

*Green heat technologies -
future sector development;
emerging technologies /
policies / regulations*

Presentation for Scottish Enterprise Clean Heat Accelerator



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Agenda

Share LCP Delta's perspective on the Scottish, UK and European policy context and implications for the development of Clean Heat technologies

Item	Topic
1	Context – why is heat important?
2	Policy & regulation – milestones and mechanisms to accelerate low carbon heat
3	Products – latest developments with green heating technologies
4	Q&A

Introducing LCP Delta

Powering the energy transition across the whole value chain

LCP Delta is a specialised energy transition practice providing

Subscription research	Consulting	Technology and data	Training
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~ 120 people

...to organisations that are active in all parts of the value chain

Generation & storage	Networks	Demand & customer propositions
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Active since 2004

...delivering expertise and advice in

Power market forecasting	Energy storage & flexibility	Hydrogen	Power trading	PV
Distributed power	Policy impact analysis	System modelling	Business models	Energy management
EV charging infrastructure	Connected home	Low carbon heat	Customer engagement	Community energy



200+ clients

Heat subscription research from LCP Delta

Providing insights and analysis on Europe's heating transition for over 20 years

Decarbonisation of Heat Service

Core focus: Forecasting how and why the sales of residential heating appliances will evolve and identifying where the key growth opportunities for low carbon heating (heat pumps, low carbon / high efficiency gas heating) exist across Europe. Insights on the leading brands, their products, market shares.

Core deliverables:

- Detailed country reports
- Historic and forecast sales datasets
- Policy / regulation / subsidy information

More info: <https://delta.lcp.com/research-services/heat/decarbonisation-of-heat-service/>



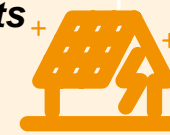
Heating Business Service

Core focus: Analysing how new consumer propositions and alternative business models – heat as a service / green finance / product leasing & rental – and the companies providing them (energy retailers / one-stop-shops / tech. start-ups) are shaping the future value chain and routes to market.

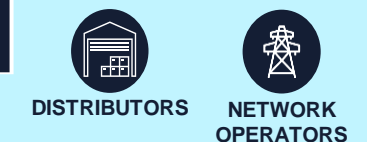
Core deliverables:

- Primary consumer research
- Thematic reports and case studies
- Stakeholder and propositions datasets

More info: <https://delta.lcp.com/research-services/heat/heating-business-service/>



Client groups:



Both Services provide:

- REPORTS & INSIGHTS
- DATABASES & DATA SETS
- MODELLING & ANALYSIS
- EXPERT SUPPORT & TEAMS SESSIONS

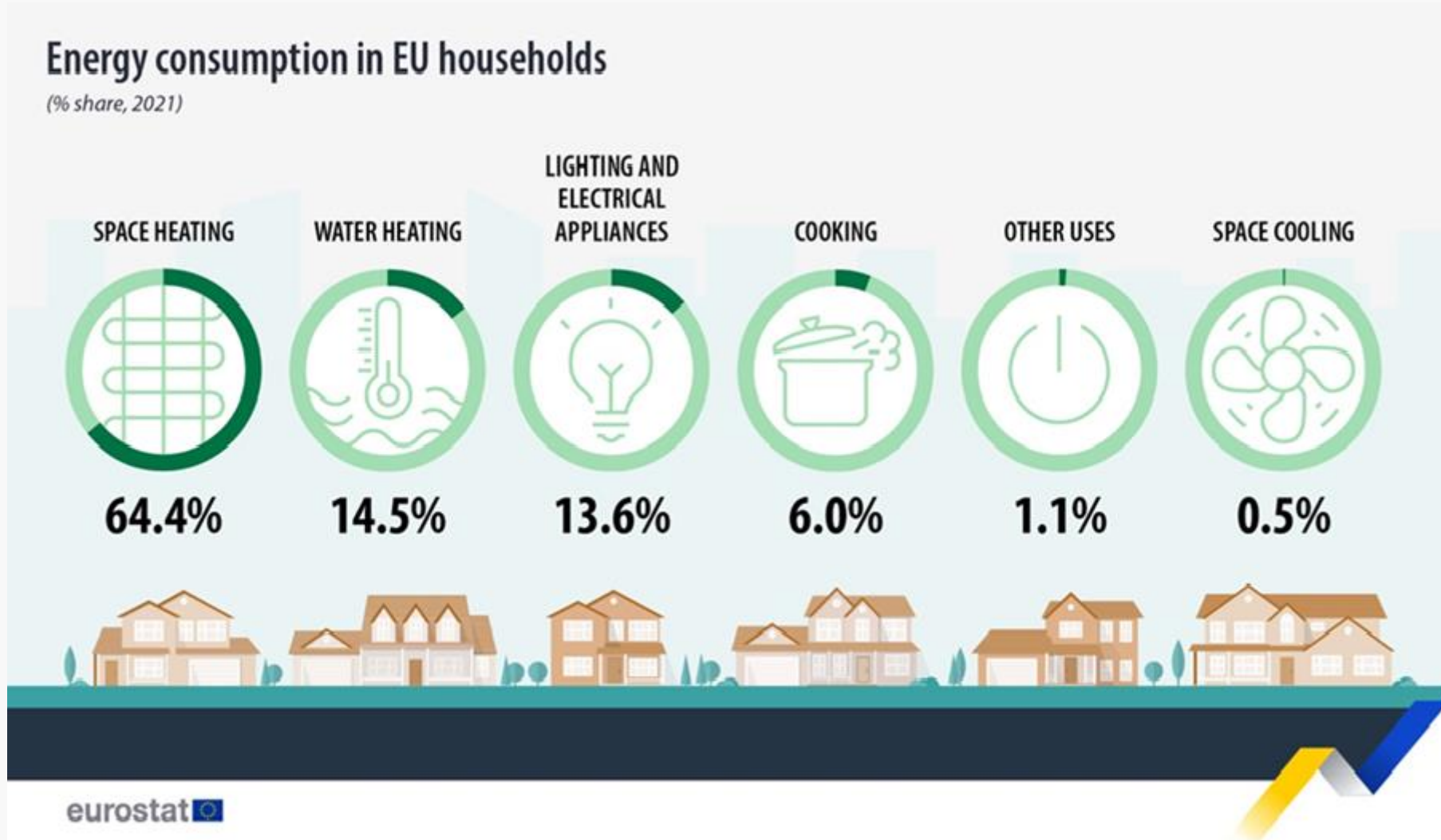
For clients doing these types of jobs:

- STRATEGY & SOLUTIONS
- R&D / INNOVATION
- MARKET INTELLIGENCE
- PRODUCT MANAGEMENT
- POLICY & ADVOCACY
- PRODUCT MARKETING

Context – why is heat important?

Why is heating important?

It's the sole largest use of energy in European households



Where are we at just now with decarbonising heat?

Assessment from the IEA concludes that, globally, the DoH is behind schedule

Tracking Heating

More efforts needed ?

On track More efforts needed Not on track

Almost half of energy demand in buildings was used for space and water heating in 2022, leading to around 2 400 Mt of direct CO₂ emissions and 1700 Mt of indirect CO₂ emissions, similar levels to the previous year. The role of efficient and low-carbon heating technologies continues to grow, but fossil fuels still meet over 60% of heating energy demand. The global energy crisis and its related risks to heating energy security and affordability are providing unprecedented momentum for a transition away from fossil fuel-based heating, particularly in Europe. The technologies needed to decarbonise heating are readily available and mature, but significantly faster rates of deployment are needed to get on track with the Net Zero Emissions by 2050 (NZE) Scenario.

What is the outlook for Europe?

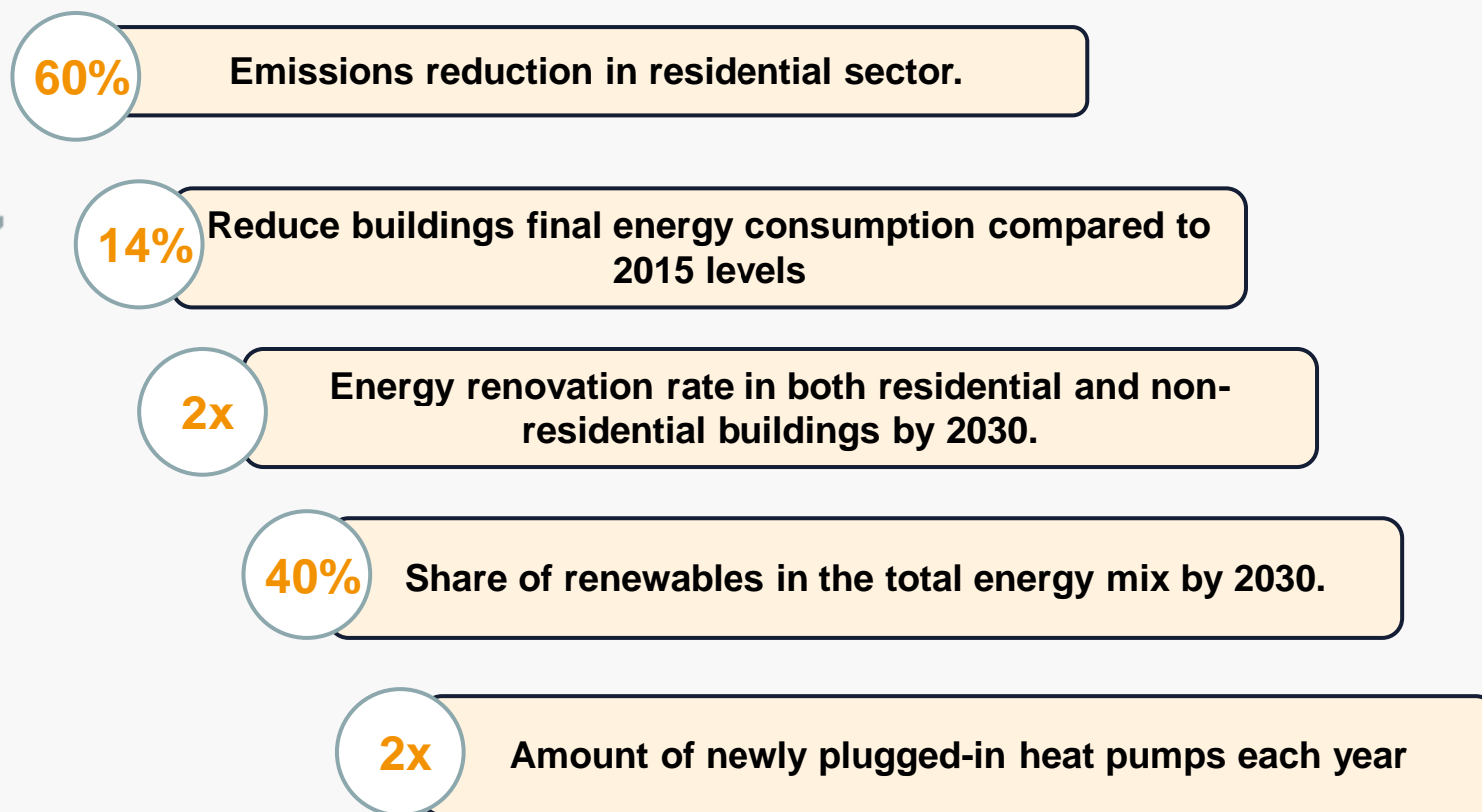


Overview of major EU policy goals

The EU's Energy strategy to become Net Zero by 2050 aims to initially reduce carbon emissions by 55% by 2030, compared to a 1990 baseline. To achieve both this intermediary and final target, low carbon heat has a vital role to play and a variety solutions will need to be adopted.

The policy landscape in the EU is supportive of the transition to low-carbon heating, as it has a vital role to play in the shift towards decarbonisation.

New business models and customer propositions are emerging in response to this changing landscape.



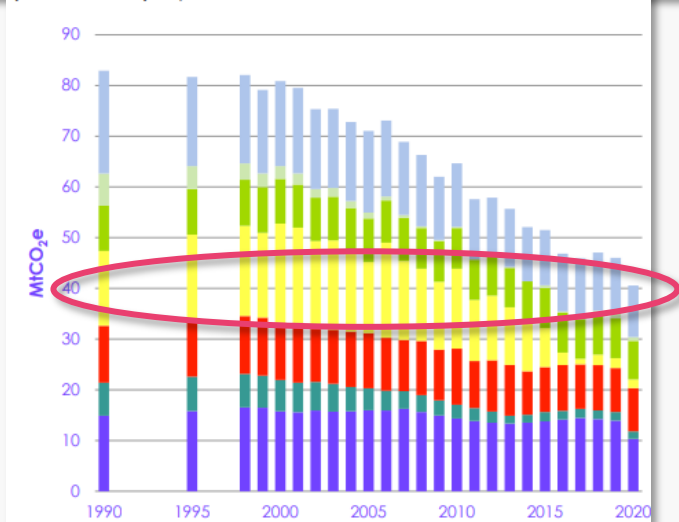
REPowerEU

Scotland's targets / key policies

Focus on the heating sector



Figure 1.3 Scotland's historical emissions (1990-2020) and the Scottish Government's pathway (2020-2032) by sector



2024:

- New Build Heat Standard prohibits installation of heating and cooling appliances with “more than a negligible level of greenhouse gas emissions”

2030:

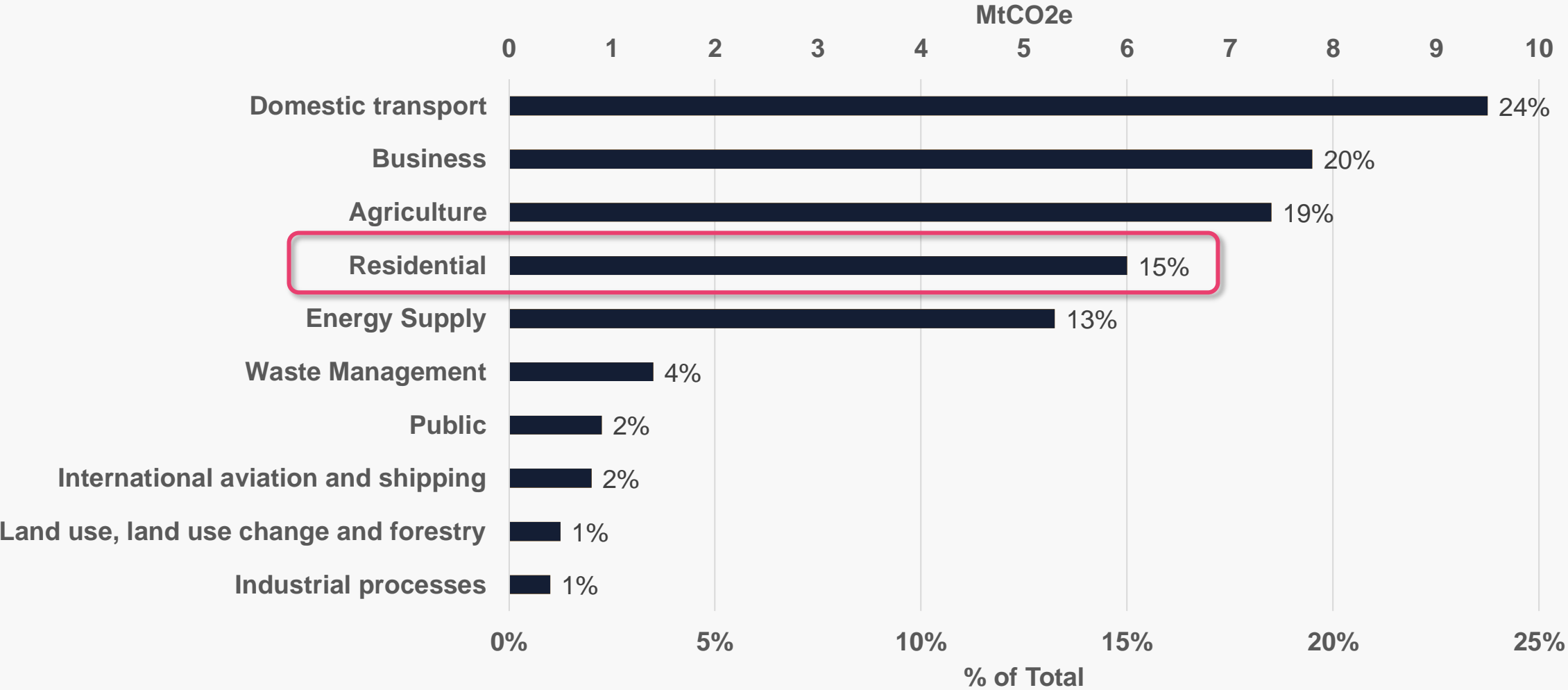
- Equivalent of **half total energy demand to be supplied by renewable sources** (across electricity, heat and transport)
- **200,000 ‘zero emissions’ heating systems fitted / year** (increased from ~5-6k today)
- **One million homes and 50,000 non-domestic buildings** to switch to zero emissions heating
- **170,000 heat pumps installed in off-grid properties**
- **Heat networks to provide 8% of Scotland's heat** (equivalent to around 650,000 extra homes from today's ~30k)

2045:

- **Net zero emissions.** End of all ‘polluting heating’

