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| **TECHNICAL ADVISORY SERVICE AGREEMENT** |
| **By and Between** |
| **Hyundai Engineering Co. Ltd.** |
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| **And** |
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| **Ove Arup & Partners Hong Kong Ltd. (Arup)** |
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| **For** |
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| **ANMA-DO Offshore Wind Farm Project**  **[Phase 2]** |

**TECHNICAL ADVISORY SERVICE AGREEMENT**

This technical advisory service agreement (the “Agreement”) is made and entered into on this [DATE] (the “Effective Date”), by and between:

**Hyundai Engineering Co., Ltd.**, a company duly organized and existing under the laws of Republic of Korea, with its principal place of business at 75, Yulgok-ro, Jongno-gu, Seoul, Korea (the “Client” or “HEC”); and

**Ove Arup & Partners Hong Kong Ltd.**, a company duly organized and existing under the laws of England and Wales, with its principal place of business at Level 5 Festival Walk, 80 Tat Chee Avenue Kowloon Tong, Kowloon, Hong Kong (the “Consultants”).

The Client and the Consultants may hereinafter be referred to individually as a “Party” or collectively as the “Parties”.

**BACKGROUND**:

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| A. | Anma Offshore Wind Co., Ltd. (the “SPC”), a special purpose company (SPC), which HEC will be a member of, is registered under the legislation of South Korea that intends to proceed with the Anma-do 528MW Offshore Wind Farm Project (the “Project”) on an offshore site near to on Anma Island, South Korea (the “Site”); |
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| B. | In addition to the Phase 1 [224MW] of the Project, the SPC is in need of a technical advisory service provider that has the proficiency to carry out and advance the services for the Phase 2 [304MW] of the Project set out in Schedule 1 on the terms and conditions set out in this Agreement (the “Purpose”); |
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| C. | HEC intends to appoint the Consultants to act as the SPC’s consultant for the Phase 2 [304MW] of the Project and to provide the services set out in Schedule 1 on the terms and conditions set out in this Agreement. |

**IT IS AGREED AS FOLLOWS:**

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| 1. | DEFINITION |
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| 1.1 | “Services” means the services set out in Schedule 1 to be performed by the Consultants in accordance with this Agreement. |
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| 1.2 | “Fee” means the fee specified in Schedule 2 payable to the Consultants for the performance of the Services. |
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| 1.3 | “Contractor” means the contractor appointed by the Client to supply goods and to carry out work in connection with the Project. |
| 1.4  1.5  1.6  1.7  1.8 | “Deliverables” mean deliverables that the Consultants agree to provide to the Client under this Agreement as set forth in Schedule 1.  “Country” means Republic of Korea to which the Project (or most of it) relates.  “Service Commencement Date” means the date on which the Services commence pursuant to Clause 12 and Schedule 1.  “Completion Date” means the time period stated for this purpose in Schedule 1.  “Sponsors" mean the parties, namely, Korea Wind Energy Co. Ltd., Equis Wind (Korea) Holdings Pte. Ltd., Hyundai Engineering Co. Ltd., Jeonnam Development Corp., and Korea Hydro & Nuclear Power Co. Ltd., to the Memorandum of Understanding for the development of the Project, which was concluded on the 30th of April 2019, that are also prospective members to the SPC. |
| 2. | ENGAGEMENT AND OBLIGATIONS OF THE CONSULTANTS |
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| 2.1 | The Client appoints the Consultants as the consultant for the Purpose stipulated in this Agreement, and the Consultants accept such appointment and agree to perform the Services on the terms and conditions set out in this Agreement. |
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| 2.2 | The Consultants shall exercise in the performance of the Services as stated in Schedule 1 under the Agreement with all reasonable skill, care and diligence in the performance of its obligations as a profession according to industry standards, and shall conform and perform in accordance with any legal requirement of the Country. |
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| 2.3 | The Consultants shall comply with all reasonable instructions of the Client and shall keep the Client fully informed on the progress and performance of the Services. |
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| 2.4 | The Consultants shall carry out the Services regularly and diligently and shall liaise and co-operate with any other consultant appointed by the Client and/or Sponsors in order that the Project can be completed with all reasonable speed and economy. | |
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| 2.5 | The Consultants shall not make any material alteration, addition or omission from the approved design without the knowledge and consent of the Client. | |
| 2.6 | The Client shall reserve the right to avail itself of the cooperation of any third party in connection with the subject matters hereof, it being understood that this shall not affect the rights and obligations of the Consultants under this Agreement. For avoidance of doubt, notwithstanding anything else in this Agreement, the Consultants shall be fully responsible for the Services whether or not carried out in partly by a third party on condition that the third party’s carrying out of the part of Services is mutually agreed with and accepted by the Consultants. If any defects or errors are found in the Services, the Consultants shall immediately re-perform, correct, or remedy the Services to the satisfaction of the Client. | |
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| 2.7 | Anything supplied by or paid for by the Client for the use of the Consultants shall be the property of the Client and where practicable shall be so marked. | |
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| 2.8 | The Consultant shall appoint a Consultant’s representative for the administration of this Agreement. | |
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| 3 | CORRUPTION AND FRAUD | |
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| 3.1 | In the performance of obligations under this Agreement, the Consultant and his agents and employees shall comply with all applicable laws, rules, regulations and orders of any applicable jurisdiction, including the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions. The Consultants hereby represent, warrant and covenant that he will neither receive nor offer, pay or promise to pay either directly or indirectly, anything of value to a “public official” (as defined below) in connection with any business opportunities which are the subject of this Agreement. Furthermore, the Consultant shall notify the Client immediately in writing with full particulars in the event that the Consultant receives a request from any public official requesting illicit payments. | |
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| 3.2 | A public official is:  (1) any official or employee of any government agency or government-owned or controlled enterprise;  (2) any person performing a public function;  (3) any official or employee of a public international organization, such a The World Bank;  (4) any candidate for political office; or  (5) any political party or an official of a political party | |
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| 4. | PERSONNEL | |
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| 4.1 | The Consultants shall provide its personnel to direct and co-ordinate the Services who shall have full authority to act on behalf of the Consultants for all purposes in connection with the Services. | |
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| 4.2 | The personnel who are proposed by the Consultants to work for the Project shall be subject to acceptance by the Client with regard to their qualifications and experience. | |
| 4.3 | In the event that it is necessary to replace any of the personnel provided by the Consultants, the Consultants shall arrange for replacement by a person of comparable competence approved by the Client as soon as reasonably possible. In the event that, the cost of such replacement shall be borne by the Consultants. | |
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| 5. | THE CLIENT | |
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| 5.1 | On all matters properly referred to the Client in writing by the Consultant, the Client shall give his decision in writing within a reasonable time so as not to delay the Service. | |

