

From: [Jonathan Dean](#)
To: [NDF](#)
Subject: Re: to supplement my online response
Date: 03 November 2019 09:37:55
Attachments: [Draft NDF consultation feedback - comparison of renewables approaches v0.2.pdf](#)

Please see my further comments on the draft NDF

On Tue, 29 Oct 2019 at 11:38, <NDF@gov.wales> wrote:

Thank you for contributing to the consultation on the draft National Development Framework. Your comments will be considered over the coming months.

Regards

NDF Team

Welsh Government

From: Jonathan Dean [REDACTED]
Sent: 29 October 2019 09:22
To: NDF <NDF@gov.wales>
Subject: Re: to supplement my online response

Please see the additional response to supplement my online response

Sent from my iPhone

On 9 Oct 2019, at 10:27, NDF@gov.wales wrote:

Thank you for contributing to the consultation on the draft National Development Framework. Your comments will be considered over the coming months.

Regards

NDF Team

Welsh Government

From: Jonathan Dean [REDACTED]
Sent: 07 October 2019 21:34
To: NDF <NDF@gov.wales>
Subject: to supplement my online response

FYI my response is not complete without the attached

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Dr Jonathan F Dean

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

<https://you.38degrees.org.uk/petitions/anglesey-says-no-to-pylons>

Sganiwyd y neges hon am bob feirws hysbys wrth iddi adael Llywodraeth Cymru. Mae Llywodraeth Cymru yn cymryd o ddifrif yr angen i ddiogelu eich data. Os cysylltwch â Llywodraeth Cymru, mae ein hysbysiad preifatrwydd yn esbonio sut rydym yn defnyddio eich gwybodaeth a sut rydym yn diogelu eich preifatrwydd. Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn anfon ateb yn Gymraeg i ohebiaeth a dderbynnir yn Gymraeg ac ni fydd gohebu yn Gymraeg yn arwain at oedi. On leaving the Welsh Government this email was scanned for all known viruses. The Welsh Government takes the protection of your data seriously. If you contact the Welsh Government then our [Privacy Notice](#) explains how we use your information and the ways in which we protect your privacy. We welcome receiving correspondence in Welsh. Any correspondence received in Welsh will be answered in Welsh and corresponding in Welsh will not lead to a delay in responding.

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Dr Jonathan F Dean

[REDACTED]

<https://you.38degrees.org.uk/petitions/anglesey-says-no-to-pylons>

Additional feedback on draft National Development Framework – energy scenarios

1. Introduction

1. In the draft National Development Framework¹, the Welsh Government presents a bold and ambitious picture of how Wales will develop between 2020 and 2040.
2. This feedback focuses on the following policies:
 - Policy 7 – Ultra Low Emission Vehicles;
 - Policy 10 – Wind and Solar Energy in Priority Areas;
 - Policy 11 – Wind and Solar Energy Outside of Priority Areas;
 - Policy 12 – Wind and Solar Energy in National Parks and Areas of Outstanding Natural Beauty (AONB);
 - Policy 13 – Other Renewable Energy Developments;
 - Policy 14 – Priority Areas for District Heat Network;
 - Policy 15 – Masterplanning for District Heat Networks;
 - Policy 22 – North West Wales and Energy.

2. Estimated future energy generation

3. There is no shortage of papers and reports laying out blueprints for how the country can become carbon neutral, to a degree, by various deadlines, including:
 - “Thirty recommendations by 2030”² prepared for the Labour Party;
 - “Re-energising Wales”³ by the Institute for Welsh Affairs;
 - “Zero Carbon Britain”⁴ by the Centre for Alternative Technology; and
 - “Future Energy Scenarios 2019”⁵ by National Grid ESO.
4. This feedback compares these to the vision presented by the Welsh Government in the NDF. Observations from “Future Energy Scenarios 2019”, which includes four scenarios, two 2050 compliant, are included in the “Thirty Recommendations by 2030” report.

