scottish renewables

SCOTTISH DEVELOPMENT INTERNATIONAL

SCOTTISH LOW-CARBON HEAT CONFERENCE

16 MAY 2017 **GLASGOW**

Part of the Euroheat & Power Congress 2017

Showcasing Scotland's Support for Heat

Chair

Jenny Hogan, Scottish Renewables

Speakers

Suzanne LeMiere, Scottish Government

Barbara Whiting, Fife Council

Paul Steen, Ramboll

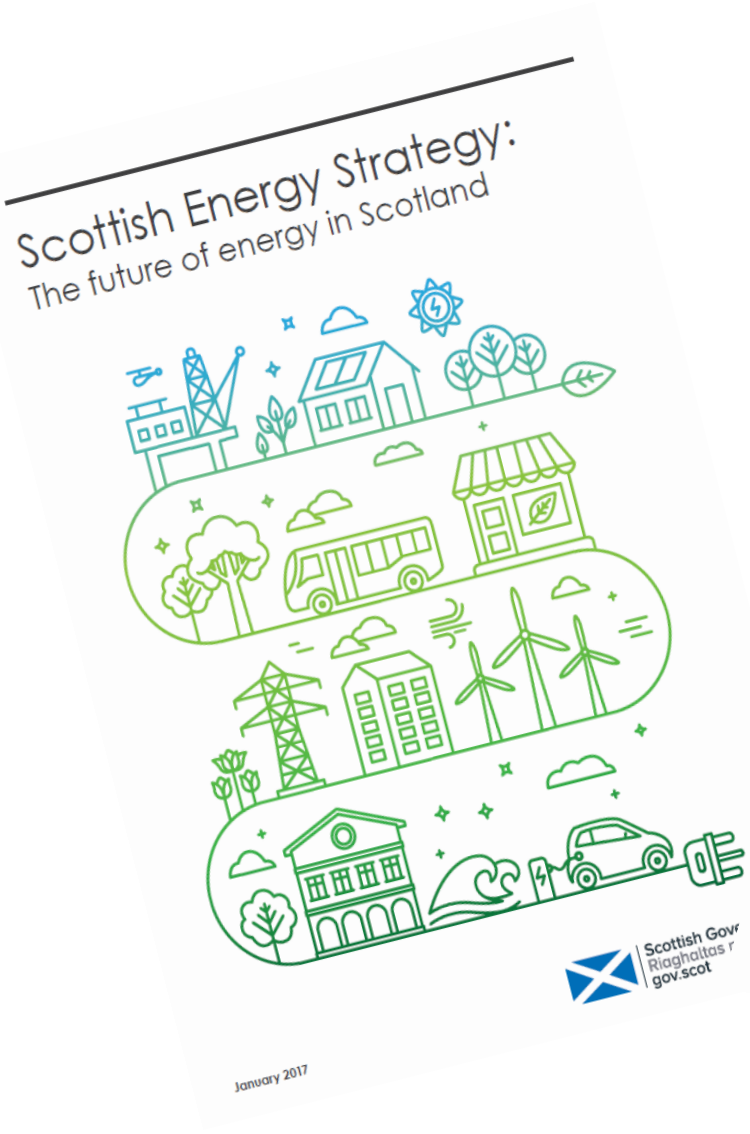
Tanja Groth, The Carbon Trust

Suzanne LeMiere

Head of Heat Policy

Scottish Government

Scotland's Climate Change Ambition



Scottish Government
Riaghaltas na h-Alba
gov.scot

Themes of draft Energy Strategy

‘Whole-system’ view

- Economic modelling, informing view of Scotland’s future energy supply and demand
- Integrated approach to heat, power and transport
- New 50% ‘all energy’ 2030 renewables target
- Renewed focus on energy efficiency and demand reduction

Stable energy transition

- Long-term plan, consistent with Climate Change (Scotland) Act
- Flexible to future changes in technology and patterns of energy use
- Managed transition of energy supply, considering our strategic energy sites after the safe closure of nuclear facilities

A smarter model of local energy provision

- Encouraging new localised models of energy supply and use
- Enhanced role for local planning and local ownership
- New economic opportunities of energy storage and ‘smart’ energy solutions

Scottish Government
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gov.scot

The draft Climate Change Plan undergoing parliamentary scrutiny.

The draft Energy Strategy is open for public consultation until 30 May;

- **Onshore Wind Policy Statement** (30 May);
- **Scotland's Energy Efficiency Programme** (30 May);
- **Local Heat and Energy Efficiency Strategies and District Heat Regulation** (18 April);
- **Unconventional Oil and Gas: Talking 'Fracking'** (31 May)

https://consult.scotland.gov.uk/energy-and-climate-change-directorate/draft-energy-strategy/

National Infrastructure Priority for Energy Efficiency:

Scotland's Energy Efficiency Programme

Scottish Government
Riaghaltas na h-Alba
gov.scot

2050 Vision

Scotland's buildings are near zero carbon by 2050 and this is achieved in a way that is socially and economically sustainable.

Aim

Scotland's Energy Efficiency Programme aims to reduce the energy demand and decarbonise the heating of Scotland's built environment in a way that is socially and economically sustainable.

Objectives

- By 2030 94% of non-domestic buildings' and 80% of domestic buildings' heat is supplied using low carbon heat technologies
- Improvements to the fabric of Scotland's non-domestic buildings result in a 10% reduction, and Scotland's domestic buildings results in a 6% reduction, in their heat demand by 2032.

Local Heat & Energy Efficiency Strategies and

District Heating Regulations

Consultation

- We are **currently consulting**, alongside the Energy Strategy, on options for Regulation of district heating and Local Heat & Energy Efficiency Strategies (LHEES)
  - to help meet SEEP heat decarbonisation objectives through more district heating
  - to help ensure a coordinated, phased, area-based approach by local authorities to delivering SEEP's objectives
- This is a **high level policy scoping consultation** that seeks views and further evidence.
- It **sets out broad scenarios**, based on the recommendations from the Special Working Group on District Heating.

LHEES & DH Regulations consultation format

- Section A consults on the role of LHEES in enabling local authorities to plan for energy demand reduction and heat decarbonisation of buildings across their area, in a phased approach to planning area-based delivery programmes to help achieve the national objectives of SEEP.

- Section B consults on a regulatory framework for district heating, including:
  - area-based zoning for district heating through LHEES;
  - granting of concessions for district heating networks;
  - licensing of district heating networks;
  - connecting supply;
  - surplus industrial heat, and
  - consumer protection.

Consultation - LHEES & DH Regs

We propose that a new regulatory framework for heat and energy efficiency strategies, and for regulation of district heating, should focus on 2 key areas. These are:

A. that local authorities are required to create local heat and energy efficiency strategies (LHEESs) to support the delivery of heat decarbonisation and energy efficiency objectives of Scotland's Energy Efficiency Programme (SEEP); and

B. that regulation be put in place to specifically support the development of district heating, including provisions for zoning of areas for heat networks, connecting users and surplus heat loads, technical standards and consumer protection.

Barbara Whiting

Lead Officer – Renewables and Low Carbon

Fife Council

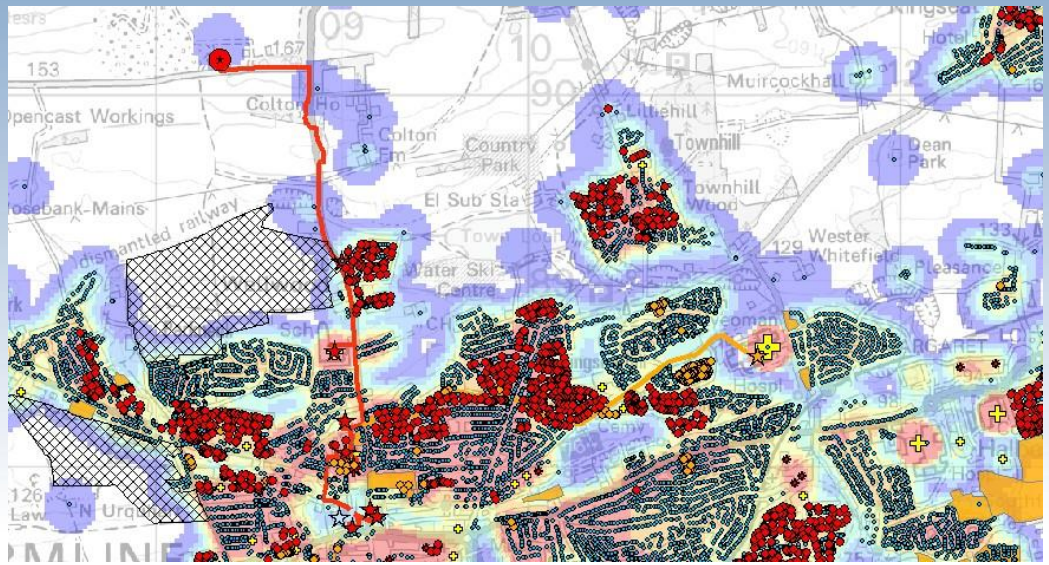
Low Carbon Heat in Fife

Fife means business.

INVEST IN FIFE

Local Authority role in Low Carbon Heat

- Local planning and development
- Social landlord:
  - Heat pumps in 20 council homes
  - Solar thermal in 300 council homes
  - District Heating Schemes
- Our own assets
- Local Heat mapping
- Influence on local economy:
  - Economic Development
  - Education & Skills
- Waste Management
- Climate Change targets

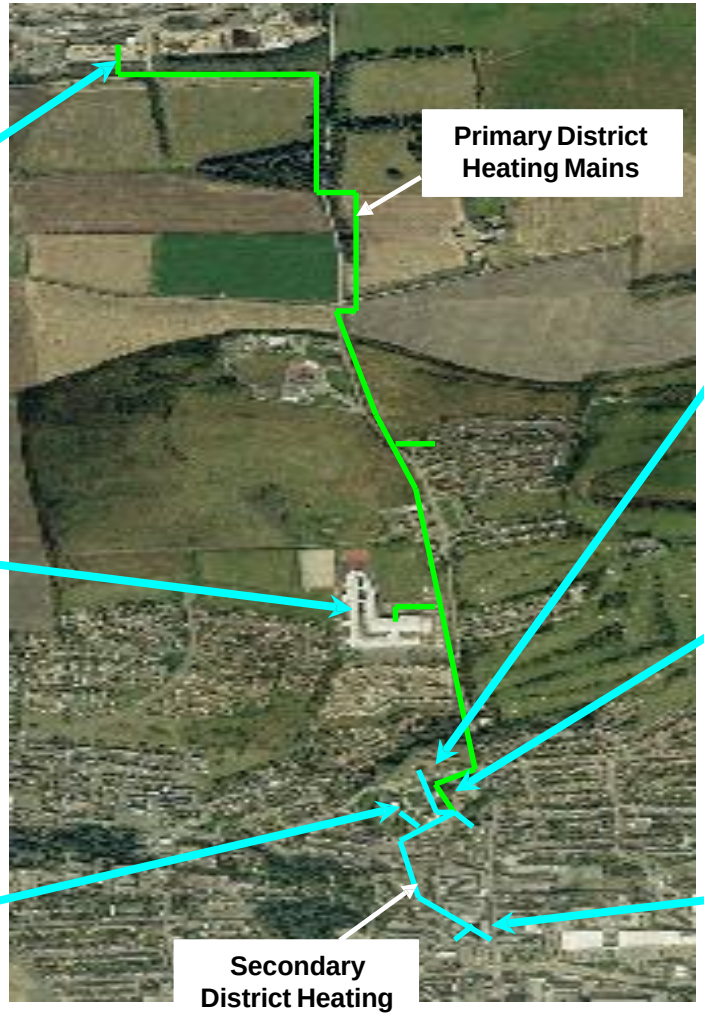


Fife means business.

Dunfermline District Heating Scheme

- Harnessing up to 2000kw of landfill heat
- Methane 21 times more potent than CO2
- Currently producing 1.3MW electricity
- Total generation of 3.5MW
- Thermal output to heat over 200 homes
- GHG savings 60,000 tonnes pa
- Thermal storage
- 8 public buildings & Tesco supermarket

Current Network



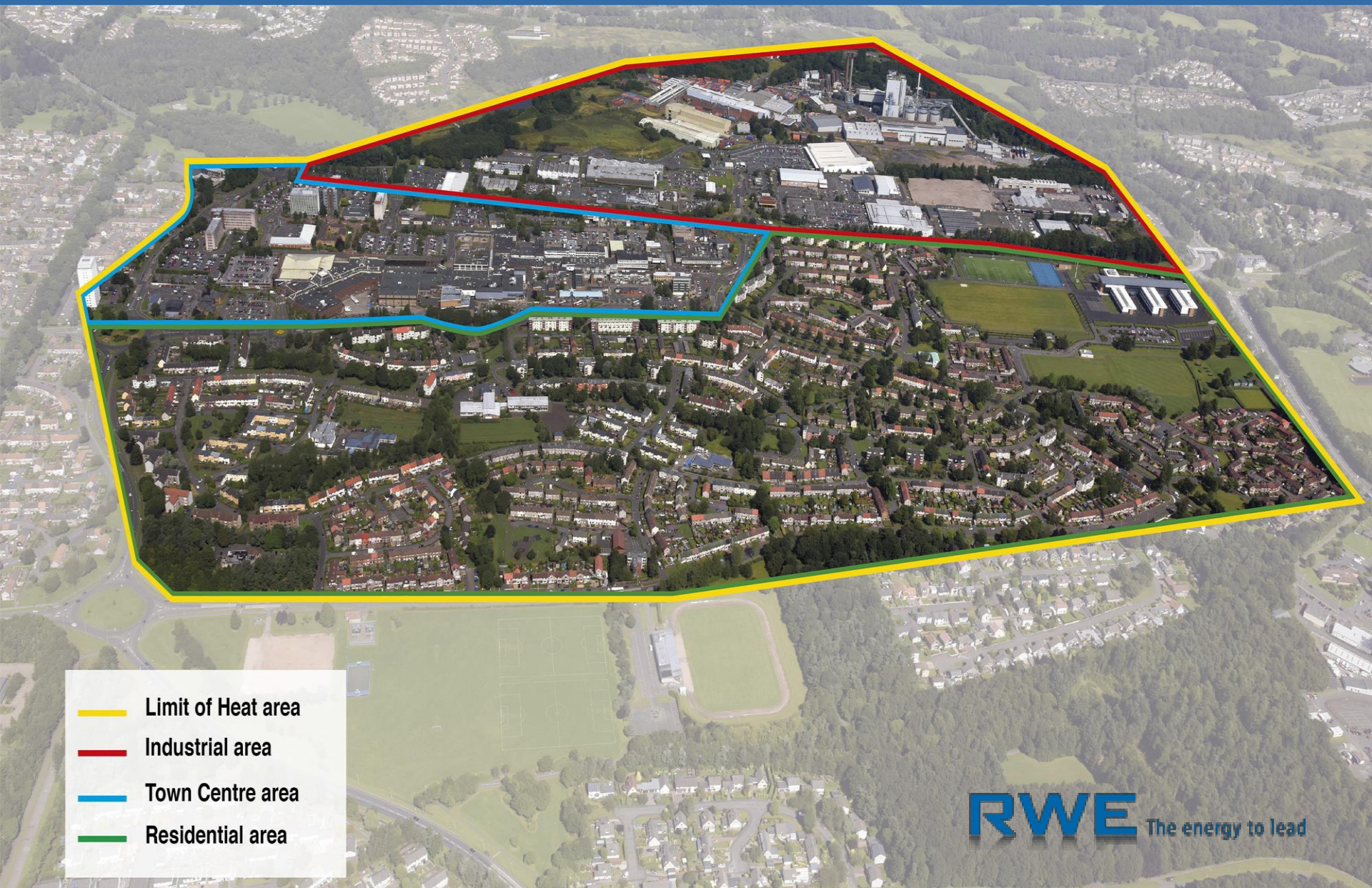
Glenrothes District Heating Scheme

- RWE Markinch Biomass CHP Plant supplied heat and power to Tullis Russell Papermakers until 2015
- Strong desire for new heat users to secure future of RWE plant
- Secured support from Scottish Government Low Carbon Infrastructure Transition Fund (LCITP)
- Heat from RWE Markinch Biomass (CHP) plant to develop a core district heat scheme in Glenrothes

Fife means business.

