

## Orkney Transmission Project Consultation on Final Needs Case and Delivery Model

### SCHEDULE 1 SHE-T response to Final Needs Case assessment

#### Key Messages

Scottish Hydro Electric Transmission (SHE-Transmission) welcomes the opportunity to respond to Ofgem's consultation on the Orkney transmission project: Consultation on Final Needs Case and Delivery Model.

Ofgem has correctly **recognised the need** for a 220 kV (220MW) transmission reinforcement for Orkney. Evidence of the renewable generation potential on and around Orkney clearly shows why any investment in new network infrastructure will be fully utilised and the benefits that this can bring to the local economy and GB consumers.

➤ **We welcome this significant milestone.**

However, SHE-Transmission strongly disagrees with the specific and **excessive additional conditionality tests** created by Ofgem as a precursor to project approval. These far exceed what is required to demonstrate developer commitment to their connections. In the current form the conditions will act as an unnecessary **barrier to customers'** reasonable expectations for a network connection and will **significantly delay** or halt the link.

➤ **We have highlighted alternative conditions that will provide Ofgem with the assurance it requires to minimise the asset stranding risk. SHE-Transmission firmly believes these alternative conditions are reasonable within the context of the needs case.**

SHE-Transmission also disagrees with Ofgem's selective interpretation of the analysis provided in support of the appropriate investment trigger point. Ofgem has proposed that investment is triggered at a confirmed generation level of 135MW. Our response demonstrates why Ofgem should not have disregarded a wide range of sources of consumer benefit that point to the 70MW tipping point. SHE-Transmission recognises Ofgem's desire to ensure that such investments are not underutilised and do not represent a net cost to GB consumers. However, when the overwhelming commitment of Orkney developers, Orkney Council and both Scottish and UK Governments is considered along with the detailed evidence and analysis of consumer benefit provided in conjunction with the Electricity System Operator (ESO) and our consultant, Gutteridge Haskins & Davey (GHD), **Ofgem's disregard for well-established industry best practice** and adoption of an overly conservative position only serves to harm consumer welfare.

➤ **SHE-Transmission strongly contends that the correct tipping point, the level of generation beyond which the investment will create net consumer benefit, is focused around 70MW.**

Ofgem has also published its consultation on the Alternative Approach (AA). Scottish and Southern Electricity Networks (SSEN) has responded separately to this consultation and we encourage Ofgem and interested parties to consider the collective arguments outlined in both responses.

Ofgem should reconsider the evidence presented by both SHE-Transmission and other respondents which clearly shows consumer benefit will start to accrue at a much lower level of connected generation, 70MW, than that proposed by Ofgem. SHE-Transmission strongly encourages Ofgem not to forgo the benefits which consumers could realise above its recommended tipping point as a result of adopting an unjustified conservative threshold and through application of excessive condition tests.

### **Background to SHE-Transmission's proposal**

There is a long-standing need for network reinforcement on Orkney to facilitate the export of significant renewable generation. This has persisted even with the shifting political commitment to renewable generation sources and, when the material external investment in energy development is considered<sup>1</sup>, will grow over the next decade. However, while the potential remains strong, Orkney developers have been stuck in a paradoxical situation where they require certainty from SHE-Transmission that the network will be reinforced to allow them to connect, and SHE-Transmission is required by Ofgem to demonstrate certainty from developers before it is permitted to progress the reinforcement.

To break this cycle, and led by stakeholder feedback, SSEN developed an Alternative Approach to the Orkney investment case with the primary objective of creating an opportunity to unlock Orkney's renewable potential whilst providing certainty that renewables would connect on time, ensuring no asset stranding.

### **Needs Case Conditionality: Generation Threshold**

In March 2018 SHE-Transmission submitted its Final Needs Case for a 220MW (220kV) transmission link to Orkney in line with its obligations under the Strategic Wider Works (SWW) licence condition. SHE-Transmission has already developed and delivered significant network investments, notably Caithness Moray and Kintyre Hunterston, through this mechanism.

SHE-Transmission proposed that at or above 70MW of committed generation the 220MW link would represent a net benefit and should proceed. It proposed that the tipping point of 70MW would be demonstrated by developers signing up to the e AA, which SHE-Transmission argues demonstrates a commitment to connect.

SHE-Transmission presented comprehensive analysis using the constraint-based Cost Benefit Analysis (CBA) methodology, which is consistent with **well-established, industry best practice and used to assess similar transmission investments across GB**. This was conducted independently by the GB ESO and our consultant, GHD, and confirmed our proposed 220kV (220MW) reinforcement and that no more than 70MW of generation is needed to justify the investment. This value of 70MW is the point at which the lifetime costs of developing the transmission link equals the estimated value of constraining that generation off, should the link not be constructed. Furthermore, our proposed option of a 220MW (220kV) link is the most economical solution across a broad range of generation scenarios for Orkney (including scenarios with limited tidal connections).

Ofgem expressed concerns on the use of constraints avoided methodology in our Needs Case to establish a break-even threshold for radial reinforcements. SHE-Transmission has undertaken further analysis since our Needs Case submission in conjunction with the ESO and our consultants exploring the impact on consumer welfare. This evaluated the benefits of the link to GB energy consumers by considering the impact of wholesale electricity price reduction (the measure of consumer welfare) resulting from connecting new renewable generation on Orkney and the wider consumer and socio-economic benefits the project will provide, both

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<sup>1</sup> <https://renews.biz/50874/scots-wave-duo-set-for-orkney-party/>

locally and nationally. This analysis included the following variables to present a balanced view of the costs and benefits of developing the proposed link:

- The lifetime costs of developing the link net of the use of system charges payable by developers (TNUoS);
- The benefit of quantified potential CO2 savings;
- The benefit of wholesale electricity price reduction;
- The benefit of wider system avoided costs; and
- At Ofgem's request, the costs associated with 100% of Orkney generators securing CfD's (worst case scenario).