¹ <https://gov.wales/sites/default/files/consultations/2019-08/Draft%20National%20Development%20Framework.pdf>

²² <https://labour.org.uk/wp-content/uploads/2019/10/ThirtyBy2030report.pdf>

³ https://www.iwa.wales/wp-content/uploads/2019/03/IWA_Energy_WP6_Digital-2.pdf

⁴ <https://www.cat.org.uk/info-resources/zero-carbon-britain/research-reports/zero-carbon-rethinking-the-future/>

⁵ <http://fes.nationalgrid.com/fes-document/>

5. Those reports that consider the whole of the UK can be scaled for just Wales using the ratio of Welsh to UK energy consumption. In 2017:
 - Wales consumed 89 TWh of energy⁶;
 - the UK consumed 149.1 million toe of energy⁷ equivalent to 1,734 TWh; therefore
 - Wales consumes just under 5% of UK energy.
6. Using population figures to scale would give a similar result. Where relevant, the scaled figure for Wales are shown [like this].
7. CATs “Zero Carbon Britain” is, unsurprisingly, the most extreme, outlining how the UK can become “net zero” as required by Westminster for 2050. It is also, though, the oldest report dating to 2013, before many of the recent cost and technology improvements in battery storage, solar PV, EVs etc. It presents, perhaps, an “end state” vision, and would be worth bringing up to date.
8. “Thirty Recommendations by 2030” and “Re-energising Wales” are both 2019 publications, aiming to achieve a step change, but not net zero, over a relatively short timescale. Fossil fuels still have an important role to play in these scenarios.
9. National Grid’s “Future Energy Scenarios”, which is updated annually, presents four possible trajectories, but only two of these, “Community Renewables” and “Two Degrees” achieve the 2050 target of 80% emissions reduction. This report highlights that different pathways exist to achieve the same objectives, which may vary by region, but all have common “no regret” early activities aligned with “Thirty Recommendations by 2030” and “Re-energising Wales”.

3. Comparison between the NDF and other scenarios (Tables 1 & 2)

10. All future scenarios include for major improvements in building energy consumption as a means of reducing the energy required for heating. This needs to be via increasing the requirements in building standards for new build, as well as retrofitting existing buildings. The NDF makes no mention of any such changes, although it does designate areas for development, there seems to be no change to the standards homes are built to.
11. The NDF only addresses onshore wind and solar PV with estimates for the combined installed capacity ranging from⁸ 4 GW (minimum to achieve target) to 46 GW (where all of the Priority Areas are filled with generation infrastructure). In comparison, the other future scenarios give the following combined wind and solar capacity:

- 5.9 GW Thirty Recommendations by 2030;

⁶ <https://www.regen.co.uk/publications/energy-generation-in-wales-2017/>

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736148/DUKES_2018.pdf

⁸ See page E1 in https://gov.wales/sites/default/files/publications/2019-08/stage-2-refinement-of-priority-areas-for-wind-and-solar-energy_0.pdf

- 6.9 GW Re-energising Wales;
- 11.6 GW Zero Carbon Britain; and
- 4.2 GW Future Energy Scenarios – Community Renewables.

12. This would suggest the minimum installed capacity, using one tenth of the land in the Priority Areas, might be more appropriate than the vast swathes of Welsh countryside in the NDF.
13. The NDF makes no specific mention, at all, of offshore wind, although does concede “other technologies are supported in principle”. All of the future scenarios see a role for offshore wind of at least a similar order of magnitude to onshore. The “Zero Carbon Britain” and “Future Energy Scenarios” reports have significantly more offshore than onshore. Offshore capacity for Wales would be similar to some of the current developments in the North Sea.
14. Other technologies such as tidal stream, tidal reach, wave, floating wind, hydro etc all have roles to play in the scenarios but get no mention in the NDF.
15. “Future Energy Scenarios” includes the following as “no regret” immediate actions, whatever pathway is taken towards net zero:
 - improving the thermal efficiency of homes so that the majority are rated at EPC Class C or higher by 2030;
 - accelerate the rate of heat pump installation with at least 2.5 million [125,000] by 2030, and more than 23 million [1.2 million Wales] by 2050; and
 - regional plans to optimise low-carbon heating solutions (heat pumps, biogas, hydrogen, district etc).
16. “Future Energy Scenarios” in the longer term (2050), includes for:
 - a total installed generating capacity in excess of 200 GW [10 GW Wales] to accommodate a peak demand of over 70 GW [3.5 GW Wales], dominated by wind, 80 GW [4 GW Wales] and solar, 50 GW [2.5 GW Wales];
 - offshore wind dominates generation at 200 TWh [10 TWh Wales] with onshore at 50 TWh [2.5 TWh Wales] amongst other renewables, with a total output of 480 TWh [24 TWh Wales];
 - significant use of interconnectors with other countries [grid connections with England and interconnectors with Ireland];
 - large scale use of smart charging EVs for grid storage and to help balance the grid; and
 - small use of CCS equipped gas generation.
17. Ground source heat pumps are more efficient than air source, but can require significant land use (compared to the properties heated) for the geothermal collector systems. However, this land can be returned to agriculture or community use once the collector pipes

