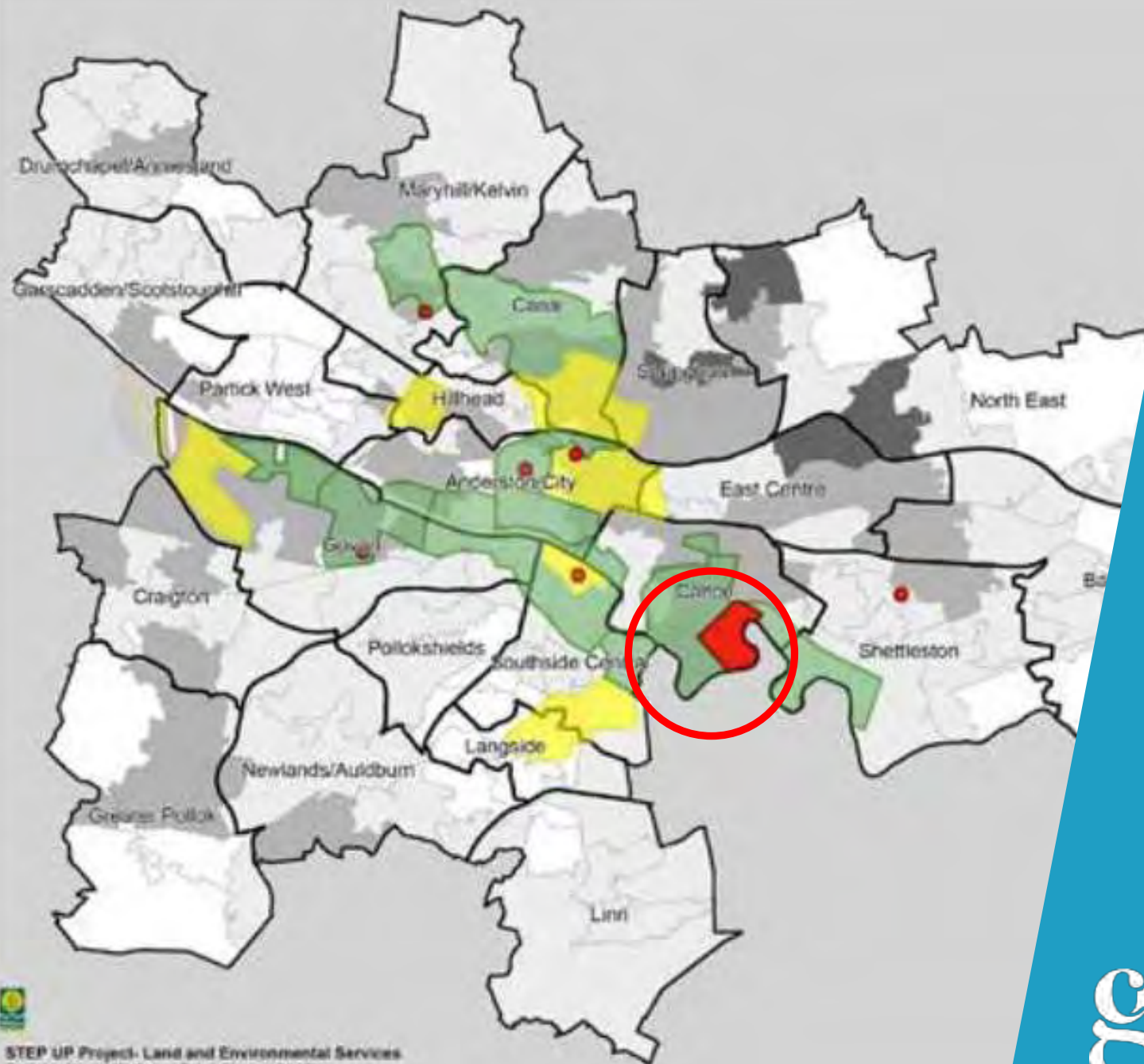




Clyde Gateway Energy Projects

D2 GRIDS

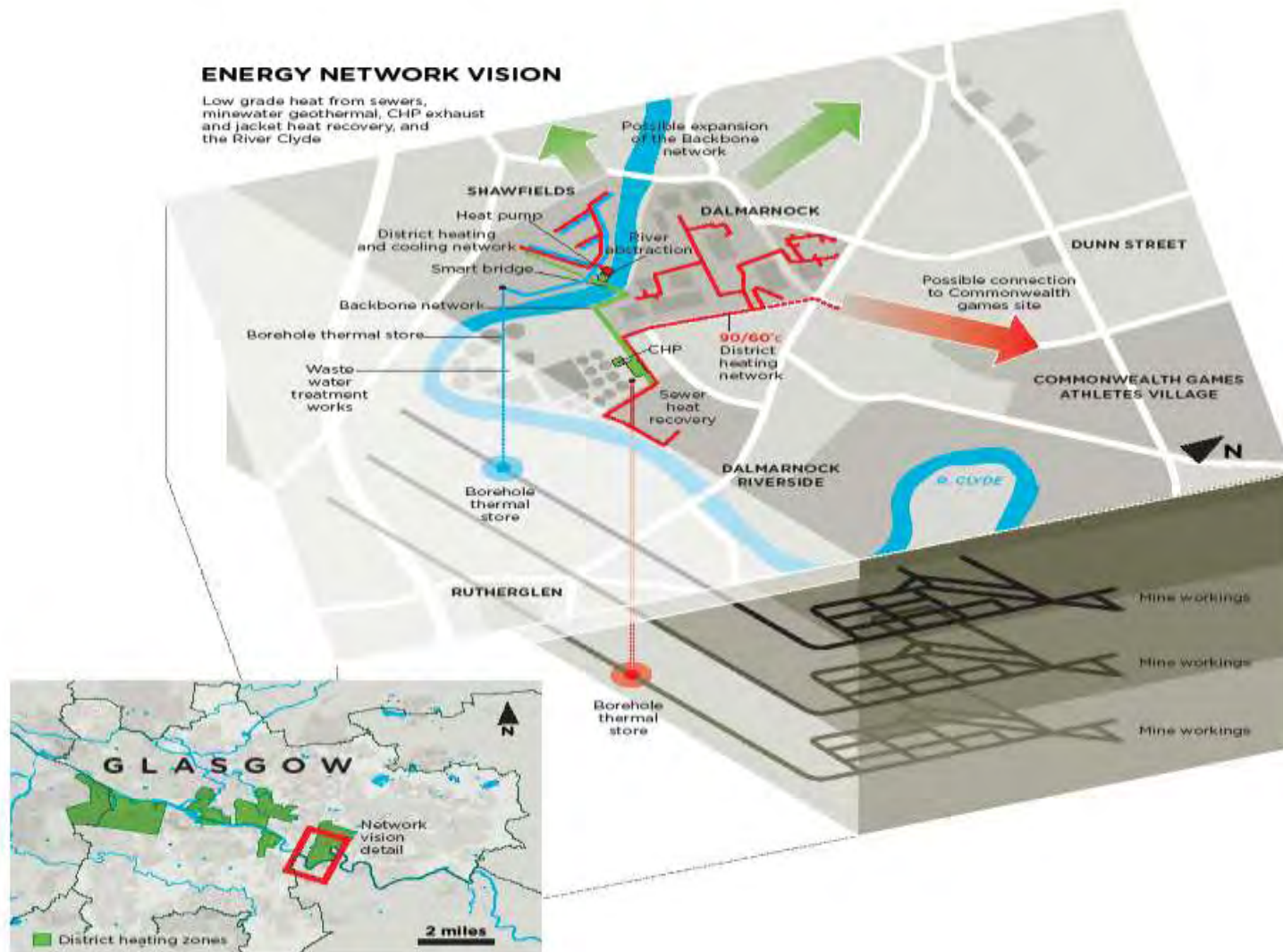
Context Sustainable Glasgow



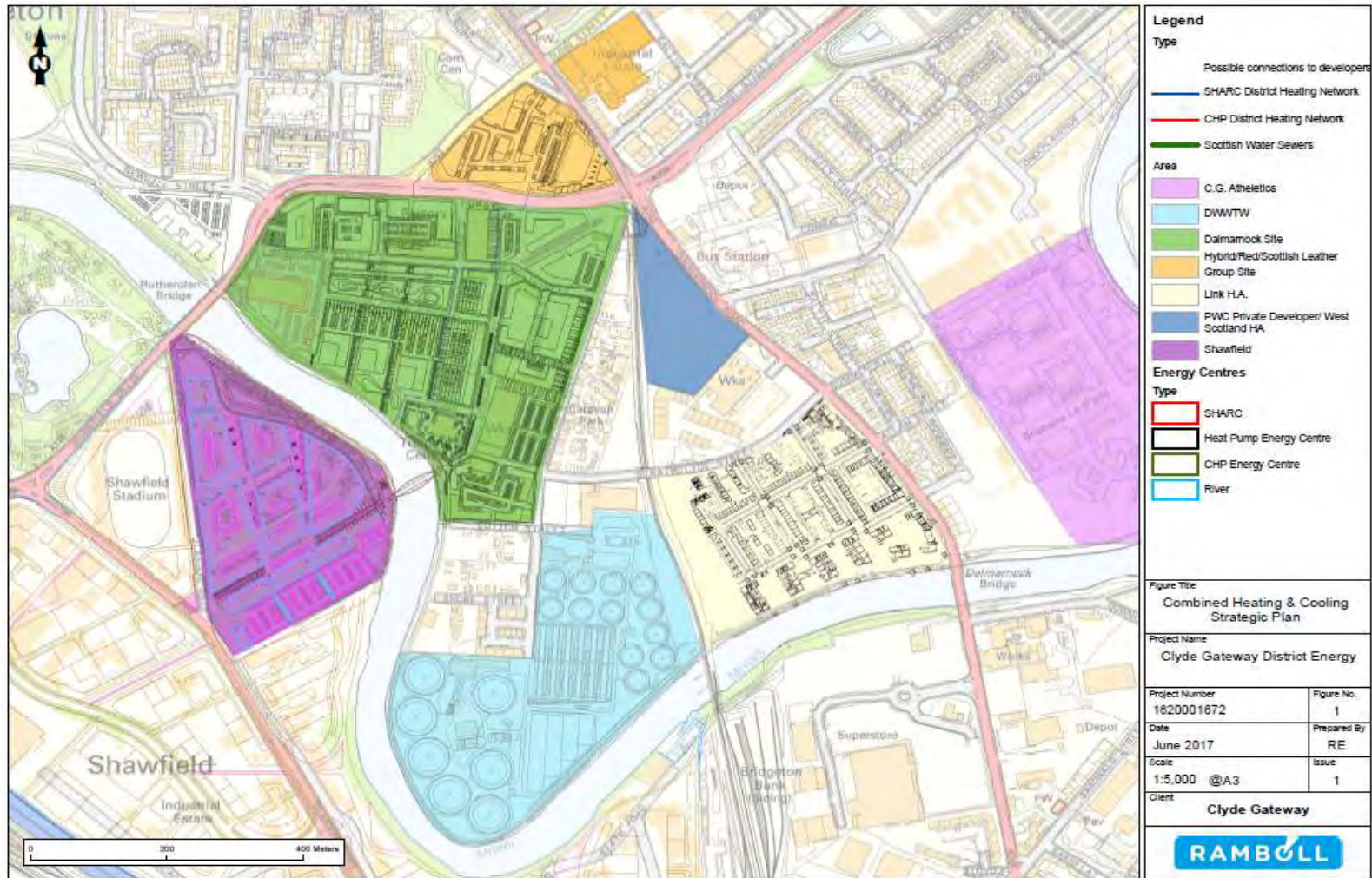
Energy & Carbon Masterplan

- Scottish Power - E & CMP 2012
- Green Regeneration Innovation District
- Climate Change Acts 2009 & 2019
- Local energy generation & resilience
- Heat Networks and Heat in Buildings Acts
- Local Heat & Energy Efficiency Strategy (LHEES)
- Local Energy System Scotland Industry Forum (LESSIN)
- Clyde Mission

