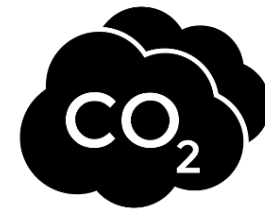
**Waste Heat – recycles
by-product locally**



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



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



**Low-carbon & protect
environment**



CODEMA'S ROLE IN DH DEVELOPMENT

Planning & Policy

e.g. Regional and Local Energy Master-Planning, policy advice and advocacy

Business Case Development

e.g. Techno-economic analysis and financial assessment

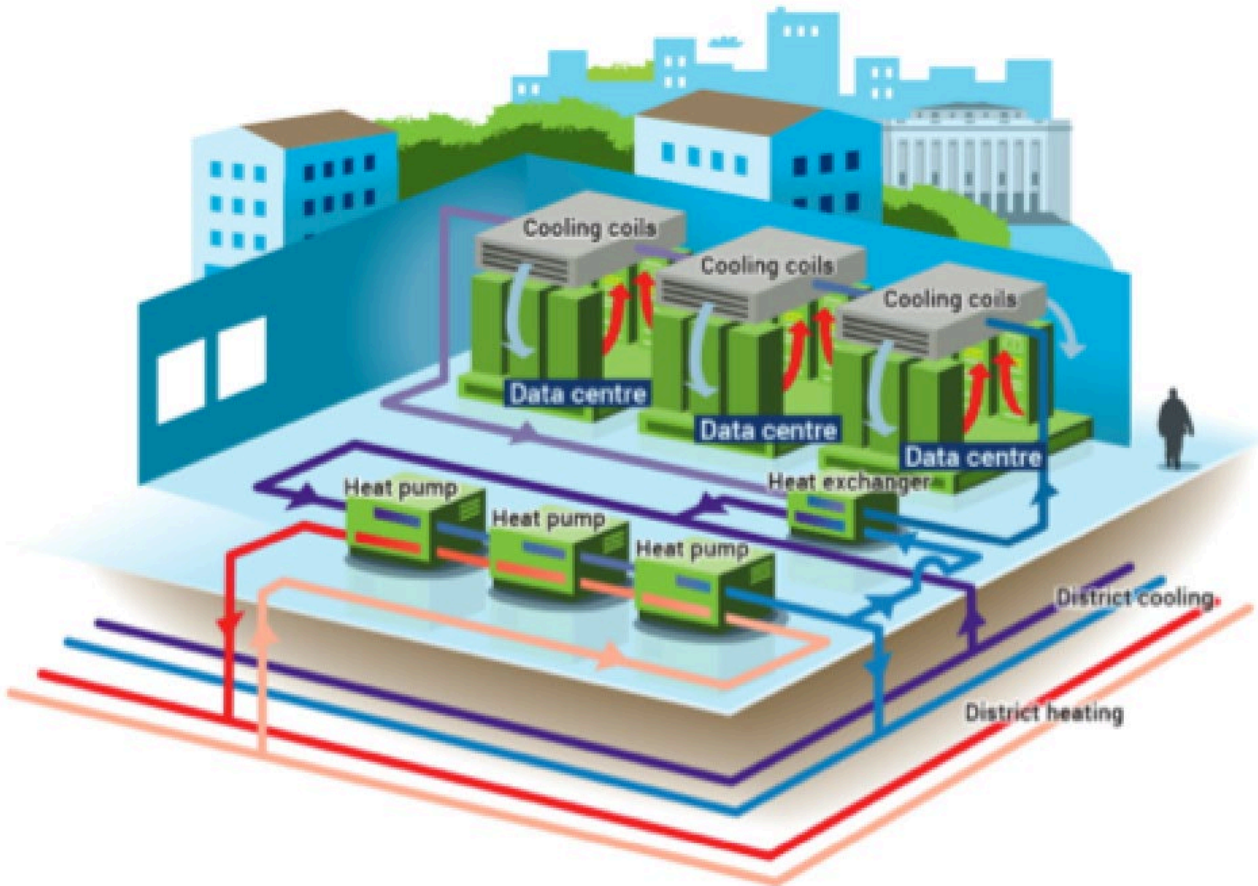
Stakeholder Engagement

Procurement & Contracting

e.g. contract design and procurement strategy to leverage capacity & allocate risk – output based

Project Delivery & Capacity Building

DATA CENTRE WASTE HEAT



1 MWh of electrical load produces
~750 kWh thermal energy

Recovered heat temperature ranges;
air cooled 25°C - 35°C
liquid cooled 40°C - 60°C

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)