are installed. Allowing for this land use needs to be included in planning guidance and standardised access mechanisms (a two acre wildflower meadow could heat five homes).

18. District heating is the one area where the NDF aligns with the other scenarios, and while heat pumps are alluded to, the dense housing suggested by P1-4 might exclude ground source heat pumps. No provision appears to have been made for heat pumps in rural areas to access agricultural land for geothermal collection.

4. Conclusions

19. Regarding renewable energy, the NDF contains some interesting ideas, but these appear to be very formative and unrefined. The principle of renewable generation is not wrong, but the scale and consequences seem ill thought through. There are valuable learnings from all the other scenarios discussed that the Welsh Government can learn from.
20. The NDF seems to allow for far more generating capacity than Wales needs, or any of the other future scenarios predict. Either the Priority Areas need further revision or the Welsh Government is planning on using renewables as a major economic tool, which is not explained in the NDF.
21. Despite this vast excess of onshore capacity, the NDF includes for no offshore wind capacity, which all of the other future scenarios include, or any of the other marine technologies which Wales has some of the best resources for.
22. There is much missing that needs to be included:
 - improvements to building standards and retrofitting of the existing housing stock – this may require taking some homes out of the use as the cost of retrofitting may be prohibitive;
 - provisions for ground source heat pumps to have “access rights” to geothermal energy in land not associated with the property;
 - regional decarbonised heat strategies, which may involve regional hydrogen or biogas production. Such regional heating systems would fit extremely well with aims for local ownership;
 - storage and balancing facilities need planning for, with former power station sites suitable for repurposing; and
 - clarity over the role of nuclear would be helpful, and where this will be permitted, although Wylfa Newydd is unlikely to be commissioned, or SMRs commercialised, by 2030, so this is a more long term view.
23. Overall, the entire section of the NDF concerning renewable energy appears like a collection of input material to a first draft, but requires much more thought and consultation before it can be considered anywhere near mature enough for policy.

TABLE 1	Draft National Development Framework for Wales	Thirty Recommendations by 2030	Re-energising Wales	Zero Carbon Britain
Sponsor	Welsh Government	The Labour Party	Institute for Welsh Affairs	Centre for Alternative Technology
Target	70% of electricity from renewables	77% reduction in energy emissions	100% renewable electricity	94% GHG reduction 6% GHG removal
Renewables and low carbon	4 – 46 GW installed capacity 9.1 TWh – 95.9 TWh generation	137 GW installed capacity [7 GW Wales] 375 TWh generation	11 GW installed capacity	770 TWh energy demand
Scope	Wales	UK	Wales	UK
Deadline	2030	2030	2035	No deadline
Energy conservation	Not really addressed although P1-4 aim to reduce transportation, P7 supports EVs	Upgrade almost 27 million homes to reduce heat demand by 20% and electricity demand by 11% [1.4 million Wales]	Upgrade 870,000 homes to reduce energy demand by 20%	Reduce heat demand by 50% by improved building standards & retrofitting Reduce transport demand by 78% by EVs, less flying, more public transport
Onshore wind	4 GW min – 46 GW max installed capacity 9.1 TWh – 95.9 TWh generation	30 GW installed capacity [1.5 GW Wales] 69 TWh generation	2.5 GW installed capacity	20 GW installed capacity [1 GW Wales] 51 TWh generation
Solar PV		35 GW installed capacity [1.8 GW Wales] 37 TWh generation	2.7 GW installed capacity	75 GW installed capacity [3.6 GW Wales] 58 TWh generation
Offshore wind	Other technologies supported in principle	52 GW installed capacity [2.6 GW Wales] 172 TWh	1.7 GW installed capacity	140 GW installed capacity [7 GW Wales] 530 TWh generation

