

# Developing & Delivering District Heating Projects



**Paul Moseley**  
Scottish Futures Trust

# Role of the public sector

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# Agenda (morning)

<b>10:05 – 10:20</b>	<b>Policy context</b>
<b>10:20 – 10:50</b>	<b>Developing a district heating project</b>
<b>10:50 – 11:20</b>	<b>Case study: Aberdeen Heat &amp; Power</b>
<b>11:20 – 11:40</b>	<b>Coffee</b>
<b>11:40 – 12:10</b>	<b>Public bodies' powers and duties</b>
<b>12:10 – 12:40</b>	<b>Case study: Danish DH business models</b>
<b>12:40 – 13:00</b>	<b>Q&amp;A</b>

# Agenda (afternoon)

<b>14:00 – 14:30</b>	<b>Business models for district heating projects</b>
<b>14:30 – 15:00</b>	<b>Procurement considerations</b>
<b>15:00 – 15:30</b>	<b>Public sector opportunities &amp; challenges</b>
<b>15:30 – 15:55</b>	<b>Q&amp;A</b>
<b>15:55 – 16:00</b>	<b>Concluding remarks</b>



# DEVELOPING & DELIVERING DISTRICT HEATING PROJECTS



# **Scotland's District Heating Ambition:**

**Draft Heat Generation Policy Statement,  
District Heating Action Plan and  
Heat Network Partnership for Scotland**

**13 May 2014**

**Rebecca Carr  
Senior Heat Policy Advisor**

# Scottish Government Policy Context

## Climate Change Act (Scotland) 2009

- at least **42% carbon emissions reductions by 2020** and 80% reductions by 2050, compared to 1990

## Energy Efficiency

- To reduce **total final energy consumption** in Scotland over the period to 2020 **by 12%**

## Renewable Energy

- 100% of Scotland's electricity demand** and **11% of heat demand** from renewables by 2020.
- at least **100,000 homes** to have adopted some form of individual or **community renewable heat technology**

## Fuel Poverty

- aim to ensure that **by November 2016**, so far as is reasonably practicable, **people are not living in fuel poverty in Scotland**

# Scottish Government Policy Context – District Heating Action Plan

EXPERT COMMISSION  
ON DISTRICT HEATING

Recommendations to  
The Scottish Government

14 NOVEMBER 2012

## 19 Recommendations

- Overarching measures**, including targets, coordinating team, district heating champions and heat mapping
- Planning and regulation**, including procurement and licencing
- Funding**, including development funding, extension of District Heating Loan Fund, Scottish Futures Trust work on loans / underwriting and funding for domestic connections



# Scottish Government Policy Context – District Heating Action Plan

## EXPERT COMMISSION ON DISTRICT HEATING

Recommendations to  
The Scottish Government

14 NOVEMBER 2012

1

## District Heating Action Plan


Response to the  
Expert Commission  
on District Heating

May 2013



# Draft Heat Generation Policy Statement

- Published on 4 March for consultation  
[www.scotland.gsi.gov.uk](http://www.scotland.gsi.gov.uk)
- Parliamentary Debate on 6 March  
“Maximising the Opportunities for Scotland from District Heating and Decarbonising the Heat System”  
[www.scottish.parliament.uk](http://www.scottish.parliament.uk)



  
The Scottish Government  
Riaghaltas na h-Alba

**TOWARDS  
DECARBONISING HEAT:**  
MAXIMISING THE  
OPPORTUNITIES FOR  
SCOTLAND

DRAFT HEAT GENERATION  
POLICY STATEMENT FOR  
CONSULTATION

# Draft Heat Generation Policy Statement

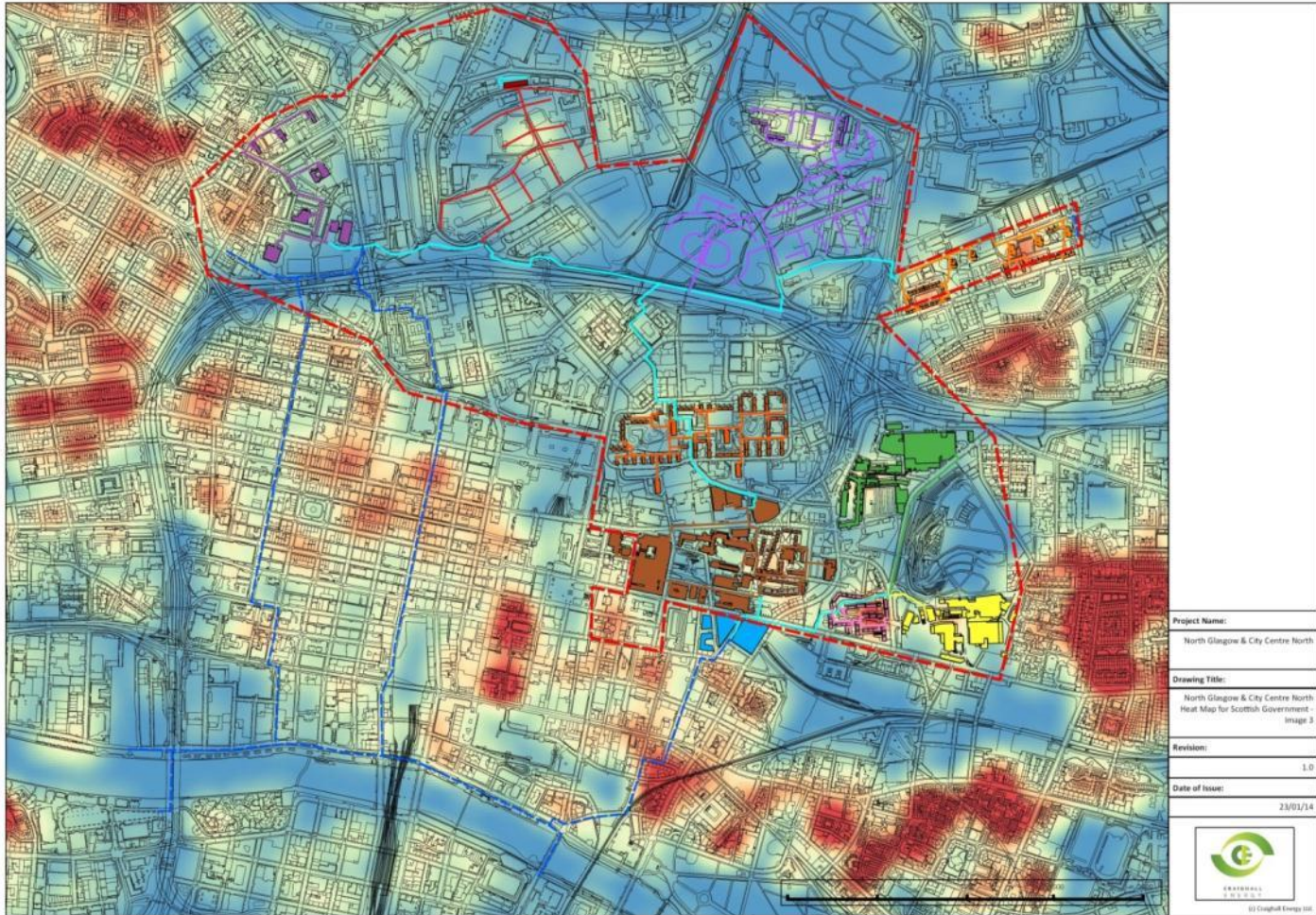
- Sets out how affordable, low carbon heat can reach more householders, businesses and communities.
- Provides a framework for effective heating and cooling for Scotland through to 2050.
- A framework for investment in the future of heat in Scotland.

# Draft Heat Generation Policy Statement

## Announcements

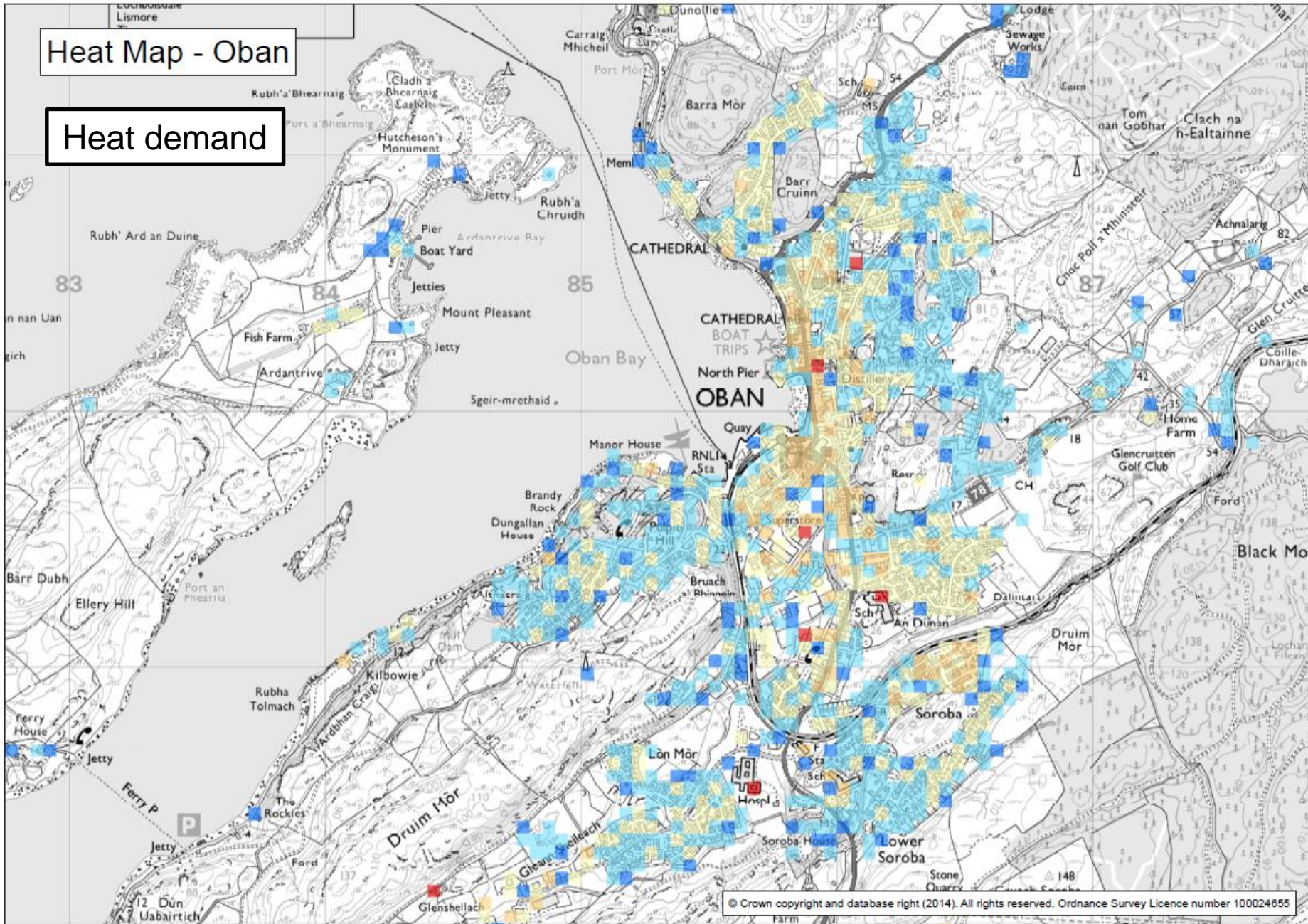
- The **national heat map** for Scotland
- A target of **40,000 homes** to benefit from affordable low carbon heat from district heating, part of an overall target of **1.5 TWh** of heat to be delivered by district heating by 2020, to both domestic and non-domestic properties.
- Increasing funding for the **District Heating Loan Fund** by over £4 million, making **£8 million** available over the two years 2014 to 2016.
- New work on exploiting Scotland's geothermal resources.

# Draft Heat Generation Policy Statement – Heat Mapping



# Heat Map - Oban

## Heat demand

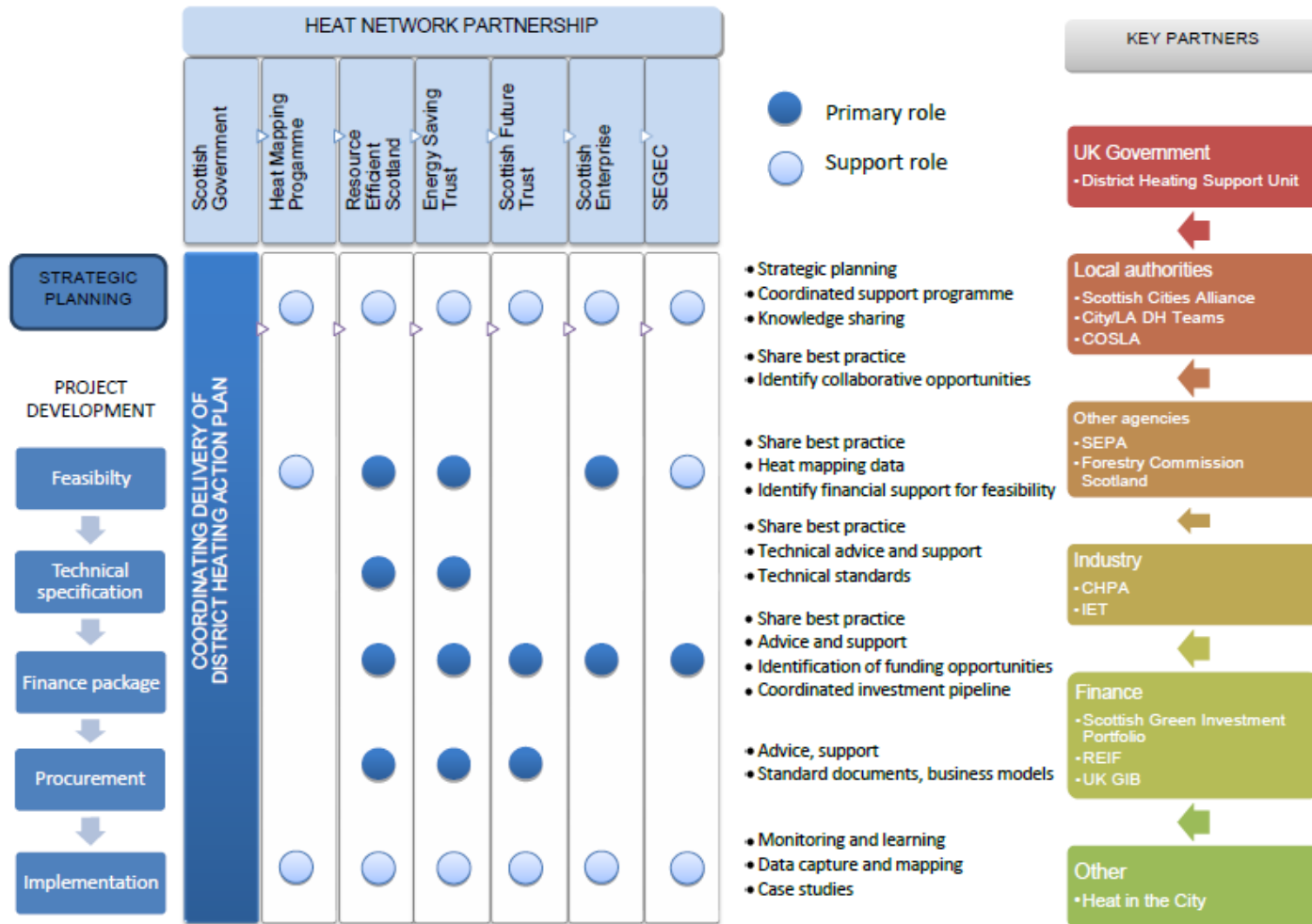


# Draft Heat Generation Policy Statement - District Heating Loan Fund

- Since 2011, £4.8 million committed to 23 projects
- Supports renewable and low carbon district heating
- Mainly off-gas biomass projects
- Additional £4 million, making **£8 million** available over the next 2 years



# District Heating Action Plan – Heat Network Partnership





# District Heating Action Plan – Heat Network Partnership



The screenshot shows a web browser window with the address bar containing <http://www.districtheatingscotland.com/>. The browser's menu bar includes File, Edit, View, Favorites, Tools, and Help. The page content features the title "Heat Network Partnership" in a large, dark font. Below the title, there are two paragraphs of text. The first paragraph states: "The District Heating Action Plan sets out the Scottish Government's response to the Expert Commission on District Heating's recommendation published in November 2012. The Action Plan sets out a clear roadmap for how will work in partnership with the wider public sector, business and industry to support the development of district heating in Scotland." The second paragraph states: "This website will form a hub of information for all organisations and groups in Scotland interested in learning about and adopting de-centralised energy. The site will continue to increase in size from October 2013 onwards." Below the text, there is a section titled "Introducing the Heat Network Partners:" followed by five logos: The Scottish Government (Saltire), Scottish Futures Trust (blue square with white text), energy saving trust (brown and black text), Scottish Enterprise (green and blue wavy lines), and Resource Efficient Scotland (circular logo with icons and text).

Heat Network Partnership

The District Heating Action Plan sets out the Scottish Government's response to the Expert Commission on District Heating's recommendation published in November 2012. The Action Plan sets out a clear roadmap for how will work in partnership with the wider public sector, business and industry to support the development of district heating in Scotland.

This website will form a hub of information for all organisations and groups in Scotland interested in learning about and adopting de-centralised energy. The site will continue to increase in size from October 2013 onwards.

**Introducing the Heat Network Partners:**



# District Heating Action Plan



- Scottish Government
  - Consulting on new targets for district heating (<http://www.scotland.gov.uk/Publications/2014/03/2778>)
  - Scotland's Heat Map - 3 training events held for local authorities in April) <http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Energy-sources/19185/Heat/HeatMap>
  - Article 14 of the Energy Efficiency Directive on Promotion of efficiency in heating and cooling (<http://www.scotland.gov.uk/Publications/2014/01/4430>)
  - Article 9, 10 and 11 of the Energy Efficiency Directive of Heat Metering and Billing (<https://www.gov.uk/government/consultations/implementing-the-energy-efficiency-directive-metering-and-billing-of-heating-and-cooling>)
  - Input to Independent Heat Customer Protection Scheme Steering Committee (<http://www.heatcustomerprotection.co.uk>)
  - National Planning Framework and Scottish Planning Policy (<http://www.scotland.gov.uk/Topics/Built-Environment/planning/NPF3-SPP-Review>)

# District Heating Action Plan – Heat Network Partnership



- Resource Efficient Scotland
  - Secretariat for Heat Network Partnership
  - Ignis Wick – heat recovery feasibility
  - Owens Illinois, Alloa – technology options appraisal for heat recovery
  - Edinburgh Bioquarter (Scottish Enterprise, NHS Scotland, City of Edinburgh Council) – technical business case
- Energy Saving Trust
  - District Heating Loan Fund and Warm Homes Fund
  - Renewable heat and district heating database
  - Home Renewables Loans Scheme

# District Heating Action Plan – Heat Network Partnership



- Scottish Futures Trust
  - Business case for Dunfermline District Heating Extension – Fife Council
  - Guidance on legal powers of Scottish public bodies to generate / procure heat and electricity supplies, and to supply heat and electricity to third parties
  - Guidance on public sector business models for district heating
  - Guidance on application of VAT to district heating projects
- Scottish Enterprise
  - Glasgow North and City Centre District Heating Study (Craighall Energy)
  - STRATEGO
  - SDI / Scottish Enterprise District Heating Missions

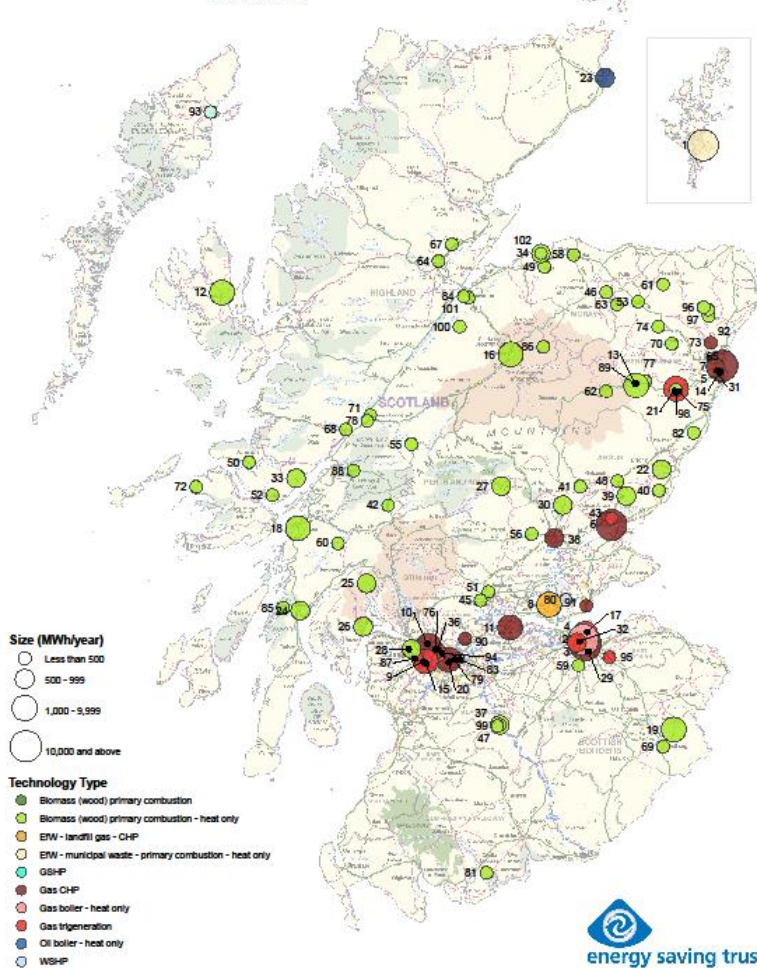
# District Heating Action Plan – Heat Network Partnership



