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DH Feasibility Study Guide

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Heat & Electricity Lead

March 2026

Comhairle Cathrach Bhaile Átha Cliath Dublin City Council

dlr Comhairle Contae County Council

Comhairle Contae Fhine Gall Fingal County Council

Comhairle Contae Átha Cliath Theas South Dublin County Council

Who we are

- Founded in 1997, Codema is a not-for-profit company limited by guarantee, dedicated to working on behalf of our local authority members to promote public good in the areas of energy and climate mitigation.
- Our local authority members are Dublin City Council, Dún Laoghaire-Rathdown County Council, Fingal County Council and South Dublin County Council and we prioritise our work within these local authorities.
- Currently over 35 staff in our office.

H/C Plans

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Best-practice Case Studies

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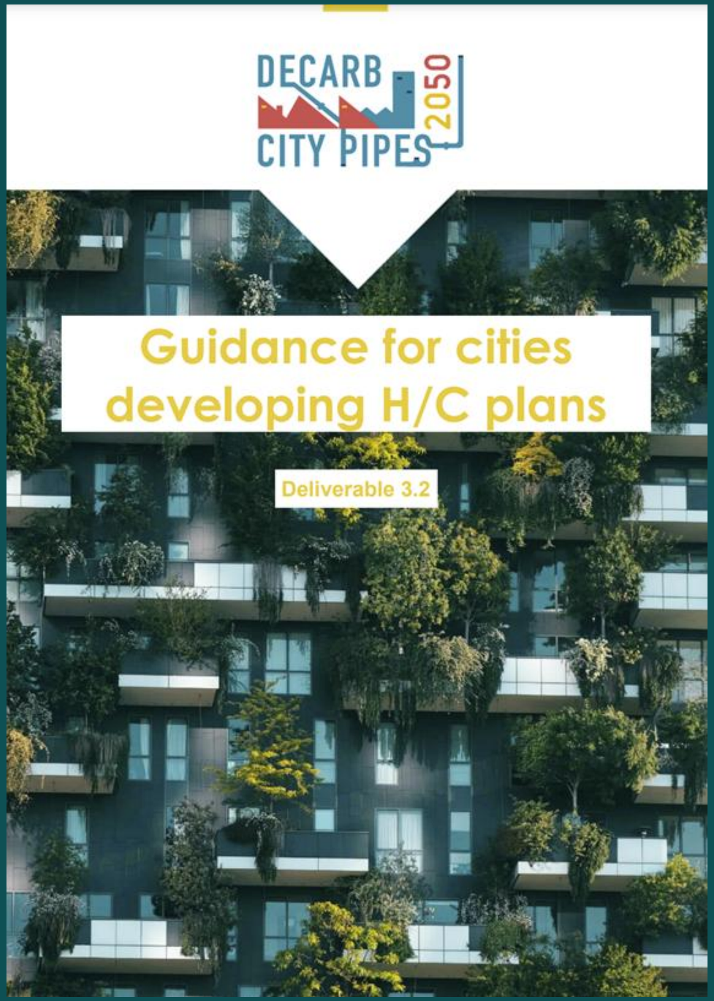
- Decarb City Pipes 2050 – lots of useful resources to support cities developing H/C Plans - https://decarbcitypipes2050.eu/library/
- Codema were project partners on this



H/C Plan

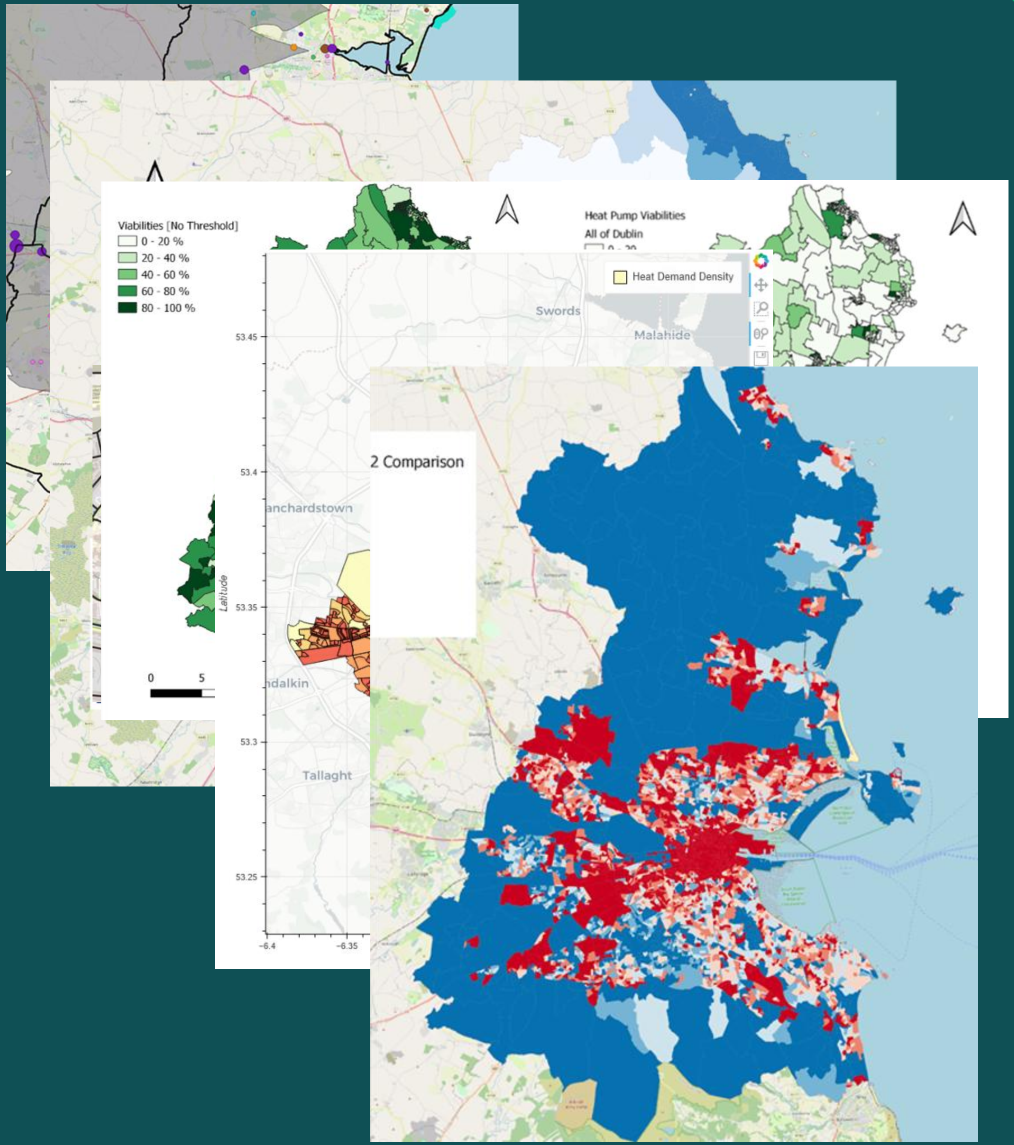
Potential supply (Heat Sources)