Potential Area Explored

INVEST IN FIFE



RWE The energy to lead

LCITP Demonstrator Capital Call

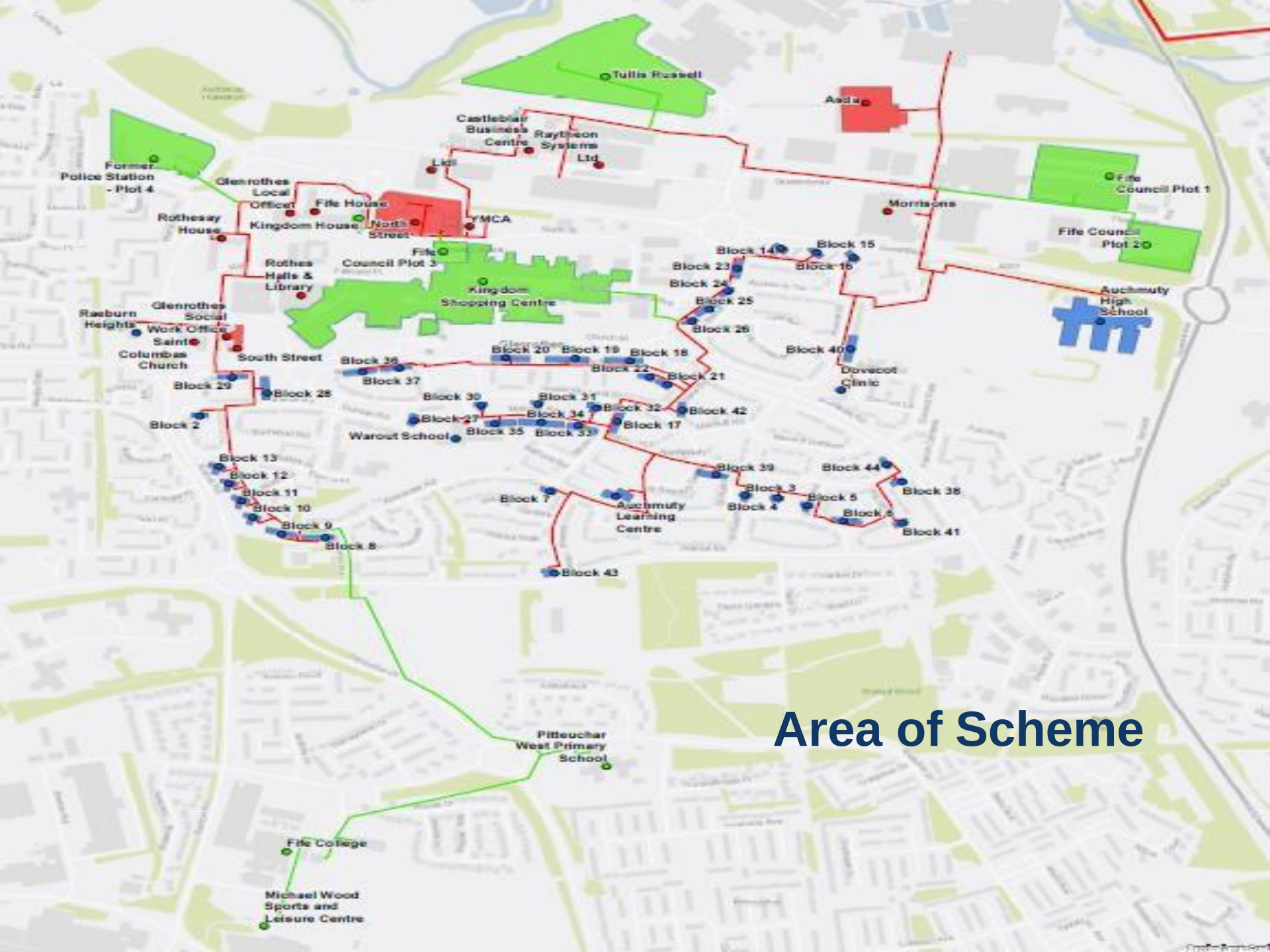
- Announced July 2016
- Up to 50% capital contribution – low carbon infrastructure projects
- Grant Award March 2017
- Successful projects need to be commissioned by September 2018

Fife means business.

Glenrothes Heat – Phase One

- Fife Council constructs & maintains distribution network
- RWE Markinch constructs & maintains energy centre with thermal storage
- Customers include: Fife Council offices, industrial, commercial & community buildings
- Prepares for connection of over 370 council homes in next phase

Fife means business.



Area of Scheme

Key Immediate Milestones

- Planning Application Notification submitted
- Final detailed network design – summer 2017
- Construction tendering awards Autumn 2017
- Construction commences – Jan 2018
- Project commissioning – September 2018
- Initial customer connections – January 2019

Fife means business.

Key Benefits

Economical, low carbon heat supply for Phase One customers:

- Guaranteed 10% reduction on existing heat costs
- Reduced environmental taxes for businesses and public sector customers
- Lower lifecycle costs – less maintenance & appliance replacement for customers
- Space saving in properties – less equipment
- Alleviates long term fuel poverty – 372 council homes

Fife means business.

Thank you!

Fife means business.

INVEST IN FIFE

Paul Steen

Associate Director

Ramboll

PAUL STEEN - RAMBOLL

DEVELOPMENT OF DISTRICT HEATING STRATEGIES

RAMBOLL

CONTENTS

- Deciding the basis of the strategy
- Mapping the benefits
- Developing the vision
- Preparing the strategy
- Enabling delivery of the strategy

Discussion of the above in the context of ongoing work with Dundee and other Cities

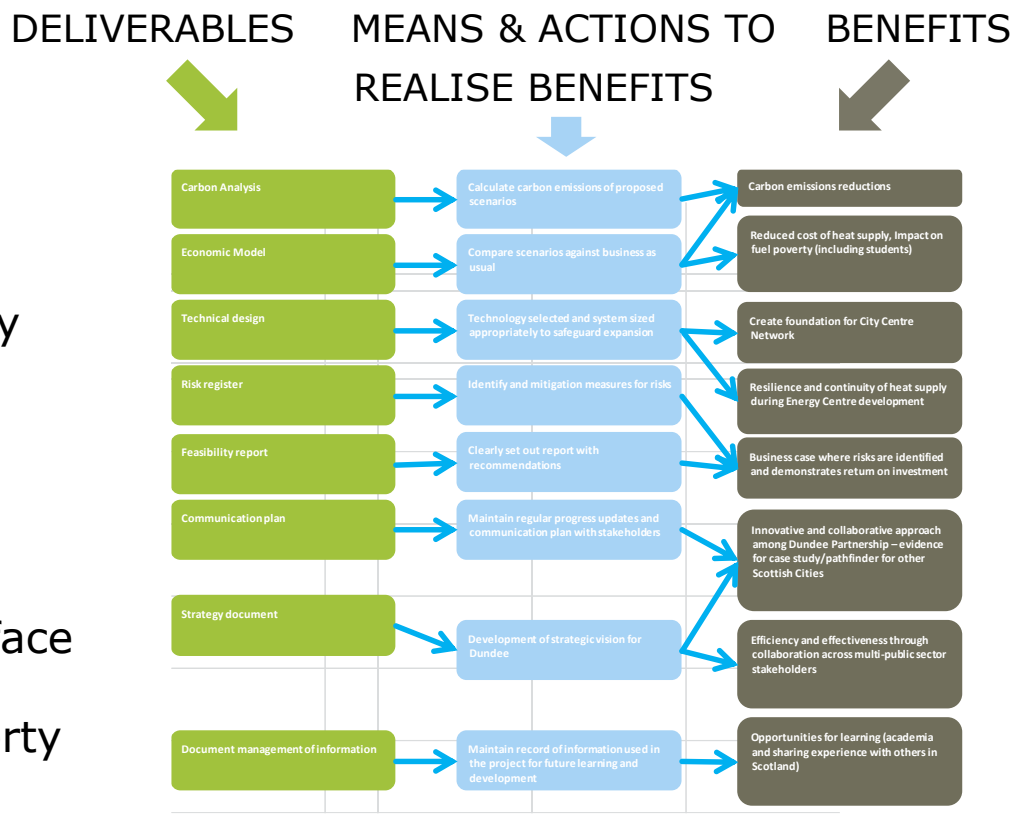
RAMBOLL

BASIS OF THE STRATEGY

- National Policy Context
- Local Policy Context
- Local Priorities
- Stakeholder Expectations
- Strategic Energy Objectives

BASIS AND BENEFIT MAPPING

- Flexible contribution from renewable and/or low carbon sources of heat
- Potential to improve air quality
- Assist developers in meeting building standards
- Lower lifecycle cost and complexity of consumer interface
- May help to address fuel poverty and secure supply
- Local employment opportunities.



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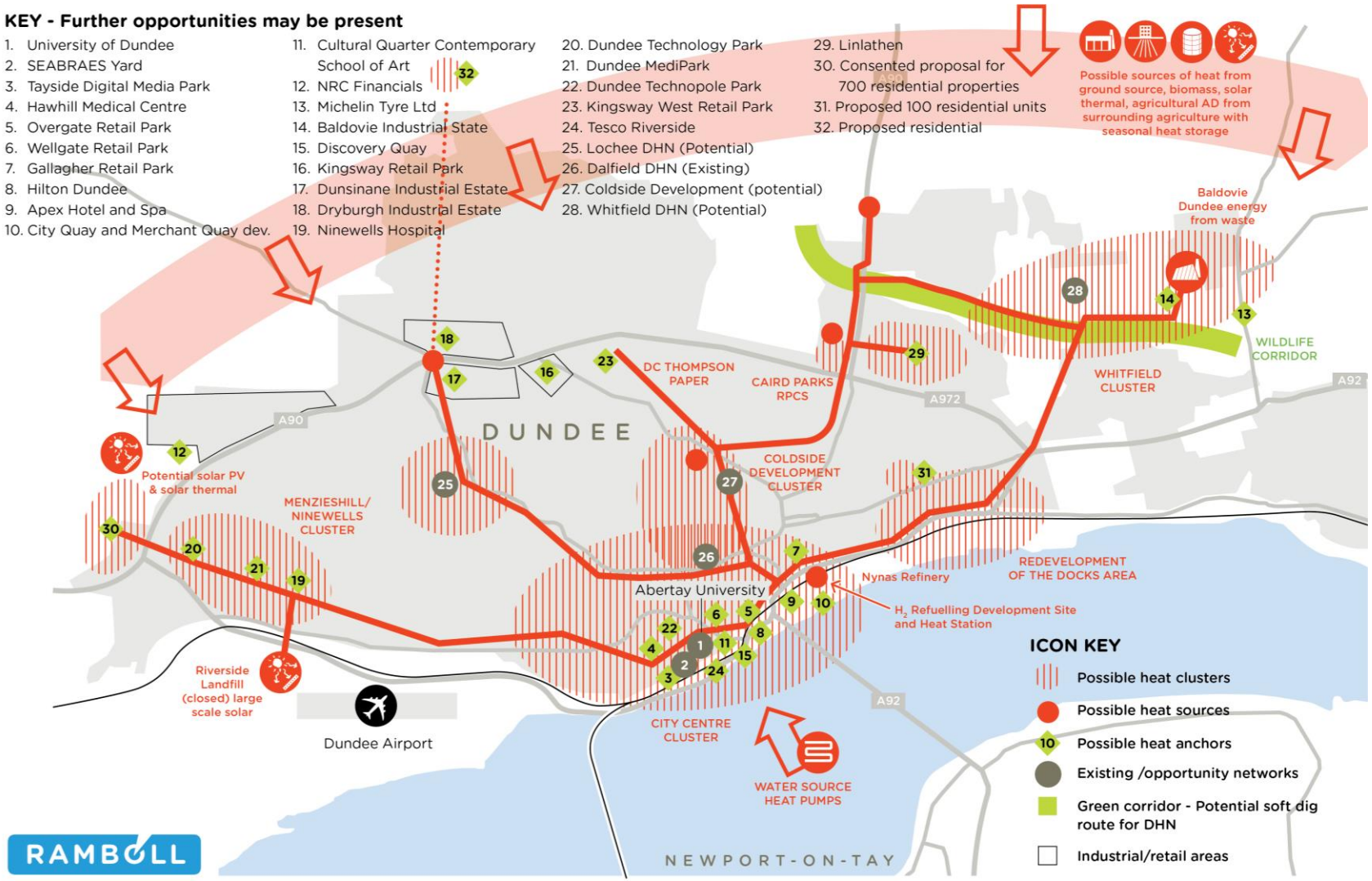
DEVELOPING THE VISION

