



Developing 4th & 5th Generation District Heating within the UK

Interreg



EUROPEAN UNION

North-West Europe

HeatNet NWE

European Regional Development Fund



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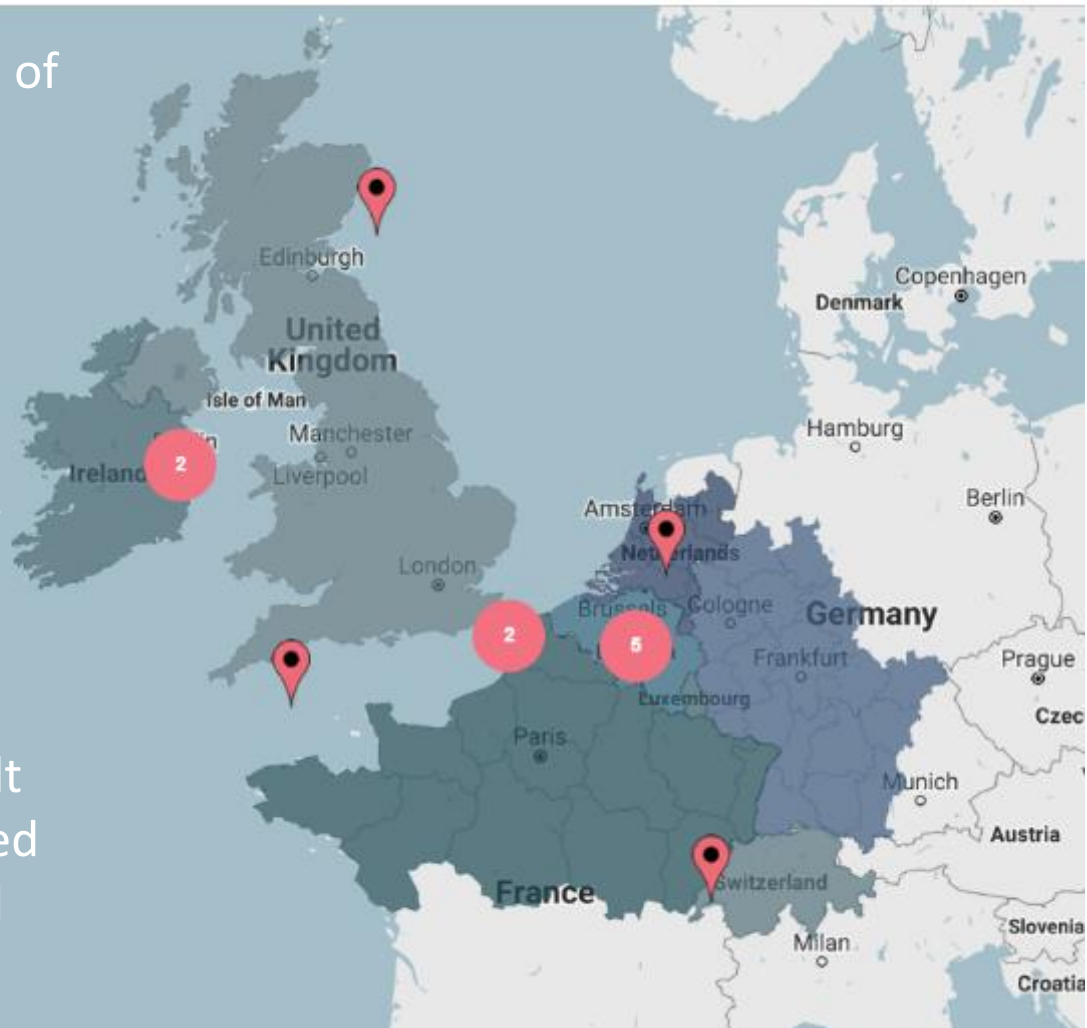


Topics Covered in Webinar

- The Heatnet Project
- 4th and 5th Generation district heating
- Plymouth Pilot
- Aberdeen Pilot
- Delivery and Engagement
- Future developments

HeatNet NWE project

The overall objective of HEATNET NWE is to introduce and demonstrate the 4th generation DHC (4DHC) in NWE. The concept requires the development of new institutional and organizational frameworks. The project will result in 15,000 t CO₂e saved per annum at its end



