Unagru
Architecture
Urbanism

nomoregas

- Who we are and what we do
- Urbanism and small projects
- nomoregas: intersection between geopolitics and sustainability
- the problem and the changing energy landscape
- questions
- nomoregas: technologies
- nomoregas: the platform
- nomoregas: energy geographies

About Us

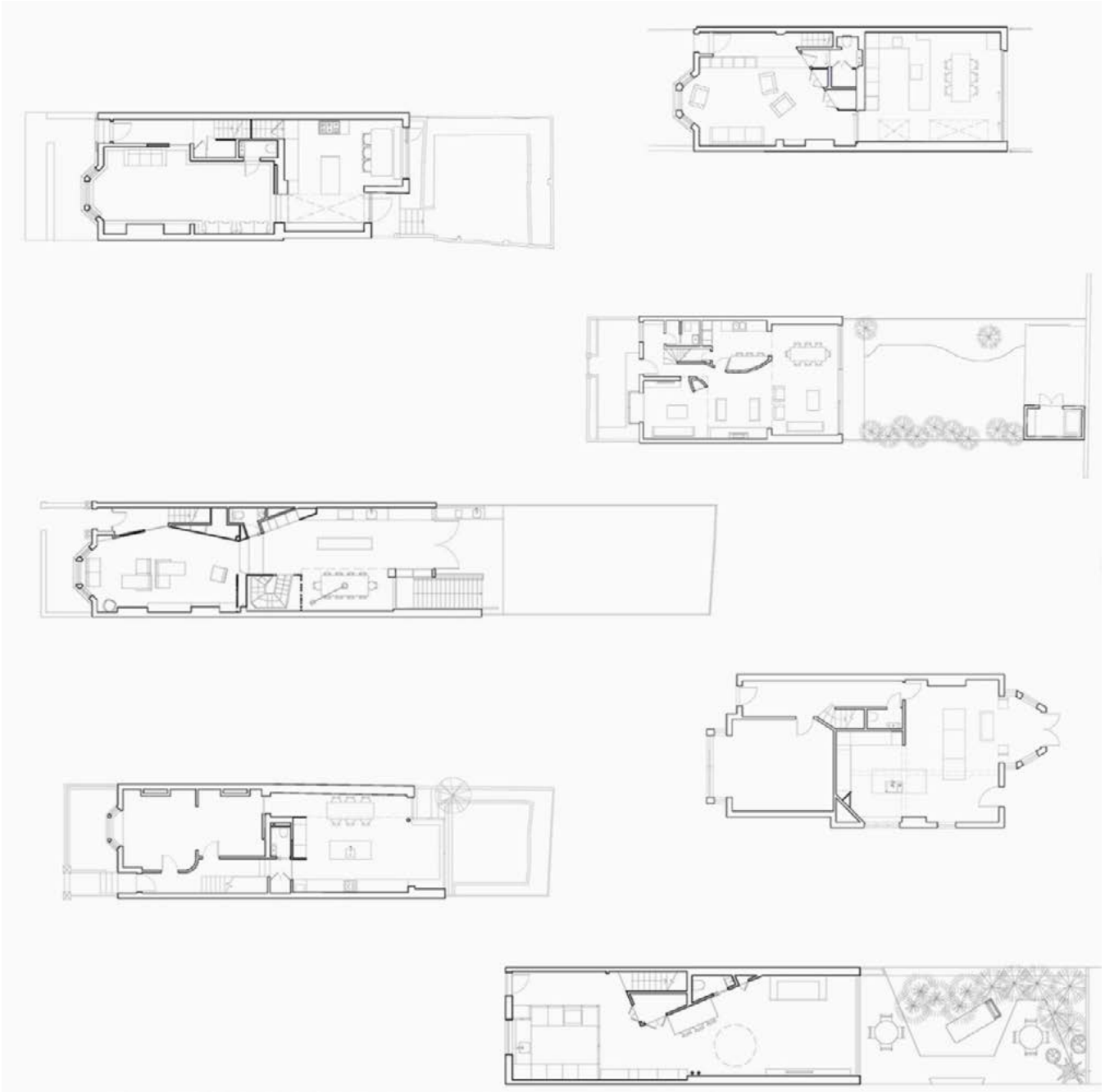
Unagru Architecture Urbanism

Una gru stands for “a crane” in Italian. In both English and Italian, the crane is both a bird and the most iconic building machine. The word’s double meaning symbolises today’s hybrid natural-artificial world and is an aspiration in our work.

Reflections on the home

Our reflection on architecture and sustainabi;ity begins with the single house. We see how thousands of small projects can have a great compounded effect.

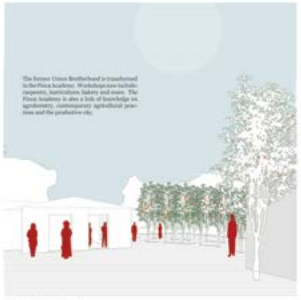
When thinking in these terms, we have to inevitably be pragmatic, user friendly, simplistic, while being wildly ambitious.



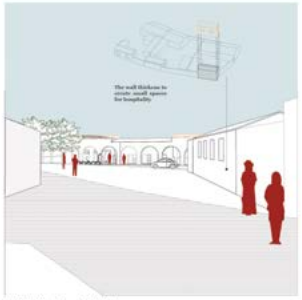
Reflections on the home

Ecological urbanism

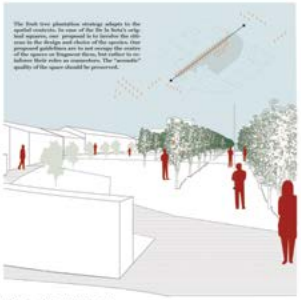
Our passion for urbanism translates to thinking in terms of processes and policies and, again, their compounded effect.



