

ENERGY PLANNING

**TO DEVELOP A DISTRICT ENERGY
PROJECT PIPELINE**

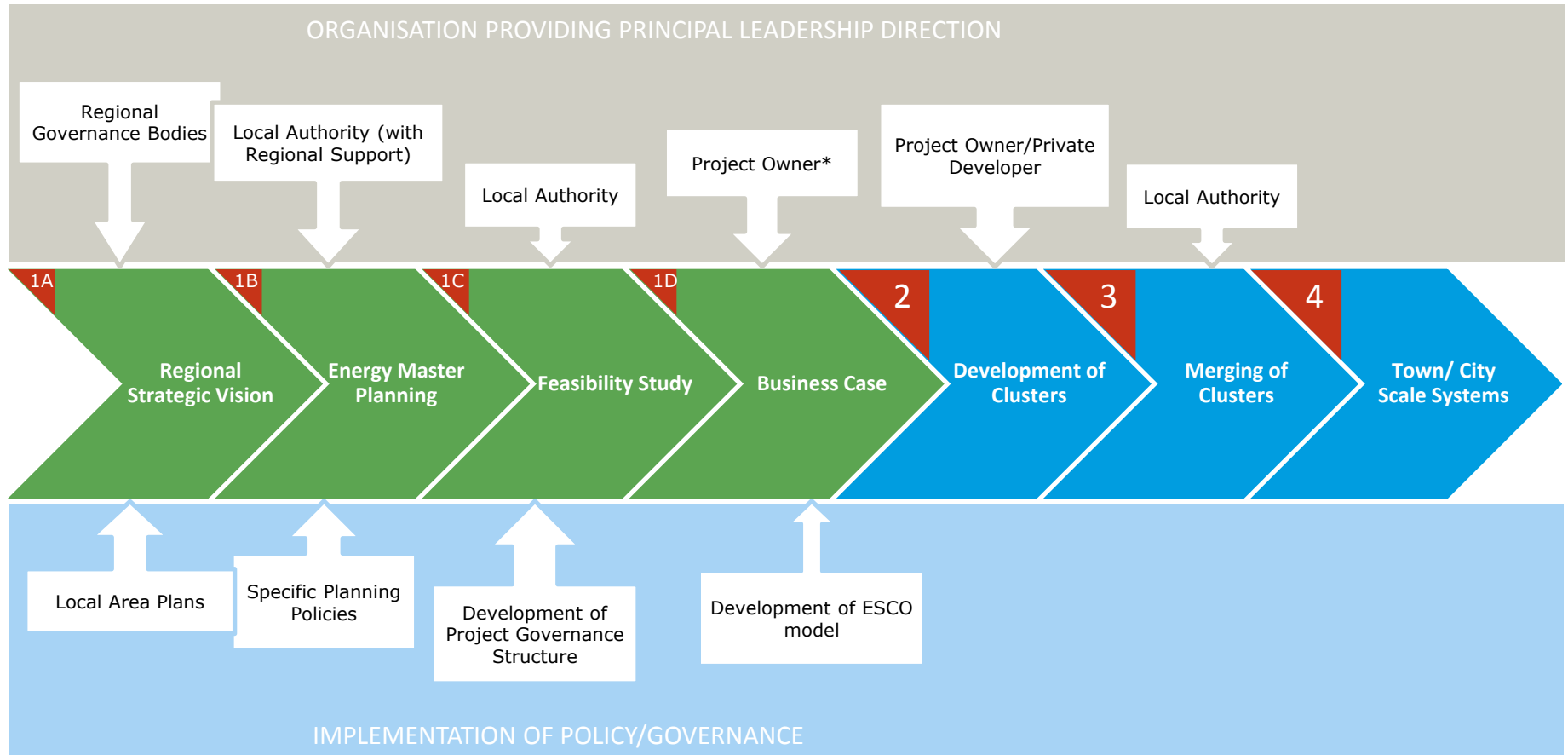
AGENDA

- 1. Process Description**
- 2. Case Study 1 – Country Level**
- 3. Case Study 2 – Regional Level**
- 4. Case Study 3 – Town Level**
- 5. Questions?**

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ENERGY PLANNING



* Project Owner can be the Local Authority or a Private Developer, depending on the outcome of the Masterplanning and Feasibility Stage Work

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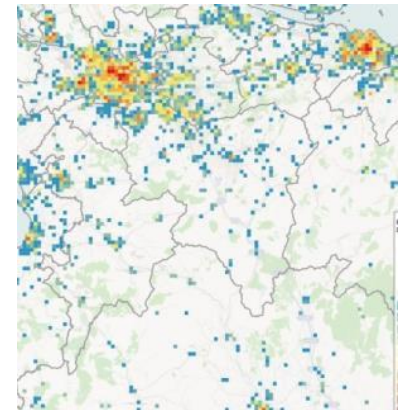
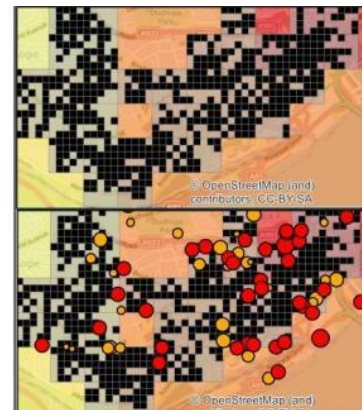
COUNTRY LEVEL PLANNING:

**DRIVER: IDENTIFY PUBLIC SECTOR PROJECTS TO
STIMULATE DISTRICT ENERGY DEVELOPMENT**

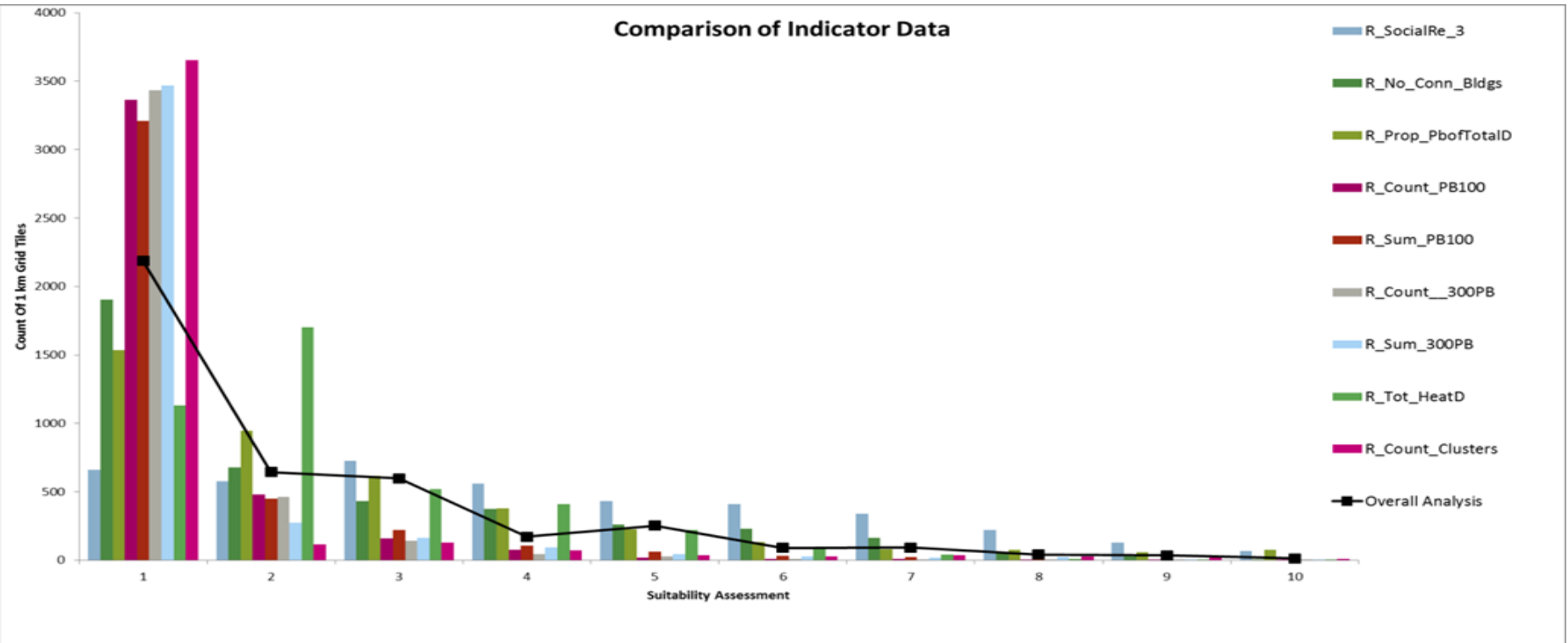
**AIM: DEVELOP A PRIORITISED LIST OF AREAS SUITABLE
FOR FURTHER INVESTIGATION**

METHODOLOGY

- Identification of 1km tiles that contain public sector buildings
- Analysis at 1km², 500m², 250m², 100m² and 50m²
- Updateable and repeatable
- Indicators of district heating performance
- Prioritise project areas for investigation