Taking into account Ofgem's concerns regarding the sensitivity of different input assumptions on the wider consumer welfare analysis, and in an effort to provide additional certainty, SHE-Transmission has worked to refine our additional analysis. The table below shows the results of our analysis which supports the initial CBA's conclusion that at 70MW of generation the GB Consumer would not be negatively impacted by the construction of the Orkney transmission cable.

|                   | CW net subsidy, CO2 & TNUoS £m | CW net subsidy, CO2, TNUoS & Network Efficiencies £m |
|-------------------|--------------------------------|--|
| Scenario – 70 MW  | (9.0)                          | 6.0  |
| Scenario – 96 MW  | 57.8                           | 72.7   |
| Scenario – 128 MW | 134.1                          | 149.1  |
| Scenario – 154 MW | 175.8                          | 190.8  |
| Scenario – 199 MW | 275.2                          | 290.2  |
| Scenario – 300 MW | 438.0                          | 453.0  |
| Break Even MWs    | 74                             | <70  |

**Ofgem's tipping point threshold of 135MW is arbitrary** and Ofgem has chosen to rely on selective elements of the additional benefits assessment provided by SHE-Transmission to verify its proposal.

In summary we disagree with this approach for the following reasons:

- The 135 MW generation threshold proposed by Ofgem is determined by taking the mid-point between the 70 MW and 199 MW identified by the ESO in the original CBA analysis as the level at which the optimum solution 'tips' between the voltage options of 132kV and 220kV assuming no other generation ever connects to the Orkney network. These MW values have been calculated based on a constraints-avoided basis.
- Ofgem's 135MW 'tipping point' is qualified by the **selective use of evidence**. It has unjustifiably discounted the comprehensive analysis and wider consumer benefits which have been presented by SHE-Transmission. The ancillary evidence provided by SHE-Transmission serves to reinforce the conclusion of the industry standard, constraints-based methodology.
- SHE-Transmission has provided **two sources of analysis** which demonstrate a tipping point around 70MW. **Ofgem has not undertaken any independent analysis** and therefore has no basis to reject the evidence provided.

- The exclusion of CO2 savings by Ofgem is inappropriate as SHE-Transmission believes that a relationship between Orkney generation and displacing non-renewable generation elsewhere in GB is inherent within the ESO's modelling. Furthermore, recognising the wider **consumer benefits of CO2 savings has already been accepted by Ofgem** in the development of CBAs which support investment decisions. This was a fundamental element of the RIIO-ED1 price control.<sup>2</sup>
- Ofgem's 135MW threshold excludes the value of TNUoS which would be received and would offset the investment cost. Ofgem is concerned that GB consumers are not exposed to the cost implications of stranded assets. However, to include the cost of the asset but exclude the **TNUoS** income from connecting parties **is inconsistent and skews the result** of the benefits assessment.
- Ofgem has requested that the estimated value of Contract for Difference (CfD) payments to generators is included equivalent to 100% of generation receiving an award. SHE-Transmission fundamentally disagrees with the validity of this assumption on two counts.
  - **CfD payments are a government policy decision.** As such they are intended to be incurred to enable the build-out of Offshore and Remote Island Wind generation. The decision to initiate a CfD auction round has been made and awards will be made to those parties who win under a competitive process. It is therefore implicit that CfD payments are a cost to GB consumers. It is also therefore not for Ofgem to second guess this process and only let generation which has no need for CfD, provides a net positive benefit to consumers, progress. **This is contradictory to the political policy decision.**
  - Notwithstanding this, modelling CfD payments to 100% of potential generation is **inconsistent with the evidence available to Ofgem**. Only a small proportion of generation will be taking part in the 2019 CfD round. To incorporate a 100% assumption is a further example of the overly conservative and unjustified approach to determining a tipping point threshold.
- Previous Strategic Wider Works mechanism (SWW) Needs Cases have not required additional conditionality for approval, therefore, **no precedent exists** and Ofgem risks discriminating against Orkney developers.
- Having demonstrated that GB consumers start to accrue benefit above 70MW, by adopting a much higher tipping point **Ofgem is preventing benefits from accruing to customers** between 71MW and 134MW; these would be lost.
- The development of the transmission link may also result in savings associated with wider system benefits. SHE-Transmission has been made aware of a whole system approach being developed by SHEPD that could realise further consumer savings if a transmission link eliminates the need for future Totex investment and increases the utilisation of the proposed link. If confirmed by SHEPD, this is a **true whole system benefit** and should be included within the analysis.

SHE-Transmission therefore remains firmly of the opinion that the volume of generation required to justify the investment is no more than 70MW. SHE-Transmission believes that determining GB consumer benefit is a useful supplementary tool to the constraints avoided CBA approach that is used to identify the economically optimum radial transmission reinforcement. We are disappointed that Ofgem has chosen to exclude all benefits to the GB consumer as identified by the ESO, GHD and SHE-Transmission.

<sup>2</sup> RIIO-GD1: Final Proposals - Supporting document - Cost efficiency  
[https://www.ofgem.gov.uk/sites/default/files/docs/2012/12/4\\_-\\_riiogd1\\_fp\\_cost\\_efficiency\\_0.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2012/12/4_-_riiogd1_fp_cost_efficiency_0.pdf)

- SHE-Transmission's analysis clearly demonstrates the generation threshold that represents value for money for the GB consumer is focused around its initial 70MW threshold and not Ofgem's 135MW threshold.
- We believe that this provides a robust assessment of the net and real impact for the GB consumer of our proposed reinforcement solution for Orkney, which builds upon the optioneering delivered by the constraints avoided CBA.

### Needs Case Conditionality: Condition tests

Ofgem has proposed that the minimum level of generation is demonstrated by the application of two additional tests. Ofgem proposes that by no later than December 2019, no less than 135MW of new generation on Orkney has demonstrated a commitment to connect by October 2022, and that this must be evidenced by either:

- The award of a Contract for Difference in the 2019 CfD Auction; or
- By having secured planning consent and finance to construct the generation project.

SHE-Transmission strongly disagrees with Ofgem's view which it believes is in conflict with its own guidance on these types of transmission investments. SHE-Transmission recognises the importance of demonstrating developer commitment. There must be reasonable tests in order that Ofgem is assured the identified benefits will be realised as generation connects. However, we have highlighted to Ofgem that a different test and tougher rules are being applied to Orkney when compared to similar transmission investments elsewhere in GB.

### *Overcoming Orkney catch-22*

SHE-Transmission strongly disagrees with Ofgem's proposed additional conditionality and maintain that these conditions are prohibitive to Orkney developers progressing. Our stakeholders tell us that the main reason why the additional conditionality does not work and why the AA was developed, was to overcome the misalignment of timelines as shown below.