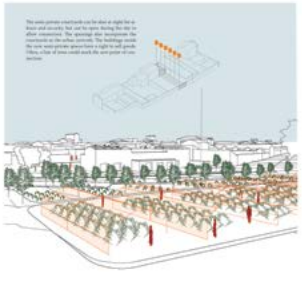
The Finca Garden



Calle Elastica Infilled



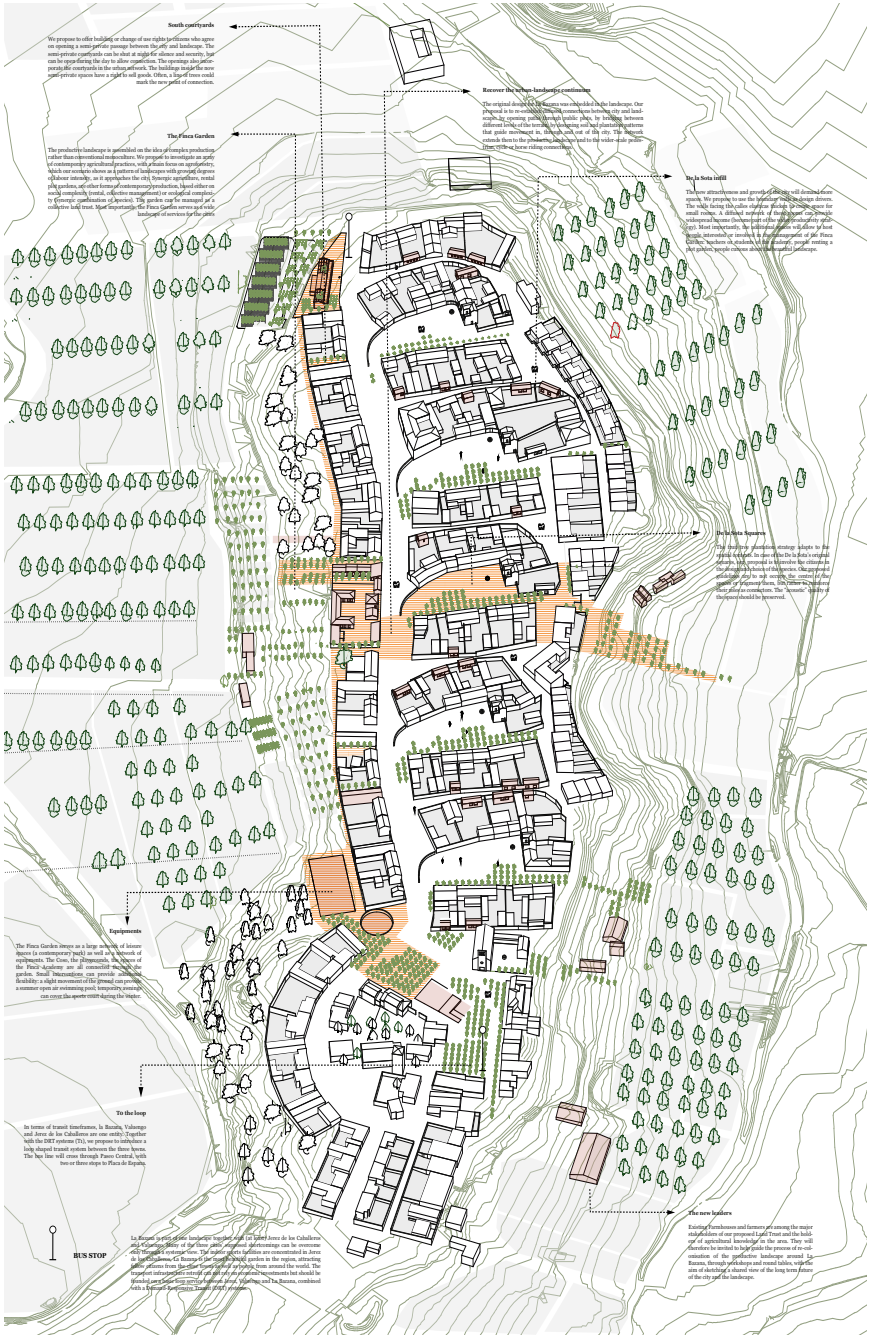
Planted De la Sota Square



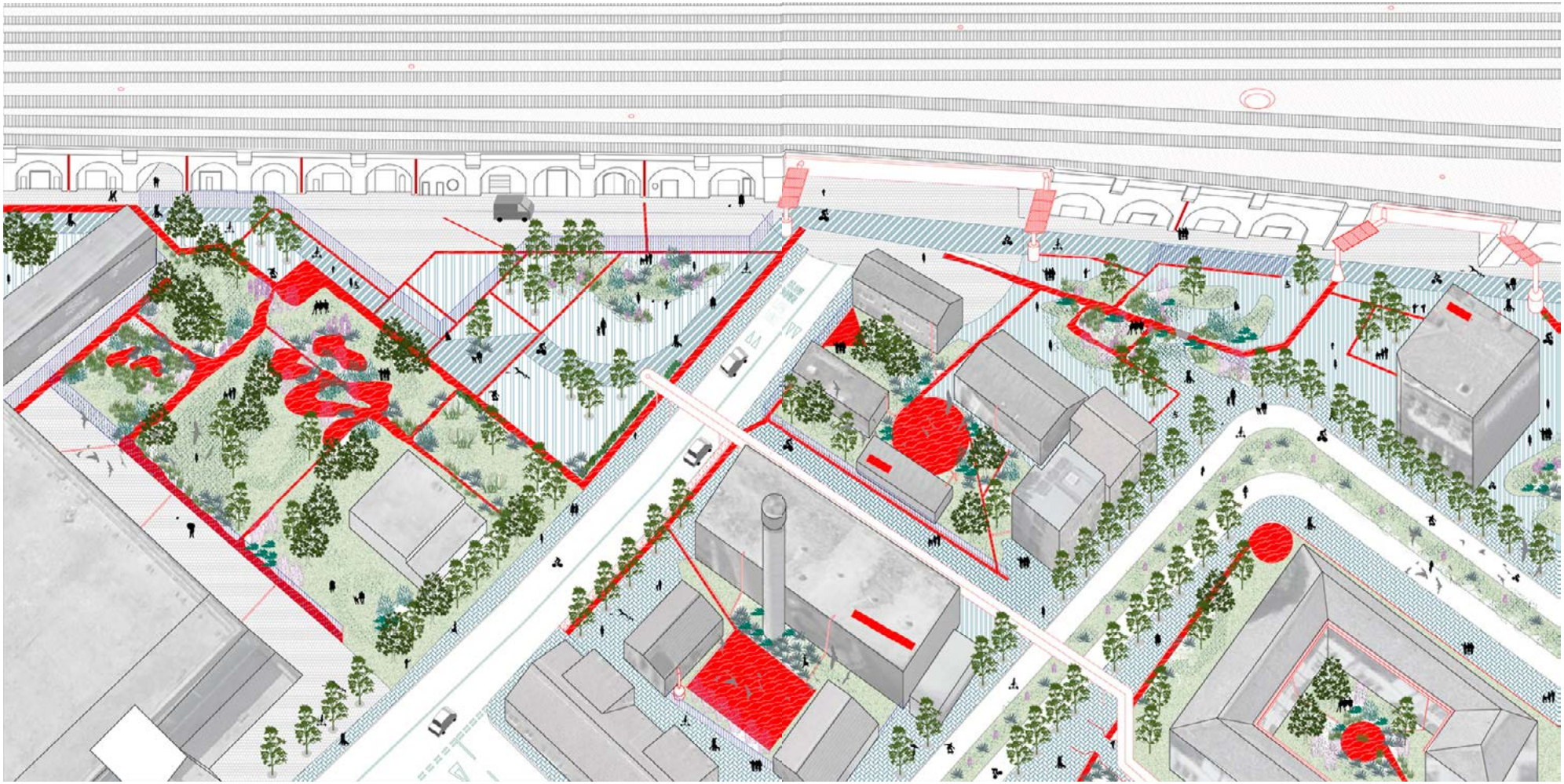
The Garden Laboratories

The new Plaza de Espana

Urban Landscape Continuum



Ecological urbanism



Activism and research

We set aside time for research into topics we care about: spatial justice and climate change are at the top of our list.

#nomoregas

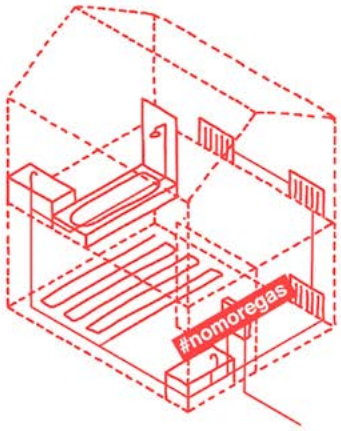
Our Mission

A tool to transition away from gas boilers.

Welcome to our website - an alternative heating information platform created by architects to respond to the energy crisis, the war in Ukraine, and climate change. We've created a free product selector with comprehensive information to ditch traditional gas boilers, and join us in our mission to achieve net-zero carbon emissions as fast as possible.

We encourage you to explore our range of alternative heating solutions for a few minutes. The best bit? They'll save money, reduce hassle, and support a more sustainable future.

This website is entirely self-researched, written and built by Unagru Architecture Urbanism, with the sole aim of doing good: we have no financial interests or ties to any of the products we recommend here. To read more about us nomoregas, please check the About section at the bottom of this page.



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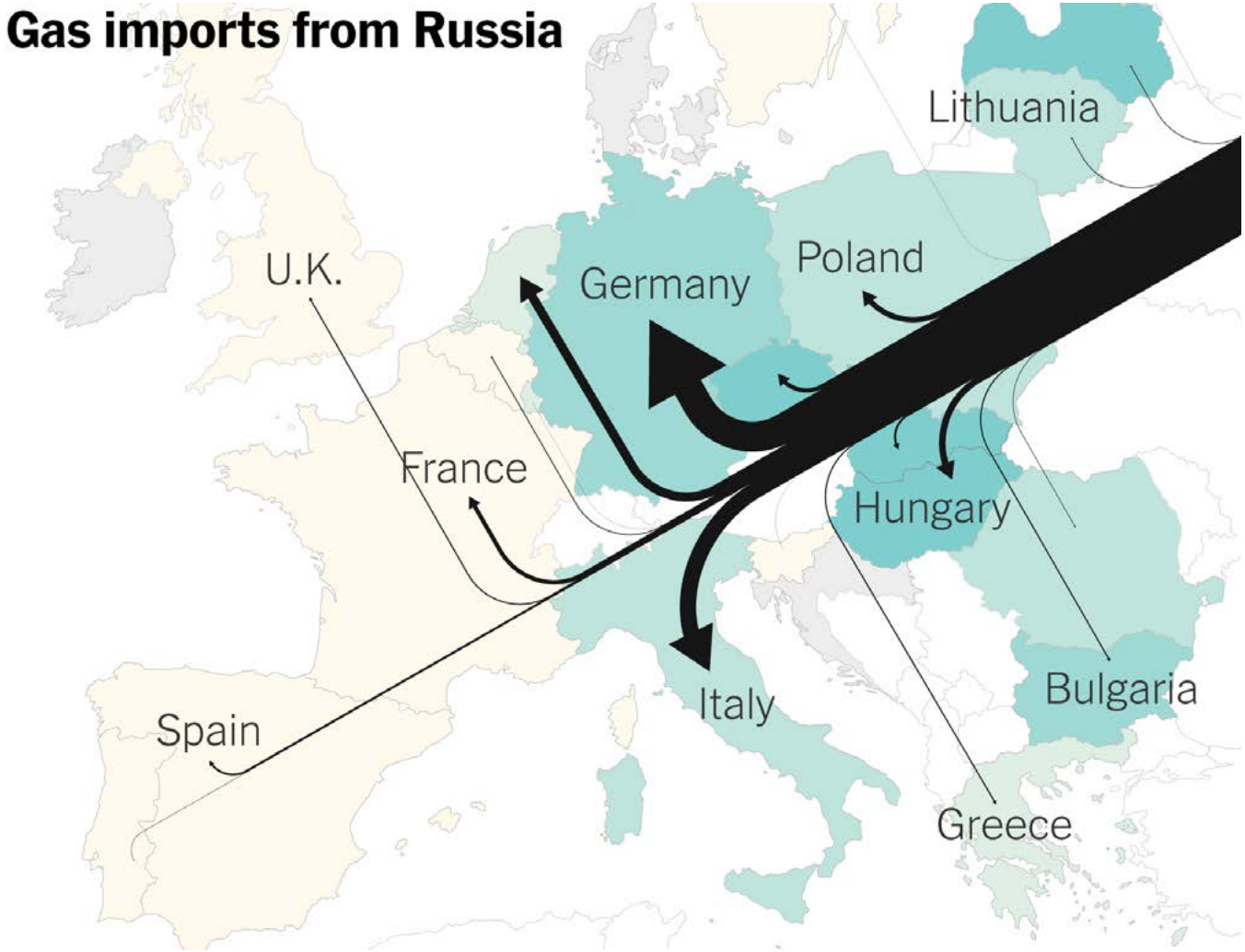
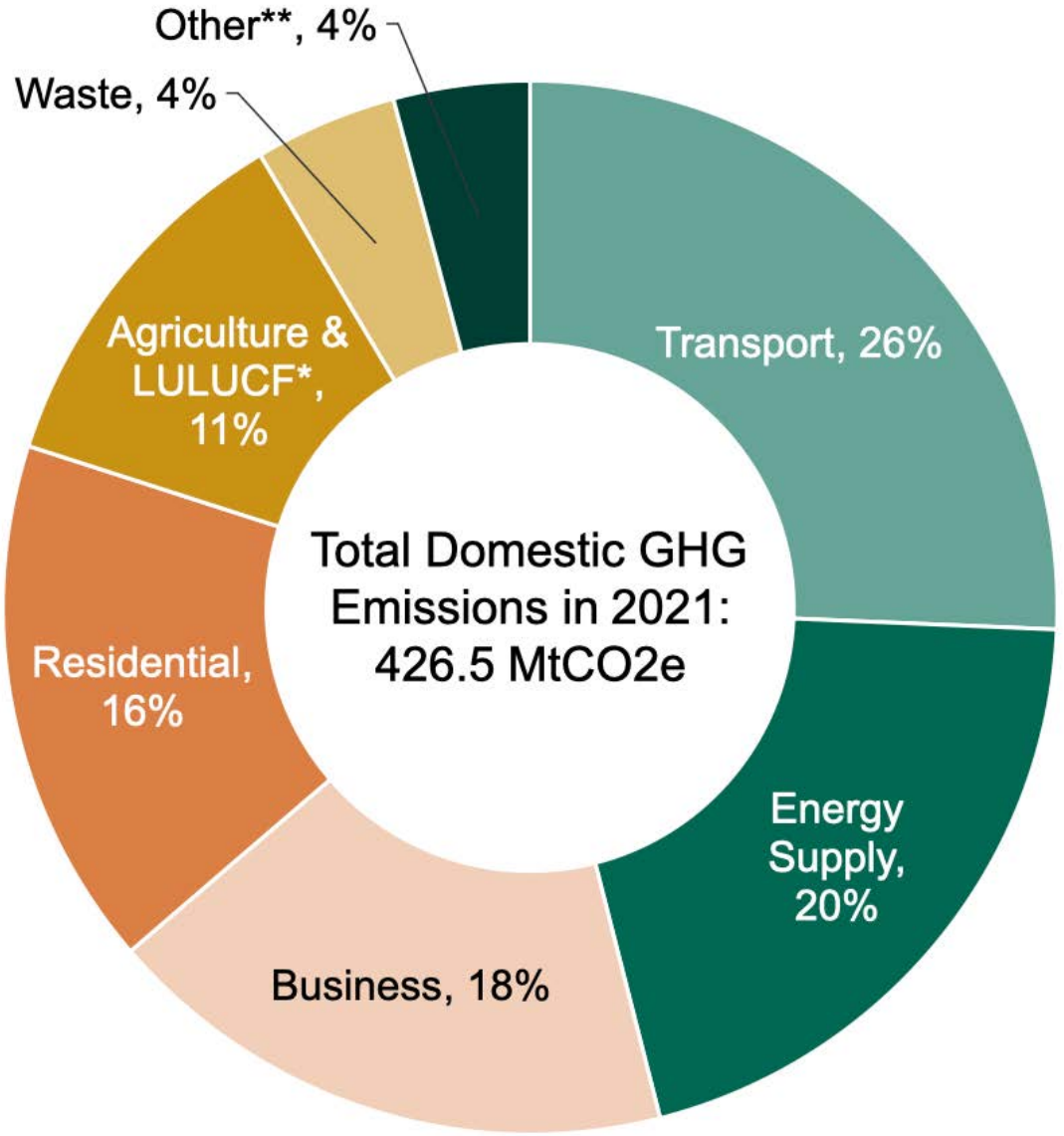
- **nomoregas: intersection of climate and geopolitics**
- **the problem and the changing energy landscape**
- questions
- nomoregas: technologies
- nomoregas: the platform
- nomoregas: energy geographie

