There’s an energy revolution underway

You don’t notice it when you switch on a light, but:

• The UK now has **more** renewable energy generation capacity than fossil fuel capacity.

• Solar and wind are now **cheaper** than fossil fuels.

• There are **rapid** developments in energy storage and smart integrated technologies.

• **Seismic** changes are underway in the decarbonisation of transport and heat.

We have the technology to go zero carbon. And the money’s there to do it. But it all needs joining up, and fast.

That’s why we’ve set up **Zero West**.

A collaboration to accelerate
the transition to a zero-carbon society
in the West of England

www.zerowest.org

Update: May 2019

Origins

In December 2016 Bristol Energy Cooperative, Foot Anstey LLP and SLR Consulting brought together about 100 people and organisations: renewables developers, community groups, the four West of England local authorities, transport providers, food growers, education, arts, financers, lawyers, IT specialists, PR companies, and other interested parties.

They argued that if the West of England region is to go zero carbon fast we need to work faster, in a more joined-up way, to complete low-carbon projects of a far greater scale than at present.

And they listed three main blockers to this happening:

1. A general unawareness (both institutionally and publicly) of the **amazing** recent advances in renewable energy technologies and their falling costs.

2. Vested interests in the **fossil fuel** industry.

3. A lack of effective **collaboration** between the sectors already working regionally on the zero carbon challenge - local authorities, the private sector and the community.

And they pitched a new collaboration, harnessing the combined resources in the room, to:

Map out a zero-carbon future for the region.
Engage decision-makers on how it can be implemented.
Influence zero-carbon policy at national and regional level.
Oppose fossil fuel interests.
Enthuse the public to join our zero carbon journey.

The reaction to the pitch that day was positive, and offers of help were made.

- A steering group was formed to take the idea to others and get more feedback.

- Other working groups were formed to get going immediately on practical activity:

  - Data modelling
  - Infrastructure project development
  - Public engagement

Since then…

- In April 2018 Zero West was incorporated as a Community Interest Company. It's aligned with the Zero Carbon Britain model, and supports actions around energy, transport, food, the built environment, and the arts.

- The 3 three working groups are well-established and working on projects of significant scale.

- Zero West has been developed with significant volunteer effort. We're now ready to ramp up to the scale the science demands, but this can't be done without on-going financial support. So if you believe in our vision, this is the time for you / your organisation to make a financial commitment and become a member.

Update on our working groups

1. Data modelling
2. Infrastructure project development
3. Public engagement

06 Nov / 2018
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NEWS SUPPLY NETWORKS

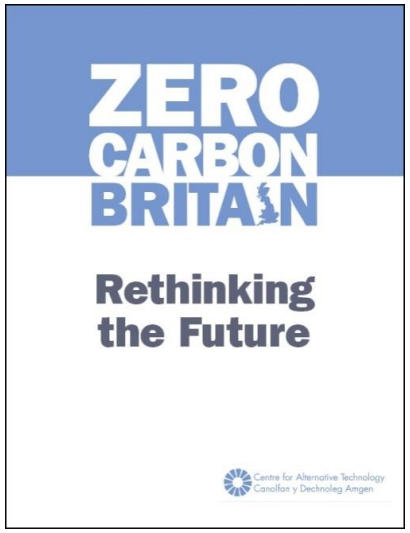
Liam Stoker
Editor, Current±

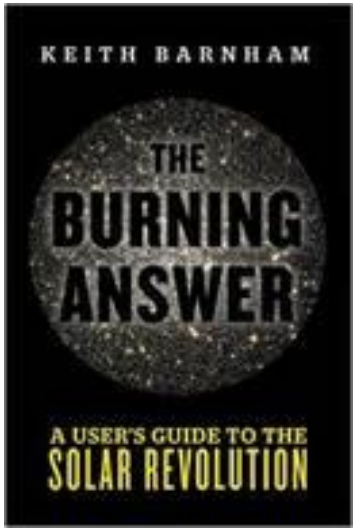
UK reaches major decarbonisation 'milestone' as renewables capacity leapfrogs fossil fuels

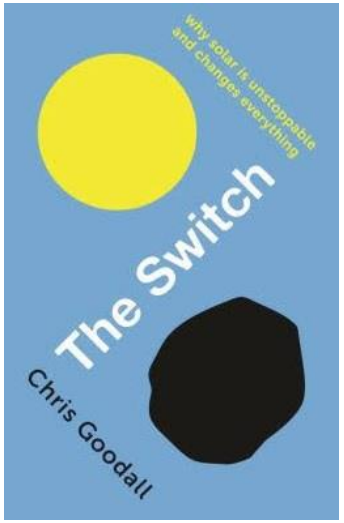
Data modelling group

The energy sector has known for some time that:

- We can get to zero carbon by using a combination of existing renewable energy technologies and energy efficiency
- And cope with scenarios like the sun not shining and the wind not blowing
- Without using nuclear.