- Workshops:
  - Ministerial Leadership Event on Heat & District Heating: 13<sup>th</sup> April
  - Developing and Delivering District Heating Projects: 13<sup>th</sup> May 2014
  - DH technology seminar – 28<sup>th</sup> May, Highland Hotel, Stirling
  - Financing District Heating Projects – September (date tbc), Glasgow Caledonian University
  - Regional strategic planning workshops

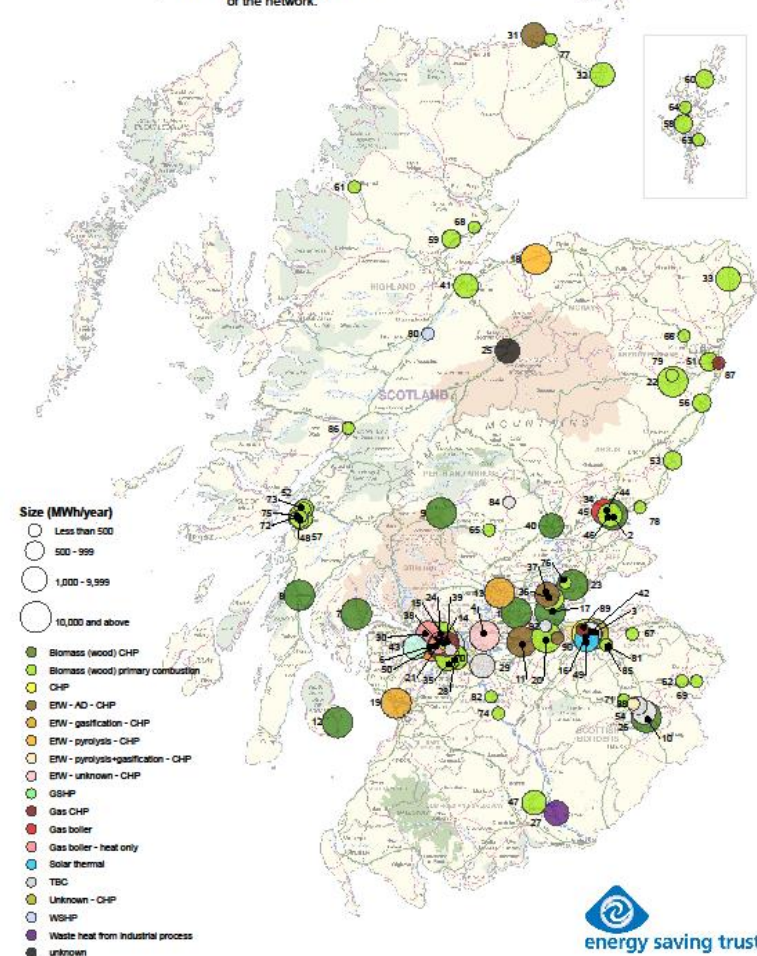
## Existing District Heating Networks in Scotland

Each point represents the technology type and estimated yearly heat output per installation, not the physical size of the network.



## District Heating Networks In Development in Scotland

Each point represents the technology type and estimated yearly heat output per installation, not the physical size of the network.



A Heated Debate... Sustainable Heat for a Low Carbon Future. Paul Wood and Graeme Gidney, AECOM

# Heat Generation Policy Statement

- Consultation closes on **9 June 2014**
- Responses to [eem@scotland.gsi.gov.uk](mailto:eem@scotland.gsi.gov.uk)  
Please put “Heat – HGPS – Response” as the subject of your email.
- or by post to  
Consultation on the Draft Heat Generation Policy Statement  
The Scottish Government  
Energy Efficiency, Heat and Low Carbon Economy Unit  
Area 1D South  
Victoria Quay  
Edinburgh  
EH6 6QQ
- If you have any queries, please contact **Joyce Whytock** on  
Tel. 0131 244 0265 or using the email address above.

Thank you





# Ruth Rule

Director  
ENERGY DIRECTION

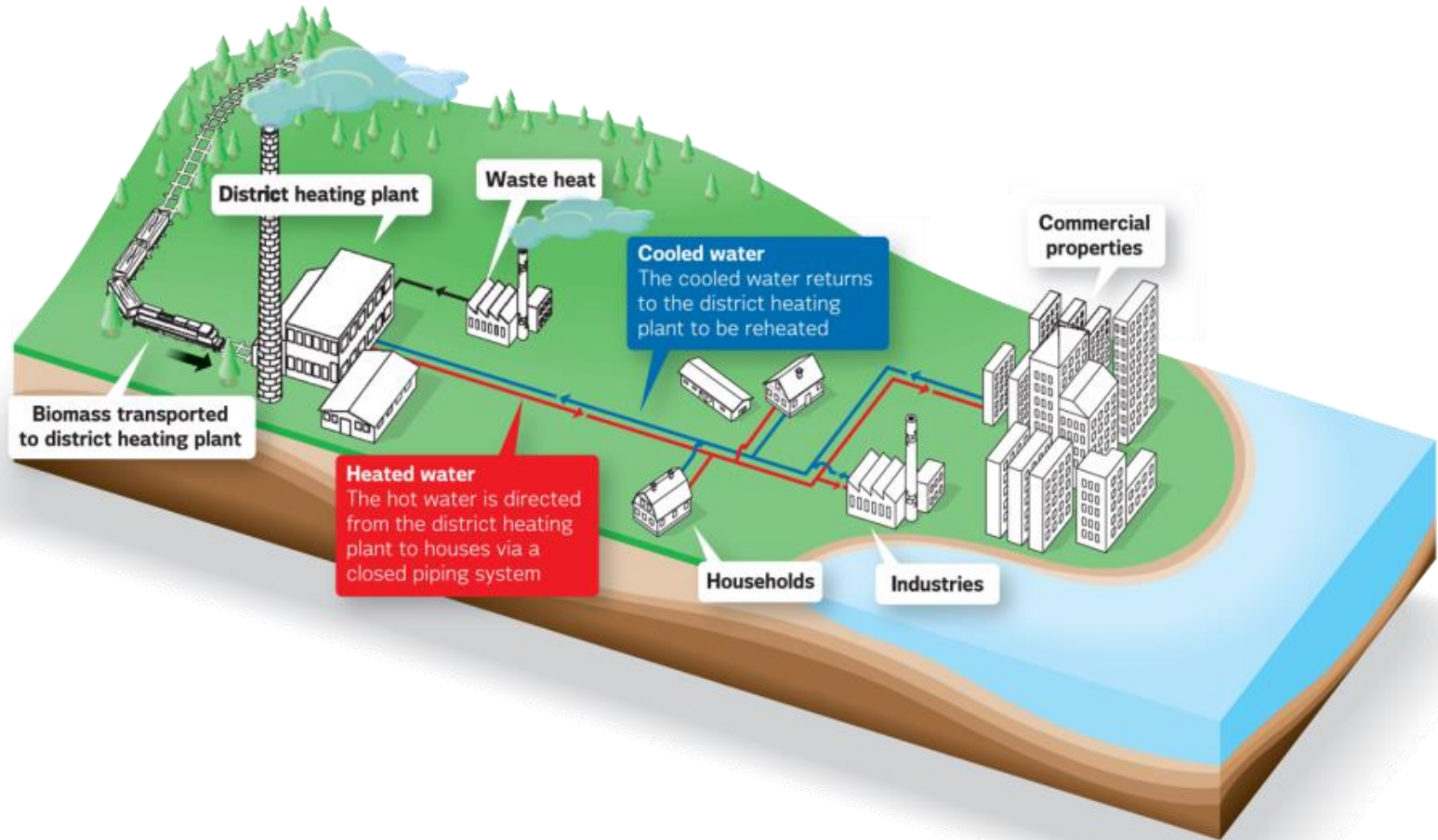


# Development and Delivery of District Heating Projects

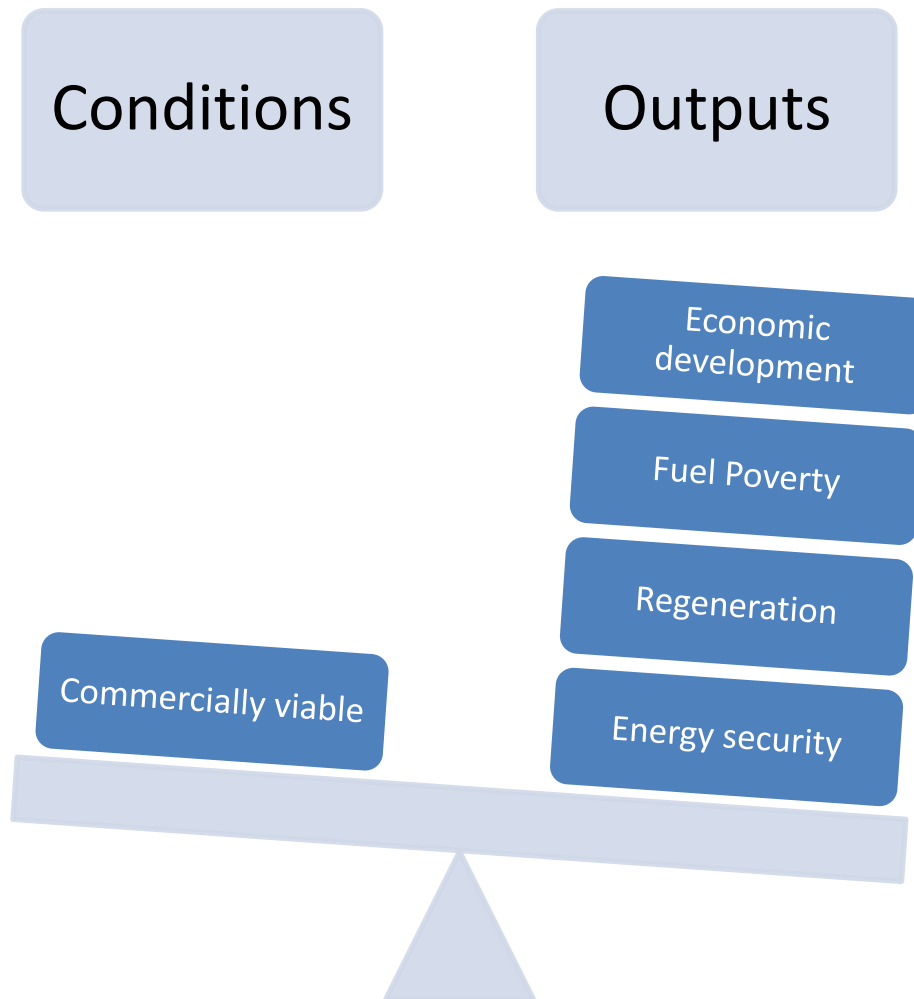
13<sup>th</sup> May 2014

## Developing a District Heating Project

# What is a district heating scheme?

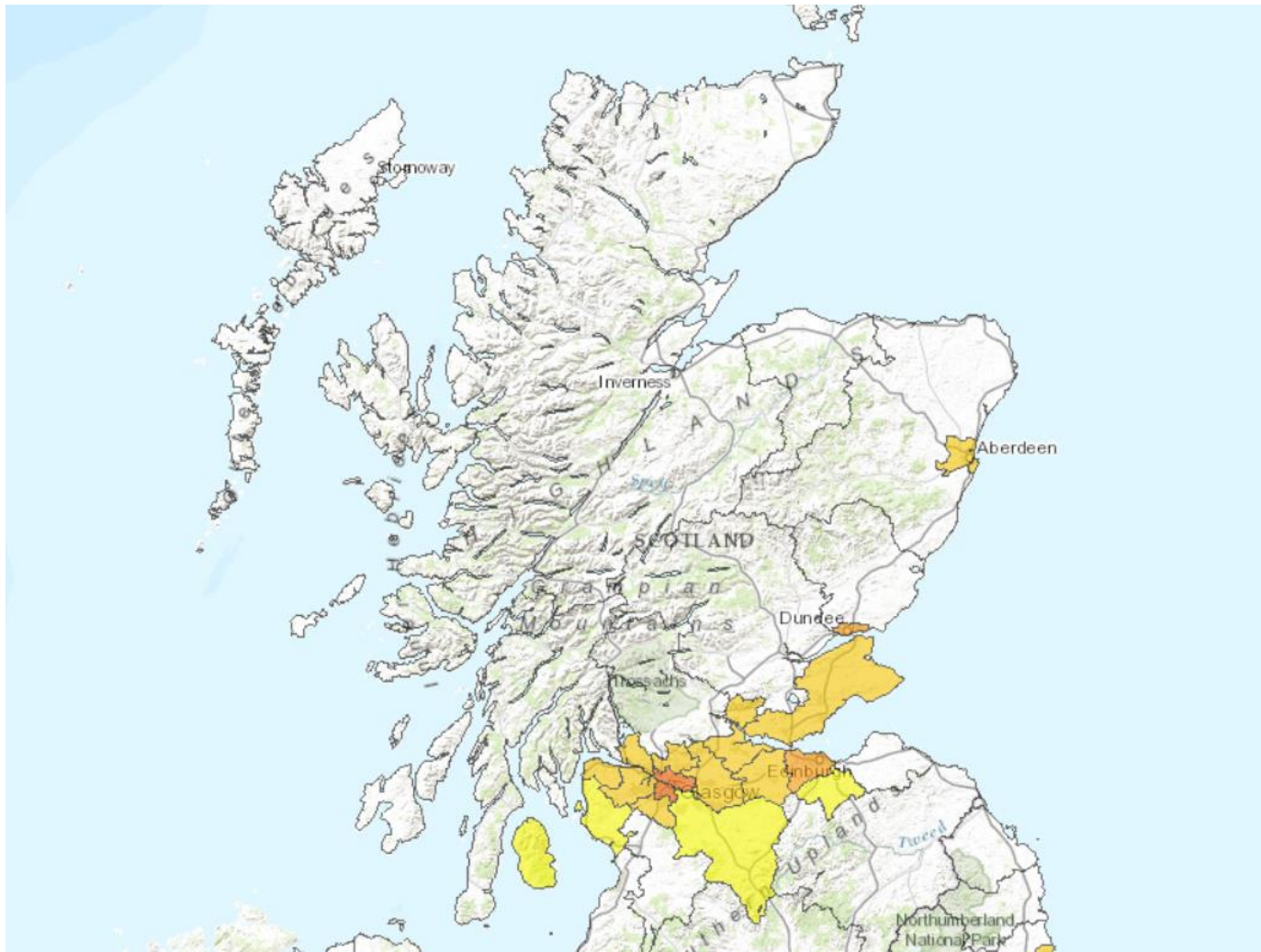


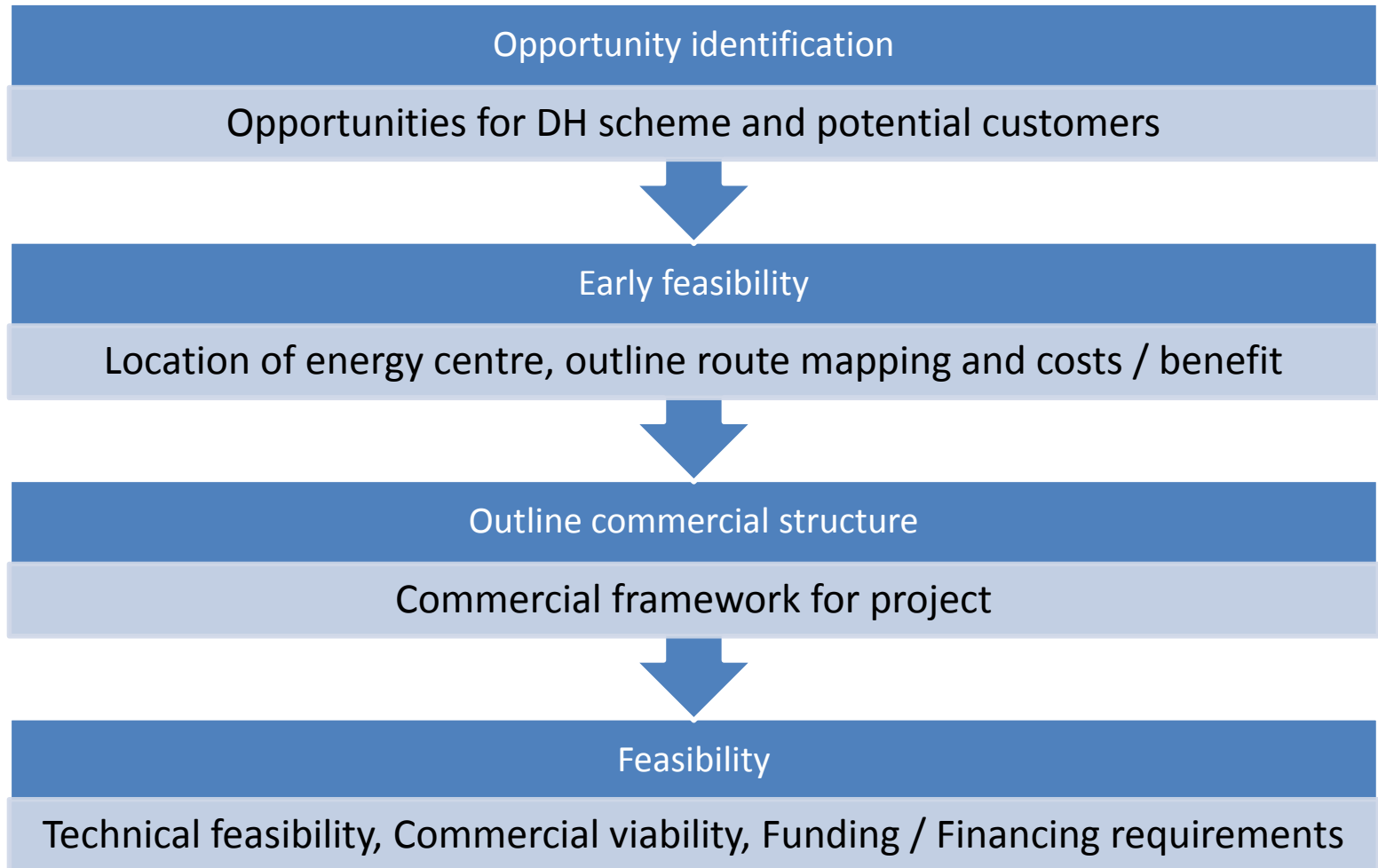
# Why develop a district heating scheme?



