Stakeholder consultation - WPD Distribution Future Energy Scenarios

South West licence area - 15 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.

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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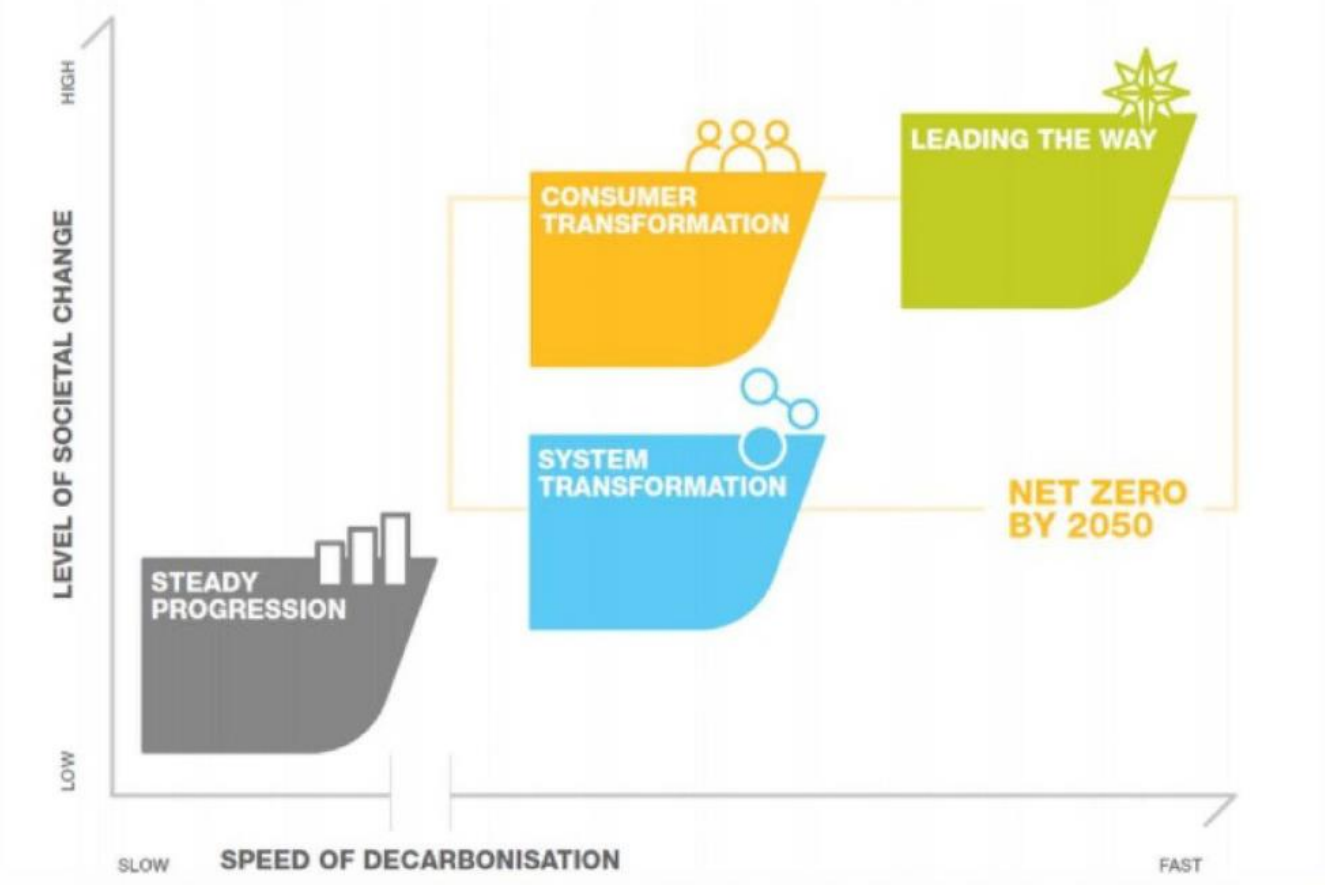
Industry Aligned Scenario Framework

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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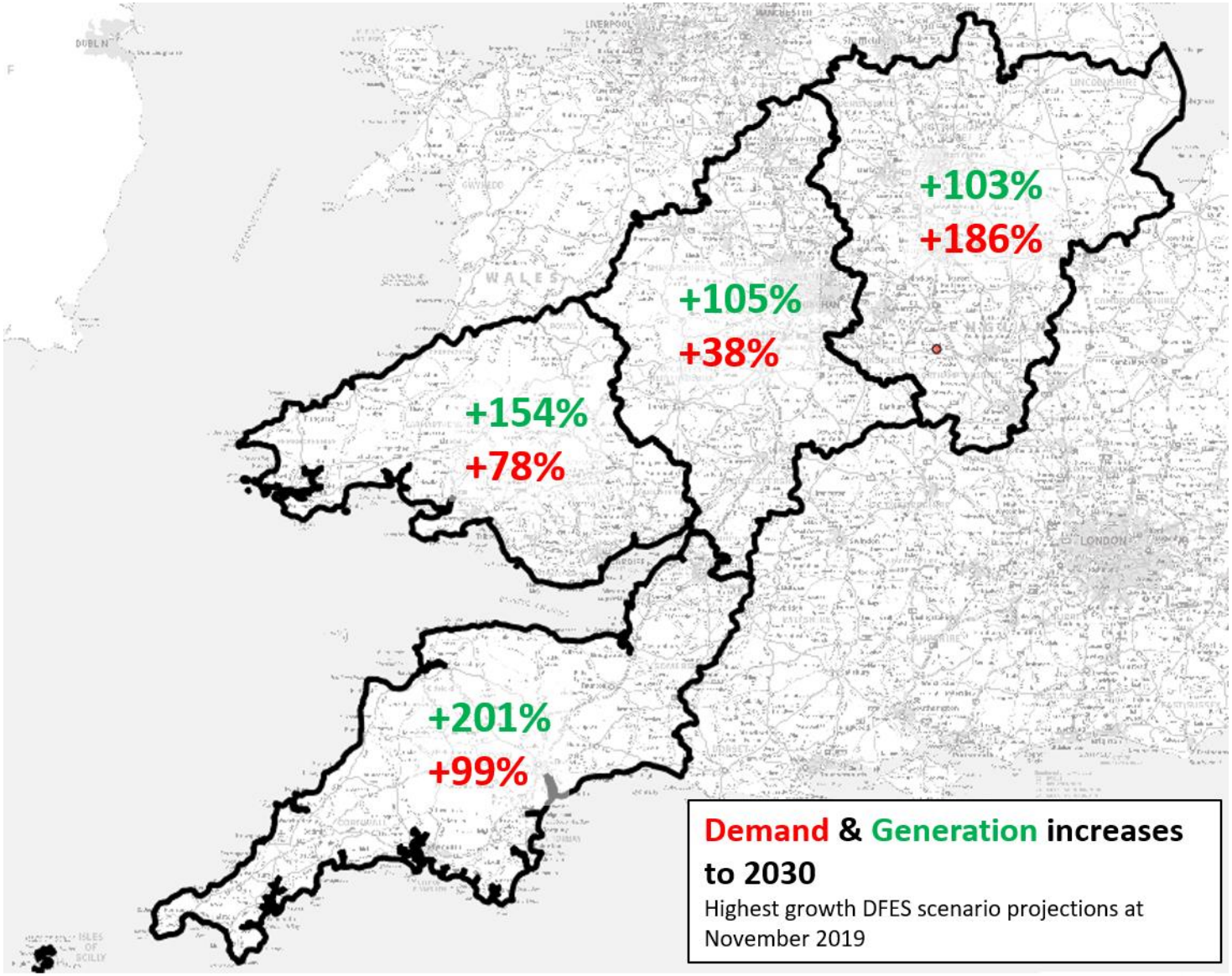
The need for regional scenarios



With reference to a 2019 baseline in each licence area.

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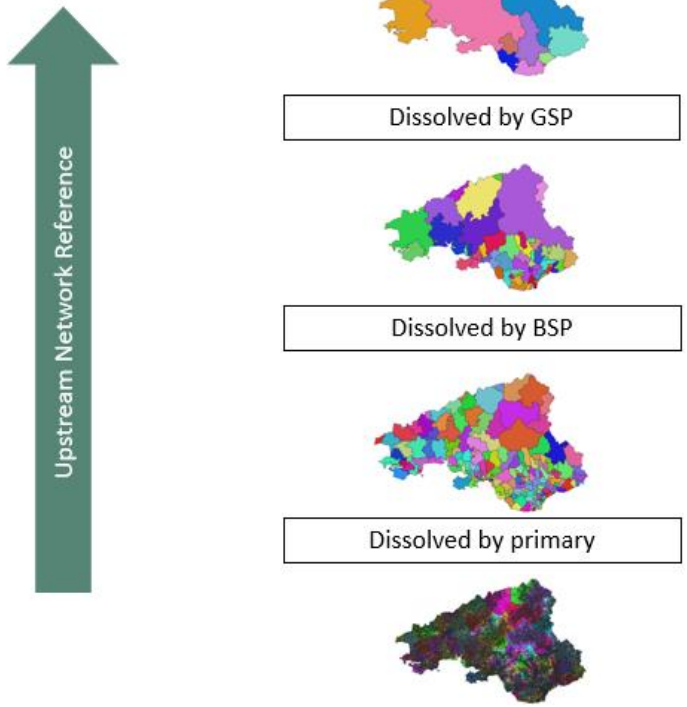
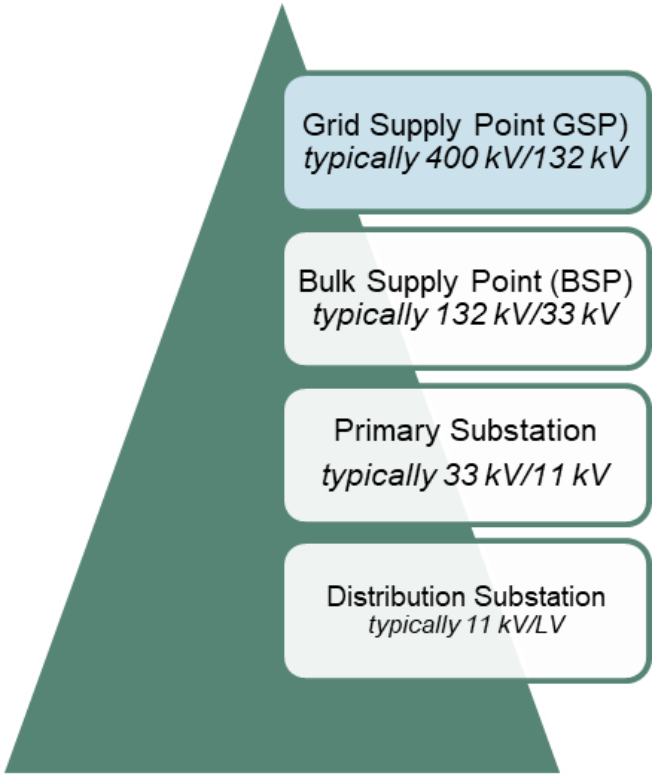
DFES Process – mapping forecasts to our network

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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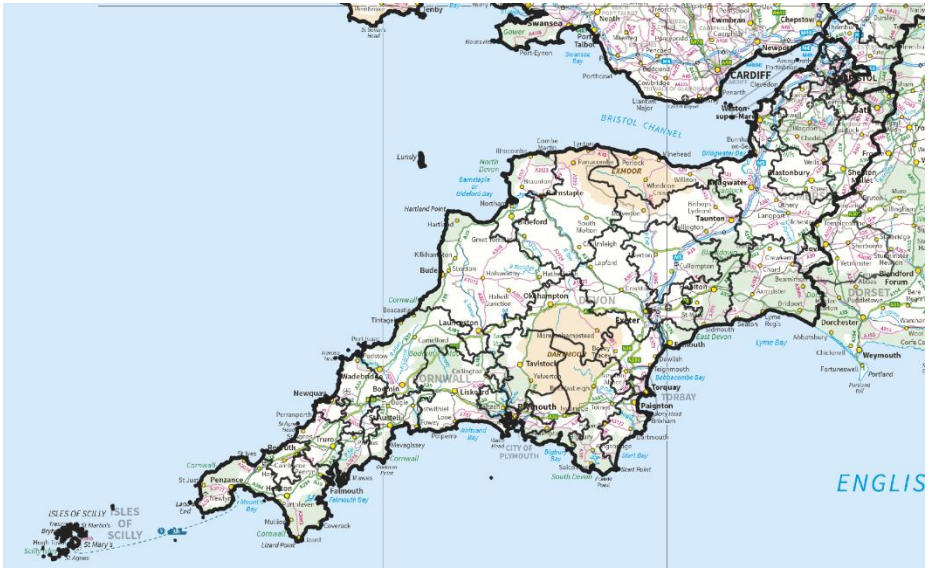
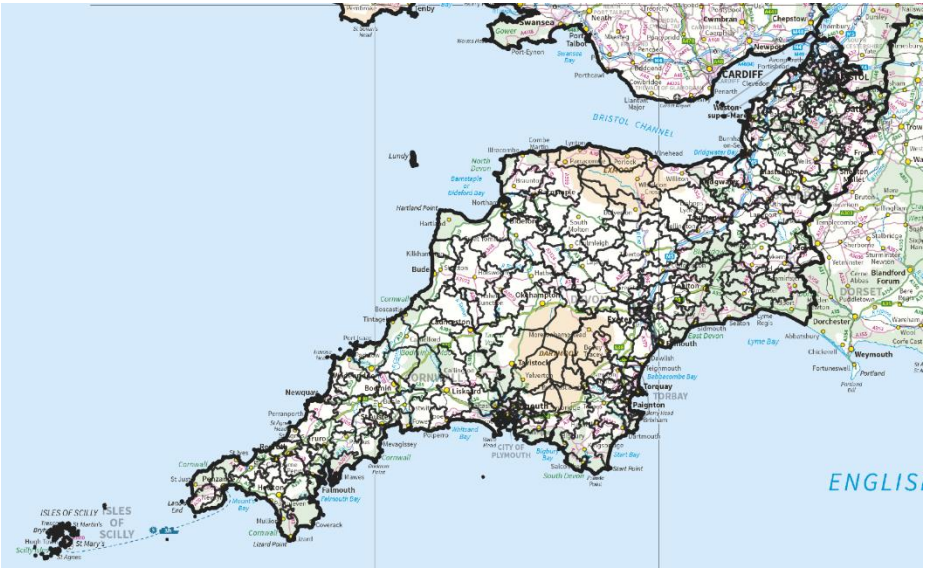
DFES Process – mapping forecasts to our network

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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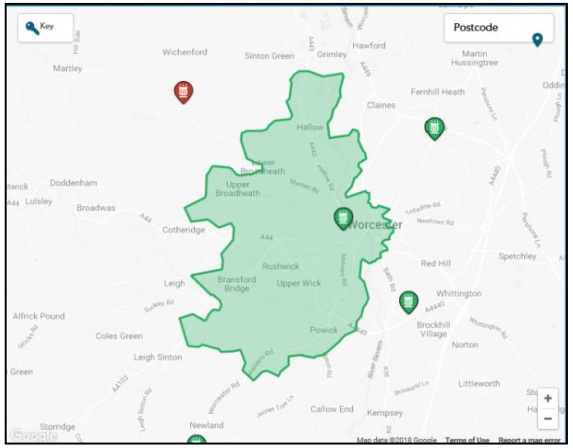
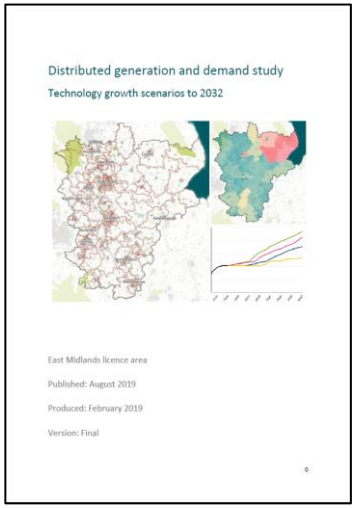
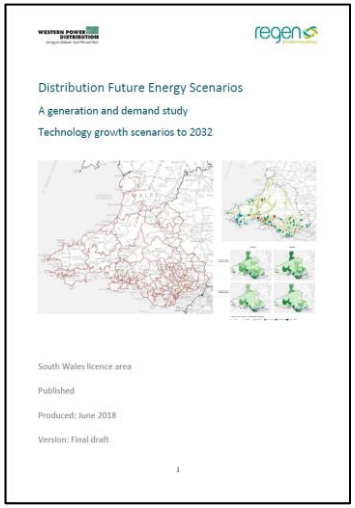
DFES Process – Study Outputs

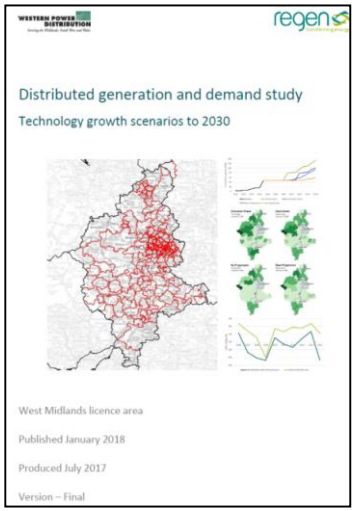
Dataset, with a growth projection for each unique combination of:

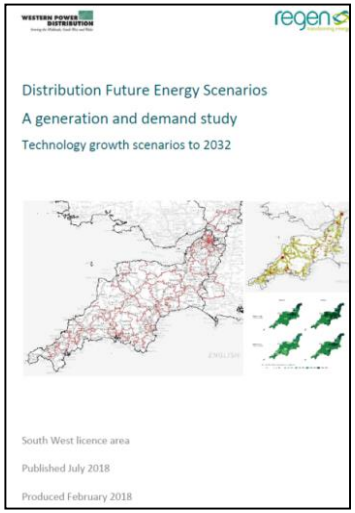
- Electricity Supply Area (~3000)
- Technology type (~50)
- Scenario (4)
- Year (20)











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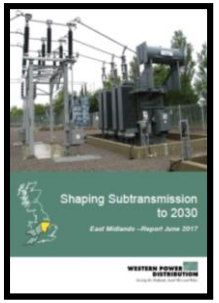
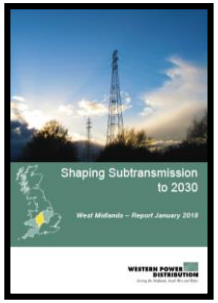
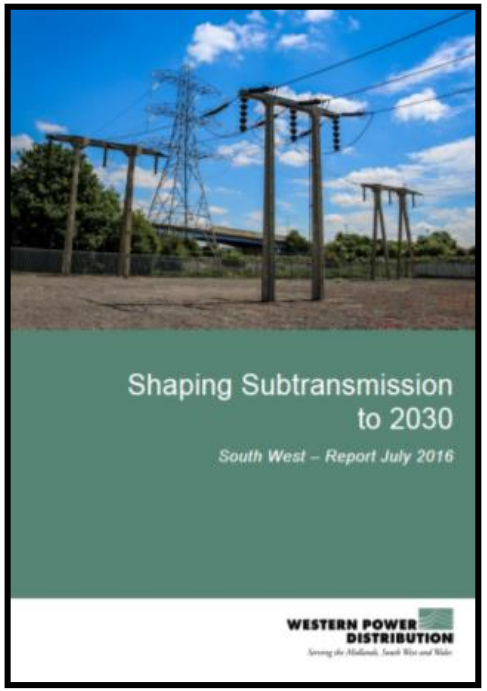
What is the DFES used for in WPD?

