

Heat Networks: The Road to Commercialisation

UK Local Authority District Energy Vanguards Network

Manchester, 21 May 2019



POWERPIPE

SUPER
A DOVER COMPANY

switch2

Michael King

District Energy Vanguards Network

Jody Pittaway

SSE

The Road to Commercialisation

UK District Energy Vanguards Event
21st May 2019

Jody Pittaway – SSE Heat Networks



Utilities



Increased heat and warmth



Decreased carbon emissions



Helped tackle fuel po



Contributed to local economy

Wyndford Estate, Glasgow

CSR Credentials



FAIR TAX MARK
ACCREDITED SINCE
2014



LIVING WAGE
EMPLOYER SINCE
2013



B RATING FOR ITS CLIMATE
CHANGE PROGRAMME RESPONSE



CREATING AND IMPLEMENTING
SSE'S INCLUSION STRATEGY WITH
INCLUSION SPECIALISTS



RANKED #1 IN
THE FTSE350 FOR
INCLUSIVE JOBS
GROWTH



ANNUAL ECONOMIC CONTRIBUTION
TO THE UK AND IRISH ECONOMIES
CALCULATED SINCE 2012



BRITISH STANDARD FOR INCLUSIVE
SERVICE PROVISION ACHIEVED FOR SSE'S
RETAIL AND NETWORKS BUSINESSES



CERTIFIED WITH THE ONLY
ACCREDITATION FOR RESPONSIBLE
BUSINESS PRACTICE IN IRELAND



AAA (LEADER) RATING FROM MSCI
ESG RESEARCH



COMMITTED TO MEETING THE TCFD
RECOMMENDATIONS IN FULL BY 2021



ONE OF TWO ENERGY
COMPANIES GLOBALLY
ON THE BLOOMBERG
2018 GENDER-EQUALITY
INDEX



FTSE4Good
INCLUDED IN THE FTSE4GOOD INDEX
SINCE 2014

Climate Change Performance

- SSE's vision is to be a leading provider of energy and related services in a low-carbon world.
- SSE's carbon target, to cut the carbon intensity of the electricity it generates by **50% by 2020**, compared to 2006 levels, was met early in 2017.
- We have now set a new, medium-term carbon target: to cut the carbon intensity of the electricity we generate by **50% by 2030**, based on 2018 levels.



A Quick Introduction to SSE Heat Networks



13 operational networks

8,000 residential
customers

10MWe of CHP
generation capacity

3 new networks to be
operational in 2019

Lots of lessons learned!

15,000 residential
customers at full build

71MW of boiler
generation capacity

Developer, land owner,
housing association

96,000m² commercial
customers

3MW of heat pump
generation capacity

Flexible business model

500,000m² commercial
customers at full build

16MW of chiller
generation capacity

Some of those lessons...

- 1** Design for performance - max plant efficiency; min system losses; whole-system commissioning; O&M with contingency; & ensure performance accountability
- 2** Future-proof – Lowering emissions; & enable system expansion wherever possible
- 3** Communication plan with all tenants and owners at sales, through the conveyancing process and into operation (wider stakeholder engagement plan)
- 4** Focus on robust commissioning process with a “one team” approach (client and heat provider)
- 5** Provide on site customer support and focus on dealing with customer issues as soon as they arise to avoid issues escalating

Complimentary skills & experience

Public Sector	SSE Enterprise
Strategic Masterplanning	Dedicated & experienced heat networks team
Heat & Electricity Loads	Financial investment
Planning Powers	Ability to ramp resources and access to specialist supply chain
Relationship with End Users	Design, delivery & commissioning expertise
Access Rights	Asset management – optimum network performance & reliability
Social Outcomes: Air Quality, Carbon, Health & Wellbeing	Specialist, award winning customer services – 11 years looking after heat customers

A Partnership Model



Our Distributed Energy Provision



Multi-utility



Electricity



DG and storage



Street lighting



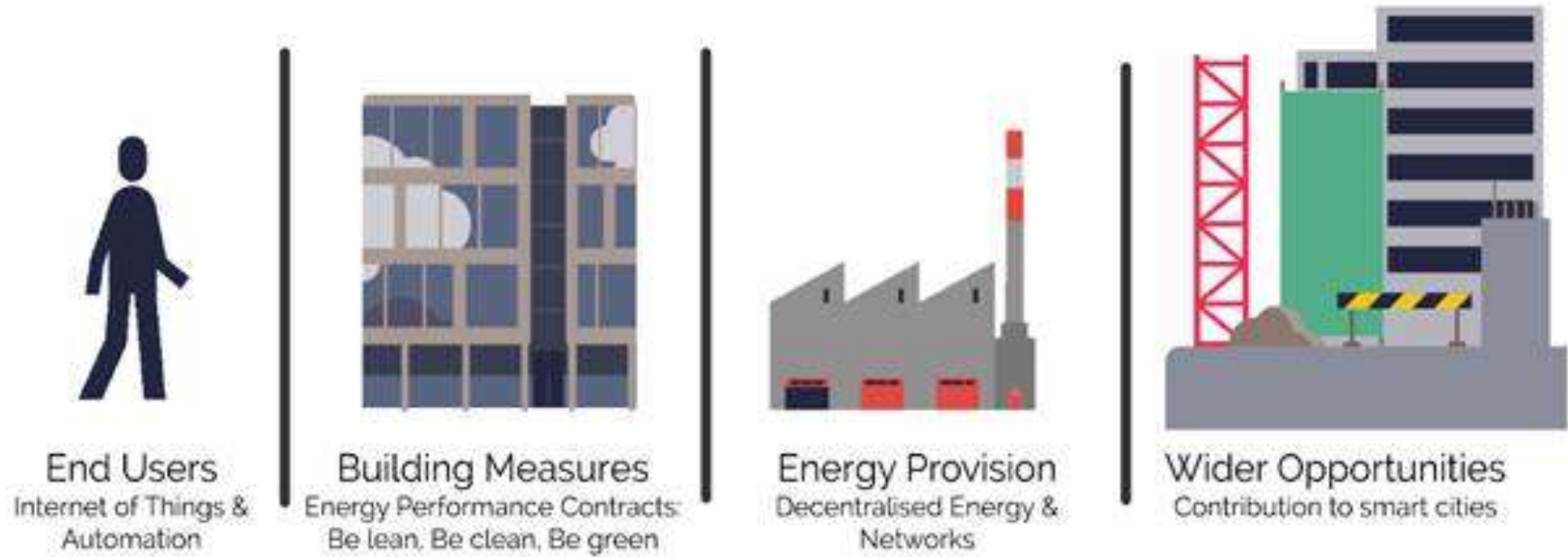
Heat



Electric vehicles



Digital services



Decentralising and integrating as we move forward...



Thanks for listening Enjoy the day!

Get in touch:

Jody Pittaway

Project Director – Heat Networks

SSE Enterprise | Utilities

E: jody.pittaway@sse.com

SSE Enterprise has provided valuable technical input which is based on its experience and learning from running heat schemes elsewhere.

SSE's experience in looking after heat customers combined with their significant customer service infrastructure was also very important to us.

**Jason Wood,
Project Director, Hadley Mace**

Joe Finneran

Wirral Met College

Behind the scenes at
Wirral Met College



HEAT AND THE **CITY**



HEAT AND THE **CITY**

Behind the scenes at
Wirral Met College

Behind the scenes at
Wirral Met College



Alex Edwards

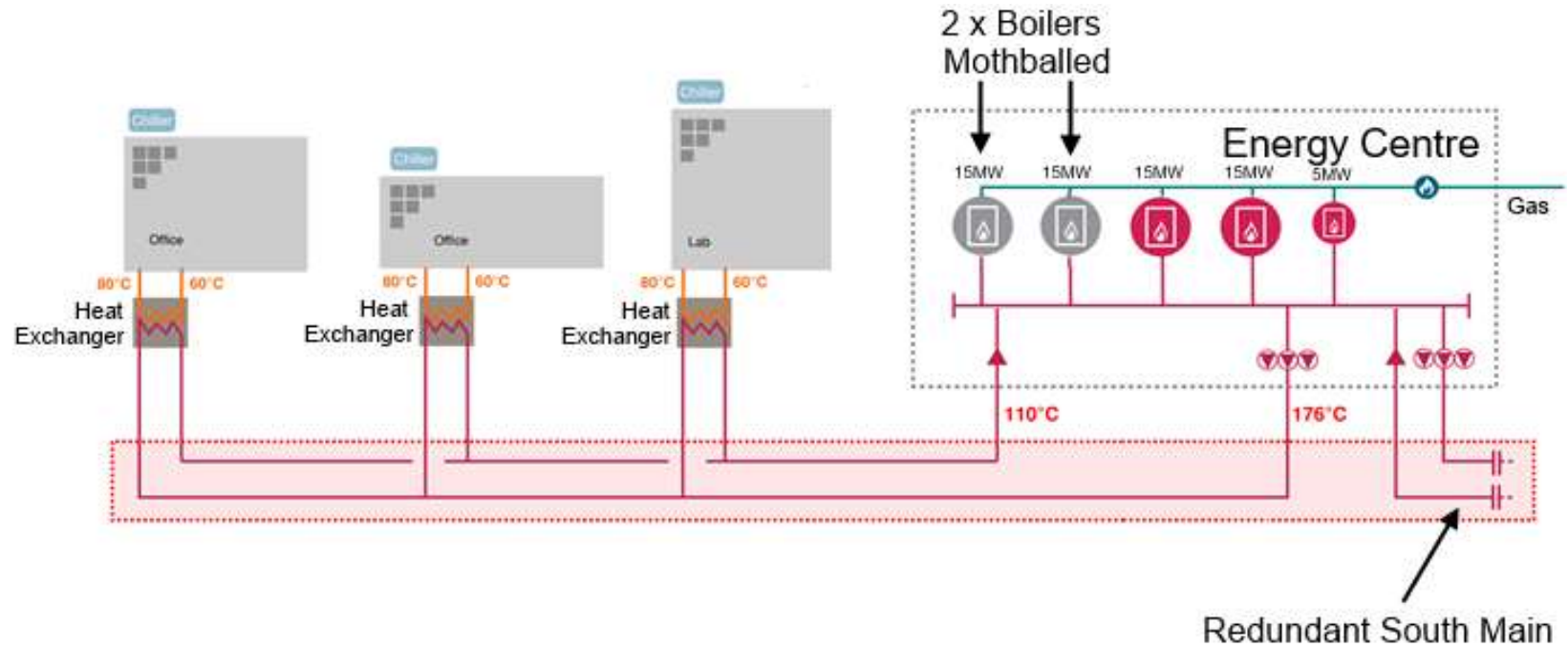
Bruntwood Estates

Alderley Park Heat Network

Alderley Park Heat Network: Current System

- Bruntwood purchased Alderley Park from AstraZeneca in 2014 as part of their relocation plans to Cambridge
- Step into science sector for Bruntwood
- Existing HTHW heat network over 100°C (2nd generation)
- Serves approx 1.5m sqft over 29 buildings (mix of lab, office, cafeteria)
- Separate decentralised cooling
- Runs 24/7/365
- Well engineered, robust & reliable with significant resilience
- Inefficient, expensive O&M, significant compliance, poor metering
- **Not compatible with future strategy**

Alderley Park Heat Network: Current System



HNDU Heat Network Feasibility Study

- Uncertainty around heat network future – led to disjointed development approach
- With support from Cheshire East/Skills & Growth/ELENA applied for HNDU funding for Heat Network Feasibility Study. Conclusions of Feasibility Study:
 1. Interim Solution:
 - Utilise existing heat network
 - Install combined heat and power (CHP)
 - Lower heat network temperature to below 100°C
 2. Long Term Vision:
 - New ambient loop heat network
 - Utilise ground and water source heat pump technology
 - Phased implementation