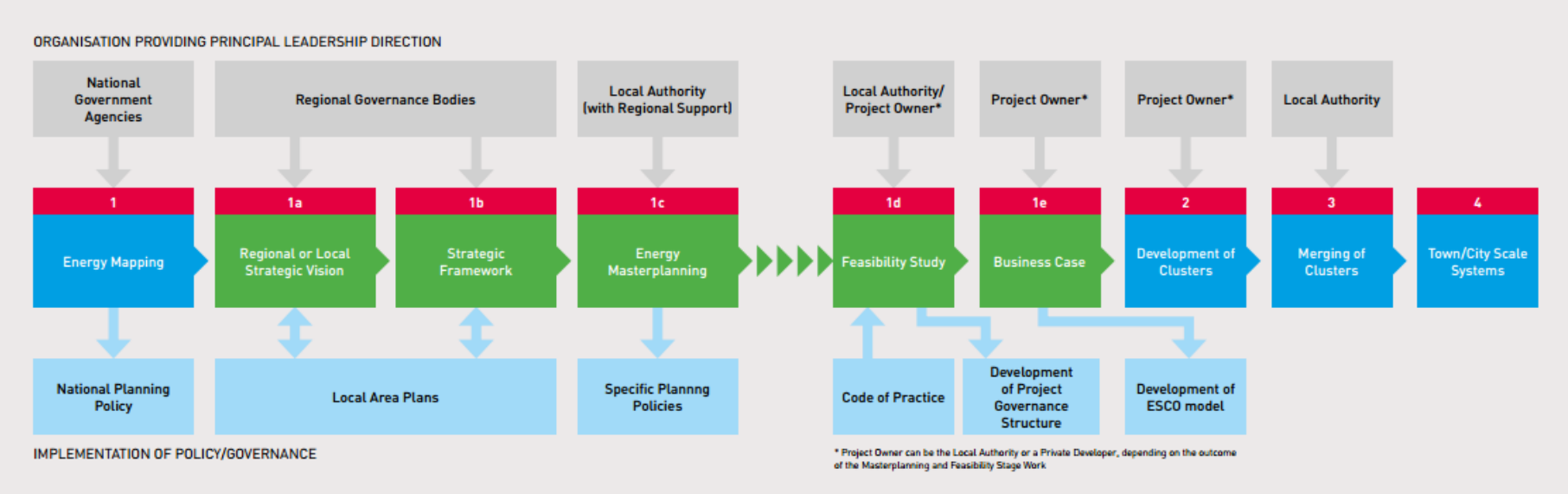
- Demand
  - Heat map data
  - Anchor properties and future development
  - Enhanced demand information
  - Operating system performance
- Supply
  - Existing heat production capacity
  - Energy resources
  - Storage

RAMBØLL

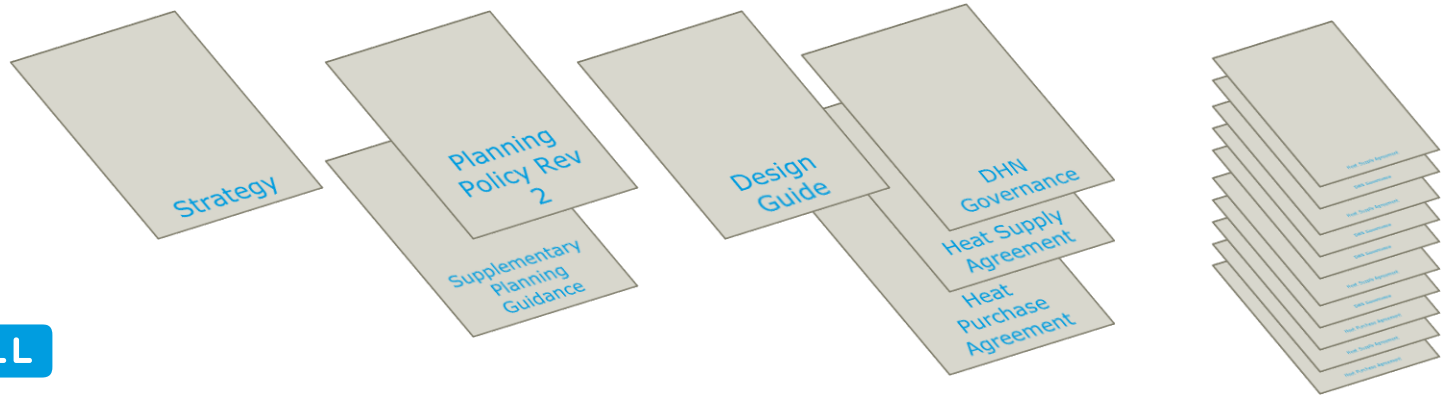
DEVELOPING THE VISION – SPATIAL MAPPING



PREPARING THE STRATEGY – TIMELINE AND OVERALL CONTEXT



From: Guide to Energy Masterplanning (Scottish Enterprise/Ramboll)



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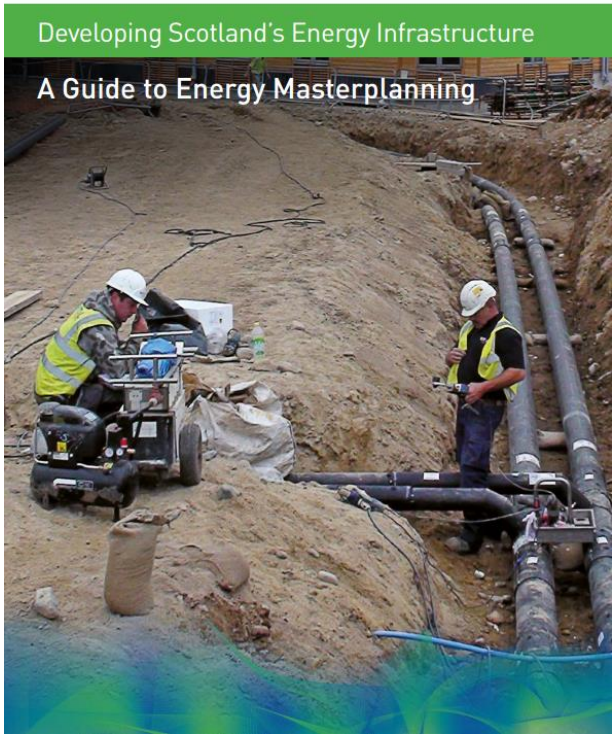
PREPARING THE STRATEGY - CONTENTS

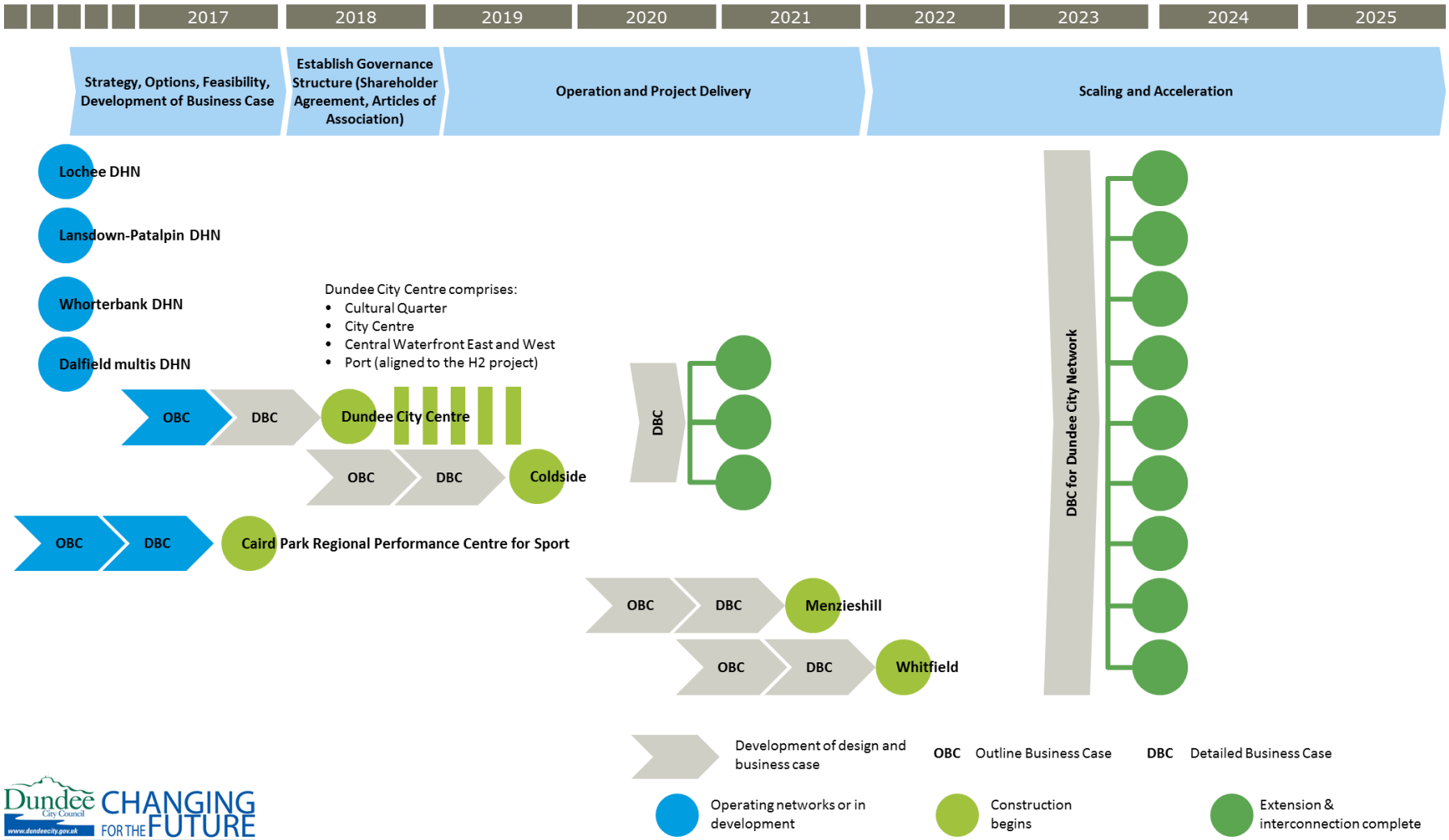
- Key benefits of district heating
- Stakeholders and other project participants
- Opportunity assessment of district heating loads
- Opportunities for heat supply
- Potential Heat Network Opportunities
- Planning and permitting
- Programme delivery and next steps
- Development of a business case

Scottish Enterprise



RAMBOLL

PREPARING THE STRATEGY - TIMELINE



Dundee City Council CHANGING FOR THE FUTURE www.dundeecity.gov.uk

RAMBOLL

ENABLING DELIVERY? - STAKEHOLDERS

- Strategy for engaging and building coalition of support among all stakeholders
- Developing a business case that is relevant and that the benefits are understandable to all stakeholders

Recognising that the perspective of each stakeholder is different

RAMBOLL

ENABLING DELIVERY – TECHNICIAL, LEGAL AND COMMERCIAL SAFEGUARDING

- Technical design standards – setting common design principles to ensure compatible hydraulics, temperatures, pressures, etc.
- Technical design standards - control systems compatible with one another and to enable Smart energy systems
- Stakeholder buy in – have to recognise and address consumer's needs
- Updating planning policy to create supportive conditions for DH
- Commercial and legal arrangements in delivery companies with flexibility for expansion of energy systems

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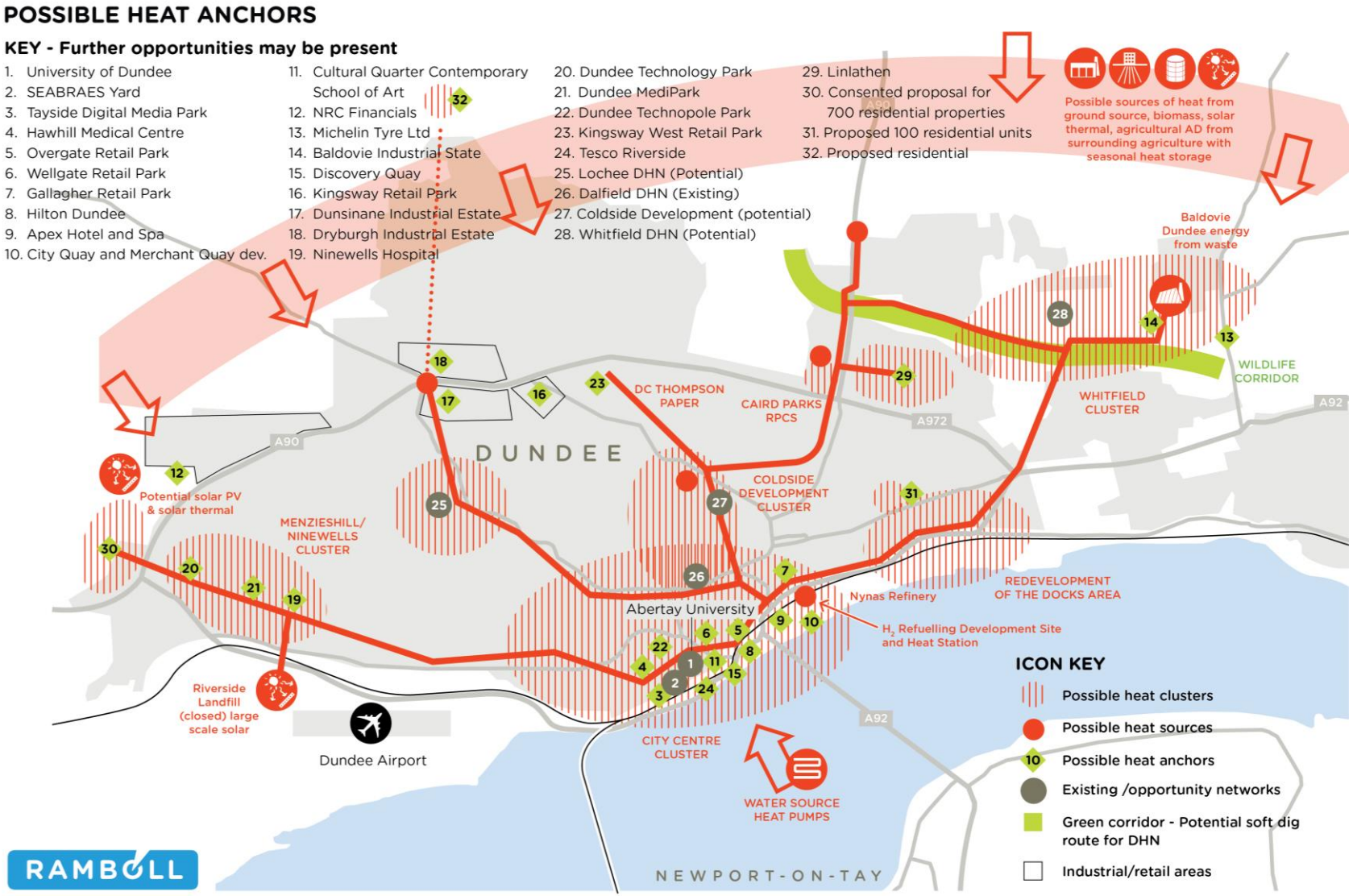
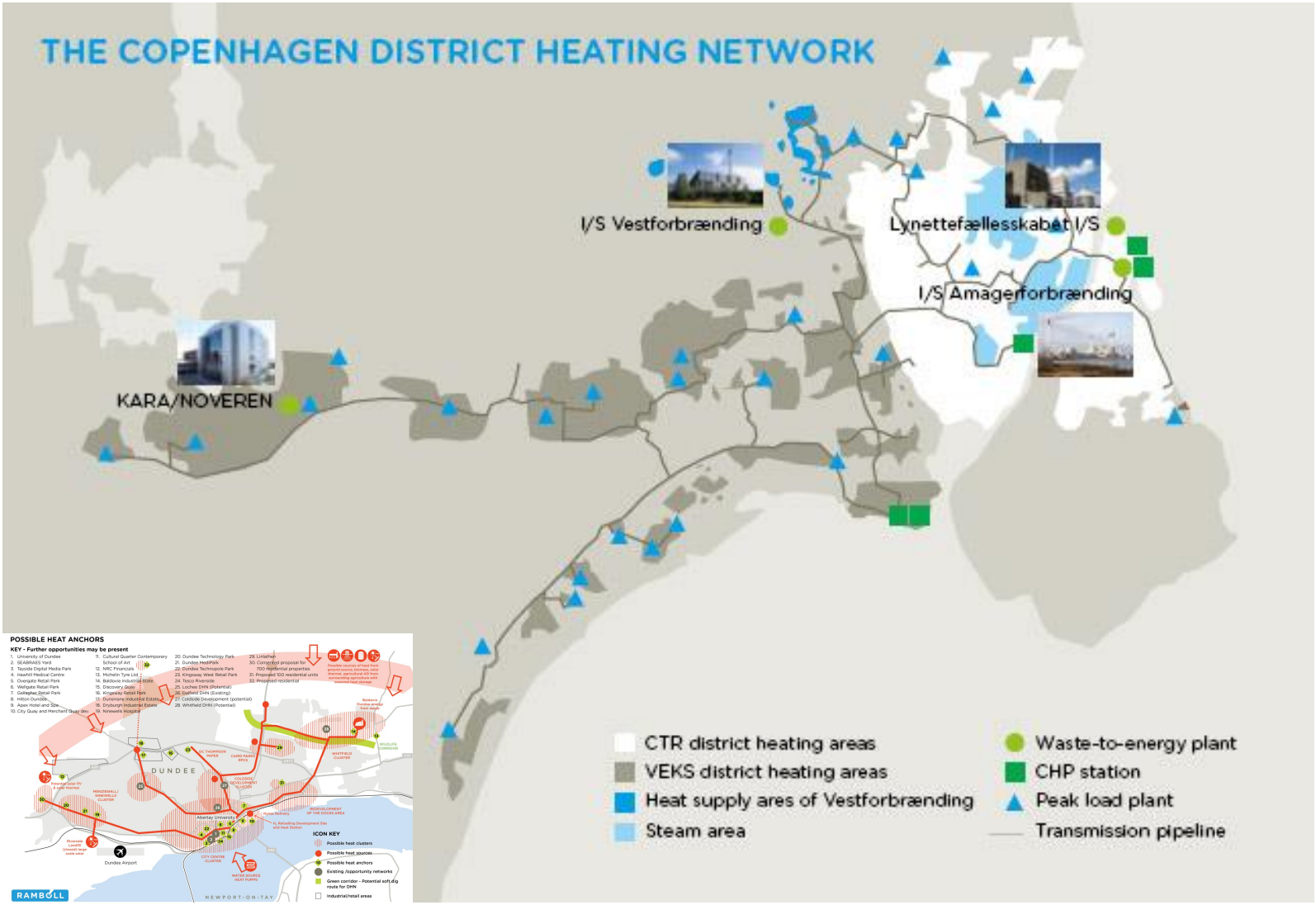
STRATEGY IS A MEANS TO IMPLEMENTATION