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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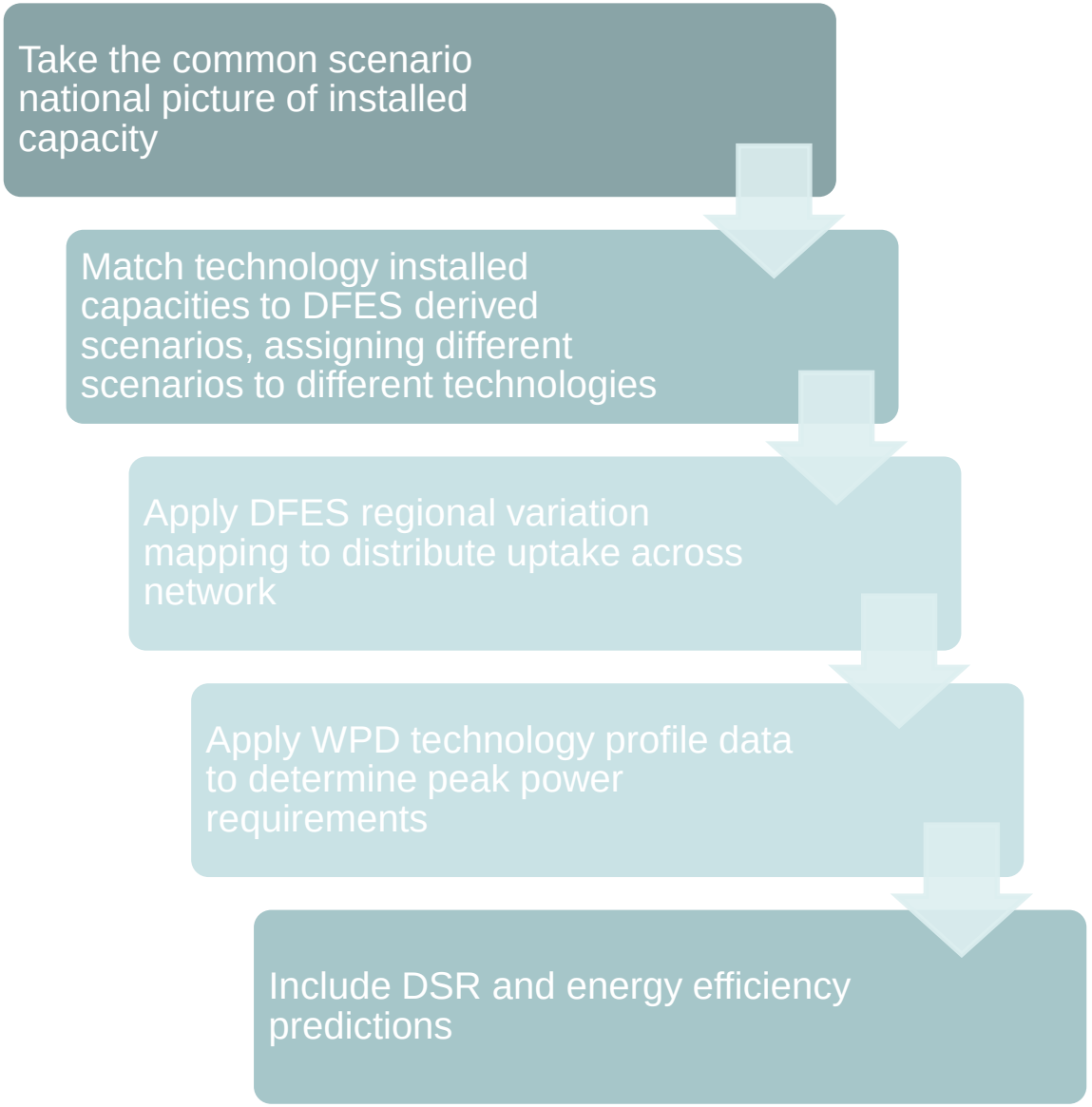
What is the DFES used for in WPD?



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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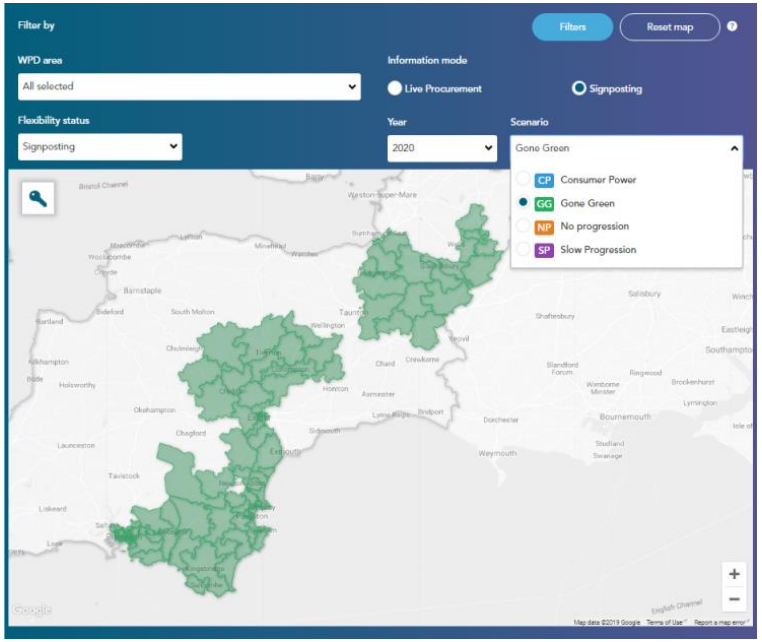
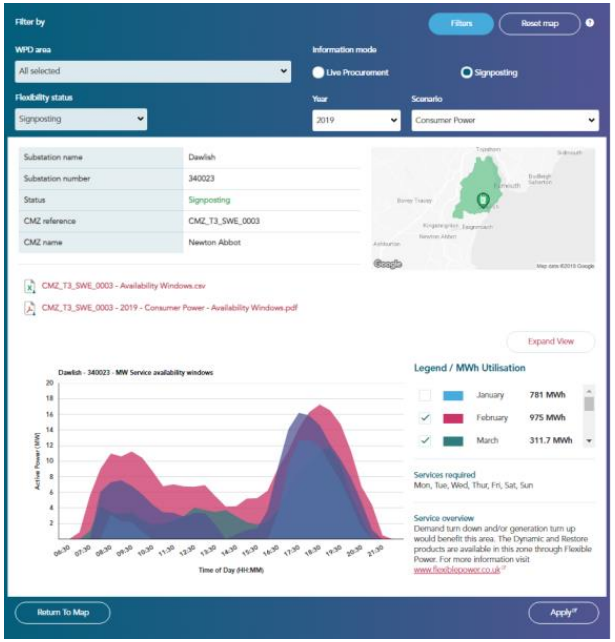
What is the DFES used for in WPD?

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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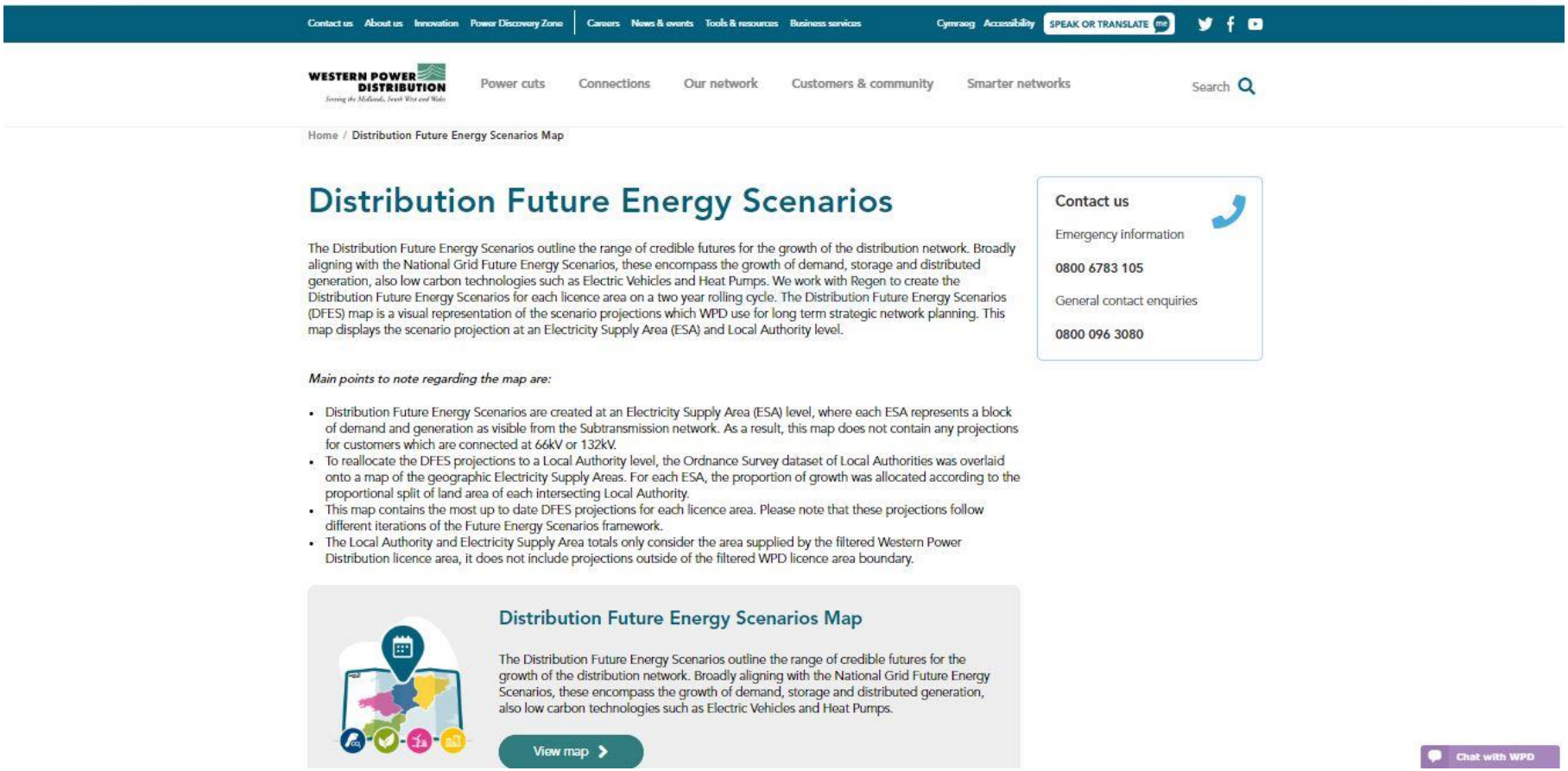
DFES Map



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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.

Contact us

Emergency information

0800 6783 105

General contact enquiries

0800 096 3080

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

Chat with WPD

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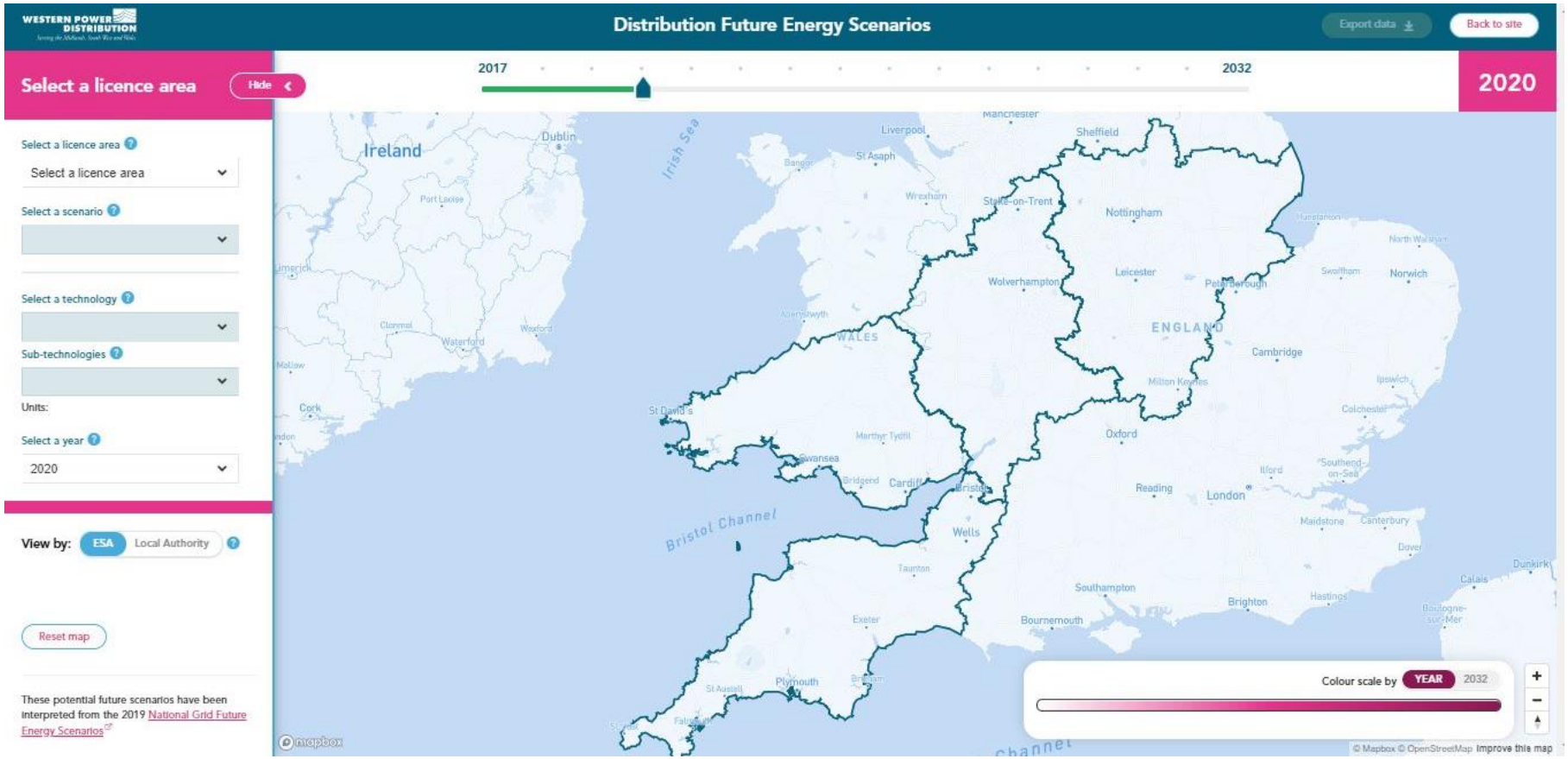
DFES Map



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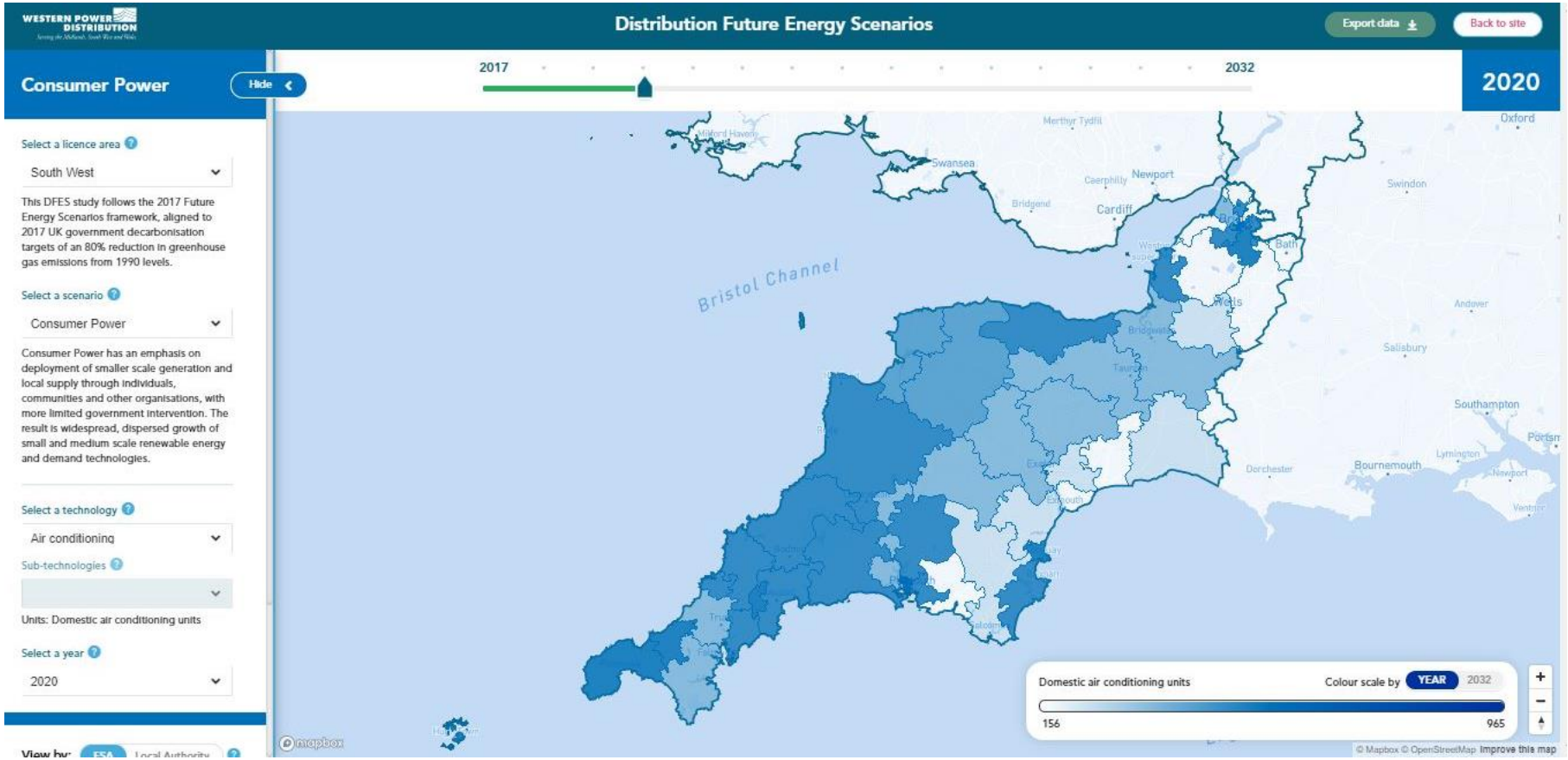