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| 5.2 | The Client shall appoint a Client’s representative for the administration of this Agreement. |
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| 6. | PAYMENT |
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| 6.1 | The Client shall pay to the Consultants, as the fix, full and complete remuneration for the performance of the Services based on completed certification of acceptance by the Client of the Deliverables under the relevant categories set out in Schedule 1, in accordance with the progress payment as specified in Schedule 2. |
|  | If a NTP is not issued by the Client, the Consultant shall not commence the Services and no payment shall be made to the Consultants. All Fee payment shall be in United States Dollars. |
| 6.2 | The Fee shall be, subject to the provision of Clause 7, inclusive of all costs, expenses and overheads incurred by the Consultants. |
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| 6.3 | The Consultants shall submit invoices for amounts in accordance with the progress payment schedule referred to in Schedule 2. |
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| 6.4 | Amounts due to the Consultants shall be paid within 45 days of date of issue of the invoice for the specified Deliverables. |
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| 6.5 | The invoice for the specified Deliverables set out in Schedule 2 shall not be paid prior to certification by the Client that the Deliverables under the relevant categories has been completed and accepted (which shall not be unreasonably withheld). |
| 6.6 | The Client reserves all rights to immediately withhold any further payments and not to be held liable to make any payments of the Fee corresponding to part of the Services due to the Consultants in the event that the Consultants fails to provide the Services in a satisfactory manner pursuant to this Agreement. |
| 6.7 | The Client shall pay to the Consultants the total amount of Value Added Tax properly chargeable by the Consultants for the supply of any goods or services under this Agreement. |
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| 6.8 | If the Consultants fail to timely complete the Services by the Completion Date, the Consultants agree to pay the Client, as liquidated damages, at the rate of 0.2% of the total value of the Fee per day for each day of delay by the Consultants. The liquidated damages hereunder are imposed not as a penalty, but as a pre-estimate of the likely consequences of delay or unavailability. The total amount of liquidated damages shall not exceed a maximum sum equal to 10% of the total value of the Fee. |

