Stakeholder consultation - WPD Distribution Future Energy Scenarios

East Midlands licence area - 20 May 2020

Regen

Regen is a mission-led membership organisation, a centre of energy expertise and market insight. We work with community energy groups, local authorities, network operators, developers and other stakeholders to help decarbonise, decentralise, and democratise the energy system.

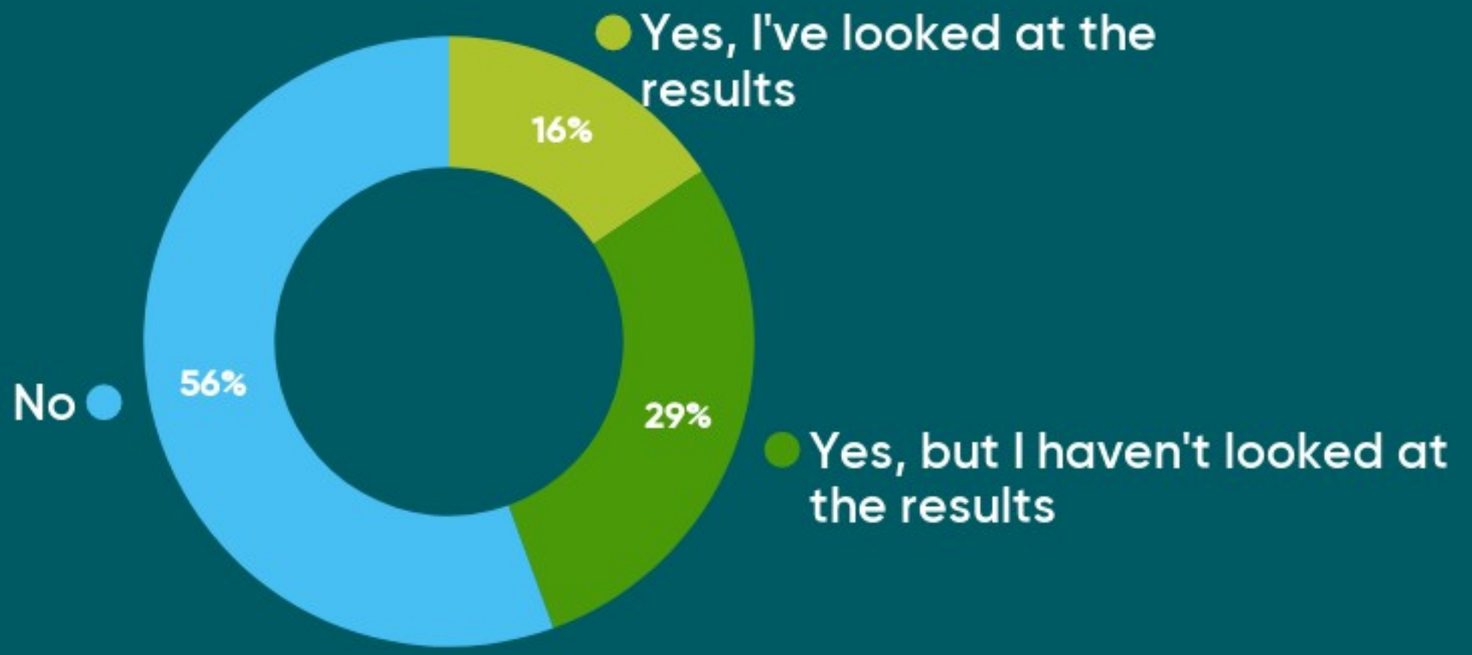
Agenda

- WPD - Network strategy for net zero future energy scenarios
- Regen - Modelling the 2020 future energy scenarios
- Regen - Modelling new homes and non-domestic developments
- Q&A

Menti.com to interact with the presentations

Ask questions on your phone using the code above, please leave a name and email address so that any not answered in the time we can contact and answer separately.

Were you aware of the WPD Distribution Future Energy Scenarios process before today?



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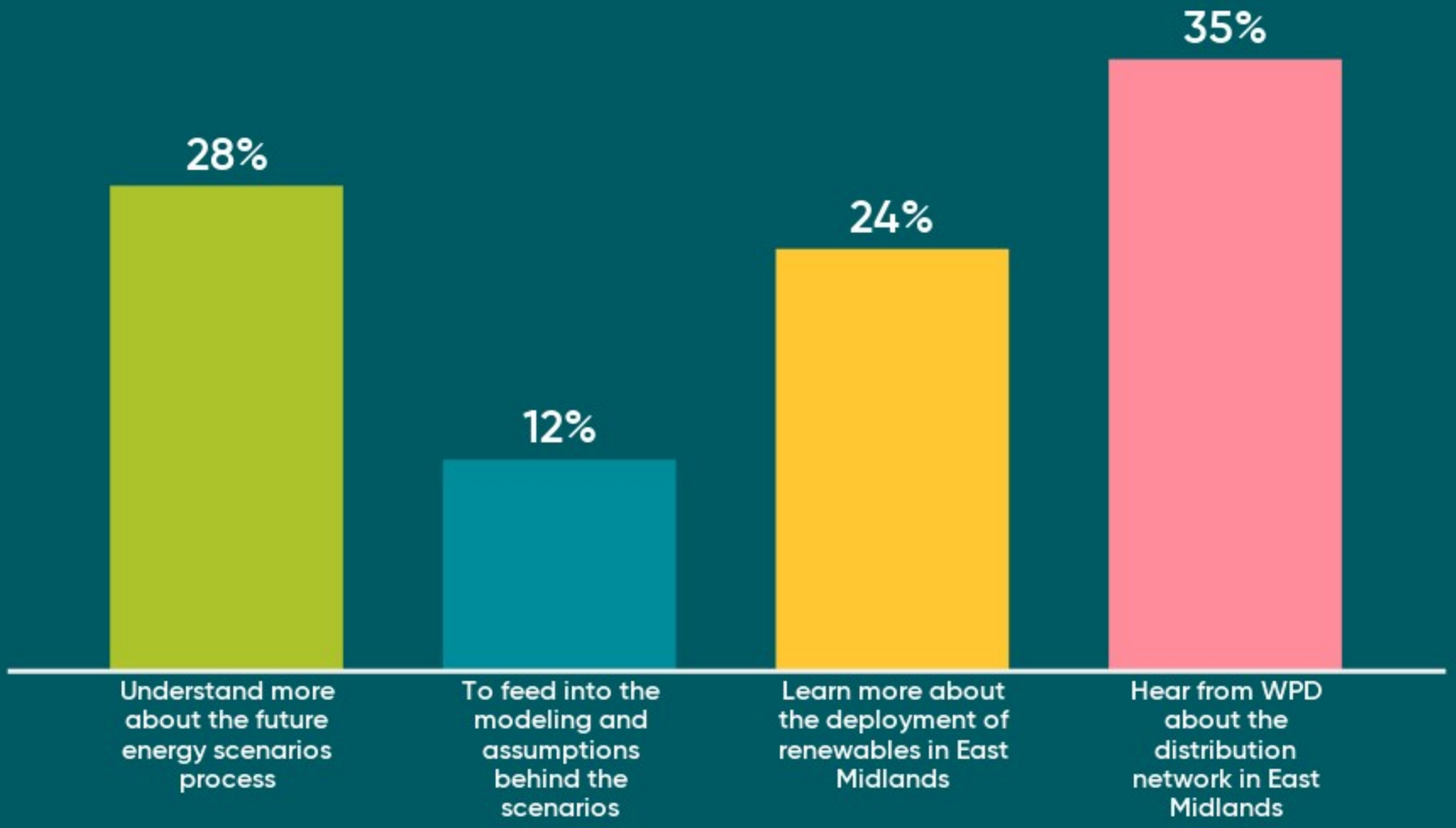
What do you want to get out of today?



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Network strategy for net zero future energy scenarios

Oli Spink - Network Strategy Engineer at Western Power Distribution

Distribution Future Energy Scenarios

Oliver Spink
Network Strategy Engineer

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Topics to Cover

- What are the Distribution Future Energy Scenarios (DFES)?
- Why is the DFES necessary?
- Updates for 2020 DFES
- What is the DFES used for in WPD?

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Distribution Future Energy Scenarios

- As a distribution system operator, we are responsible for facilitating the **electricity** needs of our customers.

- To continue to meet the needs of our customers, we need to understand their future **energy** requirements and likely energy supply mix.

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The need for scenario based planning

- Traditional extrapolation from historic trends are no longer sufficient.
- Need to understand the potential growth of:
  - Emerging demand like EVs and HPs
  - Distributed generation (DG)
  - Battery storage
  - Domestic and non-domestic conventional demand growth
- Understanding the differences between areas of our network, and accepting that a UK view of the future may not correlate with a local picture.

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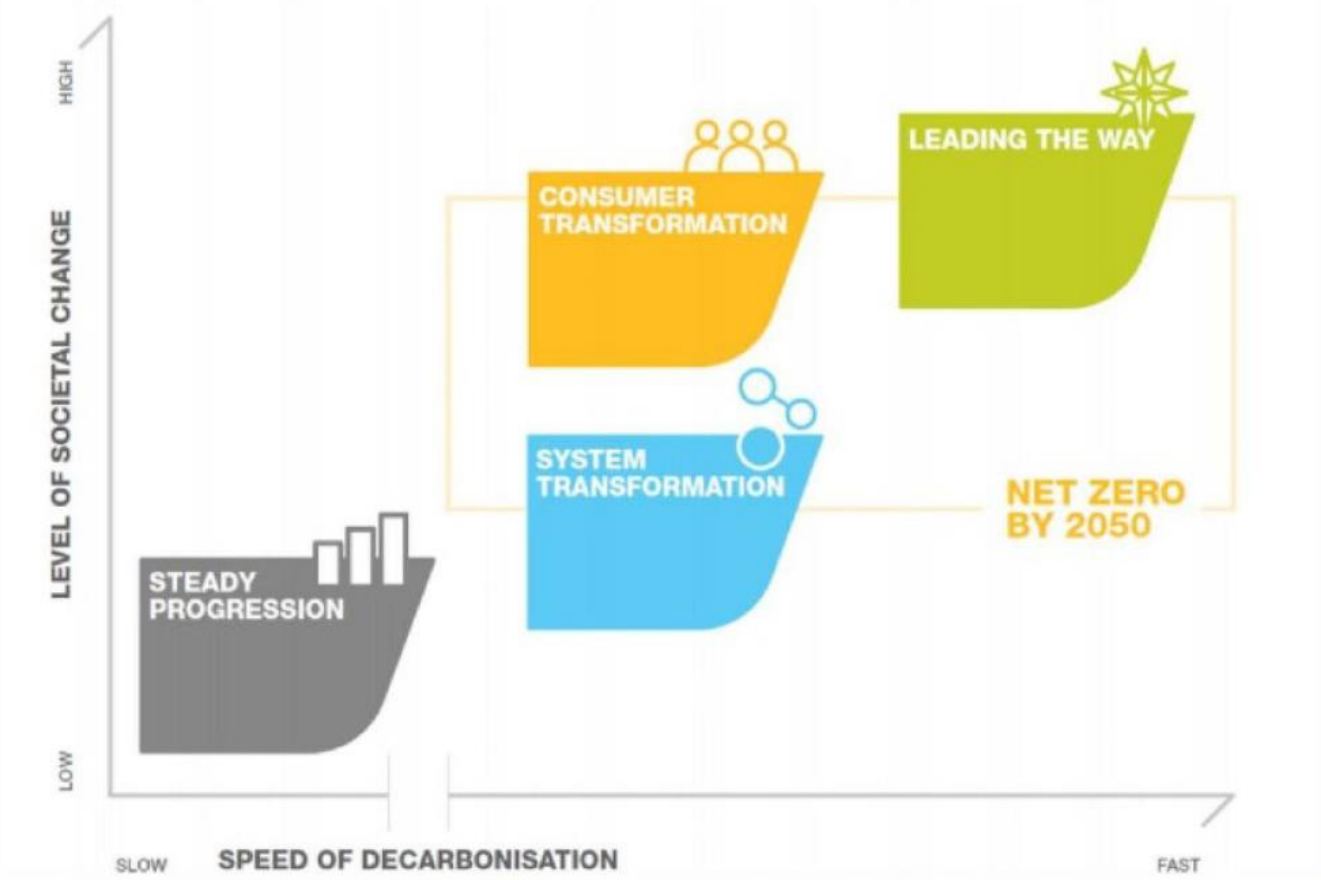
Industry Aligned Scenario Framework

The FES 2020 scenario framework

The FES 2020 scenario framework has been designed to explore the most fundamental drivers of uncertainty in the future energy landscape and reflects extensive analysis and consultation with industry. The new scenario framework is shown below.



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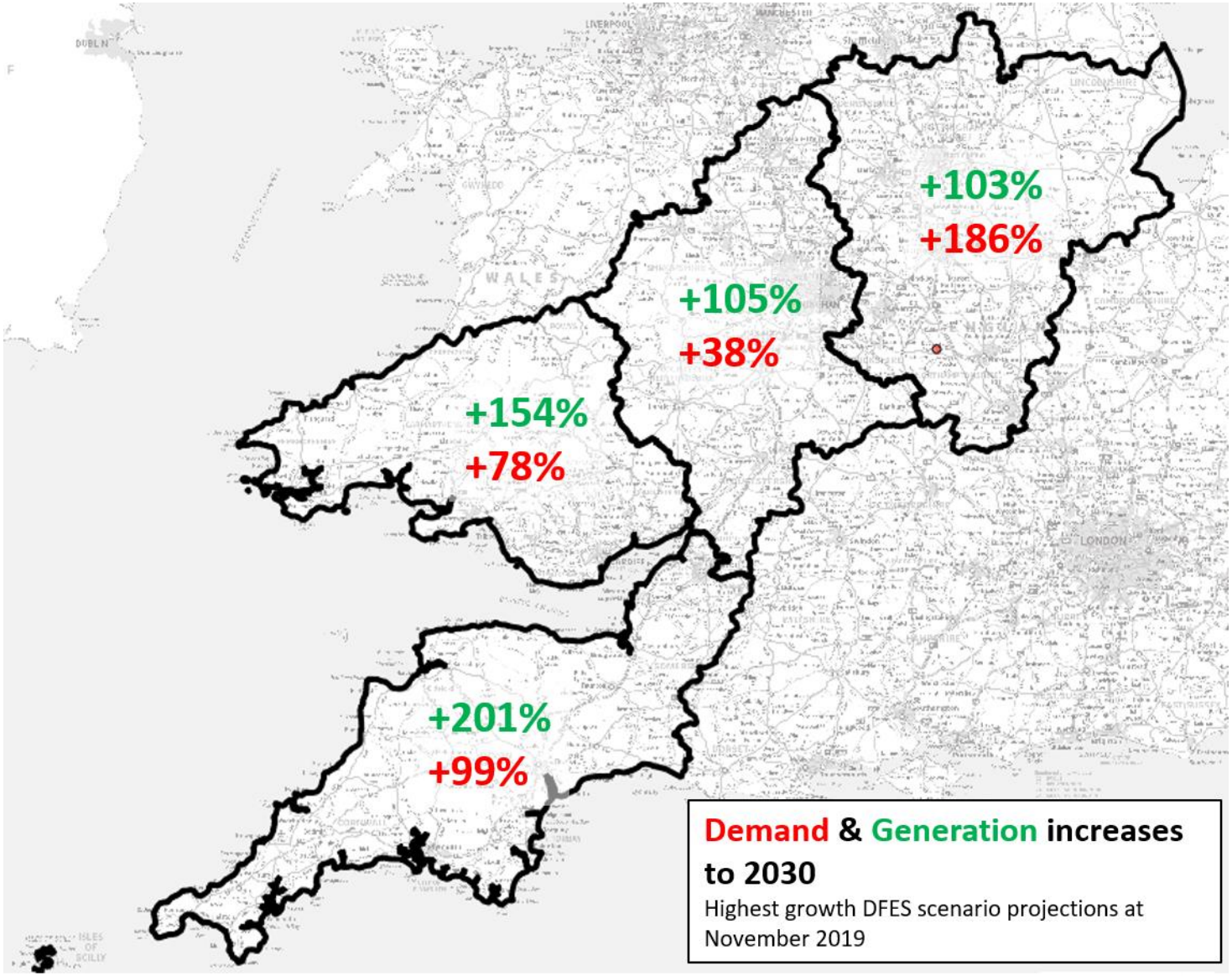
The need for regional scenarios



With reference to a 2019 baseline in each licence area.

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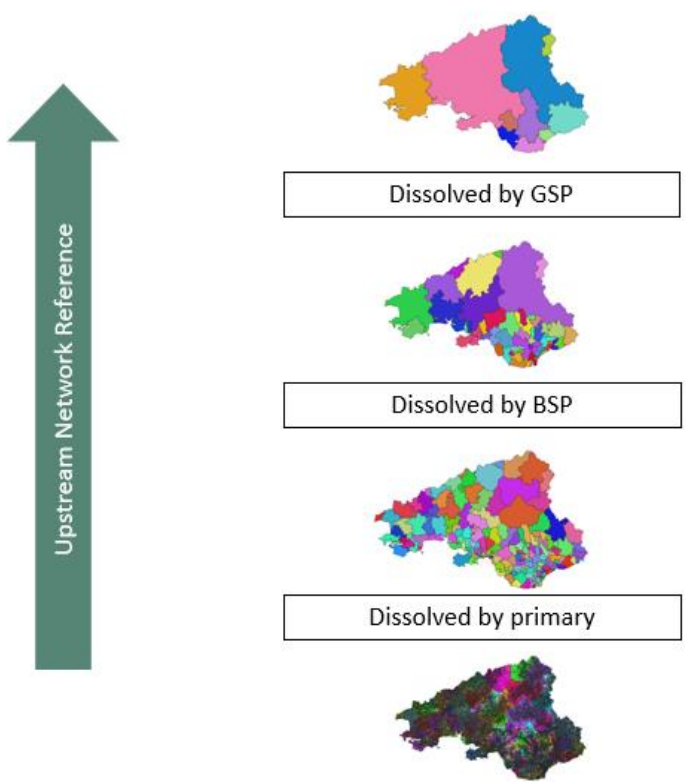
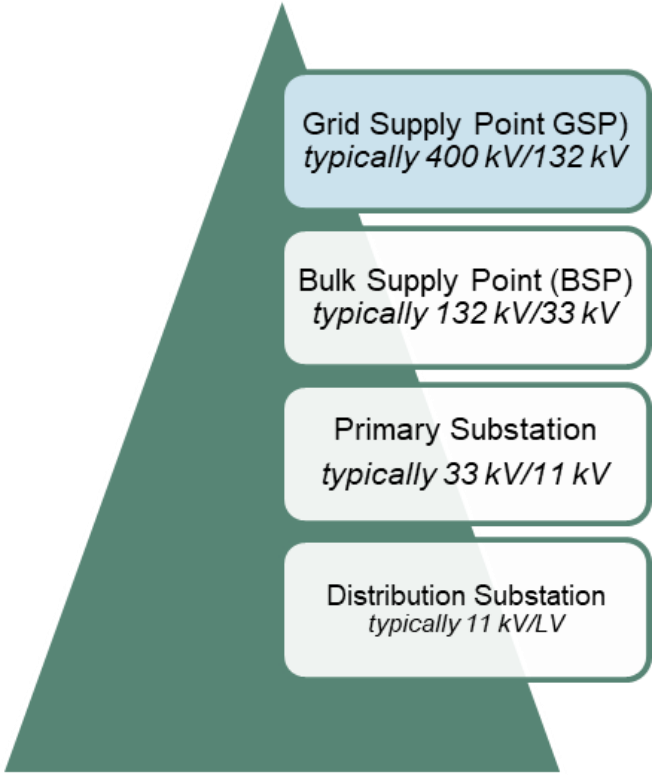
DFES Process – mapping forecasts to our network

Electricity Supply Area – a geographical area which represents a block of demand and generation as visible from the distribution network, sharing the same upstream network infrastructure.





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DFES Process – mapping forecasts to our network

Electricity Supply Area – a geographical area which represents a block of demand and generation as visible from the distribution network, sharing the same upstream network infrastructure.

