



Regional Net Zero energy workshop

University of Sussex Energy Group, Energy
Demand Research Centre and Greater Brighton
Economic Board

Workshop outline

09:35 - 09:40 Welcome

Cllr. Dr Beccy Cooper, Chair, Greater Brighton Economic Board, Leader of Worthing BC

09:40 - 09:50 Net Zero challenges and opportunities at a regional level

Prof. Tim Foxon, University of Sussex

09:50 - 10:05 Accelerating local net zero projects

John Taylor, Greater South East Net Zero Hub

10:05 - 10:15 Ensuring inclusion in smart local energy systems

Dr Marie Claire Brisbois, University of Sussex

10:15 - 10:30 Delivering a network for the Net Zero transition

Barry Hatton, UK Power Networks

10:30 - 10:45 Local Green New Deals: energy demand reduction options

Dr Donal Brown, University of Sussex/ Ashden

10:45 - 11:00 Local Area Energy Planning approach

Kirsten Firth, Brighton & Hove City Council

11:00 - 11:20 Tea and coffee break

11:20 - 12:15 Breakout groups: (1) Strategic issues at a regional level
(2) Energy supply options and network connections (3) Energy demand reduction options

12:15 - 12:35 Feedback from breakout groups

12:40 - 13:30 Lunch



University of Sussex Energy Group

Energy and Society

- Advancing Capacity for Climate and Environment Social Science ([ACCESS](#))
- Responsive Organising for Low Emission Societies ([ROLES](#))
- Local Green New Deals ([CREDS](#))

Energy Governance and Policy

- The Industrial Decarbonisation Research and Innovation Centre ([IDRIC](#))
- Governing sustainable energy-mobility transitions: multi-level policy mixes, transformative capacities and low-carbon innovations ([EMPOCI](#))

Energy Innovation and Digitalisation

- Centre for Research Into Energy Demand Solutions ([CREDS](#))
- Energy Demand Research Centre ([EDRC](#))

See more at:
<https://www.sussex.ac.uk/research/centres/sussex-energy-group/research>

Just and sustainable transitions to net zero

- Toward Just, Ethical and Sustainable Arctic Economies, Environments and Societies ([JUST NORTH](#))
- Carbon Intensive Regions in Transition ([CINTRAN](#))

Energy systems and supply technology

- Solar-Biomass Reversible Energy System for Covering a Large Share of Energy Needs in Buildings ([SolBio-Rev](#))



Energy Demand Research Centre (EDRC)



- **Funding:** £15 million UKRI funding, 70 people across 13 universities
- **Challenge:** Technical, political, social and cultural considerations needed in decarbonising buildings, transport and industry
- **Opportunity:** Energy demand reduction has multiple co-benefits
- **Key aim:** Impactful research informing and inspiring energy demand reductions that support an affordable, comfortable and secure Net Zero society
- **Main research themes:**

Futures



Flexibility



Place



Governance



Equity





SCIENCE POLICY
RESEARCH UNIT

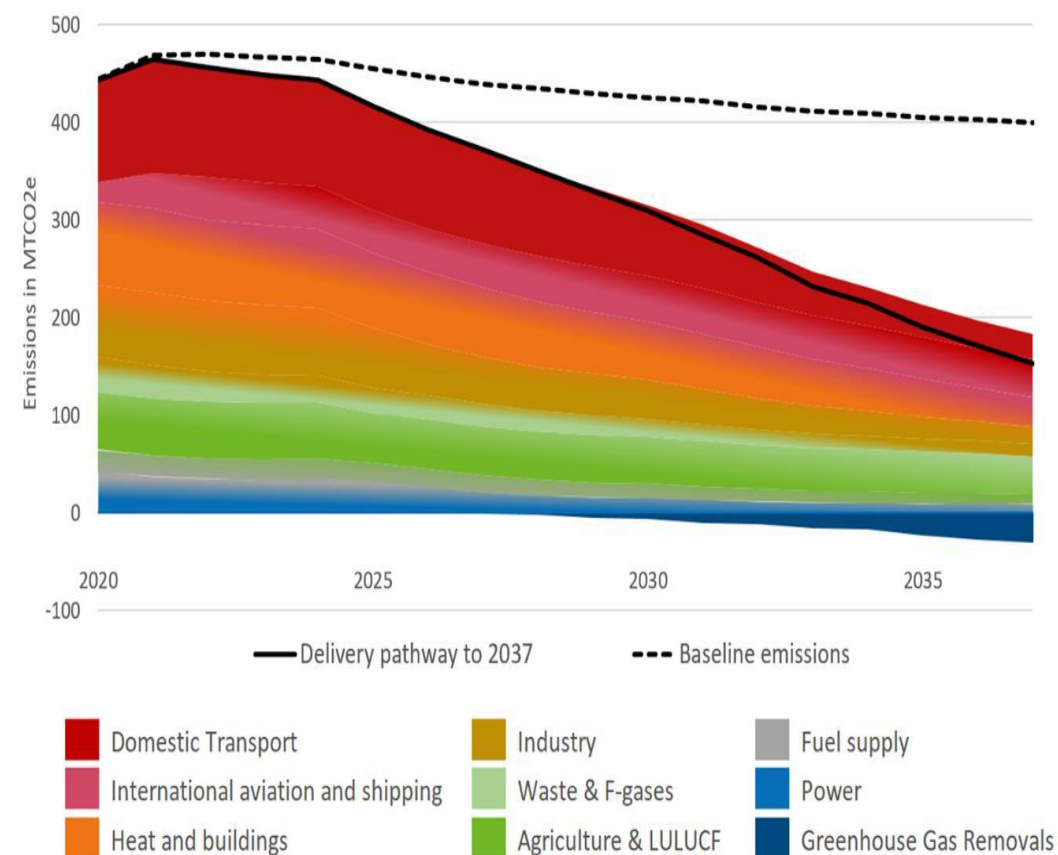


Welcome

Cllr Dr Beccy Cooper,
GBEB and Worthing Borough Council

Net Zero challenges and opportunities for UK

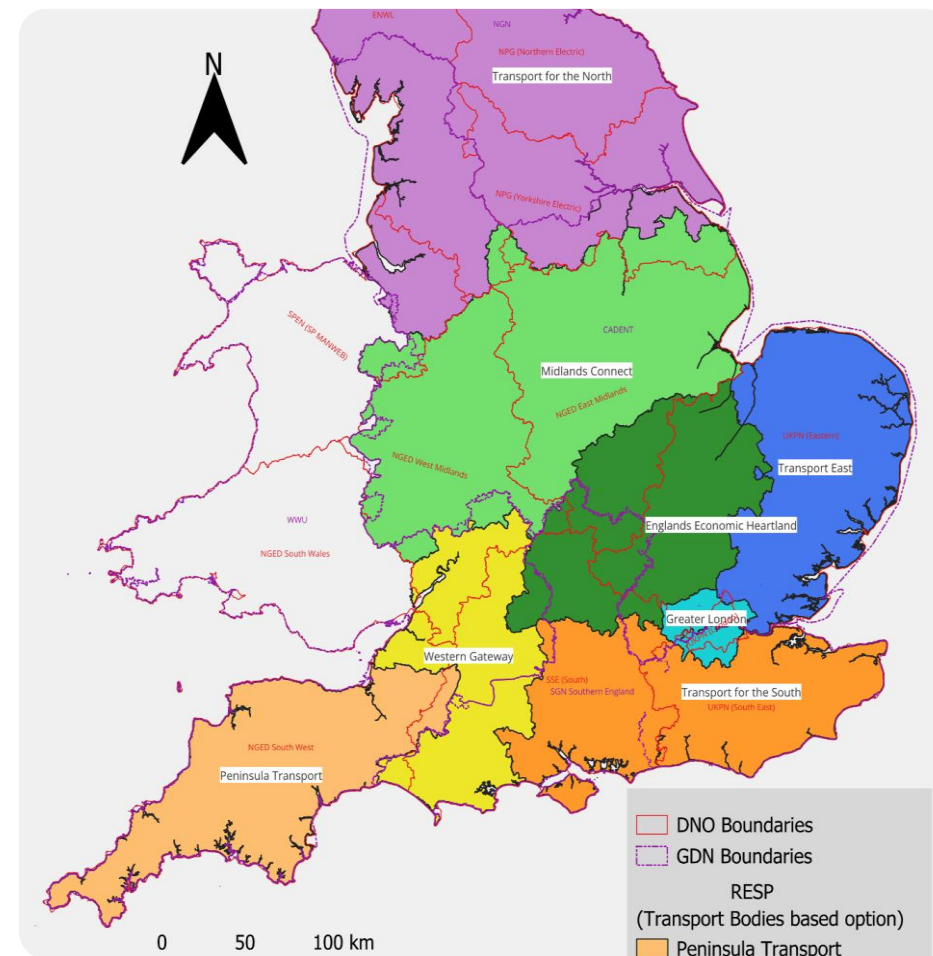
- UK target: Net Zero emissions by 2050
- 6th Carbon Budget: 63% reduction from 2019 levels by 2035
- Fully decarbonised electricity by 2035, including 50 GW offshore wind by 2030, 70 GW solar by 2035
- Heat pumps: 600,000 per year by 2028
- Smart meters, Demand Flexibility Service, EV Smart Charging
- UK Infrastructure Bank to support investment



Source: HM Government (2023), [Powering Up Britain](#)

Future of local energy governance

- New National Energy System Operator (NESO) (from 1 July 2024) – electricity, gas, heat
 - Whole system approach: Net Zero, resilience, security of supply, markets, strategic planning
- Regional Energy Strategic Planners (RESPs)
 - Between 8 and 10 RESPs across England
 - Energy system planning - Link top-down national scenarios with local and regional insights
 - Facilitate market arrangements for flexible resources
 - DNOs remain responsible for real-time operations and maintaining network, system reliability
- Local Area Energy Plans (LAEPs)
 - Currently optional for LAs in England



Energy supply and network connections

- Connection queue: over 500GW of generation capacity holding transmission and distribution connection agreements, but up to 10 year wait for connection
- DESNZ/Ofgem Action Plan (2023):
 - Raise entry requirements for new connections, and remove stalled projects
 - Better utilise existing network capacity, e.g. enhanced use of flexibility
 - Better allocate available network capacity, e.g. strategic, rather than ‘first come, first served’
 - Develop longer term process connections models, aligned with strategic planning
- Electricity Networks Association Action Plan (2023):
 - Reforming distribution network connection queue: ‘first ready, first connected’
 - Changing how Transmission and Distribution coordinate connections
 - Greater flexibility for storage distribution customers
 - Enable 30-50GW of generation connections to be accelerated

Energy demand reduction options

- Energy efficiency of UK buildings

- Heat and Building Strategy
- Future Homes Standard: 75-80% lower carbon emissions
- ECO4 energy efficiency improvements
- Social Housing Decarbonisation Scheme

- Heating

- Boiler upgrade scheme: £7,500 grant for a heat pump
- 600,000 new heat pumps per year by 2028
- Home Upgrade Grant (off gas)
- Green Heat Network Fund

- Transport and mobility

- Zero emission vehicle (ZEV) mandate: 80% new ZEVs by 2030, 100% ZEVs by 2035
- Local EV Infrastructure (LEVI) Fund for Local Authorities
- 2024 Bus Service Improvement Plan



Greater
South East
Net Zero Hub

Greater South East Net Zero Hub GBEB Regional Energy workshop

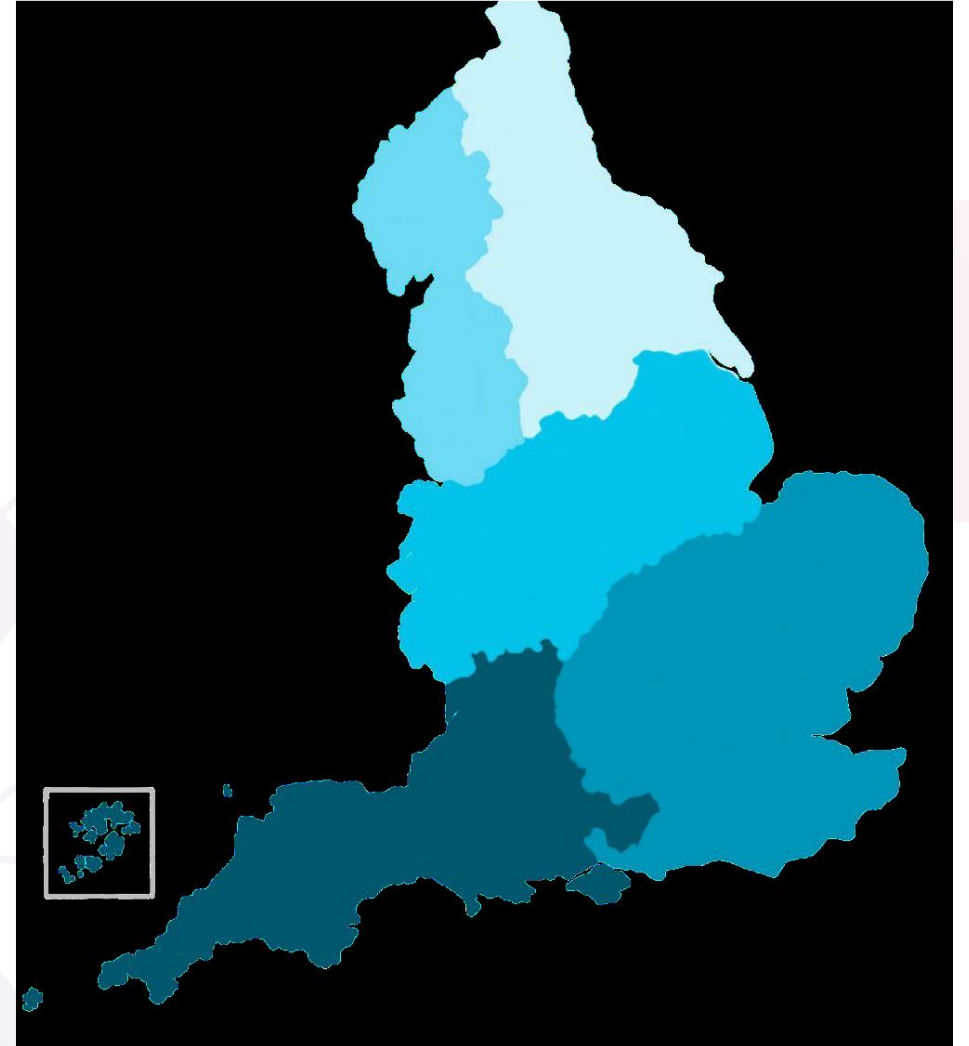
John Taylor

John.taylor@gsenetzerohub.org.uk

17th May 2024

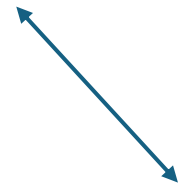
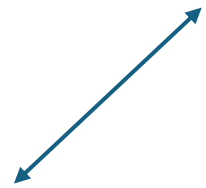
DESNZ Local Net Zero Programme