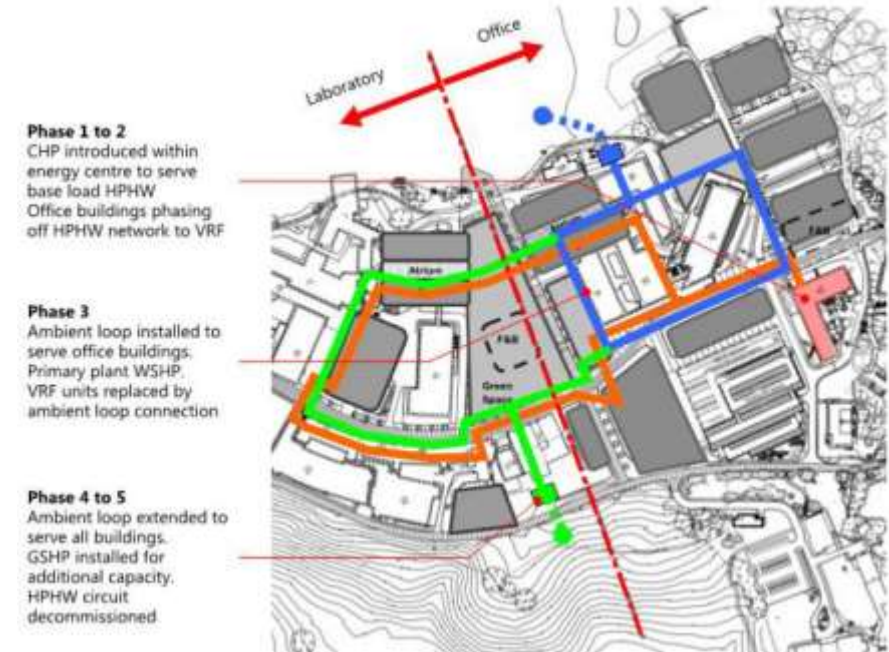
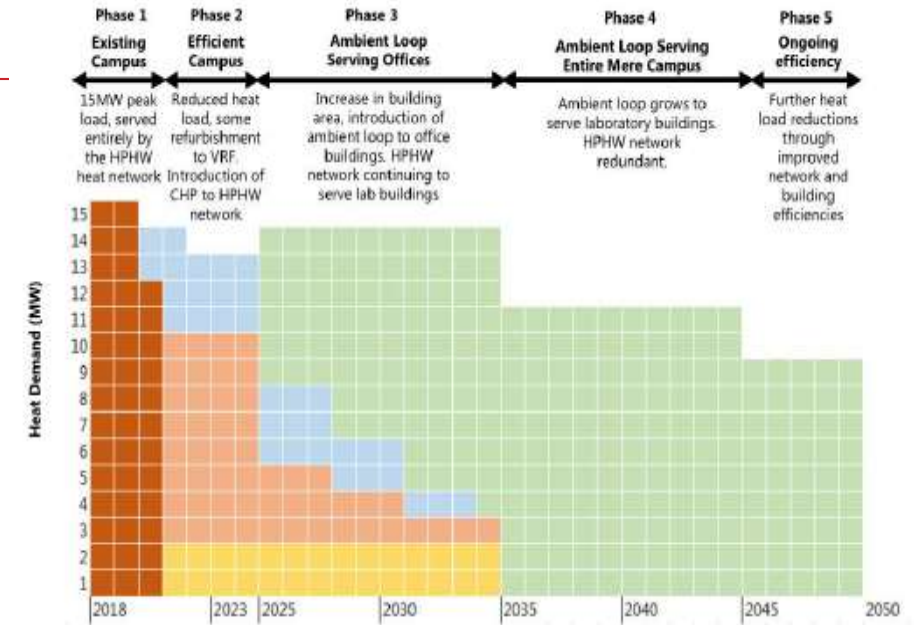
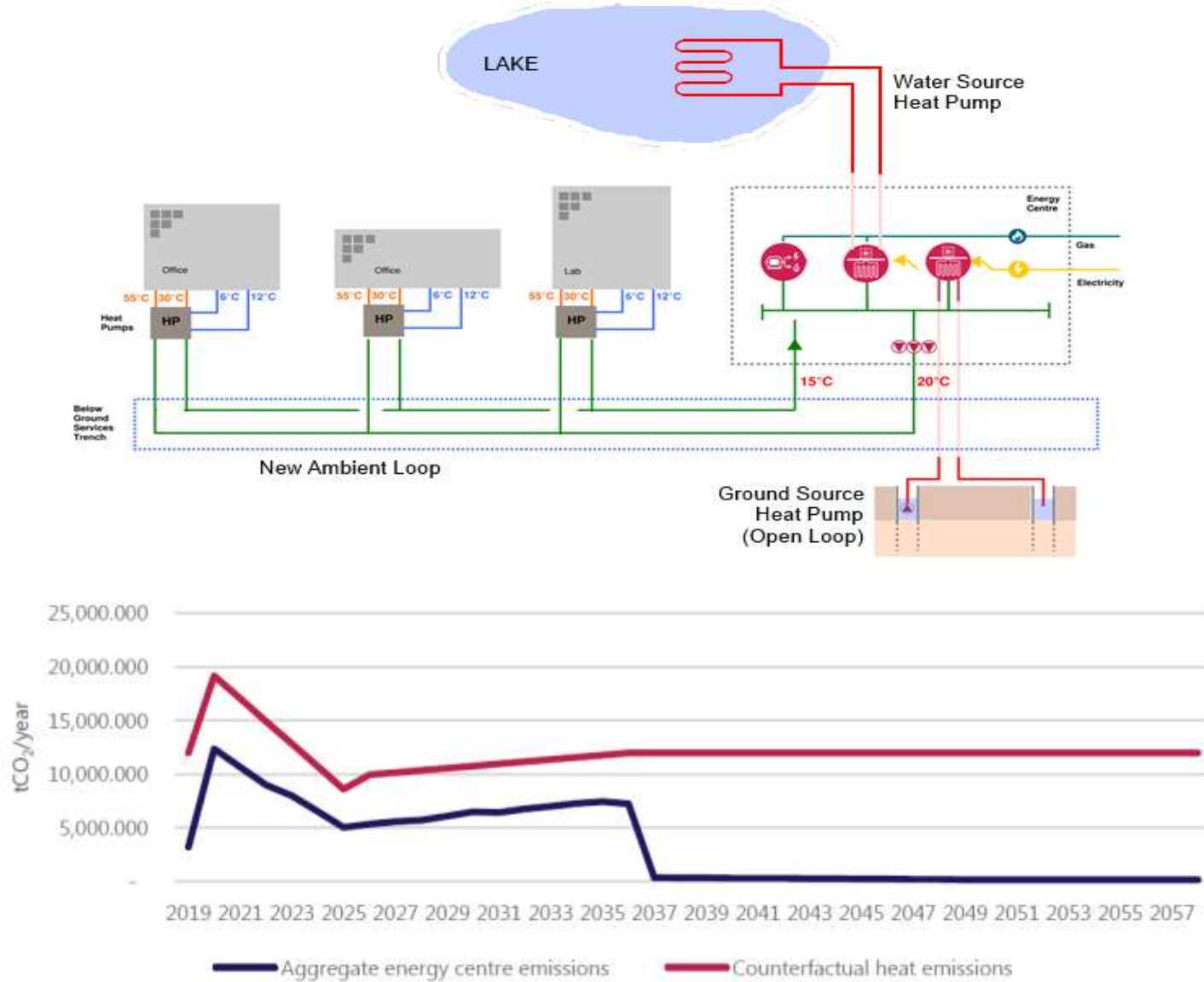
Interim Solution: CHP & Reduced Temperature

- 3rd generation heat network flow/ return of 95/80°C
- Installation of gas fired CHP (2 x 2.65MWe or 1 x 5.3MWe)
- Grid connection / reinforcement works
- Increased flow rate: upgrade of pipework in areas and additional pumps
- Incorporate into 15 year DBOM Contract
- Tender award immanent
- Estimated cost of £9.5m
- Payback estimated within 2.5 years
- Forecast completion summer 2020

Long Term Vision: Ambient Loop

- New ambient loop heat network 15-20°C (5th generation)
- Compatible with low & zero carbon technologies (GSHP, WSHP, Solar, Waste Heat)
- Favourable site conditions for GSHP & WSHP
- New pipework loop required not compatible with current heat network
- Compatible with VRF (air source heat pump)
- Funding available
- Extremely efficient - low O&M
- Significant investment (£12.2m)
- Linked with Smart Grid
- Detailed Project Design (DPD) underway with further HNDU funding
- Aligns with Bruntwood's Sustainability Strategy
- **Phased installation** planned supported by new build development & refurb

The Vision



Objectives & Constraints

Objectives:

- Reduced costs
- Reduced CO₂
- Strategy for development
- Long term plan
- Create a blue print for the business

Constraints:

- Fast pace of development on site
- New & unfamiliar technology
- Maintaining the heat load for the CHP
- Capex vs Opex
- Planning restrictions for PV
- Metering & recharging for centralised systems

George Munson

Leeds City Council



Installing 16.5km of pre-insulated pipe to deliver heat & hot water to 1,983 properties across the City of Leeds



SAXTON GARDENS ENERGY CENTRE



CROSS GREEN ENERGY CENTRE



Recycling & Energy Recovery Facility (RERF)
Aire Valley, Leeds

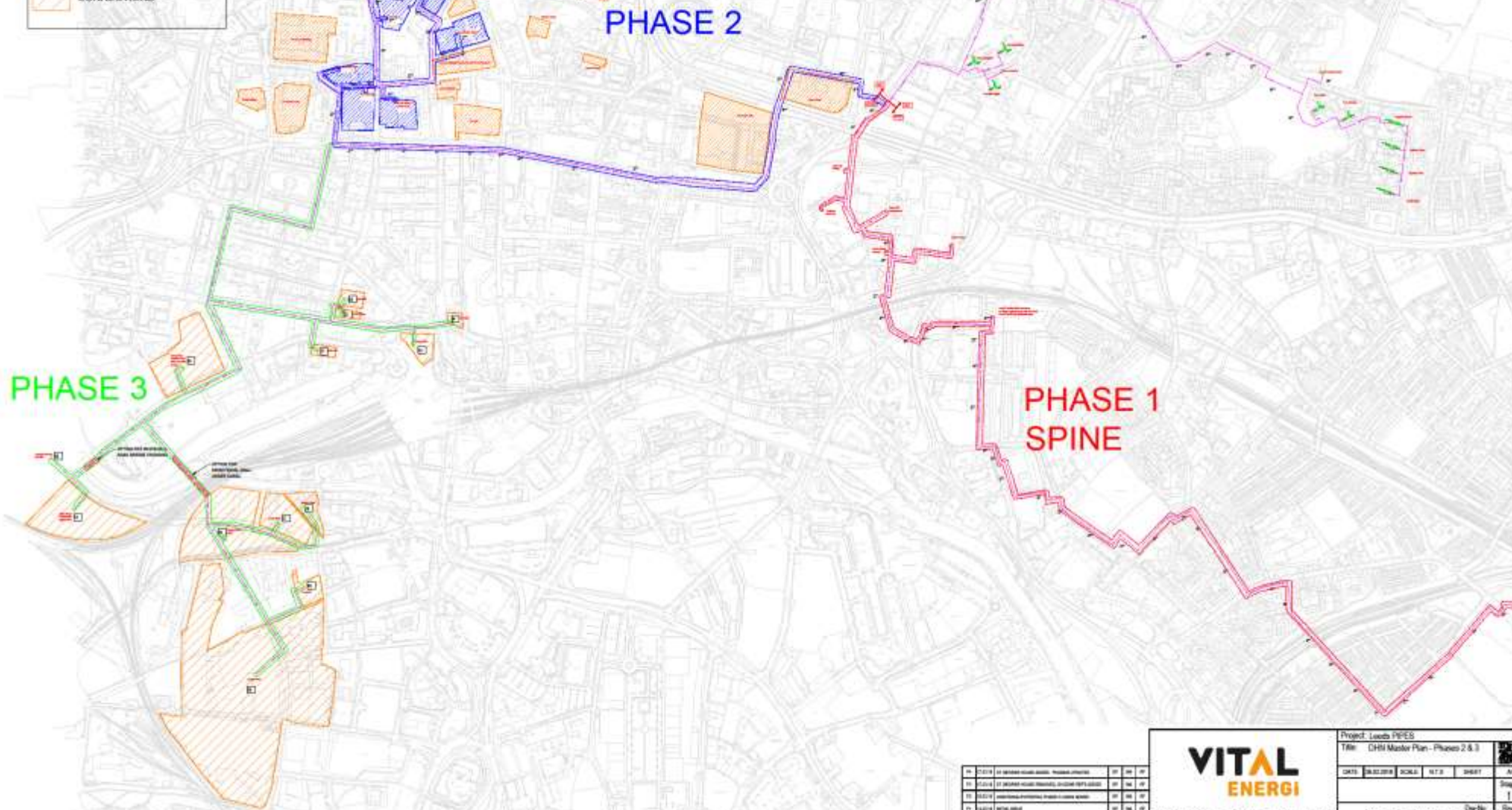






LEGEND

- PHASE 1 DH NETWORK
- PHASE 2 DH NETWORK
- PHASE 3 DH NETWORK
- PHASE 2 BUILDING CONNECTIONS
- POTENTIAL BUILDING CONNECTIONS



NO.	DATE	BY	DESCRIPTION	APP.
01	11/01/19	AL	ISSUED FOR CONSTRUCTION	AL
02	11/01/19	AL	ISSUED FOR CONSTRUCTION	AL
03	11/01/19	AL	ISSUED FOR CONSTRUCTION	AL
04	11/01/19	AL	ISSUED FOR CONSTRUCTION	AL
05	11/01/19	AL	ISSUED FOR CONSTRUCTION	AL
06	11/01/19	AL	ISSUED FOR CONSTRUCTION	AL

VITAL ENERGY

Head Office: 10000 Highway 100, Suite 100, Richmond, BC V6V 1G1
Tel: 604-273-2244 Fax: 604-273-2245

Project: Lantz PSES				
Title: CHN Master Plan - Phases 2 & 3				
DATE	SCALE	SHEET	NO.	
08/02/2019	1:1	107.0	1	
Drawn: [Name]				Stage: 1
Checked: [Name]				Rev: P4
Approved: [Name]				Date: 18/04/2019



Big Picture: using our waste to keep vulnerable people warm



THERE IS
NO  PLANET B



A housing association perspective

From Will Routh, Southern Housing

Objectives

Providing consistently **affordable heat for residents** through the lifetime of a contract, to reduce fuel poverty

Minimise financial risk (to the resident and to the HA of bad debts and unpaid heating/hot water charges)

Maintaining customer service
(despite reducing internal resource)

Constraints

Lack of **internal resource and expertise**, from adopting a reactive approach to planning policy

Commercial priority is given to new build

HAs want to **retain control of the customer relationship**

Short-term funding arrangements mean HAs often choose the **path of least resistance** when contracting

Charles Robson

Womble Bond Dickinson

Evaluating Structures – a Methodology

Charles Robson

4 February 2019



Evaluation Matrix

EVALUATION MATRIX					MODEL	
CRITERION	ISSUES	PARTICIPANT A (0 worst -5 best)	PARTICIPANT B (0 worst -5 best)	PARTICIPANT C (0 worst -5 best)	OVERALL SCORE (sum of all Participant scores)	
Commerciality	For example, Does the Model give the Participant an appropriate level of influence? Does the Model ensure adequate security of supply for the Participant? Does the Model involve a degree of risk for the Participant which is commensurate with the Participant's rewards (financial, commercial, policy and other)? Is the Model adequately resilient? In other words, is it flexible enough to accommodate reasonably foreseeable future developments?					
Governance/Policy	For example, Does the Model help the Participant to implement its policy objectives? Is the role the Participant plays under the Model within the scope of its organisational/business purposes? Does the Model require the Participant to make commitments or constrain the Participant's freedom of operation in an unacceptable way (taking into account corresponding benefits to the Participant)? Does the Model involve any reputational risk for the Participant?					

Evaluation Matrix

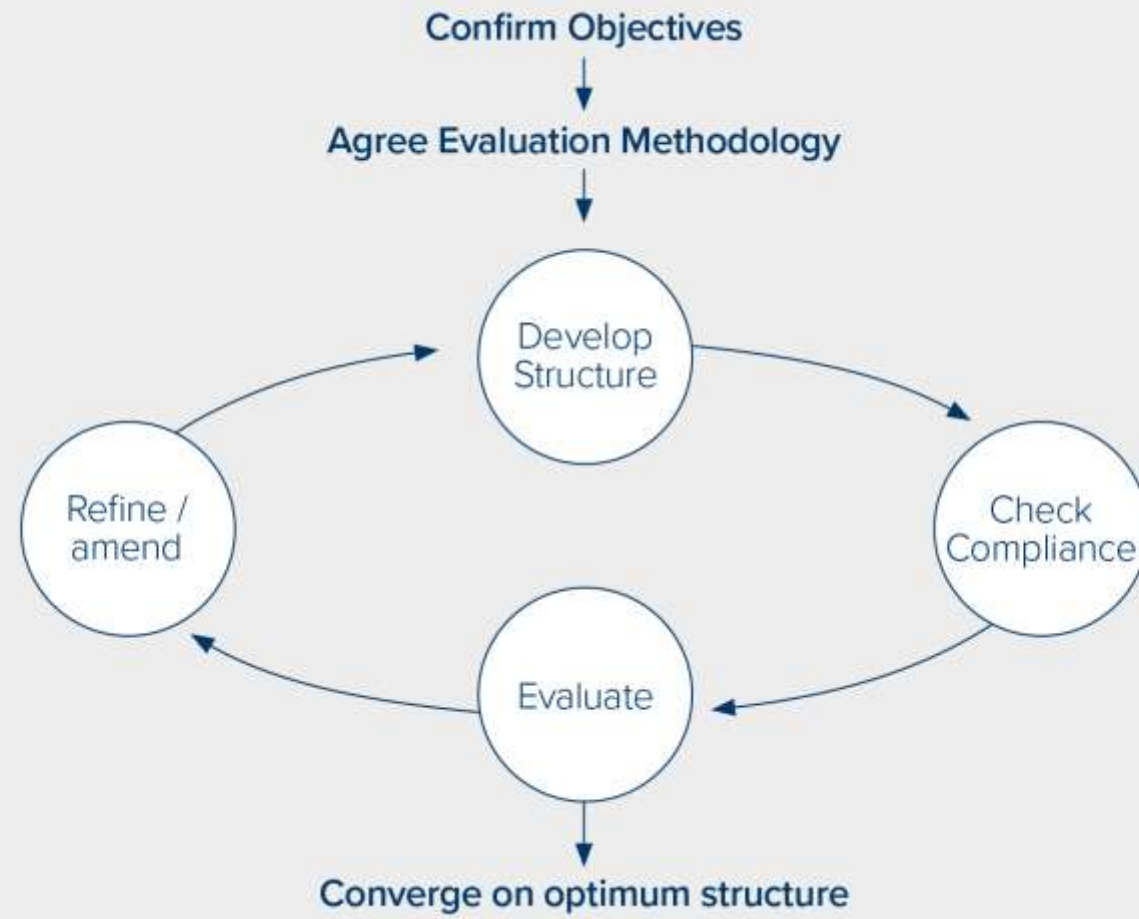
CRITERION	ISSUES	LA	UNIVERSITY	NHS TRUST
9. INFLUENCE OVER SCOPE OF THE JV	The Partner has adequate influence over the scope of activities of the joint venture/collaboration, including possible supply of energy to third parties	<i>Under this model, the scope of the JV is determined by the scope and duration of the Concession Agreement (since the SPV's rights are all derived from that document, rather than from ownership of the Energy System)</i> <i>Because each Partner would be a shareholder in the SPV, and would have a corresponding degree of influence over it, each Partner would be involved in all SPV decisions. However, Partner input to date suggests that Partners have differing appetite for development and expansion of the SPV's activities, and so this model may not be best aligned to the differing strategic objectives of each partner.</i>	As per LA	As per LA
10. COMPATIBLE WITH EXISTING ARRANGEMENTS FOR THE SUPPLY OF ENERGY	The Model is compatible with the Partner's existing arrangement for the supply of relevant energy services, including in particular in relation to termination/handover.	<i>LA's current arrangements appear flexible enough to accommodate this model (when LA becomes an Offtaker). However this model would probably involve longer energy service contracts than is currently the case</i>	<i>Compatible with current arrangements because the existing arrangements can be reduced to accommodate new agreements</i>	<i>Since this model involves the establishment of an SPV, it is possible that some staff currently engaged in energy-related activities full time could transfer to the SPV. Requires further investigation</i>

