

Kiran Turner
Network Price Controls - Transmission
Ofgem
10 South Colonnade
Canary Wharf
London
E14 4PU

Tony Nixon
Head of Gas Transmission,
Regulation
Tony.Nixon@nationalgrid.com
Direct tel +44 (0)1926 656345

24th September 2019

Re: St Fergus and Hatton IED Needs Case Consultation

Dear Kiran,

This response is submitted by National Grid Gas Transmission (NGGT). We operate and own the gas transmission assets in Great Britain.

We do not support Ofgem's minded to position for St Fergus, our analysis supports as a minimum the installation of one new unit before 2024 under all scenarios assessed. At Hatton we believe the information we have provided in our submission and within this consultation response should enable Ofgem to determine that the Epsilon Option is the most appropriate solution at the site. Below we set out the salient facts in relation to both sites. Within the appendix to this response we provide the answers to the specific question posed by Ofgem.

St Fergus

At St Fergus there are two environmental legislative drivers contained within the IED, IPPC and LCP, that could lead to investment at the site. Our counterfactual option was based on the IPPC driver, which according to our assessment required us to reduce the emissions from one unit.

In the May 2018 Ofgem reopener decision letter, Ofgem supported the decision for National Grid to invest in two units at both Peterborough and Huntingdon for IPPC compliance. In terms of the St Fergus needs case no issue was raised with regard to the driver for part of the works being IPPC compliance or defining the counterfactual as reducing the emissions from one Avon unit.

In preparing our recent needs case submission to Ofgem, we discussed our proposed solution with the Scottish Environmental Protection Agency (SEPA), who in principle supported our proposals.

From National Grid's perspective, since submission there has been a change in regulatory policy with regard to IPPC compliance. Our understanding, which we would request Ofgem to clarify within its decision letter, is that compliance with the LCP element of IED and the Medium Combustion Directive satisfies the requirements of the IPPC element of IED.

Based on the above, it is no longer appropriate for the counterfactual at St Fergus to be defined as IPPC compliance with emission reduction from one unit. Below we therefore consider the LCP implications against a Do Nothing Counterfactual.

In Table 1 we summarise the cost benefit analysis of the following scenarios:

- 78% Variable Speed Drive (VSD) availability – Steady progression FES 2018
- 90% VSD availability – Steady Progression FES 2018
- 78% VSD availability – Two Degrees FES 2018
- 90% VSD availability – Two Degrees FES 2018

We have shown the results of these scenarios for three options; no investment (counterfactual), one Avon sized unit installed by 2024 and one Avon unit installed by 2030. The cost benefit analysis is conducted over a 25 year period, with the investment costs reflected over the 45 year regulatory depreciation period. Under all of the above scenarios the most economic solution is to install one new Avon sized unit by 2024.

The Net Present Values (NPVs) converge with higher VSD availability. Our core assumption is to model VSD availability at 78% which is consistent with historic experience. Ofgem state that 90% should be achievable for the type and age of equipment. No evidence is provided to support this assumption or consideration given to the type of duty required of our machines. However, as can be seen, even with higher VSD availability the installation of one new unit by 2024 is still preferred.

Ofgem also question the apparent high asset health costs and need to fully refurbish one or two Avon units. The consequences of not investing in full refurbishment of one or two Avon units is lower unit availability and disruption to the operation of the North Sea Mid Stream Partners (NSMP) sub-terminal, which provides up to 20% of UK supplies on a winter day. The financial impact of which would be potential payment of Section I liabilities and higher gas prices for UK consumers.

Considering recent RB211 operation, over the last 3 years (since commissioning the VSDs), average usage has been 2500 hours per annum. This duty would need to be taken up by two small gas units (either existing or new), in addition to the existing hours of operation, which across the 5 Avon units is ca. 750 hours per annum.

The Avon unit berths were built in 1978 and will be 45 years old in 2024, with a nominal design life of 25 years. The condition of the units is generally poor with average availability over the last three years of 75%. To provide a reliable and safe compression service to the NSMP sub terminal, we need to improve the availability of at least two small units to ensure they can be operated reliably for over 3000 hours per annum (a 300% increase in operating hours). After 45 years of extensive usage a full refurbishment is required to provide this service. The costs of this type intervention are inherently difficult to estimate, without specific detailed studies, we therefore provided a cost uncertainty range of +/- 30%, with a central cost of £34m per unit, which is ca. 70% of the cost of a new installed unit.

In terms of the NPV impact, reducing the refurbishment costs to the lower level of our uncertainty range i.e. £24m would not change the outcome. Considering the scenario with 90% VSD availability under steady progression, the full asset health refurbishment cost would need to reduce to ca. £4.6m before the no investment option is preferred. We do not believe such costs are credible on 45 year old assets that are in poor condition.