- Five **Local Net Zero Hubs** across England
- Providing support and additional capacity to the public sector
- Driving clean growth through energy innovation
- Raising awareness of good practice, funding opportunities and new approaches to project finance
- Providing technical support to developing business cases and funding applications
- Promoting 'local zero carbon' schemes, partnerships and collaborations






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South East
Net Zero Hub



Local Net Zero Team Support

- Public Sector Decarbonisation Scheme
- Fleet and depot decarbonisation
- Area wide decarbonisation
 - District Heating
 - Able to pay retrofit models
 - SME support schemes
 - Industrial cluster decarbonisation
 - Local Area Energy Planning
- Community Energy
- Carbon Removals and Offsetting
- Plus the Domestic Energy Efficiency and Supply Chains Team



Local Authorities
Universities
NHS
Police and Fire Services
Community energy organisations

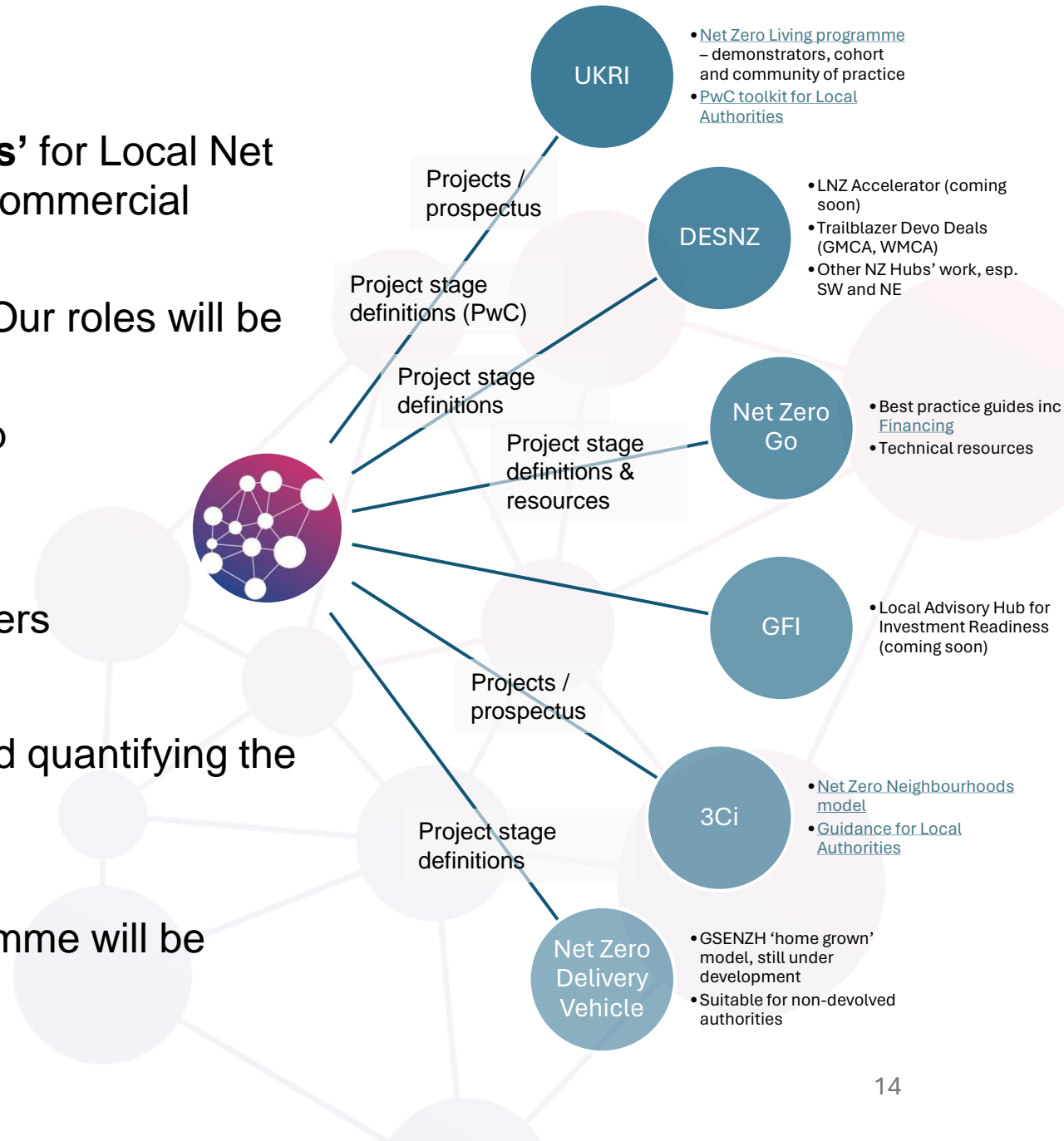
Local Net Zero Investment

Several initiatives are defining ‘**investment readiness**’ for Local Net Zero projects, and developing models for accessing commercial finance

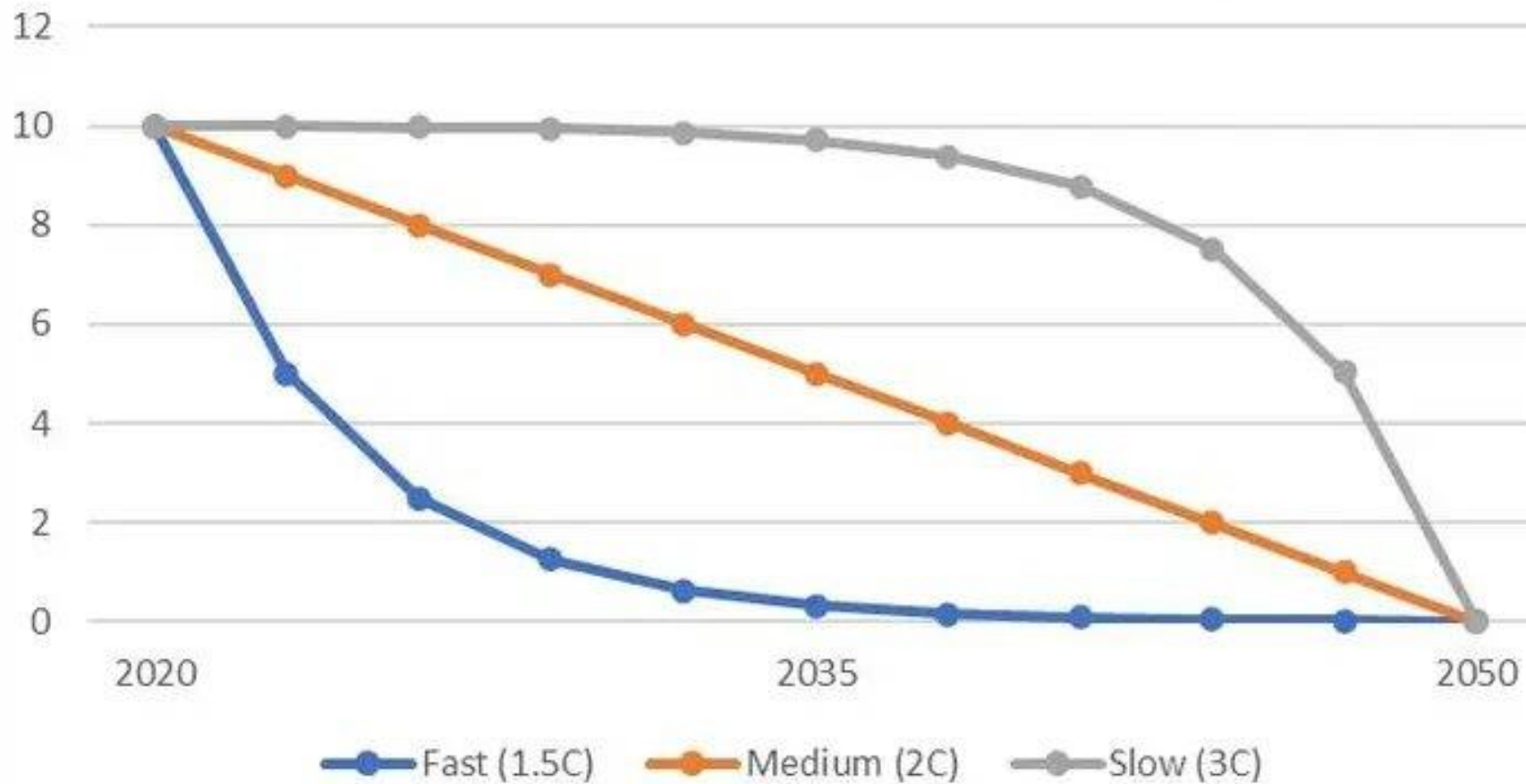
The Net Zero Hubs are an essential ‘**delivery arm**’. Our roles will be to:

- Provide a pathway for Local Authorities to develop ‘investment ready’ projects
- Technical support and critical friend roles
- Co-develop investment ‘prospectus’ with LA partners
- Connect projects to providers of finance
- Build investor confidence by tracking pipelines and quantifying the investment opportunity
- Originate new projects

The forthcoming **Local Net Zero Accelerator** programme will be managed by the Greater South East Net Zero Hub. (including new procurement DPS)



Decarbonisation Pathways to Net Zero by 2050

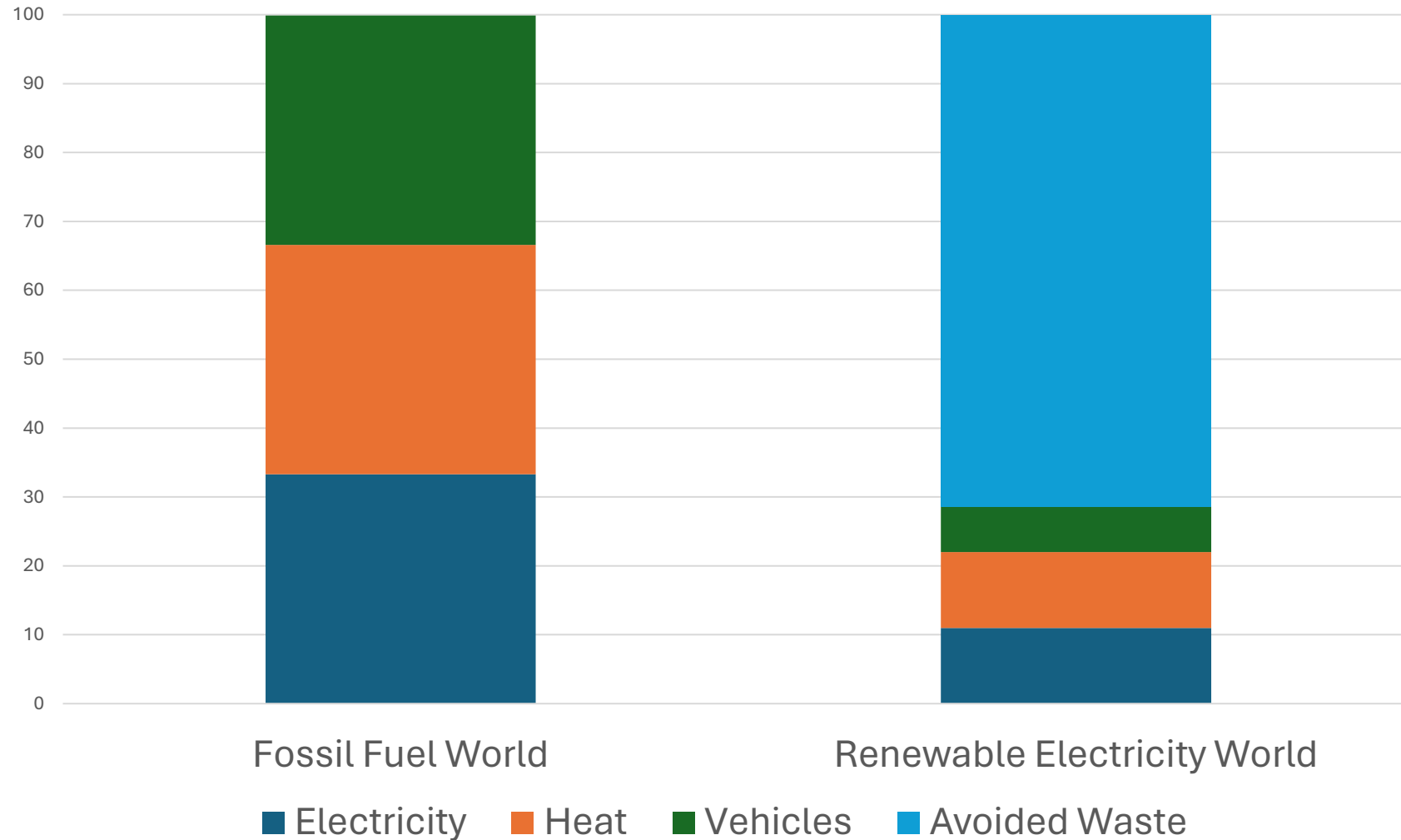


Cumulative CO2 emissions are what matters.