AC_153596250_1

Compliance check

University Hospital of [redacted] NHS Foundation Trust [redacted] will be a shareholder in the SPV as well as an off-taker. Will have role as landlord relating to lease of the plant room from [redacted] to SPV.	Power to generate or procure heat and electricity supplies	NHS Foundation Trusts (FTs) are a public benefit corporation with the function of providing goods and services for the NHS in England (s30 NHS Act 2006). This means that they are entities which are separate from government and which therefore have more freedom to make decisions about operations. FTs have a general power to 'do anything which appears to it to be necessary or expedient for the purpose of or in connection with its functions' (s47 NHS Act 2006) and this includes entering into contracts (s47(1)). FTs have the financial power to borrow money in connection with its functions (s46(1) NHS Act 2006) although this cannot exceed the limits it has set itself (s46(2) NHS Act 2006). It can invest for purposes connected with its functions (s46(4) NHS Act 2006) which may include forming, participating in, or otherwise acquiring bodies corporate (s46(5) NHS Act 2006). An FT's principal purpose is to provide goods and services for the purpose of health services in England (s43(1) NHS Act 2006). However, FTs are expressly able to carry on activities for the purpose of making additional income available so that it may better carry out its principal purpose (s43(3) NHS Act 2006). In summary, NHS Foundation Trusts appear to have the power to procure and/or generate heat and electricity supplies because of their broad powers to do anything which is necessary or expedient in connection with its functions, including the provision of health services.	Applicable. No issue. Applicable (as shareholder in SPV and off-taker). No issue. Applicable. No issue. Applicable. No issue.
	Constraints on the generation or procurement of heat and electricity supplies	Although FTs have broad powers there are limitations which could impede the generation of heat and/or electricity. Firstly, it must be noted that FTs require a licence and are overseen by NHS Improvement. Therefore, even though FTs are theoretically able to act without the constraints of a public body, FTs will in practice be subject to scrutiny, especially regarding matters such as finance and governance. This has the potential to restrain activities as approval from NHS Improvement may be required, especially where those activities can be seen as more than "business as usual", such as generating electricity rather than purchasing it. As noted above, there are restrictions on an FT's ability to borrow money. This may impact the viability of generating energy as opposed to procuring energy from an external source.	Applicable (as shareholder). No issue. Applicable. No issue. [redacted] confident in ability to raise capital.
	Power to supply heat and electricity to third parties (public and/or private sector)	As stated above, FTs are able to carry on activities beyond its healthcare functions to provide additional income (s43(3) NHS Act 2006). It could be envisaged that this would include the supply of heat and electricity to third parties, whether that party is in the public or private sector.	Not applicable as [redacted] will not itself be supplying heat/electricity.

Evaluation process





WOMBLE
BOND
DICKINSON

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Samantha Crichton

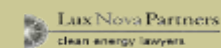
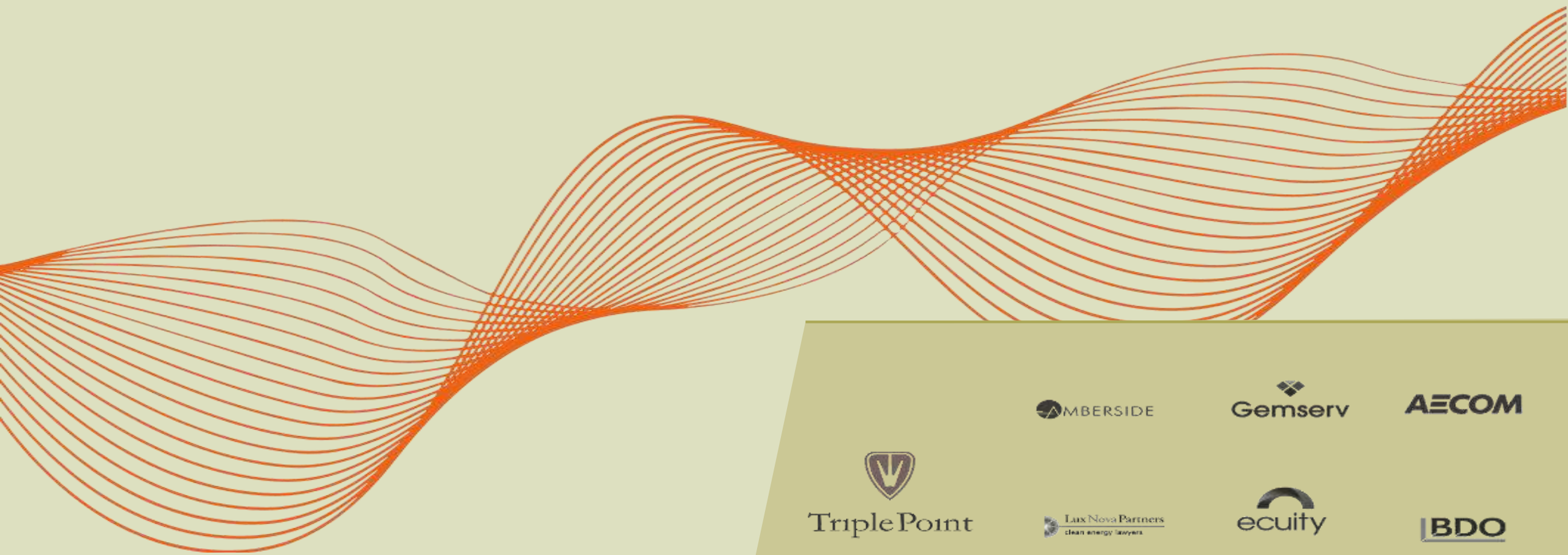
HNIP Delivery Partner

Ecuity



Triple Point
HEAT NETWORKS
INVESTMENT MANAGEMENT

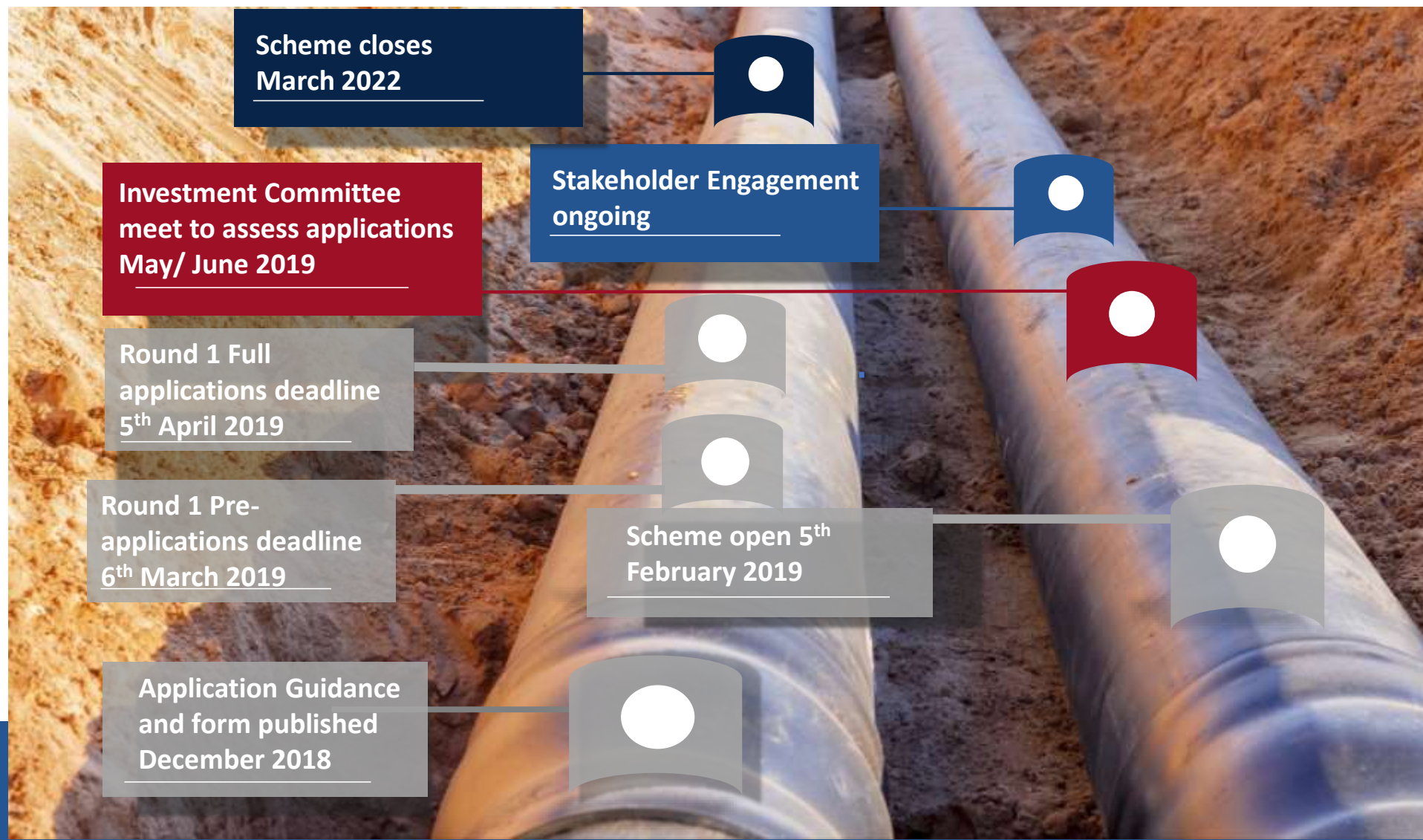
Heat Networks Investment Project



@TPHeatNetworks

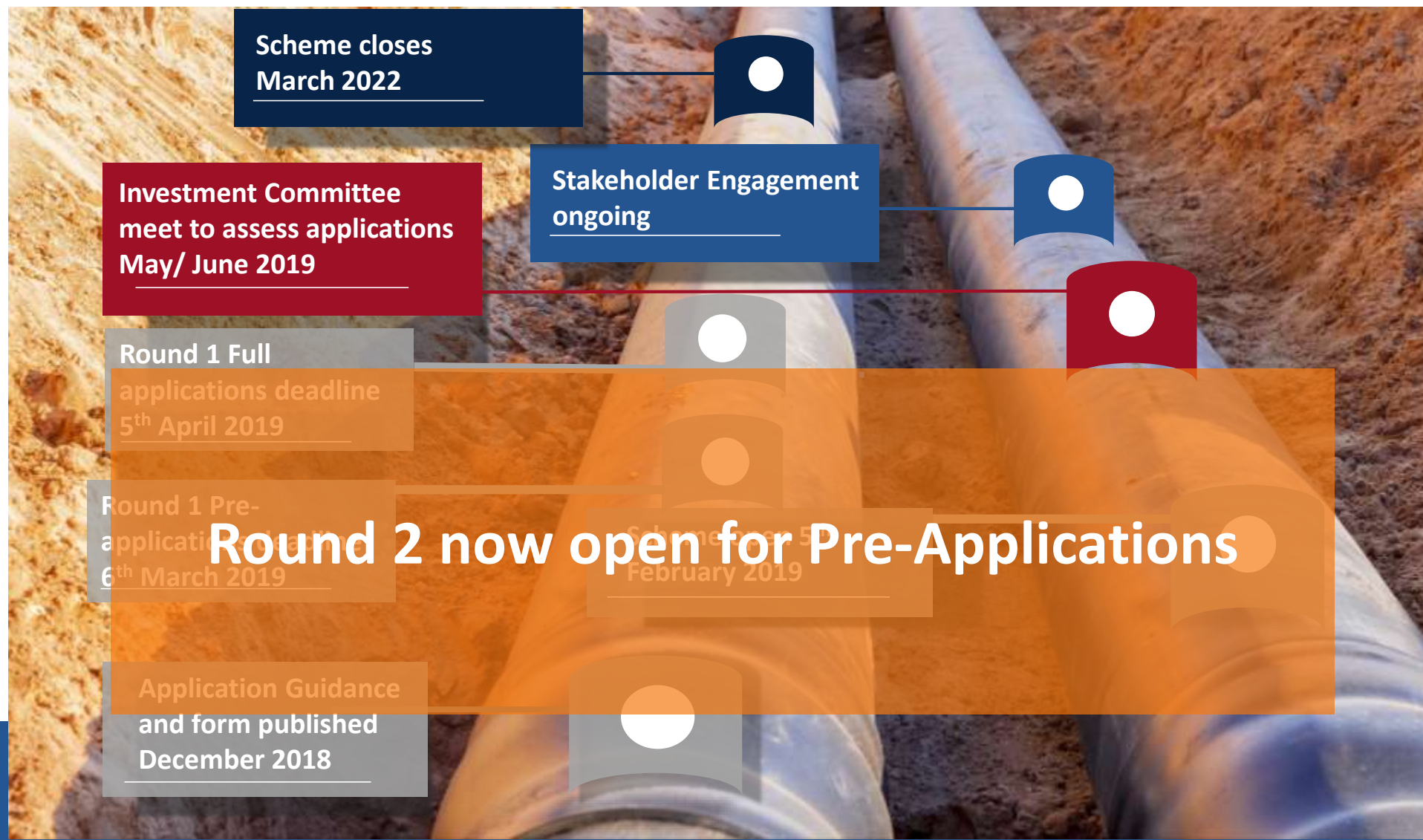


Timeline to date





Timeline to date





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INVESTMENT MANAGEMENT



Key themes from Round 1



Round 1 - summary

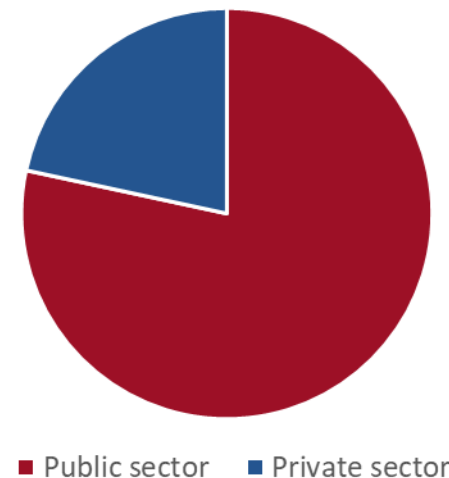
Round 1 assessment is ongoing.