- 50 - 1000
- 1000 - 10000
- 10000 - 15246

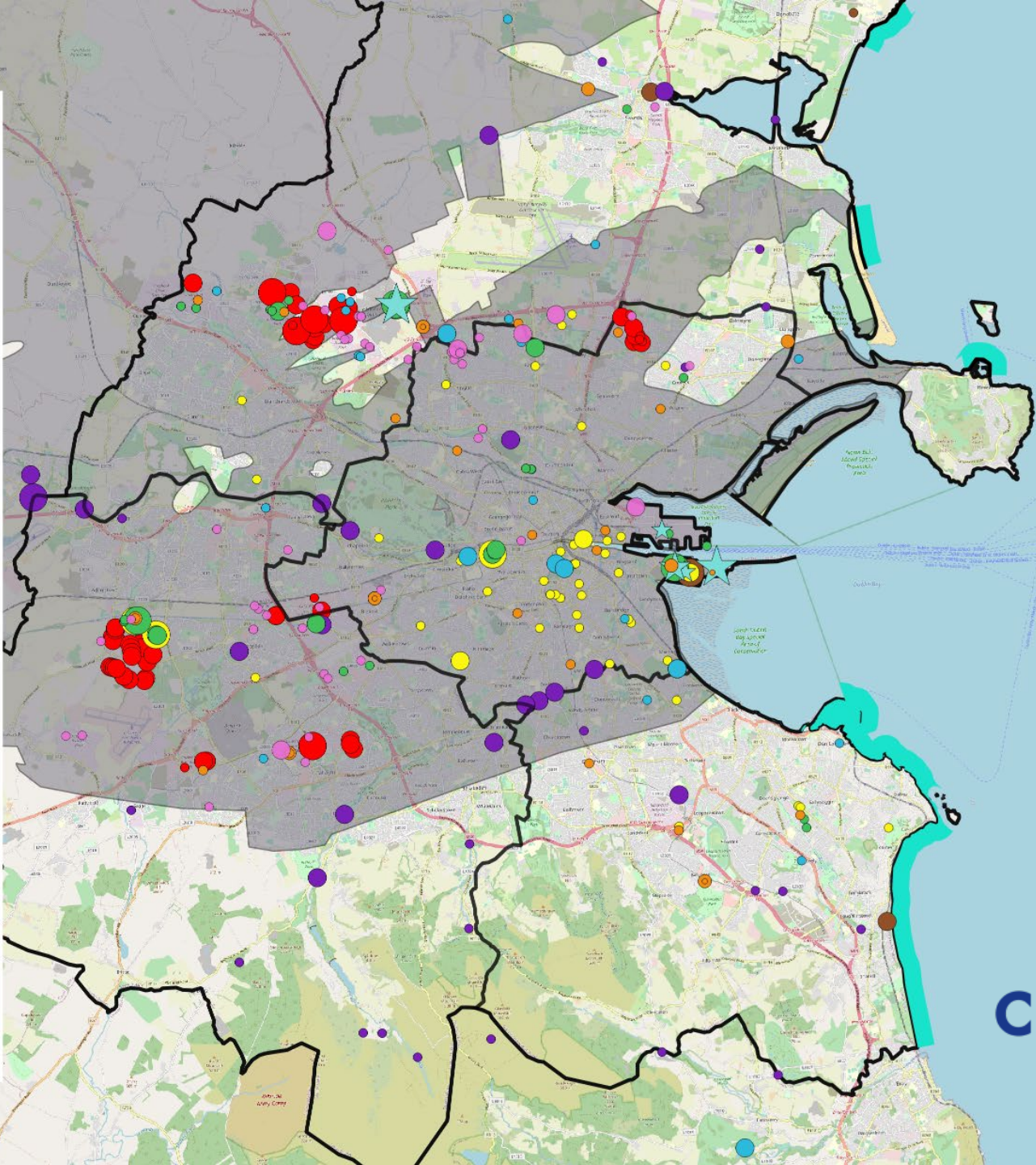
Data Centre Waste Heat (kW)

- 120 - 2689
- 2689 - 55762
- 55762 - 311220

Wastewater Treatment Plants (kW)

- Area of High Deep Geothermal Potential
- Dublin County Boundary
- Sea Water Heat Source

- Area of High Deep Geothermal Potential
- Dublin County Boundary
- Sea Water Heat Source