DFES Round 2

DFES Round 3

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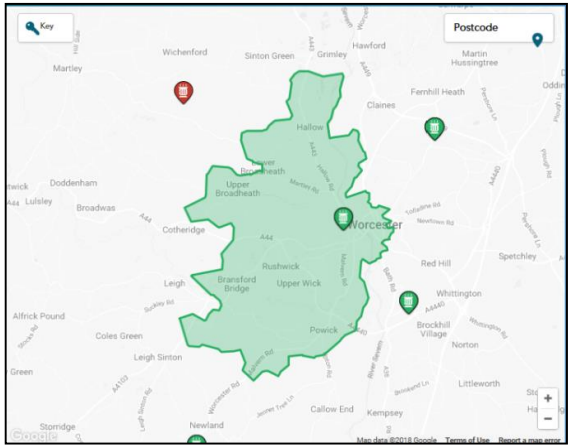
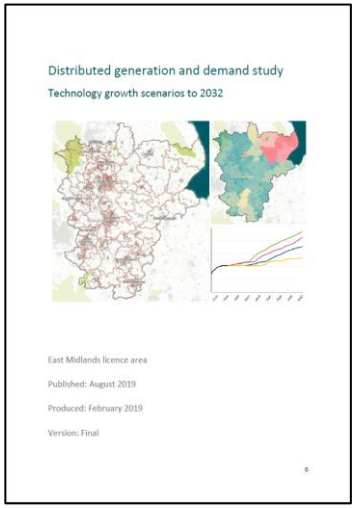
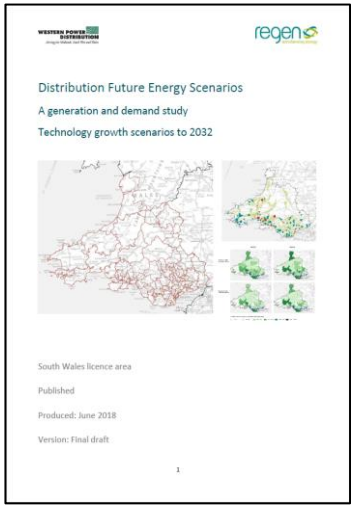
DFES Process – Study Outputs

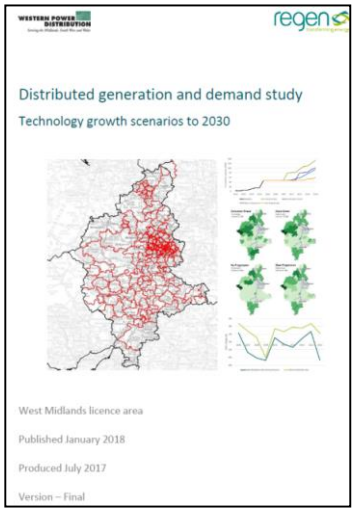
Dataset, with a growth projection for each unique combination of:

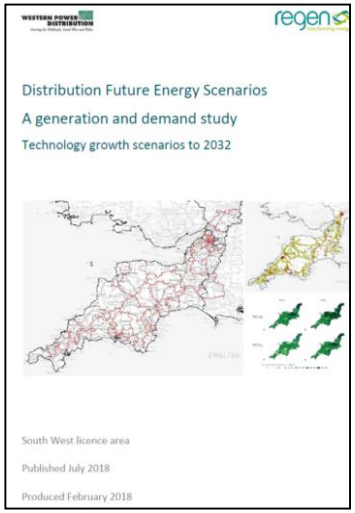
- Electricity Supply Area (~3000)
- Technology type (~50)
- Scenario (4)
- Year (20)











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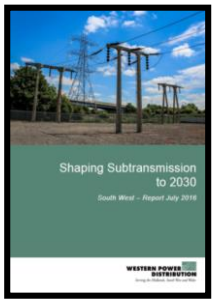
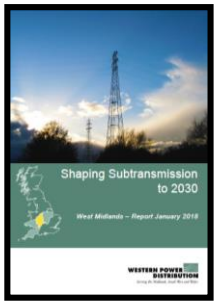
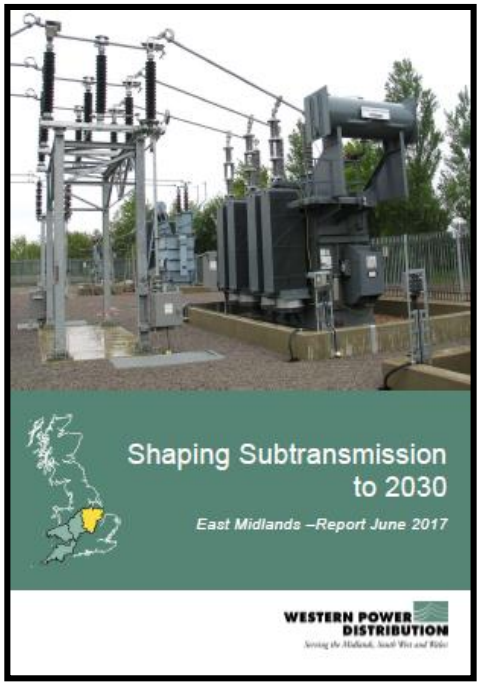
What is the DFES used for in WPD?

Shaping Subtransmission

- Detailed network review of the subtransmission network
- DFES a direct input into Shaping Subtransmission studies
- Completed on a periodic cycle
- For each combination of scenario, year, day and half-hour the network is assessed for thermal issues, voltage violations and lost load under intact and credible outage conditions
- Recommend different reinforcements/solutions to solve network constraints in different years and scenarios
- Publish a report with a summary of findings and run a webinar







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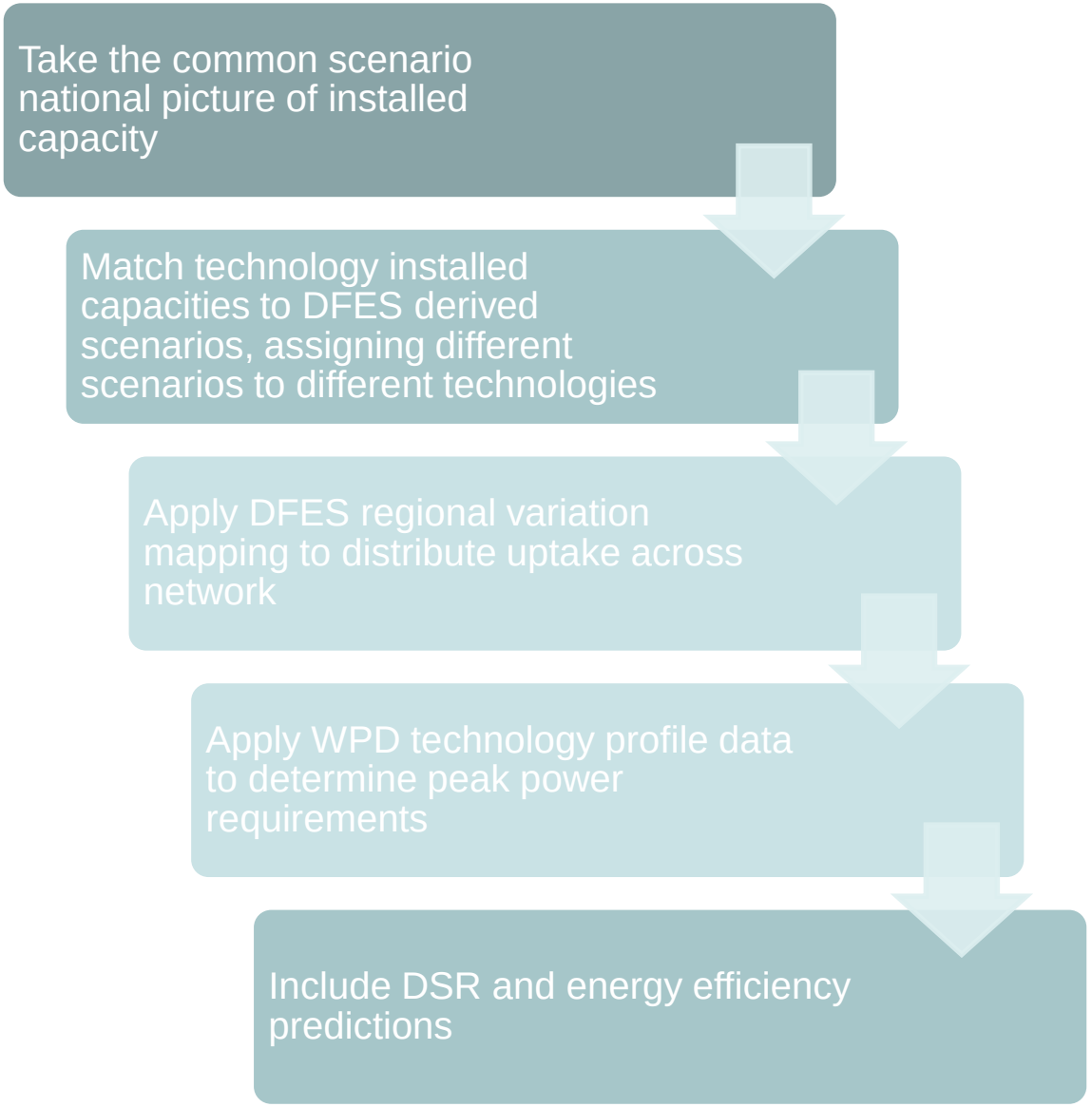
What is the DFES used for in WPD?



RIIO-ED2 Business Planning

Uses the Ofgem Common Scenario framework which is aligned to the DFES scenario projections, to create a WPD view of the future for ED2 Planning Purposes.

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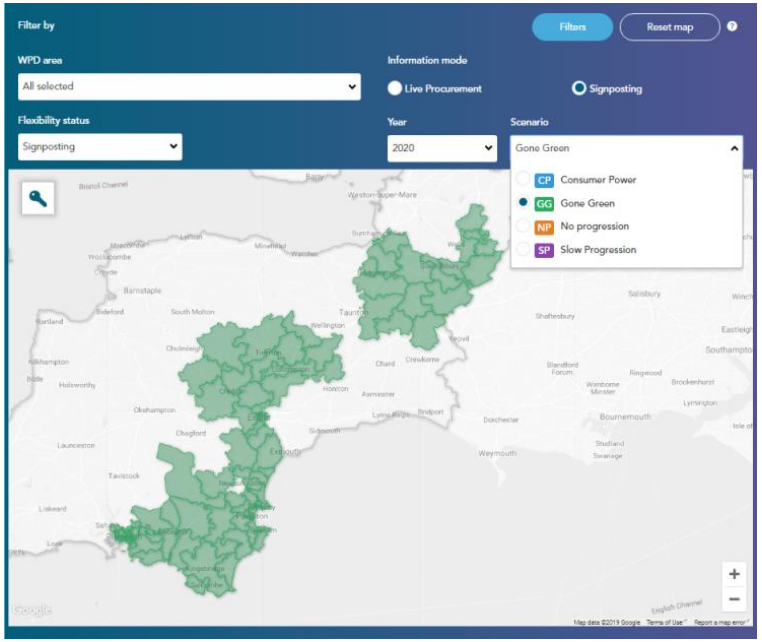
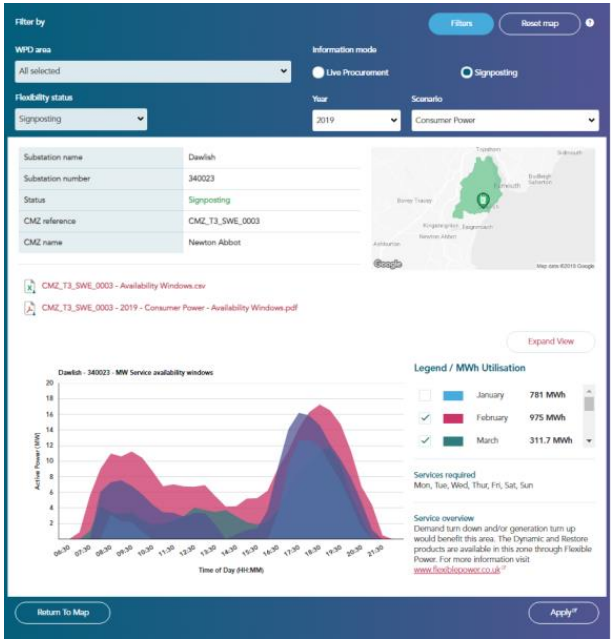
What is the DFES used for in WPD?

Signposting – highlighting potential system needs for flexibility services aligned with the DFES scenario projections.

Flexible Power – procurement of services (where appropriate) to alleviate a potential constraint.





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What is the DFES used for in WPD?

Improving Data Transparency

WPD publish DFES scenario data on our website at:

www.westernpower.co.uk/distribution-future-energy-scenarios-map

Further Collaboration

If you have any questions in relation to WPD's Network Strategy work, please contact WPD on the details below:

Email: wpdnetworkstrategy@westernpower.co.uk

By post:
Network Strategy Team
Western Power Distribution
Feeder Road
Bristol
BS2 0TB

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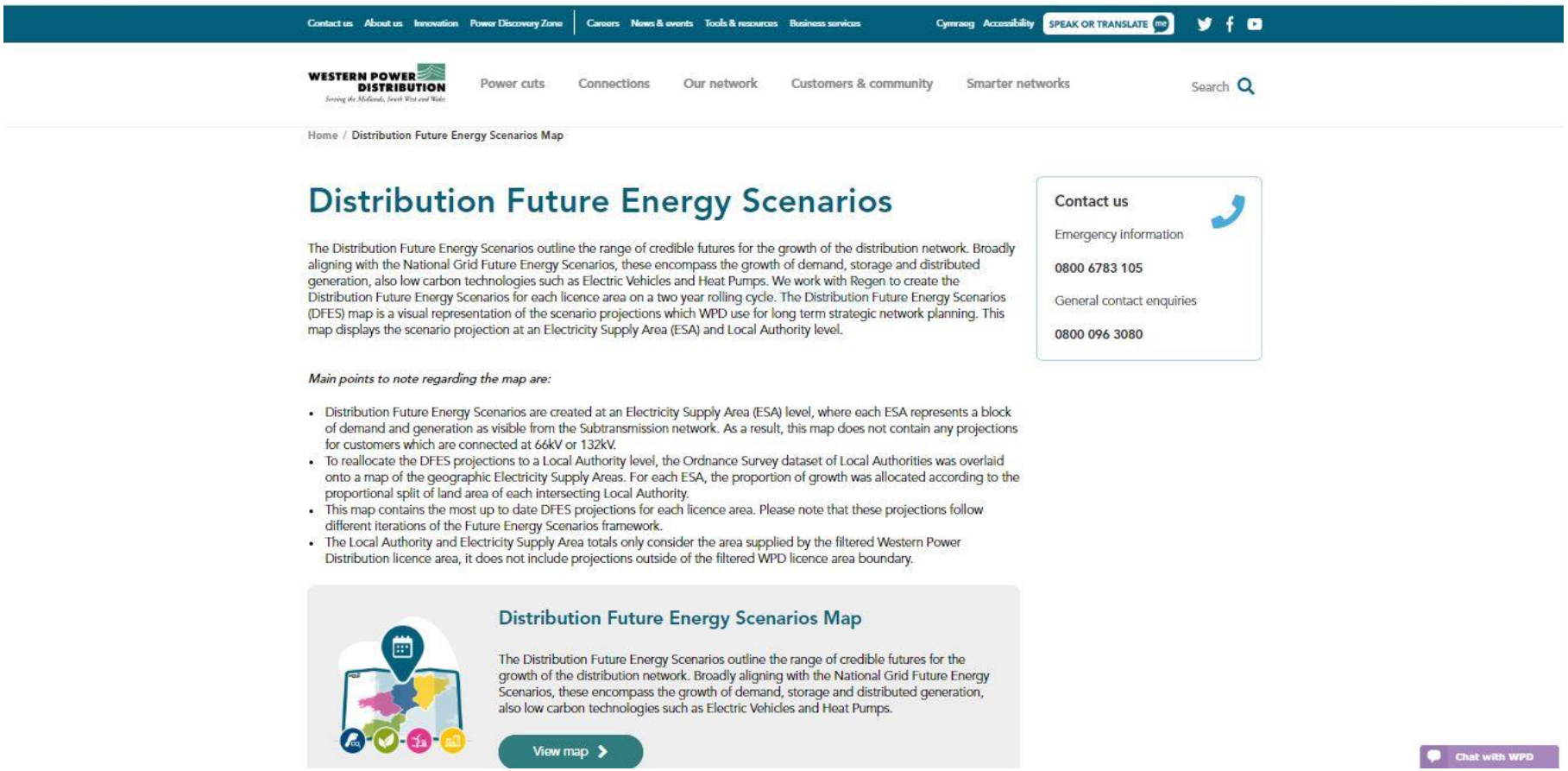
DFES Map



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Home / Distribution Future Energy Scenarios Map

Distribution Future Energy Scenarios

The Distribution Future Energy Scenarios outline the range of credible futures for the growth of the distribution network. Broadly aligning with the National Grid Future Energy Scenarios, these encompass the growth of demand, storage and distributed generation, also low carbon technologies such as Electric Vehicles and Heat Pumps. We work with Regen to create the Distribution Future Energy Scenarios for each licence area on a two year rolling cycle. The Distribution Future Energy Scenarios (DFES) map is a visual representation of the scenario projections which WPD use for long term strategic network planning. This map displays the scenario projection at an Electricity Supply Area (ESA) and Local Authority level.

Main points to note regarding the map are:

- Distribution Future Energy Scenarios are created at an Electricity Supply Area (ESA) level, where each ESA represents a block of demand and generation as visible from the Subtransmission network. As a result, this map does not contain any projections for customers which are connected at 66kV or 132kV.
- To reallocate the DFES projections to a Local Authority level, the Ordnance Survey dataset of Local Authorities was overlaid onto a map of the geographic Electricity Supply Areas. For each ESA, the proportion of growth was allocated according to the proportional split of land area of each intersecting Local Authority.
- This map contains the most up to date DFES projections for each licence area. Please note that these projections follow different iterations of the Future Energy Scenarios framework.
- The Local Authority and Electricity Supply Area totals only consider the area supplied by the filtered Western Power Distribution licence area, it does not include projections outside of the filtered WPD licence area boundary.

Distribution Future Energy Scenarios Map

The Distribution Future Energy Scenarios outline the range of credible futures for the growth of the distribution network. Broadly aligning with the National Grid Future Energy Scenarios, these encompass the growth of demand, storage and distributed generation, also low carbon technologies such as Electric Vehicles and Heat Pumps.

View map

Contact us

Emergency information

0800 6783 105

General contact enquiries

0800 096 3080

Chat with WPD

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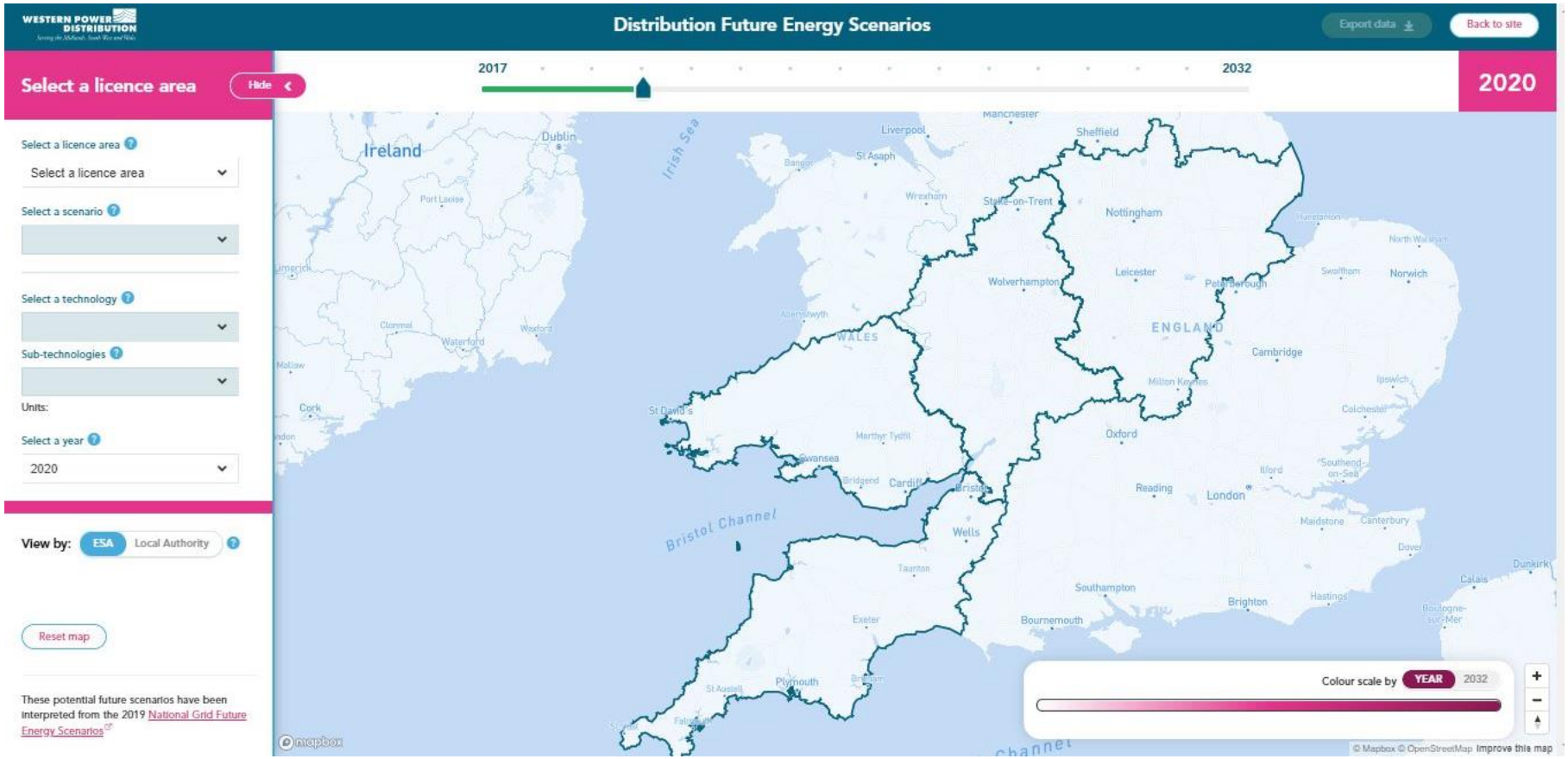
DFES Map