Infrastructure & Associated Costs for New & Upgrades

HP Viability & required fabric upgrades

Demand data - TJ/km2 & MWh/m

H/C Pathway (Lowest €/tCO2 abated)



Proposed Heating & Cooling Plan Delivery Process

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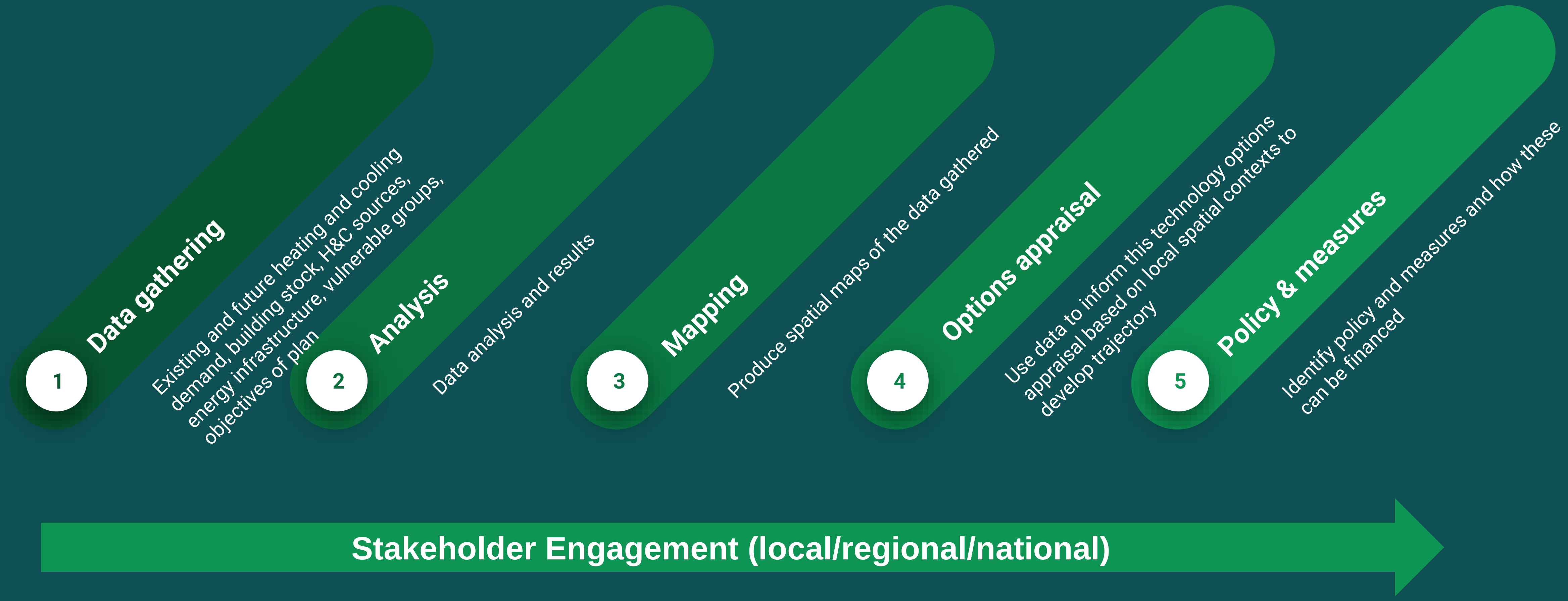

Liaising with the assessor to ensure compliance, liaising with utilities and other stakeholders for data gathering and identification of international best practice

Identifying Data Needs

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Demand & source mapping

Tailte Eireann, UIsce Eireann, ESB, SEAI, LDA, EPA, IDA, CSO

Planning Team (zoned areas, new developments, planning apps)

Architects & Housing (building stock details, retrofit programmes, social housing details, vulnerable groups)

Energy management team (LA building demands)

Climate Action Teams (outline targets, learn from past projects)

Infrastructure mapping

ESB, GNI, Uisce Eireann, OSM, TII

Highways Team (planned or recent road works which are still in protected period)

GIS officer

Planning Team

Options Appraisal

SEAI, Manufacturers & installers, OSS,etc.