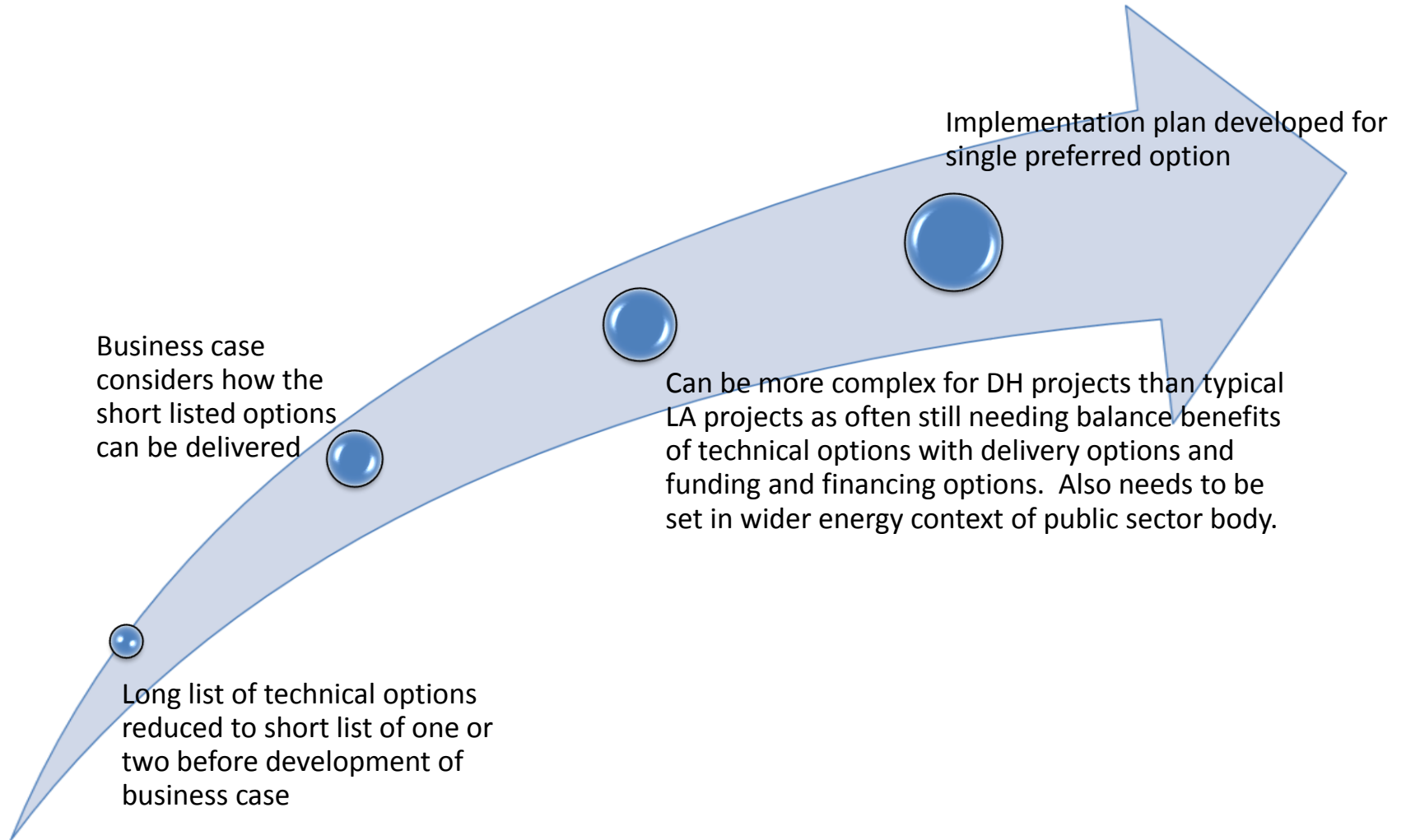
- A need to factor low carbon energy supply into strategic and local plans
  - Choices available vary considerably from one area to the next according to the extent of locally available, naturally occurring resources such as wind, solar, water and biomass.
  - Ensuring that decentralised energy systems are properly aligned with investment by other utility infrastructure providers to avoid duplication of infrastructure and the associated costs and carbon emissions.
- The development of a district heating (and cooling) network should be undertaken in full knowledge of the wider energy requirements of the local area.

# Heat Mapping













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[www.scottishfuturestrust.org.uk](http://www.scottishfuturestrust.org.uk)



# Aberdeen Heat & Power (AH&P)



**Ian Booth - General Manager**



**13<sup>th</sup> May 2014**



**Heat Network Partnership  
Developing and Delivering DH Projects**

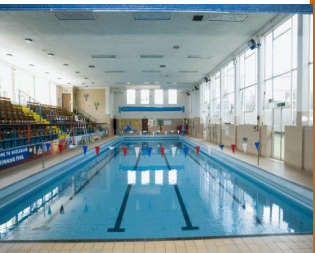
Aberdeen  
Heat & Power

Delivering Affordable Warmth .



# Aberdeen Heat & Power (AH&P)

- Background
  - The company Aims & Objectives
  - Governance
  - Why separate and not in-house Council?
  - First Project Development
  - Framework Agreement
  - Funding
  - Evolution
  - Operations now!
  - Does it work?
  - Opportunities for the future
  - Challenges for the Future
- Summary

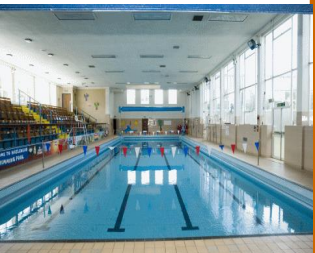


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# Aberdeen Heat & Power (AH&P) Background



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- Stems back to the HECA strategy - 1995 Home Energy Conservation Act
- Investment over several years through Housing Capital Programme - vast majority of low rise homes have gas central heating - low hanging fruit
- 1999 - City Council adopted Affordable Warmth Strategy
- But little had been done in adopting a strategy for multis - regarded as "Hard to Heat", poor thermal efficiency
- In 2001 Council commissioned options appraisal of all 59 multi storey blocks (4,500 flats)
- Had electric storage or warm air heating - under-heating due to cost
- 70% or residents estimated to be in fuel poverty
- Recommended install CHP in clusters of multis

Delivering Affordable Warmth .



# Aberdeen Heat & Power (AH&P) Background (cont'd)

- Study identified technical solutions best able to deliver low cost, efficient heating to residents
- Recommendation was to install water based communal heating systems connected to CHP where applicable
- Council could afford to facilitate such a project in one cluster but only at a rate of one project every 10-12 years due to capital constraints
- Commercial Energy Service Co's could gain access to 3<sup>rd</sup> party investment to accelerate deployment but required returns would determine a high heat cost thus undermining the objective of reducing fuel poverty
- Thus in 2002....

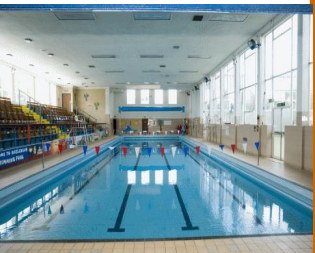






# Aberdeen Heat & Power (AH&P)

- **2002 - Established Aberdeen Heat and Power**
  - Independent - not-for-profit company, limited by guarantee, to develop and manage DH / CHP schemes "for the benefit of the people of Aberdeen"



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# Aberdeen Heat & Power (AH&P)

## The Company



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- AH&P set up in 2002 with aims to:
  - Deliver affordable heat to hard to heat properties
  - Develop district heating systems from a base of combined heat & power (CHP) systems
  - Reduce fuel poverty
  - Reduce Aberdeen City Council's carbon footprint

Delivering Affordable Warmth .



# Aberdeen Heat & Power (AH&P)

## Governance



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- Board of volunteer Directors :
  - Technical, Management, Financial, Community and intermediary skills
  - Two seats reserved on the Board for Council appointed personnel
  - Appointment of a DH / CHP specialist chosen through tender
  - Aberdeen city Council Officer support - local Champion
  - Objective to plan a pilot project



# Aberdeen Heat & Power (AH&P)

## Why Separate Company and not in house?

- Council did not have in-house skills
- Independent Company can be just that - independent
- Guarantee from Council - walk-in rights should Company fail
- Project management, operations, maintenance functions and risks transferred but with Council influence / direction from Board Members
- Council get on with running the Council, AH&P get on with running a District Heating business to deliver affordable heat.





# Aberdeen Heat & Power (AH&P)

## Development of first Project

- Agreed Pilot Project at Stockethill cluster of 4 multis:
  - Grant received for drawing up a set of Standard Agreements - through Brodies
  - Framework Agreement with 50 year term drawn up and for each project:
    - Installation Agreement inclusive of project costs (although Council carry capital risk, AH&P must manage project costs within budget)
    - Licence to occupy land for energy centre and wayleave for underground services
    - Heat Supply Agreement
    - Maintenance Agreement where applicable





# Aberdeen Heat & Power (AH&P) Framework Agreement highlights

- Council wishes to have heat delivered to occupiers of specified buildings (each project has this defined)
- AH&P agree to procure, install, operate and maintain systems to facilitate provision of heat
- Supply period is to 31<sup>st</sup> March 2052
- AH&P warrants performance and delivery of heat, with plant operated to Good Industrial Practice
- Teckal Exemption whereby Council appoint AH&P to develop DH / CHP projects without tendering, but in turn AH&P must open tender project procurement





# Aberdeen Heat & Power (AH&P)

## Framework Agreement highlights (cont'd)

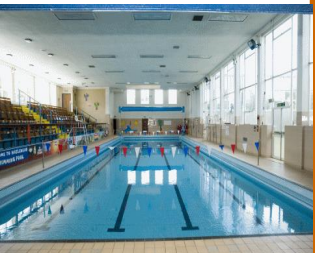
- Title passes to Council at point of supply
- AH&P must maintain equipment, Council must allow this. Conditions of access for repair, service and inspection
- Conditions of failure or discontinuance, emergency procedure
- Other usual clauses about Insurances, Indemnities, Data Protection, Waiver, Assignment, Force Majeure, Regulation Compliance etc.
- Project conditions
- Licences, consents, and permissions including planning and wayleaves must be applied for and obtained by AH&P
- Agreed project dates (specific to each project)





# Aberdeen Heat & Power (AH&P)

## Funding of first Project



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- Project cost to establish CHP and DH in first 4 blocks:
  - Total project cost £1.84m
  - 40% grant received through Community Energy Programme (CEP)
  - Based on projected secure income stream through heat charging to Council and with Council guarantee the Company secured a loan of £1m over a 10 year period

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# Aberdeen Heat & Power (AH&P)

## Evolution since first project

- CHP for domestic housing alone is not most efficient - need diversity
- Next project at Hazlehead and subsequent projects at Seaton and towards city Centre are inclusive of domestic and non domestic properties
  - More conducive to continuous running
  - More efficient
  - More cost effective
- Private Wire Connection and Agreements
- Development of Project Procedures

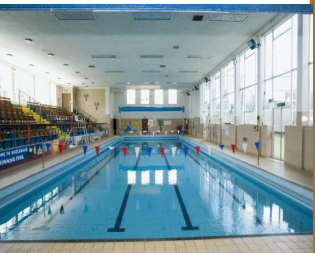




# Aberdeen Heat & Power (AH&P)

## Funding of subsequent projects

- Background of project costs based on
  - Whole life costings: Capital costs higher; Running costs lower
- For housing - full capital costs need to be covered
- If capital had to be borrowed the heat charge would increase and occupants could be pushed back into fuel poverty
- To date full capital for the housing from combination of:
  - Housing Capital Programme
  - Charge to owners for connections
  - Community Energy Programme Grant (CEP)
  - Carbon Emission Reduction Target (CERT)
  - Carbon Emission Saving Programme (CESP)
  - Energy Company Obligation (ECO)
- Non-domestic connections met largely by Central Energy Efficiency Fund (CEEF) funding





# Aberdeen Heat & Power (AH&P)

## Operations Now



- **Sources of income:**

- Sale of electricity to grid and Private Wire - 38% of sales
- Sale of heat - domestic - 36% of sales
- Sale of Heat - non-domestic - 23% of sales
- Maintenance - 3% of sales

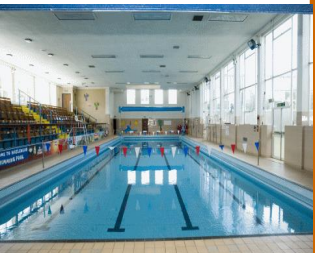
- **Costs:**

- Fuel - 75% of costs
- Maintenance - 11% of costs
- Overheads / Depreciation / Rates - 14% of costs



# Aberdeen Heat & Power (AH&P)

## So has the Business Model worked?



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# Aberdeen Heat & Power (AH&P)

## So has the Business Model worked?

**YES!**



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# Aberdeen Heat & Power (AH&P)

## So has the Business Model worked?

- Continuing to develop capital projects - 22 blocks converted to DH / CHP and further 6 stand alone
- Successful operations - 3 energy centres operational, 1 being extended currently and new one under construction
- 13 public buildings connected
- Small efficient business - 2 staff with external specialists for engineering, financial and legal services - low overheads
- Reduced fuel poverty to those connected. Typically costs to residents down by 25-40%
- Reduced carbon footprint. DH/CHP system has reduced carbon by circa 40% when compared to electric heating
- Future proofing of the network as we go - larger pipes installed - more up front capital - cost benefit may not be realised for some years

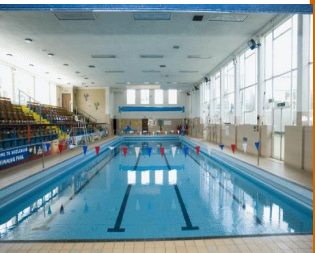




# Aberdeen Heat & Power (AH&P)

## So has the Business Model worked? (cont'd)

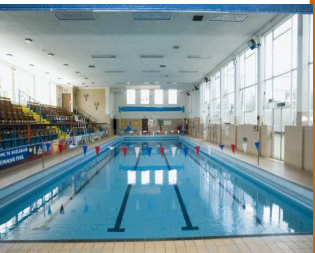
- Evolvement of agreements over time to include variations for stand alone blocks, non-domestic buildings etc.
- Limitations through Teckal arrg't only a small percentage of non-Council business allowed.
- If more non-Council connections to take place then need a separate structure to handle this
  - Evolvement of District Energy Aberdeen Limited (DEAL)
  - Modified Framework Agreement and others to accommodate
  - Company established September 2013 (non-trading as yet)
  - Permits development into commercial sector
  - Profits from DEAL to be channeled back to AH&P
  - Separate Board structure of DEAL as a heat "retail" company





# Aberdeen Heat & Power (AH&P)

## So has the Business Model worked? (cont'd)



- AH&P is a company limited by guarantee with Members
- DEAL is a company limited by shares (AH&P sole shareholder)
- AH&P will be the Network Operator and:
  - Retail heat supply to Council domestic, (including domestic owner / occupiers) and non-domestic premises
  - Private wire electricity supply to Council where applicable
  - Wholesale heat supply to DEAL
- DEAL will:
  - Retail heat supply to non-Council, non domestic customers
  - Private wire supply to non Council customers where applicable