Project partners

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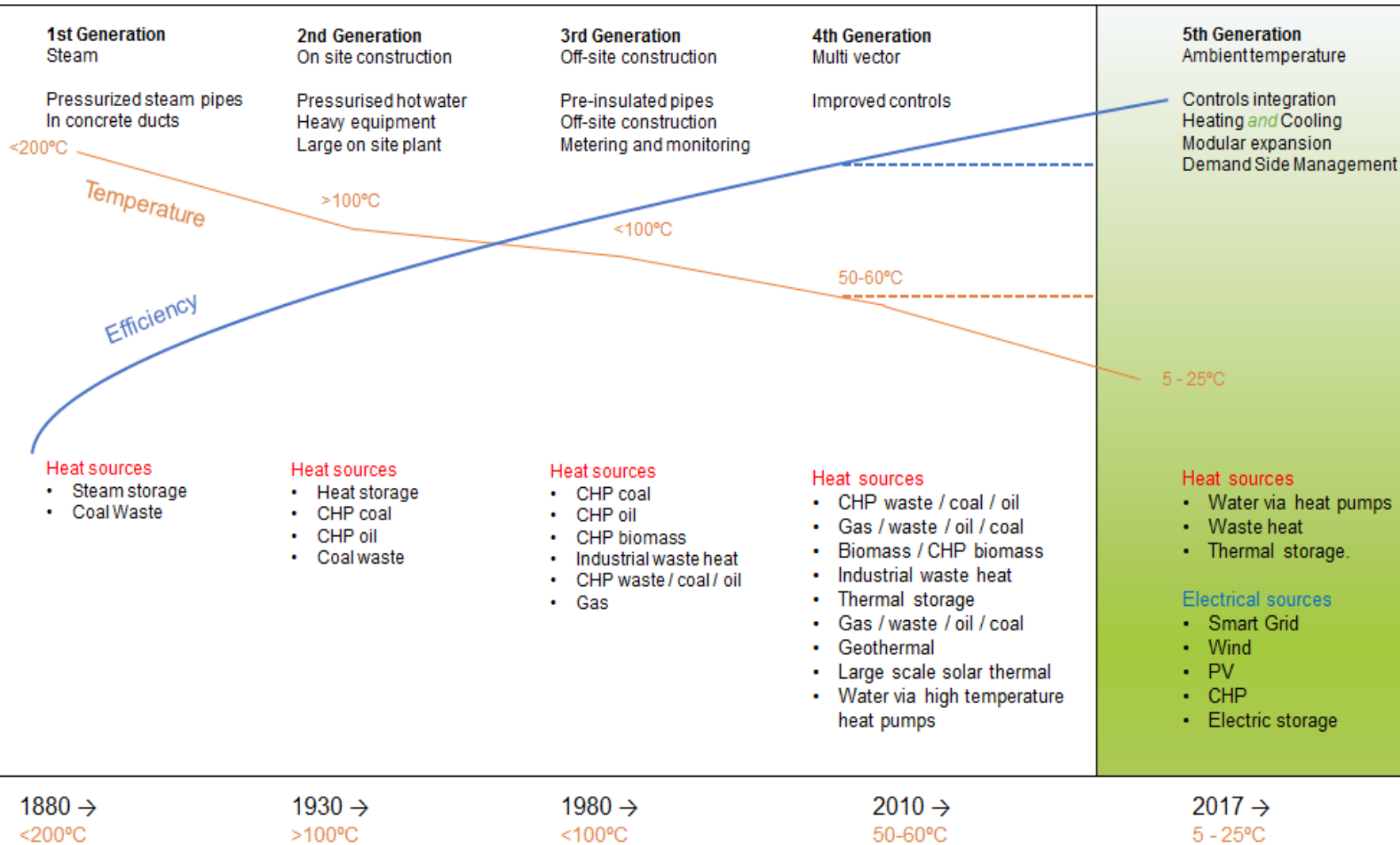


What is district energy?