Architects & Housing (cost information, tenant disruption, practical constraints)

Climate Action Teams and Building Management Teams (implementation, operation and practical considerations)

Policy Measures

SEAI, DCEE, BetterLIFE Partners,

Planning Team

Climate Action Teams

Housing

Community

Corporate Policy

CE Office

Supporting the DLAs - BetterLIFE

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Local Heating and Cooling (H&C) Plans' under Article 25(6) of the Energy Efficiency Directive (EED), there remains a critical gap between planning and implementation. The project responds directly to this need by focusing on the practical, financial, and governance elements required to make these plans operational and investment-ready.

The project aims to empower local and regional authorities to revise, align, and implement Local H&C Plans by embedding three core dimensions:

- Developing shared methodologies for H&C plans, and robust financial strategies to assess investment needs and identify funding sources.
- Incorporating decommissioning plans for fossil gas infrastructure.
- Capacity building and stakeholder engagement to ensure institutional readiness and public support.

Supporting Planning Policy Examples

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- "promote the development of waste heat technologies and the utilisation and sharing of waste heat in new or extended industrial and commercial developments (**waste heat report and requirement to install heat collectors on site**)"
- All **new developments involving 30 residential units and/or more than 1,000sq.m. of commercial floor space**, or as otherwise required by the Planning Authority, - required to submit an **Energy Statement** to **demonstrate how low carbon energy and heating solutions, have been considered** as part of the overall design and planning of the proposed development.
- **Strategic Developments will be required to investigate local heat sources and networks and, where feasible**, demonstrate that the proposed development will be **'District Heating Enabled' in order to facilitate a connection to an available or developing district heating network.**

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South Dublin County Council

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Dublin City Council

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Dublin City Council

DHC Feasibility

Project Development Stages

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District Heating Project Development Phases

Pre-Feasibility	Feasibility		Detailed Project	Procurement & Contracting	Construction	Operation
Pre-Feasibility	**Feasibility**	**Post Feasibility Preparatory Steps**	**Detailed Project Development**	**Procurement & Contracting**	**Construction**	**Operation**
Heat mapping	Background	Initial Business Model Appraisal	Detailed business model development	Implement procurement strategy	Construction & commissioning	Operation & maintenance
Energy masterplanning	Regulatory context	Establishing the Case for Change	Detailed financial analysis and plan	Finalise contracts	Handover	Expansion planning
Demand assessment	Pre-feasibility work validation	Initial Procurement Options Appraisal	Detailed procurement strategy and plan	Depending on method chosen the detailed design may take place in this development stage or the previous stage		Metering & billing
Identification of key anchor loads	Stakeholder & community identification &engagement (Including data acquisition)		Contract development (with key stakeholders)			Customer service
Identification of heat supply options	Operating temperature analysis		Define the design requirements for procurement process& legal assurance			
Identification of key Stakeholders (supply, demand, anchor loads, developer)	Heat demand analysis	Alignment Feasability Study with Infrastructure Guidelines/ Public Spending Code	Public spending compliance code			
Begin data acquisition from key stakeholders	Assessment of network and supply options		Local planning considerations			
	Financial & sensitivity analysis		Update business case			
	Risk assessment & recommendations		Depending on procurement method chose, detailed design may take place at this development stage or next stage.			

Heat Source Viability – Initial Criteria

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Criteria	Description	Method of Assessment
Proximity to Network	Distance from the heat source to the network. Preferably close proximity of the network (2-5km),	Mapping tools, GIS data
Heat Capacity (MW)	Capacity of the source to meet network demands	Calculation based on network load profiles
Source Temperature (°C)	Operational temperature range of the source	Technical data from source providers
Regulatory Compliance	Compliance with environmental and energy regulations	Review of local and national regulations
Infrastructure Retrofitting	Feasibility of integrating with existing infrastructure	Technical feasibility studies
Scalability	Potential to increase capacity to meet future demands	Forecasting models, growth scenarios
Climatic Suitability	Efficiency under local weather conditions	Historical climate data analysis
Space Required for Installation	Assesses feasibility within the available space.	
Socio-economic Impact	Effects on local job creation, energy costs, community acceptance	Socio-economic impact assessments

National Feasibility Guidance - Four Documents

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- How-To Guide – process steps, considerations, sources of information and tools for performing DH feasibility studies
- Feasibility Study Template – allows greater standardization & replicability (mirrors How-To Guide chapters for cross referencing)
- Post-Feasibility Next Steps Guidance – preparation for future project development stages
- Appendices – further details on LoI, heat sources, demand profiles, TES, Risks and mitigation, Irish datasets, carbon intensity factors, revenue types.
- https://www.seai.ie/renewable-energy-and-projects/district-heating/assess-district-heating-feasibility#comp2b8dc1dd9153573e5d6a44de193de22d

Feasibility Analysis Stages

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Main Stage and Chapter	Sub-Stages	
1. Demand Assessment	1.1 Evaluation of thermal demand	Building demand
Chapter 6		Operating temperatures analysis
2. Initial Assessment of Energy Supply Options	2.1 Longlist of options	Brainstorming potential options, typically 6 to 10.
Chapter 7	2.2 Shortlist identification	Qualitative evaluation to narrow down to 3 to 6 best options.
	2.2 Identification of alternative scenarios	Definition of 'business-as-usual' and counterfactual scenarios for comparison.
3. Heat Distribution Systems *Chapter 8*	3.1 Network Route & Building connections	Evaluation of feasible network routes and building connection types and constraints.
4. Summary of Energy Supply Options and Multicriteria Analysis of shortlisted options *Chapter 9*	4. Description off all scenarios to be analysed	Documenting all scenarios explored, including variations in network design and energy supply options.
		Identify the existing or typical solutions (business-as-usual) and alternative (counterfactual) scenarios to understand potential impacts and benefits.
Chapter 10	4.1 Multicriteria analysis	Applying an Integrated Risk Matrix (IRM) and conducting a high-level techno-economic analysis for each option.
5. Detailed Energy Supply Options Assessment *Chapter 11*	5.1 Detailed Technical Economic Analysis	Detailed financial assessment (40 years typically) Includes technical sizing, hydraulic modelling, pipe sizing, and energy system modelling. Includes sensitivity analysis
	5.2 Carbon performance evaluation	Assessment of CO2 emissions and savings
Chapter 12	5.3 Risk assessment	Evaluation of environmental and technical risks
6. Recommendations and Summary *Chapter 13*	6.1 Feasibility Study Sections summary	Detailing the preferred option recommendation