Time is a limited resource.

Success means making the biggest GHG savings now to buy us time to do the harder jobs.

How much renewable energy do we actually need?



Power stations are losing over 50% of their fuel as heat.

Internal combustion engines only convert 15-20% of the energy in petrol into motion.

40% of global shipping is moving around fossil fuels.

Gas boilers are 85-90% efficient, but heat pumps are 300-400%!

Energy in Sussex today

	Energy Demand	Generation	Net Import	Self Reliance
Sussex (2021)	26.9 TWh	1.4 TWh	25.5 TWh	5.2%

Step 1: Energy Savings

	Heating Oil: Industrial, Commercial	Heating Oil: Domestic	Petrol/Diesel: Road transport	Diesel: Agriculture	Gas: Domestic	Gas: Industrial, Commercial	Electricity: Domestic	Electricity: Industrial, Commercial	Bioenergy and Wastes
Sussex 2021 TWh	1.2	0.7	7.9	0.3	7.9	3.0	2.9	2.9	1.0
Sussex Future TWh	0.4	0.2	2.0	0.2	2.6	1.0	2.0	2.0	1.0

Step 1: Electrifying Heat

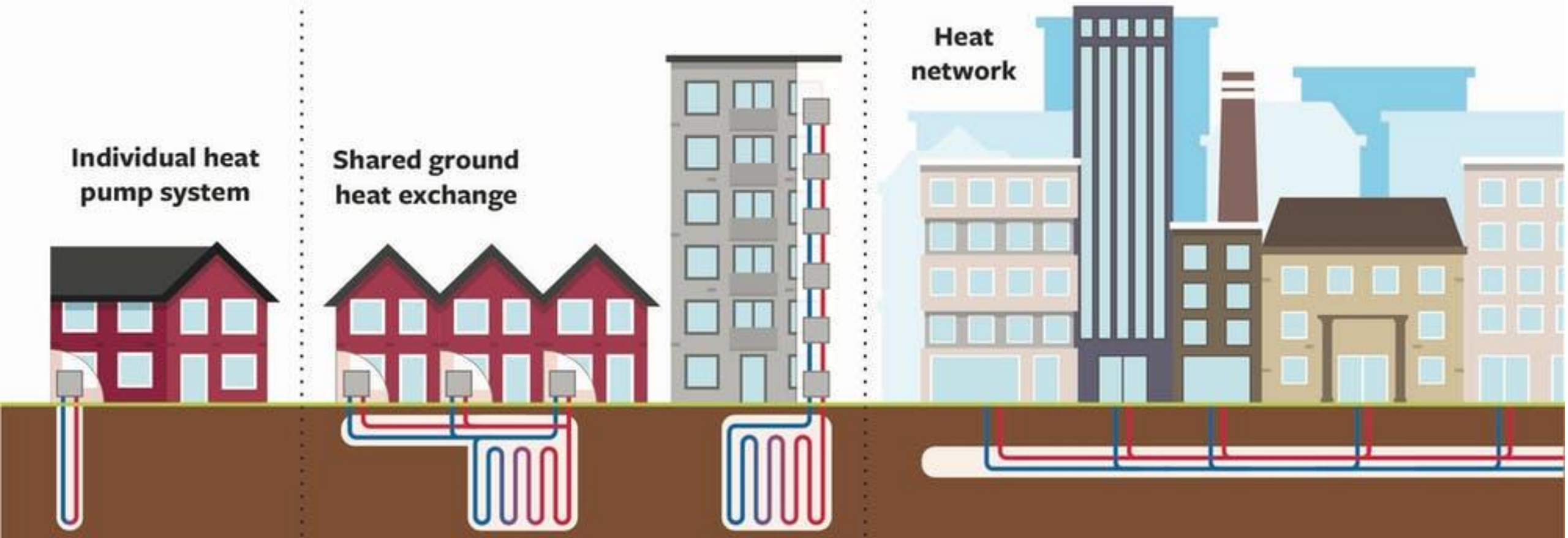
Individual

City scale

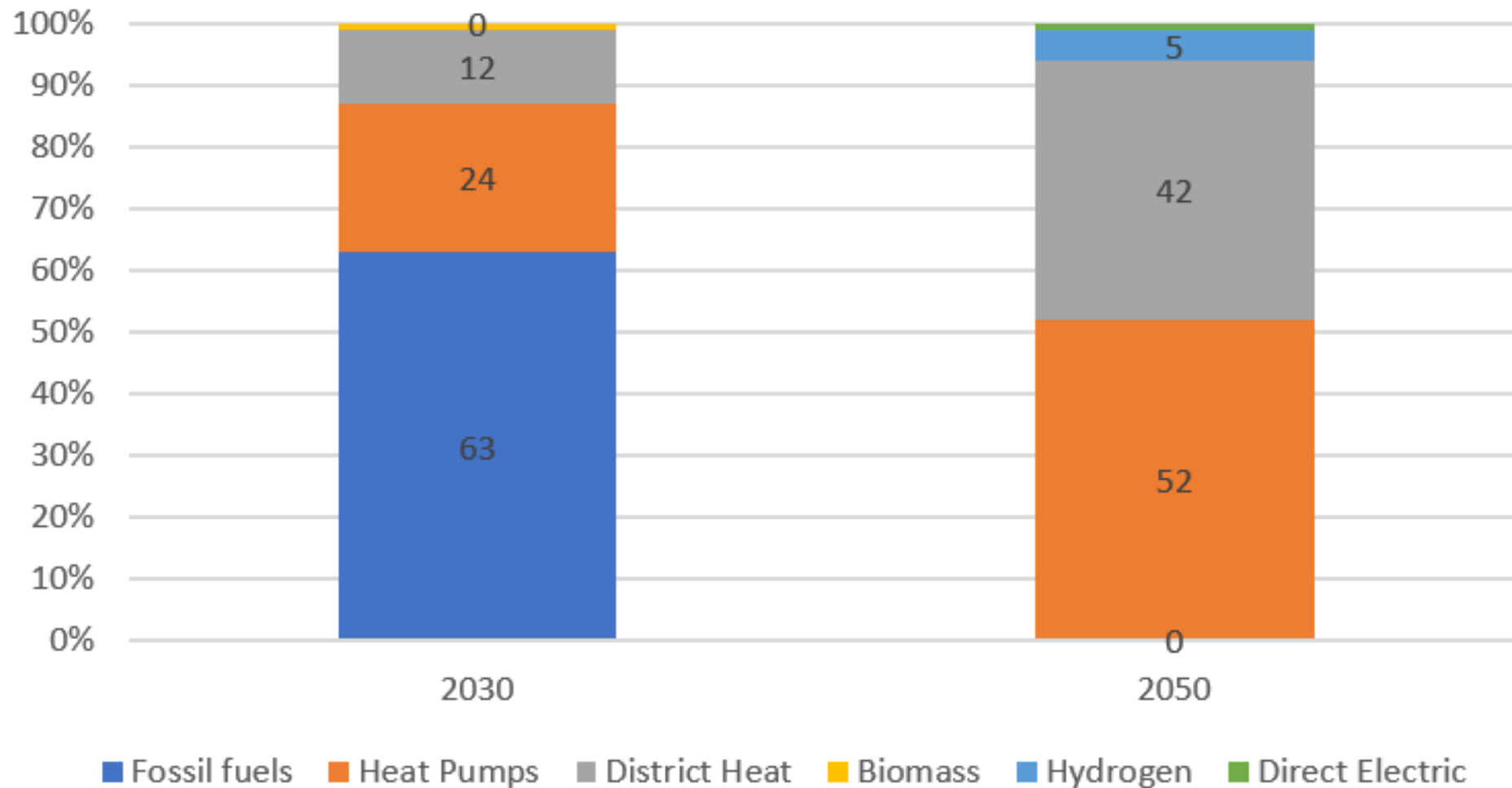
Individual heat pump system

Shared ground heat exchange

Heat network

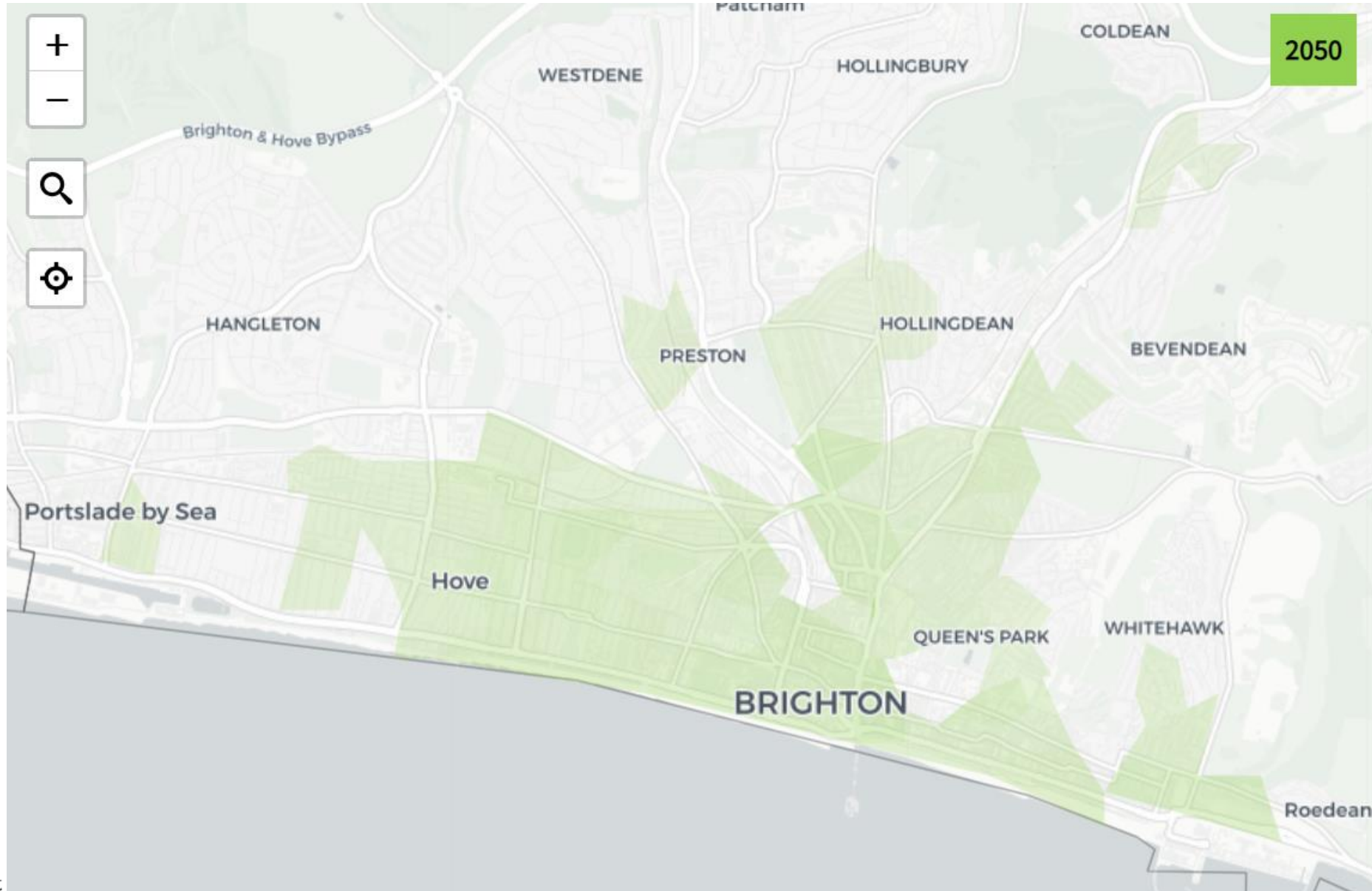


Renewable Heat in Public and Commercial Buildings

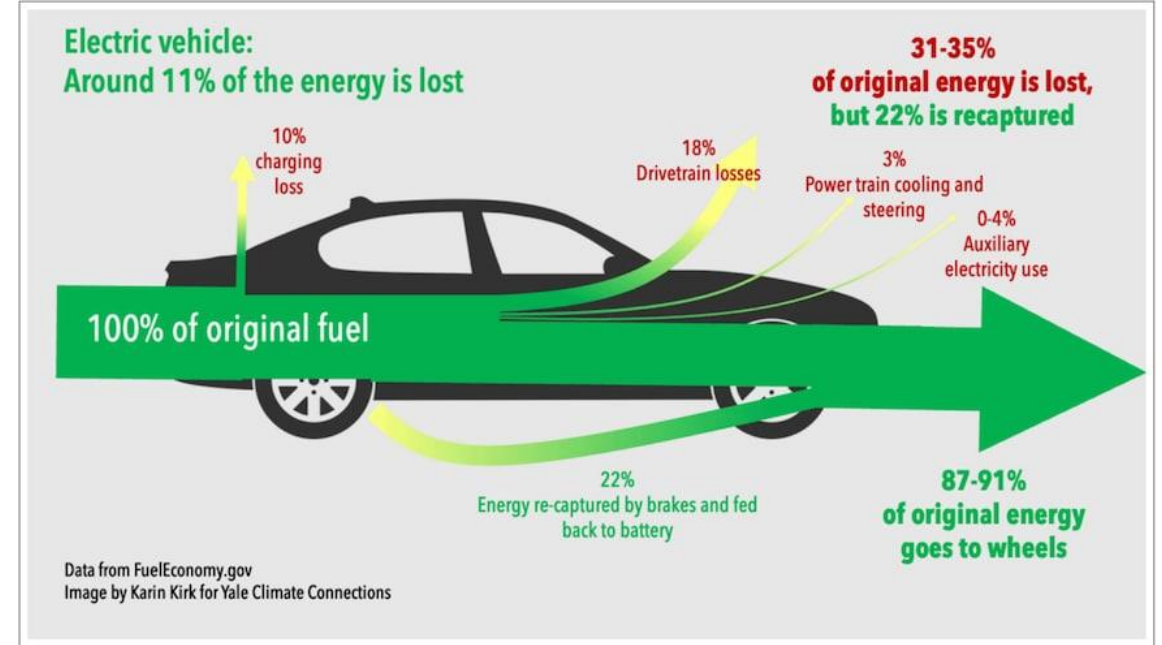
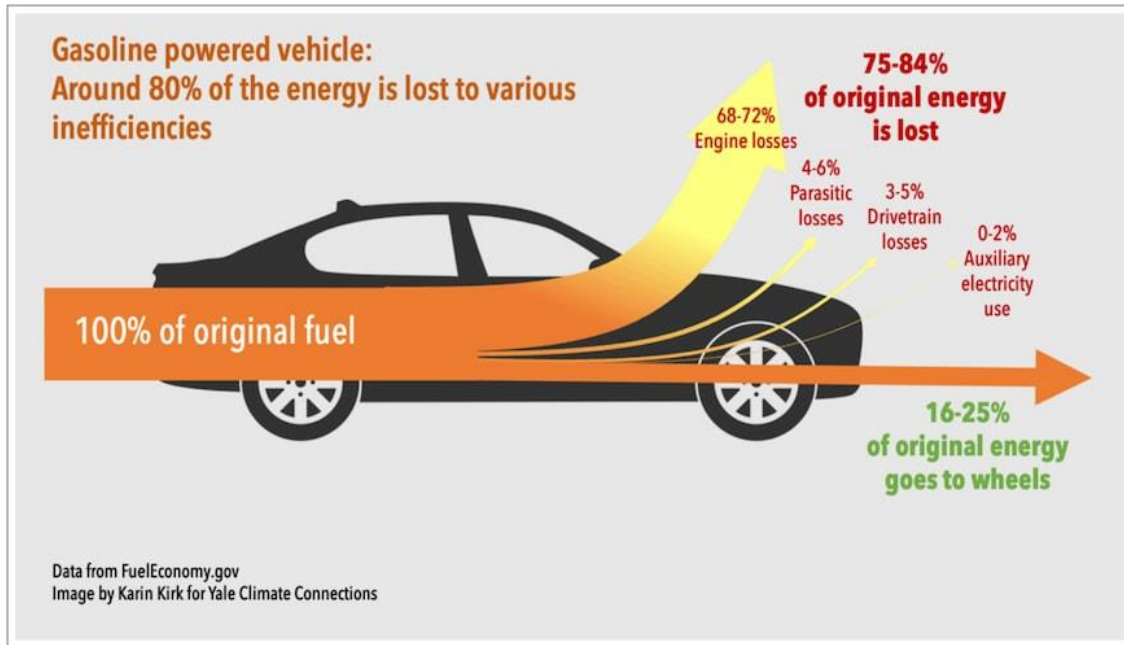


Data from Climate Change Committee 6th Carbon Budget

District Heating Potential in Brighton & Hove



Step 2: Energy Savings



Electrification of vehicles and heating systems (via heat pumps) will deliver a **75% reduction in energy demand**.

Further savings possible with active travel, insulation and behaviour change.

Step 3: Scale up Renewables

- Rampion 2 will increase generation from 1.4TWh to 5.6TWh.
- Potential to fit Shoreham gas power station and Newhaven energy recovery facility with carbon capture.
- Scale up rooftop solar, solar farms and onshore wind.



Energy in Sussex in a Net Zero future

	Energy Demand	Generation	Net Import	Self Reliance
Sussex (Net Zero)	10.5 TWh	5.6 TWh	4.9 TWh	53.3%

Further questions:

- What is the current contribution from onshore renewables?
- What is the potential onshore generation in the region?