- A network that provides heating, hot water and potentially cooling to several buildings
- It usually has centralised plant which produces hot water or cooling
- The hot water is usually circulated through a network of insulated pipes to each building
- Can change energy generation, use diversity of heat sources (including waste or renewable heat) and decarbonise over time more easily than individual building solutions



District heating Evolution



Heat network trends to lower distribution temperatures and higher efficiency

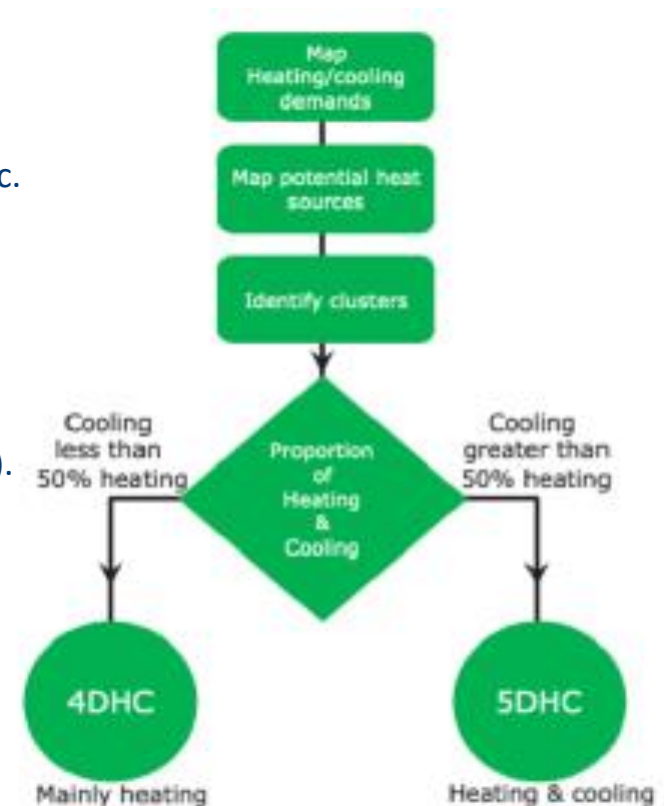
4th or 5th Generation District Energy?

4th Generation DHC

- Traditional centralised topology with energy centre(s) supplying heat.
- Supplying at around 55-45°C and return temperatures at @ 25-15°C
- Highly insulated, pre-insulated pipework that is more likely to be plastic.
- Usually needs supplementary boosting to supply DHW, and cooling would be a separate system.

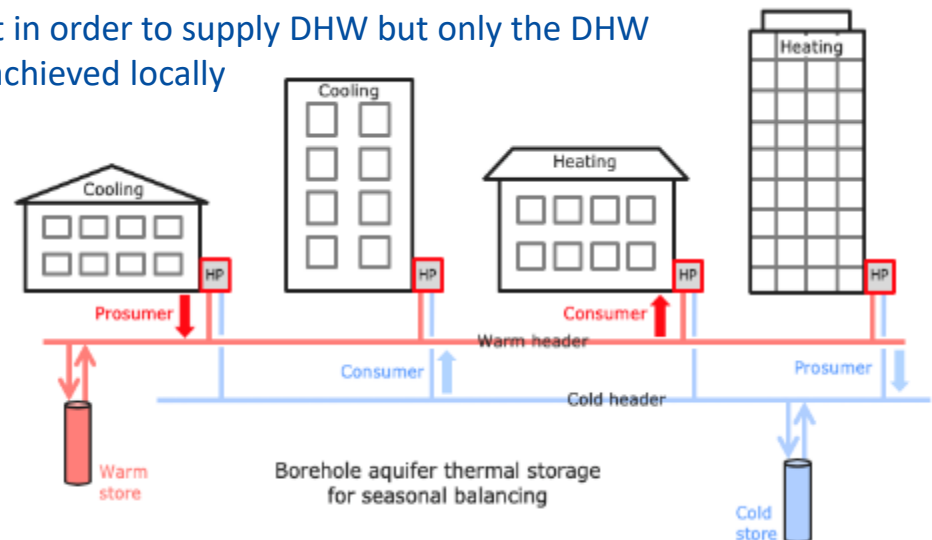
5th Generation DHC

- Non-traditional topology with decentralised plant (usually heat pumps).
- Ultra-low temperature headers in a spine/backbone. 5DHC often consists of un-insulated plastic pipework.
- Supply at <45°C, with return temperatures around 25-15°C.
- Usually includes seasonal thermal storage.
- Needs supplementary boosting to supply DHW temperatures.
- Built-in cooling supply and can interchange heating/cooling between buildings.