Detailed TEA Financial & Sensitivity Analysis

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- More in-depth look at financial modelling of the preferred heating option (IRR, NPV, Cashflow, etc.) and discussing the sensitivities which will inform the risk register.
- List of key inputs & variables to the financial model such as:
  - Technical inputs
  - Costing and financial inputs
  - CAPEX, REPEX and OPEX costs
  - Residual value
  - Revenues
- List of model outputs/results such as:
  - Cashflow
  - NPV
  - IRR
  - Simple Payback Period
- Carbon evaluation - Evaluation of carbon savings up to 2050 of the proposed DH option to the BAU scenario.

Tallaght District Heating Network

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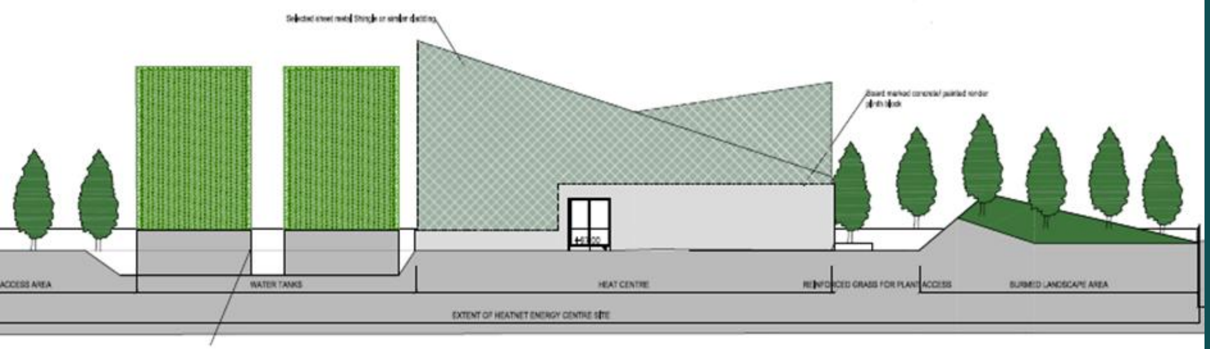

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Tallaght District Heating Scheme

Heat Source: Data Centre Waste Heat

Interreg North-West Europe
HeatNet NWE
European Regional Development Fund
EUROPEAN UNION

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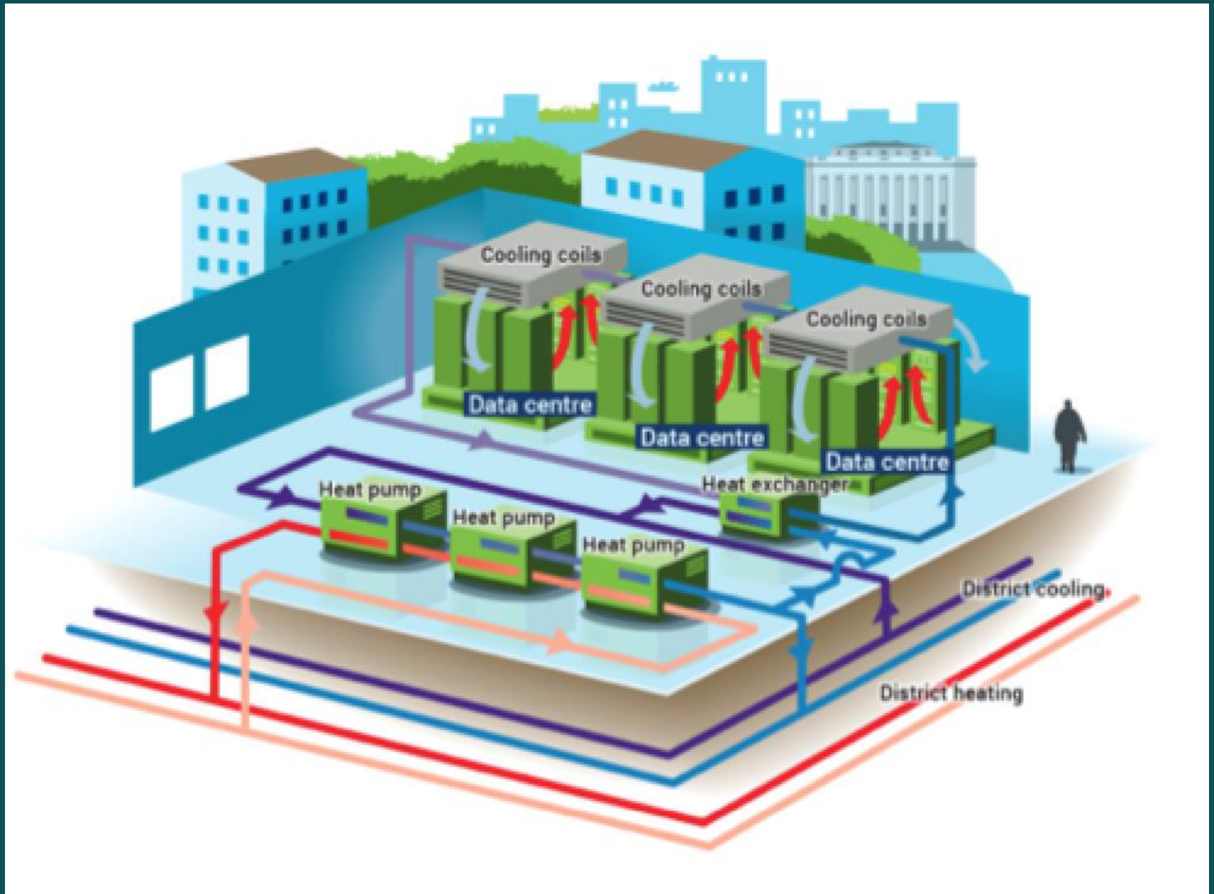
South Dublin County Council