Data modelling group

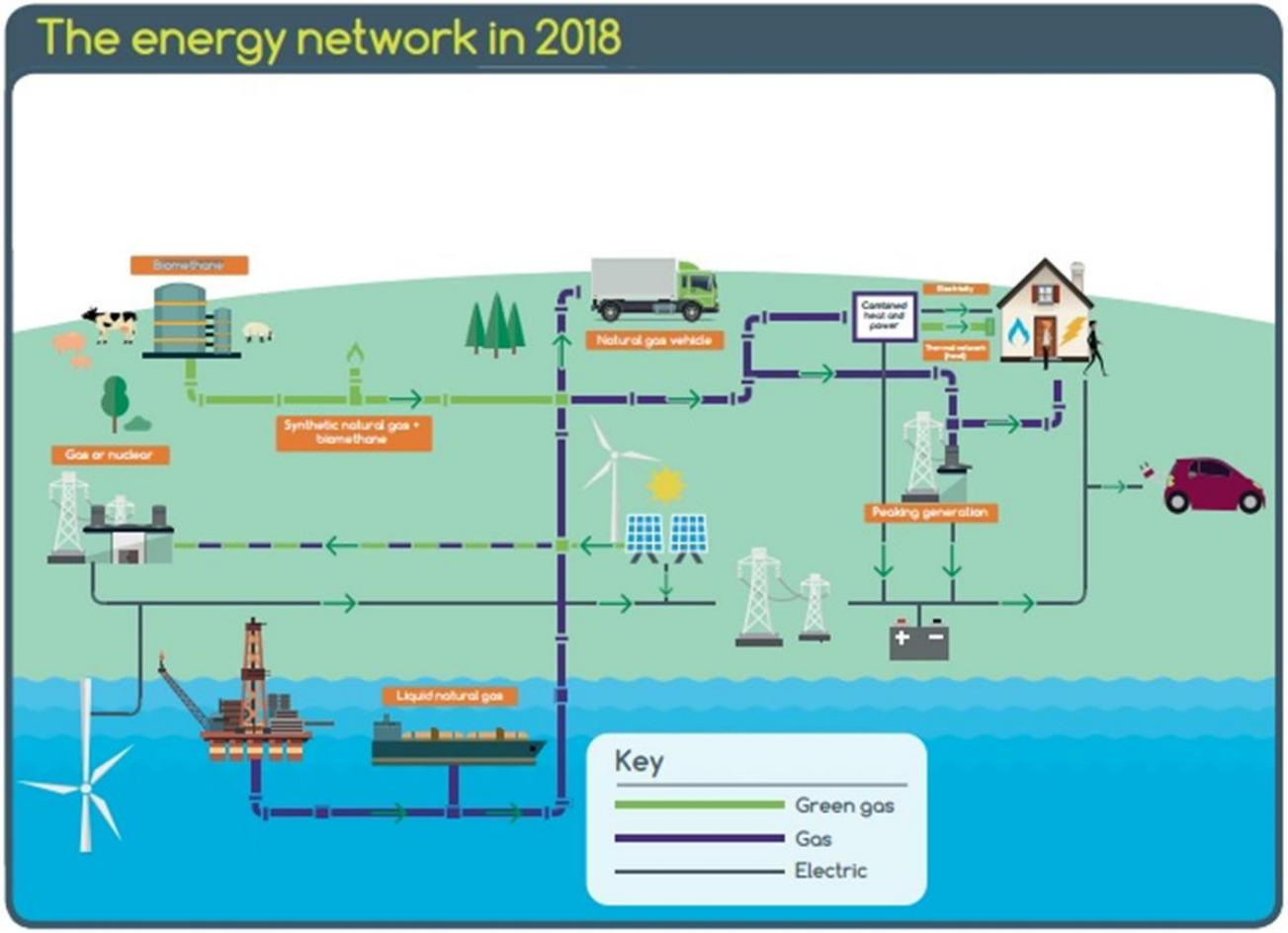
There's long been support in the region for the move to a low-carbon future.

But there's no visible, viable local plan for this that people can buy into. We need something that describes the "how" in detail. Our data modelling group is working on providing this.

Image credit: Buro Happold

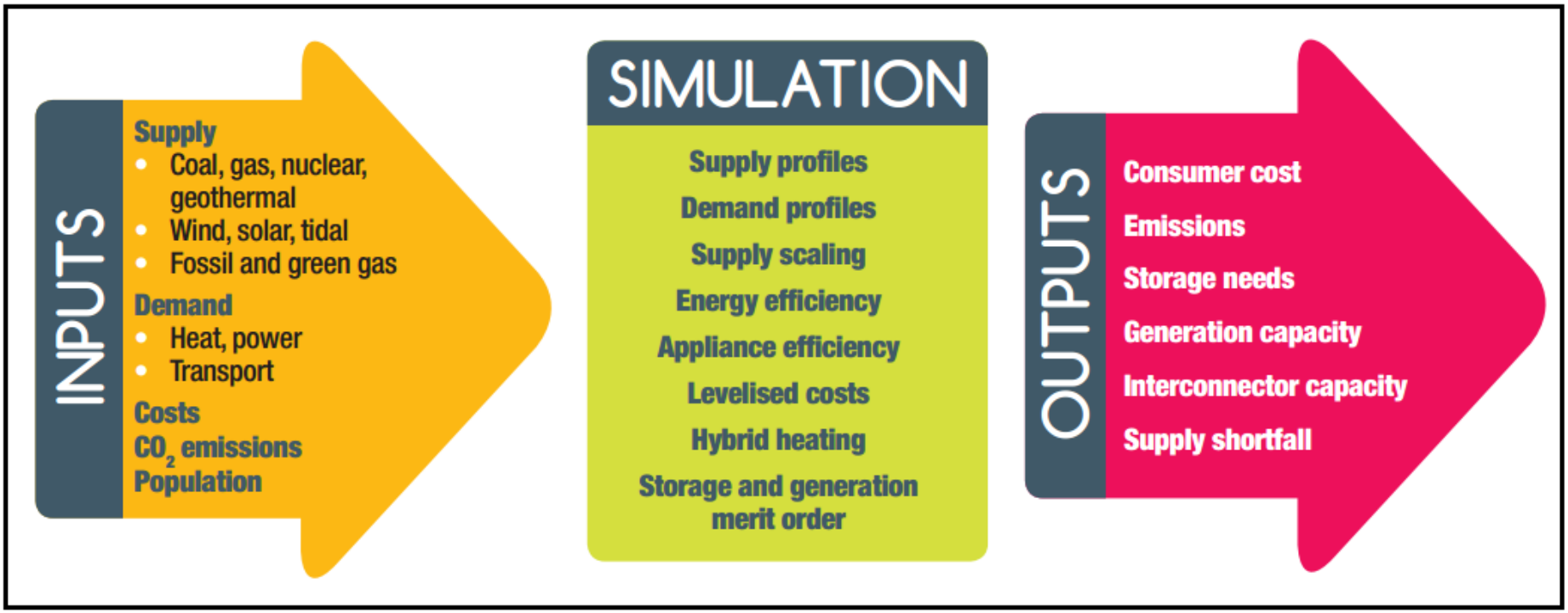
Data modelling group

In recent years the UK energy system has undergone a transformation. It's becoming greener and more integrated, with a paradigm shift in the interaction between the electricity and gas networks:



The gas and electricity distribution companies are working on fully de-carbonising the energy supply, and much data-modelling and innovation on this is underway.

