FICHTNER
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Powerfuel Portland
ERF

Climate Change, Air Quality, Health and Permit

Rebuttal Proof of Evidence of Stephen Othen

27 November 2023

ENGINEERING CONSULTING

APPEAL AGAINST THE REFUSAL OF AN APPLICATION FOR CONSTRUCTION OF AN ENERGY RECOVERY FACILITY WITH ANCILLARY BUILDINGS AND WORKS AT PORTLAND PORT, CASTLETOWN, PORTLAND DT5 1PP

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Contents

1 Introduction

1.1.1 In this rebuttal proof of evidence, I have replied to points made by two witnesses for Dorset Council, namely Tony Norton (on Energy) and Alan Potter (on carbon capture), and briefly commented on the evidence from Felicity Hart.

1.1.2 I have also responded to the written submissions on behalf of the Rule 6 Party by Paula Klaentschi (on climate matters) and Debbie Tulett (on Traffic, Amenity and Socio-econonics)

1.1.3 I have not attempted to respond to all points raised by these witnesses or written submissions, as many of the points are already covered in my main proof of evidence. Therefore, a failure to comment on a point should not be taken as signalling that I agree with it.

1.1.4 A further submission has been made by UKWIN on 24 November, which appears to be a rebuttal statement although UKWIN is not a Rule 6 Party. I have not responded to this in writing, but I reserve the right to address this statement when I give evidence, in the same way that I would respond to any rebuttal proof from witnesses for Dorset Council or the Rule 6 Party.

2 Dorset Council

2.1 Tony Norton

Shore Power

2.1.1 In paragraph 3.2, Mr Norton suggests that the uptake of Shore Power can be challenging and references a number of newspaper articles about the situation at Southampton. The articles suggest that the main reason that shore-power enabled ships do not connect to shore power when in port is the high price of electricity, quoting the UK Chamber of Shipping (page 12 in Appendix 3 to Mr Norton's proof) and this is supported by the paper from the British Ports Association (page 14ff in Appendix 3).

2.1.2 Mr Norton may not have appreciated that a key advantage of supplying shore power from the ERF is that this means that the price of power can be decoupled from the wider electricity market. The operator at Southampton Port needs to buy most of its electricity from an electricity provider and then sell this on to the shipping operators, which means that it is exposed to volatility in power prices if gas prices increase or there are any other shocks in the market. It is noticeable that the period reviewed at Southampton (April 2022 to July 2023) is a period when UK power prices were considerably higher than in the previous 10 years and this will have resulted in an increase in the shore power price charged such that it may have been less attractive to shipping operators. In contrast, the operator at Portland Port will be able to buy power directly from the generator, cutting out the various middlemen and avoiding electricity price volatility caused by gas prices such that it will not need to increase the costs if, for example, gas prices increase enormously as they did in 2022.

2.1.3 Mr Norton cites a British Ports Association report and claims that it states that electricity prices are a main barrier to shore power uptake. I agree with this, but note that provision of electricity from the ERF removes this barrier as the price charged will be decoupled from the underlying electricity market price which is driven by gas prices. I note the report references some other barriers. The primary barrier is stated as capital costs, and the report notes that no shore power project anywhere in the world has been undertaken without public support, as the costs for energy network and generation are prohibitive. This is the case at Portland - without the ERF the Port has confirmed it could not afford to deploy shore power and the timing in any case would be delayed until 2037 (See Appendix PPF2-NR2). The ERF provides the opportunity to deliver this infrastructure without the need for any public support.

2.1.4 In paragraphs 3.4 to 3.11 and Appendix 1, Mr Norton estimates the power requirements for cruise ships at Portland Port. He has analysed the 56 cruise ships which called at Portland Port in 2023 and determined that these remained for an average of 10.5 hrs and estimates that they would have consumed 4,688 MWh. His figures imply an average power consumption per ship-hr of 7.97 MW. These figures are close to my assumptions of 11 hrs per ship and 8 MW average demand, so the only difference between us is that I, based on my correspondence with the Port manager, expect cruise ship visits to increase to 65 by 2027.

2.1.5 Mr Norton then assumes that half of the ships would be shore-power enabled. I understand from the port that 60% of the ships which currently visit are shore-power enabled and that this is expected to increase.