Stockethill



Stockethill

Hazlehead



Stockethill

Hazlehead

Seaton



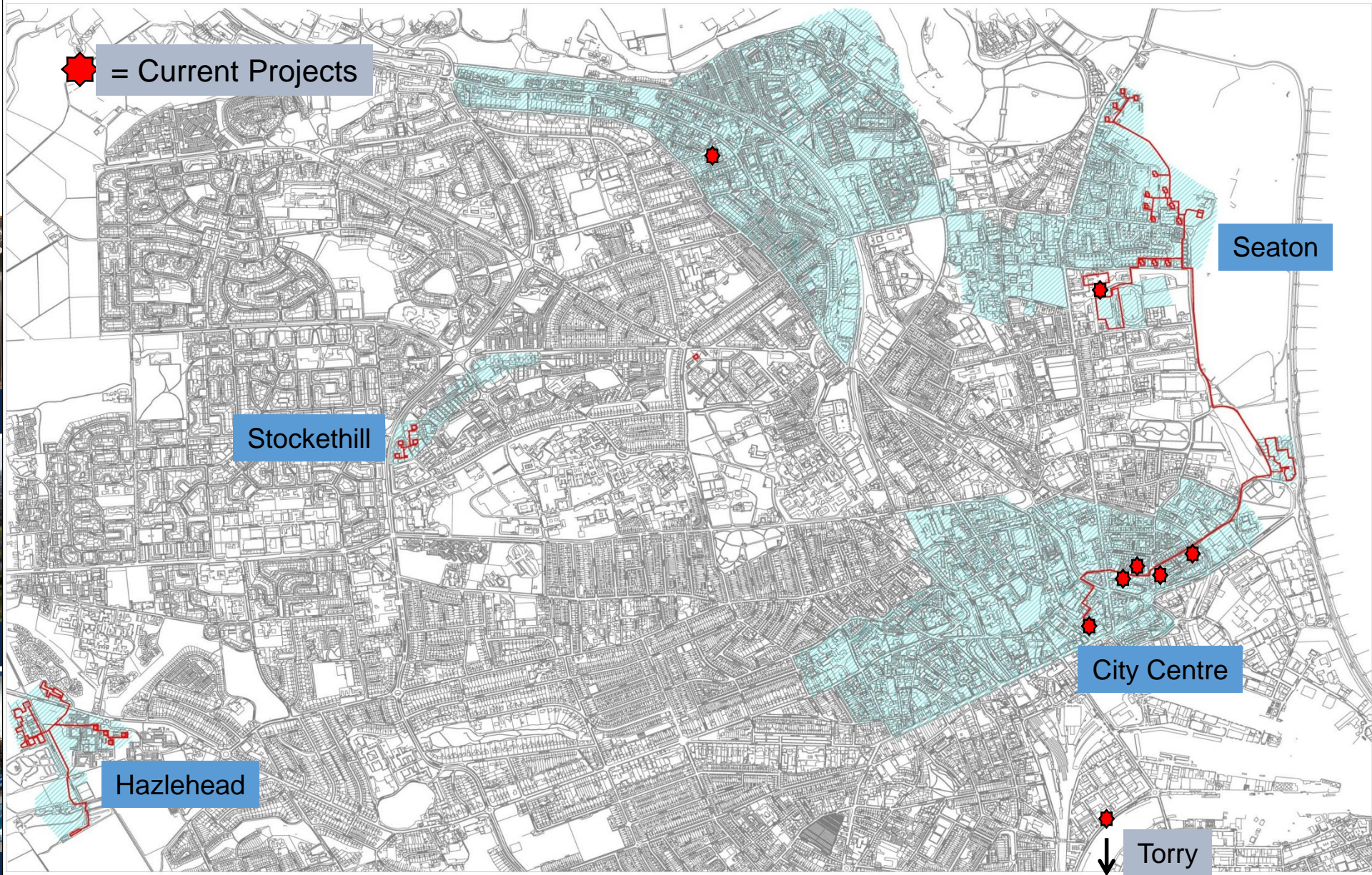
Stockethill

Seaton

Hazlehead



★ = Current Projects



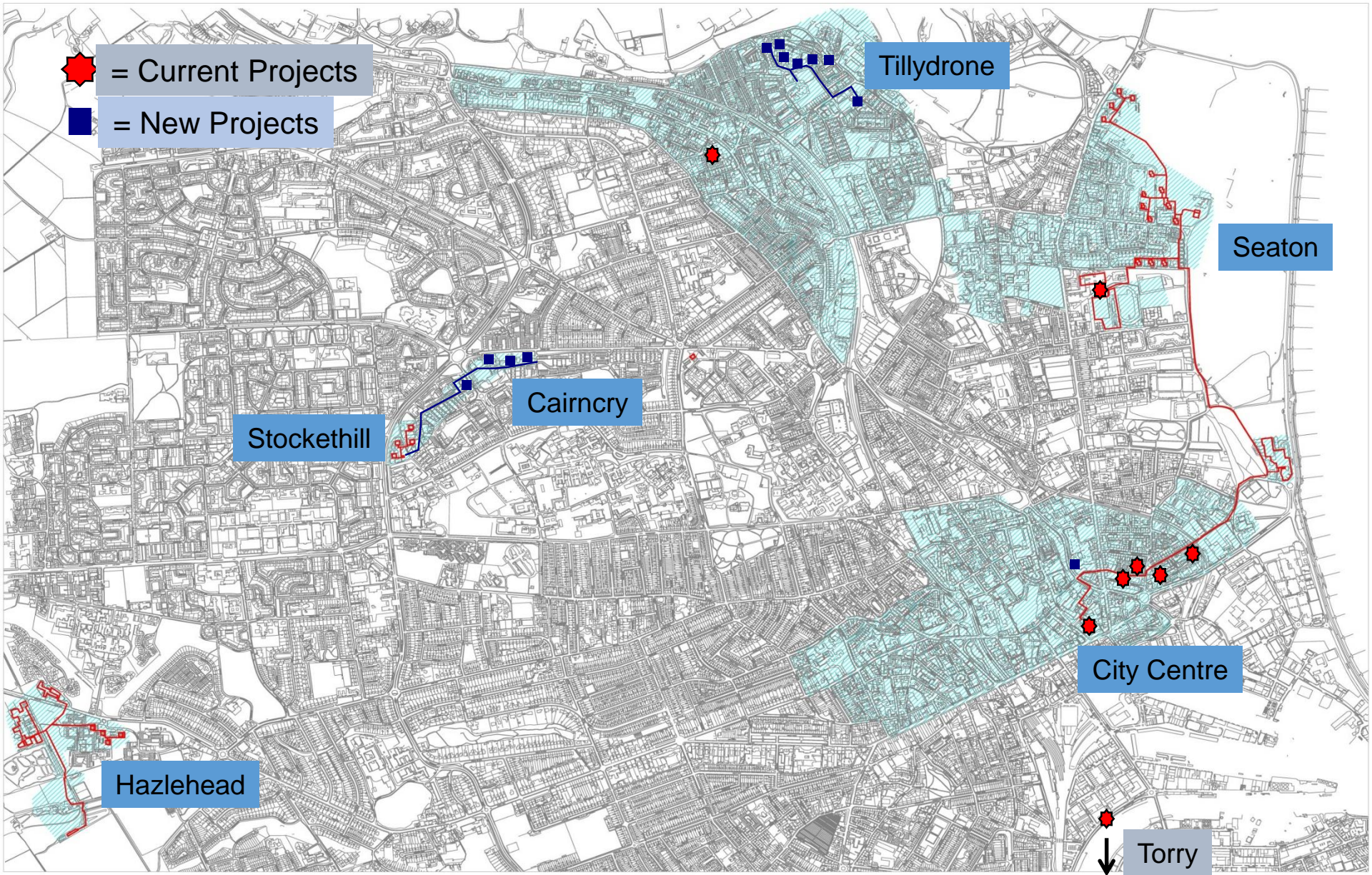
Stockethill

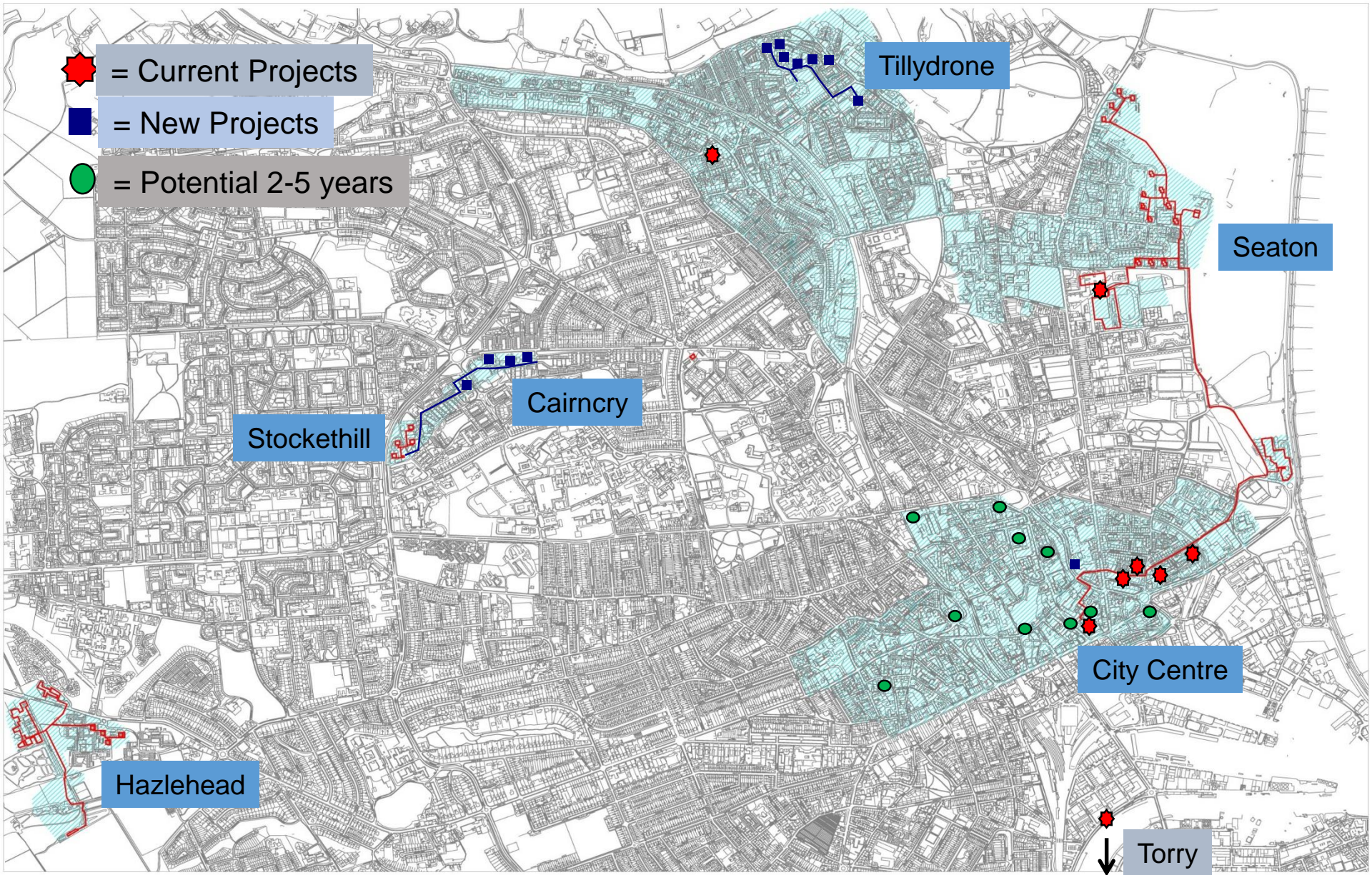
Seaton

City Centre

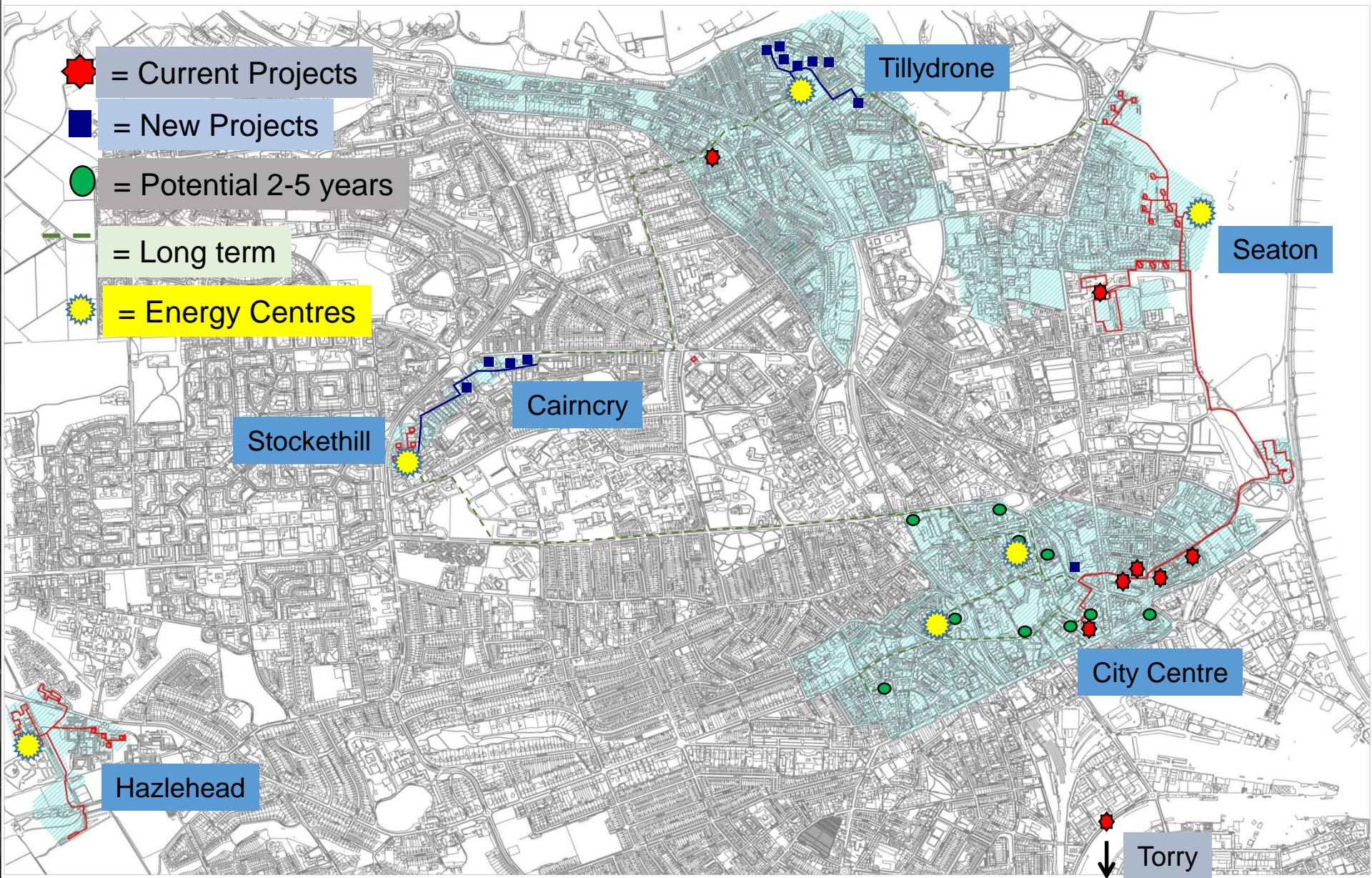
Hazlehead

Torry







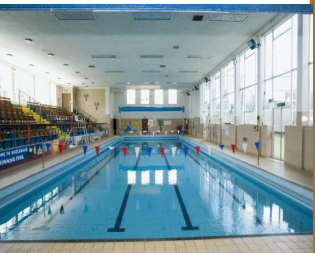




# Opportunities for the Future.....



- With the new subsidiary company District Energy Aberdeen Ltd (DEAL) set up as a heat retail arm to develop links to non-Council and non- Public Sector connections and identify infrastructure developments.
- Make use of Heat Mapping and previous development work to set and affirm strategy for network expansion
- Through these developments consider the financing of projects with potential borrowing through the District Heating Loan Fund and others, such as EU funding streams
- Strong consideration to application for parent company to become a charity - further strengthening the aims of the company.



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# Opportunities for the Future.....(cont'd)



- Extend the DH network at a pace which is financially and practically viable
- Build and sustain partnerships and agreements for future connections



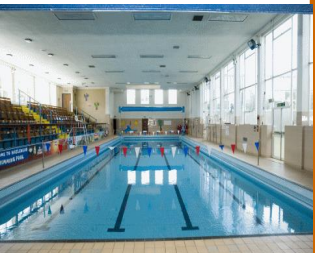
- Review fuel technologies to "bolt on" the front end (Energy from Waste, Geothermal, Biofuels, Hydrogen, other Renewables)



- Multiple CHP stations around the City linked into one city-wide heat network - possible transmission lines?



# Challenges for the Future.....

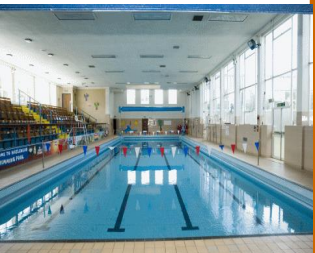


- Funding of domestic housing projects in lights of changes to funding streams (e.g. recent ECO funding changes)
- Working to overcome short term-ism of funding mechanisms and funding programmes - too short to cater for large scale DH opportunities to be built up to viable projects
- Developers accepting that DH is a viable possibility - not just build, sell, forget.
- Maintaining a sensible approach to expansion, without rushing into areas that could increase business risk - grow at a manageable pace
- Managing capital funding and associated risks against a back drop of fully funded capex to date



## Our Aims are being met....

- We believe we are still meeting our start-out ambitions
  - Tackling fuel poverty
  - Providing affordable heat
  - Reducing carbon emissions through use of low carbon technology
  - Installing reliable, efficient and controllable systems for domestic and commercial buildings



Aberdeen  
Heat & Power



## Contact Details .....



**Ian Booth - General Manager  
Aberdeen Heat and Power**

63 Cotton Street  
Aberdeen AB11 5EG

T: 01224 580058

e-mail - [info@aberdeenheatandpower.co.uk](mailto:info@aberdeenheatandpower.co.uk)

Web: [www.aberdeenheatandpower.co.uk](http://www.aberdeenheatandpower.co.uk)

Aberdeen  
Heat & Power

Delivering Affordable Warmth .



**BRODIES**<sup>LLP</sup>

# Developing & Delivering District Heating Projects

## Legal Considerations

Charles Smith, Brodies LLP

Tuesday, 13 May 2014

# The SFT Guidance on Powers

- What is covered?
  - the powers of Scottish public bodies to generate or procure heat and electricity supplies
  - their powers to supply heat and electricity to third parties
  - the constraints on these powers, whether legal or administrative
  - ancillary powers, e.g., to borrow, to establish companies, partnerships or joint ventures or to participate in these, and to trade or carry on an activity with a view to making profit
  - public procurement and heat / electricity projects (discussed later today)
  - state aid
  - competition law



## The SFT Guidance on Powers (2)

- Which Scottish public bodies are covered?
  - local authorities
  - universities
  - colleges of further education
  - NHS Boards
  - central government and its agencies (plus the Scottish Court Service)
  - registered social landlords
  - Scottish Water

## The SFT Guidance on Powers (3)

- Key considerations
  - public bodies must act within their powers
  - in most cases these are set out in legislation
  - in some cases other documents like Articles of Association are also relevant
  - to act outside these parameters will be challengeable as beyond power
- Hence the need to identify relevant powers and duties / functions
  - to procure or generate heat and electricity
  - to supply heat and electricity to third parties
- The Guidance considers each of these separately, because they are different activities

# Example 1: Local Authorities

- Power to generate or procure heat and electricity supplies: sections 170A and B of the Local Government (Scotland) Act 1973: heat and electricity are treated differently
- A local authority has power to produce heat, to buy or otherwise acquire heat and to use, sell or otherwise dispose of that heat and to enter into agreements to supply premises within or outside the authority's area with such heat
- A local authority has power to produce electricity and to use, sell or otherwise dispose of electricity that it has produced. There is no power to sell electricity except where it has been produced by a local authority. Power to purchase electricity for the authority's own needs is covered by the ancillary power in section 69 of the Local Government (Scotland) Act 1973

## Example 1: Local Authorities (2)

- Specifically, the power of a local authority to sell electricity is limited to circumstances:
  - where it is produced from waste
  - where it is produced in association with heat
  - where it is produced from specified renewable sources
- So a local authority has power to procure and generate heat and to supply it to third parties but a more limited power to do likewise with electricity
- Trading by local authorities – see Local Authorities (Goods and Services) Act 1970
- Compliance with the best value duty - section 1(1) of the Local Government in Scotland Act 2003

## Example 1: Local Authorities (3)

- Powers to borrow – Schedule 3 to the Local Government (Scotland) Act 1975 and prudential borrowing under section 35 of the Local Government in Scotland Act 2003
- Power to establish Arms Length External Organisations (e.g., companies) – the section 69 ancillary power in Local Government (Scotland) Act 1973 may be used, but care needs to be taken
  - what function is being relied upon for the use of the power?
  - cannot use section 69 to add to functions / powers
  - governance considerations

## Example 2: Universities

- A number of different structures
- Universities Acts, Royal Charters, Privy Council Orders, Memoranda and Articles of Association
- Powers of the governing body ("Court") are key and are usually broad
- These will generally permit generation or procurement of heat and electricity and also the carrying on of any trade or business, which will allow third party sales
- Note the role of the Scottish Further & Higher Education Funding Council
- Also note charitable status issue in relation to sales of heat or electricity to third parties

---

## Example 3: Registered Social Landlords (RSLs)

- RSLs are industrial and provident (community benefit) societies or Companies Act companies, and generally they are charities
- Must satisfy "legislative registration criteria" to become an RSL registered with the Scottish Housing Regulator (section 24 Housing (Scotland) Act 2010)
- Many RSLs have adopted model rules of the Scottish Federation of Housing Associations
- There is certainly power to procure or generate supplies of heat and electricity and there is also power to supply to third parties  
BUT...

## Example 3: RSLs (2)

- Important to distinguish here between different recipients of supply
  - RSL tenants are clearly covered
  - so are other RSLs or local authorities as providers of housing
  - less clarity around owner occupiers and other public sector third parties
  - supplies to private sector third parties are problematic
- Why is this?
- First, section 24(1) of the Housing (Scotland) Act 2010 requires that a body registered as a RSL must not trade for profit
- Secondly, charitable status will be put at risk by supplies to third parties unless they fall within charitable purposes set out in the Charities & Trustee Investment (Scotland) Act 2005 section 7
- A solution (if permitted by the RSL's Rules or Articles) is to establish a trading subsidiary



# "Oversizing" of Schemes

- The issue: "oversize" an energy centre or pipe network to future-proof the scheme in terms of further connections
- Not a question of powers but of whether oversizing satisfies the requirements of best value (for local authorities) or value for money (for other public bodies)
- That will require a proper assessment to be made of the likelihood of future connections: how, who and when?
- May be an affordability issue
- Consider other public bodies that may be involved and seek to work together especially if oversizing (if considered best value / value for money) is not affordable to an individual public body alone

# Conclusions

- Scottish public authorities can generate or procure heat or electricity
- In the majority of cases, they can also supply heat or electricity to third parties
- There are constraints and some complexities, but there are generally means to address them



**BRODIES**<sup>LLP</sup>

# Developing & Delivering District Heating Projects

## Legal Considerations

Charles Smith, Brodies LLP

Tuesday, 13 May 2014



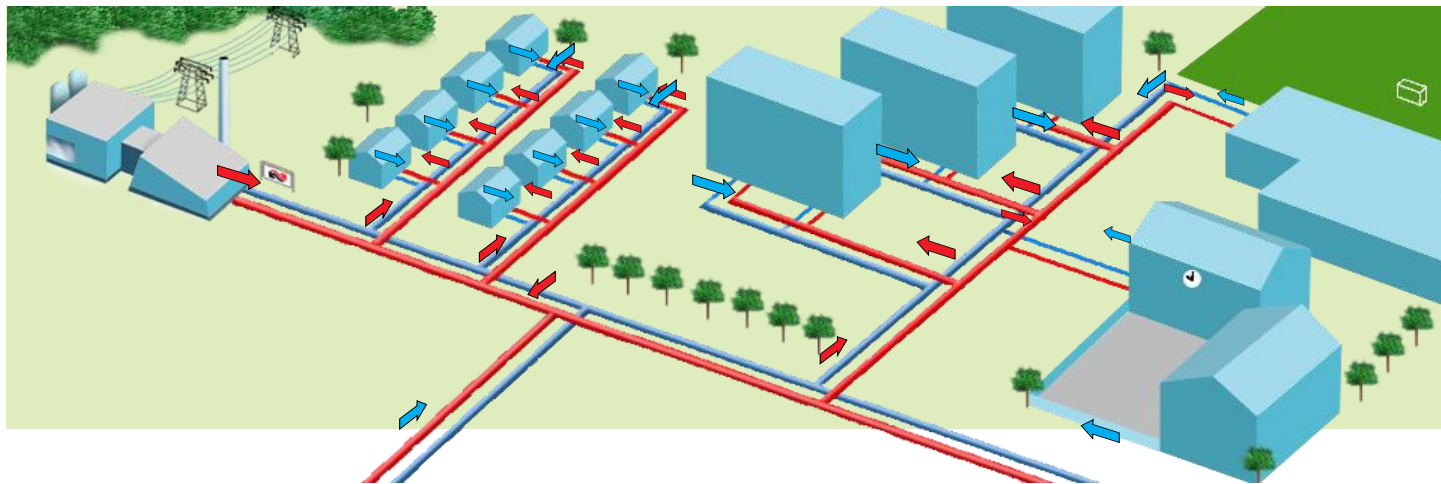
# **Danish District Heating Experiences**

HNP – Seminar on Developing and Delivering District Heating Projects, May 13, 2014

By Morten Jordt Duedahl, District Energy Partnership

# Agenda

- District heating in Denmark
- How did systems develop in Denmark
- Business models, ownership, governance



# Raison d'être

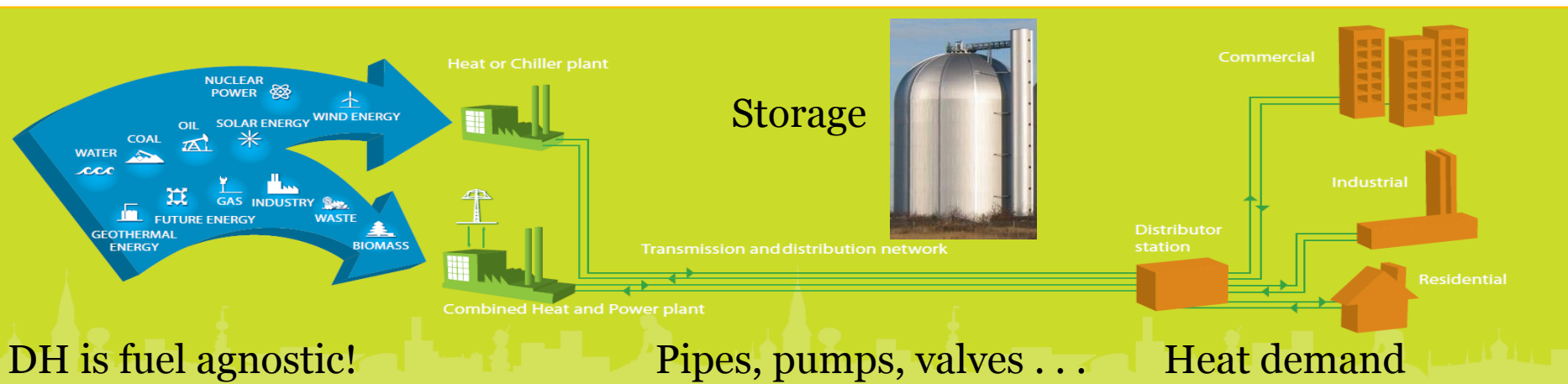
“District heating networks and renewable electricity are both essential for any country in Northern Europe that wants to cost-effectively eliminate fossil fuels by 2050”

David Connolly, Sustainable Energy Planning Research Group, University of Aalborg

# A few remarks

- Today Danish district heating is a complex structure developed over 100+ years
- ESCO = Council owned ESCO – (partly HA)
- No secrets – full transparency!!
- A utility – like e.g. water, sewage, road
- Building improvement at the same time!

