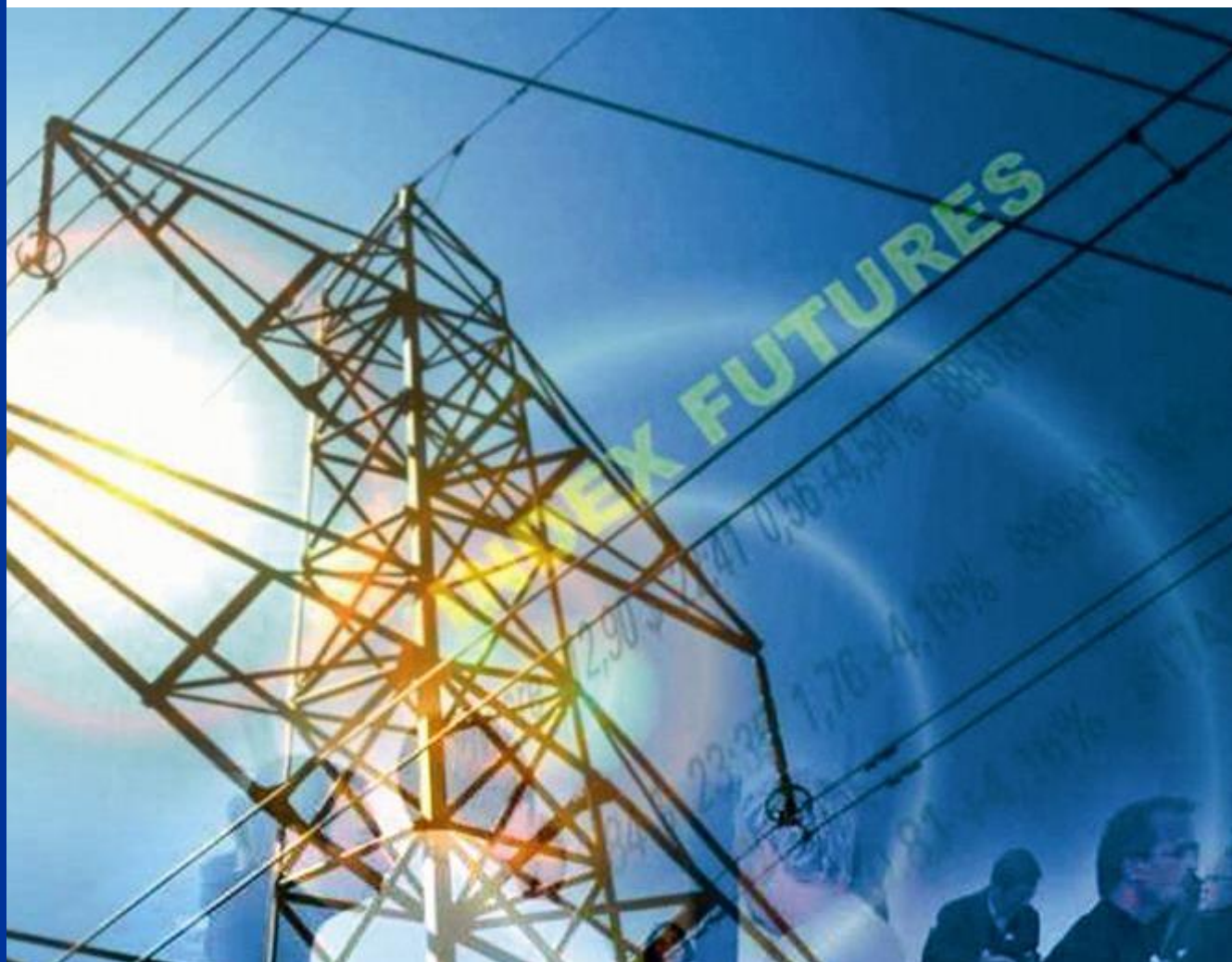
KINTYRE HUNTERSTON TECHNICAL CASE ASSESSMENT

PÖYRY

KINTYRE-HUNTERSTON STRATEGIC WIDER WORKS TECHNICAL CASE ASSESSMENT

A report to Ofgem

July 2013



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EXECUTIVE SUMMARY

SHE Transmission's proposal

Scottish Hydro Electric Transmission plc (SHE Transmission) has put forward the proposed Kintyre-Hunterston reinforcement for assessment by Ofgem under the SWW process implemented as part of the RIIO-T1 price control framework for 2013-2021.

The proposed reinforcement is estimated to be completed by October 2016 at a total cost of £234.8m, and comprises:

- 2 x 220kV 240MVA AC (2 x 40km) subsea cables from the Kintyre peninsula to South West Scotland with development of a new 132/220kV substation, including quad boosters, at Crossaig where the cable lands on the Kintyre peninsula;
- a double circuit 132kV (13km) overhead line upgrade to Carradale; and
- a 220kV onshore land cable connection and associated 220kV/132kV works at Hunterston substation.

The onshore Hunterston cable and substation works (£22.4m) has been allowed for in the Scottish Power Transmission (SPT) RIIO-T1 baseline, and therefore is not subject to the SWW process. The remaining £212.4m relates to the SHE Transmission element of the scheme.

Pöyry's scope of assessment of the Technical Case

The technical assessment has been made on the basis of a positive needs case assessment – previously provided to Ofgem in a stand-alone assessment report. The key activities for the technical case assessment we conducted were to:

- review the robustness of SHE Transmission's procurement process and likely efficient outcome;
- examine the appropriateness of the proposed costs;
- review the robustness/appropriateness of SHE Transmission's evaluation of and proposed approach to risk; and
- assess the appropriateness of the construction programme to meet proposed timescales.

We conducted an initial assessment based on SHE Transmission's Technical Case submission. We then raised a number of questions to which SHE Transmission provided responses, and our review of which guided our final conclusions and recommendations. Our assessment of the four aspects of the Technical Case can be summarised as follows:

Table 1 – Overview of Pöyry assessment

Factor	Procurement	Cost		Risk	Programme
		Project	Equipment		
Initial assessment	🟢	🟠	🟢	🟠🔴	🟠
Final assessment	🟢🟠	🟠	🟢	🔴	🟠

Summary of our assessment of Technical Case

In summary, our assessment of the Technical Case of Kintyre-Hunterston reinforcement is described below.

- A review of SHE Transmission's process for procurement and selection would lead us to conclude that the process itself is robust and has been as efficiently applied as possible within the time constraints of the project. However the process is still not complete with final negotiations for the major contracts not expected to be concluded until June 2013. The late commencement of the project has resulted in a number of activities, principally site investigation work, being undertaken in parallel with contract negotiations leading to at the very least an inefficient process ,the need for provisional sum items in contradiction to NEC 3 principals and the potential for an increased risk allocation to cover for cost uncertainty.
- The project costs appear reasonable overall and are largely determined by the construction costs which themselves are dominated by 3 large Engineering Procurement and Construction (EPC) contracts.
  - The proposed construction costs which account for over 75% of the total costs appear appropriate when taking into account the overall procurement strategy and benchmarking the major EPC components against internal and external sources.
  - Both risk management at [redacted] and project management at 5% though relatively minor by comparison are, never the less, not insignificant. For the nature and duration of the project and with the team proposed by SHE Transmission to run and manage the construction phase, project management costs of 5% are considered reasonable. Risk management is discussed further below.
- A review of both the risk strategy and final residual risk register would suggest that SHE Transmission have allocated risk where possible to the contractors best able to influence it retaining only those that are best borne by SHE Transmission or could not be transferred or insured against.
  - We note that SHE Transmission have request a P70 value for setting of residual risk but it is felt that the allowance should strike an appropriate balance between the respective likelihood of TOs or consumers paying for risks which may or may not arise. In general, the starting position would be to use a P50 value for setting the residual risk allowance as this would mean that there is perceived to be an equal probability of costs turning out higher or lower than the ex-ante allowance.
  - Further review shows that high probability risks (>70%) have been wholly allocated to the relevant contract. Under this strategy SHE Transmission are effectively taking a P100 risk position and thus passing on all the costs to the consumer. We do not consider this to strike the appropriate balance between the TO and consumer and proposed that this risk should be included in the residual risk register and retained by SHE Transmission.
- The construction programme is challenging but ultimately would appear to be as good as is practically possible being constrained by both supply chain restrictions and the required completion date. It is heavily dependent on the subsea cable installation programme.
  - Contract award is required by the end of July in order to mitigate some of the risk and an upfront payment has been agreed to secure both a manufacturing slot and vessel hire.

  - Delays due to interdependent processes or those that cannot be foreseen (in particular weather risk) could lead to a significant delay in project completion.
  - Due to the constrained time available for construction no slack is available and SHE Transmission's only available mitigation would be to increase manpower should slippages occur. Depending on timing this may not prove to be effective.

- Both our recommendation on annual ex-ante funding allowances and SHE transmissions requested allowance are shown in Table 2 (in real 2013 prices).
  - Our recommendation affords an overall project cost reduction of £7.5m (3.5%)
  - This reduction is wholly achieved through our recommendations on the treatment of risk; the re-instalment of the provisional risk back into the residual risk register and the acceptance of a P50 risk value.

Table 2 – Ex-ante allowance

	2013	2014	2015	2016	Total
Total	**£17.35**	**£60.23**	**£117.57**	**£9.59**	**£204.74**
SHE Transmission Submission	**£25.70**	**£79.50**	**£103.00**	**£4.20**	**£212.40**

Recommendations for SHE Transmission's future Technical Case submissions

Based on our Technical Case assessment for Kintyre-Hunterston, and its outcome as characterised in Table 1 we believe it is helpful to identify the following aspects:

- It is to some degree accepted that the assessment process will be iterative. However bearing in mind the often tight timescales involved significant time can be saved upfront if the technical case submission included all supporting documentation referenced.

- As part of the process for assessing the cost effectiveness of the project, traceability and project evolution is crucial in our understanding of how costs have developed. The creation of an auditable history for a SWW project, from inception to submission (and beyond), and the provision of historical data with supporting documentation detailing changes and why they were made would greatly aid this process.

- Risk assessments and the treatment of risk is both subjective and divisive and as such requires additional consideration during submissions. In additional to providing transparency for the value placed on the risk and the probability of it occurring it is essential that the risk register is regularly updated with the latest project data, annotated to explain any movement and to ensure that the risk has been allocated correctly. Historical data should be retained to show risk evolution. Unless there is a strong justification P50 should be the starting point for the risk allowance as this strikes the appropriate balance between the respective likelihood of TOs or consumers paying for risks which may or may not arise.

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1. INTRODUCTION

1.1 Background

As part of the RIIO-T1 price control, to take effect from 1 April 2013, Ofgem is including a provision for within-control period determinations on revenue adjustments (during the price control period) to enable delivery of Strategic Wider Works (SWW) outputs.

The SWW mechanism will include provisions within the licence to make future adjustments to revenues to reflect any decisions taken by the Authority to allow cost recovery for eligible projects which meet certain criteria and do not form part of the RIIO-T1 baseline.

To put forward a project for consideration under the SWW mechanism, the relevant Transmission Owner (TO) must provide a Needs Case submission followed by a technical case submission. The TO decides when to submit the proposals on the basis of when they believe they are able to justify the economic and technical case for delivering a project on a given timescale.

SHE Transmission has put forward the proposed Kintyre-Hunterston reinforcement for assessment by Ofgem under the SWW process – consisting of both a Needs Case submission and a Technical Case submission.

Ofgem has commissioned Pöyry to undertake an independent expert assessment of both the Needs Case and Technical case for the proposed Kintyre-Hunterston project. This is to inform its determination of the requirement, timing and level of funding for the project.

This concise report provides Pöyry's assessment of the Technical Case only for SHE Transmission's proposed Kintyre-Hunterston reinforcement project under the SWW process.

1.2 Structure of this report

This concise report assessing the Technical Case for the proposed Kintyre-Hunterston reinforcement is structured as follows:

- Section 2: Overview of the Strategic Wider Works process;
- Section 3: Overview of the proposed Kintyre-Hunterston reinforcement; and
- Section 4: Pöyry's assessment of the Technical Case.