We are pleased with the number of applications and the range of projects represented.

Projects from across
England & Wales



Pre-application
submissions (number)

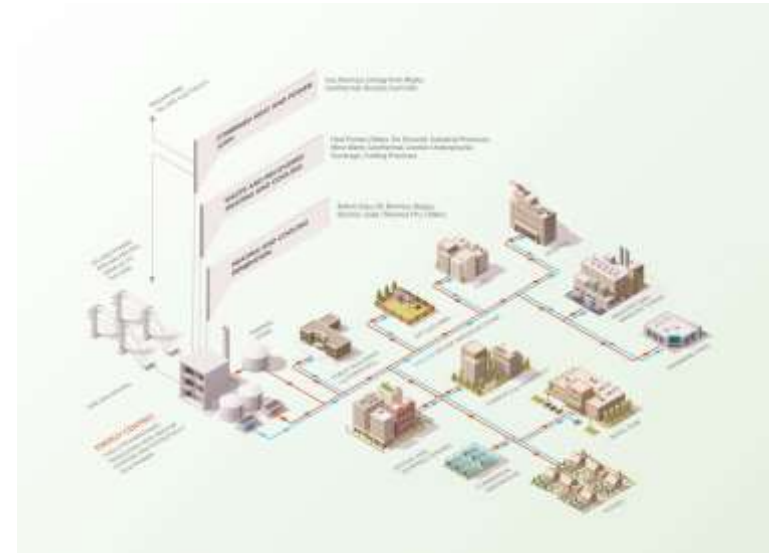




Range of technology solutions

Main heat generation technologies:

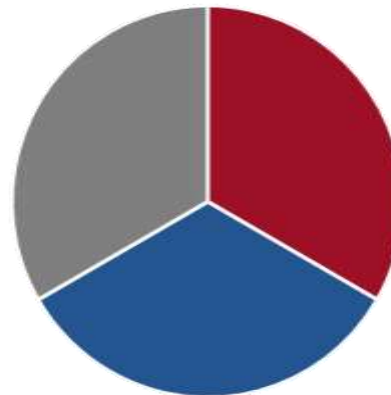
- Natural Gas CHP
- Heat from Energy from Waste plants
- Heat Pumps
- Biofuels





Equal mix of scheme sizes

GWh heat (exc network losses) per
year when scheme is built out

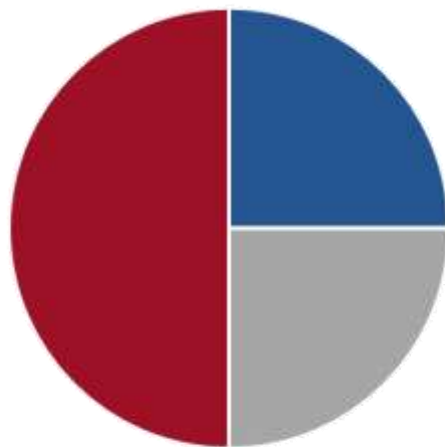


■ Over 40 GWh ■ 20 GWh - 40 GWh ■ less than 20 GWh





Heating, Cooling and Electricity

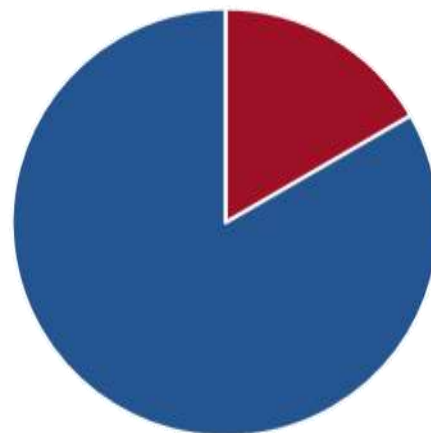


■ Heating Cooling and Elec ■ Heating and Cooling ■ heating and elec ■ heating only





Both old and new



■ Existing ■ new



What are we looking for?

We want schemes that deliver on our scored elements:

- Volume of heat delivered (GWh)
- Project carbon savings (tCO₂e)
- Future decarbonisation (tCO₂e)
- Deliverability





Round 1 – things to consider



- Work through the entire workbook, answering all questions as they may reveal additional questions.



- Provide evidence where requested to support responses including the Funding Plan and the Financial Model. Those not submitting information in the right format may lose marks.



- Make sure approvals and documentation are up to date.



Round 1 – things to consider



- Clearly highlight where in the additional documentation evidence is provided by page number.



- Indication of timescales for key project milestones is needed.



- Don't leave your application until the last minute
 - Majority of applicants to Round 1 uploaded all documents in one go.
 - The first upload of evidence was completed at 5:17pm on 4th April
 - Final upload was 11:35pm on the 5th April



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Business Development Managers



Who are they?

- Business Development Managers have been allocated to projects that have submitted or are interested in submitting applications in the near future.
- BDM support will be available to:
 - Help projects to understand the scheme's due diligence, evidence and eligibility requirements;
 - Help ensure project documentation is aligned with HNIP requirements including helping applicants identify any gaps and additional information and work that they may need to address;
 - Help applicants identify gaps or risks associated with the quality and deliverability of the project in advance of an application;
 - Direct applicants to additional sources of funding;
 - Help applicants understand the type of HNIP funding on offer and how it could contribute to the project finance;
 - Help applicants understand the requirements of the scheme to enable them to make decisions to optimise the commercial structure; and
 - Support projects exploring other funding opportunities.





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INVESTMENT MANAGEMENT

Who are they?



Andrew Cripps



Ewan Jones



Peter Concannon



Alex Tucker



Ken Hunnisett



Amy Fry



Richard Turner



Neil Rutledge



Simon Carman



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INVESTMENT MANAGEMENT

AECOM

AMBERSIDE

IBDO

ecuity

Gemserv

LIIX NOVA PARTNERS
clean energy buyers



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INVESTMENT MANAGEMENT



Q&A



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INVESTMENT MANAGEMENT

Thank you



Come and find me during lunch if you have any specific questions



Visit our website and fill in the contact form to receive updates from us www.tp-heatnetworks.org



Email us with any questions or to be added to the mailing list enquiries@tp-heatnetworks.org



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INVESTMENT MANAGEMENT

AECOM

AMBERSIDE

IBDO

ecuity

Gemserv

LUX NOVA PARTNERS
clean energy lawyers

Christer Frennfelt

SWEP



CHALLENGE
EFFICIENCY.
MAKE A
DIFFERENCE.

SWEP Brazed Plate
Heat Exchanger

Taking on the global energy challenge

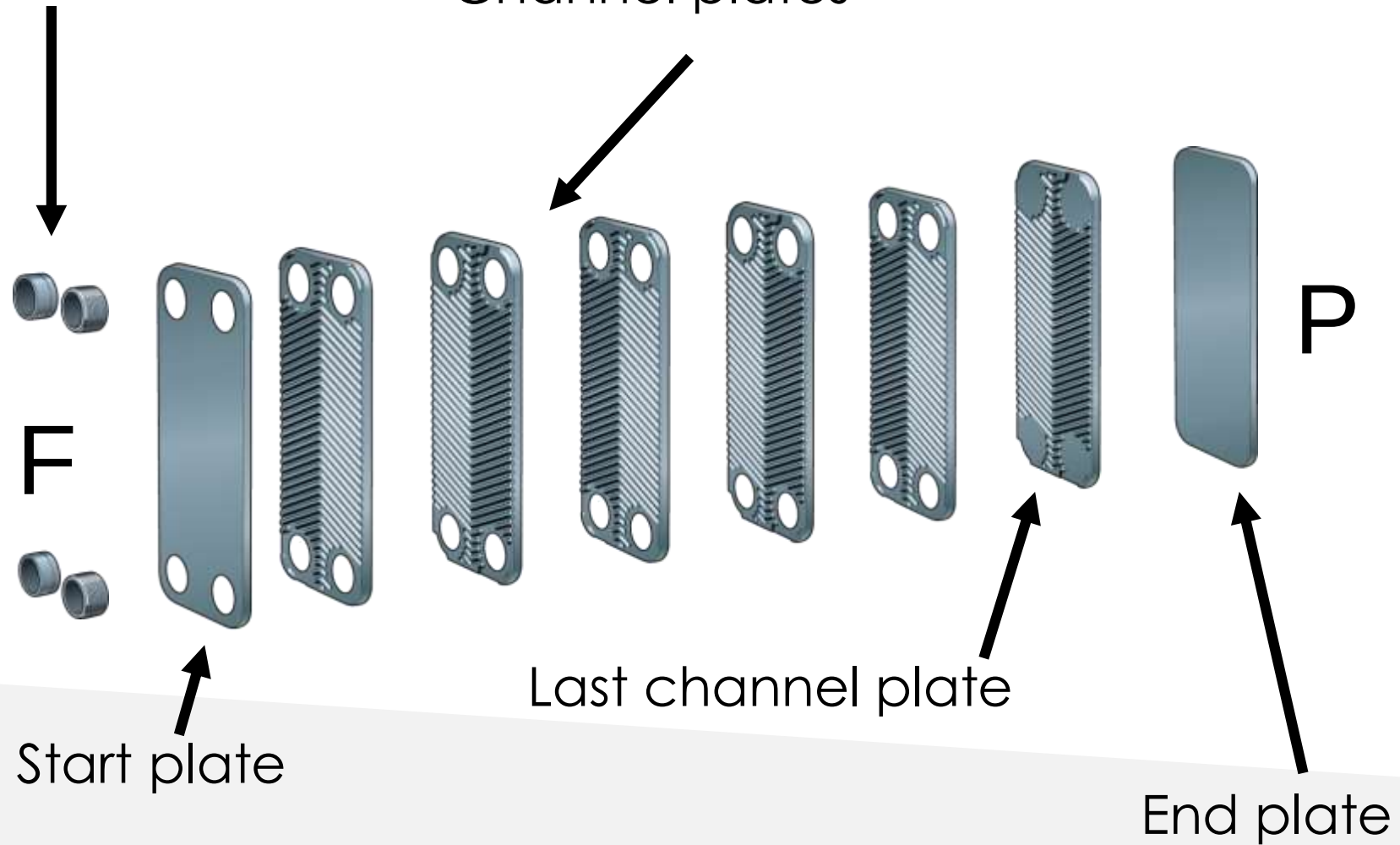
- Specialized in Braze Plate Heat Exchangers (BPHEs)
- Founded in 1983
- World-leading manufacturer
- Pioneers in BPHE technology



