

# Eco Advocacy

*Truth | Justice | Sustainability*



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Review of the security of energy supply of Ireland's electricity and natural gas systems consultation,  
Wholesale Electricity and Gas Policy Division,  
Department of the Environment, Climate and Communications,  
29-31 Adelaide Road,  
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Ireland

28<sup>th</sup> October 2022

Review of the security of energy supply of Ireland's electricity and natural gas systems  
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**Public Consultation:**

<https://www.gov.ie/en/consultation/dbe14-review-of-the-security-of-energy-supply-of-irelands-electricity-and-natural-gas-systems/#>

**Deadline:** 5:30pm on Friday 28<sup>th</sup> October 2022

Email submission to: [energyconsultation@decc.gov.ie](mailto:energyconsultation@decc.gov.ie)  
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Dear Sir/ Madam

Note that there are **10 pages** in total to this submission inclusive of the cover page.

Yours Sincerely,  
[REDACTED]

# SUBMISSION

1. Firstly, we welcome the fact the department consultation on this issue. We have conducted significant research into the area of sustainable alternatives and fully acknowledge that fossil fuels are essential in the short term until energy supply has been secured with constant, dispatchable energy supplies. We are very enthused about **Deep-bore Geothermal Energy** as a possible ultimate solution and would strongly encourage policy to **move away from Big Wind** which are white elephants and which consume vast amounts of scarce finite natural resources. **Likewise, utility grade solar on agricultural land is a scandalous** abuse and waste of finite, productive agricultural land.

## IDENTIFICATION OF ENERGY SYSTEM SHOCKS

2. We note the following paragraph on page 9 of the document entitled 'Technical Analysis of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems Non-Technical Report': -

*"Electricity sector supply-side shocks: The increased volumes of installed RES capacity means that Ireland's electricity supply will be increasingly dependent on prevailing weather conditions. As such, low wind/solar generation could mean that the system must rely on gas-fired and interconnector capacity to meet demand. The simultaneous expected increase in electricity demand and decommissioning of existing power stations also means that new generation capacity will be required to ensure system adequacy."*

Given the unpredictability of both Wind and Solar, we note the reliance on gas. This is entirely understandable and unavoidable; otherwise there would be blackouts. We have been very critical of the constant drive to erect more and more wind turbines as we know they are white elephants during periods when there is no wind. Similarly solar only functions during day light hours and there is much evidence confirming how inefficient they are at these latitudes. We have provided imagery below to demonstrate this point. There is an alternative; Deep-bore Geothermal Energy. We are aware that legislation is currently being drafted to facilitate Deep-bore Geothermal Energy. This is very late in the day and we are concerned about the amount of time this is taken. Unlike Wind and Solar, Deep-bore Geothermal energy is constant and dispatchable. We are therefore anxious that this be expedited as a matter of urgency to take pressure off the requirement for gas to support wind and solar.

3. We note the graph on page 24 of the document entitled 'Table 6.3: Impacts of electricity mitigation options under Shock scenario 5'. We see options of Biomass and Hydrogen but not the absence of Deep-bore Geothermal Energy. This is a cause of concern as Deep-bore Geothermal Energy affords an opportunity to provide dispatchable and constant supply of electricity. There are already numerous installations around Paris in France and in many other countries.

4. Having conducted a search of the consultation document entitled 'Review of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems' we found only one mention of 'Geothermal' compared with numerous mentions of wind. Critically

*'Renewable energy sources such as wind and solar are intermittent and require a complementary flexible source of power such as conventional generation, batteries, demand side response, interconnection, or other solutions to back them up and ensure that the electricity system remains in operation and stable even when these sources of energy are not available. Ireland has an electricity interconnector to the UK, the East West Interconnector (EWIC) and an interconnector to Northern Ireland. Planned infrastructure includes the North-South Interconnector, two new electricity interconnectors (one between Ireland and the UK and the second between Ireland and France) and other network reinforcements identified by EirGrid and ESB Networks.'*

And

*'The interdependencies between the electricity and gas networks has increased in recent years and this trend is expected to continue as more intermittent renewable sources are added to Ireland's energy system. The development of a renewable gas market is also likely to impact the planning of the electricity and gas networks at distribution and transmission levels.'*

We are glad to see the problems of putting so much intermittent energy on the system. This is a real problem and makes us focus on delivering forms renewable energy that are constant and displaceable.