### *Illustration of misalignment of link and developer timelines – catch-22 problem*



- Projects have not and cannot progress to the point of securing planning permission or reaching financial close until there is further certainty that there is an opportunity for connection.
- Additional needs case conditional tests which make the link dependent on planning consent and financial close remove the ability for the investment to proceed. This removes the connection opportunity for developers which rely on island links.



These additional conditions, set by Ofgem, go beyond any requirements for mainland GB connections which only require a signed connection offer alongside payment of securities and liabilities. Furthermore, these conditions do not address the feedback and concerns of Orkney stakeholders, nor do they align with industry practice in terms of assessing connecting parties' certainty of connection through queue management. This is apparent in Ofgem's inclusion of financial close being associated with generator certainty. Feedback from the ENA's original queue management work noted network operators should not determine when a project has met financial close.

Stakeholders have reiterated these concerns in feedback we received in the AA consultations.

In summary we disagree with this aspect of Ofgem's proposal for the following reasons:

- Ofgem's requirement for generators to demonstrate that they have planning and finance or a CfD by December 2019 does not acknowledge the key issue identified by stakeholders in SHE-Transmission's consultations of misaligned timelines between generators, network operators and policy makers, which the AA was designed to address. **This is a barrier to connection.**
- Ofgem's proposals place onerous conditions on Orkney developers beyond what would be required if they were looking to connect on the GB mainland. **This is unjustifiably discriminatory.**
- Ofgem's consultation does not give due acknowledgement of, or present alternative remedies to address, the concerns from our stakeholders on the existing barriers to entry and the burdensome levels of securitisation required from Orkney developers present. **The proposal is overly conservative.**
- The AA was also developed to ensure that capacity is allocated at the earliest opportunity to mitigate the risk of stranded assets and the additional costs to consumers which Ofgem has agreed with and approved in the AA consultation but not the needs case. **Alternative solutions which introduce change are required to unblock network development.**
- The timescale proposed to demonstrate developer commitment, as well as the increased tipping point requirement may be unachievable and risk a delay to final approval of the Orkney transmission link. This would subsequently delay the transmission project with the loss of considerable benefit to Orkney and wider GB consumers.

### SHE-Transmission's alternative proposal for conditionality

SHE-Transmission has worked with Orkney developers to propose alternative conditionality to Ofgem's conditions namely;

- **Generation Threshold;** 70MW of new Renewable Generation.
- **Demonstrating Developer Commitment;** Generators signing up to the ready to connect part of the AA (Part 1) mitigating the risk to consumers of a potential asset stranding and also placing securities under the industry standard methodology.
- **Deadline:** Due to the delay of the connection energisation date from October 2022 to April 2023 we propose that the conditionality deadline is delayed until April 2020, to align with our revised construction programme. This optimises the window for generator commitment to be demonstrated without jeopardising the deliverability of the link.

SHE-Transmission, in agreement with Orkney stakeholders, continues to support the Ready to Connect process. We agree with Ofgem that this process will mitigate the risks associated with stranded assets thereby

reducing potential exposure faced by consumers as a result of the increased commercial risk faced by developers. The Ready to Connect process, combined with the industry standard securities and liabilities will provide adequate certainty to Ofgem, without imposing additional and more stringent conditions on Orkney developers with mainland connections.

## **Conclusion**

SHE-Transmission is firmly of the view that Ofgem must reconsider its position as outlined in its minded-to consultation on the Orkney's Needs Case and proposed Delivery Model. SHE-Transmission remains convinced that the tipping point is no more than 70MW and that Ofgem has no precedent for applying additional conditionally for approval. SHE-Transmission has not only demonstrated wider benefits to the GB consumer, but far reaching socio-economic benefits of the link. Conversely, Ofgem has been selective in the use of this evidence and ignored the analysis and wider consumer benefits which have been presented by SHE-Transmission.

SHE-Transmission has revisited the additional CBA since the submission of its Needs Case. We have outlined the constituent parts, the costs savings versus the generation thresholds, and why 70MW delivers benefits to the GB consumer. Combined with the feedback Ofgem has received from developers on Orkney, we believe this analysis gives it the certainty to approve the Needs Case at the 70MW tipping point and with the alternative conditionality proposals.

It is particularly disappointing to note the inconsistency in Ofgem's decision on approving the AA (Part 1) for implementation but not forming part of the needs case conditionality. Furthermore, it is also disappointing that Ofgem has disregarded the substantial stakeholder support in the development of the AA and the proposed conditionality. SHE-Transmission, working together with stakeholders, has proposed an alternative conditionality which we are convinced works for Orkney developers whilst simultaneously providing suitable mitigation against any detrimental impact on the GB Consumer.

**Ofgem agree there is a need for reinforcement, but the current conditions proposed are extremely challenging and risk threatening the viability of the project unless revised.**

We look forward to the opportunity to discuss our concerns with Ofgem in due course.

*Please note that responses to specific consultation questions relating to the Needs Case are provided in **Appendix 1** below.*

## **APPENDIX 1 - Consultation Questions 1-6**

### **1. Do you agree that the current network on Orkney needs reinforcing in order to connect additional generation?**

As highlighted in our covering letter, the Needs Case and subsequent analysis undertaken by Scottish Hydro Electric Transmission (SHE-Transmission) and Ofgem, both conclude that the network on Orkney needs reinforcing to enable the connection of additional generation. SHE-Transmission welcomes Ofgem's decision to approve the Needs Case, technical solution and the deliverability of the link.

### **2. What are your views on the generation scenarios developed by SHET-T? We are particularly interested in views on the likelihood of wind generation progressing without subsidy support and the likelihood of tidal generation around Orkney developing to the levels predicted by SHE-T scenarios.**

#### **Generation scenarios developed by SHE-Transmission**

In the submission and development of the Strategic Wider Works (SWW) Needs Case, SHE-Transmission considered 8 generation scenarios:

- 3 from National Grid's 2017 Future Energy Scenarios (FES),
- 5 developed following an evidence-based approach (from Orkney generation applications) by GHD and agreed with the Electricity System Operator (ESO).

These scenarios were used as part of our Cost Benefit Analysis (CBA), using the constraint-based Cost Benefit Analysis (CBA) methodology, which is consistent with well-established, industry best practice and used to assess similar transmission investments across GB.

Following discussions with Ofgem SHE-Transmission developed:

- a further 3 generation scenarios, and following feedback from Ofgem, removed tidal generation completely.