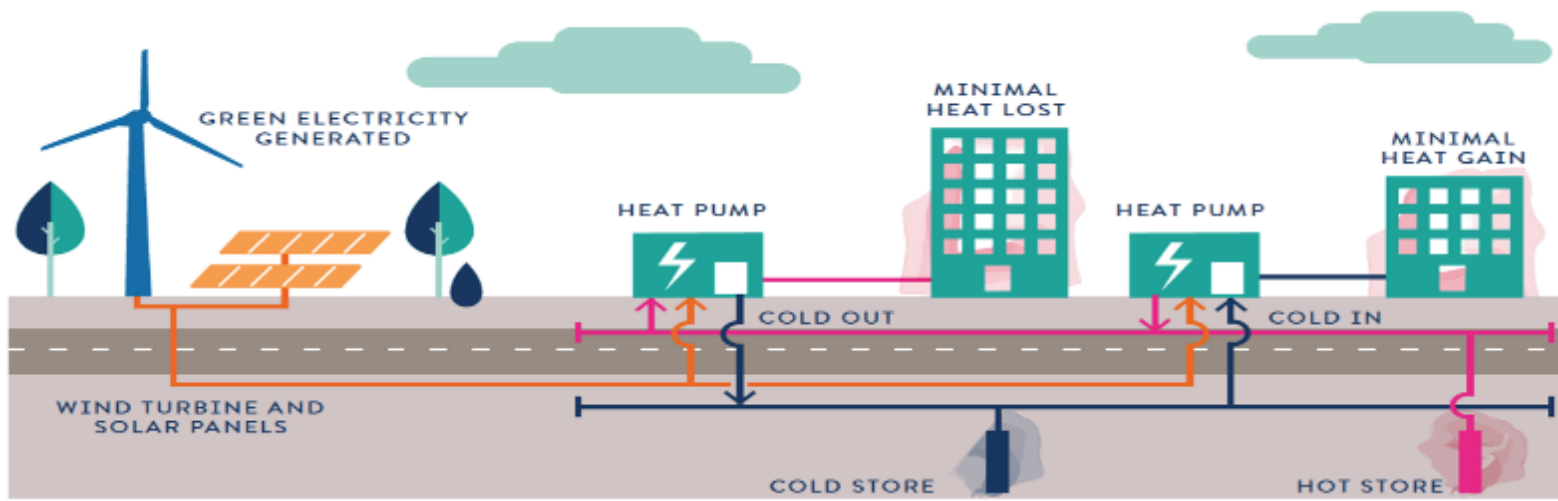
5th Generation District Energy

- 5DHC is the supply of heat along a spine with interchange of heating cooling between buildings and a balancing mechanism including seasonal thermal storage.
- Common two-pipe header system (spine) operating at even lower temperatures than 4DHC.
- The low temperature headers act as a heat source for multiple decentralised energy centres that take-out and feed-in heat.
- This approach also requires a means of balancing the heat in the headers, when all buildings are in heating mode for instance.
- The spine and long term thermal store become the heat source/sink for decentralised inputs and outputs of heat.
- Generally 5DHC would supply at less than 45°C (often closer to 30°C or less). . Return water temperatures may therefore be designed to be around 25-15°C.
- 5DHC will always require a temperature boost in order to supply DHW but only the DHW volumes need to be boosted and this can be achieved locally