5. The consultation finishes by asking some questions: -

### Risks

1. Are there any other security of supply risks that you can identify in addition to those set out in section 6?

**Answer:** We believe that both wind and solar being so intermittent should be immediately discontinued as the primary options and a focus put on other forms that are constant. Moreover, an analysis should also be taken of the resources necessary to put these in place. We have provided some narrative below on the amount of resources required to put gigantic wind turbines in place. This is unsustainable.

2. If there are other risks that you have identified, could you outline some mitigation options to address the risk(s)?

**Answer:** We encourage the use of Deep-bore Geothermal energy which is constant and dispatchable. We have provided further narrative in this document.

3. Are the five shock scenarios that were considered, and the additional scenarios related to the Russian invasion of Ukraine, sufficiently broad?

**Answer:** Yes

### Mitigation Options

4. Do you have any additional mitigation options that you think should be considered?

**Answer:** As stated above, the focus should be on forms of renewable energy that can provide constant and dispatchable energy. Deep-bore Geothermal energy looks very promising in this respect.

5. Which gas supply mitigation options, if any, should be considered for implementation?

**Answer:** We further acknowledge the need to put in place adequate storage facilities of Gas to allow for spikes and wonder would Whiddy Island or Whitegate be possibilities? Furthermore although Gas is a fossil fuel, we acknowledge that in the short term, it is essential to keep the grid at capacity. We are concerned about reliance on the UK for supplies and would therefore encourage further exploration off the Irish coast where there are known to be promising prospects of locating further deposits. We would be anxious though that the state benefit from sourcing any future reserves and that they are not owned by multi-nationals such as SHELL or BP, etc.

6. Which electricity supply mitigation options, if any, should be considered for implementation?

**Answer:** Deep-bore Geothermal Energy

7. What measures should be considered on the demand side to support security of supply of electricity and gas?

**Answer:**

- No More **Data Centers** should be added to the grid. Data Centers now account for a substantial amount of the electricity demand. We may even have to look at 'deleting' some information. Storing each and every morsel of digital information comes at a cost.
- Eirgrid: estimated that they will consume 30% of all electricity by 2030. This is way out of kilter with all other countries
- Most countries are seeing their electricity demand stagnate or decline; as their populations are stagnant or decreasing and energy efficiency is increasing
- This compares with Ireland where we are seeing our electricity demand increase.
  - This is due to data centres. This hasn't happened before.
  - Its always been the case that an increase was driven by economic activity;
- its never been the case that one particular sector just exploded our electricity demand in this way
- CSO statistical publication, 03 May 2022, 11am

- In 2015: Data centres accounted for 5% of metered electricity consumption,
- In 2021: Data centres accounted for 14% of metered electricity consumption (a near 3 fold increase).
- This compares to:
  - **Urban Dwellings** who accounted for 21% of metered electricity in 2021 and
  - **Rural Dwellings** who accounted for 12% of metered electricity in 2021.
- the expansion of data centres is causing a crisis in the security of supply of electricity.
- **Roof space:** Do data centre proposals consider the use of roof space for mounting solar panels to assist with energy requirements? The evidence is that most data centres currently do not utilise their roof space in this way. That said, given the amount of electricity required, solar on roofs would likely be tokenistic at best.

8. Do you have any views on how the mitigation options should be implemented?

**Answer:**

- May need to look at a **carbon consumption model** rather than a **carbon production model** for Europe. This would also tackle the issue of **goods being imported from high carbon China** as opposed to be manufactured in low-carbon Europe. Problem is that gives rise to import **tariffs**.
- A top down (Plan led) approach would be preferable rather than the current developer led Bottom up approach.
- An integrated approach which considers wider aspects of and impacts of Data Centers in Irelands (as outlined herein) needs to be considered. This should consider;
  - Security Issues,
  - Resource requirements,
  - Compliance with EU law,
  - Impact on Ireland's commitments under international agreements,
  - Impact on energy requirements and renewable energy ambitions,
  - Network requirements,
  - Consumer Behavior; seeking reductions without adjusting our behavior.

### **Policy Measures**

9. Do you support the policy measures proposed in section 8 of the consultation paper?

**Answer:** with so much wind (and to a lesser extend solar) on the system, there isn't a whole lot of options but to put in place a system of gas storage until more permanent solutions can be arrived at.