HOW AMBITIOUS IS THIS?



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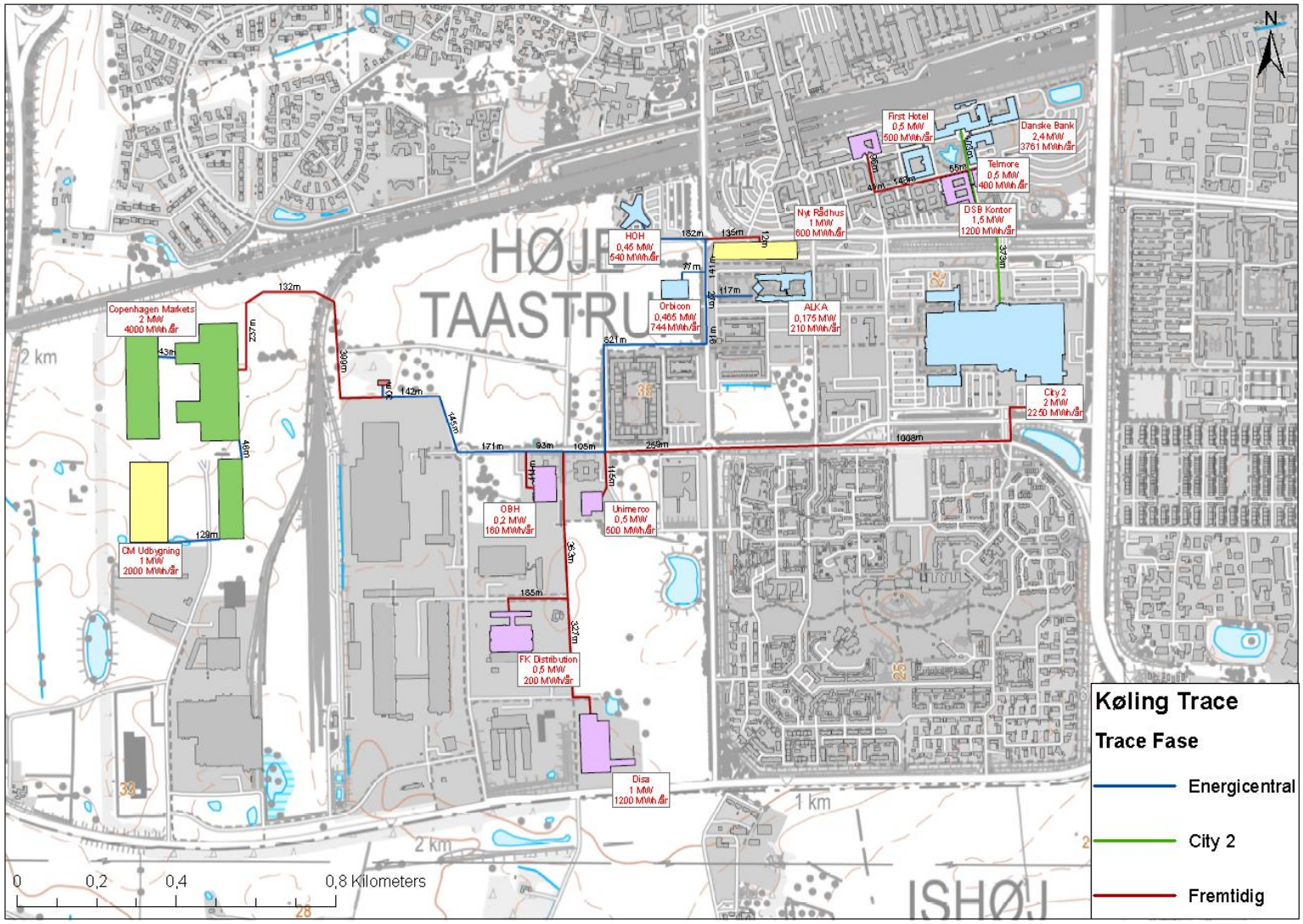
INTEGRATE COMBINED HEATING AND COOLING



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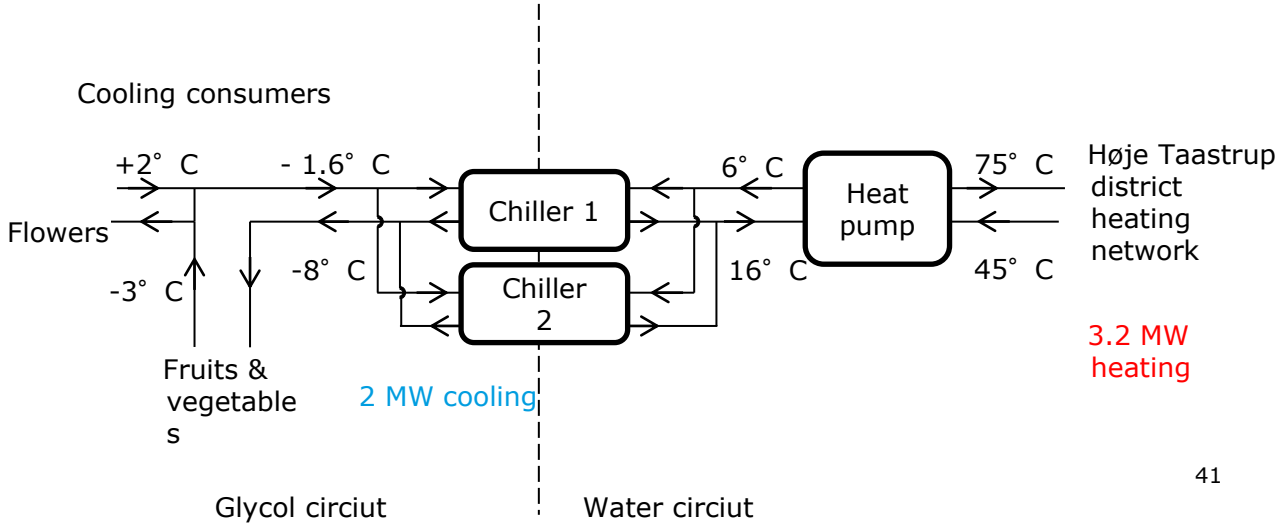
COPENHAGEN MARKETS
COMBINED HEATING AND COOLING

2 chillers + 2 heat pumps

Providing cooling for fresh fruit, flow and vegetable market hall in Copenhagen. Waste heat from cooling plant is enhanced and add to district heating for the city.

- Heat sink:
  district heating water
  45ºC to 75ºC
- Combined COP (Heating + Cooling >3.60)
- 2.3 MW of heating
- 3.2 MW of cooling
- Heat source:
  Glycol/water
  16ºC to 6ºC
- Installed by ICS



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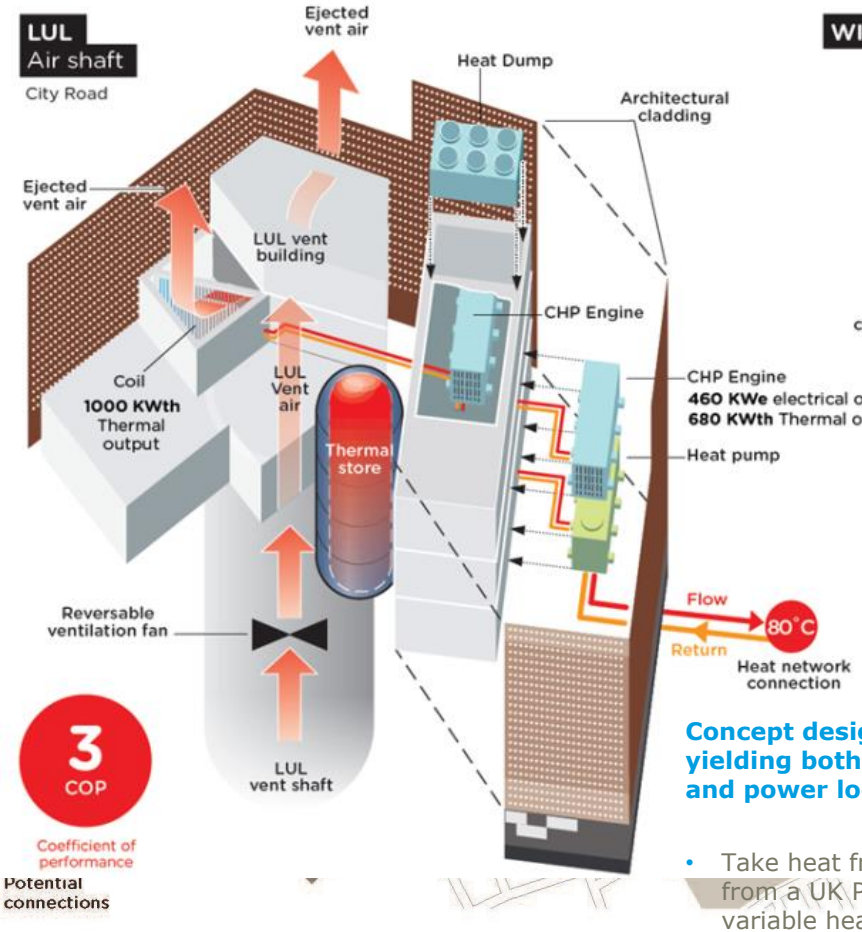
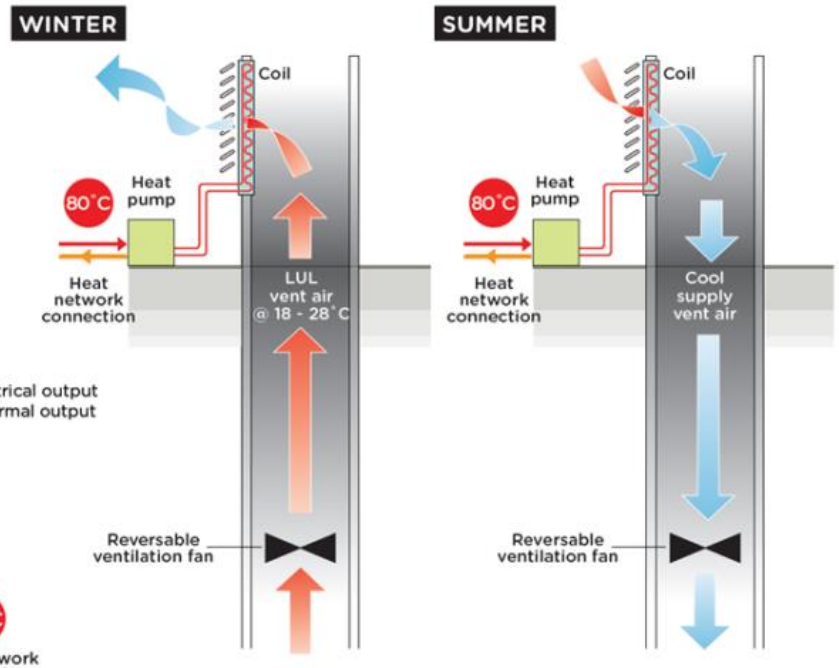
EXPANSION AND CONNECTION