OPPORTUNITY FOR DEVELOPING DISTRICT HEATING & COOLING

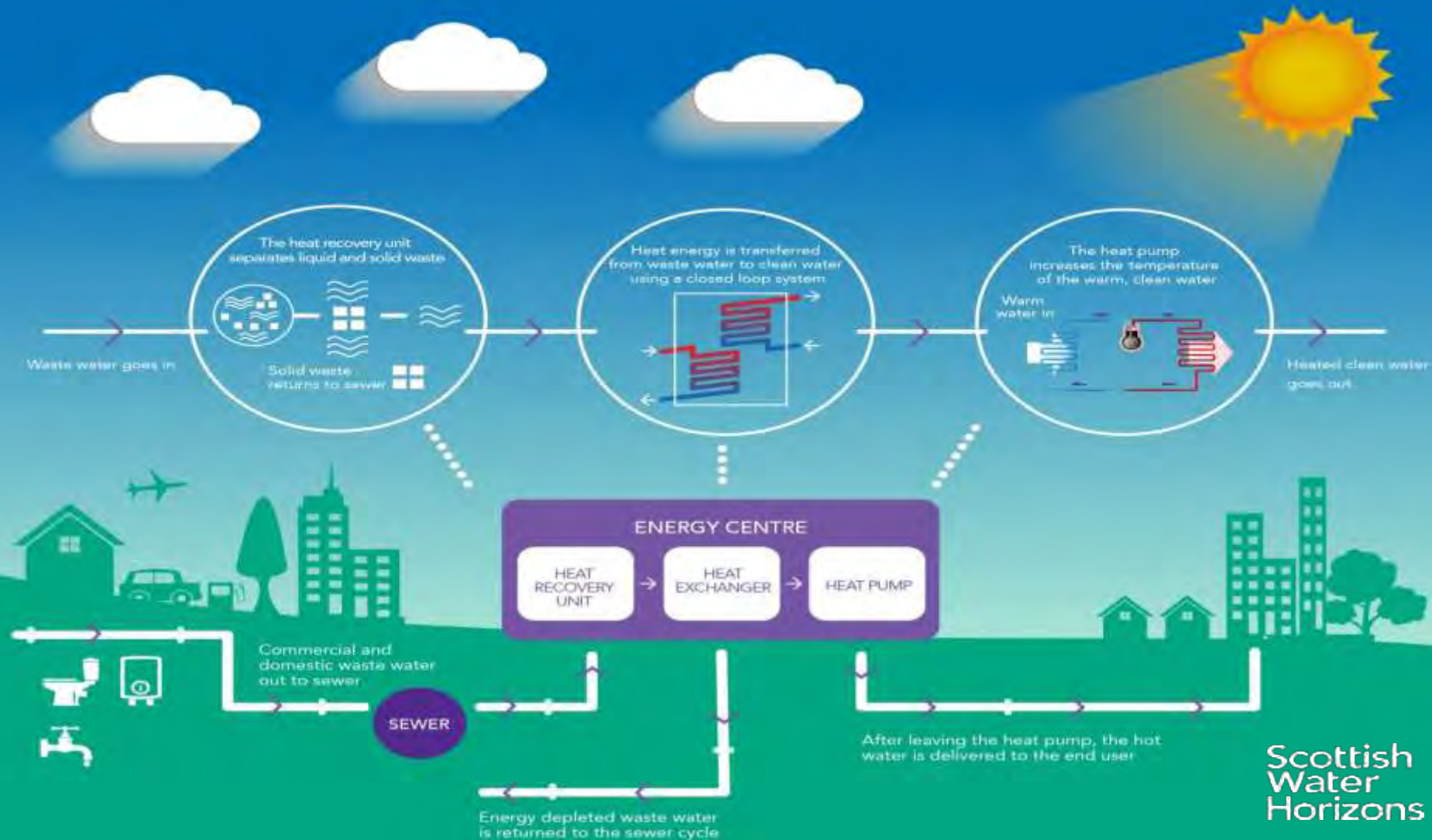


ENERGY PROJECT AREAS



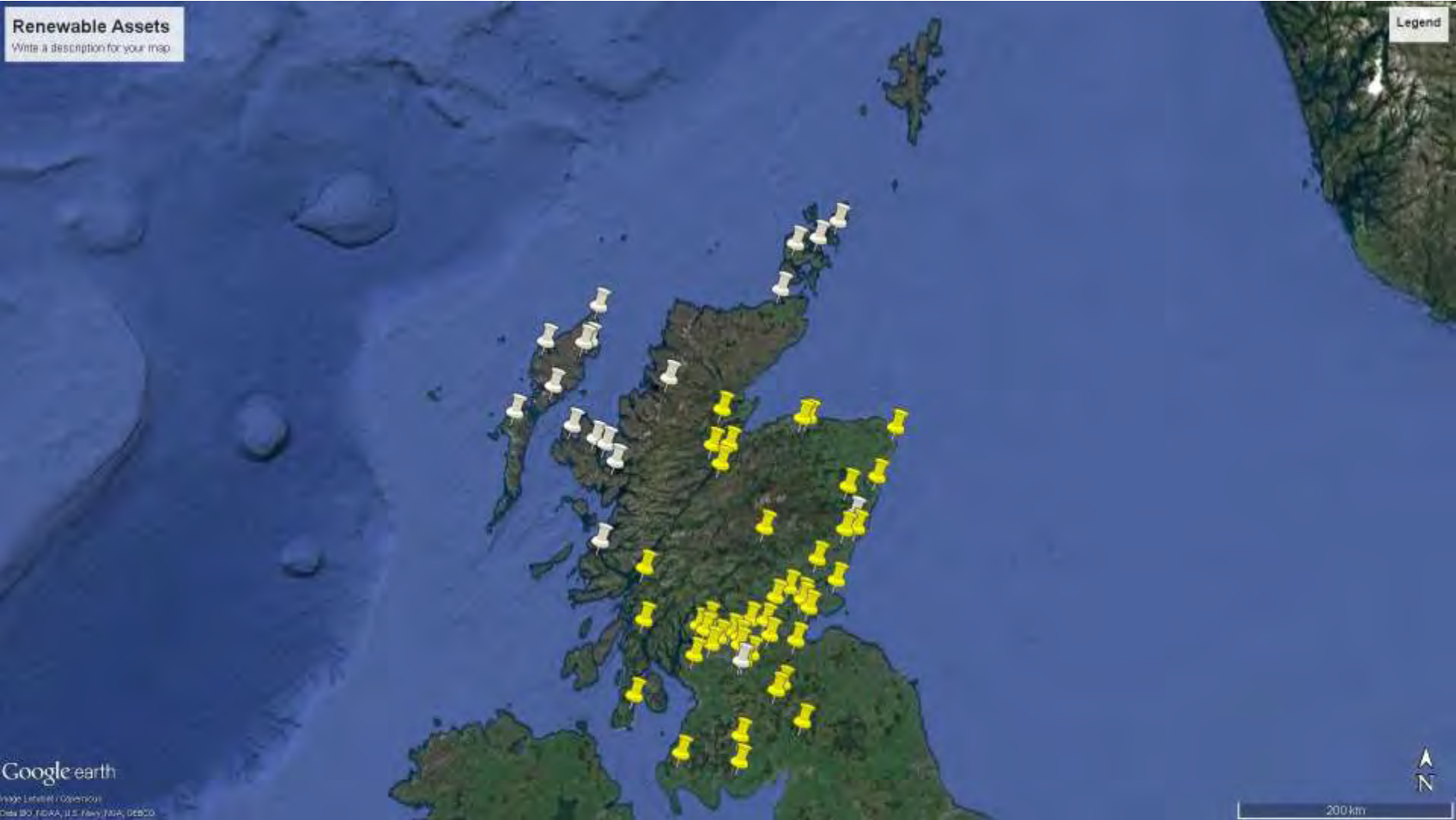
