

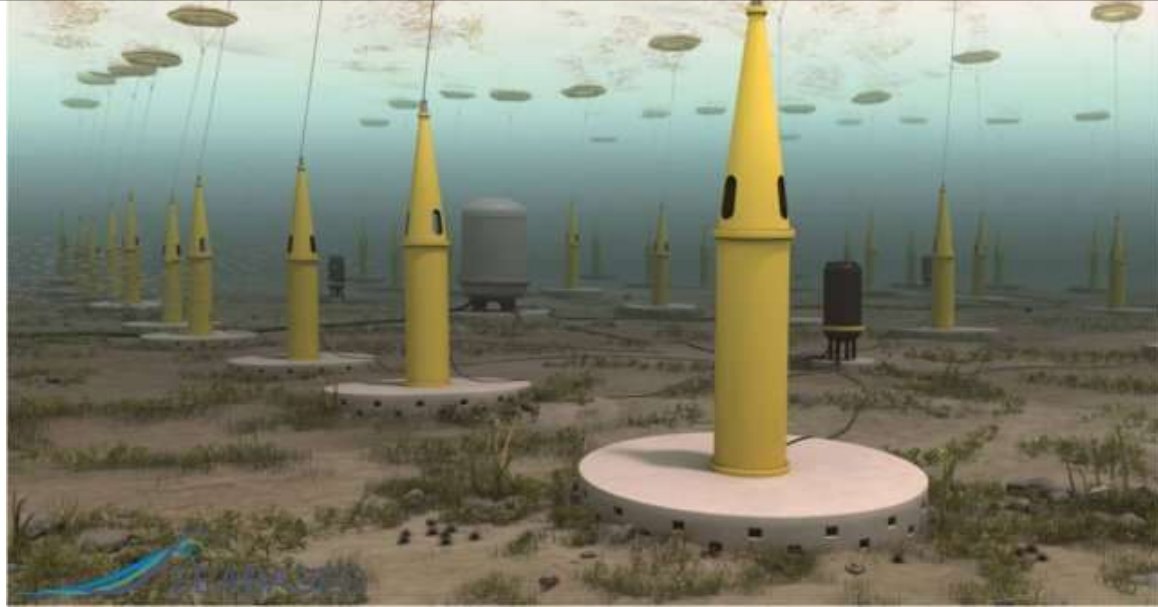


Empowered by The Sea

SEAFARADAYS

ENERGY PRIVATE LIMITED

PETITION FOR PROJECT SPECIFIC TARIFF DETERMINATION OF 1.125 MW WAVE ENERGY PARK AT A&N ISLANDS



PRESENTED TO

**Joint Electricity Regulatory Commission
(For the State of Goa and Union Territories)**



संयुक्त विद्युत विनियामक आयोग
(गोवा राज्य और संघ राज्य क्षेत्र)

Joint Electricity Regulatory Commission
(for the State of Goa and Union Territories)

**BEFORE THE HON'BLE JOINT ELECTRICITY REGULATORY COMMISSION
FOR THE STATE OF GOA AND UNION TERRITORIES**

Filing No.....

Case No.....

IN THE MATTER OF:

Petition under Sections 61(h), 62, 64, 86(1)(a), 86(1)(b) and 86(1)(e) of the Electricity Act, 2003 for determination of Tariff for sale of power to Electricity Department of the Union Territory of Andaman and Nicobar Islands in respect of Renewable Wave Energy Project off Hut Bay Island at Andaman and Nicobar Islands.

AND

IN THE MATTER OF:

M/s. SeaFaradays Energy Private Limited

Corporate Office:

416, 4th Floor, Somdatt Chambers – II,

Bhikaji Cama Place,

New Delhi – 110066

Registered Office:

2FCS44 Second Floor,

Ansal Plaza, Vaishali,

Ghaziabad – 201010, Uttar Pradesh

.....PETITIONER

Versus

Electricity Department (ED – A&N),

Andaman and Nicobar Administration,

Vidyut Bhawan

Port Blair – 744101

.....RESPONDENT



I N D E X

S. No.	Particulars	Annexure & Volume
1.	Petition on behalf of the Petitioner under Sections 61, 62, 64 read with Sections 86(1)(a), 86(1)(b) and 86(1)(e) of the Electricity Act, 2003, along with affidavit.	Volume I (Page no. 1 – 44)
2.	A copy of the Certificate of Incorporation of the Petitioner Company	ANNEXURE P – 1 Volume I of II
3.	A copy of the Letter of Association Letter with Seabased AB as a technology partner.	ANNEXURE P – 2 Volume I of II
4.	A copy of the MNRE Approval Letter Ref No. 114/7/2015 – OE dated 23 rd February 2016	ANNEXURE P – 3 Volume I of II
5.	A copy of the Detailed Project Report (DPR) Ref. No. SEPL/DPR/A&N/HB/002/Rev 0 dated 9 th May 2016.	ANNEXURE P – 4 Volume II of II
6.	A copy of Respondent's communication on Petitioner's DPR	ANNEXURE P – 5 Volume I of II
7.	A copy of the Letter of Association Letter with Dharti Dredging & Infrastructure Limited (DDIL) as a strategic support partner for offshore renewable energy projects in India	ANNEXURE P – 6 Volume I of II
8.	Order copy of Seabased AB's Sotenas Wave Energy Plant of Fortum Energy	ANNEXURE P – 7 Volume I of II
9.	Order copy of supply of Seabased AB's Wave Energy Converters and associated components to TC Energy for	ANNEXURE P – 8 Volume I of II



S. No.	Particulars	Annexure & Volume
	Wave Energy Park at Ghana	
10.	A copy of the EU Newsletter on Environmental Impact	ANNEXURE P – 9 Volume I of II
11.	A copy of MNRE Letter – Approval for visit of M/s SeaFaradays Energy to Andaman & Nicobar for Preliminary Potential Analysis of Ocean Energy – Reg (Ref. No. 113/6/2015 – GT dated 11.08.2015)	ANNEXURE P – 10 Volume I of II
12.	A copy of the Invitation Letter dated 17.12.2015 from MNRE for PAC meeting dated 19.01.2016	ANNEXURE P – 11 Volume I of II
13.	A copy of the Minutes of Meeting of the Project Appraisal Committee (PAC) appointed by MNRE	ANNEXURE P – 12 Volume I of II
14.	A copy of SeaFaradays Letter No. SEPL/MNRE/2016/0021 dated 15.02.2016 in response to Technical Queries raised by PAC Panel regarding Wave Energy Converters (WEC) during presentation made to the PAC	ANNEXURE P – 13 Volume I of II
15.	A copy of the Wave Data Report of the Hutbay Island and South Andaman procured from Fugro GEOS UK.	ANNEXURE P – 14 Volume I of II
16.	A copy of the Monthly Generation Profile of Wave Energy Park	ANNEXURE P – 15 Volume I of II
17.	A copy of the Tariff Model	ANNEXURE P – 16 Volume I of II



**BEFORE THE HON'BLE JOINT ELECTRICITY REGULATORY COMMISSION
FOR THE STATE OF GOA AND UNION TERRITORIES**

Filing No.....

Case No.....

IN THE MATTER OF:

Petition under Sections 61(h), 62, 64, 86(1)(a), 86(1)(b) and 86(1)(e) of the Electricity Act, 2003 for determination of Tariff for sale of power to Electricity Department of the Union Territory of Andaman and Nicobar Islands in respect of Renewable Wave Energy Project off Hut Bay Island at Andaman and Nicobar Islands.

AND

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.....PETITIONER

Versus

Electricity Department (ED – A&N),

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Port Blair – 744101

.....RESPONDENT





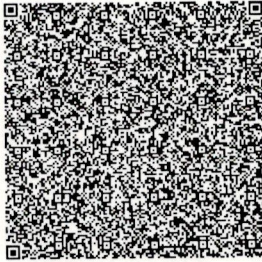
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Government of National Capital Territory of Delhi

e-Stamp

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Certificate Issued Date	: 29-Jul-2016 05:00 PM
Account Reference	: IMPACC (IV)/ dl750703/ DELHI/ DL-DLH
Unique Doc. Reference	: SUBIN-DL750703543082911472000
Purchased by	: SAURABH JOLLY
Description of Document	: Article 4 Affidavit
Property Description	: Not Applicable
Consideration Price (Rs.)	: 0 (Zero)
First Party	: SAURABH JOLLY
Second Party	: Not Applicable
Stamp Duty Paid By	: SAURABH JOLLY
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



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Affidavit



I, Sh. SAURABH JOLLY, S/o Sh. SUNIL KUMAR JOLLY (aged 35 years), (occupation) DIRECTOR, residing at G-125, ASHOK VIHAR PHASE-I, DELHI - 110052), the deponent named above do hereby solemnly affirm and state on oath as under:-

1. That the deponent is the Managing Director / Director who is authorized as per the resolution of the company dated 7th July 2016 and is acquainted with the facts deposed to below.
2. I, the deponent named above do hereby verify that the contents of the paragraph Nos. 1 of the affidavit and those of the accompanied petition are based on the records of the Petitioner maintained in the ordinary course of business and/or based on information available in public domain, which I believe to be true and verify that no part of this affidavit is false and nothing material has been concealed.

