Distribution Future Energy Scenarios Stakeholder Consultation Event

WPD South Wales licence area

Thursday 24th June 2021

A bit about 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.

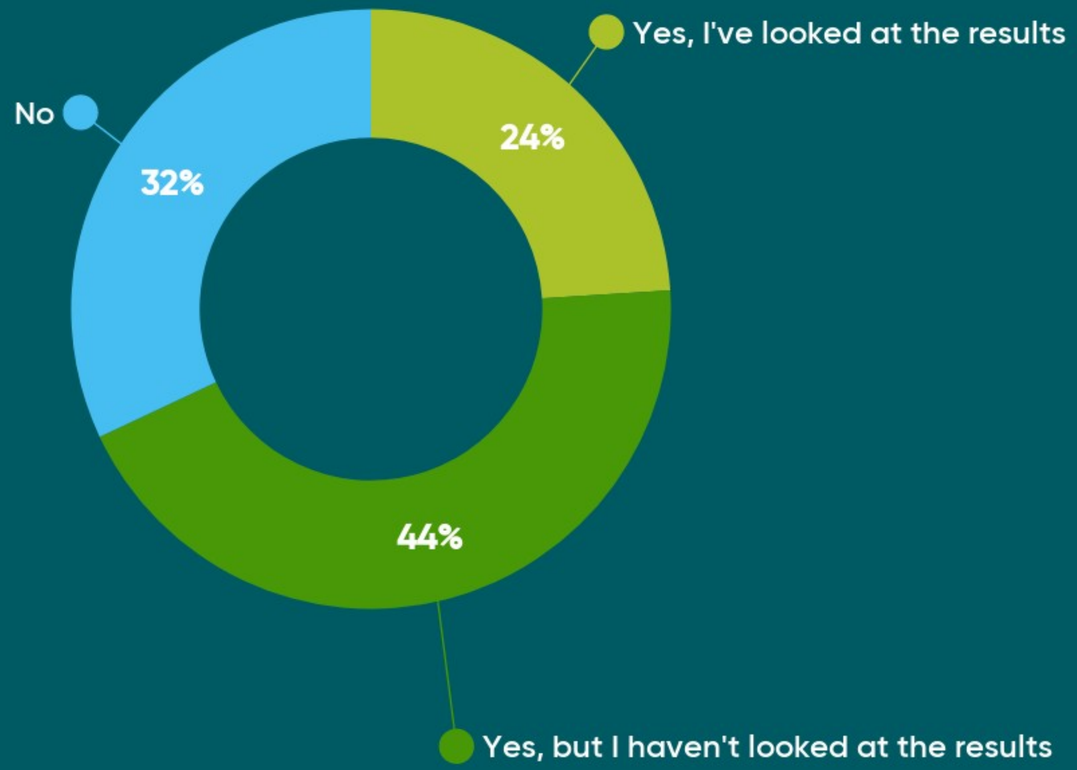
Agenda

- WPD - Network strategy for net zero future energy scenarios
- Regen - Modelling the 2021 future energy scenarios
- Q&A

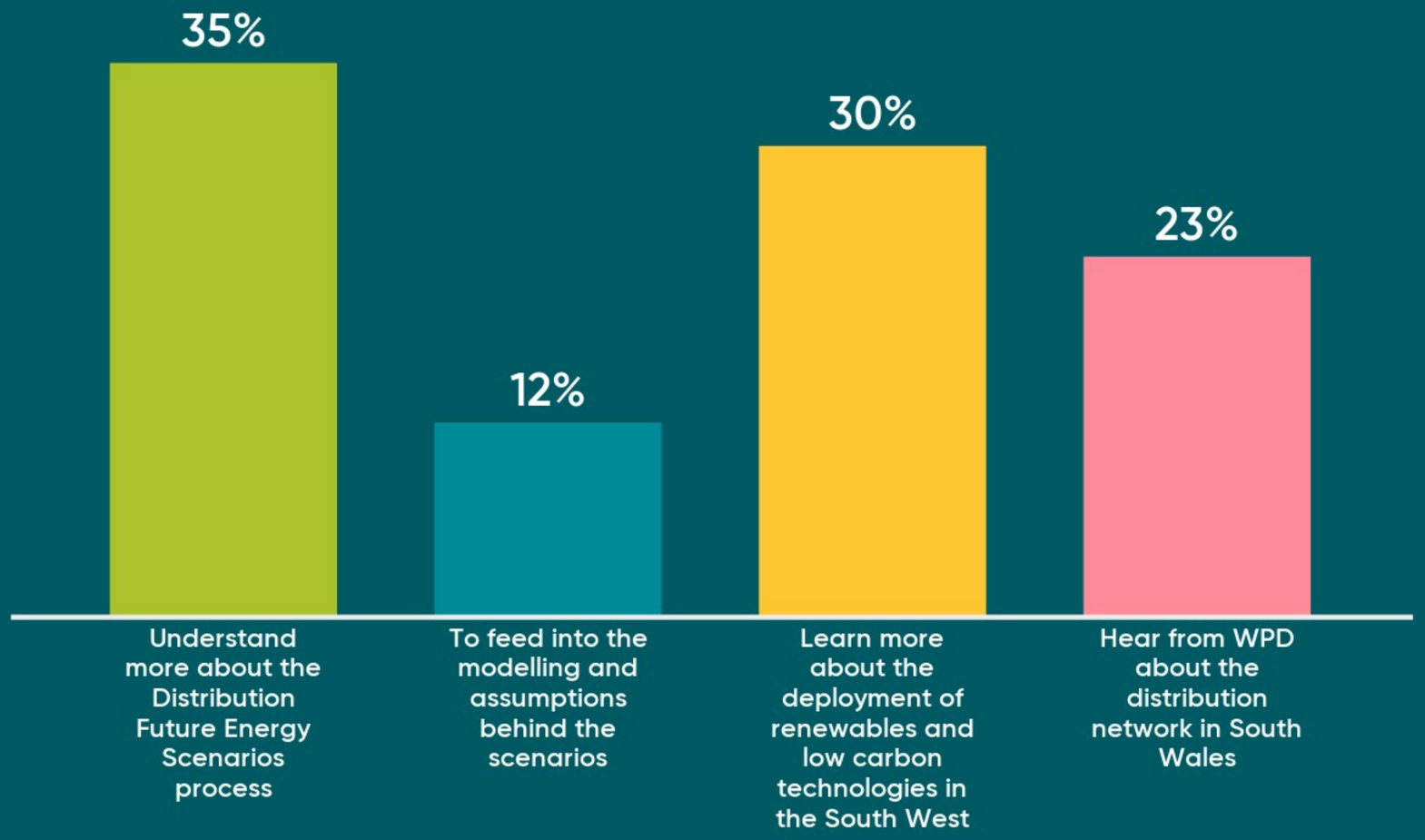
The key role of stakeholders

- Reflecting regional variation and considerations
- Testing modelling assumptions
- Informing technology-specific projections
- Direct engagement on projects, developments and future possibilities
- Reflecting local authority new development plans and energy strategies

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



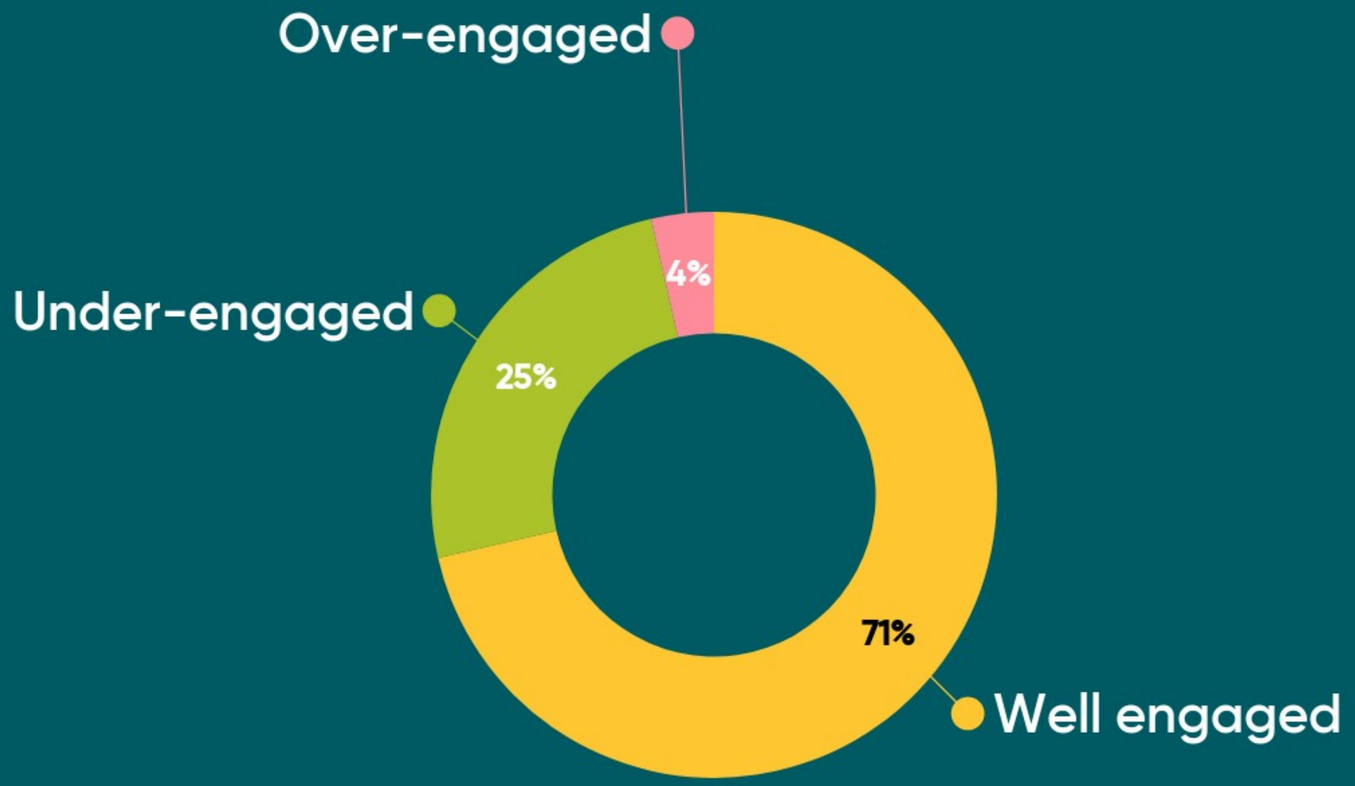
What do you want to get out of today?



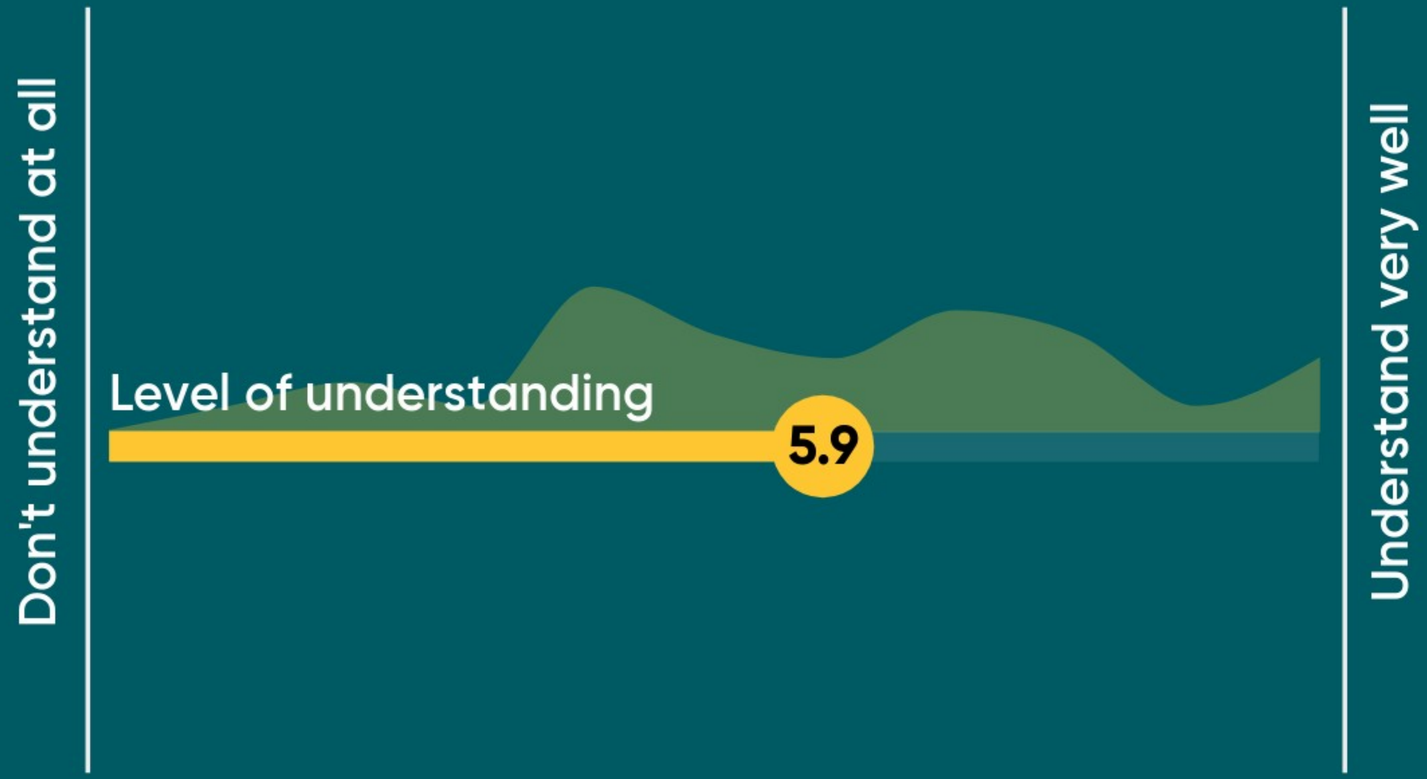
WPD - Network strategy for net zero future energy scenarios

→ Oli Spink - Network strategy engineer, WPD

How would you rate your level of engagement with WPD?



In your opinion, how well do you understand the relationship between National Grid FES, WPD DFES, and Local Area Energy Planning?



In addition to the current DFES outputs, what further outputs would you find useful?

Current publications include:
- The DFES dataset
- The DFES online map
- A methodology slidepack
- Summary ‘regional view’ reports for each licence area
- Technology summaries by licence area

Local authority datasets would be very useful

Local Authority area outputs, outputs available as GIS files where relevant

Summary of plans for reinforcement

Local authority summary reports

Technology summaries

As in the theme of the question and the CCC news this morning - what would be useful is an actual Govt and DNO backed plan to see the actual investment being made to give sufficent grid for a clean electric future

Local authority level indormation

EV datasets at local level

local authorityt datasets would be useful.