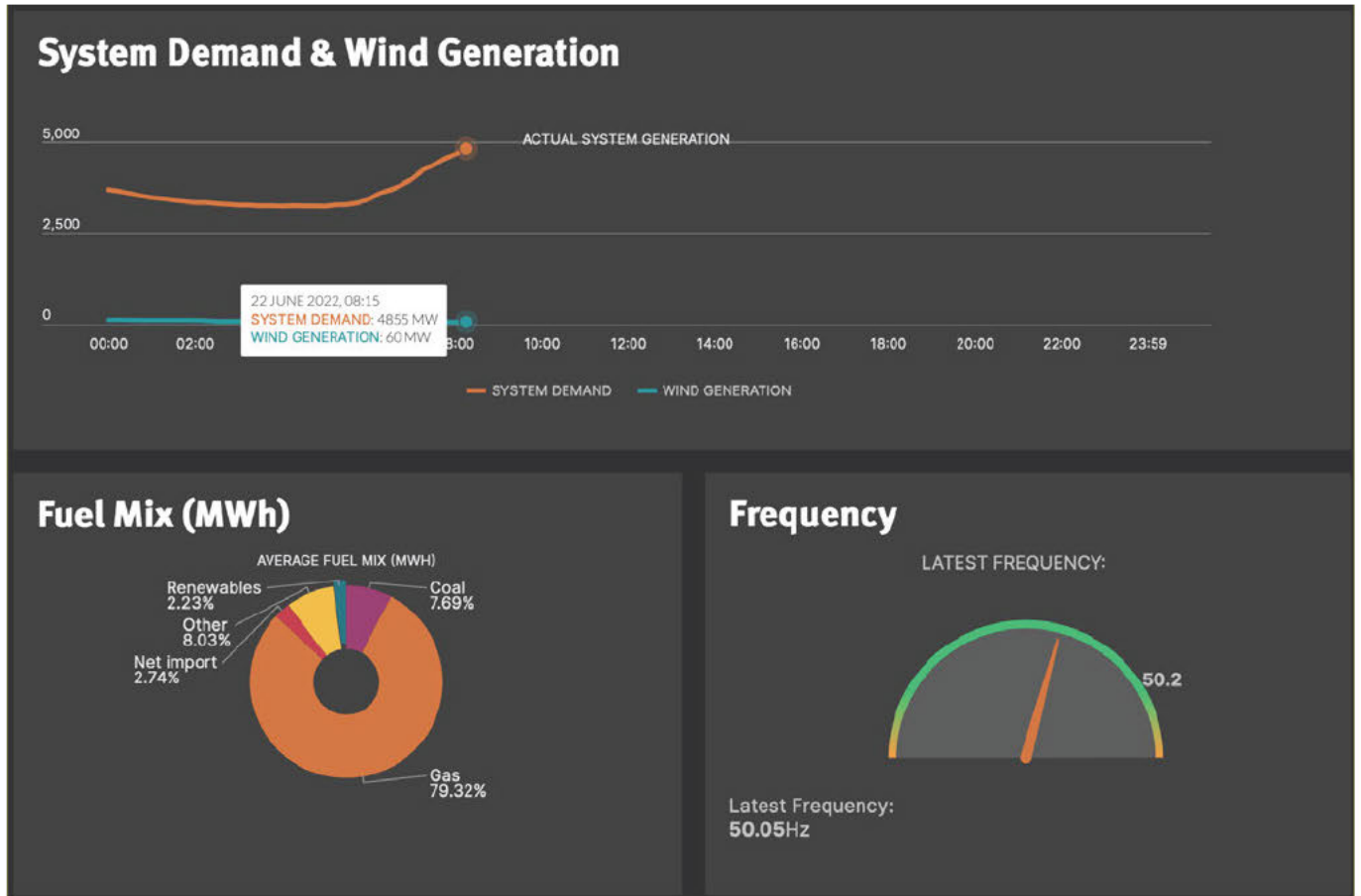
We have conducted a lot of research into this and very encouraged at the prospects of Deep-bore Geothermal as an ultimate solution. We are happy to collaborate further on this if need be.