TABLE 1	Draft National Development Framework for Wales	Thirty Recommendations by 2030	Re-energising Wales	Zero Carbon Britain
	14 towns selected for district heating	Onshore & offshore wind to provide 55% demand		
Other marine	Developments of 100 units to consider district heating	3 GW installed capacity with 1 GW min tidal stream (7 TWh)	4 GW installed capacity of tidal range, tidal stream, wave and floating wind	10 GW/25 TWh wave 20 GW/42 TWh tidal
Other renewable		Install 8 million heat pumps to supply 22% of heat demand [400,000 in Wales] Heat networks in urban areas Solar thermal supported Organic waste to biogas Hydro 0.5 GW additional installed capacity (8 TWh)	Install 170,000 heat pumps (ground, air, hybrid) 55 MW in-stream hydro 115 MW of fuelled technologies (biomass, anaerobic digestion, energy recovery) 9 TWh of heat energy from sustainable bioenergy	3 GW/24 TWh geothermal 3 GW/8 TWh hydro 25 TWh solar thermal 15 TWh geothermal 105 TWh ambient (heat pumps) 274 TWh biomass (inc synfuels)
Nuclear (low carbon)	Supported in NW Wales only 3.5 GW	9 GW installed capacity 63 TWh generation	Not included	Not included
Storage & balancing	Not addressed	Hydrogen, battery, CCS on gas peaking plants	Biomass fuel, hydrogen, battery, pumped storage	Hydrogen, biogas, syngas, pumped storage

TABLE 2	Draft National Development Framework for Wales	Future Energy Scenarios			
		Community Renewables scenario		Two Degrees scenario	
Sponsor	Welsh Government	National Grid ESO			
Target	70% of electricity from renewables	Progressing to “80 by 50”	80% emissions reduction	Progressing to “80 by 50”	80% emissions reduction
Renewables and low carbon	4 – 46 GW installed capacity 9.1 TWh – 95.9 TWh generation	150 GW total installed [7.5 GW] [4.2 GW wind & solar]	160 GW total installed [8 GW] [7.1 GW wind & solar]	220 GW total installed [11 GW] [3.9 GW wind & solar]	215 GW total installed [10.8 GW] [6.1 GW wind & solar]
Scope	Wales	GB [Wales]			
Deadline	2030	2030	2050	2030	2050
Energy conservation	Not really addressed	Improve the thermal efficiency of homes so that the majority are rated at EPC Class C or higher by 2030			
Onshore wind	4 GW min – 46 GW max installed capacity 9.1 TWh – 95.9 TWh generation	23 GW installed [1.2 GW]	42 GW installed [2.1 GW]	20 GW installed [1 GW]	25 GW installed [1.3 GW]
Solar PV		30 GW installed [1.5 GW]	53 GW installed 2.7 GW]	22 GW installed [1.1 GW]	42 GW installed [2.1 GW]
Offshore wind	Other technologies supported in principle	30 GW installed [1.5 GW]	46 GW installed [2.3 GW]	35 GW installed [1.8 GW]	53 GW installed [2.7 GW]
Other marine	14 towns selected for district heating	About 10 GW installed [500 MW]			
Other renewable	Developments of 100 units to consider district heating				
Nuclear (low carbon)	Supported in NW Wales only 3.5 GW	4.5 GW	8 GW	4.5 GW	16.5 GW
Storage & balancing	Not addressed	12.5 GW	28 GW	12.5 GW	23 GW