2.1.6 In paragraph 3.11, Mr Norton describes the cruise ship power demands as “de minimis”. I am not sure why he wishes to consider the cruise ship demand alone, as he then demonstrates that the RFA ship demand is considerably higher.

2.1.7 Mr Norton then considers the provision of shore power to the RFA ships. He is under the impression that the port has a 5MW grid connection and that this could be used to supply shore power and charge a battery, but he is mistaken; the 5 MW grid connection referred to in the Shore Power Strategy Report (CD2.8) is part of the grid connection for the ERF and is included in the grid connection agreement for Powerfuel Portland Ltd. The proposal in the Shore Power Strategy Report is that, if all of the power generated by the ERF was being exported to ships, such that no power was being exported to the grid, then up to 5 MW could be imported to the ERF and transmitted to ships as well. As Mr Roberts explains, the port applied for a grid connection offer for 20 MVA (attached as Appendix NR3 to Mr Roberts’ proof), but this is dependent on significant upgrade works and so is not available until 2037. It is also very expensive and unaffordable (as stated in Appendix NR2 to Mr Roberts’ proof).

2.1.8 The 5 MW import connection would not be available to the port if the ERF was not built. This is because the grid connection agreement would lapse and the Distribution Network Operator (DNO) would release the capacity to the next applicant in the queue. This is because DNOs are required to manage connections fairly, given the demands on the network. While the holder of a grid connection agreement can novate this agreement to a successor company on the same development site (which is specifically the ERF site, not the wider port), the holder of a grid connection agreement cannot move the offer to a new site or pass the offer to a different company on a different site. As such, Mr Norton’s proposal to use a battery that will charge using this 5MW import is simply not possible as there is no import capacity available to the Port to do so.

2.1.9 In paragraph 3.12, Mr Norton refers to the new CHP plant at the naval base at Portsmouth and implies that the Royal Fleet Auxiliary could implement something similar at Portland. I note that the base at Portsmouth is much larger than the RFA facilities at Portland and includes, as stated in the article at page 15 of Appendix 3, an electrical and steam network. This means that there was an existing heat demand at the naval base which the CHP plant could provide, presumably replacing or supplementing existing gas boilers. This means that this example is not relevant to Portland.

2.1.10 In paragraphs 3.18 to 3.20, Mr Norton demonstrates how a 120 MWh battery storage solution, combined with a 5 MW grid connection, could supply power to cruise ships and the RFA ships in Portland Port. As noted above there is no import available at the port and therefore this approach is simply not possible. However, for completeness I have consulted my colleagues in Fichtner who specialise in battery storage projects to understand whether this would be technically and commercially viable if there were import capacity available. Fichtner has provided services to 20 GWh of large scale battery projects in the UK over the last 3 years, including 20 projects of a similar size to the battery system proposed by Mr Norton. My colleagues do not disagree with Mr Norton’s technical assessment, with one exception. A battery storage system has an auxiliary load, mainly for cooling purposes, and I don’t think that Mr Norton has allowed for this. My colleagues advise me that the auxiliary load on a 120 MWh battery system would be around 10 kW/MWh, or 1.2 MW for a 120 MWh battery storage system. This would vary over the year, with a higher load when the battery is being charged or discharged, but it means that 10-20% of the grid load would be needed to provide auxiliary power.

2.1.11 Despite this point, I accept that a battery storage solution could be technically viable if there were import capacity available. However, it would not be commercially viable. From our database, we estimate that a 120 MWh storage project would have a capital cost of around £40 million (with a

range of £30 million to £50 million), which is a very significant investment and would make it hard for the port to offer shore power at a competitive rate, noting that the port operator would also need to purchase power and so be exposed to the electricity market. To illustrate this simplistically, I note that Mr Norton anticipates a total potential Shore Power Demand of 30,428 MWh per year (Table 4 in his Appendix 1). Over 20 years, therefore, the total demand would be around 600,000 MWh. This means that the capital cost of the battery system would be £65 per MWh supplied over that 20 year period, which would clearly affect the costs of shore power and the likelihood of shipping operators using the service.