Details of Enclosures:

- (a) Petition for Determination of Project specific Tariff along with all Annexures
- (b) Petition Fee – Rs. 1,00,000/- vide Demand Draft No. 45479 dated 30/07/2016

(Deponent)

Place: New Delhi

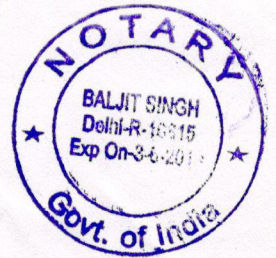
For SeaFaradays Energy Private Limited

(Name & Designation of the Authorised Signatory)



ATTESTED
BSmg
BALJIT SINGH
NOTARY DELHI-R-10615
Govt. of India
NEW DELHI

vi
29 JUL 2016



I, BALJIT SINGH Advocate, / Notary R-10615-Delhi
do hereby declare that the person making this affidavit is known to me through the perusal of records and I am satisfied that he is the same person alleging to be deponent himself.

B Singh
Advocate

Solemnly affirmed before me on this 29th day of July 2016 at 3:00 a.m. / p.m. by the deponent who has been identified by the aforesaid Advocate.

I have satisfied myself by examining the deponent that he understood the contents of the affidavit which has been read over and explained to him. He has also been explained about section 193 of Indian Penal Code that whoever intentionally gives false evidence in any of the proceedings of the Commission or fabricates evidence for purpose of being used in any of the proceedings shall be liable for punishment as per law.



ATTESTED
B Singh
BALJIT SINGH
NOTARY DELHI-R-10615
Govt. of India
NEW DELHI

vii 29 JUL 2016

PETITION UNDER SECTIONS 61(h), 62, 64 READ WITH SECTIONS 86(1)(a), 86(1)(b) AND 86(1)(e) OF THE ELECTRICITY ACT, 2003

MOST RESPECTFULLY SHOWETH:

Introduction

1. The **Petitioner**, SeaFaradays Energy Private Limited (SeaFaradays), is registered under the Companies Act, 2013 having its registered office at 2FCS44 Second Floor, Ansal Plaza, Vaishali, Ghaziabad – 201010, Uttar Pradesh and Corporate Office at 416, Somdatt Chambers II, Bhikaji Cama Place, New Delhi – 110066. A copy of the **Certificate of Incorporation** of the Petitioner Company is attached as **ANNEXURE P – 1**.

2. The Petitioner is **first** of its kind **startup** company in India, setup with the objective to **harness the Offshore Renewable Energy** and emerge as **Renewable Energy Independent Power Producer (RE-IPP)** and place **India** among the top few countries to take lead in **Ocean Energy**.

3. The Petitioner is the **authorized technology partner** of **Seabased AB** (Seabased), (a Swedish OEM and Patent technology holder for the Wave Energy Converter (WEC) and associated components), for India. A copy of the Letter of Association is attached as **ANNEXURE P – 2**.

4. The **Ministry of New and Renewable Energy** (MNRE) is the **nodal** Ministry of the Government of India (GoI) for **all matters** relating to **new and renewable energy**. The broad **aim** of **MNRE** is to **develop** and **deploy** new and renewable energy for **supplementing** the **energy requirements** of the country. The **role** of new and renewable energy has been assuming **increasing significance** in recent times with the **growing concern** for the country's **energy security**. MNRE is keen to promote **new technologies** who are market ready for **commercial implementation** and simultaneously **encourages** Private Player Participation by aiding financial assistance for setting up of the projects under their Research, Design, Development and Demonstration (RDD&D) Scheme.



5. The Petitioner's proposed Wave Energy Technology has been **reviewed, approved and accepted** subsequent to a formal techno commercial review carried out by the esteemed panel of **Project Appraisal Committee (PAC)** comprising of eminent members from **MNRE, Ministry of Earth Sciences – National Institute of Ocean Technology (MOES-NIOT), Indian Institute of Technology (IIT)-Chennai and Indian Navy**. Copy of the **Acceptance Letter** is attached as **ANNEXURE P – 3**. The **details and chronology** of the engagement and approval is duly enumerated in the relevant paragraphs of the Petition.
6. In accordance with the above, the Petitioner is in the process of **development of Wave Energy Project at Andaman and Nicobar Islands** for **demonstrating the suitability** of Ocean Wave Energy Technology in Indian Offshore conditions. In collaboration with Seabased, the Petitioner plans to **set up a 1.125 MW (45 kW x 25 WECs)** Ocean Wave Energy Project at Hut Bay Island in the Union Territory of A&N Islands. The Petitioner shall be **responsible** for overall **Execution, Management and Operation & Maintenance** of Wave Energy Park for the **life cycle** of the Wave Park / duration of the **Power Purchase Agreement (PPA)**.
7. For **executing** the Project, the Petitioner intends to **incorporate a Special Purpose Vehicle (SPV)** Company which shall be a **subsidiary** of the Petitioner. This SPV shall be the **Generating Company** within the meaning of **Section 2 (28)** of the Electricity Act, 2003 ('Act'). Section 2 (28) of the Act is reproduced as under:
- “(28) "generating company" means any company or body corporate or association or body of individuals, whether incorporated or not, or artificial juridical person, which owns or operates or maintains a generating station;”*
8. As per reference letter in **ANNEXURE P – 3**, **MNRE** is **willing** to provide **financial assistance** to the Project under their prevailing **RDD&D Scheme** wherein a **grant** amount of up to **50%** of the **capital cost** of the Project is provided.
9. For the implementation of the Project, a **Detailed Project Report (DPR)** covering all **technical and commercial** aspects of the Project, including the **proposed LCOE** was



submitted to the Electricity Department, A&N Islands (the Respondent) on 09.05.2016. The copy of the same is attached as **ANNEXURE P – 4**.

10. The **Respondent** is **operating & maintaining power generation, transmission & distribution systems** and networks in the A&N Islands for providing **electric power supply to general public & local industries** and also implements various schemes under Plan and Non – Plan Programmes for augmentation of generating capacity and establishment of new power houses and T&D systems. The Respondent also functions as a **Nodal Agency** for implementing **Renewable Energy Programme** of MNRE in the Islands. Further to receipt of the DPR, copy of the Respondent’s communication in this regard is attached as **ANNEXURE P – 5**.
11. The **Respondent** is **currently engaged** with various **IPPs** (RE and Fossil Fuel based), **HPPs** and **Self Generation plants**. For **purpose of clarity, in this case, the Petitioner shall act as RE-IPP responsible for establishment, operation & maintenance** of the 1.125MW **Wave Energy Park**.
12. Pursuant to the Draft Joint Electricity Regulatory Commission (JERC) (Procurement of Renewable Energy) Regulations, 2010, Third Amendment published for public comments by the Hon’ble Commission vide no. 14/2010 dated 17.06.2016 the **Renewable Purchase Obligations (RPO) targets** for the State of Goa and Union Territories has been **increased to 17% by FY 2021-22** with Solar RPO at **8%**. Thus it is **clear** that in the **ensuing years, humungous quantum of RE power** is to be **procured** by the Respondent which will require **larger share** from **non-Solar** due to **peculiarities** of islands.
13. Furthermore, **pursuant to Clause 2(o)** of the JERC (Procurement of Renewable Energy Regulations) 2010, Hon’ble Commission **recognises** the MNRE **approved sources** as **eligible renewable energy generating sources** (such as ours). Clause 2(o) of the said Regulations is reproduced below:

“2. Definitions

...



(o) "Renewable Energy Sources" in this context means electricity generating sources recognized or approved by the MNRE.

...

14. The **Wave-Energy technology** has been **categorised** as a **new and emerging renewable energy technology** by the MNRE, and the Petitioner's Project has been identified for **financial assistance** under **RDD&D Scheme** of MNRE. Therefore, this Project would also **contribute** towards **fulfilment** of Respondent's **RPO**, which are **proposed** to be **enhanced** to **17.00% by FY 2021-22** from the present levels of 3.95% for FY 2016-17 to 6.00% FY 2018-19.