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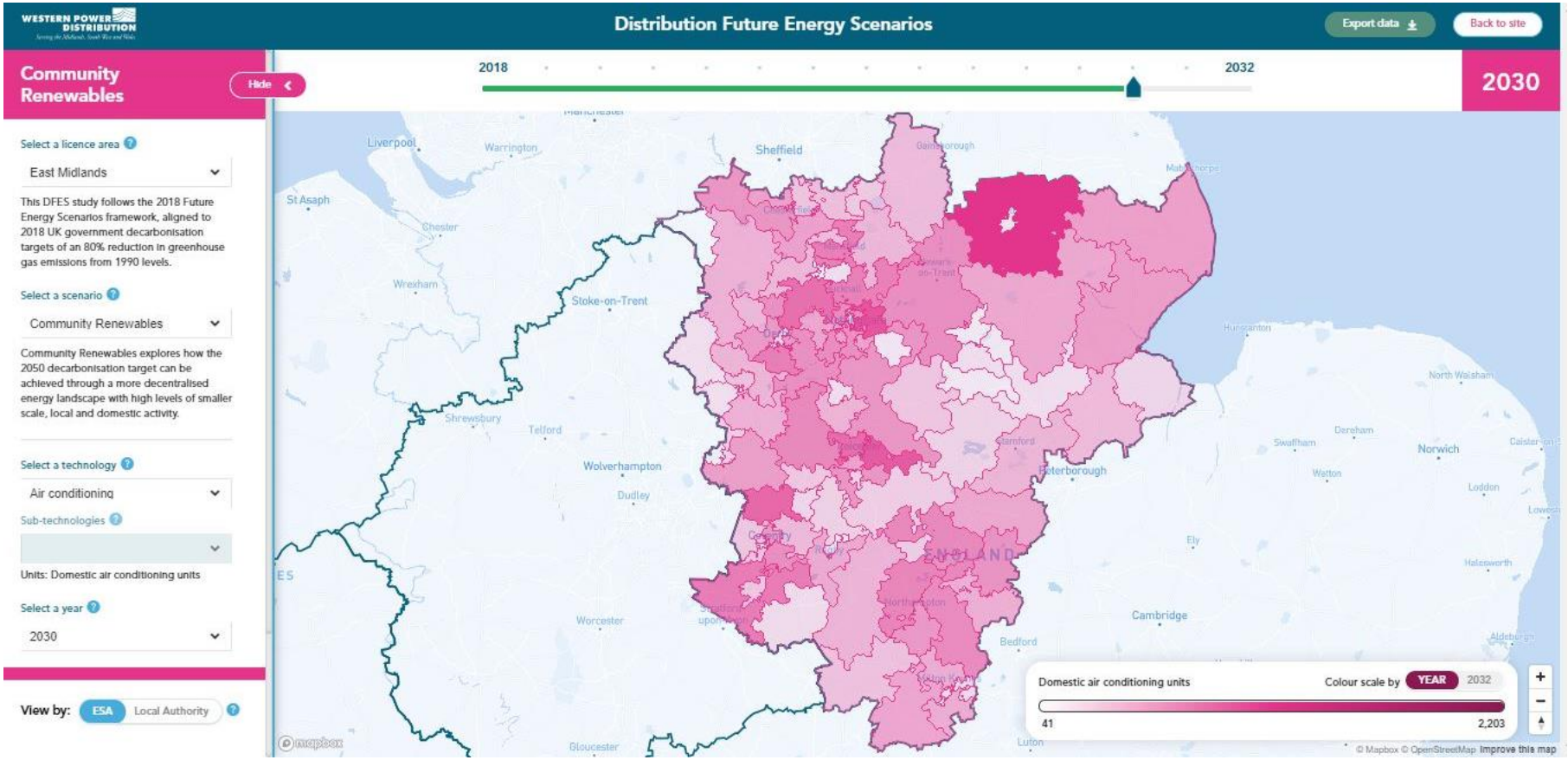

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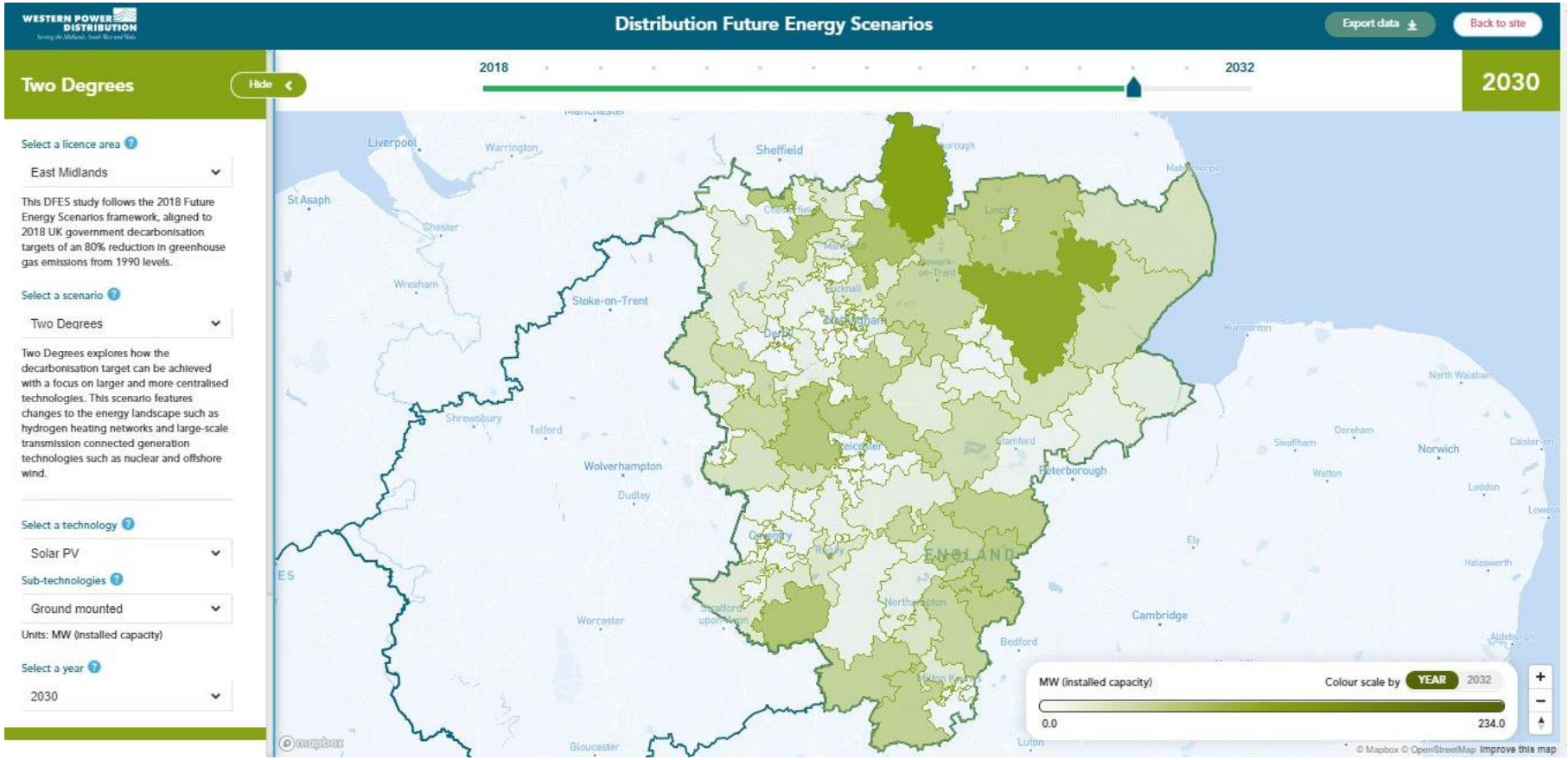

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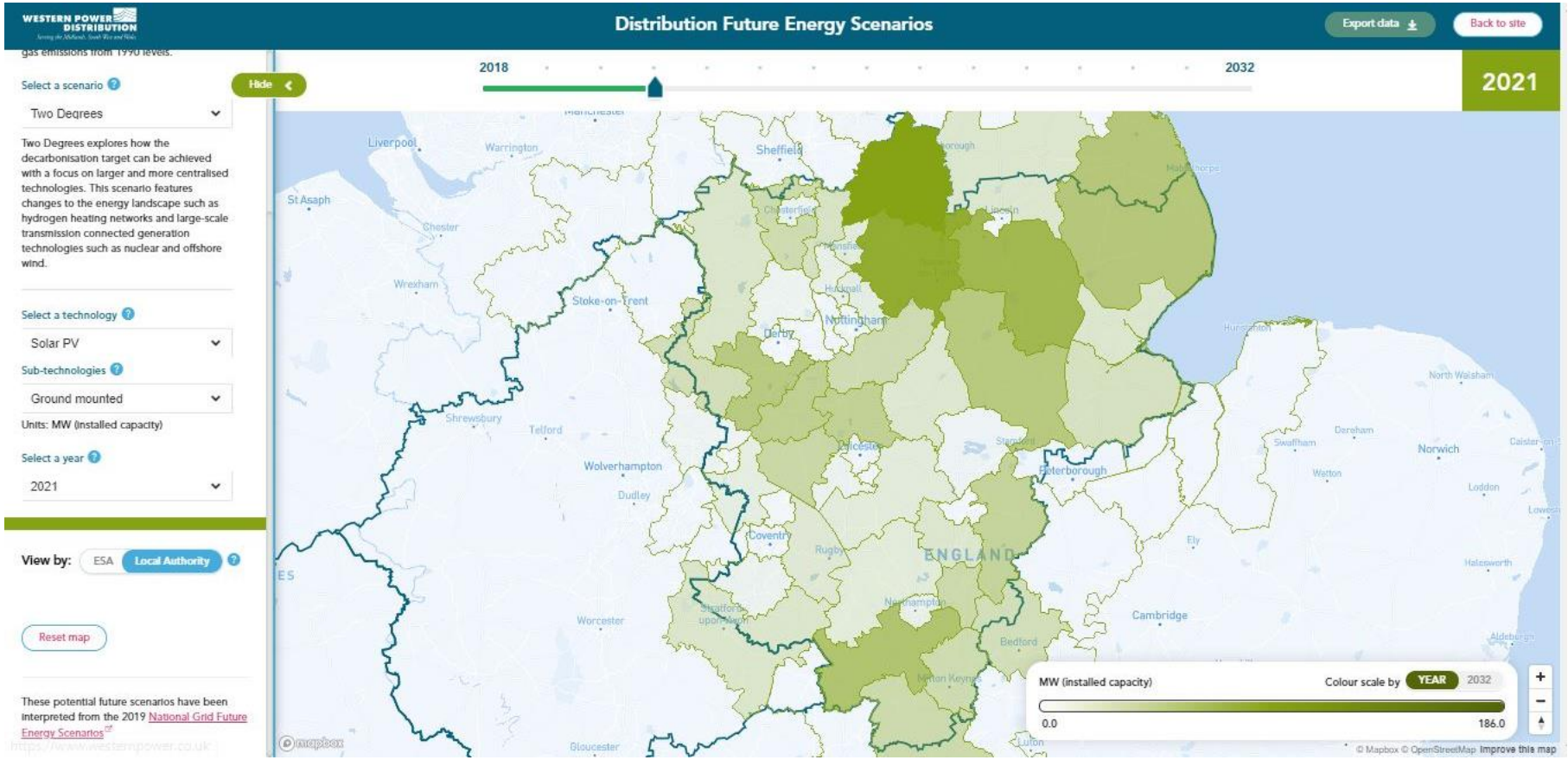
DFES Map



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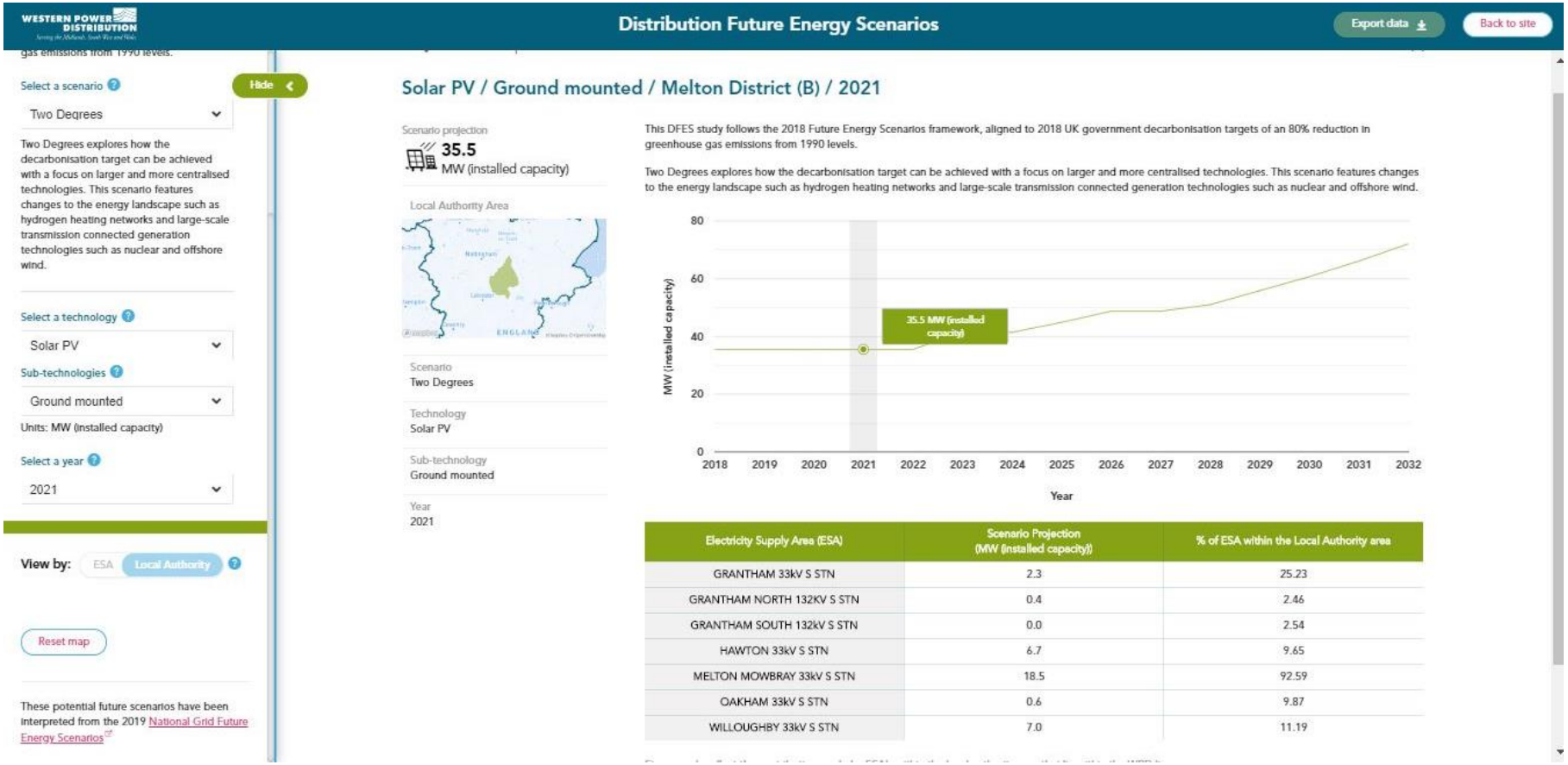
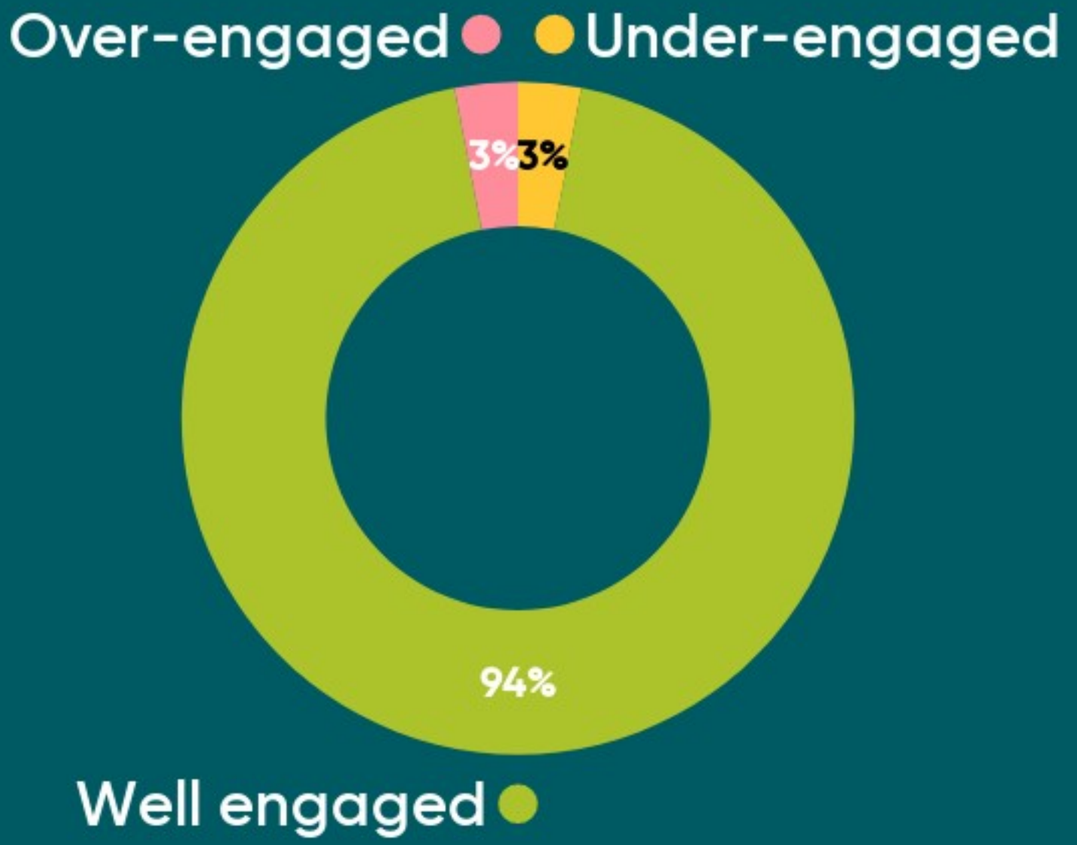
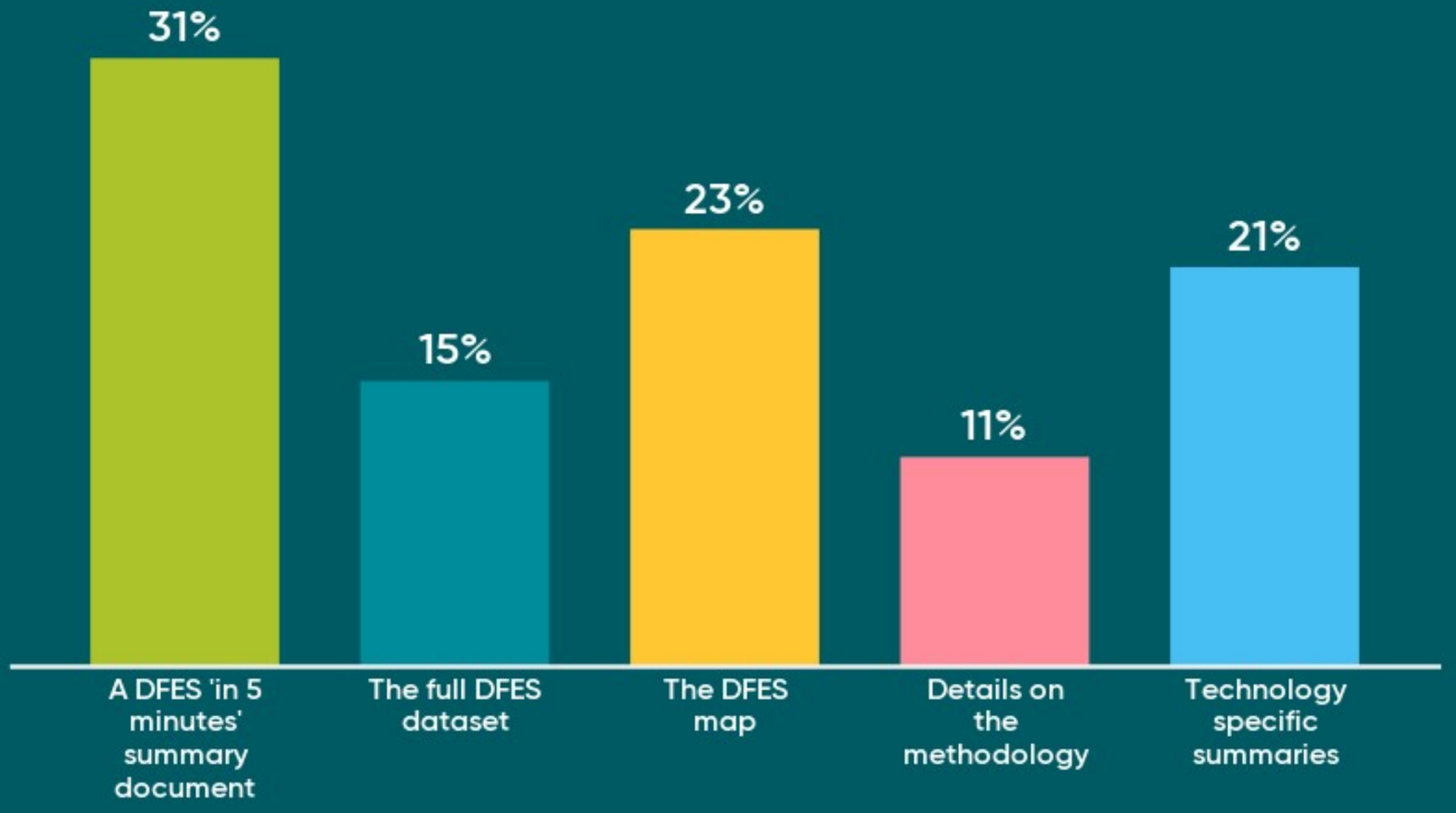


Electricity Supply Area (ESA)	Scenario Projection (MW (installed capacity))	% of ESA within the Local Authority area
GRANTHAM 33kV S STN	2.3	25.23
GRANTHAM NORTH 132KV S STN	0.4	2.46
GRANTHAM SOUTH 132kV S STN	0.0	2.54
HAWTON 33kV S STN	6.7	9.65
MELTON MOWBRAY 33kV S STN	18.5	92.59
OAKHAM 33kV S STN	0.6	9.87
WILLOUGHBY 33kV S STN	7.0	11.19

Stakeholder engagement from WPD



Which WPD DFES publications would be useful to you?