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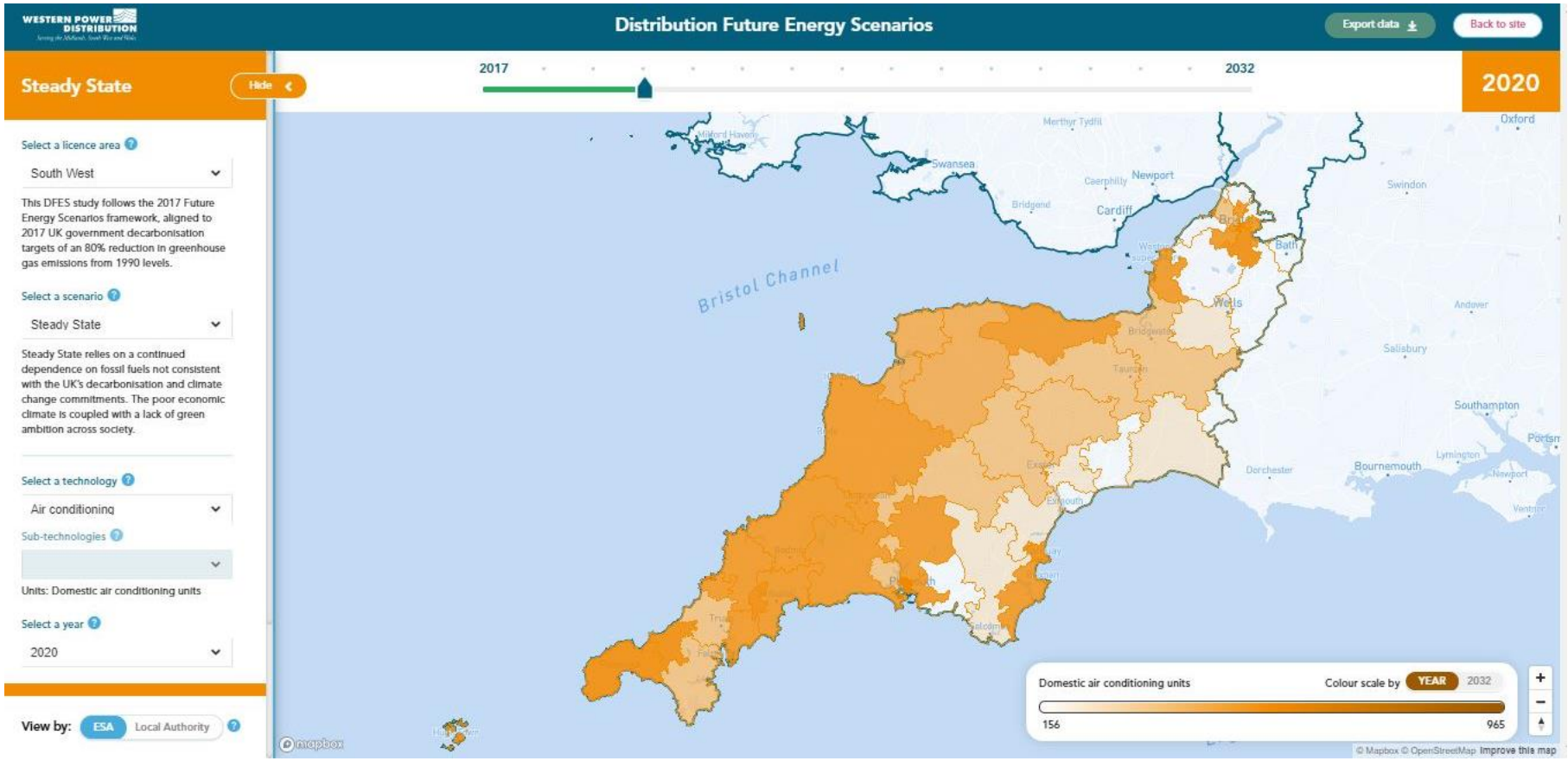

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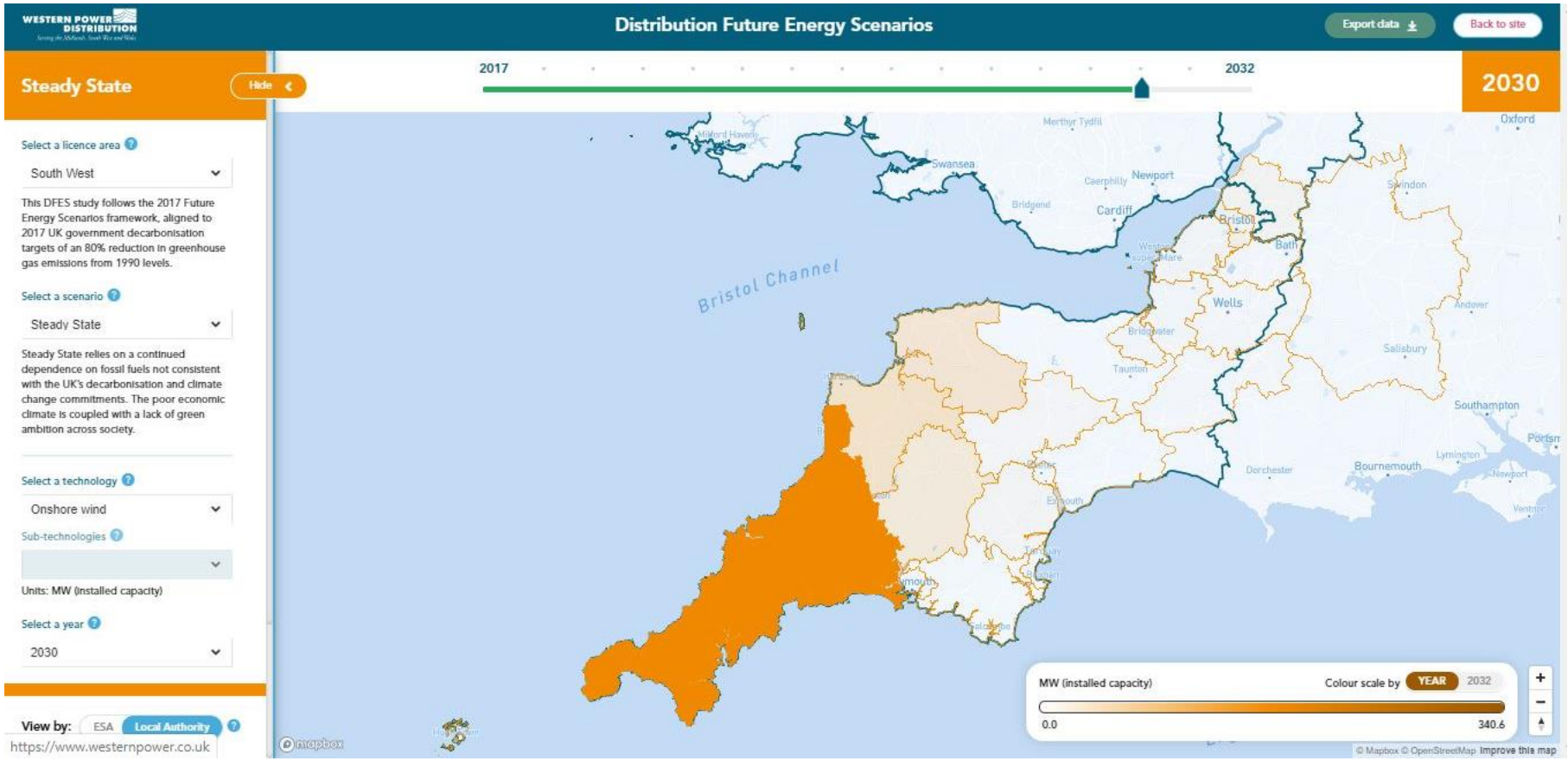

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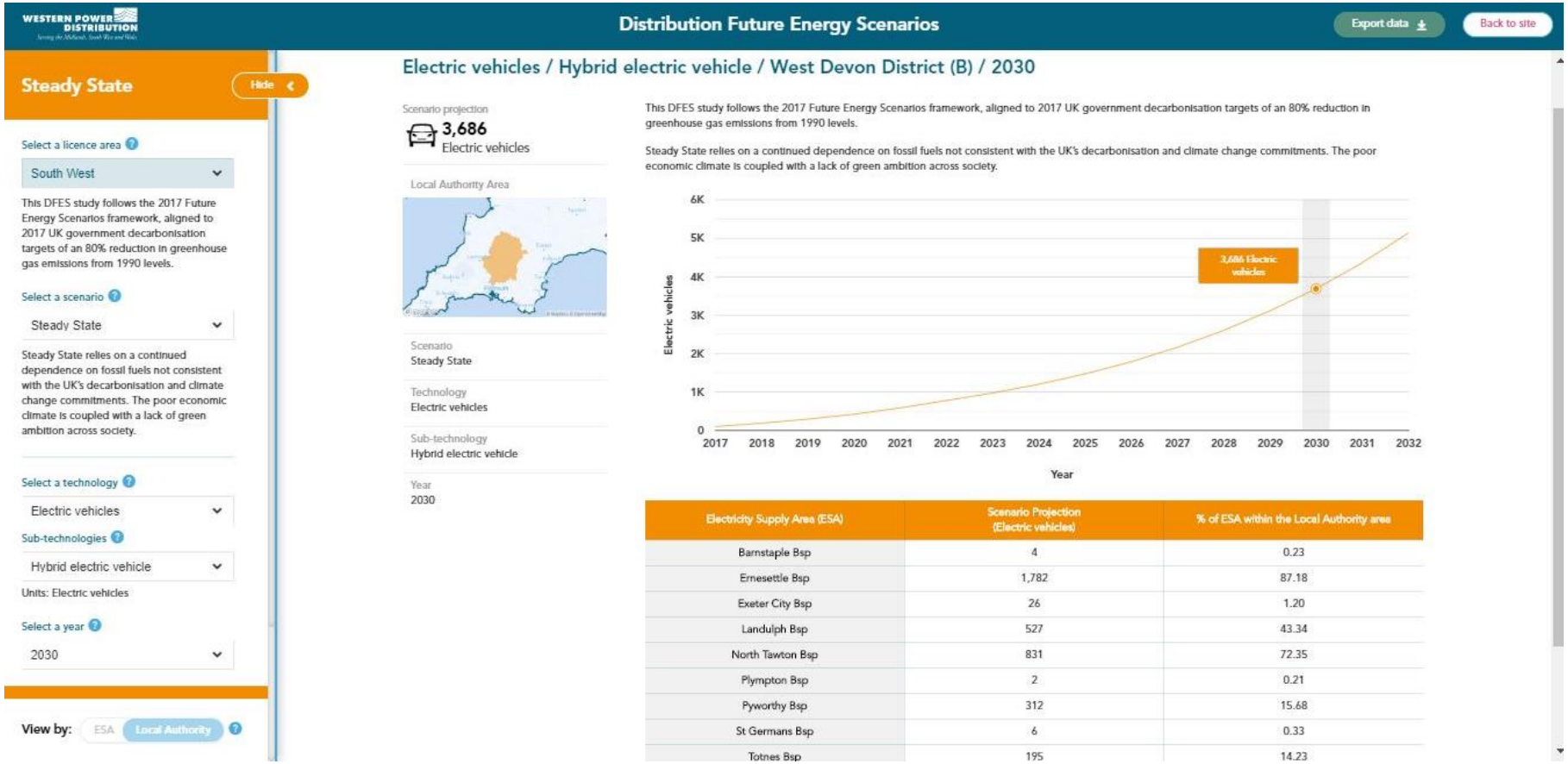
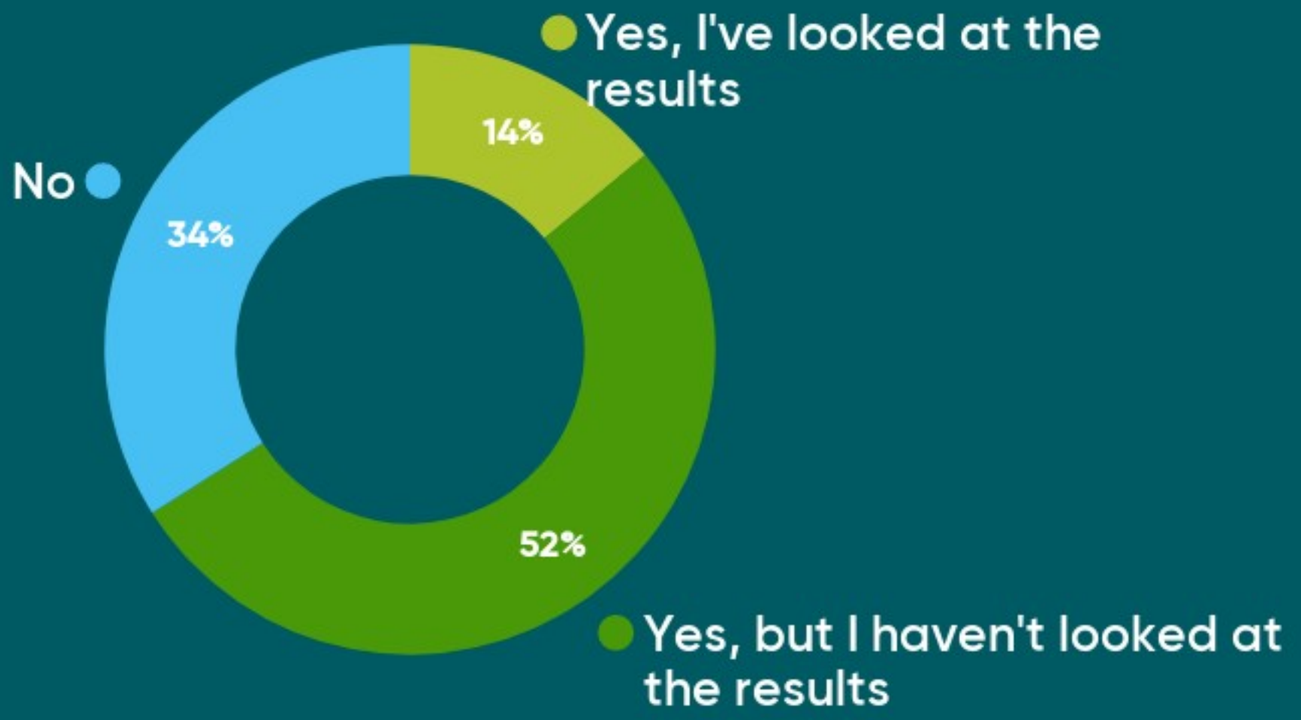


Electricity Supply Area (ESA)	Scenario Projection (Electric vehicles)	% of ESA within the Local Authority area
Barnstaple Bsp	4	0.23
Ernesettle Bsp	1,782	87.18
Exeter City Bsp	26	1.20
Landulph Bsp	527	43.34
North Tawton Bsp	831	72.35
Plympton Bsp	2	0.21
Pyworthy Bsp	312	15.68
St Germans Bsp	6	0.33
Totnes Bsp	195	14.23

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



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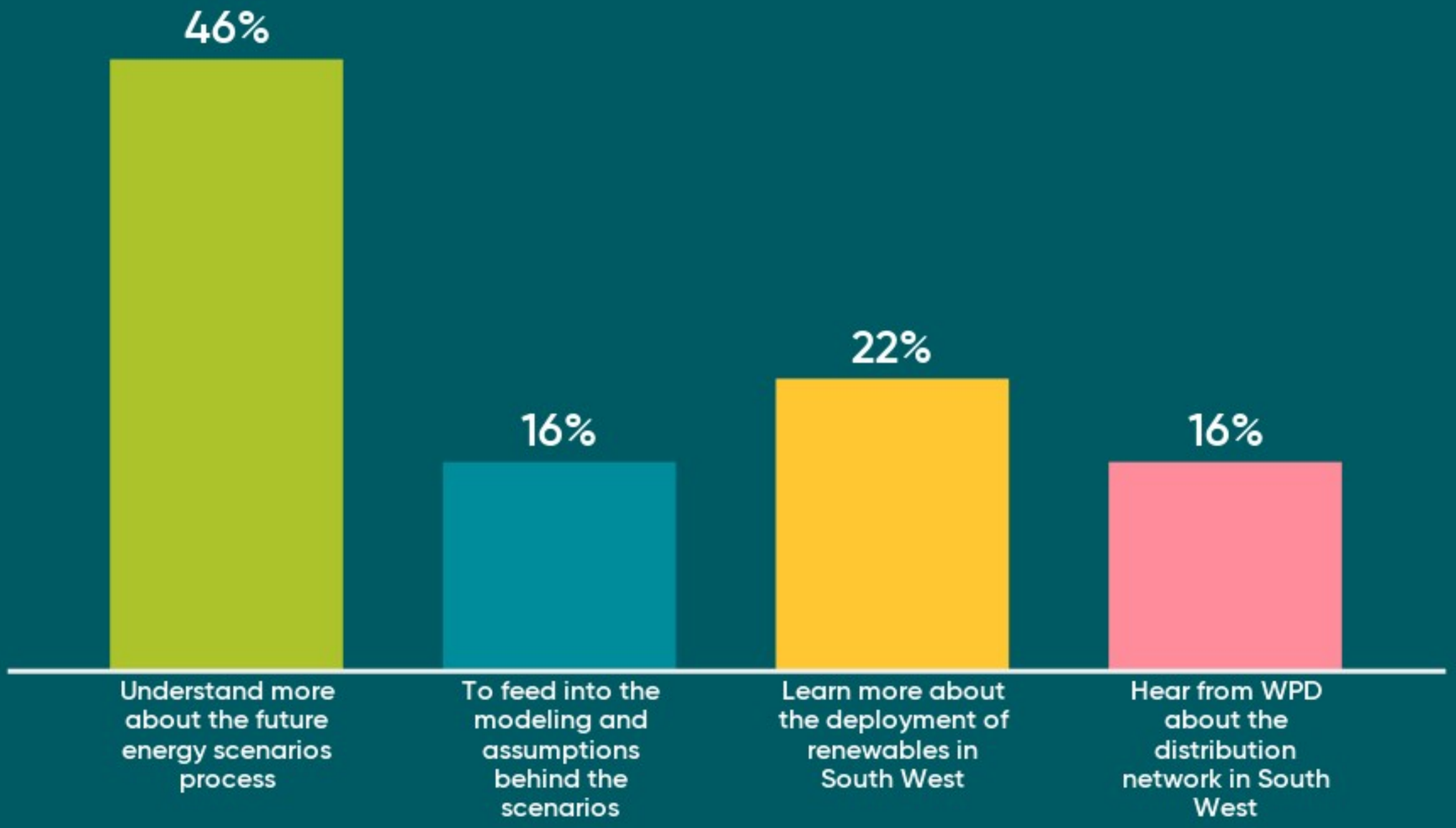
What do you want to get out of today?