2.1.12 As Mr Norton notes, a number of companies are building battery storage systems to support the grid around the country. He refers to a 50 MW/100 MWh system near Salisbury and a 150MW/300 MWh system in Yorkshire. These systems are paid for providing grid support and balancing services. However, to do this, the systems need to be capable of discharging their capacity quickly. Both of Mr Norton's examples are two hour systems, which mean that they can fully discharge over two hours. Due to the weakness of the grid connection, the suggested battery storage system at Portland could only discharge much more slowly; even if it could use all of the 15 MW export capacity of the ERF grid connection, for example, and had no requirement to supply shore power at the time, it would take 6 hours to fully discharge to the grid, and this assumes that this grid connection could be passed to a battery operator, which is unlikely to be the case.

2.1.13 Therefore, while I agree with Mr Norton that a battery storage system would be a technically viable solution to provide shore power, if the port could secure 5 MW of import capacity which it does not currently have, it would not be a commercially viable solution. Therefore, I agree with the statement in the Shore Power Strategy Report, which Mr Norton quotes at paragraph 3.20, that "there are currently no commercially viable alternative options to provide grid connected Shore Power for Portland Port other than the proposed ERF."

2.1.14 Given that the port does not have access to any import capacity and in any case I do not consider that the battery storage system is a commercially viable alternative, I have not commented on Mr Norton's comments on its climate change advantages. However, I do want to comment on Mr Norton's statement in paragraph 3.24 that *"Local GHG emissions from the proposed ERF are therefore 4.7 times those abated by the supply of electricity to berthed vessels"* and so *"The provision of shore power from the proposed ERF should not therefore be seen overall as a local GHG emission reduction measure."* Firstly, GHG emissions are not a local issue. Secondly, these statements treat the ERF as merely a power station to provide power to ships, which is not correct; the ERF will divert waste from landfill and displace power generated by other power stations. Therefore, Mr Norton's statements are misleading.

2.1.15 In summary, I do not accept Mr Norton's suggestion that shore power would not come forward and I consider that the battery storage system proposed by Mr Norton is not practically available, due to the lack of import capacity, and would not be commercially viable even if the port had access to 5 MW of import capacity.

District Heating

2.1.16 In section 4 of his proof, Mr Norton comments on the prospects for district heating. In paragraphs 4.4 to 4.7, he reports that the Osprey Leisure Centre has an air source heat pump to provide much of its heat demand. As a result, he reduces the heat demand for the Leisure Centre to 77 MWth. I have consulted Arup, who prepared the original heat plan (CD 1.27). Arup has confirmed that the heat demand for the leisure centre was an estimate for a typical leisure centre. I accept that the

leisure centre would be more likely to continue to use its heat pump at present, although the relative economics might change in the future.

2.1.17 In paragraphs 4.8 to 4.9, Mr Norton suggests that Comer Homes is not a suitable heat user. He asserts that the apartments have individual gas boilers and so it would not be practical to retrofit a district heating scheme. This may be true for the 208 existing flats. However, the Ocean Views development, when completed, will include 554 flats, with 155 in the remaining existing building and 191 new build apartments. There is no reason why the remaining 364 flats should not be set up with a centralised heating system, particularly if there is a heat source readily available.

2.1.18 In paragraph 4.11, Mr Norton notes that the hospital demand is low. I agree, and I can confirm that I did not include this heat demand in the carbon assessment. (See section 3.1.3.4 of the revised carbon assessment (PFF11-SO3) where I list the heat users.) Nevertheless, Mr Norton adds the hospital demand to his reduced demand from the Leisure Centre to give a total heat demand of 331 MWth, and then calculates a linear heat demand of 0.3 MWth/m for the northern leg (assuming that 1,000m of pipe is needed). He says, and I agree, that this would not be economically viable, although this has not been proposed.