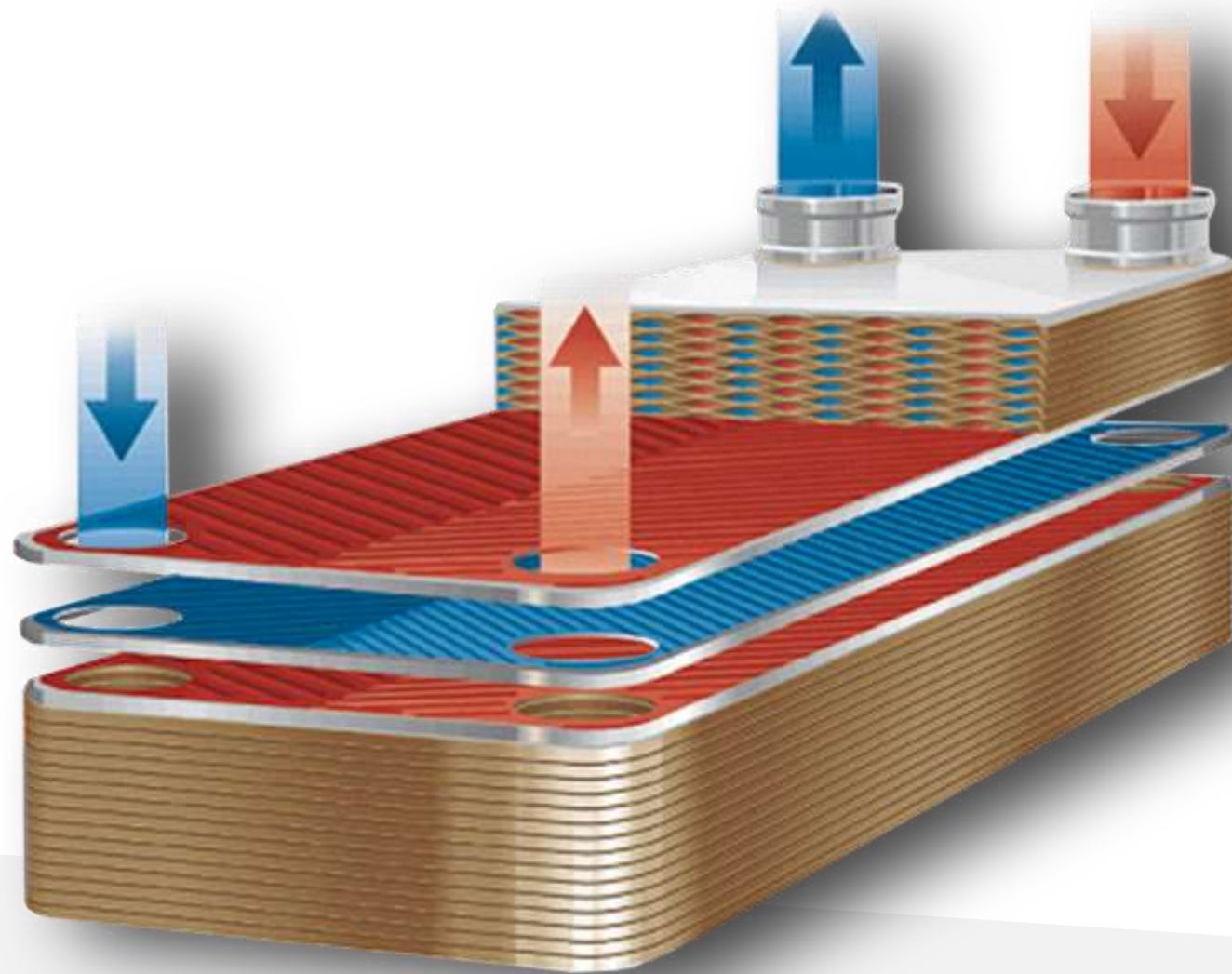
Basic design of a BPHE

Connections

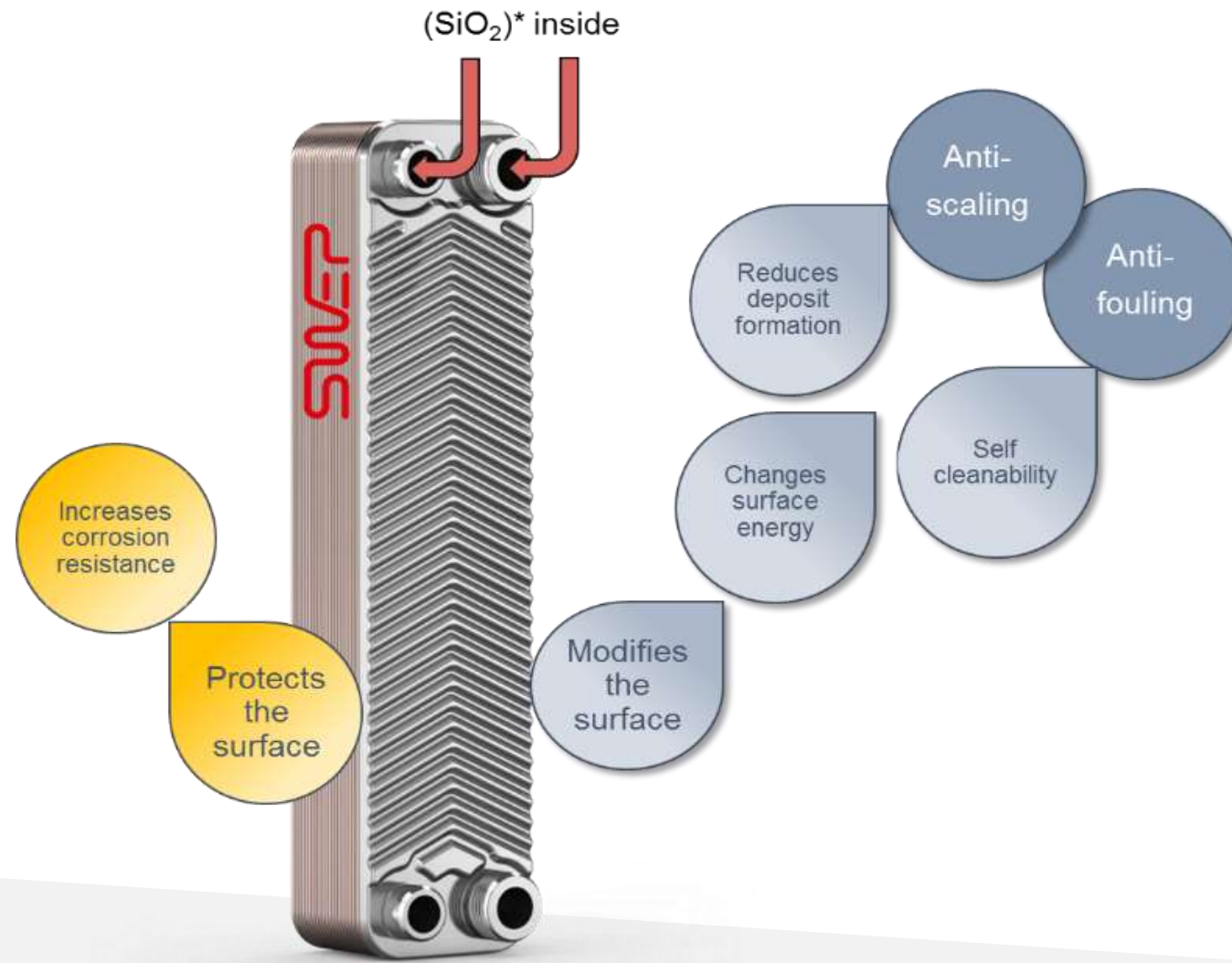
Channel plates



How a BPHE works



SEALIX®



Ian Allan

Switch2

Switch2 Energy

Making a success of community heating

Over 35 years' experience

*switch*2

38,000 PAYG customers

40
engineers

Processing £16 million in
payments

240,000 bills
sent annually

500 schemes

110 energy
centres

Serving 70,000 customers

153
employees



What is it all about?

*switch*2

Money and the environment

Open systems

More than
one vendor

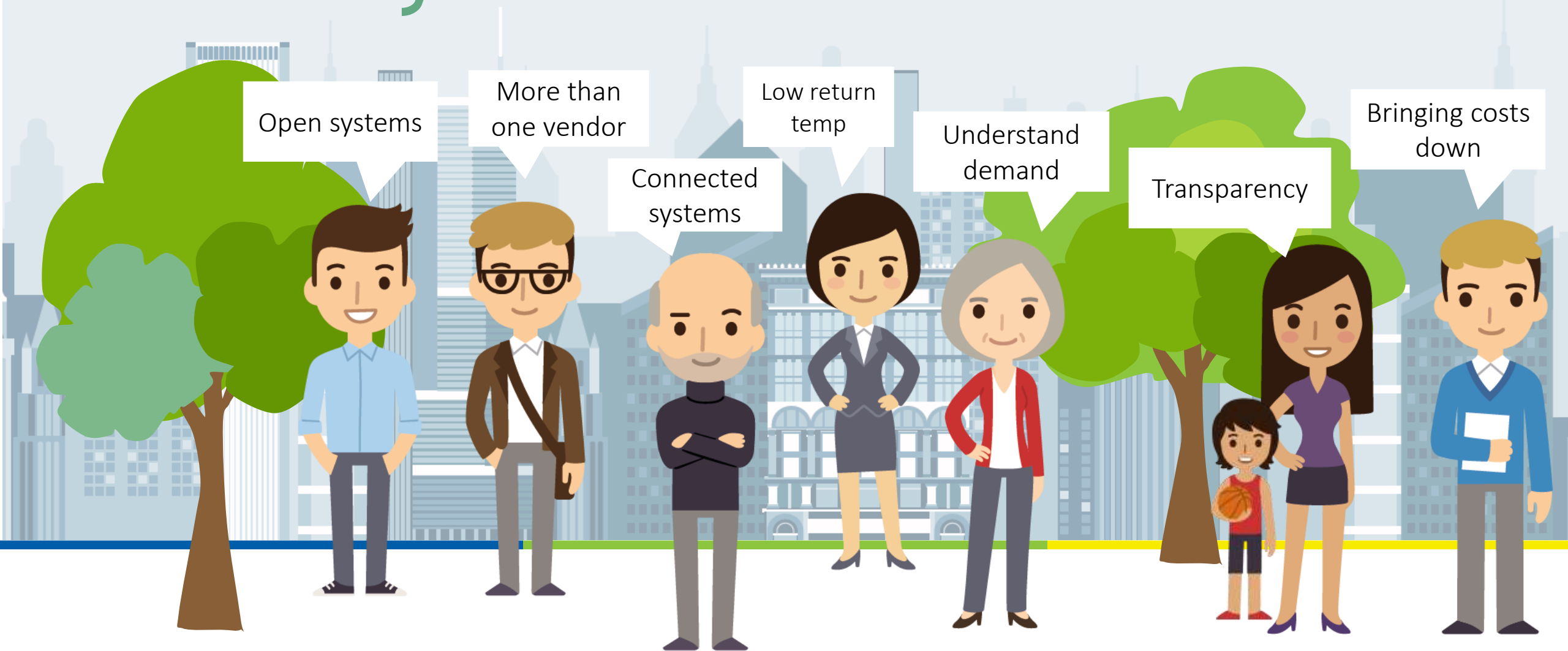
Low return
temp

Connected
systems

Understand
demand

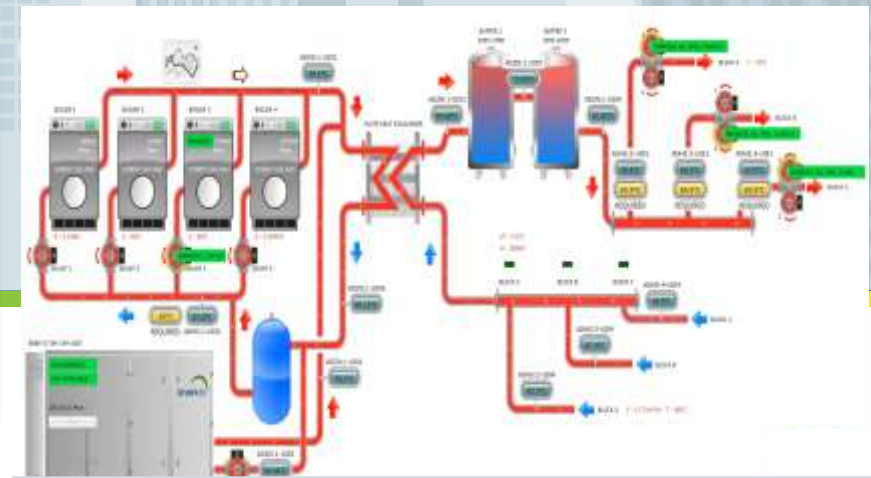
Transparency

Bringing costs
down



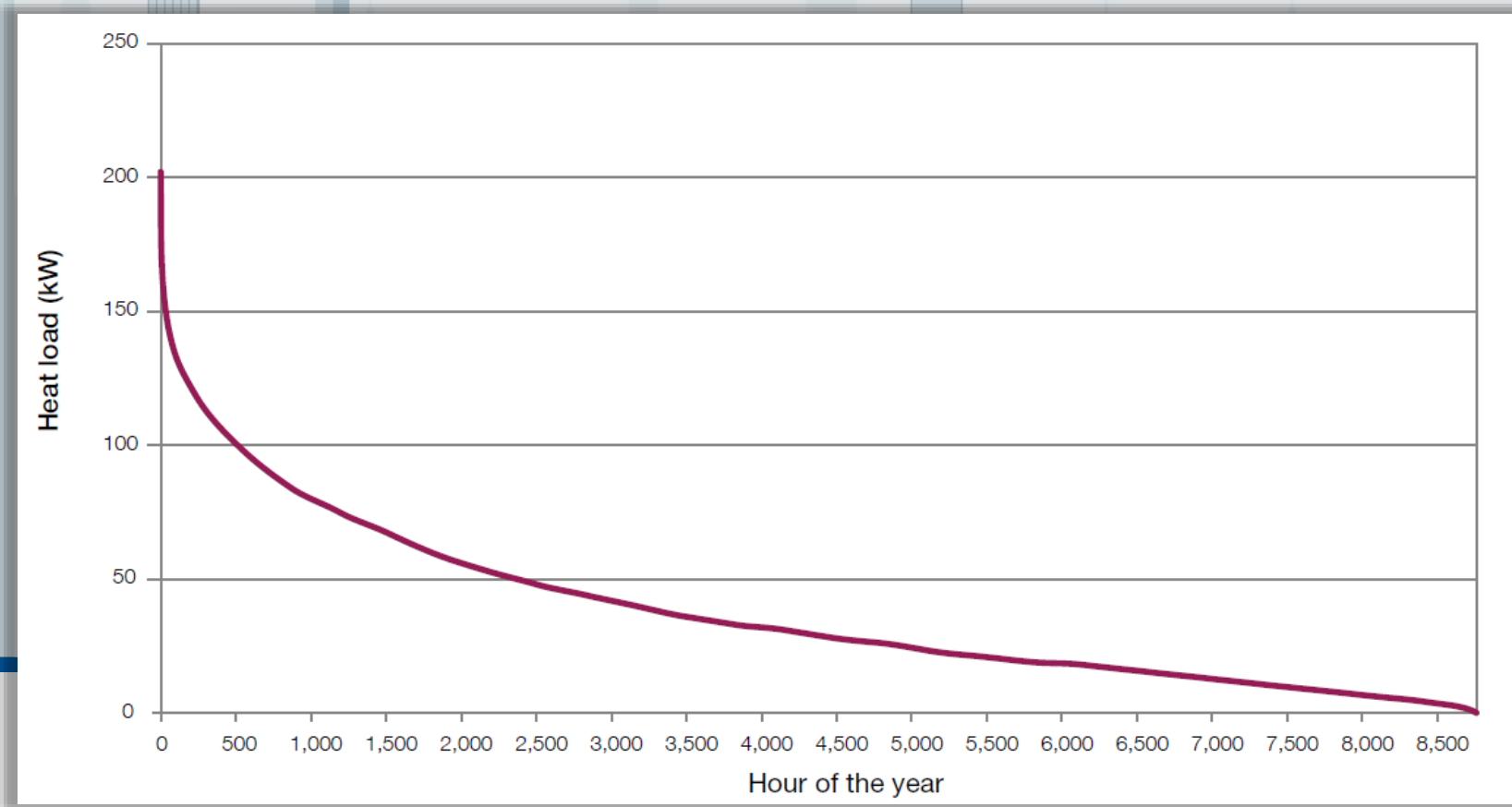
Switch2 Optimise: End-to-end operations & Maintenance

switch2



Final thoughts: Heat demand curve

*switch*2



Iain Richards

Powerpipe



Not only supplying DH systems with high efficiency and quality....

"We make your everyday easy"





Who are Powerpipe Systems AB?

- Swedish manufacturer of pre-insulated DH pipe systems ranging from DN25 – DN900, with over 30 years experience
- HQ & Production: Gothenburg, Sweden
- Annual production: 30,000 pipes & 17,000 fittings
- 100 employees
- Main markets Sweden, Norway, France, UAE & UK
- European Standardisation Committee for District Heating
- Member of UKDEA





We make your everyday easy !