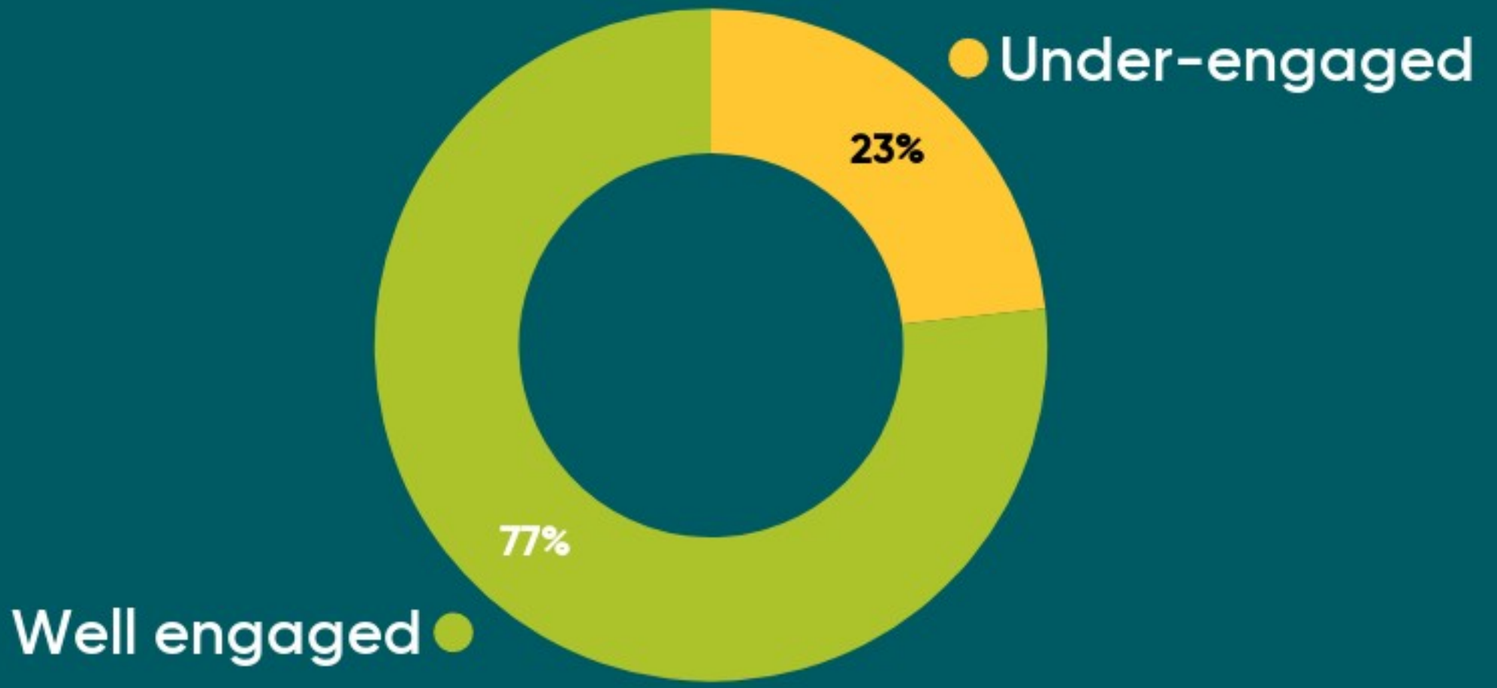


54

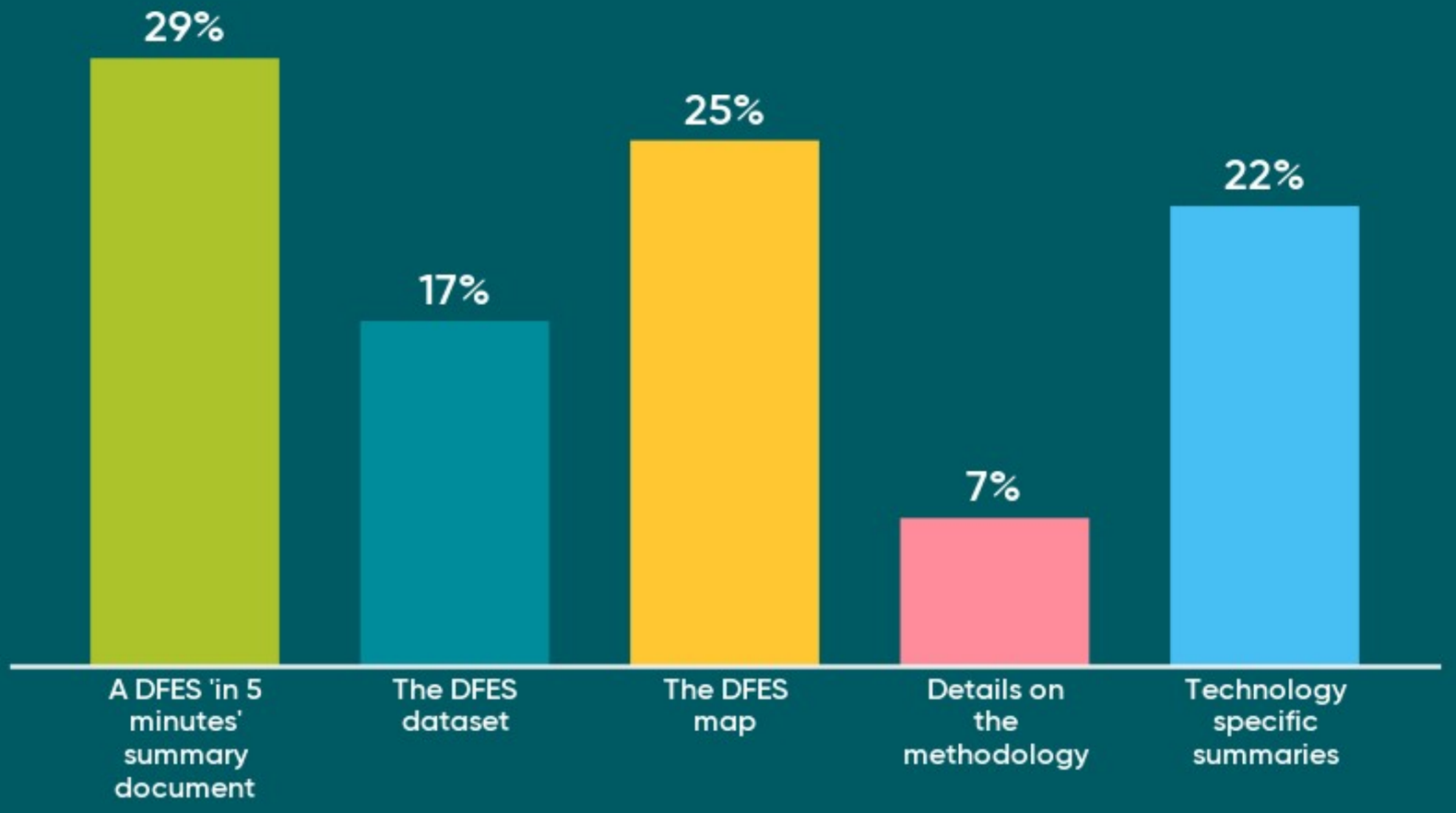
Network strategy for net zero future energy scenarios

Oli Spink - Network Strategy Engineer at Western Power Distribution

Stakeholder engagement from WPD



Which WPD DFES publications would be useful to you?



47

Input into modelling the 2020 Future Energy Scenarios

Ben Robertson - Analyst at Regen

Scope of work

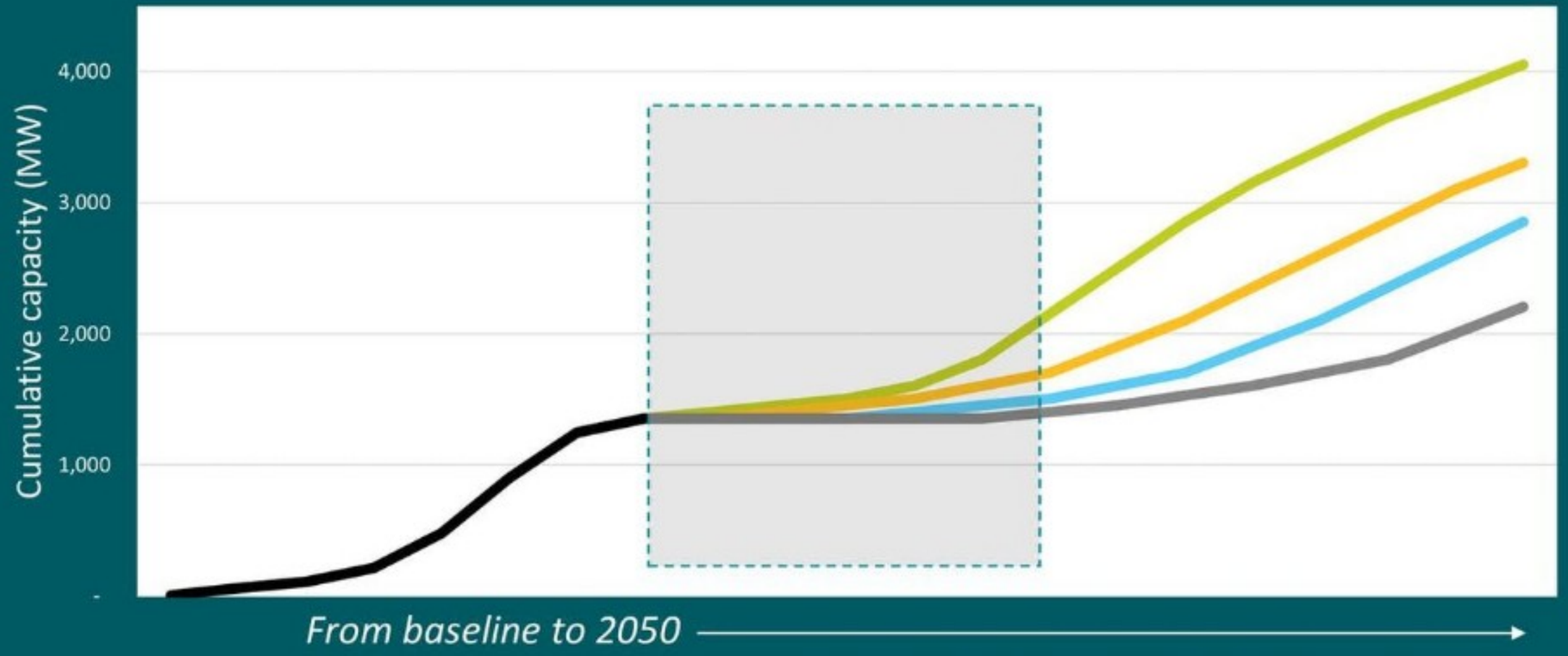
Using the National Grid **Future Energy Scenario (FES)** framework we project installed **generation** / **storage capacity, disruptive demand** technologies, and new **building development**. → the *what*

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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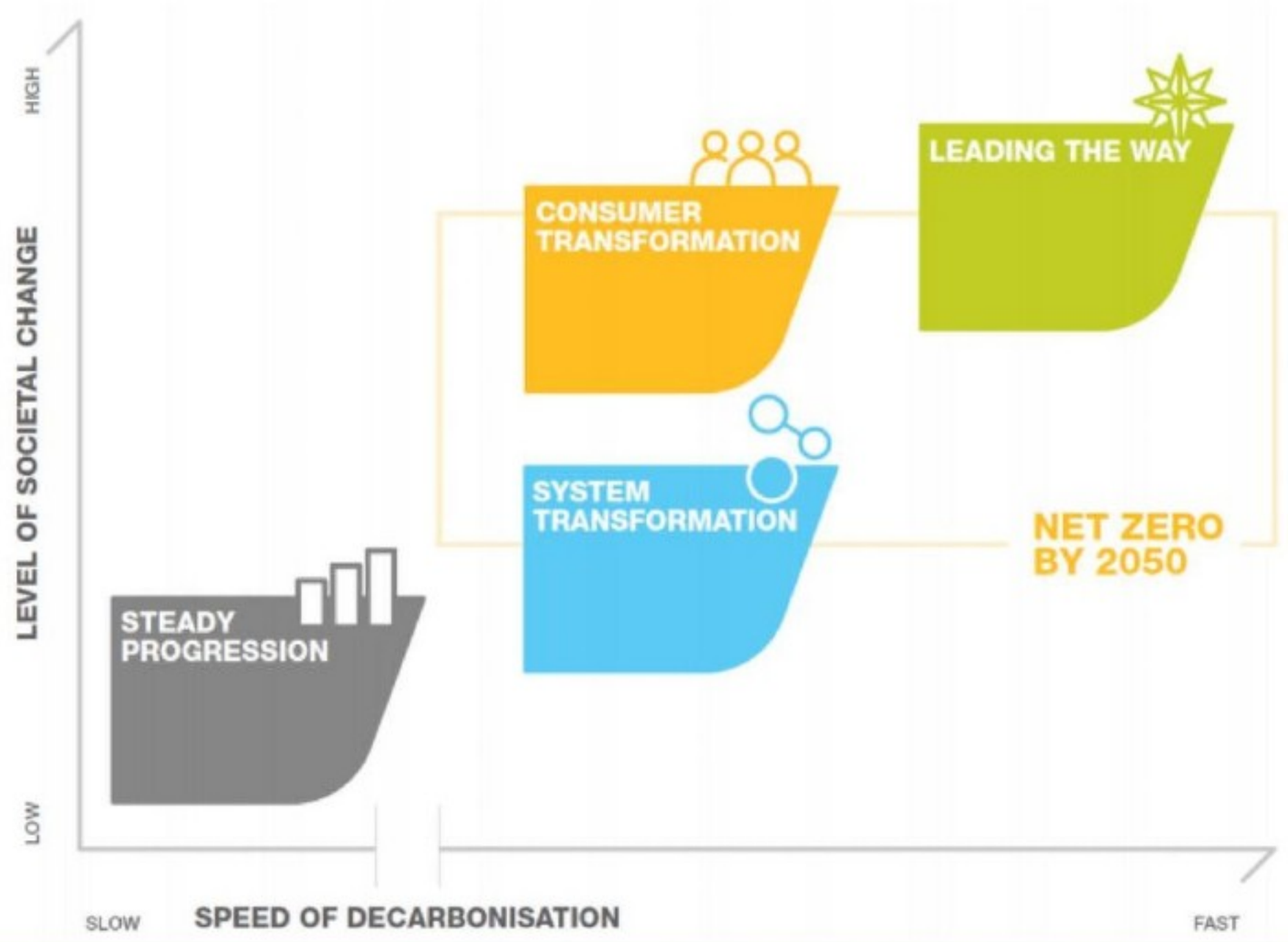


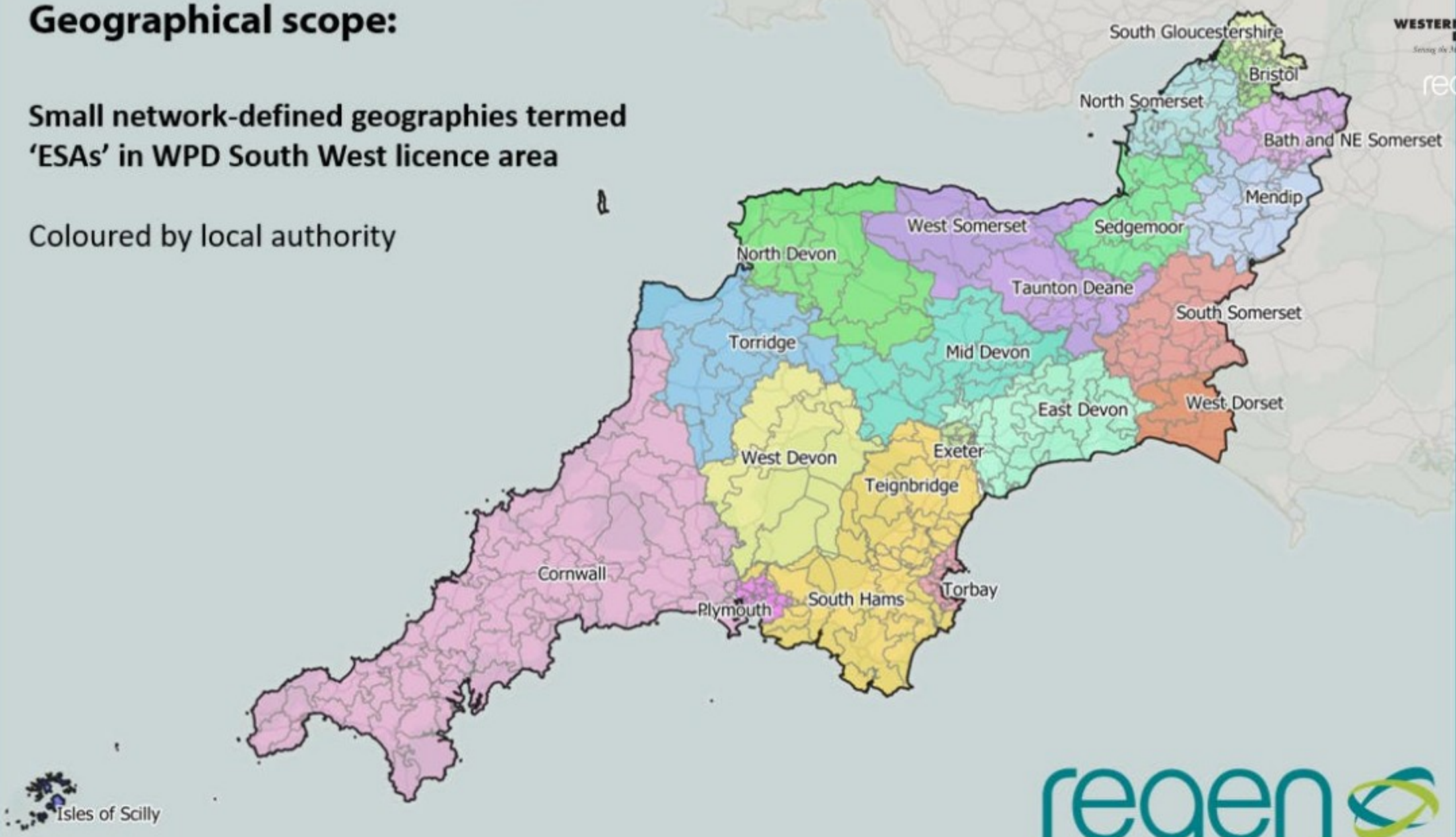
The Future Energy Scenarios set out by National Grid have changed since the last time this study was completed.