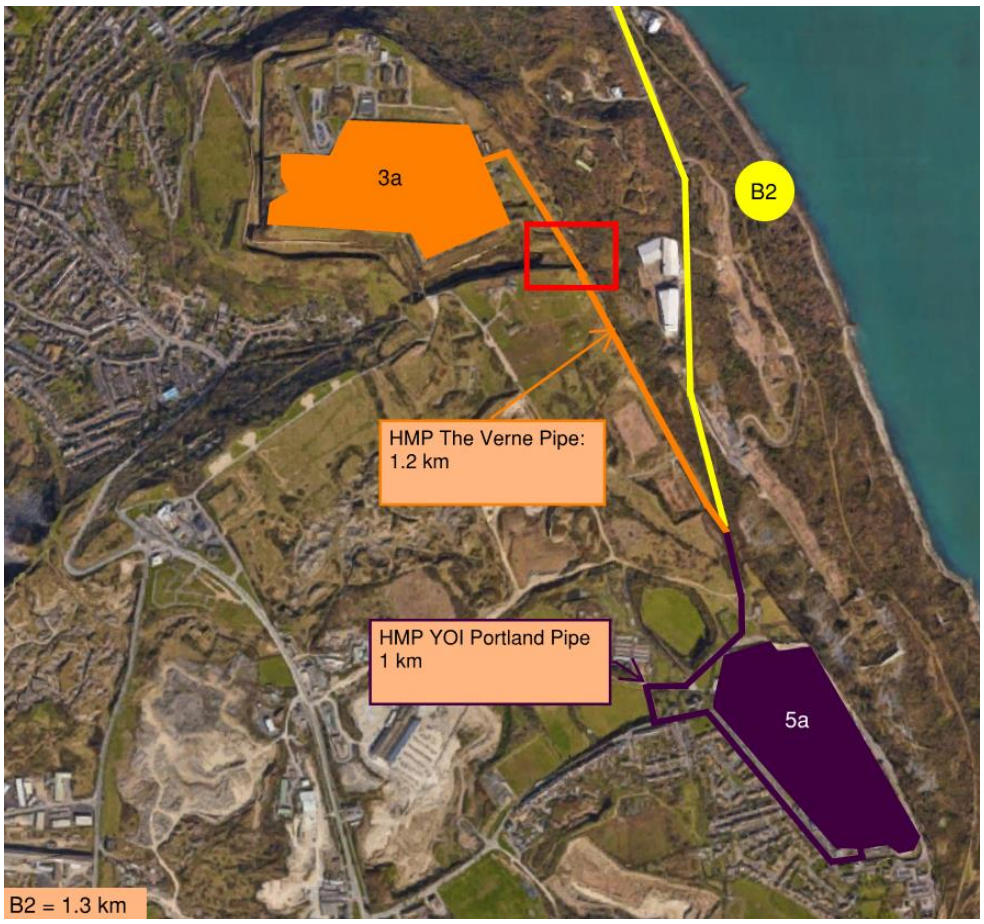
2.1.19 I note that Mr Norton does not calculate the linear heat demand for the northern leg which was actually proposed. Arup, the authors of the district heating study, estimated that 1,400 m of pipework would be needed to connect the leisure centre and Comer Homes, with a total heat demand of 5,931 MWh. This gives a linear heat demand of 4.2 MWh/m, which exceeds Mr Norton's claimed industry thresholds and implies that the scheme as proposed would be economically viable.

2.1.20 Moving to the southern leg, Mr Norton estimates (paragraph 4.13) that 5,000 m of pipework would be needed. I have again consulted Arup, who have informed me that 3,500 m would be needed, as shown in the maps below. This gives a linear heat demand of 4 MWh/m, again exceeding his threshold.

Figure 1: Northern leg – heating route

Source: Arup

Figure 2: Southern Leg – heating route



Source: Arup

2.1.21 In paragraph 4.21, Mr Norton notes that the prisons are elevated above the harbour and that this would lead to increased pumping costs. He estimates that the electricity costs would be around £157k per year, based on an electricity price of £208.6/MWh, being the average price paid by a medium-sized enterprise in 2022. I agree that there will be a higher pumping requirement than for a conventional district heating network, and I consider that his estimate of instantaneous power demand is reasonable. However, the power price is excessive. As Mr Norton will be aware, power prices in 2022 were unusually high due to the effects of the Russia-Ukraine war, which is hoped to be a temporary effect. Also, the power for the pumping station would be supplied from the ERF and so the cost to the ERF operator would be the lost income, not the cost of purchasing power from the grid. Hence, I would expect the actual cost for power usage to be no more than £80k per year.

2.1.22 More importantly, Mr Norton asks in paragraph 4.21 whether pumping costs were included in the economic assessment. I can confirm that they were, along with other operational costs, to a total of £208k per year. I can also confirm that the IRR calculation is relatively insensitive to operational costs, with capital costs and heat income being more important.

2.1.23 Mr Norton has then assessed the capital cost of the southern leg, with his primary reference source being a report by Parsons Brinckerhoff on the South West Exeter DH network, which was proposed to use heat from the Exeter ERF (CD12.51). There are some significant differences between the district heating network considered in CD12.51 and the southern leg of the Portland network.