- How does this look spatially? How does it relate to planning and grid constraints?
- Other technologies? i.e. tidal, small nuclear, carbon capture.
- How do we scale up investment and delivery of local energy projects to deliver the above ambition?



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Net Zero Hub

Digital Services for Local Authorities

Zeyn Saigol

Strategic Project: Digital Services

- The Hub is expanding its offering to local authorities around digital tools, data, and technical support.
- We have a small budget to support this, plus internal resource (data analysts). Outputs due by April 2025.

Challenges:

- Many different project types contribute to net zero.
- The market is highly complex, and tools and data management are often bundled into consultancy services.

Solution:

- Discovery phase to identify what will help local authorities most.

Projects Ideas (non-exhaustive)

A. Decision tree for tools & data

Inputs:

- Project type & phase
- Task

Outputs:

- Which tools and datasets will be relevant

Support:

- Light-touch help applying the tree

B. Basic LAEP* modelling tool

Inputs:

- Datasets for the region, in a standardised format
- Net zero target

Outputs:

- Optimised set of potential pathways to meet the target

Out-of-scope:

- Defining data formats
- Visualisation of outputs

* Local Area Energy Plan

Show of hands please!

- A. Decision tree tool + light-touch support
- B. LAEP pathway modelling tool
- C. Some other data-based assistance

I'm around this afternoon – further input welcome



Greater South East Net Zero Hub



Department for
Energy Security
& Net Zero

SCIENCE POLICY RESEARCH UNIT

Ensuring inclusion in smart local energy systems

Dr Marie Claire Brisbois, Sussex Energy Group, Science Policy Research Unit

Regional Net Zero Energy Workshop
May 17, 2024

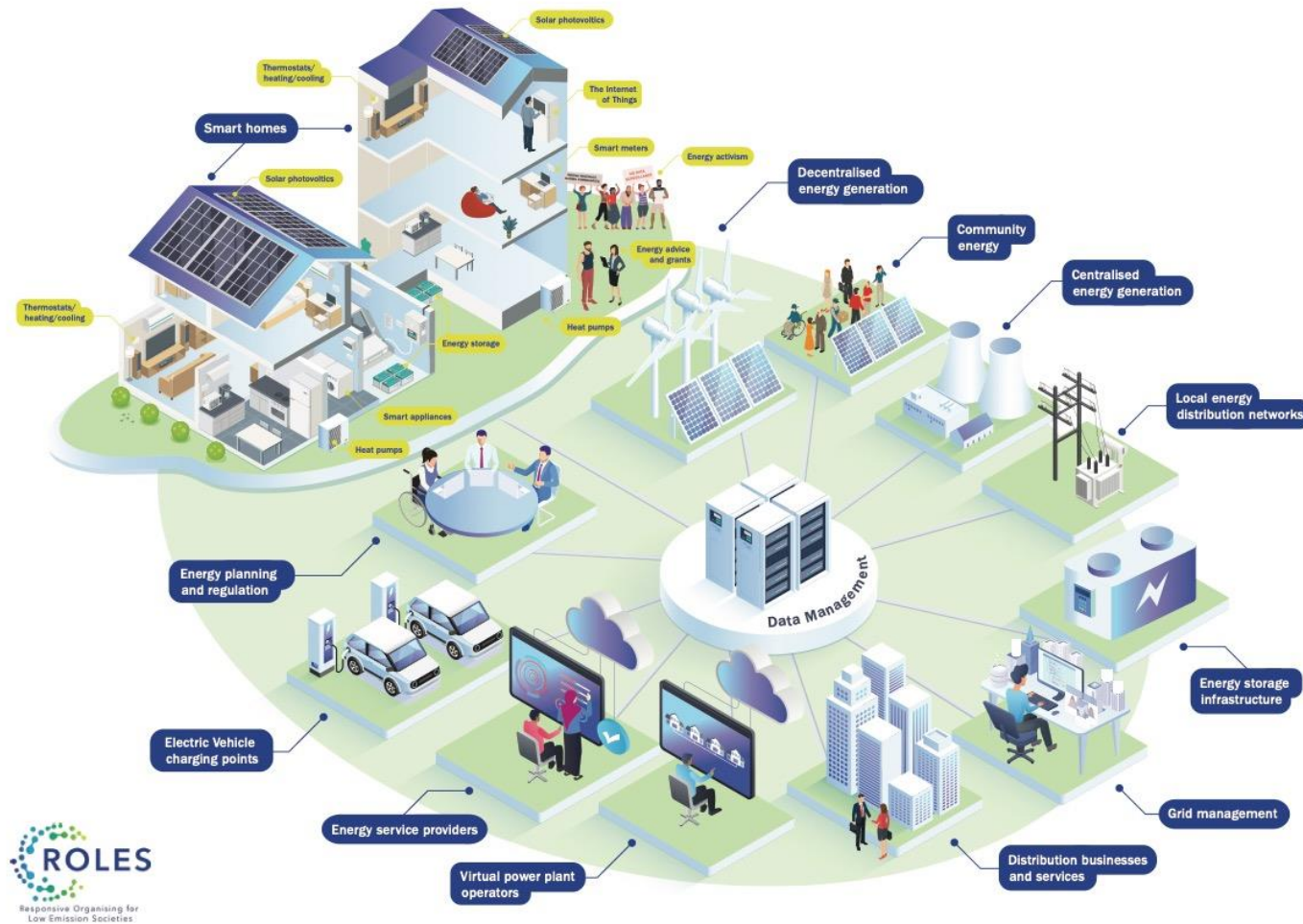


BUSINESS
SCHOOL

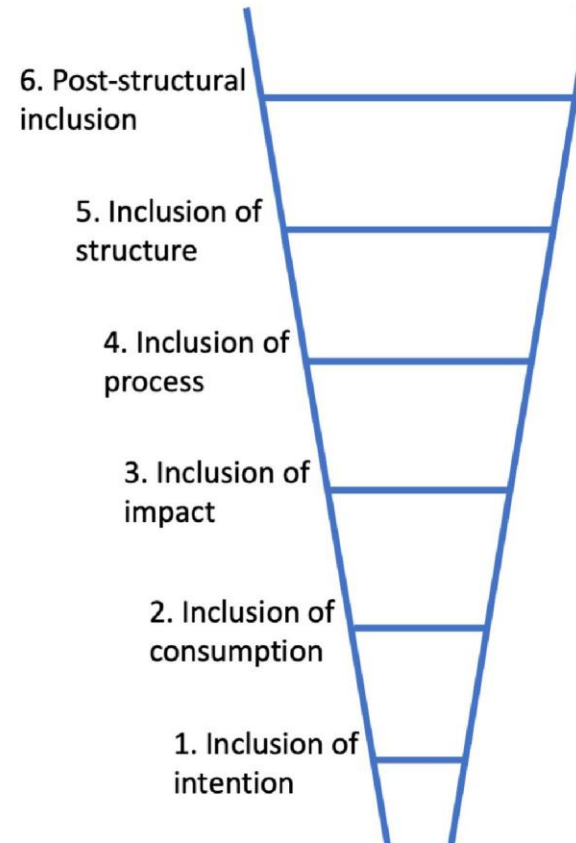
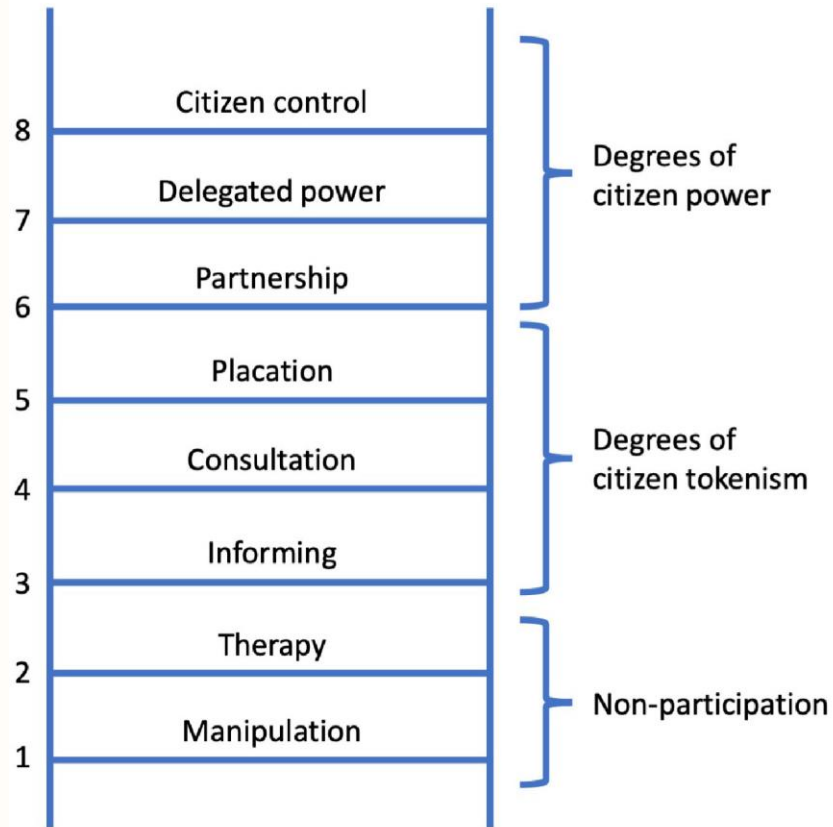


Smart, local energy systems

Technology-enabled, digitally connected, energy systems



What is local inclusion?