BUNHILL HEAT NETWORK EXTENSION & HEAT RECOVERY

Heat source and ventilation opportunities



Ventilation shaft heat pump operation



Concept design to cut carbon emissions and fuel bills in the borough, yielding both financial and environmental benefits by generating heat and power locally in Islington, London

- Take heat from the exhaust air from the London Underground and heat from a UK Power Networks transformer cooling system. This low grade and variable heat source will be upgraded through the use of heat pumps to meet the Council's aim of providing more heat to their homes whilst keeping the energy costs affordable

RAMBOLL

THANK YOU

RAMBØLL

Tanja Groth

Decentralised Energy Manager

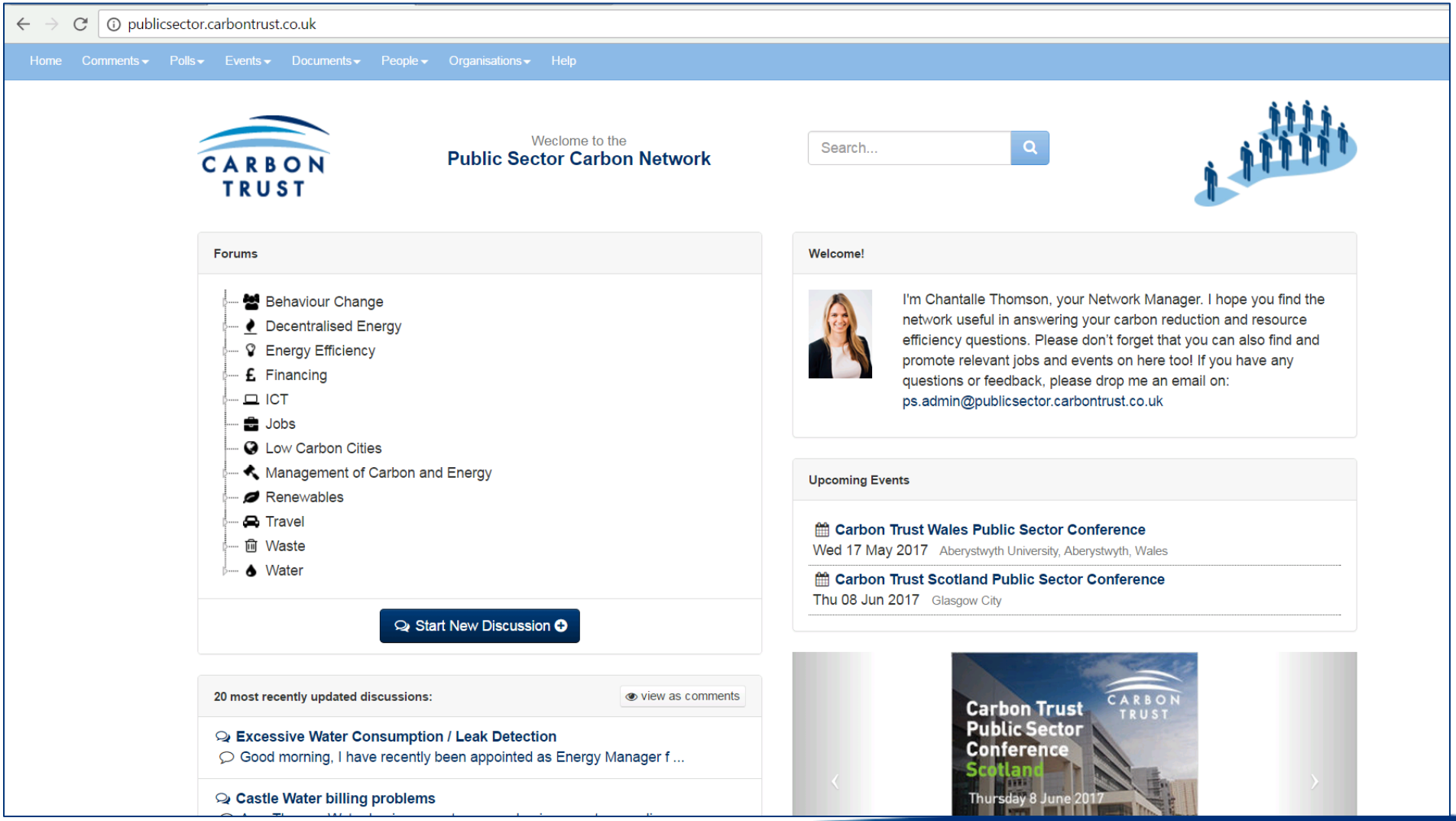
The Carbon Trust

Free Carbon Trust Support

Our mission to help you accelerate the transition to a sustainable, low carbon economy

Tanja, 16/05/2017

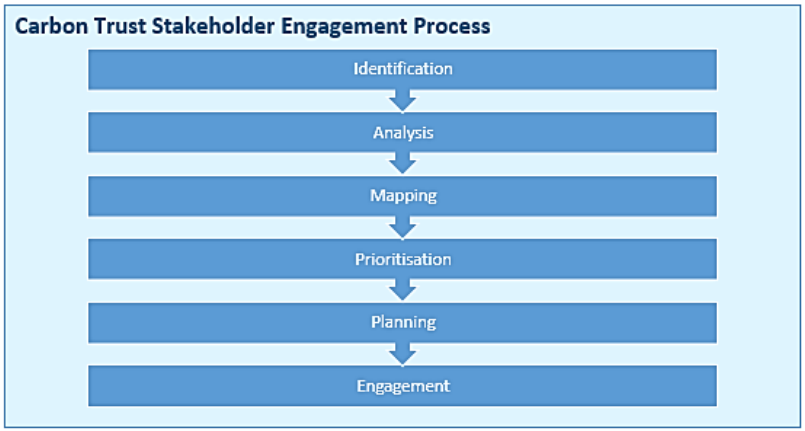
Join our Public Sector Network

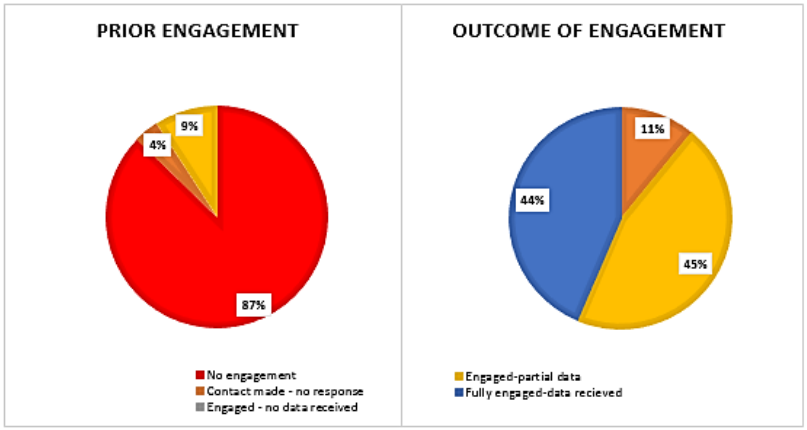


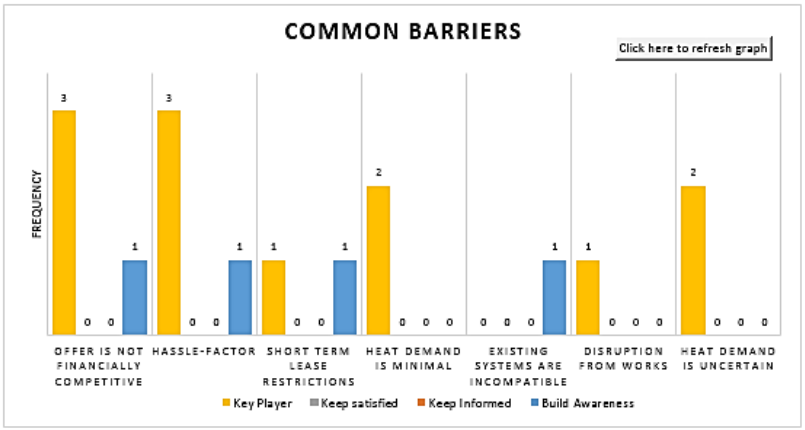
Download our Approach to Stakeholder Engagement

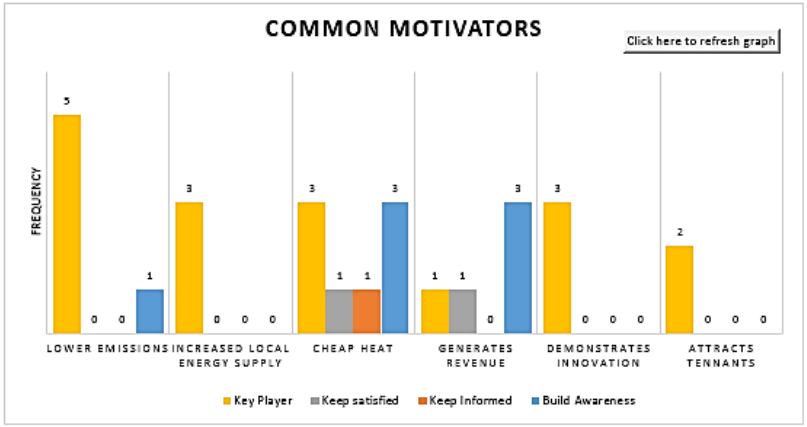
CARBON TRUST

STAKEHOLDER ENGAGEMENT TOOL



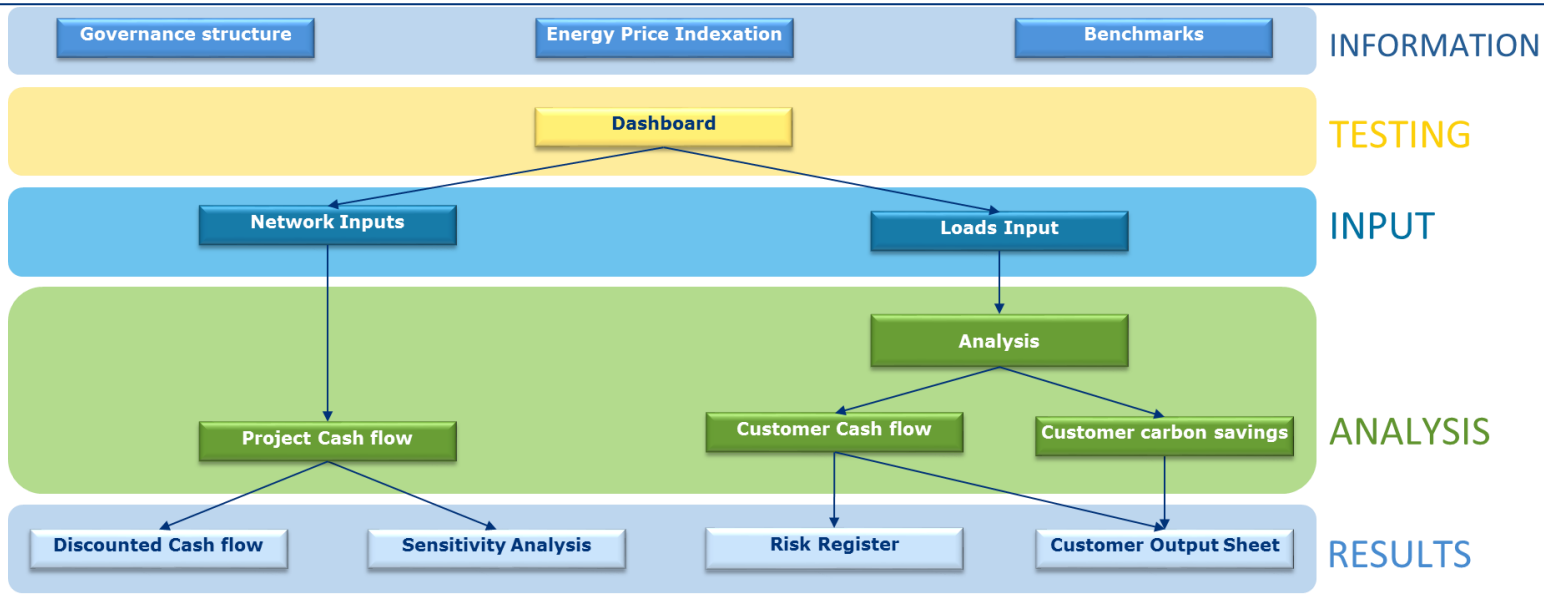


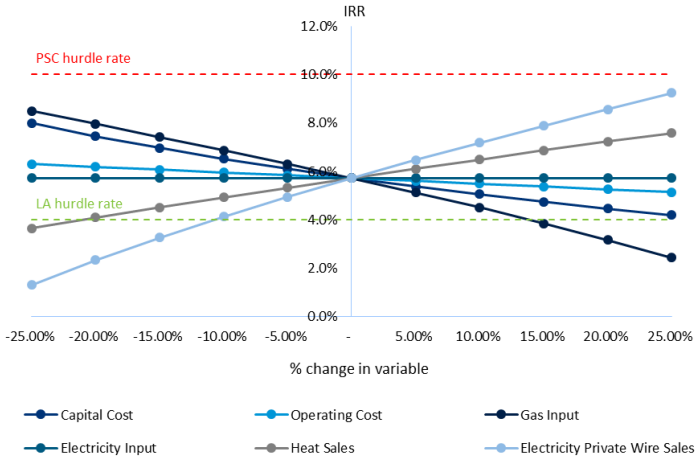


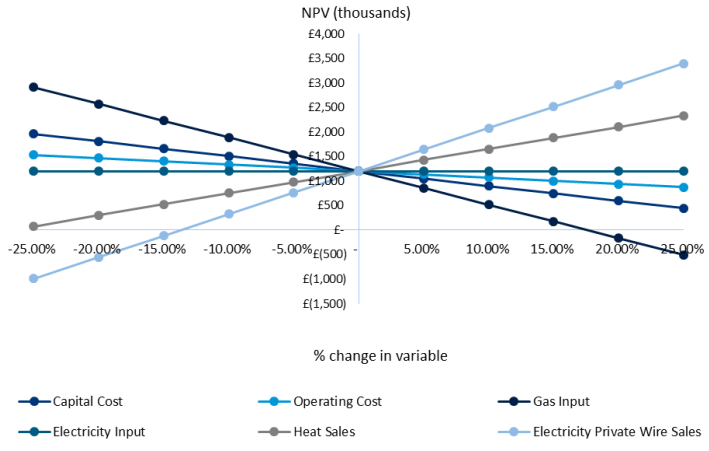


Request Our Quality Assurance Cashflow Tool (QACT)

https://www.carbontrust.com/resources/tools/heat-network-cashflow-template/







Attend our Scotland Conference

Carbon Trust Scotland Public Sector Conference

A dedicated Conference for Public Sector organisations in Scotland (and those in the north of England with ready access to Glasgow), for knowledge-sharing, solution-showcasing and peer-to-peer networking.