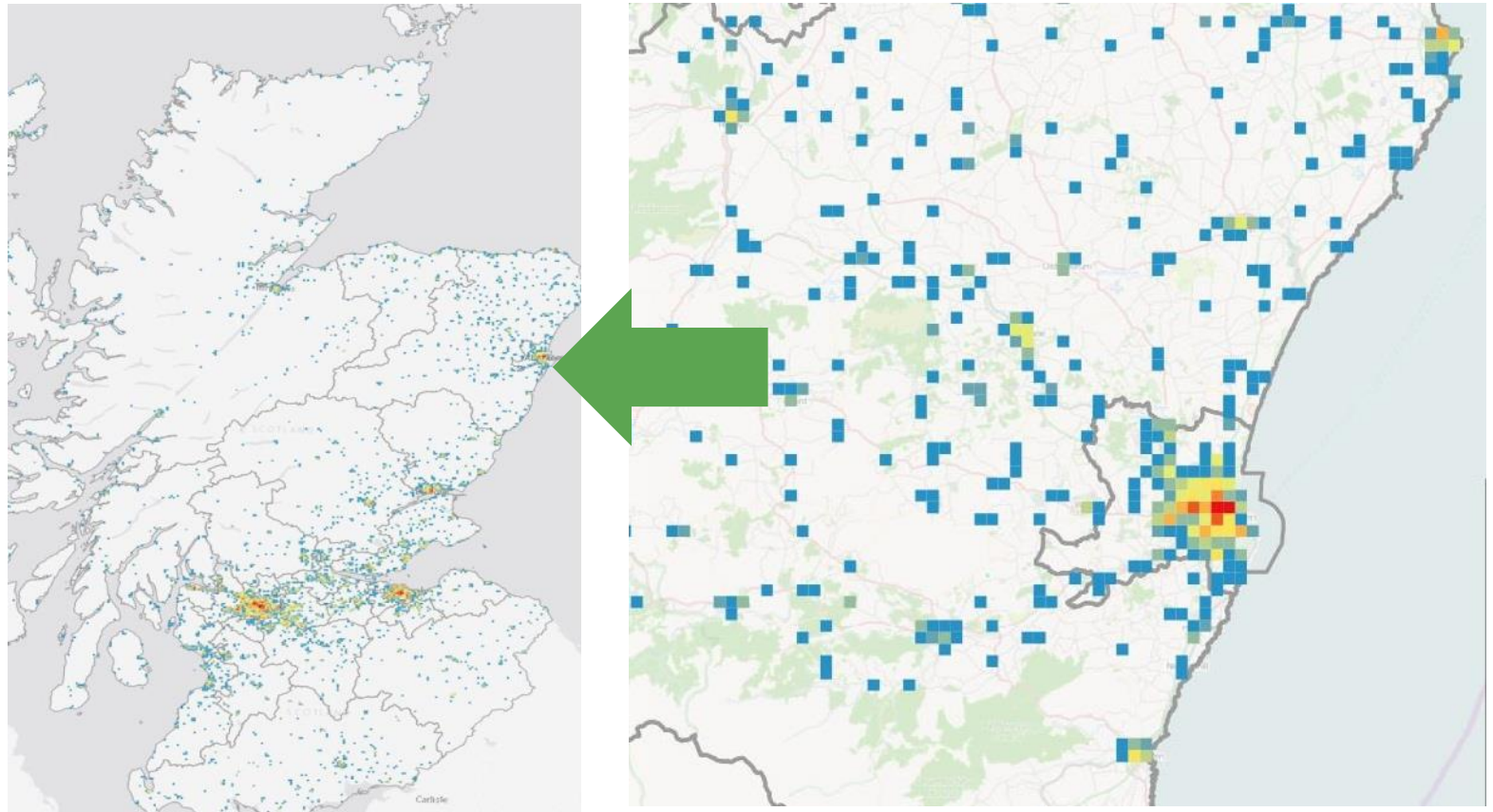


ASSESSMENT CRITERIA

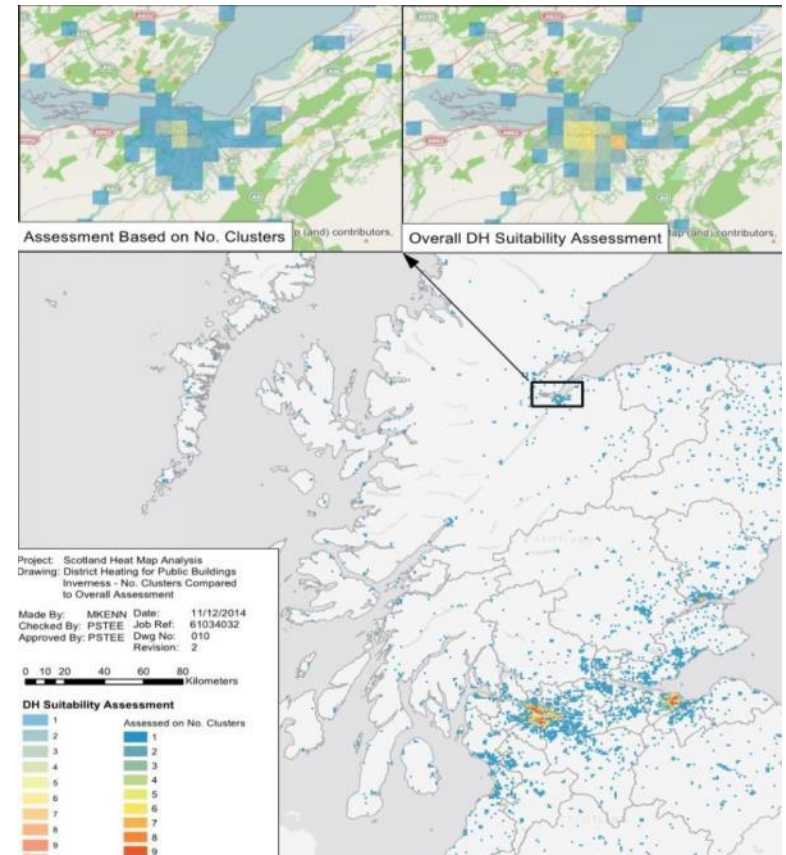
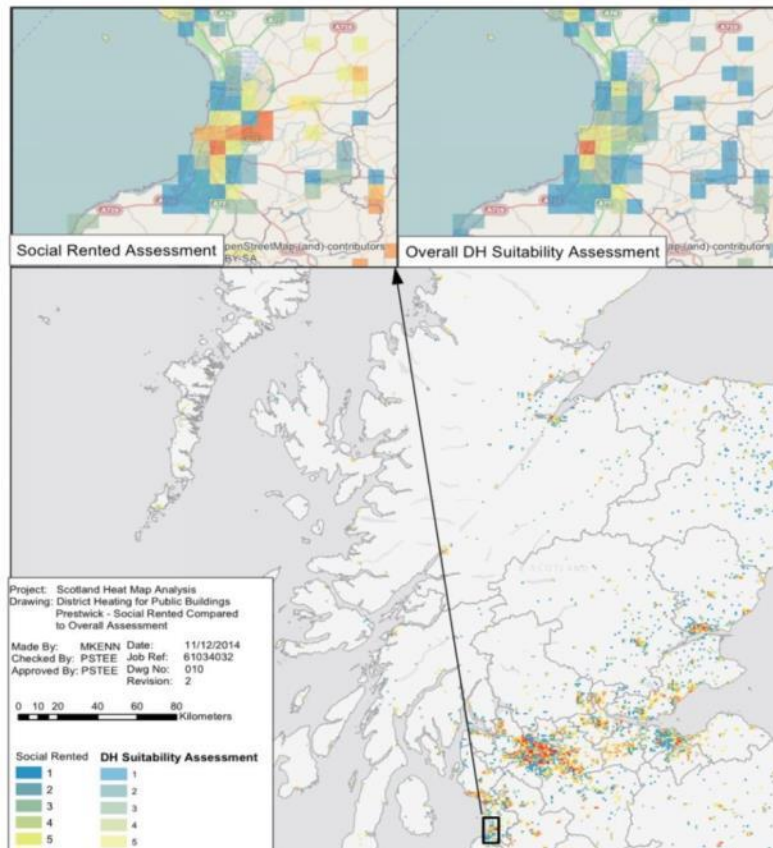


- Fuel Poverty
- Potential for Connecting Clusters
- Total demand density
- Demand and number of significant loads
- Demand and number of connectible loads

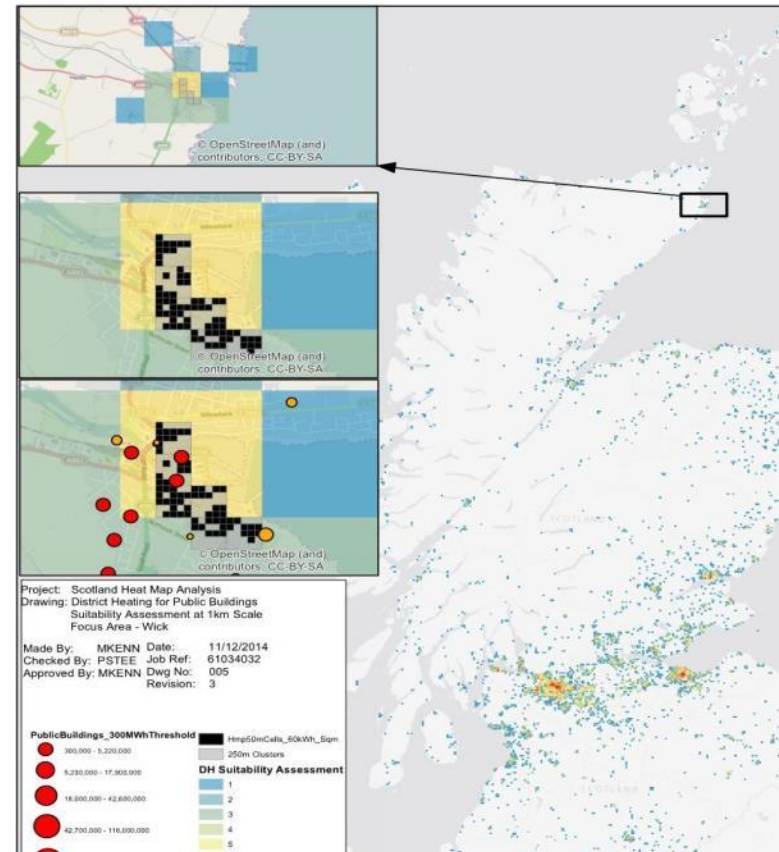
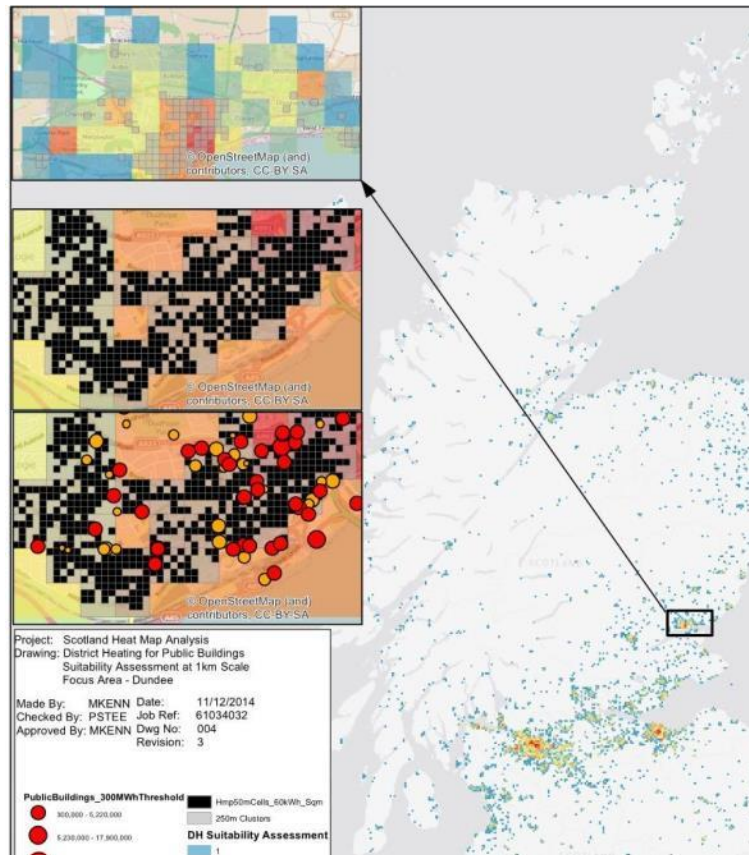
OVERALL ANALYSIS RELATIVE PERFORMANCE