Scotland's greenhouse gas emissions, 2020

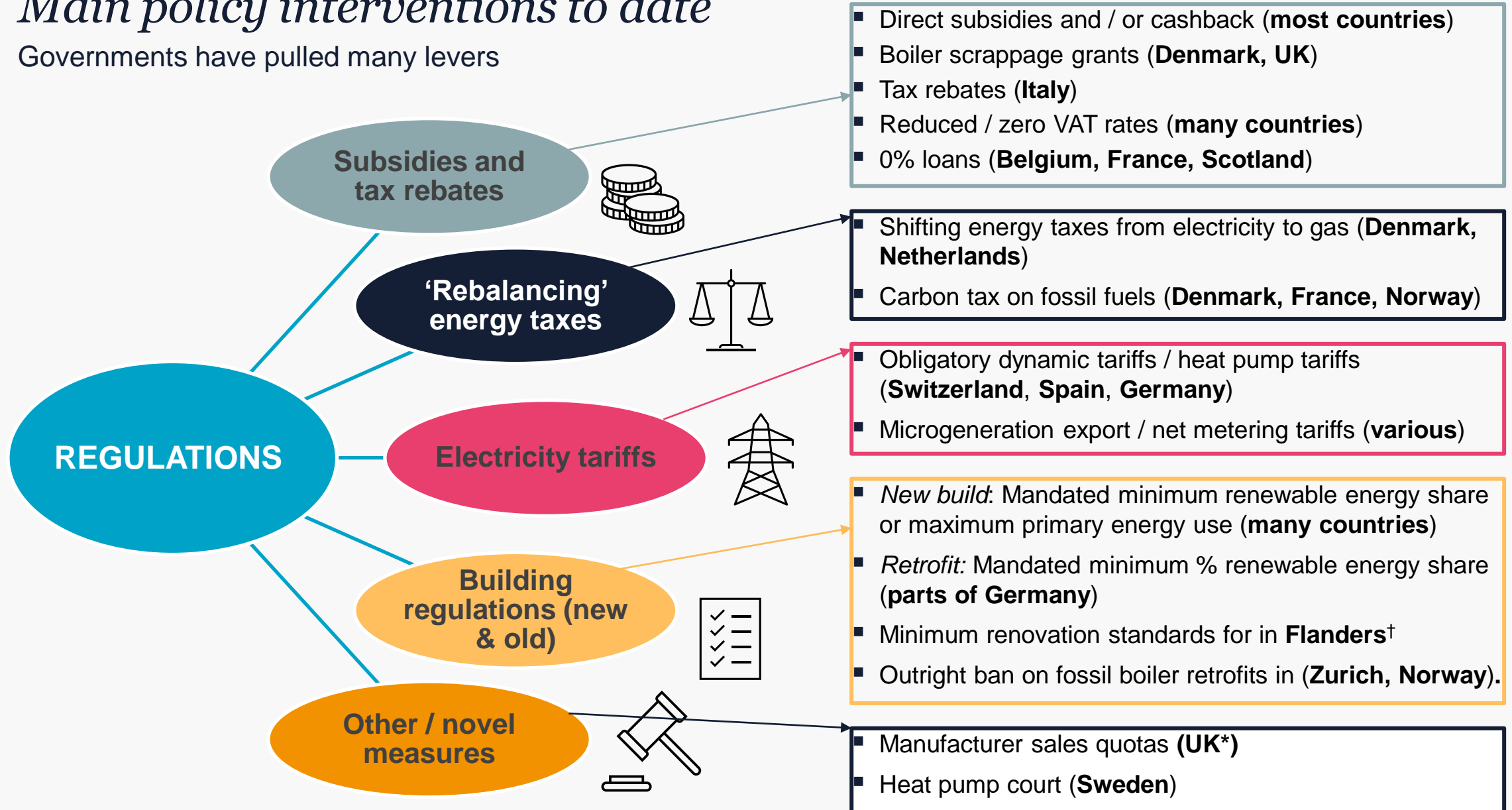
Source: Scottish Government



Policy & regulation – milestones and mechanisms to accelerate low carbon heat

Main policy interventions to date

Governments have pulled many levers



‘Renovation obligations’

A new kind of policy instrument which could drive DoH

What is a renovation obligation?

- A requirement for the new owner of an existing home (‘old build’) to **improve the energy performance**, making the dwelling more efficient
- Would cover aspects like **insulation / glazing / ventilation etc.** as well as **central heating**
- **A specific timeframe** to make the improvements would be expected – on the order of ~5 (based on current examples)
- Owners would be able to **make use of relevant grants / low cost loans** to meet the obligation
- Seems a transparent and logical idea!

What examples are there to date?

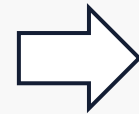
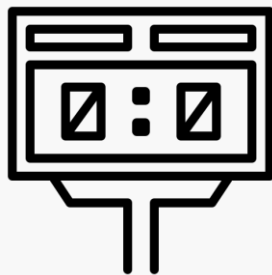
- **Germany (Baden-Württemberg):** A pre-cursor to a full renovation obligation – as far back as 2015 a mandated share of 15% renewable energy was required for heating replacements
- **Belgium (Flanders):** Worlds-first renovation obligation. From 2023, homes with an energy label of E or F must be renovated to label D or higher within 5 years after purchase. New heating will help but not necessary
- **Scotland:** Proposed new renovation obligation which would include new owners to ‘end their use of polluting heating systems’ within a period of 2-5 years (currently being consulted)



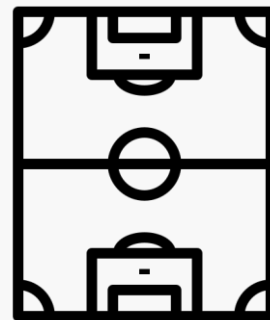
The move towards locally-driven decarbonisation of heat (1/3)

Across Europe there are growing examples of local heat plans (i.e. at the granularity of each household in the territory).

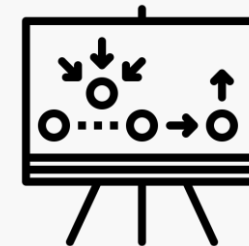
Directives at the European level set the overarching policy goals



National laws / strategies / roadmaps set the framework for how each countries approach



Empowered local strategies make best use of local knowledge & expertise to deliver the outcome