Wales and West Utilities (WWU) is the gas distribution system operator in our region. Over 50% of UK energy consumption is fuelled by gas, with over 80% at peak times. As part of its zero-carbon data-modelling, WWU has developed an integrated energy system simulator called the **2050 Energy Pathfinder.** This "combined heat and electric model" takes real-world data for the heat and power demand of homes and businesses in a particular region, and adds projected new demand such as that for electric vehicles. It then compares this total demand with a simulated range of low-carbon supply options:



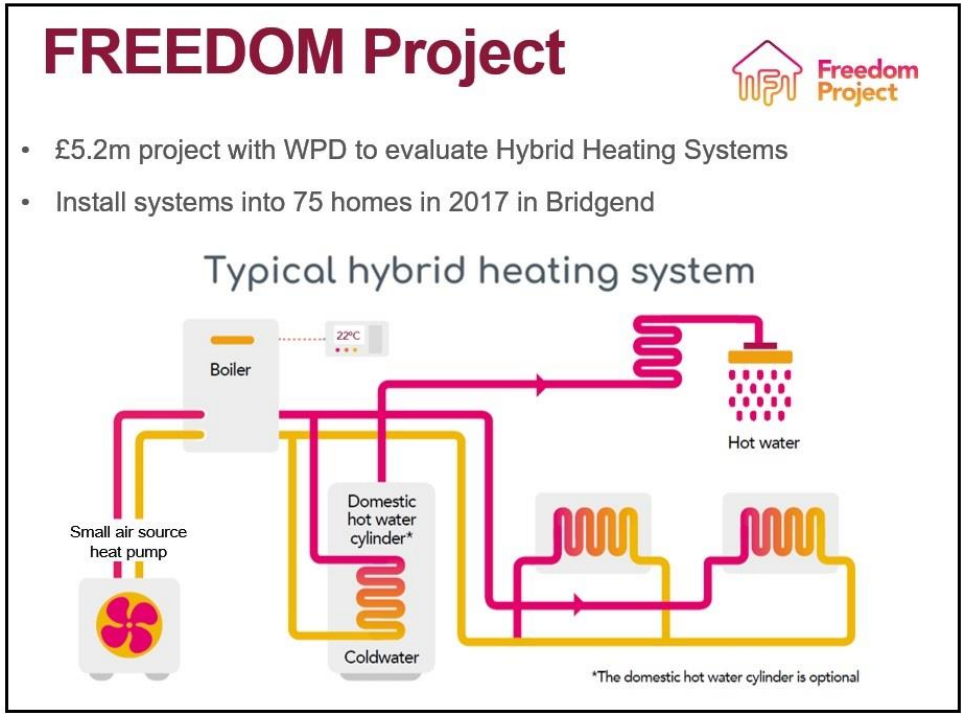
The Pathfinder model is of great interest to the ZW data-modelling team, because it enables any energy scenario, current or future, to be modelled for a town, city, county or country. The results show the costs, carbon impact and any shortfall/surplus in heat and power supply.

Our Zero West team therefore contacted WWU about the model, who provided a dedicated seminar on it. Since then our team has been developing a West of England-specific version of the model, with WWU support.

We are delighted to now make the first version of this available for peer review, and have organised a first session with industry experts, the West of England local authorities, the West of England Combined Authority and the wider energy community. Our aim is to create a compelling vision of what's possible in the West of England if we really try, and to inspire ambitious and focused action.

Our data modelling team is particularly interested in the findings of the Freedom Project. This 2017 pilot tested the effectiveness of smart hybrid heating systems. It was a cross-sector collaboration between Wales and West Utilities, Western Power Distribution, and PassivSystems.

The project combined an air source heat pump (ASHP) and high-efficiency boiler with smart optimising controls to provide flexible switching between renewable power and green gas. It ran in Bridgend, across 75 properties of all types.