Data Centre Waste Heat



1 MW of IT load produces
~0.8MW of heat

Recovered heat temperature ranges;
air cooled 25°C - 35°C
liquid cooled 40°C - 60°C

Pricing of DC Waste Heat

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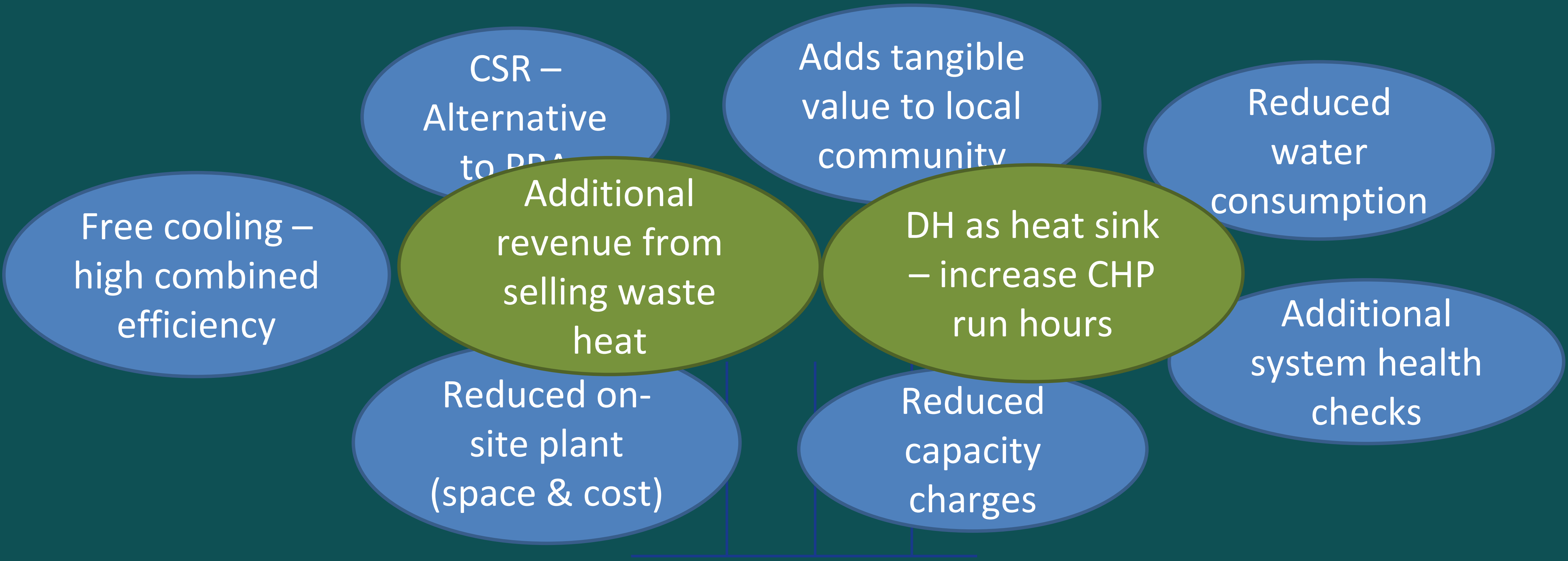
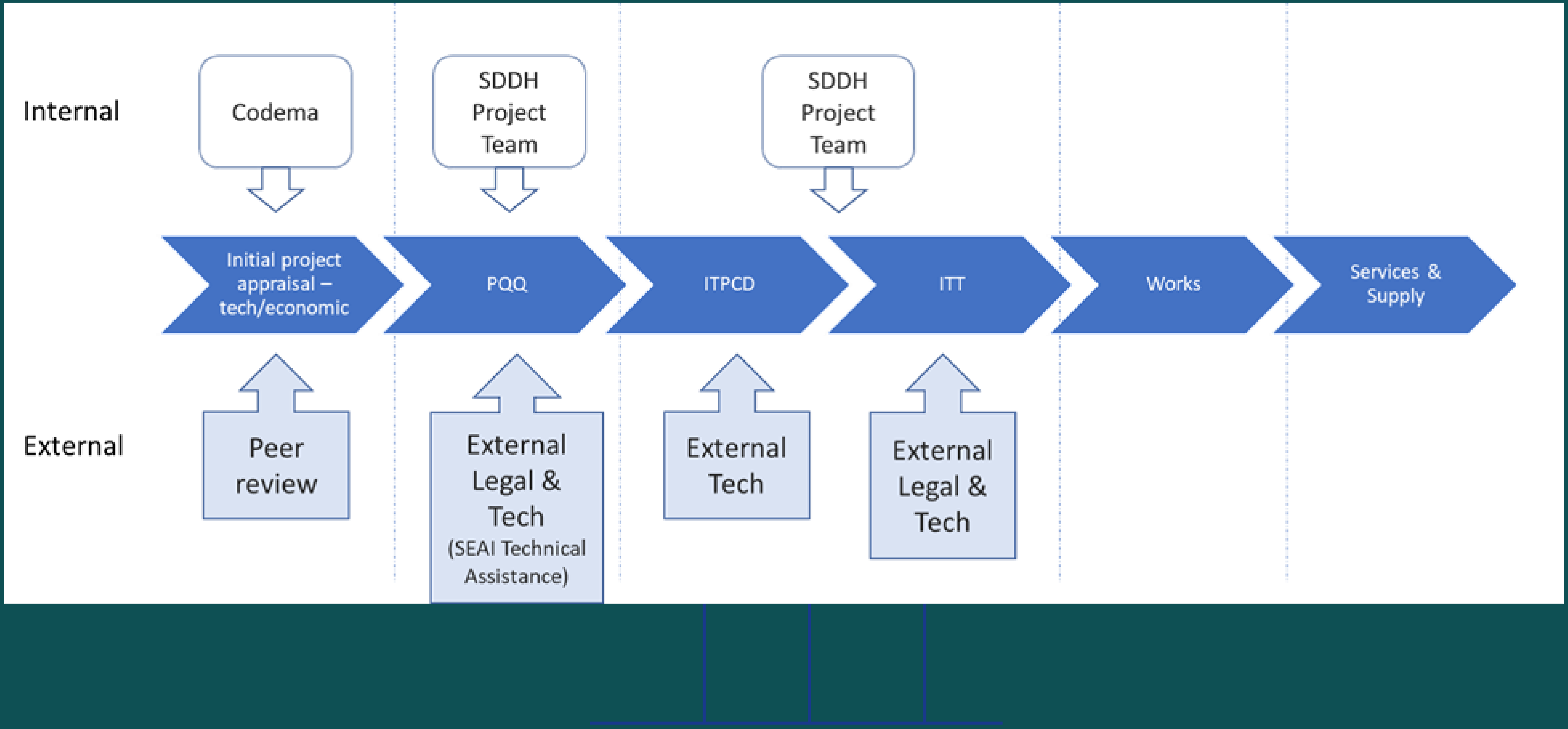
- Waste heat available from data centre for **free** – no loss in revenue to DC for supplying waste heat, in fact there are **multiple benefits**.