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| 7. | ADDITIONS TO THE FEE |
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| 7.1 | In the event that the Consultants are required by the Client in writing to perform additional services or are required to re-perform any of the Services by reason of any alterations or modifications to the Project subject to the Deliverables already approved by the Client, the Client shall pay to the Consultants a fair and reasonable additional amount based on the Consultant's hourly rates set out in Schedule 2. |
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| 7.2 | If the Client requests Consultants to perform any part of the works listed below outside of Republic of Korea and Hong Kong, the Client shall reimburse direct expenses such as airfare, per diem, relocation allowance, visa fee, passport fee, traveller’s insurance and etc. in accordance with the evidence of the amount submitted by the Consultants which shall be reasonably agreed between two parties;  (1) Business trip for collecting site data and participating in conferences; and/or  (2) Technical supports that may be requested by the Client. |
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| 8. | INSURANCE AND LIABILITY |
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| 8.1 | The Consultants shall maintain professional indemnity insurance for any one claim or number of claims arising out of the same occurrence (aggregate in respect of contamination/pollution) as described in Schedule 1 provided always that such insurance is available in the market on reasonable terms. As and when they are reasonably required to do so by the Client, the Consultants shall produce for inspection documentary evidence that such insurance is being maintained. |
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| 8.2 | Notwithstanding any other term of this Agreement, the liability of the Consultants under or in connection with this Agreement, whether in contract, in tort (including negligence) for breach of statutory duty or otherwise shall not exceed one times the total fee in aggregate for all phases of works instructed. |
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| 8.3 | Neither Party hereto shall have any liability to the other for any lost revenues, lost profits or anticipated profits, cost of capital, loss of production, loss of product, or any special, indirect, consequential or punitive damages suffered, sustained, paid by the other party hereto or any third party and whether or not foreseeable at the time of entering into this Agreement, except in the event of liability arising from Clause 8.3 (to the extent that it does not concern loss of profit of any of the Parties themselves), and Clause 3. |

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| 8.4 | No claim or proceedings shall be commenced against the Client or Consultants under or in connection with this Agreement after the expiry of 6 years from the date of practical completion of the Project, unless a claim is formally made before the expiry of 6 years from the date of practical completion of the Project. |
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| 9. | COPYRIGHT AND INTELLECTUAL PROPERTY |
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|  | Copyright and other intellectual property rights in all Deliverables, drawings, reports, specifications, bills of quantities, calculations and other documents specifically prepared by the Consultants in connection with the Project and the specific designs contained in them shall vest solely in the Client. The Consultants shall not use such Deliverables, drawings and/or other documents for any purpose other than to perform its obligations under this Agreement and for the Purpose. For the avoidance of doubt, copyright and other intellectual property rights in all standard materials and/or documents that are not specifically prepared for the Project remain vested in the Consultants. |

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| 10. | CONFIDENTIALITY |
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| 10.1 | The Consultants shall not, save in the proper course of carrying out their obligations under this Agreement, disclose to any person or otherwise make use of any confidential information obtained in the course of the Agreement relating to the Client. The Client shall have the like obligation not to disclose or otherwise make use of, except so far as necessary, any confidential information, relating to the Consultants, including the fee paid to the Consultants under this Agreement. |
| 10.2 | Confidentiality obligations of each Party under this Agreement shall be subject to the provisions of Non-Disclosure Agreement made and entered into by and between the Parties on 23th March 2020. |
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| 11. | ASSIGNMENTS AND SUB-CONTRACTS |
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| 11.1 | Subject to Clause 11.2, the Consultants shall not initiate or terminate any sub-contract for performance of any part of their obligations under this Agreement without the Client's written approval. The Client shall be entitled to assign or transfer any of his rights or obligations under this Agreement without the Consultants' written approval. |
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| 11.2 | The Consultants may recommend that specialist contractors, sub-contractors or suppliers to be employed by the Client design and execute any part of the work. The Consultants will be responsible for reviewing such design to see that it conforms with the Consultants’ design intent and for the direction and integration of such design into the Consultants’ design of the Project. The Client will hold such Contractor, sub-contractor or supplier and the Consultants responsible for the competence, proper execution and performance of the work entrusted to that Contractor, sub-contractor or supplier. |