In addition to the current DFES outputs, what further outputs would you find useful?

Current publications include:
- The DFES dataset
- The DFES online map
- A methodology slidepack
- Summary ‘regional view’ reports for each licence area
- Technology summaries by licence area

What technologies are likely to be welcomed in each area at any given point. Perhaps an available capacity for each technology and likely restrictions.

Heat pump areas

Engagement on strategic sites for e.g. housing and their implications

Relationship between strengthening supply infrastrusture and installing distributed generation - to enable communities to maximise distributed locally owned generation

Local area map of investments

Regen's role in Distribution Network Future Energy Scenarios (DFES)

- Frankie Mayo - Senior energy analyst, Regen
- Grace Millman - Energy analyst, Regen

Distribution-connected electricity generation, such as:

- Onshore and offshore wind
- Ground-mounted and rooftop solar PV
- Hydropower
- Anaerobic digestion
- Landfill and sewage gas

- Gas- and hydrogen-fired power
- Gas-fired combined heat and power
- Diesel generation
- Waste incineration

Distribution-connected electricity storage, such as:

- Battery storage for grid services, co-located with renewables, for high energy users and small-scale battery storage
- Non-battery storage, such as liquid air energy storage

New sources of distribution-connected electricity demand, such as:

- Domestic heat pumps
- District heating heat pumps
- Direct electric heating
- Night storage heaters
- Thermal storage

- Electric cars and LGVs
- Electric HGVs
- Electric buses
- Electric vehicle chargers

- New housing developments
- New business space developments

- Hydrogen electrolysers

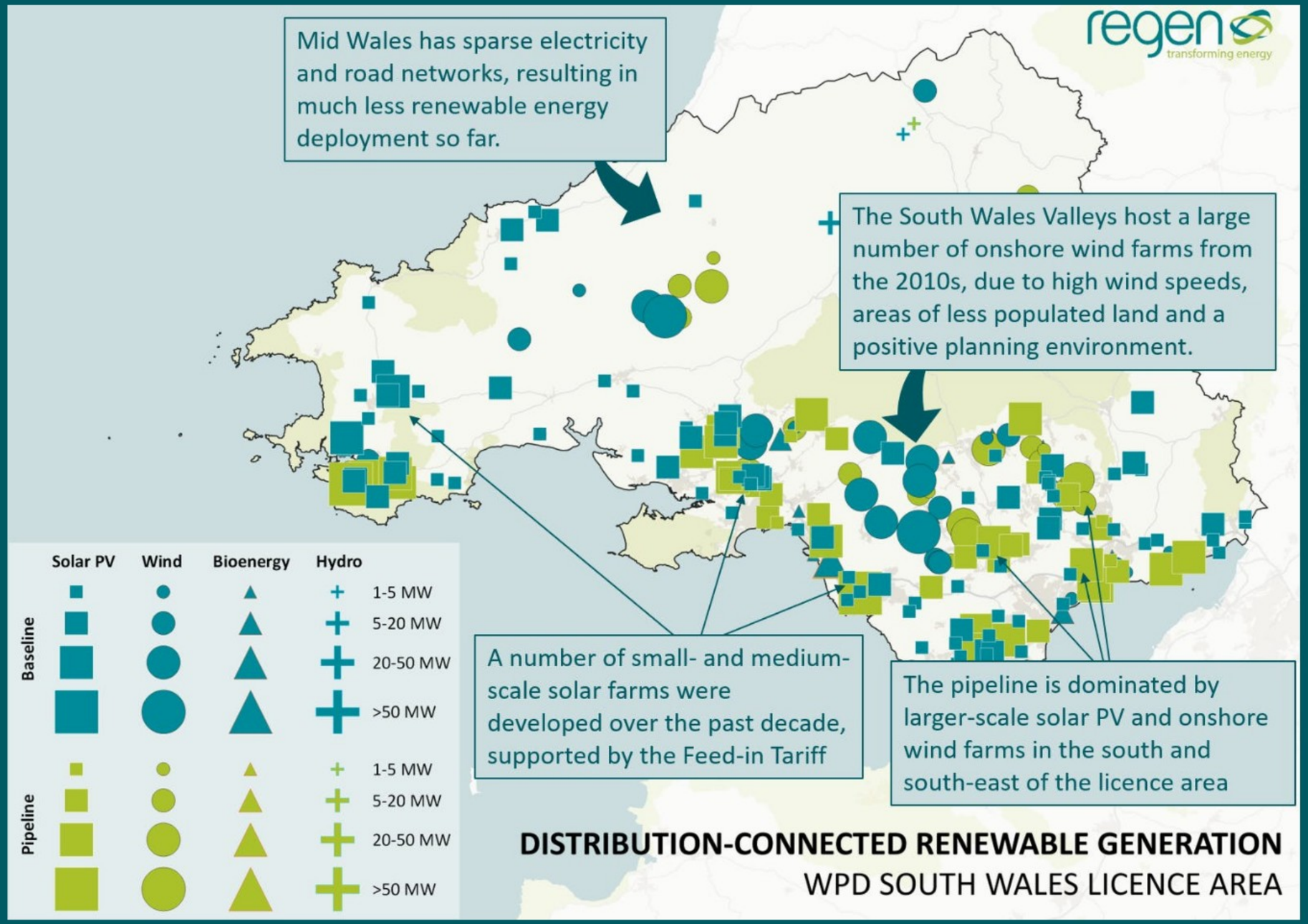
The scope of Distribution Future Energy Scenarios

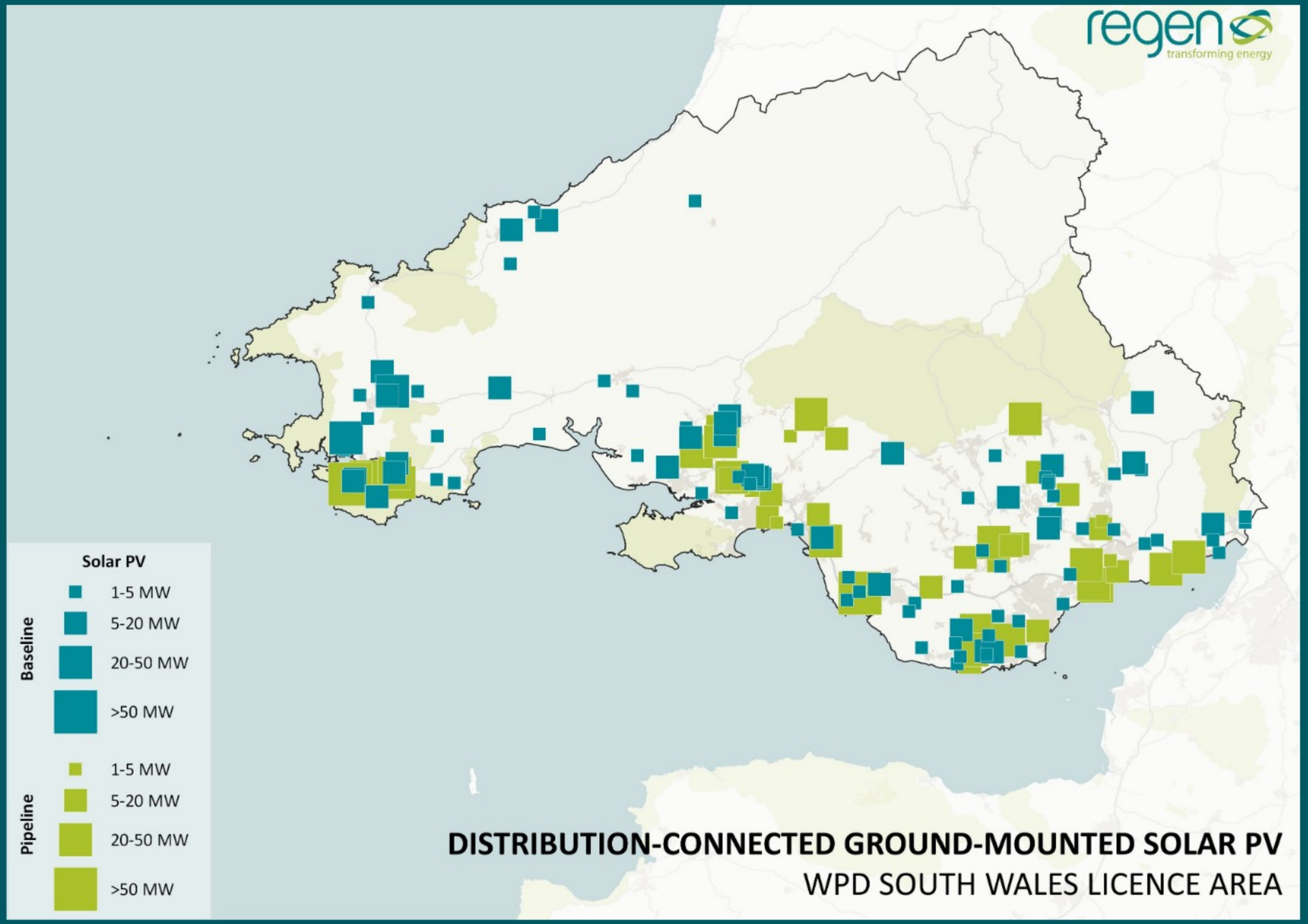
South Wales licence area context and analysis input

- Frankie Mayo - Senior energy analyst, Regen
- Grace Millman - Energy analyst, Regen