10. What further tools and measures do you think would contribute the most to Ireland's energy security of supply?

**Answer:** Deep-bore Geothermal Energy. There is some useful information coming from Cornwall currently. See: <https://geothermalengineering.co.uk/united-downs/>  
Its been tried in tested in many other countries such as Iceland, Germany, Austria, France, the USA and so on.

SUSTAINABILITY

- 6. Secondly; our principal point is that the focus must be on sustainability. There has been too much of a dash for 'green energy' without actually examining the viability of it. For example wind and solar have been pushed a lot by the administration with various incentives to industry. As it happens both wind and solar only provide intermittent forms of energy making the country highly reliant on gas to fill the gap on days when there is no wind. The war in the Ukraine has shown just how dependant on gas the western world is. Please see below a graph of the energy matrix on a windless day. The day in question was the 22<sup>nd</sup> June 2022, but this is far from isolated and we have many such graphs to demonstrate this issue over many days.



- 7. If the department focus on 'SUSTAINABILITY' this would solve many of Irelands energy issues.

**8. It is submitted that had a proper SEA been conducted into all sources of alternative energy years ago, it would have been established that Geothermal was far more promising and sustainable than either wind or solar.**

## DEVELOPER LED

9. The current regime in so far as it relates to Wind and Solar is Developer led rather than plan led. This is unsatisfactory, as developers are part of a bigger capitalist system, which is focused primarily on profit. In short there should be a top down state led focus.

## SUSTAINABILITY / POTENTIAL

10. In Ireland a fault line stretching from Limerick to Louth [the Caledonian fault line] exists. This is where two tectonic plates collided many millions of years ago. All along this fault line there are numerous mines; Silver Mines, Lisheen Mines, Galmoy Mines and Tara Mines in County Meath being perhaps the most notable. Indeed we understand that Tara mines have significant data on the temperatures/ underground rock formations, which can help inform research into Deep-bore geothermal energy. Kentstown Rock Formation is ideally suited for some type of deep-bore geothermal energy and we know that this lies beneath this mine. Moreover there are numerous 'hot springs' all along this line and there is in fact a townland near Enfield, County Meath known as 'Hotwell'. At times of significant rainfall events, water comes up boreholes at c.22°C, such is the geothermal activity beneath. There is enormous potential for geothermal energy on the island of Ireland given the bedrock and geological structure of the landmass.

## DEEP BORE GEOTHERMAL

11. Deep-bore Geothermal Energy is essentially 'free' energy contained within the earth's crust. Briefly, it entails boring 2 boreholes to depths of between 2 and 3 miles. It is dependant on the existence of a particular type of rock to conduct water from A to B. It can also be facilitated by way of a dual core pipe (single pipe). The water coming back up is superheated to temperatures of between 100°C and 200°C. A modest enough plant is all that is required on the surface to convert the energy into electricity. There are many examples around Paris, Austria, Germany, Iceland and so on. There is comparatively small investment in this energy when compared with that required to site a wind turbine. It should be noted that Heat production by surface geothermal energy represents three quarters of the energy produced in France by geothermal energy.
12. The ADVANTAGES of Deep Geothermal over Wind are many and may be summarised as follows: -
  - a. Utilization of the knowledge built up by the mining sector.
  - b. no visually obtrusive issues,
  - c. no property devaluation,
  - d. no health issues,
  - e. no fluctuations in the availability of energy,
  - f. no spinning reserve (backup) requirement,
  - g. no wastage of finite natural resources such as sand and gravel, steel and so fourth.
  - h. There are numerous suitable geological bedrock areas in Ireland.
13. We are highlighting Geothermal because whatever resources are required to put it in place are far better invested in this in that this is a form of constant energy as opposed to intermittent energy from Wind and Solar. We know from our extensive research that wind and solar are essentially white elephants and little more than a vanity exercise, which has not been properly thought out. They are only feasible when sustained by lucrative grant assistance, which in itself should be sounding alarm bells. To make matters worse, wind and solar are extremely resource hungry of finite resources. It is a scandal that these have been pursued for so long given their inefficiency together with the devastating impacts on the landscape and the divisive impact on local communities.

