

Queens Quay and Heat Pumps

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SUSTAINABLE DEVELOPMENT GOALS



Why Even Bother??

- Climate Change
- Climate Emergency
- Global Warming
- CO2 emissions
- Decarbonisation
- The Paris Agreement – Legally binding targets
- 1.5°C – Limit to stay under for global temperature rise
- 2050 – Global target for Net Zero
- 2045 – Scotland's Net Zero target
- 2030 – Own company target for carbon reduction?
- COP 26 The Glasgow Pact – Decade of Action



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 - COP 26 The Glasgow Pact – Decade of Action
- SECR audit
 - ESOS “The ESOS strikes back”
 - CSR investment appraisals
 - MOODY’S
 - Carbon Pricing- EU-ETS (UK –ETS)
 - Consumer “trends” (greenwashing?)
- Price of energy
• More on that later.

The reasons for trying to decarbonise heat are varied



Heat accounts for between 25% and 50% of carbon emissions.

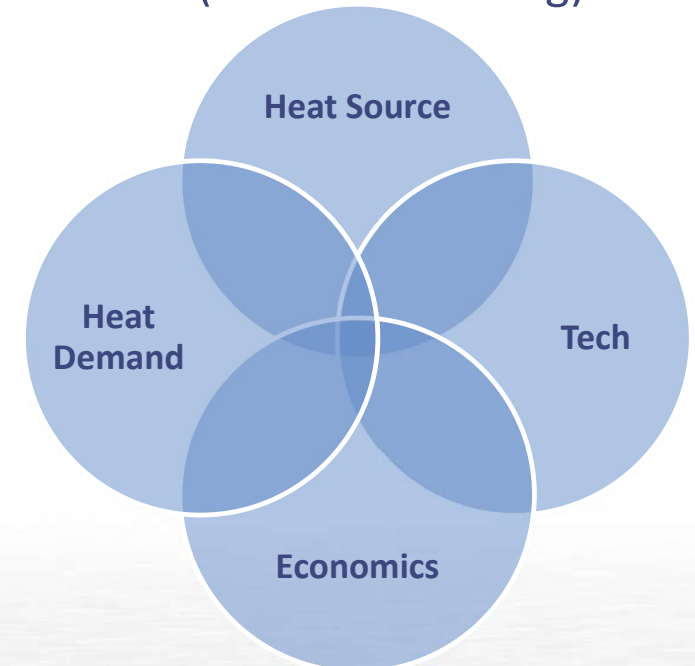
The imperative to do it quickly is overwhelming.

The progress to date far from overwhelming.

So where do we use heating?