IMPACT OF WEIGHTING COMPARED TO SPECIFIC INDICATORS



ANALYSIS OF HEAT DEMAND CLUSTERS



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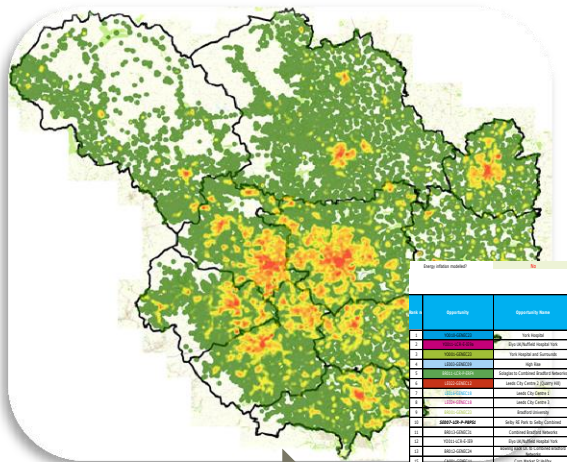


REGIONAL LEVEL PLANNING:

**DRIVER: IDENTIFY PUBLIC AND PRIVATE SECTOR PROJECTS
TO ESTABLISH A PIPELINE OF PROJECTS**

**AIM: DEVELOP A PRIORITISED LIST OF OPPORTUNITIES
FOR TAKING FORWARD TO THE NEXT STAGE**

ENERGY PLANNING: GENERAL APPROACH



LONGLIST

[illegible]

SHORTLIST

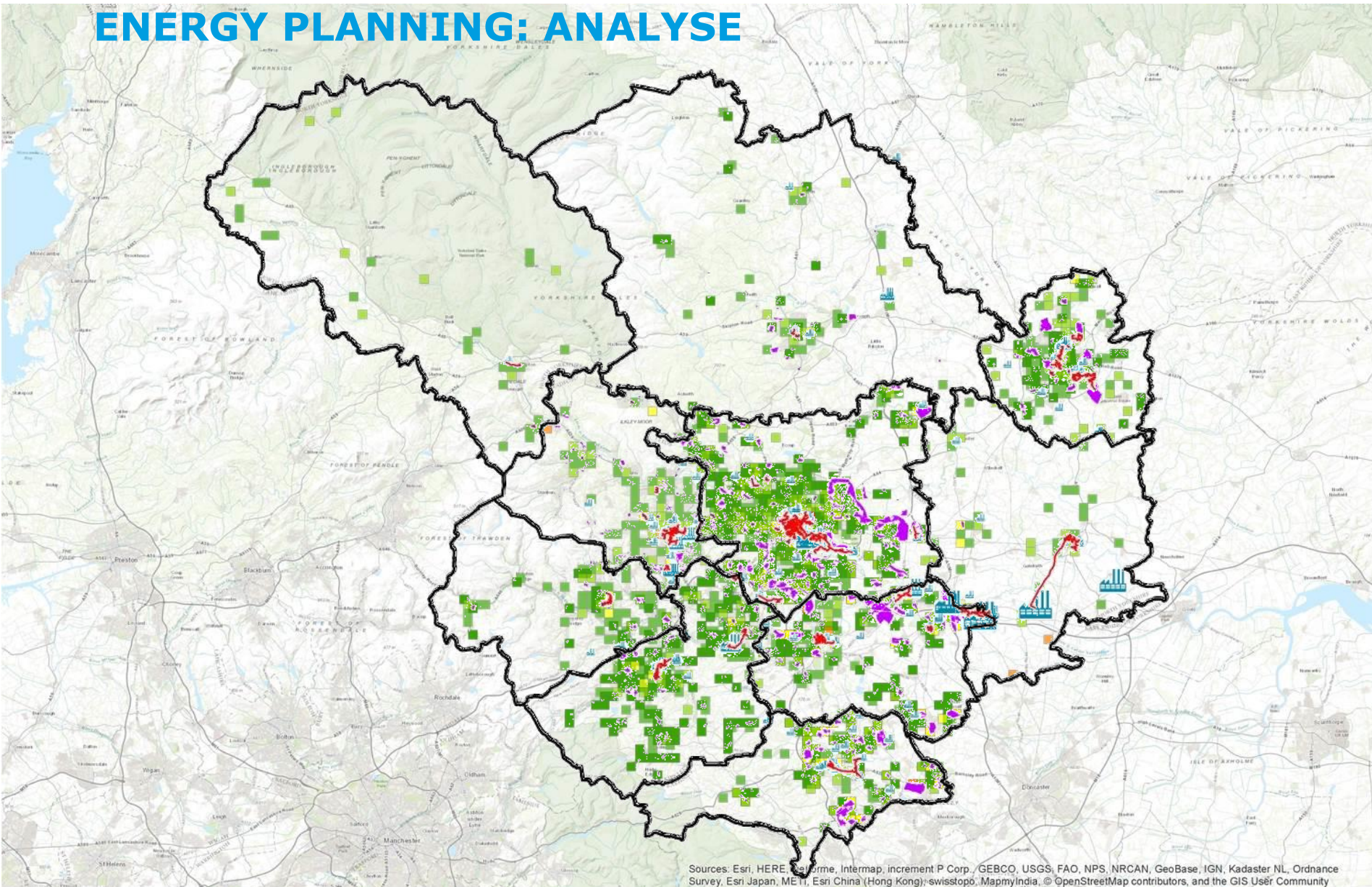


ANALYSE

RANK

ENGAGE

ENERGY PLANNING: ANALYSE



ENERGY PLANNING: RANK

New Gas Engine CHP 7MW

BA001 involves the connection of a variety of demands across a range of categories, including government buildings (such as the town hall on Church Street), commercial offices, hotels and residential buildings. In this scheme heat will be supplied to the district heating network by a gas fired CHP unit, which could potentially be accommodated within the grounds of one of the government buildings connected to the network. Should these locations be deemed unsuitable, an alternative generation asset location will be required. There are two road crossings required along the network route, on the A635 and the A628. These roads, whilst locally significant do not appear to pose a prohibitive barrier to the development of this network given that there are some potential alternative routes available for traffic diversions to allow any potential roadworks to be carried out.