Value Proposition

- **Quick Lead times**
 - Max 10 days delivery time – all year around
- **Flexibility**
 - Bespoke solutions on demand – nothing is impossible
 - We adapt to the demands of the UK market
- **Technical & Quality (Your integrated partner)**
 - Easily accessible technical support – Quick and experienced staff (**Engineering manager 40y exp.**)
 - Training and supervision (joints and leak detection)
 - Static calculation tool
 - Design validation (design optimization)
- **Product**
 - District Heating Pipe – Available in 16 mtr lengths helping cut the cost of Installation
 - Insulation Technologies – Lambda value of 0,026 w/mK



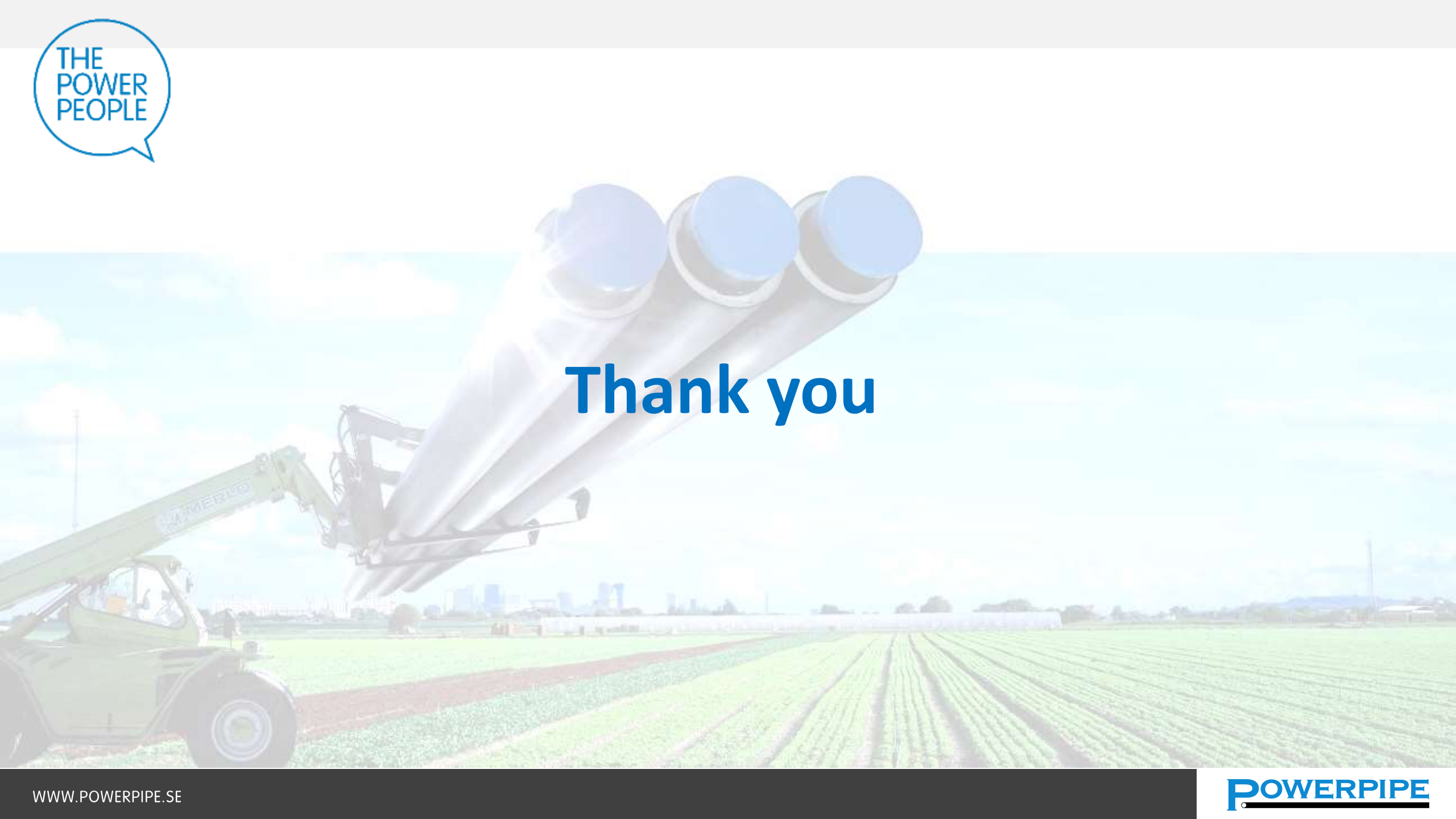


UK references since 2011

Engie/Southampton
Engie/Olympic Park
Engie/Coventry
Engie/Leicester
EON
GallifordTry
Veolia SELCHP
Aberdeen
Birmingham
Bristol City Council
Camden
Newcastle
Southwark
Tottenham Hale Wharf

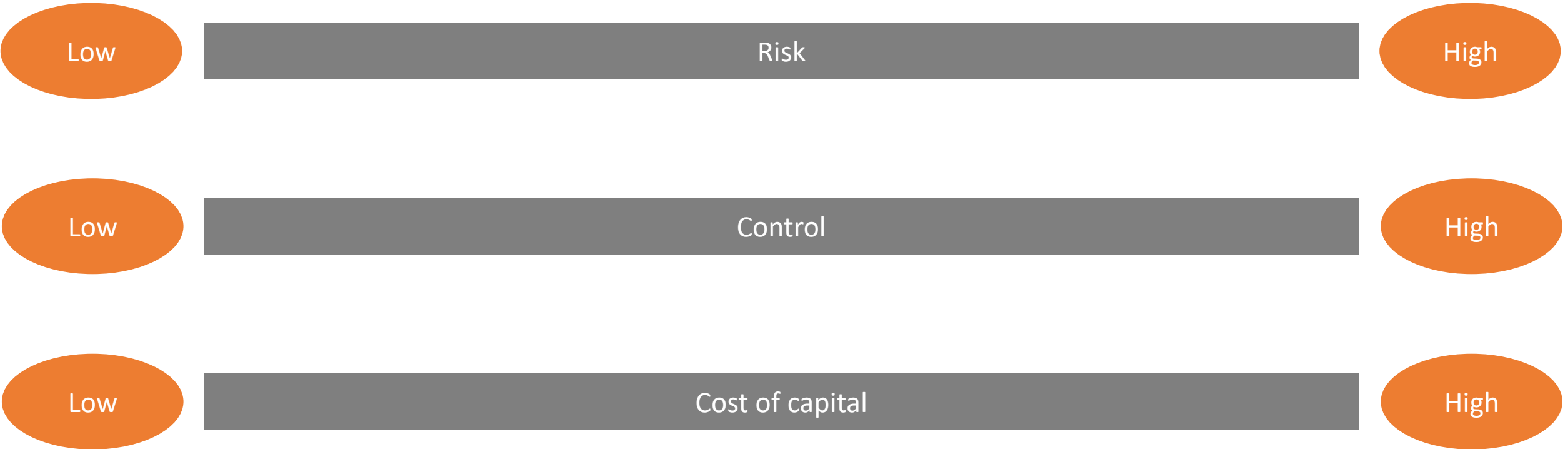
.....



A large Merlo telehandler is shown in the lower-left foreground, lifting three massive, dark-colored pipes that extend diagonally across the upper half of the image. The pipes have blue caps on their ends. The background features a vast green agricultural field with distinct rows of crops, a distant city skyline under a blue sky with scattered clouds, and a long white structure, possibly a greenhouse, in the middle ground.

Thank you

Where does your organisation fit?