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| 12. | COMMENCEMENT, COMPLETION, VARIATION, TERMINATION AND SUSPENSION |
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| 12.1 | This Agreement is to be effective from the Effective Date. |
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| 12.2 | The Consultants shall not proceed with performance of any Services under this Agreement unless and until the Client provides a written notice to proceed (hereinafter referred to as the “Notice to Proceed” or “NTP”) that specifies the Service commencement date (hereinafter referred to as the “Service Commencement Date”). The Services shall be commenced on the Service Commencement Date, which shall proceed in accordance with the delivery time in Schedule 1, and shall be completed within the Completion Date, subject to extensions in accordance with this Agreement. |
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| 12.3 | The Agreement may be varied on application by either Party by written agreement of the Parties. If requested by the Client in writing, the Consultants shall submit proposals for varying the Services. The Consultants shall not delay the varied Services and shall meet the Completion Date. |
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| 12.4 | In the event the Services are impeded or delayed due to the fault of the Client so as to increase the scope, cost or duration of the Services:   1. the Consultants shall inform the Client of the circumstances and probable effects with supporting documents; and 2. upon mutual agreement, the Completion Date of the Services shall be adjusted accordingly. |
| 12.5 | If circumstances arise for which neither the Client nor the Consultants are responsible and which make it irresponsible or impossible or reasonable for the Consultants to perform in whole or in part of the Services in accordance with the Agreement, the Consultants shall promptly dispatch a notice to the Client. In these circumstances, the Client, at its discretion, shall reasonably determine whether an extension of time is necessary or can be approved. |
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| 12.6 | The Parties agree that any delay in the submission of deliverables that may arise from the current conditions of COVID-19 shall not be considered as an excusable delay under this Agreement. In the event that performance of the Services is disrupted due to material changes to the current conditions of COVID-19, Completion Date of the Services shall be adjusted accordingly upon mutual agreement as is fair and reasonable in the circumstances. |
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| 12.7 | The Client may at any time by giving 30 days' notice in writing require the Consultants to suspend all or part of the Services and on receipt of such notice the Consultants shall take immediate steps to bring to an end the Services with all reasonable speed and shall not incur any expenditure. If the Client have not required the Consultants to resume performance of the Services within a period of 6 months from the date when Services have been suspended under this Clause 12.7, either Party may terminate the Consultants’ engagement under this Agreement. |
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| 12.8 | When the Client has required the Consultants to suspend the Services and, provided that the Consultants’ engagement has not been terminated under Clause 12.7 above, the Client may at a time within the period of 12 months from the date of such notice require the Consultants in writing to resume performance as soon as reasonably practicable. This Agreement shall automatically and immediately terminate in the event the Consultants are not required by the Client to resume performance within the period of 12 months from the date of such notice. |
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| 12.9 | If the Consultants fail to discharge their obligations under this Agreement, the Client may notify the Consultants in writing of such default and shall require the Consultants to remedy such default within 14 days of notice and in the event that the Consultants fail to do so, the Client may terminate the Consultants' engagement forthwith. |
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| 12.10 | If it is shown that the Consultant is in breach of Clause 3 and notwithstanding any penalties or other sanctions to which the Consultant may be subject under the law of the Country, or in other jurisdictions, the Client will be entitled to terminate the Agreement in accordance with Clause 12.8. |
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| 12.11 | If payment of non-disputed invoices is delayed for more than 45 days after the invoice mentioned is due, the Consultants shall notify the Client in writing of such delay; and in the event that the Client fails to remedy such delay in payment within 14 days of notice, the Consultants may suspend performance of the Services and/or terminate their engagement forthwith. |
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| 12.12 | Termination of this Agreement shall not prejudice or affect the accrued rights or claims and liabilities of the Parties. |

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| 13 | CONSEQUENCES OF TERMINATION AND SUSPENSION |
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| 13.1 | If the Consultants’ engagement is terminated, the Client shall make payment to the Consultants for all unpaid and outstanding Fees incurred prior to the date of such termination and, where the Consultants' engagement is terminated due to the Client’s sole default, evidenced and approved costs incurred by the Consultants incidental to the orderly termination of the Services. |
| 13.2 | Upon termination due to the Consultants’ default and/or breach of this Agreement, the Consultants shall refund to the Client within 45 days of the effective date of such termination all advanced payment as of the date of such refund, less any amounts due and payable by the Client to the Consultants which are outstanding as of the date of such refund; and the Client will not be required to provide any further progress payments. |
| 13.3 | Termination of the Consultants' engagement shall be without prejudice to the rights and remedies of either Party arising out of or in connection with this Agreement. |
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| 14. | DISPUTE RESOLUTION PROCEDURE |
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| 14.1 | The Parties shall endeavour to resolve any dispute arising in connection with this Agreement by arbitration. |
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| 14.2 | Any dispute shall be finally settled through binding arbitration in Seoul in accordance with the International Arbitration Rules of the Korean Commercial Arbitration Board. The arbitration proceeding shall be conducted in English. The award rendered by the arbitrators shall be final and binding upon the Parties. Notwithstanding, either Party may seek interim injunctive relief from a court of competent jurisdiction, which shall not be deemed as a waiver of any provision in this Clause. |
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| 15. | LAW |
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|  | The construction, validity and performance of this Agreement shall in all respects be governed by the laws of the Republic of Korea. |
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| 16. | CHANGE IN LEGISLATION  If after the date of the Agreement the duration of the Services is altered as a result of changes in or additions to the laws or regulations in any country in which the Services are required by the Client to be performed, the agreed Completion Date shall be adjusted accordingly upon mutual agreement. |
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| 17. | NOTICES AND COMMUNICATIONS |
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| 17.1 | Any notice to be given under this Agreement may be in electronic or non-electronic forms and shall take effect from receipt at the address stated below. Delivery can be by e-mail or hand or facsimile message against a written confirmation of receipt or by registered letter or by telex subsequently confirmed by letter.  Client’s company name ………………… Hyundai Engineering Co., Ltd.  Client’s address ……………………….… 75, Yulgok-ro, Jongno-gu, Seoul, Korea  E-mail …………………………………..… anmado@hec.co.kr  Telephone number ……………………… TEL 82( 2) 2134 3145, HP 82 10 9965 4468  Consultants’ company name …………… Ove Arup & Partners Hong Kong Ltd.  Consultants’ address …………………… Level 5, Festival Walk, 80 Tat Chee Avenue, Kowloon Tong, Kowloon, Hong Kong  E-mail …………………………………..… peter-a.thompson@arup.com  Telephone number ……………………… +852 2268 3457 |
| 17.2 | Despite the Client's instruction to do so, in the event that the Parties are not able to conduct face-to-face meetings, workshops, seminars, etc. in the Republic of Korea due to COVID-19 related restrictions, the Parties shall nonetheless carry out communications through audio conference, video conference, or other similar means of communication platforms. |