Design Developed Through Competitive Dialogue



TDHS Design Concept

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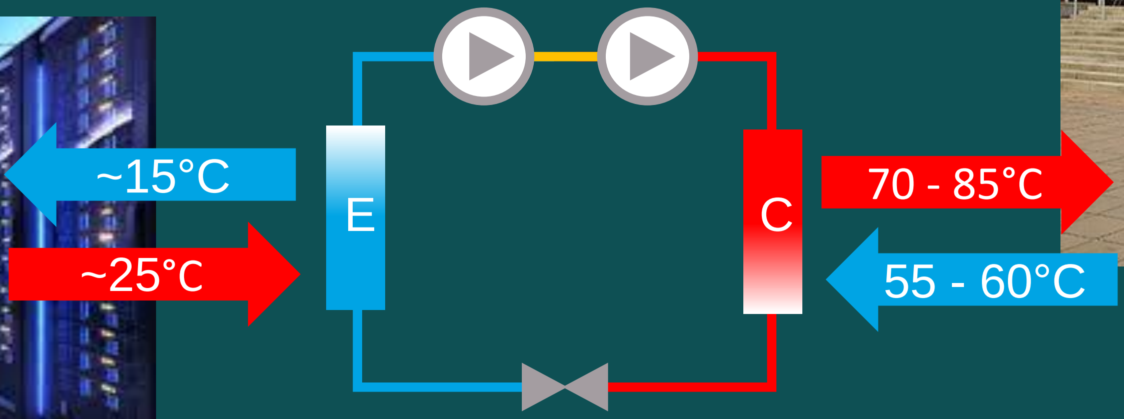
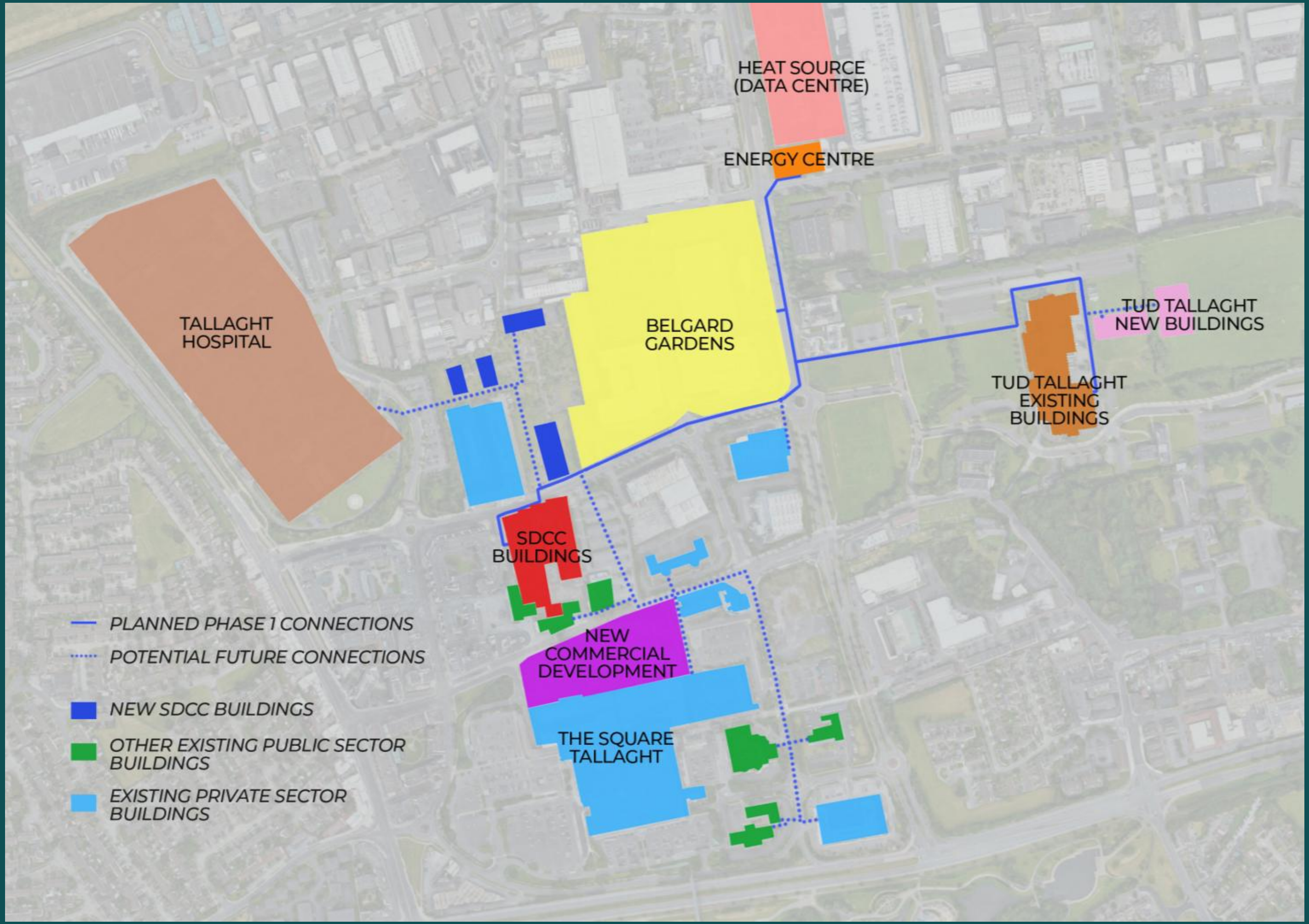