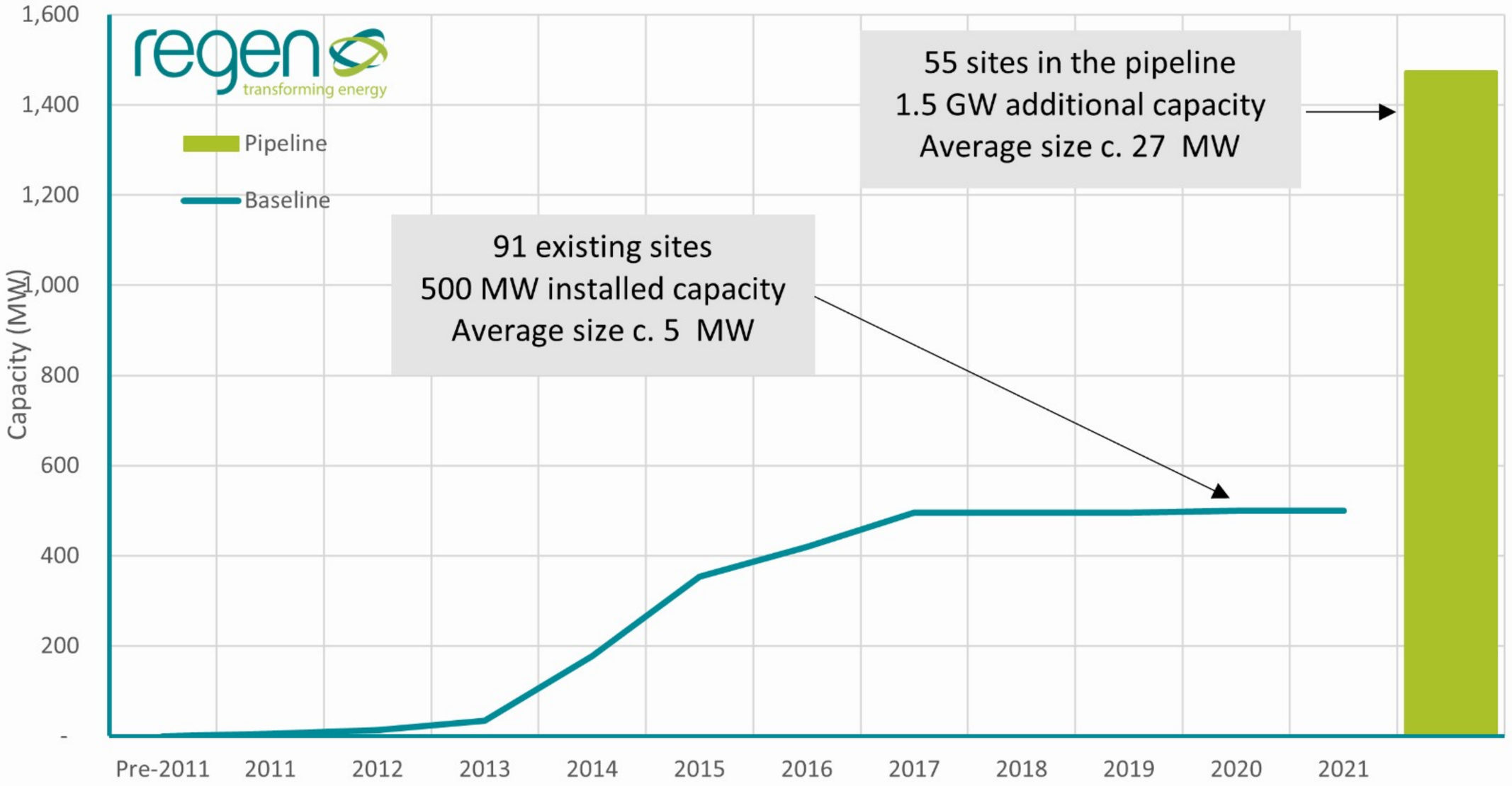
Renewable generation

→ Frankie Mayo - Senior energy analyst, Regen

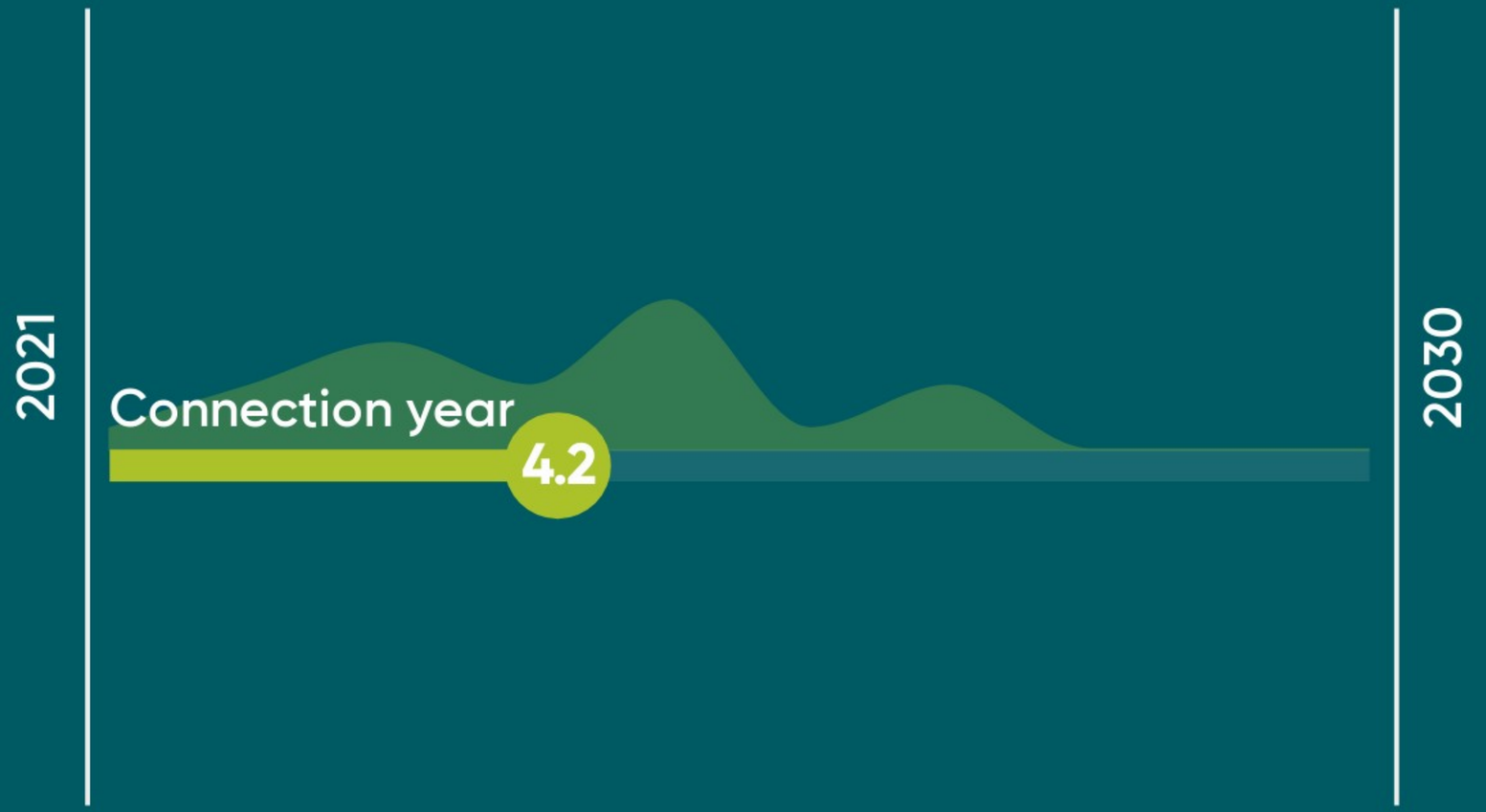

regen
transforming energy
Mid Wales has sparse electricity and road networks, resulting in much less renewable energy deployment so far.
The South Wales Valleys host a large number of onshore wind farms from the 2010s, due to high wind speeds, areas of less populated land and a positive planning environment.
A number of small- and medium-scale solar farms were developed over the past decade, supported by the Feed-in Tariff
The pipeline is dominated by larger-scale solar PV and onshore wind farms in the south and south-east of the licence area
Solar PV
Wind
Bioenergy
Hydro
Baseline
1-5 MW
5-20 MW
20-50 MW
>50 MW
Pipeline
1-5 MW
5-20 MW
20-50 MW
>50 MW
DISTRIBUTION-CONNECTED RENEWABLE GENERATION
WPD SOUTH WALES LICENCE AREA

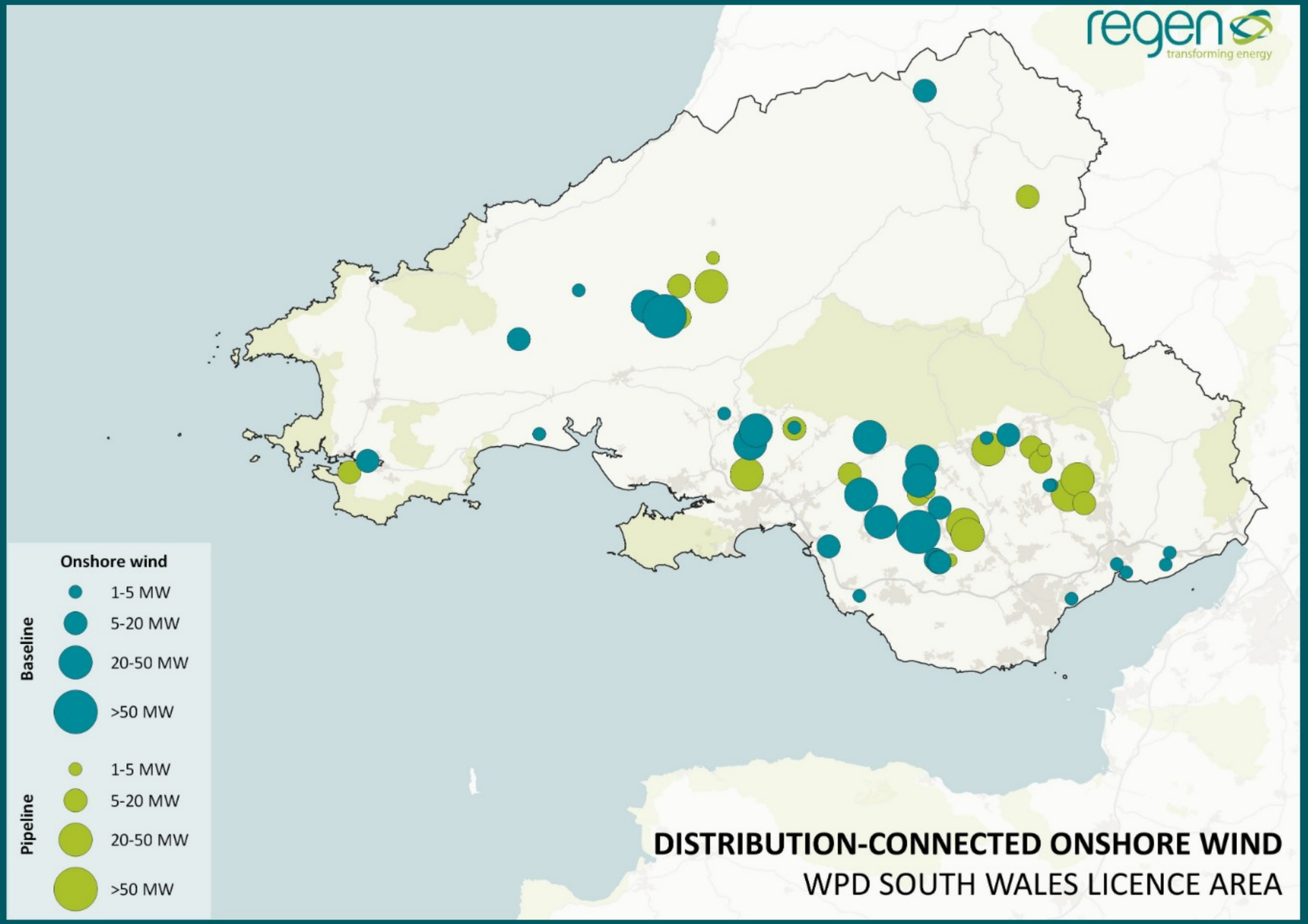

regen
transforming energy
Solar PV
Baseline
1-5 MW
5-20 MW
20-50 MW
>50 MW
Pipeline
1-5 MW
5-20 MW
20-50 MW
>50 MW
DISTRIBUTION-CONNECTED GROUND-MOUNTED SOLAR PV
WPD SOUTH WALES LICENCE AREA

Large scale solar PV capacity in the South Wales licence area

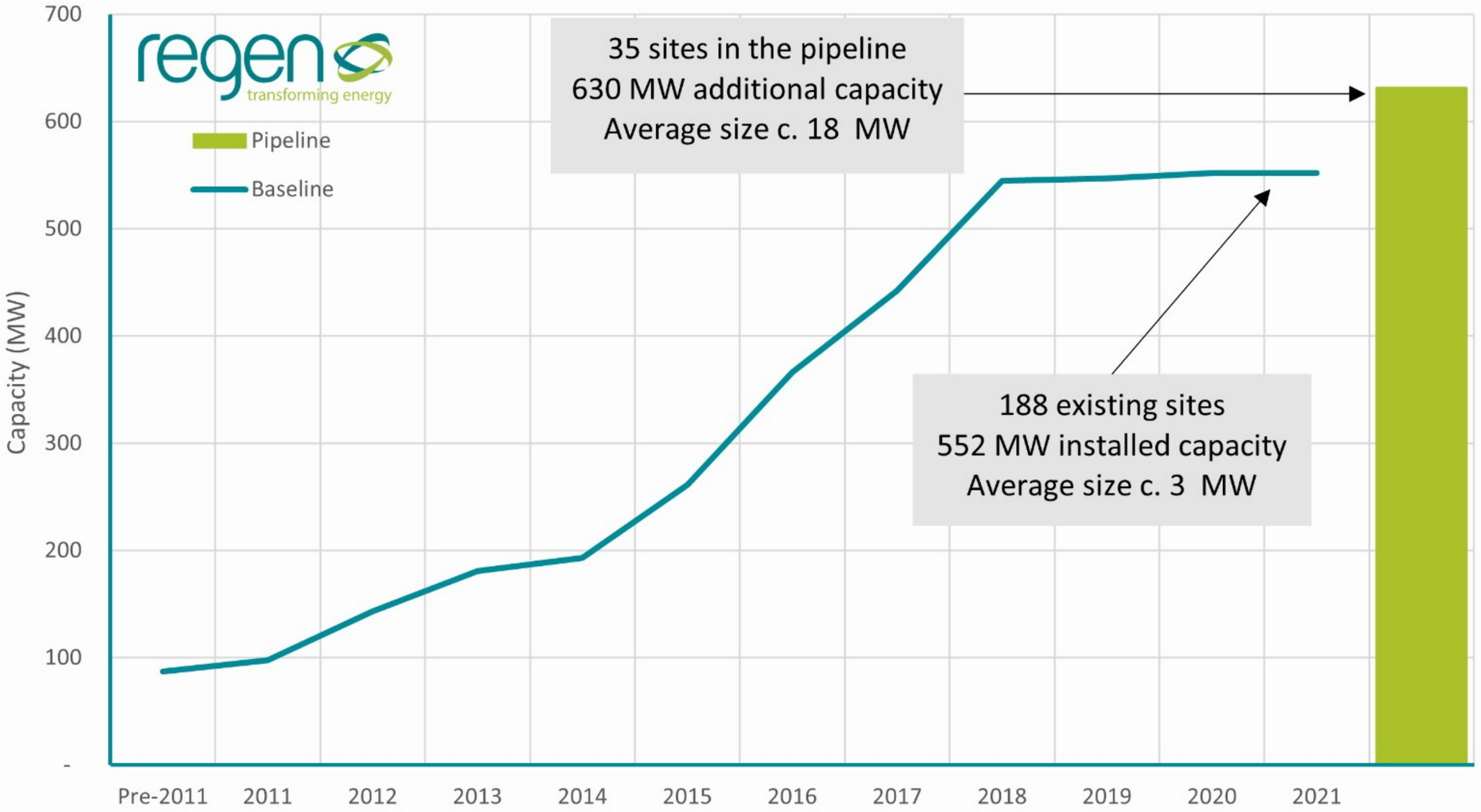


When will the large-scale solar pipeline start connecting in South Wales?

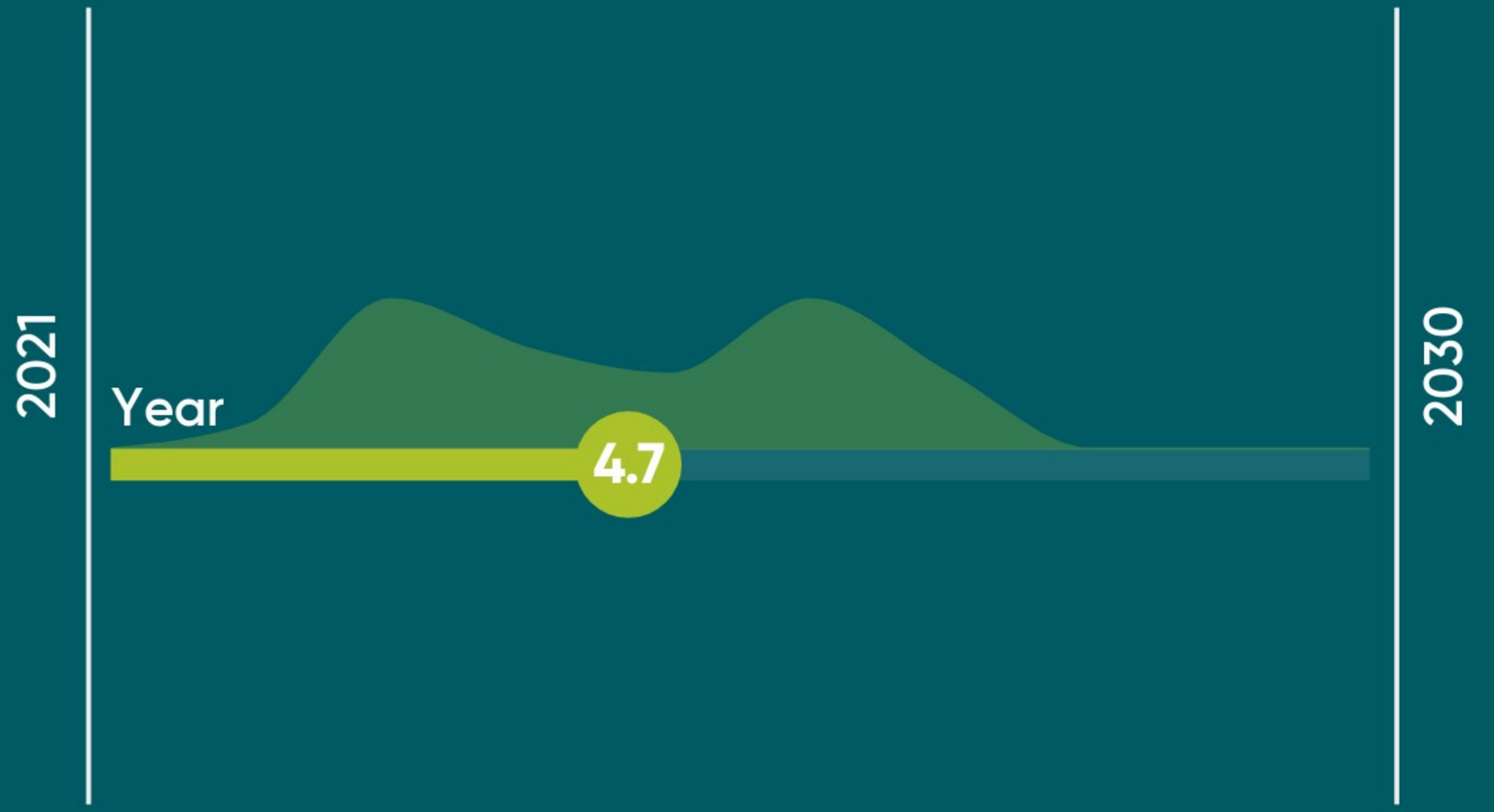



regen
transforming energy
Onshore wind
Baseline
1-5 MW
5-20 MW
20-50 MW
>50 MW
Pipeline
1-5 MW
5-20 MW
20-50 MW
>50 MW
DISTRIBUTION-CONNECTED ONSHORE WIND
WPD SOUTH WALES LICENCE AREA

Onshore wind capacity in the South Wales licence area



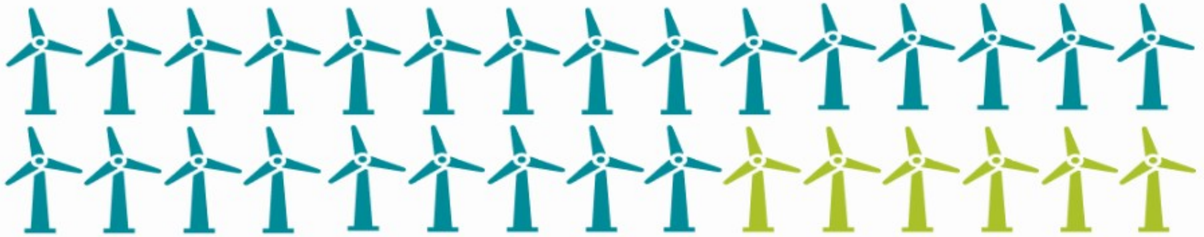
When might onshore wind deployment pick up again in South Wales?