# Technically DH is NOT Complicated

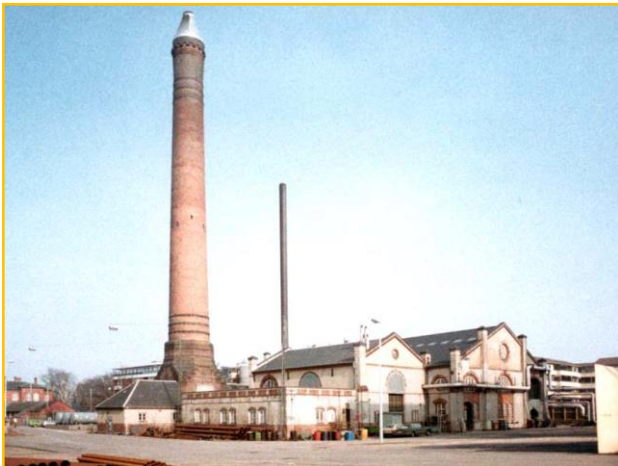


- A SMART (and very large) boiler system – a lot bigger and a lot smarter!
- Changing “free” heat valuable heat
- Extremely well proven technology!



# DH in Denmark

- 63% of all house holds (1.632.000)- 98% in Copenhagen
- + 17.000 (2012) (up to 75%)
- Today ~450 schemes - 30.000 km pipes



# Denmark's Wake Up Call – 1973

- 99% oil and coal = import dependence
- Inefficient energy use = building improvements

Sustainable solutions needed!!



# Consistent Energy Policy + Long Term planning

## Legislation

- 1976 – Electricity Act (CHP, Cost Eff)
- 1979 – Heat Supply Act + RES + WtE
- 1986 – Decentralized CHP
- 1990, 1993, 2008 – Increased biomass (new CHP and conversion)

## Incentives

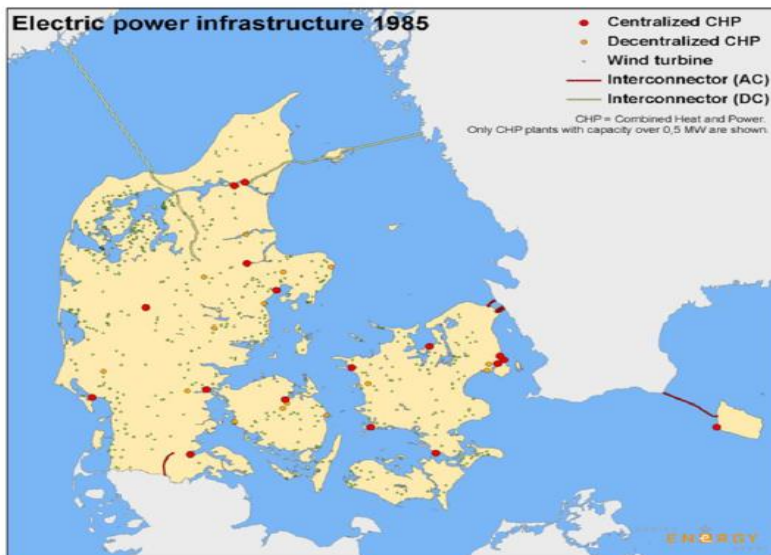
- 1981 – Investment grants for biomass DH/CHP
- 1984, 1992 – Subsidies for CHP
- 1994 – Financial support to establish DH on biomass or natural gas
- 1991 – High energy tax and CO<sub>2</sub> tax on fossil fuels



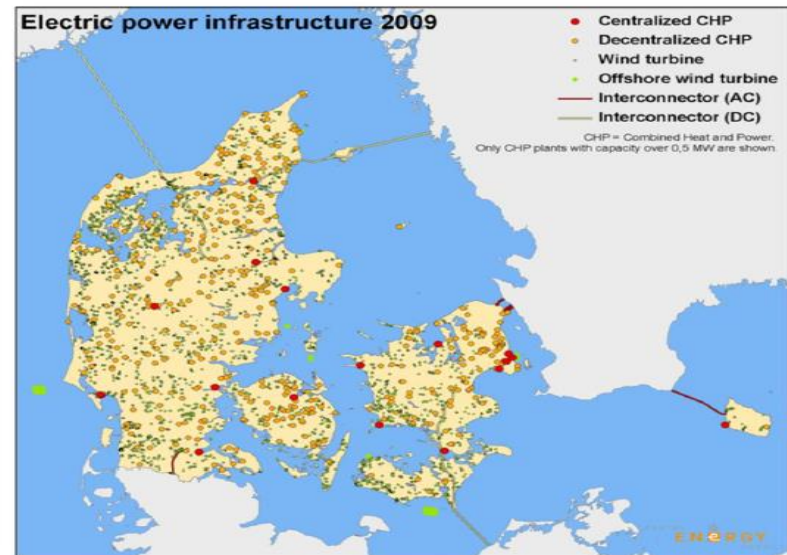
Plan – Coordinate – Legislate - Support

# De-centralised CHP in Denmark

## Centralised

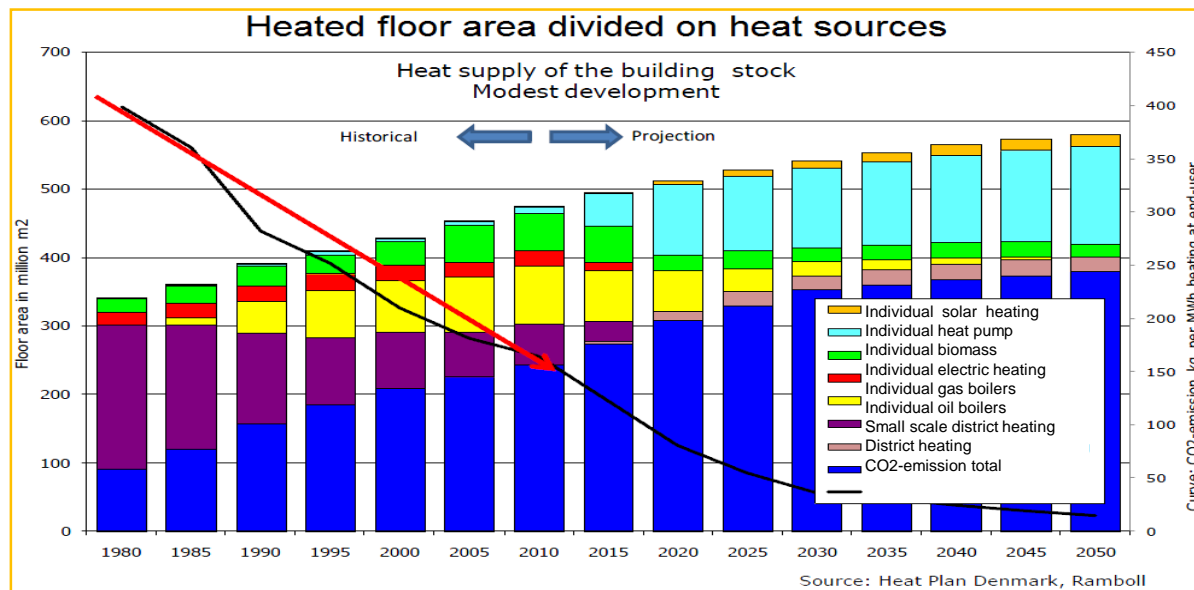


## Decentralised

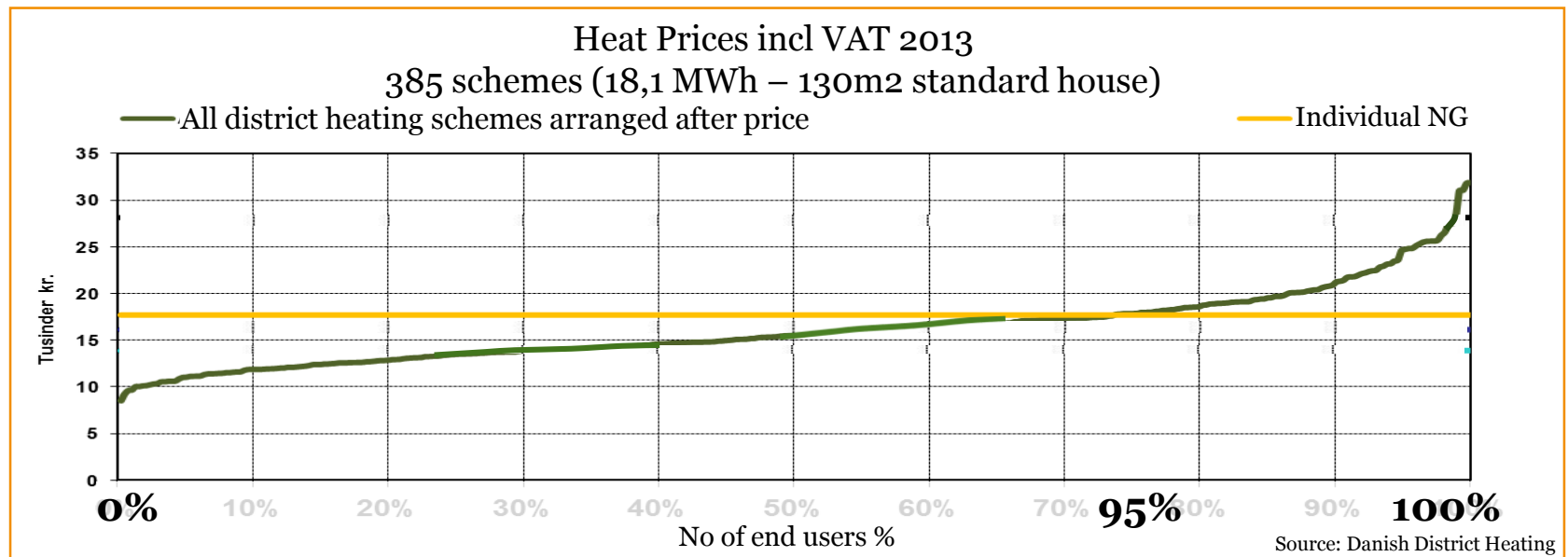


# The Future

- A central part of Smart Energy Systems & 2050 targets
- Integrate surplus wind and solar electricity



# DH Costs less than Natural Gas



- ~75% of schemes cost less than natural gas
- ~95% of end user spend less compared to natural gas

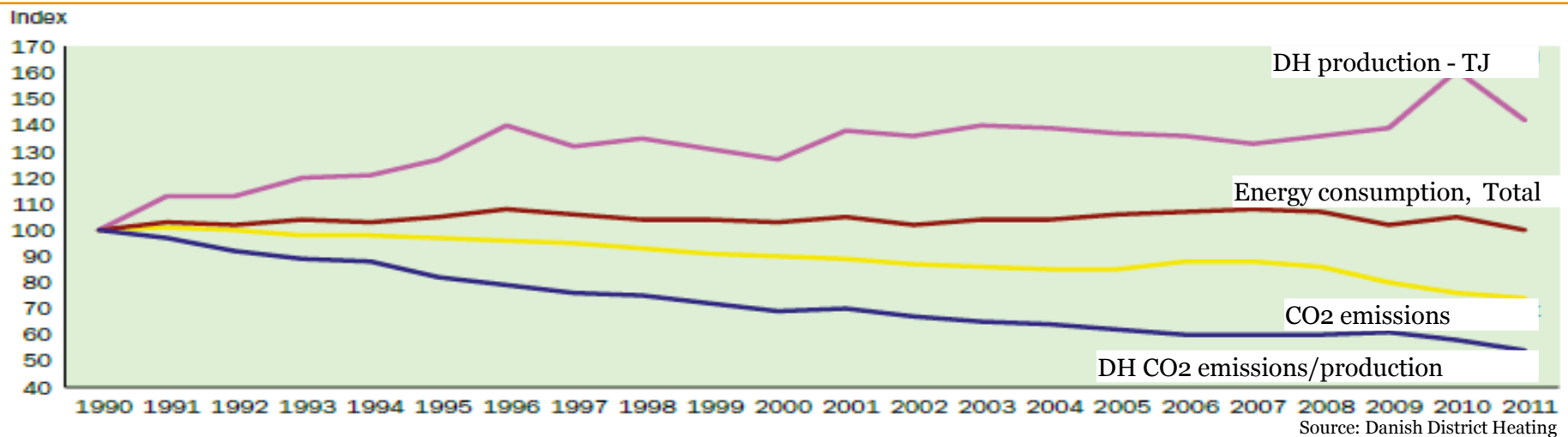
# Jobs

- 10.700 direct jobs (15.000 in 2020) + investments
- Same can be done in Scotland



# Denmark's DH Carbon Footprint

- 40% lower compared to no DH (heating)
- 46% lower pr DH unit produced







# Business models and scheme development

# Denmark's Wake Up Call – 1973

## Original policy objectives:

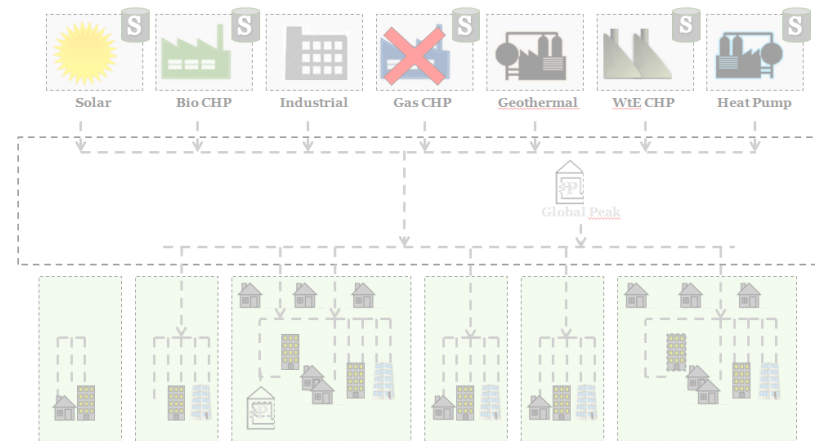
- Import independence (oil)
- Energy efficiency / savings
- Security of supply
- Environment / CO<sub>2</sub> (Fossil free by 2035 / 2050)
- Stable (and low) prices for consumers
- Transparency



# Generic non-for-profit business model

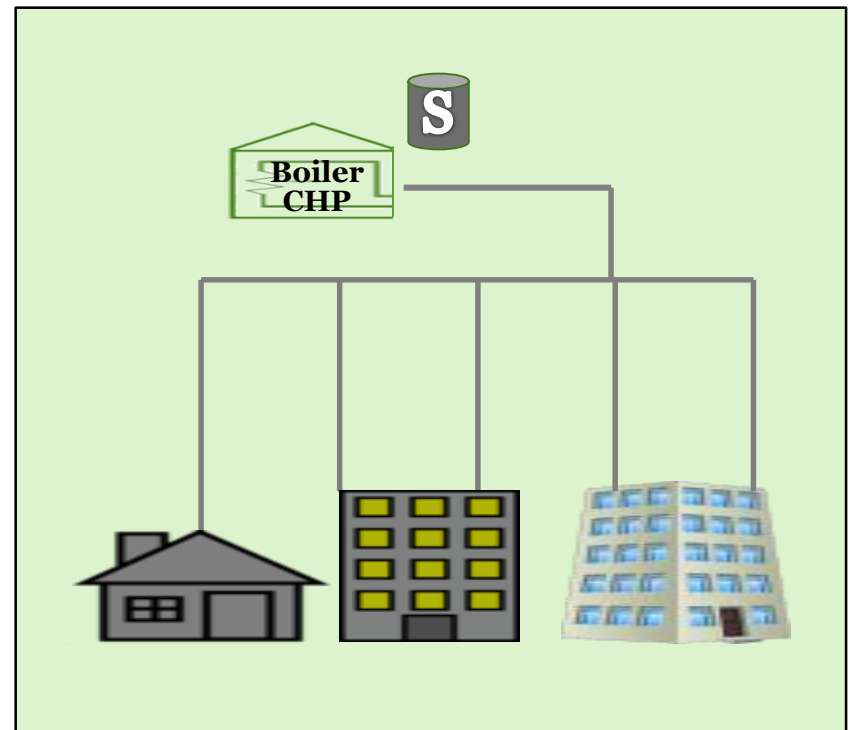
- End user owned!!
  - SPV – ESCO – consumer or council owned
  - Part of the municipality
- Pipework is a natural monopoly
  - Size does matter
- **Heat Supply Law from 1979**
- Price = associated costs
- Prices set from year to year based on budget
  - Profit to balance price from year to year
  - Profit for future investment
- Same price for everyone

## Master planning – many years



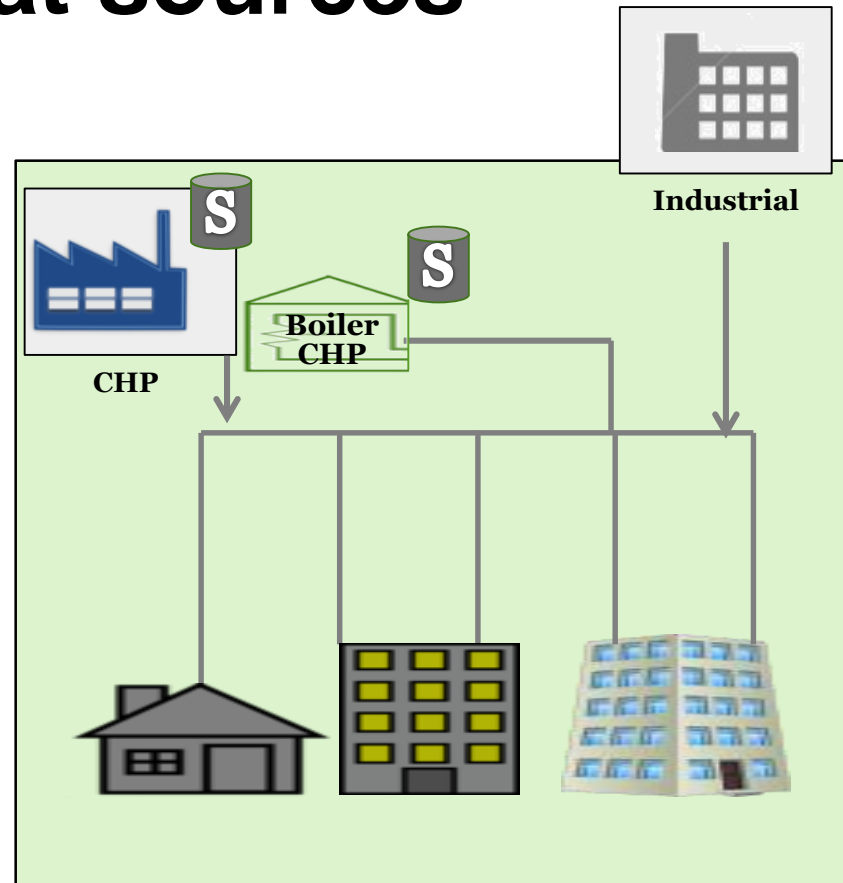
# Stand alone or early systems

- Sell electricity – fair feed in tariff
- Store heat = higher income on electricity
- Sell heat to end users
- Provide lowest/best possible price
- Either ESCO or part of council
  - Normally owns all assets
  - Maybe even owns consumer installations – but not normally
- No of employees – varies
- Open “tenders” for all contracts



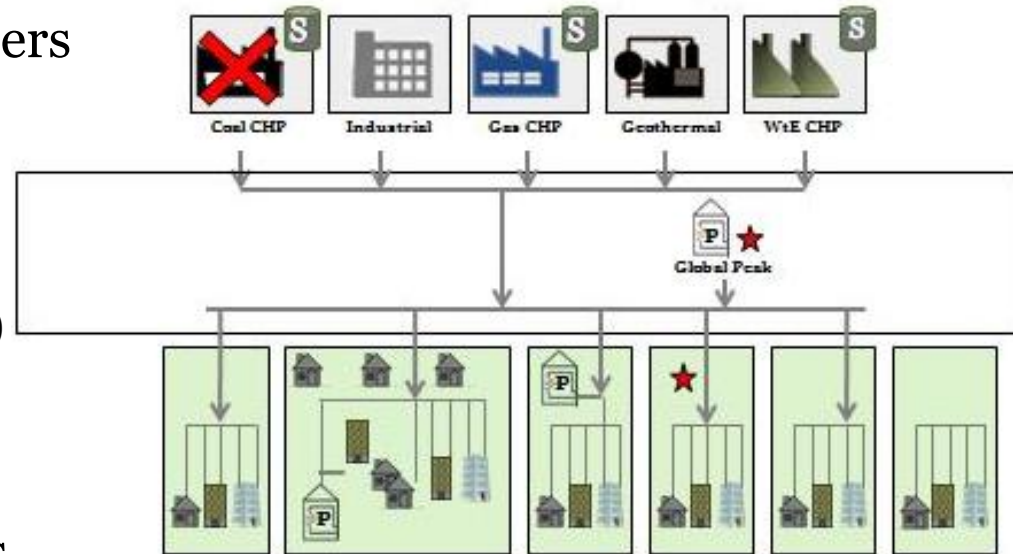
# Added external heat sources

- External (private) heat sources (CHP, WtE, Industrial)
- Pipes are still owned by DH scheme
- Based on “simple” business contract:
  - Point of delivery (who is in charge of investment)
  - Amount of heat
  - Price
  - When
  - Length of contracts
- **Industrial**
  - Long/short term
  - Other objectives?