6: Innovations developed within a framework of experience, knowledge & discourse of marginalised groups, who set the agenda and terms for innovation

5: The circumstances within which innovation takes place is itself made inclusive: excluded groups find it easy & desirable to become involved

4: Innovations in which the marginalised groups participate and influence developments

3: Evidence that innovations have a positive impact on wellbeing of marginalised groups

2: Innovation adapts novel product-services with evidence of use by marginalised groups

1: Innovators claim to respond to needs in marginalised groups, but without latter's involvement

Why seek more inclusion?

Most of the SLES projects in the UK are centrally-defined and controlled, with ‘users’ receiving financial benefit from participation.

However, research demonstrates that:

- There is enormous public appetite for more direct involvement in energy systems
- Deeper inclusion can create better plans that integrate local knowledge and contexts, drive uptake, and support social acceptance
- There is significant private capital to be mobilized.

Bloomberg UK

‘We Are Energy Nerds.’

By [Olivia Rudgard](#)

19 April 2024 at 10:00 BST




Alex Atack for Bloomberg Green

Thinking differently about energy system inclusion

- Energy systems have traditionally been run from the top-down
- It's much more complicated to think about energy consumers as important decision-makers – but they increasingly are
- We need new mechanisms for inclusion, new participatory processes, new ideas, and new models for decision-making (also the focus of a new EDRC research project beginning next week!)

Governance



Political feasibility and readiness to act

[Find out more](#)



References

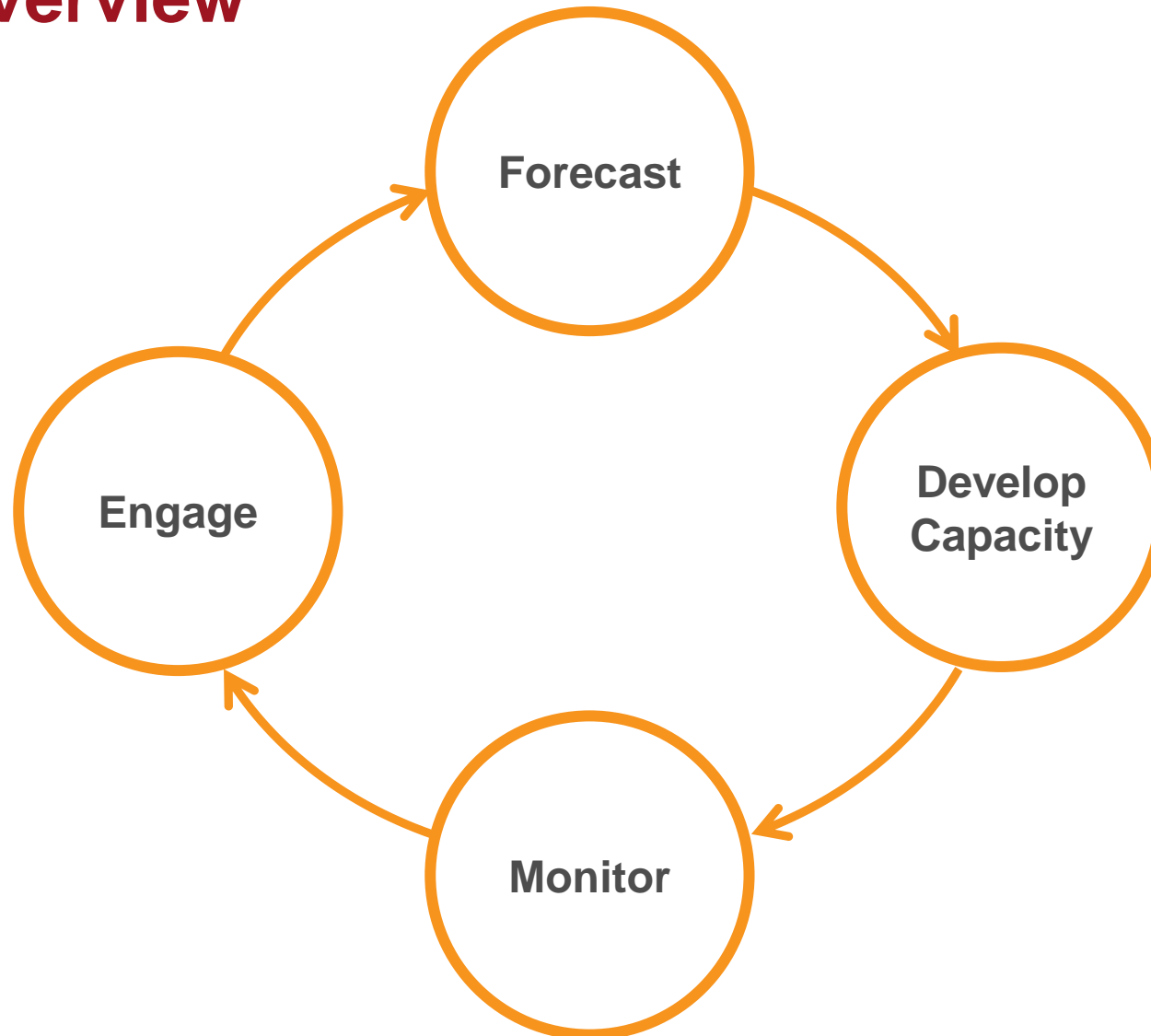
- Brisbois, M. C. (2020). Decentralised energy, decentralised accountability? Lessons on how to govern decentralised electricity transitions from multi-level natural resource governance. *Global Transitions*, 2, 16-25.
- Powells, G., & Fell, M. J. (2019). Flexibility capital and flexibility justice in smart energy systems. *Energy Research & Social Science*, 54, 56-59.
- Smith, A., Contreras, G. A. T., Brisbois, M. C., Lacey-Barnacle, M., & Sovacool, B. K. (2023). Inclusive innovation in just transitions: the case of smart local energy systems in the UK. *Environmental Innovation and Societal Transitions*, 47, 100719.



Planning and Forecasting



Planning Overview



Our customers and stakeholders are at the heart of the work we deliver


Forecasting

- Annual process of forecasting:
 - **Distribution Future Energy Scenarios**
- Forecasting based on:
 - Stakeholder engagement
 - Research into local plans
 - External datasets (e.g. ZapMap, Office of National Statistics)
 - Scenario based analysis
- Forecasts shared in a number of ways:
 - Overview and easy to access maps
 - Data sets of growth volumes (new homes, EVs, Heat Pumps) across varying scenarios

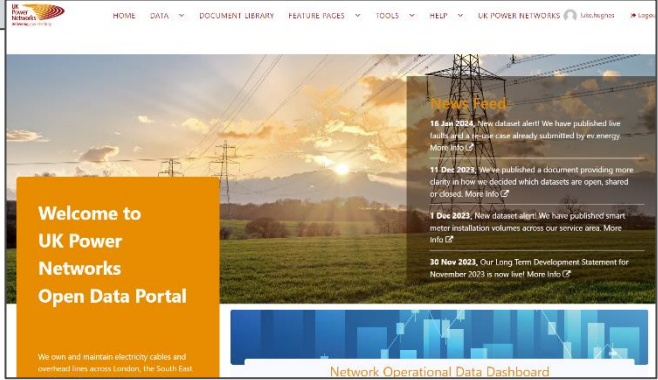
Distribution Future Energy Scenarios (DFES)

Data forecasting supporting the

Scenarios



[Distribution Future Energy Scenarios - UKPN DSO \(ukpowernetworks.co.uk\)](https://ukpowernetworks.co.uk)



[Open Data Portal | UK Power Networks](#)

Our forecasting process is transparent and allows stakeholders to access datasets for free

Develop Capacity

- Annual process of assessment:

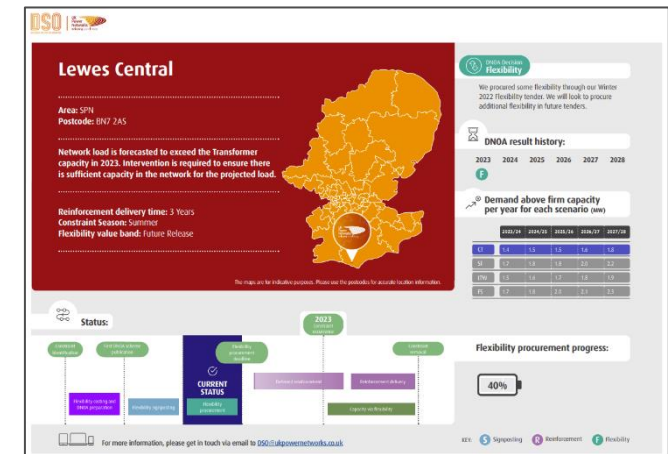
Distribution Network Options Assessment

- Outcome – Flexibility

- Engage customers to increase generation or reduce demand at peak times.
- Option effective where demand peaks are a small number of hours each year, or where medium term scenarios are uncertain

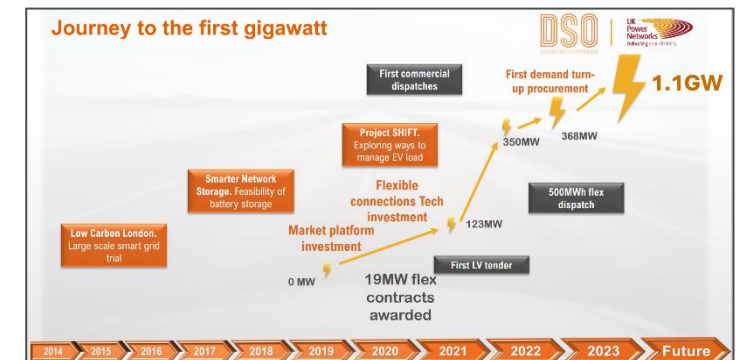
- Outcome – Capital Investment

- Capacity developed ‘just in time’ based on scenarios and long term modelling. This ensures cost effective investments for customers.
- More than £1bn invested each year to ensure capacity is available, resilient and reliable.



[Distribution Network Options Assessment \(DNOA\) \(ukpowernetworks.co.uk\)](https://ukpowernetworks.co.uk)

[Flexibility - UKPN DSO \(ukpowernetworks.co.uk\)](https://ukpowernetworks.co.uk)



Our approach is flexibility first. Where we build we ensure future capacity needs are met.

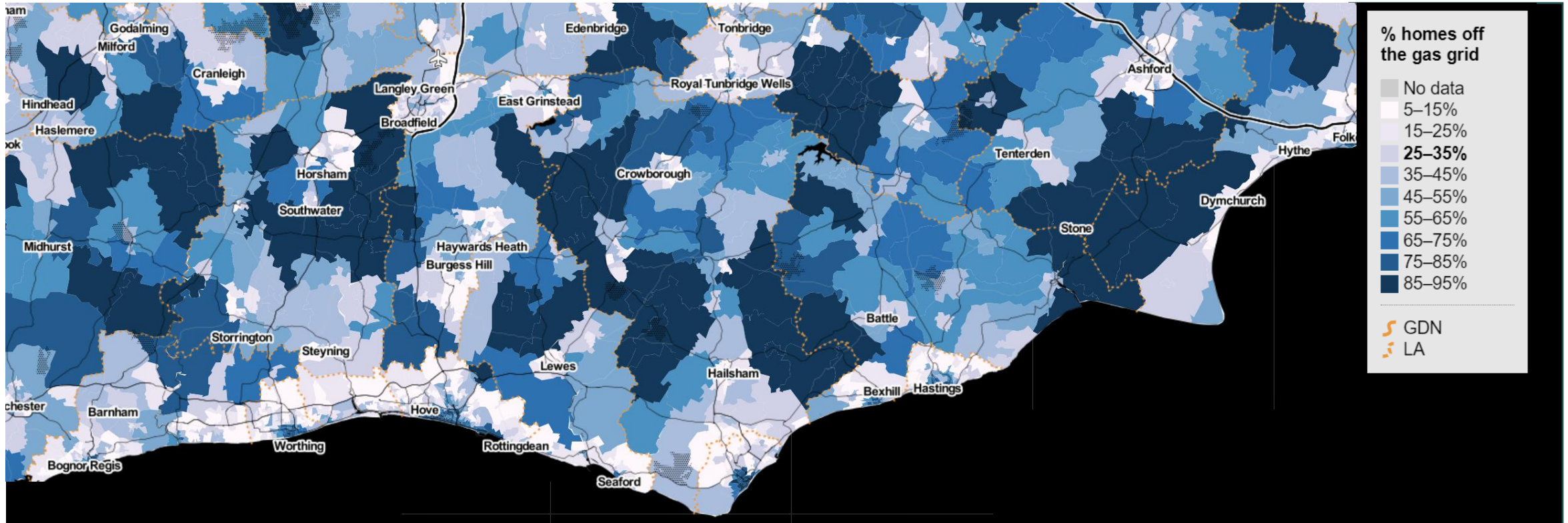
Develop Capacity – Planned Regional Investments

- £1bn invested every year across UK Power Networks region.
- Within the South East ten largest schemes within the period identified to the right, these account for £58m investment up to 2028.
- Investments identified will unlock more than 800MW of capacity within region, approximately 23% of today's demand.