Summary Economic Indicators

Capital Cost of the Project:	£12.8M
Annual Income:	£5.2M
Annual operating margin:	£0.97M
Return on Investment:	8%
Simple Payback Period:	13 years

Key Performance Indicators

Economic Saving Potential:	£3.2k (per customer basis)
Annual CO ₂ Savings:	8400 tCO ₂
Development Risk Factor:	0.9 (1=high,0=Low)

Summary Technical Parameters

Generating station technology:	gas fired CHP - IC engine
Generation asset heat offtake capacity:	7.8 MWh
Annual heat demand:	67.7 GWh
Diversified peak heat demand:	19.3 MWh
Length of network:	3.8 km
Linear heat density:	18 MWh/m
Number of connections:	99
Main generation asset contribution:	61%
Network construction type:	Local Town Centre/Suburban
Accumulator modelled?:	yes

Key Economic Indicators

Energy Centre CAPEX:	£6.8M
Heat Network CAPEX:	£3.8M
Connection CAPEX:	£1.9M
Development CAPEX:	£0.3M
Land acquisition CAPEX:	£0M

	Low	Medium	High
Value of Electricity:	£46 /MWh	£63/MWh	£85/MWh
IRR over 25 years:	-2.91%	5.62%	13.65%
NPV over 25 Years @ 6% DF:	£0M		

Overall heat generation cost*:	£26.5/MWh
Heat generation cost main generation asset:	as above

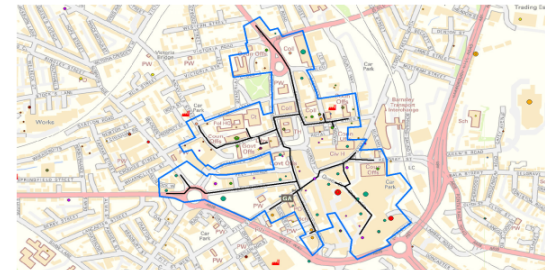
Annual electricity generated:	38.5GWh
Annual heat generated:	42.7GWh

Average heat selling price:	£41.6/MWh
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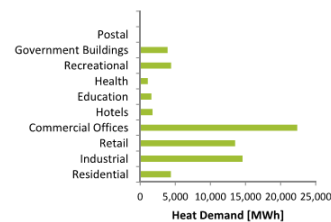
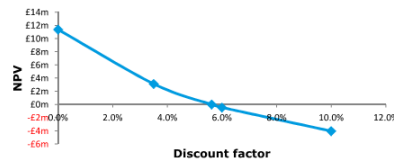
Annual revenue from electricity sales:	£2412k
Annual revenue from heat sales:	£2814k
RHI support modelled as:	RHI not applicable
Annual RHI income:	£0k
Annual fuel costs:	£3730k
Annual O&M costs:	£317k

Scheme Quality

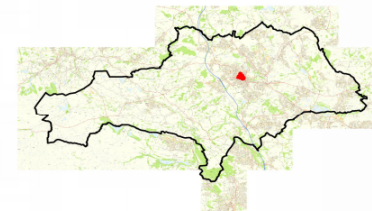
Are municipally owned buildings involved as anchor loads?:	few relative to total scheme demand
Demand Diversity:	High
Expected impact of development timescale on viability:	Low
Development status of main generation asset:	development pipeline
Number of public sector heat loads:	18
Number of private sector heat loads:	81
of these, number of non residential:	70
% of total heat to the public sector:	10%
% of total heat to the private sector:	90%



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Project Reference: BA001-GENEC18



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Additional Information and Notes:

Economic and carbon KPIs exclude impact of development phasing.

Economic KPI's reflect EBITDA and exclude project financing.