- The SW Exeter network would primarily serve a new residential development of 2,446 individual houses, requiring an extensive distribution network of many small pipes, as well as some non-domestic users. The southern leg of the Portland network would serve two customers, connecting to existing centralised heating systems.

- The SW Exeter network included a District Heating Energy Centre (DHEC), located 1.3 km from the ERF. The intention was that there would be a high temperature hot water circuit from the ERF to the DHEC. This would transfer heat to a lower temperature heating circuit from the DHEC, supported by back-up boilers, and heat would be distributed to the users from the DHEC. The southern leg of the Portland network does not need a DHEC or back-up boilers, as the prisons would retain their existing boilers to act as back-up. In effect, the current boilerhouses in the prisons take the place of the DHEC in the SW Exeter scheme.

- Given the complexity of the SW Exeter district heating network, with over 2000 customers, it was proposed that the network, and the DHEC, would be operated by a separate Energy Service Company (ESCo). I agree that this would be likely. However, the southern leg of the Portland scheme would only supply two customers, so adding an ESCo would be unnecessary.

2.1.24 In paragraph 4.22 and Table 2, Mr Norton has estimated the capital costs of the southern leg of the Portland scheme. These are based on the SW Exeter scheme. Mr Norton's estimate of £18.868m is considerably higher than the cost in the District Heating Paper (CD2.7) of £9.42m, which was calculated by Fichtner for the CHP-ready assessment (CD12.68) submitted as part of the Environmental Permit application. I have compared the two estimates in the table below and then commented.

- Column 2 is Mr Norton's breakdown from Table 2 of his proof.

- Column 3 is Fichtner's breakdown, from the CHP- ready assessment (CD12.68) and adding up to £9.42m stated in CD2.7.

- Mr Norton has included £4.787m for fees and contingency. This is 34% of the other itemised costs. My costs include fees and contingency, albeit at a lower level of 15-20%. Therefore, to make the comparison easier, I have distributed Mr Norton's contingency and fees to each of the other items by increasing them all by around 34%, giving the adjusted costs in column 4.

- Fichtner's costs were for the northern and southern legs, whereas Mr Norton's are only for the southern leg. I have adjusted the cost for the main pipe to only include the southern leg, and presented the revised figures in column 5.

Table 1: Costs of district heating scheme

Item	Costs (£m 2021)			
	Norton	Fichtner	Norton (adj)	Fichtner (adj)
ERF heat interface	0.849	1.2	1.138	1.2
DHEC/Back up boiler	4.235	1.67	5.674	1.67
Main pipe	5.642	6.55	7.560	5.011
On plot costs	3.356		4.497	
Fees and contingency	4.787	Incl		
Total	**18.868**	**9.42**	**18.868**	**7.881**

Source: Norton Proof, CD12.68.

2.1.25 I have considered the differences between columns 4 and 5, which are the restated and adjusted cost estimates for the southern leg.

1. My cost and Mr Norton's cost for the ERF heat interface are very close.

2. Mr Norton has allowed far more cost for the DHEC than I have allowed for the back-up boiler. This is because he has assumed that an entirely new energy centre would need to be built, as was proposed for SW Exeter, and that this would be operated by a separate ESCo. I have assumed that the single back-up boiler would be included in the footprint of the ERF as it would be operated by the ERF plant operator. However, as we are only considering the southern leg, I now consider that this is overly conservative as, in reality, the back-up system would be the prisons' existing boiler plant.

3. The difference in pipe cost is due to the difference in pipe length. Mr Norton's cost (including fees and contingency) is £7.5 million for 5,000m, or £1,500 per m; my cost is £5 million for 3,500m, or £1,430 per m.

4. Mr Norton has included £4.5 million (including fees and contingency) for on-plot costs. I am not sure what these include but, if they are based on the SW Exeter scheme, then they would allow for a large amount of small pipework and heat exchange units for multiple small users. This is not appropriate for the prisons, where the heat network would connect into the existing heat systems. However, I accept that there would be some on-site costs which could be borne by the heat network supplier rather than the prisons.

2.1.26 Overall, I consider that Mr Norton has significantly over estimated the costs for the southern leg. I accept that my costs may be slightly too low for the on-site costs but also note that I have allowed for a back-up boiler which would not be needed if only the southern leg were built.