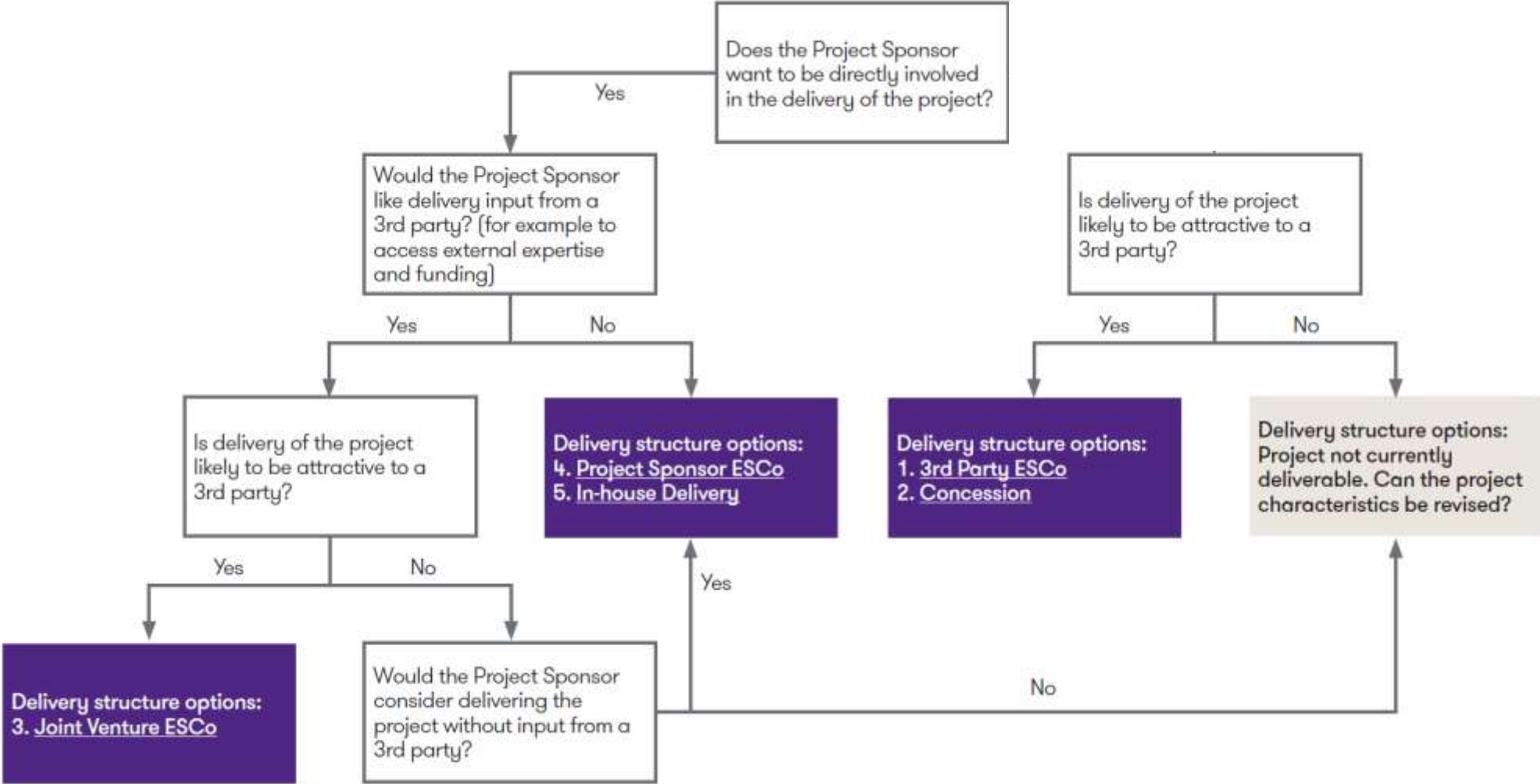
Michael Berrington and Neil Peckett

Grant Thornton

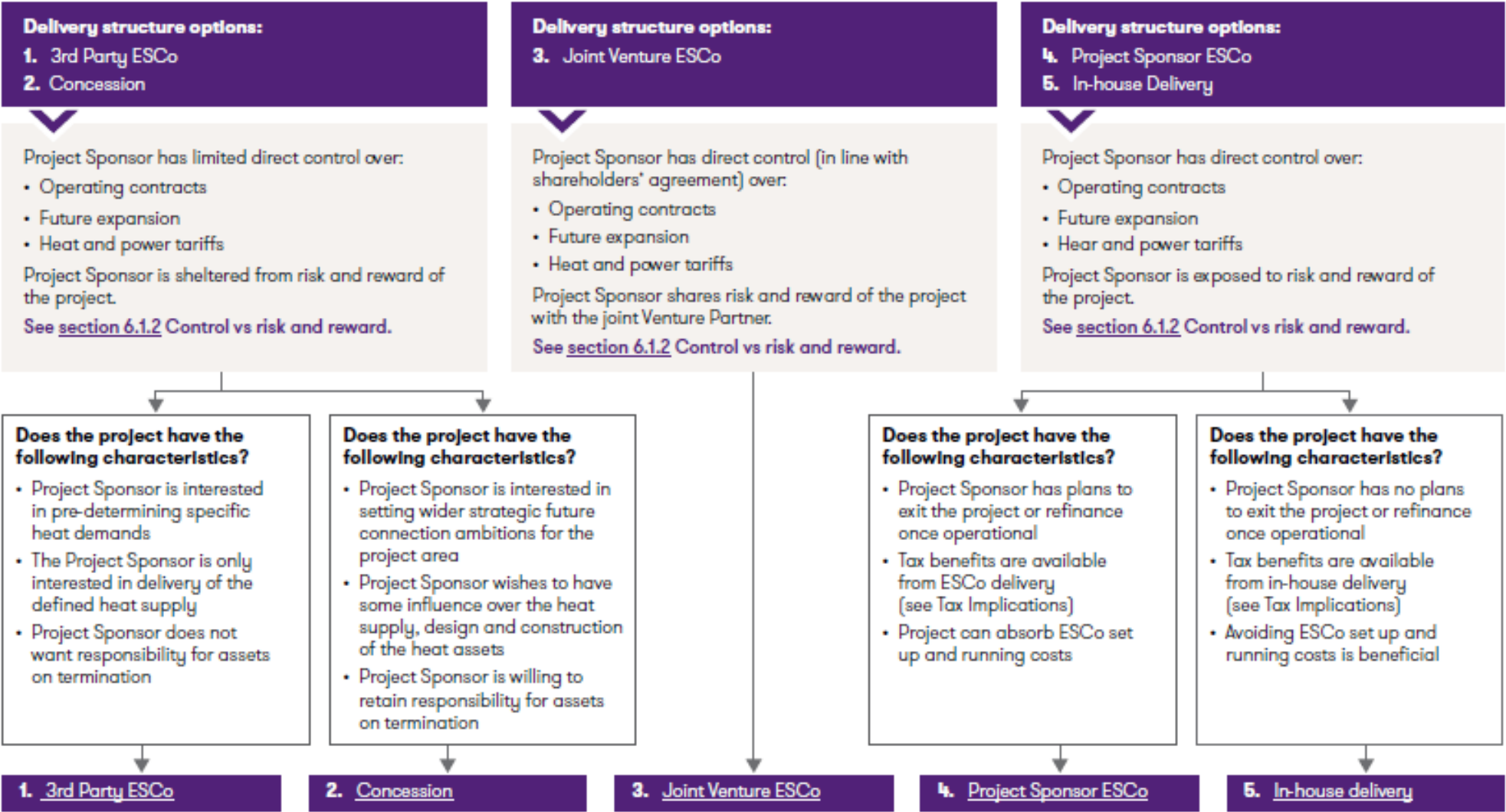
Delivery Structures

Michael Berrington – Principal Consultant

Decision Tree – Delivery Structure Options



Preferred Delivery Structure

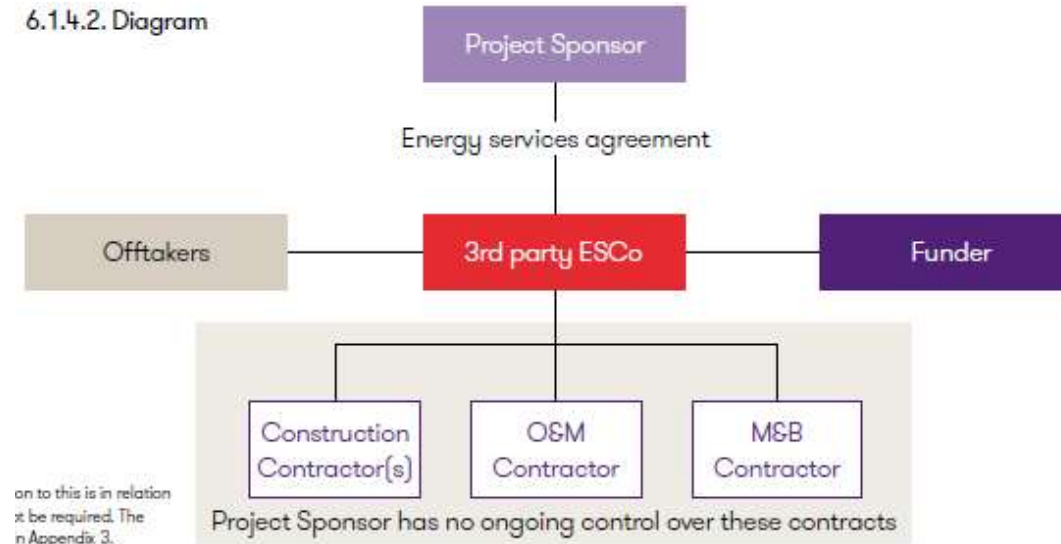


Delivery Structures



3rd Party ESCO

6.1.4.2. Diagram



Advantages

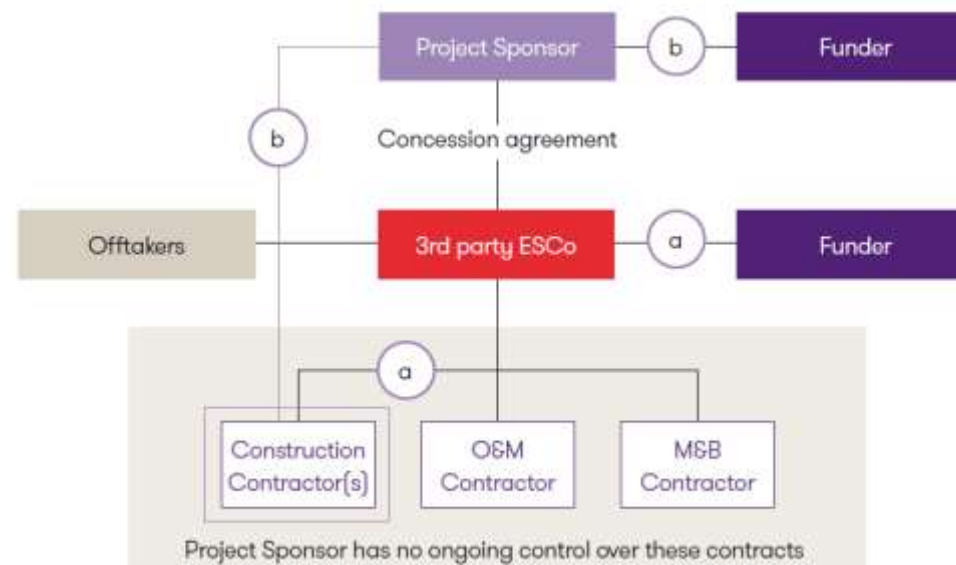
- allows technical and performance risk to be transferred to a 3rd party. The 3rd party is likely to operate many district heating projects and therefore be well placed to manage these risks
- leverages 3rd party expertise and skills
- secures external funding

Disadvantages

- the Project Sponsor will have limited control over how the project is delivered. This may make it more challenging for the Project Sponsor to achieve its strategic objectives in relation to the project (e.g. future expansion, setting heat and power tariffs)
- project must meet 3rd party's return on investment criteria, which could result in higher heat and power tariffs



Concession Model



Advantages

- allows technical and performance risk to be transferred to a 3rd party. The 3rd party is likely to operate many district heating projects and therefore be well placed to manage these risks
- leverages 3rd party expertise and skills
- secures some level of external funding
- Project Sponsor is able to influence expansion of the heat services to specific users

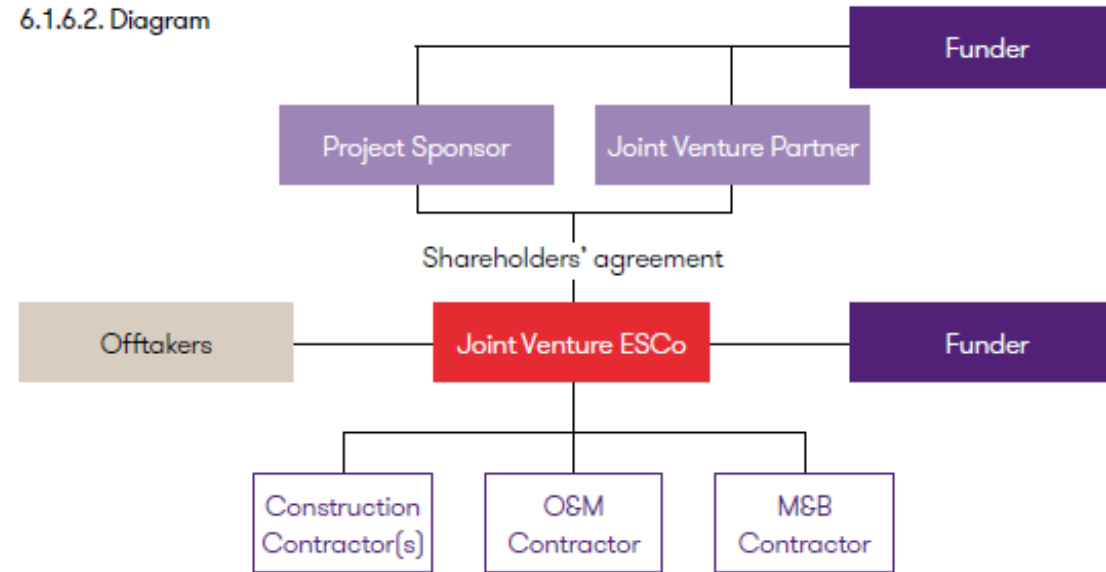
Disadvantages

- the Project Sponsor will have limited control over how the project is delivered. This may make it more challenging for the Project Sponsor to achieve its strategic objectives in relation to the project (for example, future expansion, setting heat and power tariffs)
- project must meet 3rd party's return on investment criteria, which could result in higher heat and power tariffs
- Project Sponsor retains liability for assets



Joint Venture ESCO

6.1.6.2. Diagram



Advantages

- Project Sponsor retains some strategic control over the project
- project risks are shared between the partners
- Joint Venture Partner may bring expertise and skills
- Joint Venture Partner may bring funding
- opportunities to exit the project through sale of shares

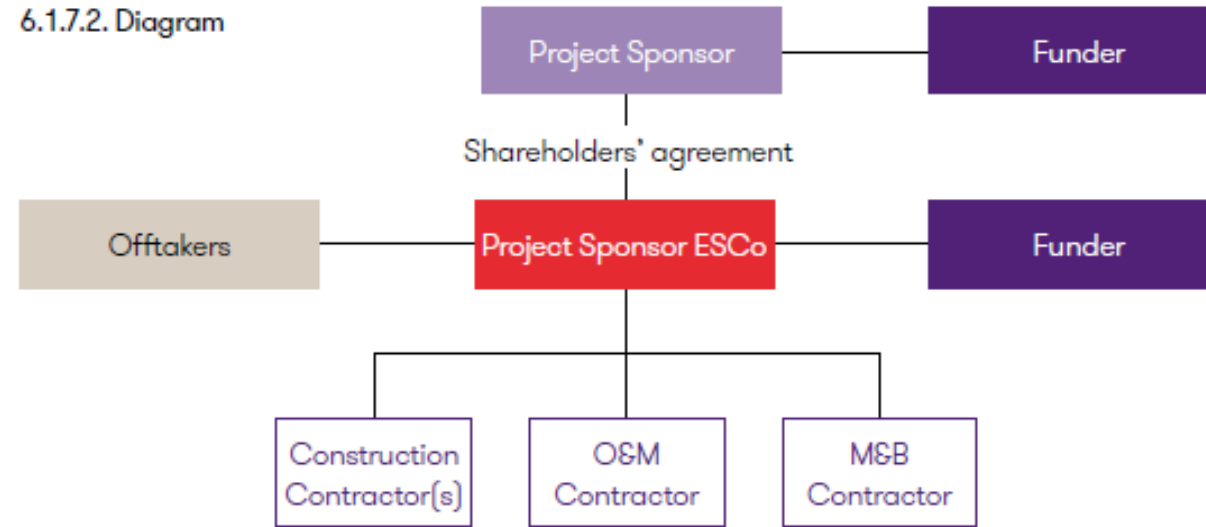
Disadvantages

- legal complexity in set up and negotiating the relationship and risk sharing between the partners
- the partners will need to agree on the direction of the project (e.g. future expansion, setting heat and power tariffs)
- project must meet the Joint Venture Partners' return on investment criteria, which could result in higher heat and power tariffs



Project Sponsor ESCO

6.1.7.2. Diagram



Advantages

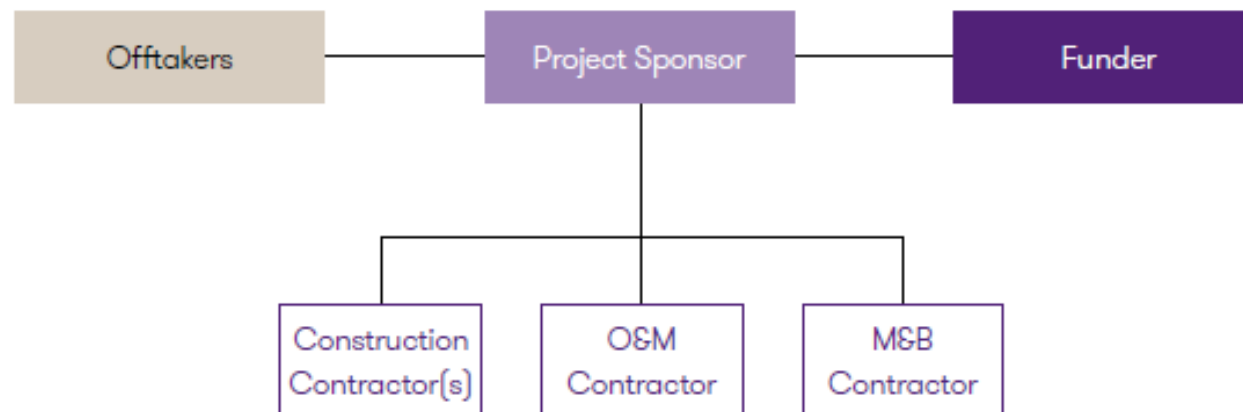
- Project Sponsor retains all strategic control over the project (for example future expansion, setting heat and power tariffs)
- Opportunities to exit the project through sale of shares and/or refinance project debt

Disadvantages

- Project Sponsor is exposed to all project risks (if not passed down to contractors)
- Responsibility for funding/securing funding lies with the Project Sponsor
- Drawing on external expertise and skills is limited to contracting arrangements



In-house delivery



Advantages

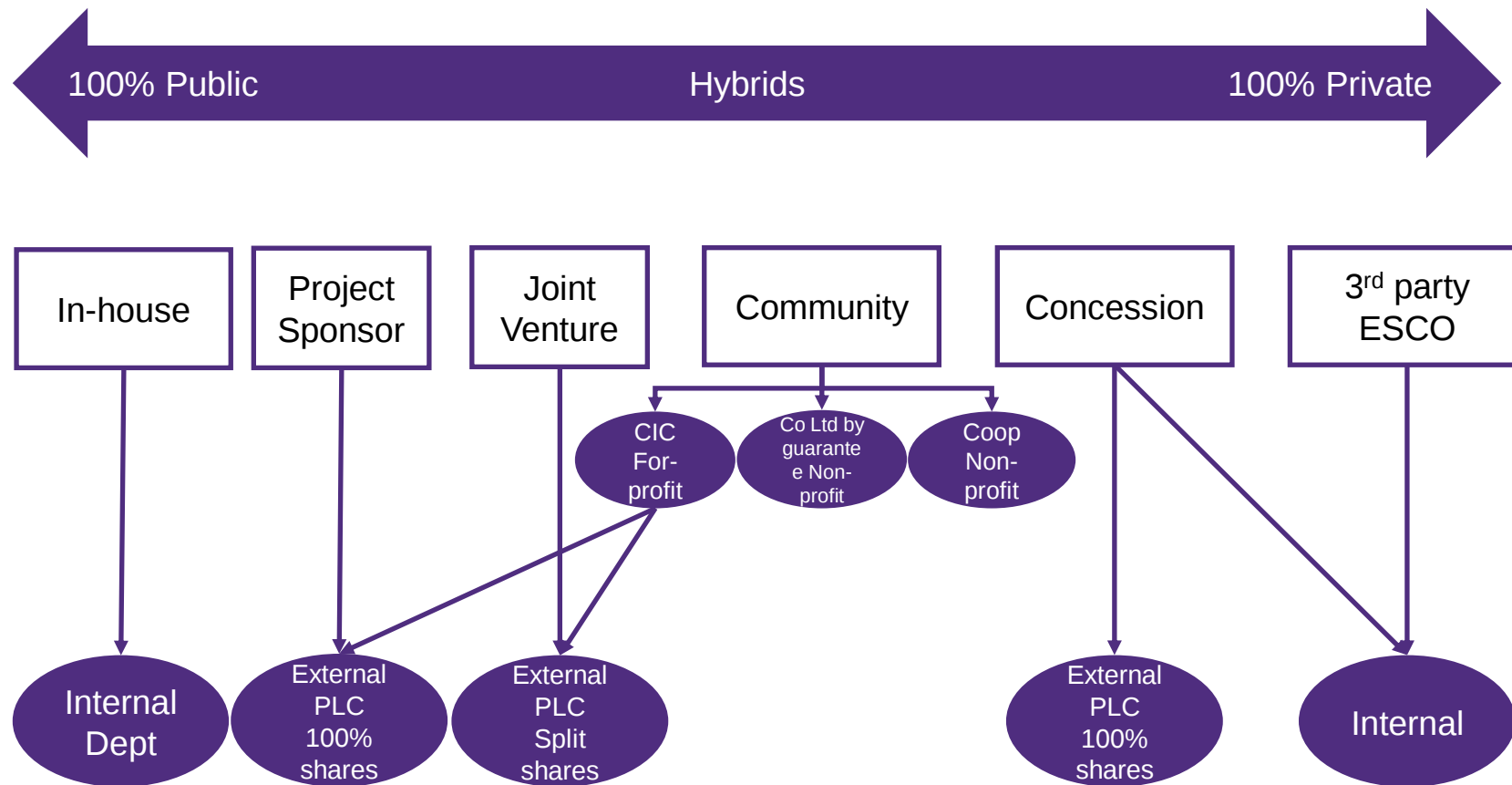
- Project Sponsor retains all strategic control over the project (for example, future expansion, setting heat and power tariffs)
- Costs of establishing and running an ESCo are avoided

Disadvantages

- Project Sponsor is exposed to all project risks (if not passed down to contractors), including limited commercial protection from the liability of the project if it fails
- Responsibility for funding/securing funding lies with the Project Sponsor
- Drawing on external expertise and skills is limited to contracting arrangements
- Opportunities to exit the project are limited
- May result in irrecoverable VAT – see [Section 9.2.3](#).