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Input into modelling the 2020 Future Energy Scenarios

Ben Robertson - Analyst at Regen

Scope of work

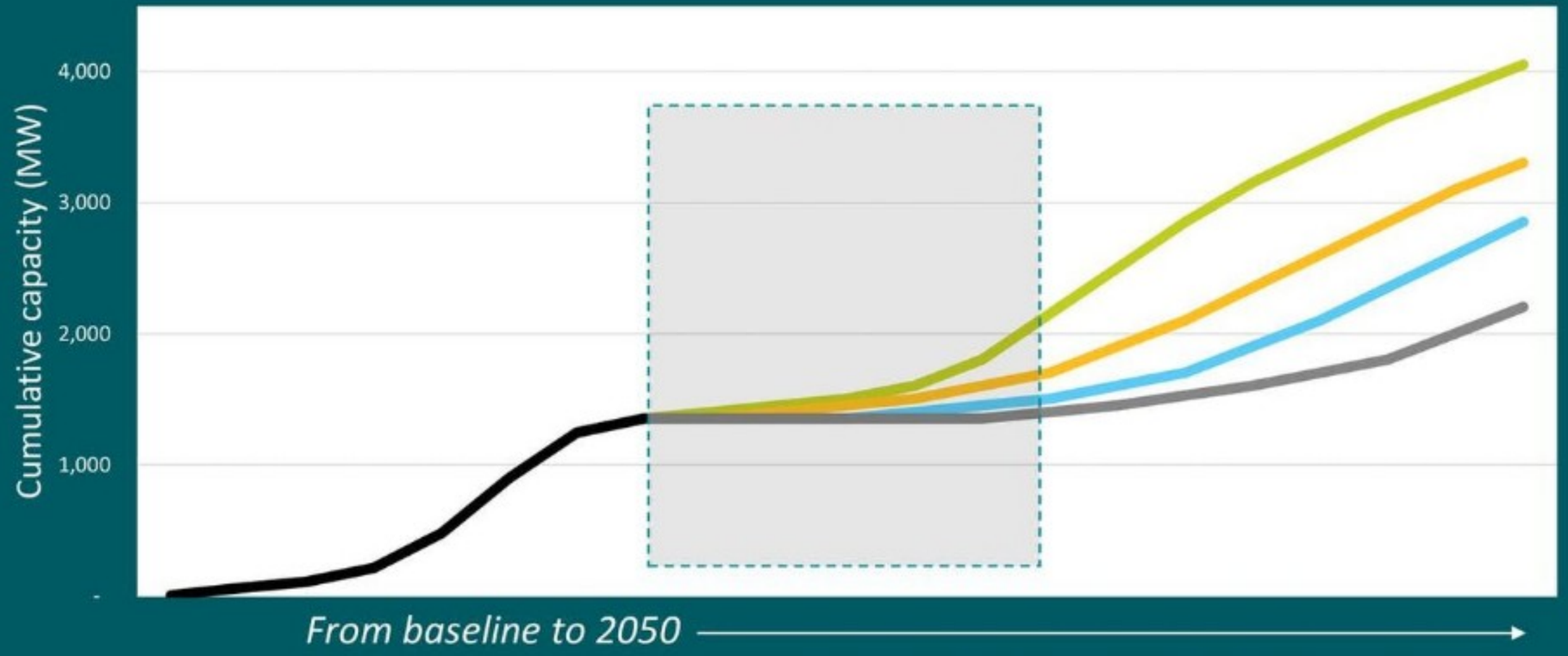
Using the National Grid **Future Energy Scenario (FES)** framework we project installed **generation** / **storage capacity, disruptive demand** technologies, and new **building development**. → the *what*

These are reported down to small **specific areas** within the Western Power Distribution licence areas termed Electricity Supply Areas (ESAs), by year out to **2050**. → the *where* / the *when*

The analysis is informed by **local stakeholders**, such as local government, developers, and community energy groups. → the *why*

Scope of work

1. Baseline → 2. Pipeline / near term growth → 3. Scenarios / long term growth



The FES 2020 scenario framework

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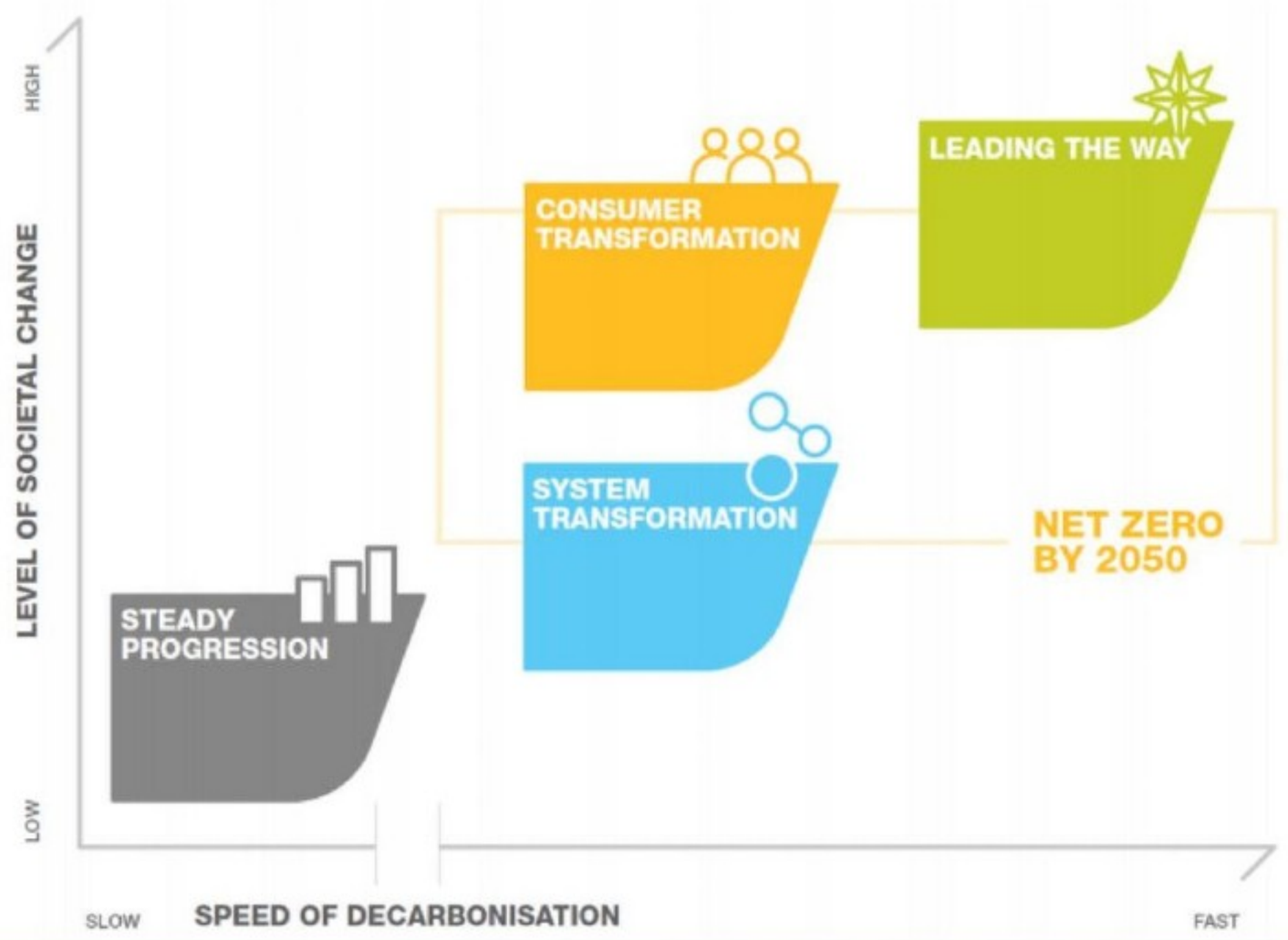


The Future Energy Scenarios set out by National Grid have changed since the last time this study was completed.

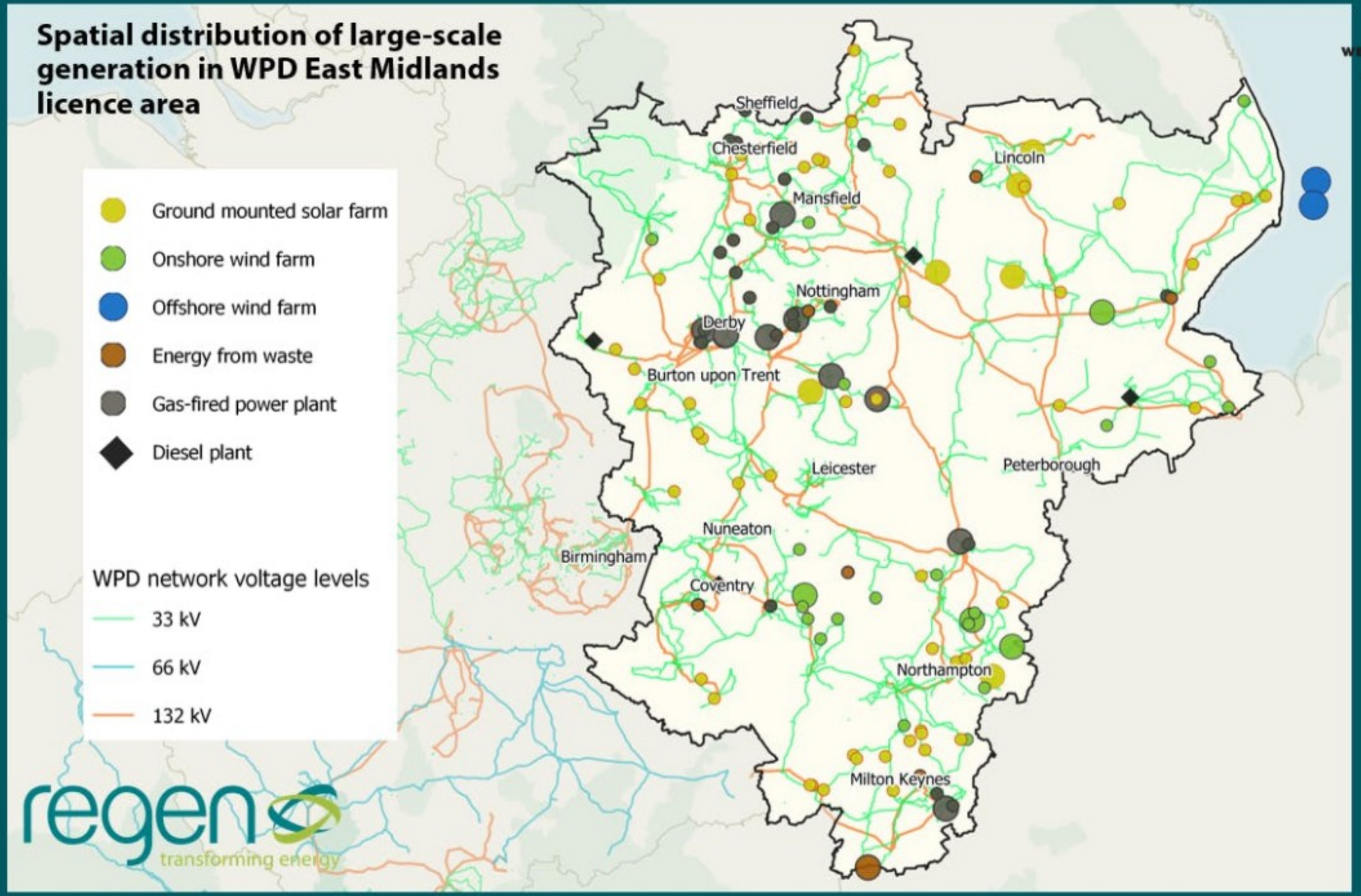
They incorporate recent changes, such as the UK net zero carbon emissions target for 2050.

Geographical scope:

Small network-defined geographies termed 'ESAs' in WPD East Midlands licence area

Coloured by local authority

Spatial distribution of large-scale generation in WPD East Midlands licence area



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Pipeline of future projects

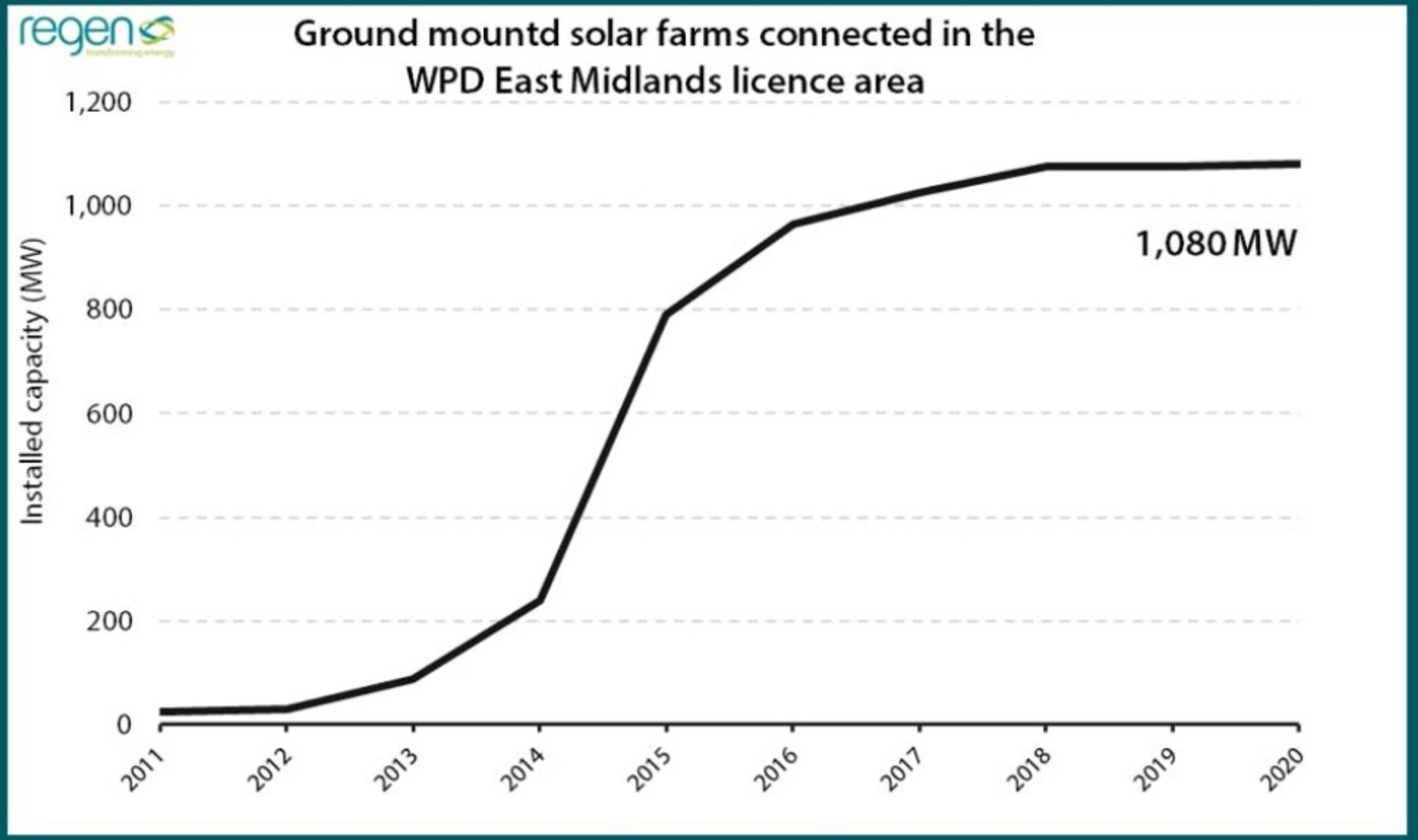
- Over 1,500 MW of solar PV with connection agreements
- Over 90 MW of energy from waste with connection agreements
- Over 160 MW of gas-fired power with connection agreements

We will be looking in-depth at the following technologies:

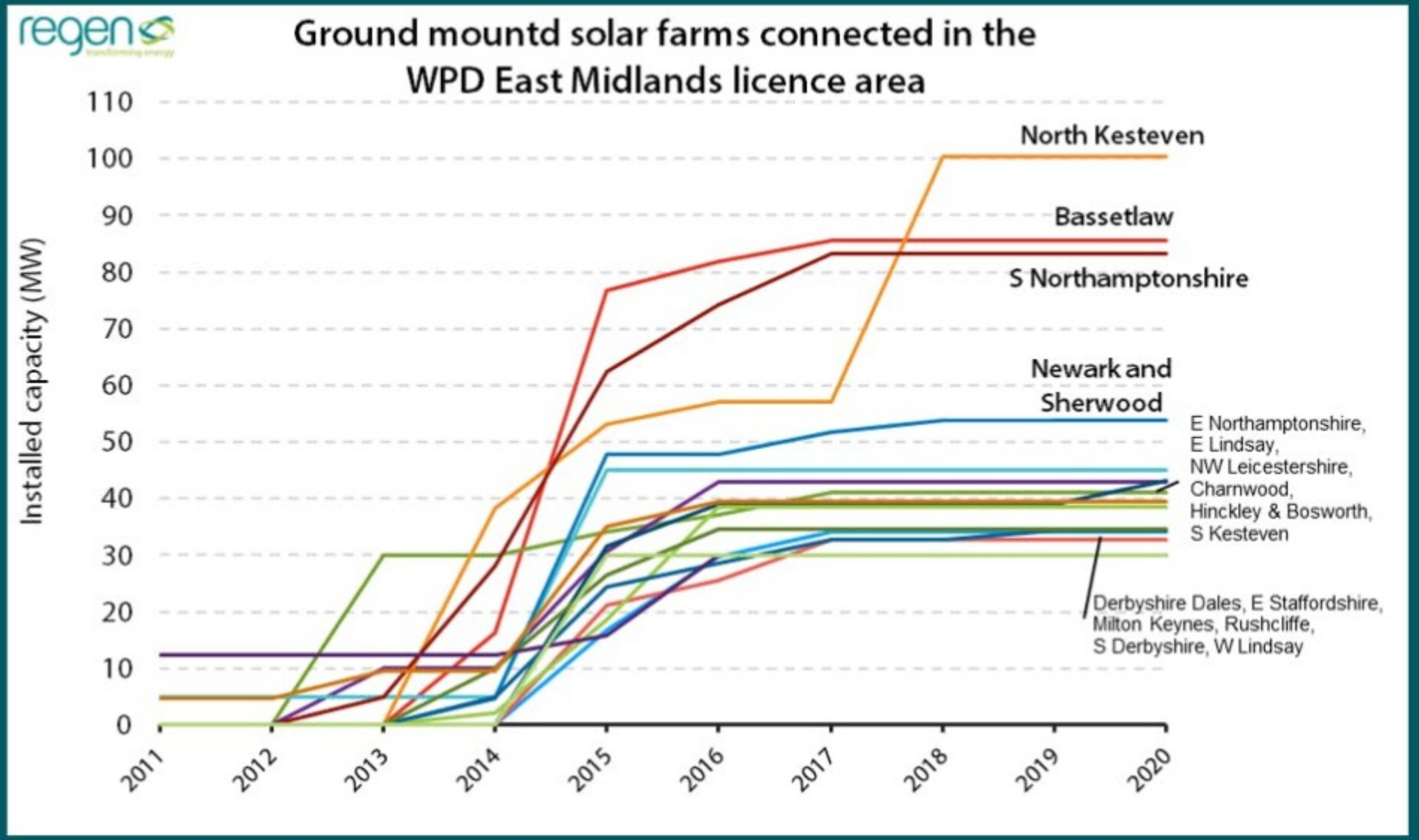
- Ground mounted solar PV
- Fossil fuel generation
- Electric vehicles