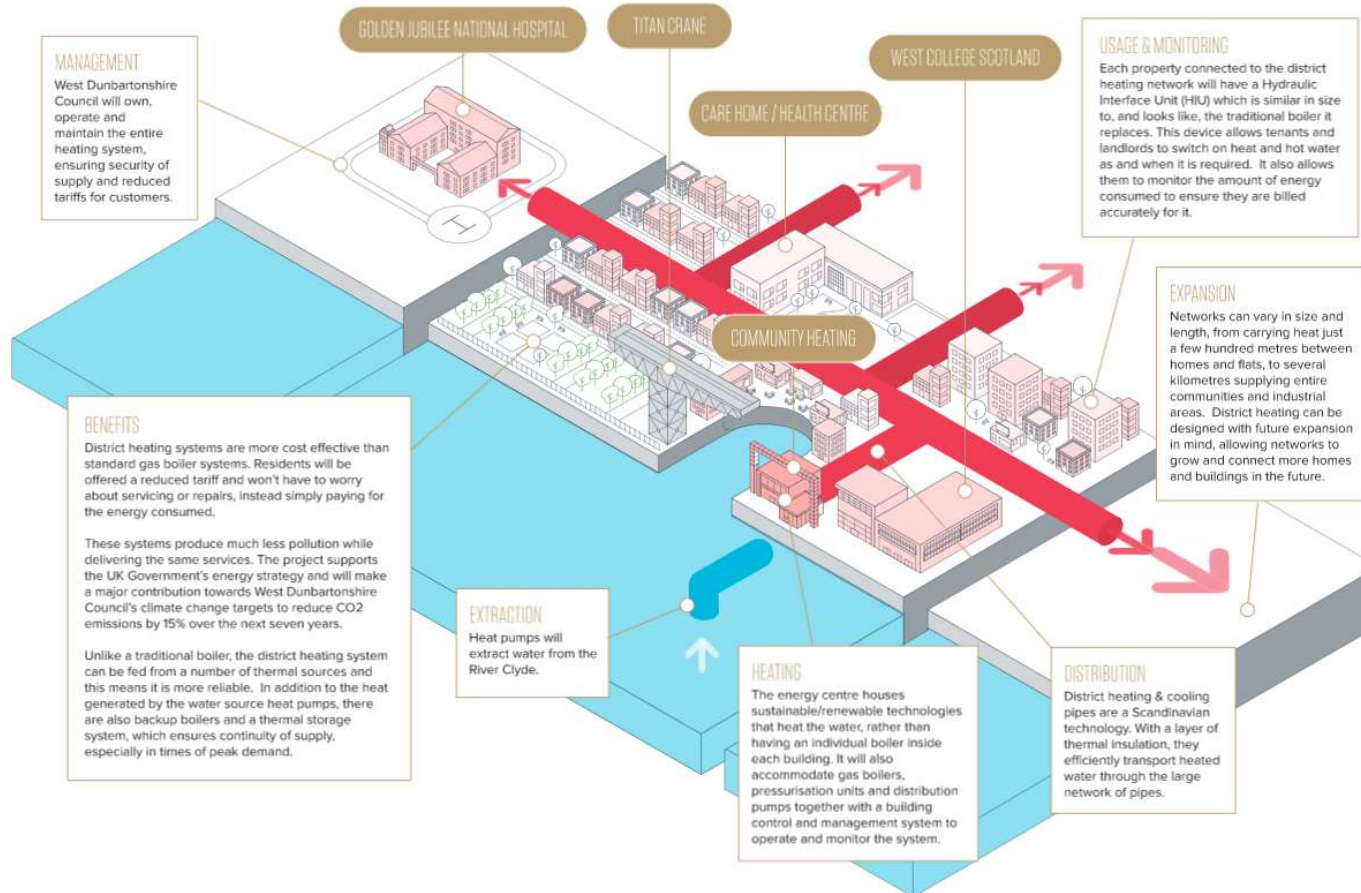
- Heat use is across all sectors defined by age and size of building, location, ownership.
- Options for all types of buildings exist for delivering comfort via heat pumps
- Industrial options emerging up to and beyond 160C (ideal for distilling).