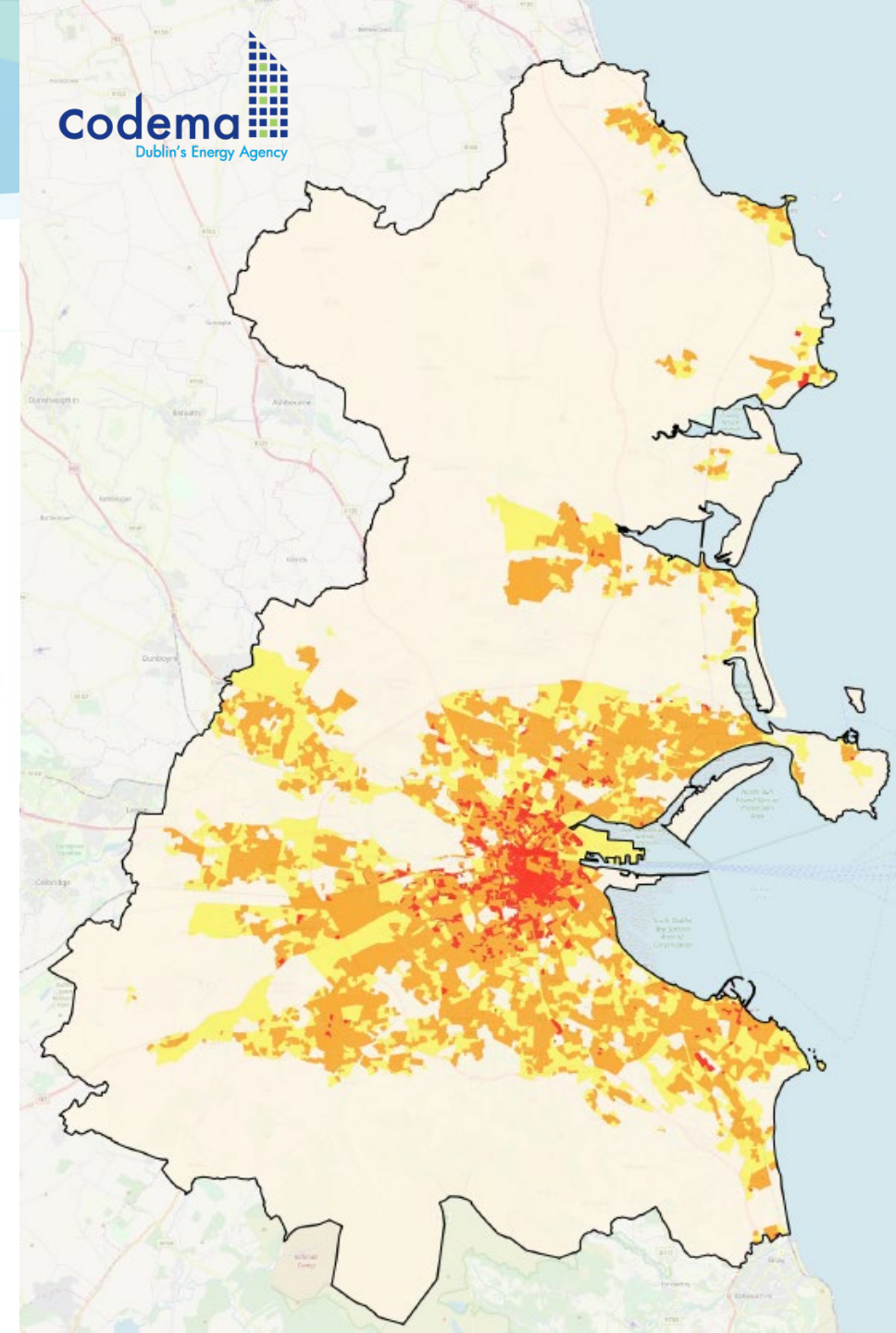
DUBLIN HEAT DEMANDS

Areas Suitable for District Heating in Dublin

Heat Demand Density (TJ/Km²)

-  Very Feasible
-  Feasible
-  Feasible with New Government Supporting Regulation
-  Future Potential

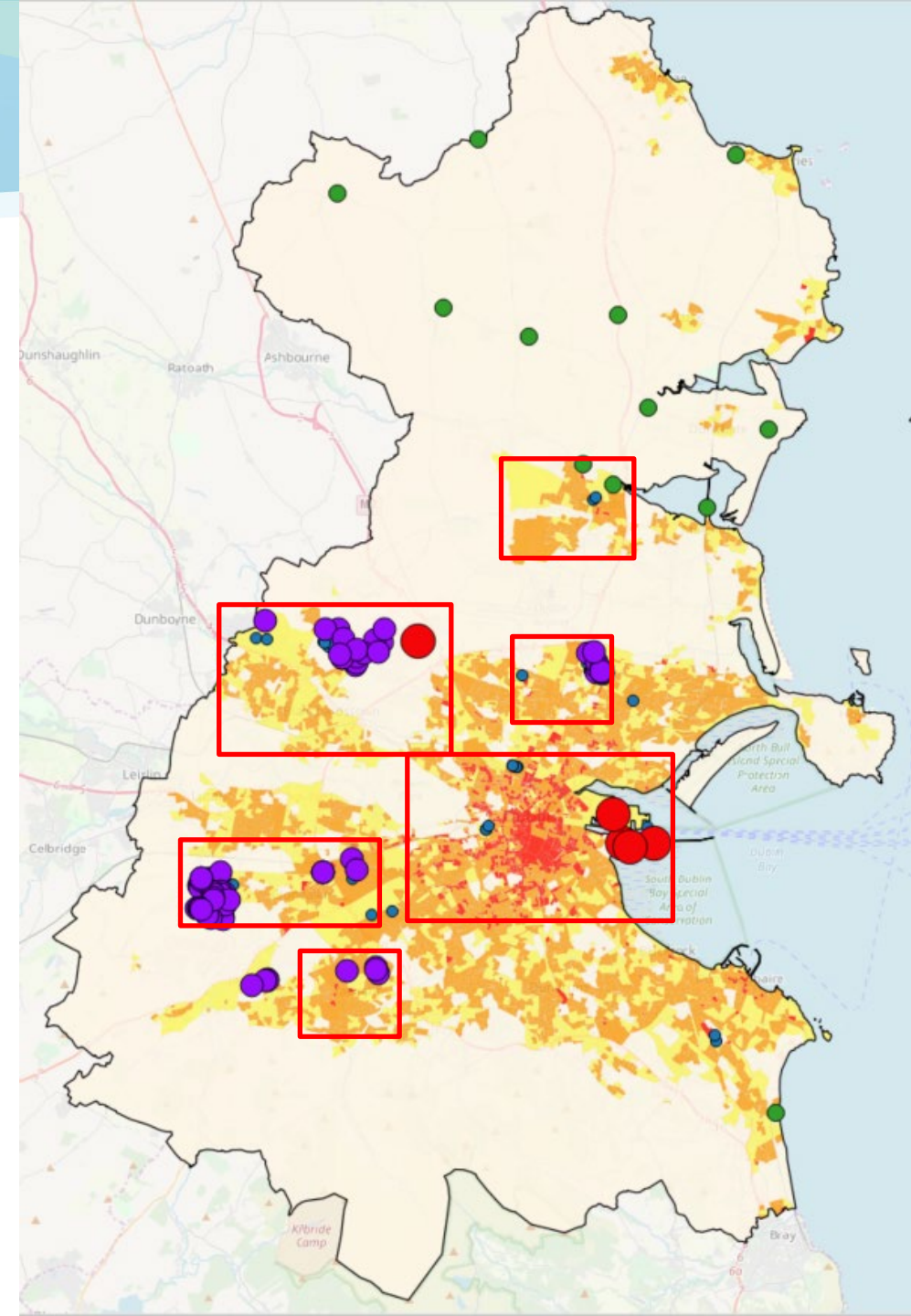
- ~70% of total Dublin region heat demand suitable for DH
- 86% of Dublin City heat demand suitable for DH