Community Energy Project



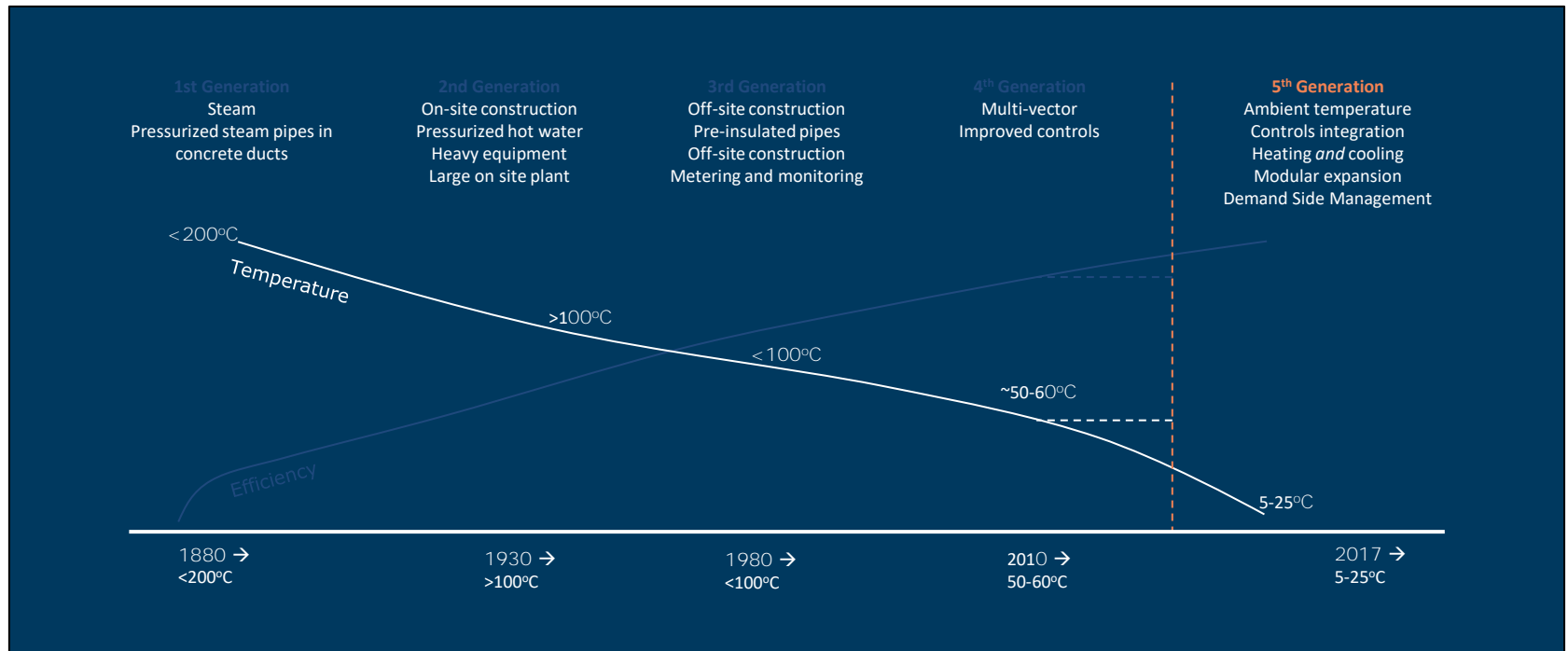


Renewable Assets
Write a description for your map

Legend



5th generation continues the temperature