# City Wide schemes – transmission company

- “Best” heat at the best price
- Sell to DH schemes / stakeholders
- Natural monopoly
  - Share (larger) investments
  - Access to “free” heat
- Heat from all available sources:
  - Internal (peak load, sun, geo thermal)
  - External (CHP, WtE, Industrial)
  - DH schemes themself
- ESCO - group of municipalities
- With own board with clear rules



# Public sector's role in development

- National Planning in sectors (since 1979) – based on least cost:
  - Natural gas (done by end 80's)
  - District heating (more RE)
  - Individual solutions
- No power only from 1979 – only CHP
  - Price of heat = reduction in electricity efficiency for first 12 years
  - After 12 years small profit was allowed
- Local authorities (Heat Supply Act 1979)
  - Local Plans done by end 80's
  - Approve all projects – (Large CHP/ WtE close to cities)
  - Socio economic business case
  - Underwrite risk
  - Profit must benefit end users
  - Start and support project development (HNP like but local)

# Copenhagen - example

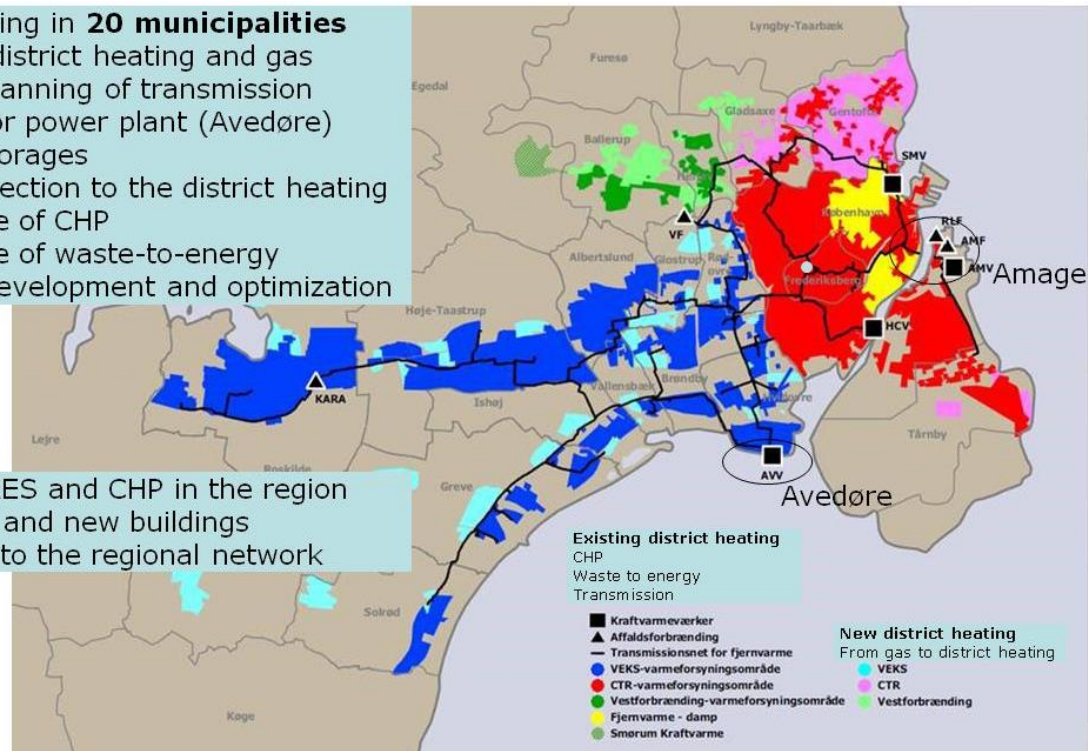
- 100% financed by most competitive loans
  - 100% loan guarantee from councils/municipalities
  - No subsidies
  - Open tender – transparency + economic efficient
  - End users only pay relevant cost
- 
- 50.000 m2 heated
  - Strong transmission companies – will always choose the “ best” heat
  - Small organisations today – very lean and in a competitive environment
  - Fuel flexibility



# Copenhagen system

Heat planning in **20 municipalities**  
 Zoning of district heating and gas  
 Regional planning of transmission  
 New site for power plant (Avedøre)  
 Thermal storages  
**98%** connection to the district heating  
**95%** share of CHP  
**25%** share of waste-to-energy  
 Dynamic development and optimization

**Near-by** RES and CHP in the region  
 to existing and new buildings  
 connected to the regional network



Ramboll, Anders Dyrelund

## Different asset classes – ownership /control

- Generation assets – private and public mix
- Transmission assets – always municipal owned, not-for-profit
- Distribution- non-for-profit, municipal ESCO
- Municipal ESCO's are free to build own generation asset!



# Public sector control in Denmark

- Planning – by law
- Forced connection – stay on rules
- Heat charges – non for profit long term prices
- Technical standards – country wide voluntary
- Future expansion of networks – planning and socio economic calculations

# How did the business models work

- Did the business model reflect:
  - The original objectives
  - Regulatory framework
  - Funding environment
- Objectives, regulatory framework and funding was co-designed with the master plans

# Typical governance arrangements?

- Board of directors
  - Politicians
  - Large end user groups
- Boards with real power
  - Can be influenced by council decisions
- Transparency
- National Heat Act – very clear rules (few loop holes!)
- Not for profit – best heat at the lowest price (socio economic)
- Benchmarking – help optimize daily operations and investment
- Rules on how to use profit or no profit
- User interest in optimal management
- Subsidies to connect – or forced/planned

# Funding

- Was the infrastructure publically funded / subsidised?
  - No subsidies directly to DH
  - Policy, subsidies and taxes to control the whole energy system
  - Some time end user did get a offer to connect sooner
- Access to international financial markets
- Guaranteed loans from municipalities
  - not from the state – not needed
- Easy access to low cost heat – CHP (12 years rule)
- Taxes on oil etc – helped the business case

# Did it work? Meet objectives?

## Original policy objectives:

- Import independence (oil) – 100% (2009: 124%)
- ✓ • Energy efficiency – increased
- ✓ • Security of supply - ?
- ✓ • Environment / CO<sub>2</sub> (Fossil free by 2035 / 2050)
- ✓ • Stable (and low) prices for consumers
- ✓ • Transparency

# Issues / constraints

- Efficient?
  - Today a national benchmark
- Public fear of inefficiencies
  - Transparency
  - End user involvement
  - Open tenders
  - Benchmark
- Governance
  - Benchmark
  - Semi professional boards (both good and bad)



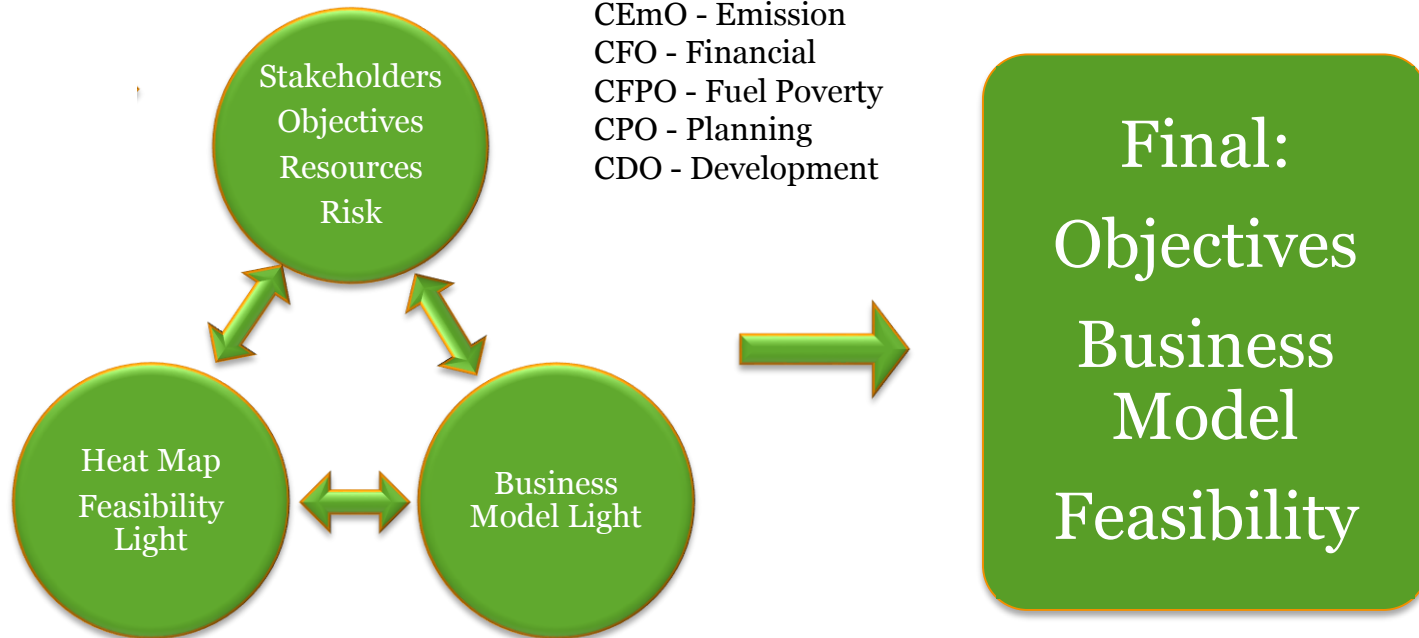
# Lessons for Scotland

- Plan! Think long term
- Set clear objectives = clear governance models – who can do what?
- Support - Underwrite risk on loans
- Skills development – and job creation – a strategy is needed
- Tech is well proven – we have done a lot of the learning
- Be careful off cherry picking

# Public Sector Challenge

External:  
Housing Associations  
Private developers  
Municipal buildings – Scotland / UK  
Large offices  
HMP  
RSL  
NHS

Internal:  
CHO - Housing  
CEO - Executive  
CEnO - Energy  
CEmO - Emission  
CFO - Financial  
CFPO - Fuel Poverty  
CPO - Planning  
CDO - Development



# Thank you

Morten Jordt Duedahl

Head of Secretariat

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[www.districtenergypartnership.com](http://www.districtenergypartnership.com)



# District Energy Partnership

- Mission: Strengthen DH framework conditions
- Provide: Evidence, Knowledge, Input
- Active in Scotland and England
- Free of charge

**GRUNDFOS** 

 **Grontmij**

*Danfoss*

**LOGSTOR**

**ista**

**COWI**



# Ruth Rule

Director  
ENERGY DIRECTION




# Development and Delivery of District Heating Projects

13<sup>th</sup> May 2014

## Business Models for District Heating Projects

# Business models for district heating



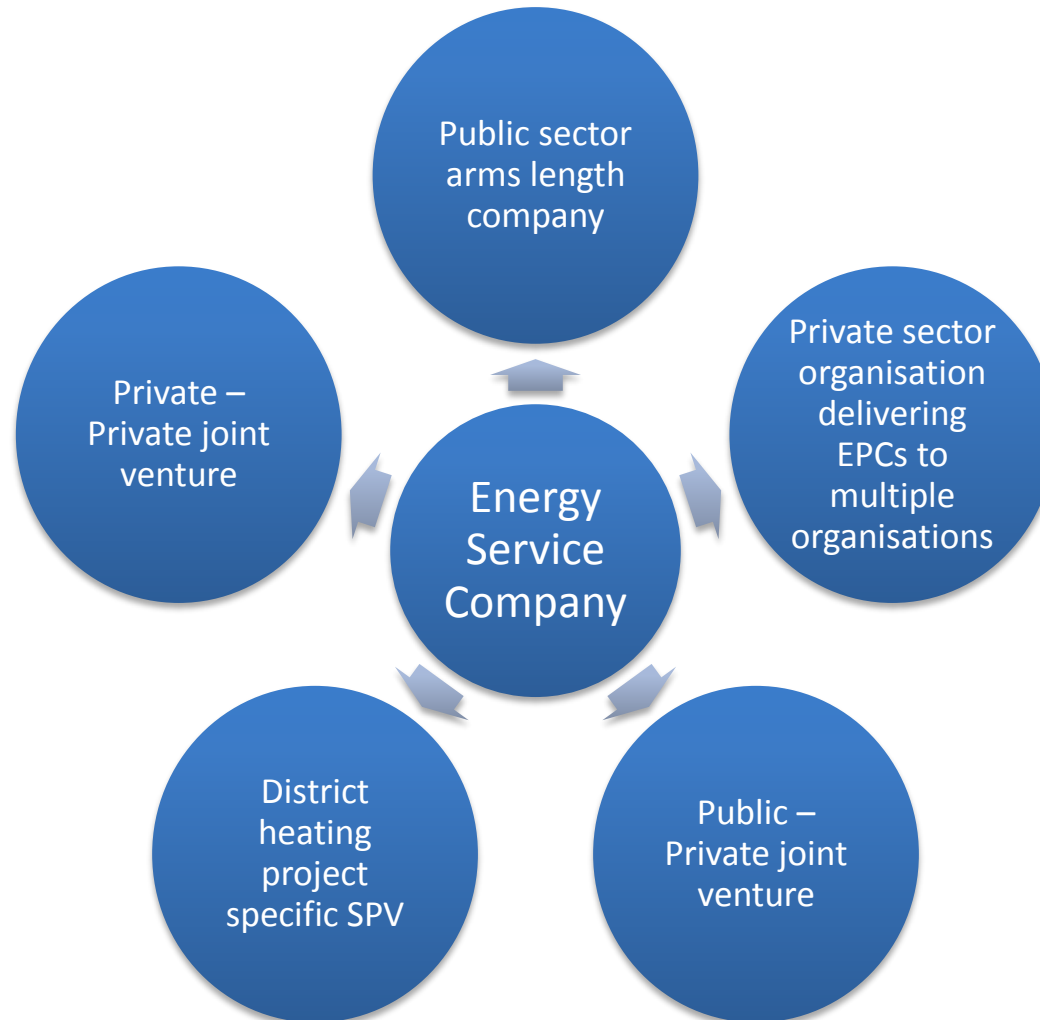
Option	Description	Risk allocation	Example
1	Entirely public sector funded, operated and owned	Public sector retains all risk	Purchase contracts for equipment only
2	Public sector led, use of private sector contractors	Private sector assumes construction and possibly operation risk	Purchase turnkey asset delivery contract, possibly with maintenance and/or operation
3	Private sector invests/takes risk in some elements of the proposed activity	Private sector takes risks for discrete elements	As 2 with increased private sector operational risk, and payment or investment at risk
4	Joint venture, equal share in project with a private sector partner	Most risks are shared	Joint Venture – both parties investing and taking risk
5	Public funding to incentivise private sector activity	Public sector support only to economically unviable elements	Power Purchase Agreement
6	Private sector ownership with public sector promise in element of the project	Public sector underpins key risks	Public sector guarantees demand or credit risk
7	Private sector ownership with only involvement from public sector in facilitation role	Private sector risk beyond early stages development	Public sector makes suitable site available and grants lease/licence/royalty arrangement
8	Total private sector owner project	Private sector carries all risks	No or minimal public sector role

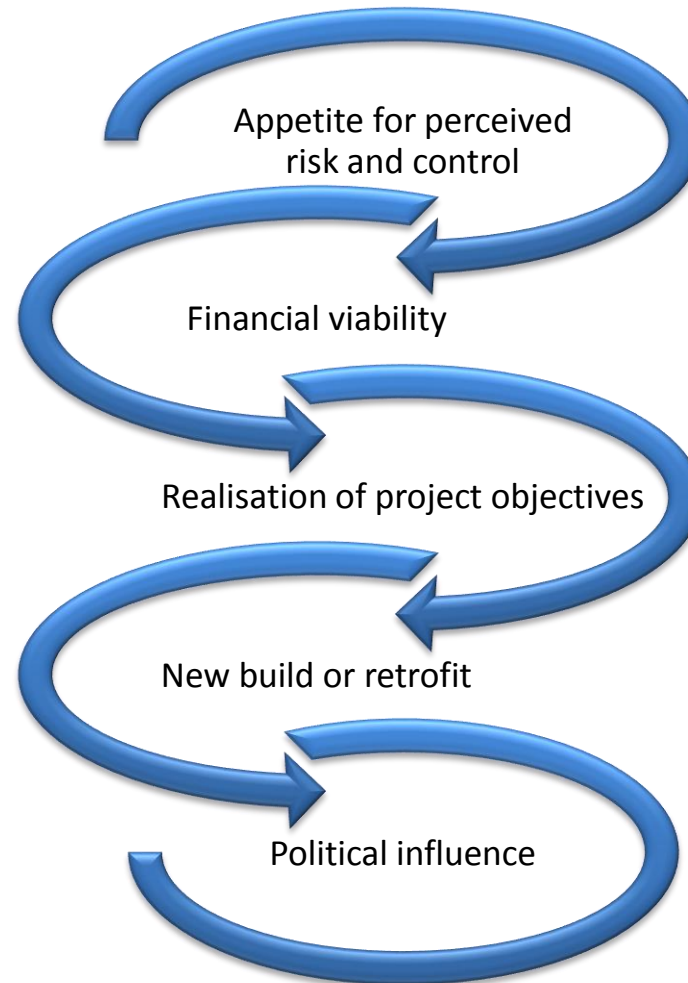


# The short list

Delivery Structure	Description	Example
Wholly owned public sector	<p>Public sector organisation leads the development of the project and takes full financial risk.</p> <p>Elements of the construction and operation are outsourced through turnkey asset delivery contracts.</p>	<p>Aberdeen Heat and Power Fife Islington</p>
Wholly owned private sector	<p>Private sector led development with private sector entity taking full financial risk for the project.</p>	<p>Birmingham Leicester Kings Cross</p>
Housing scheme	<p>Residential Social Landlord led project, with RSL taking financial risk for the project.</p> <p>Elements of the construction and operation are outsourced through turnkey asset delivery contracts.</p>	<p>Cube</p>

# ESCo – myth, legend or something else?





?<12%

- Public sector (subject to benefits realised)

~12%

- 'ESCo'