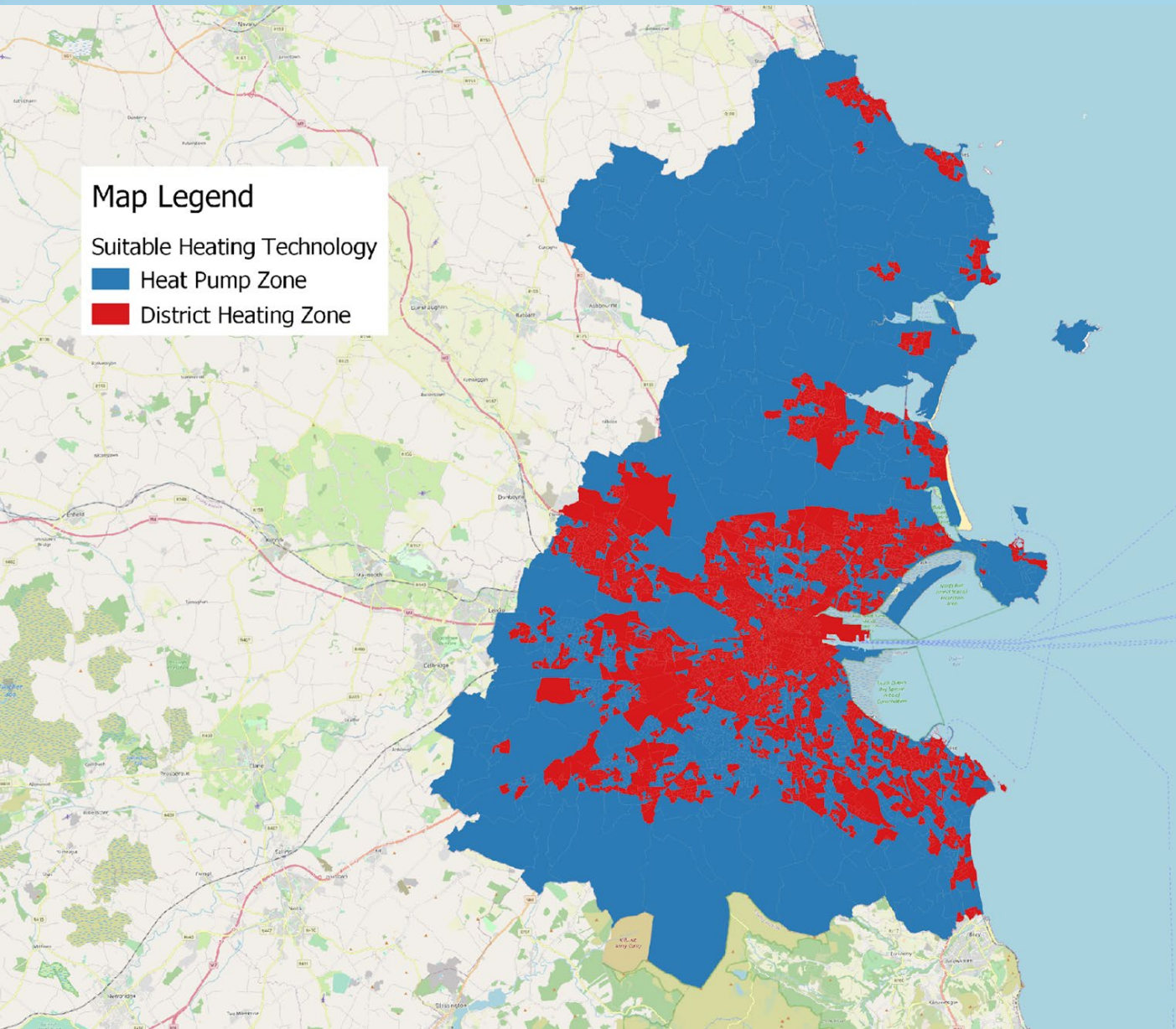
HEAT PLANNING/ZONING

Identify DH Zones & Pilot areas

- Local Authorities must now identify ‘Strategic Energy Zones’ & ‘Decarbonisation Zones’
- Overlap of high heat density & heat availability
- Areas of new development
- Areas with highest fossil fuel use