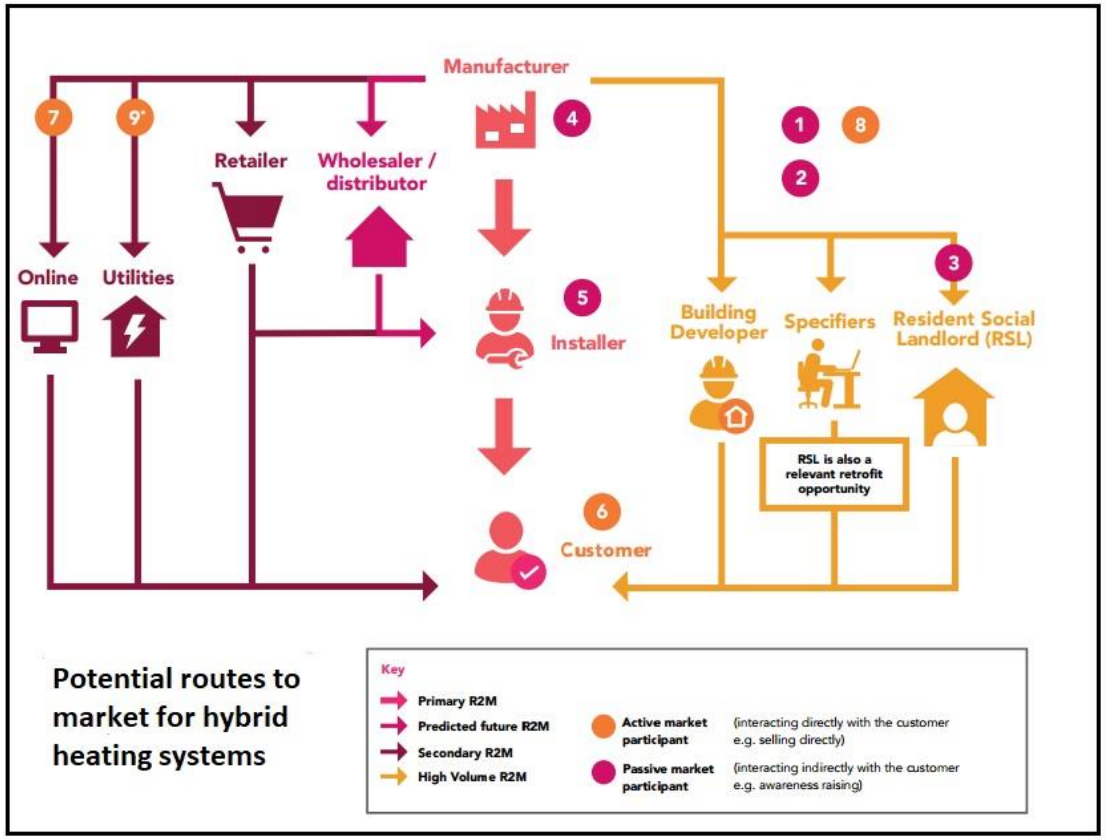
WALES&WEST UTILITIES

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

passivSYSTEMS

Imperial College has analysed the findings from the Freedom Project, and concluded that this solution could:

- be the **lowest cost** pathway to **fully decarbonise** residential heat.
- prevent over-investment in power generation and energy infrastructure capacity.
- divert that money instead into flexible domestic assets for consumers.



Infrastructure projects development group – current work

A key Zero West aim is to help accelerate the development of low-carbon infrastructure in the region.

Our infrastructure projects group is doing this by:

1. Initiating new developments.

2. Promoting existing developments that our members, partners or the public ask us to assist with. This might involve, technical, financial or promotional support.

Zero West will not be an asset owner of the developments. That will be the organisations who come together on any particular development.

Infrastructure projects development group – current work

1. New offshore wind schemes

Over the past 18 months Zero West has established a coalition of organisations and specialists in the region who are interested in developing offshore wind projects in South West England.

The group began by assessing the feasibility of a new scheme in the location of the earlier Atlantic Array development. That scheme had been pulled when it was close to gaining the necessary permissions. The group decided it would be better to focus now on a wider area stretching to Wales and potentially Ireland.

It's estimated that 3GW of wind capacity could be delivered here, producing approximately 11 TWh of energy per year. To put this in context, the annual combined electricity and gas consumption in the West of England area (comprising Bristol, BANES, North Somerset and South Glos) is approximately 11.5 TWh.

The cost of developing offshore wind has dropped hugely over recent years, at a rate very few people predicted.

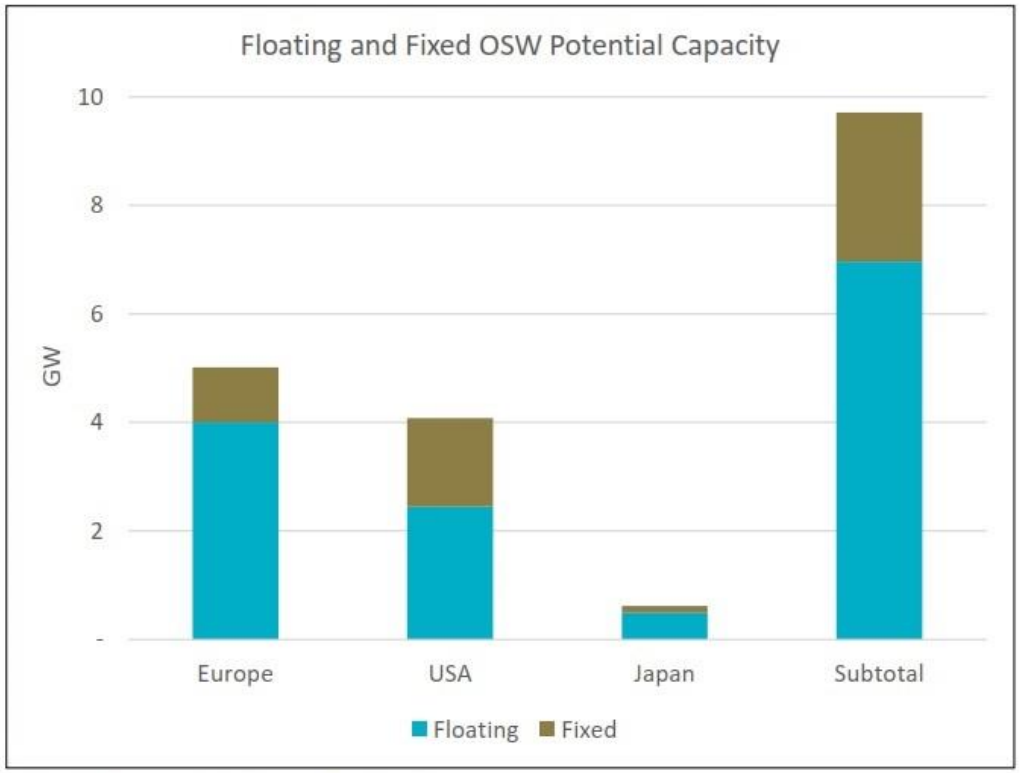
In 2017 government auctions set a record low-strike price of £57.50 per MWh for the biggest offshore wind farm in the world, off the North-East coast of England. The equivalent strike price for Hinkley was £92.50 per MWh.

The offshore wind price had halved in two years. making it cheaper than coal, gas, and nuclear. These schemes use fixed-foundation wind turbines.

