

From: [Gareth Thomas](#)
To: [NDE](#)
Subject: NDF response
Date: 23 October 2019 21:38:15
Attachments: [NDFresponse-form.docx](#)

Dear Sir,

Please find attached a response form to the NDF consultation.

Best Regards

Gareth Thomas

Questionnaire on the draft NDF

To help us make our 20-year Plan better we want to know what you think of it. There are 8 questions to answer – you can answer all or some of the questions.

You don't have to fill in the questionnaire on your own – you can fill it in with a friend or with a member of your family.




There's a space for you to choose how you feel about each question – just tick the box below the symbol to let us know whether you agree. If you want to write comments about the questions you can do that too, but you don't have to.

Remember, you have until **15th November 2019** to give your feedback.

Part A – the main points of the NDF

Our plan is for the biggest developments in Wales to happen in towns and cities – places like Cardiff, Newport, Swansea and Wrexham. We want to make transport clean and make lots of clean energy, to help improve our environment.




1. Do you think we are aiming to do the right things with our plan?

Yes	Not sure	No
		
X		
<p>Comments:</p> <p>The aims are correct, but the implementation suggested is not well thought out (see comments in section C)</p>		




2. We have 10 aims in the NDF. Should we think about anything else? Tell us anything we've missed out

Yes	Not sure	No
<p>The NDF also needs to think about...</p>		

3. Do you think the Plan will help achieve healthy and well-planned places?

Yes	Not sure	No
		
		X
<p>Comments: The proposed plan will decimate Mid Wales.</p>		




4. Do you think the plan will help us take care of our environment?

Yes	Not sure	No
		
		X
<p>Comments:</p> <p>The environmental impact on Mid Wales will be devastating.</p>		




Part B – different parts of Wales

We have plans for the three regions in Wales to help them grow. You can tell us what you think about these ideas - even if you live or work in a different area.




5. Do you agree with our plans for North Wales?

Yes	Not sure	No
		
	X	
<p>Comments:</p> <p>Nuclear energy on Anglesey is only mentioned briefly, but it is an important part of CO₂ emission reduction.</p>		

6. Do you agree with our plans for Mid and South West Wales?

Yes	Not sure	No
		
		X
<p>Comments:</p> <p>This area appears to be the dumping ground for large scale renewable energy projects which will decimate the tourism industry and hence many local communities. In Powys, the plan to grow Llandrindod Wells and Newtown appears to be thrown in to appease the residents. For the people of Mid Wales, the NDF paves the way to the destruction of communities in the area.</p>		

7. Do you agree with our plans for South East Wales?

Yes	Not sure	No
		
		X
<p>Comments:</p> <p>South East Wales get most of the benefits without suffering any of the pain. There is no mention of tidal power for this region, even though the tidal range is over twice that of the other regions.</p>		

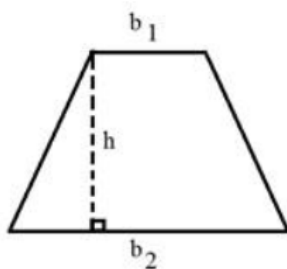
Part C

8. Do you have any other comments you would like to make about this plan?

Comments:

I am a member of Abermule with Llandyssil Community Council and as such have contributed to the feedback to the NDF provided by the Council. In the CC response the possibility of harnessing tidal energy in the Severn estuary is mentioned. This is my personal feedback in which I wish to expand on the CC response by putting some figures behind the massive opportunity offered by the Severn Estuary.