Legal Forms



Funding options

Neil Peckett - Manager

Funding Options

Funding Source	Comments
Project sponsor internal reserves	- Utilises available reserves to provide a return - Can remove / reduce 'outside' interference in Project - Need only meet internal hurdle rate
Project sponsor borrowings	- Sponsor borrows and on-lends - May enable access to finance at a lower rate - Can allow for lending in form of either debt or equity (or mix)
Private sector equity	- Provides funding without increasing debt burden - Results in dilution of equity - May result in loss of control
Private sector debt	- Input of sector specialist knowledge - Prioritised debt payments - Potential higher returns requirement
Bank debt	- Less likely to result in a loss of control - Linked to specific assets - Potential higher returns requirement
Lease finance	- Reduces capital burden - Needs 'moveable' assets
Crowdsourcing	- Can be used to lessen funding need - Needs to be repaid in some form – e.g. through reduced bills
Soft loan	- Cheap form of finance at below market rates - State aid implications (if Public Sector)
Grant funding	- Cheapest form of finance - State aid implications (if Public Sector) - Eligibility requirements



Funding sources to explore

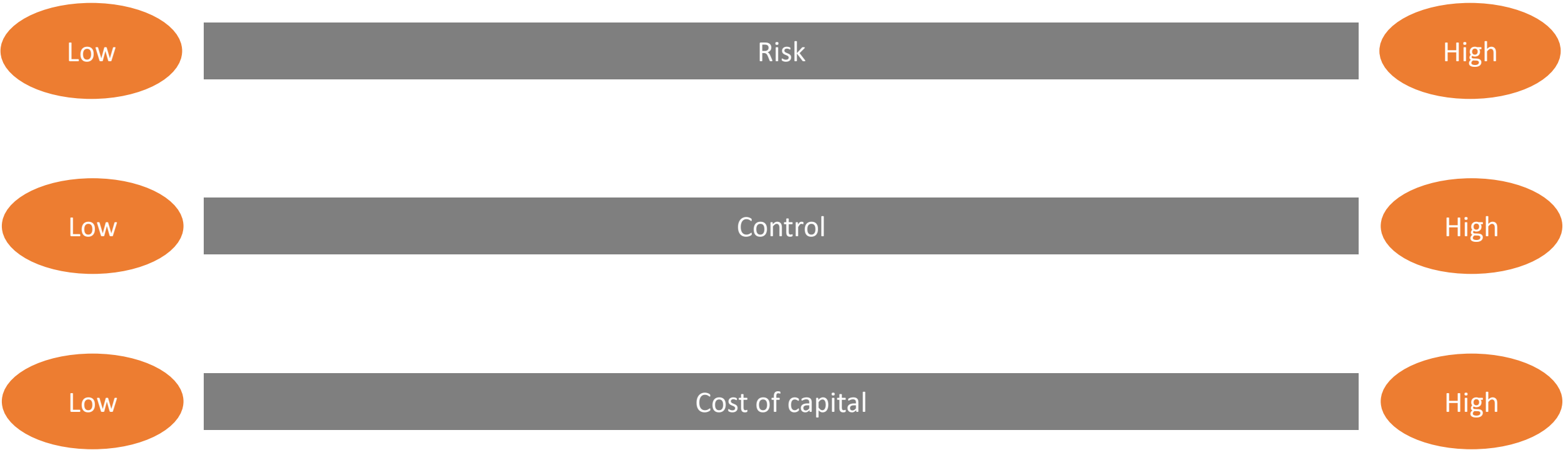
	1. 3rd Party ESCo	2. Concession	3. Joint Venture ESCo	4. Project Sponsor ESCo	5. In-house delivery			
Responsibility for seeking funding:	Lies with 3rd Party Esco	Depends on funding route: a. Assets funded by 3rd Party ESCo Lies with 3rd Party ESCo b. 3rd Party ESCo adoption of assets and/or A funding requirement exists beyond that covered by 3rd Party ESCo Lies (at least initially) with Project Sponsor	Is shared between Project Sponsor and Joint Venture Partner	Lies with Project Sponsor	Lies with Project Sponsor			
Funding sources for Project Sponsor to explore:								
<u>Project Sponsor internal reserves</u>	NO	3rd Party ESCo funds assets	YES	Extended to ESCo via debt or equity	YES	Direct spend within Project Sponsor		
<u>External debt into ESCo</u>	NO	3rd Party ESCo funds assets	YES	From Joint Venture Partner or TPI	YES	Although provider may require significant equity share, which would become a Joint Venture ESCo	NO	No ESCo
<u>External equity into ESCo</u>	NO	3rd Party ESCo funds assets	YES	From Joint Venture Partner or TPI	YES	Although a significant share would make this a Joint Venture ESCo	NO	No ESCo
<u>Lease funding</u>	NO	3rd Party ESCo funds assets	YES	Lease funding of assets	YES	Lease funding of assets	YES	Lease funding of assets
<u>3rd party ESCo funding</u>	YES	3rd Party ESCo funds assets (which may be through for example, internal reserves, debt, equity, lease or grant funding)	YES	If Joint Venture Partner is a 3rd party ESCo	NO	No involvement from 3rd Party ESCo	NO	No involvement from 3rd Party ESCo/Project Sponsor initially funds assets
<u>Grant funding</u>	NO	3rd Party ESCo funds assets	YES	Subject to conditions of grant	YES	Subject to conditions of grant	YES	Subject to conditions of grant



Link to guidance

- <https://www.gov.uk/government/collections/heat-networks-guidance-for-developers-and-the-supply-chain>

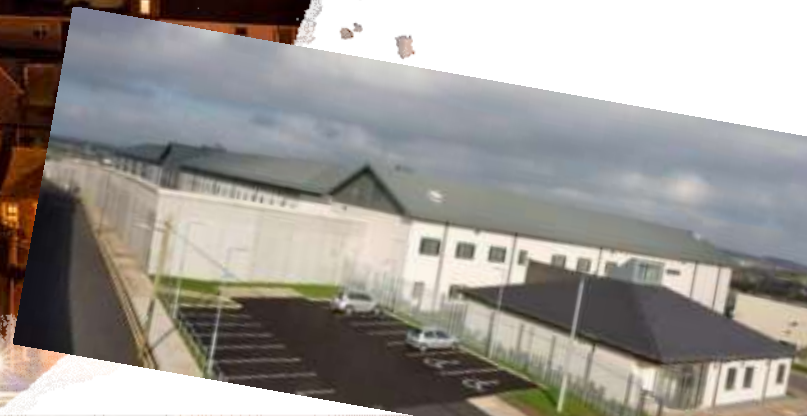
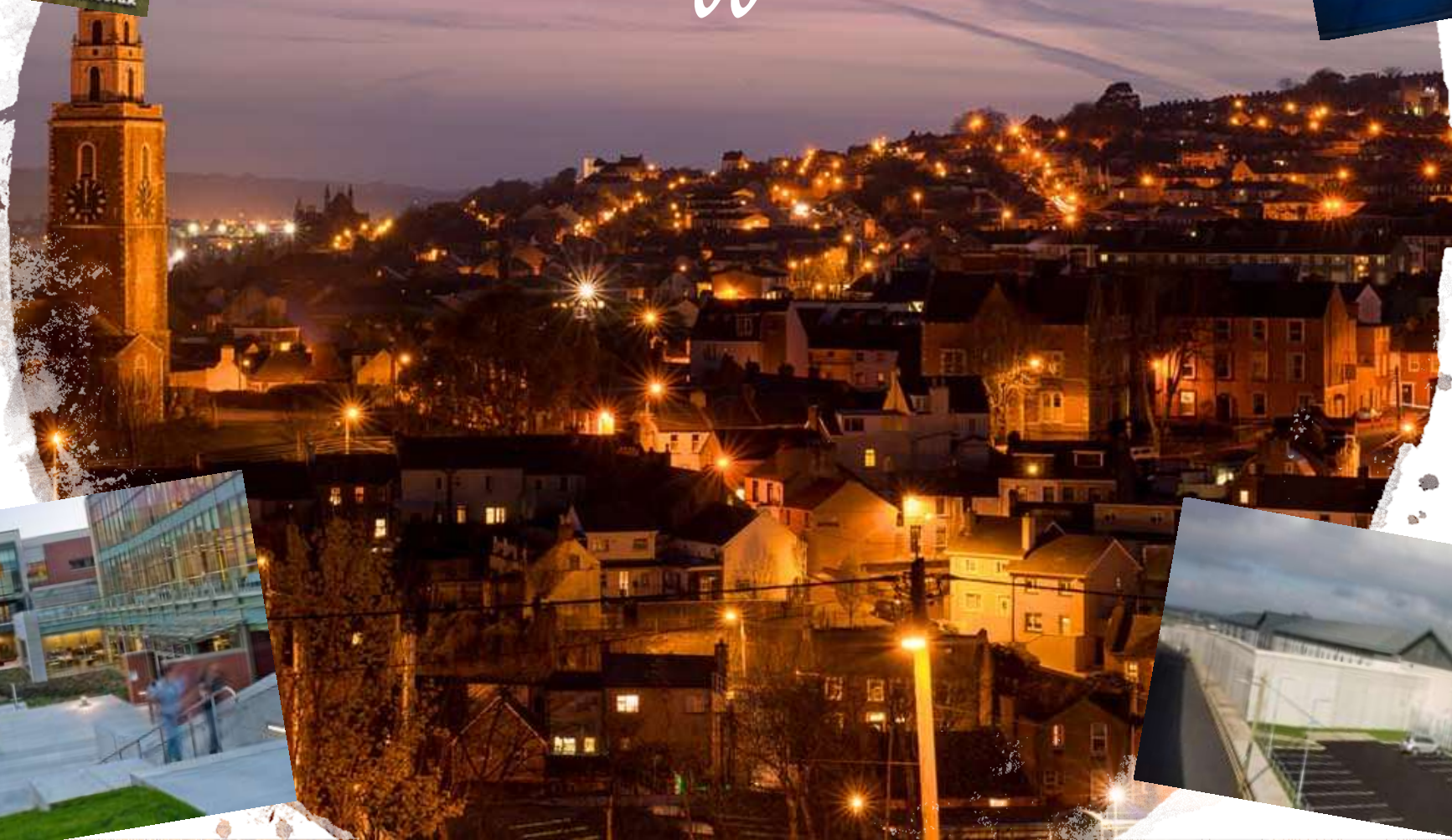
Where do the business models fit?



Choosing a structure: theory into practice



Greetings from Leaffield



Part 1:

- Review the models and give them a score based on how well they match the needs of the role you are playing (0 = worst fit; 5 = best fit)
- Sum your group's totals to see which model works best
- Discuss: does it work well for everyone? Why? Why not?

You have 25 minutes and you must make a decision!

Part 2:



HEAT AND THE **CITY**



Utilities

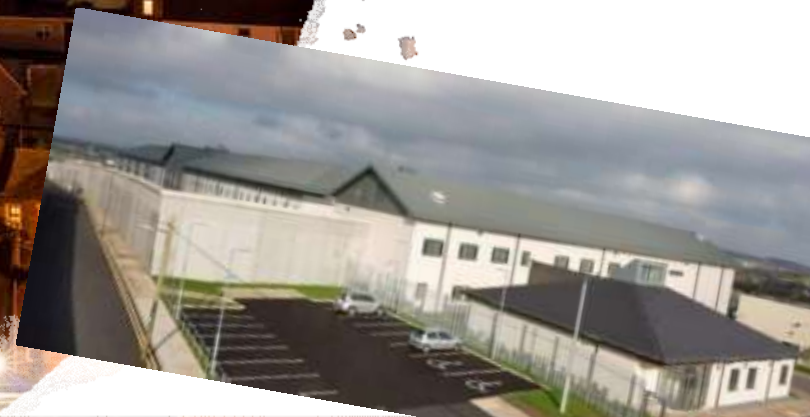
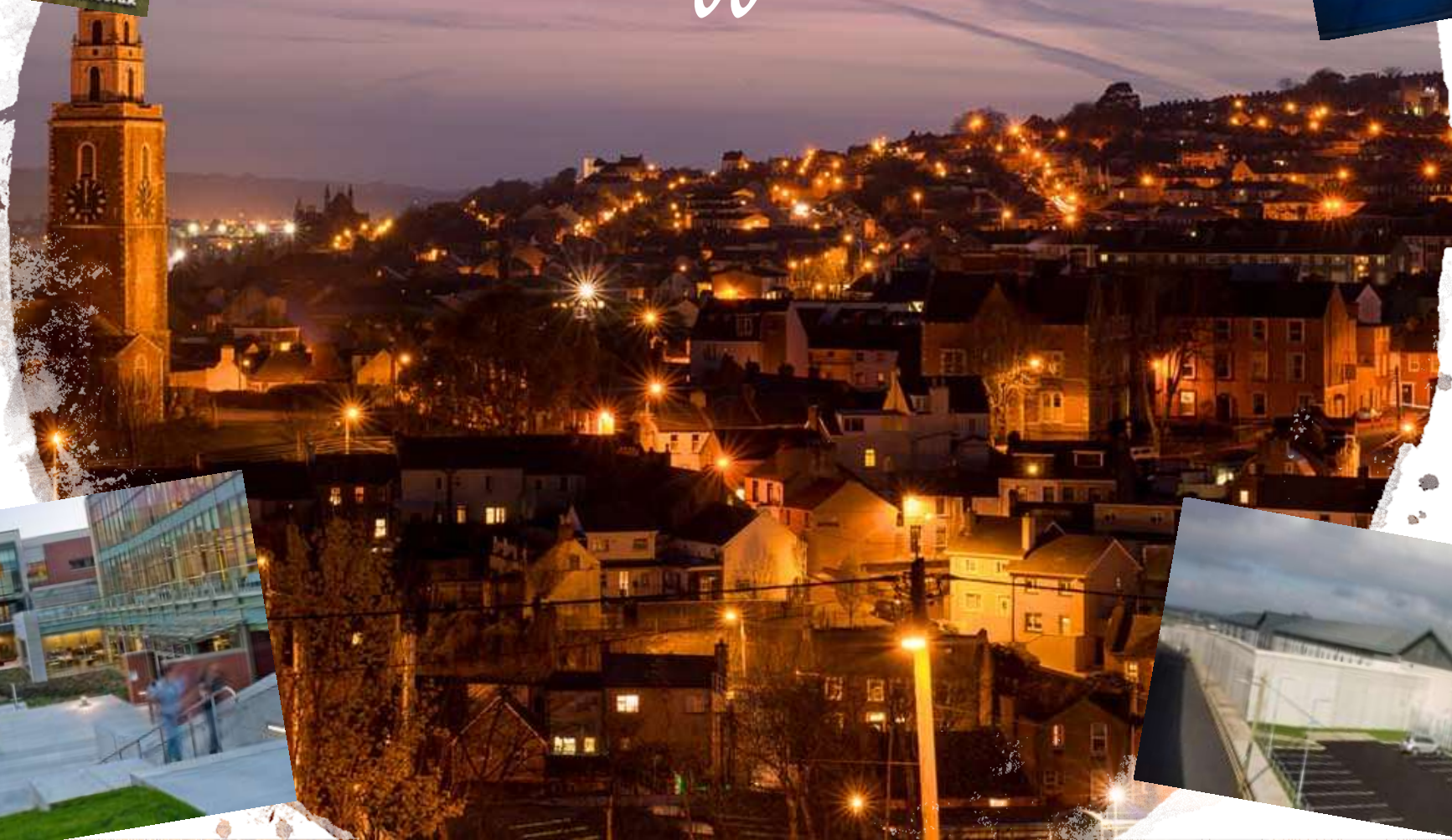
POWERPIPE

SWEF
A DOVER COMPANY

switch2



Greetings from Leaffield



Thank you!

Join us for a drink!