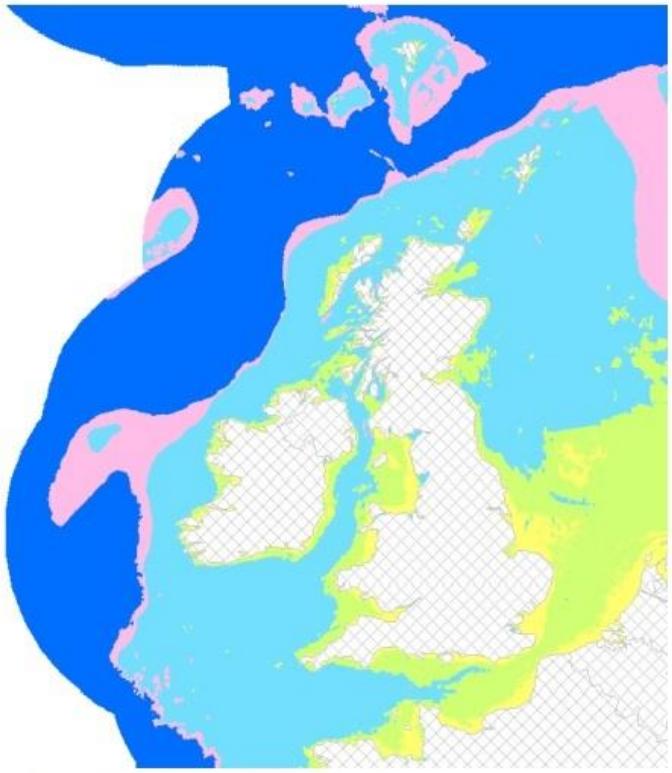
The sea off the South-West coast is deeper than in most parts of the UK. This makes it more suitable for floating wind turbines, which can be deployed in depths greater than 60m. Our group therefore decided to focus its efforts on this technology.

Although floating foundation technology is less developed than the fixed-foundation turbines used in offshore wind farms in other UK regions, floating turbines have the potential to achieve cost parity. This is due to a potential international market much greater than that for fixed offshore turbines:

Why Floating Wind – Deployment Potential



Based on analysis by Carbon Trust, 2015



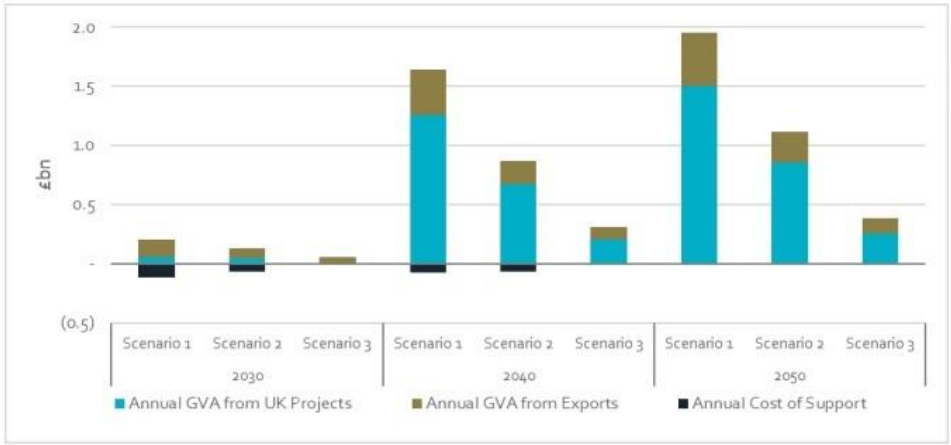
Friends of Floating Wind, 2018

- Key markets potential for 7,000GW = 30,000TWh p.a. (roughly current global demand)
- Even in UK waters, majority of potential is floating

Offshore Floating Wind (FLOW) therefore represents a great opportunity for the UK:

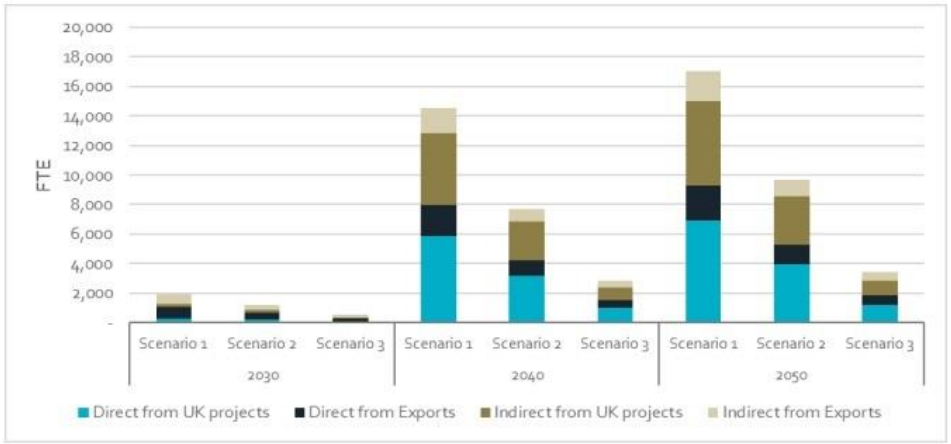
Why Floating Wind – UK GVA and Jobs

CATAPULT Offshore Renewable Energy



UK GVA

- UK market could generate £1bn - £1.5bn GVA p.a. by 2050
- Export market could generate £300 - £500m GVA p.a. by 2050



UK Jobs

- UK market could support 7,000 - 13,000jobs by 2050
- Export market could generate 2,000 – 4,000 jobs by 2050

ORE Catapult analysis, 2018

And South West England can play a key part in a co-ordinated UK FLOW programme which delivers at a scale big enough to drive down the technology costs in the same way fixed-foundation turbines did.