Queens Quay



Queens Quay



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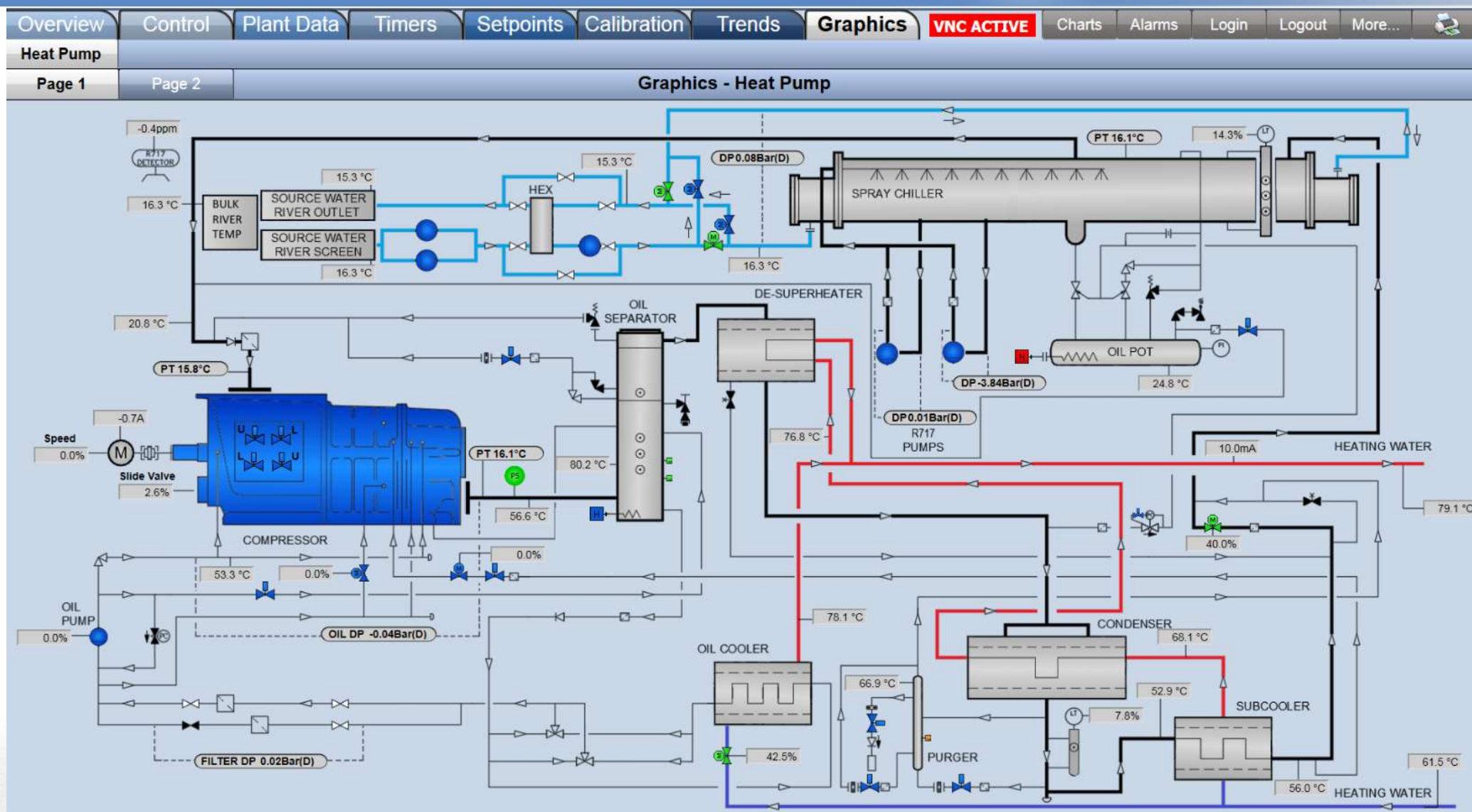
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Data

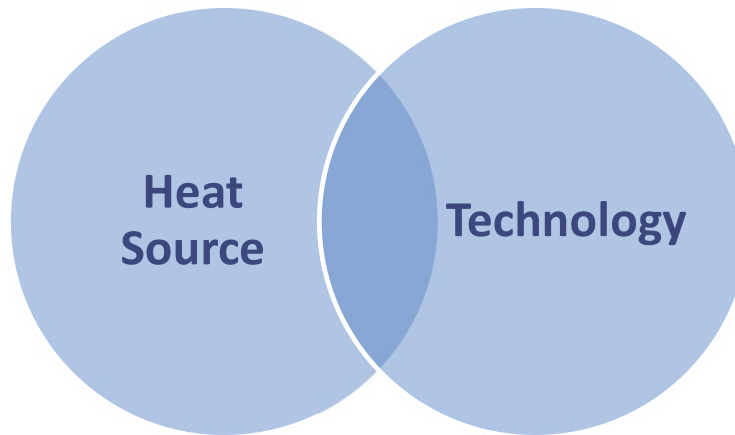


Data



Looking at the known factors of heating.....