15. It is pertinent to mention herein that **at present** there is **no existing policy and regulatory framework** in place with regards to **tariff determination** for **Wave Energy Projects**. The Petitioner most humbly submits to the Hon'ble Commission that as the Wave Energy Project is **stipulated** as an **eligible** renewable energy resource by the MNRE, therefore, in **accordance** with the **provisions** of Section 61(h) of the **Electricity Act ('Act') 2003** the Hon'ble Commission may kindly **determine** the **tariff** for the Project accordingly. Section 61 (h) of the Act is reproduced below:

"The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:-

...

(h) the promotion of co-generation and generation of electricity from renewable sources of energy;

...

16. In view of above, the Petitioner **humbly prays** the Hon'ble Commission to **determine Project specific Tariff** for the proposed Wave Energy Project in **accordance** with the **provisions** of Sections 61(h) and 62 of the Act. The Petitioner **undertakes** to place on record any further documents identified/ required by this Hon'ble Commission for the purposes of tariff determination through the data gaps. The relevant extract of Section 62 of the Act is reproduced as under:



“(1) The Appropriate Commission shall determine the tariff in accordance with the provisions of this Act for-

(a) supply of electricity by a generating company to a distribution licensee:

...

(2) The Appropriate Commission may require a licensee or a generating company to furnish separate details, as may be specified in respect of generation, transmission and distribution for determination of tariff.

...”

17. Thus, in accordance with Section 64(1) of the Act, the Petitioner is submitting the present Petition to the Hon’ble Commission **seeking determination of tariff to sell power** generated from its Wave Energy Project to the **Respondent**. The relevant extract of Section 64 of the Act is reproduced as under:

“(1) An application for determination of tariff under section 62 shall be made by a generating company or licensee in such manner and accompanied by such fee, as may be determined by regulations.

...”

18. Furthermore, in accordance with Sections 86(1)(a), 86(1)(b) and 86(1)(e) of the Act, the Petitioner is submitting the present petition to the Hon’ble Commission **seeking determination of tariff to sell power** generated from its Wave Energy Project to the **Respondent**. The relevant extract of the said Sections is reproduced as under:

“(1) The State Commission shall discharge the following functions, namely: -

(a) determine the tariff for generation, supply, transmission and wheeling of electricity, wholesale, bulk or retail, as the case may be, within the State:

....

(b) regulate electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through agreements for purchase of power for distribution and supply within the State;

....



(e) promote co-generation and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;

... ”

19. India is the **second most populous country** and amongst the fastest growing economies in the world, hence the **quantum required to meet the energy demand is humungous and invariably place India among the top countries contributing to the global rise in GHG emissions in the near future.** Thus, the **primary challenge** for India would be to **alter its energy mix**, which is dominated by coal, to a **greater share of cleaner and sustainable** sources of energy. India also needs to take **immediate steps** and a **tough stance to balance** without compromising on the **targets set for economic development and environment sustainability.** Therefore, **increasing the installed capacity of renewable** energy sources, new and emerging technologies such as wave energy is the **need of the hour to supplement and meet** the requisite demand.
20. India has **endorsed** the long term United Nations Framework Convention on Climate Change (UNFCCC) targets for **limiting the increase** in the global average surface temperature to 2⁰C above the pre-industrial level. At COP 21 in Paris, Parties to the UNFCCC reached a historic agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon economy in future. On October 2, 2015, **India declared its Intended Nationally Determined Contribution (INDC)** for the period **2021 to 2030.** Inter-alia, the INDC declared by India has **intended to reduce the emissions intensity of its GDP by 33% to 35% by 2030 from 2005 level** and also **achieve about 40% cumulative electric power installed capacity from RE sources by 2030** with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF). It also **includes creation of an additional carbon sink of 2.5 to 3 billion tons of CO₂ equivalent** through an additional forest and tree cover by 2030.



Scenario at A&N Islands – Land Scarcity & the Diesel Menace

21. As the Hon'ble Commission is well aware that **A&N Islands** are a **group of segregated islands** that form the Union Territory. Due to **geographical peculiarities** of these islands including **separation by sea over great distances**, there is **no single power grid** for the entire electrified islands, and a power house at **each location caters independently** to the power requirements of areas/islands. Therefore, the **power generation** in A&N Islands is **localised** and is **substantially diesel based**.
22. It is pertinent to note that in A&N Islands, approximately **90.9%** of the **total land area** is **categorised** under **forest area** (including 59.15% of area is covered under protected forest) and **1.51%** as **Cultivable Waste Land**. Henceforth, despite the positive experience of solar energy installations in India, **exploring the Ocean Wave energy to meet the electricity demand** of A&N Islands seems a **viable option** with a **positive environment footprint**.¹
23. As evident from the details mentioned in the table below, the **present power scenario** in the UT of A&N Islands is **predominantly diesel based**, which accounts for over **90%** of the **total installed capacity**.

A&N Electricity Generation at a Glance (FY 2016-17)	
Total Installed Capacity	108.75 MW (98.50 MW Diesel, 5.25 MW Hydro, 5 MW solar)
Peak Demand	58 MW
Annual units sold	252.60 MU

24. From the information available in the Hon'ble Commission's Order dated 06.04.2016 in Petition No. 196 / 2016, for determination of ARR for the First MYT Control Period (FY 2016-17 to FY 2018-19) and Retail Supply Tariff for FY 2016-17 for the Respondent, the Petitioner has **observed** that, in terms of energy generation, the **diesel based generation** accounts for more than **94%** of the total energy requirement, as evident from the following table.

¹ Draft Report- Feasibility Study to install Wind Turbines in Andaman & Nicobar Islands, Published by NIWE in April 2015.



(All units in MUs)

Particulars	FY 2016-17	FY 2017-18	FY 2018-19
Energy Sales	252.60	265.32	278.87
T&D Loss	17.11%	15.34%	13.59%
Total Energy Requirement	304.73	313.39	322.75
Diesel based Sources (A)	287.78	296.53	305.77
Own Generation	107.88	116.63	125.87
Power Purchase	179.90	179.90	179.90
Renewable Sources (B)	17.30	17.30	17.30
Small Hydro (KHEP)	10.58	10.58	10.58
Solar PV (G/Charama SPV)	6.72	6.72	6.72
Total Energy Availability (A+B)	305.08	313.83	323.07
Surplus / (Deficit)	0.35	0.44	0.32

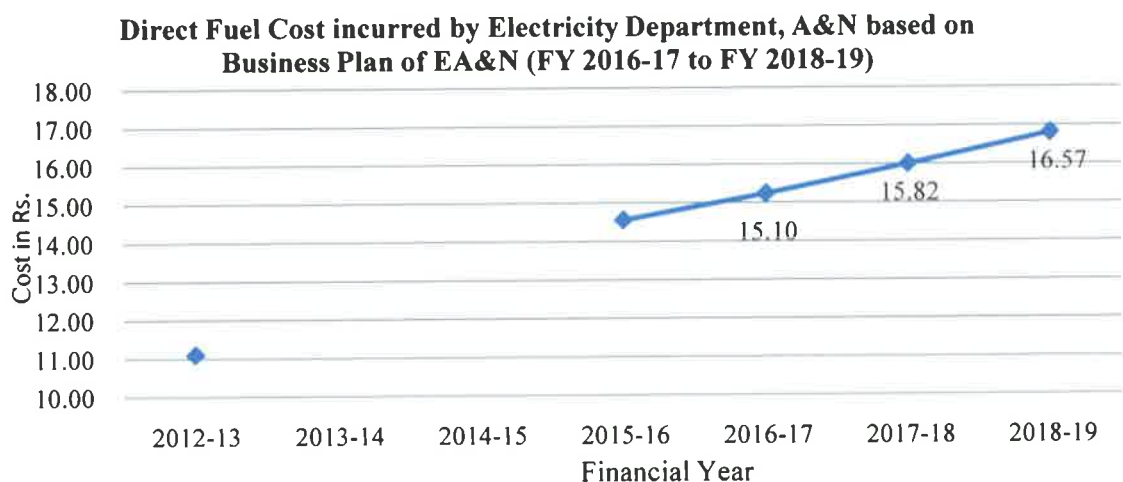
25. It is **prudent to mention** here that pursuant to the country's commitment in **carbon reduction, dependency on diesel to meet** electricity demand is **not desirable** for the **growth** of the **country** both **economically and environmentally**. This is **even critical** for A&N Islands having **more fragile ecological environment** and **economy largely dependent upon Central Government**.
26. Approximately **85%** of the **energy conversion** in the **world** today is **fossil fuel based**; the **harmful effects** of **emissions** from these fossil fuel based energy conversion is **debated globally**. Presently, nearly **80%** of **India's crude oil** requirement is met from **imports** and it is **stipulated** that this **percentage** is **expected to increase** with the ensuing demand in future. Additionally, the **global crude oil** has seen a **tremendous variation** wherein per cost of crude oil (Indian Basket) reached to a whopping **USD 120 per barrel** in the past and **per litre price of diesel** was **regulated** at that time.
27. The Petitioner most humbly specifies that the **price of diesel** is now **deregulated** and is **determined** by the **oil marketing companies** based on **international market** and currency rates. Thus, **any increase** in the **price of crude oil** in near future will be



passed to the **generating cost of electricity** in some form; thereby **increasing the per unit electricity rate** in the A&N Islands.