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2. DESCRIPTION OF THE STRATEGIC WIDER WORKS ASSESSMENT PROCESS

2.1 Overview of Strategic Wider Works process under RIIO-T1

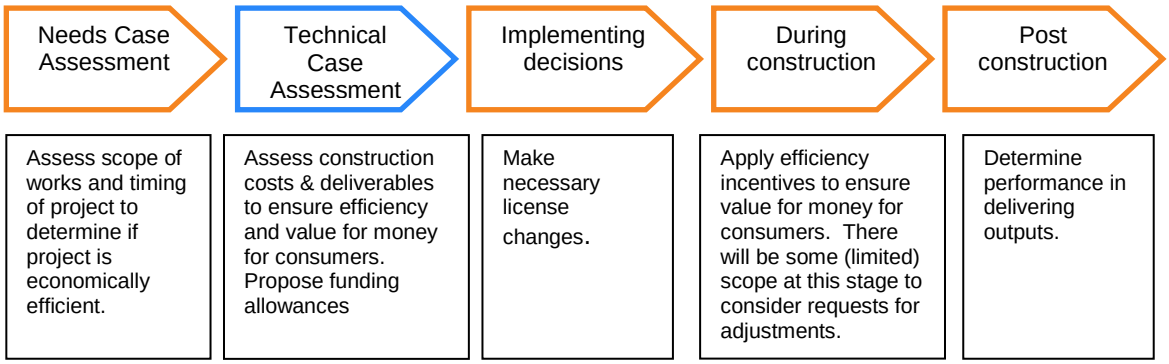
The Strategic Wider Works process for RIIO-T1 has been adopted to enable the onshore TOs to put forward major wider reinforcement schemes (in cost and/or scale terms):

- linked to anticipatory investment for typically meeting renewable generation developments; and
- subject to uncertainty of need, timing and scale – at the time of the RIIO-T1 settlement at least.

Details of the Strategic Wider Works (SWW) arrangements, as they will apply to SHE Transmission, are set out in Appendix 2 "Guidance on Strategic Wider Works Arrangements" of the Ofgem, RIIO-T1: Final Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd.

The stages in the overall SWW process are outlined in Figure 1 and discussed below.

Figure 1 – Overview of Strategic Wider Works (SWW) assessment process



The assessment leading to a decision on cost recovery is in two stages:

- the first stage is a Needs Case assessment, commencing following receipt of the Needs Case submission; and
- the second stage is a project assessment, commencing following receipt of the Technical Case submission.

The above assessment stages are interactive and are likely to overlap:

- the review of the Technical Case submission may be an input to the conclusion of the Needs Case assessment (e.g. by providing input assumptions, based on latest cost estimates, for updating or testing quantitative analysis, and further information on delivery strategy and practical factors driving the proposed timing); and
- completion of the full project assessment is subject to a positive conclusion from the Needs Case assessment.

Where, following the above assessment, the Authority reaches a decision to allow cost recovery, Ofgem will take forward the necessary licence changes to reflect that decision.

This will include specification of ex-ante total expenditure (totex) funding allowances (with annual profile), secondary deliverables, and completion date for the SWW project.

During construction, Ofgem will monitor progress towards outputs, and expenditure against profiled allowances. The risk of differences between allowances and expenditure will be shared between the TO and consumers through the efficiency incentive mechanism, with a sharing factor (50% in SHE Transmission's case) determining the proportion of this difference which is borne by the TO. In addition, the Cost and Outputs Adjusting Event (COAE) mechanism will provide scope for ex-post adjustments in certain circumstances. The COAE mechanism will only apply to material changes attributable to a single prescribed event. Further details of the material changes and prescribed events relevant in SHE Transmission's case are set out in the guidance document referred to above.

Finally, post construction, Ofgem will determine performance in delivery of outputs. This will include establishing whether and when the agreed increase in boundary capability had been delivered and where applicable, understand the reasons for any failure to deliver in line with agreed outputs, and the extent to which the TO could be held responsible for this. Ofgem may address late delivery through the imposition of a financial penalty, which would be set taking into account the level of consumer detriment and any aggravating or mitigating actions taken by the TO.

2.2 Assessment of the Technical Case under the SWW process

The assessment in this report provides an input to Ofgem's Technical Case assessment under the SWW process (the second stage shown in Figure 1), following a positive conclusion to assessment of the Needs Case. The key objectives are to assess efficiency and value for money for consumers based on construction costs & deliverables and to propose appropriate funding allowances. Namely:

- The robustness and sensitivity of SHE Transmission's process for procurement and selection, and whether this process has been efficiently applied and could be expected to lead to an efficient outcome. A review of the procurement and selection process will be carried out to assess how the market was engaged and SHE Transmission's approach to definition and application of evaluation criteria to short-list and select the final supplier/s and technology.
- The appropriateness of the proposed costs, taking into account the conclusions on the above and any additional detailed cost assessment including benchmarking of specific elements such as;
  - Substation asset supply and installation;
  - HVAC subsea cable supply and installation; and
  - Overhead line supply and installation.
- SHE Transmission's evaluation of risks, risk management strategy and proposed approach to allocating risks and risk costs. A key principle of the RIIO-T1 arrangements is that risk is best borne by the party able to influence it so this will included an assessment of the TOs ability to influence the level and timing of the risk – for example, through contracting arrangements or consideration of alternative solutions.
- The appropriateness of the construction programme and progress made towards being ready to proceed in the proposed timescales. This will include assessment of critical path definition and consistency and interaction with key risks such as extreme

weather, consenting, key milestones and treatment of task interdependencies by SHE Transmission.

Under the principles of the RIIO framework, the depth of Ofgem's and Pöyry's supporting review of the above assessment areas is undertaken proportionate to the perceived quality of the Technical Case submission and the level of justification provided by SHE Transmission, including relevant supporting evidence.

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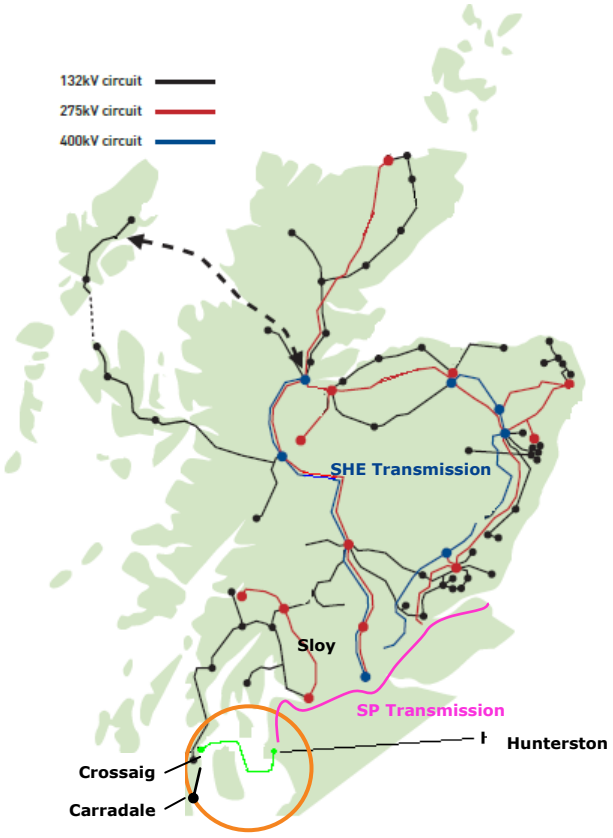
3. OVERVIEW OF THE PROPOSED KINTYRE-HUNTERSTON REINFORCEMENT

SHE Transmission states that the project to reinforce the transmission system in Kintyre is driven, primarily, by the need to relieve the growing pressure on the local network, and to support the growth of renewable generation in the region. The proposed reinforcement is illustrated and described in Figure 2 below:

Figure 2 – Overview of Kintyre-Hunterston link



The proposed reinforcement comprises:

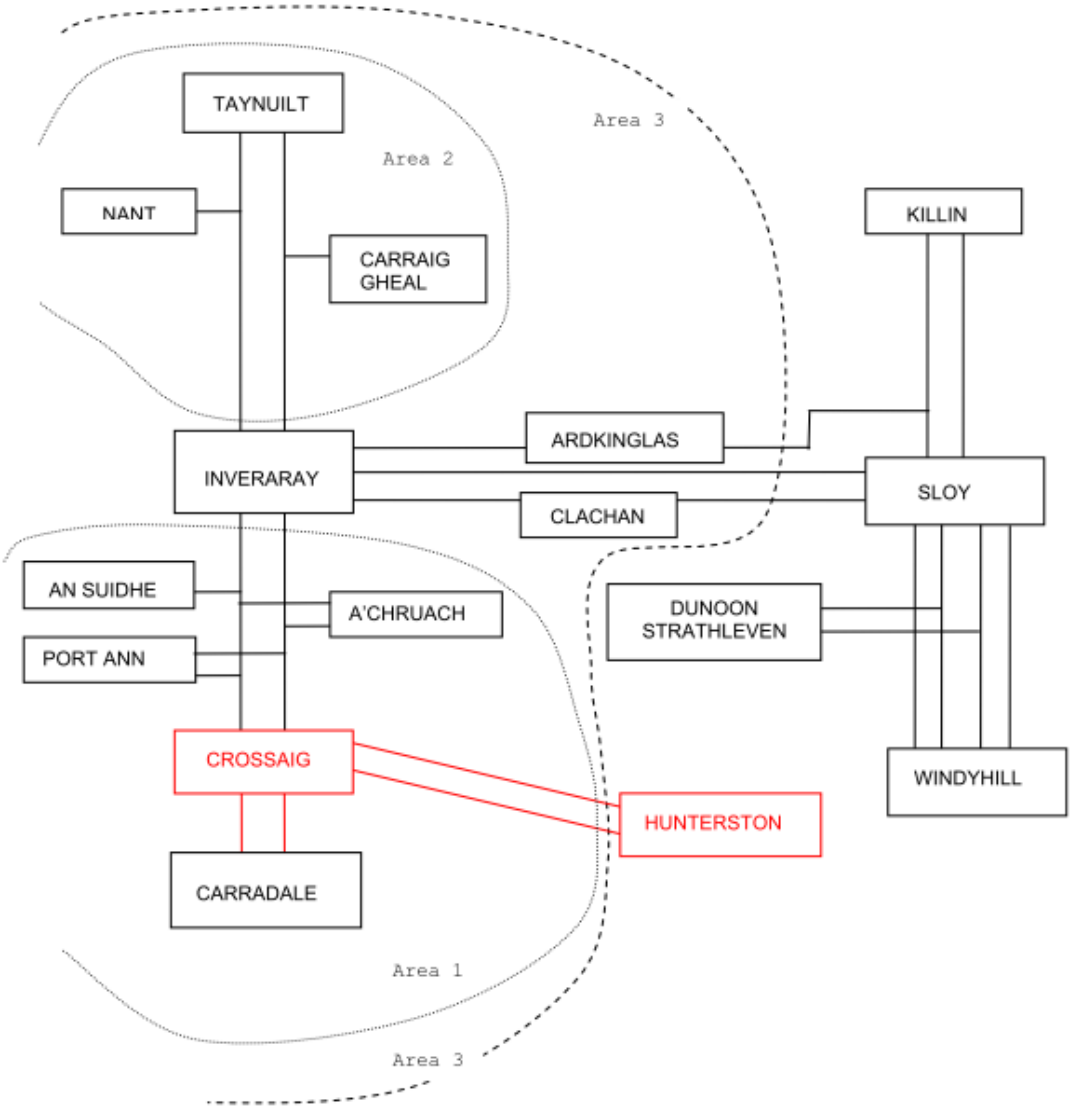
- 2 x 220kV 240MVA AC (40km) subsea cables from Crossaig to SP Transmission's existing substation at Hunterston;
- a new 132/220kV substation, including Quad Boosters, at Crossaig;
- construction of 13km of new 132kV double circuit overhead line between Crossaig and Carradale;
- the dismantling of the existing 132kV overhead line between Crossaig and Carradale; and
- incurs a Present Value (PV) capex of £266.6m with a project completion date of October 2016.

Source: Kintyre-Hunterston reinforcement, stakeholder's summary.

The project is largely located in SHE Transmission's licensed area, but 3.5km of land cable and associated substation works (132/220kV transformer and associated switchgear) are located in SPT's licensed area at Hunterston. SPT will be completing the required works in their licensed area. The SPT share of the works has been allowed in their RIIO-T1 baseline, and therefore will not be subject to the SWW process. It is not specifically included within the scope of the SWW assessment by Pöyry. The PV given in Figure 2 includes costs for SPT's works at Hunterston.

An electrical circuit diagram of the south west region of the Scottish transmission network and the proposed Kintyre-Hunterston reinforcement scheme is provided in Figure 3 below:

Figure 3 – Electrical diagram of the transmission network in the Kintyre region and the proposed reinforcement



Notes:

(i) The diagram also shows local network boundaries against which network capacity to export from Kintyre to the wider transmission network would apply

(ii) Both Windyhill and Hunterston lie within the SPT network region. This is the network within the SHE transmission area.

Source: SHE Transmission Needs Case Report, Kintyre to Hunterston Transmission Reinforcement, 8th January 2013.

It is worth highlighting that even after commissioning of the proposed Kintyre-Hunterston reinforcement, a minor boundary constraint exists for transfer of power across the Area 1 boundary in Figure 3. The geographic location of future renewables development on the Kintyre peninsula influences the increase in export capacity that can be provided by the proposed Kintyre-Hunterston reinforcement. The boundary constraint could potentially reduce network capacity increase by as much as 50MW from a maximum potential of c.600MW.