Future energy scenarios for ground mounted solar

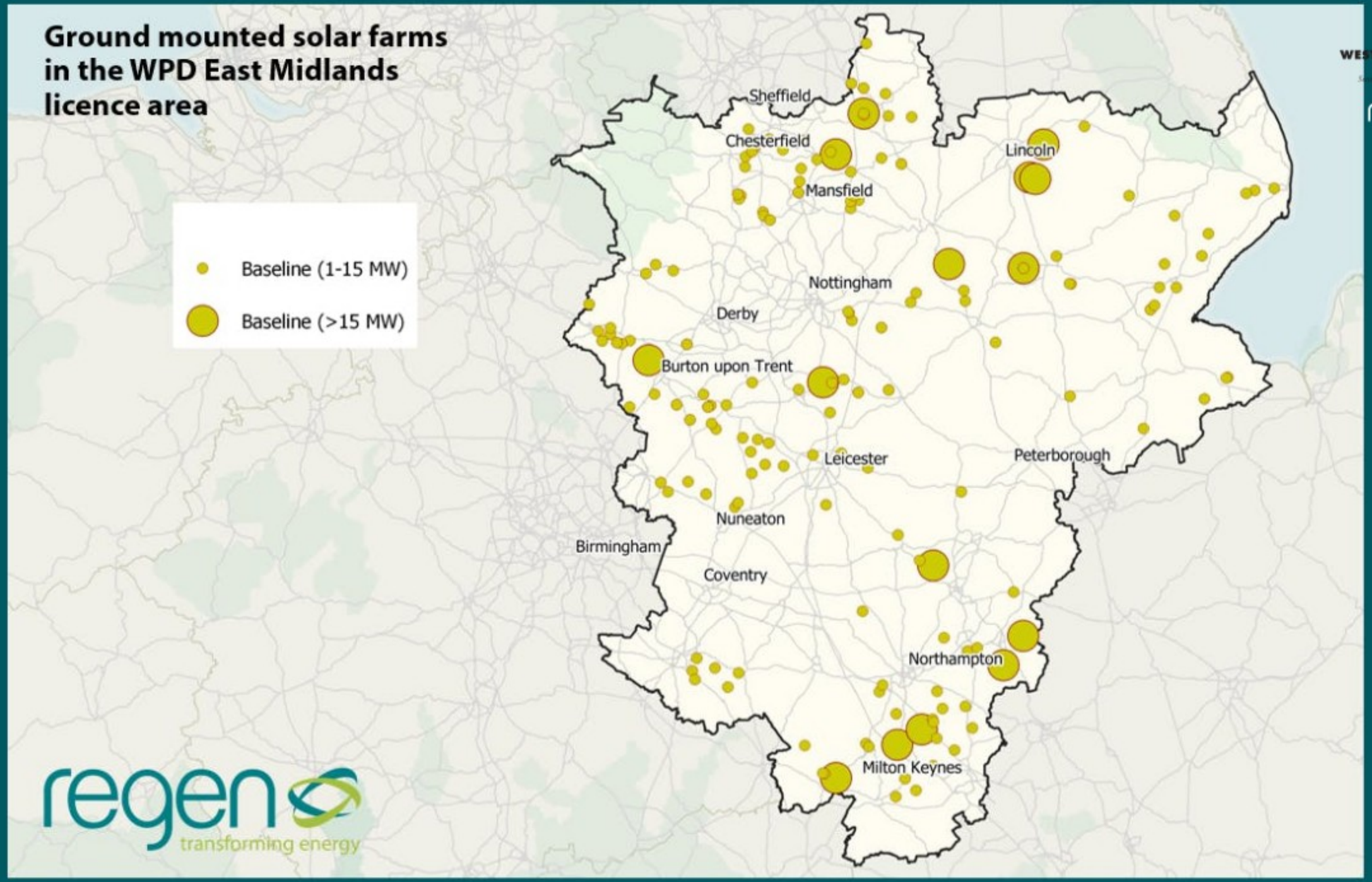
Ground mounted solar PV total baseline



Ground mounted solar PV baseline by local authority



Ground mounted solar farms in the WPD East Midlands licence area



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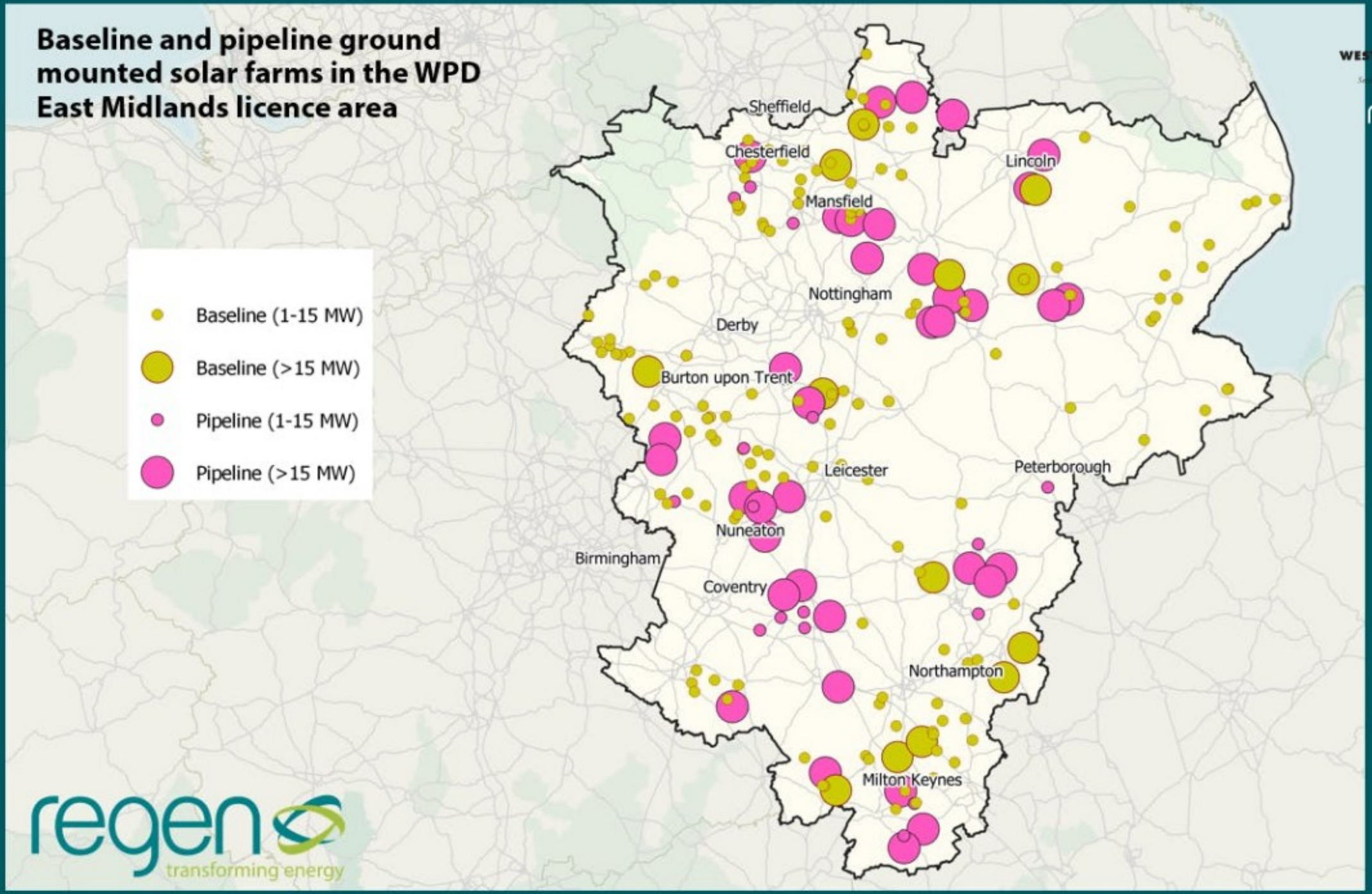
Pipeline of ground mounted solar projects

- 60 ground mounted solar sites (1,580 MW) with a connection agreement
- Average size solar farm in pipeline is 25 MW
- 1,360 MW obtained connection agreement since 2018

Baseline and pipeline ground mounted solar farms in the WPD East Midlands licence area



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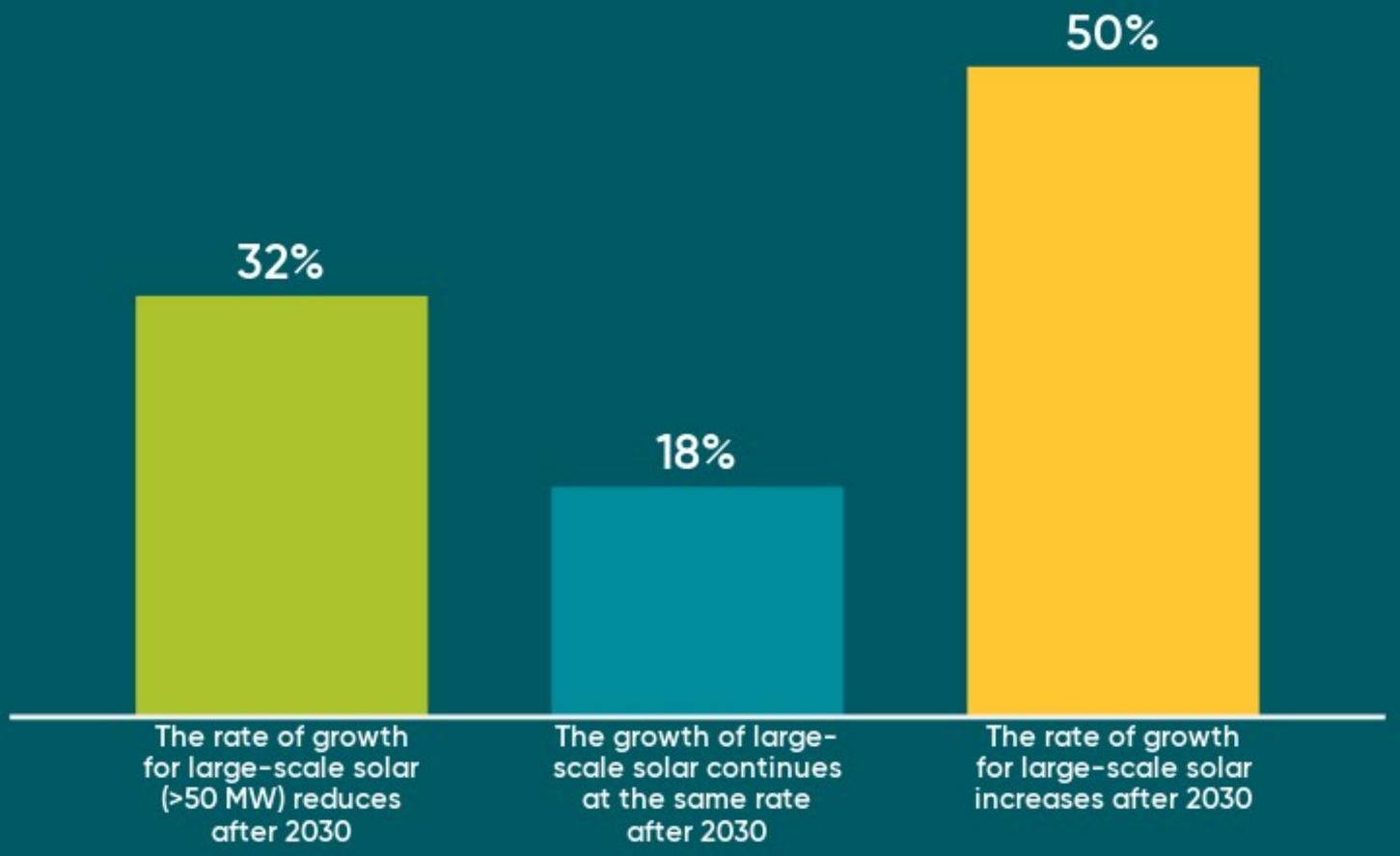
1. When might ground mounted solar deployment pick up again?

2. Beyond what's currently in the pipeline, where will subsidy-free business models lead in the future?

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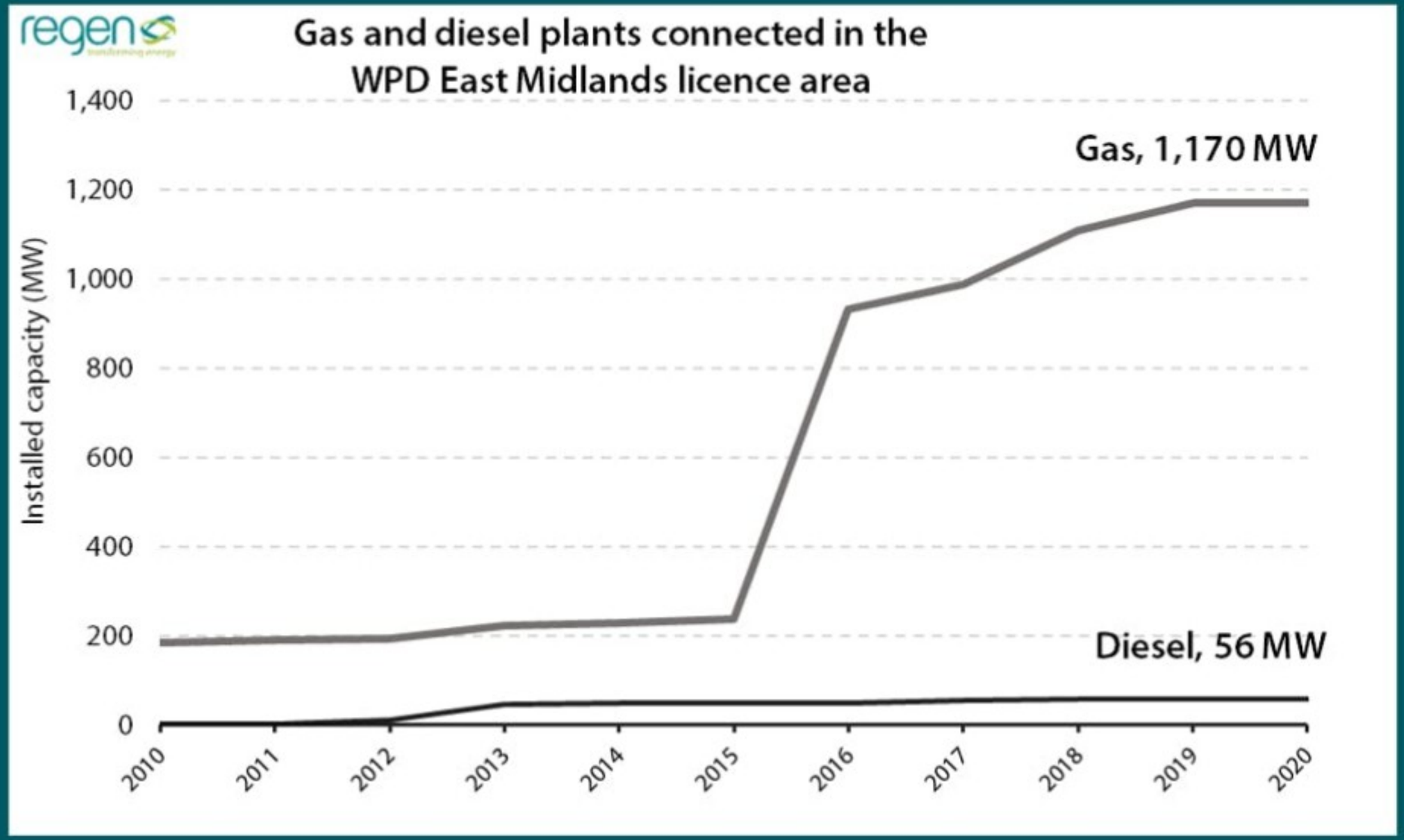
Future energy scenarios for fossil fuel generation

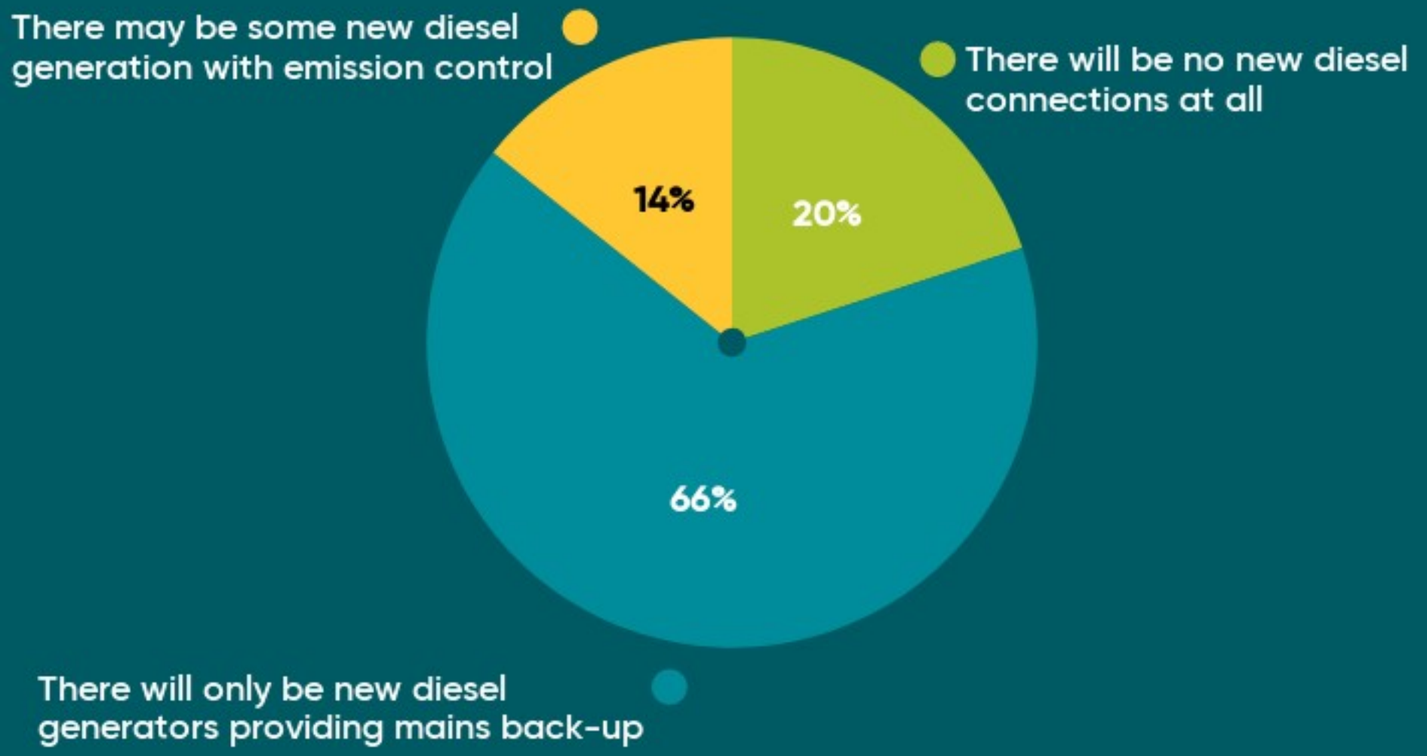
Fossil fuel generation baseline total



Pipeline of gas and diesel projects

- 10 gas-fired power sites (160 MW) with a connection agreement
- 3 diesel sites (40 MW) with a connection agreement
- No new connection agreements since 2018

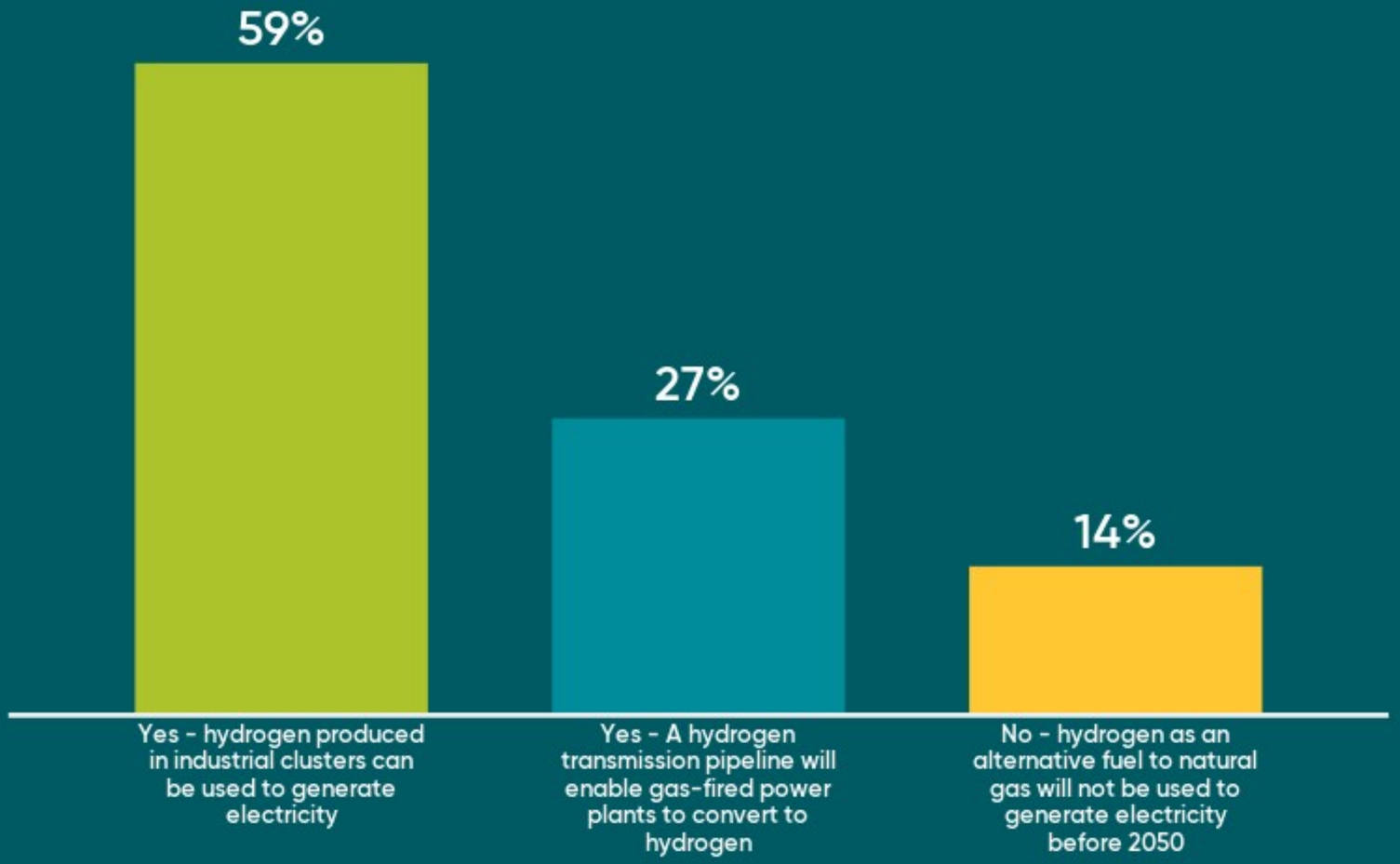
1. What does the future hold for diesel generation hold? By the mid-2020s...