HEAT PLANNING – DH & HEAT PUMPS

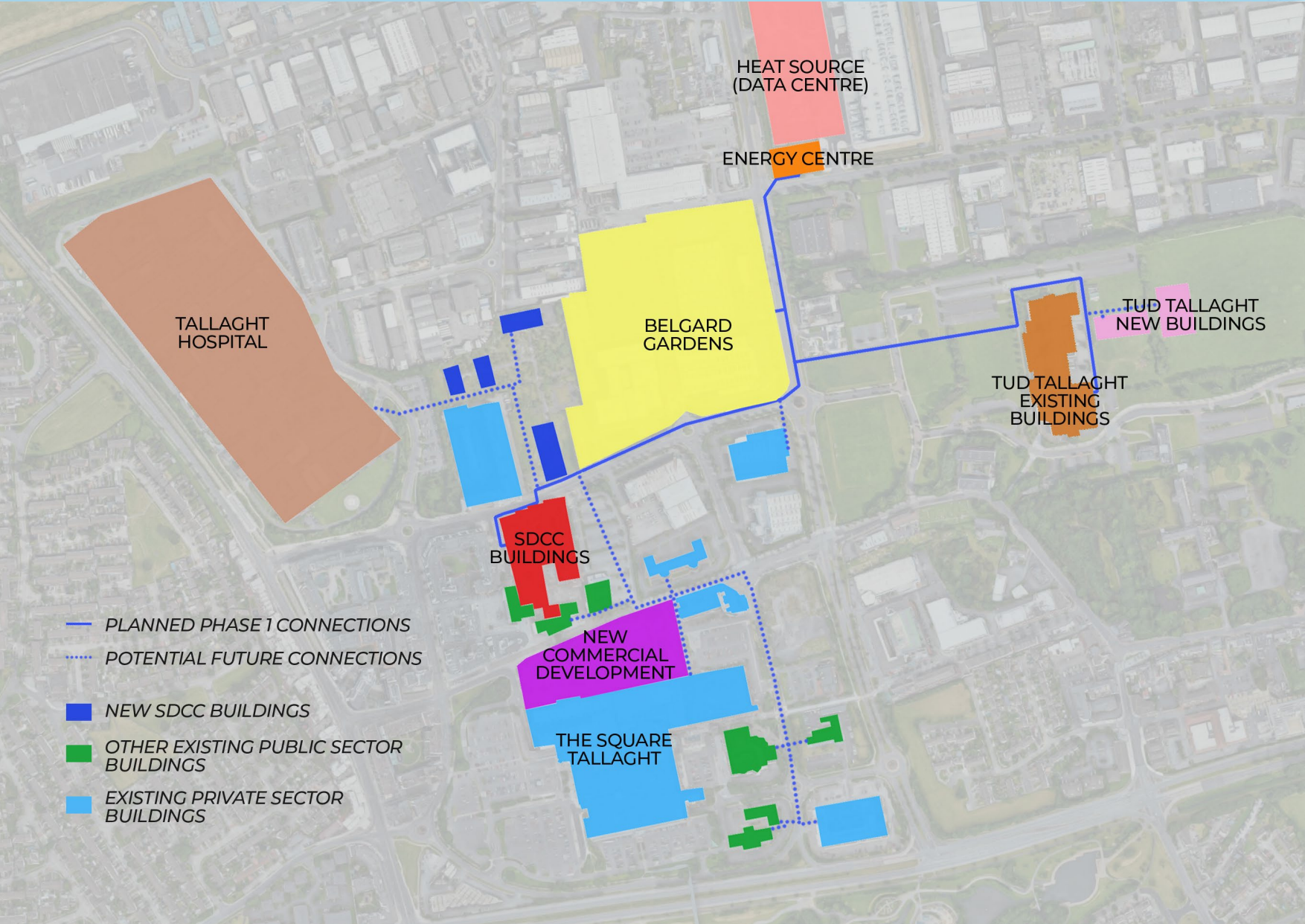


Heating Technology	% Heat Supplied
District Heating	70%
Individual Heat Pumps	30%

By 2030;

- 140,000 heat pumps
- 1,500km of DH distribution network

TALLAGHT DISTRICT HEATING SCHEME



Interreg
EUROPEAN UNION
North-West Europe
HeatNet NWE
European Regional Development Fund

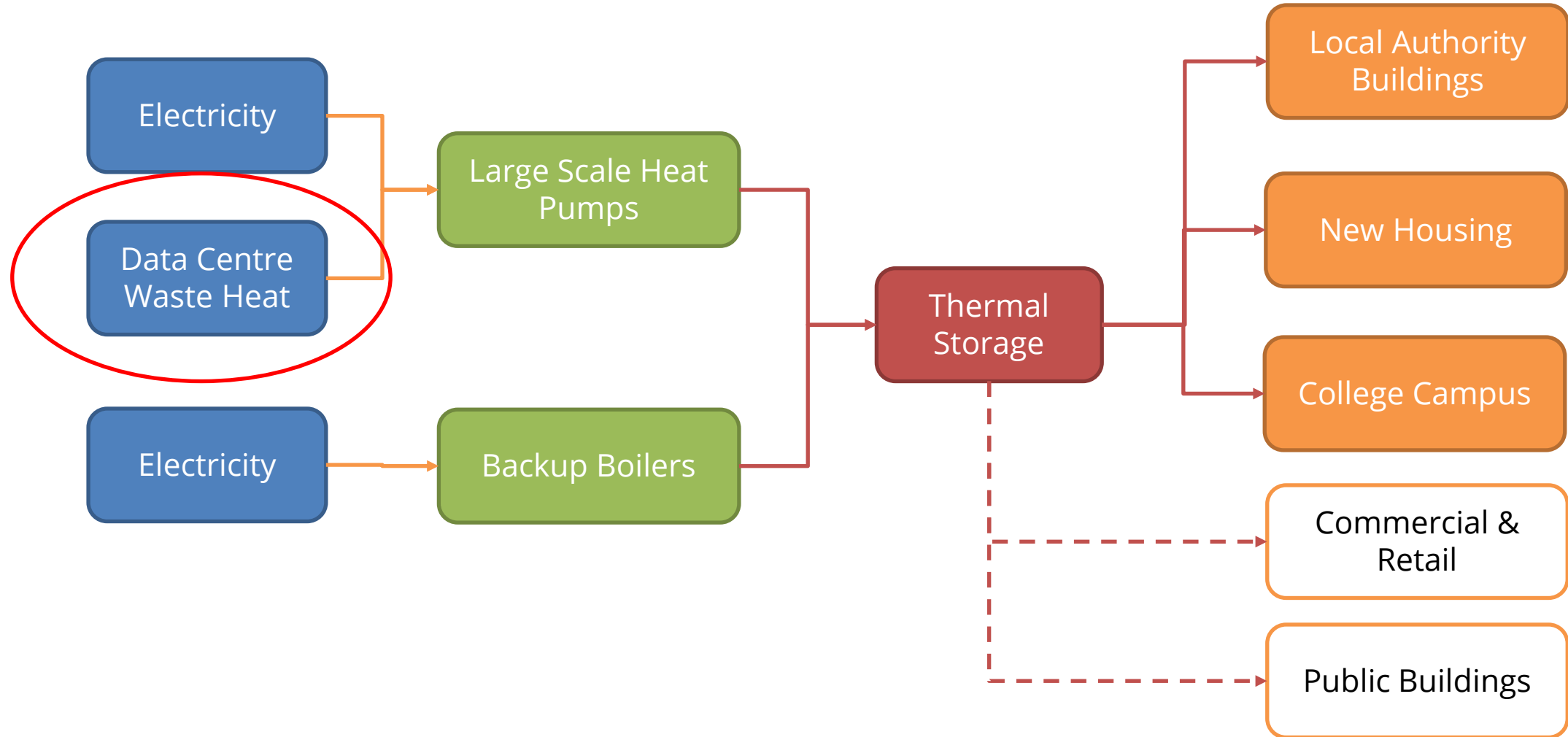


Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Key First Step - Local Policy to Support DH