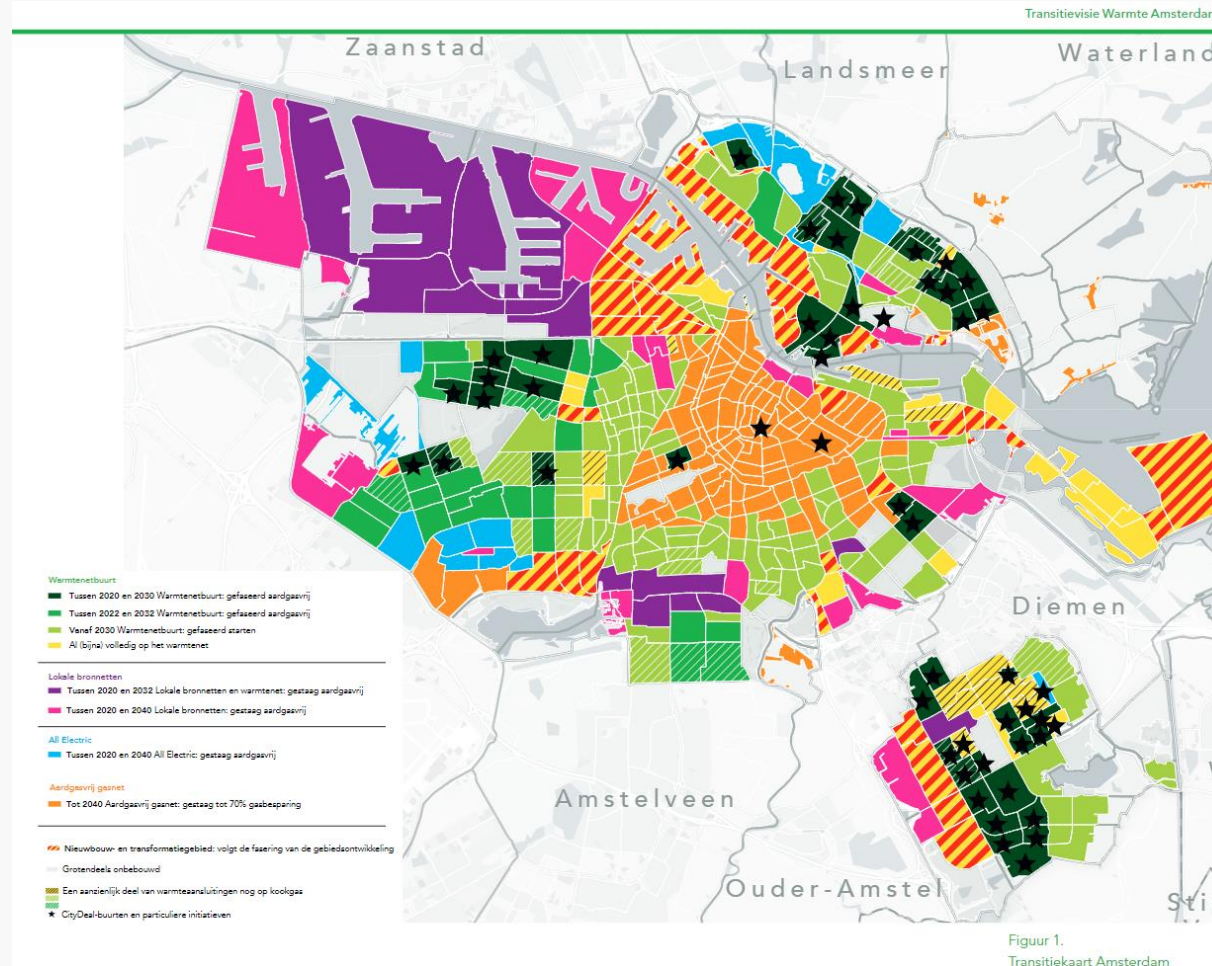


The move towards locally-driven decarbonisation of heat (2/3)

Example of the Netherlands



The HTV for Amsterdam identifies over 10 different types of heating zone:



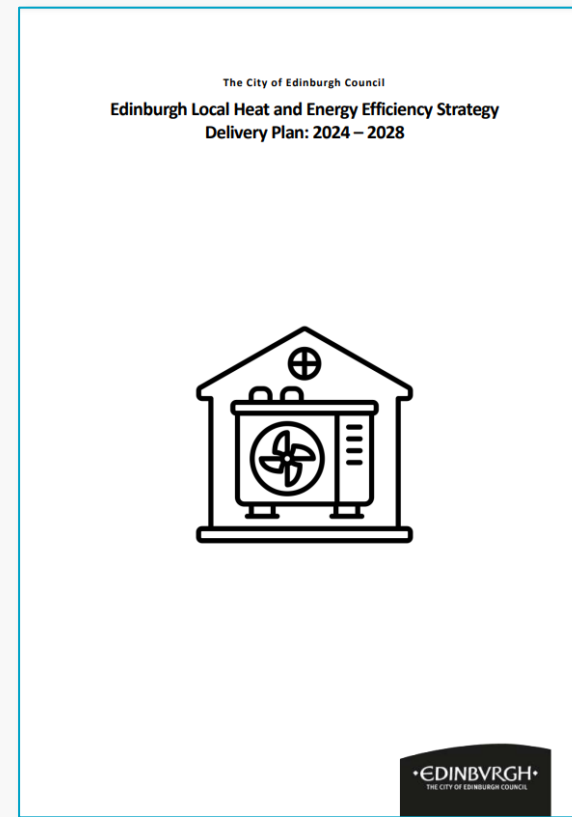
The move towards locally-driven decarbonisation of heat (3/3)

Examples of Germany and UK



Numerous German cities had pre-empted the federal governments move to municipal heat planning

Edinburgh's zoning prioritises areas moving to fully-electric heat pumps and heat networks



Key DoH Policy Milestones to 2030+

Across Europe, with selected highlights from key countries

Europe ('24)

Energy Performance of Buildings Directive (EPBD) revision confirmed; sets end dates for: the installation of standalone fossil fuel boilers (2039), and for subsidies to gas boilers (2025).

Scotland ('24)

Tightened new build regulations enter into force, prohibiting the installation of combustion heating systems in new builds.

Germany ('26)

Updated 'GEG' applies to existing homes in large municipalities (100,000+ inhabitants); heating retrofits must utilise 65% renewable energy (some exceptions).

Germany ('28)

'GEG' (Building Energy Law) requiring minimum 65% renewable energy use in retrofit heating installations applied to remainder of German market (municipalities with <100,000 inhabitants).

Europe (~'29)

Proposed update to the minimum heating efficiency of all heaters on the European market; could be set at 115% which would eradicate several technologies from the market (Ecodesign and Energy Labelling Directives).

Europe ('39)

End of standalone fossil fuel boiler installations as per the revised EPBD.