Furthermore, an additional CBA was provided, focusing on demonstrating the wider consumer welfare benefit of the generation. This validated the initial CBA findings. Our response to Question 5 provides more detail on this.

As a result, SHE-Transmission firmly believes that 11 generation scenarios provide a comprehensive range of new generation outcomes. SHE-Transmission has fully explored the potential generation scenarios on Orkney, and even with the removal of tidal generation, the breakeven point where the GB consumer will not be detrimentally impacted remains at 70MW of generation.

It should be noted that the generation scenarios only consider new generation looking to connect on Orkney; this does not include any unconstrained or transfer of generation from the existing ANM system or demand.



## **Subsidy free**

SHE-Transmission's role as transmission owner is limited when making assumptions as to whether individual generation projects are economically viable without a subsidy. However, as part of the SWW process, SHE-Transmission's consultants GHD, based on feedback from Orkney stakeholders, have explored the viability of remote island wind projects on Orkney progressing without a subsidy.

Due to high wind capacity factors prevalent on the islands, our consultants GHD are confident that some wind generation can progress without subsidy support. However, the analysis suggests that the difference between subsidy and subsidy free projects is marginal. Stakeholder feedback also reiterates this marginal difference. Fundamentally, whether a project can progress without subsidy support is contingent upon where the project is located, as well as the project's ongoing use of system charges which, at this point in time are an uncertainty throughout the energy industry following Ofgem's forward looking charging review. SHE-Transmission notes the open letter which specifically highlights Orkney customers; however, the Orkney Needs Case should be decided upon its own merits using the best information available at this point in time and not the uncertainties of industry reviews on charging.

SHE-Transmission also notes that one generator, Energiekontor UK, has endeavoured to find a subsidy free route to market by working with stakeholders, resulting in its project being fully funded solely with the projected revenues from a PPA.<sup>3</sup> This is the first subsidy-free wind generation project in the UK and shows that engaging with stakeholders on alternative ways to connect can be fruitful and viable, which is the backbone of our Alternative Approach (AA).

## **Tidal Generation**

As with the likelihood of wind projects going subsidy free, SHE-Transmission's role in assessing whether Tidal Generation is commercially viable is also limited.

We included tidal generation in our 8 original generation scenarios, as there are a number of tidal projects currently contracted to connect on Orkney (310MW). Following feedback from Ofgem we also produced an additional three generation scenarios which included zero tidal generation. Even when excluding tidal generation and only including onshore wind the tipping point remains at 70MW.

The potential for future tidal generation should not be dismissed however. With the European Marine Energy Centre (EMEC), Orkney is at the forefront of efforts to develop commercially viable devices to harness wave and tidal energy resources. There is an unmet need for network access to trial marine technologies and the EMEC test centre has been recognised at a global level for such innovation. The likelihood and potential scale of future renewable developments in the area could be significant.

While tidal flow is an embryonic technology, there is already 8 MW of tidal flow generation in Orkney, with 2 MW connecting directly into the islands, and a clear indication that more is to be expected. In a recent case, Wave Energy Scotland selected AWS Ocean Energy and Mocean Energy to deploy half-scale wave energy machines at the EMEC, by 2020. The companies will receive a share of £7.7m from Wave Energy Scotland for the projects.<sup>4</sup> With active technology development, excellent renewable resource, and a benign planning

<sup>3</sup> <https://www.linkedin.com/pulse/subsidy-free-onshore-wind-uk-stuart-mcaleese-mba-mienvsc>

<sup>4</sup> <https://renews.biz/50874/scots-wave-duo-set-for-orkney-party/>

environment, we consider our scenarios plausible, with potential future growth trajectories for both tidal flow and onshore wind in Orkney.

Throughout the development of the Orkney needs case SHE-Transmission has planned against the uncertainty of generation which includes the uncertainty of project economics (subsidy-free considerations) and the commercial viability of tidal generation in both the generation scenarios and the development of the Alternative Approach (AA). Other obstacles exist, which the AA seeks to address, such as:

1. Fixed capacity queue
2. Misaligned timelines
3. Securities and Liabilities

These barriers are considered in more detail in our response to question six.

### 3. What are your views on the technical design and costs of the proposed Orkney link?

As part of our March 2018 Needs Case submission, SHE-Transmission used a Cost Benefit Analysis (CBA), based on established industry constraints avoided principles and Ofgem's SWW guidance, to compare a number of reinforcement solutions. This analysis was conducted independently by the GB System Operator and our consultant, GHD, and identified our proposed option of a 220MW (220kV) link to be the most economical solution across a broad range of generation development outcomes for Orkney (including scenarios with limited tidal connections). SHE-Transmission is pleased that Ofgem has confirmed that it is satisfied with the technical solutions identified in the Needs Case and will progress the detailed design and competitive pricing of the scheme for inclusion in the Project Assessment should the Needs Case be approved.

In terms of costs, best value will be achieved through competitive tenders for all key procurement awards for both framework and one-off contracts. SSEN Tender events are carried out pursuant to the requirements of the EU Procurement Directives, as reflected in UK Statutory Instruments under the Utilities Contracts Regulations 2016 and Utilities Contracts (Scotland) Regulations 2016, ensuring transparency and equal treatment of all participants. The use of framework agreements provides the following key benefits:

- Competition – a framework agreement is not a guarantee of work and successful framework contractors are aware they will likely have to compete against the other framework contractors for specific projects – ensuring costs are competitive.
- Enhanced quality – quality standards and experience on projects of a scale and cost commensurate with our projects is a key criterion for qualification into SSEN tender processes.
- Improved safety performance – SSEN places its safety requirements on a contractual basis, ensuring corners are not cut and everyone operates in a safe manner for their and others' benefit. [If it's not safe we don't do it].
- Superior programme management and delivery – ensuring projects are delivered to plan, on time and on budget.
- Commercial benefits i.e. continuous work programmes avoiding duplication of resource and cost, cost efficiencies through project synergy and economies of scale.

- Accountability – Should anything not go to plan there are clear contractual mechanisms and financial instruments, ensuring consumers' exposure to the potential cost of a contractor's act or omission is mitigated.

In addition to this supplier relationship management, processes are used for strategically important suppliers to measure and improve relationships, which encourages supplier innovation and drives value from the supply chain. SHE-Transmission believes the costs achieved through these mechanisms are reflective, competitive and offer value to the GB consumer. For specific projects, this is further reviewed and refined during the project assessment phase.