2.1.27 In paragraphs 4.25 to 4.31, Mr Norton says that the district heating demand is de minimus as it only reduces the ERF power export by 1.5% at most. This is an unusual view. As I set out in tables 7 and 8 of the carbon assessment, the ERF is expected to export 136,800 MWh in power-only mode, or 18,307 MWh of heat and 134,026 MWh of power when supplying the projected heat demand. Hence, the heat export is about 13.6% of the power export I note that MVV, in its planning application for Canford, is projecting 39,130 MWh of heat and 222,998 MWh of power (from a larger plant), so that the heat export is about 17.5% of the power export. (MVV offers very little evidence that this amount of heat can be exported.) I presume, therefore, that Mr Norton would consider that the Canford plant's heat export opportunities, if delivered, are also de minimus.

2.1.28 In summary, I accept (to some extent) that the specific heat loads proposed for the northern leg of the district heating scheme may not be available at present. However, I do not agree that the southern leg is unlikely to be delivered. I consider that Mr Norton has overstated the capital costs for this leg and has not appreciated the advantages of a public sector heat user for anchoring a district heating scheme.

Other points

2.1.29 In paragraph 5.2, Mr Norton states that the ERF would not export baseload power to the grid because it would, on occasion, be exporting power to cruise ships instead, and suggests that this would affect the value of the power. (In paragraph 3.11, Mr Norton described this as "de minimus", which appears to be an inconsistent position.) I do not agree, however, with Mr Norton's expectations of the power market.

1. In my experience, small ERFs such as the Portland ERF tend to export power under the terms of a fixed price Power Purchase Agreement which doesn't require constant power, although does generally require a minimum annual quantity. This gives the ERF certainty over the power price. The energy supplier will then combine this power with power from a number of other smaller power stations to sell on.

2. Cruise ships arrive on a schedule. Therefore, if the ERF plant operator did need to commit to power export, this could be done on a day ahead basis with reasonable certainty.

2.1.30 In paragraph 5.4, Mr Norton notes that ERFs close down for 760 hours, although it is not correct to say that this happens in one major shutdown. There is an annual shutdown, but this tends to be 2 weeks in most years. The timing of the shutdown, however, is not consistent across the industry and it can be varied. I would expect the Portland ERF to avoid the cruise ship season for its annual shutdown, as well as the peak district heating season. The prisons would be supplied with heat by their existing boilers during this time, as mentioned earlier.

2.2 Alan Potter

2.2.1 In paragraph 3.29, Mr Potter says *"Finally while the Appellant claims that the Appeal site offers the advantage of the ability to provide carbon capture, that is not available on the allocated sites, I note no space is actually identified to accommodate the necessary infrastructure as part of the application, and a number of the allocated sites have sufficient space to accommodate such infrastructure. In that regard the current application for a similar sized EfW plant at Canford Magna does include such land."*

2.2.2 As I explained in section 2.5 of my main proof, carbon capture was not included in the application because in September 2020, when the application was submitted, there was no policy in place to support carbon capture. This is now changed, which is why the very recent application for the plant at Canford Magna does purport to include land for carbon capture. However, the space allowed is entirely inadequate, as Mr Roberts notes in paragraph 4.2.21 xiii of his proof. As I note in paragraph 2.5.9 of my proof, Fichtner estimated in August 2021 that a land area of 4,000 m^2 would be needed for a carbon capture plant at Portland. MVV has allocated a land area of 900 m^2 at Canford Magna which I consider is insufficient.

2.2.3 As I note in paragraph 2.5.9, the Appellant has been in discussions with the port over potential land for a carbon capture plant. In Appendix SO10, attached, I have included a drawing showing one area which could be used. The area shown in red is over 11,000 m^2, which is far more space than would

actually be needed, so it is clear that a carbon capture plant could easily be accommodated in the port. In fact, I note that Felicity Hart accepts this in paragraph 8.143 when she says that "A Post Combustion Carbon Capture (PCCC) plant could be technically feasible to be developed at Portland Port."

2.3 Felicity Hart

2.3.1 In paragraphs 8.56ff, Ms Hart summarises the conclusions of Mr Norton. She does not add any new information in these paragraphs and so I have no specific points to raise. I have responded to Mr Norton above.

3 SPWI/TPA

3.1 Paula Klaentschi

3.1.1 In paragraph 2.2, Ms Klaentschi implies that an ERF can be co-located to a cement factory. I am not aware of any cases where this is done, as cement factories require a high temperature heat which cannot be provided by an ERF. She may be referring to the use of a high grade SRF in some cement kilns as a substitute fuel.