Fossil fuels are at the intersection between the climate crisis and geopolitics; contributing to the transition to renewable energy will serve two purposes.



The biggest obstacle to net zero

Today, 95% of UK homes are centrally heated, relying on gas or oil-fired boilers. There are 26 million gas boilers in the UK, each emitting 3.5 tons of CO2 annually on average. The combined 90 million tons is almost double the emissions of all our power plants combined.



The biggest obstacle to net zero

Gas boilers are also dangerous emitters of carbon monoxide, which can be lethal indoors, and Nitrogen Dioxide (NO2), particularly dangerous in cities.

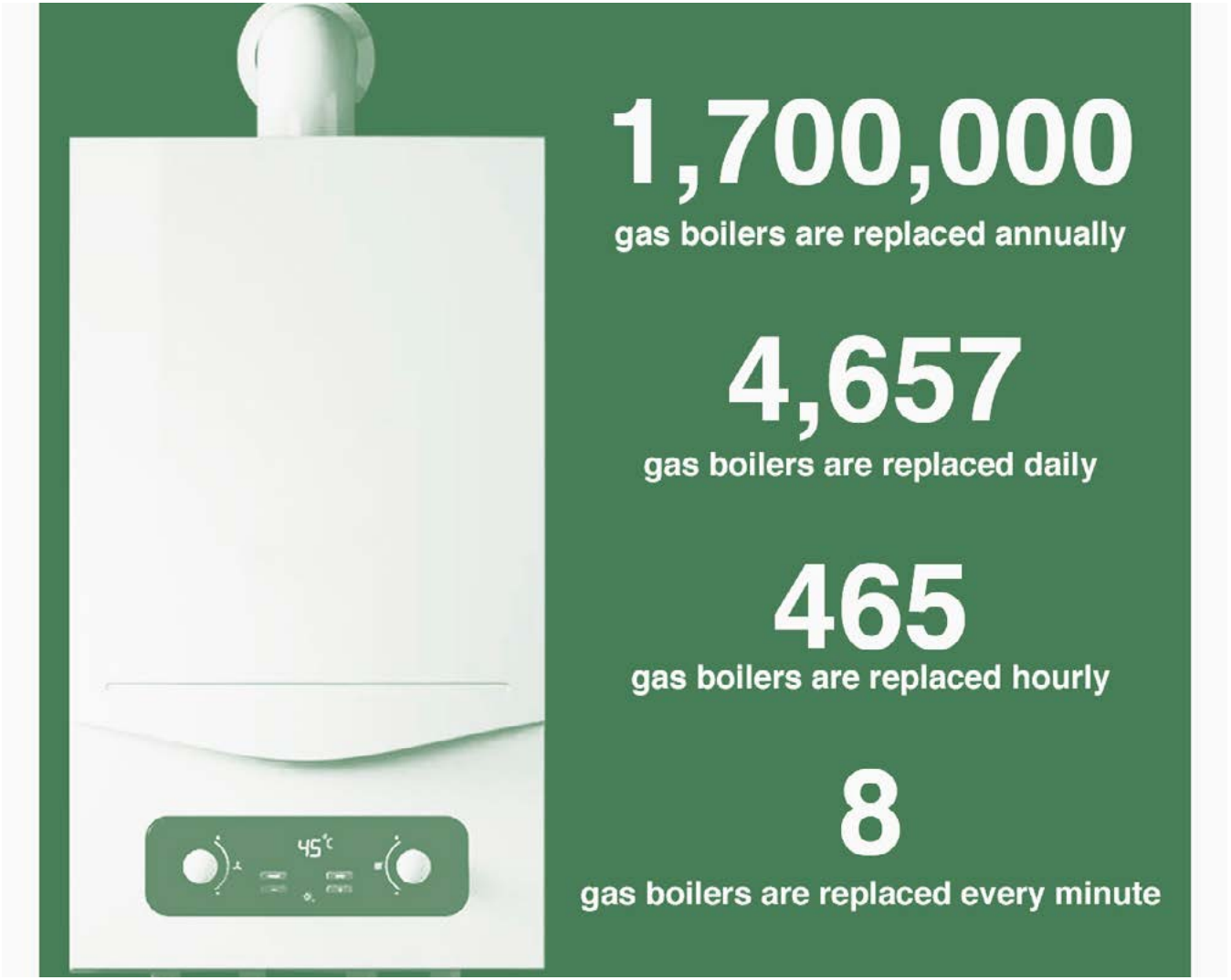
Clearly, we want to get rid of them .

It's not happening.

Boilers are replaced every fifteen years at a pace of 1.7 million annually. Only a fraction of these, about 35,000 was replaced by a heat pump in 2023: less than 2%. It would take five hundred years to complete the transition at this pace.

Is someone doing something?
The government has a target replacement pace of 600,000 per year by 2030- which would still entail decades before the transition is complete. It also banned boilers in new-builds from 2025. But the target for new homes in the UK is 300,000/year or less than a fifth of the boilers replaced.

Will existing boilers stay for ever?



Heat pumps can only be part of the solution.

Heat pumps are the obvious best solution to the heat engine transition,.

Heat pumps require exterior space, a half decent fabric, and money. Often we need larger radiators and so on.
Retrofitting old buildings is particularly invasive, risky and expensive.

Brief:
Not always people have the money, the time and the expertise available to retrofit a heat pump.

The size and income gap

	Type of property	Sq. metres\	EPC	£tCO2 reduced cumulatively 2030	2040 (average by us)	£tCO2 reduced cumulatively 2050	Type of intervention
1	One bed ground floor flat, Lymington Road, Camden	49	C	£ 734	£ 548	£ 362	
2	Two bed mid- floor flat, EPC B: Cavendish House, Barnet	75	B	£ 1,073	£ 798	£ 523	
3	Two bed ground floor flat, EPC C; Sherwin House, Lambeth	53	C	£ 827	£ 607	£ 386	ASHP and Rads
4	Three bed, 2 storey maisonette, EPC D; Northcote Road, Wandsworth	114	D	£ 652	£ 453	£ 254	
5	Two bed mid- terrace house, EPC C, **Electric heating**; Aldenham Drive, Hillingdon	60	C	£ (73)	£ (305)	£ (537)	ASHP and Rads
6	Four bed mid terrace house, EPC C; Surrey Road, Southwark	93	C	£ 510	£ 418	£ 325	
7	4 bed detached house; EPC D; Mowbray Road, Croydon	133	D	£ 269	£ 218	£ 167	ASHP no rads
8	3 bed mid- terraced house, EPC E; Albany Road, Newham	94	E	£ 373	£ 281	£ 189	ASHP & Rads
9	Five bed mid terraced house, EPC E; Tradescant Road, Lambeth	142	E	£ 500	£ 333	£ 166	
10	Communally heated flats, Ernest Dence Estate, Greenwich	5700	C-E	£ 282	£ 230	£ 178	ASHP

But the combination of fabric upgrade and heat pumps doesn't make economic sense in small leaky buildings.

There is still a large gap in the market and policies, or a large opportunity for decarbonsation.