- **Local Authority Planning Policy:**
 - **promote the development of waste heat technologies and the utilisation and sharing of waste heat in new or extended industrial and commercial developments**
 - support the development of low-carbon district heating networks across the County
 - support the development of both deep and shallow geothermal energy sources

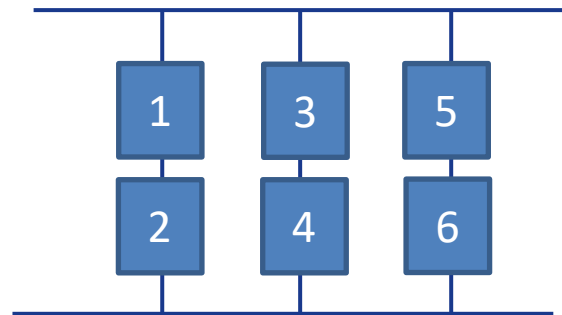
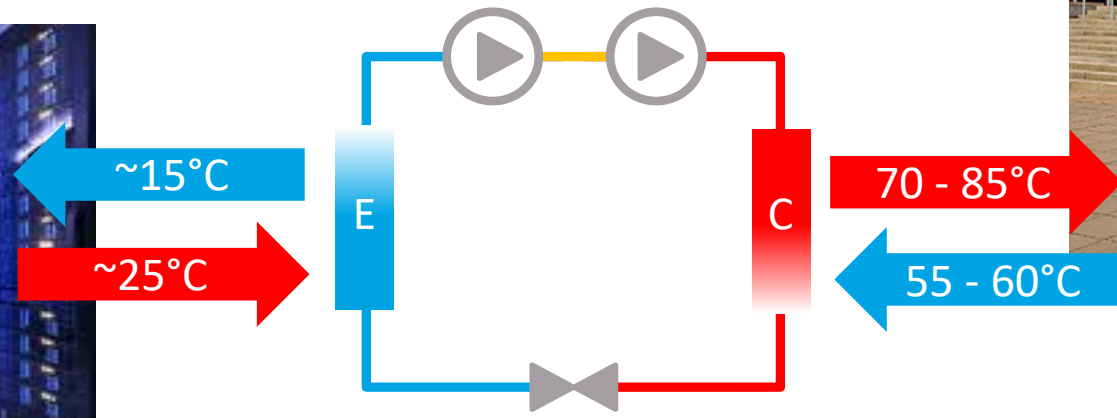
TALLAGHT DH DESIGN CONCEPT



TALLAGHT DH DESIGN CONCEPT

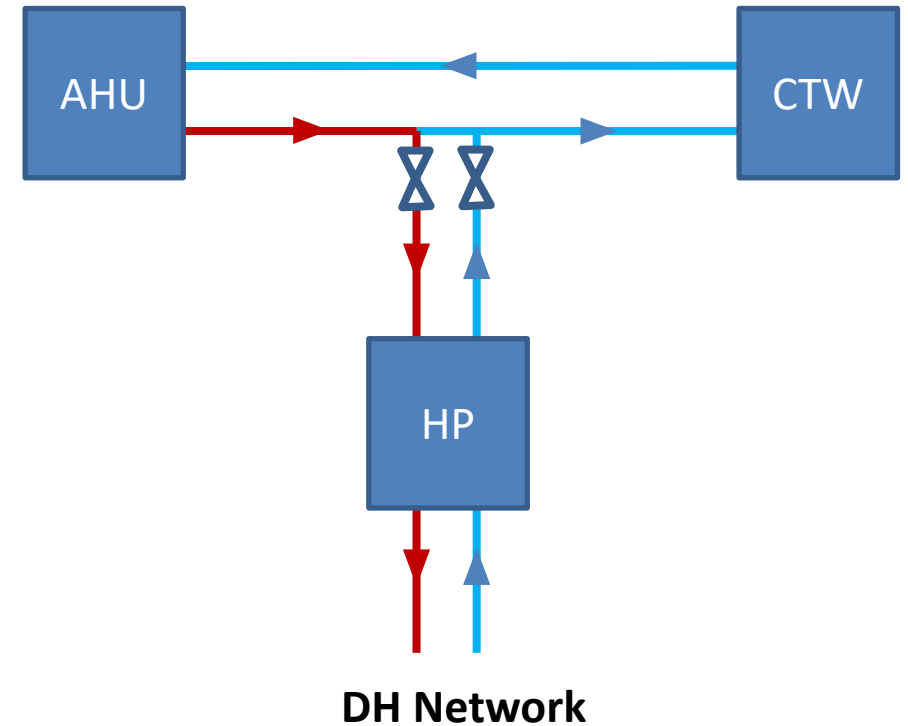


2-Stage Heat Pump



CONNECTING TO A COOLING SYSTEM

- Connect upstream of on-site cooling plant (chillers, CTW etc.)
- Reduced load/water consumption of chillers, CTW
- High combined efficiency delivering **both cooling and heating**