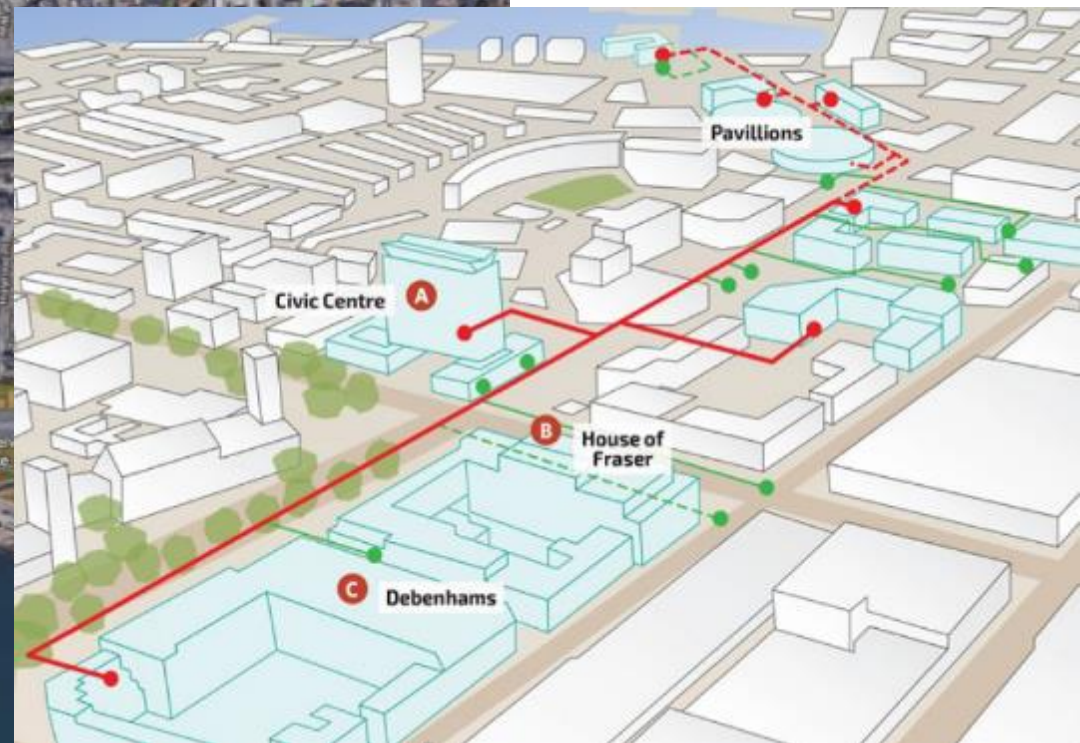
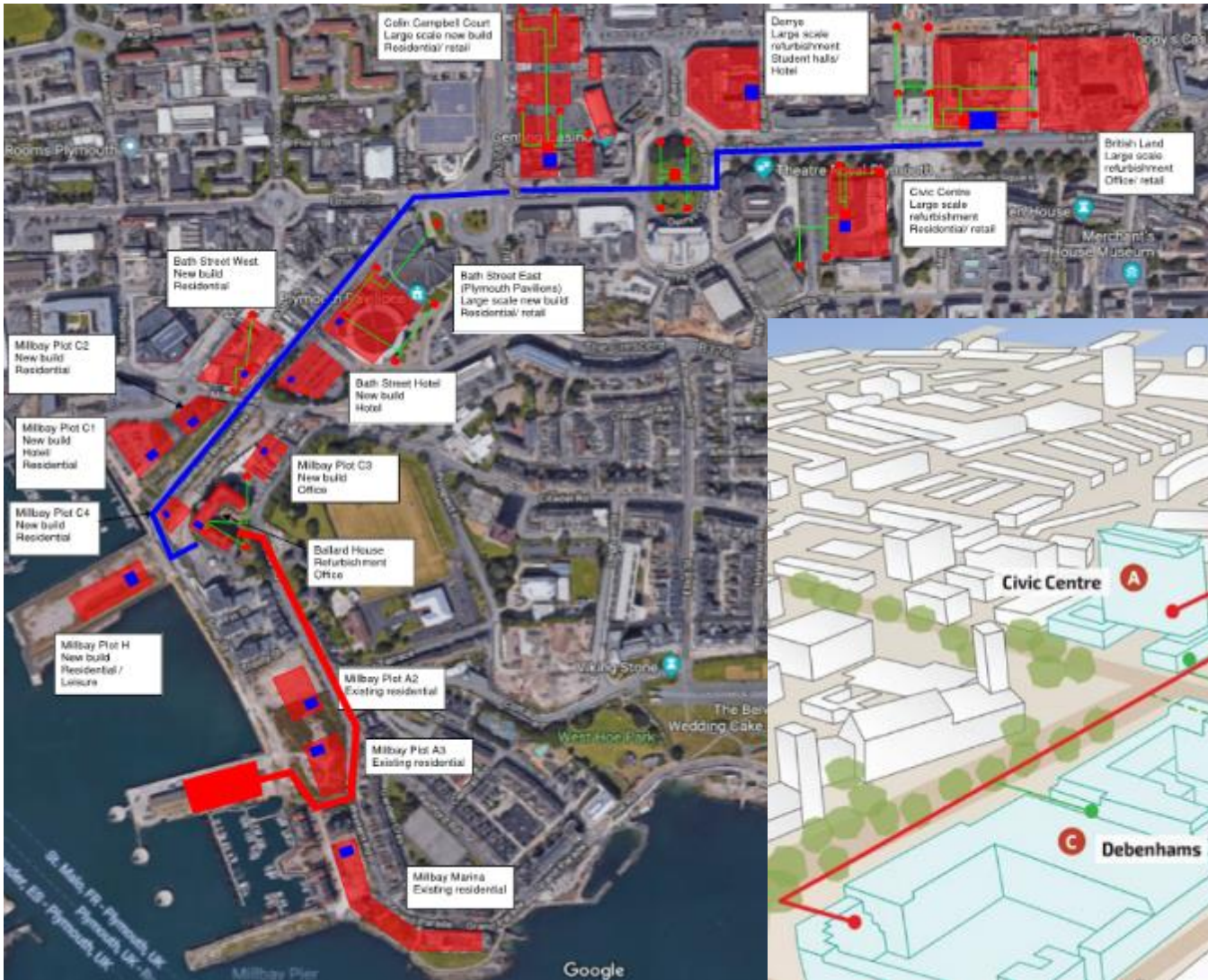