- Heat sources can be varied but are available across the UK, whether air, surface water, ground water, waste heat.
- The heat source is either
 - already warm enough and needs simple distribution or
 - needs boosted with a heat pump (before or after distribution)

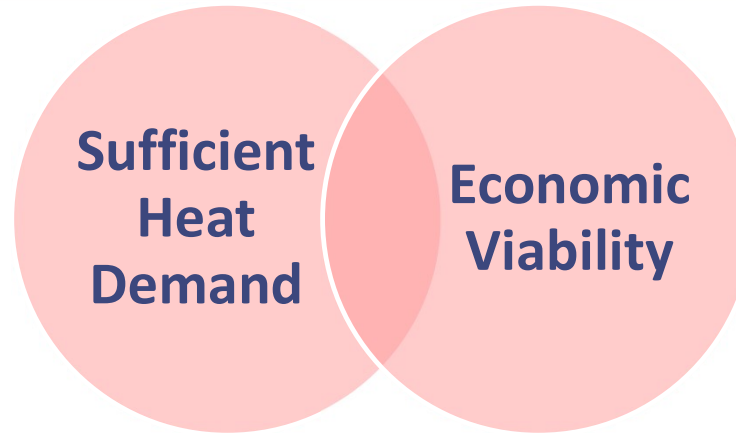


- Technology to allow clean heat is in three parts:
 - Generation
 - Delivery
 - Boosting
- “Ready to use” heat is rarely available
 - Industrial (incl power generation)
 - Energy from waste
- **Luckily, Heat Pumps can be deployed in all scenarios**



So if solutions exist, what are the investment barriers?

- Heat demand is a fact....but
- Creating a robust demand to allow investment for new paradigms is the challenge; be this
 - Individual heat pumps
 - Heat Networks fed by Big Heat Pumps (as proven by UK and ScotGov funded projects at Queens Quay and Bristol)



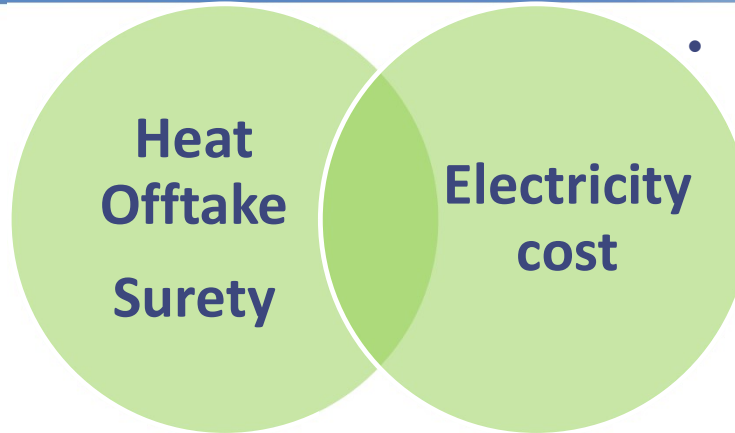
- Clean heat economics are:
 - Capital cost
 - 12.5% -to 25%
 - Distribution cost
 - 0% to 50%
 - Heat Boosting cost
 - 37.5% to 75%

Make clean heat obligatory?

Heat boosting is 100% electricity cost.

So if solutions exist, how do we jump the barriers?

- Policy is emerging to drive towards clean heat but.....
- It is too slow
- Remains optional (even public sector)
- Doesn't include large commercial buildings
- Could be marshalled ahead of demand with ... Strong policy
 - Heat Network Ready certification (HNR)



Policy Ask:

Energy being a reserved matter needs UK Gov lead:

Buildings Must pledge to Decarbonise by 2025 or pledge (HNR)

Policy Ask:

Local Electricity passed through at cost (<10miles)

Sleeved PPAs

- Electricity cost is made up of;
 - Commodity cost
 - Wind @5p/kWh
 - Policy costs @20p/kWh
 - Policy costs include;
 - Transmission
 - Time of use
 - Green Levies

So 80% of electricity cost is counter-productive.