Above: Map of major projects in the South East up to 2028

Develop Capacity – Off Gas Grid Areas

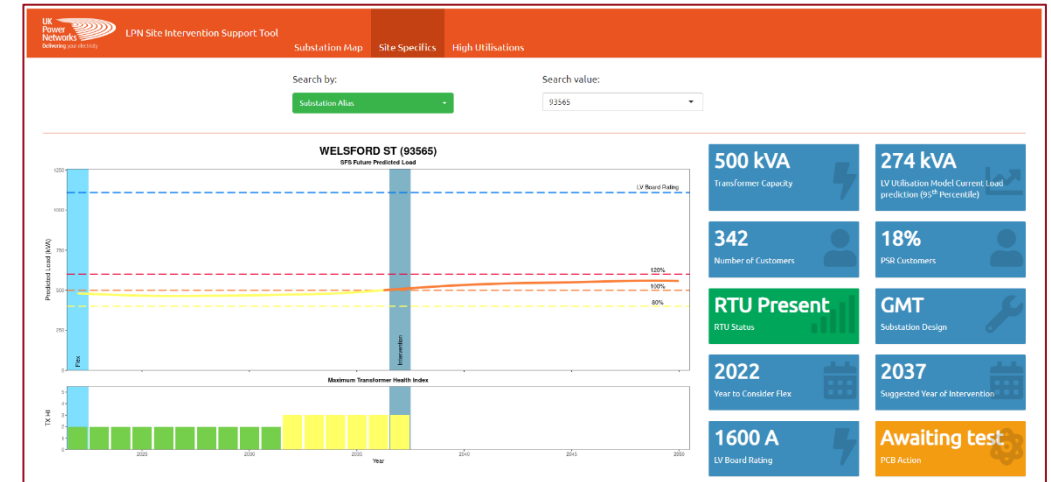


Above: Map of Off Gas Areas, Source: [Non-gas map \(nongasmap.org.uk\)](http://nongasmap.org.uk)

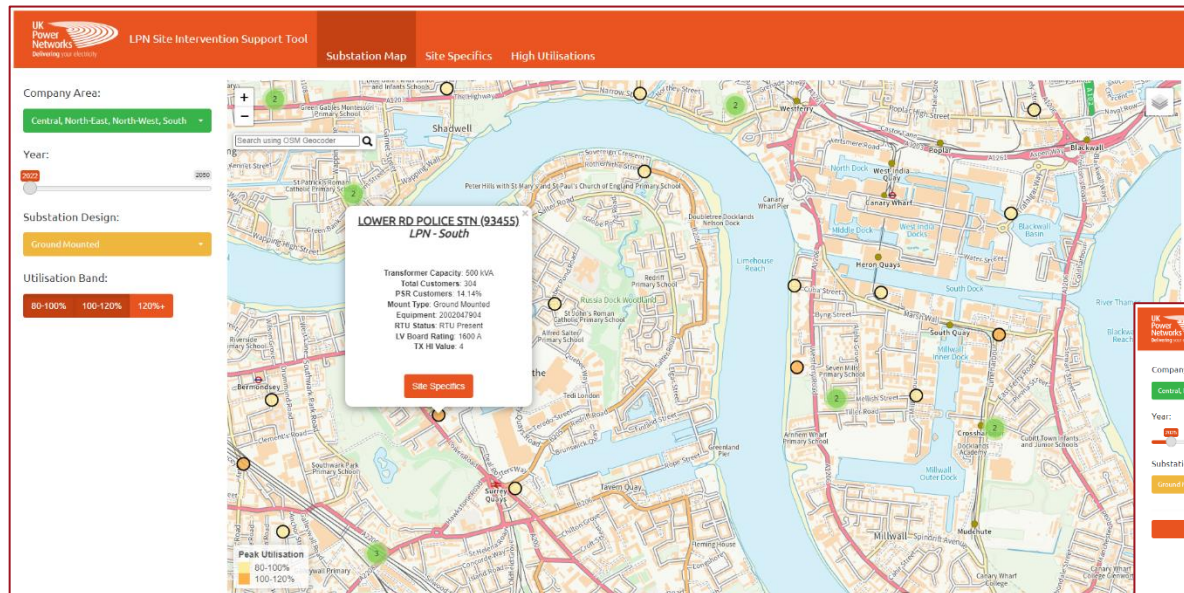
- Strategic Investment in off gas communities, creating opportunity for early decarbonisation where future heating options limited.
- Investment of £73m underway up to 2028 to install additional capacity in rural networks, aimed to ensure 71% of the 341,000 off gas customers are supplied by a network ready for Net Zero.

Monitoring

- Measurement of major sites already in place
- Focus over past two years to ensure use of smart meter, local equipment and data analysis provides greatest insight into demand and trends



Site by site in depth analysis incorporating condition, load and customer vulnerability (anonymised) data.



Map based view provides simple overview of sites

Table view allows selection of forecast year

Company Area:	Show	10 entries	Search:							
Central, North-East, North-West, South	Substation Alias	Substation Name	Substation Design	Transformer Health Index	Predicted Future Load in 2025 (kVA)	Transformer Capacity (kVA)	Utilisation (%)	PSR Customers (%)	Total Customers	RTU Status
Year: 2022	10246	SHEPHERDS BUSH RD HYTHE IRIS	Ground/Mounted	4	646	500	129%	2.13	94	No RTU Present
Substation Design: Ground Mounted	10262	CHANCEY RD E1 EST BUSH C1	Ground/Mounted	5	668	500	134%	19.32	135	RTU Present
Download data in table	10313	HARVEY RD RAUFARBTHORP ELEMENT	Ground/Mounted	5	674	500	135%	19.51	82	RTU Present
	10415	BISHOPS PARK RD	Ground/Mounted	5	481	500	156%	7.81	443	RTU Present
	10430	RAINFIELD THAMES WALK	Ground/Mounted	3	733	500	147%	12.44	201	RTU Present
	10510	WOOLBICH ST SOUTH PARK	Ground/Mounted	3	662	500	132%	10.68	337	RTU Present
	10582	KELSPON RD	Ground/Mounted	1	621	500	124%	0.59	364	No RTU Present
	10600	OAKBURY RD	Ground/Mounted	1	610	500	122%	13.8	558	RTU Present
	10643	CEDARIE RD	Ground/Mounted	1	965	800	123%	11.51	278	RTU Present
	11044	LOTS RD 90	Ground/Mounted	3	667	500	133%	16.89	367	RTU Present

Engaging

- Activities already underway:
 - Stakeholder engagement events
 - Connecting customer focus groups
 - Research into local plans
- Enhancements to Local Area Planning:



Above: UK Power Networks attendance at Local Government Association's Annual Conference to engage and gather feedback

DSO | UK Power Networks
Home Contact us Resources News & events Log in Register

YOUR LOCAL NET ZERO HUB

Connecting you with the resources and support you need to achieve Net Zero

We are here to facilitate your local Net Zero plans. Join Your Local Net Zero Hub to collaborate and create well-evidenced plans.

Register Resources

[Your Local Net Zero Hub](#)

Free support to shape your Net Zero plans

Register to use our free tool, built to aid Local Authorities in developing robust, evidence-based plans to enable Net Zero

Register for Beta Access



Summary

- Range of activities in place to ensure we engage fully with stakeholders and customers
- We are continually developing improvements to our process to engage further – your feedback supports this
- Further information and insights are available to you – just get in touch

Thank You



CENTRE FOR RESEARCH INTO
ENERGY DEMAND SOLUTIONS

A Local Green New Deal for Brighton and Hove



Tim Foxon, Donal Brown, Christian Jaccarini, Giulia Mininni, Claire Copeland, Marie Claire
Brisbois, Siobhan Stack-Maddox, Beatriz Aguirre Martinez and Max Lacey-Barnacle

**Sussex Energy Group, Science Policy Research Unit, University of Sussex and New
Economics Foundation**

REGIONAL NET ZERO ENERGY WORKSHOP – 17 MAY 2024



www.creds.ac.uk

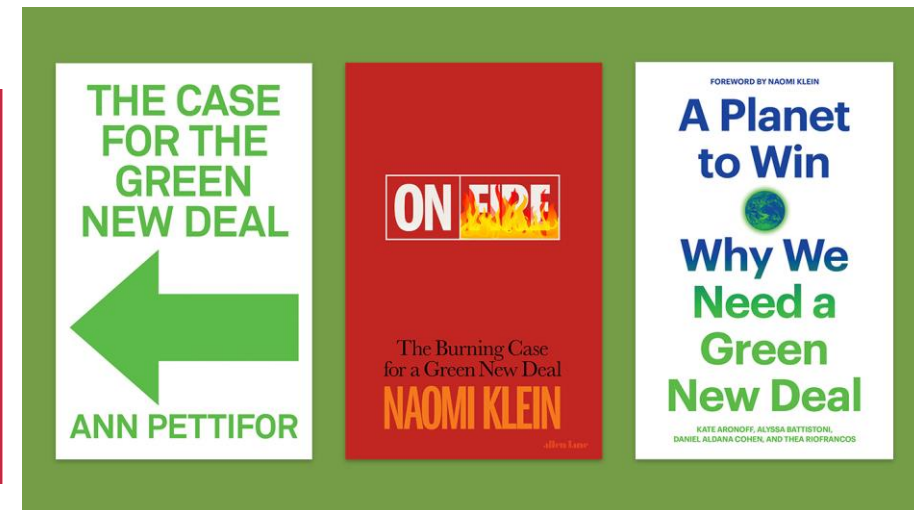
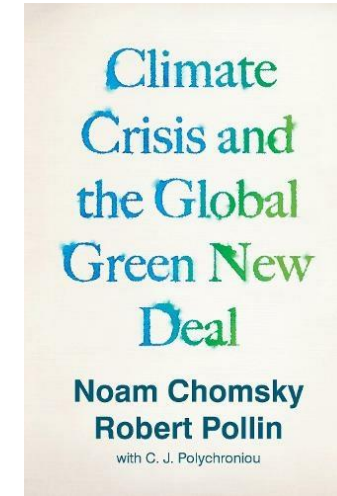
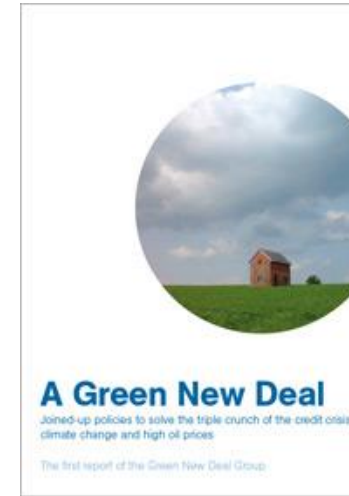
Green New Deal: core elements

We reviewed a large amount of material to understand the origins and features of the UK GND

This review identified 5 core features :

1. financial reforms;
2. green infrastructure investment;
3. financing the GND;
4. ownership structures;
5. economic, social and climate justice

Brown et al (2023), The Green New Deal: historical insights and local prospects in the United Kingdom (UK), Ecological Economics, 205, 107696

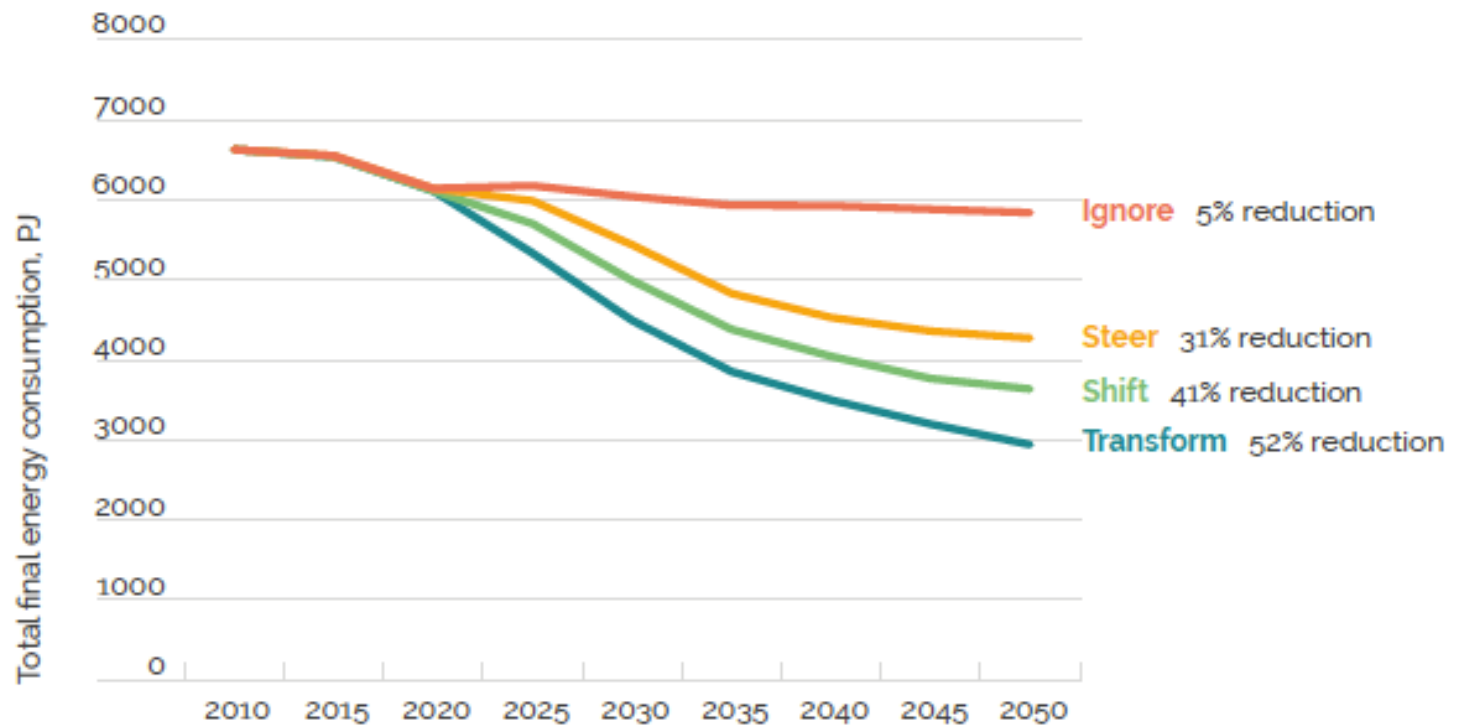




Low energy demand scenarios

- Delivering net-zero could mean an >50% reduction in energy demand
- Most energy saving activities must be devised and delivered locally
- This will require radical policy reforms and increased devolution in the UK

