

# Hudson South 1 to Hudson South 2 HVDC Platform Interlink

## General Information

Proposing entity name	ANBARD
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	Boardwalk Power Option 3.1
PJM Proposal ID	428
Project title	Hudson South 1 to Hudson South 2 HVDC Platform Interlink
Project description	<p>The project proposes a 700 MW offshore transmission link between the new offshore substation platforms (OSP) at Hudson South 1 ("HS1") and Hudson South 2 ("HS2") associated with the Hudson South Wind Energy Area A and E, respectively, in the Hudson South Call Area. This 700 MW offshore transmission link is referred to as Boardwalk Power Option 3.1 and can be categorized as "Option 3 – Greenfield upgrades between offshore substations proposed in response to the Option 3 problem statement" as outlined in the PJM/NJBPU SAA solicitation problem statement. The proposed project consists design and construction of a new ±400 kV 700 MW HVDC interlink cable connecting the OSPs at the Hudson South 1 and Hudson South 2 Wind Energy Areas. The Project is designed to optimally improve the availability of the offshore transmission system and unlock additional benefits. The project is a complementary solution that uses state-of-the-art offshore transmission technology to realize 700 MW of redundant offshore transmission capacity for offshore wind generation resources in a reliable and cost-effective manner using the HVDC submarine cable with minimal environmental impact. The transmission link rating is designed to match the anticipated offshore wind solicitation sizes as well as transmission capacities of other Anbaric "Option 2" solutions with which it should be combined to realize the cost-saving synergies and performance improvements. Further details associated with the project are provided in subsequent sections of this submission in brief and discussed in extensive details the project analysis attachments.</p>
Email	jfuller@anbaric.com
Project in-service date	01/2033
Tie-line impact	No
Interregional project	No

Is the proposer offering a binding cap on capital costs?

Yes

Additional benefits

The project unlocks the following distinct benefits: The interlink realizes redundant transmission capacity whenever one offshore wind export link is out of service, improving the offshore transmission system availability. This results in a reduction of the annual expected energy not transmitted (EENT). Refer to Attachment 2 Cost Benefit Analysis in the Technical Description documentation provided in the project analysis attachments section for more information. The interlink realizes a redundant supply of auxiliary power to the Offshore Substation Platform (OSP) and the connected Offshore Wind Farm (OWF) whenever one offshore wind export link is out of service, reducing the CAPEX and OPEX associated with installing and running diesel generators offshore. The interlink provides an opportunity to re-route power from one POI to another POI during onshore grid outages and congestion. The interlink enables the future provisions for development of an offshore grid with the inclusion of HVDC circuit breakers. The benefits unlocked by using the interlink are shown by means of a cost-benefit analysis discussed in the BPU supplemental data collection form and Attachment 1 Analysis Report and presented in full in Attachment 2 Cost Benefit Analysis in the Technical Description documentation provided in the project analysis attachment section.

## Project Components

1. 400 kV HVDC Submarine Cable

### Greenfield Transmission Line Component

Component title

400 kV HVDC Submarine Cable

Project description

A 400 kV submarine cable facilitating the HVDC platform interlink between the two new offshore substation platforms (OSP) at Hudson South 1 ("HS1") and Hudson South 2 ("HS2") associated with the offshore Hudson South Wind Energy Area A and E, respectively, in the Hudson South Call Area. The voltage level for the interlink cable system is  $\pm 400$  kV employing DC cables and accessories. The choice for  $\pm 400$  kV has been made to ensure compatibility with the Anbaric "Option 2" solutions. The HVDC submarine cable will consist of two cables insulated for  $\pm 400$  kV with a copper or aluminum conductor. The cables will be designed for installation in sea water, buried in the seabed, and will be rated for the dynamic transfer of 700 MW. The cables will be insulated with solid extruded cross-linked polymer (XLPE) and will not contain any oil or other type of insulating fluid. The strength and flexibility of this type of cable make it well suited for installation conditions beneath the seabed, as planned for the Project. Further details regarding this 400 kV HVDC submarine cable system (including ampacity, insulation system design, key components, and installation methods) are outlined in the "Technical Description" documentation provided in the project analysis attachment section.

Point A Offshore substation platform at Hudson South 1 (“HS1”) offshore wind lease area (Wind Energy Area A in Hudson South Call Area)

Point B Offshore substation platform at Hudson South 2 (“HS2”) offshore wind lease area (Wind Energy Area E in Hudson South Call Area)

Point C

	<b>Normal ratings</b>	<b>Emergency ratings</b>
Summer (MVA)	700.000000	700.000000
Winter (MVA)	700.000000	700.000000
Conductor size and type	1x800Al 400kV	
Nominal voltage	DC	
Nominal voltage	400 kV	
Line construction type	Submarine	
General route description	<p>The submarine cable route from the Hudson South 1 OSP to the Hudson South 2 OSP is approximately 25 mi (40 km). A detailed offshore cable route map can be found in Attachment 20 of the Technical Description documentation provided in the project analysis attachments section. The cable system is expected to be installed in water depths of up to approximately 137 ft (42 m). The submarine cable circuit exits the HS1 OSP in a southerly direction along both the border of the Hudson South A offshore wind energy area and the proposed St. Lucie to New York Fairway towards the HS2 OSP. It crosses the proposed transit lanes in the Hudson South Call Area. A detailed routing diagram can be seen in Attachment 3 Constraints Mapbook of the Technical Description documentation. Attachment 18 Permitting Plan of the Technical Description documentation describes the complete permitting status for cable route. The preliminary assessments show that sharp gradients of the water depth are not present along the proposed route. This will be confirmed with further detailed bathymetry surveys during the development stage. The seabed material encountered along the route is mostly sand, gravel and some clay. A detailed description of the proposed route is presented in the "Technical Description" documentation provided in the project analysis attachments along with figures and associated route maps.</p>	
Terrain description	<p>The sea floor along the submarine transmission link route is relatively flat and shallow, approximately 137 ft (42 m).</p>	