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 South West licence area

Coloured by local authority



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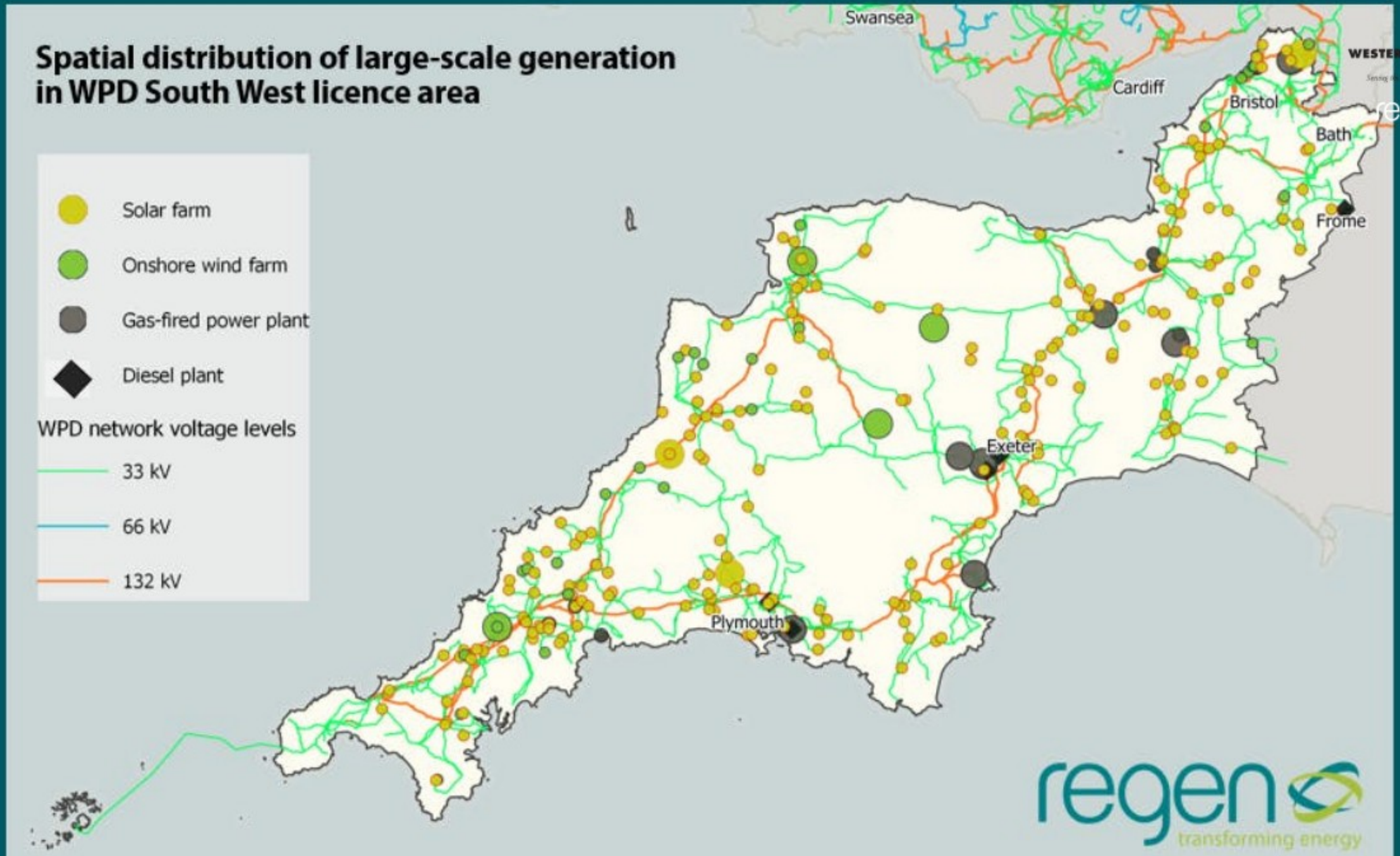
Spatial distribution of large-scale generation in WPD South West licence area



Pipeline of future projects

- Over 530 MW of solar PV with connection agreements
- Over 45 MW of onshore wind with connection agreements
- Over 150 MW of gas-fired power with connection agreements

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

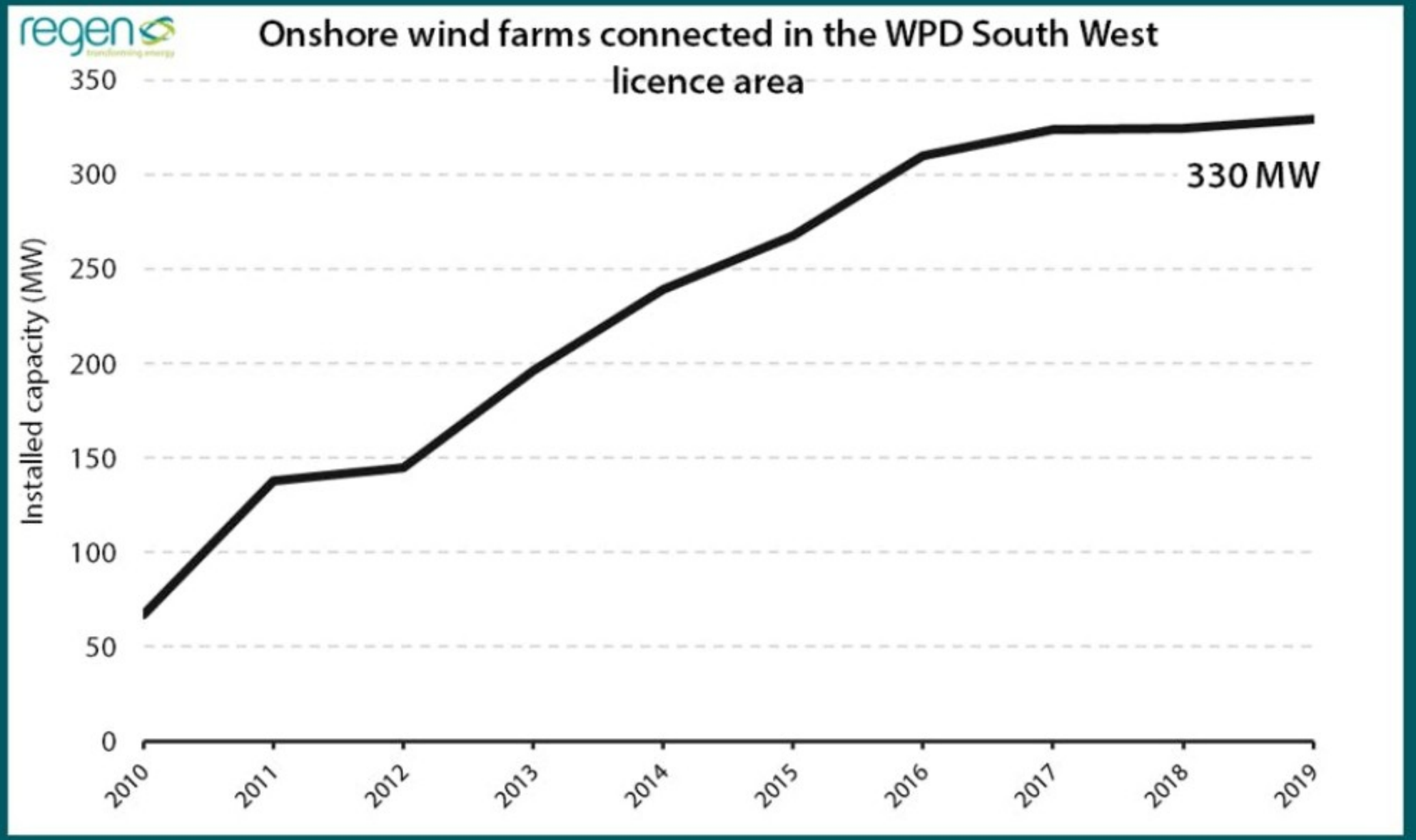
- Onshore wind
- Rooftop solar PV
- Heat pumps

Future energy scenarios for onshore wind

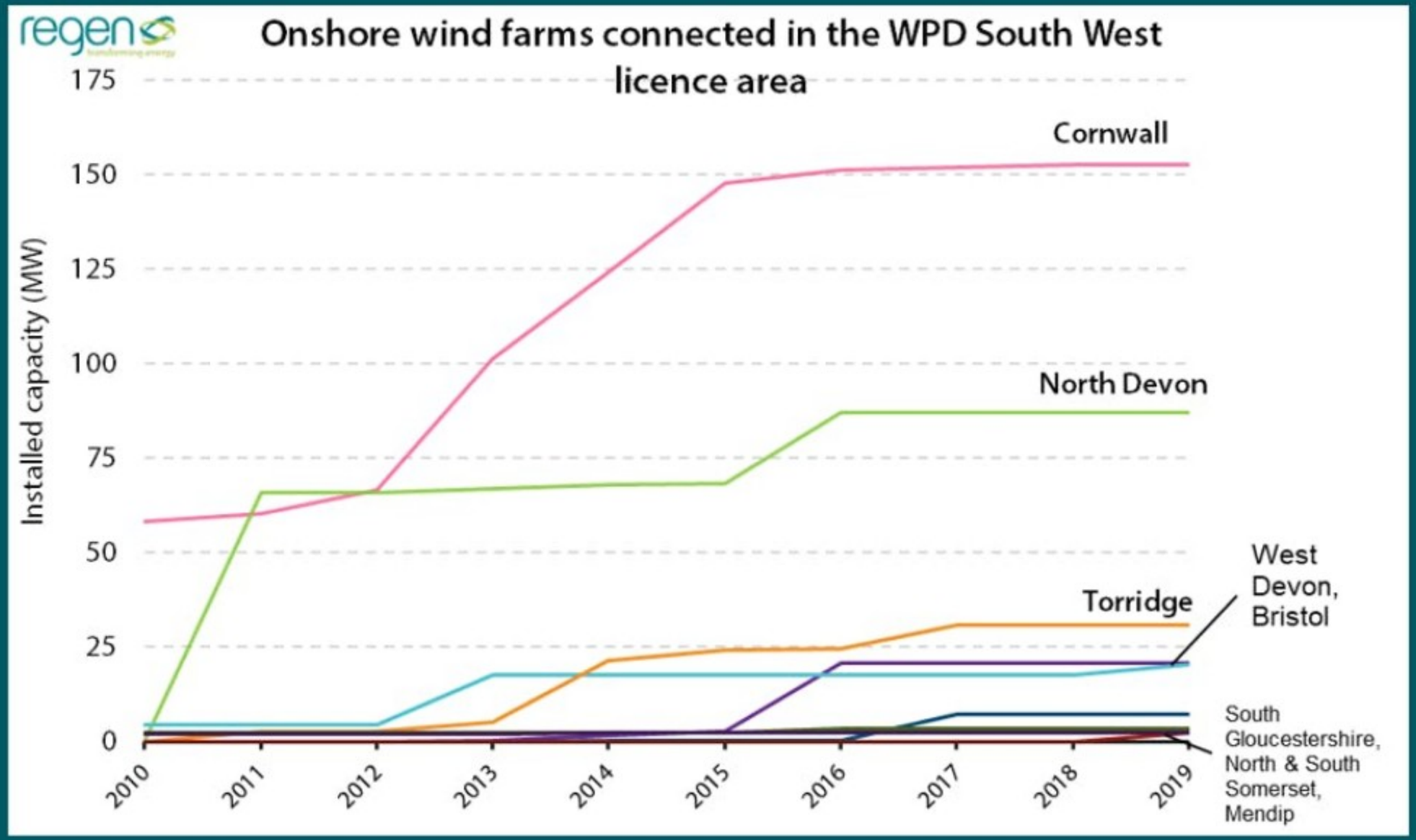
Our consultation event in South West two years ago raised the following points:

- Lack of local appetite for onshore wind meant few planning applications were coming through
- Growth in onshore wind is likely to come from small-scale community owned projects

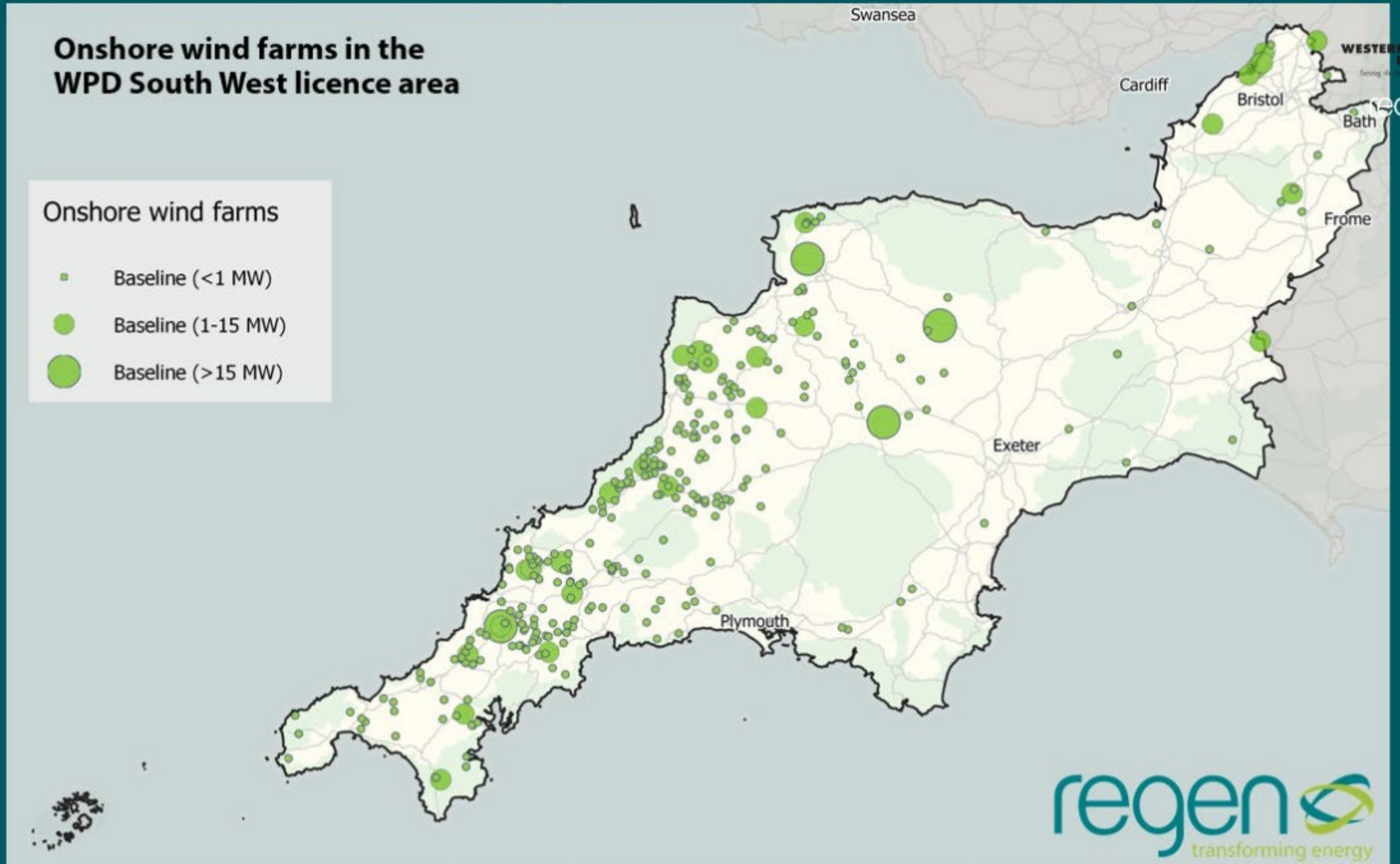
Onshore wind total baseline



Onshore wind baseline by local authority



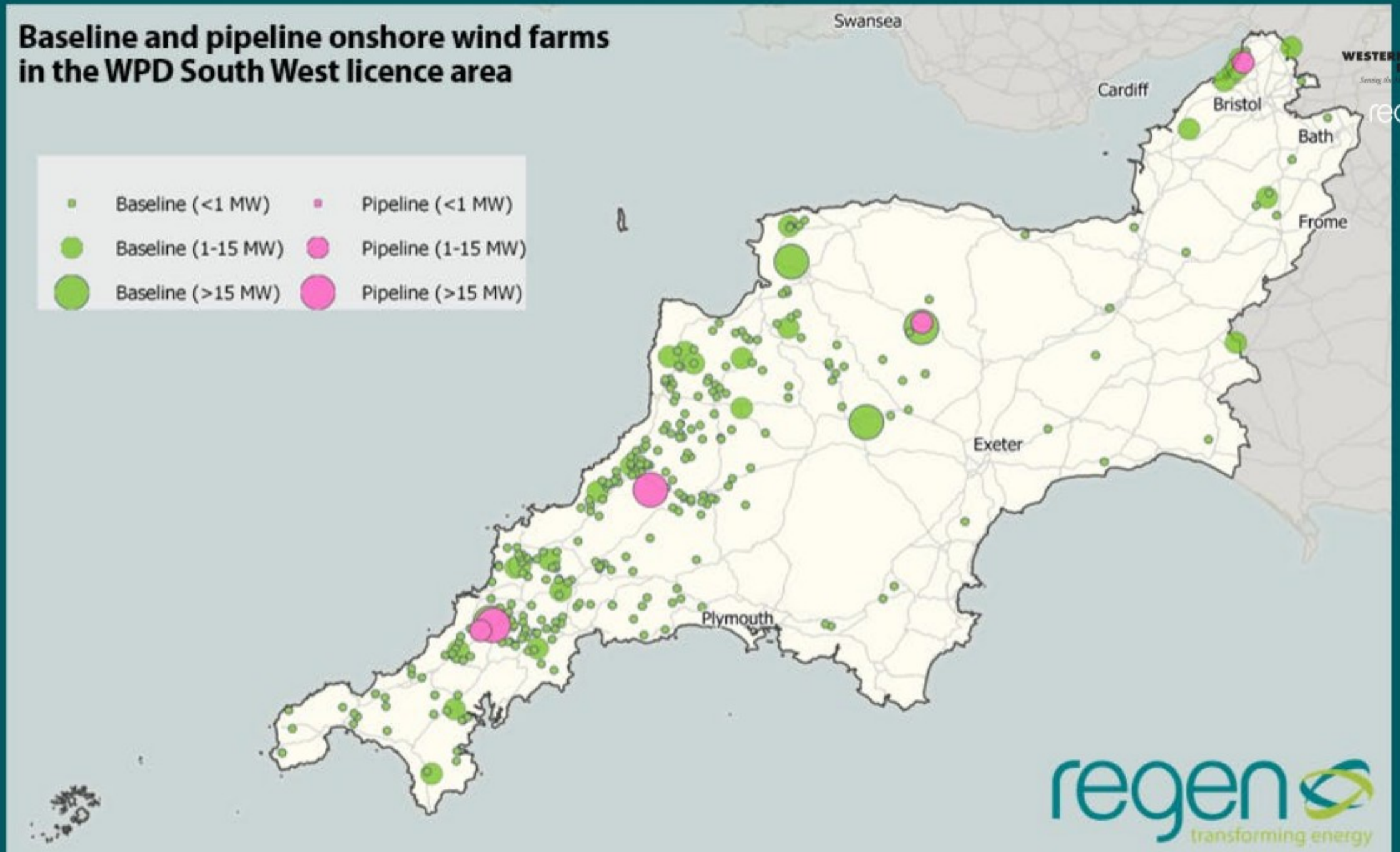
Onshore wind farms in the WPD South West licence area



Pipeline of onshore wind projects

- Five onshore wind sites (48 MW) with a connection agreement
- Two large (20 MW) and three smaller (<5 MW) sites
- Connection agreements granted in 2018/19