CREDS Positive Low Energy Future (PLEF) scenarios



Source: <https://low-energy.creds.ac.uk/>

Local Green New Deals

We propose “Local Green New Deals” as a unifying policy strategy for this

1. Cheaper, warmer, zero carbon homes
2. Affordable, sustainable public transport
3. Car-free city centres and active travel
4. Expanding green spaces and nature restoration



Cheaper, warmer, zero carbon homes

National goals

Greater Brighton



Almost all homes are EPC C or above by 2035

C

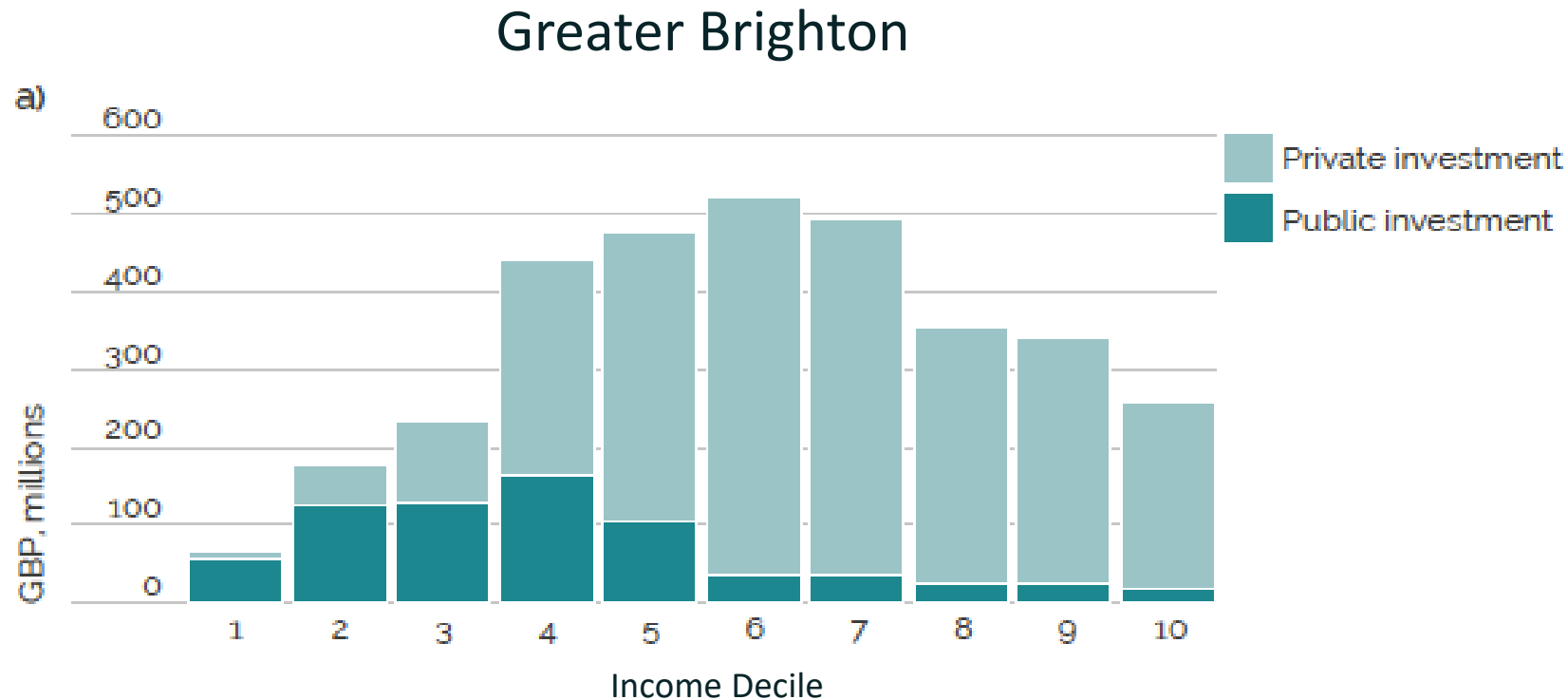
53% Energy efficiency & heatpumps reduce CO₂ emissions



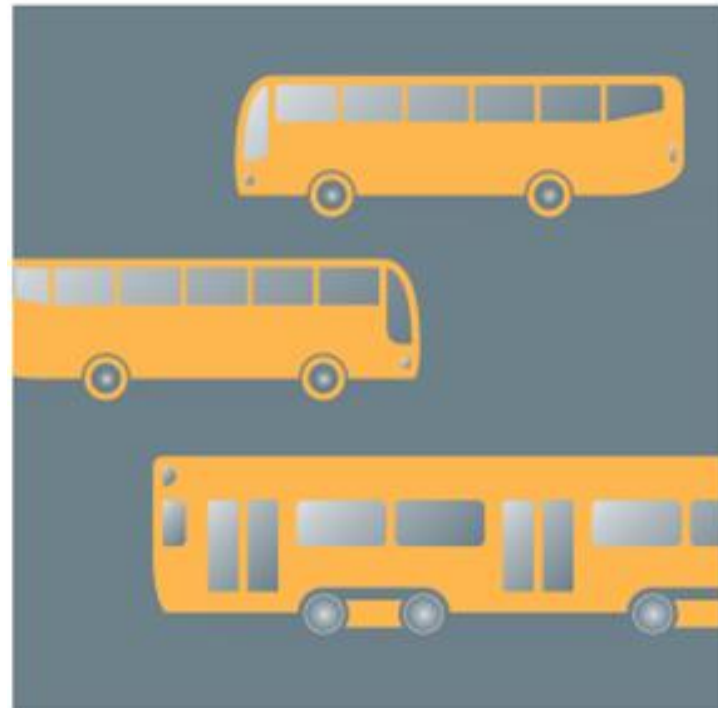
- 316,000** Homes are retrofitted
- 46,000** Households lifted out of fuel poverty
- 5,000** New retrofit jobs created
- £4.84bn** Bill savings by 2045

Home retrofit: public vs private investment

- Blended Finance model
 - Public Investment
£286,300,000
 - Private investment
£2,650,200,000



Affordable, sustainable public transport



National goals

By 2040, hundreds of new bus routes & increased service frequency

66% Increase in bus journeys

44% Increase in tram, train & metro journeys

Greater Brighton

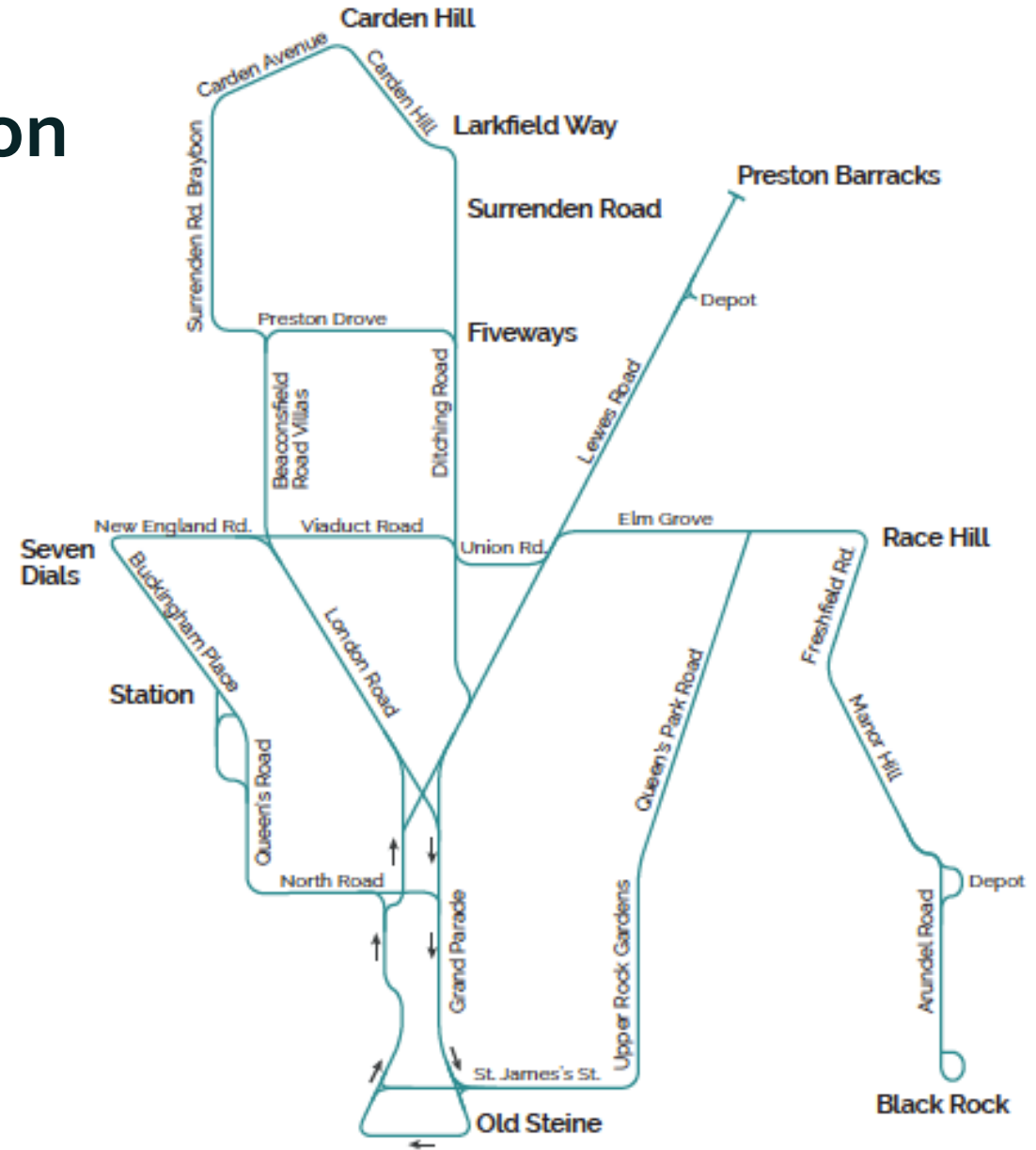
Bus journeys increase from 6% to 7% of overall trips

£2.1bn Investment by 2040 to rapidly electrify buses

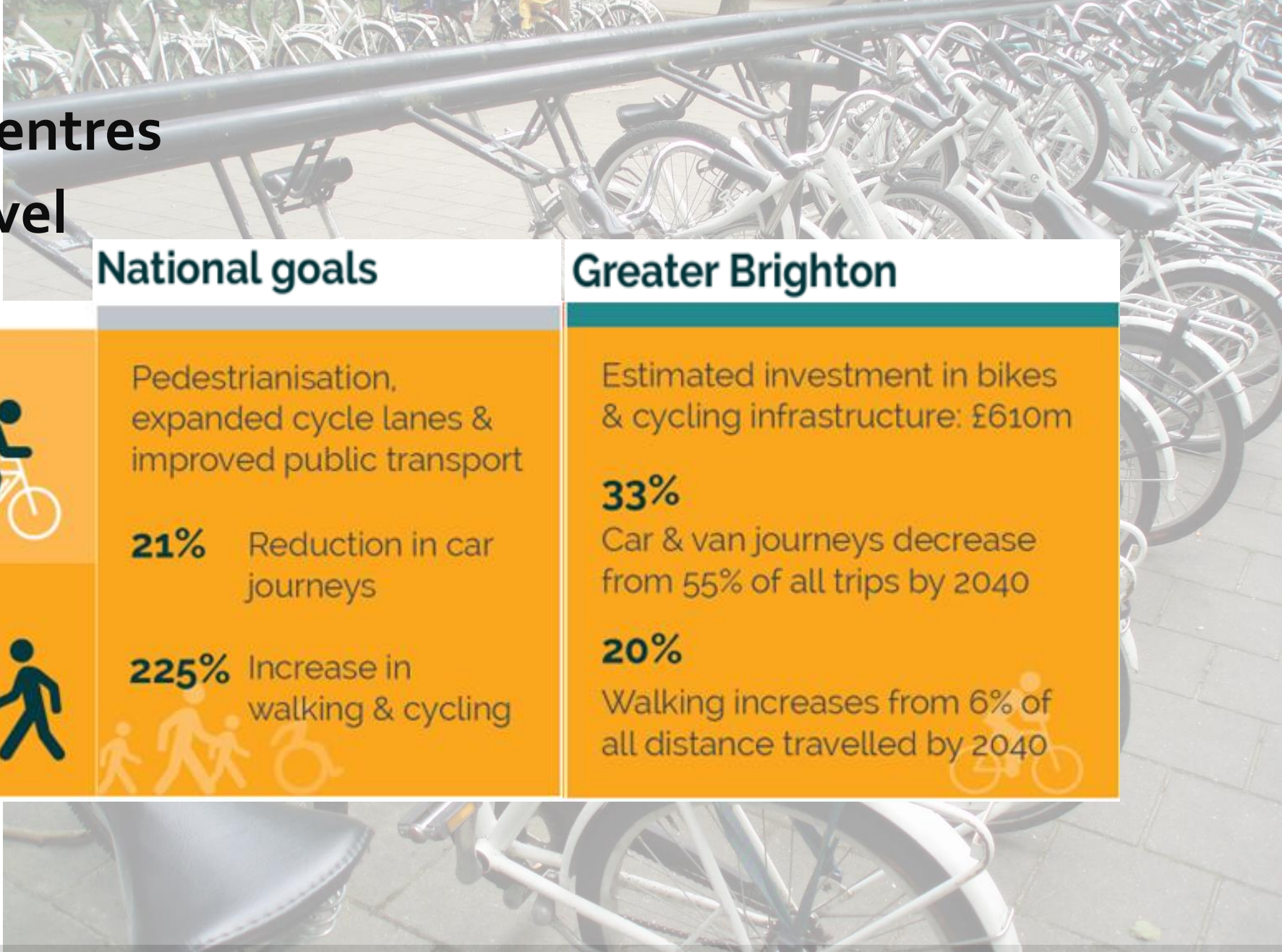
£200 to £400m Reintroduction of Brighton & Hove tram system