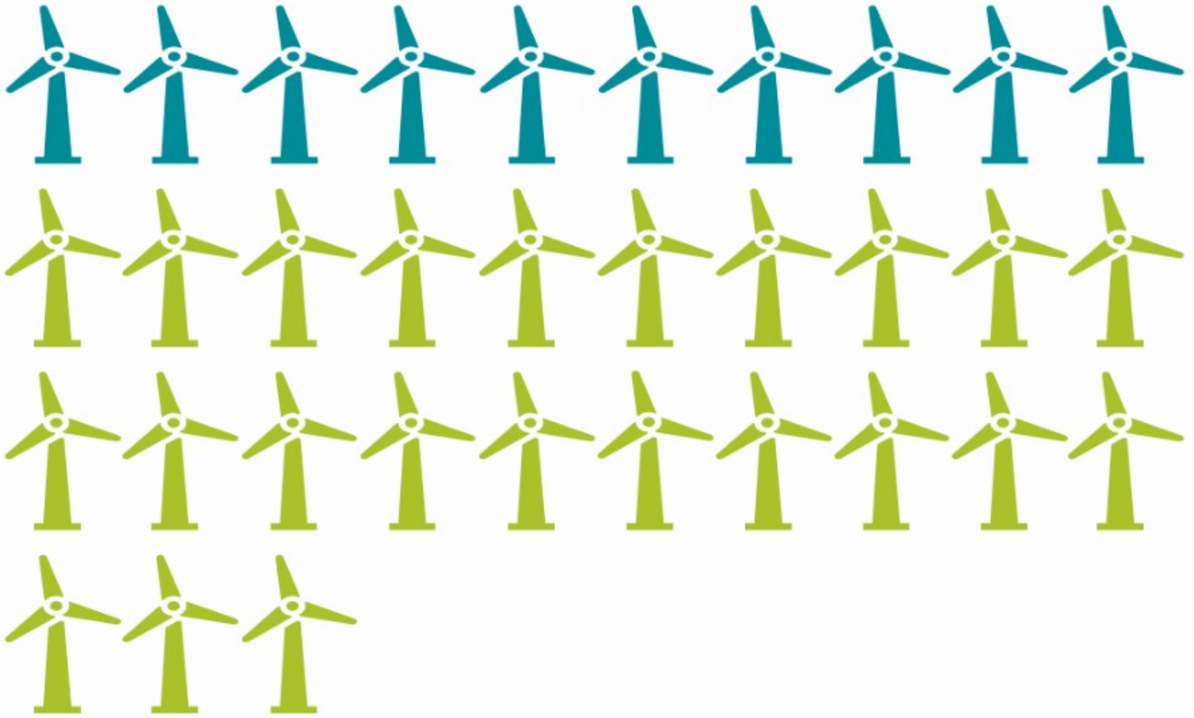
Onshore wind farm capacities in the South Wales licence area

< 1 MW

1 MW – 10 MW



10 MW – 50 MW

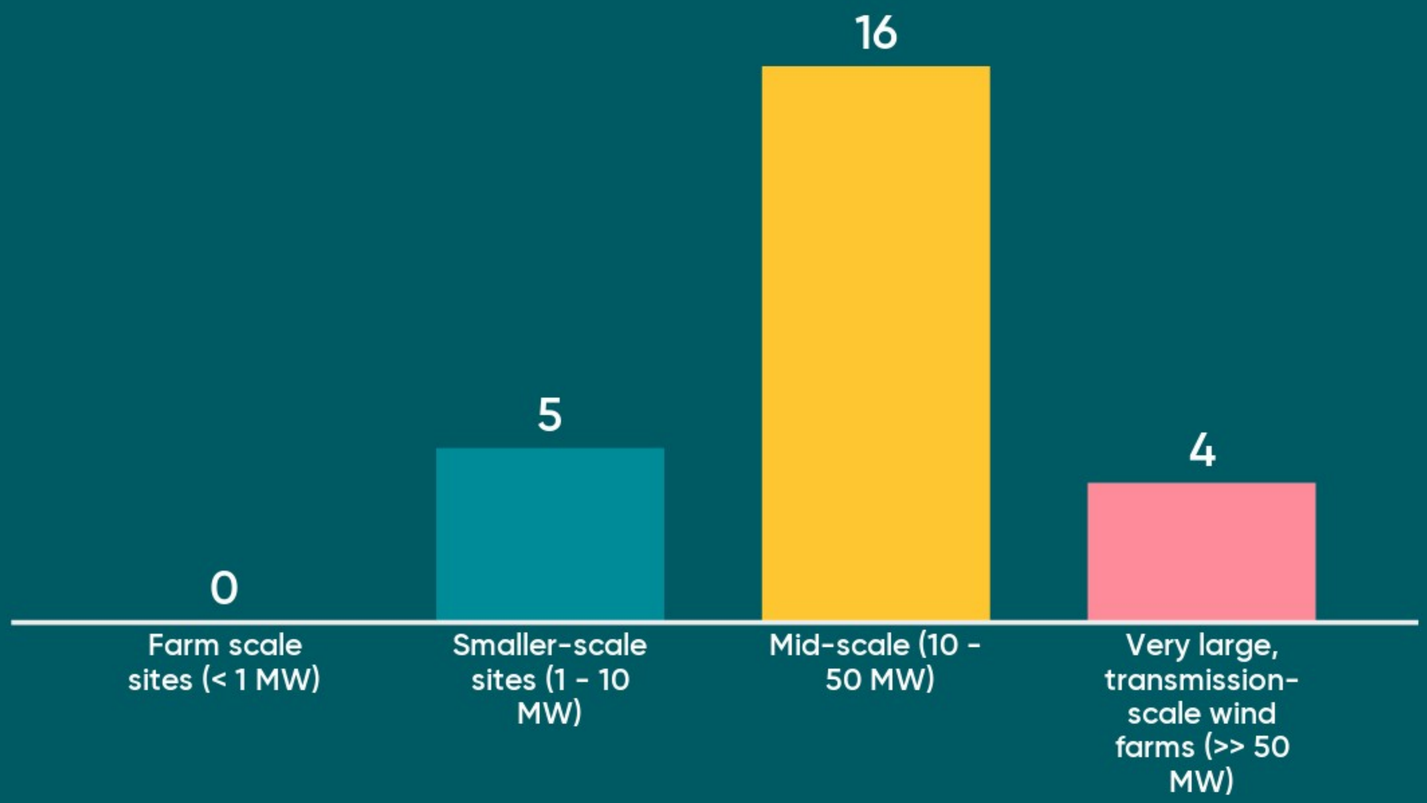


> 50 MW

= existing wind farm

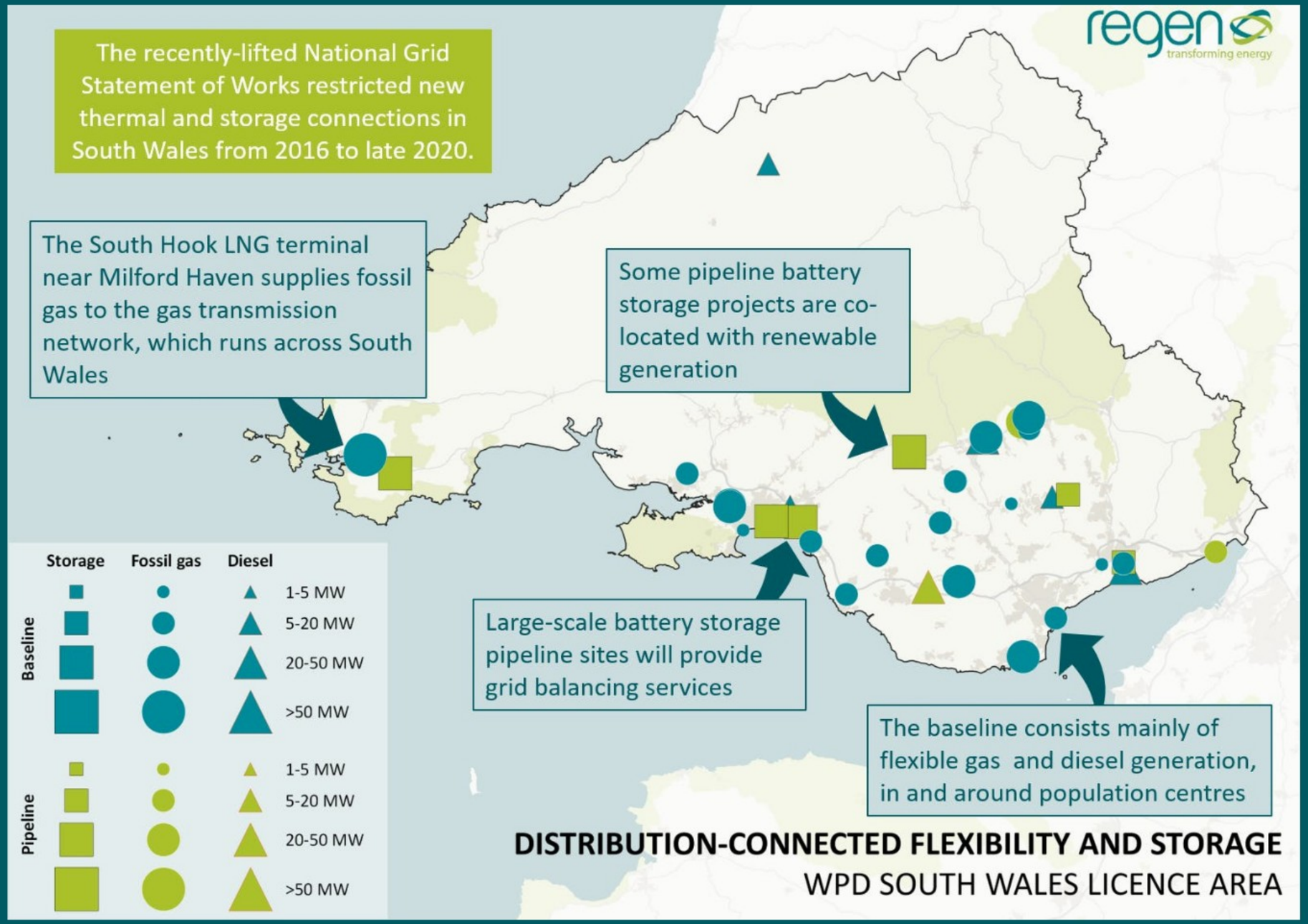
= pipeline wind farm

What scale will future subsidy-free onshore wind farms tend to be?

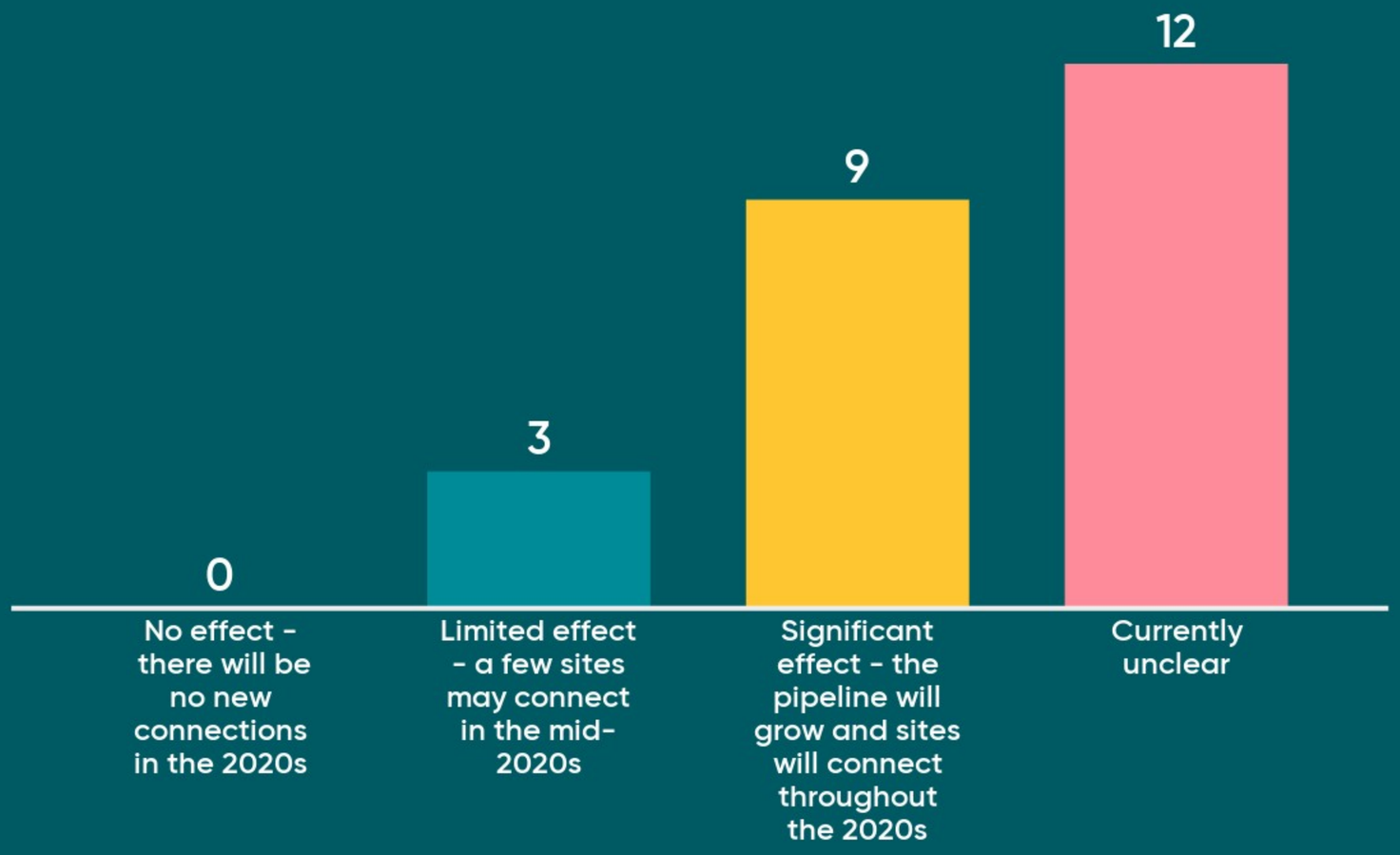


Flexibility and storage

→ Grace Millman - Energy analyst, Regen


regen
transforming energy
The recently-lifted National Grid Statement of Works restricted new thermal and storage connections in South Wales from 2016 to late 2020.
The South Hook LNG terminal near Milford Haven supplies fossil gas to the gas transmission network, which runs across South Wales
Some pipeline battery storage projects are co-located with renewable generation
Large-scale battery storage pipeline sites will provide grid balancing services
The baseline consists mainly of flexible gas and diesel generation, in and around population centres
Storage
Fossil gas
Diesel
Baseline
1-5 MW
5-20 MW
20-50 MW
>50 MW
Pipeline
1-5 MW
5-20 MW
20-50 MW
>50 MW
DISTRIBUTION-CONNECTED FLEXIBILITY AND STORAGE
WPD SOUTH WALES LICENCE AREA

What effect will the lifting of the 'Statement of Works' have on the near term pipeline in South Wales?