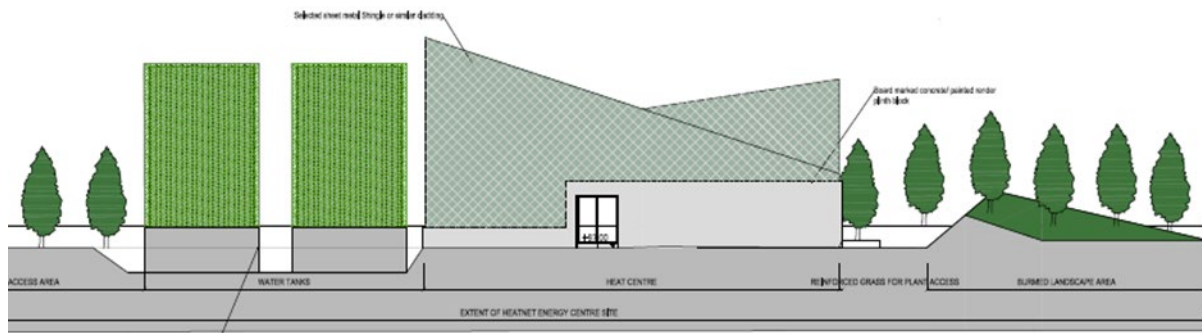


BENEFITS OF THE SCHEME



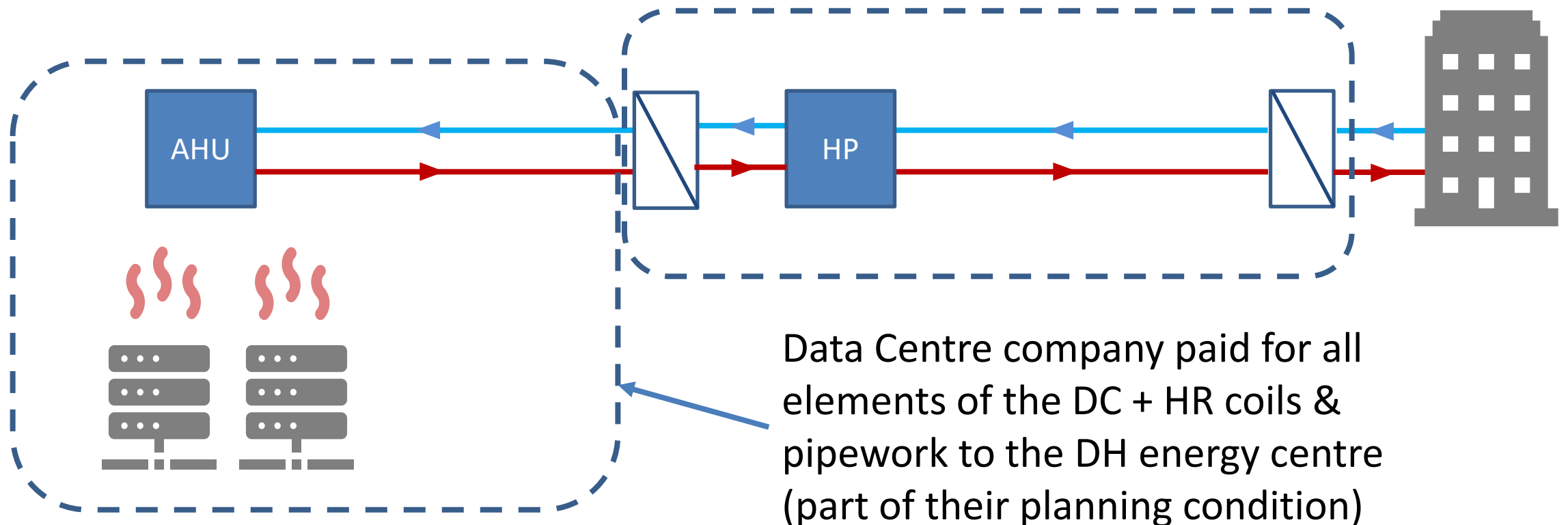
Energy System benefits:

- CO₂ savings of ~**1,400 tCO₂** per year for proposed Ph. 1
- Reduction in fossil fuel use for heating by **100%**
- Cleaner air – no particulates
- Utilises off-peak electricity
- Utilises waste heat which currently has no value
- Provides cooling as well as heating (high combined efficiency)
- Integrates electricity and heat networks – allows balancing of the grid, greater utilization of renewable electricity