Rapid transit/ light rail expansion

- Reintroduction of trams in Brighton and Hove?
- Systems in similar UK cities have cost £ 200- £ 400m



Car-free city centres and active travel



National goals

Pedestrianisation, expanded cycle lanes & improved public transport

21% Reduction in car journeys

225% Increase in walking & cycling

Greater Brighton

Estimated investment in bikes & cycling infrastructure: £610m

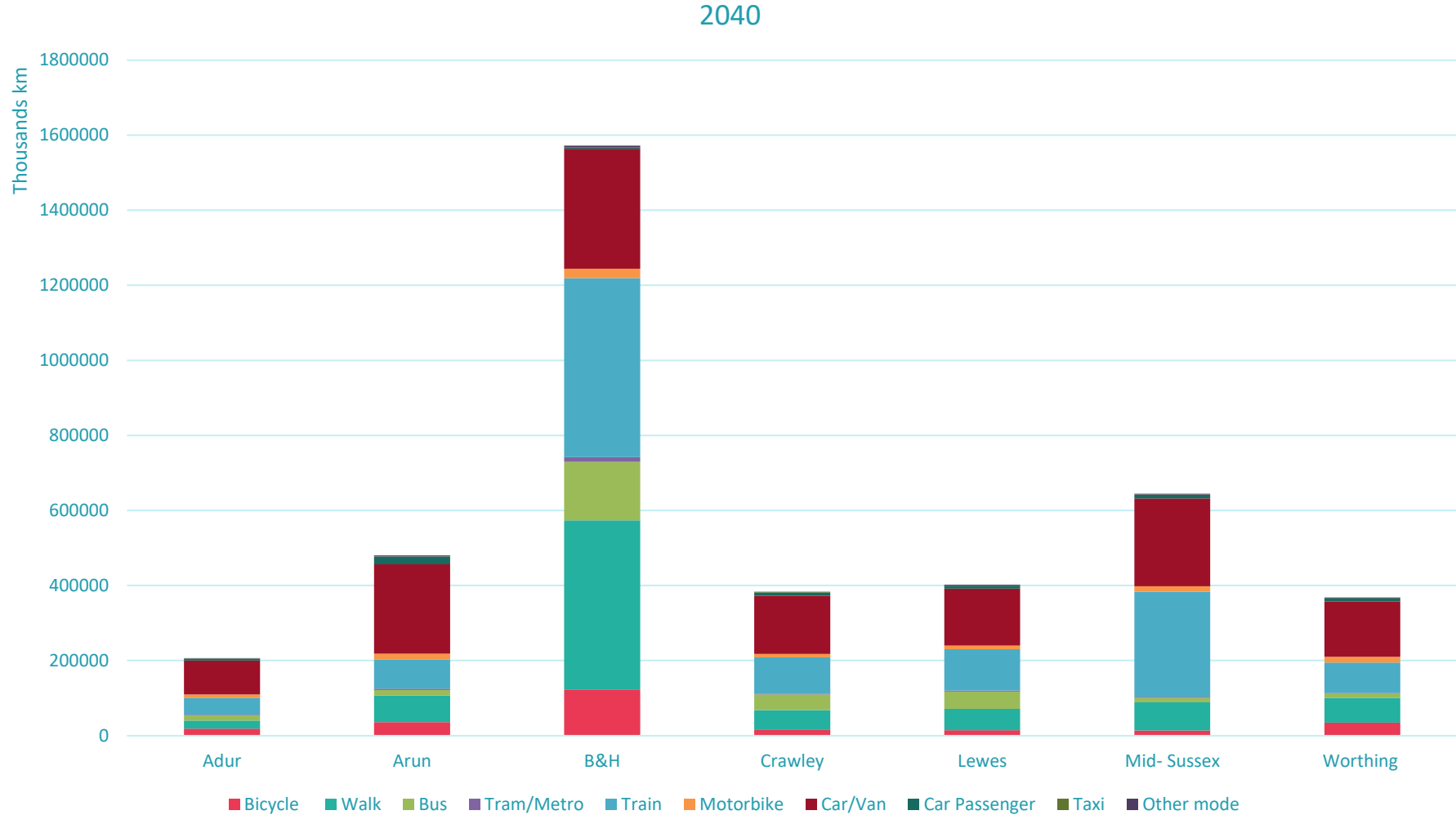
33% Car & van journeys decrease from 55% of all trips by 2040

20% Walking increases from 6% of all distance travelled by 2040



Modal shifts

- Huge expansion in walking and cycling
- Significant reduction in volume & proportion of journeys taken by car



Expanding green spaces and nature restoration

National goals

Greater Brighton

218.8Mt

Cumulative carbon sequestered by 2040 using broadleaved native woodland

800ha

Required to deliver the local share of afforested land

2,338km²

Land required

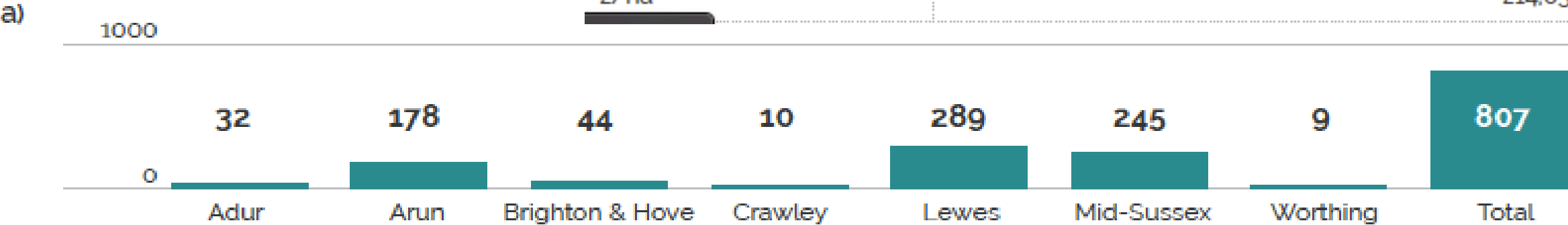
£11m

In carbon credit payments by 2040

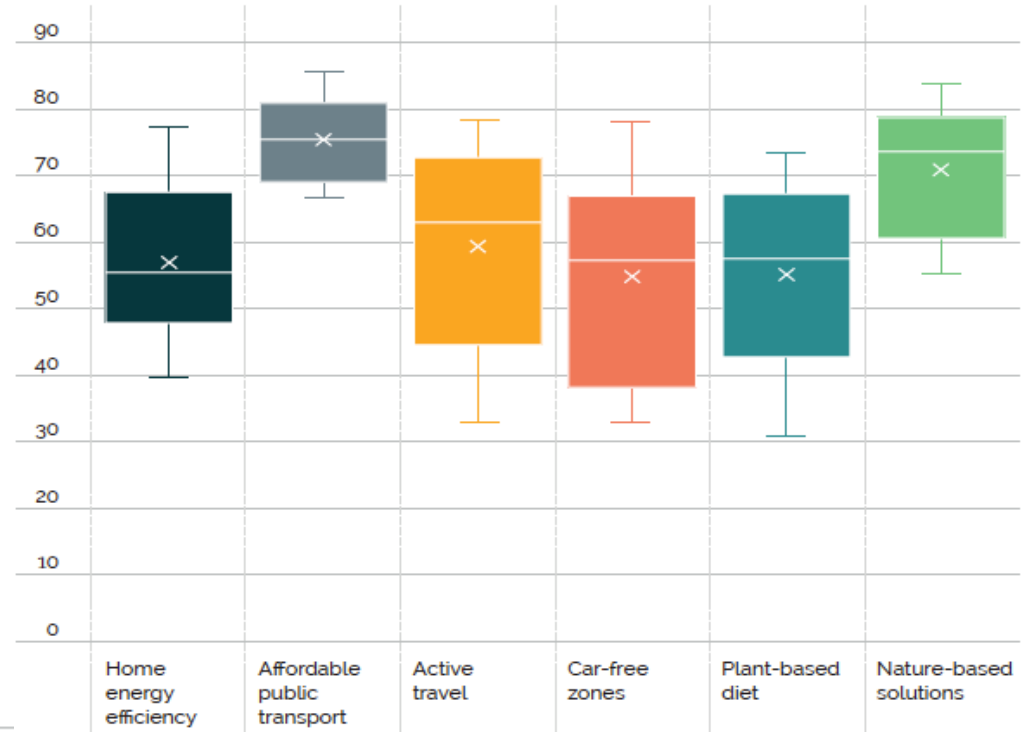
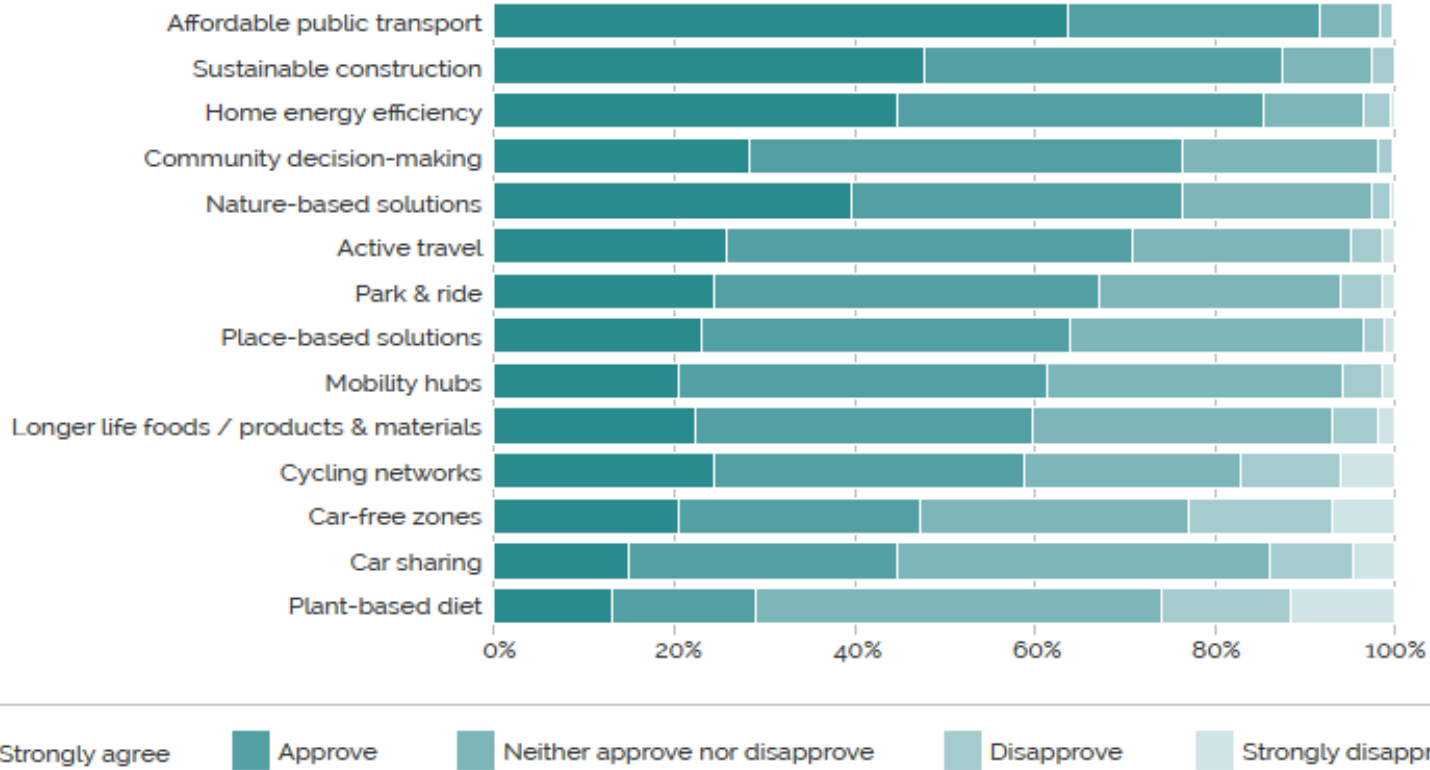


Afforestation scale & costs

	Afforested Land (Ha)	tCO ₂	Carbon Sequestration Costs
Adur	32	29,626	£444,388
Arun	178	166,702	£2,500,526
Brighton and Hove	44	40,907	£613,608
Crawley	10	9,651	£144,764
Lewes	289	270,414	£4,056,211
Mid Sussex	245	229,326	£3,439,891
Worthing	9	8,355	£125,323
Greater Brighton Total	807	754,981	£11,324,710
£/ha			£14,038



How popular are these measures?



Survey with n= 343 Greater Brighton Residents

Detailed focus group with 25 residents