TDHS



Energy System benefits:

- CO2 savings of ~1,400 tCO2 per year for proposed Ph. 1
- Reduction in fossil fuel use for heating by 100%
- Cleaner air – no particulates
- Utilises off-peak electricity
- Utilises waste heat which currently has no value
- Provides cooling as well as heating (high combined efficiency)
- Integrates electricity and heat networks – allows balancing of the grid, greater utilization of renewable electricity

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Thank you

Contact
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Heat Source Shortlist

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- Potential further considerations:
  - Cost
  - Availability & access
  - Security of supply
  - Price stability/reliability
  - Lifespan
  - Heat Owner engagement
  - Environmental
  - Planning – land availability & planning
  - TRL

DH Networks – Flexible Demand Response

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- **Article 3:** Member States shall ensure that energy efficiency solutions, including demand-side resources and system flexibilities, are assessed in planning, policy and major investment decisions
- As an Island nation with high renewable penetration (circa 40% wind power) and significant grid contraints (in part due to the presence of so many data centres which consume 20% of all electricity in Ireland) Ireland is an interesting test case of rthe rest of Europe - demand flexibility is key for reducing wasted electricity and ensuring grid stability
- **“Flexibility isn't optional – it's the foundation of a stable, clean energy system.”**


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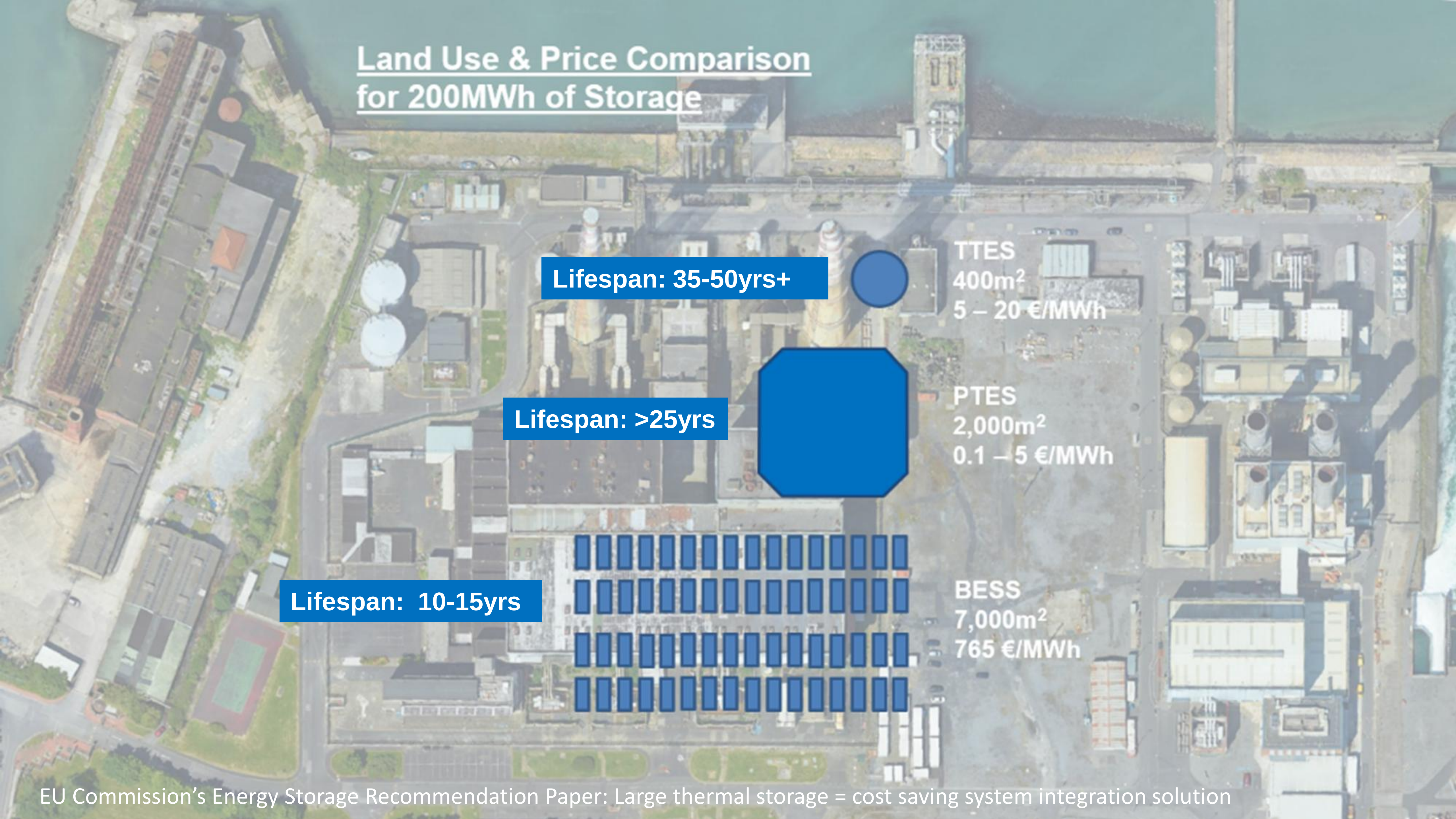
What the blackout in Spain, Portugal says about renewables