4. PÖYRY'S ASSESSMENT OF TECHNICAL CASE

Our assessment of the Technical Case for SHE Transmission's proposed Kintyre-Hunterston reinforcement as detailed below is based on the SHE Transmission technical case submittal document of 10 January 2013 supplemented by a series of Q&A responses. At the time of submittal SHE Transmission were still undergoing negotiations on all the major contracts and thus cost information could not be considered fixed and final. Not only was the final contract price still to be confirmed, allocation of risk and acceptance of equalisation items still remained fluid. As a consequence the figures presented in this report are generally a snap shot at any given time may not be the final contract values.

4.1 SHE Transmission's approach to procurement

4.1.1 Overview of approach

A review of the procurement and selection process is carried out to assess how the market was engaged and SHE Transmission's approach to definition and application of evaluation criteria to short-list and select the final supplier/s and technology.

- This includes supply of plant, construction and installation services, and engineering and design.
- The overall contracting strategy taken and how this might influence project efficiency and risks is also investigated.

This enables assessment of the techno-economic efficiency and robustness of SHE Transmission's approach in terms of sensitivity to design changes and potential supply chain constraints for example. Co-ordination of procurement with SPTL is also reviewed.

4.1.2 Contracting strategy

SHE Transmission used a multi-contract strategy for the reinforcement works due to the complex nature of the project. The largest contracts are for the 220kV AC cable works, the Crossaig to Carradale overhead line works, and the Crossaig substation works. These comprise approximately 76% of the total project cost. Project management, environmental and consenting studies, design and engineering studies, operations and other minor construction works are either undertaken internally, tendered as competitive contracts or under existing framework agreements. The status of the key contracts is given in Table 3.

Table 3 – Construction works procurement timetable

Contract Title	OJEU / PQQ Issue	Tender Evaluation Status	Proposed Contract Award
10.0558 Kintyre – Hunterston 220kV AC Cable Works	18/06/2010	Complete	01/06/2013
11.0546 Crossaig to Carradale Overhead Line (including Pubic Road Improvements)	26/08/2011	BAFO: 10/05/13	15/07/2013
11.0581 Crossaig Substation (Framework outwith Project)	14/03/2012	Complete	Awarded

SHE Transmission indicated that all tenders have been carried out in line with current EU thresholds.

The procurement process used by SHE Transmission is illustrated in Figure 4. Our view is that this is an appropriate contracting strategy to take for this project.

Figure 4 – Overview of Procurement process

4.1.2.1 HVAC subsea cables

Twin 220kV HVAC subsea cable circuits of 41.5km length and each rated at 240MVA are to be constructed from the new substation at Crossaig to SP Transmission's existing substation at Hunterston. Each subsea cable will be designed to comply with SHE Transmission 220kV subsea cable specification and will be connected to short lengths of onshore underground cable at either end. The design is such that no field joints are included.

SHE Transmission has used a fixed price design and build procurement strategy for the HVAC subsea cable supply and installation with the cable contractor also responsible for supplying the cable laying vessel. A subsea burial risk assessment has been carried out and the report "Risk and Burial Assessment" has been used by SHE Transmission in contractual discussions regarding burial requirements and cable protection. The cable contractors have based their offers on the report and a hybrid of re-measure elements has been included to cover any deviations. The key risks, which largely relate to cable protection (The need for additional rock cover or alternative burial methodology to achieve a typical target burial depth of 0.6m), have been identified and included in the SHE Transmission risk register.

SHE Transmission indicate that the procurement process is close to completion and that they are aiming to close out all technical and commercial issues [redacted] with the leading subsea cable contractor with regular meetings following to close out all deviations and exceptions. The earliest Contract Award for the Cable works would be 01 June 2013. Full site and route selection procedure has been undertaken.

Contracts are now agreed in principle and SHE Transmission has provided status of risks being negotiated into contract with cable tenderers. This aspect is considered further in Section 4.3. SHE Transmission [redacted] have agreed an upfront payment [redacted], to secure a cable laying vessel and manufacturing slot.

SHE Transmission have accepted that the programme is challenging but state that their procurement process is robust. The use of 220kV cable with it smaller supply chain is not perceived to have a negative impact on the cost with the demands of the Kintyre – Hunterston project not expected to have any significant impact on worldwide supply which is already showing signs of constraint.

4.1.2.2 HVAC onshore cables

The HVAC subsea and onshore cables are to be awarded as a single package but will be technically split. The onshore cables are defined as the cable sections from beach transition joints to sealing pin ends and are to be compliant with the SHE Transmission 220kV AC Cable system specification. The cables will be 3x single core from the beach transition to the onshore substations (1km Kintyre, 3.5km Hunterston).

SHE Transmission is leading and maintaining design responsibility for the complete cable works and maintain design interfaces with SPT. SPT are responsible for cable and works costs for the onshore cable link to Hunterston substation. SHE Transmission is responsible for the complete cable procurement and installation as detailed in the commercial agreement which is being concluded between SHE Transmission and SPT. SHE Transmission indicate that SPT were issued with and accepted a tender commercial evaluation at each stage of the tendering process. Our Assessment of the procurement process is as above for the HVAC subsea cables.

4.1.2.3 Crossaig substation

A new 132/220kV substation will be constructed at Crossaig. This will include 220/132kV 240MVA auto-transformers, 240MVA quadrature boosters, 33kV tertiary reactive compensation and associated switchgear. The quad boosters are to allow power flow control and optimisation for the lower capacity 132kV overhead lines on the Kintyre peninsula running in parallel with the subsea cable circuit. Shunt reactive compensation is to be installed at both Crossaig and Hunterston to reduce capacitive charging current.

SHE Transmission has recently implemented a substation framework agreement that will cover all transmission projects. For each project the preferred contractor will produce a detailed design, to include all civils, electrical and plant, for acceptance by the SHE Transmission project team. SHE Transmission has confirmed that the procurement process for the framework agreement is now complete and Siemens/BAM have been awarded the framework which includes Crossaig substation.

Site investigation works were carried out concurrently with the tender clarification and evaluation process with the intention of transferring some risk to the contractor. An allowance to cover this risk is included in the risk costs. Ground conditions risks have not been accepted by the framework contractor until full site investigations are complete and have been assessed and will then be negotiated. **A more efficient approach would have been to complete site investigations prior to tendering**, this would reduce the possibility that contractors would reject risk transfer.

4.1.2.4 132kV OHL contract

The 132kV OHL is 13.5km in length and of double circuit design. The new tower design will be steel lattice L7c and conductors will be single 500mm^2 AAAC Rubus with a rating of 245MVA The current overhead line is a double circuit of Lynx conductor and tower construction with a N-1 capacity of (79/99MVA).

The OHL contract is being procured on a full design and build fixed price basis with the tender is to be awarded on the basis of “most economically advantageous tender”. The contract covers the design, procurement, engineering, construction and commissioning of the new 132kV OHL from Crossaig to Carradale. It includes for the dismantling and disposal of the existing 132kV OHL and towers. It also includes extensive public road improvements including design, construction and removal (where applicable) of access tracks and roads. This has been driven by the need, to minimise the risk to the programme, to take temporary ownership of Forestry Commission routes to ensure the availability and the good condition of key access routes to site. Under this arrangement SHE Transmission have obligation to manage traffic flow of all users but have rights to instigate/require repairs in the case of damage.

SHE Transmission have aimed to reduce uncertainty for the contractor by carrying out site investigations to aid with foundation selection, construction method, selection of tower type etc. LSTC carried out overhead line survey, initial design and site investigation along proposed route and detailed ground investigation for proposed tower locations has been undertaken. Site investigation works were carried out during the tendering process with SHE Transmission aiming to transfer this risk to contractors during clarification process and prior to award. **A more efficient approach would have been to complete site investigations prior to tendering**, this would reduce the possibility that contractors would reject risk transfer.

SHE Transmission has confirmed that the tender evaluation process is not yet complete although advanced. A preferred tenderer has been identified following four rounds of

tender submissions and detailed clarifications. BAFO submissions were due on the 10th May 2013. The preferred contractor will produce a detailed design for acceptance by the SHE Transmission project team.

SHE Transmission has provided details of the overhead line contract tender evaluation criteria, weightings (for technical and commercial elements) and current rankings. The specialist consultant LSTC have provided, as part of their framework agreement, guidance on the tender assessment. The leading tender submission was used for the detailed cost submission with equalisation cost, provisional sums and discrete risks added to cover the full scope of works. Limited number of deviations and exceptions remain to be concluded with all leading tenderers. SHE Transmission state that contracts are now agreed in principle, has provided status of risks being negotiated into the contract with overhead line tenderers and that the leading tenderer has accepted all risks, subject to the accuracy off ground investigation reports undertaken by SHE Transmission. There is additional provision for additional works that SHE Transmission state are due to external factors outside their control.

4.1.2.5 SPT scope

Under the project scope of supply SPT are responsible for the Civil works and ducting from Hunterston up to and including the transition joint pit. Cable manufacture, installation and commissioning would be then procured under the main contract with the cost subsequently transferred. In order to ensure the necessary co-ordination a clear responsibility matrix has been agreed between SHE Transmission and SPT and the commercial agreement drafted.

Under this arrangement the SHE Transmission/SPT boundary will move to the transition pit and thus a boundary change request has been submitted to Ofgem.

4.1.2.6 Current status (22 May 2013)

At the workshop of 22 May 2013 SHE Transmission confirmed that though contract negotiations were still ongoing and no official preferred bidders have been announced to maintain competitive tension and maximise commercial negotiations all three EPC contracts were largely complete with few technical and commercial issues outstanding.

- Cable contract

  [redacted]- Assumptions have been made in order to proceed but risk exists that the cable size may need to increase. Overall cost would be less than 10% of the onshore element. Marine Scotland sign off is not possible until [redacted] Stage 1 award so that [redacted]can present the detailed methodology. The methodology has been discussed in principal and as such it is not expected that any cost or programme implications will be raised. Contract terms and conditions are still to be finalised for latent defects, indemnity and limitations of liability.

  The commercial agreement between SPT and SHE Transmission has been drafted and the boundary change request has been submitted to Ofgem.

- OHL Contract

  BAFO now received. Completion of site investigations, ground line surveys and public and private road conditions remain outstanding.

- Substation Contract

Completion of site investigations, ground conditions and transport and delivery requirements remain outstanding. Ground condition risk and foundation issues still remain to be commercially agreed.

4.1.3 Tendering evaluation process

SHE Transmission have undertaken a comprehensive tender evaluation process for the project. A pre-qualification scoring mechanism, with support from external consultants where necessary due to the project complexity, has been utilised to reduce the number of tenderers taken forward. This is supplemented by pre-tender meetings to ensure the contractors identified were capable of undertaking the work.

For those contractors successful each tender package undergoes its own SHE Transmission internal evaluation process comprising both a technical and commercial evaluation. In line with SHE Transmission's own policy the technical and commercial evaluation a undertaken separately and independently of each other.

The evaluation process consists of multi stages each broken into multiple sections with each of these sections further subdivided. Each section is given their own weighting out of 100 and an additional score out of 50 is given for the Tender interviews to give an overall maximum of 150. The tender matrix is populated or updated as the process progresses.

The award is ultimately made on the basis of the "most economically advantageous tender".

4.1.3.1 Cable works

The cable technical evaluation was undertaken by CCI (design) and Telesecure (installation). Tenders were received from 3 Bidders (ABB, Nexans and Prysmian) which though limited is consistent with current supply chain capability for cable voltages at this level. Each bidder was requested to offer a solution to achieve the power rating required, and as such the solutions offered differed depending on the manufacturer's specific cable design, and attitude to risk (conservatism). However each bidder's best and final offer included for a cable design they were confident was the most cost effective, technically acceptable solution.

[redacted] SHE Transmission have subsequently advised that both [redacted] and CCI have reviewed the bid and are confident their offer is compliant but that the design basis is based on the accuracy of the data contained within protection and burial report provided by SHE Transmission and remains as SHE Transmission's risk. [redacted], as is normal for subsea cable installation, will not accept ground risk. Ground conditions are such though that increased burial depth below that specified and designed for, with the exception of the shipping lane, is unlikely, leaving soil resistivity as the only realistic risk. The increased depth required in the shipping lane has been catered for by an increased cable cross sectional area (csa) to cover the shipping lane up to and including the Hunterston onshore offshore transition. As such the cable provided by [redacted] will be manufactured with [redacted] different cross sectional areas but supplied as a single factory length by using a 'factory' joint to connect the [redacted] sections. This approach is a relatively common practice for subsea cable installations where the onshore/offshore transition often results in the most onerous cable conditions. The use of a cable with [redacted] different cross sectional areas is the most cost effective solution with no significant impact on manufacturing time but affording an overall installation time saving when compared to the use of an in situ joint. The factory joint also offers an increase in reliability over the equivalent in situ joint.

The tender evaluation undertakes an equalisation process to effectively put the bids on an equal footing. [redacted]

The initial technical evaluation by Telesecure indicated that in their opinion the [redacted] programme is too short. However after further discussion they have subsequently revisited the methodology and now accept that the installation method proposed, [redacted].