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| 18. | THIRD PARTY RIGHTS |
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|  | Nothing in this Agreement confers or purports to confer on any third party any right to enforce any term of this Agreement. |
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SIGNED by Mr [ ]

For and on behalf of

Hyundai Engineering Co., Ltd.

SIGNED by Mr Peter A Thompson

For and on behalf of

Ove Arup & Partners Hong Kong Ltd.

**Schedule 1**

1. **Services**

Technical advisory services for design, construction, operation, maintenance, finance and ownership of the Project including all ancillary facilities.

1. **Service Commencement Date**

The service shall be commenced as of the Effective Date.

1. **Completion Date**

The Completion Date means the date on which the Consultants complete the Services by submitting all Deliverables in accordance with the delivery time limits set forth in Schedule 1, no later than 31st of March, 2022, or 8 weeks from the Service Commencement Date defined in Clause 12.2, whichever is the later.

The Project is considered completed when all deliverables have been submitted at least once (i.e. Rev.-) by the Completion Date. Arup will continue to revise the deliverables as per HEC’s comments up to Rev.A after the Completion Date, if required.

1. **Scope**

In view of the Purpose and taking into account any common issues from the Phase 1 of the Project, the scope of Services under this agreement shall cover technical advisory services for concept design of the Phase 2 of the Project as follows:

* General project management and technical support to HEC
* Review of the available site data that are applicable to the Phase 2 area and recommendation of further investigation works, if any
* Development of design parameters and design scenarios to extend coverage to the Phase 2 area (review and revision of Phase 1 Design Criteria documents)
* Site layout optimization and AEP calculations for total OWF (Phase 1+ Phase 2) with interaction effects from adjacent Nakwol OWF. A total of four scenarios are proposed as follows:
  + One Optimised Site Layout for AEP for Phase 1+2 using Doosan WTG
  + One Optimised Site Layout for AEP for Phase 1+2 using SGRE WTG
  + One Optimised Site Layout for AEP considering Capex for Phase 1+2 using Doosan WTG
  + One Optimised Site Layout for AEP considering Capex for Phase 1+2 using SGRE WTG
* Concept design of turbine foundations and sub-structures; It is suggested to consider the following 9 cases, based on preliminary logging information derived from the current ground investigation for comparison with the phase 1 area findings :

| **Case** | **Water Depth** | **WTG Model** | **Foundation Type** | **Remark** |
| --- | --- | --- | --- | --- |
| 1 | 16m | Doosan | Jacket | Include Pile Driveability Assessment, and Jacket Lifting Analysis |
| 2 | 16m | SGRE | Jacket |
| 3 | 22m | Doosan | Jacket |
| 4 | 22m | SGRE | Jacket |
| 5 | 16m | SGRE | Monopile | With an aim to minimize monopile length |
| 6 | 22m | SGRE | Monopile |
| 7 | 27m | Doosan | Jacket | Include Pile Driveability Assessment, and Jacket Lifting Analysis |
| 8 | 27m | SGRE | Jacket |
| 9 | 27m | SGRE | Monopile | With an aim to minimize monopile length |

* Concept design of electrical and cabling system (with the view of independent or combined operation of the Phase 1 & 2 offshore wind farms)
* Construction programme and scheduling
* Bill of Materials, Technical Specification and relevant RFQ documents for the preferred turbine and associated foundation system concept, electrical equipment and other associated systems and/or facilities in connection with Phase 2 Concept Design. If requested, these documents shall be provided separately or combined with corresponding documents of Phase 1.
* O&M Conceptual Design (with the view of independent or combined operation of the Phase 1 & 2 offshore wind farms)
* Project Capex and Opex estimates for the Phase 2 offshore wind farm.
* Review and/or modification, reproduction of Phase 1 drawings and documents to be required by reasons of Phase 2 design or Minor Update, if required. “Minor Update” means simple calculations or simulations with minor input updates.