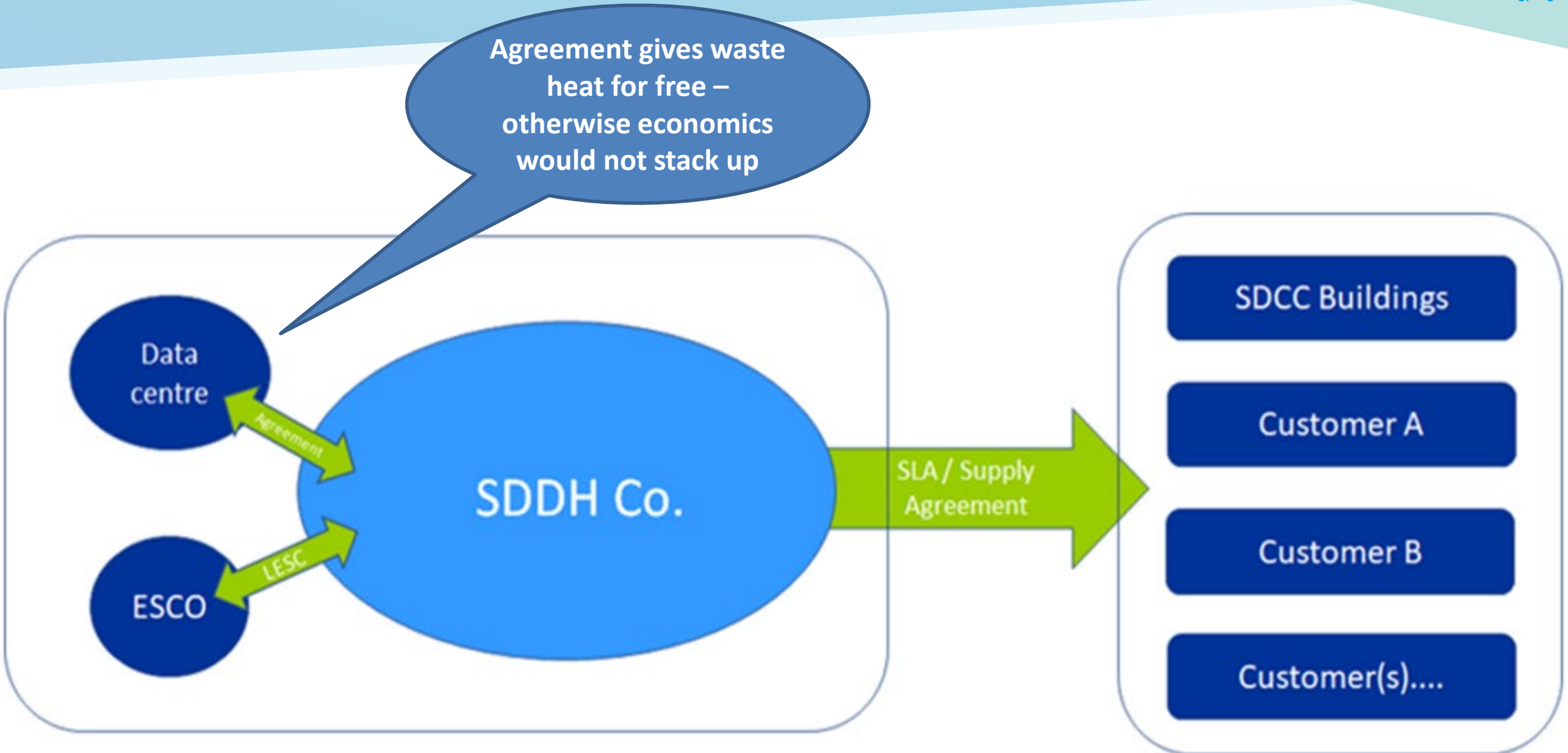


WHO PAYS/OWNS WHAT ELEMENTS?

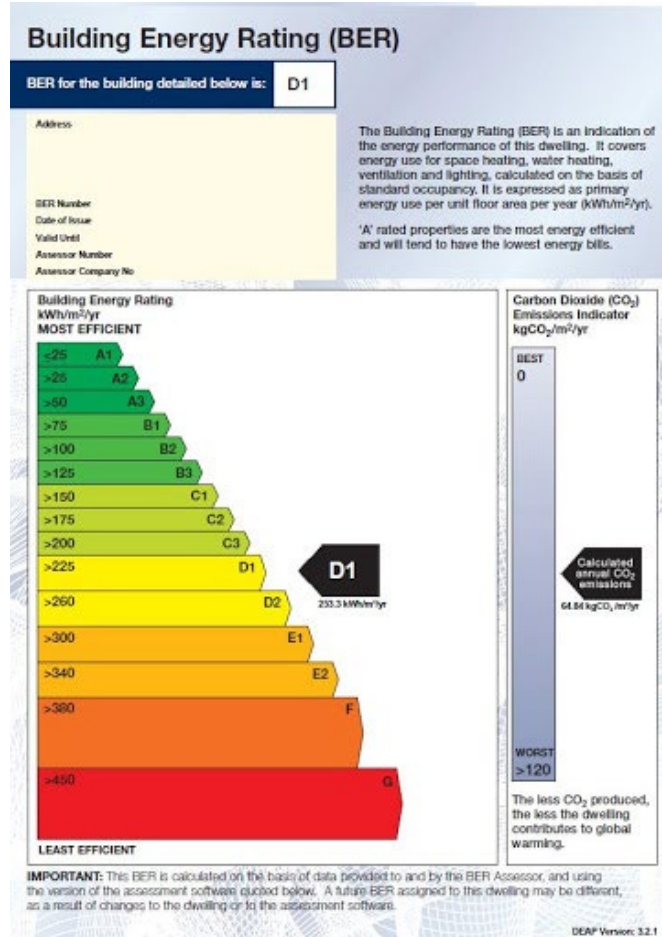
DH Co. pays for everything up to and including the HEXs (EC, network, EC equipment, building substations)



RELATIONSHIP BETWEEN STAKEHOLDERS



BENEFITS FOR BUILDING DEVELOPERS



Building Developer benefits:

- Cost-effective building regulation compliance – lower cost than the counterfactual
- Improved reputation
- Higher RE
- Trench sharing e.g. fibre optics
- Less noise
- No carbon monoxide or fuel leak risks
- Lower maintenance
- Provides low-cost (5 to 10%), low-carbon heat
- Space saving – plant and TS are off site

KEY SUCCESS FACTORS

- Local Authority role in planning – future-proof supply and demand **through planning conditions**
- Driven by **Local Energy Agency** with technical, policy and facilitation skills
- Local Authority '**Energy Champion**' to push project internally
- **Proximity** of Data Center to heat demand centre – cant be rural
- **Funding supports** – EU INTERREG, National Climate Action Funding, data centre investment, etc.

FOR MORE INFORMATION

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