28. There are various **power houses** at different locations in the islands having **DG sets capacity** ranging from **6 kW to 5000 kW**. **Despite knowing** that generating power with fossil fuel is **not a long term sustainable solution** and understanding **adverse socio – economic, climate and environmental impacts**, the Islands are **constrained to depend** on Diesel for power generation. It is important to **emphasise** that this **heavy dependence on diesel** is due to the **limitations of existing proven Renewable Technologies like Solar, Wind and Small Hydro** due to **peculiarities** of the Islands (refer para 63 for further details).

29. In its MYT Petition for the Control Period from FY 2016-17 to FY 2018-19 as submitted to the Hon'ble Commission, the Respondent had **projected its fuel cost** (Direct Generation cost excluding other allied costs) at **INR 15.10 per unit, INR 15.82 per unit and INR 16.57 per unit** for **FY 2016-17, FY 2017-18 and FY 2018-19** respectively despite **no virtual increase** in the **International Crude Oil prices**.



30. The above **cost is averaged out generation cost per unit** of electricity covering **self generation, Independent Power Plant (IPPs) and Hired Power Plants (HPPs)**. Pursuant to the Table No. 5.20, 5.21 and 5.22 of MYT Order in Petition No. 196/2016 dated 06.04.2016 the per unit average Fuel cost vis-à-vis the diesel consumption as approved by the Hon'ble Commission is presented below:



Particulars	FY 2016-17	FY 2017-18	FY2018-19
HSD 'Only' Cost (Rs. Cr.)	291.14	301.01	311.34
Generation (MUs)	305.07	313.83	323.07
HSD Consumption (in KL)	73,280.52	75,765.31	78,364.91
HSD Cost (Rs/L)	39.73	39.73	39.73
Avg 'Fuel Only'* Cost (Rs/kWh)	11.11	11.12	11.13

* Excluding Fixed Generation costs, escalation, Operation & Maintenance costs

31. Considering the India's crude price basket for March 2016 as USD 36.42 per BBL, and comparing the same with the HSD Cost and Average Generation Cost, the following table summarises scenarios of HSD Cost and Average Generation Cost, at various price levels of Crude in (USD/BBL), without considering any impact of variation foreign exchange rates.

Crude (USD/BBL)	HSD Cost (INR/L)	Avg Fuel (HSD) Only Cost (INR/kWh)*	HSD Cost after addition of Estd. Cost on a/c of Taxes not levied and Freight Charges (~INR 11/L) (INR/L)	True cost of Fuel (HSD) Only incl. Taxes not levied and Freight Charges (INR/kWh)*
36.42	39.73	11.11	50.73	14.19
45.00	49.09	13.73	60.09	16.81
55.00	60.00	16.78	71.00	19.86
65.00	70.90	19.83	81.90	22.91
75.00	81.81	22.88	92.81	25.96
85.00	92.72	25.93	103.72	29.01
95.00	103.63	28.98	114.63	32.06
100.00	109.08	30.50	120.08	33.58

* Excluding Fixed Generation costs, escalation, Operation & Maintenance costs

32. It is given to understand that the HSD cost per litre on account of:
- A&N being a Union Territory, there is a different pricing mechanism between State vs Union Territories primarily on account of Taxes (Excise, VAT, ESS etc.) which accounts to the Exchequer loosing Indirect Taxes collection amounting to ~ INR 6 / litre. This shall increase with increase in market price



of Crude Oil; however, for the basis of computation, it is kept constant for now.

- A&N being a remote location, the Freight charges of diesel from Chennai to A&N Islands are estimated to be **~INR 5 / litre**.

33. Thus the resultant additional cost of HSD / litre: **INR 6 + INR 5 ~ INR 11.00 / litre** which should be added to the current pump price of diesel in A&N to arrive at a true cost of **'Fuel Only'**. The current value of 'Fuel Only' Generation cost of INR 11.11 translated to INR 14.2 by just adding the Service Tax and Freight Charges from Chennai, still excluding Fixed Generation costs, escalation, Operation & Maintenance costs (please refer table above for incremental fuel cost comparison).
34. Thus the **HSD cost** of INR 39.73/litre **as mentioned** in the table above **does not reflect the true economic landed cost of HSD / litre in A&N Islands**, as for every litre of HSD being consumed in A&N Islands, the **Central Exchequer** is being **burdened with ~INR 11** and the same is **currently not being reflected** in EDA&N generation cost.
35. It is **evident** that the **present average cost of generation as approved** by the Hon'ble Commission in its MYT Order (for A&N Islands) in Petition No. 196/2016 dated 06.04.2016, is in a **regime of lowest international crude price** in the last few decades. Therefore, the international crude prices, and therefore, **cost of diesel based power generation is imminent to grow year on year on account of dynamics of fuel pricing, vintage of diesel plants, general inflation**, etc. The Renewable Energy technologies can **provide the much needed energy security** by **supplementing** the growing power demand and simultaneously **arresting the growth** in tariff.
36. As described in para 63 below, the **proven renewable technologies have constraints and limitations** with respect to islands, thus, **despite focus on solar, reliance on diesel** continue and **shall continue to grow unless a right energy mix** is found for the islands **wherein Wave Energy** can be a **significant, sustainable and reliable RE source**.



37. The Petitioner **emphasizes** that **A&N Islands** are **blessed** with a **substantial coastline** (~1496 Km) thereby enabling them to be **able** to **explore** the **Ocean Wave Energy** to **meet** its **requisite** energy demand. Oceans cover about **70%** of the **Earth's surface** with a **significant energy density** and a **substantial commercial potential** if the energy can be extracted using a **reliable, environmentally benign** and **cost effective technology**. It is **more consistent** and **predictable** than that of other renewable resource such as wind and solar. Thus, Wave has the potential to become a **Sustainable Energy Solution for Islands**.
38. Until 2014, the **CAGR** of **per capita power consumption** at A&N Islands, as **reported** by the Respondent, during the last 15 years is **6%**. The per capita power consumption is expected to **grow** from the current levels of **604 kWh to 960 kWh by FY 2021-22** therefore, showing a **humungous growth of 159%**. Therefore, harnessing the **environmental friendly** and **predictable wave energy** for power generation to meet the requisite demand in the UT of A&N Islands is a **viable and a practical option**.

Wave Potential Overview – Global & Indian Perspective

39. Oceans cover about **70 %** of the Earth's surface and contain **significant energy density** and have **substantial commercial potential** if the energy can be extracted using a reliable, environmentally benign and cost-effective technology. It is **more consistent** and **predictable** than that of **other renewable resources** such as wind and solar. The various types of ocean energy technologies, such as **tidal energy, wave energy, ocean thermal energy conversion** and **salinity gradient energy**. Given their geographical distribution and the wealth of resources available, tidal, and wave energy are those poised to provide the most significant and sustainable contribution to make the dependable world's energy system.
40. **Wave energy**, with a **global potential 30 times** higher than that of tidal energy and will **prove** to be a **renewable resource** with a **difference**. Wave energy is the **most interesting** and **promising** among **all forms** of ocean energy. During the **process** of **wave power extraction**, wave energy **does not create any waste** or **emit CO₂**; it leads to **no noise pollution** and is also **environment-friendly**. Unlike most renewable



energy resources, **wave energy can produce power throughout the year.** Wave energy is **highly concentrated near the ocean's surface** in oceans worldwide.