The Carbon Trust and GLA
Heat Pump Retrofit London 2020

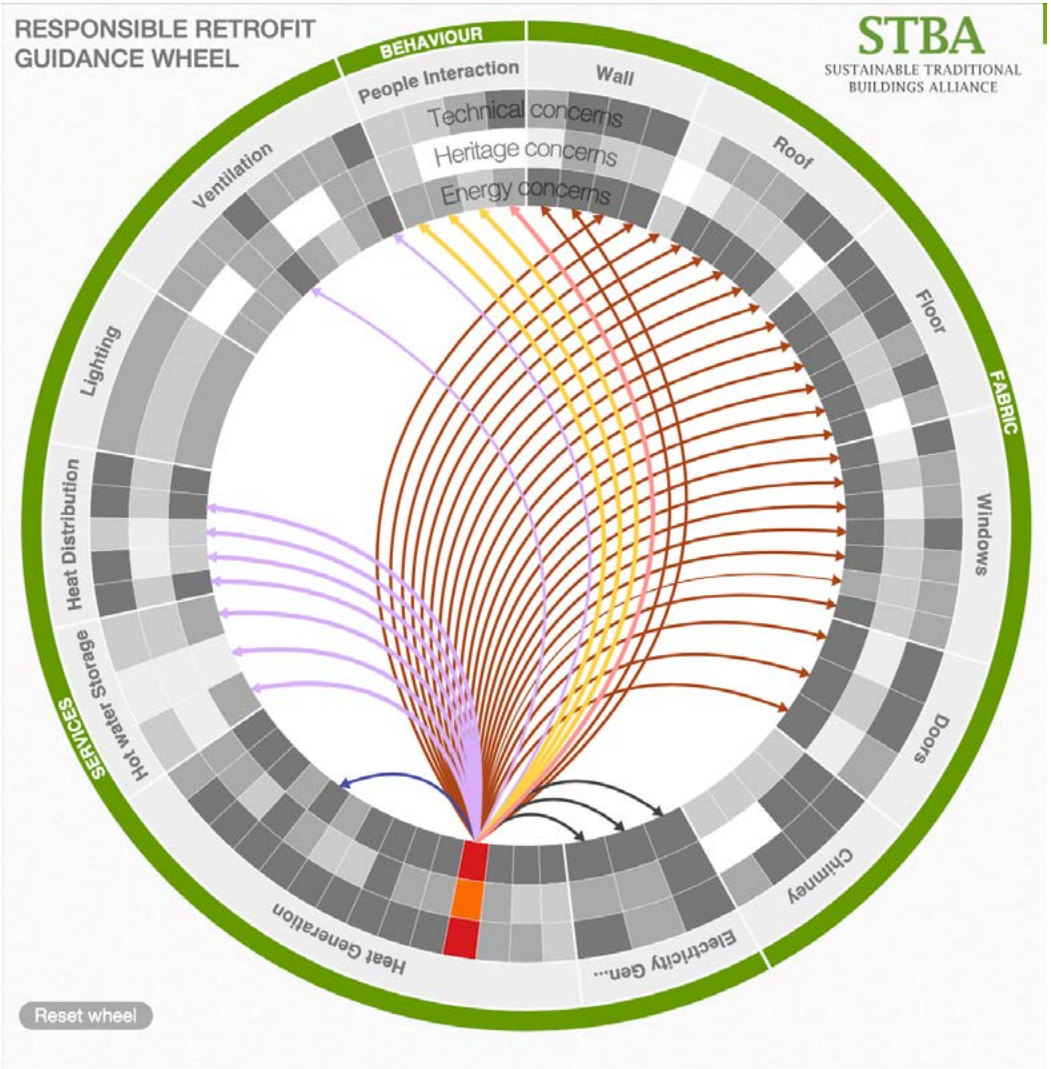
Fabric first vs CO2 first

Scientific orthodoxy on sustainable buildings prescribes focusing on the building's fabric.
But there are two problems:

The first is complexity. Retrofitting old buildings is risky and expensive. Retrofitting can be wasteful and carbon-intensive.

The second is scale of replacement required and the opportunity of replacing a boiler every 8 minutes. Given the complexity and costs of retrofit, we should decouple all other interventions from deep retrofits. Remember 1.7 million!

Retrofit will come in time, but a boiler replacement is an opportunity we should not miss (ideally combined with a light retrofit, easy wins).



STBA

Fabric first vs CO2 first

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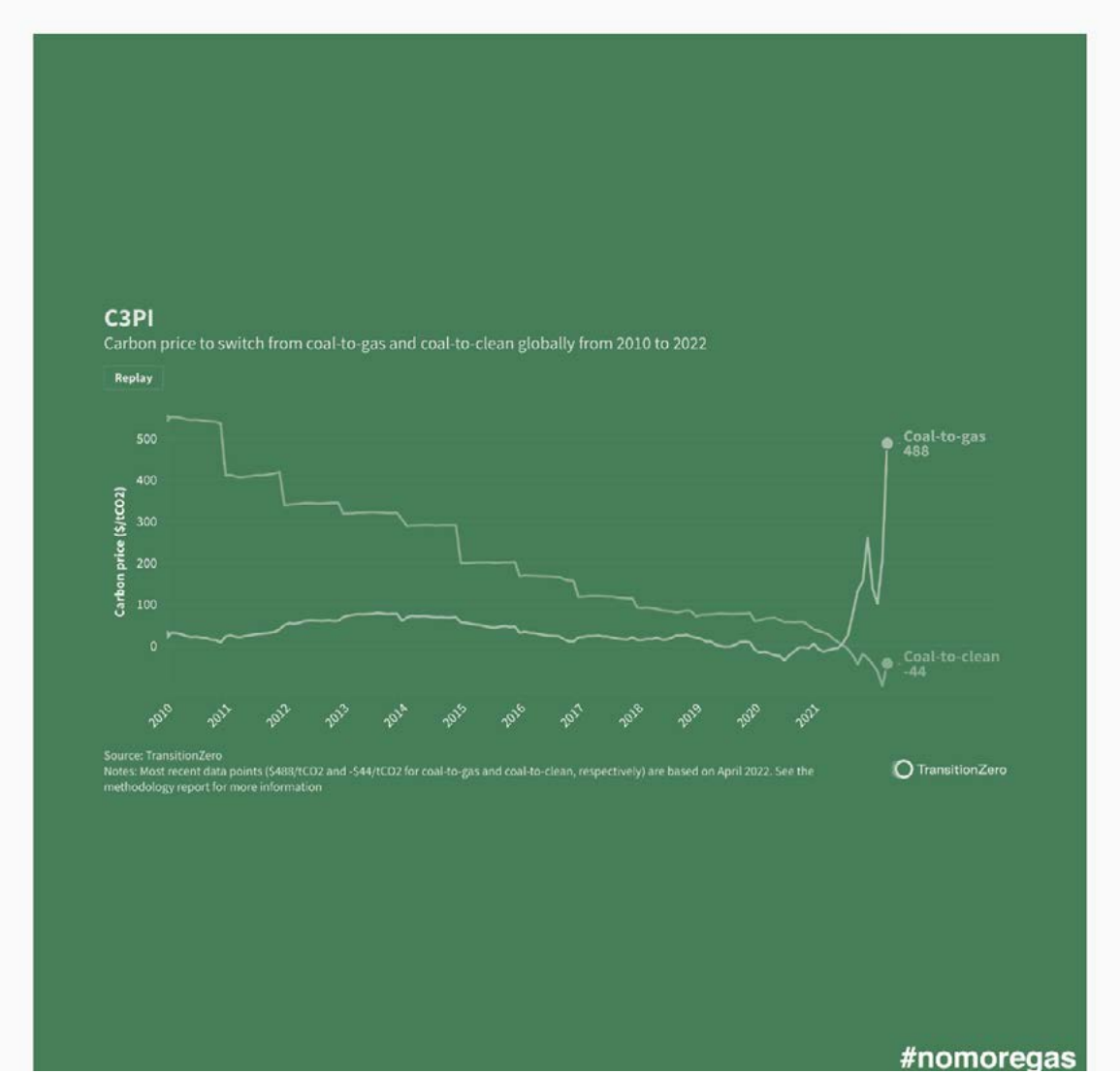
The first is complexity. Retrofitting old buildings is risky and expensive. Retrofitting can be wasteful and carbon-intensive.

Preston large scale retrofit: external insulation should be easy..

Energy prices

Two arguments in favour of gas boilers: costs and efficiency.

The first is contestable in many ways. Firstly, we know pricesa re volatile. Secondly, the cost of electricity is regulated and tied to that of gas. It is likely in the coming years, as electricity production becomes locally more abundant, that the

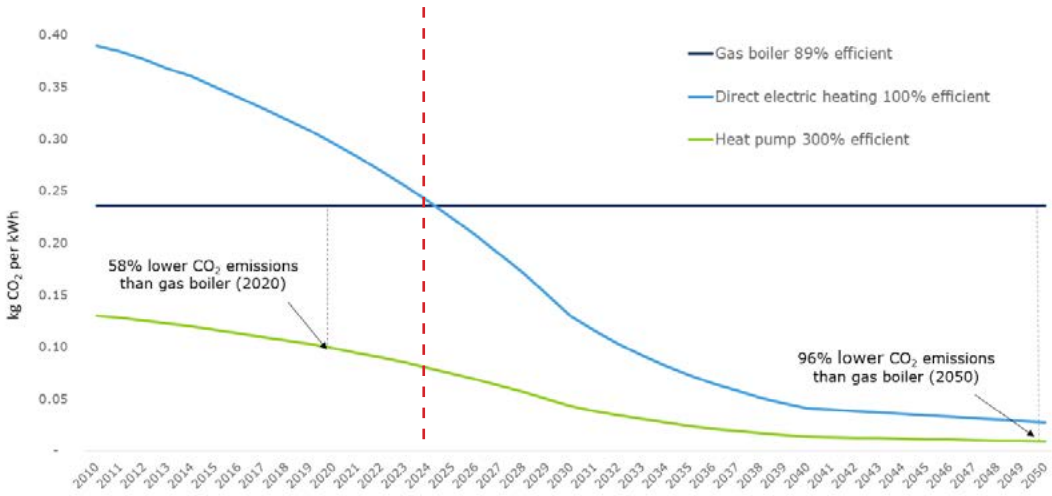


The decarbonisation of the grid

The definition of efficiency is changing.

A study from the Carbon Trust projecting the carbon intensity of the UK's energy grid in time shows how even traditional (supposedly wasteful) direct electric heating will emit less carbon than gas boilers from 2025. If we sum these emissions over fifteen years, direct electric heating would already save carbon dioxide. Secondly, direct electric heating is not the only solution: many smarter, more efficient options today further reduce the cost and carbon intensity of electric heating.