[redacted] Costs have increased from round to round as contractors presumable took on more risk and adapted their offer but it is not immediately clear what can be apportioned to scope clarification or risk acceptance.

The original reports suggest that Land cable offered by [redacted] is not compliant in some way. This suggestion has now been revised and reports will be updated to reflect the current status that the offer is fully compliant.

Throughout the tender process [redacted] were consistently good in all categories and the only bidder able to meet the pre qualification and factory test requirements as well as proving type test documentation. To date they have the most experience of cables at this and similar voltages.

Table 4 – Subsea Cable – Tender evaluation scores

[redacted]

4.1.3.2 Overhead line works

The OHL technical evaluation was supported by LSTC. Over 27 contractors prequalified and subsequently tenders were received from 6 Bidders.

OHL works is very much a core aspect of SHE Transmission's business which they understand well. Though it remains an ongoing process, which very much reflects how comfortable they are with this aspect, [redacted] are currently first choice being technically and commercially best and currently have the least outstanding contractual issues. The score for the 6 bidders are shown in Table 4 below.

Table 5 – Overhead line works – Tender evaluation scores

[redacted]

4.1.3.3 Substation works

The Substation has not been tendered as a standalone contract but rather forms part of one of three framework agreements to provide substations on the SHE Transmission licensed transmission operation area.

As the tender was for a framework agreement rather than a specific project the tender contained a number of models, four electrical and one civil, the purpose of which was to allow tenderers scale for pricing all the Schedules of Rates. There were five tenderers for the framework of which four were technically acceptable and forwarded to the commercial

evaluation stage. The ABB/BBES consortia scored the highest in the technical assessment providing a detailed response, demonstrating an understanding of the requirements, and a joint up approach. Alst Ent, Miller Quatro and BAM Siemens followed in that order. Ultimately the three areas were awarded as follows:

- ABB Ltd & BBES Ltd; Lot one Caithness & Sutherland;
- Alstom Grid UK Ltd & Enterprise Managed Services Ltd; Lot two East Coast; and
- BAM Nutall & Siemens T&D; Lot three Moray and West.

Kintyre-Hunterston, estimated at [redacted] as part of the framework, falls within Lot three Moray and West and will be undertaken by BAM Nutall & Siemens T&D.

The framework approach is intended to offer an overall saving for substations when compared to a project by projects cost basis but does preclude the ability for a manufacturer to offer a bundled price for larger more complex projects such as Kintyre-Hunterston. The contract strategy applied by SHE Transmission to this project prevents [redacted] from bundling both the substation and cable into a single offer. The strategy, which is commonly used for transmission projects in the UK, is envisaged to provide an overall benefit over time across the total network.

4.1.4 Summary of our view of SHE Transmission's approach to procurement

SHE Transmission's approach to procurement appears to be appropriate and robust giving higher weighting to costs, risk and technical compliance whilst giving due recognition to other more intangible measures. A number of the measures are subjective and hence at risk of manipulation. However, where the majority of such risks occur the evaluation is advised by independent external contractors to limit any overt favouritism. **Overall, based on the time constraints imposed, both the techno-economic efficiency and robustness of this approach is good with the award based on the basis of the "most economically advantageous tender".**

The late commencement of the project however has resulted in a number of activities, principally site investigation work, being undertaken in parallel with contract negotiations leading to at the very least an inefficient process ,the need for provisional sum items in contradiction to NEC 3 principals and the potential for an increased risk allocation to cover for cost uncertainty.

4.2 Cost Assessment

4.2.1 Overview of approach

The key project unit costs for items of plant, construction and installation (i.e. substation transformers, switchgear, quad boosters, HVAC cables and overhead lines, onshore civil work, undersea cable laying etc.) are compared with benchmark unit costs

TNEI have, over time, developed an extensive in house cost library used for tendering, benchmarking and estimating purposes. This library includes data from multiple projects for public bodies and private companies across a wide range of industries, including transmission and distribution and onshore and offshore wind, in the UK and worldwide. This is further supplemented by publically available information. The primary data sources used for benchmarking of this project are:

- TNEI's internal database;
- National Grid 2010 Offshore Development Information Statement (ODIS) Appendices;

- RIIO-T1 asset cost data; and
- the IET/PB Power Cost Study 2012.

Benchmarking is undertaken for the major items and activities only. Even where projects appear technically similar costs can vary due to a range of issues such as location, supply and demand, contract strategy, material costs, exchange rates and inflation and thus, when benchmarking, a range of values have to be utilised rather than a single cost (Even then the range is typical, for guidance only, not absolute and each project must be considered in its own right). This is further necessitated as no two technical solutions are the same and no two projects utilise a consistent approach to cost allocation such as even for what would appear to be two identical cost items they may not consist of the same component build up; allocation of design, commissioning and project management costs can be spread across all components or lumped into a single large one split evenly between manufacture and installation or not. Different suppliers do it in different ways and are largely inconsistent across projects.

The general approach is that Substation costs (equipment and works), in £m/MW, and HVAC cable and overhead line costs (equipment and works), in £m/MW/km, are benchmarked in a top-down cost assessment as appropriate. Costs are assessed with reference to the design details and efficiency and comparison with similar projects in GB, Ireland and internationally. The influence of SHE Transmission's approach to procurement and selection, and risk on proposed project costs is specifically considered.

4.2.2 Project costs

4.2.2.1 Overview

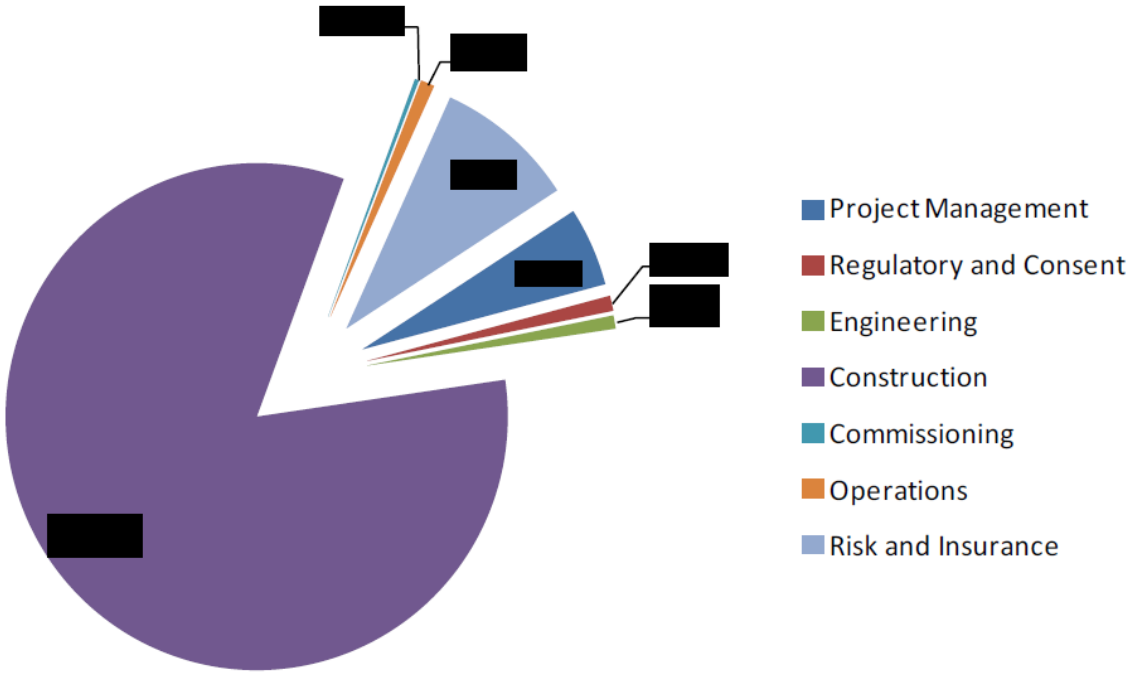
SHE Transmission have broken down the key components of the total cost make up (Capex and Opex), of their element, for the Kintye Hunterston project as below.

Table 6 – Overview of project costs

Item	Cost
Project Management	[redacted]
Regulatory and Consent	[redacted]
Engineering	[redacted]
Construction	[redacted]
Commissioning	[redacted]
Operations	[redacted]
Risk and Insurance	[redacted]
Total	**£212,431,255.81**

It can be clearly seen that the vast majority of the cost associated with construction (83%) with risk and insurance [redacted] and project management (5%) the next two largest areas.

Figure 5 – Distribution of project costs



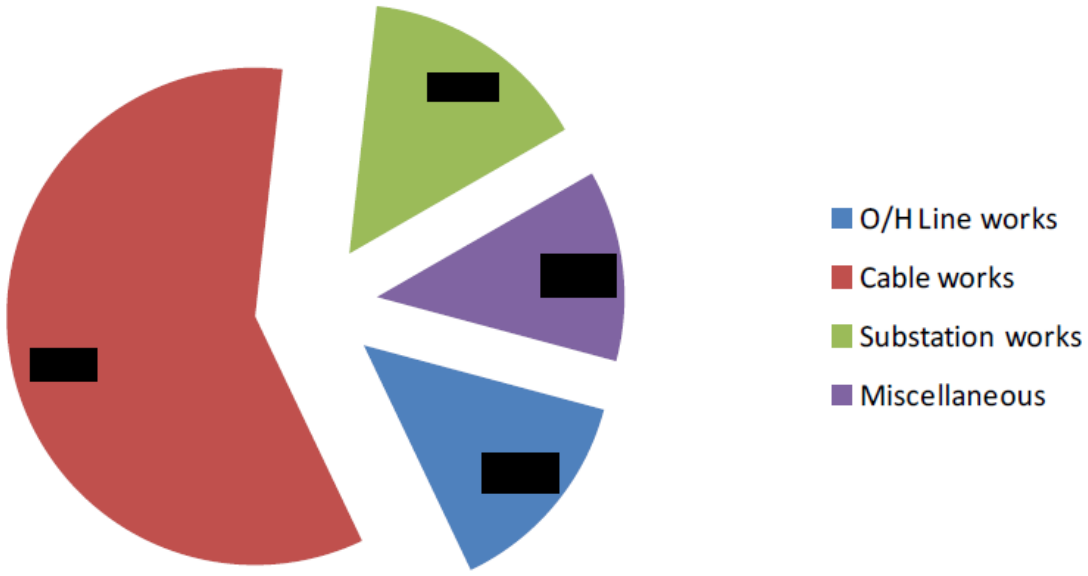
4.2.2.2 Construction overview

Of the Construction costs the three EPC packages; O/H Line works, Cable works and Substations works account for 88%. The remaining 12% remains as a SHE Transmission direct cost largely covering enabling/facilitation works, provisional sums and miscellaneous small discrete packages. The EPC package costs include the contract cost (current BAFO) and any outstanding equalisation items still to be negotiated.

Table 7 – Overview of construction costs

Item	Cost
O/H Line works	
Cables works	
Substation works	
Miscellaneous (Inc. provisional sums)	
Total	**£176,218,414.61**

Figure 6 – Distribution of construction costs



4.2.2.3 Substation works

The total Crossaig substation works costs are [redacted], and include new 132/220kV substation transformers, Shunt reactors and Quad Boosters at a fully installed cost (excluding other civil costs) of approximately [redacted] with installation accounting for 10% of the total cost. The substation buildings, switchgear and miscellaneous items account for the remaining [redacted].

2010 ODIS Transformer costs (assembled but excluding civil works) range from between £0.8 million and £2.2 million depending on rating and voltage ratio. Shunt reactor costs are £12K/MVAr. RIIO costs have a similar range but a higher top end. The TNEI internal database cost for an EHV substation is circa £1.5 million per bay inclusive of all protection and control, civil and structural and station auxiliary requirements.

Both SHE Transmission's total substation costs and the cost of key items are at the lower end of the benchmark cost range. This would appear consistent with SHE Transmissions approach to substation build and the use of frameworks; where the framework approach is intended to offer overall saving when compared to a project by projects cost basis.

Table 8 – Substation costs

Item	SHE Transmission	Benchmark
2 off 220/132kV Transformers	[redacted]	2,000,000 - 5,500,000
2 off Quad Boosters	[redacted]	4,800,000 - 6,000,000
2 off Shunt Reactors	[redacted]	2,500,000 - 3,000,000
1 off Substation inc 13 substation bays and 2 Future Cable Feeder Bays	[redacted]	15,800,000 - 22,500,000
Total	[redacted]	**£25,100,000 - 37,000,000**

4.2.2.4 Cable works

Table 9 – Overview of Cable works costs

[redacted]

TNEI internal fully installed costs for submarine transmission cable ranges from between 0.6 - 1.35 £m/km which is comparable SHE Transmission's costs.

The supply costs, which exceed the benchmark range, are largely market forces led. The current high demand for subsea cable due to the demand by offshore wind developments combined with a relatively small supply chain is causing costs to escalate. In the short to medium term there is no reason to suggest that this upward trend will not continue irrespective of commodity prices.