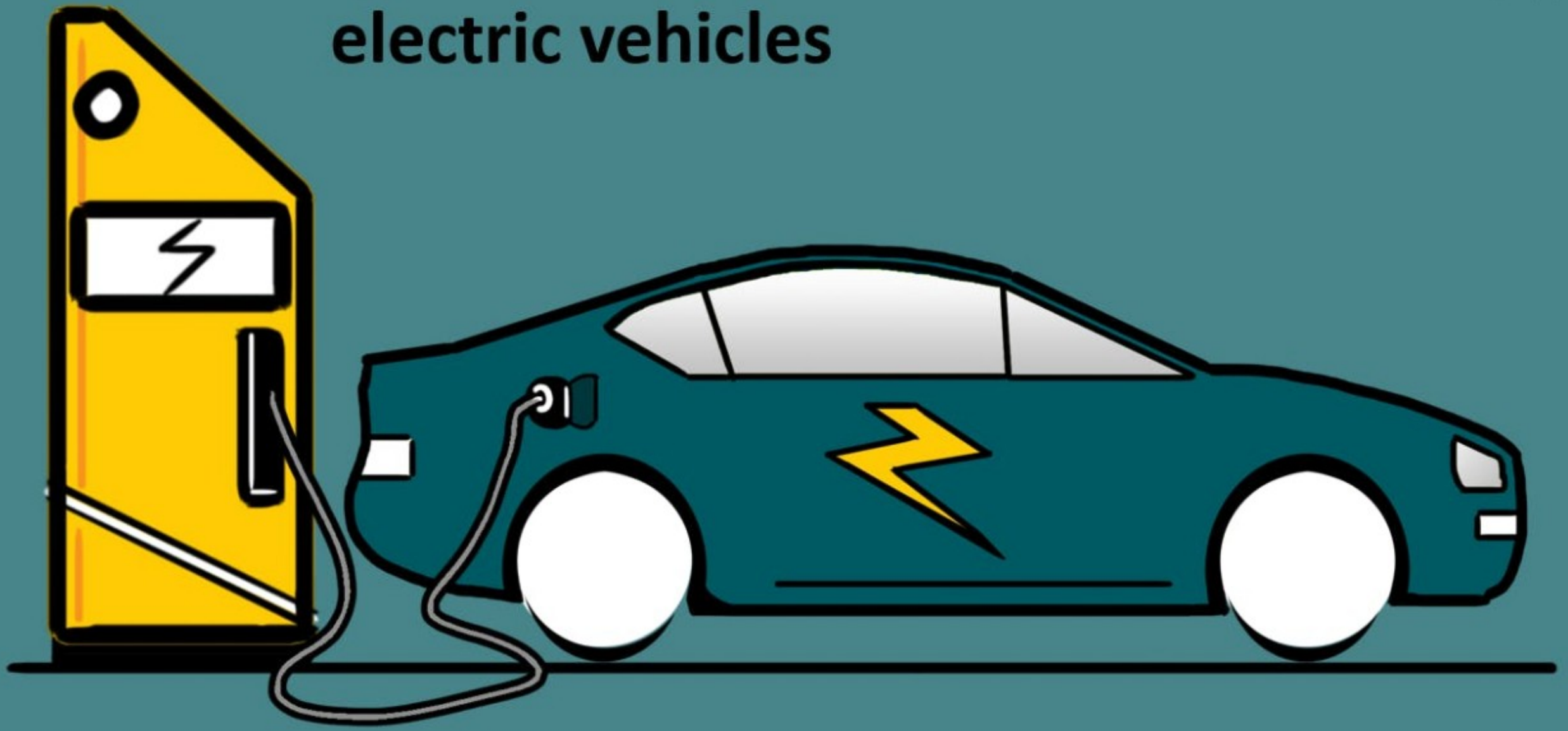
Potential uses of hydrogen in the East Midlands

- Heat for homes and businesses
- Transport fuel for vans and lorries
- Industrial processes and power generation

2. In a high hydrogen scenario, is the use of hydrogen as a fuel for electricity generation a viable business model in the long-term?



Future energy scenarios for electric vehicles



Our consultation event in East Midlands last year raised the following points:

- Many commercial fleet vehicles are home-based (on-street parked) so main barrier is around on-street charging infrastructure
- Local authorities agree that on-street charging should be considered in local planning

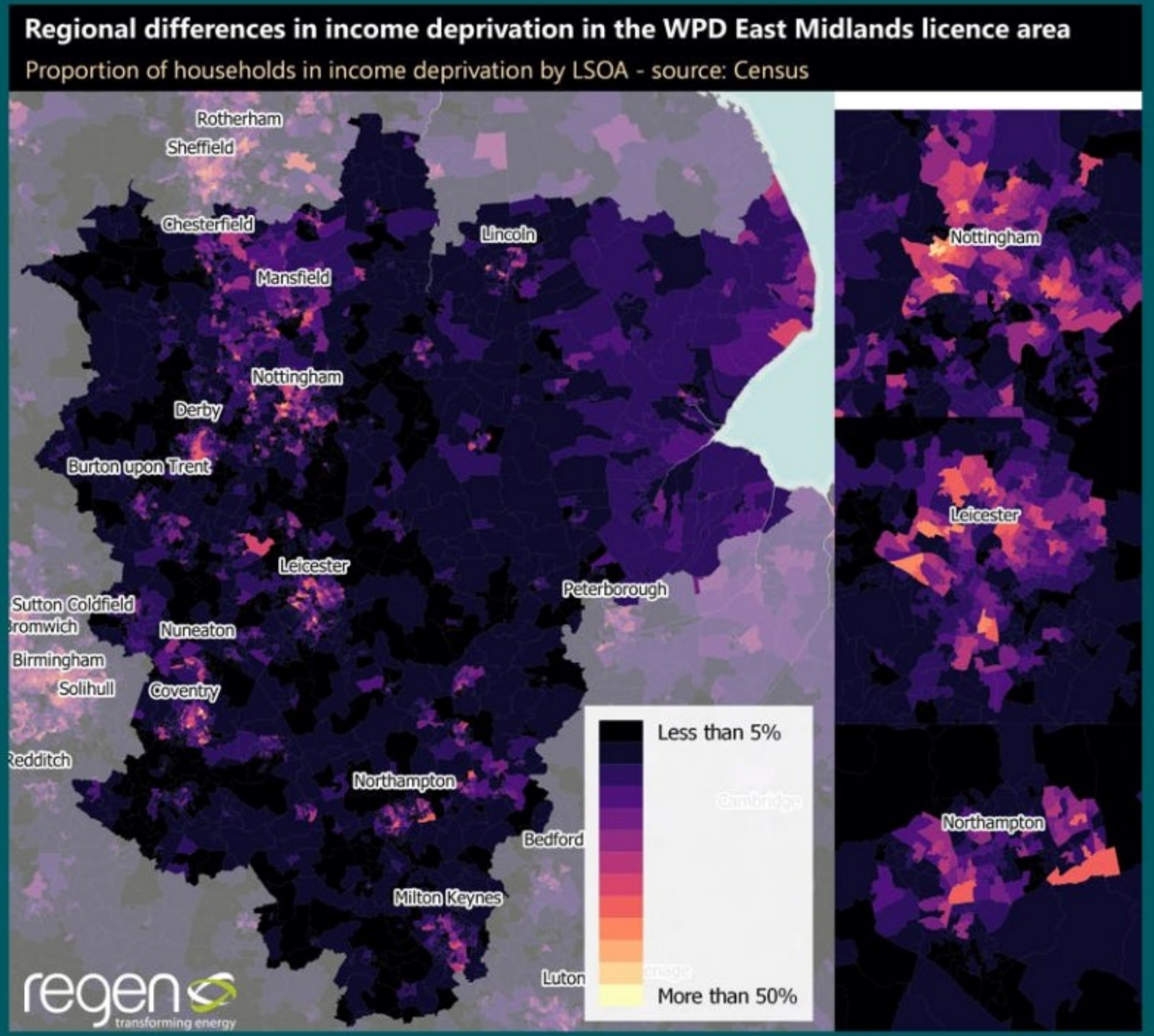
EV uptake drivers

- Plans to bring ban on new petrol/diesel car sales forward to 2035 (from 2040)
- Proposed changes to building regulations to increase the proportion of new developments with a charge point
- £10m government funding pot for local councils to install on-street chargers
- Two of the four 'Go Ultra Low' cities are in the East Midlands (Nottingham & Milton Keynes)
- Clean Air Zones (e.g. Leicester)

Electric vehicle uptake so far

At the end of 2019, there were around **23,500** electric cars registered in the East Midlands licence area, under 1% of all the cars in the area.

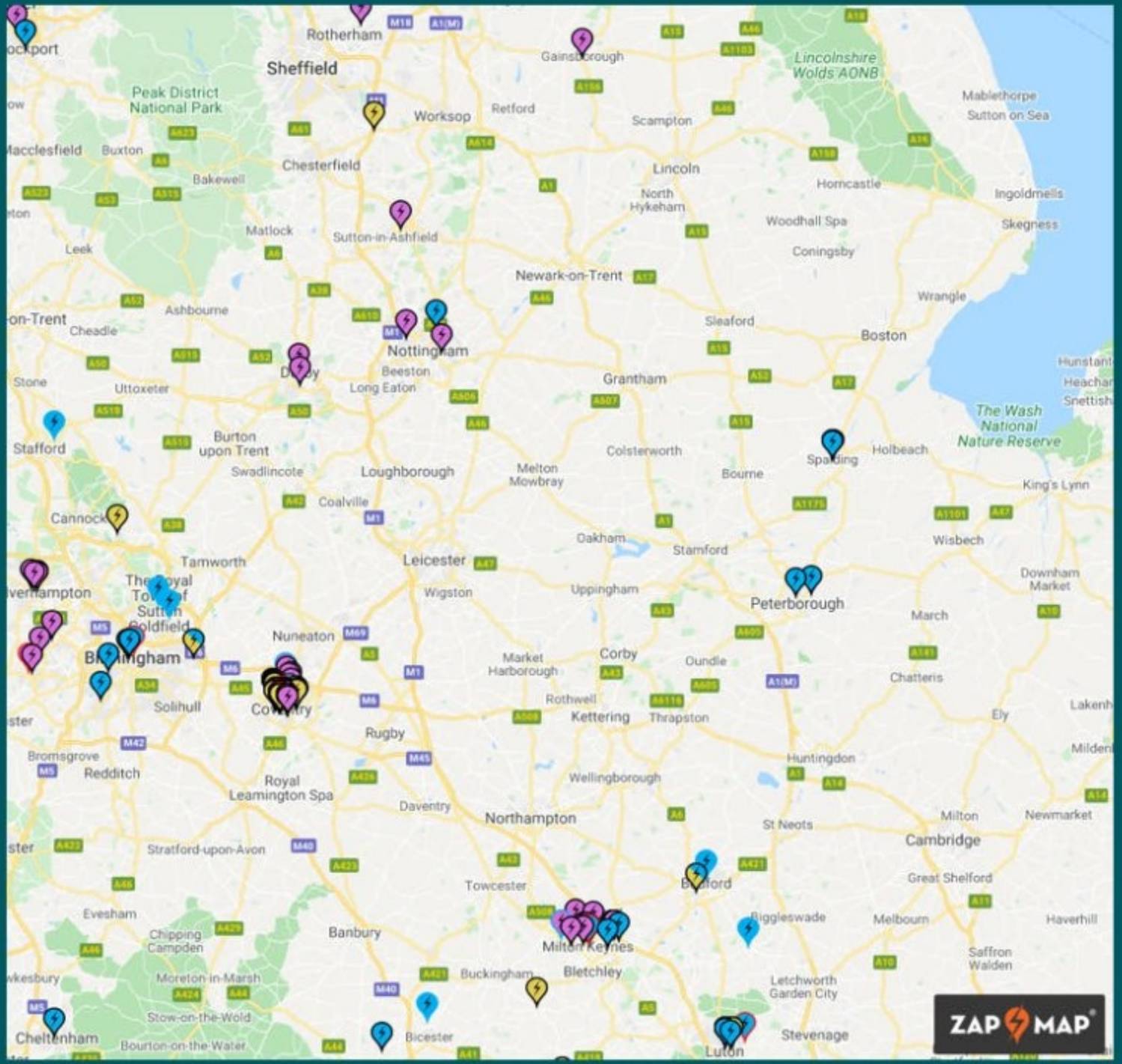
In the 2040s under National Grid Net Zero scenarios, around 100% of cars are projected to be electric.



Uptake factors

We use demographic factors for domestic-scale technologies, such as:

- Affluence
- household type (detached, terrace etc.)
- Household tenure (owned, rented etc.)

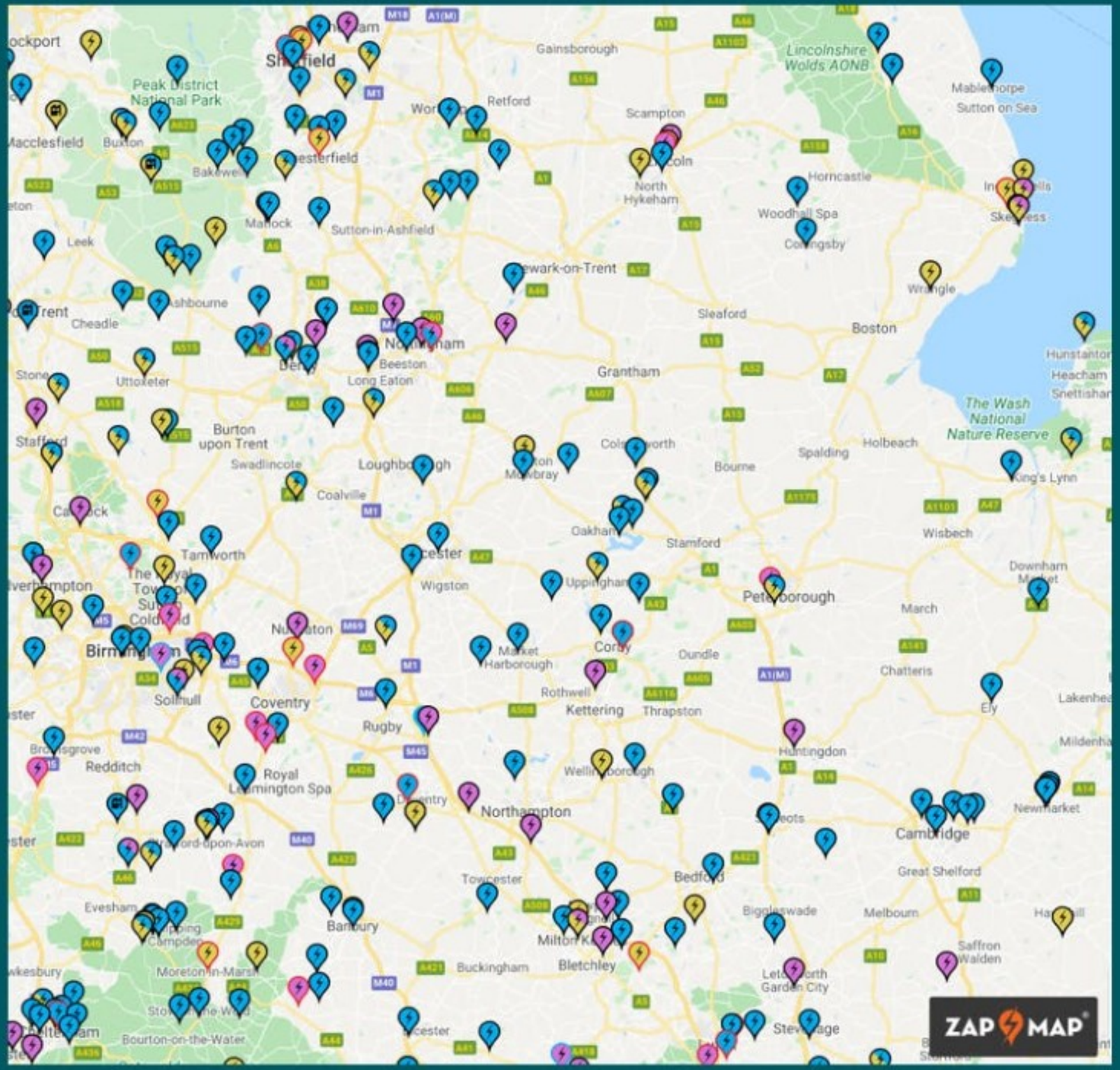


WESTERN POWER DISTRIBUTION

regen

'On-street chargers'

- On-street chargers see very distinct spatial distribution
- Heavily weighted towards urban areas
- Often installed by local council and private developers

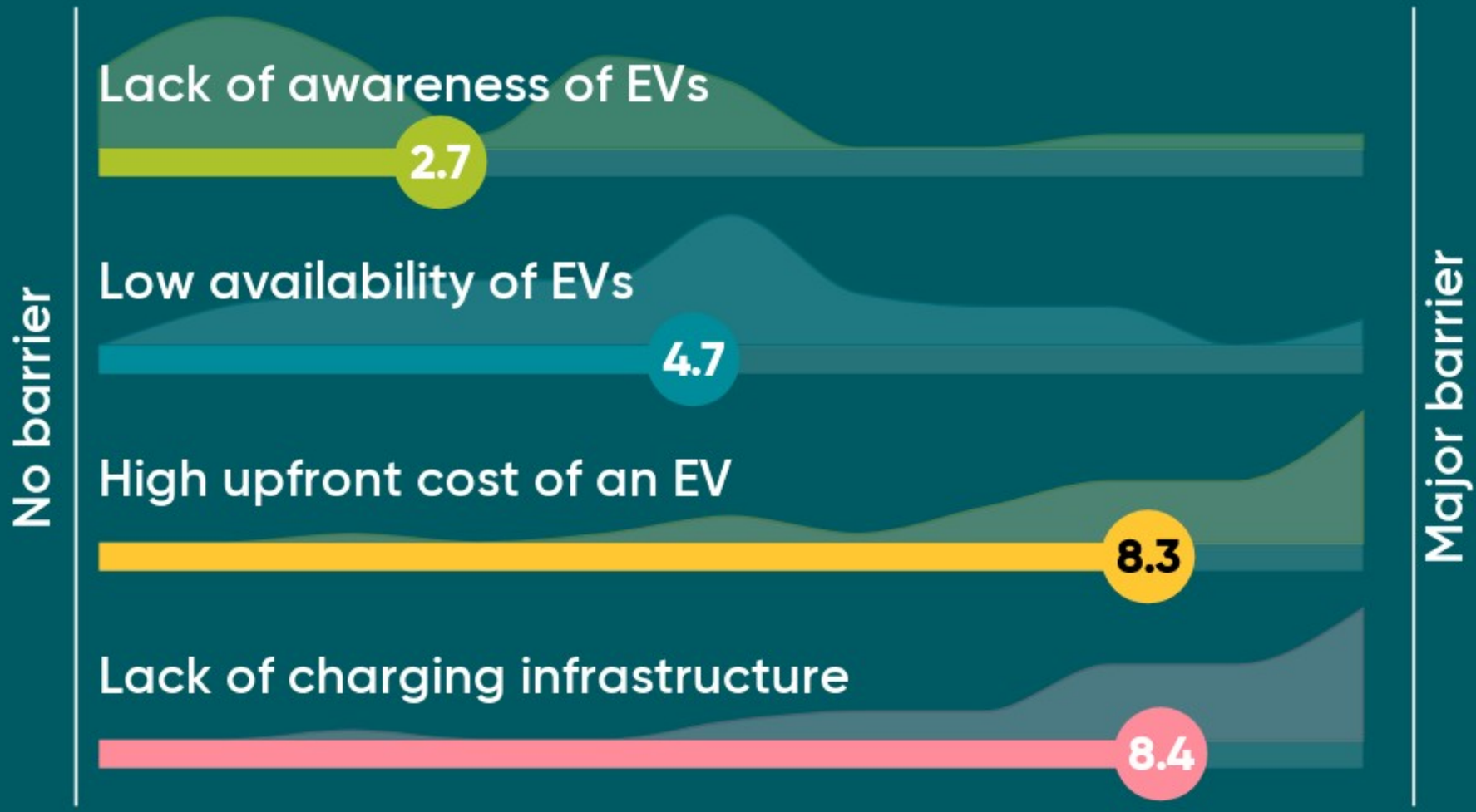


‘Hotel chargers’

- One of the largest categories of public charge points is in hotels and other accommodation
- More disperse, but lower rates of utilisation

1. In the near term, where are we likely to see high levels of electric vehicle adoption?

2. What are the key barriers to uptake?



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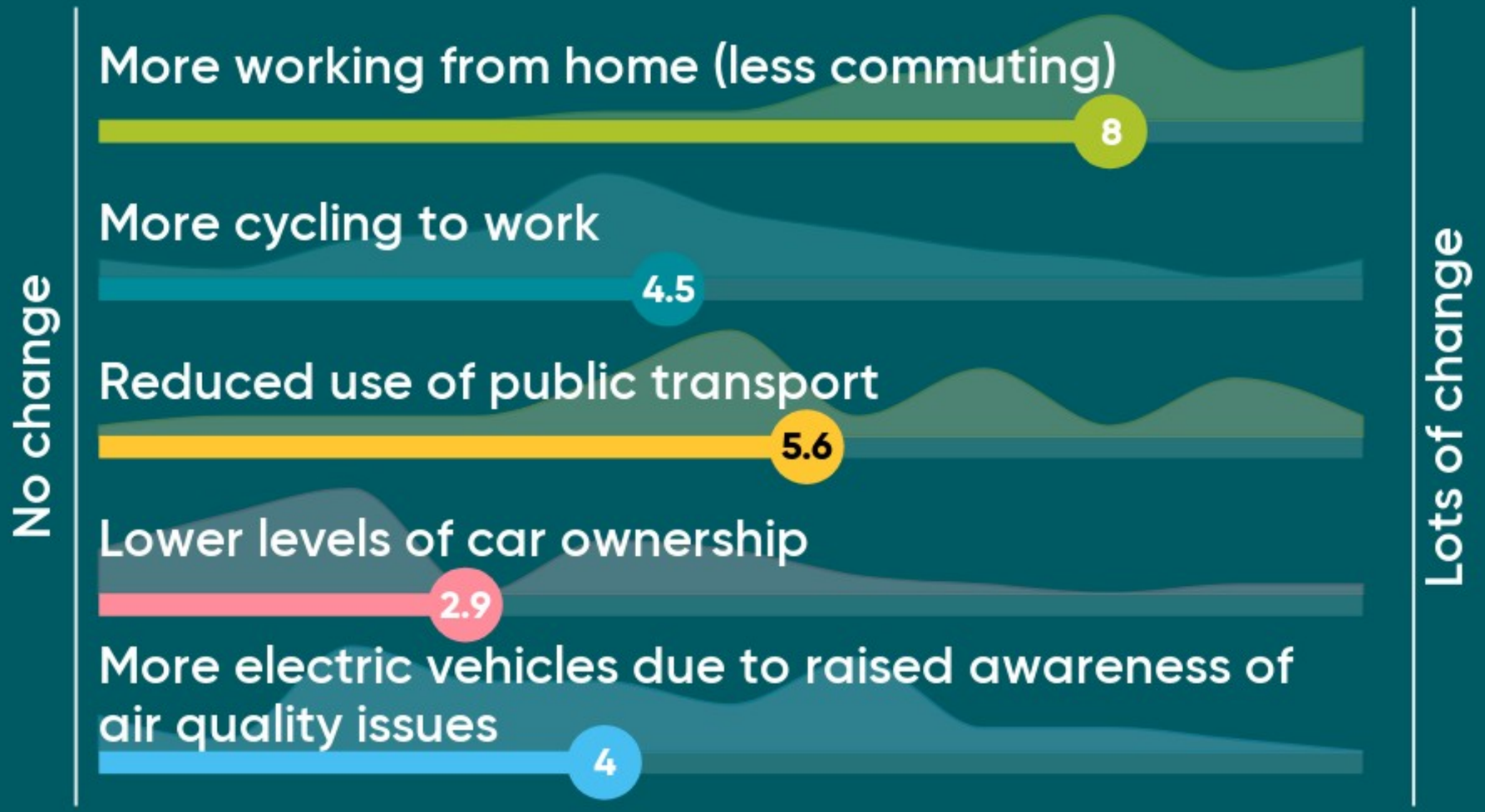
3. How will covid-19 impact transport?