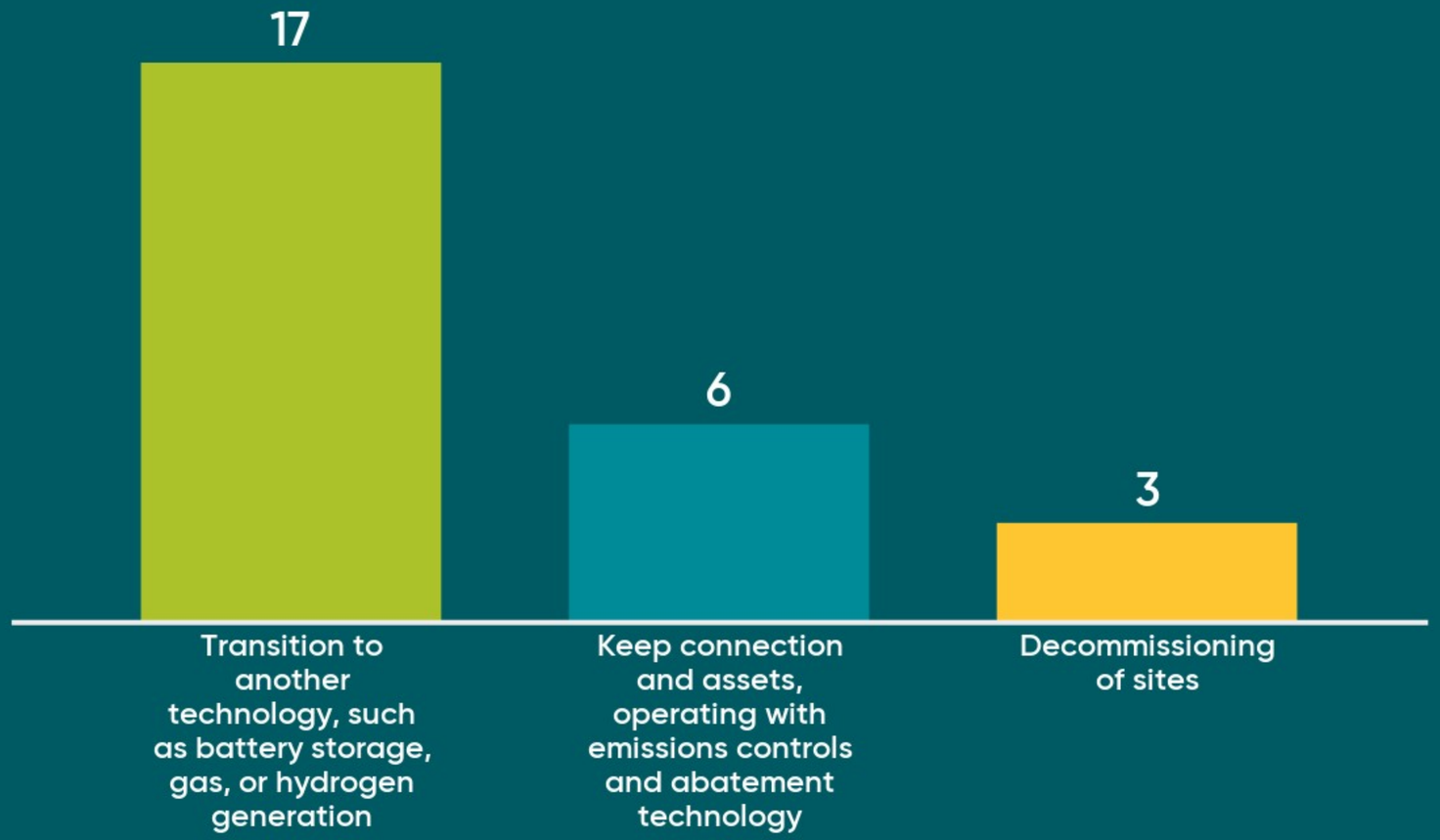


Diesel generation

There are stringent environmental permitting regulations and ambitious emission reduction targets around commercial medium-scale diesel generators.

In particular, the permitting regulations and air quality requirements under the Medium Combustion Plant Directive (MCPD) have been passed into UK law.

What will happen to current commercial medium-scale diesel generation sites that are impacted by the MCPD?

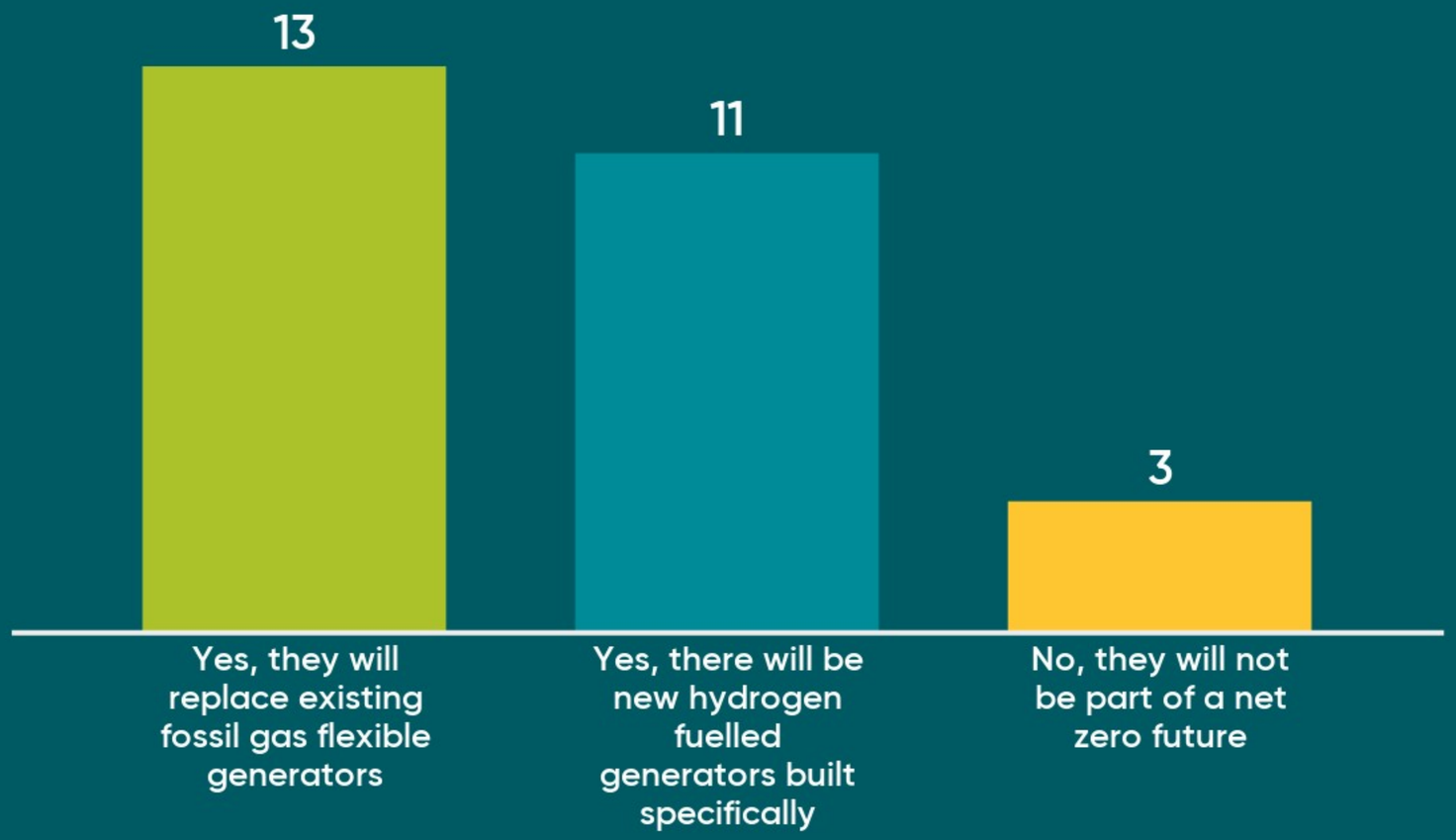


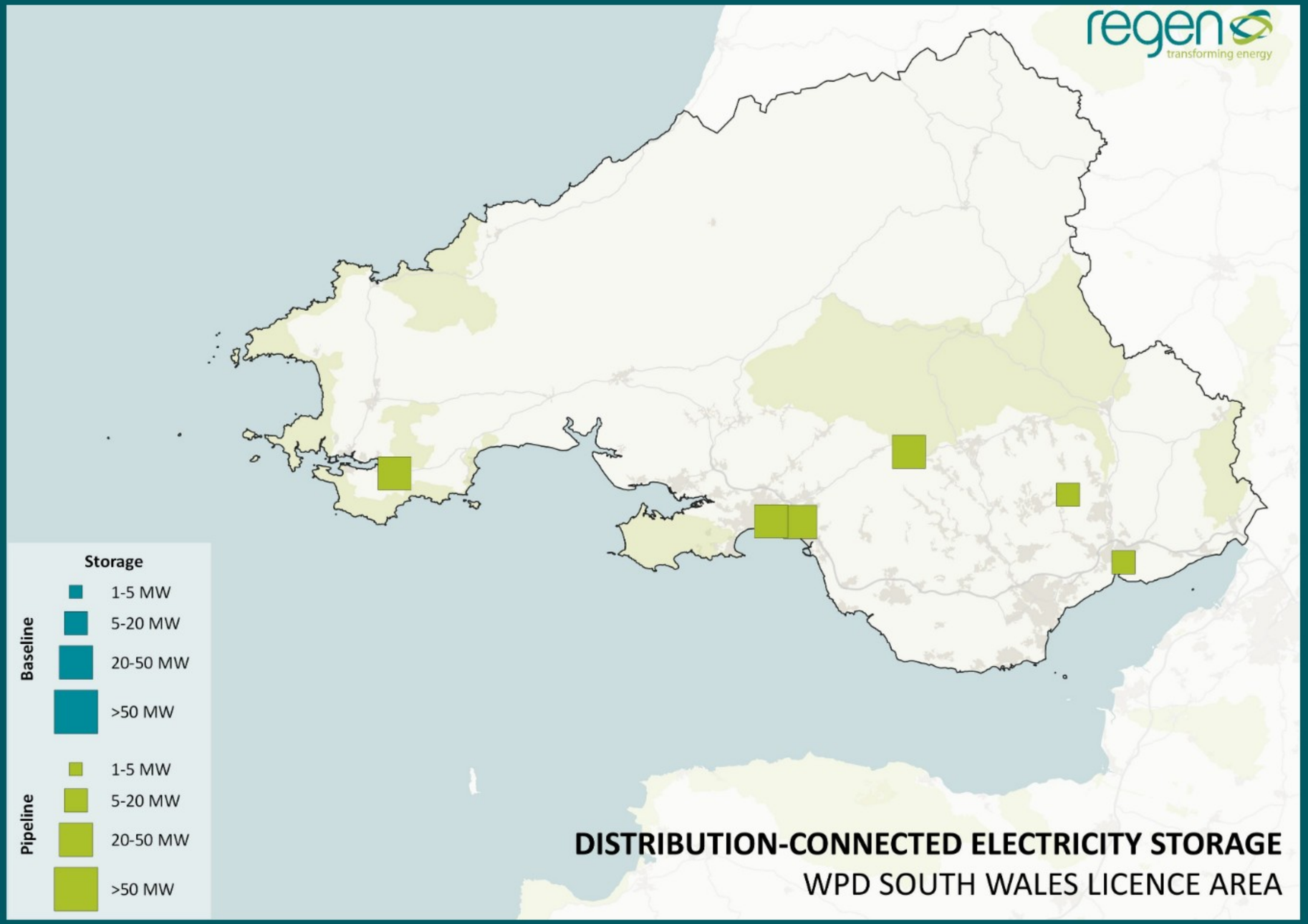
Hydrogen fuelled generation

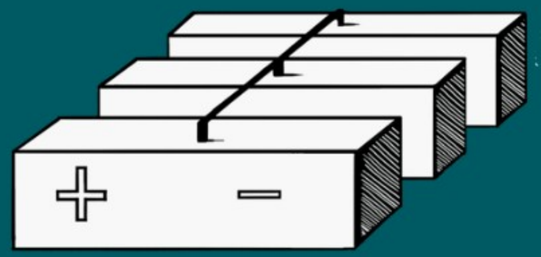
Historically, fossil gas generation has responded to price signals and the needs of the network (peaking operation). A lot of this is currently connected to the distribution network.

In areas where hydrogen network development may happen, there is the potential for hydrogen fuelled electricity generation to develop, replacing fossil gas with a low carbon alternative.

Are hydrogen fuelled flexible generators likely to be part of a net zero future?