Installation costs, which fall within the mid benchmark range, are largely subject to project specific conditions such as burial depth, sea bed conditions, weather, and installation methodology. More onerous conditions lead to slower installation rates increasing installation time and consequently, costs. The installation methodology proposed suggests conditions are largely benign but the short route lengths make any fixed costs associated with mobilisation, equipment hire and testing etc relatively expensive on a per km basis.

Table 10 – Subsea cable costs

Item	SHE Transmission Unit Cost	SHE Transmission Cost range	Benchmark
Subsea cable supply	[redacted]	[redacted]	0.4 - 0.5 £m/km
Subsea cable installation	[redacted]	[redacted]	0.2 - 0.85 £m/km
Total	[redacted]	[redacted]	**0.6 - 1.35 £m/km**

The onshore installed cable costs appear high at [redacted] the benchmark cost range of 1.5 - 2.6 £m/km. The cable supply costs are comparable but installation costs dictate the SHE Transmission total cost. There are two possible explanations for this: Benchmark costs are on £m/km based on typical multiple kilometre cable lengths (installed in ducts or direct laid) and thus any fixed costs and local anomalies are absorbed over the whole length. The onshore installation costs for this project relate to a total length of circa 1km and thus there is no opportunity to absorb the cost. In this case costs are driven by the civil scope associated with the installation and whilst these are high they are comparable across all three tenderers and thus are considered appropriate for the scope of work required.

Table 11 – Onshore cable costs

Item	SHE Transmission Unit Cost	SHE Transmission Cost range	Benchmark
Onshore cable supply	[redacted]	[redacted]	1.35 - 2.35 £m/km
Onshore cable installation	[redacted]	[redacted]	0.15 - 0.25 £m/km

Total	[redacted]	[redacted]	**1.5 – 2.6 £m/km**

4.2.2.5 Overhead Line works

Table 12 – Overview of overhead line works costs

[redacted]

Construction of 13km of new 132kV double circuit overhead line between Crossaig and Carradale is set to cost [redacted].

The overhead line contract also includes extensive road improvement and maintenance works necessary for the construction work to be undertaken, at a total cost of [redacted] giving a total contract cost of [redacted].

National Grid 2010 Offshore Development Information Statement (ODIS) Appendices estimates a 132kV double circuit costs 0.7 - 0.9 £m/km installed. IET Transmission Costing report estimates a comparable unit cost range of 0.75 - 1.2 £m/km for an AC overhead line. The SHE Transmission OHL costs, which are higher than the typical benchmark costs can be partly explained by the remote location of the OHL, which adds a cost premium to the work in terms of mobilisation and construction costs, and the project specific requirement to dismantle the existing overhead line. As the OHL contract was subject to an open tendering process and the 6 returned bids resulted in a [redacted] the OHL costs proposed by SHE Transmission can be considered to be robust. The lowest cost offer of the 6 would have fallen within the benchmark range and was only unsuccessful due to the high cost of the road works element.

The benchmarking of road works is difficult, as it is very project specific, but would be generally done on a cost per km basis based on the number of lanes, use, and type of road surface. In the case of the Kintyre-Hunterston project road works forms a significant element of the overall OHL cost due to the particular project requirements associated with the remote location and the need to take temporary ownership of Forestry Commission. To attempt to quantify the associated cost accurately each tenderer has undertaken a comprehensive breakdown of all road, and tracks within the area required for access. Attempting to benchmark on a simple £/km basis would be erroneous. As with the OHL works themselves, the competitive nature of the tendering process would conclude that the costs are reasonable.

Table 13 – 13km double circuit OHL costs

Item	**SHE Transmission Cost** £m/km	**SHE Transmission Cost range** £m/km	**Benchmark** £m/km
OHL works	[redacted]	[redacted]	0.7 – 1.2
Road works	[redacted]	[redacted]	----
Total	[redacted]	[redacted]	----

4.2.2.6 Project Management

Project Management costs for the project amount to [redacted] including a [redacted]. The costs which include project management , project controls, engineering , administration and support services for the duration of the project account for 5% of the total project costs and are considered reasonable for this size, type and duration. The project team comprises a core mixture of SHE Transmission staff supplemented by external specialists and with the capacity to draw further resource from the wider company as required.

4.2.3 Final Costs – Split by TO

The project is largely located in SHE Transmission's licensed area, but 3.5km of land cable and associated substation works (132/220kV transformer and associated switchgear) are located in SPT's licensed area at Hunterston. SPT will be completing the required works in their licensed area. The SPT share of the works has been allowed in their RIIO-T1 baseline, and therefore will not be subject to the SWW process.

The overall project cost includes a proportion allocated to Scottish Power Transmission (SPT). SHE Transmission have provided a breakdown of the costs but have been unable to provide any further detail of the SPT costs.

Table 14 – Transmission Operator Cost-Split

Item	Total Cost
SHE Transmission	£212,431,255
SPT Transmission	£22,400,000

4.2.4 Our view of project costs

A Comparison of the key benchmarked costs items (contract price excluding equalisation items) shown in Table 15 would indicate that the SHE Transmission costs are reasonable. The project costs are driven by a combination of the multi contract procurement strategy and the tender evaluation process leading to a competitive tender situation resulting in most economically advantageous solution. Whilst the cost may be at the top end of the benchmark range or even exceeding it in the case of the onshore cable costs the robust process would lead to the conclusion we have drawn. Costs are largely lead by current market forces and the nature of this project.

Table 15 – Project cost comparison

Item	SHE Transmission Cost	Benchmark Cost
O/H Lines	[redacted]	£9,100,000 – £15,600,000
Subsea Cables	[redacted]	£50,400,000 – £113,400,000
Onshore Cables	[redacted]	£1,500,000 - £2,600,000
Substations	[redacted]	£25,100,000 - £37,000,000
Total	[redacted]	**£86,100,000 – £168,600,000**

Subsea Cable: The Subsea cable contract/costs seem comparable to internal database costs and are deemed reasonable.

Land Cable: The Kintyre Land Cable Works (1km) at [redacted] are high but deemed reasonable for the defined scope.

Substation: The substation as a whole as well as the individual Transformer, Quad Boosters and Shunt Reactor costs are comparable to TNEI data sources.

Overhead Lines: SHE Transmission unit costs for the overhead line (including foundations, earthing, conductors) is comparable to internal cost estimates and therefore reasonable. Road works costs appear reasonable for the scope defined.

Overall, our assessment is that costs appear reasonable.

4.3 SHE Transmission's approach to risk

4.3.1 Overview of approach

We have reviewed the project risk register, key project risks and mitigation actions as identified by SHE Transmission and how these have been treated in the costs.

We recognise that a key principle of the RIIO-T1 arrangements is that risk is best borne by the party able to influence it. Therefore, the key to our risk methodology was an assessment of SHE Transmission's ability to influence the level and timing of the risk – for example, through contracting arrangements (e.g. for HVAC cable, or hedging strategies, or consideration of alternative solutions (e.g. in response to consenting difficulties). This methodology allowed us to assess the costs that TOs have assigned to risks, and how they align with where TOs can have biggest influence on risk management.

4.3.2 Risk Strategy

As part of Scottish and Southern's Major project services (MPS) governance process (Scottish & Southern are the parent company of SHE Transmission) the Kintyre-Hunterston project has undergone regular risk identification and review workshops during the project's development. Consequently the risk register is a live document continually developing and being refined.

The objective of each workshop is to:

- review risks and identify mitigation;
- identify new risks;
- close any expired risks;
- clarify appropriate risk ownership; and
- transfer appropriate risks and ensure adequate commercial treatment.

In order to undertake the analysis certain assumptions have been made whilst a number of risks have been excluded in order not to skew the results:

- [redacted] will be selected as principal contractor and contract award will be within the validity period of their offer (31st July 2013) and thus the cost and programme are based on their tender and that the cable provided will be fully compliant and both type tested and type registered. Contract terms have largely been agreed between x and SHE Transmission and thus this remains a valid assumption. [redacted].
- Scottish Power Transmission (SPT) will provide any agreed support and undertake their commitments on time and thus will not have a detrimental impact on SHE Transmission (SPT risks).
- New Cable and OHL routes are fixed and information relating to existing OHL routes is accurate.
- Actual ground conditions don't deviate significantly from the preliminary ground investigation, existing foundations can be removed to a depth of 1.3m and foundation pull out tests will not required and thus project costs will not change.
- The existing 132kV switchgear is capable of handling the cable charging current.

Each assumption has been considered against likelihood and impact. Deviations could have a substantial impact on both cost and programme with those relating to the cable scope carrying a significant risk.

A key supply chain risk is obtaining manufacturing slots for High Voltage (HV) subsea cables, which is known to be a major industry bottleneck. SHE Transmission has indicated that the preferred contractor [redacted] has confirmed that they can meet the required supply delivery date. This should minimise the risk of ability to procure the subsea cable in line with planned construction, installation and commissioning plan.

SHE Transmission and their preferred cable contractor are currently closing out technical and commercial issues. This is due for completion [redacted] the contract will be awarded subject to SHE Transmission Board approval and Ofgems minded-to decision.

[redacted]

Under the quantitative risk analysis (QRA) approach adopted by SHE Transmission a number of risks have been specifically excluded and have been transferred elsewhere.

- Risks considered to have >70% of occurrence have been included in the project base estimate as high probability risks have a disproportionate affect on overall risk exposure.
- Risk transferred to contractor are the commercial responsibility of the contractor and will remain with the contractor.
- Risks formally transferred through insurance will be reclaimed through the insurance provision contained within the project estimate.
- Additional costs that breach the threshold can be applied for through the regulator (in line with COAE materiality threshold).
- No risk allowance has been made for currency fluctuations, London metal exchange/material prices or inflation within the project risk register. Price fluctuations are included on the basis of estimates and hedged where appropriate.
- No risks have been included in the analysis to account for significant change of scope or risk events that could result in >20% of the actual total project expenditure as unknown significant scope changes should form part of a re-authority request or raised

through a separate project and unforeseen changes of scope may be re-applied for under COAE provision.

Those that are unlikely or not included in the scope or specifically excluded.

- Risk considered to have a <5% probability of occurrence have minimal impact on the relevant confidence levels of the QRA and explicitly includes for the risk cable damage from anchoring which is seen as a low probability risk due to low sea traffic.
- No risks have been included in the analysis for any regulator penalties or system constraint costs as these cannot be advance funded as part of a project budget.
- No allowance has been included for Opex risk or costs. The current submission highlights funding required for Capex only. The operational cost submission is based on establishing a per unit cost from data submitted as part of the TPCR reporting pack.

SHE Transmission have stated that the total risk allowance has been reduced through either transfer of risk through insurance or as an outcome of negotiations whereby the contractors agreed to take a greater proportion of the project risk – i.e. simplistically an increase in contract value had been offset by a reduction of risk. **SHE Transmission have been unable to confirm whether the transfer of risk is cost effective, leading to an overall project reduction, as the contractors cost increase has not been assessed against SHE Transmission's risk reduction.** In mitigation SHE Transmission advised that any contractor cost changes included numerous items as part of the ongoing negotiations and thus individual costs could not be quantified.

In addition to moving some risks into the contract, and therefore removing them from the risk register, the project team had indicated that as cost estimates used within the risk register were adjusted as more accurate estimates were developed or specific quotations were provided.

The project team had also changed a number of assumptions as their understanding of the issues improved (for example, as better survey data was made available or new delivery team members joined with relevant experience of previous projects). The major impact of this was in the weather and burial risks, where the team had backed some risk into the contract, but modified their assumptions as to the 'worst case' risk, such that the 'best view' number reduced but the 'maximum' number increased, making the risk curve more asymmetric.

Whilst the overall view was that this approach appeared thorough and well documented, the outcome of a detailed audit produced several apparent issues typical of this process not least would be the impact of multiple delays has not been explicitly quantified. **The risk register only considers discrete events and there has been no systemic assessment of the consequential risk of, say, cable burial delay triggering commissioning delay.** This should be borne in mind when considering what overall regulatory settlement is appropriate.

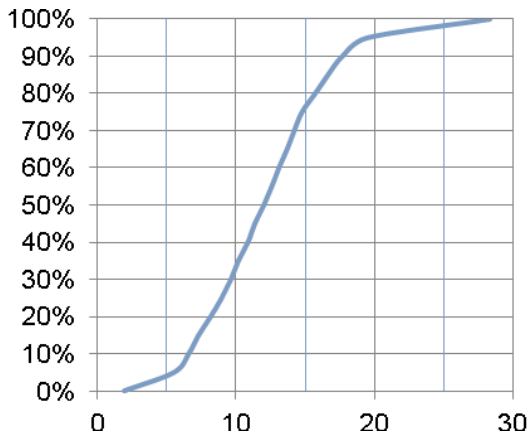
4.3.3 Residual Risk allocation and profile

The approach adopted by SHE Transmission involved listing all the identified risks and assigning each a least likely, most likely and worst case value, along with a percentage probability of that risk materialising. All the risks were fed into a Monte Carlo simulation which them produced a probability distribution curve.