Right-of-way width by segment	The offshore transmission link route is approximately 25 mi (40 km) in length and requires a 200 ft wide area for work activities. The offshore transmission link route is located in federal waters and requires a new Right of Way/Right of Use Grant or Easement Grant from BOEM.
Electrical transmission infrastructure crossings	Boardwalk Power Option 3.1 cable route does not cross any electrical transmission infrastructure.
Civil infrastructure/major waterway facility crossing plan	Not applicable to Boardwalk Power Option 3.1 cable route
Environmental impacts	Installation activities for the offshore transmission link may impact physical resources (air quality, geological resources, water quality), biological resources (avian and bat species, benthic and shellfish resources, finfish and essential fish habitat, marine mammals and sea turtles), cultural resources (marine archaeology), and socioeconomic resources (commercial and recreational resources, commercial shipping, environmental justice populations, existing infrastructure, tourism, public health and safety, workforce and demographics). The environmental Protection Plan (Attachment 15) includes a preliminary evaluation of potential impacts to these resources and proposes preliminary avoidance, minimization, and mitigation measures. Studies and assessments to be completed once the solicitation bid is awarded include geologic hazards, air emissions, water quality, seagrass and macroalgae, benthic resources, marine mammals and sea turtles, fish and fish habitats, birds and bats, marine archaeology, socioeconomic, electric and magnetic fields, in-air and underwater acoustics, commercial and recreational fisheries, military activities, radar, and navigational aids. The submarine transmission link is located on the Outer Continental Shelf and will require a Bureau of Ocean Energy Management (BOEM) Right of Way/Right of Use Grant or Easement. Anbaric will obtain all required federal and authorizations as described in Attachment 18 Permitting Plan and will comply with all permitting requirements resulting from the permitting process.
Tower characteristics	Not applicable to Boardwalk Power Option 3.1
Construction responsibility	Proposer

## Benefits/Comments

"The project unlocks the following distinct benefits: The interlink realizes redundant transmission capacity whenever one offshore wind export link is out of service, improving the offshore transmission system availability. This results in a reduction of the annual expected energy not transmitted (EENT). Refer to Attachment 2 Cost Benefit Analysis in the Technical Description documentation provided in the project analysis attachments section for more information. The interlink realizes a redundant supply of auxiliary power to the Offshore Substation Platform (OSP) and the connected Offshore Wind Farm (OWF) whenever one offshore wind export link is out of service, reducing the CAPEX and OPEX associated with installing and running diesel generators offshore. The interlink provides an opportunity to re-route power from one POI to another POI during onshore grid outages and congestion. The interlink enables the future provisions for development of an offshore grid with the inclusion of HVDC circuit breakers. The benefits unlocked by using the interlink are shown by means of a cost-benefit analysis discussed in the BPU supplemental data collection form and Attachment 1 Analysis Report and presented in full in Attachment 2 Cost Benefit Analysis in the Technical Description documentation provided in the project analysis attachment section. "

## Component Cost Details - In Current Year \$

Engineering & design	CONFIDENTIAL AND PROPRIETARY INFORMATION
Permitting / routing / siting	CONFIDENTIAL AND PROPRIETARY INFORMATION
ROW / land acquisition	CONFIDENTIAL AND PROPRIETARY INFORMATION
Materials & equipment	CONFIDENTIAL AND PROPRIETARY INFORMATION
Construction & commissioning	CONFIDENTIAL AND PROPRIETARY INFORMATION
Construction management	CONFIDENTIAL AND PROPRIETARY INFORMATION
Overheads & miscellaneous costs	CONFIDENTIAL AND PROPRIETARY INFORMATION
Contingency	CONFIDENTIAL AND PROPRIETARY INFORMATION
Total component cost	\$80,950,097.00
Component cost (in-service year)	\$108,868,881.00

## Congestion Drivers

None

## Existing Flowgates

None

## New Flowgates

None

## Financial Information

Capital spend start date	01/2023
Construction start date	12/2031
Project Duration (In Months)	120

## Cost Containment Commitment

Cost cap (in current year)	\$104,034,738.00
Cost cap (in-service year)	\$139,915,156.00

## Components covered by cost containment

1. 400 kV HVDC Submarine Cable - Proposer

## Cost elements covered by cost containment

Engineering & design	Yes
Permitting / routing / siting	Yes
ROW / land acquisition	Yes
Materials & equipment	Yes
Construction & commissioning	Yes
Construction management	Yes

Overheads & miscellaneous costs	Yes
Taxes	No
AFUDC	No
Escalation	No
Additional Information	Refer to the cost commitment legal language
Is the proposer offering a binding cap on ROE?	Yes
Would this ROE cap apply to the determination of AFUDC?	Yes
Would the proposer seek to increase the proposed ROE if FERC finds that a higher ROE would not be unreasonable?	No
Is the proposer offering a Debt to Equity Ratio cap?	Yes
Additional cost containment measures not covered above	Refer to the cost commitment legal language

## **Additional Comments**

None