The detailed scope of services to be performed by the Consultant shall be in Table 1:

Table 1: Detailed Scope of Services

A = The Consultants (Arup), H = The Client (HEC) S = SPC (Anma Offshore Wind Co., Ltd.)

| **No.** | **Work description** | **Led by** | **Description** | **Remark** |
| --- | --- | --- | --- | --- |
| **1** | **General** |  |  |  |
| **1.1** | **Project Management** |  |  |  |
| 1.1.1 | Phase 2 Concept Design Project Plan | A | - Detailed submission schedule  - Submission, checking and response to comments mechanisms |  |
| 1.1.2 | Preparation of Monthly Progress Report | A | Produce monthly progress reports  - Summary of work progress  - Summary of submission status  - Summary of outstanding queries / issues to be resolved | To be executed in a similar manner as in Phase 1. |
| 1.1.3 | Conference, presentations and meetings requested by HEC and/or Sponsors | A | - Production of presentation / conference material  - Preparation of meeting minutes | Subject to a maximum of one time of presentation / conference with the ultimate client. |
| **1.2** | **Technical Support** |  |  |  |
| 1.2.2 | Preparation of the technical documents related with Due Diligence of Lender | A | Optional Scope  (Refer the clause 5 of Schedule 2) |  |
| 1.2.3 | Preparing the technical documents related with project financing | A |  |
| 1.2.4 | Technical review & support requested by Sponsors | A |  |
| **2** | **Review of Available Data, Design Criteria & Recommendation for Further Investigations** | | | |
| 2.1 | Design Criteria and Design Scenarios for Phase 2 | A | - Review the applicability of the Phase 1 Design Criteria, and provide revised design parameters  - Development and confirmation of the design scenarios of Phase 2, as referred to the 9 cases specified in the “Scope ~~of Services~~” | All newly available data are assumed to be readily available and to be provided by HEC. Arup will not be responsible for gathering the data nor confirming the authenticity of the data. |
| **3** | **Site layout & AEP calculation** | | |  |
| 3.1 | Micrositing & AEP Calculation Report | A | Preparation of the following four scenarios considering the presence of both Phase 1 and 2 turbines with interaction effects from adjacent Nakwol OWF   1. One optimized Site Layout for AEP for Phase 1+2 using Doosan WTG 2. One optimized Site Layout for AEP for Phase 1+2 using SGRE WTG 3. One optimized Site Layout for AEP considering Capex for Phase 1+2 using Doosan WTG 4. One optimized Site Layout for AEP considering Capex for Phase 1+2 using SGRE WTG | Subject to a maximum of one agreed optimized micro-siting layout per scenario, as described under “Scope”. |
| **4** | **Concept Design (Offshore Structure)** | | |  |
| 4.1 | WTG Substructure and Foundation Design Report | A | - WTG substructure and foundation design with the consideration of the 9 cases specified in the “Scope ~~of Services~~”  - Report comprises both calculations and design drawings  - Pile driveability assessment: Pile driveability assessment in Concept Design stage is only to demonstrate that monopile / jacket of such size could be driven to the expected level | All newly available data are assumed to be readily available and to be provided by HEC. Arup will not be responsible for gathering the data nor confirming the authenticity of the data. |
| **5** | **Concept Design (Onshore Substation & Switching Station)** | | |  |
| 5.1 | Onshore Substation & Switching Station | A | - Provide concept-level equipment list and layout of the onshore substation & switching station  - Provide preliminary assessment for the recommended location of the substation on Juk-Do Island & switching station in Yeonggwang-gun  - Provide general site layout and concept level civil / structural / architectural requirements | The level of details depends on whether the information regarding actual site location, site information and ground condition data are available and can be provided by HEC. |
| **6** | **Concept Design (Electrical & Cabling)** | | |  |
| 6.1 | Selection of export cable voltage level(154KVAC or 230KVAC) | A | - Through economic feasibility study considering losses in the electrical system, the number of cables and required equipment such as transformers and switchgear to connect Grid (Grid voltage level is 154KV.) |  |
| 6.2 | Cable Routing Selection and Installation Report | A | - Review and revise the cable route and layout given the choice of onshore substation (island) and two separate sub-sea cables  - High level review the landing point provision with the consideration of additional space required for more than one cable landing.  - Detailed assessment of landing points on Juk-Do and in mainland shall be done in FEED stage. | Any changes of cable routing or layout made by HEC after 1st issue (Rev.-) will be considered as major changes and mutual agreement shall be made to determine the revised acceptance criteria of the deliverables. |
| 6.3 | Electrical System Configuration Report | A | - Study and confirmation of the electrical system provision based on client’s decision on the choice of offshore substation or onshore substation (island)  - Single line diagrams for the preferred electrical system configuration (array cables, island / offshore / combined / separate Phase 1& 2 substations, subsea cables, connections with existing mainland substation, and all related electrical equipment  - Preliminary sketches / drawings on the configuration for the intermediate substations and mainland substation connection  - Review and Revise Concept Design Report for Monitoring House, Onshore Substation, intermediate substations and mainland substation connection (Elec, Arch, Civil) with consideration of combined/separate Phase 1&2 operation. | Any changes of choice of substation type made by HEC after 1st issue (Rev.-) will be considered as major changes and mutual agreement shall be made to determine the revised acceptance criteria of the deliverables. |
| **7** | **EPC Procurement Preparation** | | |  |
| 7.1 | Construction Programme and Scheduling Report | A |  | To be executed in a similar manner as in Phase 1. |
| 7.2 | Bill of material | A | - Include a maximum of two out of the 9 cases; Exclude the preparation of bills of material (BOM) for architecture, HVAC, Firefighting, C&I, etc.) where the designs at this Concept Design stage are not mature enough for the preparation of BOM. |  |
| 7.3 | Technical Specification | A | Include essential content of the specifications ready for further development in the basic design stage:  - Civil (For the final selected foundation type)  - WTG (incl. Tower)  - Electrical System  - Others (Architecture, HVAC, Firefighting, C&I, etc. if applicable)  To be executed in a similar manner as in Phase 1. (To be minor updated, if required.) |  |
| 7.4 | RFQ | A |  |
| 7.5 | Technical bid evaluation | A | Optional Scope  (Refer the clause 5 of Schedule 2) |  |
| 7.6 | Commercial bid evaluation for Phase 2 | S/H |  |
| **8** | **Finance and Operation** |  |  |  |
| 8.1 | Project CAPEX & OPEX Estimate Report | A |  | To be executed in a similar manner as in Phase 1. |
| 8.2 | O&M Strategy Report | A | - Review and revise the O&M Strategy with the consideration of combined / separate Phase 1 & 2 operation.  - Revision of the O&M Report, which was prepared in Phase 1, based on the decision of adopting onshore island substation located on Juk-Do. |  |
| 8.3 | Monitoring House Location Selection Report | A | - Continue the monitoring house location selection work from Phase 1 based on new information provided by the client. | All newly available data are assumed to be readily available and to be provided by HEC. Arup will not be responsible for gathering the data nor confirming the authenticity of the data. |
| **9** | **Final Documentation** |  |  |  |
| 9.1 | Phase 2 Final Concept Design Report | A |  | To be executed in a similar manner as in Phase 1. |