Analysis of the risk register provided with SHE Transmission's technical case and dated 16/01/2013 gives a maximum risk exposure of [redacted] and a P50 risk (probability of being less than or equal to this level is 50%) of [redacted]. SHE Transmission have requested a risk

allowance based on P70 'in line with many construction standards' equating to [redacted] which based on a project cost of £212.4m amounts to [redacted].

Figure 7 – Probability distribution curve



Subsequently SHE Transmission have provided an updated risk register dated May 2013 [redacted] a marginal reduction for P70 and a marginal increase for P50.

Figures 8 and 9 show an overview of the residual risk distribution from the project, based on the results of the Monte Carlo risk modelling provided to us by SHE Transmission. They highlight the relatively symmetric distribution of risk for this project and show an improvement as the project developed, uncertainties were reduced and risk re-allocated where appropriate.

Figure 8 – Overview of risk distribution from project - *September 2012.*

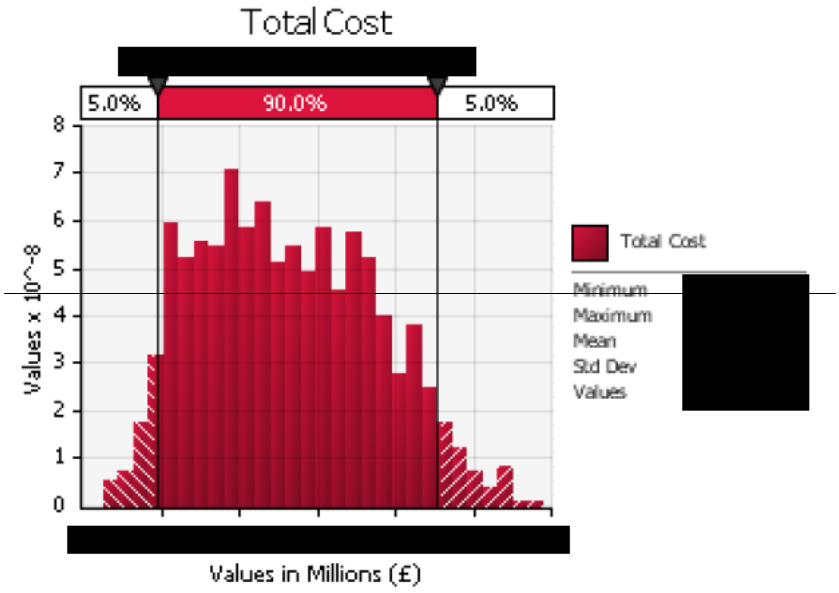
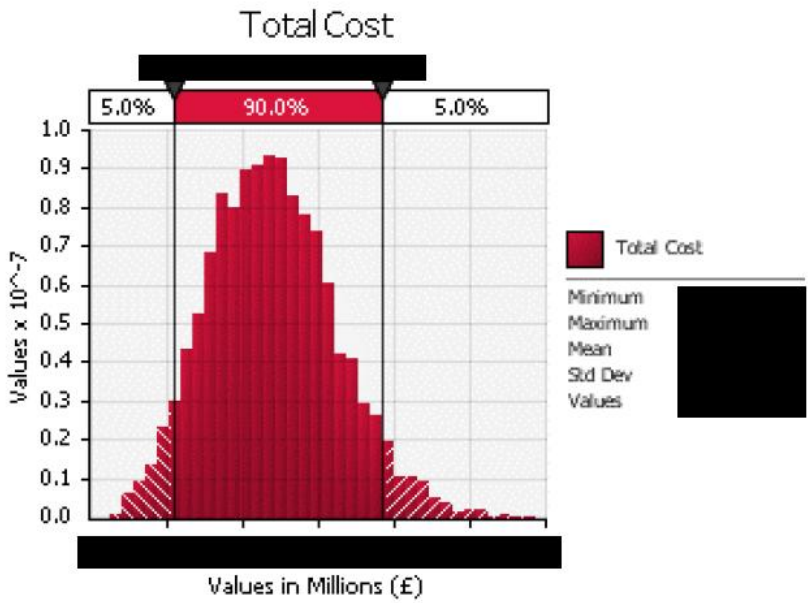


Figure 9 – Overview of risk distribution from project - *May 2013.*



4.3.4 Risk allocation

As part of SSE's Major Project Services (MPS) governance process the Kintyre-Hunterston project has undergone regular risk identification and review workshops during the projects development under the process risk are allocated to the area best able to deal with them. **Whilst the intention is correct and the process appears robust there are number of issues raised**. The current allocation is as follows:

- Contract [redacted]
- Insurance [redacted]
- Provisional sums [redacted]
- Residual (SHE Transmission) [redacted]

The key principle of the RIIO-T1 arrangements is that risk is best borne by the party able to influence it and in the majority of cases this is often the EPC contractor responsible for the element of the works. However where the EPC contractor has accepted the risk it should be clear that their offer is cost effective. It not acceptable for SHE Transmission to discharge their responsibilities at the expense of the consumer and thus if the risk were cheaper for SHE Transmission to hold it should remain within the residual risk pot. **SHE Transmission have been unable to show auditable trail between the risk register and the contractors to identify what portion of the contact is risk and the value of this risk if it had been retained. Any concern that this may be deliberate on SHE Transmission behalf simply to minimise their risk at the expense of the consumer is low** as there is clear evidence that contractor risk has been subject to contract negotiation and that final values are based on specific conditions such that some risk still remains with SHE Transmission i.e. the contractors haven't taken on everything.

Insurance, of [redacted], accounts for circa [redacted] of the construction costs of which 96% of this is directly associated with the offshore element. For a project of this size bearing in mind the

significant offshore element **insurance costs appear reasonable.** In mitigation SHE Transmission have confirmed that these have been benchmarked against three leading insurance brokers in this field. For each key construction contract the insurance provision covers:

- Construction all risks
- Third party liability
- Environmental Impairment Liability Insurance
- Marine Cargo
- Plant and Materials for incorporation into the works
- Construction Equipment
- Protection and Indemnity Insurance
- Hull and Machinery Insurance
- Worker's Compensation and Employer's Liability
- Motor Liability Insurances
- Professional Indemnity Insurances

Provisional sums account for [redacted] of the construction cost and can be broken down by work area. In general they relate to construction activities that are required but cannot yet be quantified such as ground conditions, environmental mitigation and in all cases commodity costs.

Table 16 – Provisional sum breakdown by work area

Construction Works	Provisional Sum (£m)
Enabling works/Forestry Clearance	[redacted]
33kV Diversion works	[redacted]
OHL contract	[redacted]
Cable contract	[redacted]
Substation contract	[redacted]

NEC 3 contracts do not provide for the use of provisional sums. Where unavoidable these would be expected to form part of the contractors fixed price with compensation events allowed for, to cover the differences. Consequently provisional sums would be expected for events that will occur but cannot be properly defined before contract award. **SHE Transmission's process include for the transfer of any risk with a probability of higher than 70% being transferred to the contract "as high probability risks have a disproportionate affect on overall risk exposure". This is effectively taking a P100 risk position which is neither acceptable industrial practice and certainly does not offer any balance between TO and consumer risk allocation.**

Assuming each provisional sum event having a probability of 70% the P70 risk value would be [redacted] with a P50 risk at [redacted] offering a more appropriate cost sharing solution

between the OFTO and the Consumer. SHE Transmission have been requested to rerun their analysis with the provisional sums re-instated and the risk values would be [redacted] respectively for P70 and P50 an increase of circa [redacted] and [redacted] but [redacted] less than requested.

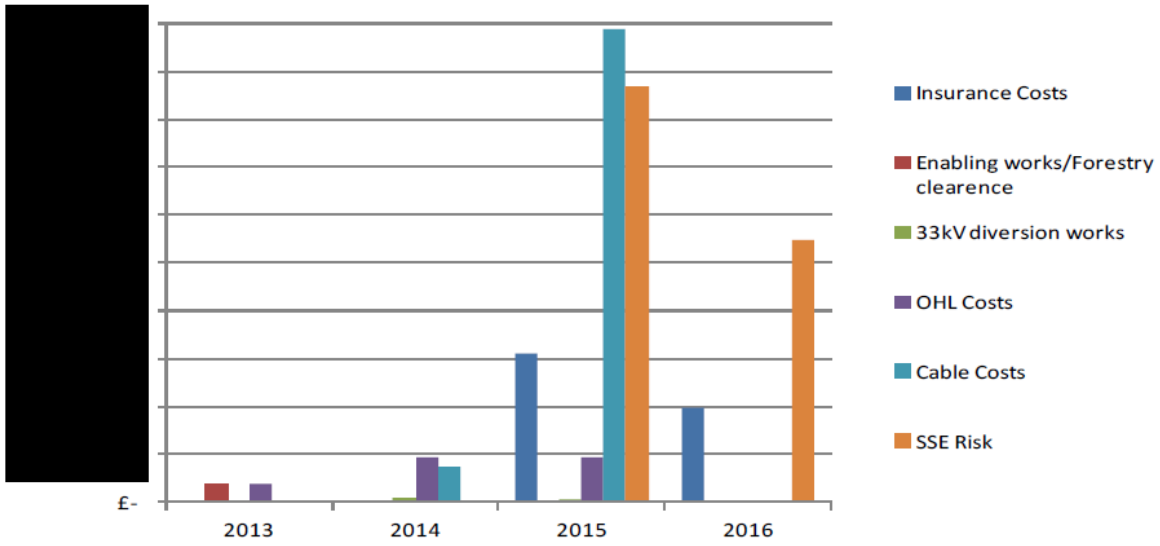
Alternatively a (full) pass-through arrangements (i.e. TO(s) bears no risk) could be utilised. This mechanism is best used when the TO has little control over the risk materialising, (and hence little benefits to consumers from incentivising the TO to try to mitigate the risk). The likelihood of the risk is high enough to justify agreeing specific circumstances for cost pass-through and thus fits well with SHE Transmission's provisional sum risk.

Where provisional sums are genuine they should be treated as such and form part of the fixed contract. Where they are risk they should revert to the retained risk register and treated as such.

The residual risks are the remaining risk that cannot be transferred and thus must be borne by SHE Transmission. At [redacted] these amount to just over [redacted] of the construction costs. Though the vast amount of these relate to construction activities a number are not and may be removed prior to contract award or construction commencement.

A breakdown of risk allocation and the cost over the life of the project is given in Figure 10 Substation provisional sum costs are not explicitly broken out of the overall substation cost breakdown but are expected to be similar in profile to that of the OHL.

Figure 10 – Overview of risk cost profile



4.3.5 LME and currency exchange

SHE Transmission have excluded currency exchange risk but included LME fluctuations in their submission.

No allowance will be included in the Ofgem submission for fluctuations between submission and determination. One month prior to Ofgem determination the FX rates will be updated and any significant changes to the price (increase or decrease) will be issued for acceptance to Ofgem.

Under the contract negotiated by SHE Transmission the contractor is entitled to a compensation event to adjust for metal price inflation. Upon placing purchase orders for

procurement of materials the Contractor will be entitled to a CE adjusting from the base rate per tonne (in US dollars), listed in the contract, to the spot rate at the time of purchase order.

Further adjustment will be made to convert the amount from US dollars to the currency for payment using exchange rates prevailing at the time, [redacted]. Relevant market data such as LME and comex will be used to assess the adjustment.

To insure against commodity fluctuation SHE Transmission have taken the average spot cost of the previous 3 years and adjusted their submission based on the difference between that cost and the cost as of November 2012.

Figure 11 shows the average price fluctuation over the 3 year period with year 0 being the current price.