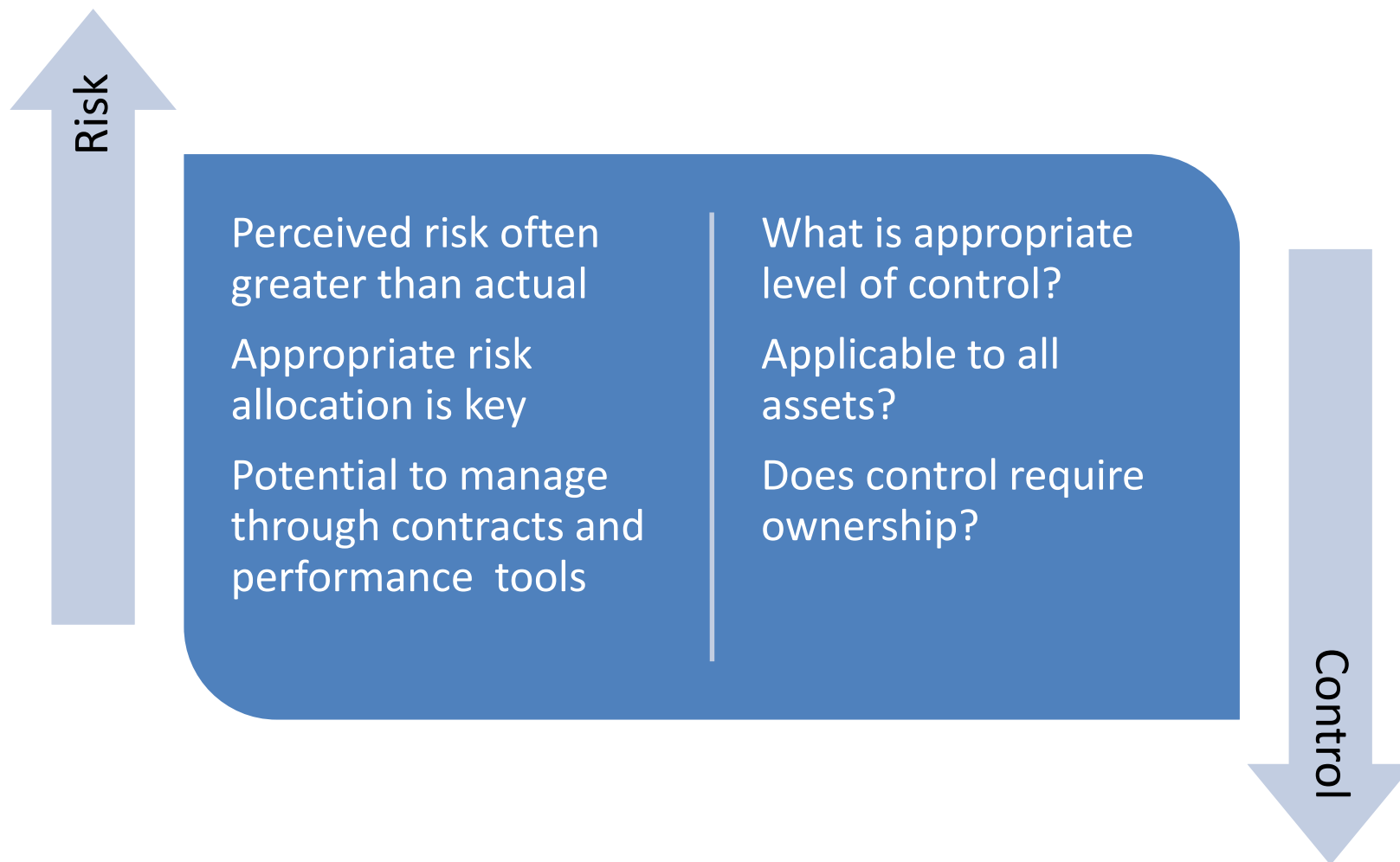
~15%

- Equity returns

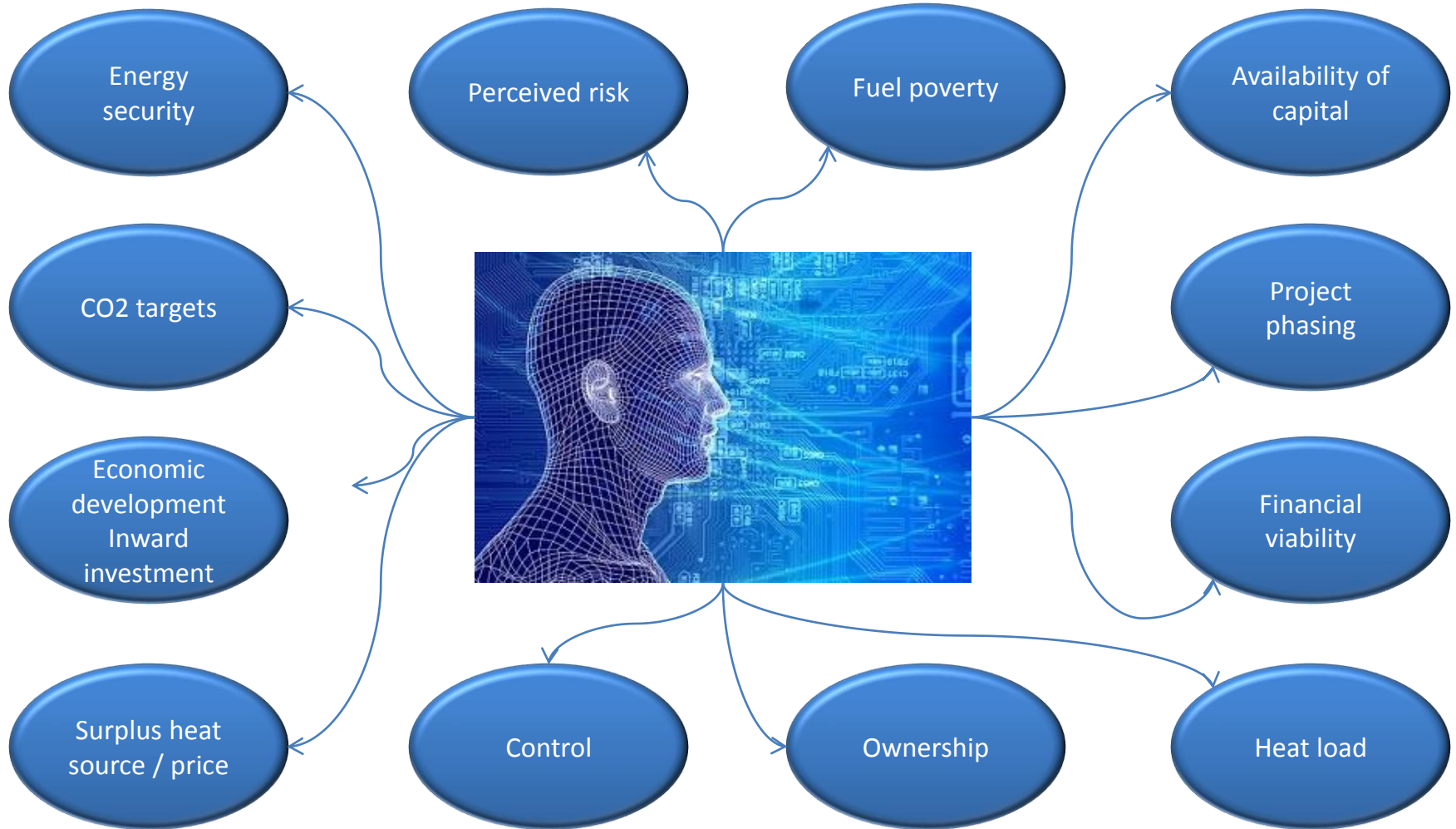
# Business models and project objectives

Option	Description	Ability to meet objectives	Requirement for public sector funding
1	Entirely public sector funded, operated and owned	High	Yes
2	Public sector led, use of private sector contractors	High	Yes
3	Private sector invests/takes risk in some elements of the proposed activity	Medium -High	Yes
4	Joint venture, equal share in project with a private sector partner	Medium	Yes
5	Public funding to incentivise private sector activity	Medium	Yes
6	Private sector ownership with public sector promise in element of the project	Medium - Low	No
7	Private sector ownership with only involvement from public sector in facilitation role	Low	No
8	Total private sector owner project	Limited	No

**In reality the picture is much more complicated.....**



# Summary



SCOTTISH  
FUTURES  
TRUST

[www.scottishfuturestrust.org.uk](http://www.scottishfuturestrust.org.uk)





## District heating projects and procurement law

Roger Cotton – Head of Procurement, Brodies LLP

[roger.cotton@brodies.com](mailto:roger.cotton@brodies.com) – 0131 656 0129

# The 1 minute introduction

- EU law
- Free market principles
- Transparency, Equal Treatment and Non-discrimination
- Regulation 4(3): An authority must:
  - treat economic operators equally and without discrimination; and
  - act in a transparent and proportionate manner.
- Advertise the opportunity, be clear as to requirements and criteria, and run a fair process

# Coverage

- Public sector directive and regulations
  - Central government
  - Local authorities
  - RSLs
  - NHS Boards
  - 5 pages of named bodies
  - A catch-all definition – entities funded or managed by other authorities
- Utilities directive and regulations
  - Scottish Water
  - Energy network operators
  - Transport infrastructure operators

# Procurement of DH

- Procurement recognises three categories
  - Works
  - Goods / Supplies
  - Services
- Elements of a DH scheme
  - The network – works
  - Fuel - supplies
  - O&M – services
  - Output energy – supplies
    - Selling is not regulated
    - Buying is regulated

# The problems for a potential heat user

- Cannot simply select preferred supplier
- Breach of procurement law brings significant sanctions
- No general “public to public” exemption
- No exemption to allow prioritisation of other policies

# Strategy 1

- Arm's length body (ESCO) meeting the "Teckal" test
- Decisive influence over strategic objectives and significant decisions
- No private sector participation in ESCO
- Essential part of ESCO's activities are for its sponsor (80%)
  
- 80% measured against sales to sponsor, or activities "entrusted" by sponsor?
  
- Can be implemented with one authority or multiple authorities

## Strategy 2

- Joint delivery
  - Co-operation between public sector bodies in delivery of services
  - Common objectives
  - Public interest
  - No more than 20% market participation
  
  - Front-line services only, or supporting services?
  - Profit?

# Conventional strategies

- Self supply
- Competitive procurement
  - Environmental criteria
  - The inherent advantage of the network operator



## (High risk) strategy

- Specification
  - “The requirement is the supply of energy from a DH network”
  - Would limit the pool of providers to one
  - An equipment example from the NHS
  - But, regulation 9(16): other than in exceptional circumstances, an authority must not specify its requirements which refer to
    - materials or goods of a specific make or source or to a particular process, or
    - to origin or means of productionwhich have the effect of favouring or eliminating particular economic operators.

# Procurement risk management

- Short time bar periods
- Transparency
- Could be used for a known breach (a bold step) or to manage a “grey area”



## District heating projects and procurement law

Roger Cotton – Head of Procurement, Brodies LLP

[roger.cotton@brodies.com](mailto:roger.cotton@brodies.com) – 0131 656 0129

# Opportunities & challenges for the public sector



**Paul Moseley**  
Scottish Futures Trust

# Role of the public sector

- **Multiple public sector actors**
- **Public sector role**
  - **Co-ordination / facilitation / planning**
  - **Guarantee / promise / under-writing**
  - **Funding / financing**
  - **Development & operation of schemes**
- **Legal powers, business models, governance, finance, contracting & procurement strategy**
- **Project development is an iterative process**

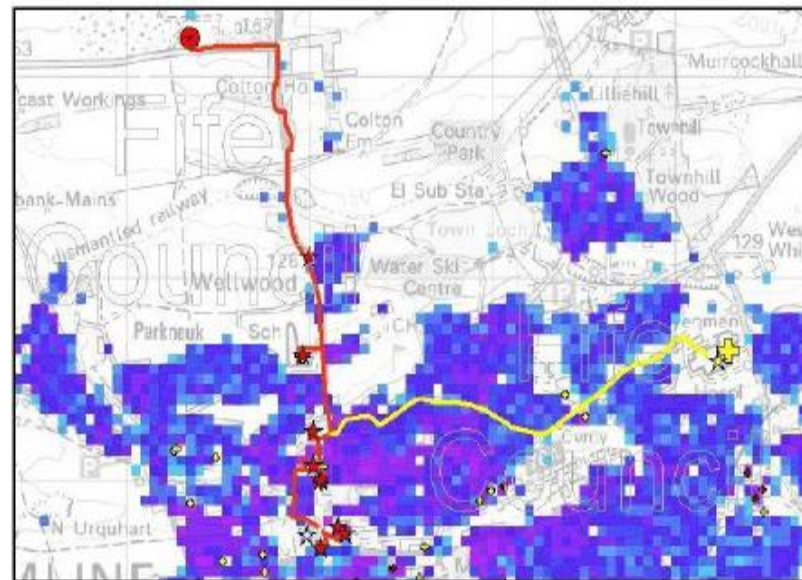


- **Support to Pathfinder Projects**
  - **Templates to be made available to other projects**
- **Guidance**
  - **public bodies' powers / duties**
  - **Public sector delivery structures**
  - **VAT treatment**
- **Funding sources & financing structures available to the public sector**

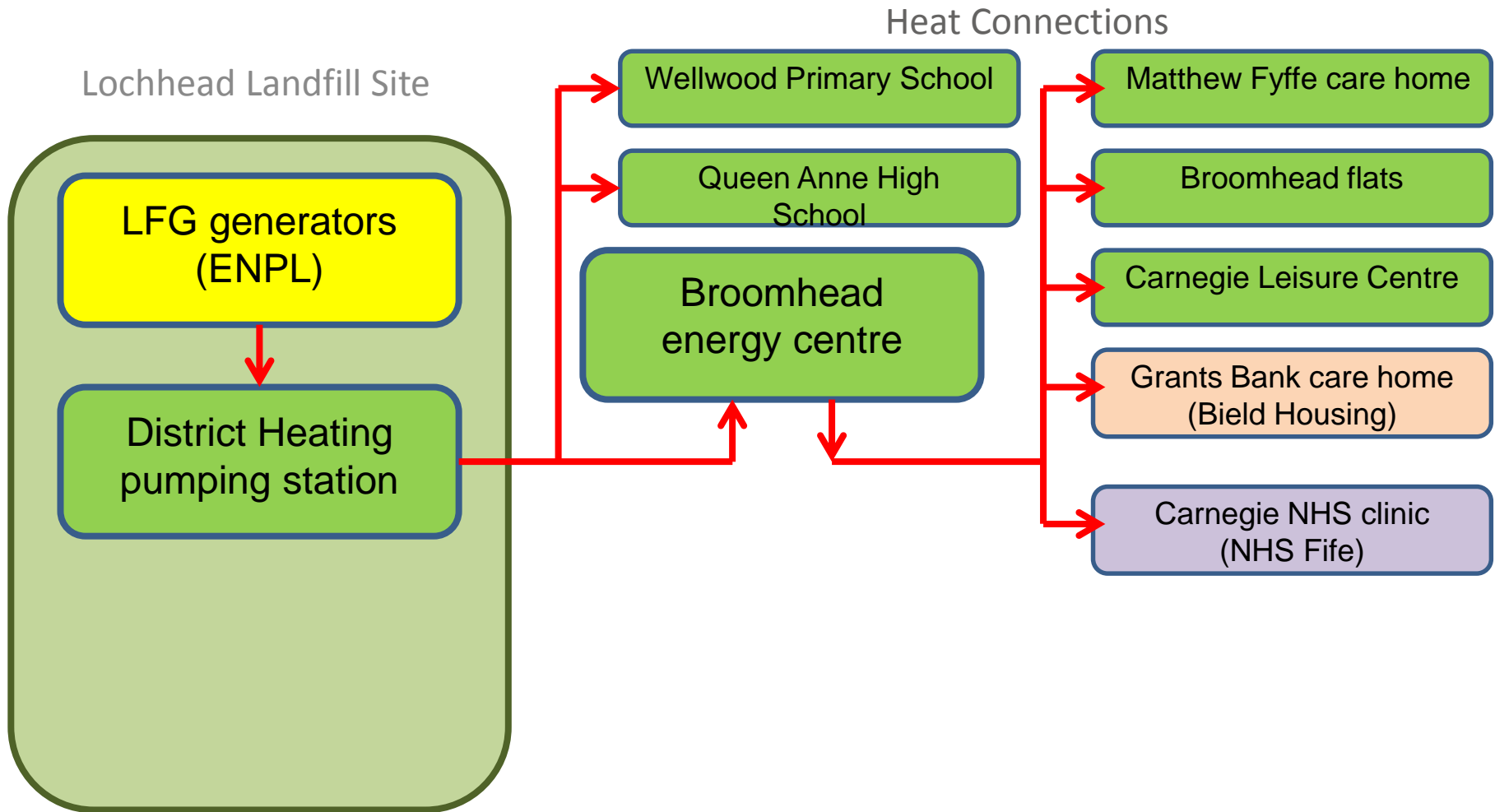


# Case Study: Dunfermline

- Existing heat network owned and operated by Fife Council
- Current heat supply: landfill gas
- New heat supply: bio-gas from anaerobic digestion facility
  
- Queen Margaret Hospital – steam boilers
- Proposal: use QMH as an anchor load to extend heat network