1. **Approval of Deliverables**

All Deliverables shall be submitted in both PDF and editable formats (e.g. doc., dwg.). ~~The Consultants shall timely deliver to the Client the Deliverables within the Completion Date, and in the event that the Client disapproves of a Deliverable, the Consultants shall promptly correct the relevant Deliverable and re-deliver a corrected version of the Deliverable to the Client until the Client approves and grants confirmation that the Deliverable is completed. For avoidance of doubt, the Client’s approval of the Deliverables shall be taken into account of the delivery time for the Deliverables.~~

All deliverables, unless otherwise specified, shall be deemed approved and will be regarded as the final revision after the 2nd issue (i.e. Rev.A). The progress calculation for all deliverables shall be as follows:

1st issue by Arup (Rev.-): 80%

1st comment by HEC, regardless of the status being “Reject” or “Approved with Comments”: 90%

2nd issue by Arup (Rev.A): 100%

Due to the tight project programme, if HEC withholds responses to any of the deliverables for more than two weeks, it will be deemed that the deliverables have been approved.

The comments from HEC are expected to be minor in nature. In the case of Arup receiving comments involving changes that lead to major revisions to the concerned deliverable or a series of deliverables, mutual agreement between HEC and Arup should be made to determine the revised acceptance criteria of the deliverables. Arup will not be responsible for the delay of completion of services caused by any such changes.

1. **Deliverable List**

| **Deliverable** | | **Corresponding Item in Table 1** |
| --- | --- | --- |
| **No.** | **Document** |
| 1 | Phase 2 Concept Design Project Plan | 1.1.1 |
| 2 | Design Criteria and Design Scenarios for Phase 2 | 2.1 |
| 3 | Micro-siting and AEP Calculation Report | 3.1 |
| 4 | WTG Substructure and Foundation Design Report | 4.1 |
| 5 | Onshore Substation (Island) | 5.1 |
| 6.1 | Selection of Export Cable Voltage Report | 6.1 |
| 6.2 | Cable Routing Selection and Installation Report | 6.2 |
| 6.3 | Electrical System Configuration Report | 6.3 |
| 7.1 | Construction Programme and Scheduling Report | 7.1 |
| 7.2 | Bills of Material | 7.2 |
| 7.3 | Technical Specifications | 7.3 |
| 7.4 | RFQ | 7.4 |
| 8.1 | Project CAPEX and OPEX Estimate Report | 8.1 |
| 8.2 | O&M Strategy Report | 8.2 |
| 8.3 | Monitoring House Location Selection Report | 8.3 |
| 9 | Phase 2 Final Concept Design Report | 9.1 |

1. **Professional Indemnity Insurance**

The Consultants shall maintain professional indemnity insurance of up to the value of the fees as defined in **Schedule 2**.