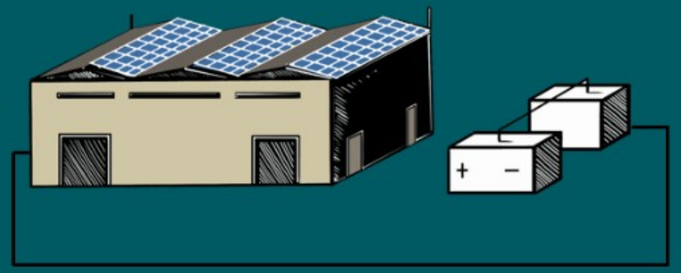

regen
transforming energy
Storage
Baseline
1-5 MW
5-20 MW
20-50 MW
>50 MW
Pipeline
1-5 MW
5-20 MW
20-50 MW
>50 MW
DISTRIBUTION-CONNECTED ELECTRICITY STORAGE
WPD SOUTH WALES LICENCE AREA



Standalone network services
Multi-MW scale batteries providing balancing, flexibility and support services to the grid

Co-location
Multi-MW scale sited alongside renewable energy generation projects

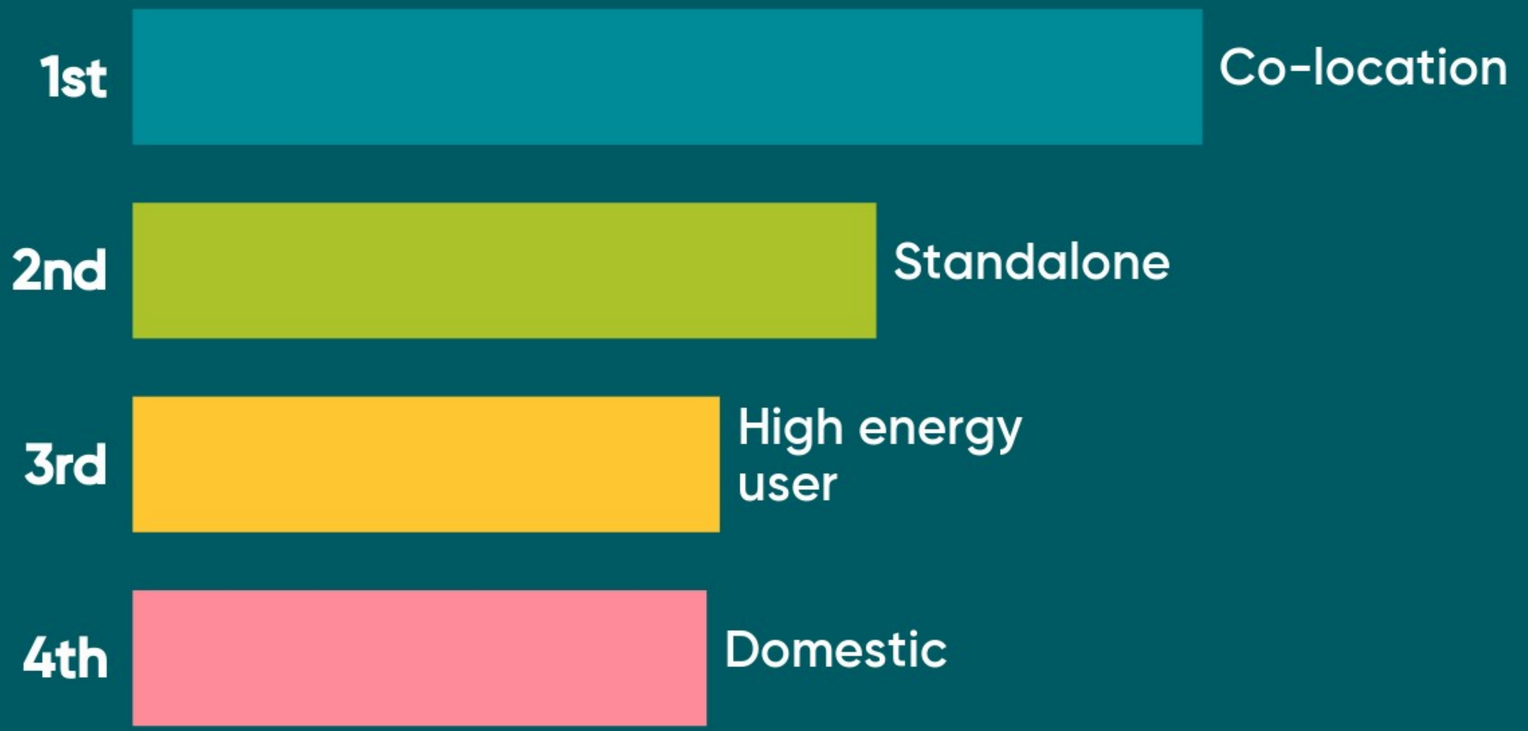
High energy user
Single MW scale sited at large energy user operational sites to support onsite energy management



Domestic
10-20 kW scale batteries installed in households use alongside rooftop PV or provide back up services

Storage business models

Which business model will see the most growth over the near and medium term?



Hydrogen

→ Grace Millman - Energy analyst, Regen

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transforming energy

H_2

Decarbonising existing hydrogen production

Transport fuel for HGVs/buses, aviation, and shipping (potentially in the form of ammonia)

Electricity generation

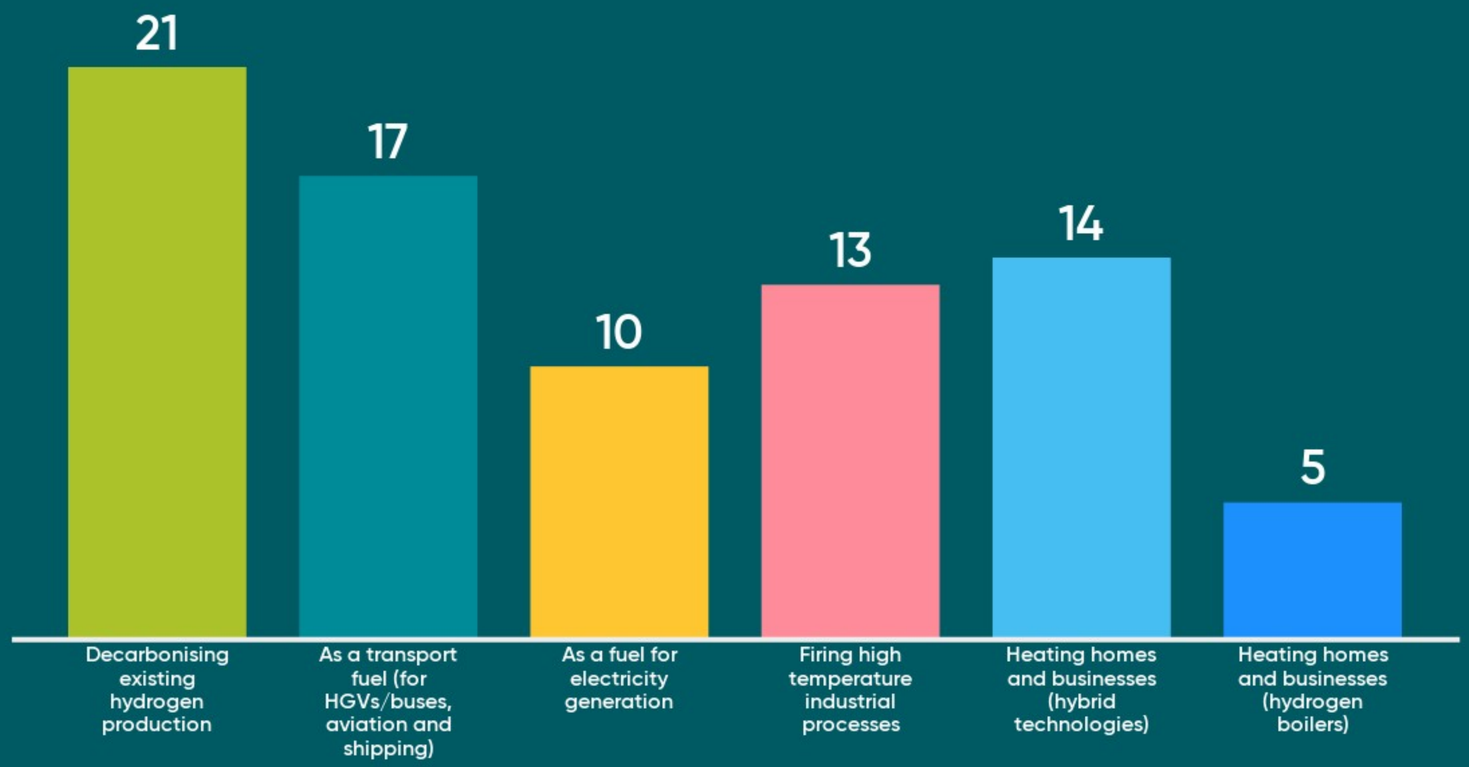
Firing high temperature industrial processes

Heating homes and businesses

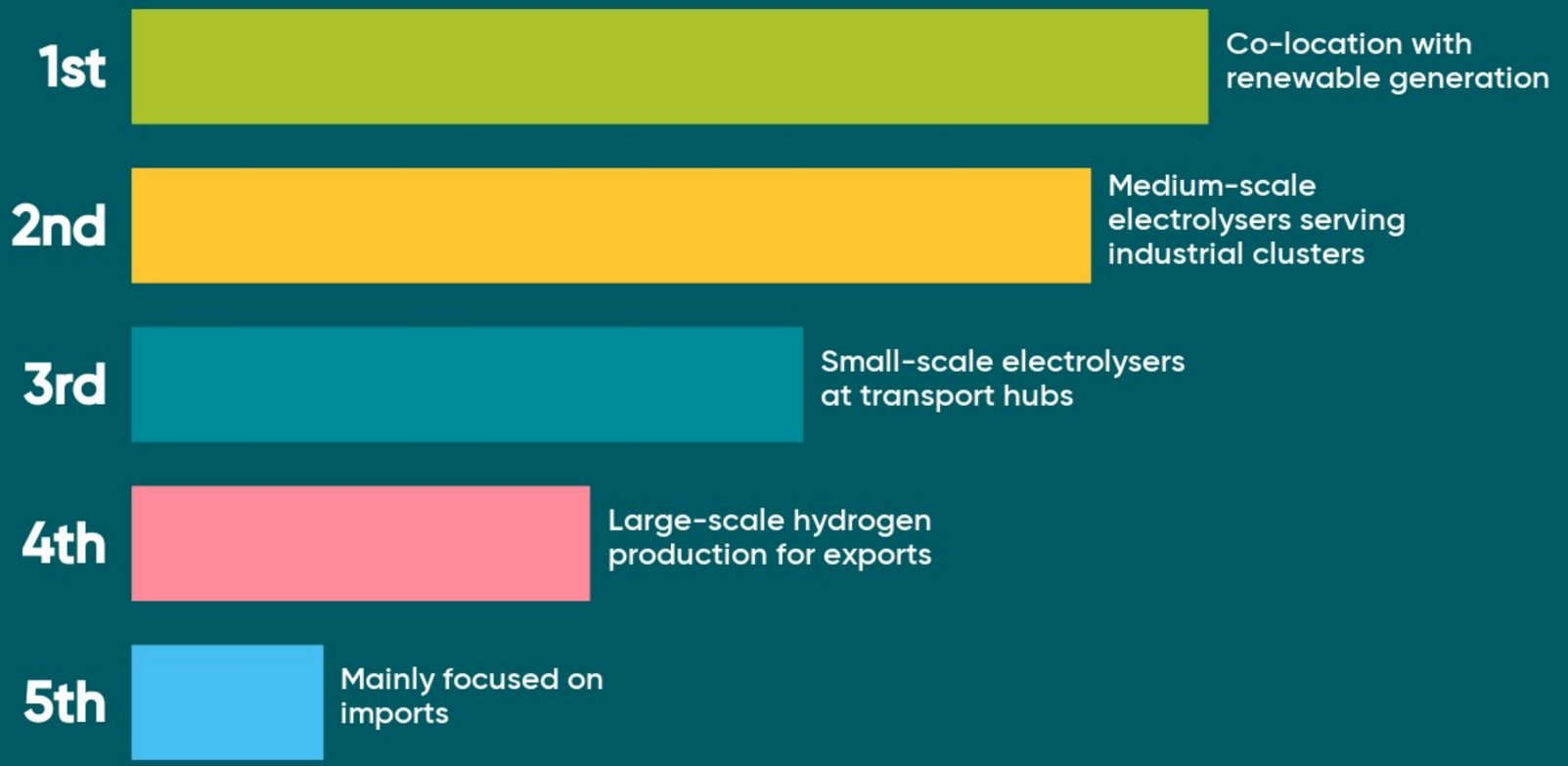
Potential uses of green hydrogen

2

How do you think green hydrogen will be used in South Wales on the pathway to net zero emissions?



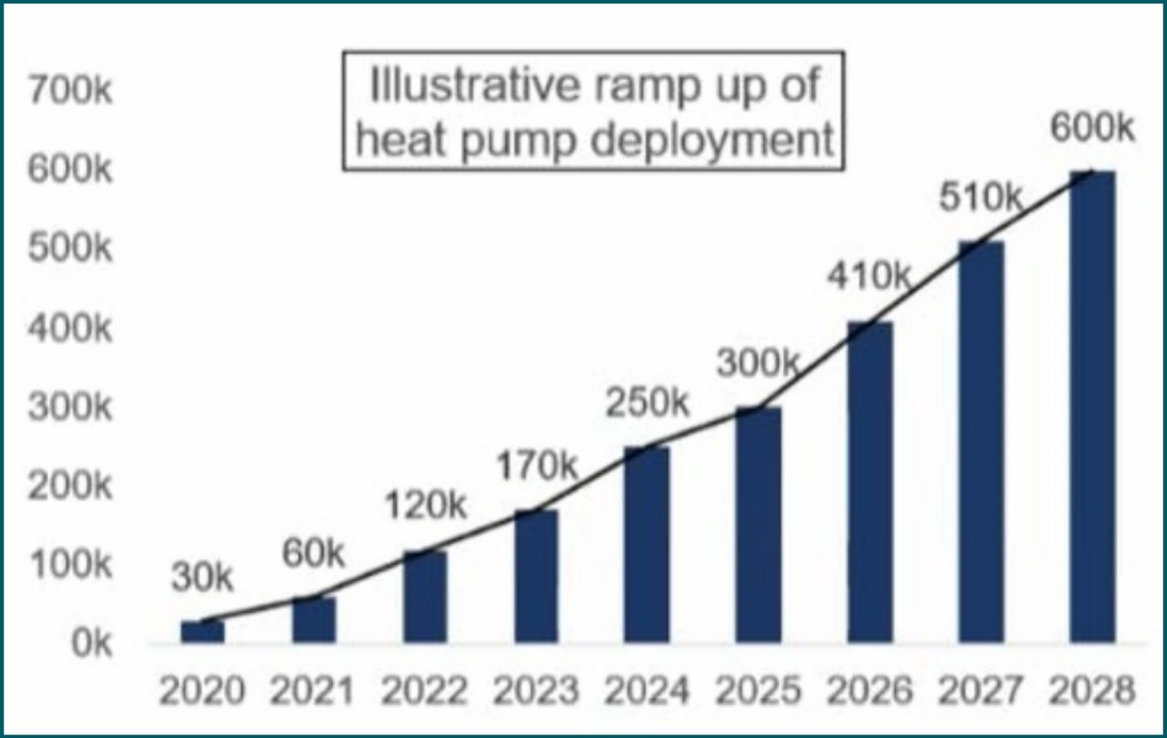
Which hydrogen business models will see the most growth over the near and medium term?