2024-'26

2027-'29

2030+

Netherlands ('24)

New government scraps former plan to introduce new minimum heating efficiency standards in retrofit (from 2026) – would have meant that hybrids / thermally-driven heat pumps / fully electric HPs were the only options in retrofit.

UK ('25)

Possible introduction of 'Clean Heat Market Mechanism (CHMM)' setting heat pump sales quotas for leading 'boiler' manufacturers to meet, else be fined.

UK ('26)

Government 'go / no go' decision on the role of hydrogen in heating due. Evidence base largely to come from the H100 trial in Scotland. If 'go', all boilers would need to be 100% H2-ready from 2030.

Europe ('27)

ETS2 (emissions trading scheme) to be introduced which applies to fuels used across various sectors including domestic heating.

Scotland (~'27-'28)

Possible implementation of 'Renovation Obligation' – requiring home buyers to remove 'polluting heating systems' within 2-5 years of purchase (timescale currently under consultation).

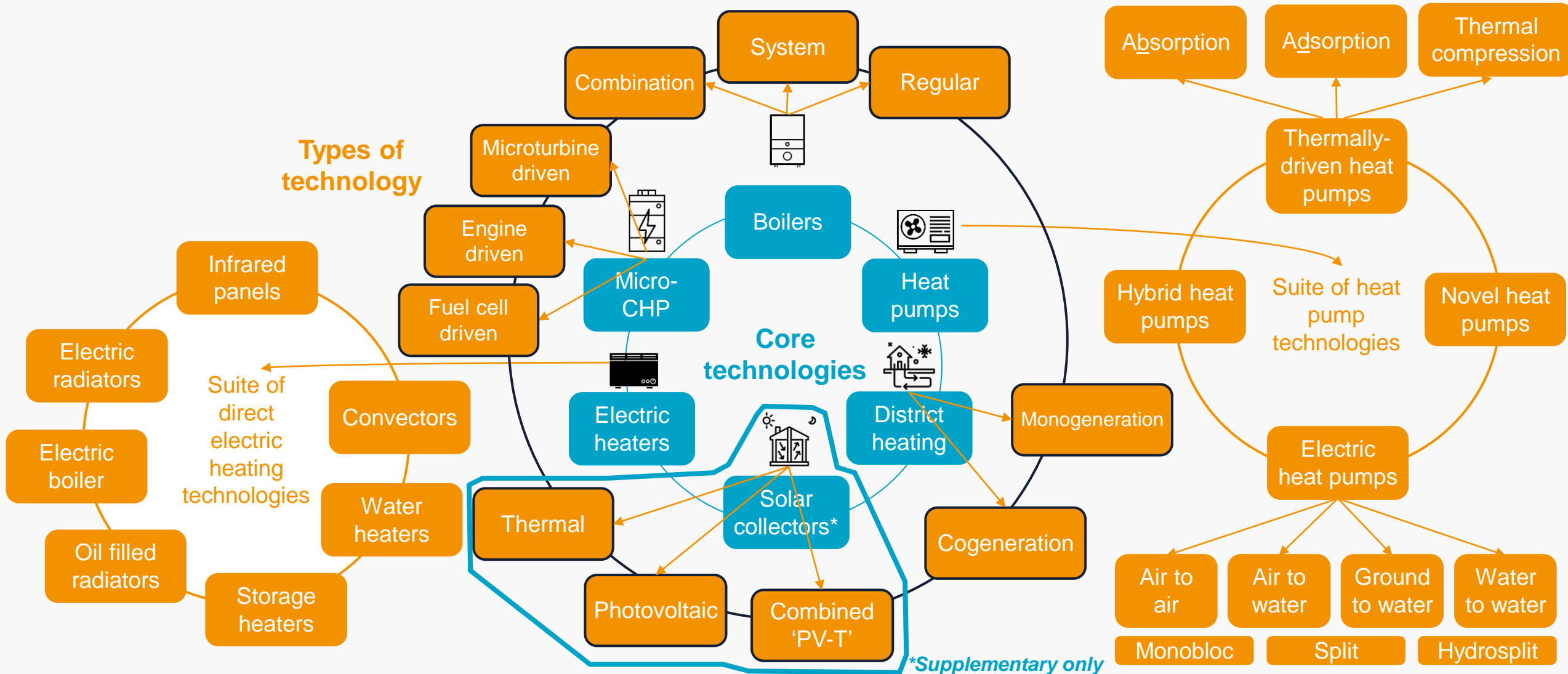
Europe ('30)

All new residential buildings must be 'zero emission' (Energy Performance of Buildings Directive)
Target of 49% renewable energy use in existing buildings (Renewable Energy Directive)

Products – latest developments with green heating technologies

What are the heating product options today?