Joining the Dots - United We Stand

CATAPULT Offshore Renewable Energy

- UK FLOW opportunity is **at least** in GSW and Scotland
- UK government revenue support will be at national level

- Maximising regional benefit through local resourcing and investment:
  - Cornwall and Isles of Scilly LEP
  - Scottish Enterprise
  - Welsh Government
  - Highlands and Islands Enterprise

- Other key players
  - RenewableUK
  - ScottishRenewables
  - ORE Catapult
  - Carbon Trust

- Centres of Excellence
  - GSW and Aberdeen
  - Focus on regional-specific issues
  - Do not duplicate on generic issues

Getting FLOW to cost parity with fixed-foundation turbines is probably a 10-year process. It will require both political and revenue support from the government for the earlier pathfinder schemes. This discussion is underway.

Through attending industry events, our Zero West FLOW group made contact with the renewables lead for the Cornwall & Isles of Scillies Local Enterprise Partnership (LEP). Marine energy is one of this LEP's key development strategies. In 2018 a supportive MP had facilitated a meeting with the energy minister to discuss project leases and revenue funding for a sequence of pilot, pre-commercial, and early-commercial scale UK FLOW schemes. The minister then requested a formal proposal. This was submitted, and approved, and a FLOW taskforce of key organisations is now being organized.

The proposed FLOW sites for the South West in chronological order are:

1. Wave Hub, Cornwall – 36 MW
2. Pembrokeshire Demonstration Zone – 90 MW
3. Celtic Zone – 500 MW

These progressively larger schemes would be the pre-cursor to the roll-out by 2030 of large-scale, commercial schemes in the Greater South West region.

Floating Offshore Wind (FLOW) in the Great South West

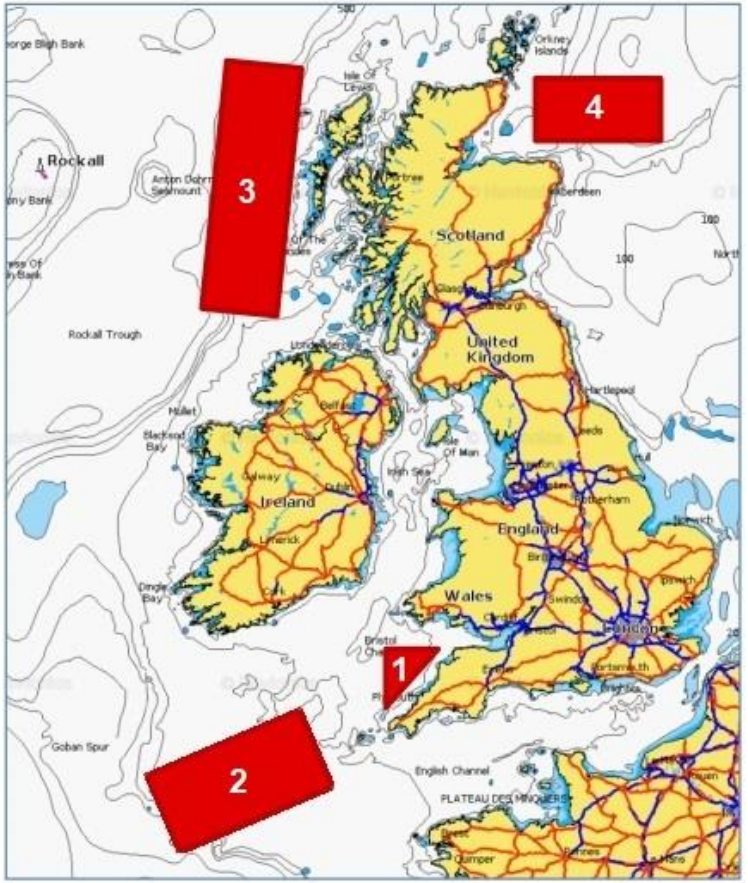
Regions One and Two on the map

Deployment Factors:

- Offshore Water Depth:
  - 60m min
  - 100m-250m optimum
- Assembly & Port ≤ 360Nm
- Power & Grid Access
- Regional Economic Development

Pipeline Design Concept:

- GSW & Wales:
  - WaveHub – 36MW – 2022
  - PDZ – 90MW – 2024
  - Celtic Sea-SW Apps – 500MW 2025-27-29
- Scotland:
  - Hywind – 30MW – 2018
  - Kincardine – 50MW – 2024
  - Moray Firth-NW Apps – 500MW 2025-27-29

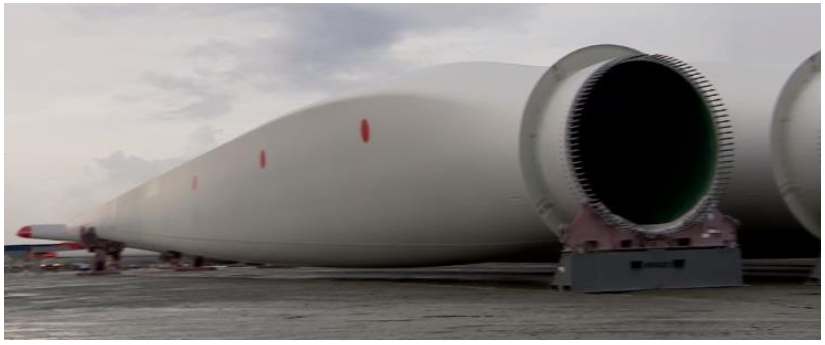


Additionally, in March 2019 the government announced a Sector Deal with the offshore wind industry, as part of its Industrial Strategy. In the Deal the government committed to bring forward new technologies such as floating offshore wind and hybrid projects.

In summary, there is clearly government support for FLOW, and the industry has a track record of delivery and innovation. A crucial factor in UK FLOW's success will be obtaining national revenue support mechanisms for the early schemes. Achieving this will require co-ordinated lobbying from local government, the LEPs, and the community across the whole South West region. Our FLOW team is beginning to work with colleagues across the region on building that support.