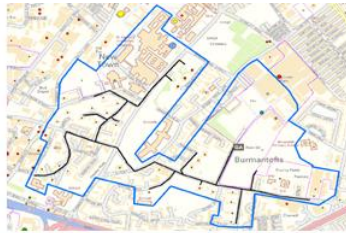
* including all overheads

** excludes RHI (where relevant).

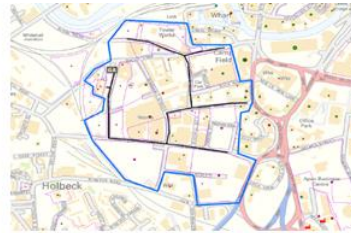
ENERGY PLANNING: ENGAGE



AQL - Southbank



St. James District



Southbank - West



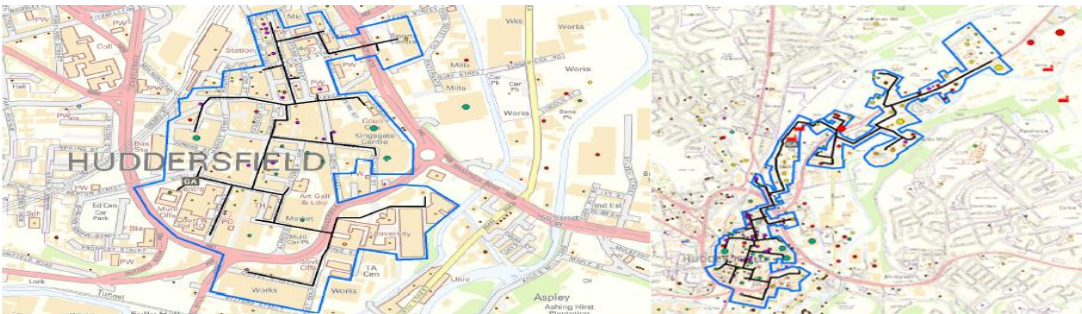
Aire Valley East new Developments



City Centre -South



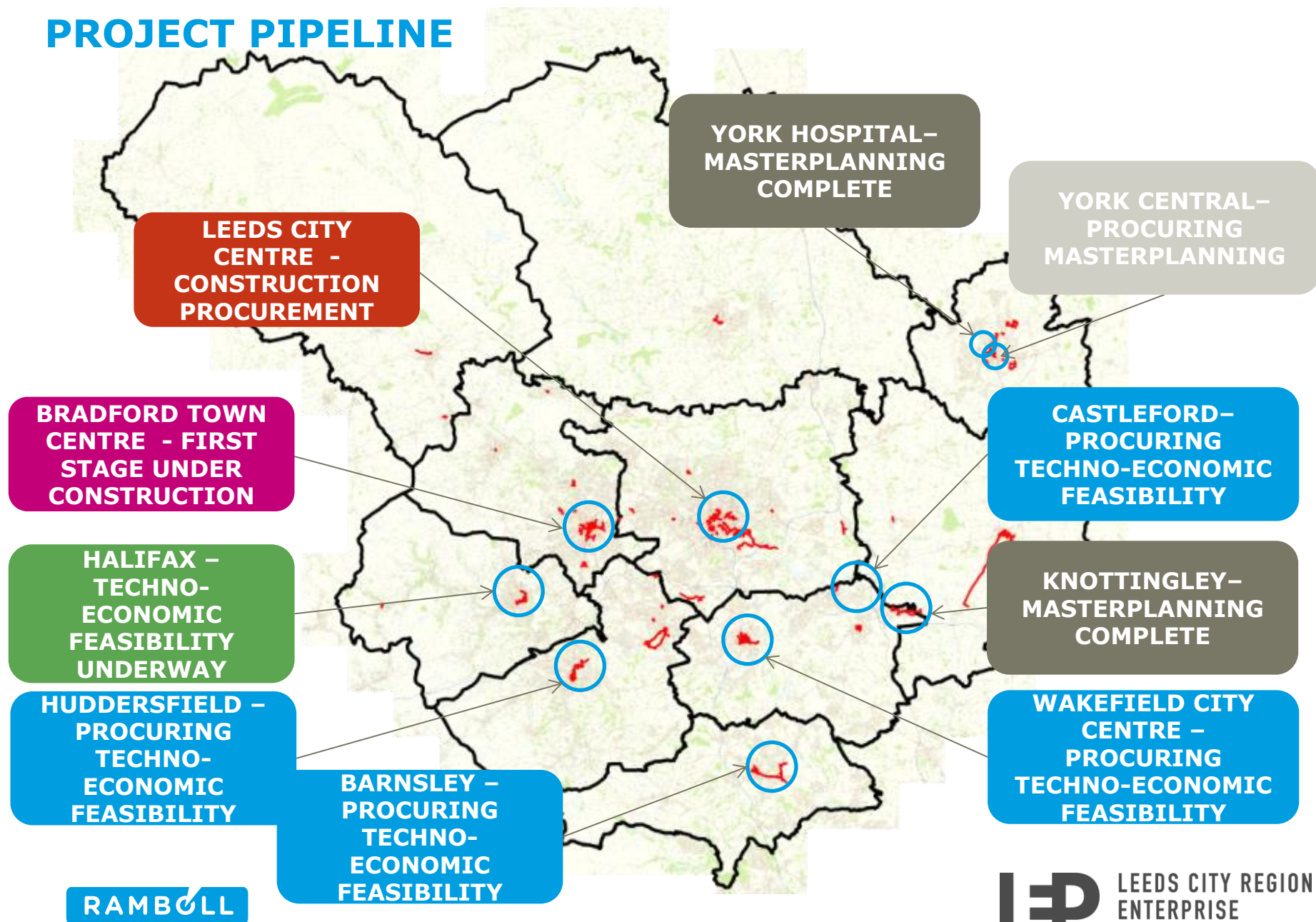
City Centre - North



Meetings with relevant departments in municipalities to establish:

- Additional / New Information
 - Appetite
 - Capacity
- Planning Powers
 - Technical Requirements
- Preferred Delivery Model
 - Next Steps

PROJECT PIPELINE



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LEP LEEDS CITY REGION
ENTERPRISE
PARTNERSHIP

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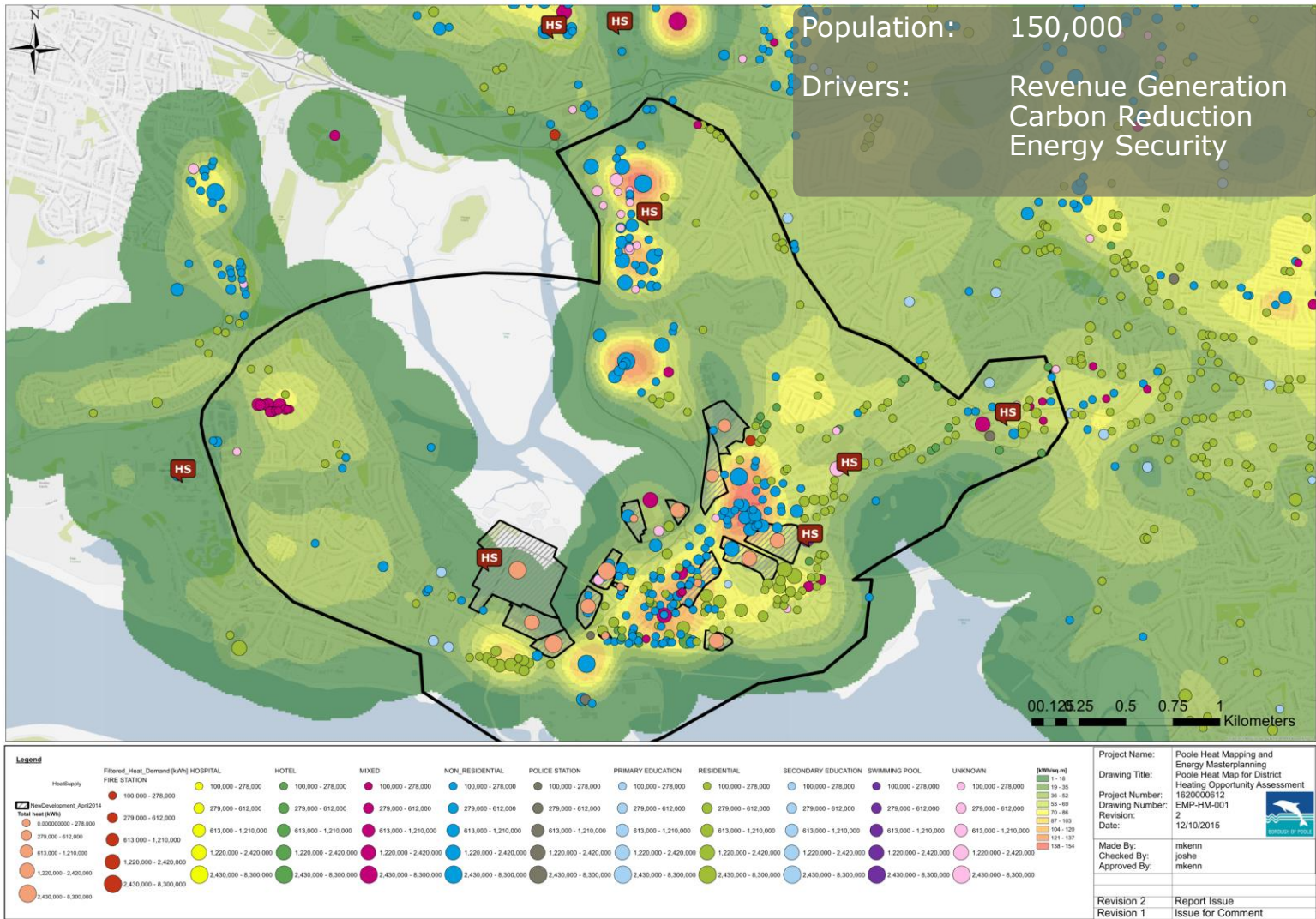


TOWN LEVEL PLANNING:

**DRIVER: IDENTIFY DISTRICT ENERGY OPPORTUNITIES AND
POTENTIAL PROJECT PHASING**

**AIM: DEVELOP A STRATEGIC VISION FOR THE TOWN'S DE
DEVELOPMENT**

POOLE – TOWN LEVEL



OUTPUTS FROM OPPORTUNITY ASSESSMENT

Outputs

5 Unique DH Projects

Interconnect Over Time

Different Ownership Profiles

Deliver:

Carbon Savings

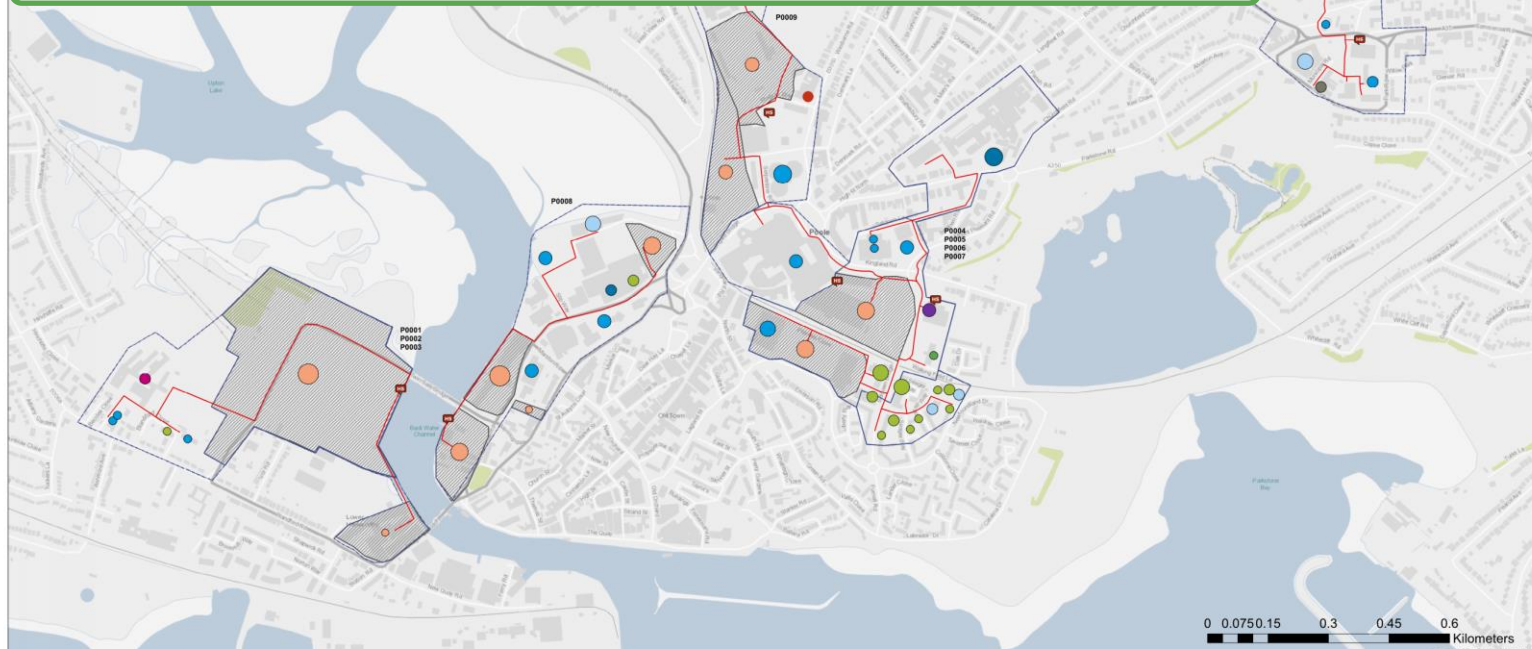
Cost Savings

Long Term Revenue Stream

Way Forward:

Pathway for Zero Carbon

Pathway for Investment

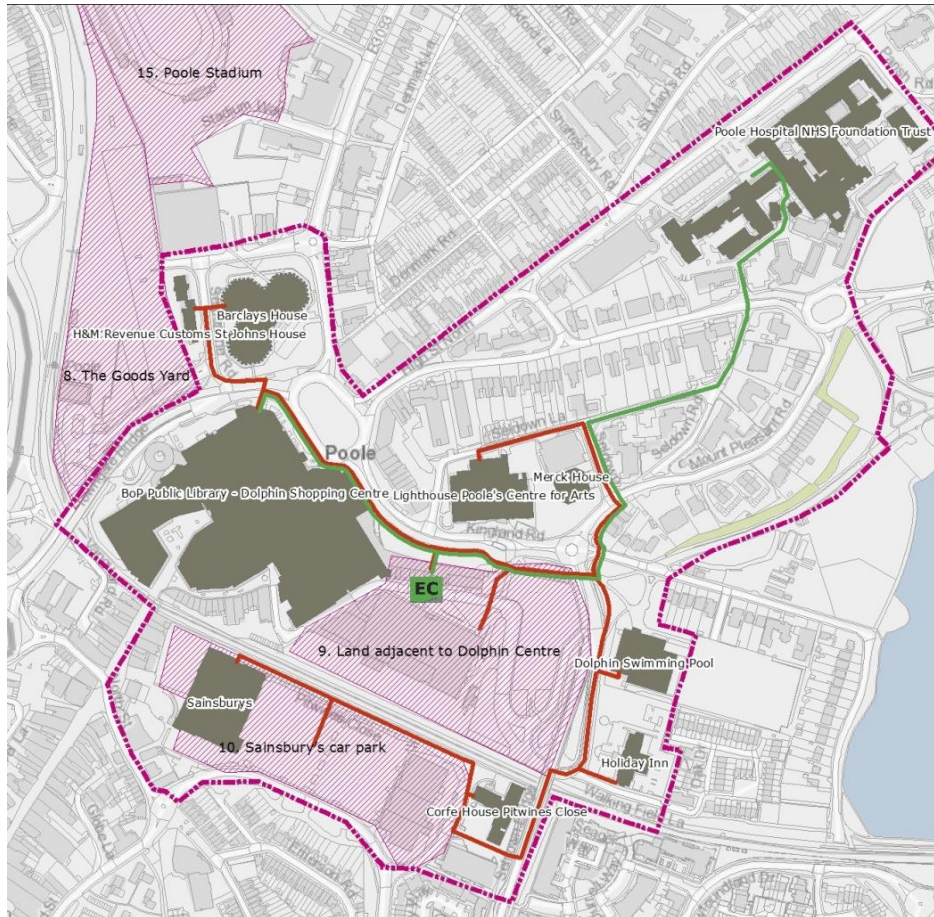


Legend



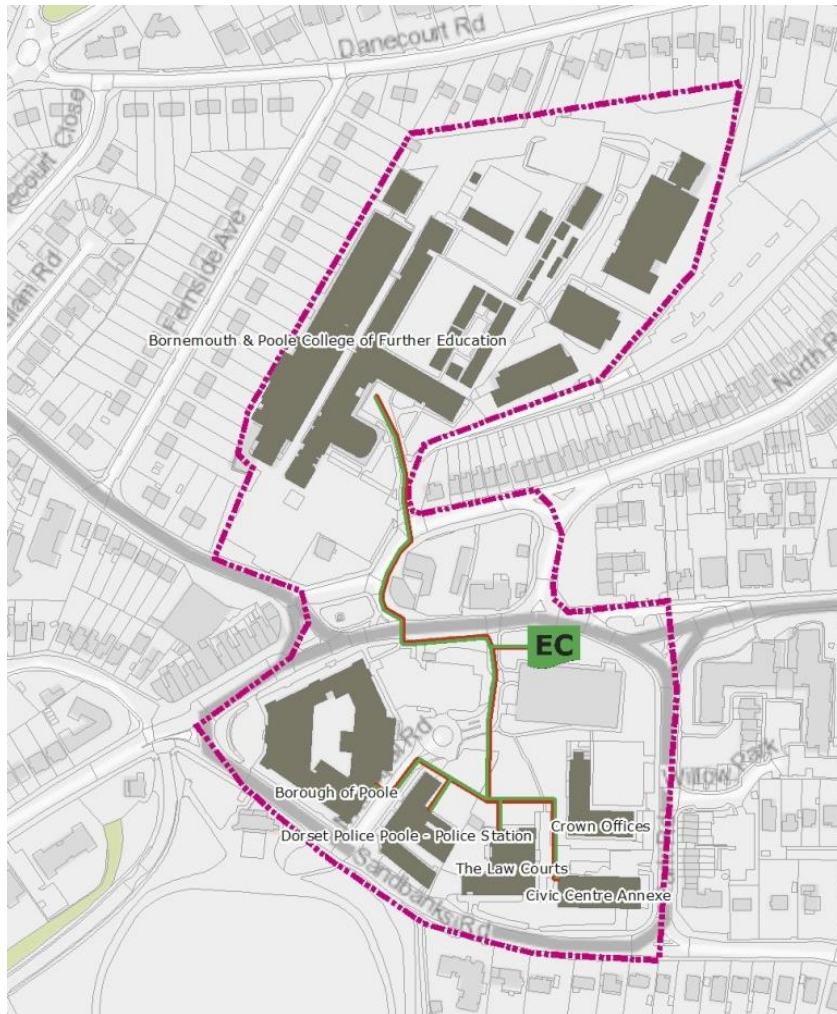
Project Name:	Pooler Heat Mapping and Energy Masterplanning Identified Project Opportunities
Drawing Title:	
Project Number:	1620000612
Drawing Number:	EMP-HM-004
Revision:	2
Date:	05/10/2015
Made By:	ggiri
Checked By:	mkenn
Approved By:	
Revision 2:	Report Issue
Revision 1:	Issue for Comment

CLUSTER 1 – TOWN CENTRE NETWORK



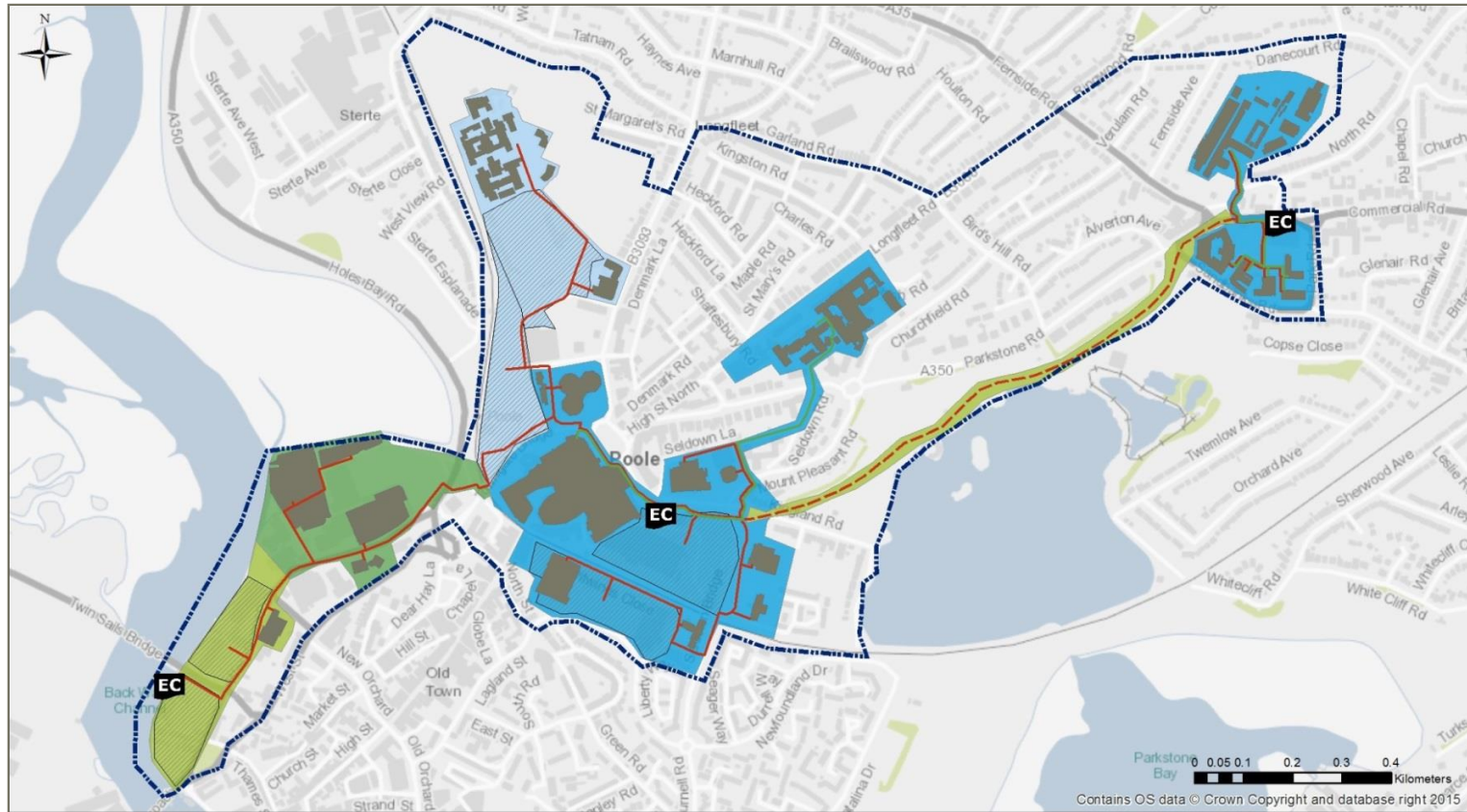
- High Level of Public Involvement
- Opportunity for Heat and Power Supply
- Good mix of new developments and existing "Anchor Loads"
- Central location for catalysation of the wider strategic vision

CLUSTER 2 – COUNCIL OFFICES AND COLLEGE



- Small Number of Stakeholders
- Can act as a proof of concept project
- Reduce carbon emissions and costs for municipality and local College.
- Heat and Power supplied to multiple buildings

PROJECT PIPELINE - TIMELINE



**Project
Commencement**

End of CHP lifetime

End of boilers lifetime

**Installation of
Gas CHP**

15 YEARS

**Installation of
new prime mover
technology**

5 YEARS

**Replacement of
gas with
alternative fuel**

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THANK YOU

Mairead Kennedy

mairead.kennedy@ramboll.co.uk

+1 226 979 1721

**READ MORE ON OUR WEBSITE:
WWW.RAMBOLL.COM/ENERGY**