Holly Young
05/20/2025

The recent power outage in Spain and Portugal has raised questions about the stability of solar and wind power. It also reignited the debate around the phasing out of nuclear energy.

Land Use & Price Comparison for 200MWh of Storage



EU Commission's Energy Storage Recommendation Paper: Large thermal storage = cost saving system integration solution

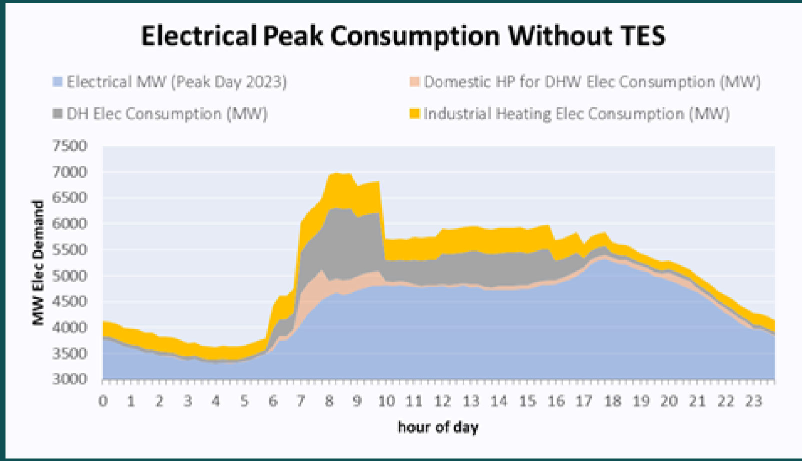
Thermal Energy Storage: A strategic win for Ireland

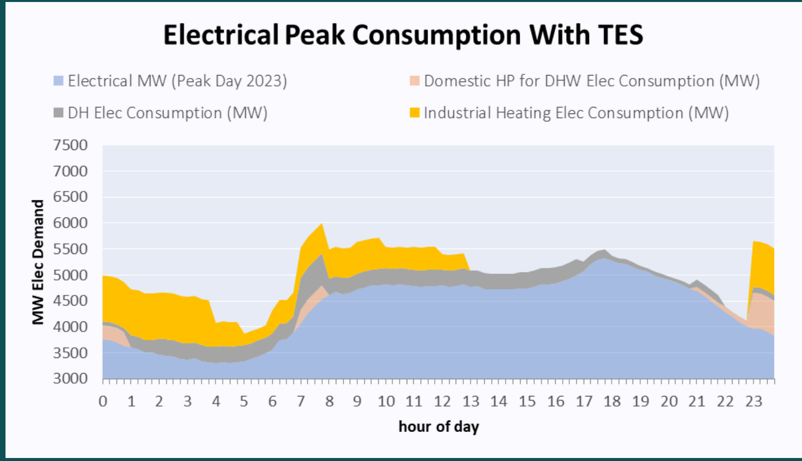
TES Findings:

- 997 MW of peak electrical demand avoided through use of TES across DH, Industrial and domestic
- TES can deliver 76% of Ireland’s 2030 flexibility target
- TES: 99% cheaper, 90% less space, 66% fewer raw materials vs BESS

DH-Specific Results:

- Absorbs curtailed renewable electricity (up to 86% based on 2030 DH targets) and boosts energy security
- Heat production costs fall by up to 38% with TES payback of 1.6 years
- €92.6 million of value to the electricity grid per year
- Up to 21.2% CO_2 reductions for district heating when paired with TES





Documents

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- Raise awareness of TES - Thermal energy storage comparison and case study document
- Empower heat asset owners to provide flex - Domestic step-by-step guide, District heating & industrial step-by-step guide
- Remove existing barriers to deployment - Market & policy roadmap incl. policy recommendations to enable greater adoption of flexibility/TES in the heat sector
- Create an evidence base - Final technical report including modelling methodologies. Literature reviews, etc.