This ITV report on the world's biggest offshore wind farm off the coast of North-East England highlights the scale of the opportunity for us in the South-West:

https://www.facebook.com/calendarnews/videos/1622491737895384/



Infrastructure projects development group – current work

2. Whole-street retrofit using the Energiesprong model

Energiesprong is a revolutionary approach to whole-house, whole street, deep retrofit done at scale using a model developed in the Netherlands. It's also available for new-build. Its schemes are done to the very best energy standards, and the money saved on future energy bills and maintenance is used to pay for the works. The retrofits are quick to install: a complete house makeover is usually done in a week and residents don't need to move out.

Energiesprong now has a UK office, and is using the social housing sector in the UK as its launch market. It's currently looking for new sites, ideally in clusters of 300-500 properties. Financial support is available. Zero West has facilitated meetings between Energiesprong, the four West of England local authorities and local social housing providers to assess the feasibility of submitting a regional bid of this size.

Infrastructure projects development group – current work

3. Electric heat microgrids

Bristol start-up Clean Energy Prospector (CEPRO) has been developing innovative community microgrids for a number of years. Zero West has helped it develop an investment model that would enable community microgrids to be rolled out nationally. A joint venture company has now been incorporated, and initial investment has been made to progress the first two all-electric housing schemes in the project portfolio.

The Water Lillies co-housing project in Bristol

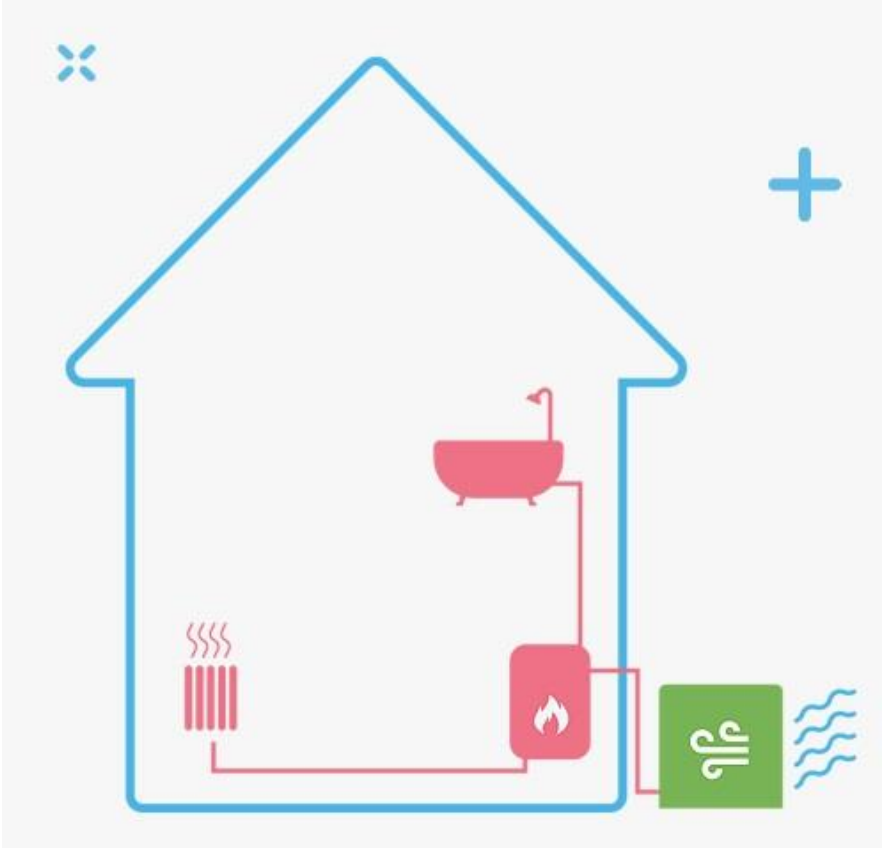
Infrastructure projects development group – current work

4. Hybrid heating

The technology used in the earlier-mentioned Freedom Project pilot is now commercially available from PassivSystems.

Its B-Snug hybrid heating service combines a new air-source heat pump with an existing boiler and a smart control system.

Zero West is currently working with PassivSystems to promote this service in the region.



B-Snug

Infrastructure projects development group – current work

5. Electric buses

All the major vehicle manufacturers are now putting their focus on electric cars, vans and trucks. The Chinese city of Shenzhen has fully electrified its bus fleet, with 16,000 e-buses for its population of almost 13 million people. It is expected to achieve an estimated 48% reduction in CO2 emissions, and has halved its fuel bill.

The Zero West projects group has developed a financial model that enables buses with combustion engines to be converted to electric. It has selected a company to convert the engines, and crowd-funding monies are available for the work. The group is now in discussions with local transport providers about proceeding with a pilot project.

Infrastructure projects development group – current work

6. Local energy supply

There are a number of local energy supply initiatives under way in the region, and Zero West provides an information-sharing platform for them.

One such initiative is the current feasibility work by Low Carbon Gordano and Zero Carbon Bristol on a scheme to install a 1MW "urban rooftop solar farm" on domestic roofs in the Lockleaze area of Bristol. This would initially be funded by a bond issue, and eventually be owned and operated by Lockleaze Neighbourhood Trust.

The solar panels would supply locally-generated and affordable energy to 300 households. As well as bringing immediate financial savings to those struggling with energy bills, this replicable scheme would help create community assets, raise aspirations, and provide a platform for local residents to create climate resilience and develop local enterprise.

Infrastructure projects development group – current work

7. Bristol hydro scheme

Bristol Energy Cooperative (BEC) has recently received permission from the Environment Agency and Bristol City Council to develop a 360kW hydro scheme at Netham Weir, near the Feeder Rd.

The scheme will not receive the Feed-in Tariff, and will be totally unsubsidised, so BEC has asked Zero West for innovative ideas on how the scheme can be funded.

Infrastructure projects development group – current work

8. Smart finance

The group's aim is to facilitate the implementation of transformational, smart energy schemes at a scale which will attract institutional investment.