Baseline and pipeline onshore wind farms in the WPD South West licence area



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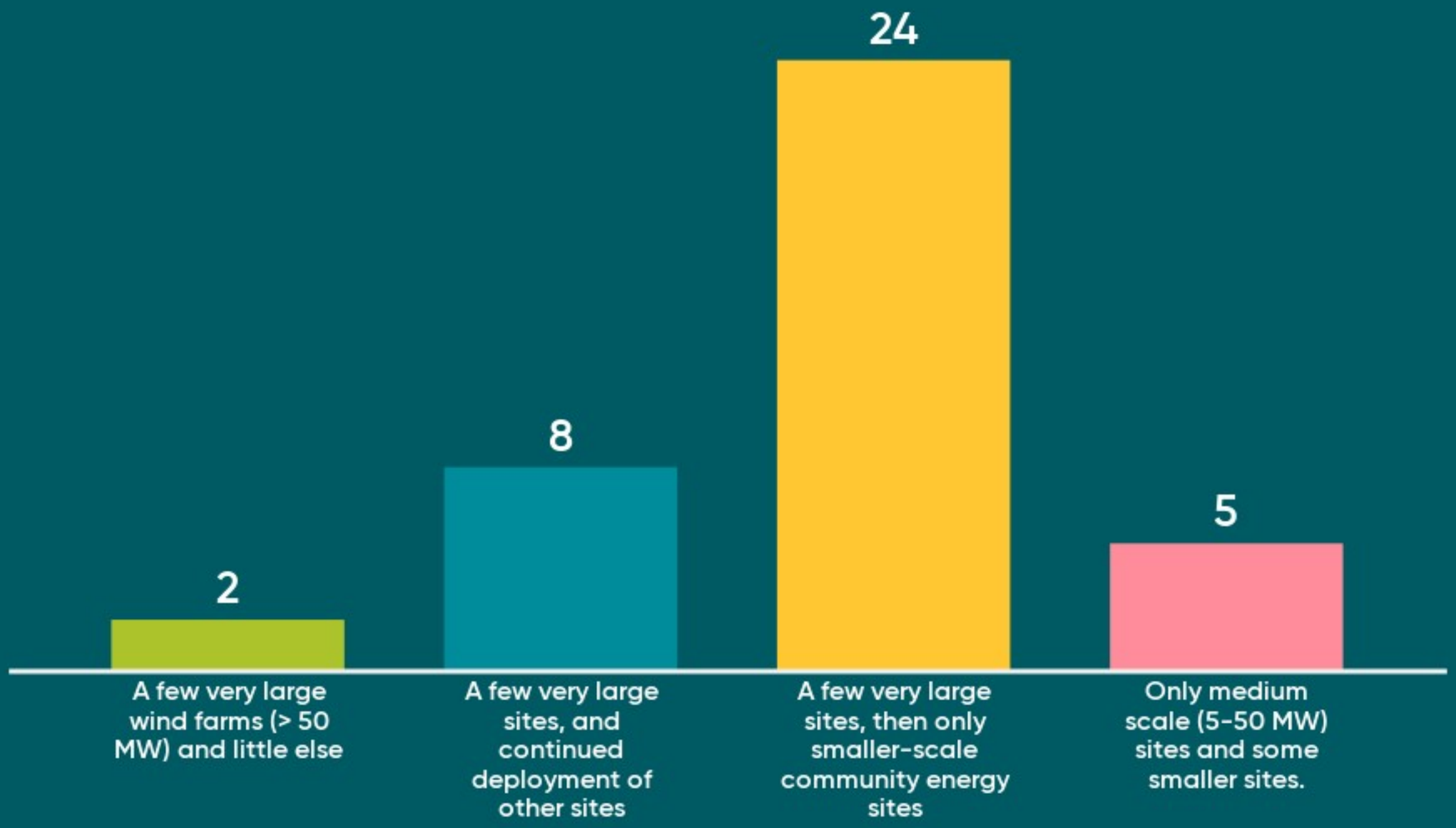
Subsidy-free onshore wind in the South West, and the element of local ownership

1. Under an ambitious scenario, when might onshore wind deployment pick up again?

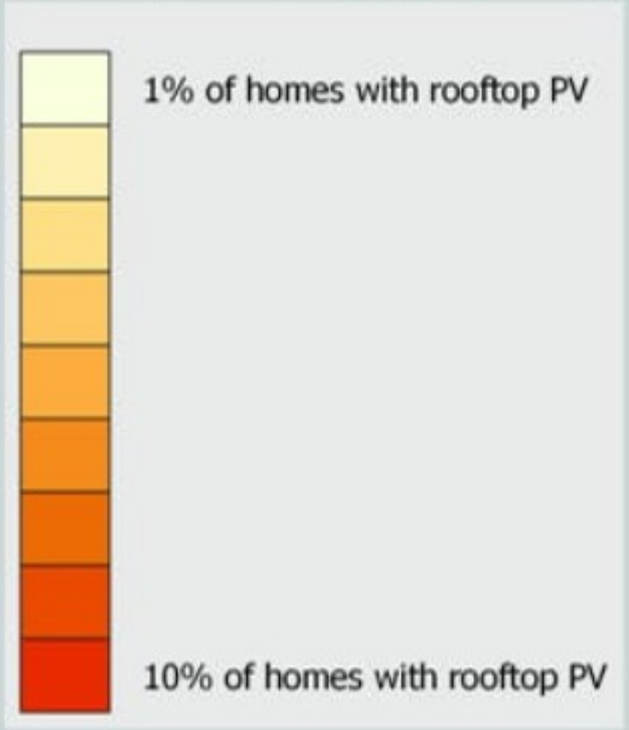
40

2. Where will subsidy-free business models lead?



Future energy scenarios for rooftop solar

Heat map showing percentage of homes with rooftop PV by local authority



South Gloucestershire
Bristol
North Somerset
Bath and NE Somerset
Mendip
West Somerset
Sedgemoor
North Devon
Taunton Deane
South Somerset
Torridge
Mid Devon
East Devon
West Dorset
West Devon
Exeter
Teignbridge
Cornwall
Torbay
South Hams
Plymouth
Isles of Scilly

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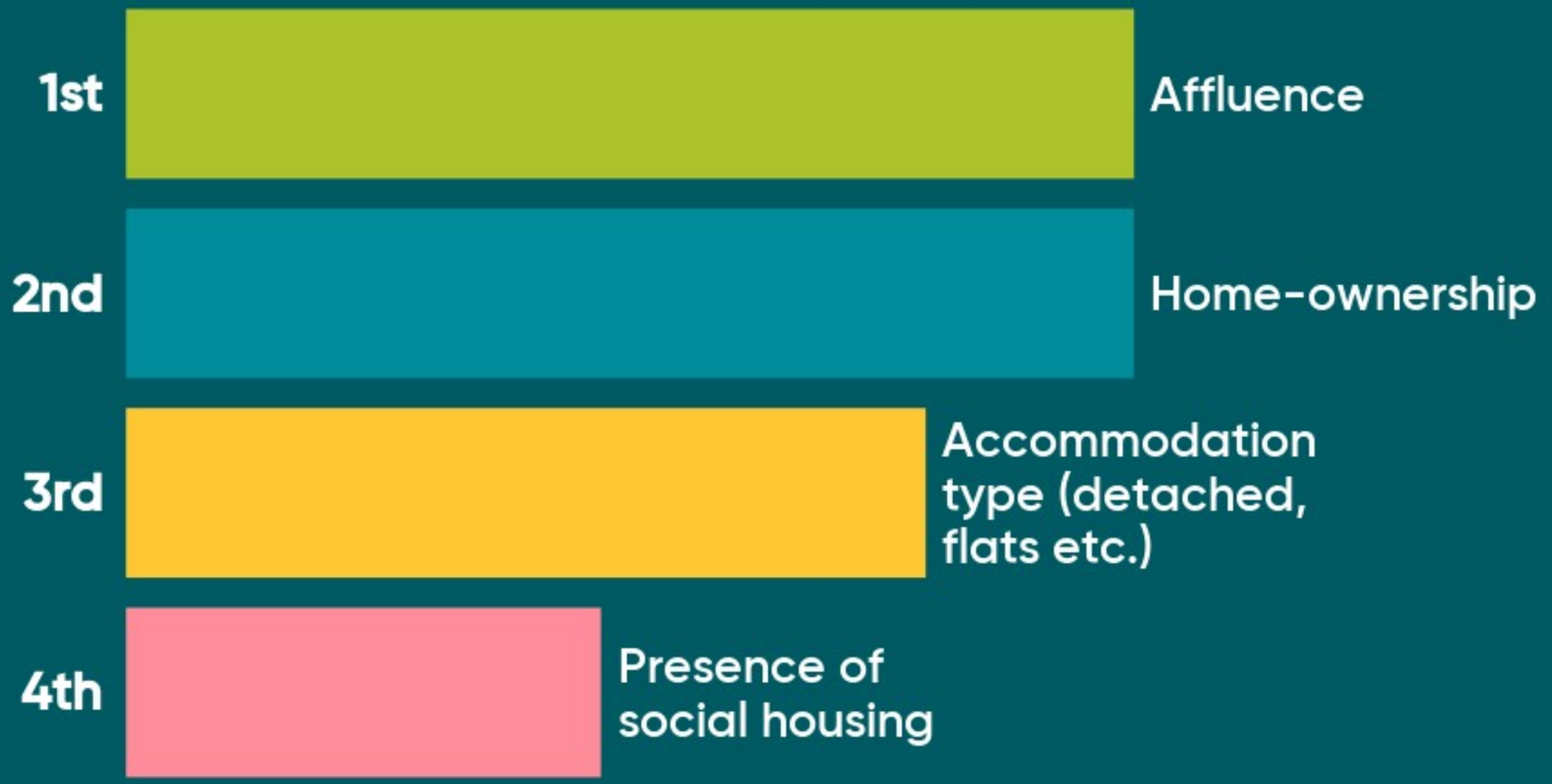
1. How important are these factors in rooftop solar PV uptake uptake?



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Rooftop PV in new-builds

- We do separate analysis for domestic PV on existing building and on new-builds
- We use EPC data to get trends on solar installation in new-builds

2. What proportion of new-builds in your area are currently installing rooftop solar PV?

37

Future energy scenarios for low-carbon heat

Heat pump figures – for the South West licence area

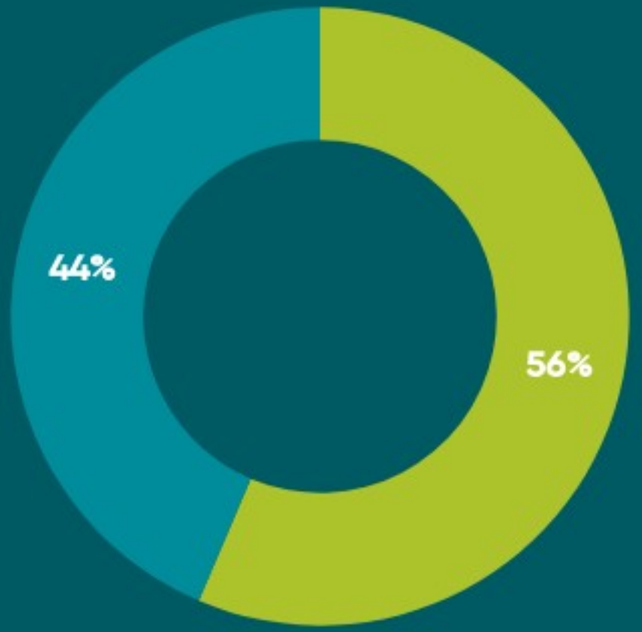
- Heat pumps are currently installed in around 0.7% of homes in the South West
- The national average is around 0.4% of homes with heat pumps
- National FES numbers project around 10% of homes with heat pumps by 2030

Schemes that support heat pump deployment

- Domestic RHI: scheme extended until March 2022
- RHI to be replaced with a Clean Heat Grant targeted at biomass boilers and heat pumps.
- Future Homes Standard: ban on fossil fuel heating in new-builds from 2025

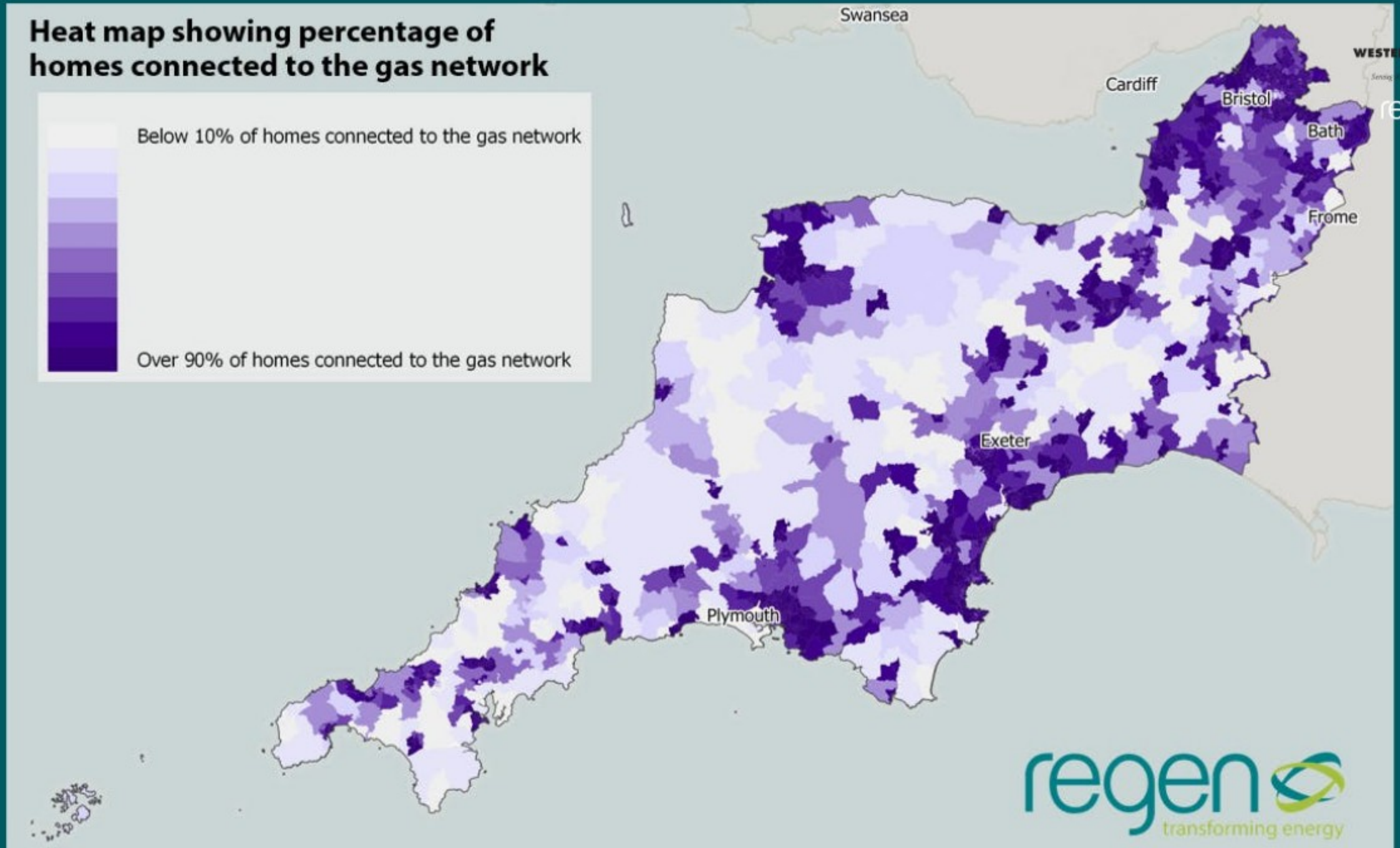
1. How might the 2025 Future Homes Standard impact low-carbon heating uptake in new-builds?

The number of new homes with gas boilers will fall linearly towards 2025, and replaced largely by heat pumps

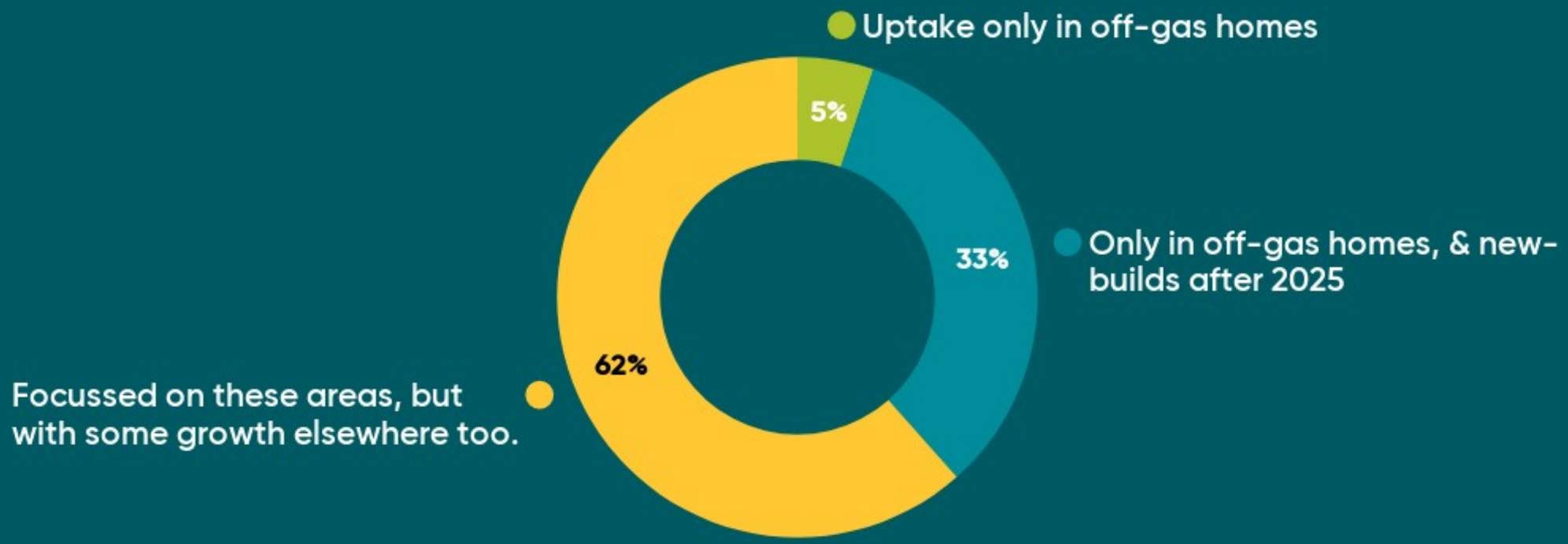


Gas boilers will continue to be installed right up until 2025, then largely replaced by heat pumps.