Numerous technology options – with many subcategories:



Patent filings: Heat pump related patents

Analysis of heat pump related patents published over the last two years

Heat pump related patent filings in numbers:

266

Number of heat pump related patent filings published during 2022-2024 in EU

30%

German companies leading with 30% of total publications – followed by Japanese brands

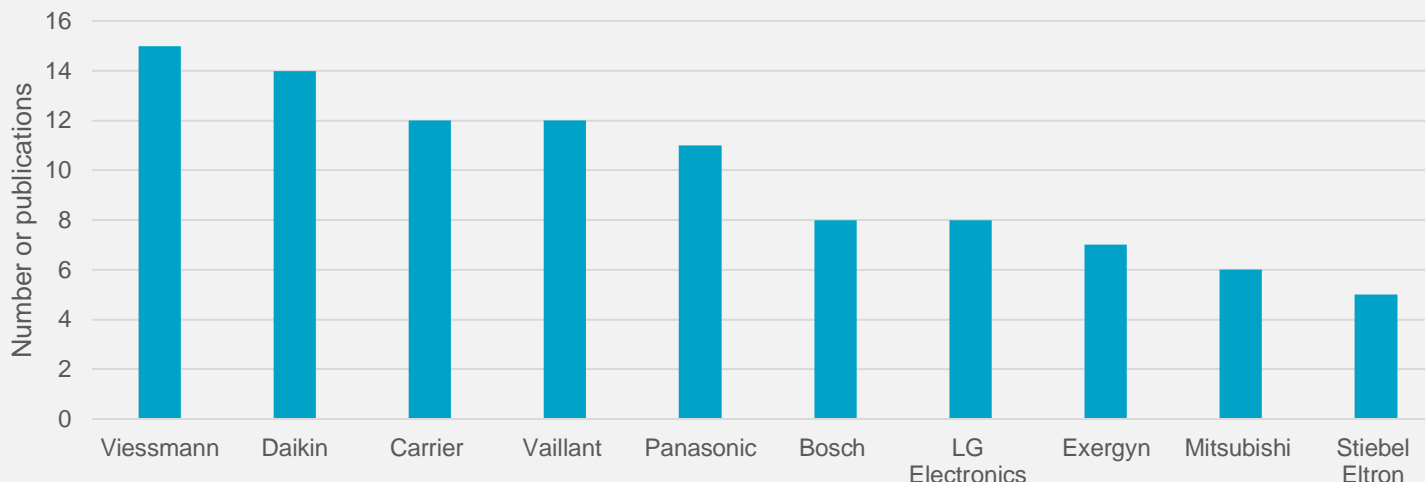
15

Viessmann leading company with 15 patent filings published, focused on device and operation methods

~50%

Half of patent filings concern control and operational methods, as well as refrigeration cycle

Top10 – Heat pump related patent filing publications by company, 2022-2024



Topic focus:

- +
 - Components and device
 - Refrigeration cycle
 - Control and operation methods
 - Refrigerant & fluids
 - Heat storage
- - New developments



Sources: [European Patent Register](#), [UK Intellectual Property Office](#)

Examples: Gaseous products (1/2)

Highlights from recent trade shows



SMTI's TDHP (16kW) – shown at MCE



ATAG all-indoor gas hybrid HP – shown at VSK



Bosch monobloc gas hybrid HP with non-integrated hydraulic interface & no cylinder – shown at ISH

Examples: Gaseous products (2/2)

Highlights from recent trade shows



ATAG 100% H2-ready boiler – shown at MCE



Panasonic 100% H2 fuel cell micro-CHP – shown at Installer Show

Examples: storage

Highlights from recent trade shows



Energie range of DHW HPs – shown at ISH



Midea range of PCM batteries – shown at MCE

Examples: 'Complete' solutions

Highlights from recent trade shows



Hisense AC multi-split / Air-Air HP + Hydro Box with DHW (R32), & Solar PV + batteries + EV charging – shown at MCE



Haier heat pump + solar PV + battery + EV charger with cloud-based monitoring and control system – shown at MCE

Examples: Aesthetics (HP outdoor units)

Highlights from recent trade shows



Dimplex A-W monobloc – shown at ISH



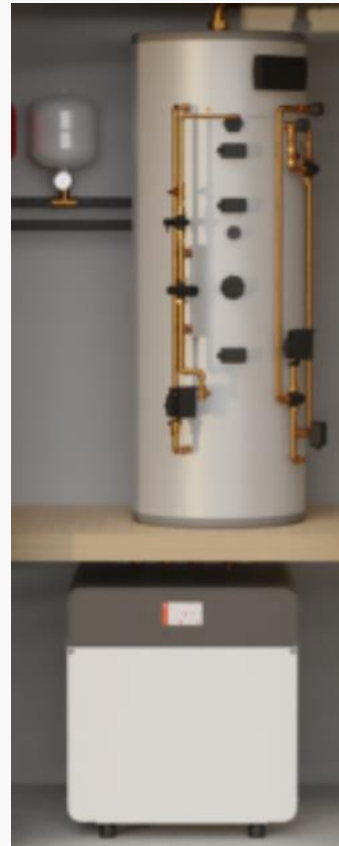
Templari A-W monobloc (R290) – shown at MCE

Examples: Other novel appliances

Further examples worth highlighting



Indoor-only air source heat pumps (e.g. Mitsubishi)



Shared-borehole ground source heat pumps (e.g. Kensa)



PVT heat pumps (e.g. Triple Solar)



Infrared panels (e.g. Ambion)



Contact us



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