and efficiency trends but breaks from tradition



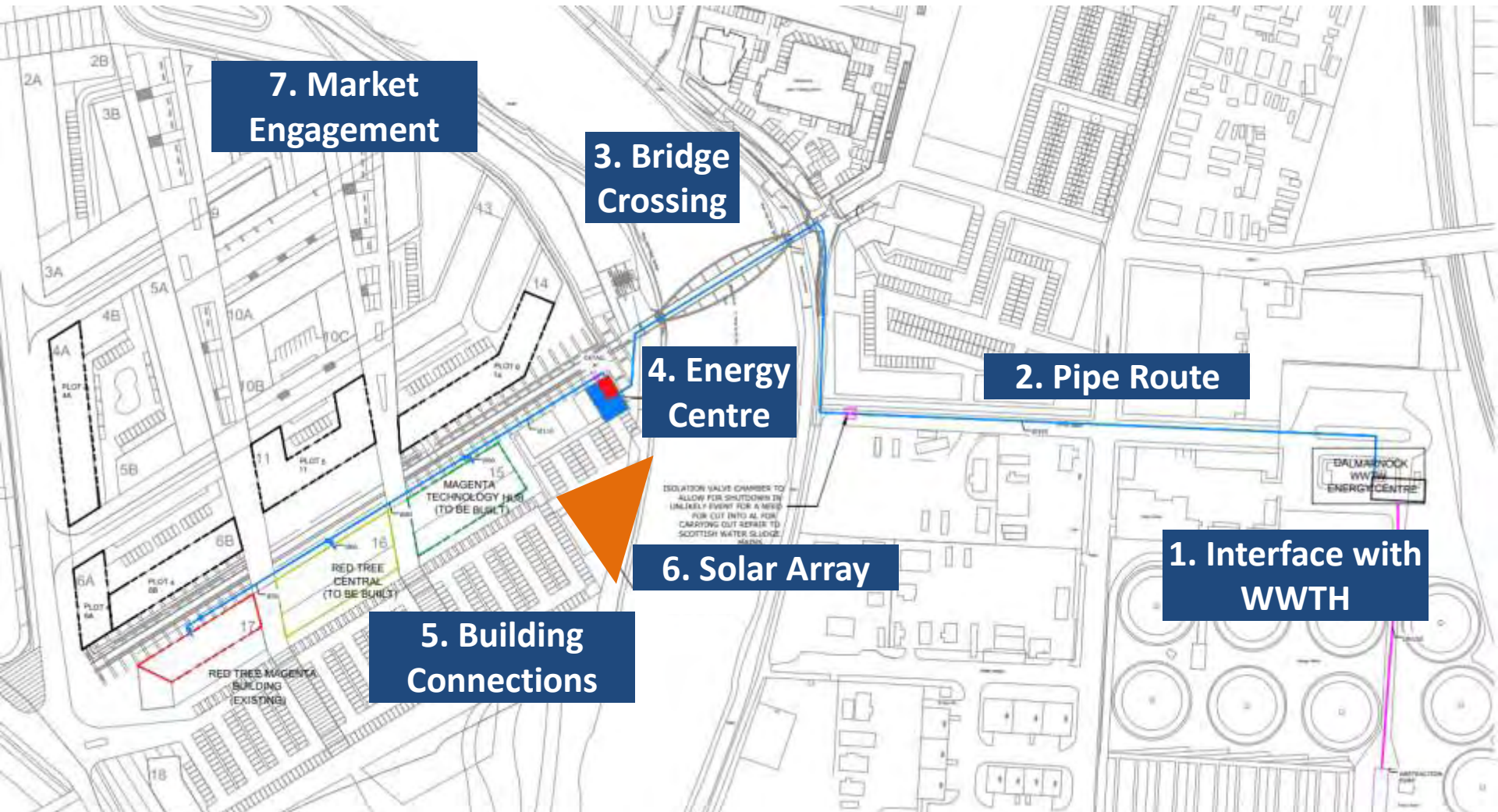
Source: CIBSE (2019) Intranets for heat: Introducing BEN networks