5th Generation - Benefits

- Resilient to climate change- cooling and heating
- Rejected energy recovered and shared, reducing primary energy
- Helps buildings achieve future compliance
- No flues or emissions- air quality benefits
- Flexible- plug and play (decentralised)
- Allows greater use of renewable energy and waste heat sources
- Opportunity to offer 'grid services' to electricity network



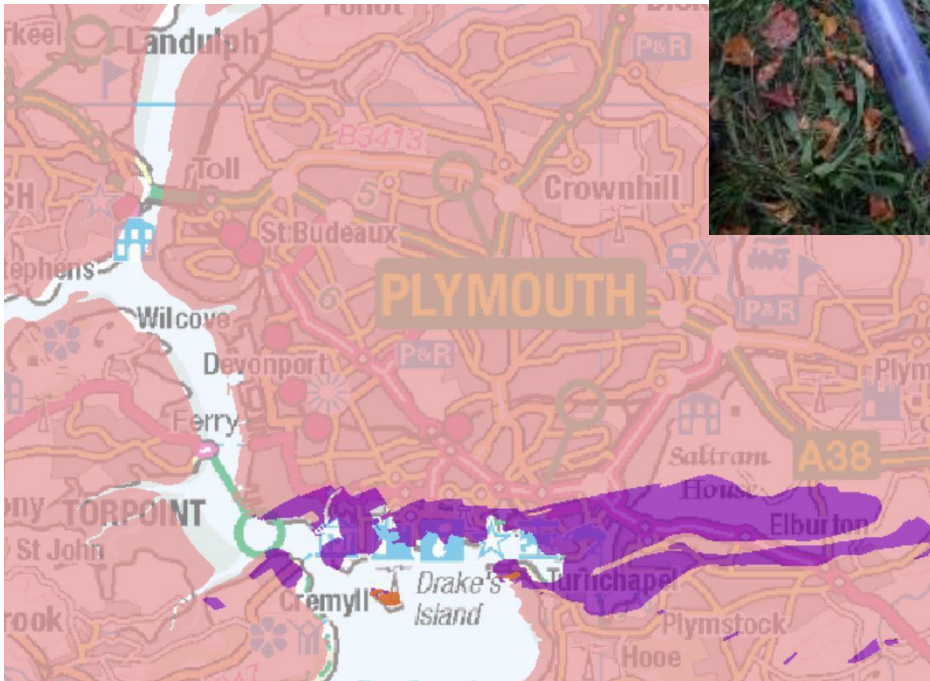
Plymouth Pilot



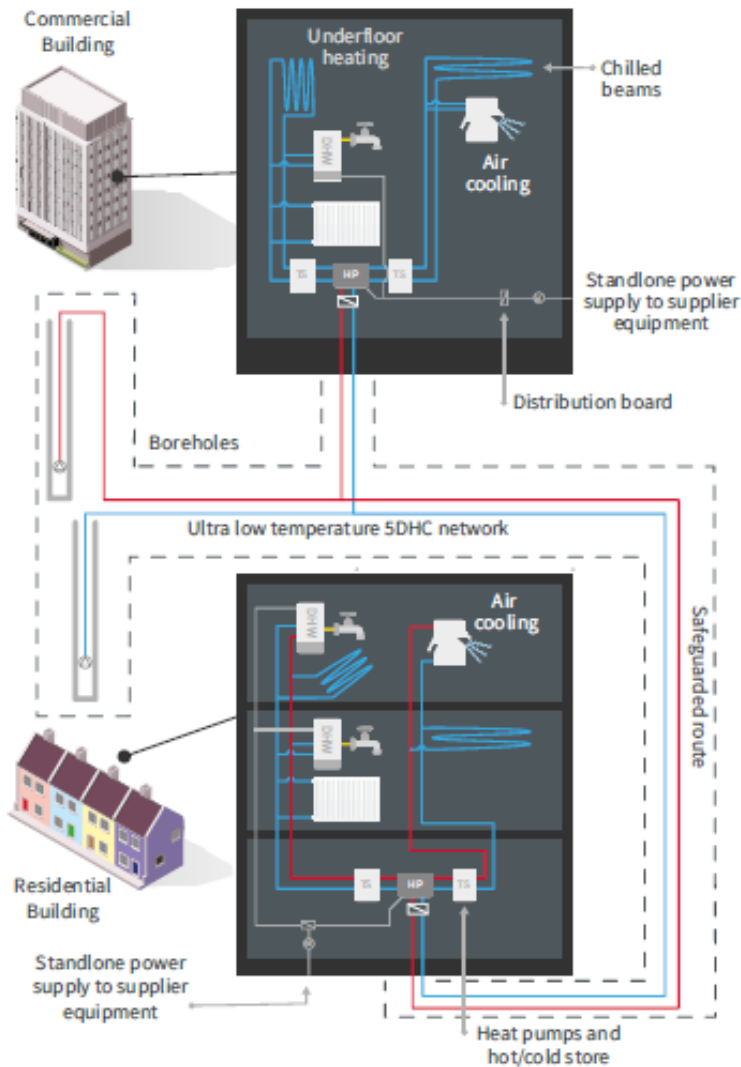
Plymouth Pilot

Aquifer Bedrock

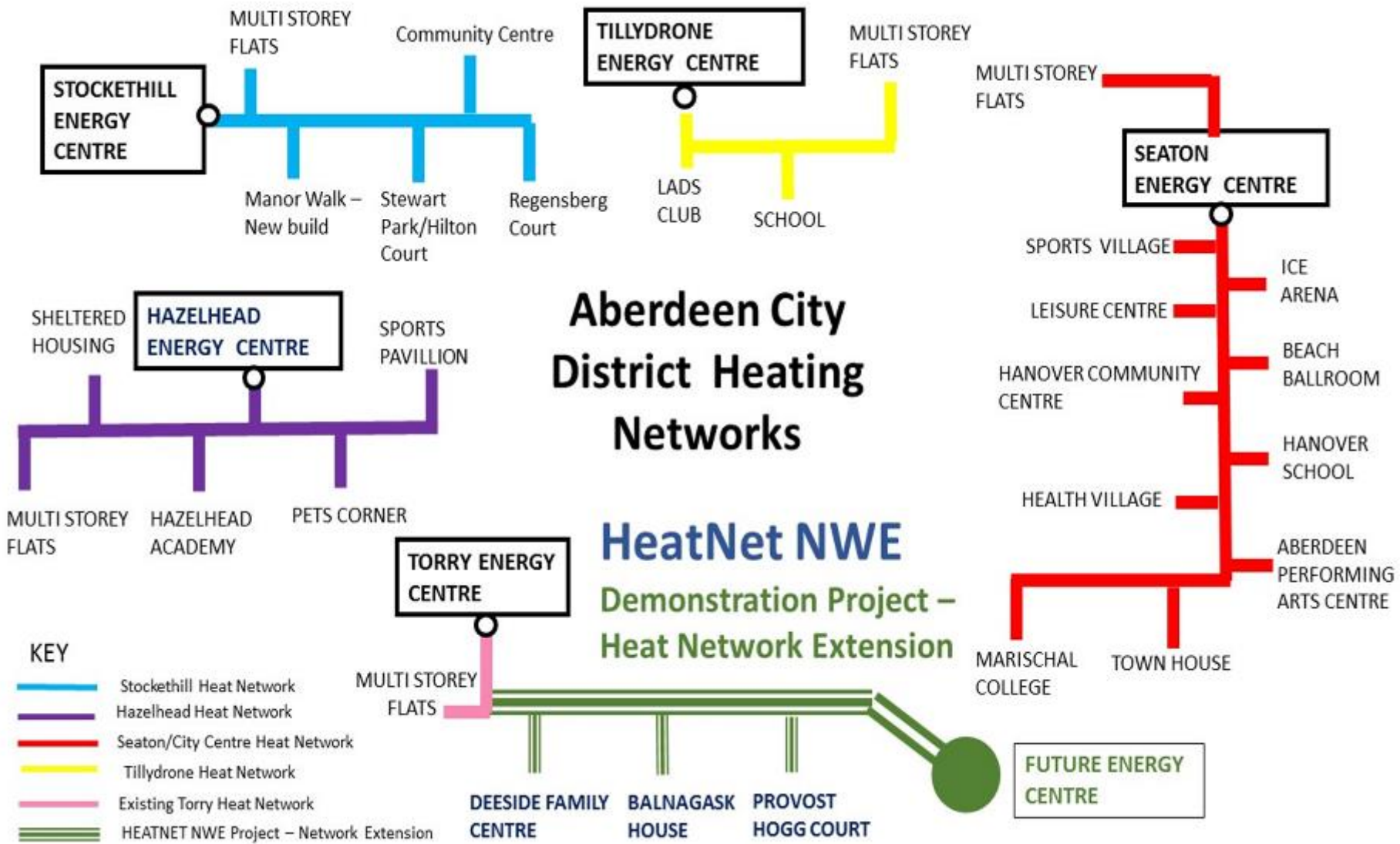
-  Principal
-  Secondary A
-  Secondary B
-  Secondary (undifferentiated)



Plymouth Pilot



Aberdeen City District Heating Networks



KEY

- Stockethill Heat Network
- Hazelhead Heat Network
- Seaton/City Centre Heat Network
- Tillydrone Heat Network
- Existing Torry Heat Network
- HEATNET NWE Project – Network Extension

Aberdeen Pilot



Aberdeen Pilot



Aberdeen City Centre