41. The **World Energy Council** has estimated that approximately **2 terawatts** (2 million megawatts), about **double of current world electricity generation**, could be **generated** from the **oceans via wave power.** The UK Marine Foresight Panel estimates that **just 0.1% of available marine energy could supply five times the global demand for energy.**

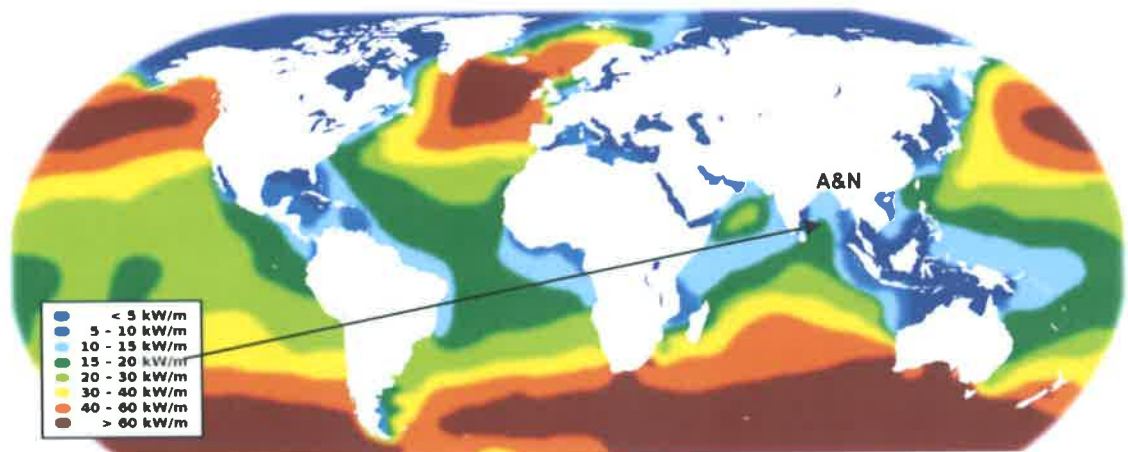


Figure: World Wave Potential

Source: Web

42. India boasts a 7,516.6 km long coastline² encompassing the mainland, Lakshadweep Islands, and the Andaman & Nicobar Islands, with an estimated potential of Wave Energy at approximately 40 GW with the **average harness-able Wave potential** available along coastline & Islands is in the range of **10-20 kW/m** as depicted in the figure below:

² <http://mha1.nic.in/par2013/par2013-pdfs/ls-300413/498.pdf>

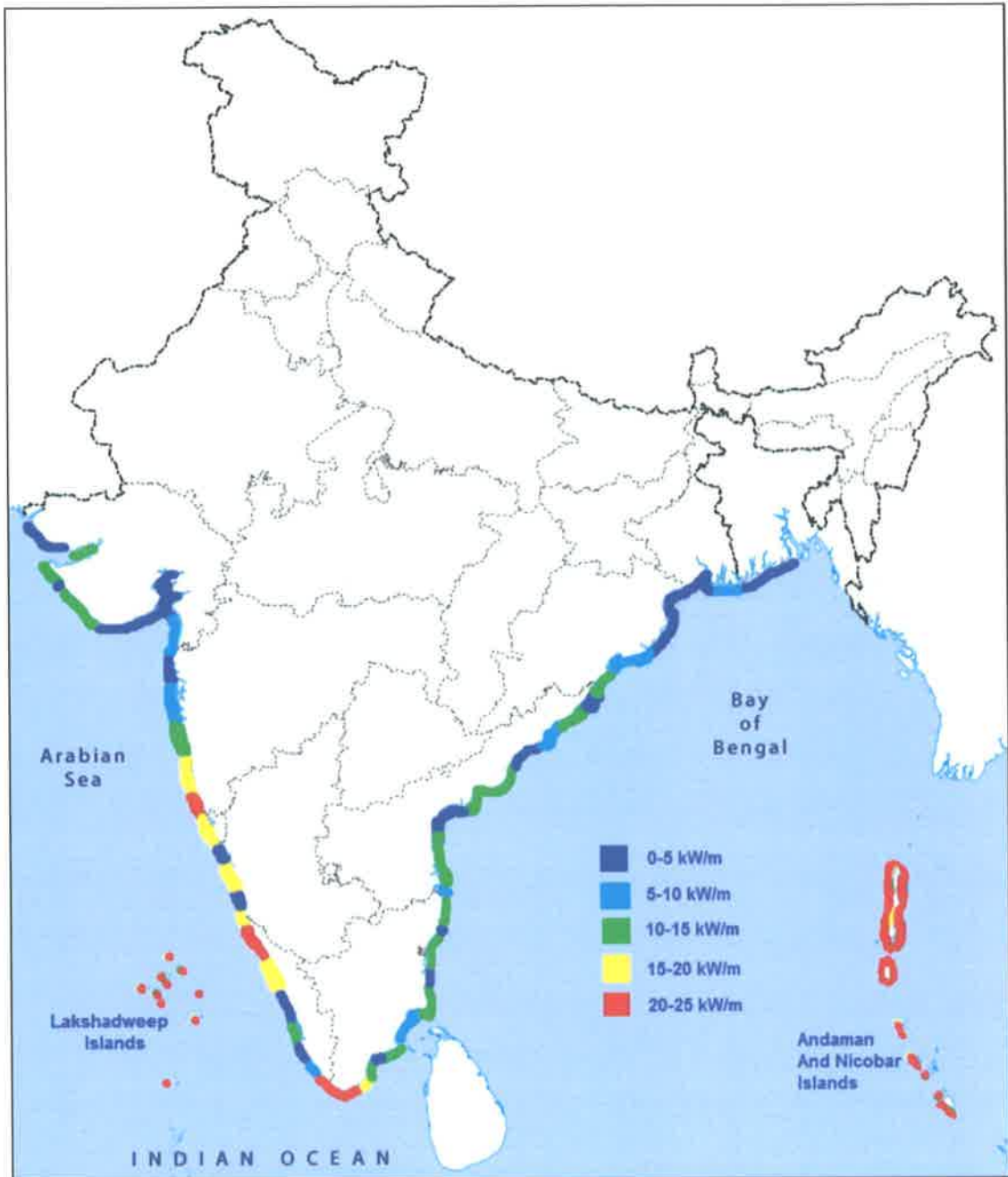
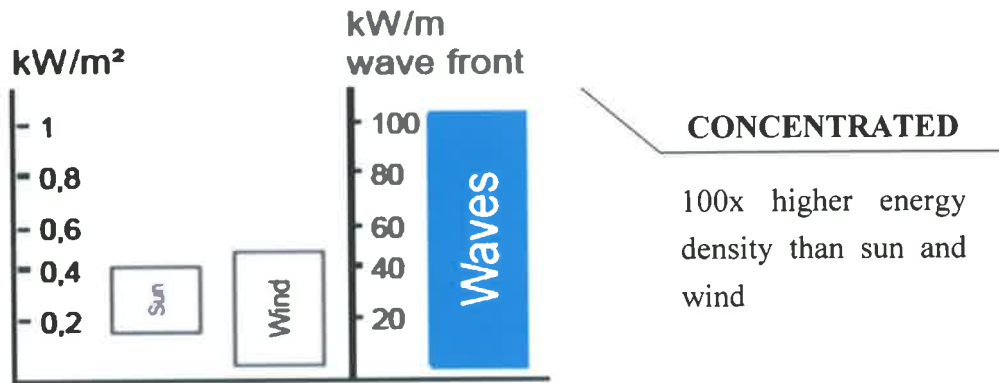


Figure: Indian Wave Potential

43. The **global wave energy** potential estimates range from 10,000 to 15,000 TWh per year worldwide. The **utilization factor** (CUF/PLF) for wave power is estimated to be in the range of 33% ~ 80% depending on the **wave climate** at the **location of installation**.
44. The figure below compares the **harness-able potential** of various RE Sources, with Wave Energy **showcasing** the **highest** available harness-able potential.





45. Wave energy, apart from being:

- **Renewable**
- **Environment friendly**
- Providing **increased energy security** thus **less Dependency on Foreign Oil Companies and price volatility**

Offers the following **exclusive/ incomparable advantages** over other proven RE sources:

- **Abundant and Widely Available**
- **Higher Energy Density** (refer para 44 for potential scale)
- **High Predictability**
- **No Damage to Land** – (Unlike solar which requires 4~6 Acres land/MW)
- **Less visual/noise impact**
- **Capable of high efficiency** (up to **80%**) in ideal conditions
- **High Grid Adaptability** – due to higher accuracy of predictability (up to 98%)
- **Low Frequency of maintenance**

46. Ongoing **research and development** in the sector has **brought** the wave power industry into the **beginnings of commercial development**. The following table details the operational wave energy plants installed globally.