Figure 11 – Overview of LME average price fluctuation

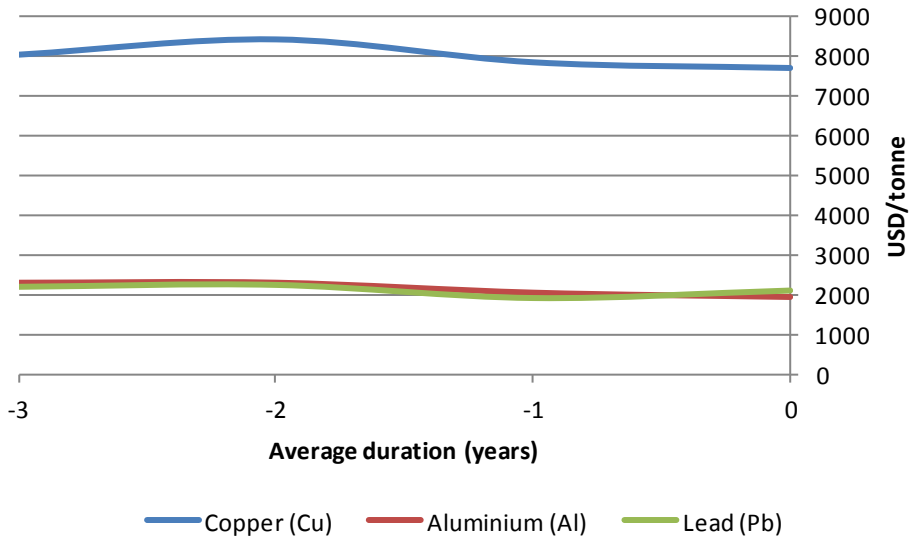


Table 17 – LME cost (USD/Tonne)

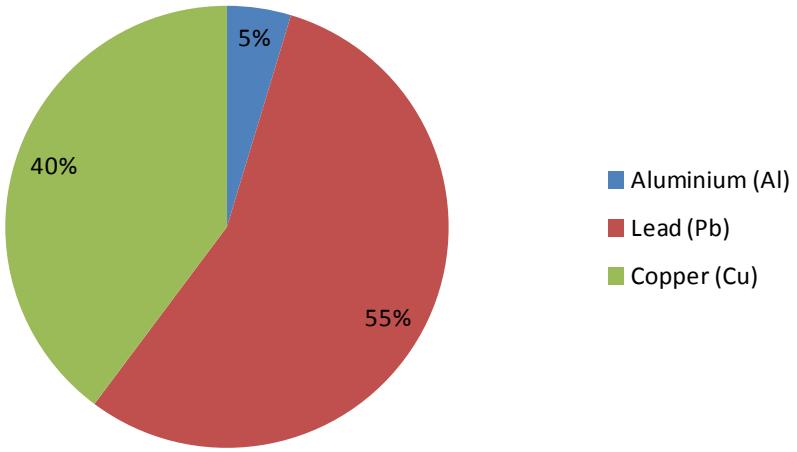
Current	Base	3 year average	Difference
7700	7861	8050	189
1950	1913	2280	367
2100	2024	2200	176

Whilst the methodology would appear appropriate, based on the contract and current prices SHE Transmission would appear at the very least not to have taken an unfavourable position with regards to LME fluctuation risk. The LME cost to the consumer based on SHE Transmission's current position is [redacted] divided as shown in Figure 12. Note

though Aluminium has the highest cost differential it has the lowest volume and hence minimal impact on overall LME cost.

[redacted]

Figure 12 – LME cost distribution



4.3.6 Treatment of key project risks

As stated previously the risk register is a live document continually developing and being refined. It was noted that the quantitative risk analysis (QRA) undertaken was a new process for SHE Transmission specifically adopted for regulatory projects such as SWW.

Each identified risk have been allocated to its respective area; procurement, design, regulation consent engineering and construction. Of the current risk register 93% of the exposure is split between engineering and construction. The top 5 remaining residual risks identified all relate to construction

- It may not be possible to achieve a 1.7m burial depth in shipping lane.
- Additional chain cutting may be required [redacted].
- More substantive road alterations, than expected, are required, to enable the delivery of the largest components.
- The contractor has not accepted ground risk for the HDD approach to Hunterston.
- Unforeseen ground conditions at substation site (peat area).

The first risk item relates to the inability to bury the subsea cable to 1.7m in the shipping lane. Figures provided in the technical case report indicate that the target depth for burial is only 0.6m with a maximum achievable depth of 1.0m. Consequently not achieving a burial depth of 1.7m is highly likely to occur. A provisional sum is included for rock placement and the risk appears to be around the amount of remedial action required. SHE Transmission are still hopeful that the risk and hence need to bury to1.7m can be relaxed through declaring the area a no anchor zone though the request has yet to be granted.

[redacted]

The third risk is scope creep due to the need for more substantive public road alterations being required. It would not be expected that the contractor would accept a risk but owing to the current status of the project, with preferred bidder being known it would be expected that SHE Transmission should be able to revisit the risk register to reduce both the probability and associated cost. Further discussion with SHE Transmission confirmed that their responsibilities include for the onerous requirements of taking temporary ownership of Forestry Commission roads to ensure availability and good condition of key access route to site. Under this arrangement they have the obligation to manage traffic flow of all users but are required to instigate repairs in the case of damage. In addition the transportation and access routes are yet to be fully defined and agreed with the local council for the heavy equipment.

Though the preferred contractor has not undertaken a detailed assessment of the requirements provisional sums have been included based on more detailed information provided by others. The risk remains high until a detailed dilapidation survey of the road can be undertaken which is not until after contract award.

SHE Transmission have also identified a high probability and high cost associated with both substation and HDD ground condition risk. The Substation site investigation and topographical surveys are not due to early July 2013. Once these are concluded, which is expected to be prior to contract award the contract and risk prices will be adjusted accordingly. HDD ground risk is unacceptable to any of the tenderers and will remain with SHE Transmission as part of their residual risk.

4.3.7 Our view of SHE Transmission's approach to risk

Our initial recommendation is that a P50 value is used to set the ex-ante residual risk allowance.

We note Ofgem's guidance that the determination of the ex-ante allowance for the residual risk should strike an appropriate balance between the respective likelihood of TOs or consumers paying for risks which may or may not arise. In general, the starting position would be to use a P50 value for setting the residual risk allowance as this would mean that there is perceived to be an equal probability of costs turning out higher or lower than the ex-ante allowance.

The use of P70 value means that there is a 70% probability that the TOs will have to spend less on residual risk than they have been given in their ex-ante allowance. This would only be appropriate where there is significant upside risk, which needs to be balanced by a higher P-value.

The project does not have significant upside risk as any asymmetric risk distribution and high costs have been addressed by the COAE mechanism. Therefore, we do not believe that additional protection from the upside risk by setting P>50 is appropriate.

Insurance risk appears reasonable [redacted] but provisional sums as they stand are not considered acceptable. Provisional sums should revert to the residual risk allocation and the same P50 ex-ante residual risk allowance allowed.

From discussions the QRA risk process adopted by SHE Transmission is new to SHE Transmission and will be rolled out across all future SWW applications. In that respect it is not clear whether the risk strategy adopted is still developing or has been forced on them due to limited project timescales.

In principle the process is reasonable but shortfalls are apparent in both the traceability/auditability of risk allocation and how to deal with high probability risks. It is possible in future where more time is available that these provisional sums may be better defined and hence incorporated into the contacts however it is not acceptable to take a P100 stance on these and alternatives should be further investigated.

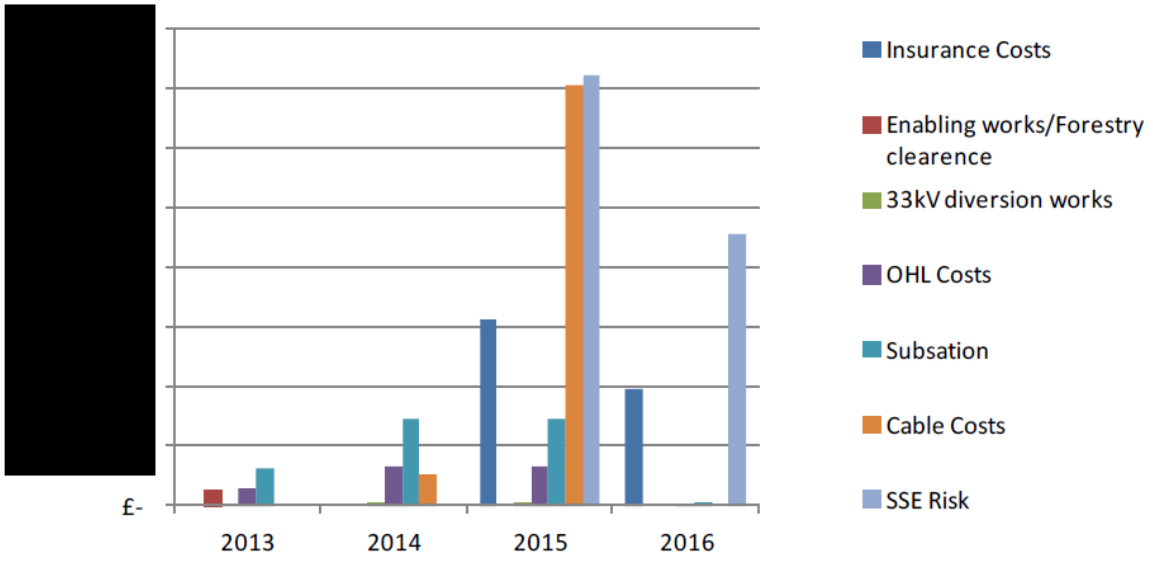
Our view is that the provisional sums should be re-incorporated in to the risk register. Taking a P50 value and using the cost distribution as it stands would give a risk value of [redacted], a reduction of [redacted] against that requested by SHE Transmission (Table 18).

Table 18 – Risk allocation (proposed and requested)

[redacted]

The breakdown of risk allocation and the cost over the life of the project changes from that requested by SHE Transmission (Figure 10) to that proposed in Figure 13. For the purposes of this analysis the risk distribution remains the same but the values have been adjusted pro-rata on the P50/P70 ratio. As with the Figure 10, provisional sum costs, which are not explicitly broken out of the overall substation cost breakdown, are expected to be similar in profile to that of the OHL.

Figure 13 – Overview of proposed risk cost profile



4.4 Assessment of construction programme

4.4.1 Overview of approach

A review of the construction programme was carried out to develop a view on whether it seems realistic and achievable in the proposed timescales, including consideration of project progress made to date such as consenting and other pre-construction works.

Critical path definition and consistency and interaction with key risks such as extreme weather, consenting, key milestones and treatment of task interdependencies by SHE Transmission were investigated in detail. Interdependencies with the procurement strategy were also assessed.

4.4.2 Project milestones

The programmes proposed by SHE Transmission (a single page level 1 summary schedule and a more detailed programme) have been reviewed and appear reasonable to meet the project completion date (*It is noted that the two programmes appear not to fully align accepting though that they are still work in progress*).

However, the programme critical path should be defined as it is key to identifying and mitigating potential bottlenecks and assessing the likely impact of delays.

The following project milestones detailed in Table 19 below are proposed based on the completion date and the information provided by SHE Transmission. Please note that the milestones do not provide an indication of activity interdependencies.

Table 19 – Key Dates

Activity	Date
Subsea cable Crown Estate licence granted	15th July 2013
Clydeport Licence application granted	15th July 2013
Contract award (Cable Substation and OHL contracts)	30th July 2013
Substation site establishment	01st October 2013
Substation construction start	12th November 2013
OHL works construction start	23rd June 2014
Subsea Cable installation start	01st May 2015
Subsea Cable installation finish	30th October 2015
Substation commissioning (completion)	30th October 2015
Commercial Load completion	30th October 2015
OHL works commissioning (completion)	30th November 2015
Project Completion	31st March 2017

Onshore cable installation is planned to take place in 2014. SHE Transmission indicates that this should align with NGET/SPTL activities on the Western HVDC Link.

Note Navy exercises, in the area that the cable will be installed, which occur in April and October should offer minimal risk to the installation programme.

4.4.3 Progress to Date

The project is currently in the procurement phase with contract negotiations entering their final phase.

[redacted] the Preferred Bidder for the onshore and subsea cable contract with a Stage 1 cable contract award to be made by early June to enable both the cable manufacturing slot and a cable laying vessel to be secured in order to meet the project timeframes.

[redacted]

Installation near Hunterston landing point is still under review due to the need to bury the cable deeper (1.7m+) to protect from risk of emergency anchoring damage due large vessels using the ship corridor into Clyde. SHE Transmission are exploring having this area re-designated as a “No Anchor Zone” to allow shallower burial but this would still expose the cable to an emergency anchoring event. SHE Transmission have confirmed that the cable design includes increased cross sectional area in this location due to the need for higher de-rating requirements due to increased depth.

Marine surveys have been undertaken and [redacted] have accepted some risk on this basis of the results. [redacted] will undertake their own surveys post contract award to confirm their design.

The substation contract is to be let to Siemens/BAM as part of the new substation framework agreement. As the substation site requires clearance site investigation has yet to be undertaken and transport and delivery arrangements are still under discussion.

The OHL contract is still under review though [redacted] are provisionally ranked as first choice. The outstanding issues are similar to the substation in that access restrictions have limited the amount of site investigation work that can be achieved. Due to the requirement to take over the Forestry Commission roads for the duration of the project a detailed dilapidation report is required which has yet to be completed.

The interface with SPT has been catered for by the SHE Transmission Project Lead meeting with SPT lead on regular basis. It is planned that during the construction programme there will be regular interaction between the relevant delivery engineers.

4.4.4 Critical path

A Schedule Risk Analysis (SRA) workshop was conducted on Friday 30th November 2012 to review the programme related uncertainties and risks that could impact the on schedule delivery of the Kintyre – Hunterston Reinforcement project.

The programme analysed is based on the Contractor’s programme. The programme’s integrity was maintained with no fundamental changes made to the critical path, remaining durations or completion dates.