Cost category		78% VSD Steady Progression			90% VSD Steady Progression			78% VSD Two Degrees			90% VSD Two Degrees		
		No investment	One unit 2024	One unit 2030	No investment	One unit 2024	One unit 2030	No investment	One unit 2024	One unit 2030	No investment	One unit 2024	One unit 2030
Investments	IED capital costs	0	-47	-47	0	-47	-47	0	-47	-47	0	-47	-47
	Asset Health	-95	-64	-95	-95	-64	-95	-95	-64	-95	-95	-59	-95
	IED decommissioning costs	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
	Total Investment Costs	-100	-116	-152	-100	-116	-152	-100	-116	-152	-100	-116	-152
NG Operating Costs	Total NG RAV	-146	-168	-220	-146	-168	-220	-146	-168	-220	-146	-168	-220
	Compressor fuel usage - gas	-125	-104	-109	-85	-71	-74	-137	-114	-119	-97	-80	-84
	Compressor fuel usage - Elec	-190	-190	-190	-203	-203	-203	-174	-174	-174	-184	-184	-184
	CO2 - ETS+CPS	-38	-34	-35	-26	-23	-24	-42	-37	-38	-30	-27	-27
	Section I	-600	-8	-15	-70	-2	-4	-521	-5	-13	-52	-1	-3
	Total NG Costs	-1,055	-452	-569	-530	-467	-526	-1,020	-498	-564	-509	-460	-519
Societal Costs	Emissions - NOx	-11	-4	-6	-8	-3	-4	-12	-5	-7	-9	-3	-5
Totals	Total Undiscounted Costs	-1,110	-508	-575	-538	-470	-530	-1,032	-502	-571	-517	-463	-524
	Total discounted Costs	-618	-306	-343	-319	-283	-314	-579	-304	-342	-309	-280	-311
Societal Damage	Emissions - Nox (tonnes)	1,809	724	1,011	1,221	482	676	1,970	764	1,078	1,380	525	735
	Emissions - CO2 (tonnes)	1,109,921	997,677	1,027,411	755,085	678,676	698,771	1,212,402	1,087,698	1,120,127	856,074	767,596	789,290

Table 1: St Fergus CBA scenarios

In summary, our analysis shows that the best solution for consumers and customers is the installation of an Avon sized unit before 2024. Based on our core assumptions (78% VSD availability, steady progression) the advantages of this option over a no investment counterfactual are:

- 25 year NPV relative benefit of over £500m
- A 98% reduction in constraints costs
- A fuel use saving of over £20m
- A saving of over 1000 tonnes of NOx (60% reduction against counterfactual)

In all scenarios tested this option is preferred and represents a 'No Regrets' investment. Flows through the St Fergus NSMP sub-terminal are forecast for the next 25 years and this investment will deliver a significant emission reduction and fuel saving.

Hatton

We agree with Ofgem's view that investment is required at Hatton. In terms of the appropriate solution, we have engaged with relevant OEMs to address specific points raised by Ofgem. It has been confirmed that it is possible to modify the compressor envelope(s) of certain units so that they will effectively operate with the existing VSD. This would then negate the need for commercial turn-up contracts and also reduce asset health spend. Applying this new information to our CBA analysis results in the Epsilon Option being the new preferred option, with an NPV benefit against the next nearest option of £9m and an upfront capital cost benefit of £16m.

We have also considered adjusting duty points to enable an RB211 sized unit and a retrofit solution to be considered viable options. To enable a like for like comparison, we have undertaken a desk top exercise to estimate the costs of installing the Epsilon Option, an RB211 sized unit and a retrofit solution on a single existing RB211 berth i.e. brownfield. At this stage there is significant uncertainty of costs, however we believe the results provide a fair basis for comparison. The costs are as follows:

Epsilon (new unit(s)) Option - £61m

RB211 sized new unit - £60m

RB211 retrofit solution - £46m (plus potentially £10m for SCR & Oxidation Catalyst)

There is only a marginal upfront capital cost benefit of a new RB211 sized unit compared to the Epsilon Option, as the Original Equipment Manufacturer (OEM) costs are not significantly different and the works required are largely identical. The main disadvantage of an RB211 sized unit is that it would not provide resilience across the full operating range at Hatton. We would therefore be required to operate more units at other compressor stations to cover the shortfall, resulting in higher fuel costs and emissions. We therefore do not consider the option preferable to the Epsilon Option.