Heat map showing percentage of homes connected to the gas network

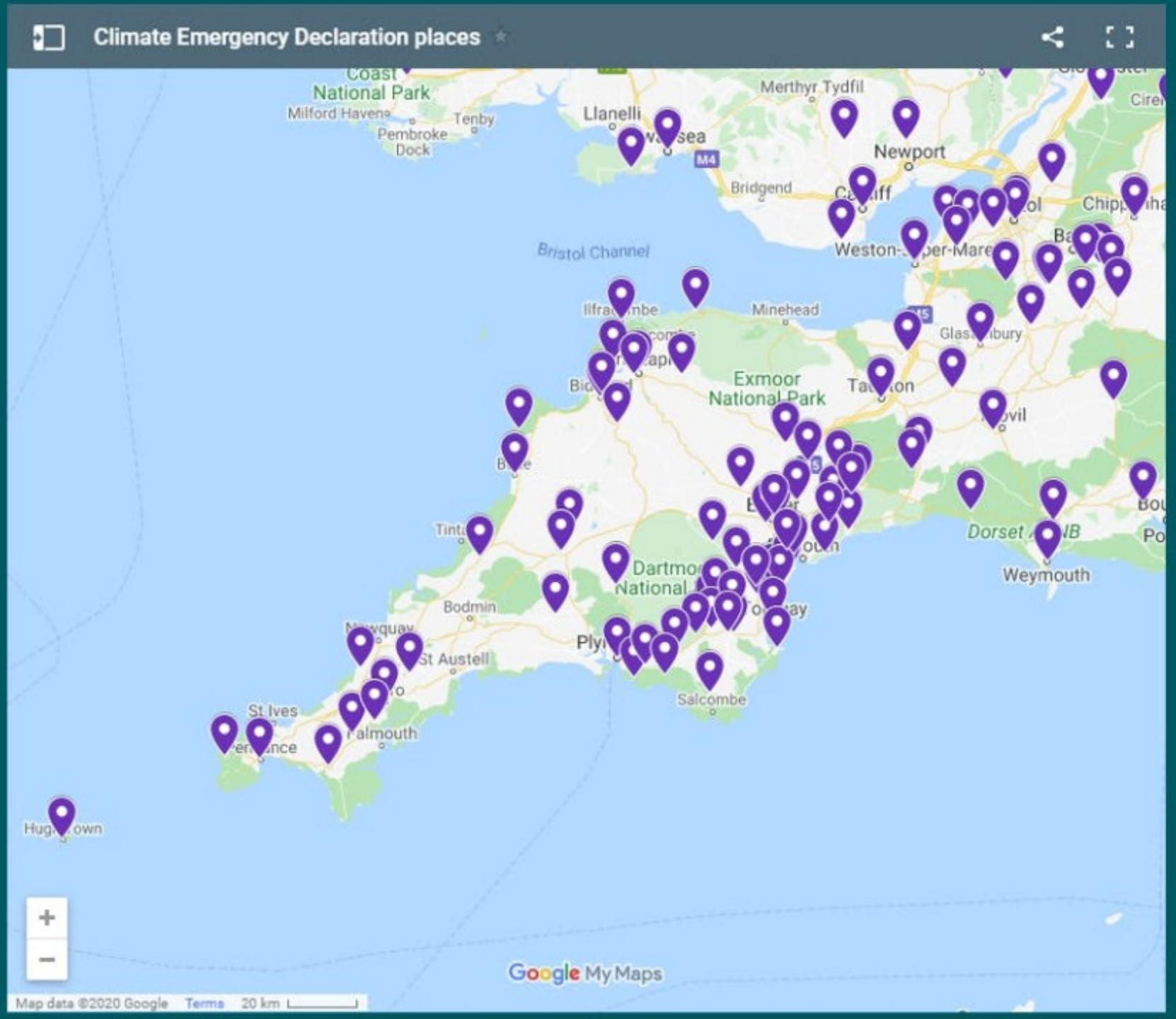


2. In the near term, will heat pump uptake will be limited to certain households?

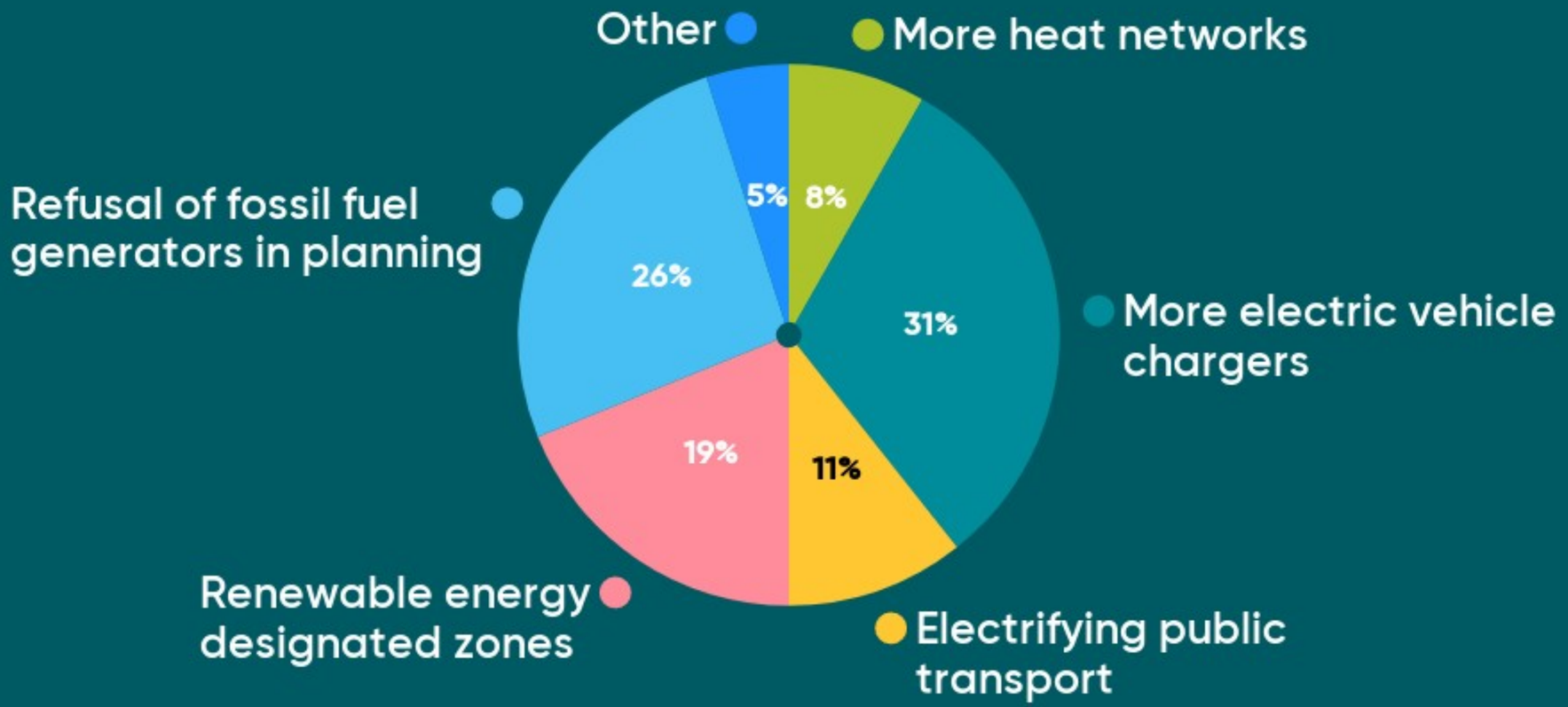


Local plans, policies and schemes

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
Coast
National Park
Milford Haven
Tenby
Pembroke
Dock
Llanelli
Merthyr Tydfil
Newport
M4
Bridgend
Bristol Channel
Minehead
Exmoor
National Park
Glastonbury
Dorset
Weymouth
Bodmin
St Austell
St Ives
Falmouth
Salcombe
Google My Maps
Map data ©2020 Google
Terms
20 km

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



Are there any specific documents or plans you would direct us towards? For example for the 'Cornwall Climate Change Action Plan'.

no

No

Bristol Heat Network plans

No

(Draft) Greater Exeter Strategic Plan 2040

https://www.creds.ac.uk/wp-content/pdfs/CREDS-Shifting-the-focus-July2019.pdf

Climate Emergency Progress Report on BNES CE website - shows our targets for RE installation

No

Responses to local development plans

26

Are there any specific documents or plans you would direct us towards? For example for the 'Cornwall Climate Change Action Plan'.

Somerset Climate change Strategy - when published later this year (hopefully).

Housing associations sustainability reporting (when strategies are included)

Draft Cornwall Climate Change Development Plan Document

Each district in Somerset has its own Action Plan as well as aligning to the overall Somerset Plan

Local Plans, esp renewable energy strategies

South Glos Climate Emergency Action Plan

Renewable Energy Assessments being undertaken by Local Authorities

MOD are developing a net zero route map. Please contact me for further info

Devon Carbon Plan

Are there any specific documents or plans you would direct us towards? For example for the 'Cornwall Climate Change Action Plan'.

South Somerset Environment Strategy 2019

Exeter zero carbon blueprint

Devon Carbon Plan

B&NES climate emergency strategy study

Teignbridge draft local plan out for consultation

No

SWT Climate Change Plan; SWT Climate Change Plan - https://www.somersetwestandtaunton.gov.uk/climate-emergency/ Planning Policy - https://www.somersetwestandtaunton.gov.uk/planning-policy/

Stroud district local plan review draft plan

26

New developments study

- Joe Noble, Graduate Analyst at Regen

New developments overview

What?

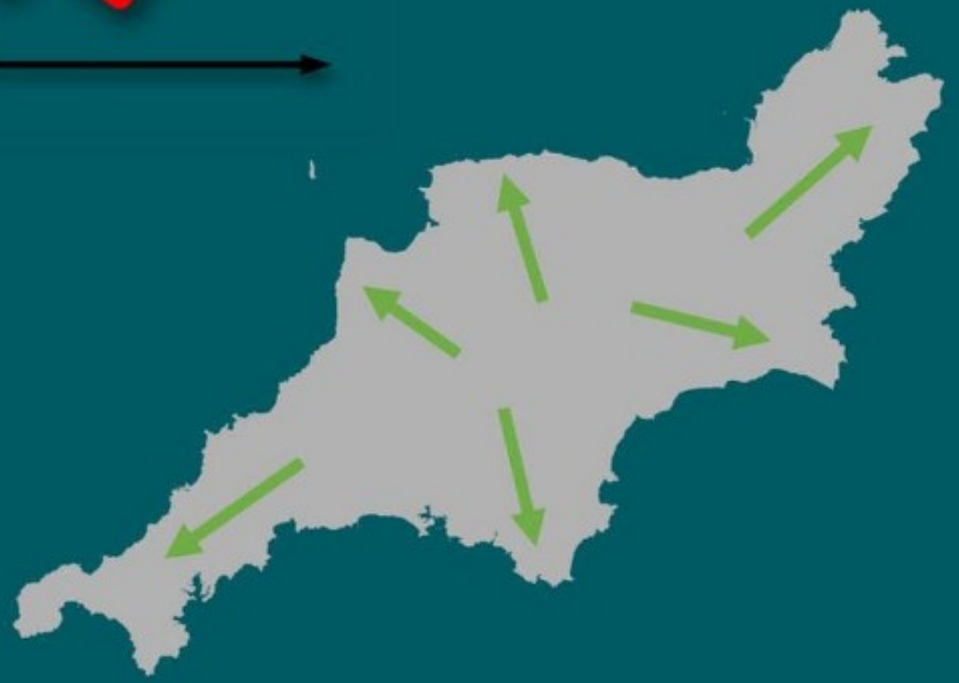
Assesses the scale and spread of new underlying demand

How?

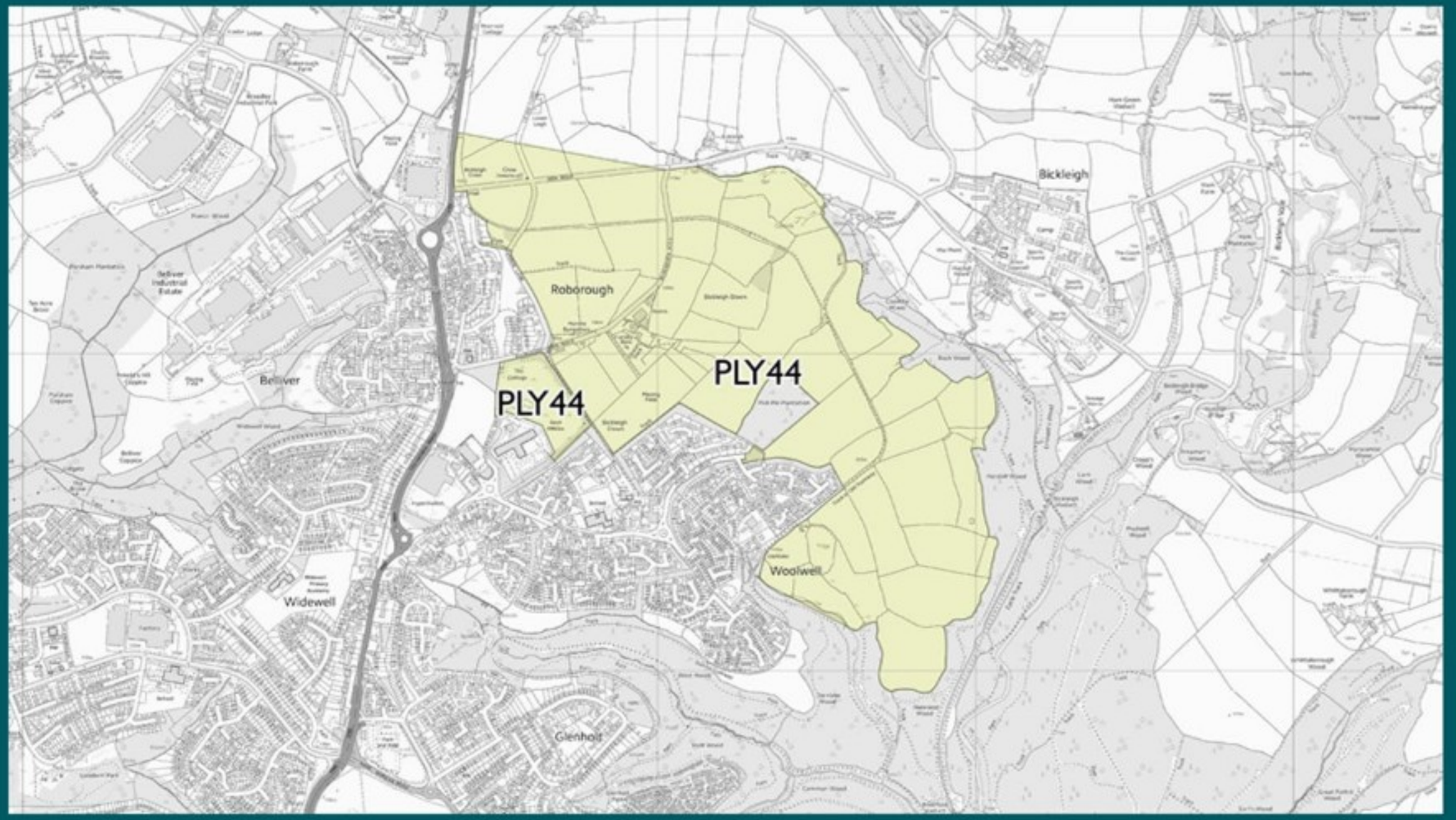
Collecting planning policy data from local authorities

Why?

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



Example - Woolwell urban extension

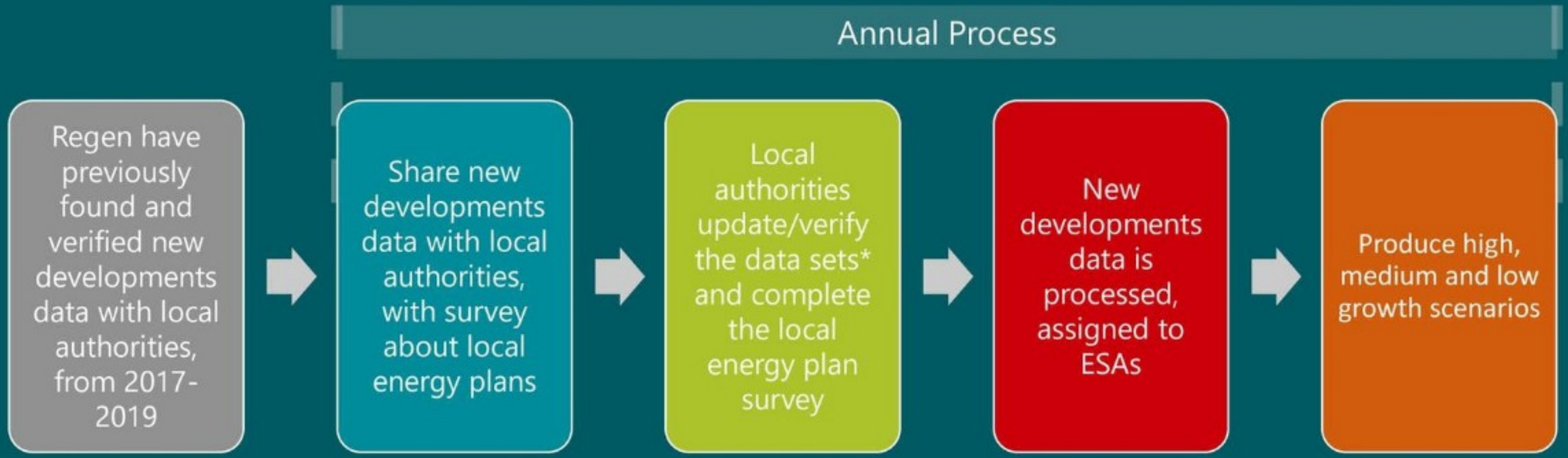


Plan for:

- 2000 new homes
- New primary school + appropriate local facilities
- Aim to ‘maximise opportunities for on site energy generation’

Source: https://plymswdevonplan.co.uk/policy/so4/ply44

Methodology overview



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

The data we collect

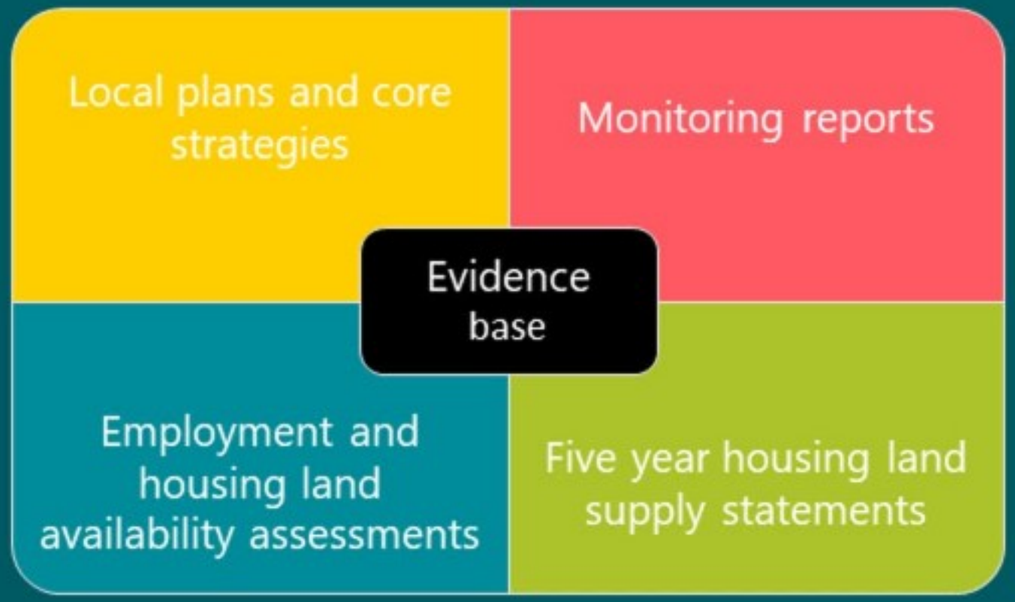
Allocated and planned new domestic and non-domestic sites:

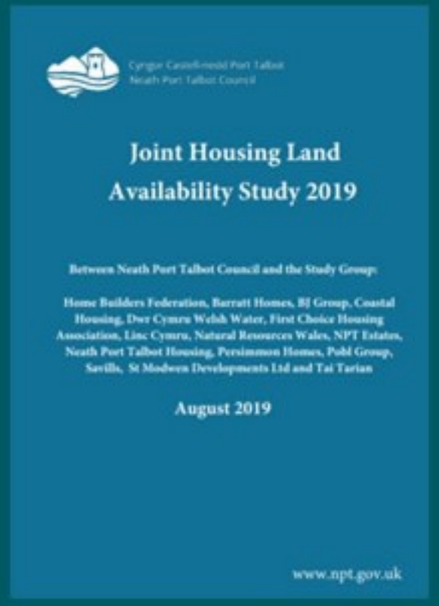
- Over 20 homes (domestic)
- Over 0.1ha site area (non-domestic)

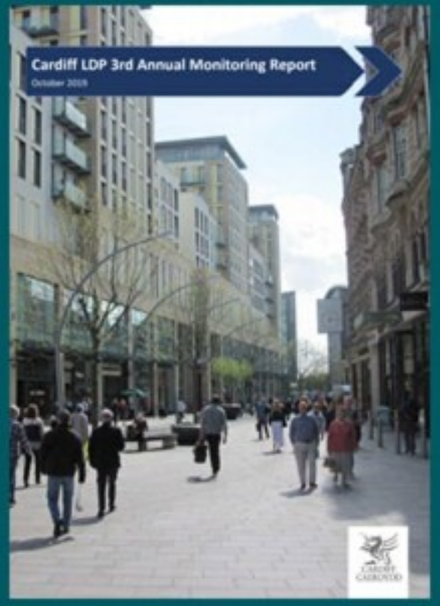
In order to estimate demand, we need:

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

Data sources

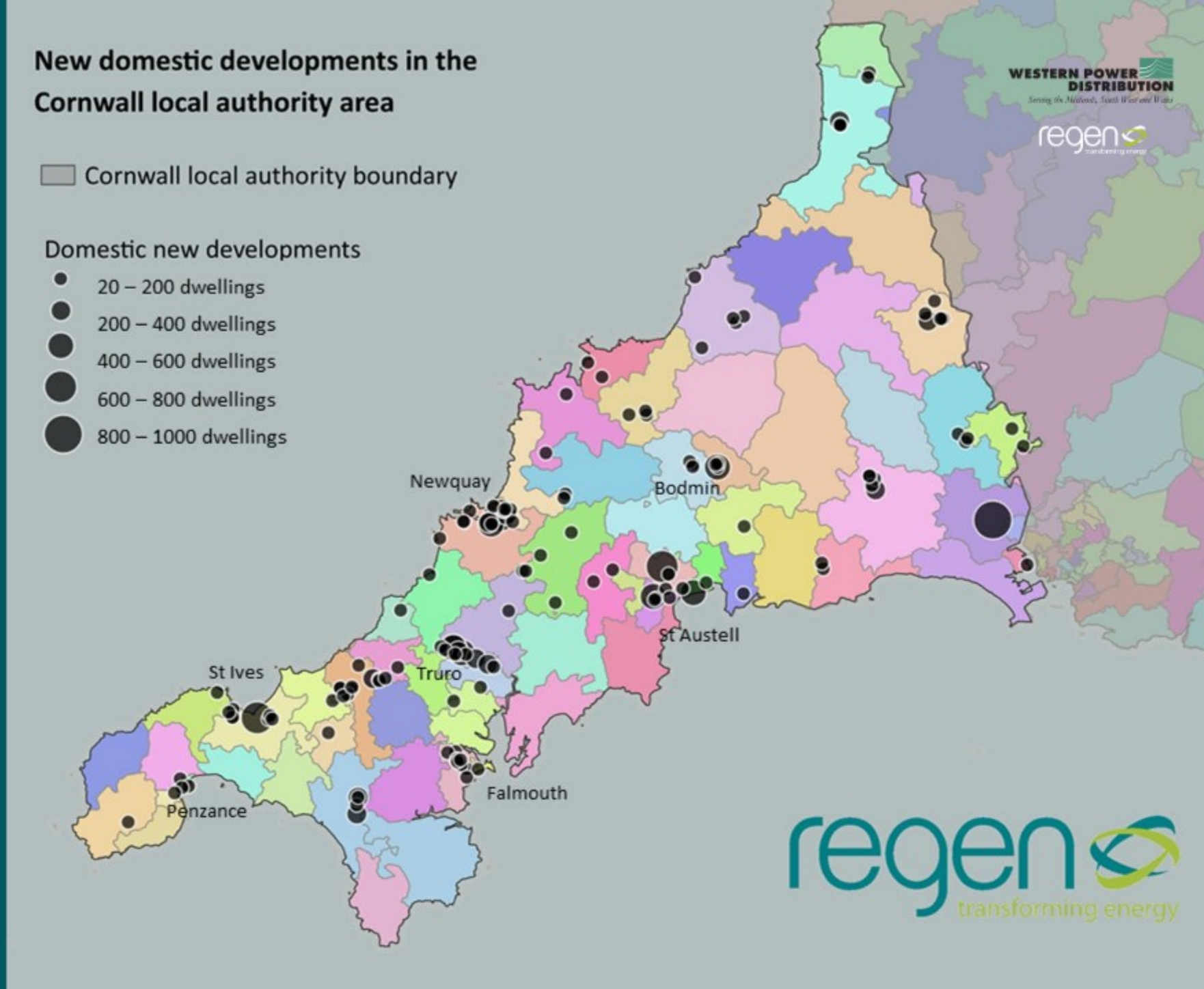






Assigning sites to local distribution networks

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

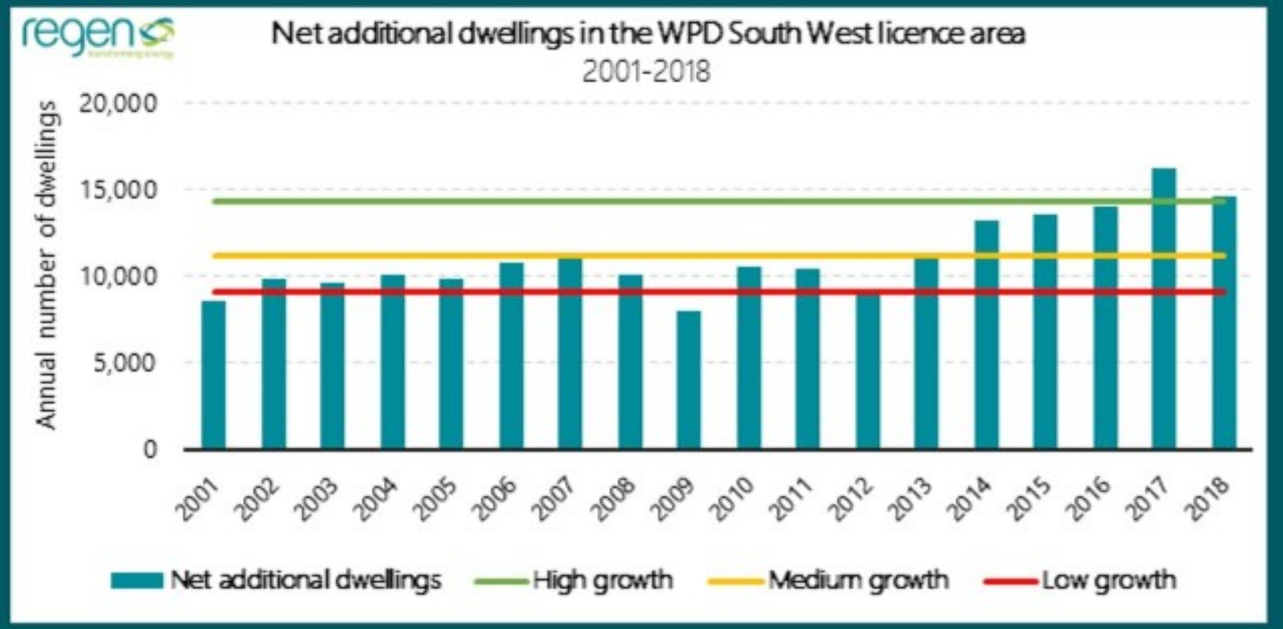
Threshold of 20 homes:

- 2% homes lost
- 32% 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

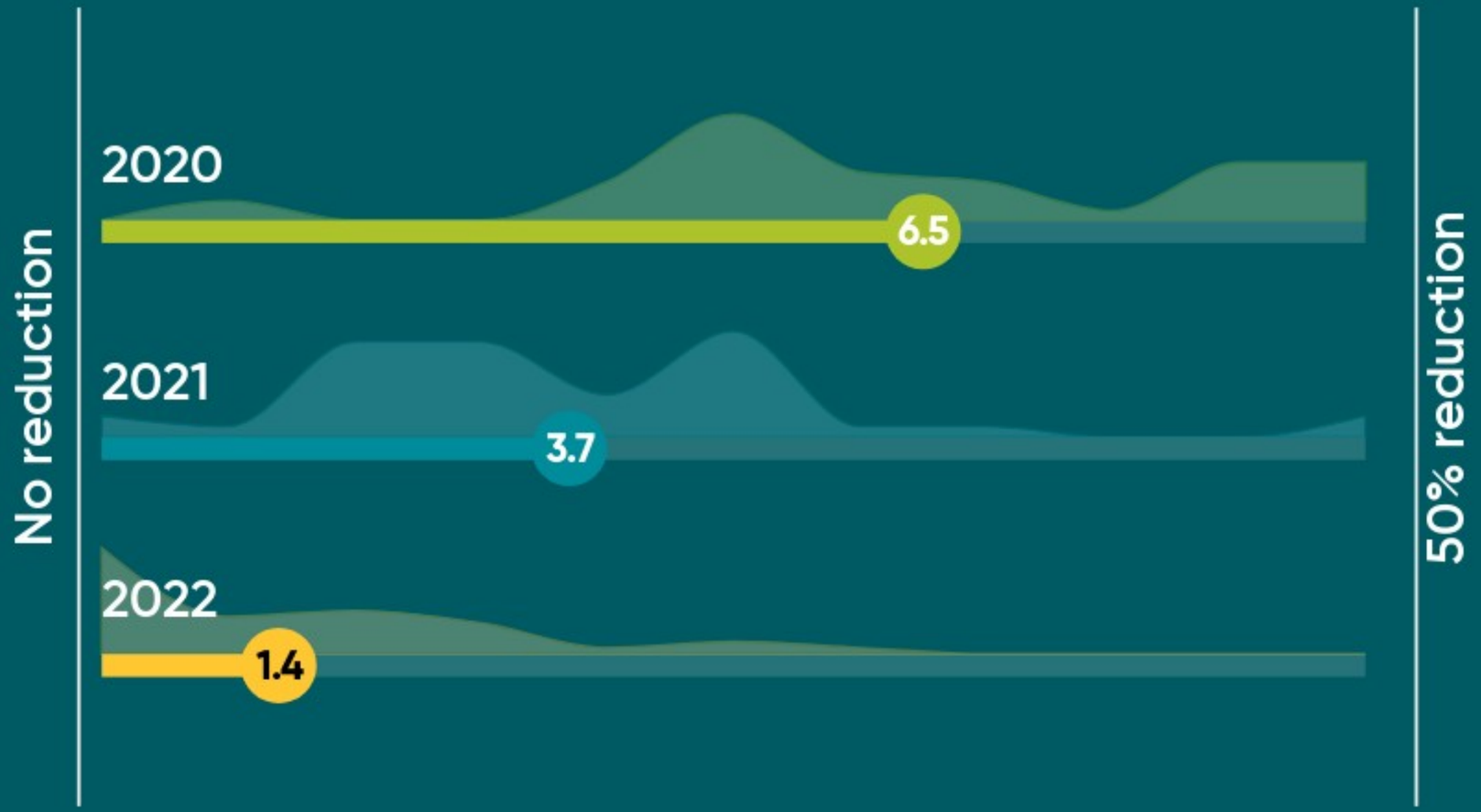
Calculate and distribute the number of dwellings not captured by the >20 homes criteria

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?

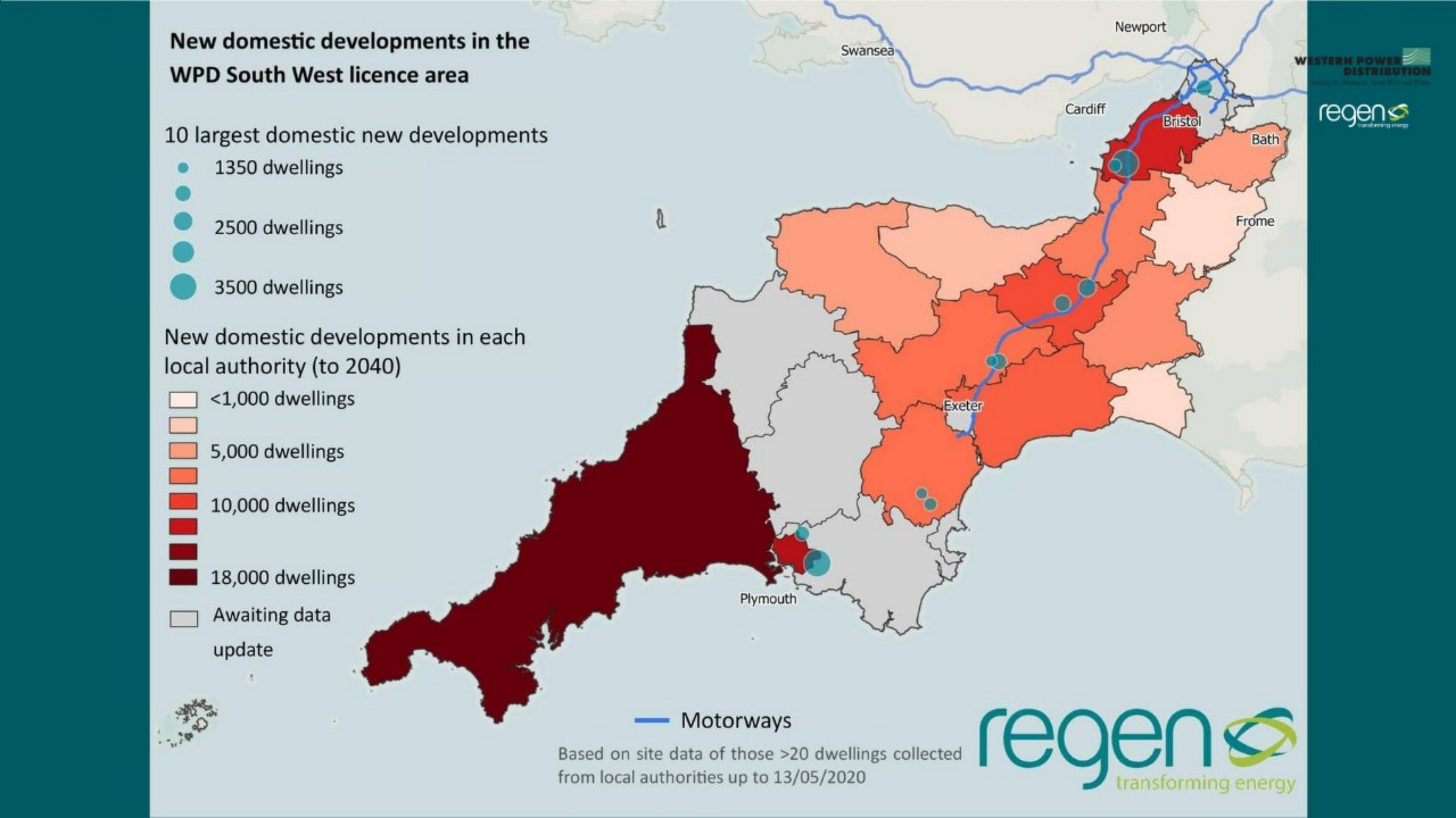


41

Preliminary results

Heat map of domestic developments to 2040, with the 10 largest sites in the South West.

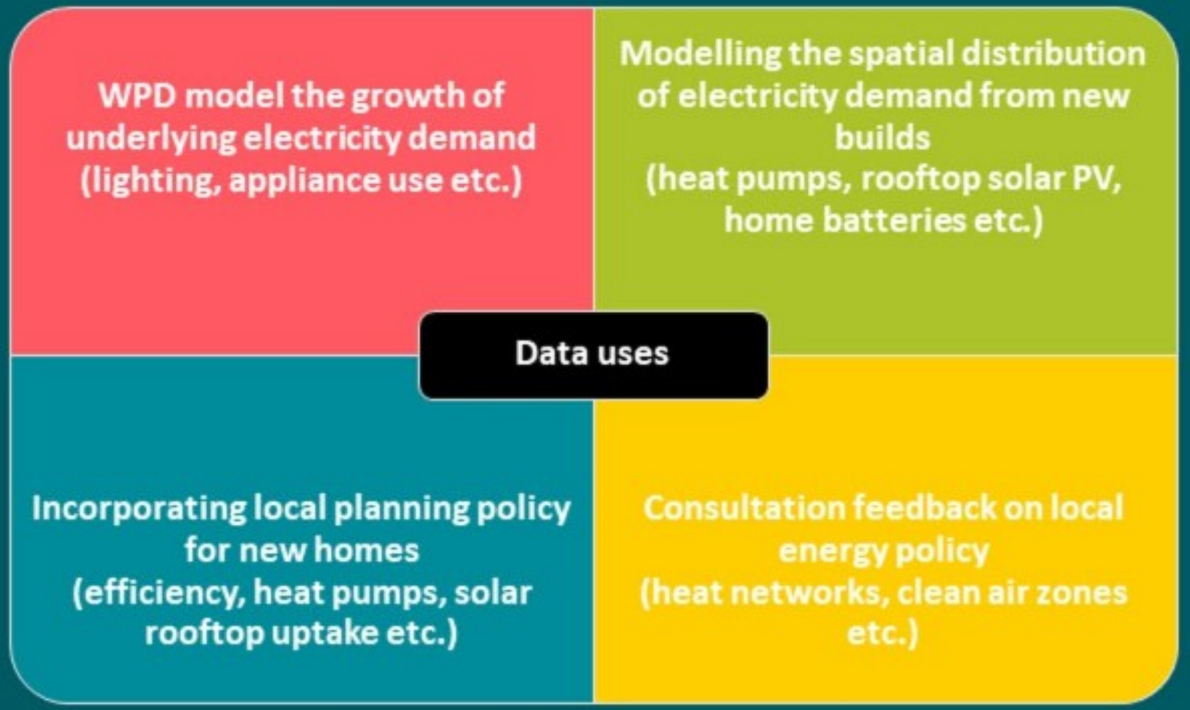
New domestic developments in the WPD South West licence area



WESTERN POWER DISTRIBUTION

regen transforming energy

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.

- 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.