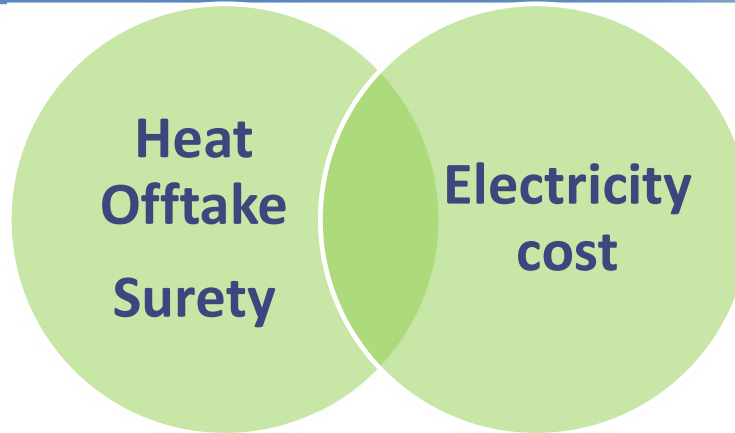


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So what would happen if these two light touch policies were allowed:

- **Heat Network Ready certification (HNR)** would create a worksteam auditing buildings
- **Investors would lower risk rating as HNR levels rose**
- **Cities would auction Zones at larger end of possibilities**
- **Project demand would rise**



Sleeved PPAs support:

- Pulling forward onshore & offshore wind aligned to such offtakers.
- Mega Heat network projects to enter development stage (stalled since RHI closed)
- Individual Heat as A Service based on heat pumps which would become fundable by investors incl insulation
- Provision of Grid balancing
- Long term fixed costs

The reasons for trying to decarbonise heat are varied



Switching from fossil methane will require huge sources of energy.

Using renewable resources brings options in several aspects but harnessing them via Heat Pumps boosts output by a factor of 3 or more.

Efficient use of resource is unparalleled with Heat Pumps which turn 1kWh of electricity to ~3kWh of heat.

H2 as a delivery vector in heat results in 82% less heat delivery or needs 6x as many wind turbines.

Local air quality should be of huge concern as heating transitions from gas.

Heat pumps avoid any local NOx or SOx emissions whereas current use of gas contributes significantly.

Heating using gas is responsible for more than half of imported gas.

Switching to heat pumps even if powered by central gas CCGT would be 33% less but wind powered 100% less.

A Just Transition implies high quality work for all.

Delivering clean heat especially via heat pumps (big or small) will grow our manufacturing and employment.

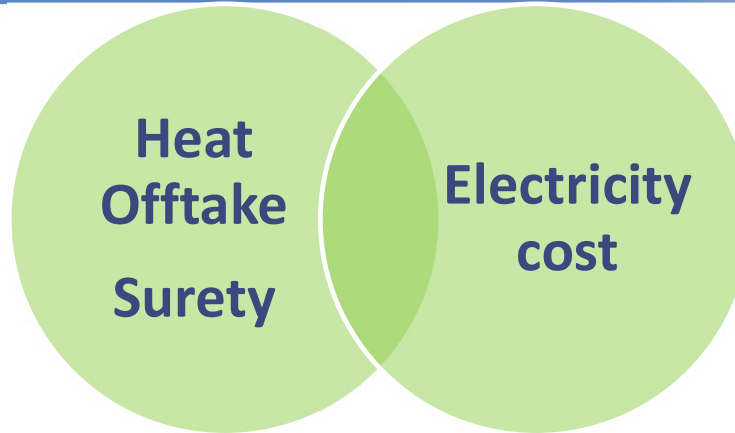
The ultra-flexibility of Heat Pumps can support greater levels of locally generated electricity.