Station	Developer/ Technology Provider	Country	Capacity (MW)	Year of Commissioning
Sotenas Wave Energy Plant*	Seabased AB	Sweden	1	2015
Azura Wave Power Device	Northwest Energy Innovations	United States	0.2	2015
Mutriku Breakwater Wave Plant	Basque Energy Agency	Spain	0.3	2009
SDE Sea Waves Power Plant	SDE Energy Ltd.	Israel	0.04	2009
Islay Limpet	Wavegen	United Kingdom	0.5	2000
Orkney Wave Power Station	European Wave Energy Centre	United Kingdom	2.4	Proposed

* With the largest commercially operational, grid connected plant based on our technology

47. It is prudent to evaluate the **international available benchmarks**. Based on the study³ published by CRISIL, in support with IIT Chennai, duly enumerates the **CAPEX vis-à-vis the scale of the Project with an OPEX of ~ 5-9%**:

Technology	Pre-demonstration project cost in million (low-high)	Demonstration project cost in million (cost for developers first 10 MW project (low-high))	Commercial project cost in million for developers 10 MW project after 50 MW deployed
Wave			
Capex/MW	€ 9.3 (7.8-11.0)	€ 6.2 (5.2-7.2)	€ 4.3 (3.5-5.0)
Opex./MW/yr.	€ 0.80 (0.67-0.93)	Euro 0.37 (0.30-0.45)	€ 0.25 (0.17-0.24)
Tidal Range			
Capex/MW	n/a	n/a	€ 2.3 (1.0-3.5)
Opex./MW/yr.	n/a	n/a	€ 0.025 (0.02-0.03)
Tidal Stream shallow			
Capex/MW	€ 12.6 (9.5-15.7)	€ 5.5 (4.4-6.5)	€ 3.9 (2.9-4.95)
Opex./MW/yr.	€ 0.55 (0.40-0.71)	€ 0.38 (0.29-0.48)	€ 0.20 (0.15-0.24)
Tidal Stream Deep			
Capex/MW	€ 11.0 (9.3-12.5)	€ 4.5 (3.8-5.2)	€ 3.9 (2.9-4.95)
Opex./MW/year	€ 0.41 (0.34-0.50)	€ 0.20 (0.15-0.25)	€ 0.16 (0.11-0.20)

Table: International benchmarks for CAPEX and OPEX

Source: Black & Veatch Marine Energy Cost Analysis 2010

³ http://www.ireda.gov.in/writereaddata/AFD_Tidal.pdf



Year	Capital Cost (\$/kW)	Fixed O&M (\$/kW-yr)
2015	9,240	474
2020	6,960	357
2025	5,700	292
2030	4,730	243
2035	3,950	203
2040	3,420	175
2045	4,000	208
2050	5,330	273

Table: Cost and Performance projections for Ocean Wave Technology

Source: Cost and Performance Data for Power Generation Technologies, Black & Veatch⁴

48. **Cost projections by IRENA⁵** – Due to the limited commercial experience, the estimates for **Levelized Cost of Electricity (LCOE)** of **wave energy technologies** in 10 MW demonstration projects is in the range of **EUR 330-630 per megawatt hour (MWh)**. However, there is **considerable scope for economies of scale** and learning, with the **projected LCOE for wave energy in 2030 estimated** to be between **EUR 113-226 per MWh**, if deployment level of more than 2 Gigawatt (GW) is achieved.

Project Promoters and Proponents

49. The Petitioner, **SeaFaradays Energy Private Limited** is a **first** of its kind company in India, set up with an objective to **harness, promote, develop, own, operate and maintain** “Offshore” renewable energy projects and **place India** among the top few countries to take **lead in Ocean Energy**.
50. The Petitioner has the **necessary attributes, technical know – how and logistics capability** to provide various **services in offshore industry** with the intent of meeting the growing demand of the world and are desirous of power projects in India and elsewhere. The **promoters** of the Petitioner are **among the pioneers of offshore industry in India**, with a **vast experience in Extensive Construction, Project Management and EPC experience** in areas including but not limited to **Offshore Oil & Gas, Energy, Port and Marine Infrastructure** projects in India and elsewhere. Details pertaining to the profile of the Petitioner, its promoters, etc can be found under the **Section 3.4 of the DPR**.

⁴ <http://bv.com/docs/reports-studies/nrel-cost-report.pdf>

⁵ http://www.irena.org/documentdownloads/publications/wave-energy_v4_web.pdf



51. The Petitioner is the **authorised technology partner** with **Seabased AB**, an **Original Equipment Manufacturer**. Seabased AB was founded in 2001 as an innovation and patent holding company closely **associated** with the **Swedish Centre for Renewable Electric Energy Conversion Uppsala University**.
52. The Petitioner is in **strategic partnership** with **M/s Dharti Dredging and Infrastructure Limited (DDIL)**, **one of the largest Indian dredging companies** in the private sector. DDIL, with their **technical expertise, experienced project management teams** and **strong financials** has executed **numerous projects in Indian subcontinent and elsewhere**. DDIL is an **ISO 9001, 14001 and OHSAS 18001 company**, owning a **spectrum of dredgers and associated support vessels** extensively being utilised for capital **dredging works, Oil & Gas, Infrastructure development of ports and harbours etc**. With an **extensive experience** in offshore and associated activities, DDIL is now **foraying into Energy, Marine and Defence sector**. Other relevant details about DDIL can be found under **Section 3.4.1 of the DPR**. A copy of Letter of Association is attached as **ANNEXURE P – 6**.
53. From global perspective, Seabased Wave Technology has over 29 MW of confirmed orders as below:
- **Sotenäs, 10 MW – Fortum, Swedish Energy Authority**
 - Phase 1 – 34 + 2 WEC, 1 LVMS, 9.5 km sea cable, GCP land station, SCADA-system and wave measuring buoy – **The 1st MW Grid connected to the Swedish Main Grid on 16th Dec 2015 and is successfully Operating and Producing Electricity since Jan'16**
 - Phase 2 – Subsequent to evaluation, decision regarding the continuation with additionally 9 MW
- Refer **ANNEXURE P – 7** for details.
- **Ghana, 14 MW – TC Energy, Ada, Ghana –Repeat Order of Another 5MW**
 - Phase 1 - 6 WEC, 1 LVMS and land station are delivered and under installation at Ada – Commissioning expected in March, 2016
 - Phase 2 - 375 WEC, 8 LVMS, cables => 14 MW
 - Contract and financing – Fully contracted, financing under discussion with banks, LOI with EKN and LOI with SEK



- MoU and customer PPA for 1,000 MW
- O&M contract under discussion

The Order copy with TC Energy is attached as **ANNEXURE P – 8**. It may duly be noted that in this case, Seabased is not acting as RE-IPP and the scope is only limited to Design, Manufacturing, Supply and Supervision only during Installation and Commissioning.

54. The Petitioner **intends to build a portfolio of over 100 MW** of Wave Energy installed capacity in the **next five years** at various locations near Indian coasts, as summarised in the table below:

Description	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Forecast order Book (Cumulative)	~1 MW	~40 MW	~70 MW	~100 MW	~200 MW
Forecast Delivery (Cumulative)		~1 MW	~33 MW	~69 MW	~105 MW

55. The Petitioner has already **identified a few stakeholders**, wherein the Wave Energy projects can be implemented and **discussions** are at **advanced stages**. Some of the **key prospective stakeholders** apart from the A&N Islands are:

- **The Indian Navy** - Already engaged with the Indian Navy for setting up an 8-10 MW Wave Energy project in Karwar Smart Naval Base, Karnataka as well as Naval Base at Lakshadweep
- **Oil and Natural Gas Corporation (ONGC)** – Pilot Project for unmanned Offshore Platforms
- **Coastal Indian States** – Discussions ongoing with Kerala and Andhra Pradesh
- **Ports** - Discussions ongoing with the Mumbai Port Trust and Visakhapatnam Port

Need for the Project

56. The Government of India has put in **concentrated and dedicated** efforts for **redirecting its energy system** by **encouraging** the use of **new and renewable energy** in the **past decade**. The **two most prevalent sources** of RE in India are **Wind**



and Solar which have achieved **tremendous growth** in **mainland** with an installation of about **27 GW and 6.7 GW** respectively as on March 2016.