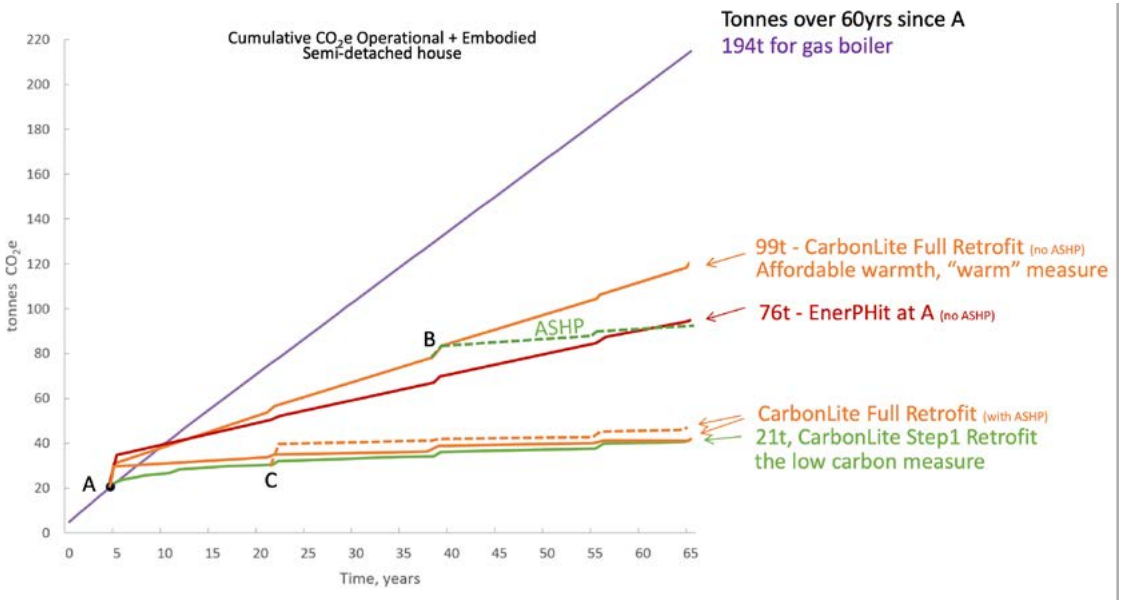
Figure 2: Carbon intensity of gas boilers and heat pumps[4] at different efficiencies: 2010-2050[5]



Orthodoxy challenged

AECB's CarbonLite Retrofit Approach: A New Benchmark for Sustainability

The CarbonLite Retrofit (CLR) standards offer a practical framework for reducing energy use in existing buildings. The AECB's CLR approach emphasises improving the building's fabric with affordable measures that ensure substantial energy savings and improved thermal comfort. This down-to-earth approach is scalable and accessible, making it suitable for a wide range of buildings and budgets.

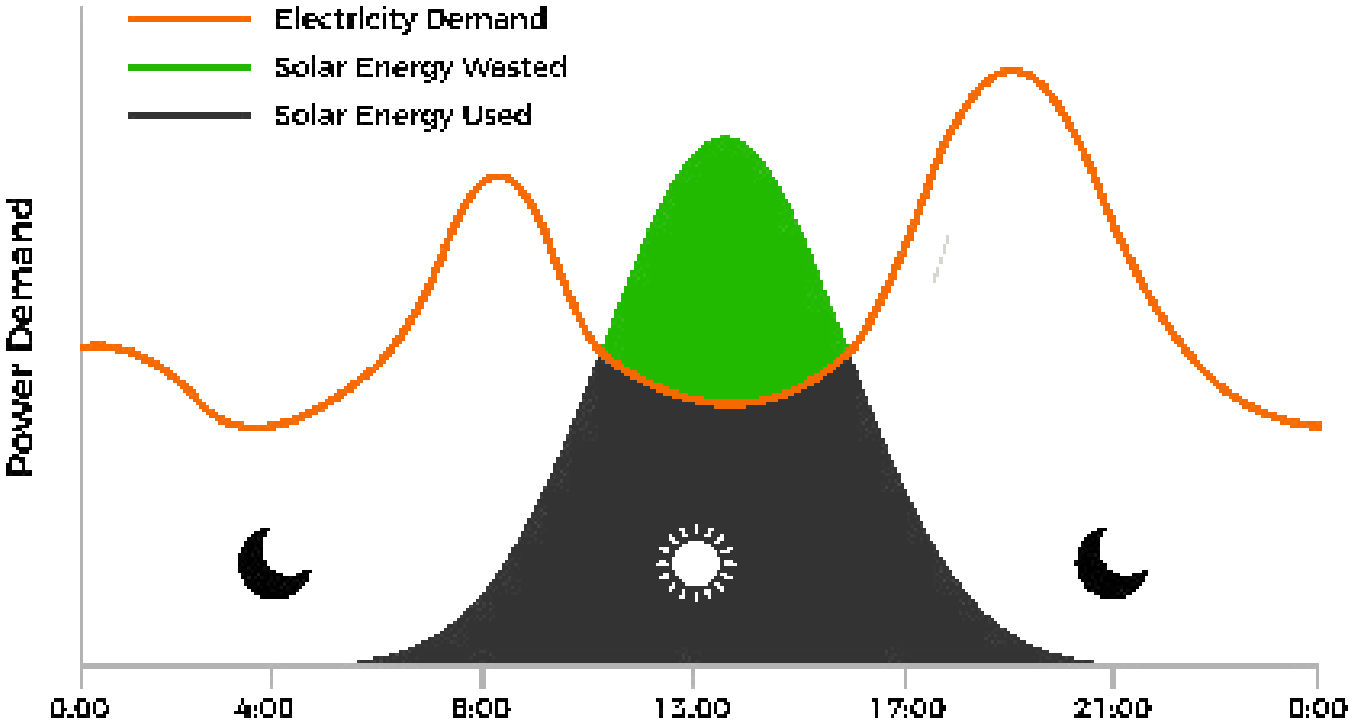


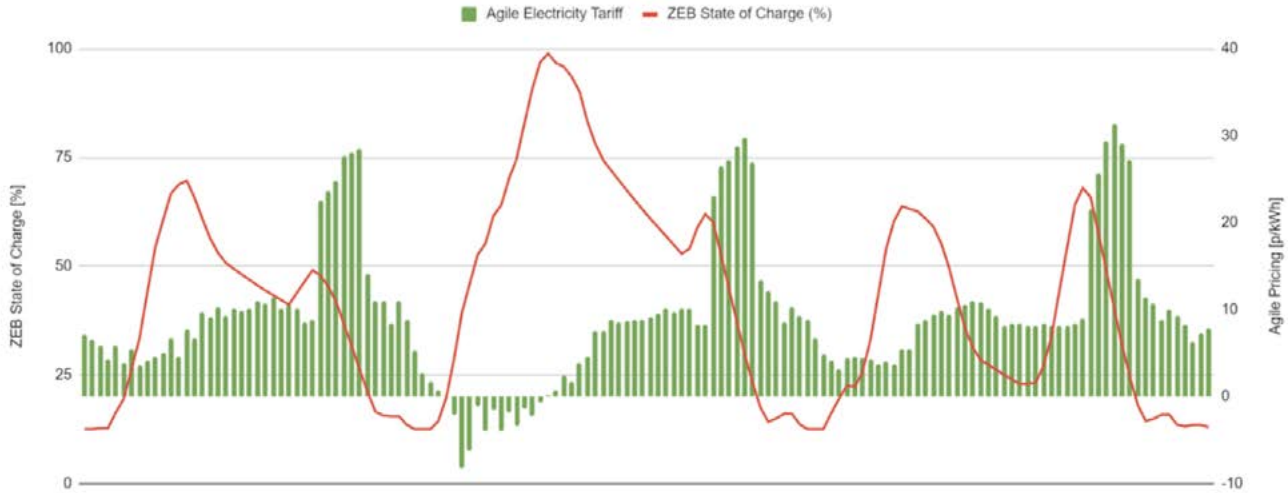
The decarbonisation of the grid

More reliance on renewables also means oscillations in demand and output need to be equalised through storage.

The main bottleneck for the transition to sustainable energy is battery storage. Intermittance and Dunkelflaute.

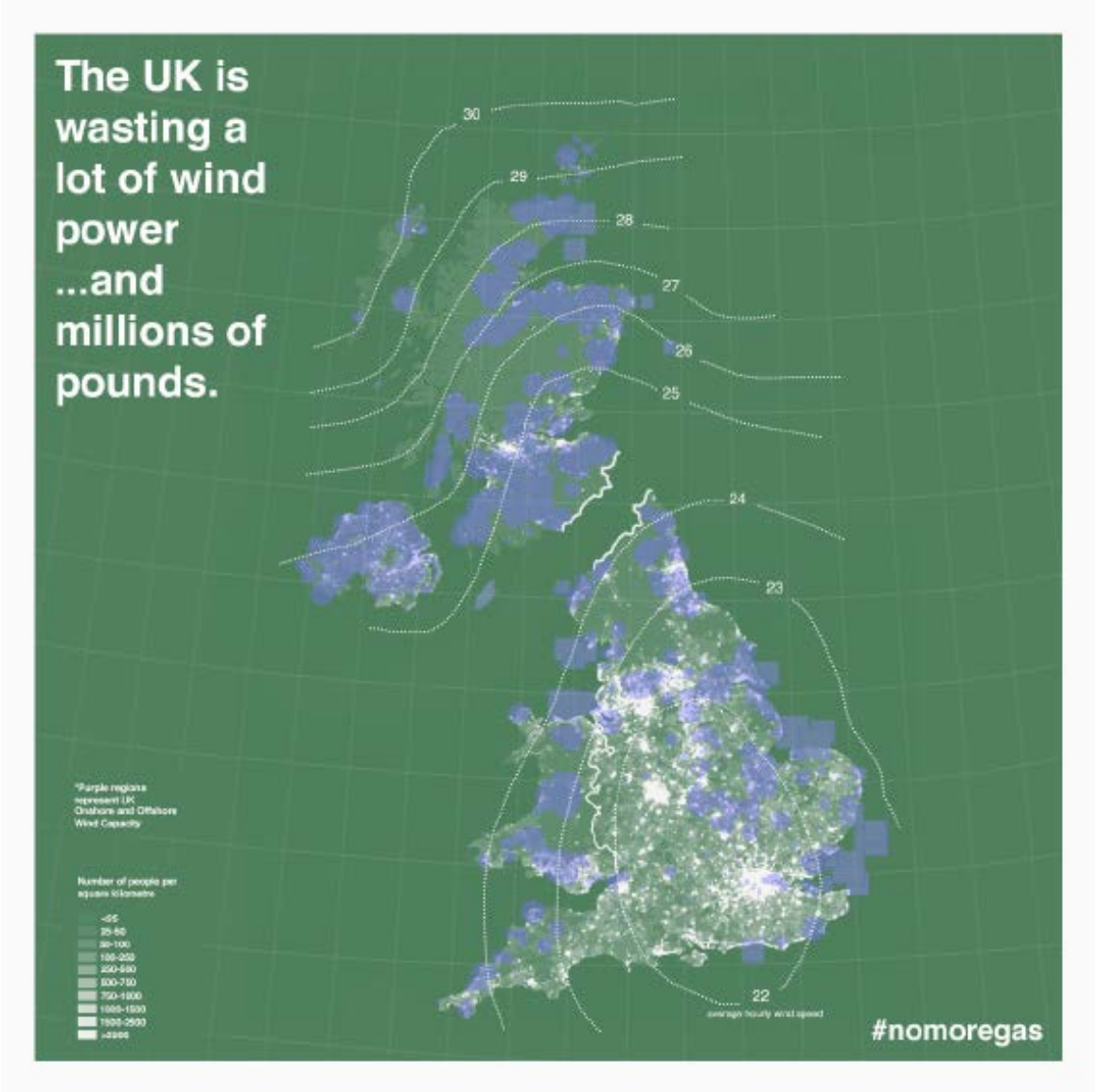
The availability of energy vs demand also affects prices.