**Schedule 2**

**1. Fees**

The lump sum fee for the Service is US$400,000.00. All sums are net of VAT and any other applicable taxes, levies, imposts or other duties which will be added as appropriate

**2. Payment Schedule**

Payment schedule is as follows:-

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Deliverable Stage** | **Payment** | |
| **%** | **US$** |
| 1 | Upon Instruction to Proceed | 30 | 120,000 |
| 2 | Upon submission of Deliverable 1 & 2 | 5.25 | 21,000 |
| 3 | Approval of Deliverable 1 & 2 | 2.25 | 9,000 |
| 4 | Upon submission of Deliverable 3 | 7 | 28,000 |
| 5 | Approval of Deliverable 3 | 3 | 12,000 |
| 6 | Upon submission of Deliverable 4 | 10.5 | 42,000 |
| 7 | Approval of Deliverable 4 | 4.5 | 18,000 |
| 8 | Upon submission of Deliverable 5 | 5.25 | 21,000 |
| 9 | Approval of Deliverable 5 | 2.25 | 9,000 |
| 10 | Upon submission of Deliverable 6.1 to 6.3 | 7 | 28,000 |
| 11 | Approval of Deliverable 6 | 3 | 12,000 |
| 12 | Upon submission of Deliverable 7.1 to 7.4 | 7 | 28,000 |
| 13 | Approval of Deliverable 7 | 3 | 12,000 |
| 14 | Upon submission of Deliverable 8.1 to 8.3 | 5.25 | 21,000 |
| 15 | Approval of Deliverable 8 | 2.25 | 9,000 |
| 16 | Upon submission of Deliverable 9 | 1.75 | 7,000 |
| 17 | Approval of Deliverable 9 | 0.75 | 3,000 |
| **Total** | | **100%** | **400,000** |

All achieved ‘Deliverable stages’ specified above will be aggregated by the 20th day of each month and claimed by the Consultants for the Client’s monthly payment process. Payment will be remitted to the Consultants’ account within 45 days based on the date of the Consultants’ monthly claim invoice.

**3. Hourly Rates**

Any additional scope of services beyond those noted above will be scoped and charged at a mutually agreeable lump sum with the Client prior to implementation using a change order system or using standard hourly rates. Expenses will be charged separately. Time charge rates for additional services will be on the basis of the rates set out in the table below:

|  |  |
| --- | --- |
| **Category** | **Rate (US$ / Hour)** |
| Director | 225 |
| Associate Director / Group Leader | 190 |
| Associate | 160 |
| Senior Engineer | 145 |
| Chartered Engineer | 128 |
| Assistant Engineer | 95 |
| Graduate Engineer | 74 |
| CAD Draughtsman | 68 |

Time charge assumptions / exclusions:

1. The above time charge rates are for additional services reimbursed on a time basis.
2. The above rates include for all normal overhead costs (payroll, general administration, etc.).
3. The rates apply until end of March 2023, when they will be subject to review.
4. Payment for the supervision staff will be considered as additional fees paid on time-charge basis, based on the actual hours spent on site.
5. The rates do not include for costs of travel, subsistence, document reproduction, photocopying or international communications network usage such as IDD telephone / fax calls.

**4. Expenses**

The fees stated above are inclusive of all disbursements and expenses associated with the defined scope of service and deliverables in **Schedule 1**, except for those listed below.

* All International travel, accommodation, subsistence and disbursements outside of Republic of Korea and Hong Kong other than that stated above. All flights will use economy class international airlines and hotel accommodation shall be of equivalent standard to that provided by Arup International Ltd.
* Fees associated with site investigation or topographical surveys of the sites and verification of the utilities available at the sites.
* Fees for any local consultants.
* 3D images/color renderings unless agreed otherwise.
* Non-typical expenses such as the purchase of relevant data, photographic expenses, model construction and other items requested by the Client and shall be reimbursed at cost.
* Fees associated with statutory submissions or gaining of information/data to complete the service.
* Fees associated with the purchase of data, maps and satellite images etc. as required. The client will be invoiced at cost for the purchase of this data.

**5. Optional Scope**

The following services are considered to be optional, in addition to the main scope of works:

* Technical documents for due diligence of lenders (US$ 10,000)
* Technical documents related to project financing (US$ 10,000)
* Technical review & support requested by client (US$ 10,000)
* Technical support for Technical Bid Evaluation, if required (US$ 10,000)
* Commercial Bid Evaluation (CBE) for Phase 2 items (Arup review and support only) (US$ 10,000)