#### **4. Do you agree with our concerns that a constraints-based CBA may not robustly demonstrate the true consumer cost/benefit of a radial extension to the transmission network?**

No, SHE-Transmission firmly believes that the constraints avoided CBA methodology remains applicable in the optioneering process. The constraints avoided CBA approach is an established methodology in GB transmission system development. It forms the basis of the Network Options Assessment process led by the ESO, follows Ofgem's SWW Guidance, and is well understood by industry parties including generation developers as the basis for network investment.

SHE-Transmission is obligated under the terms of its licence to respond to customer requests for connection to the transmission system in the North of Scotland. In doing this we seek to develop an economic, efficient and coordinated system that seeks to balance the needs of specific customers and the wider GB consumer base.

To provide connections to the Scottish islands we have identified that radial extensions to the existing system are the best way to address customer needs and have explored various technology solutions and ratings to arrive at our proposed solution. A key part of our work uses the constraints avoided CBA methodology to compare a number of potential technical solutions to arrive at the best economic solution to meet the needs of our customers on Orkney in response to our licence obligations.

SHE-Transmission notes Ofgem's concerns regarding its applicability to radial extensions and we have worked with the regulator to further test our conclusions arising from the constraint avoided CBA. To this end, additional analysis was undertaken, based on exploring the link's impact on Consumer Welfare (CW), which again supports the original CBA outcome. This additional analysis is detailed in our response to Q5.

#### **5. What are your views on the "additional CBA", outlined in this chapter, which has been used to sense check the results of the original constraints-based CBA?**

As noted in our response to question 4, SHE- Transmission carried out further additional analysis to compare the benefits to GB consumers arising from the investment in transmission reinforcement and generation enabled. The aim of this additional analysis is to assess if the optimum economic reinforcement identified by the constraints avoided CBA provides an overall benefit to the GB consumer.

Our additional analysis is based on the wholesale electricity price reductions (a measure of Consumer Welfare) calculated by the ESO using its BID3 model, over the lifetime of the link, at different levels of wind generation

akin to that connecting in the Orkney area. In addition to wholesale price benefits, other benefits are identified including; CO<sub>2</sub> reductions arising from generation displaced, and network development costs avoided if a link was constructed. The benefits are compared to the costs of the link and any additional consumer costs that arise or are avoided, to arrive a net value for the GB consumer. The final cost to the consumer is calculated as a present value by incorporating the following steps:

**Identify the consumer welfare benefit arising from the wholesale price reduction;** The starting point for this analysis is to acknowledge that the provision of transmission capacity to the Orkney Islands would be solely used by renewable generation. For most renewable projects, as the short run marginal cost of these technologies is so low, they serve to reduce the wholesale price during high renewable periods. Consumer Welfare (or increase in consumer surplus) measures the money saved by consumers through such wholesale price reductions and is determined by National Grid ESO in its market modelling.

**CO<sub>2</sub> reductions arising from generation displaced;** The consumer surplus figures calculated by the ESO include the impact of the ESO's carbon price assumptions. However, the ESO's central carbon price assumptions are lower than BEIS' carbon price assumptions. BEIS uses a single carbon price assumption across all of its scenarios, indicative of a carbon price necessary for the UK to meet its long-term carbon policy commitments.

Given that, in the longer term, BEIS' carbon price is significantly higher than the ESO's, there is additional benefit to the consumer of renewable generation from Orkney displacing fossil fuel generation in GB, which is not fully considered in the ESO's calculation of consumer surplus. To determine the value of these supplementary CO<sub>2</sub> benefits we assume Orkney wind initially wholly displaces gas fired generation – but over the life of the link, as the UK economy decarbonises, the proportion of gas fired generation displaced falls to only 10%. We use the difference between the two carbon price forecasts to determine an annual supplementary carbon value for Orkney wind generation. A Present Value (PV) is then determined for these supplementary carbon benefits.

**Net off the subsidy costs associated with Orkney generators securing Contracts for Differences (CfDs);** Our calculation assumes that the value of the consumer welfare and avoided carbon benefits would be eroded by any subsidies given to the generators that are funded by the GB Consumer. However, arguably the award to Orkney generators of a CfD does not in of itself result in an erosion of consumer welfare given that the CfD auction will allocate all the prescribed budget to a tranche of renewable projects which may or may not include Orkney. Therefore, the CfD costs are not avoided by consumers if the Orkney link is not constructed – they arise regardless and therefore shouldn't be included as a cost.

That argument notwithstanding, since submission of the needs case we have continued to engage regularly with Orkney developers and because of this engagement SHE-Transmission understands that only a small proportion of Orkney generators (40MW) intend to bid for a CfD subsidy in the 2019 auction. Consequently, we have updated our additional CBA analysis based on the conservative assumption that 50% of generators will be in receipt of a subsidy using the highly conservative assumption that all large generators have a CfD subsidy strike price of £70/MWhr (2018 prices – equates to £63/MWh in 2012 prices). We believe that this assumption reflects the most likely scenario of 40MW on Orkney receiving CfD subsidy whilst the 50% conservative assumption provides for the unlikely scenario of another subsidy regime being developed in the future.

**Net off the lifetime costs of developing the link;** These costs are net of the use of system charges payable by wind developers (TNUoS) on Orkney, as the 'revenue' from these charges reduces the potential cost impact of

the link on the GB consumer. We have made the conservative assumption, based on the current charging arrangements, that only 40MW of transmission contracted generation will pay TNUoS, hence the remainder of the cost of the investment would be incurred by the GB energy consumer along with the avoided wider TNUoS charge. However, this cost would be offset by the additional security of supply benefit to the Orkney islands which results in an avoided network cost for the running of standby thermal generation plant.

SHE-Transmission remains firmly of the view that TNUoS revenue is a valid benefit. Consider a scenario where 220MW of generation is connected. The full cost of the cable is being recovered from generators. The cost to consumers per unit of electricity energy consumed has not increased – the Orkney link cannot recover marginal cost increases from consumers – it must take the market price. Therefore, if 220MW represents no consumer impact then proportionally any TNUoS payment also represents a benefit, offsetting PV of the cable.

### **Network Efficiencies**

In response to Ofgem's feedback SSEN is currently assessing the benefit of the new 220kV transmission reinforcement on the existing Orkney Distribution system. Due to the early stages of this assessment we have isolated these benefits in our revised additional CBA analysis; however, it is important to note that any benefits from the outcome of this assessment should be considered alongside the needs case assessment. Any additional benefits which are realised to existing demand or generation customers connected to the Orkney distribution system would contribute towards the existing need for the reinforcement.