Curtailment

The lack of connection between Northern and Southern electric grids. Energy-rich areas (purple) are separated from density inhabited and energy-hungry areas (white).



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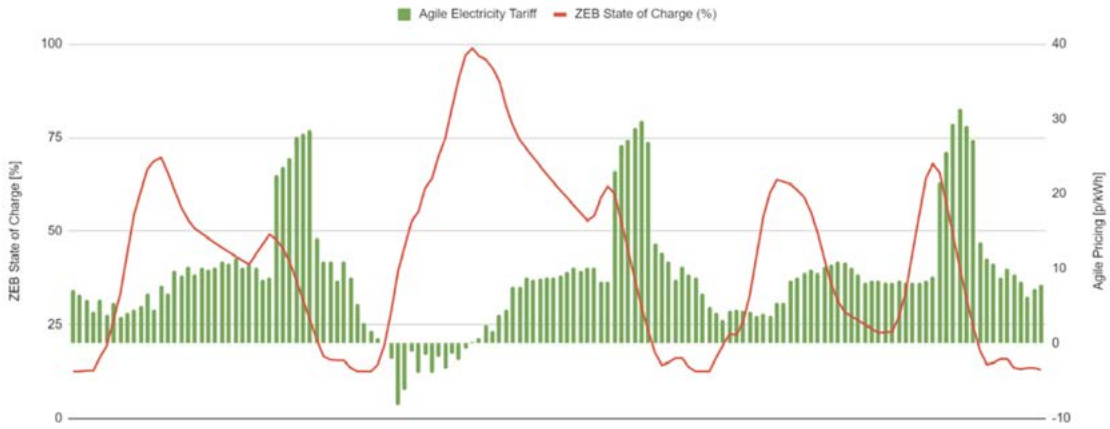
- **Questions?**
- **Part 2:**
- nomoregas: technologies
- nomoregas: the platform
- nomoregas: energy geographies
- future

Nomoregas technologies:
Heat batteries

This heat battery manufactured in the UK by Tepeo has a ceramic core that can be heated up to 800 C and maintains its temperature for several hours. It is a large, heavy box, the size of a washing machine, and it weighs 350kg, but once the access and weight hurdles are solved, it can be installed anywhere by most plumbers, and it doesn't need a flue.

Zeb has an internet connection, drawings real-time information about the grid and live weather data and combines the information with the historical use of the house to take advantage of the best electricity prices throughout the day and night.



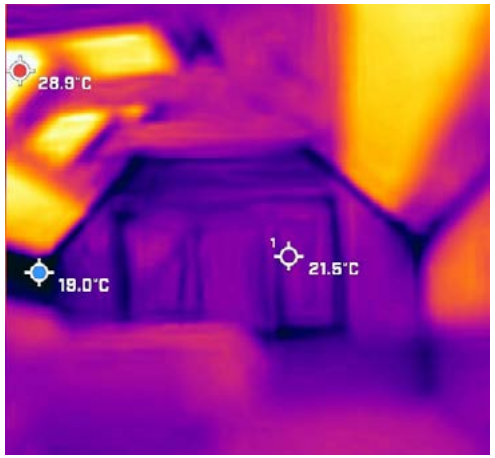
Nomoregas technologies:
Heat batteries

Mixergy is a hot water cylinder with a couple of twists.

Firstly, it heats the water from the top. Hot water stays on top, so it doesn't mix with the cold water at the bottom and stays consistently warm. This means that the heater can calibrate the hot water required and only heat that much. Second, it is smart: the tank learns your habits to be as efficient as possible. It will typically build up a reserve at night when electricity is cheapest and only reheat what you need (if you still need some) during the day.

Nomoregas technologies:
Infrared panels

Infrared heating is different compared to the air heating we are used to. Radiators heat the air, and underfloor heating heats the floor, which heats the air; infrared heating is more akin to the winter pub heaters (without the light): you feel the heat on you, and the waves heat the objects around you. The outcome is potentially more efficient than ambient heating because it is less susceptible to loss from air movement (a draughty window, opening the entrance door, or just doors between different rooms).



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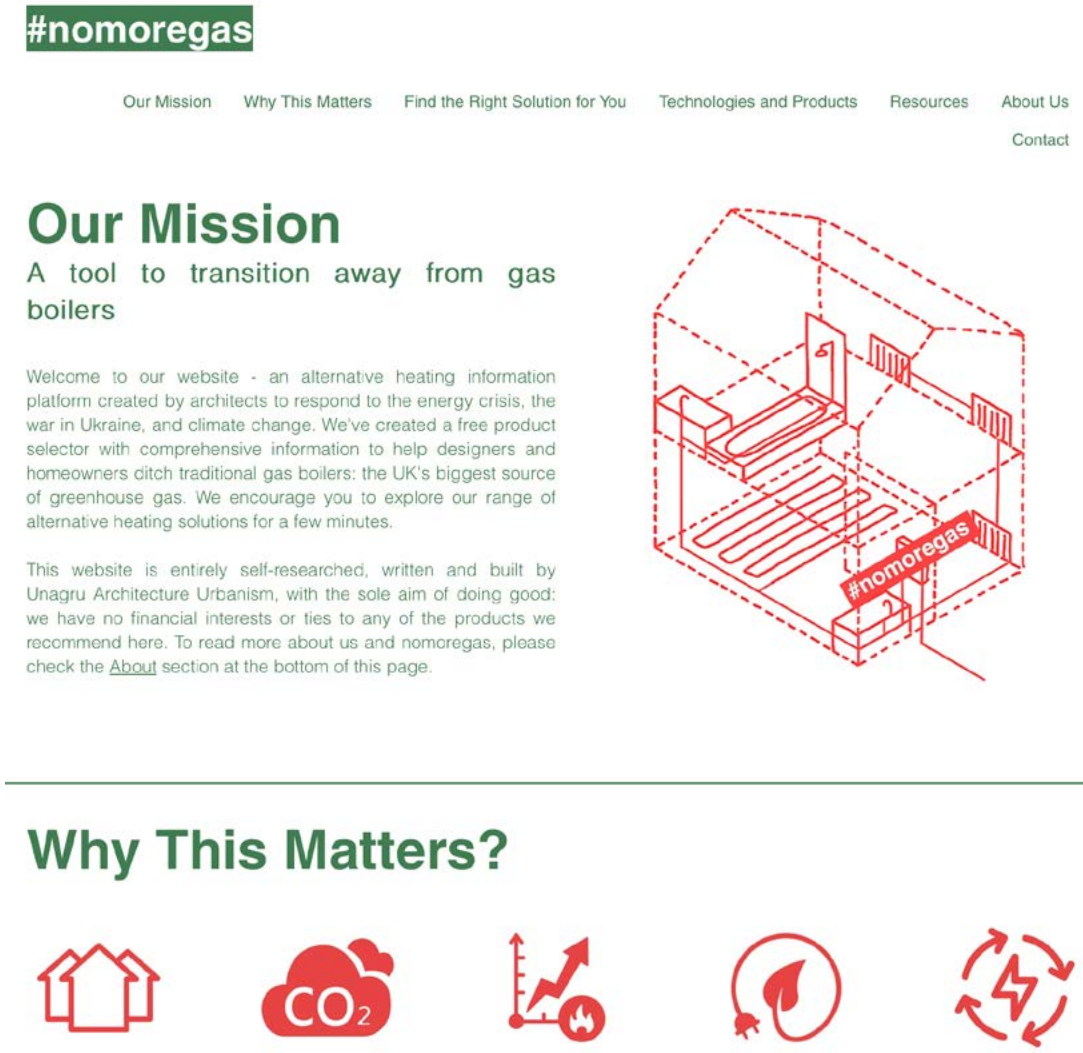
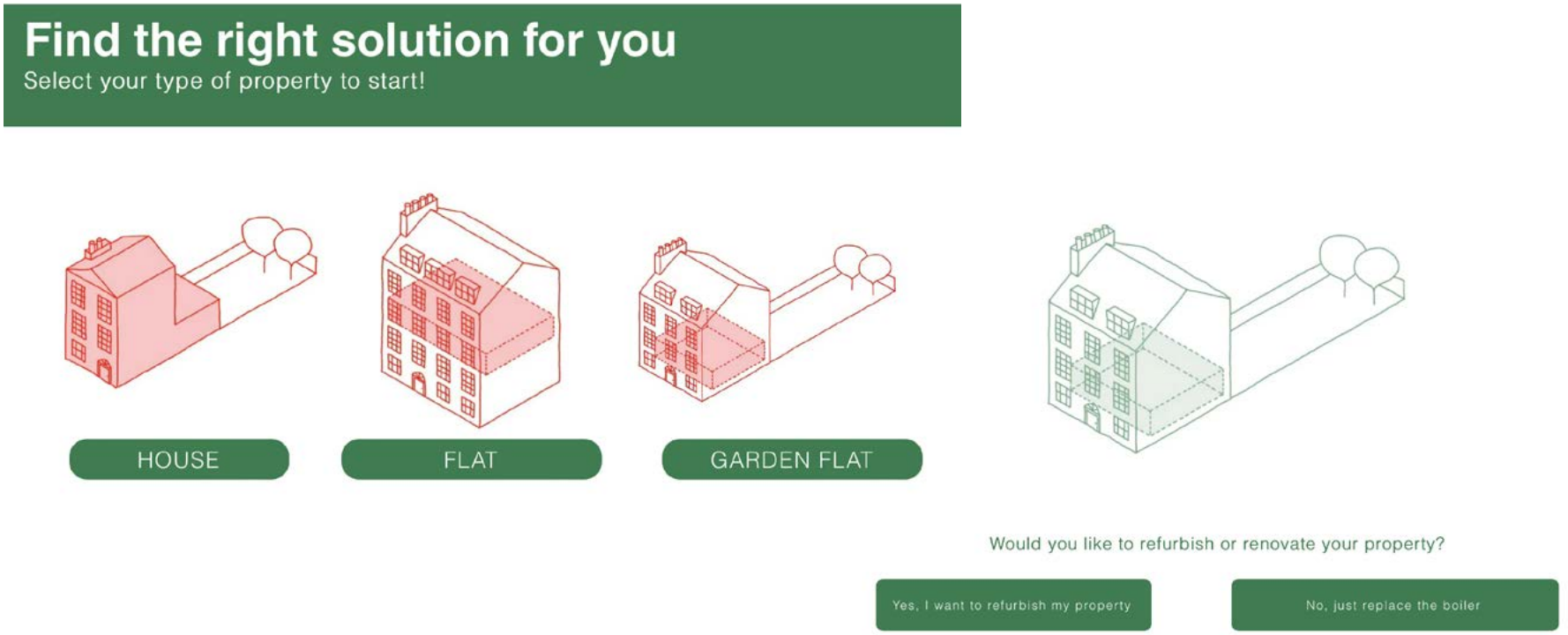
- **nomoregas: the platform**
- nomoregas: energy geographies