A retrofit solution has a potential £15m upfront cost advantage against the Epsilon Option. However, the retrofit technology is relatively old, first introduced in 1994. Before progressing with such a solution we would need to ensure that the OEM would continue to support the machine for the next 25 years. The unit has a limited operating window where its emissions are able to meet the IED requirements. If required, to widen the operating envelope we would need to install

a selective catalytic convertor (SCR) and an oxidation catalyst to address both NOx and CO emissions. The site has significant space constraints therefore more work would also need to be undertaken to assess the viability of fitting an SCR system and storing the associated ammonia. From a cost perspective we would anticipate an SCR and oxidation catalyst would cost ca. £10m. Even with an SCR system, the retrofit solution would not provide resilience across the full operating range at Hatton. We would therefore be required to operate more units at other compressor stations to cover the shortfall, resulting in higher fuel costs and emissions.

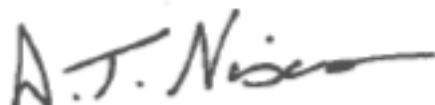
With regard to procurement of a retrofit solution or a RB211 sized unit, we would need to go back to market, undertake a further BAT assessment and obtain approval from Ofgem on solution and cost. We anticipate this process would take approximately 12 months, which would put at risk the ability to deliver new capability at the site before both RB211s are decommissioned. To ensure 1-in-20 compliance this would then potentially require commercial contracts which have been estimated at £8m per annum.

Based on our updated evaluation, we believe that the Epsilon Option represents best value to consumers. It has a positive cost benefit compared to other options previously assessed and offers significant advantages over an RB211 sized unit or a retrofit solution. The retrofit solution is attractive from an upfront capital cost perspective, but has a number of limitations in terms of operating envelope and future proofing. To partly overcome these challenges it is likely that an SCR /oxidation catalyst system would be required, at which point the upfront capital cost benefit would be limited and outweighed by higher operational costs.

Ofgem have also raised the question of whether it is possible to build on brownfield land instead of the greenfield solution currently proposed. As identified above there is a potential £15m cost advantage of a brownfield solution. As we progress the works further and submit our cost assessment to Ofgem, we will undertake a full assessment of the advantage and disadvantages of both approaches and update our costs accordingly.

We hope you find this response helpful. If you would like to discuss any of the above please do not hesitate to contact me.

Yours Sincerely



Tony Nixon
Head of Gas Transmission, Regulation

Appendix - Consultation Question Responses

Q1. In your view has NGGT clearly set out the need for the proposed investment to comply with emissions legislation, including the impact on network capability and resilience at St Fergus and Hatton?

In our submission, we have clearly set out the need for the proposed investment to comply with emissions legislation. However, we understand that Ofgem and the Environmental Agencies have since our submission reached an alternative position on IPPC compliance at St Fergus. At both sites, we have clearly set out the impacts and benefits of the various compliance options, which have been quantified through a cost benefit assessment.

Q2. Do you agree with our initial view that new investment at St Fergus is not required at this time as there is sufficient capability from existing compressors at the site?

No, we do not agree with Ofgem's initial view. In the main body of our response we have set out the cost benefit of installing one new small unit. If no investment is undertaken, we would anticipate disruption to supplies at St Fergus, which we do not believe would be in the interest of consumers or customers. For further detail please refer to the main body of our response.

Q3. Do you agree with our initial view that new investment at Hatton is needed at this time to maintain the existing capability and resilience at the site?

Yes, we do agree with the need to undertake investment at Hatton to ensure 1-in-20 compliance and for efficient system operation.

Q4. Do you agree with our initial view that NGGT has not sufficiently demonstrated that the current proposed solution at Hatton is the most economic option?

In the main body of our response we have addressed Ofgem's challenges, which has led to a change in the most economic solution. For further detail please refer to the main body of our response.

Q5 Do you agree that our approach to assessing the technical aspect of the options proposed by NGGT is appropriate?

In our opinion the assessment that Ofgem has undertaken could have been performed as part of the May 2018 reopener. Nearly all of Ofgem's assessment relates to the earlier phases of the investments' development e.g. IPPC compliance and retrofit options.

We also consider that Ofgem should be more transparent on the basis for its minded to position, examples include:

- it is unclear on the agreement Ofgem have reached with the Environmental Agencies for IPPC compliance
- there is no evidence to support Ofgem's assertion that 90% availability is a robust long term planning assumption, for the type of duty the VSDs are required to undertake at St Fergus
- Ofgem do not clearly set out the consequences of not investing at St Fergus

All three of the points raised above could have an impact on Ofgem's minded to decision and help stakeholders to understand the potential trade-offs being made in coming to a decision.