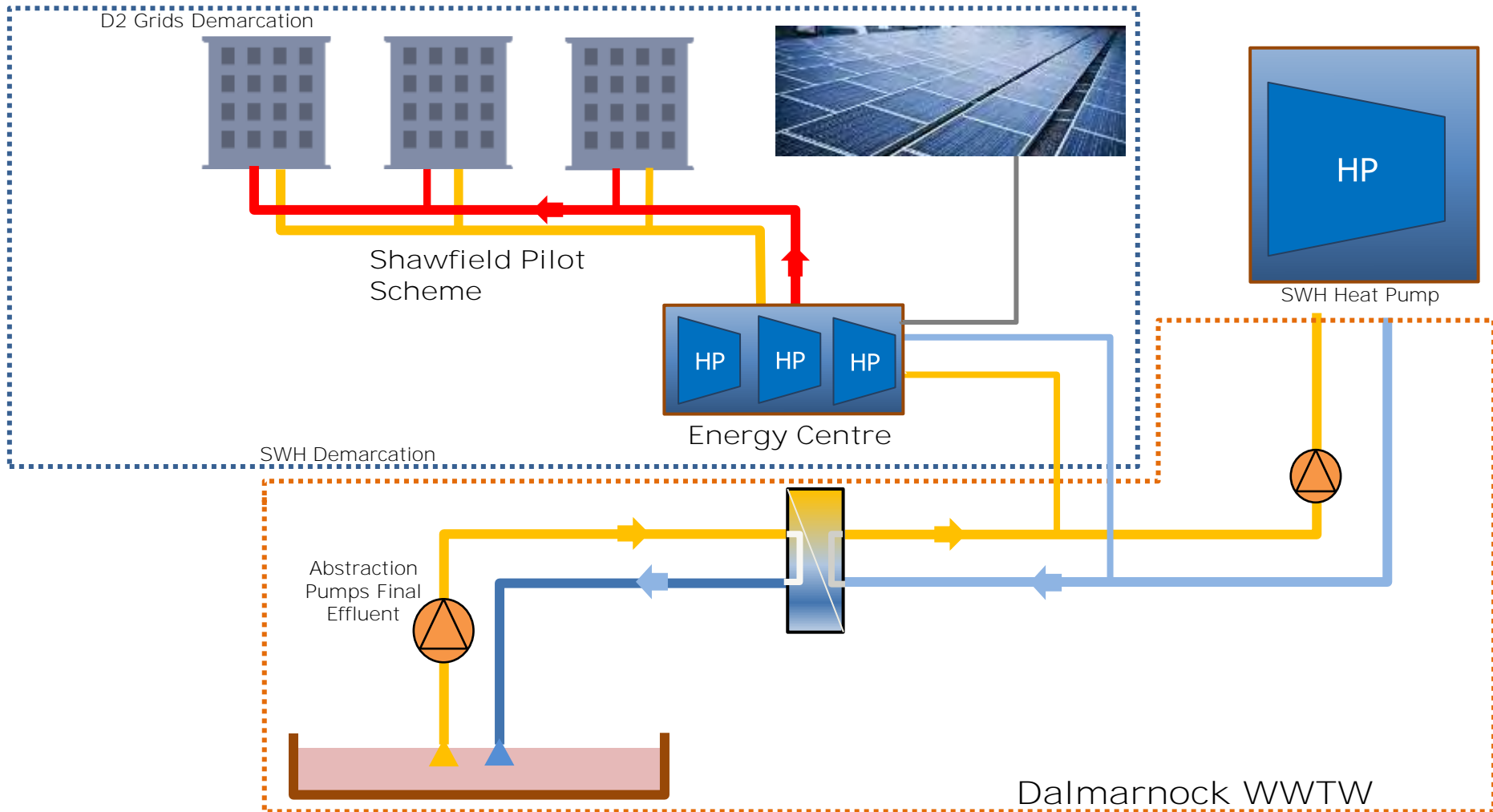
Infrastructure



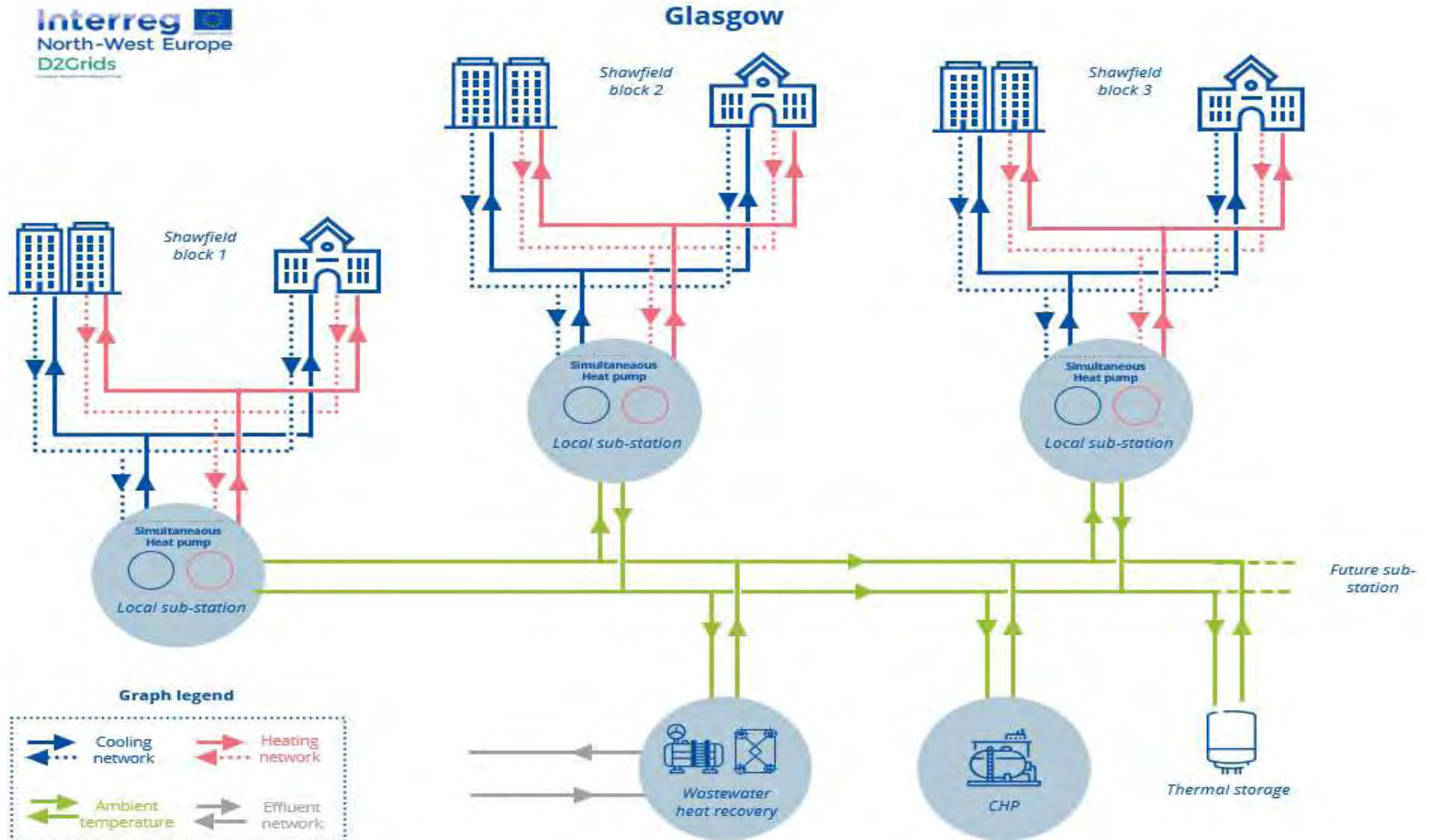
PROJECT DELIVERABLES SITE PLAN



PROJECT DELIVERABLES



D2 Grids Schematic



Key Performance Indicators for 5GDHC

Principle 1 - Closing the Energy loop

KPI 1.1 Measuring the self sufficiency of the DHC system

KPI 1.2 Measuring the % of energy supplied from external sources to meet demand

Principle 2 - Low grade sources for low grade demand

KPI 2 Measuring the quality of energy used to match the supply with demand

Principle 3 - Decentralised demand driven energy supply

KPI 3.1 Quantifying the demand drivenness of the system for heating and cooling

KPI 3.2 Quantifying the decentralisation of the system

Principle 4 - Integrated approach to energy flows

KPI 4.1 & 4.2 Measures installed capacity v virtual minimum capacity for heating and cooling integration with other sources