## SUSTAINABILITY of Wind and Solar

14. **The TURBINES:** The manufacture of steel and other components to assemble a turbine (particularly on the scale proposed) must also be assessed as regards its impact on the environment *vis à vis* carbon footprint and environmental sustainability of natural and finite resources.
15. **Carbon footprint of wind energy:** The manufacture of cement requires significant temperatures. The carbon footprint / ton is therefore very significant. It is submitted that the use of such a vast quantity of concrete would give rise to an unacceptably high carbon footprint. The reality is that construction and erection of wind turbines will give rise to significant and unsustainable resource consumption.
16. We were unable to easily find exact grade of aggregate, steel or nm of concrete in any of the works be it bases, culverts, manholes, etc. It would be essential that the applicants provide a table of figures for the amounts of aggregate required to construct the network of access roads.

## MATERIALS USED

17. It is considered helpful to provide a short analysis of some of the components of wind turbines, which we will now outline.
18. **STEEL:** To create 1,000 Kg of pig iron, you start with 1,800 Kg of iron ore, 900 Kg of coking coal 450 Kg of limestone. The blast furnace consumes 4,500 Kg of air. The temperature at the core of the blast furnace reaches nearly 1,600 degrees C. The pig iron is then transferred to the basic oxygen furnace to make steel. 1,350 Kg of CO<sub>2</sub> is emitted per 1,000 Kg pig iron produced. A further 1,460 Kg CO<sub>2</sub> is emitted per 1,000 Kg of Steel produced so all up 2,810 Kg CO<sub>2</sub> is emitted. 45 tons of rebar (steel) are required so that equals 126.45 tons of CO<sub>2</sub> are emitted.
19. **CONCRETE:** To create a 1,000 Kg of Portland cement, calcium carbonate (60%), silicon (20%), aluminum (10%), iron (10%) and very small amounts of other ingredients are heated in a large kiln to over 1,500 degrees C to convert the raw materials into clinker. The clinker is then interground with other ingredients to produce the final cement product. When cement is mixed with water, sand and gravel forms the rock-like mass know as concrete. For the turbines currently being proposed, upwards of 200 lorry loads of readymix calculate are required to anchor each turbine (in addition to lots of reinforcing steel).
20. **RARE METALS:** Each and every wind turbine has a magnet made of a metal called neodymium. The mining and refining of neodymium extraordinarily dirty and toxic – involving repeated boiling in acid, with radioactive thorium as a waste product – 90% of it comes from – Baotou, China. Neodymium is a rare earth metal, which is generally sourced in China and which is causing. There are c. 4 tons of neodymium magnets in each turbine for example. China’s Ministry of Industry and Information Technology estimated that the cleanup bill for southern Jiangxi Province could amount to 38 billion yuan, or around \$5.5 billion. Only a fraction of that amount has so far been spent.
21. **The MAGNETS:** The turbines themselves come from a process, which cannot be considered sustainable. In fact the trail of destruction and environmental pollution, which is left behind, is shameful.
  - a. To quote from the enclosed article on the issue ‘*Neodymium is commonly used as part of a Neodymium-Iron-Boron alloy (Nd<sub>2</sub>Fe<sub>14</sub>B) which, thanks to its tetragonal crystal structure, is used to make the most powerful magnets in the world...There’s not one step of the rare earth mining process that is not disastrous for the environment. Ores are being extracted by pumping acid into the ground, and then they are processed using more acid and chemicals. The fact that the wind-turbine industry relies on neodymium, which even in legal factories has a catastrophic environmental impact...Finally they are dumped into tailing lakes that are often very poorly constructed and maintained. And throughout this process, large amounts of highly toxic acids, heavy metals and other chemicals are emitted into the air that people breathe, and leak into surface and ground water. Villagers rely on this for irrigation of their crops and for drinking water. ‘Whenever we purchase products that contain rare earth metals, we are unknowingly taking part in massive environmental degradation and the destruction of communities.’*

- b. Curiously RTE's weekly 'World Report' programme also alluded to the issues presented in Baoding, China on 31<sup>st</sup> May 2015; <http://www.rte.ie/radio1/world-report/> It was referred to as China's most polluted city.
- c. Aside from the manufacture of the magnets alluded to above and in the appended enclosure, World Report alluded to the manufacture of Blades for wind turbines together with solar panels. Some statistics about Baoding were that the skies are constantly full of smog from pollution and thus far this year, they had only got 16 days smog free as of [31<sup>st</sup> May 2015]. The listener was informed that Blue skies are seldom seen. Fine particles (PM 2.5) are double that of recommended levels and the population have respiratory problems/ breathing difficulties and facemasks are frequently worn in an attempt to protect oneself. It is estimated that air pollution is responsible for 100,000 deaths each year. Because of China's Censorship, it is difficult to obtain detailed data. To make matters worse, at decommissioning stage, the blades are being chopped up and being land filled. See: <https://www.bloomberg.com/news/features/2020-02-05/wind-turbine-blades-can-t-be-recycled-so-they-re-piling-up-in-landfills>