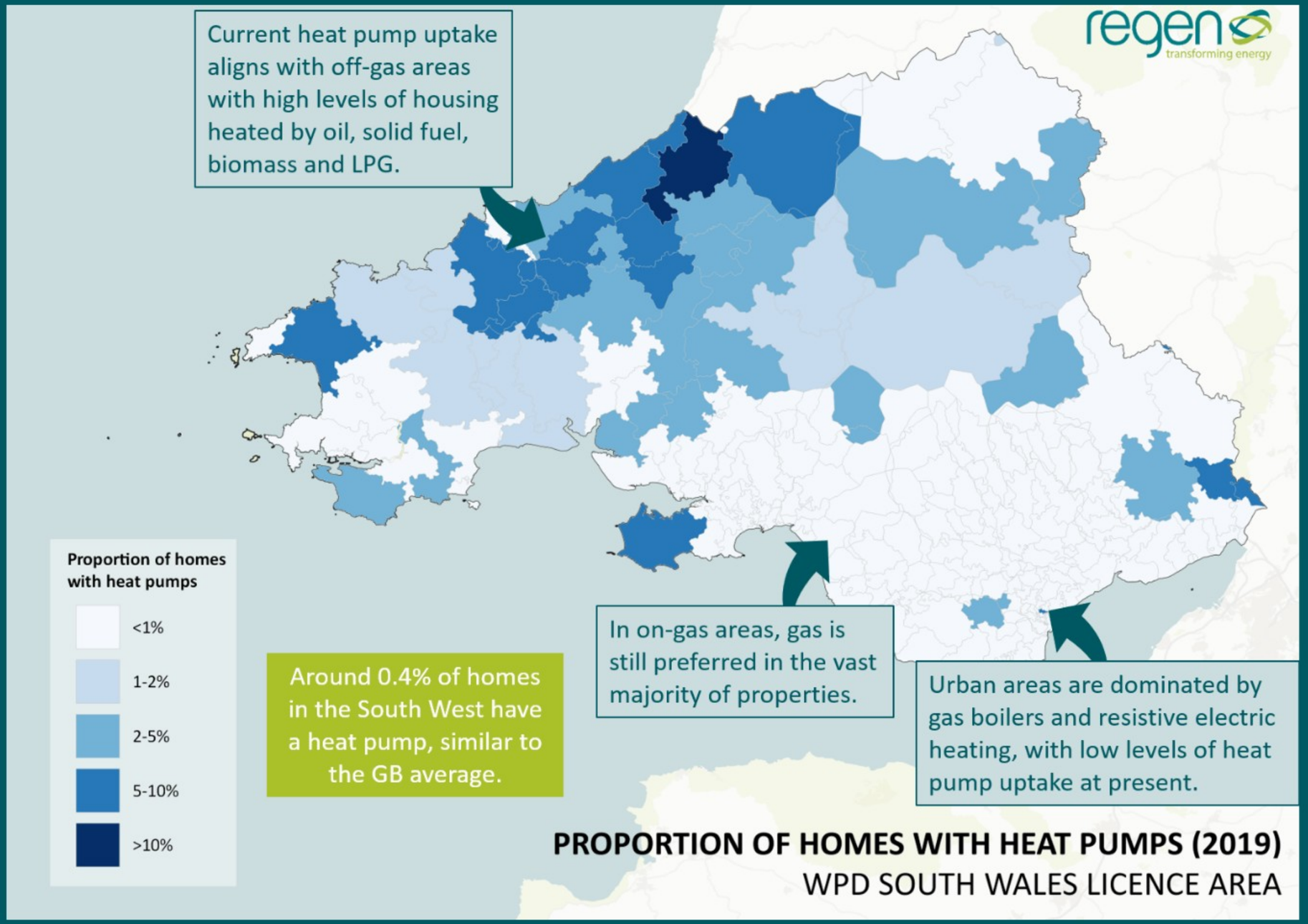
Electrified domestic heat

→ Grace Millman - Energy analyst, Regen

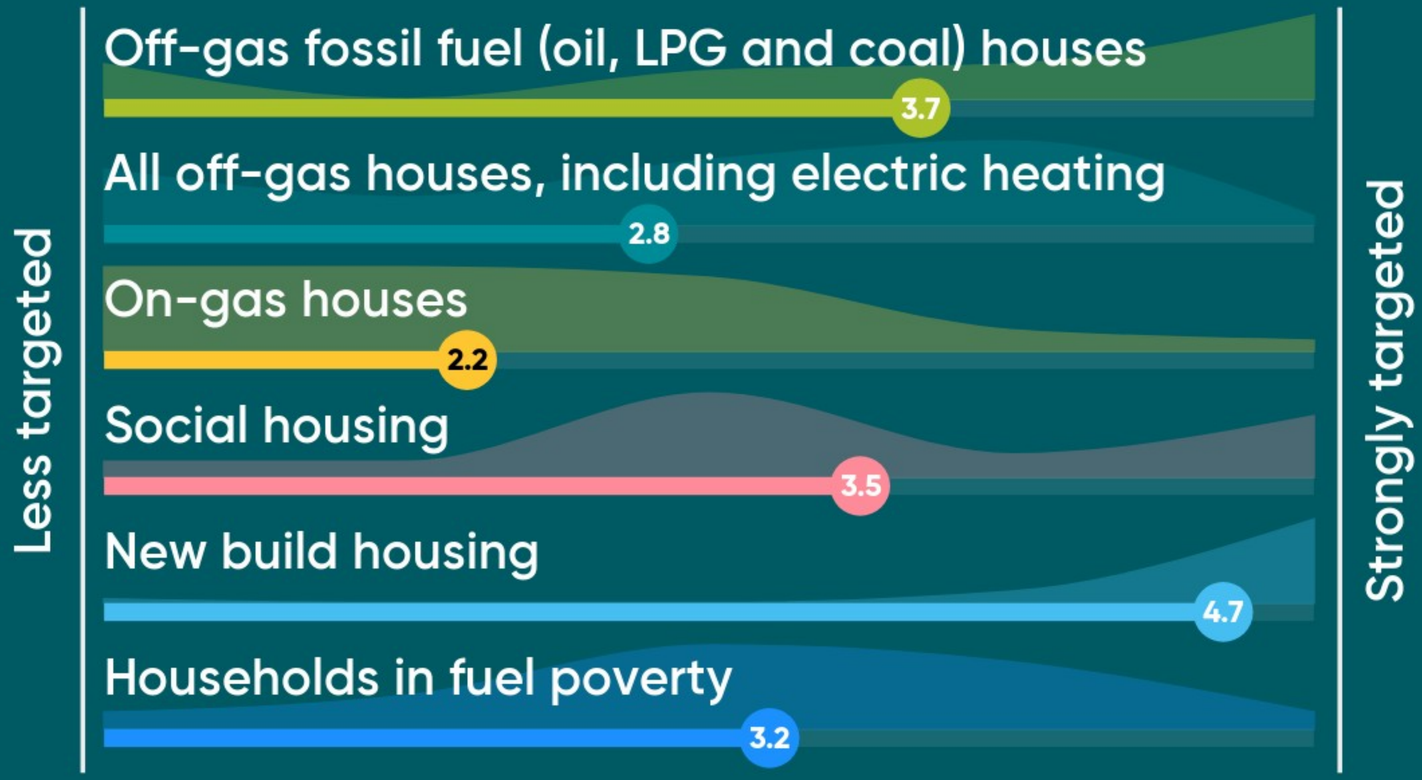
Domestic heat policy context



- Government ambition to install 600,000 heat pumps per year by 2028 (currently around 30,000 per year)
- Government ambition to phase out high-carbon fossil heating in off-gas properties in the 2020s
- Future Homes Standard, which will require new build homes to install low carbon heating, expected to be in force from 2025
- Domestic RHI to close in March 2022 (to date has supported 55,000 heat pump installations)
- Clean Heat Grant proposed, but not yet confirmed, to support domestic low carbon heat installations
- Heat and Building Strategy expected from BEIS in the coming months

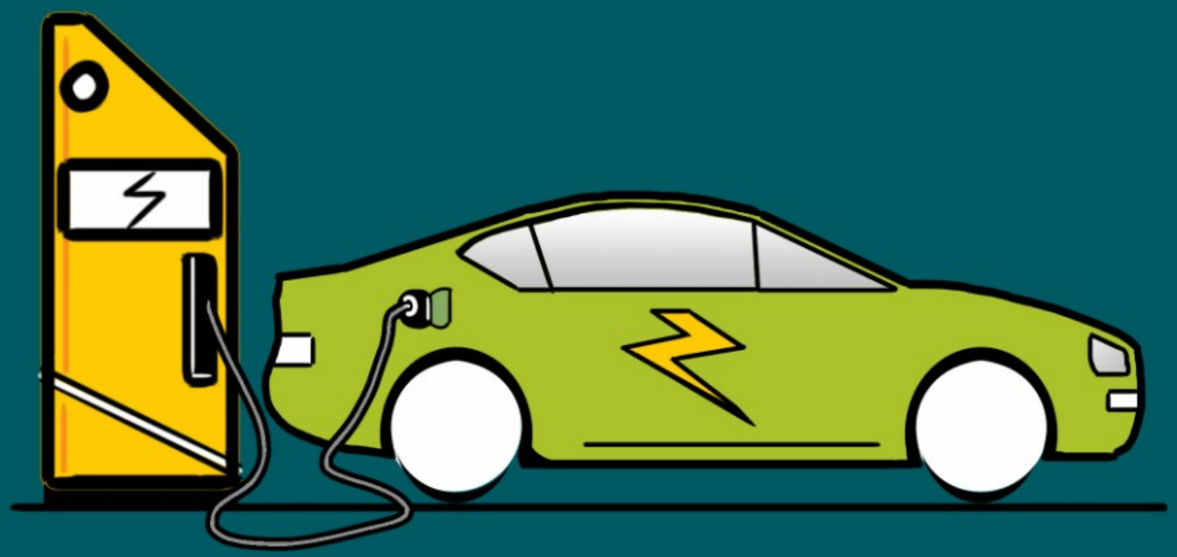

Current heat pump uptake aligns with off-gas areas with high levels of housing heated by oil, solid fuel, biomass and LPG.
Proportion of homes with heat pumps
<1%
1-2%
2-5%
5-10%
>10%
Around 0.4% of homes in the South West have a heat pump, similar to the GB average.
In on-gas areas, gas is still preferred in the vast majority of properties.
Urban areas are dominated by gas boilers and resistive electric heating, with low levels of heat pump uptake at present.
PROPORTION OF HOMES WITH HEAT PUMPS (2019)
WPD SOUTH WALES LICENCE AREA

As the government looks to achieve its target of 600,000 heat pumps installed per year by 2028, which of these areas will be targeted?



Electric vehicles

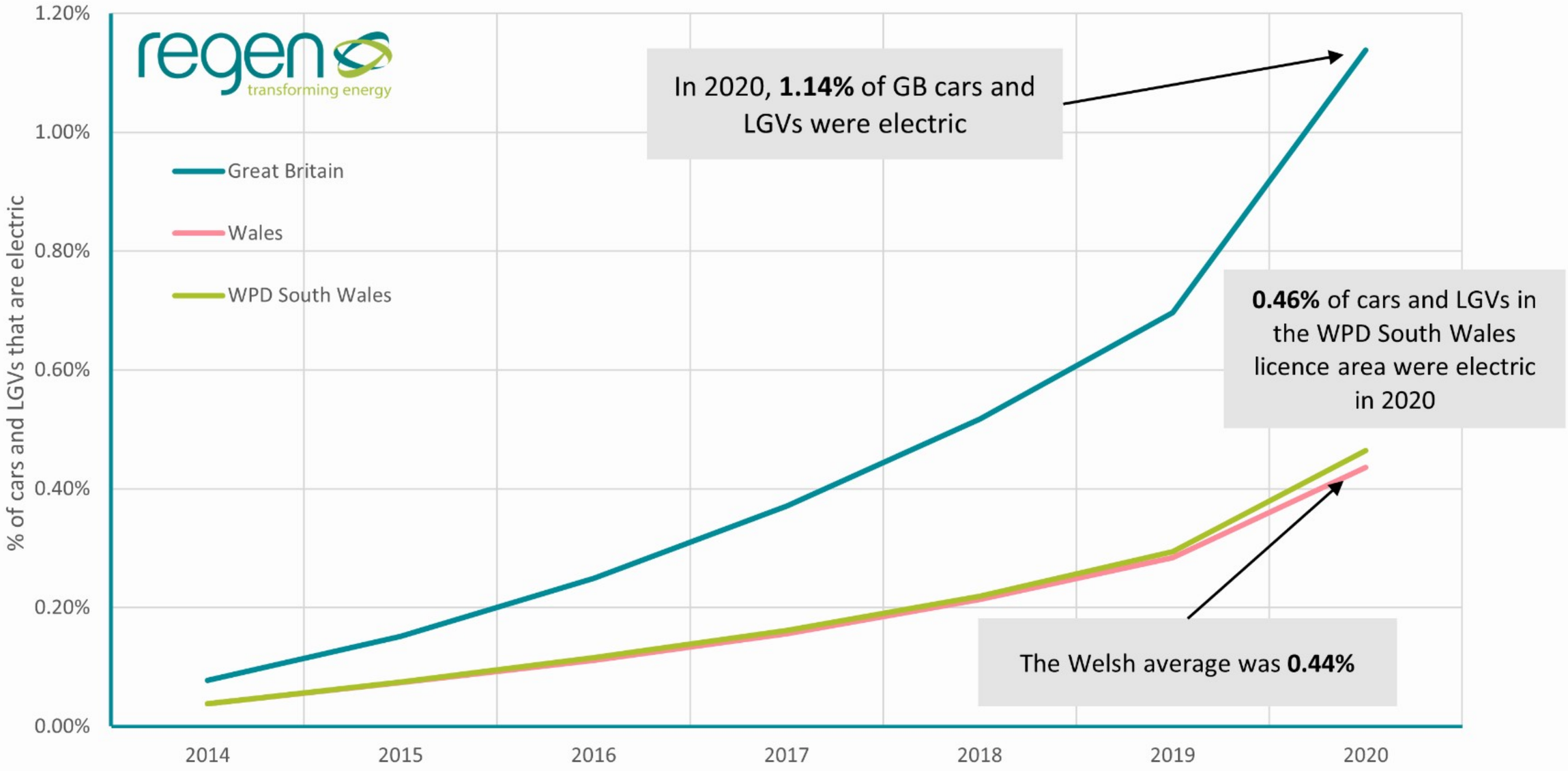
→ Frankie Mayo - Senior energy analyst, Regen