57. However, **despite** achieving the **astonishing progress** on technologies such as Solar, Wind and energy efficiency, India is **not yet on track** to be **within** the **Global Carbon Budget on Climate Change**. Thus, **consistent, proactive, faster, wider and deeper action** is required for **'Energy De-Carbonisation'**.
58. **Energy Generation** contributes to approximately **two – thirds** of the **green house gases (GHG) emissions**, which contributes to the **carbonisation problem**. Oceans cover approximately **two – thirds of the total area of earth**, thereby becoming a **potential solution** for the issue of **De-Carbonisation**. **Section 1.2 in the DPR elaborates** in detail about the **Energy Decarbonisation** and its need for India.
59. **No single RE source** can suffice the **power requirement** of the **planet**. Thus **considering** the **geographical, political, logistical, resource availability, environmental and economical aspects**; a **mix** of new and renewable energy sources is to be **collectively utilized** with **one source complementing** the **other**.
60. There are various **types of Ocean Energy Technologies** available, namely - **Tidal, Wave, Ocean Thermal Energy Conversion (OTEC) and Salinity Gradient**. Given their **geographical distribution** and the **wealth of resources** available, **Wave and Tidal Energy** are **poised** to **provide** the **most significant** and **sustainable** contribution to make the **dependable** World's energy system.
61. Wave energy is the most **interesting** and **promising** among all forms of Ocean Energy and **possesses** global potential **30 times** higher than that of Tidal energy. The **potential of Wave Energy**, when evaluated in the **Indian context**, is estimated to be **~40GW*/year, 5 times** than that of Tidal (**~8GW*/year**). Further, it is **important** to **emphasise** here that, A&N Islands **experiences** both **North-Eastern** and **South-Western Monsoon** thus the **overcast sky** and **monsoon period** extends to **8~8.5 months** annually.



62. **90%** of the **energy generation** in A&N Islands is through **Diesel Generators** which in addition to the **higher costs** has **many side-effects** such as **emissions** contributing to **green house gases** thus to **global warming**; **carbon black** is mainly **produced** by **diesel combustion** which has **800 times** more **global warming potential** than **CO₂** and is **branded Group 1 carcinogen** (causes Lung cancer).
63. **Shortage of optimal sites, apparent scarcity of land, protected forests, clearances, and weather & logistics constraints** in the A&N Islands act as a **barrier** in **setup of proven renewables**. These **geographical & topographical peculiarities** of the islands including **separation by sea over great distances** **neither supports** the setting up a **land based renewable power plant** **nor does provide** a **dependable / reliable solution**.
64. Thus there is a **need to explore harnessing energy** from **Offshore Renewable Resources** **available in abundance**.
65. Considering the **peculiarities** of the **Islands, Solar Power** has its own **limitations** namely:
- The **performance** in the **monsoon** months is **in-consistent**,
 - **Sky** is **overcast** for **majority period** of the **year**
 - **Not available** during the **night**
 - **Not** accurately **predictable** and
 - **Requires** over **5 Acres of precious land** (land available is already scarce in the Island) for **every MW** of Solar Installation.

Similarly, **Wind Power** also faces the following **limitations/hindrances**:

- **Installation** of Wind Energy in Islands is a **Herculean task**
 - **Logistical challenges**
 - **Shortage** of **accessible sites** having **potential**
 - Thus making it more or less **impossible** to **install large scale** wind projects in the **islands**
66. However, **Wave Energy** **overcomes** the above listed **limitations** and **provides** a **reliable and sustainable renewable energy solution** for the **Islands** as it is:



- **Performing at higher PLF's during monsoon**
 - **Being available day & night**
 - **Highly & accurately predictable**
 - **No damage to land** - just requiring a couple of 40 feet container space on land.
 - Thus resultant **~50% PLF**
67. **Based on the Resource Assessment & Feasibility study** (discussed in **Section 4.4 of DPR**), there is a **scope of installation in various capacities** ranging from **few kW to large scale MW** Wave Energy Parks at **various locations** in Andaman & Nicobar Islands and **our patented technology can be the driving factor for complete phasing out of diesel power generation** gradually.
68. Although it is a **proven solution**, has **already been implemented** in Sotenas, Sweden still we **intend to implement** the same in India keeping in view the **enormous advantages** of the Project and the favouring conditions **available** in India.
69. **Despite crude** being at its **lowest**, the **current generation costs** are **already** in the tune of **INR 15 to INR 20 / kWh**. This is **bound to increase year-on-year** due to **diesel price fluctuation, escalation & inflation** in other costs.
70. As per **Hon'ble Commission's report 2014-15**, **delivered power cost per unit is INR 26.58**. On the other hand, Renewable Energy will **offer fixed tariff for 25 years** whereas **diesel cost will Inflation / Escalation** market dynamics and **Energy Security**.

Proposed Wave Energy Solution

71. The Petitioner has **planned** to use the **standard model** of WECs in the A&N Islands to **harness electricity** from Wave Energy in consultation with Seabased AB. Seabased AB is the **proprietary owner** of this WEC technology developed after research conducted for over a decade and this technology is now having worldwide patents. Seabased AB have **research tie-up** with **Uppsala University** and has a research station based in Lysekil, Sweden exclusively for the **continuous development** of Wave Energy and WEC systems. The **first full scale** WEC was **installed in March 2006** and the site has been **continuously updated**.

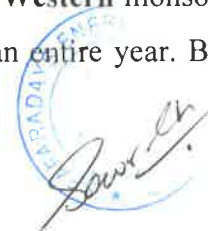


72. **Our technology** works on the **principle of Wave Energy Conversion** and **utilises the motion of waves to directly drive the Wave Energy Converters (WECs)**. This WEC technology is based on the WECs with **linear generators**. The **generating unit is placed on the sea bed** is connected to a **'Buoy'** on the **surface** via a **wire rope**, which **captures the energy in the motion of the waves, enabling the WEC to generate electricity**. The WECs are **connected to marine substations**, from which **alternating current** can be **transmitted** directly to the **onshore grid**. **Details about the technology with schematics and illustrations can be found under Section 3.3.2 in the DPR.**
73. The **electricity generation** using **WECs based on our technology** follows **Faraday's Law** wherein **electricity is generated** through (induced in) the **stator coils** due to rate of change of flux caused by **linear movement** of the **magnet/translator** in the **stator conductor**. The **Technical Description** of the Wave Energy System is appended in **the DPR.**
74. In a **typical** Wave Energy Project, **depending** upon the Wave Energy Park **capacity** and the **wave conditions** at the Wave Energy Park **location**, there can be about **1 – 10,000 WEC units**. Each of the Seabased AB generators have a **nominal capacity** of about **20 – 200 kW**. These units are deployed with a marine vessel carrying several units that can be positioned on the sea bed. The WECs are **suitable** to be **placed** across **various types of sea beds** and can work satisfactory with an inclination of up to 15% deviation from a vertical position. Details pertaining to the technical specifications of the technology may be found in **Section 3.3.2 of the DPR.**
75. The Petitioner's technology partner Seabased AB has **significant international experience** in this new and emerging RE technology. With the **commissioning of Grid connected 1 MW Wave Energy Park at Sotenas for Fortum Energy**, Seabased AB has **established** many **World firsts, including the World's first multiple unit wave power plant** and the **World's first subsea generator switchgear**. Seabased AB also has a **healthy order receipt** of about **29 MW** across different locations of the world.



Advantages of our Wave Energy Solution

76. Ocean waves are **more predictable, available day and night and omni-directional** in **comparison with wind and solar reception**. As a result wave energy **represents lesser challenges to grid operations and balancing**.
77. **Key Advantages** of using our Wave Energy Solution at A&N Islands are as follows:
- **Modularity** of units with **plug and play** system thus **easy scalability** of the capacity.
 - **Robust design with few moving parts**.
 - **Higher** power conversion efficiency CUF can be as **high as 80%** in a good wave climate.
 - **Lower frequency of maintenance**.
 - **High quality** electricity **without grid adaptations**.
 - **Patented** technology and system.
 - **High predictability** of the waves and **system** can be **tailor designed** suiting the available waves.
 - **High energy density**
 - **No damage to land** or the coast line for **future development** and/or **expansion**.
 - **Reduced dependencies** on **foreign oil companies** as India imports almost 80% of its fuel.
 - **Unlike solar** and **wind** energy installations, **wave energy** will **not put any impact on the already scarce land**, as approximately 91% of the total land area in the UT is forest land (including 59.15% of area is covered under protected forest) and 1.51% Cultivable Waste Land leaving only approx.7.5% of the total land for general purposes.
78. With an **objective to harness the yet untapped** wave energy potential in India, and **considering the projected rise** in energy demand in A&N Islands and, furthermore, **aiming towards reducing** A&N Islands' **dependency** on **diesel** based power generation, MNRE has **approved the proposal** of the Petitioner to **set up** a Wave Energy Project.
79. A&N Islands **experience** both **North – Eastern** and **South – Western** monsoons due to which it **exhibits excellent wave climate** spanning over an entire year. Based on



the desktop study, there is a **scope of installation in various capacities** ranging from a few kW to large scale MW wave energy parks at various locations in A&N Islands which can **help in phasing out of diesel power** gradually.