Date: 8 June 2017
Location: Glasgow Caledonian University, Cowcaddens Road, Glasgow G4 0BA

CPD accredited

The public sector has been at the vanguard of Scotland's commitment to cutting carbon and delivering national targets. It directly employs almost a quarter of the Scottish workforce – over half a million people. It also has a huge potential influence over buildings, infrastructure, the private sector and local communities.

Event Details

Thu, 08 Jun 2017

10am until 4.30pm

Glasgow Caledonian University, Cowcaddens Road, Glasgow G4 0BA

View on map

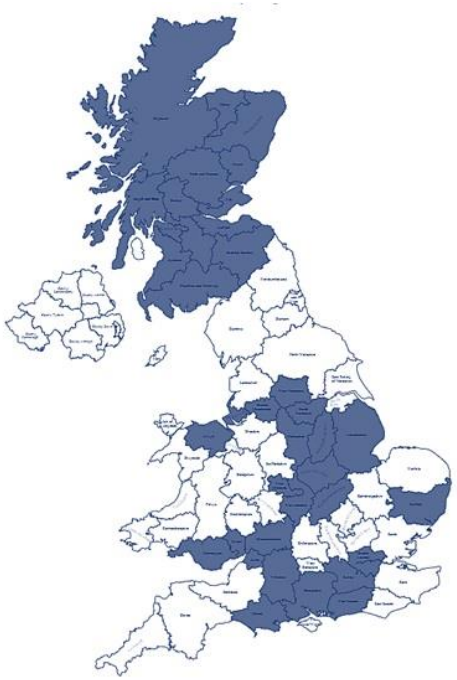
Public sector only

Free

Register

Carbon Trust Services (unfortunately not free)

- Since 2012, the Carbon Trust has successfully delivered heat network development support for **more than 40** heat network projects from energy mapping through to construction and delivery.
- In the last year, we have delivered support to 25+ HNDU-funded projects, with local authorities such as Stirling Council, Zero Waste Scotland, Birmingham City Council, Bristol City Council, Portsmouth City Council, Leeds City Region, Swindon Borough Council and Flintshire County Council.



Stakeholder Management	Planning Policy Support	Financial & Commercial Modelling	Technical Advice
Proven approach with up to 100% success rate using our **best practice model**.	Successful track record in **policy design** and as expert witness in hearings.	Best practice cash flow model template, **soft market tested** with investors and operators.	**15+ years' experience** in technical advice, procurement and project management support.

Our mission is to accelerate the move to a sustainable, low carbon economy

Keep in touch:

Dr Tanja Groth, tanja.groth@carbontrust.com
Roddy Hamilton, roddy.hamilton@carbontrust.com

https://www.carbontrust.com/resources/tools/public-sector-carbon-network/

Progressing Projects in Scotland – What are the opportunities?

Chair

Stephanie Clark, Scottish Renewables

Speakers

Neil Ferguson, Scottish Enterprise

Ian Dunsmore, Scottish Water Horizons

Dave Pearson, Star Renewable Energy

Tim German, Energy Systems Catapult

Neil Ferguson

Specialist - Energy

Scottish Enterprise

Low Carbon Heat: Opportunities and Support

Neil Ferguson
Scottish Enterprise

SCOTTISH DEVELOPMENT INTERNATIONAL

Scottish Enterprise

Scottish Enterprise – Economic Development

Scottish Enterprise aims to deliver a significant, lasting effect on the Scottish economy.

We have over **1100** staff and invest around **£300m** per annum in the Scottish economy.

Our four interconnected drivers of growth

SCOTTISH DEVELOPMENT INTERNATIONAL

Scottish Enterprise

About Scottish Development International

Scottish Development International (SDI) is the specialist trade and investment arm of The Scottish Government, Scottish Enterprise, and Highlands & Islands Enterprise.

SCOTTISH DEVELOPMENT INTERNATIONAL

Scottish Enterprise

Economic Development: Why Low Carbon Heat?

For example:

- Siemens estimate that £24bn will be invested in the UK to meet renewable heat targets (2013-20).
- DECC's Heat TINA estimated that innovation in heat technologies has the potential to add c. £25bn to UK GDP by 2050
- Scottish Government draft Climate Change Plan: by 2032, 80% of domestic + 94% non-domestic buildings supplied by low carbon heat with **virtually all natural gas boilers replaced**

Low Carbon Heating: SE Strategic Approach

- Maximise economic benefits **within Scotland** from new market opportunities in low carbon heat
  - Build the Scottish supply chain to take advantage of domestic growth
  - Targeted inward investment to fill key supply chain gaps.
- Maximise the **potential for exports** to identified key international markets
- Develop Scotland as a **leading location** for innovative solutions
  - Support for indigenous companies to innovate
  - Encourage innovative inward investors

Scotland's Heating & Cooling Industry

SE Company Survey

Identified 227 low carbon heating and cooling companies in Scotland

Majority in design and installation of equipment although also a significant manufacturing base

Heat recovery, storage, heat pumps, bio fuels and fuel cell companies present

Strong core of companies in the heat control, sensors and monitoring areas

The four clusters			
Heat Generation	**Cooling**	**Energy Management**	**Heat Distribution**
Heat pumps		**Controls**	**District heat**
Efficient heat / fossil fuels (eg CHP / fuel cells)		**Sensors**	**Heat storage**
Geothermal	**Heating, Ventilating and efficient air conditioning**	**Heat modelling**	**Waste heat recovery**
Burning organic matter, biomass	**Refrigeration**	**Energy monitoring**	-
Solar thermal	-	**Demand management**	-

SCOTTISH DEVELOPMENT INTERNATIONAL

Scottish Enterprise

Scottish Market Opportunities: 'Short term'

Essential element of Smart Energy System implementation

DECC forecast 10 fold increase in heat output by DH schemes (30 TWh) by 2030

DECC forecast 1m heat pumps installed in UK and 150,000 in Scotland by 2030

Scottish Government predict 50% non-domestic heat supplied by biomass by 2050

Forecasts of 5- 23% of total UK gas demand to be supplied by bio-methane by 2050

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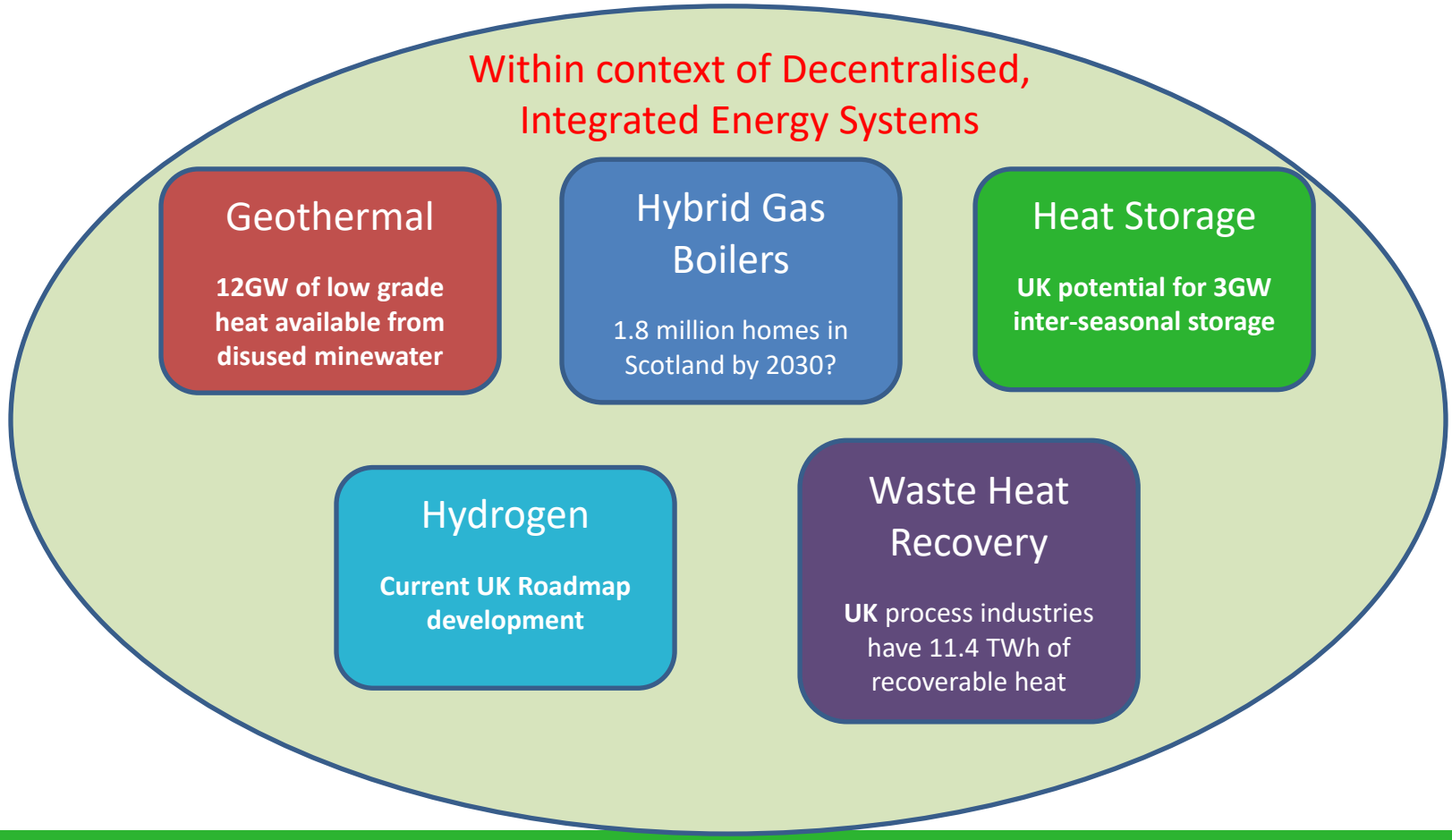
Opportunities for Innovative Technology



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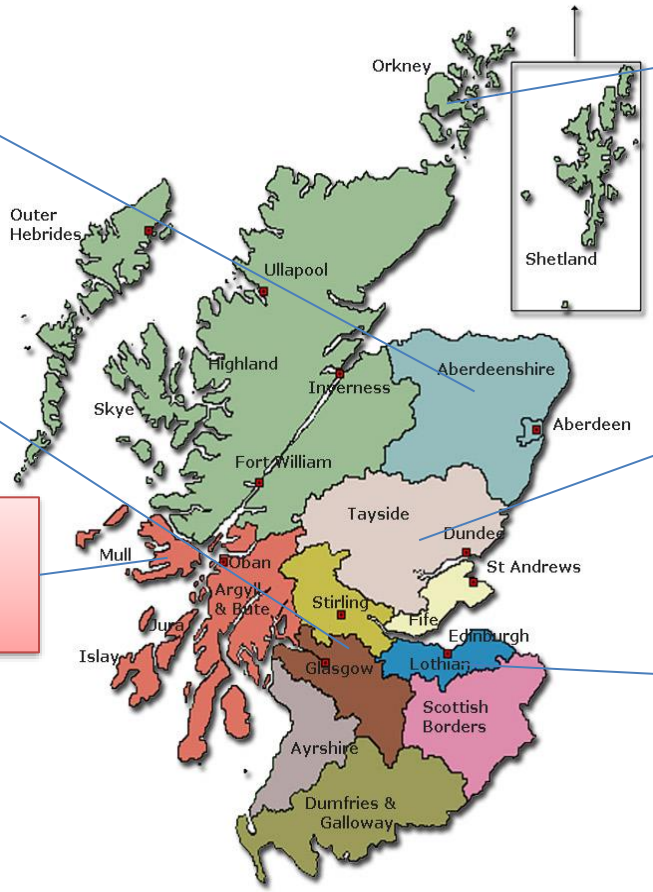
There's a lot going on in Scotland....

Energyzing Insch project
£4.3m Scottish Government grant to develop local energy grid - project to generate renewable heat and electricity, battery storage and fibre optic network for active network management

Hartwood Geothermal project
Scottish Government grant to look at the feasibility of extracting heat from mine water

Mull Hydro-Heat 'Access' Project
Hydro scheme matching local energy generation with local energy demand to heat homes on Mull



Orkney Surf n Turf
Hydrogen from electrolysis for fuel cell use in buildings and berthed ferries.

Keithick Biogas plant
AD bio-methane grid injection plant producing 3 million m3 of biomethane for the gas grid

East Heat
Heat battery storage system for domestic hot water powered by solar pv system

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....and plenty of opportunity globally

For example:

China: Use of renewable heat in buildings will double by 2020, and its deployment will account for 60% of total global growth.

France: aggressive energy efficiency programmes – 2012 directive to reduce residential buildings heat use from 150 to 50 kWh/m2

Sweden: Aims to phase out fossil fuel heat and achieve a 50% renewable share in final demand by 2020.

USA: 10-15 States have strong incentives for renewable heat. ≥400 kWe gas CHP market to grow 12% / year.