### **Updated additional CBA Results**

SHE-Transmission supported by GHD has sought to aggregate the costs and benefits of the investment proposal as described above to determine the net benefit to the GB consumer. We believe that this provides a robust assessment of the net and real impact for the GB consumer of our proposed reinforcement solution for Orkney, which builds upon the optioneering delivered by the constraints avoided CBA. Table 1 below outlines the constituent parts of our additional CBA and lists the break-even MW values

**Table 1: Updated additional CBA**

|                   | CW net subsidy,<br>CO2 & TNUoS £m | CW net subsidy, CO2,<br>TNUoS & Network<br>Efficiencies £m |
|-------------------|-----------------------------------|--|
| Scenario – 70 MW  | (9.0)                             | 6.0  |
| Scenario – 96 MW  | 57.8                              | 72.7   |
| Scenario – 128 MW | 134.1                             | 149.1  |
| Scenario – 154 MW | 175.8                             | 190.8  |
| Scenario – 199 MW | 275.2                             | 290.2  |
| Scenario – 300 MW | 438.0                             | 453.0  |
| Break Even MWs    | 74                                | <70  |



**6i What are your views on our proposed conditions of approval? Do you agree with our view that the information available does not demonstrate that building a 220MW connection to Orkney would be beneficial for GB consumers if only 70MW of generation came forward to use the link? Do you agree with our proposal to set a minimum-generation threshold of 135MW?**

No, SHE-Transmission does not agree with the Ofgem proposal to set a minimum generation threshold of 135MW and we believe that the information and analysis provided in the needs case does support our contention that the link is beneficial where a minimum threshold of 70MW of generation is met.

The 70 MW generation threshold identified by SHE-Transmission in our Needs Case submission is based on the point where the lifetime costs of our solution equal the benefit of constraints avoided if a link is constructed – the so called ‘breakeven’ point.

The 135 MW generation threshold proposed by Ofgem is determined by taking the mid-point between the 70 MW ‘breakeven’ cost value and a value of 199 MW identified by the ESO as the level at which the optimum solution ‘tips’ between the voltage options of 132kV and 220kV. Both the 70 MW ‘breakeven’ and 199 MW ‘tipping point’ are calculated using the constraints avoided approach. These are different measures and therefore it is not appropriate for Ofgem to apply a ‘mid-point’.

The 135 MW generation threshold was tested by Ofgem using a similar additional CBA approach, but excluding all cost adjustments and benefits proposed by SHE-Transmission as described in Question 5 above. The conclusion, based on the limited benefit of wholesale price reductions net of CfD subsidy costs, is that reinforcement with 135 MW of generation returns a positive impact for the GB Consumer.

SHE-Transmission believes that determining GB consumer benefit is a useful supplementary tool to the constraints avoided CBA approach that is used to identify the economically optimum radial transmission reinforcement. However, we are disappointed that Ofgem has chosen to exclude all benefits to the GB consumer as identified by the ESO and SHE-Transmission. We are also disappointed that Ofgem has not adjusted the ‘cost’ of the link the GB consumer will incur with the revenue resulting from TNUoS charges transmission generators will pay.

If these additional, real and tangible benefits and cost adjustments are included, SHE-Transmission’s analysis clearly demonstrates the generation threshold that represents value for money for the GB consumer is lower than the 135 MW proposed by Ofgem.

SHE-Transmission, recognising Ofgem’s concerns regarding the highly sensitive nature of different input assumptions on the wider consumer welfare analysis, and in an effort to provide additional certainty that the asset would not be stranded, has refined its additional CBA. As shown in Table 1 above our analysis supports the initial CBA’s conclusion that at 70MW of generation the GB Consumer would not be negatively impacted by the construction of the Orkney transmission cable.

To summarise, our updated additional CBA, as outlined in Question 5 above, includes the following costs and benefits that are compared against Consumer Welfare as measured by a reduction in wholesale electricity prices:

- **Updated capex;** of £228.9M reflecting a more accurate cost estimate as a result of the project assessment preparation;
- **CO<sub>2</sub> benefits;** we firmly believe that there is additional benefit to the consumer of renewable generation from Orkney displacing fossil fuel generation in GB that is not fully considered in the ESO's calculation of consumer surplus;
- **Subsidy (CfD) costs;** following feedback from Orkney developers we have adjusted this assumption to reflect a conservative 50% of Orkney generators receiving CfD; and
- **TNUoS;** we firmly believe that generators paying TNUoS does have a benefit to the consumer, and considering Ofgem's future charging works, only 40MW paying TNUoS is a conservative assumption.

Following feedback from stakeholders and Ofgem, our additional CBA has been carried out with the assumptions above and with the exclusion of network efficiencies, which are to be considered at a later date. This demonstrates, based on the break-even MW values in Table 1, that the overall investment for the consumer will become positive around 70MW, even before the inclusion of network efficiencies.

Ofgem's proposed minimum-generation threshold puts this renewable potential and further benefits at risk. Therefore, SHE-Transmission is still firmly of the view that at 70MW of generation the link is of benefit to the consumer.

SHE-Transmission recognises that the development of radial reinforcements to the Scottish Islands is challenging but we believe our analysis is robust and balances the need to respond to our customers' needs, enables development to support long term, legally binding government renewable targets, and safeguards GB consumers from inefficient investment. We believe that, when considering the wider range of benefits, value for money at a lower generation threshold is clearly achievable, as demonstrated by our economic analysis, and that imposing the 135MW criteria will negatively impact the delivery of a solution to unlock Orkney's rich renewable potential.

Furthermore, this rich potential was recognised in the Baringa report, published for the DECC/Scottish Government titled 'Scottish Islands Renewable Project Final Report' (14/05/13).<sup>5</sup>

## **6ii Do you agree that the fact of a generator signing up to SHE-T's 'Alternative Approach' does not provide an adequate level of certainty that the generator will progress to full commissioning?**

No, we do not agree. SHE-Transmission firmly believes that the Alternative Approach (AA) provides an adequate level of certainty that the generator will progress to full commissioning.