The objectives of the meeting were to:

- conduct an assumptions analysis and identify any constraints;
- identify any significant risks to the achievement of the project objectives;
- identify actions to be undertaken to increase the probability of project success;

- review the durations expressed in the base programme and identify any line item uncertainty; and
- test various scenarios that could fundamentally affect the programme of work.

The project risk register was reviewed and those risks with a schedule impact were included within the analysis, where appropriate. Minimal duration uncertainty was identified against specific activities within the base programme as it was felt the internal project team did not have the appropriate expertise or information at this stage

The base programme submitted by the OHL Contractor uses a 6 day working week calendar (without holidays hence working throughout the Christmas period). If a 6 day working week has not been sanctioned the programme may change significantly

The results indicate 0% confidence that the current base programme will achieve the First Energy date as planned (to 31st October 2015). SHE Transmission recommended that mitigations (such as; re-programming, additional resource or parallel working) and timescale risk allowance be incorporated to better the results shown above.

The results show cable installation as having the greatest impact on the critical path of the programme of works and that any delay to cable procurement / manufacture would push the project completion date out by 1 year due to access restrictions for cable laying resulting from winter and Navy training. SHE Transmission has instigated the possibility of an advanced purchase order to secure the cable manufacturing slot as a primary mitigation measure to secure 1st energy in October 2015.

By SHE Transmission's own admission the SRA programme has failed to demonstrate confidence in meeting the planned First Energy date when risk is applied. SHE Transmission's recommendation is that a re-programming exercise is undertaken in order to de-risk the programme and that consideration should be given to contingency plans such as; changing working time, parallel working, adding resource etc. in order to recover any lost time.

SHE Transmission have advised that SRA process undertaken was deliberately pessimistic having no upside. Due to the overall project timescales and the timing of the SWW process there is no float in the programme. Should slippages occur the only proposed solution to recover time is to increase the manpower through additional working teams.

The construction work is largely carried out offline, with only the final connections requiring outages, and hence delays won't impact the current system operation and under the worst case scenario SHE Transmission would expected to install at least one of the two cable circuits thus allowing partial transmission capacity.

4.4.5 Our view of construction programme

Due to the overall project timescales and the timing of the SWW process no float in the programme has been allowed for with recovery from any slippage dependent on the ability to add additional resources. Whilst this can mitigate early construction programme slippage it has limited impact at the end of the programme and is unlikely to have any impact on manufacturing delays. The programme appears to show that a delay of one month on the cable installation programme would force a delay of 6+ months due to a combination of Navy training and the need for winter downtime.

Whilst the programme in itself appears reasonable it is tight and has been driven by the end date. In addition it is heavily reliant on the subsea cable installation which is reliant on largely benign installation conditions and thus very much subject to weather delay.

SHE Transmission have contingency plans in place but there impact will be largely dependent on the timing of any event though ultimately they expect under worst case scenario to install one of the two circuits to enable at least partial transmission capability.

Ultimately the programme would appear to be as good as is practically possible being constrained by both supply chain restrictions and the required completion date. More time would have allowed float to be built in whilst removal of supply chain restriction may have allowed both circuits to be installed in parallel.

4.5 Third HVAC cable optionality

SHE Transmission views the option of a third subsea cable and associated 132kV overhead line works to be the next part of an incremental development path that caters for increasing generation in the Argyll and Kintyre region, rather than as an extension to the currently proposed project. It should be noted that the third cable on its own would only benefit the region to the south of Crossaig. Consequently the third cable should be considered together with the rebuild of the Inveraray-Crossaig 132kV OHL to obtain the desired capacity increase for the whole Kintyre region.

There is no provision within the current design and programme for a third 220 kV cable, however, there is capacity for a spare bay at Crossaig 220/132 kV substation, although it is not currently planned to populate this bay. The proposed design of Crossaig substation allows for future extension if needed.

The works could not accommodate an additional cable to be installed within the proposed timescale due to manufacturing lead times and the limited subsea installation window from May to September (2015). Therefore if a further cable was to be introduced this would be best managed as a separate project with stand alone mobilisation and demobilisation costs attributed accordingly.

4.5.1 Proposed Cost

If the third cable is bought as an option on the current tender there could be some capital cost advantages due to economies of scale and utilising one manufacturing slot rather than two. However, treating as a standalone project would be preferable to allow optimisation in timing of investment.

The budget costs for the third cable and associated substation extension at Crossaig and Hunterston, managed as a separate project, is approximately [redacted] this is based upon 2013 prices using least costs tendered rates. The costs assume generation is connected directly at Crossaig and no addition infrastructure support.

4.5.2 Planning

There is space for a third SGT and third cable connection at Crossaig substation, however the substation planning does not include for a third SGT. In addition there are no consents/wayleaves for the provision of a third land cable at each end of the link.

Although, some initial survey information is available on a third subsea cable route a revised Environmental Appraisal would be required to progress this option. SHE Transmission considers the preferred way forward would be to progress the third cable

as a separate project to be developed as and when required. If developed as an incremental project the original proposed works would complete on time as planned but the third cable would be integrated in the shortest timescales thereafter, say 18-24months later.

4.5.3 Procurement

The proposed two cable project is fully tendered and the contract is ready to be placed. Requesting a third cable at this stage as part of the current tender would change the scope of supply significantly leading to a delay to the project. To ensure compliance with EU Public Procurement rules either a full new tender would be required, or a re-tender with the prequalified tenderers. In this event the timescale to meet the 1st energy of October 2015 could not be realised.

Two of the most significant project issues with accommodating a third subsea cable within the proposed timescale are due to manufacturing lead times and the limited subsea installation window from May to September (2015).

In additional a third cable would require:

- Revision to project governance processes which would require time to achieve.
- Revision of the Environmental Appraisal to include details of the third cable option.
- Some initial survey information is available on a third subsea cable route however additional detailed cable survey will be required to confirm route.
- Detailed switching studies will be required on third cable option to confirm design and check for any potential resonance or transient overvoltage issues. This will take approximately six months.
- Updates to planning, consents, wayleaves.
- Increased ground availability at Hunterston to accommodate the additional cable in the defined cable corridor.

Managed as an extension to the current project, inclusion of a third subsea cable will delay the proposed project by around 18-24 months.

Managed as a separate project, the earliest date for energisation of a third subsea cable would be October 2018.

4.5.4 Overall

SHE Transmission believe that the third cable option along with the rebuild of the 132kV overhead lines between Inveraray and Crossaig should be considered as a separate standalone project to be progressed when forecast generation volumes are better understood and cost benefit studies show a strong positive benefit and give the optimal timing for delivery.

4.6 Summary of assessment findings

Our assessment of the four key aspects of the Technical Case can be summarised as follows:

Table 20 – Overview of Pöyry assessment

Factor	Procurement	Cost		Risk	Programme
		Project	Equipment		
Initial assessment					
Final assessment					

In summary, our assessment of the Technical Case of Kintyre-Hunterston reinforcement is described below.

- A review of SHE Transmission's process for procurement and selection would lead us to conclude that the process itself is robust and has been as efficiently applied as possible within the time constraints of the project. However the process is still not complete with final negotiations for the major contracts not expected to be concluded until June 2013. The late commencement of the project has resulted in a number of activities, principally site investigation work, being undertaken in parallel with contract negotiations leading to at the very least an inefficient process ,the need for provisional sum items in contradiction to NEC 3 principals and the potential for an increased risk allocation to cover for cost uncertainty.
- The project costs appear reasonable overall and are largely determined by the construction costs which themselves are dominated by 3 large EPC contracts.
  - The proposed construction costs which account for over 75% of the total costs appear appropriate when taking into account the overall procurement strategy and benchmarking the major EPC components against internal and external sources.
  - Both risk management at [redacted] and project management at 5% though relatively minor by comparison are, never the less, not insignificant. For the nature and duration of the project and with the team proposed by SHE Transmission to run and manage the construction phase, project management costs of 5% are considered reasonable. Risk management is discussed further below.
- A review of both the risk strategy and final residual risk register would suggest that SHE Transmission have allocated risk where possible to the contractors best able to influence it retaining only those that are best borne by SHE Transmission or could not be transferred or insured against.
  - We note that SHE Transmission have request a P70 value for setting of residual risk but it is felt that the allowance should strike an appropriate balance between the respective likelihood of TOs or consumers paying for risks which may or may not arise. In general, the starting position would be to use a P50 value for setting the residual risk allowance as this would mean that there is perceived to be an equal probability of costs turning out higher or lower than the ex-ante allowance.

  - Further review shows that high probability risks (>70%) have been wholly allocated to the relevant contract. Under this strategy SHE Transmission are effectively taking a P100 risk position and thus passing on all the costs to the consumer. We do not consider this to strike the appropriate balance between the TO and consumer and proposed that this risk should be included in the residual risk register and retained by SHE Transmission.

- The construction programme is challenging but ultimately would appear as good as is practically possible being constrained by both supply chain restrictions and the required completion date. It is heavily dependent on the subsea cable installation programme.
  - Contract award is required by the end of July in order to mitigate some of the risk and an upfront payment has been agreed to secure both a manufacturing slot and vessel hire.
  - Delays due to interdependent processes or those that cannot be foreseen (in particular weather risk) could lead to a significant delay in project completion.
  - Due to the constrained time available for construction no slack is available and SHE Transmission only available mitigation would be to increase manpower should slippages occur. Depending on timing this may not prove to be effective

4.7 Recommendations on annual ex-ante funding allowances

4.7.1 Overview of approach

In this section we present the recommendations on annual ex ante funding allowances under SWW. The allowances reflect:

- the total cost figures (EPC Contract, Other, residual risk distribution) provided by SHE Transmission;
- the annual profile of costs provided by SHE Transmission;
- our assessment of final cost; and
- our recommendation of P50 from the residual risk distribution to use for residual risk element including provisional sums of ex ante funding allowances take into account the need for an appropriate balance between respective likelihood of SHE Transmission vs. consumers paying for risks which may or may not arise.

4.7.2 Proposed ex-ante allowances

The requested and proposed annual ex-ante allowances are shown in Table 21 and are based on the most recent cost information available which will need to be updated before the final figures are set.

The assumed total cost figures are as provided by SHE Transmission (in real 2013 prices):

- EPC contract cost of [redacted];
- Other costs of [redacted]; and
- ex-ante residual risk allowance (including provisional sums) of [redacted] at P50.

The annual profile for each cost category is as per the figures provided by the SHE Transmission modified to reflect the profile of the residual risk including provisional sums at P50 rather than P70.

Table 21 – Ex-ante allowances

	2013	2014	2015	2016	Total
EPC contact	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Others	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
P50 Risk	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	**£17.35**	**£60.23**	**£117.57**	**£9.59**	**£204.74**
SHE Transmission Submission	**£25.7**	**£79.5**	**£103**	**£4.2**	**£212.4**

Table 22 has been included for completeness to show the increased boundary capacity (see figure 3) resulting from completion of the Kintyre Hunterston reinforcement project.

It should be noted that the post reinforcement (N-D) capability for Area 1 is higher than the (N-1) capability due, in part, to the introduction of the high capacity cable circuits which are not subject to an (N-D) assessment.

Table 22 – Capacity Increase

Area	Season	Existing Capacity (MVA) Pre -Reinforcement		Future Capacity (MVA) Post -Reinforcement	
		N-1	N-D	N-1	N-D
Area 1 (Carradale and Port Ann to Inveraray)	Winter	99	n/a	400	540
	Spring	92	n/a	390	530
	Summer	79	n/a	370	510
Area 2 (Taynuit to Inveraray)	Winter	99	n/a	99	n/a
	Spring	92	n/a	92	n/a
	Summer	79	n/a	79	n/a
Area 3 (South West area)	Winter	250	150	510	420
	Spring	230	130	490	410
	Summer	200	120	460	380

4.8 Recommendations for SHE Transmission's future Technical Case submissions

Based on our Technical Case assessment for Kintyre-Hunterston, and its outcome as characterised in Table 1 we believe it is helpful to identify the following aspects:

- It is to some degree accepted that the assessment process will be iterative. However bearing in mind the often tight timescales involved significant time can be saved upfront if the technical case submission included all supporting documentation.
- As part of the process for assessing the cost effectiveness of the project, traceability and project evolution is crucial in our understanding of how costs have developed. The creation of an auditable history for a SWW project, from inception to submission (and beyond), and the provision of historical data with supporting documentation detailing changes and why they were made would greatly aid this process.
- Risk assessments and the treatment of risk is both subjective and divisive and as such requires additional consideration during submissions. In additional to providing transparency for the value placed on the risk and the probability of it occurring it is essential that the risk register is regularly updated with the latest project data, annotated to explain any movement and to ensure that the risk has been allocated correctly. Historical data should be retained to show risk evolution. Unless there is a strong justification P50 should be the starting point for the risk allowance as this strikes the appropriate balance between the respective likelihood of TOs or consumers paying for risks which may or may not arise.

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