Also vital to design new paradigms that don't dump waste heat.



• Image borrowed from the European Heat Pump Association

How hard would these policies be to deploy?



Policy Ask:

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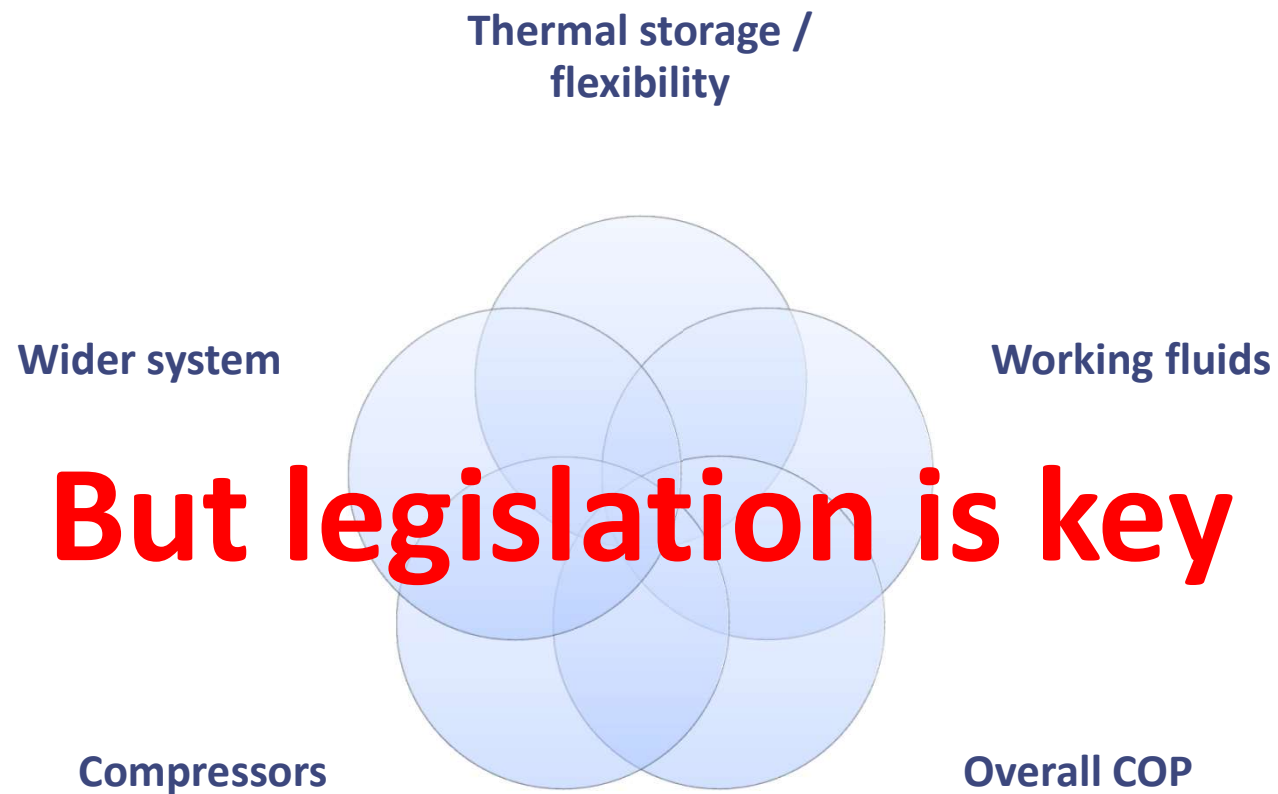
Buildings Must Decarbonise by 2025 or pledge (HNR)

Policy Ask:

Local Electricity could be passed through at cost (<10miles)

Sleeved PPAs

Research opportunities



Thank You

Questions or comments?



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