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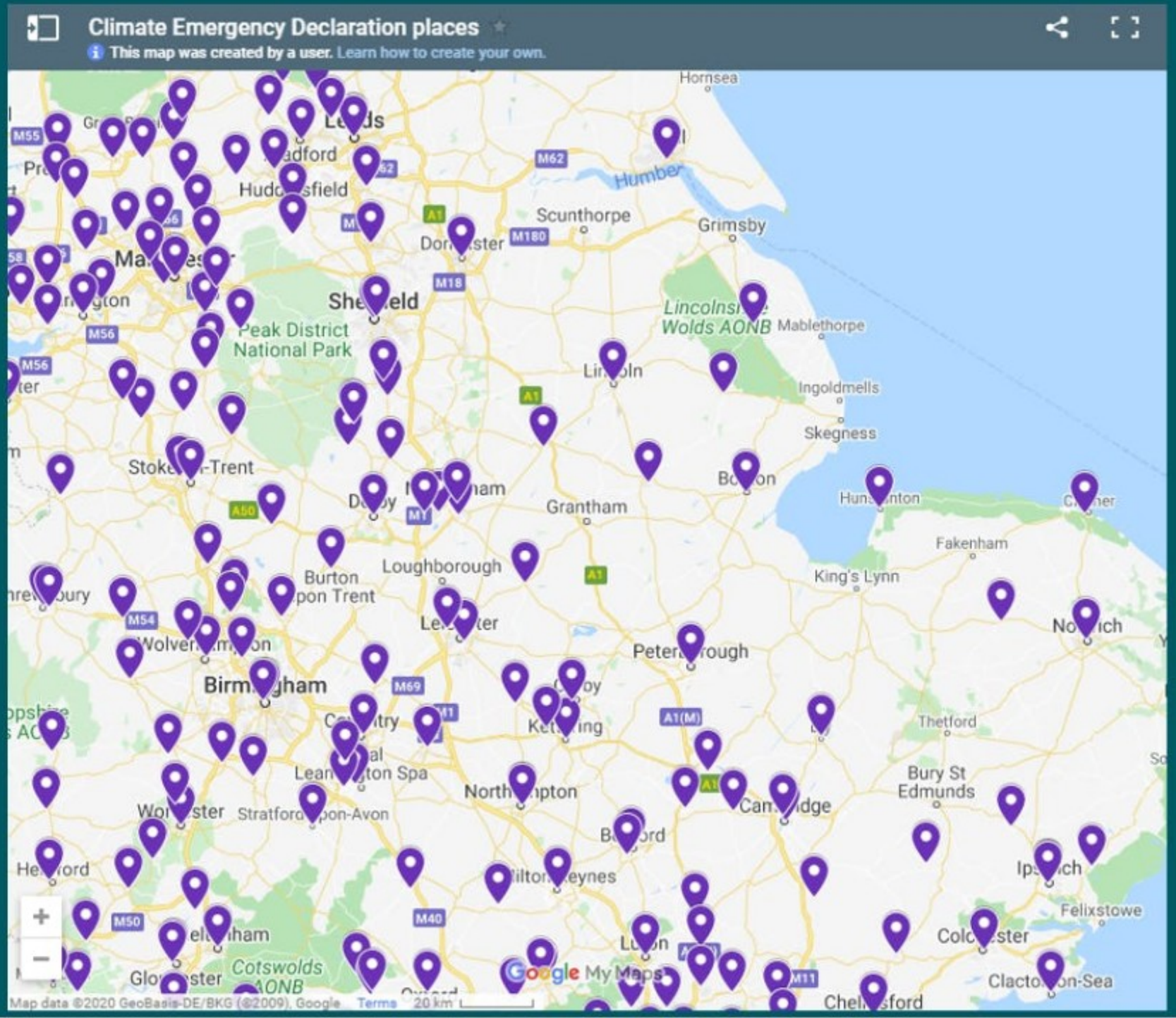
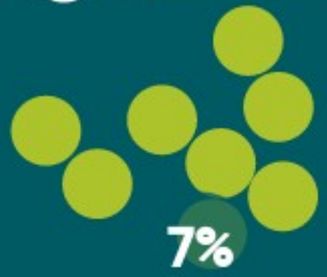
Local plans, policies and schemes

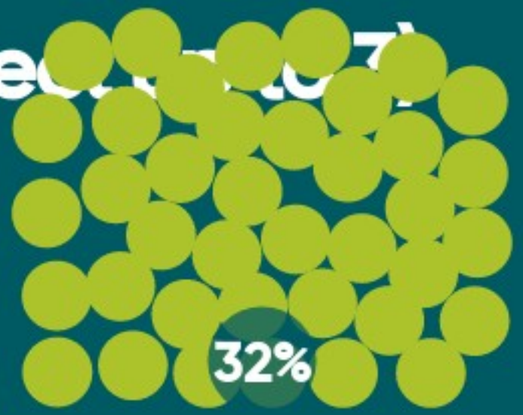
We are researching local plans and policies in regards to heat and wider electricity supply and demand too. We are looking to find out more about heat networks, clean air zones, new-build policies etc.


Climate Emergency Declaration places
This map was created by a user. Learn how to create your own.
Hornsea
Humber
Scunthorpe
Grimsby
Lincolnshire Wolds AONB
Mablethorpe
Ingoldmells
Skegness
Peak District National Park
Grantham
Loughborough
Burton upon Trent
King's Lynn
Fakenham
Thetford
Bury St Edmunds
Peterborough
Birmingham
Stratford-upon-Avon
Cotswolds AONB
Felixstowe
Clacton-on-Sea
Google My Maps
Map data ©2020 GeoBasis-DE/BKG (©2009), Google
Terms
20 km

What changes will climate emergency declarations bring about? (Select up to 3)



More heat networks

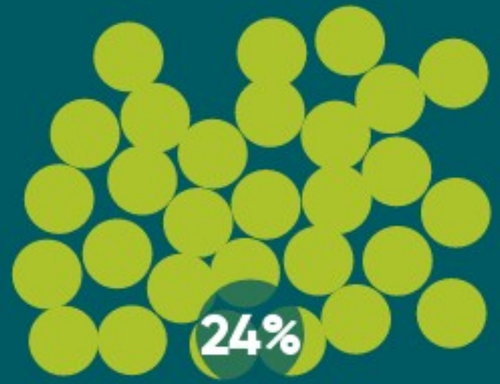


More electric vehicle chargers

Electrifying public transport

Renewable energy designated zones

Refusal of fossil fuel generators in planning



Higher standards for new homes (e.g. Zero carbon homes)

Other

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Are there any specific documents or plans you would direct us towards? For example for the 'Nottingham ULEV Experience'.

WCC EV Charging Strategy

Oxford to Cambridge Arc

Rutland Local Plan - Pre-submission consultation (expected to be published soon) includes policy requiring EV charging points

Plug in coventry.

Coventry Local Plan and Coventry's emerging Climate Change Strategy

East Northamptonshire renewable energy spd. September 2014

LLEP Low carbon growth plan

Recent charging station built by Gridserve

CAT Zero Carbon Britain - thinking of scenarios for net zero earlier than 2050

Are there any specific documents or plans you would direct us towards? For example for the 'Nottingham ULEV Experience'.

Plan:MK

Local Energy Strategies

There is No Planet B by Mike Berners Lee

Warwick DC in the process of drafting a Climate Change DPD

Maybe Kettering Energy Park. Renewable energy supporting an emploment site

VCIS

South East Midlands LEP Energy Plan

Emerging South Northamptonshire local plan (ev chargers

East Midlands Manufacturing Zone project, especially transport module

New developments study

- Joe Noble, Graduate Analyst at Regen

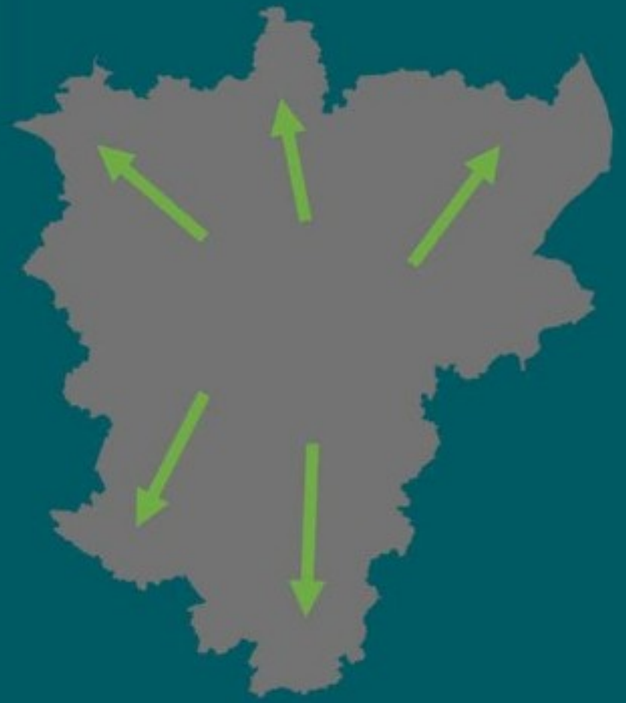
New developments overview

What?

Assesses the scale and spread of new underlying demand

How?

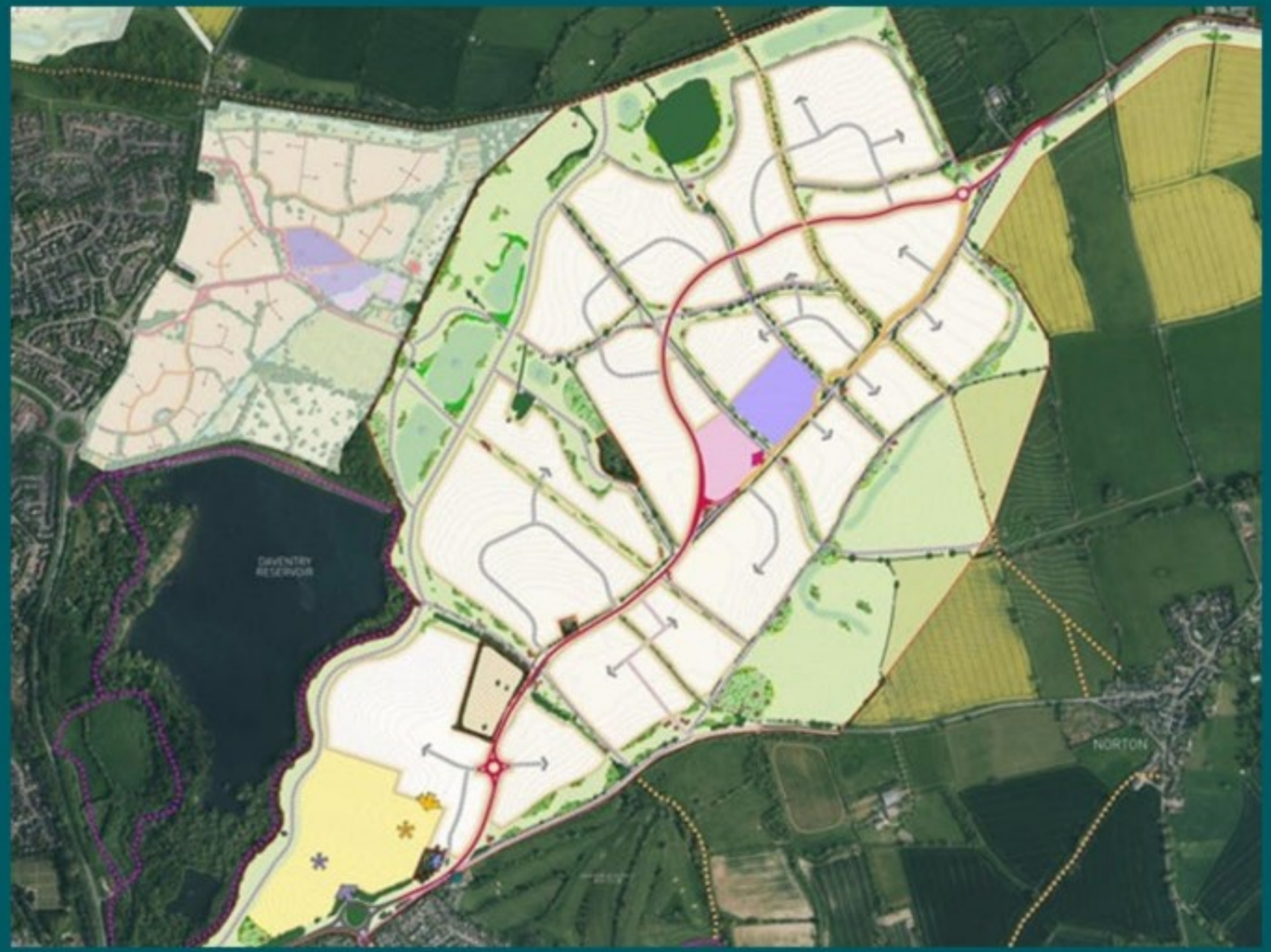
Collecting planning policy data from local authorities



Why?

Inform WPD of future network requirements, **preventing the network being a barrier to a net zero future**

Example – Daventry North East Development

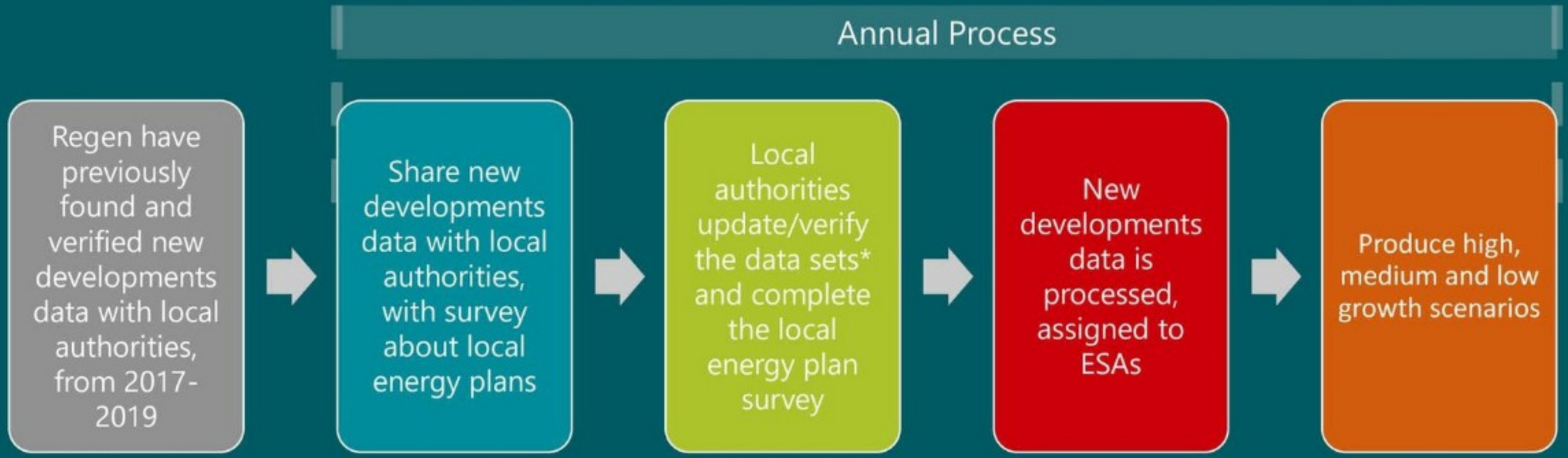


247-hectare site, with plans submitted for:

- 3,400 new dwellings
- 2 primary schools
- Secondary school site
- Local centres and community facilities

Source:
http://www.daventrynortheast.co.uk/

Methodology overview



*if unavailable or no response from LA, Regen will research planning policy documents

The data we collect

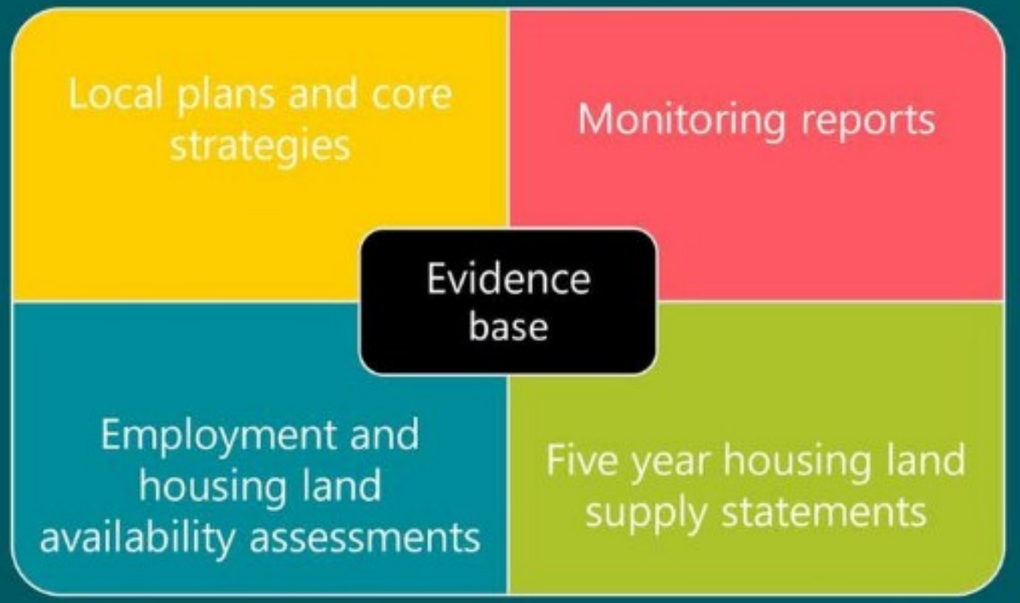
Allocated and planned new domestic and non-domestic sites:

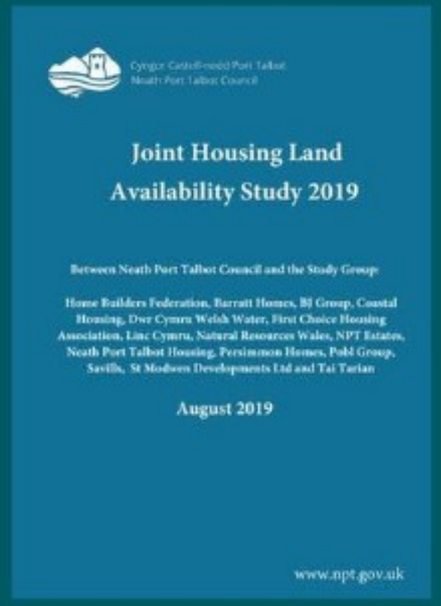
- Over 20 homes (domestic)
- Over 0.1ha site area (non-domestic)