### **Part 1 of the Alternative Approach (AA): The Ready to Connect process**

Ofgem has noted there is 'significant uncertainty as to how much wind generation on Orkney will progress to full commissioning'. SHE-Transmission has considered the risk of generation uncertainty and the potential risk

<sup>5</sup> <https://www.gov.uk/government/publications/scottish-islands-renewable-project-final-report>

"Renewable resources from wind, wave and tidal on the Scottish Islands of the Western Isles, Orkney and Shetland are considerable, and renewable generation on the Scottish Islands could make a significant contribution to Scotland's and the UK's 2020 renewables targets, as well as playing an important role in longer term decarbonisation objectives. Of a total practical resource potential in excess of 80 TWh/yr (around 20% of current total GB electricity demand"

a stranded asset would have on the consumer. To address this generation uncertainty in the policy development of the needs case, SSEN developed, in consultation with customers and stakeholders, the Alternative Approach (AA) which we believe provides an adequate level of certainty above and beyond the conventional industry arrangements. It requires contracted parties to:

- Present delivery plans for scrutiny;
- Allow SHE-Transmission to undertake queue management based on the delivery plans and credible milestone dates (when compared to standard technology programmes);
- Enter into revised connection agreements with contractual obligations to meet delivery plan milestones; and
- Accept ongoing queue management including the risk of losing their position in the capacity queue where milestones are not met.

It is important to note the significant commercial risks associated with generators signing up to the AA. The AA creates a competitive environment for generators to be ready to connect by submitting realistic delivery plans; however, the main implication of this to both generators and investors is that the grid connection date and costs are less certain. Although there is no direct financial penalty associated with the AA, if developers do not submit realistic delivery plans or miss progression milestones, they risk losing their queue position. This can result in later connection dates, which could delay project delivery and have significant indirect cost implications for the developer. Not to mention changes associated with the securities and liabilities of the project (discussed further in Part 2 below), for example moving from Orkney Phase 1 (this needs case) to Phase 2 (future development).

Overall, the commercial and financial implications associated with the AA demonstrate a developer's commitment to connect where they agree to an amended contract, by incentivising developers to provide realistic information in their delivery plans in terms of achievable milestones, projected connection date and required capacity.

One of the main blockers to connection for Orkney projects is the misalignment of timelines associated with developing a connection on Orkney i.e. lead times for the SHE-Transmission works do not align with developers' timelines resulting in the Orkney 'catch-22' whereby developers cannot progress their projects due to the uncertainty of the reinforcement and SHE-Transmission cannot progress the reinforcement because of the uncertainty of generators. To reduce this misalignment, the AA allows SHE-Transmission to take a holistic view of the timelines associated with providing the connection. In addition to creating a competitive environment for generators to progress their connections, the AA also places an obligation on developer to keep SHE-Transmission up to date with their project on a minimum of a bi-annual basis. Overall the AA aims to provide the certainty to generation that there is an opportunity for connection on Orkney.

SHE-Transmission, in agreement with Orkney stakeholders, will continue to support the Ready to Connect process, agreeing with Ofgem that the process will mitigate the risks associated with stranded assets, thereby reducing the overall risk and associated costs to consumers and increased commercial risk faced by developers.

### **Limbs A and B of Ofgem's conditionality**

Ofgem does consider that the Ready to Connect part of the Alternative Approach is required in order for the Orkney project to progress. Additionally, Ofgem acknowledges that the AA minimises the stranding risk to

consumers as well as add valuable learning to the rest of the industry. However, Ofgem does not agree that the AA provides an adequate level of certainty and has proposed additional conditionality namely;

- **Generation Threshold;** A minimum of 135MW
- **Demonstrating Generator Commitment;** Through the award of a CfD in the 2019 auction or by having secured planning consent and finance to construct the generation project
- **Deadline;** By no later than Dec 2019

In line with our approach to the AA, and in order to respond to these additional requirements, SSEN has undertaken further engagement with stakeholders.

The proposed limbs A and B of Ofgem's conditionality and the volume of generation needed for December 2019 are prohibitive to Orkney developers progressing. The main reason why the conditionality does not work and why the AA was developed was to overcome misalignment of timelines. Generation projects (between the 70-135MW tipping point) will not be able to meet the conditionality set by Ofgem. Projects have not and cannot progress to the point of planning permission being secured or reaching financial close until there is further certainty that there is an opportunity for connection.

The main reason the AA was developed was to overcome misalignment of timelines (see Figure 1).

**Figure 1: Orkney Conditionality timeline**



Here we can see:

- Generation projects (between the 70-135MW tipping point) will not be able to meet the conditionality set by Ofgem.
- Projects have not and cannot progress to the point of planning permission being secured or reaching financial close until there is further certainty that there is an opportunity for connection.

On this basis, SHE-Transmission does not agree that it is practical to ask developers to demonstrate that they have secured finance or planning permission so early in the development lifecycle that the additional conditionality proposed by Ofgem requires.

The conditions, set by Ofgem, go beyond any requirements of mainland GB connections (which require a signed connection offer alongside placement of securities and liabilities), are not based on any feedback from stakeholders, and do not align with industry objectives regarding assessment of connecting parties' certainty of connection through queue management. This is apparent in Ofgem's inclusion of financial close being

associated with generator's certainty. Feedback from the ENA's original queue management work noted that it is not a network operator's role to determine when a project has achieved financial close. This view was reiterated by stakeholders in feedback to SSEN via the AA consultations and in recent engagement with Orkney stakeholders.

## **Part 2 of the AA: Adjustment to securities and liabilities**

Part 2 of the AA proposal details an adjustment to securities and liabilities and was developed because the industry standard methodology in applying securities and liabilities was prohibitive to Orkney customers due to the substantial costs associated with the sub-sea cable link and the risk placed on developers. Ofgem's view is that Part 2 of the AA creates an additional risk to GB consumers and could provide a competitive advantage to Orkney generators and on that basis, it is minded to reject this part of the AA proposal.

We have responded to the securities and liabilities decision separately in our response to the consultation "SHEPD derogation request for Orkney's Alternative Approach".

## **Industry standard securities and liabilities: demonstration of user commitment**

If Ofgem's final position is to reject part 2 of the AA, then industry standard securities and liabilities will apply to Orkney customers. The industry standard methodology, approved by Ofgem in 2013, for securities and liabilities, was developed to demonstrate user commitment whilst considering the risks to consumers<sup>6</sup> and how this risk, following analysis from the ESO, is reduced when planning permission is achieved and projects are more likely to progress until completion. This is a commercial risk which market entrants need to consider when progressing their grid connection, holding generators to account in securing planning permission, and ensures they are liable for any costs incurred, protecting the GB consumers<sup>7</sup>.