Zero West won't own the assets arising from the projects it facilitates. The owners will be the organisations who choose to partner on any particular project, and they will decide on the best funding mechanism to use with it.

Early on Zero West established a finance group. This is providing initial due diligence on the development group's projects, and mapping out possible funding sources. These include institutional investment, commercial funding, social funding, and community funding.

The money's out there, as these earlier green bond raises show:

2015: Transport for London 10-year, 2.25%, £400m fully subscribed.
2015: City of Gothenburg 6-year, 1.455%, 1050 million Swedish Krona raised.
2017: SSE 8-year, 0.875%, €600m bond to refinance its wind farms.

Infrastructure projects development group – current work

8. Non-smart finance

Meanwhile, the £4 billion **Avon Pension Fund** currently has an estimated **£105 million** invested in fracking. This money needs to move into local zero-carbon infrastructure.

Avon Pension Fund

Total fund size: £4,299,723,923
Total fracking investments: £105,396,874
Direct investments: £29,836,459
Estimated indirect investments: £75,560,415
% Invested in fracking: 2.45%

Top fracking investments
Shell — £21,439,892
Cabot Oil & Gas — £4,291,154
Occidental — £4,105,412

Source: https://foe.scot/resource/divest-fracking-councils-banking-gas/

Infrastructure projects development group – current work

9. Non-financial blockers

There are a variety of blockers to the zero-carbon transition, including regulatory, policy and mind-set. Removing these involves bringing people together, working through the issue, and developing solutions. Here are a few real life blockers currently hindering the Zero West project teams:

Solar PV on industrial buildings
It's very difficult to persuade users of large industrial warehouses to install rooftop solar. The buildings are often part of property portfolios owned by institutional investors. The portfolios change hands frequently, and the owners don't see enough financial value in a solar installation to invest time in working through a roof-top lease negotiation with their tenants.

Solar on new build housing
Very little rooftop solar is installed on new build housing, because housing developers are currently allowed to get away with it under current planning law.

Grid connections
Distribution network operators have to give as much weight to grid applications from fossil fuels developers as those from renewable developers.

Infrastructure projects development group – current work

9. Non-financial blockers

Planning fees

The size of the administration fee levied by councils for planning applications is directly proportional to the size of the physical area being developed. This means that the fee for a planning application for a large solar farm can be as much as the fee for developing a shopping centre. This is a huge disincentive for renewable energy developers, and the policy needs to be amended.

Demand Side Response (DSR)

DSR is an arrangement where large commercial users of electricity are financially incentivized to lower or shift their electricity use at peak times. This helps manage load and voltage profiles on the electricity network. It also reduces the need for the network operator to make costly grid upgrades to meet new demand. DSR technology is already well-advanced and in use at individual sites:

But for true network benefits to be achieved, a significant number of energy users in a geographical cluster must all to commit to adopting it. This isn't yet happening, so we need to engage with businesses about both the financial benefits DSR will bring them and their environmental responsibility to their staff, their local community, and future generations.

Public engagement group – current work

"…The shift to zero carbon could be one of the most exciting opportunities in human history. It offers many benefits including better housing, affordable, accessible transport, reduced obesity, improved health, cleaner air and more jobs. We can transform isolated, stressful, consumer-focused lifestyles and find better physical and psychological wellbeing by increasing our sense of connection with community and nature." **"Zero Carbon Britain – Making it Happen" report**

There are several strands to the public engagement group's work:

- Climate change outreach, eg, "climate conversations"
- Policy work
- Lobbying/campaigning activity
- Traditional marketing campaigns such as energy-switching

Public engagement group – current work

Most of Zero West's work so far has been on data modelling and infrastructure project development. This was because we felt it was important to demonstrate some successful, inspiring Zero West activity before seeking wider buy-in from the general public.

The public engagement group's focus so far has therefore been on developing initiatives for Zero West's public launch and increasing the number of key Zero West supporters.

The group organised a "Zero West" day-conference in January 2018. This brought together people involved in many of the fantastic low-carbon initiatives already underway in the region on food, energy, transport, and housing. It was a day of visioning, info-sharing and planning.

It's also run a number of sessions of the "West of England Energy Game".

Public engagement group – current work

Now, with the kids' climate strike, Extinction Rebellion, and wise words from David Attenborough and Mark Carney, the time is absolutely right to provide an inspiring vision of what the future could look like if we act now, at scale.

The group is working on practical actions that people can do immediately, and also beginning to work with the projects team on removing some of the blockers to the zero-carbon transition that have been identified.

Finally, as our data modelling nears the point where we can share it with the public, we'll soon be seeking input on a desirable vision for the West of England from a wide range of stakeholders. And we aim to then work with artists and cultural organisations to produce engaging and moving visions that will inspire hope and action.

Next steps

Our membership scheme is now live. Please join us!

When we first suggested this collaboration we were determined it would not just be a talking shop. The significant projects we've initiated since then demonstrate we're about action.

In the next 6 months we want to work with others to:

- Turbo-charge the project development work done so far.
- Complete a high-level plan for making the region zero-carbon by 2030.
- Create and share a zero-carbon vision that everyone can get behind – a better future which brings jobs, health and happiness.

We're working closely with others doing similar work, and are fully aligned with the Bristol City Leap initiative. Read more about our mission and values at www.zerowest.org

Membership fees

- Zero West is membership-based, with 2 membership categories: organisations and individuals. Each category has 50% voting rights.

- Membership for individuals is free, but we suggest people make a yearly donation.

- For organisations, membership for 2019 is:

  Voluntary groups: £10
  SMEs and NGOs: £50
  Large companies: £500

- We're also seeking strategic partners to provide a greater initial contribution. This could be through financial and/or pro-bono support.

You and Zero West

Magical things happen when people work together. So please join us now to create a better future!

With best wishes

The Zero West team
info@zerowest.org

www.zerowest.org

ZERO WEST