An information platform

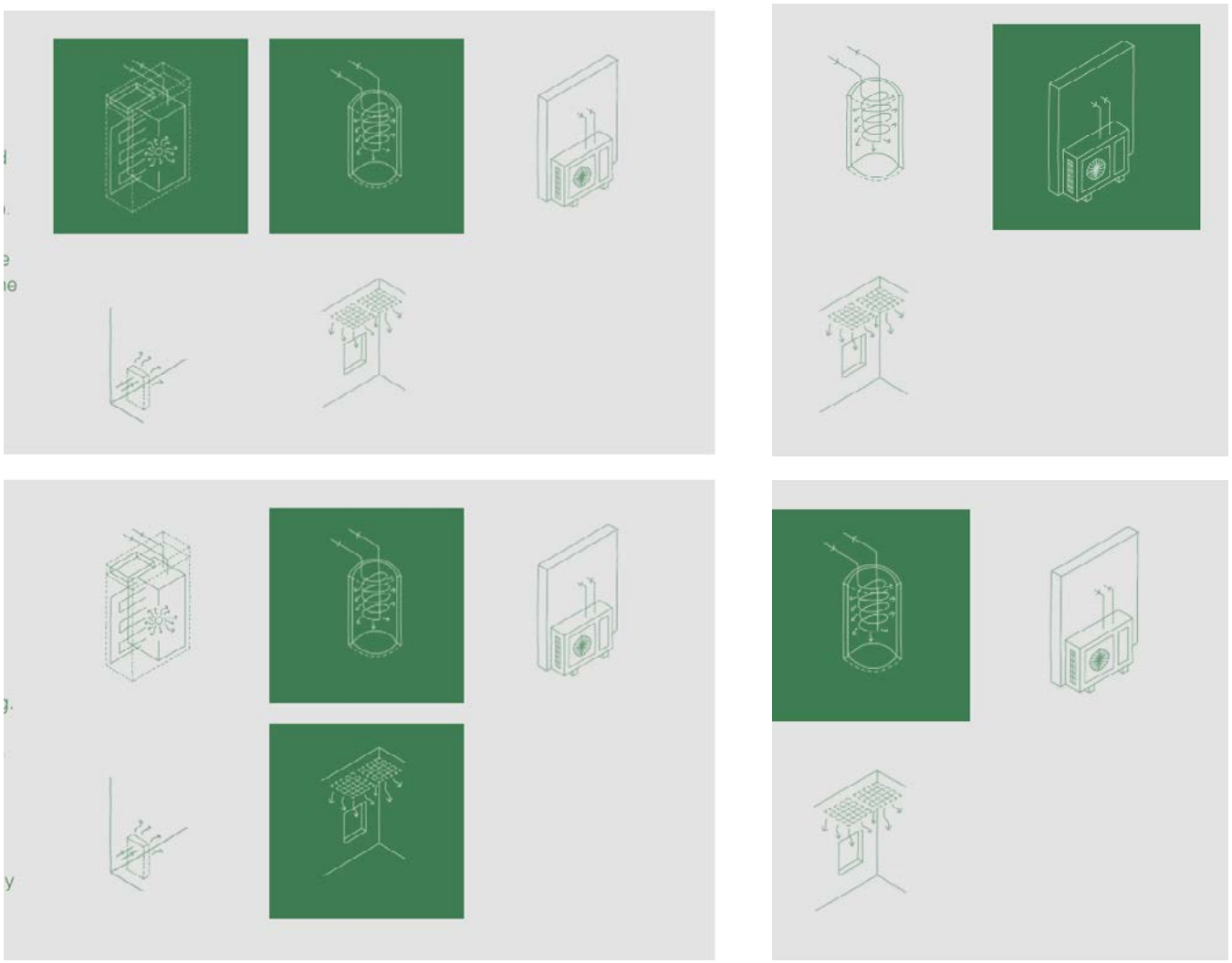


A simple tool for desigers and homeowners



Several possible combinations

A tool to navigate among several solutions and combinations.



A simple tool for desigers and homeowners

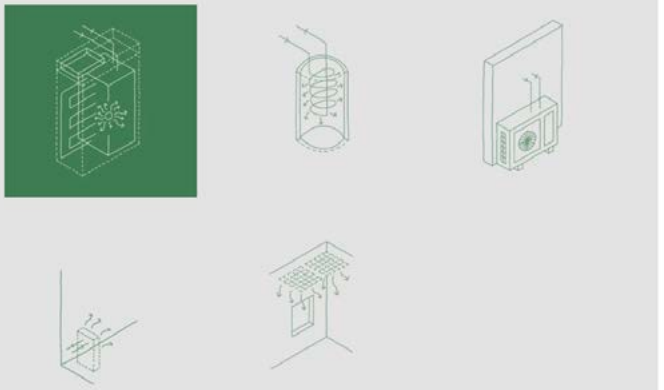
Flats: 90-140 square metres
Just replace the boiler

"A boiler needs replacing", was the condition we originally set out to investigate and solve. Small flats without gardens or terraces that are not planned to be refurbished will be the most important category that will make or break our transition away from gas, one boiler at a time. For this to happen, we need cost-effective and unintrusive solutions.

Option 1

Install a heat battery boiler, like the Tepeo ZEB, to supply hot water and heating. You remove the existing boiler and plug in this new one.
90 to 140 square metre flats should be just within the ZEB's energy capacity. If your property is not well insulated you should look at Option 2 below.

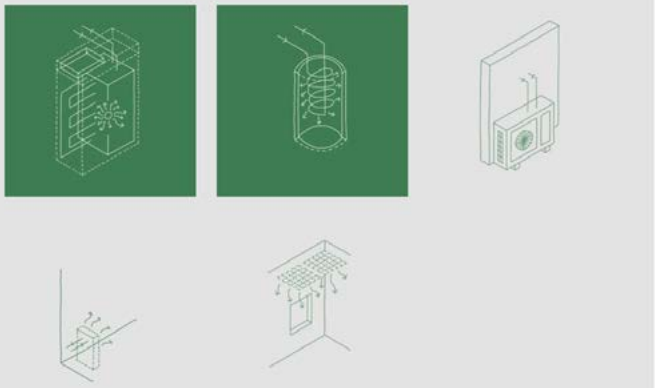
Approximate cost: £6000 installed



Option 2

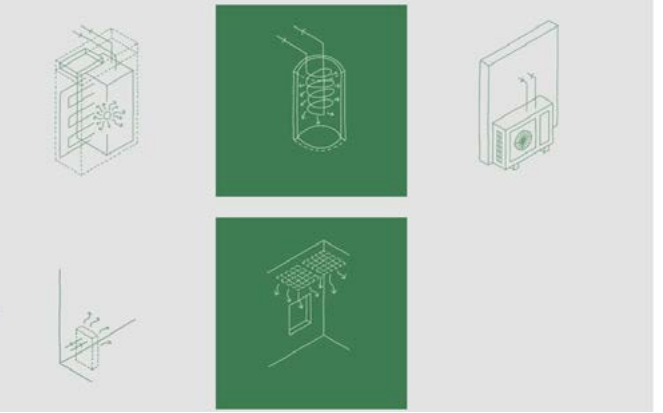
Install a *heat battery boiler* and a smart hot water cylinder to supply hot water and heating.

The addition of the smart water cylinder gives you more power output because the hot water is managed by a new machine, leaving the smart heat battery to deal only with heating. Option 2 also allows more flexibility of use and ultimately reduces your bills because you are almost guaranteed to charge only at night.



Option 3

Avoid heat batteries by combining Infrared panels for heating and a smart hot water cylinder.
The infrared panels will be visible and typically installed on the ceiling. The installation entails some construction work: you may want to remove the radiators, and you will need to run cables to the infrared panels. On the other hand, infrared heating usually will not require upgrading the electric power supply to three-phase and does not have space or weight constraints.