22. We invite you to assess the following links to substantiate what we have outlined above: -

**Rare-earth mining in China comes at a heavy cost for local villages**

Pollution is poisoning the farms and villages of the region that processes the precious minerals  
Cécile Bontron

Tue 7 Aug 2012 13.59 BST

<https://www.theguardian.com/environment/2012/aug/07/china-rare-earth-village-pollution>

**Rare earth mining in China: the bleak social and environmental costs**

China produces 85% of global supply of the 17 chemically similar elements crucial to smartphone, camera lens and magnet manufacture – and half that output is from the city of Baotou  
Jonathan Kaiman in Baotou

Thu 20 Mar 2014 14.30 GMT

<https://www.theguardian.com/sustainable-business/rare-earth-mining-china-social-environmental-costs>

**The dystopian lake filled by the world's tech lust**

By Tim Maughan

2nd April 2015

<https://www.bbc.com/future/article/20150402-the-worst-place-on-earth>

**China Wrestles with the Toxic Aftermath of Rare Earth Mining**

China has been a major source of rare earth metals used in high-tech products, from smartphones to wind turbines. As cleanup of these mining sites begins, experts argue that global companies that have benefited from access to these metals should help foot the bill.

BY MICHAEL STANDAERT

JULY 2, 2019

<https://e360.yale.edu/features/china-wrestles-with-the-toxic-aftermath-of-rare-earth-mining>

- 23. **Human Rights:** In addition to the issue of sustainability raised above, there are clearly significant Human Rights issues to consider here. It is therefore unconscionable that the practices alluded to in the appended article should be supported in any way
- 24. **The FUEL:** The sheer volumes of concrete required together with boat trips is vast. It follows that the amount of diesel fuel necessary to fuel the truck to haul all this material on site would be enormous. This too must be factored into the carbon footprint equation together with the sustainability of consuming so much fossil fuel in the construction of the proposed wind turbines.
- 25. **Where does the aggregate come from?**
  - a. Further to the above, sourcing such an enormous quantity of aggregate would pose enormous challenges. Aggregate is a major constituent of concrete. Aggregate will also be required to



construct all the hard standing areas and access roads. It is submitted that this is squandering of national resources.

- b. The sighting of turbines should be in a situation where naturally occurring bedrock can be utilized, obviating the need for the requirement of such vast amounts of concrete and aggregate. Furthermore, in addition to aggregate, sand and gravel are also component constituents of concrete. Through our experience and understanding of the quarry industry, we know that supplies of sand and gravel are rapidly dwindling. It is therefore essential that such schemes be situate on naturally occurring bedrock!

26. **Sporadic nature of wind power:** wind power is historically very sporadic and erratic. To state the obvious, in periods of static airflow, no wind is produced. This causes all sorts of challenges for management of the grid in that it must be replaced by alternative sources of energy. Other alternative Energy Sources are discussed separately in this submission, as are issues pertaining to the management of the grid.

