**LCOE Model Documentation**

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The LCOE model is comprised of three documents:

1. **AEP -** *Combines mechanical power matrix with JPD and losses to produce AEP.*

AEP was calculated per the DOE’s *Standardized Cost and Performance Reporting for Marine and Hydrokinetic Technologies (2014).* Each tab on the AEP calculation Excel document is labeled corresponding to the numbered reporting requirements (pg. 9-10). Of most importance in this work is the mechanical power matrix, which was produced according to specification (i.e. 200\*Tp time series simulation of a Bretschneider spectrum for each bin of the resource JPD). It should be noted that the reference resource used in this project is the (Tp-Hs) JPD associated with the 2013 guidance document as this was the most recent at project start and was used throughout for consistency.

1. **CBS -** *Contains all cost assumptions for ICC and O&M.*

The Cost Breakdown Structure (CBS) holds the cost of the WEC down to a component level within the machine itself as well as the costs allocated for the balance of system. The assumptions used are listed in the column to the right of the cost and description. The outputs of this document are Installed Capital Cost (ICC - $) and Operational Expense (OpEx - $/yr).

1. **Wave Energy Converter Cost**

The cost of the WEC was evaluated on a component by component basis primarily using mass and cost with the cost being assigned based on material in question.

1. **Balance of System:**

The following Balance of System Costs were assessed using industry data on a $/kW basis. The main source of data for this work was *The future potential of wave power in the United States*. See the “(1) - Industry Data” tab for further detail.

*Development -* The development costs include all activities from project inception to financial close, where financial close is the date when project and financing agreements have been signed and all the required conditions have been met.

*Electrical Infrastructure -* All electrical infrastructure to collect power from generators and deliver to the grid.

*Assembly and Installation -* Captured within the *Assembly and Installation* category of the cost breakdown was the transport of the WEC and piles to site, installation of piles and the installation of the WEC on its moorings.

*Substructure and Foundation -* Captured within the *Substructure and Foundation* category of the cost breakdown was the capital expense of the piles and mooring lines themselves.

The basis of the following can be found in the “(2) - Soft Cost Calcs” tab.

*Financial Costs -* Financial costs are comprised of insurance, finance, and contingency costs. These costs are functions of the other capital cost categories, thus an increase in any other capital cost will result in an increase in the financial cost.

1. **LCOE -** *Combines the outputs of AEP and CBS for final LCOE calculation.*

LCOE is calculated with an FCR of 0.108 and the standardized formula of:



AEP is derived from the attached documents as described above, while ICC and O&M come from the CBS. These values are manually entered based on the output of the AEP and CBS documents. An array loss factor of 10% is applied to the AEP due to the LCOE calculation being completed based on a large array.