If a barrage were to be placed between Lavernock Point just south of Cardiff, and Brean Down south west of Western Super Mare (possibly via Flat Holm to aid construction), the area of the Severn estuary can be approximately calculated as a trapezoid:



Area of a Trapezoid

$$A = \frac{(b_1 + b_2)h}{2}$$

The distance from Lavernock to the original Severn Bridge is 42.5km and the distance from Brean Down to the bridge is 41.5km and so we can take 42km as an average value for h. The width of the estuary at the Severn Bridge is 3km (b1) and the width of the estuary between Lavernock Point and Brean Down is 13km (b2). The Severn estuary area can thus be calculated as:

$$((3 + 13) \times 42) / 2 = 336 \text{ km}^2$$

This is a very conservative estimate as there is a large area of water close to Newport not included in the trapezoid, and the area of water up stream of the Severn Bridge is not included.

The energy available from a barrage is dependent on the volume of water passing through it. The potential energy contained in a volume of water is:

$$E = \frac{1}{2}Mgh$$

where:

h is the vertical tidal range,

g is the acceleration due to the Earth's gravity = 9.81 meters per second squared and

M is the mass of water available

The half factor is due to the fact that the mass is not available for the complete tidal range and the average tidal range has to be used.

The mass of water available is given by:

$$M = A\rho h$$

where:

A is the horizontal area of the barrage basin,

ρ is the density of water = 1025 kg per cubic meter (seawater varies between 1021 and 1030 kg per cubic meter) and
 h is the vertical tidal range

Example calculation of tidal power generation in the Severn Estuary

Assumptions:

The tidal range is 15m

The surface of the tidal energy harnessing is 336 km²

Density of sea water = 1025.18 kg/m³

Mass of the sea water = volume of sea water \times density of sea water

= (area \times tidal range) of water \times density

= (336 $\times 10^6$ m² \times 15 m) \times 1025.18 kg/m³

= 5×10^{12} kg (approx) or 5 Giga Tonne's

Potential energy content of the water in the estuary at high tide = $\frac{1}{2} \times \text{Mass} \times \text{gravitational acceleration} \times \text{tidal range}$

= $\frac{1}{2} \times 5 \times 10^{12} \times 9.81 \text{ m/s}^2 \times 15 \text{ m}$

= 380×10^{12} Joules (approx)

Now we have 2 high tides and 2 low tides every day where water flows in and out of the estuary. We therefore have 4 passages of the mass of water per day.

Therefore, the total energy potential per day = Energy for a single high tide $\times 4$

= $380 \times 10^{12} \text{ J} \times 4$

= $1520 \times 10^{12} \text{ J}$

The mean power generation potential = Energy generation potential / time in 1 day

= $1520 \times 10^{12} \text{ J} / 86400 \text{ s}$

= 17.6 GW

Assuming the power conversion efficiency to be 30%:

The daily-average power generated = 17.6 GW \times 30% = 5.2 GW

Currently, wind turbines are a maxim of 3MW and with an on shore capacity factor of 24% they produce on average 720kW each. In order to be able to produce the same amount of energy as the Severn estuary is capable of, there would need to be 24,400 wind turbines installed. But this is not the whole story, tidal power is entirely predictable as it is known when the high and low tides are, whereas wind power is totally unpredictable, requiring a back up to be available for when power cannot be produced.

Whilst I appreciate that this might be a massive project costing a large amount of money, energy could be captured just by placing turbines in the Estuary between the points suggested as the speed of water flow will be the greatest at this point, being the narrowest point at the mouth of the estuary. For the NDF to overlook this massive potential and instead advocate the total destruction of communities in Mid Wales is nothing short of criminal and shows a total lack of understanding of the potential Wales has to offer.

Tell us a little about you:

Name:	Gareth Thomas BSc. CEng MIET
Where you are from:	[REDACTED]
Best way to contact you about the NDF (for example, email address):	[REDACTED]
We won't [REDACTED] [REDACTED] [REDACTED]	

To return the questionnaire:

Email it to: ndf@gov.wales

Post it to: NDF Team, Planning Directorate, Welsh Government, Cathays Park, Cardiff, CF10 3NQ

Thank you very much for your feedback. We will read what you have told us and think about how we can improve the NDF. We will let you know when we have finished this work.