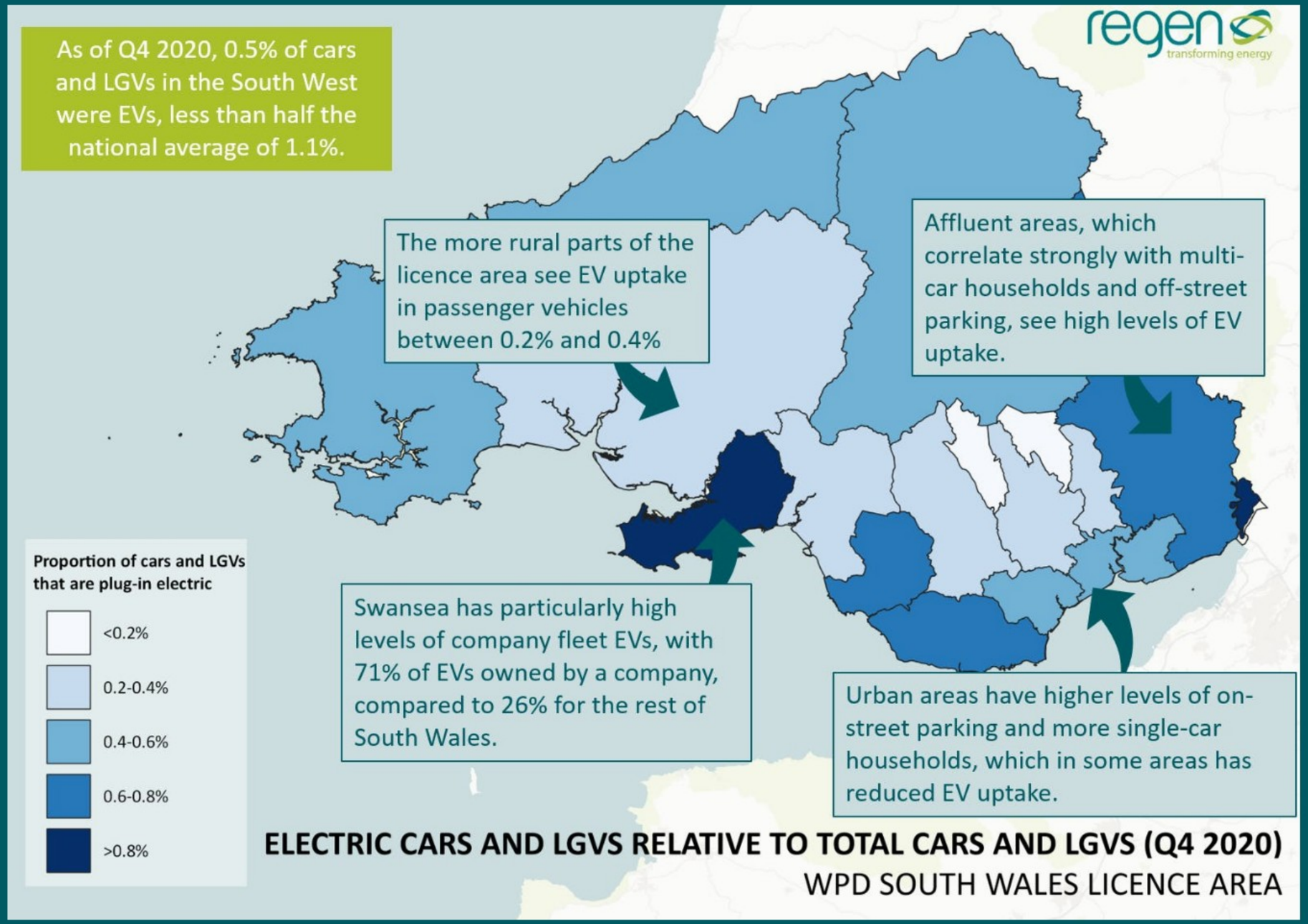


UK policy on EVs and EV chargers

- End of the sale of new petrol/diesel cars and vans from 2030, with plug-in hybrid car and van sales allowed until 2035
- EV sales have increased dramatically since the start of the COVID-19 pandemic, with a more affordable second hand market also emerging
- Proposed changes to building regulations to increase the proportion of new and existing developments with chargepoints
- Installation of a national network of ultra-rapid charging hubs at motorway service areas

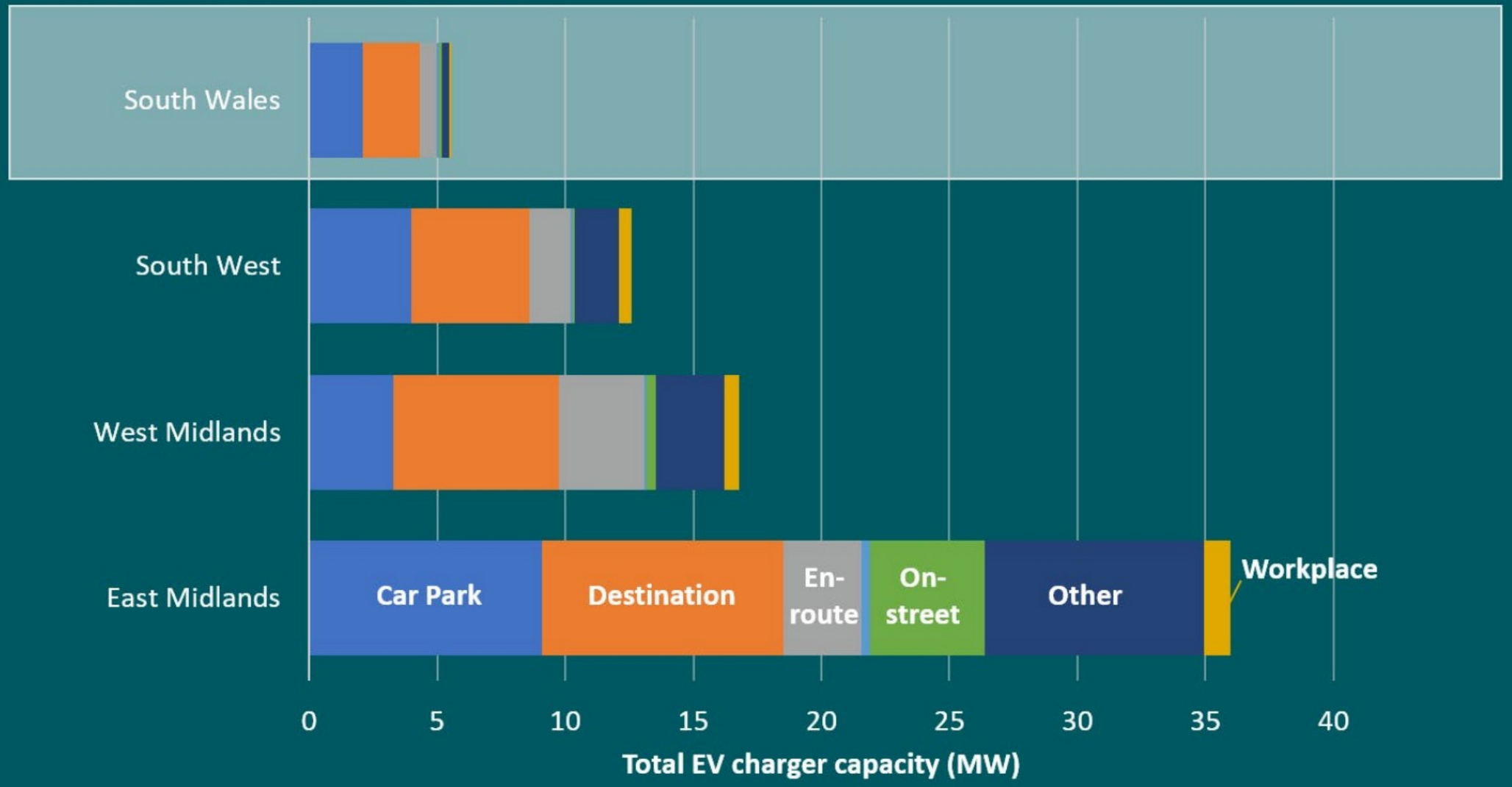
Proportion of cars and LGVs that are electric - GB vs WPD South Wales



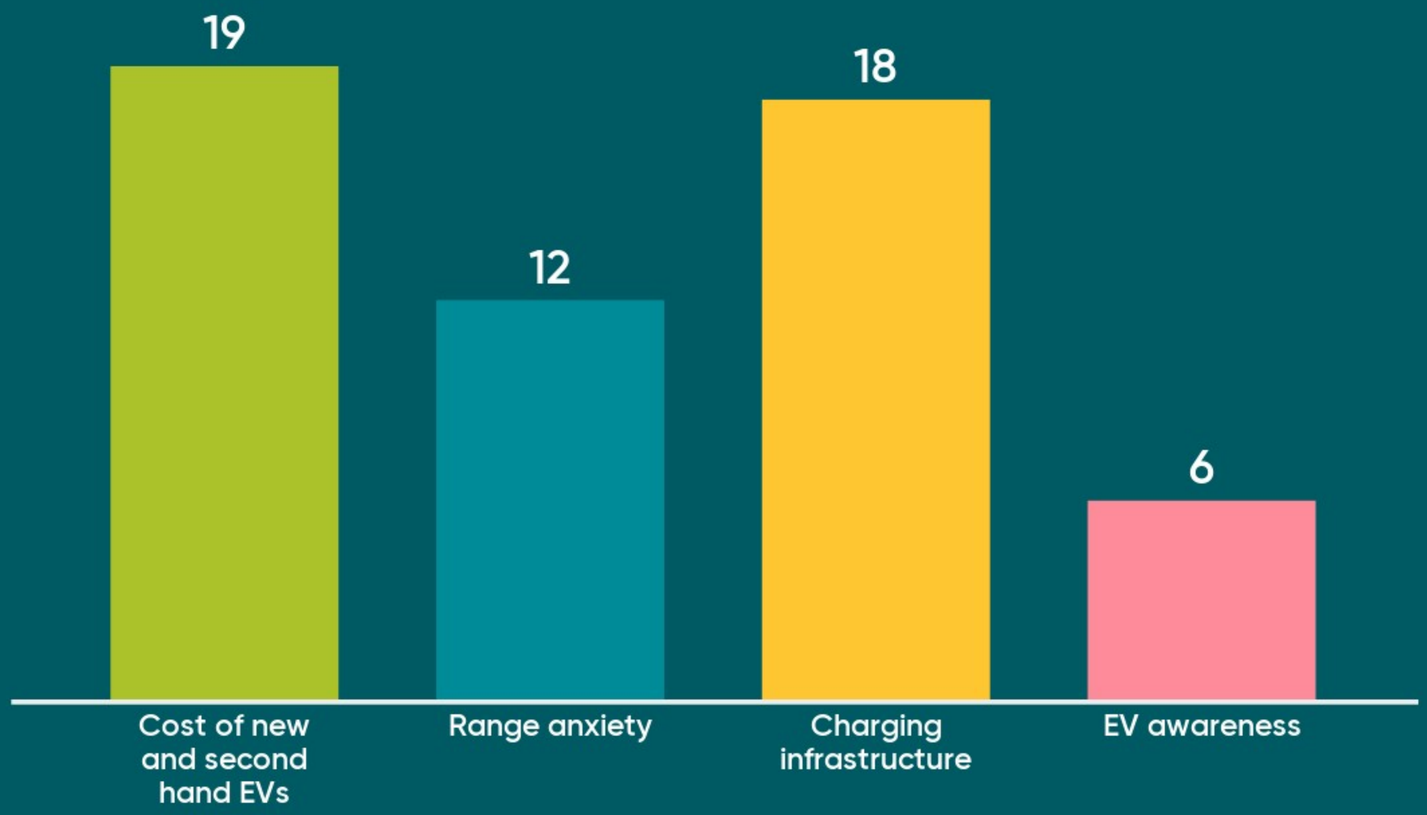

As of Q4 2020, 0.5% of cars and LGVs in the South West were EVs, less than half the national average of 1.1%.
The more rural parts of the licence area see EV uptake in passenger vehicles between 0.2% and 0.4%
Affluent areas, which correlate strongly with multi-car households and off-street parking, see high levels of EV uptake.
Swansea has particularly high levels of company fleet EVs, with 71% of EVs owned by a company, compared to 26% for the rest of South Wales.
Urban areas have higher levels of on-street parking and more single-car households, which in some areas has reduced EV uptake.
Proportion of cars and LGVs that are plug-in electric
<0.2%
0.2-0.4%
0.4-0.6%
0.6-0.8%
>0.8%
ELECTRIC CARS AND LGVS RELATIVE TO TOTAL CARS AND LGVS (Q4 2020)
WPD SOUTH WALES LICENCE AREA

EV charging capacity by location type in WPD's licence areas

Source: National Chargepoint Registry



Why is South Wales' current uptake of EVs behind the national rate?



What will the solutions to EV charging for on-street parked vehicles?

Further questions and Q+A

- Frankie Mayo - Senior energy analyst, Regen
- Oli Spink - Network strategy engineer, WPD
- Grace Millman - Energy analyst, Regen

How has the energy system and people's use of energy shifted as a result of the COVID-19 pandemic?

More energy used from home due to move to home working.

Cycle of consumption over the day will have changed.

Carmarthenshire hasn't seen a slowing down of house building. More home-working in rural areas, which is anticipated to continue. Less travel. Facilities in town and urban centres not open for as long

Significant drop in energy use for transport.

Greater focus on heat in homes and comfort due to home working

ore energy being used at hoe due to increased numbers of those working from home. The time at which energy is being used is also likely changed as people are at home all day, not just in the morning and night.

Move to home working and less commuting

More home, less office, less commuting

Slowing house building and general construction projects, incl associated renewables. Societal shift to flexible home working is reversing.

How has the energy system and people's use of energy shifted as a result of the COVID-19 pandemic?

Housing development and building has increased due to house price rises.Home working likely to stay

More energy in the day due to home working

Absolutely. Hybrid working now to be the norm. EV take up accelerated by Salary Sacrifice Schemes

increased demand for domestic heating during the winter

Typically most households are occupied for longer and using more energy so increased overall energy consumption but I'd also expect a shift away from the historical demand profile (two peaks daily).

Is there anything else you'd like to highlight for our analysis?

Interesting

1

Did you find the event today...