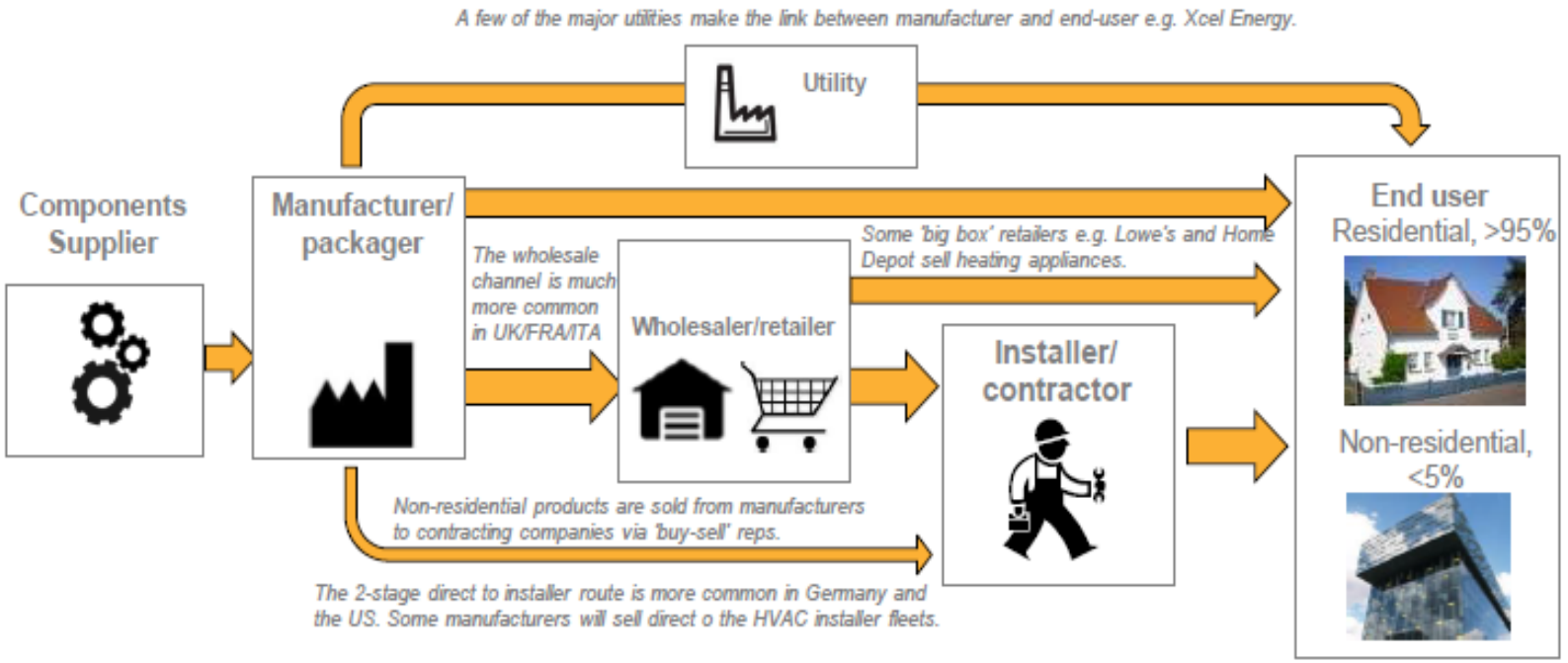
SE/SDI Initiatives 2014-17

- Survey of Scottish companies involved in low carbon heat (Innovas)
- Scottish LC Heat sector ‘cluster’ mapping & analysis
- Research into key international opportunities (Delta EE)
- Research into **operation of heat market**: UK & international (Delta EE)
- Catalogue of Scottish capability to support low carbon heat innovation (BRE)
- Development of **Low Carbon Heating Expert Support** programme
- Geothermal learning journey to Iceland

‘Team Scotland’ approach with HIE, Scottish Government and members of the Scottish Heat Network Partnership

Understanding the landscape – market operation

Conventional and novel boiler supply chain, USA



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Low Carbon Heat Expert Support Programme

- Designed to help companies consider and build strategies to enable them to plan for and win business in the low carbon heat sector
- Awareness raising workshops + provides up to **2 days worth (100% funded) of one-to-one support** for companies
- Delivered by specialist suppliers who have knowledge and experience of the sector

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Broader economic development support

- **Company Growth services:** support for IP development, strategy development, planning, marketing, people development etc.
- **SMART: SCOTLAND:** Grants that support technical and commercial feasibility studies and R&D projects.
- **R&D Grant:** Grants to support industrial research and experimental development.
- **Collaborative R&D grants: e.g** supporting customer-supplier co-developments
- **Regional Selective Assistance (RSA):** to support investment that will directly result in the creation or safeguarding of jobs in Scotland.
- **Scottish Investment Bank:** seed, co-investment and venture funding
- **SDI Trade support:** overseas visits, missions, strategic reviews etc.

Ian Dunsmore

Heat from Wastewater Project Manager

Scottish Water Horizons

Energy and heat opportunities

Ian Dunsmore

Scottish Water Horizons

Scottish Water Horizons

Scotland's Targets

- **100% electricity consumption from renewable sources by 2020 (interim 50% target by 2015 met)**
- **The new strategy calls for a 66% reduction in emissions by 2032**
- **11% heat from renewable sources by 2020**
- **80% of Scottish homes to be heated using low-carbon technologies by 2032**

Scottish Water Horizons

Scottish Water

- **Serve over 5 million customers**
- **£1.18 billion turnover**
- **Energy use 445GWh/year - 3rd highest OPEX cost**
- **Hosting/self-generating 2x power consumed**
- **Developed hydro, wind, PV, biomass and biogas on SW sites and now with partners on their sites**
- **Design, Build, Finance, Operate and Maintain model available**

Thinking Differently
Wastewater = an energy source
Sewers = distributed heat opportunity

Over **50%** of Scotland's total energy use comes from heat

Over **50%** of Scotland's greenhouse gases result from heat

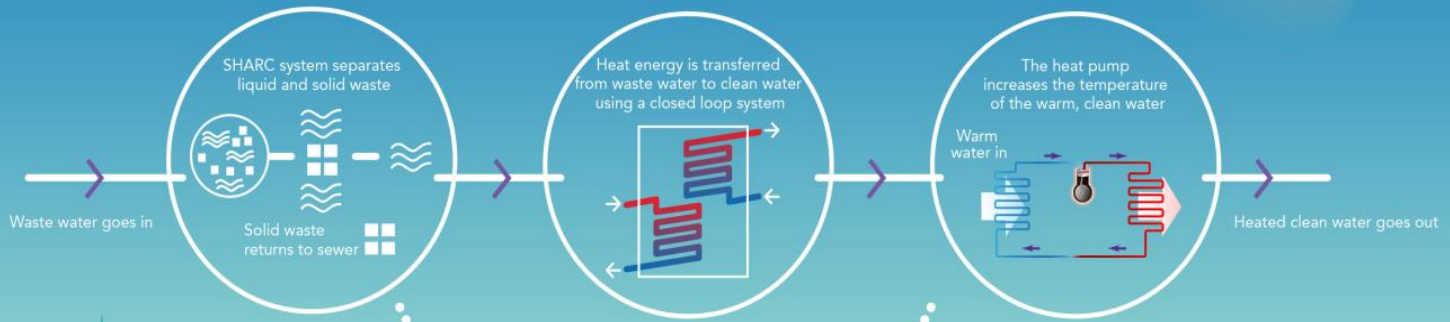
£2.6 billion spent each year in Scotland on heating and cooling

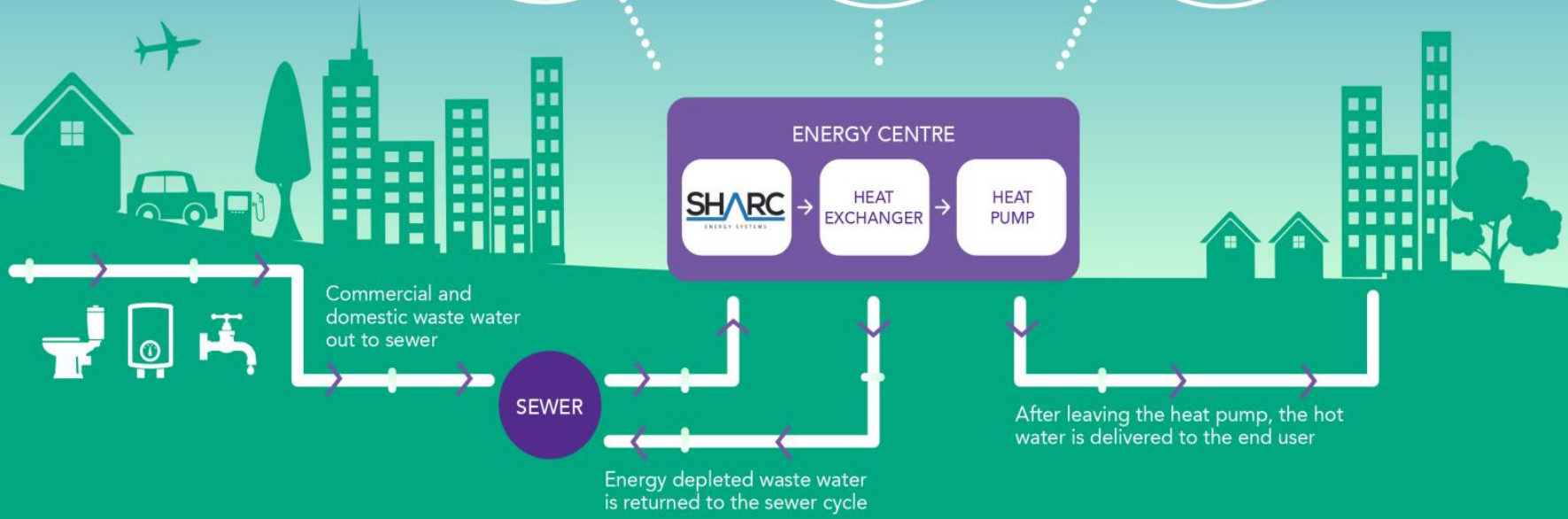
Over **921 million litres** of waste water are produced in Scotland each day

Over **31,000 miles** of sewers (distributed heat) across Scotland

Scottish Water Horizons

Capturing heat from waste water



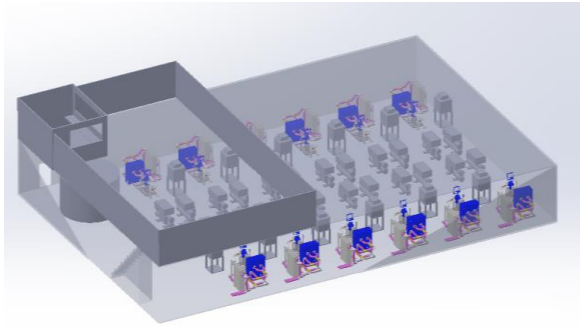


Scottish Borders Campus

1st installation in the UK

Scottish Water Horizons

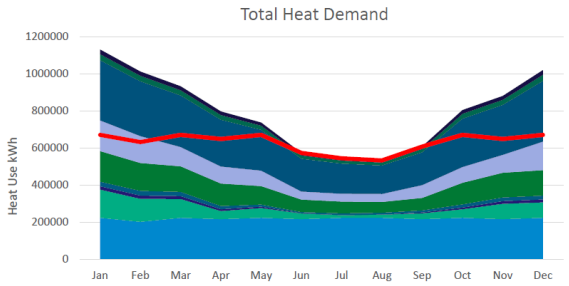
Clyde Gateway

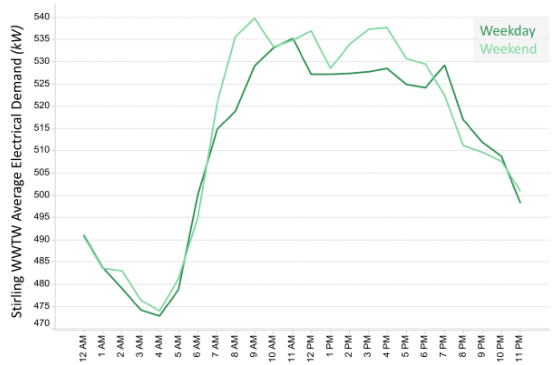


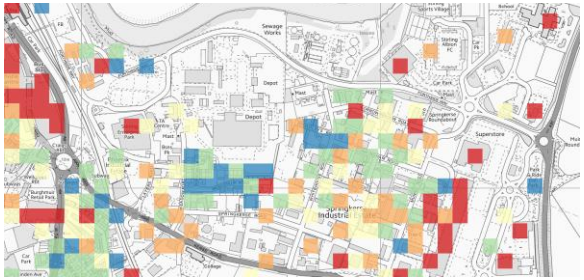
- **Regeneration Project on the East side of Glasgow**
- **80 Hectares of reclaimed land being developed**
- **SHARC technology being adopted to provide district systems for heating and cooling**
- **As part of the project SHARC will base their Scottish operational office within the redevelopment site**

Scottish Water Horizons

Stirling District Heating







- **Installation of a Hydrogen Fuel Cell and heat from wastewater system on Stirling wastewater treatment works**
- **Biogas from site AD plant used in Fuel Cell to generate electricity and heat**
- **Electricity used to power the heat pump and the treatment works with the heat being sold to district heating network operated by Stirling Council**
- **Delivering air quality benefits as well as low carbon district heating**

Scottish Water Horizons

Bandwidth

- **Group of 3 individual buildings across Scotland**
- **Aqualibrium: Library and leisure centre in Campbeltown**
- **Pickaquoy: Multi use community hub in Kirkwall**
- **Kelvingrove: Art gallery and museum in Glasgow**
- **All sites utilising heat from wastewater technology to displace fossil fuel**

Scottish Water Horizons

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Energy Systems Catapult

Energy Systems Catapult

CATAPULT
Energy Systems

Unleashing innovators and industry by enabling access to relevant energy research and collaboration opportunities

Follow us:
@EnergySysCat

What is a Catapult?

- Government business **innovation** intervention
- Part of a **world-leading network** of technology and innovation centres
- Build on existing grant and networking support
- **Bridge the gap** between businesses, academia, research and government
- A long-term investment to **transform** the UK's ability to create new products and services
- Open up global opportunities for the UK and **generate sustained economic growth** for the future
- Established and overseen by **Innovate UK**

Since 2013
11 Catapults
£1.6 billion

The Energy Systems Catapult

Whole System Analysis

Convene key stakeholders, develop and apply research, analysis and modelling capabilities to help UK make strategic choices about transition pathways and innovation prioriities collaborating with industry, Government and academia

Innovation & Commercialisation

Whole systems architectures; systems integration; consumer insights; subject matter experts; development; “product” management; energy knowledge exchange; collaboration; targeted support for SMEs

Test & Demonstration Platform

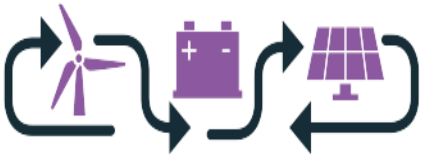
Whole systems; facilities, capabilities and best practice; alliances and partnerships; appropriate scale; multi-vector; technical, commercial, business; Consumers insights; mitigate risk and reduce time to market; realistic pricing of risk

Collaboration & Consensus
UK Energy Transition Pathways & Innovation Priorities

Today…

Reactive policy landscape creates **innovator and investor risk**
Complex, diverse scenarios create **innovation indecision**

Convene key stakeholders, including the Energy Technologies Institute's Strategy Analysis Function, Committee on Climate Change, National Grid, UKERC, WholeSEM and academia, to further develop and apply research, analysis and modelling capabilities and deliver clear strategic recommendations to enable informed transition pathway and innovation priority choices in collaborating with industry, Government and academia



Transition Pathways are transforming aerospace and automotive. Catapult will help do the same for energy.