3.1.2 In paragraph 2.2, it is clear that Ms Klaentschi considers that district heating for residential users should be avoided. This conflicts with government policy, expressed in the Heat and Buildings Strategy which includes a number of policies to support and develop heat networks, and with the Committee on Climate Change, which supports the use of heat networks to deliver emissions savings (see page 154 of the 2023 Progress Report, CD9.23).

3.1.3 Also in paragraph 2.2, Ms Klaentschi implies that an ERF needs a 4 week shutdown and suggests that this is inconsistent with providing shore power. As I explained in response to Mr Norton, the ERF will not be closed down for a continuous 4 week block and the annual shutdown can be arranged to take place outside of the cruise season.

3.1.4 In paragraph 2.3, Ms Klaentschi quotes from paragraph 5.30 of the Supplementary Planning Statement (CD2.3). She has accidentally extended the quote to include her own view. For the avoidance of doubt, I have shown the correct quote below.

> *""5.30 It is recognised by both government and the waste industry that CCS is not currently commercially viable, without some form of financial support. The Department for Business, Energy, and Industrial Strategy (BEIS) is giving consideration to potential mechanisms for supporting the application of CCS in the waste sector in respect to new and existing ERF."*

Ms Klaentschi then says *"These uncertainties reduce the weight that should be given to these claimed benefits."* As I explain in section 2.5 of my proof, government policy has moved on and it is now the intention that energy-from-waste plants will be included in the UK emissions trading scheme, providing a financial mechanism to support the application of CCS.

3.1.5 Also in paragraph 2.3, Ms Klaentschi notes that "Carbon capture requires significant additional parasitic load." (Debbie Tulett makes a similar point in paragraph 2.29 of her planning proof.) This is correct; adding a carbon capture plant to an ERF would reduce the exported power by 15-30%, but would also capture 90-95% of the carbon dioxide in the flue gases. This would mean that the power generated by the ERF would effectively be carbon negative as some of the captured carbon dioxide would be biogenic carbon.

3.1.6 The concern from the Rule 6 Party appears to be that the ERF would not be able to supply shore power as well as operating a carbon capture plant, and so the benefits of one or the other should be discounted. This is not correct, or reasonable. It is not correct because the ERF would still export enough power for an RFA ship and a cruise ship, which could be topped up using imported power, and the efficiency of the ERF could be improved further, as I mentioned in paragraph 2.2.4 of my main proof. It is not reasonable because the long-term UK future energy mix will, both on the run up to and during a net zero situation, always include combustion-based power stations in order to support baseload and peak load energy demand alongside nuclear and intermittent renewables technologies. An inescapable reality of this situation is that these combustion plants, whether fossil

fuel gas fired, or partially renewable (like the Appeal Proposal), will generate CO_2 and future policy will increasingly support or require that this is captured and then subsequently utilised or stored. Carbon capture will have a universal impact on the efficiency of these plants by virtue of increasing their parasitic load. The extent of the effect is likely to reduce over time as carbon capture technologies are developed and improved, but there will be an effect across the board. This is a fundamental consequence of delivering net zero. It is not limited to certain combustion plants; it will affect **all** such plants in the UK. It is both inappropriate and unfair to level criticism at the Appeal Proposal that carbon capture will reduce its efficiency / power output. It will do the same to every ERF and gas-fired power station in the UK.

3.1.7 In paragraph 5.7, Ms Klaentschi states

> *"Natural England (CD4.95) has identified risks associated with ship to shore transfers in this highly exposed location. I question knowing commercial pressures, operative doing a job of work and in our local winds, how these transfers can be achieved without inevitable operational spillages and consequential pollution to our sea, our international sailing arena, and our beaches. It should also be remembered that from each tonne of waste burnt there are also emissions and also roughly 20-25% becomes a new byproduct for Dorset of ash which requires disposal or treatment to render safe to use and only in controlled restricted circumstances. Natural England within the same document are also raising concerns over the IBA transfer spillage issue."*

3.1.8 If RDF is delivered by ship, it will be transported baled and wrapped to prevent the escape of fuel. Natural England did not object to the application on these grounds, but suggested that a planning condition should be in place to require any material to be removed from the harbour and foreshore on a bi-monthly basis. For IBA, Natural England's concern related to the general handling of bottom ash. I can confirm that bottom ash would be transferred from site in sealed containers or sealed tankers and would not be handled outside.