If Orkney developers are willing and able to progress projects under the standard industry approach to securities and liabilities, which, for attributable works costs are 4.5 times as much as mainland North of Scotland customers and for wider works have the highest charge in GB, this is a strong signal that those projects are more than likely to progress to full commissioning.

It should be noted that placing securities and liabilities is only one part of the financial commitment required for generation developments. In addition to the grid application, projects must undertake environmental studies and economic analysis to progress. For example, in Orkney before a planning application can be submitted (c£125k) at least two seasons of bird data is required for an environmental impact assessment (c.£80k). Orkney stakeholders will respond separately to Ofgem regarding how much financial commitment has been demonstrated by each project's spend to date.

Any additional commitment proposed for Orkney customers, without commercial agreement, would arguably be discriminatory to those generators, being far in excess of the user commitment requirements set out in Schedule 15 of the CUSC.

<sup>6</sup> "In calculating the liabilities, the methodology includes a number of factors to more accurately reflect the risk if inefficient or stranded assets and avoid over securitisation of new investments. These factors cover sharing risk with consumers, potential reuse by the TO, catch up investment" CMP 192 changes outlined in CUSC 15 guidance, pg 3.

<sup>7</sup> "...a generator may decide to cancel its project or reduce its capacity after the associated works have already begun. This may result in unnecessary costs to other network users which is ultimately borne by the end consumers. User commitment arrangements place liabilities on generators triggering particular investment works, in order to financially secure the investment on their behalf". CMP 192 changes outlined in CUSC 15 guidance, pg 4.



### **6iii. Do you agree that the award of a CfD to a generator would provide an adequate level of certainty that the generator will progress to full commissioning?**

SHE-Transmission agrees that the award of a CfD to a generator provides a level of certainty that a generator will progress to full commissioning. This is because it provides guaranteed revenue over a 15-year period, and as such a project becomes financeable.

However, based on our extensive stakeholder engagement with Orkney generators SHE-Transmission understands that only a small proportion of those developers will be entering the 2019 CfD auction and hence this condition (as mentioned in Question 5), while relevant for the wider industry, is less so for Orkney generators.

### **6iv. Do you agree that, in the absence of a CfD, a generator securing planning consent and finance to construct a project is a good indicator of a project's likelihood of progressing to commissioning?**

No, we do not agree with the proposed additional conditionality and maintain that, in conjunction with the backstop date of December 2019, these additional conditions are inconsistent with the CUSC, are discriminatory, and prohibitive to Orkney developers progressing to commission.

#### **SHE-Transmission's justification for the AA (Part 1 and Part 2) conditionality**

SHE-Transmission firmly believes that the AA provides additional certainty, above the industry standard process for connection agreements, by requiring developers to enter a queue management system where they are contractually obliged to meet timescales set out in their delivery plans or face losing their position in the capacity queue. The contractual framework underpinning the AA would demonstrate a significant commercial commitment from generators. The adjustment to securities and liabilities proposals also demonstrates financial commitment from generators in line with comparable mainland customers. We believe the AA is the way forward for generators to contract, and this view is shared with our stakeholders. SHE-Transmission also notes that:

- The industry standard methodology for securities and liabilities was developed considering the risks on consumers and how this risk is reduced when planning permission is achieved.
- The securities and liabilities methodology also assume that 4 years prior to connection, a project would not have planning permission or financial close and securities are lowered.
- This is a commercial risk which market entrants need to consider when progressing their grid connection and hold generators to account of securing planning permission and ensures they are liable for any costs incurred protecting the GB consumers.

Part 2 of the AA to securities and liabilities was developed because the industry standard methodology to securities and liabilities was prohibitive to Orkney customers due to the substantial costs associated with the sub-sea cable link and the risk placed on developers.

SHE-Transmission believes that if Orkney developers can progress projects under the AA, this is a strong indication that those projects are likely to progress to full commissioning. The standard industry approach to securities and liabilities costs are 4.5 times higher than mainland North of Scotland customers, and as such could prove too prohibitive.

### **SHE-Transmission's proposal for an Adjusted Conditionality**

Following Ofgem's proposed conditionality and requirement for further certainty on whether a generation project will progress to commissioning, SHE-Transmission has worked with Orkney developers to propose alternative conditionality to both Ofgem's and SHE-Transmission's Needs Case proposed conditions:

- **Generation Threshold;** 70MW of new Renewable Generation.
- **Demonstrating Developer Commitment;** Should Ofgem be minded to reject the Derogation Request – Part 2: Temporarily adjusting liabilities within the AA consultation; Generators signing up to the ready to connect part of the AA (Part 1) mitigating the risk to consumers of a potential asset stranding and also placing securities under the industry standard methodology
- **Deadline;** Due to the delay of the connection energisation date from October 2022 to April 2023 we propose that the conditionality deadline is delayed until April 2020, to align with our revised construction programme. This optimises the window for generator commitment to be demonstrated without jeopardising the deliverability of the link.

(See Table 2 below)

**Table 2: Proposal for an Adjusted Conditionality**

|                                   | <b>SHE-T</b>   | <b>Ofgem</b>                                     | <b>Adjusted Conditions</b>                             |
|-----------------------------------|--|--|--|
| <b>Generation Threshold MW</b>    | 70   | 135  | 70   |
| <b>Conditionality A</b>           | Signed up to the Ready to Connect process under the AA | Successful in CfD Auction                        | Signed up to the Ready to Connect process under the AA |
| <b>Conditionality B</b>           |  | Planning Permission and financial close achieved |  |
| <b>Securities and Liabilities</b> | Adjusted Liabilities under the AA                      | BAU minded to reject the AA to Liabilities       | BAU – should Ofgem reject the AA securities            |
| <b>Deadline</b>                   | Conditionality delayed until April 2020                | 2019   | Conditionality delayed until April 2020                |

Overall, SHE-Transmission, in agreement with Orkney stakeholders, will continue to support the Ready to Connect process and we believe that the above proposal for an Adjusted Conditionality will provide more certainty to Ofgem, consistent with mainland connections and achieve the overall primary objective of the Alternative Approach, creating an opportunity for connection on Orkney and reduce the risks associated with stranded assets.