Catapult helps stakeholders with objective strategic whole systems analysis and clear communication

Future Power Systems Architecture (FPSA)

To work with **stakeholders** to create a platform to determine a system architecture for the **whole GB electricity system** and catalyse its implementation to support transformation by 2030

Drivers of new or extended functionality

- The flexibility to meet changing but uncertain requirements
- The change in mix of electricity generation
- The use of incentives to enable customers to benefit and the system to operate more efficiently
- The recovery from major events or emergencies
- The active management of networks, generation, storage and demand
- The emergence of new parties providing new services to customers
- The emerging need for coordination across energy vectors

Enabling Framework

Each of the 35 identified functions can be aligned with one (or more) of these seven key drivers

The Institution of Engineering and Technology

Enabling Frameworks
opportunities for engagement

- FPSA 2 Findings and Recommendations Report Launch – 23rd June at IET, Central London.
  Plenary and workshops (including policy and academic interaction)
  Please register:
  https://www.eventbrite.co.uk/e/future-power-system-architecture-phase-2-fpsa2-report-launch-tickets-33659240695

- Enabling Frameworks – central to way forward will be active engagement with academia
  1. work together to further progress e.g. ‘use case development’
  2. actively engage with one (or more) of the 16 identified R&D project opportunities.

Smart Systems & Heat

CATAPULT
Energy Systems

Smart Systems and Heat Phase One

Follow us:
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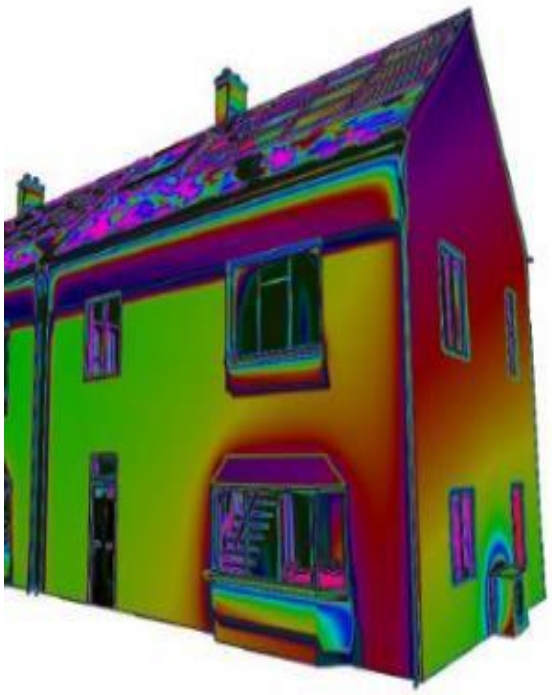
ETI's Smart Systems and Heat Programme

Delivered by CATAPULT Energy Systems

energy technologies institute



"Creating future-proof and economic local heating solutions for the UK"

- Connecting together – the understanding of consumer needs and behaviour with the development and integration of technologies and new business models into…
- Delivering enhanced knowledge amongst industry and public sector
- Resulting in industry and investor confidence to implement from 2020 which enables a UK heat transition

ETI members

bp, CATERPILLAR, EDF ENERGY, Rolls-Royce, Shell, Department for Business, Energy & Industrial Strategy, EPSRC Pioneering research and skills, Innovate UK Technology Strategy Board

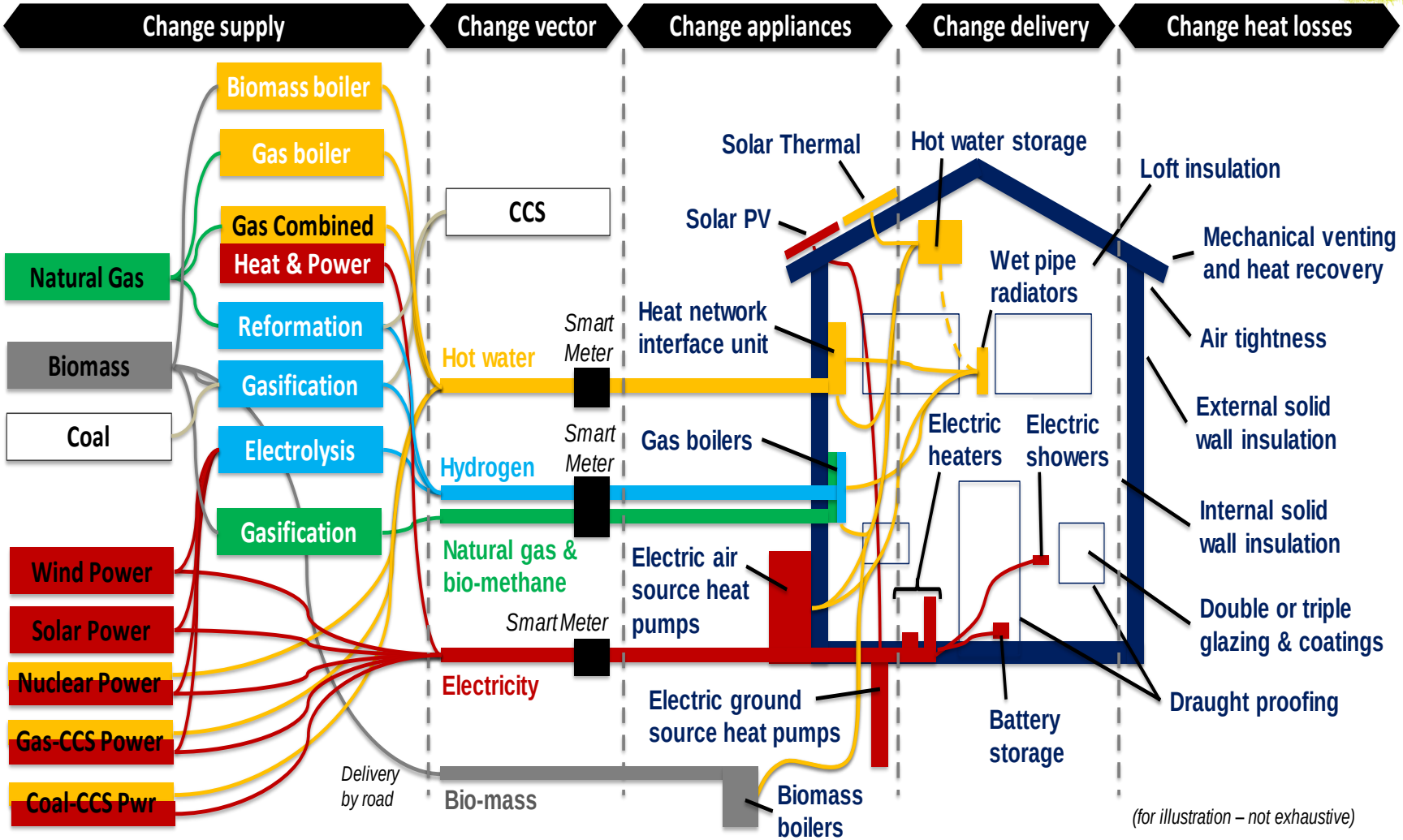
ETI programme associate

HITACHI Inspire the Next

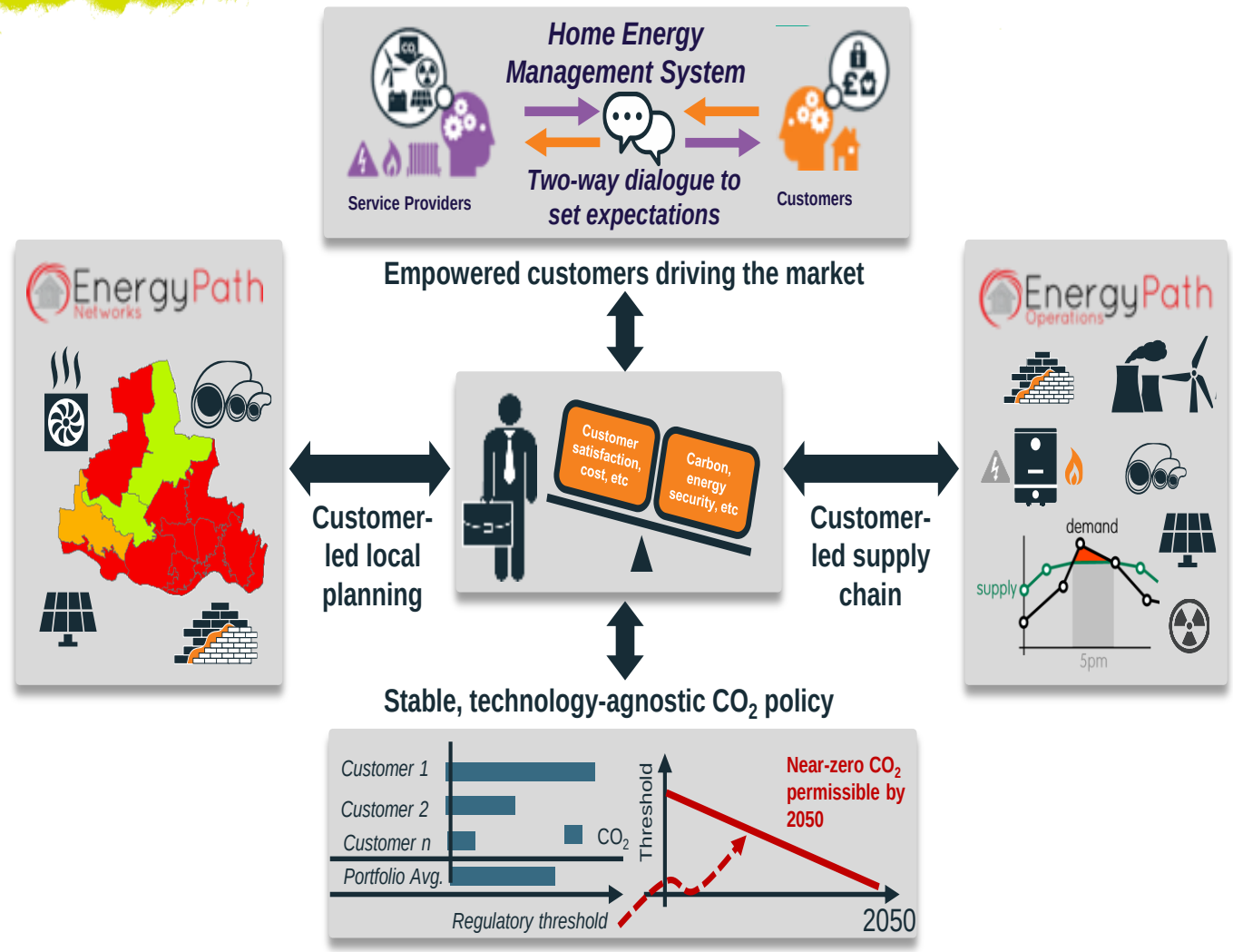
The Energy Systems Catapult will deliver Phase One of the SSH programme as a supplier to the ETI following the transition of the SSH programme team to the Catapult. From 2017 the Catapult will be responsible for delivery of Phase Two of the programme independently of the ETI.

Decarbonising domestic energy is a very complex systems integration challenge

CATAPULT Energy Systems



SSH is creating an ecosystem to help the energy sector make a customer-centric market really work



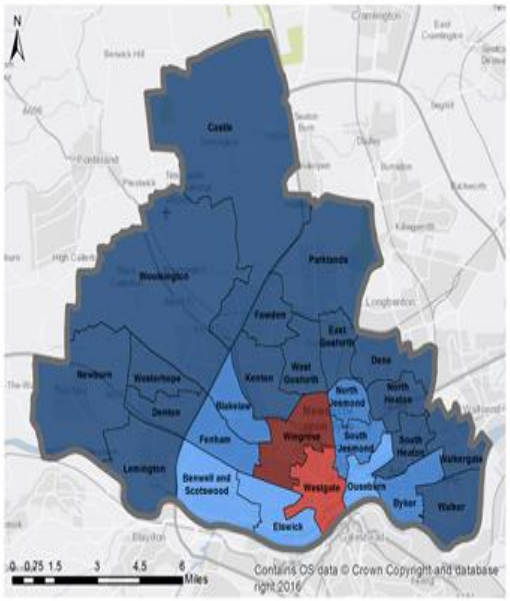
Currently working with three local authorities to deliver Area Energy Strategies

– **Newcastle**
– **Greater Manchester (Bury)**
– **Bridgend (with the Welsh Government)**

• A spatial Energy Study has also been delivered to GMCA:

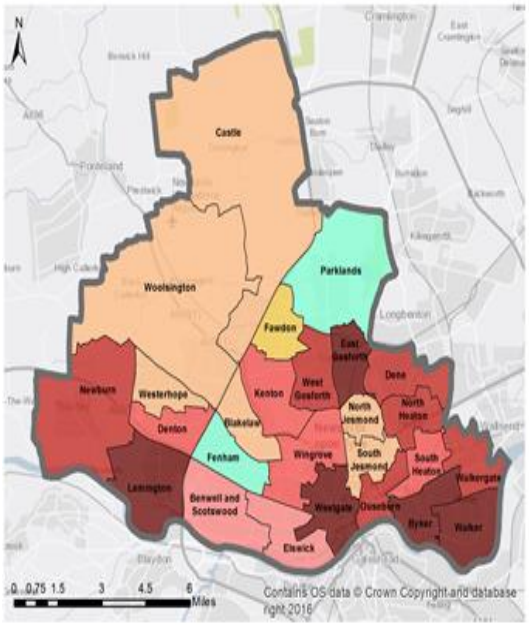
https://es.catapult.org.uk/wpcontent/uploads/2016/05/Compressed_GMCA_Spatial_Energy_Plan_2016_11_07-LATEST-ilovepdf-compressed.pdf

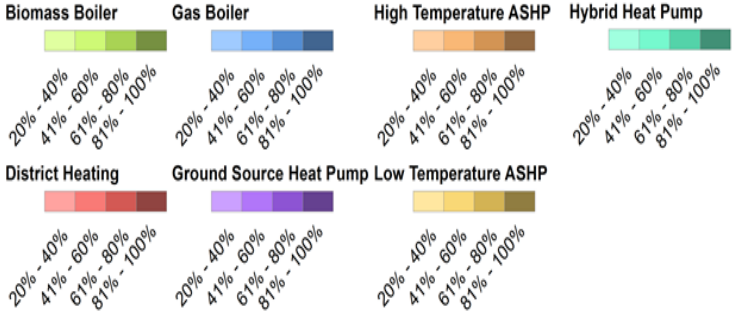
Business As Usual



Dominant Heating System by Ward (2050)

Carbon Target





SSH in Scotland and next steps

- **Scottish LAs part of SSH Local Authority Forum**
  - **Discussions with Scottish Government, Fife Council, OREC, Community Energy Scotland, SPEN re: integrating SSH in Levenmouth**
- **Separate discussion re: whole systems approaches discussions with EMEC in Orkney and, providing technology demonstration opportunities for SMEs at PNDC**
  - **Develop an EnergyPath Networks - centric offering for supporting Local Authorities and their partners in the preparation of local area energy plans**
- **Build an SME community that can bring new technologies for consideration for inclusion in the EPN tool area energy plans**
  - **Further develop and strengthen EnergyPath Networks and add new capabilities, e.g. Hydrogen**

Thank you

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