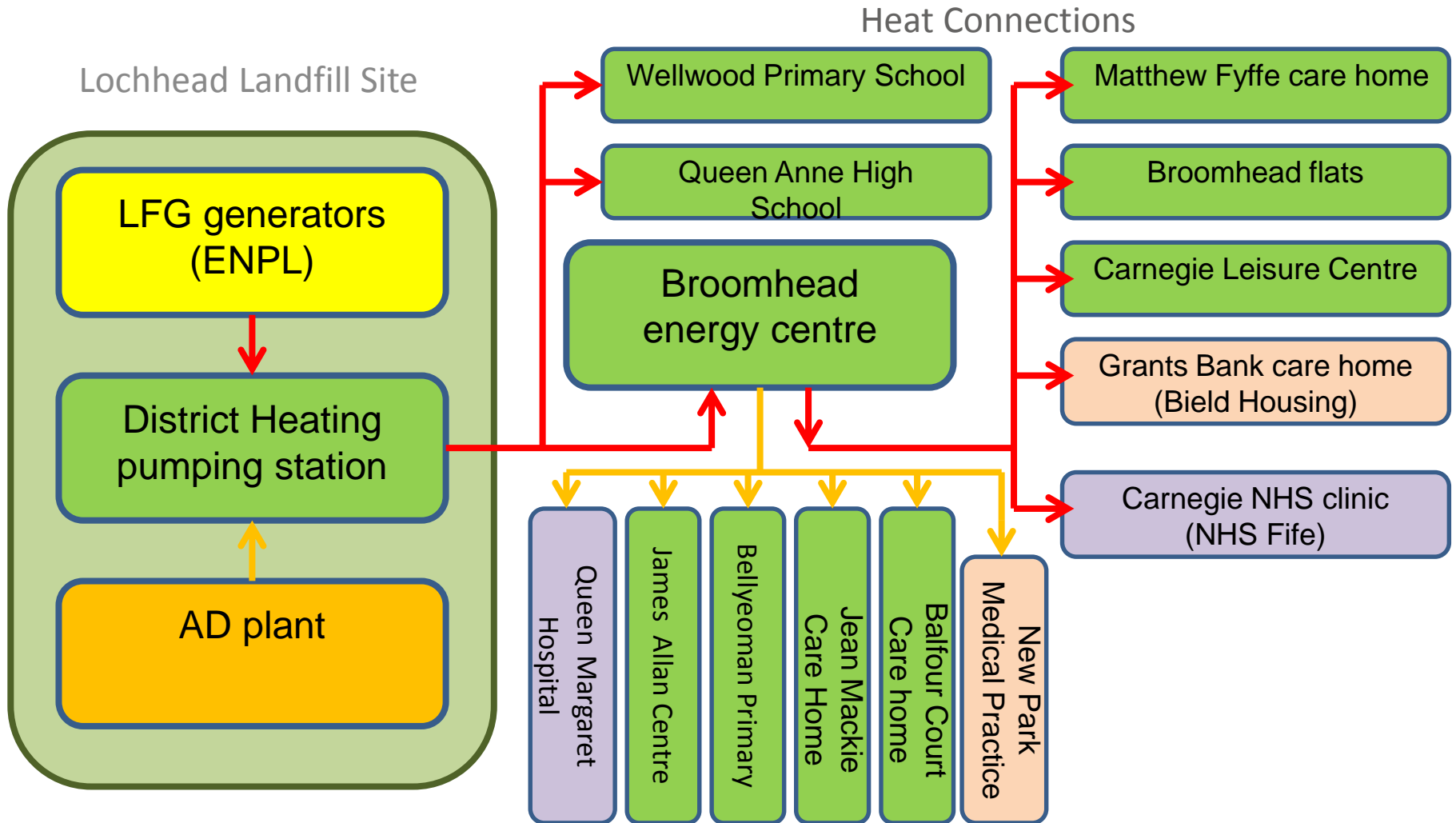


# Existing scheme

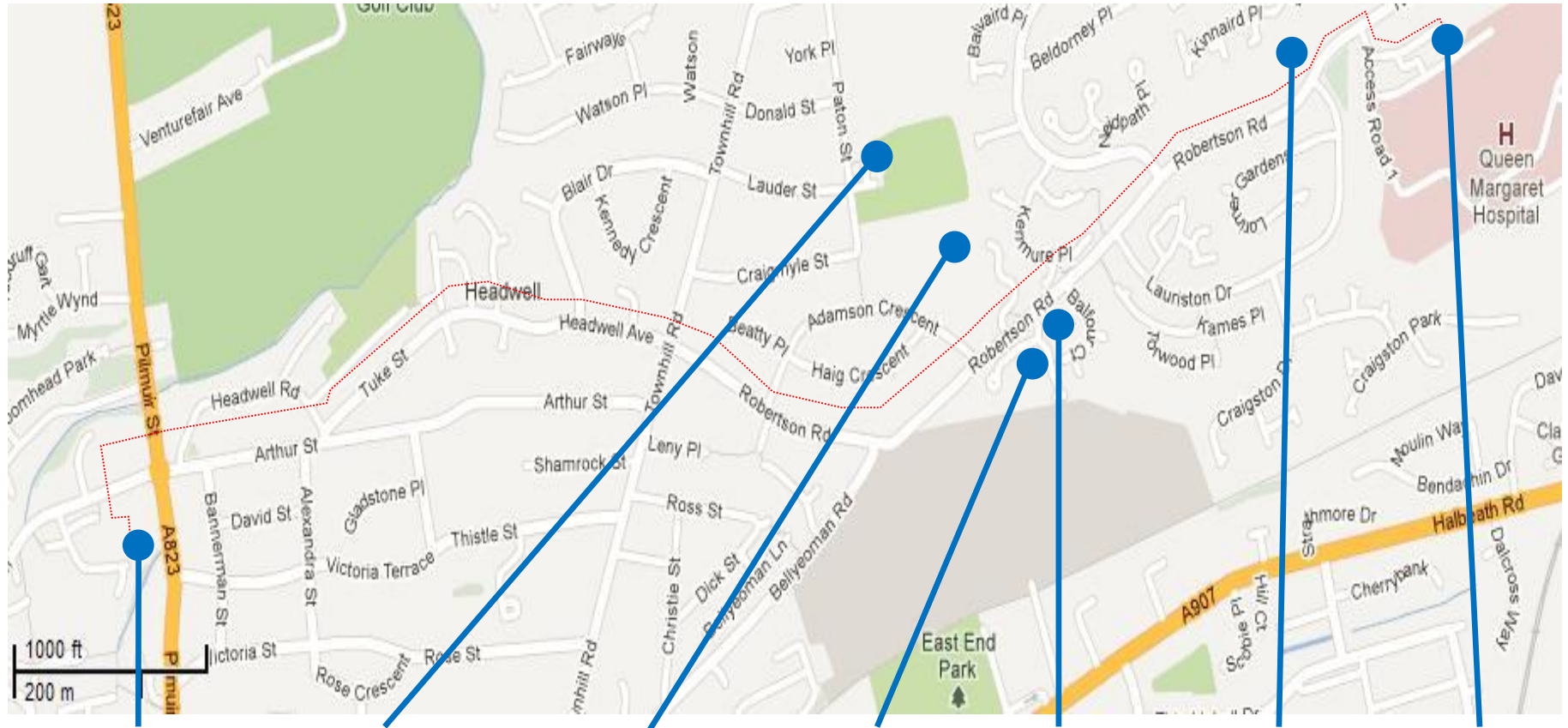




# Proposed extension



# Proposed extension - schematic



Broomhead  
Energy  
Centre

James Allan  
Community  
Centre

Bellyeoman  
Primary  
School

Jean Mackie  
Care Home

Balfour  
Court

New Park  
Medical  
Centre

Queen  
Margaret  
Hospital

# Network route options

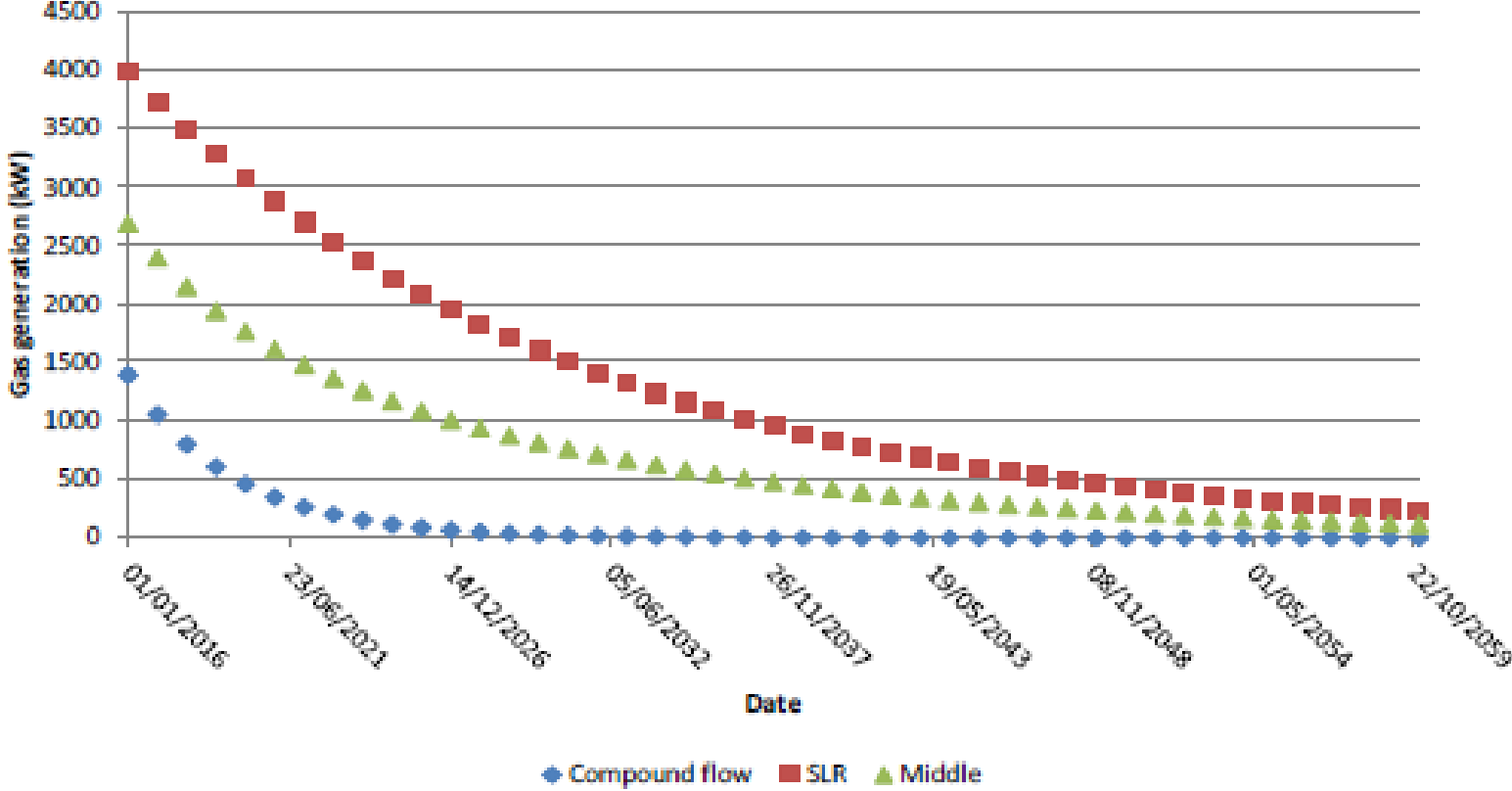


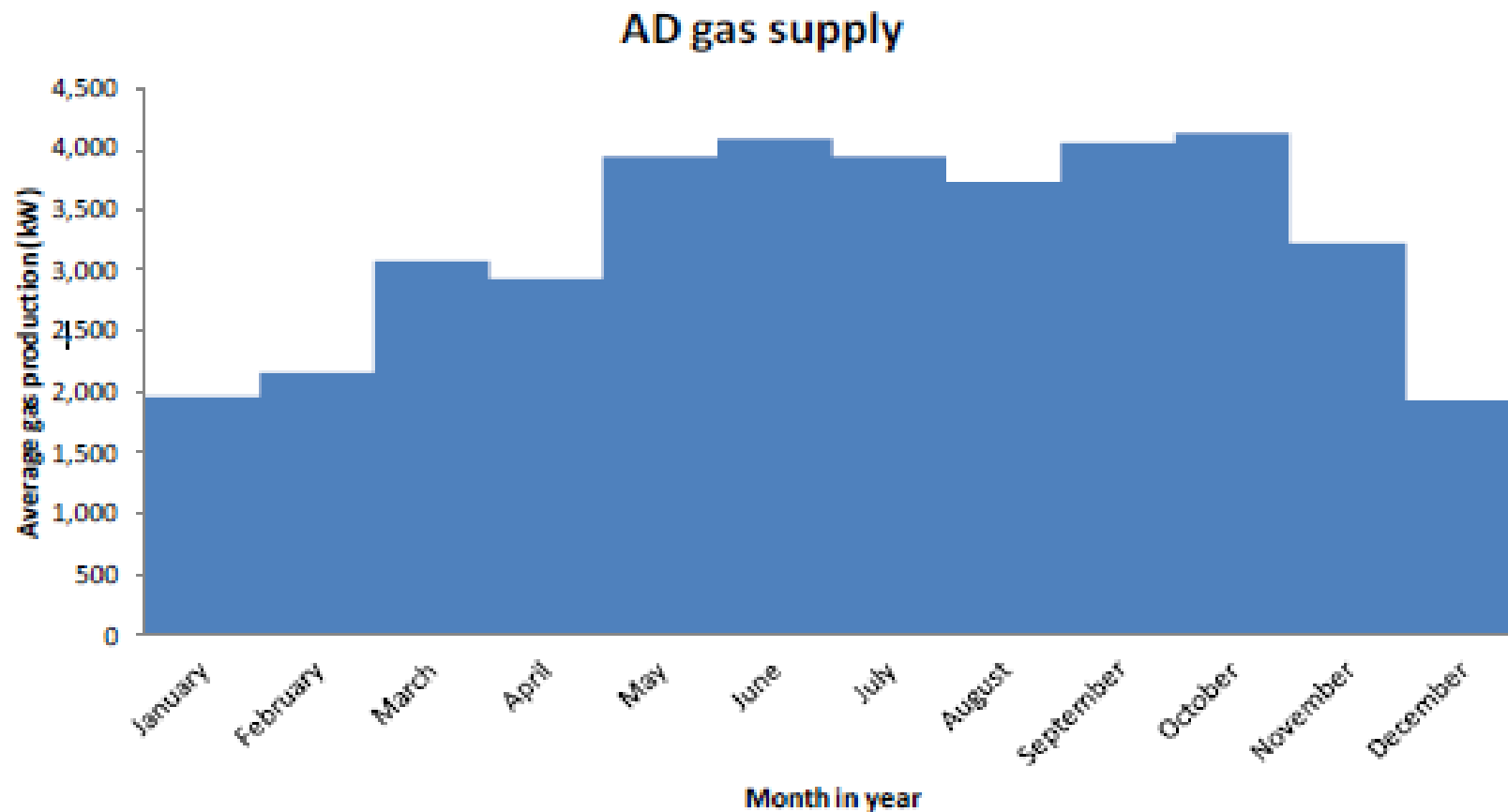
- **Fife Council / NHS Fife**
  - Objectives – social / economic / carbon
  - Powers – trading, establishing/participating in SPVs
  - Funding & finance – access to capital, ability to borrow
  
- **Technico-economic modelling**
  - Low carbon heat availability
  - Heat loads
  - Network options
  - Heat supply options
  
- **Procurement, contracting & financing options**



# Landfill gas yield

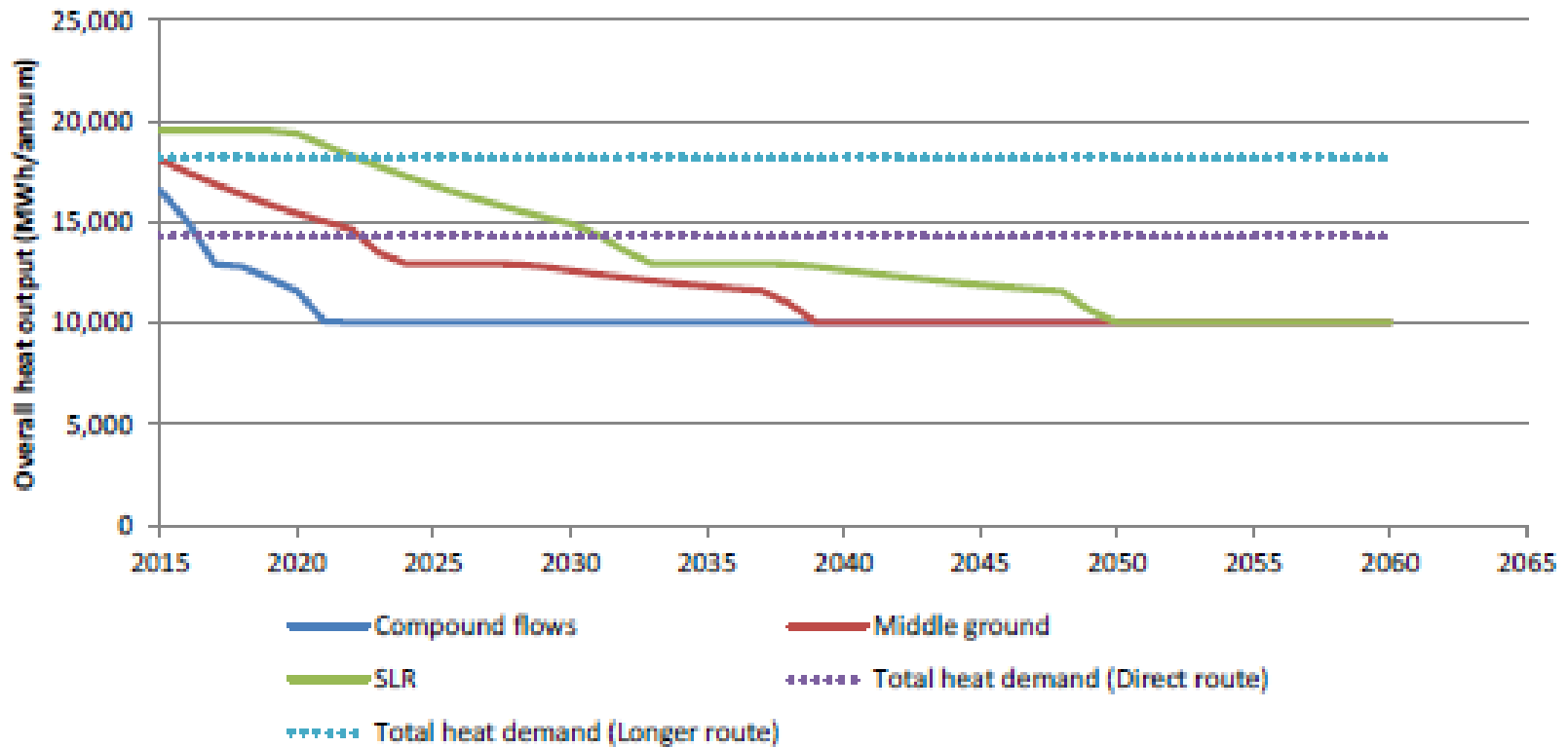
Comparison of gas generation rates



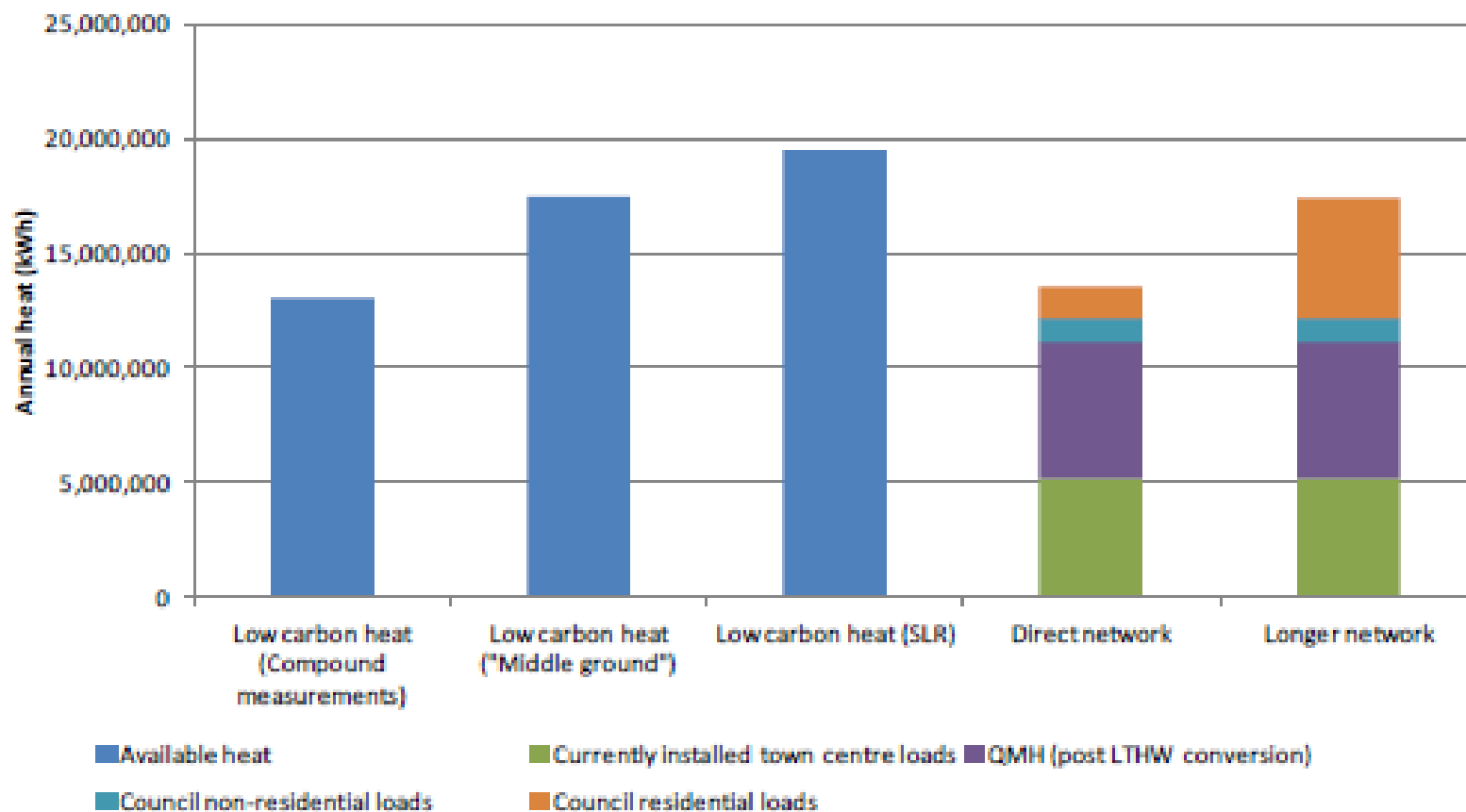


# Low carbon heat availability

## Overall heat output



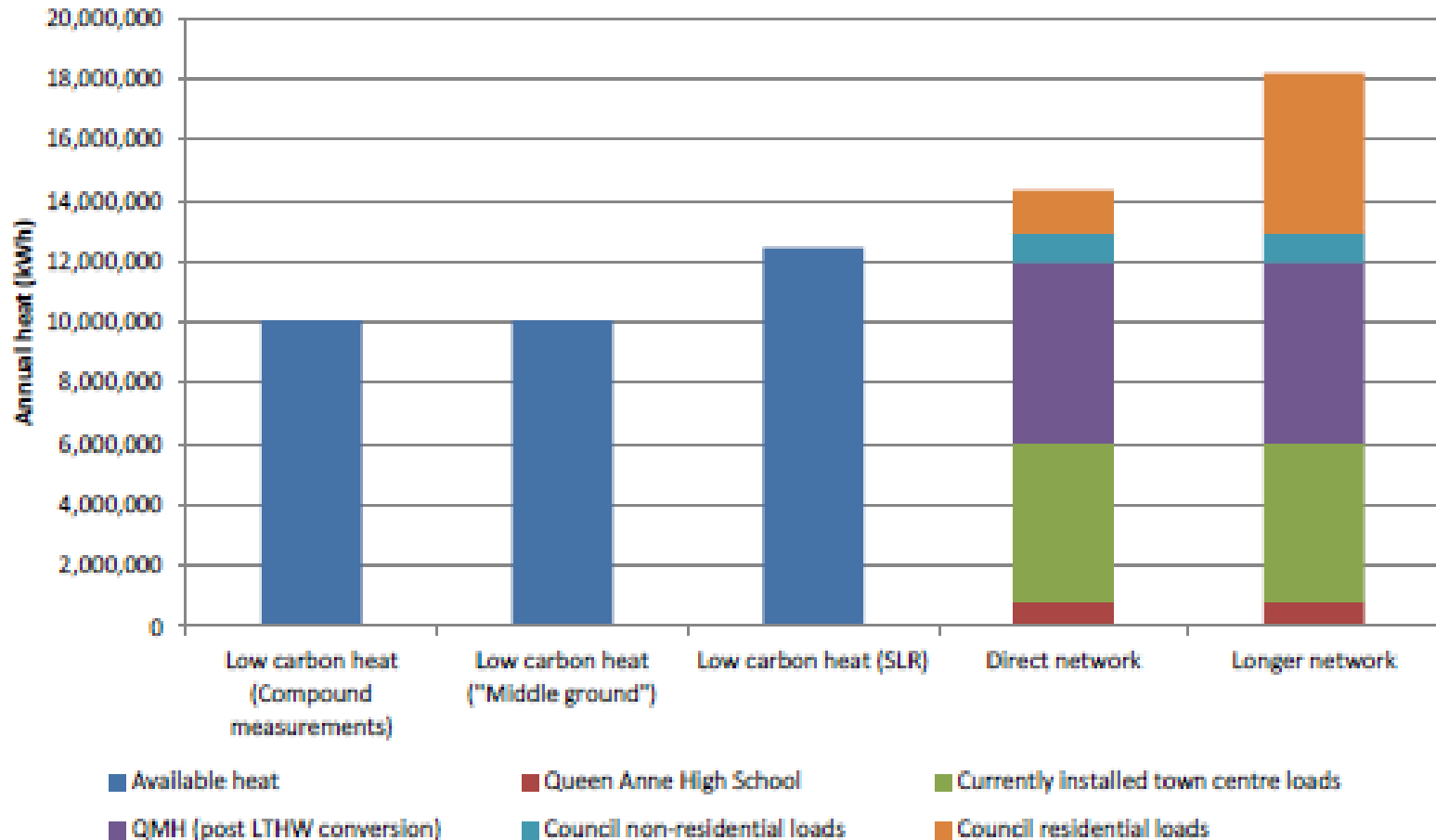
## Low carbon heat availability 2016 and steady state loads





# Low carbon heat availability (2041)

## Low carbon heat availability 2041 and steady state loads



- **Understanding project costs (capital, whole-life costs)**
- **Understanding project risks**
- **Sensitivity analysis**
  - **Supply: heat availability**
  - **Demand: future heat loads**
  - **Project costs**
- **Allocating benefits**
  - **Cost savings**
  - **Carbon savings**
  - **Additional benefits for DH compared with stand-alone**



- Is there a solution that meets all stakeholders' objectives?
- Affordable
- Deliverable
- Value for money
- Need a pragmatic approach



# Potential future initiatives

- Need to accelerate project development process
  - Sharing experience and lessons learnt
  - Case studies
- Quantifying 'social' benefits of district heating
- Templates for SPV structure?
- Heat supply agreements?
- What would be of most benefit?





# DEVELOPING & DELIVERING DISTRICT HEATING PROJECTS