27. **Spinning Reserve:**

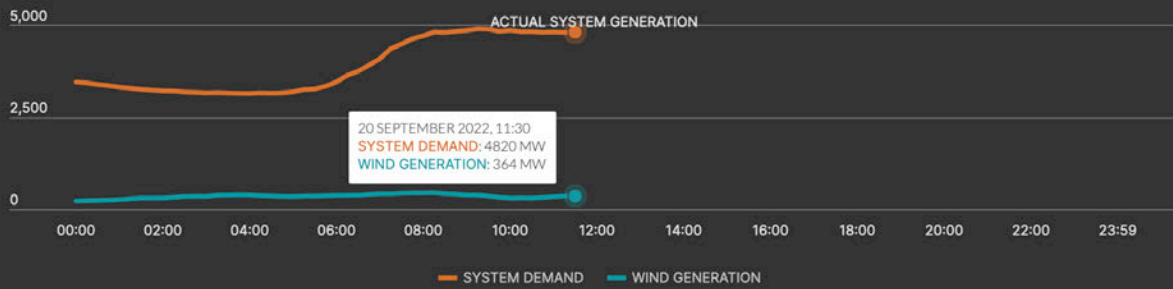
- a. It follows that alternative sources of energy must be constantly available to provide power when wind isn't blowing. This can be referred to as cycling up and cycling down. During periods of static air mass and nil generation of wind energy, power must be generated from other sources.
- b. Currently the main energy source is at the Moneypoint station in County Clare. Is it not the case that this must be kept burning in order to take up the slack when there is no wind energy coming on stream? We understand that it and similar power plants cannot be turned off, as they take too long to power up (48 hours), which for obvious reasons would not be feasible when wind energy falls off. We further understand that this has been very problematic in Scotland where there are a large numbers of wind turbines. '
- c. The Limits of Wind Power [by William Korchinski] states: - '***The analysis reported in this study indicates that 20% would be the extreme upper limit for wind penetration... Very high wind penetrations are not achievable in practice due to the increased need for power storage, the decrease in grid reliability, and the increased operating costs. Given these constraints, this study concludes that a more practical upper limit for wind penetration is 10%. At 10% wind penetration, the CO2 emissions reduction due to wind is approximately 45g CO2 equivalent/kWh, or about 9% of total.***' [Source: The Limits of Wind Power [by William Korchinski]
- d. In 2012, Ireland was already at 15.3% from wind. This figure is almost certainly higher now with the advent of more energy streams (including wind) since then. '*The Department of Energy figures also show that in 2012 19.6 per cent of our gross electricity production was by renewables. 15.3 per cent of this was wind, followed by 2.7 per cent by hydroelectricity.*'

28. **Efficiency of Wind Turbines:**

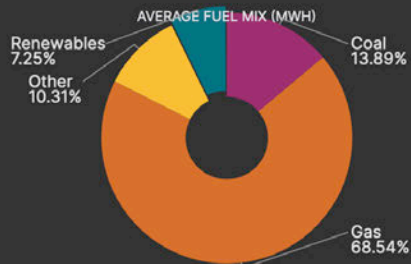
- a. '*Not all the energy of blowing wind can be harvested, since conservation of mass requires that as much mass of air exits the turbine as enters it. Betz's law gives the maximal achievable extraction of wind power by a wind turbine as 59% of the total kinetic energy of the air flowing through the turbine*' [Harvesting the Wind: The Physics of Wind Turbines Kira Grogg – 2005]
- b. '*Further inefficiencies, such as rotor blade friction and drag, gearbox losses, generator and converter losses, reduce the power delivered by a wind turbine. Commercial utility-connected turbines deliver 75% to 80% of the Betz limit of power extractable from the wind, at rated operating speed.*' [Tony Burton et al., (ed), Wind Energy Handbook, John Wiley and Sons 2001], See also [http://en.wikipedia.org/wiki/Wind\\_turbine#Efficiency](http://en.wikipedia.org/wiki/Wind_turbine#Efficiency)

29. It is essential that natural resources be conserved for the generations to come. Otherwise where will they source resources' if our generation keeps on plundering them at the current scale? Real sustainable and non-intermittent sources of energy such as Geothermal should be prioritised over wind and solar.

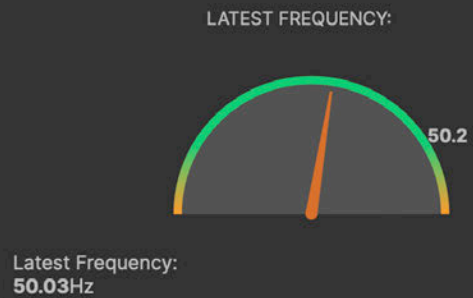
## System Demand & Wind Generation



## Fuel Mix (MWh)



## Frequency



30. Finally, we leave you with one more screenshot of the energy matrix as of 20<sup>th</sup> September 2022, that 68.54% of the energy matrix is supplied by gas because there is little or no wind. Please focus on real sustainability rather than chasing false promises of wind and solar which are quite useless as they cannot be depended upon and further are resource hungry and cause significant angst within communities. This will in turn help to secure security of energy supply.

ENDS