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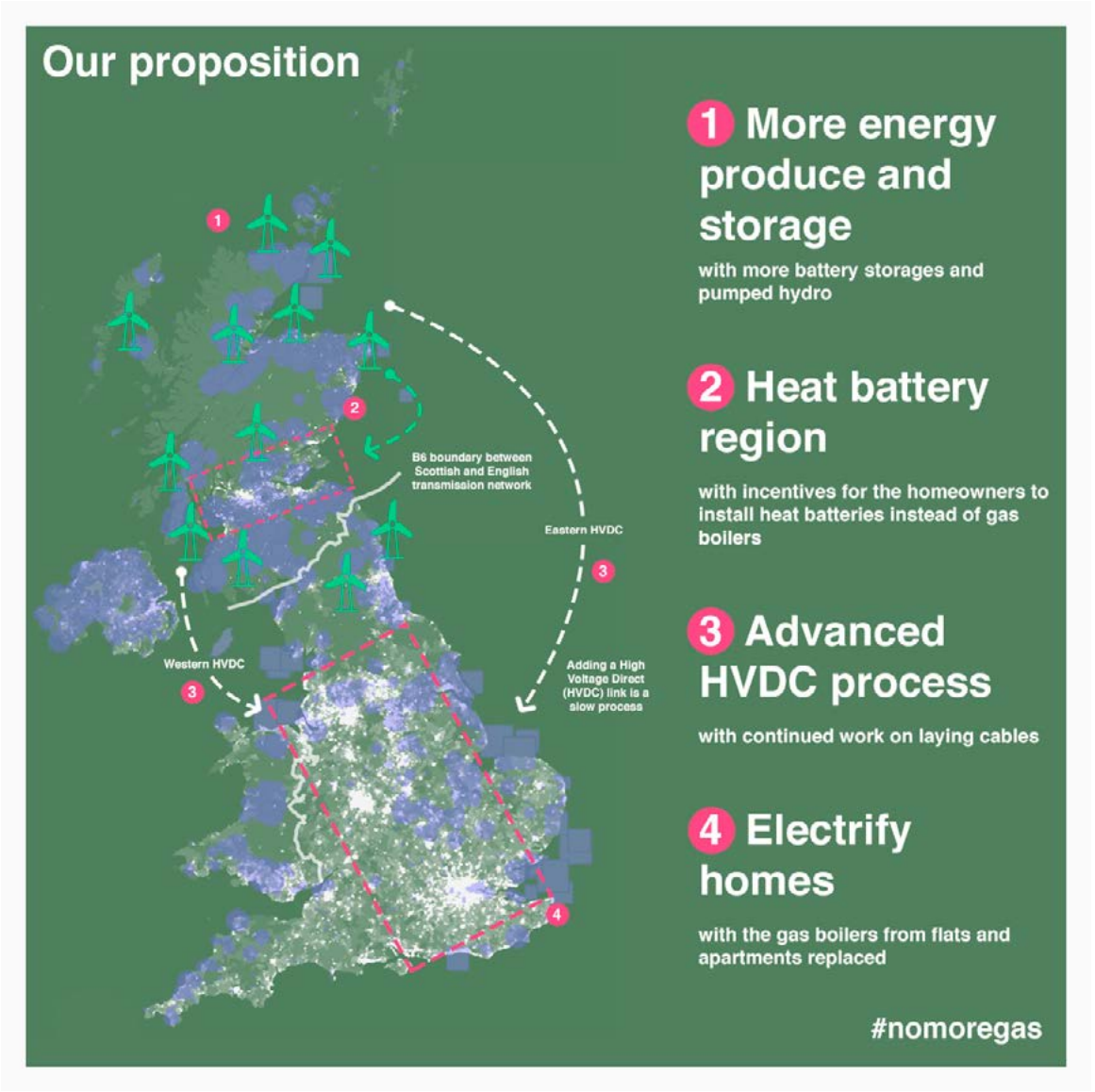
- Energy and policy geographies

Energy geographies

We have known for decades now that the future energy mix will be based on renewables, and the key to a sustainable future is the electric grid. Buckminster Fuller proposed a global electric grid in the 1930s and worked on the project for several decades. Since the early 2000s, OMA - Office for Metropolitan Architecture - has been developing scenarios for the European electric grid, where the Mediterranean countries supply solar energy and the Northern countries wind. The latest rendition of this idea is Eneuropa, again by AMO (the research arm of OMA), with McKinsey, Imperial College London, energy consultancy KEMA and analyst Oxford Economics. On the right is a portion of the map, where the UK spans between the Isles of Wind and the Tidal States. The most important and costly investment to implement this plan is a new long-range and powerful electric grid.

Geographies of policy

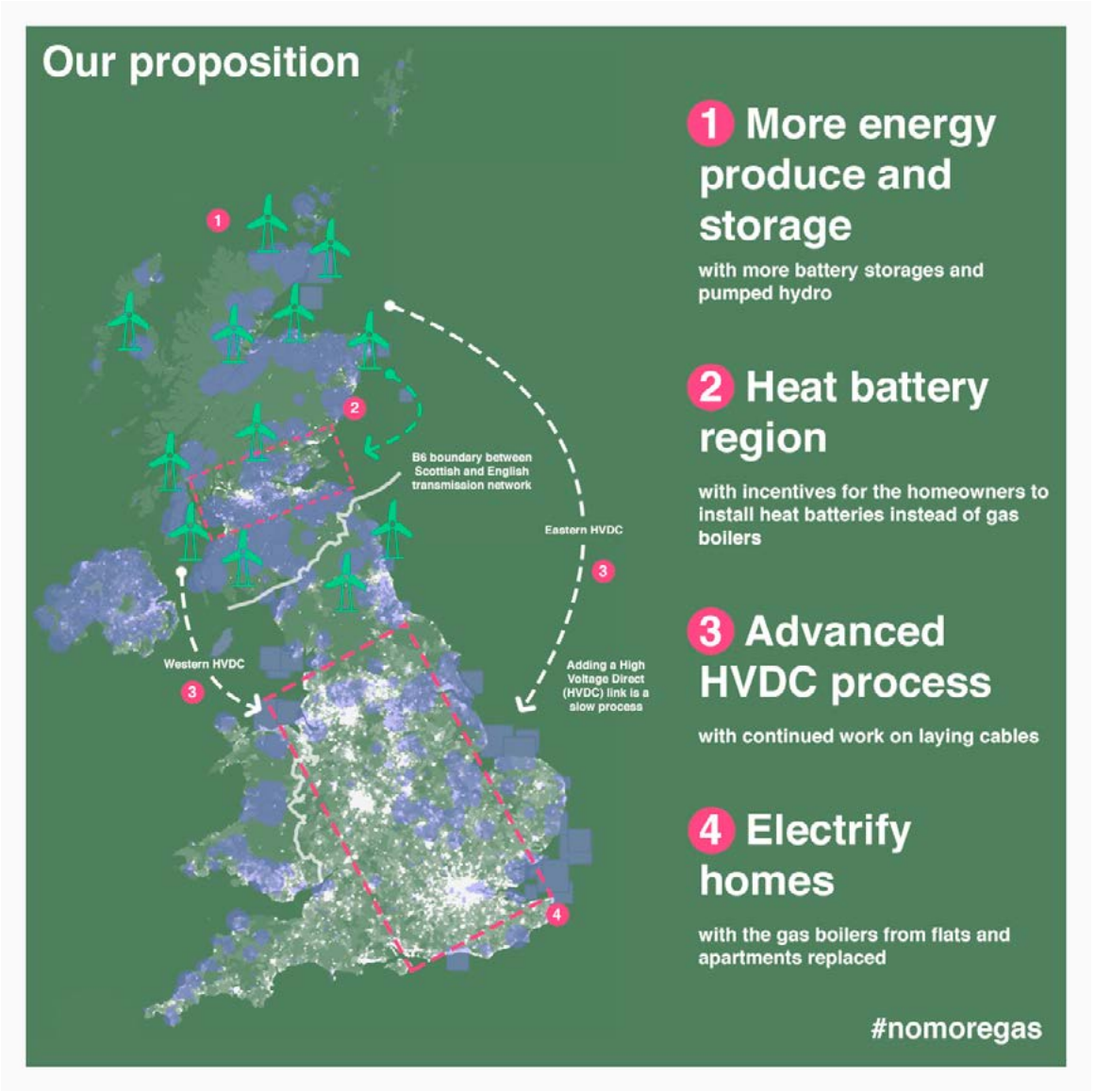
Energy geoagraphies could become policy geographies. Adding new technologies to available mix for office and residential heat engines opens the way for regional incentives. Energy hungry areas in the North could receive the most incentives to install heat batteries and avoid curtailment. Curtailment costs close to £1 billion a year. That same money could be invested in heat batteries given away almost for free!
In the South, instead, priority should be given to efficiency.



Geographies of policy

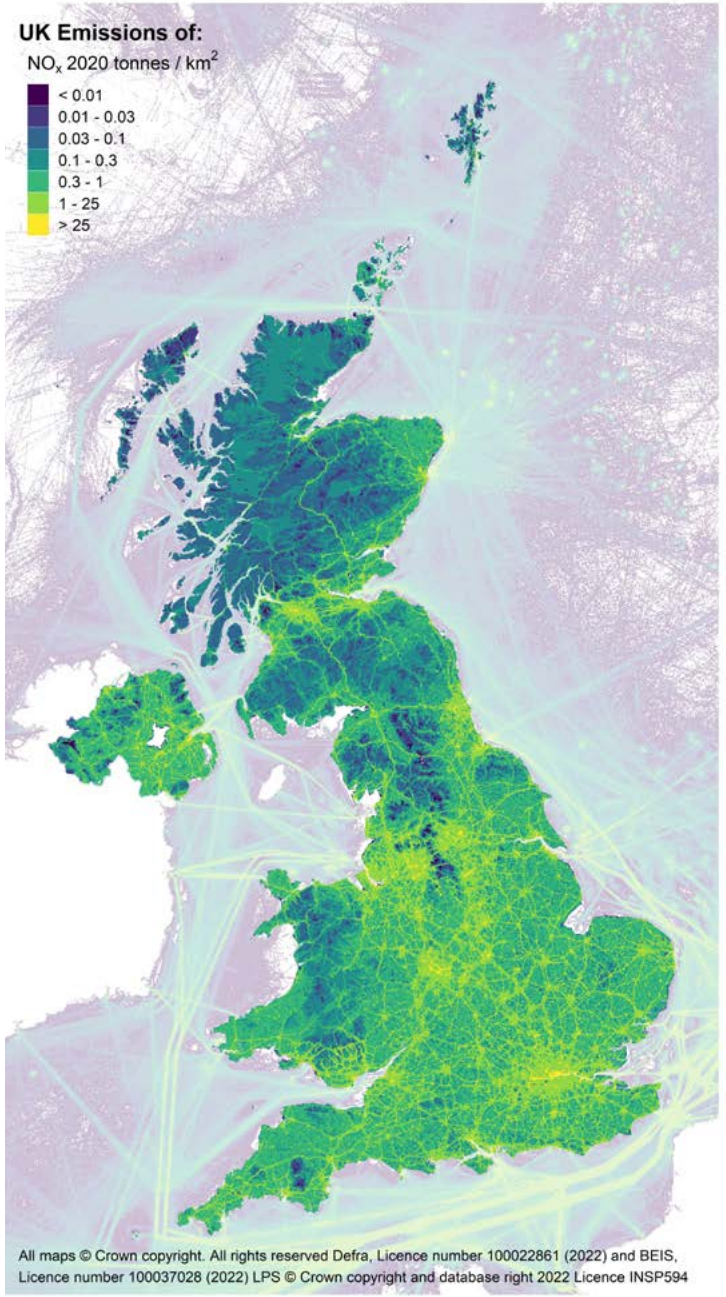
Incentivise heat batteries North of the grid divide. Assist lower income households with upfront costs and energy bills after the transition.

Incentivise (more) efficiency and electrification in densely populated areas.



Geographies of policy

A different geography is that of air pollution. Based on this map, further inventives could go to highly polluted areas where the electrification of heat engines would benefit both the climate and people's health.



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- **Next steps**

next steps

- find research partners
- increase the website’s visibility
- research funding
- design competition and exhibition
- suggestions?

Thank you