3.1.9 In section 6, Ms Klaentschi carries out a simple carbon intensity calculation, in which she treats the ERF as a power station only. As I explain in my proof, firstly in paragraphs 3.2.1-3.2.3 and secondly in response to UKWIN in paragraph 3.5.18, this is incorrect as an ERF serves two purposes; it provides a treatment solution for residual waste and it generates electricity. Other forms of power generation do not provide a treatment solution for residual waste and so, when considering the carbon intensity of the power generated, it is necessary to take account of how the residual waste would otherwise be treated. As explained in paragraph 3.5.18, I have calculated the effective carbon intensity of the additional power generated by processing waste in the ERF, rather than landfill, as virtually zero.

3.1.10 In paragraph 7.4, Ms Klaentschi suggests that it could take until 2035 before the Portland ERF is commissioned. This seems to me to be unduly pessimistic. She refers to the Bridgwater ERF, which secured planning consent in 2015 and is now nearing final commissioning. I do not know what has delayed this plant, but I do know that it started construction in 2019. In paragraph 7.5, she sets out the necessary stages to construct an ERF. I agree that these are the stages, but do not agree that they should take as long as she implies. I make this statement on the basis that Fichtner has been involved in the development of over 40 ERF projects in the UK over the past 20 years and are recognised as the UK's leading engineering firm in the ERF sector.

3.1.11 In paragraph 7.5 e, Ms Klaentschi includes a quote from SSE. The full email from which this quote comes is included on page 203 of her evidence in pdf format, but the email which the SSE representative is replying to is not included. The quote is:

"With regards to the constraints, the screenshots below show the upstream constraint is likely to be the National Grid constraints detailed under "Transmission Works" within the GSP information. These are ongoing works that more often than not require certain curtailments for a project until the Transmission works are complete, rather than delaying the connection itself."

3.1.12 This is a general statement about the Chickerill GSP BSP, which would apply to new grid connection applications. I can confirm that the Portland ERF already has a grid connection agreement and it would not be affected by these constraints.

3.2 Debbie Tulett

3.2.1 In paragraph 2.16, Ms Tulett says *"As explained above, the Appellant has not taken the impact of Bibby Stockholm into consideration. There is no consideration of the amenity and quality of life of the occupants of the barge, and how this will be affected by the ERF."*

3.2.2 This is no longer correct. The potential impacts from odour and noise have been evaluated and information has been submitted to the Environment Agency, as I outline in paragraph 2.6.7 of my proof.

3.2.3 In paragraph 2.19, Ms Tulett says *"The Appellant has not adequately assessed the visibility of the plume during nighttime in particular. But this is important because Portland is a tourist area and leisure pursuits go well into the night. Therefore, the stack could be perceived negative by night time visitors and residents who enjoy the tranquil, dark night time skies."*

3.2.4 I agree that the visibility of the plume at night was not quantified. This is because the concerns around the plume related to how it was viewed within the wider landscape and its effect on the views from the mainland, which are not relevant at night. Nevertheless, I have checked the results of the dispersion modelling. During night time hours, 29 hours of visible plumes were predicted over five years. However, 26 of these occurred during the severe weather in 2018, so there were only three night time hours with visible plumes over five years outside those unusually cold periods. The reason that there are so few visible plumes is that the site is next to the sea, which keeps the air warmer at night, compared to sites over land. Therefore, I do not consider that the issue raised by Ms Tulett is a concern.

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Powerfuel Portland ERF

Climate Change, Air Quality, Health and Permit

Appendix SO10 to Rebuttal Proof of Evidence of Stephen Othen
Land Area for Carbon Capture Plant

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Drawing not to scale.
For information purposes only.
Not for construction.
All drawings are for indicative purposes only and may be subject to variations.

Notes:

Postcode: DT5 1EH W3W: nails.overpower.happy

Key:

Powerfuel Portland (5.33 Acres)

Proposed CCSU Area (2.92 Acres)

Project Name:
Powerfuel Portland

Document Name:
Proposed CCSU Site

Document Reference #:
1081-01-70

Scale: 1:2500@A3

Produced:	Checked:	Date:
RC	GF	27/11/2023