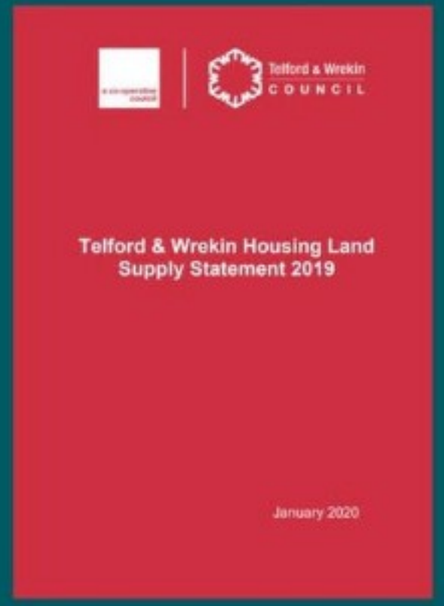
In order to estimate demand, we need:

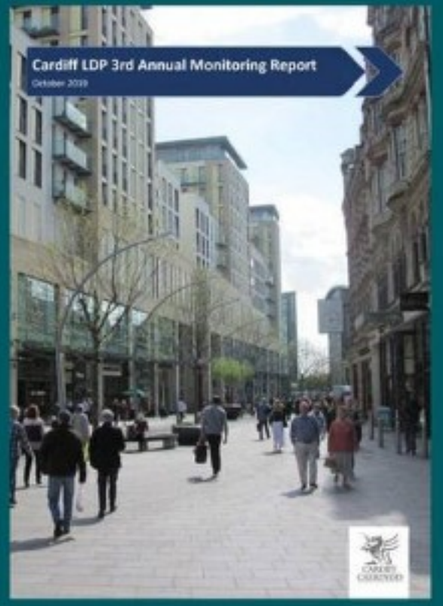
- Number of dwellings/site area
- Locational data (E/N)
- Category and floorspace (for non-domestic)
- Trajectory/build out rates
- Source information

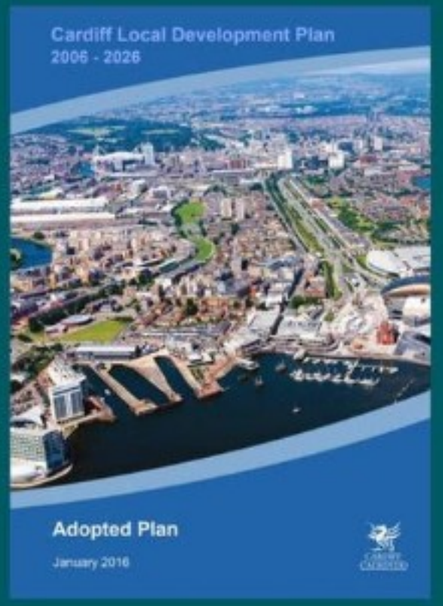
Data sources





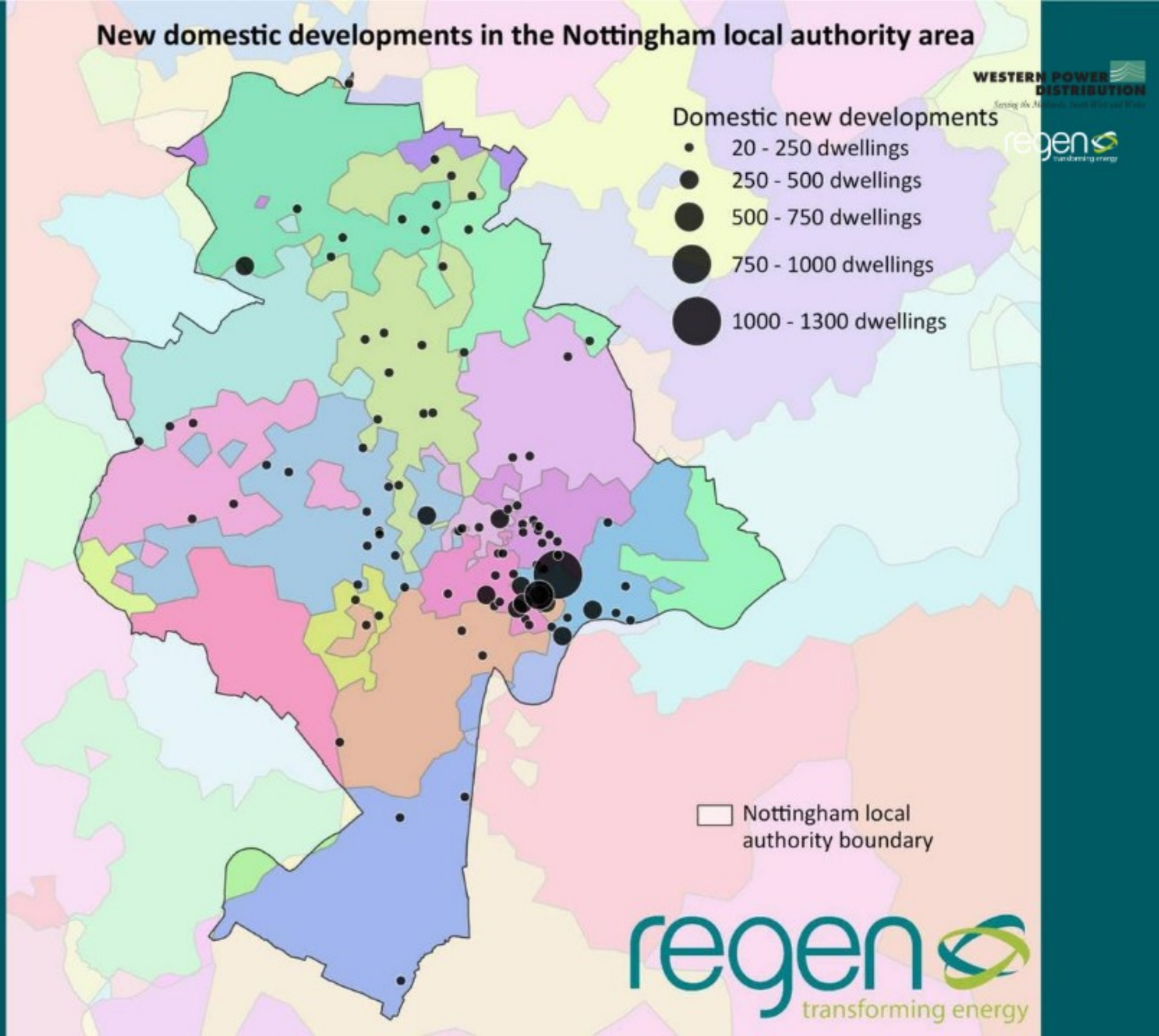






Assigning sites to local distribution networks

Assigning to local distribution networks



Creating growth scenarios

Methodology – growth scenarios

Calculate and distribute the number of dwellings not captured by the >20 homes criteria

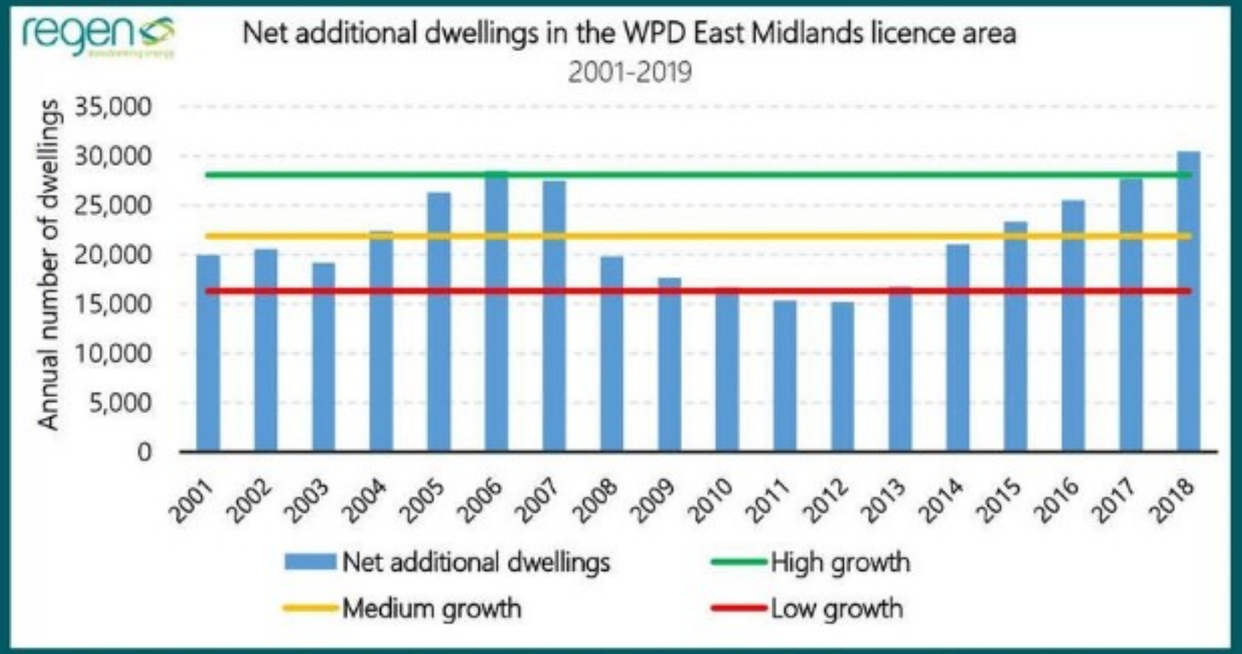
Threshold of 20 homes:

- 4% homes lost
- 37% of site reduction

Methodology – growth scenarios

Calculate and distribute the number of dwellings not captured by the >20 homes criteria

Analyse historic growth in the region



Source: UK GOV

Methodology – growth scenarios

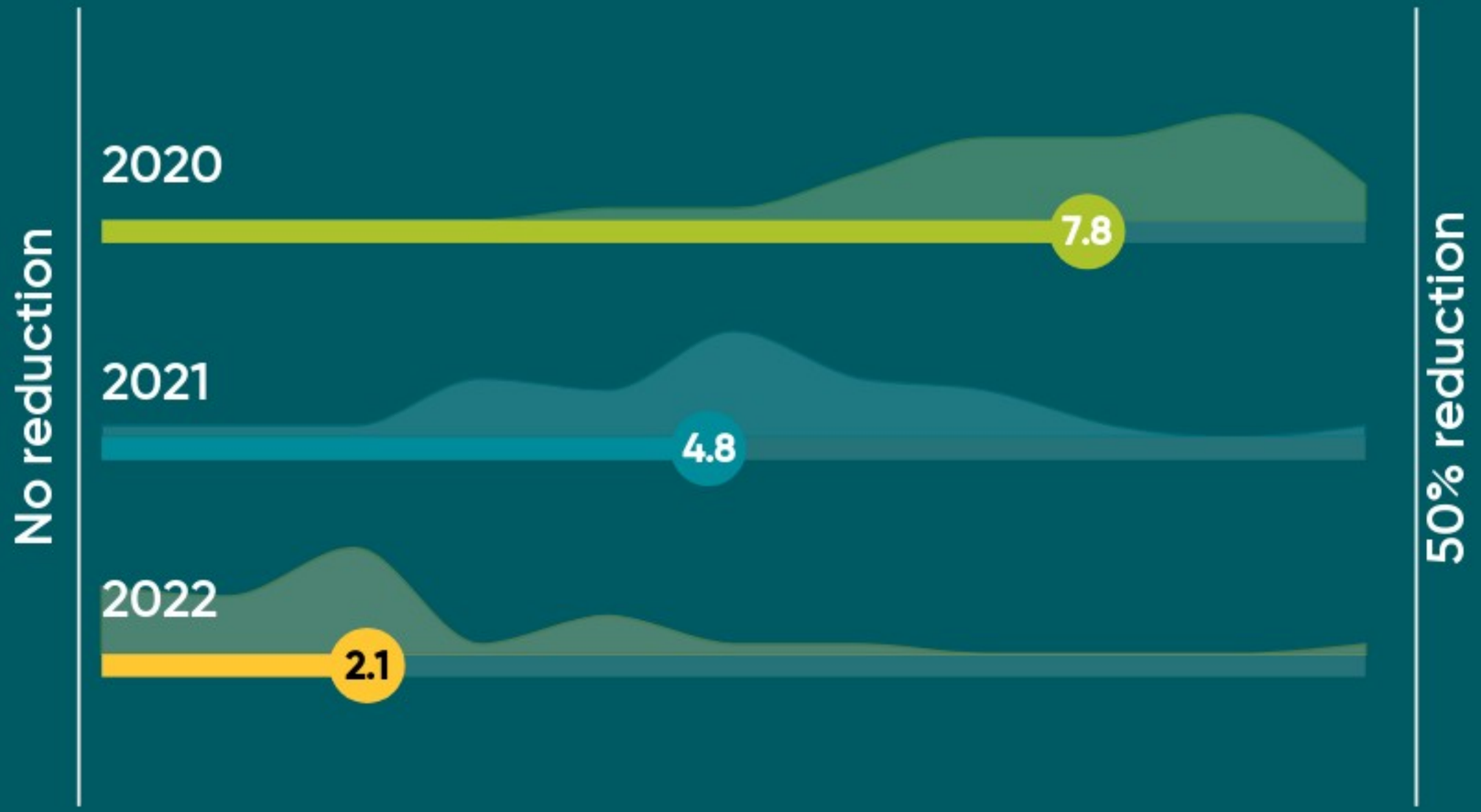
Calculate and distribute the number of dwellings not captured by the >20 homes criteria

Analyse historic growth in the region

Produce growth scenarios

Dwellings offset to later years	High growth		Medium growth		Low growth	
	% Planned sites built on schedule	% Planned sites delayed to later years	% Planned sites built on schedule	% Planned sites delayed to later years	% Planned sites built on schedule	% Planned sites delayed to later years
Imminent (Next year)	85%	15%	75%	25%	65%	35%
Short term (2-3 years)	80%	20%	55%	45%	40%	60%
Medium term (4 - 10 years)	65%	35%	40%	60%	20%	80%
Long term (11 - 15 years)	65%	35%	40%	60%	20%	80%

What do you think the magnitude of the lapse in build rates will be, if any, due to COVID-19?



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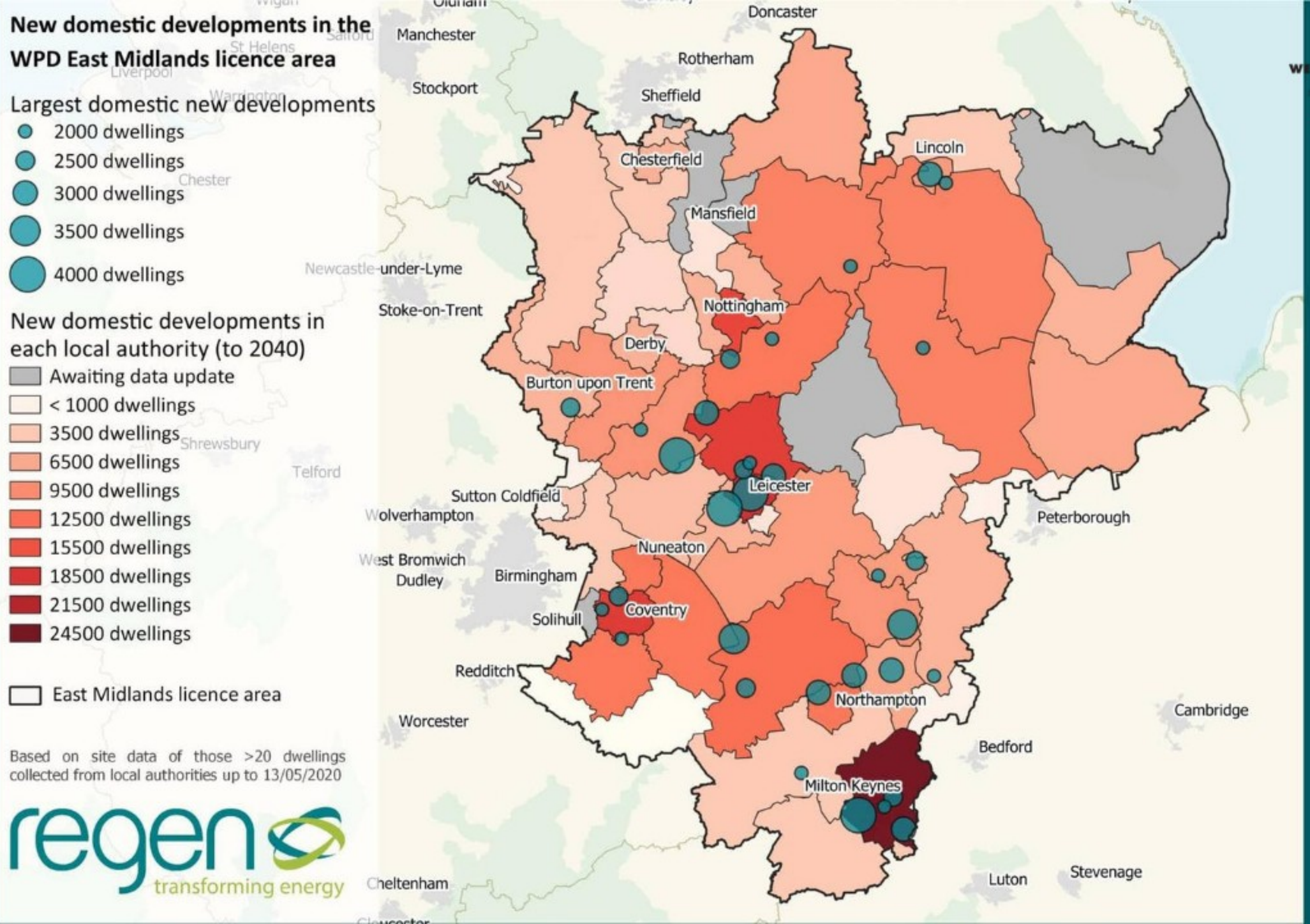
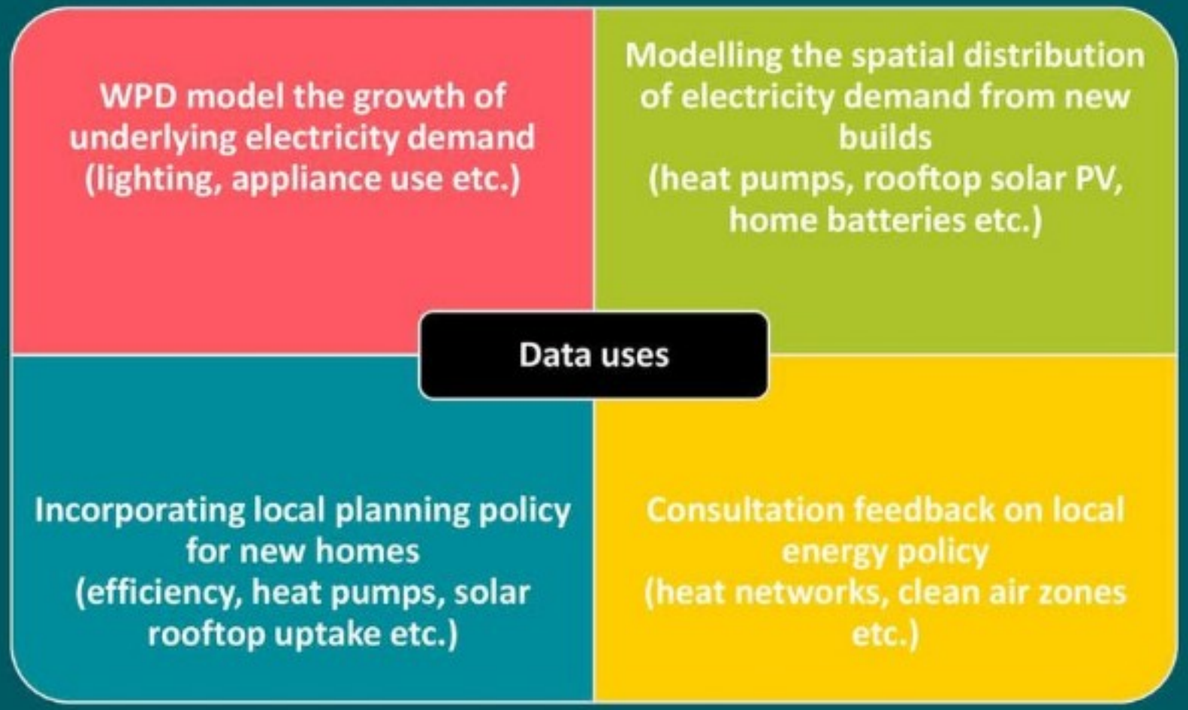
Preliminary results

Heat map of domestic developments to 2040, with the 10 largest sites in the East Midlands.

New domestic developments in the WPD East Midlands licence area



Outcomes of the study



It's not too late to get involved

- Update your local authority's new-developments status by clicking on the SharePoint link in the email you have been sent from smills@regen.co.uk.

- Local authorities - please get in touch if you haven't had any contact via email, or are having issues using SharePoint.

- There is also a survey regarding local energy policy for each local authority to fill out.

- Cut off for new developments feedback was the 30th April, however we will incorporate further input until the end of May in light of the current circumstances. This is a yearly process so any new planning policy documents can be incorporated next year if not captured this time.

Final thoughts and comments?

Please leave questions and thoughts via the Mentimeter Q&A.

Next steps

- Thank you for your ongoing participation
- DFES publication timelines
- Further collaboration
- Contact WPD: wpdnetworkstrategy@westernpower.co.uk

Contact Regen:

For queries relating to the modelling of generation, storage, EVs and low-carbon heat:

Ben Robertson:
brobertson@regen.co.uk
Frankie Mayo:
fmayo@regen.co.uk

For queries relating to the Local Authority new developments study:

Silvia Mills:
smills@regen.co.uk

Although we have an office telephone number, this is unlikely to be answered during the current lockdown so please use the email addresses above.