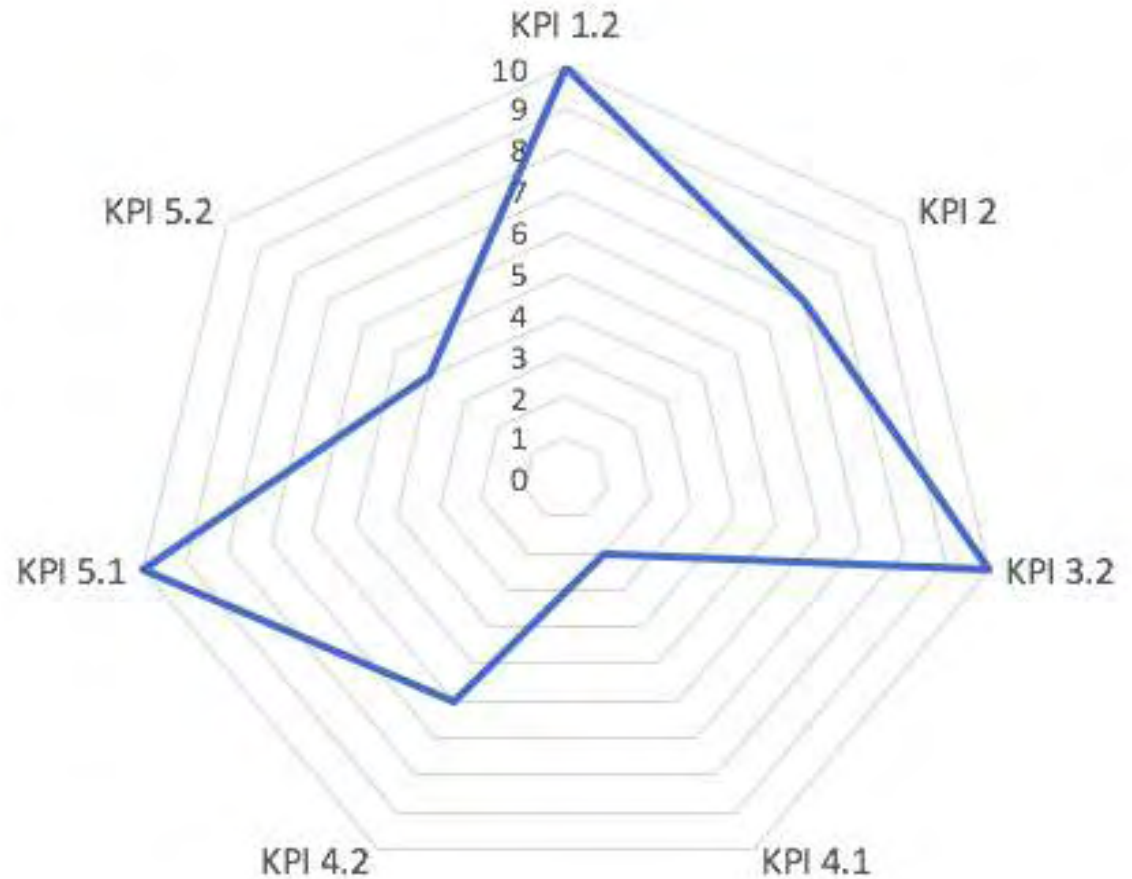
Principle 5 - Local sources as a priority

KPI 5.1 energy sources other than electricity

KPI 5.2 assess the proximity of electrical energy sources

D2 Grids Spider Diagram

	Glasgow
KPI 1.1	
KPI 1.2	10
KPI 2	7
KPI 3.1	
KPI 3.2	10
KPI 4.1	2
KPI 4.2	6
KPI 5.1	10
KPI 5.2	4
Average	7.0



Dalmarnock Energy Centre & D2 Grids

Dalmarnock Renewable Heat Project

- Waste Water (Sewage) to Heat Recovery Energy Centre and District Heating Network
- Collaboration partnership between Clyde Gateway and Scottish Water Horizons
- Potential for growth and scalability
- **Power & Thermal Integration**
 - 2,643 sq ft Energy Centre
 - 200KWth Sewage heat recovery system
 - High flow rates - 850 – 3385l/s
 - Stable Supply temperatures & conditions
 - Average peak output up to 30 MW
 - Peak cooling demand capability 9.715 MW
- **Key Issues**
 - Grid Connections
 - Local Energy Strategies (LHEES)
 - Financial Modelling

Dalmarnock Energy Centre & D2 Grids

- **Experience / Thoughts**

- Different Mindset (More Holistic)
- Predicting Complex Energy Flows Whilst Maximising Resource
- Coordination/Collaboration with New Low Energy Sources (Third Parties)
- Bidirectional Flow

- **Modelling/Simulation**

Digital Twin/Virtual Networks
Simulation Software – a new skillset

Challenges

Speculative Growth (What Does the Future Look Like?)
Flexibility/Adaptability
Accurate Building Energy Demands
Future Climate Scenarios & Impact
Existing Building Stock
Existing Infrastructure Frailties



RED TREE



CLYDE GATEWAY
THIS IS THE PLACE



D2 Grids
5GDHC



CLYDE GATEWAY
THIS IS THE PLACE

g CLYDE GATEWAY
THIS IS THE PLACE

g CLYDE GATEWAY
THIS IS THE PLACE