- In addition to pilot , city centre businesses were approached to look at interest on connecting to district heating .
- Identifying the ownership of city centre properties provided challenges
- Speaking to owners at a very early stage has advantages and disadvantages.

Aberdeen City Centre

- Some interest from Businesses
- Main message from contact was to get back in touch once there was a definitive plan, and a network that was close enough to connect.
- Concerns that arose included :
 - Associated Costs & Investment required
 - Disruption
 - Timescales involved
 - Uncertainties when development would take place (business planning)

Aberdeen City Centre

Complexities of connecting to businesses:

- Owner/ commercial tenant / factor or management agency control
- Identifying the correct decision maker
- Long term commercial business plans
- Current contractual energy agreements

Development Challenges

- Societal change is needed to fully develop district heating within the UK
- This can be encouraged by the need to reduce CO₂ emissions within the UK
- Conventional heating within UK single boiler in individual premises – Changing the mind-set of this approach.
- Changing attitudes to communal heating.

Q&A



Any questions?

Keep in touch:



Visit the HeatNet webpage: www.nweurope.eu/heatnet

- Policy recommendations
 - Guides for Public Sector Organisations and Energy Companies to develop District Heating in North-West Europe
 - Guide to Integrating 4DHC with Energy Efficiency Retrofitting
 - Procurement Guide for 4th Generation District Heating and Cooling
- Comin soon: a heat mapping guide and a guide to energy management!

Join the Final conference in Heerlen (Netherlands) on 22-24th April 2020, part of “Cities and Citizen Energy Forum” (Energy Cities Annual Conference)!

Meet us at the event: “North West Europe making an impact” in Tourcoing (France) on 4-5th December.

More webinars and events to come too!

Contact us!



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Thank you!