Environment – We Care

80. While **designing** the WEC, the **team** has worked from a **holistic perspective**, with the **environmental** issues in **focus**. All **materials** and **components** are well known and **compatible** with the **environment**. The use of chemicals and oils has been minimized. The small amount of grease necessary in the water tight sealing on top of the WEC is the only oil based substance in contact with water. There are **no** hydraulic solutions for energy conversion, excluding all extensive use of oil inside the WEC. The **corrosion protection** and **painting** of the devices is done **in-house** with **best environmental practice**. **No emissions** to air and water from the operation are expected from the WEC solution.
81. **Marine growth**, including **sea weed**, **barnacles** and other invertebrates is expected to occur, especially on the buoy. **No antifouling substances** are **used in favour of expected self-regulating mechanism** of gravity. **Physical appearance** of devices in water tends to aggregate fish, birds and marine mammals. The **objects** have been seen to **provide as roost, protection and new sources of food**.
82. There are **some ecological consequences** of wave power installation: the **occupied sea bed area** from the WEC foundation will **inevitably become unavailable** for bottom dwelling organisms. However, the **introduction** of a new body is expected to **create a new habitat in favor** of the hard substrate organisms.
83. The **visual impact** of our Wave Energy Solution is **limited** to the view of the buoy. The **buoy** is about 4-6 m in diameter, **painted yellow** according to **IALA's recommendations** due to **navigational safety** reasons. The buoy occupies an area of about 15 m² ocean surface and the part above sea level is about ½ m. Hence, the **impact on landscape values** will be **very limited**. For **safety reasons**, the **buoy** might be **equipped with lighting arrangements** that also could be **visible** from land. All in all **impact on sea users** will be an **estimated exclusion zone** surrounding the wave energy park. **Properly marked, it will not create any navigational risks.**



84. The newsletter of '**Science for Environment Policy: European Commission DG Environment News Alert Service**' may also be referred which is attached as **ANNEXURE P – 9**.

Groundwork for the Project

85. The **Government of India** has set an **ambitious target** to increase the Renewable Energy installed capacity in India from **43 GW** in March 2016 to **175 GW** by **FY 2022** and has allocated specific targets for Solar, Wind, Biomass and Small Hydro to all the States and Union Territories. Apart from the above mentioned renewable energy technologies and keeping the future vision in view, MNRE is exploring ways and means to **deploy new and emerging renewable energy** technologies as well.
86. Pursuant to the **MNRE's thrust on exploring new and emerging renewable energy technology** installations in India, the Petitioner approached MNRE for **approval to conduct Preliminary Potential Analysis** of Ocean Energy in the A&N Islands' region.
87. MNRE, vide Letter No. 113/6/2015-GT dated 11.08.2015, (copy attached as **ANNEXURE P – 10**), **approved the request** of the Petitioner to **conduct** a Preliminary Potential Analysis of Ocean/Wave Energy in the A&N Island as a part of their **initiative to accelerate and enhance support for RDD&D of Ocean/Wave Energy** in the Country.
88. In order to **understand the suitability of Ocean Energy Projects** (Wave and Tidal) in India, MNRE **constituted a Project Appraisal Committee (PAC)** to review Ocean Energy Technologies. Pursuant to the invitation letter (No. 114/7/2015 – OE dated 17.12.2015) for PAC meeting to be held on 19.01.2016 at New Delhi. The PAC comprised of senior **officials** from MNRE along with **technology experts** from **National Institute of Ocean Technology (NIOT)** and **Indian Institute of Technology – Madras (IIT-M)**. A copy of the PAC invitation letter is attached **ANNEXURE P – 11**.



89. For **evaluation** by the **MNRE** and **Project Appraisal Committee** constituted under MNRE, the Petitioner submitted a Preliminary Report dated 05.01.2016. Subsequently, the Petitioner **presented** before the PAC about the **technology to be used, current status of the technology**, its **commercialisation** and **way forward** for **setting up first** Wave Power Project in India. A copy of the Minutes of Meeting of the PAC is attached as **ANNEXURE P – 12**.
90. Pursuant to the **technical queries** raised by the members of the PAC, the Petitioner **provided** a **comprehensive written response** vide Letter No. SEPL/MNRE/2016/0021 dated 15.02.2016, **satisfactorily addressing** all the queries. A copy of the same is attached as **ANNEXURE P – 13**.
91. Pursuant to PAC meeting and **response provided** by the Petitioner for the **technical queries** raised during PAC meeting, MNRE **found** the **proposed technology suitable** and **advised** A&N Admin to **undertake the project** under **MNRE's RDD&D Scheme** to **demonstrate suitability** to Indian wave conditions. The **approval** of the Project, based on proven technology, under the MNRE's RDD&D Scheme, was conveyed vide Letter No. 114/7/2015-OE dated 23.02.2016 (copy attached as **ANNEXURE P – 3**).
92. **Considering the high cost of Diesel based Generation** in islands (more than **INR 25/kWh**), MNRE **recommended** A&N Administration to **undertake** the Wave Energy Project under MNRE's RDD&D Scheme and vide their Letter No. 114/7/2015-OE dated 23.02.2016 (**attached as ANNEXURE P – 3**) **advised** A&N Administration to **specify possible Project Specific Tariff** for the Wave Energy Project. MNRE also **stipulated** A&N Administration to decide the **Viability Gap Funding (VGF)** and **possible financial assistance on behalf of MNRE**. Furthermore, MNRE also **advised** A&N Administration to **specify the mode of facilitation of land, power evacuation, permissions** from various authorities, etc.
93. A **detailed Resource Assessment Study** was **carried out** to **study** the **wave climate, power needs, forest & wildlife reserves** and other **socio-economic factors**. With subsequent **scrutiny** of the **available data** with **stakeholders**, 2 locations namely -



Hut Bay and South Andaman were zeroed in as potential wave park locations to meet the majority of the demand of power requirements of A&N Islands.

94. The Petitioner carried out Desktop Feasibility study for Hut Bay and South Andaman using **6 years Met-ocean data procured** from **M/s Fugro GEOS, UK** – a worldwide recognized Survey Agency (Report annexed as **ANNEXURE P – 14**). Both the locations demonstrate **excellent wave climate** and have their own Project implementation peculiarities:

Location	Features	Considerations for installation only for Demo Wave Energy Park
South Andaman	Higher PLF for Wave Energy Park expected at 45~50%	
	Power requirement is of greater quantum. Scope for installation of 30~50MW Wave Energy Park	Evacuation distance for Demo Wave Energy Park is longer (approx. 21Km) which affects the overall CAPEX of the Demo Wave Energy Park. The cost of the long evacuation cable shall have negligible or no impact whilst installing 30/50 MW capacity Wave Energy Parks.
	Good Grid and availability, easy for connectivity with Wave Energy Park	
Hut Bay	Higher PLF for Wave Energy Park expected 47.5% ~ 52.5%	
	Evacuation distance is less, therefore commercially viable for Demo Wave Energy Park	Approx. 5Km which is viable even for a Wave Energy Park of smaller capacity

95. After carrying out the detailed Resource Assessment along with Techno-commercial feasibility, the Petitioner submitted the DPR (attached as **ANNEXURE P – 4**)



covering all **technical** and **commercial** aspects of the Project including the **proposed LCOE** to the Respondent on 09.05.2016.

96. A **formal response** on the **DPR** is **awaited from the Respondent**, however, the Petitioner have had various site visits and discussions with the Respondent regarding DPR. It has been **advised** by the Respondent to **get the Project Specific Tariff determined** by **Hon'ble Joint Electricity Regulatory Commission (JERC)** as the proposed Wave Energy Park would be first of its kind project in the country. Thus, the Petitioner files this petition for **Project Specific Tariff Determination** to the Hon'ble Commission. The copy of Respondent's communication in this regard is attached as **ANNEXURE P – 5**.

Project Overview and Off-take Arrangement

97. After **due considerations** and **scrutiny** in relation to the Wave Energy Park capacity and **CAPEX**, **Hut Bay** has been **selected** for the **implementation** of the Project. Tentative Coordinates of Wave Energy Park are 10° 28' 42.69" N, 92° 30' 18.71" E and the nearest grid point is Harminder Bay. The distance of the tentative Project location from the shore is approximately 4.56 km (Refer section 4.3 of the enclosed DPR).

Facts about the Location	
Location	Hut Bay
Tentative Coordinates of Wave Energy Park	10° 28' 42.69" N, 92° 30' 18.71" E
Estimated Water Depth	28m~35m
Distance from Shore	4.56 km (approx)
Nearest grid p ^o int	"Harminder Ba ^s " – The Respondent to make the grid connectivity point available within 500m of Land Fall Point
Estimated load during the day	
0500 Hrs to 1700 Hrs	1 MW
1700 Hrs to 2200 Hrs	2 MW
2200 Hrs to 0500 Hrs	1.2 MW
Current annual consumption (kWh)	~ 10 MU

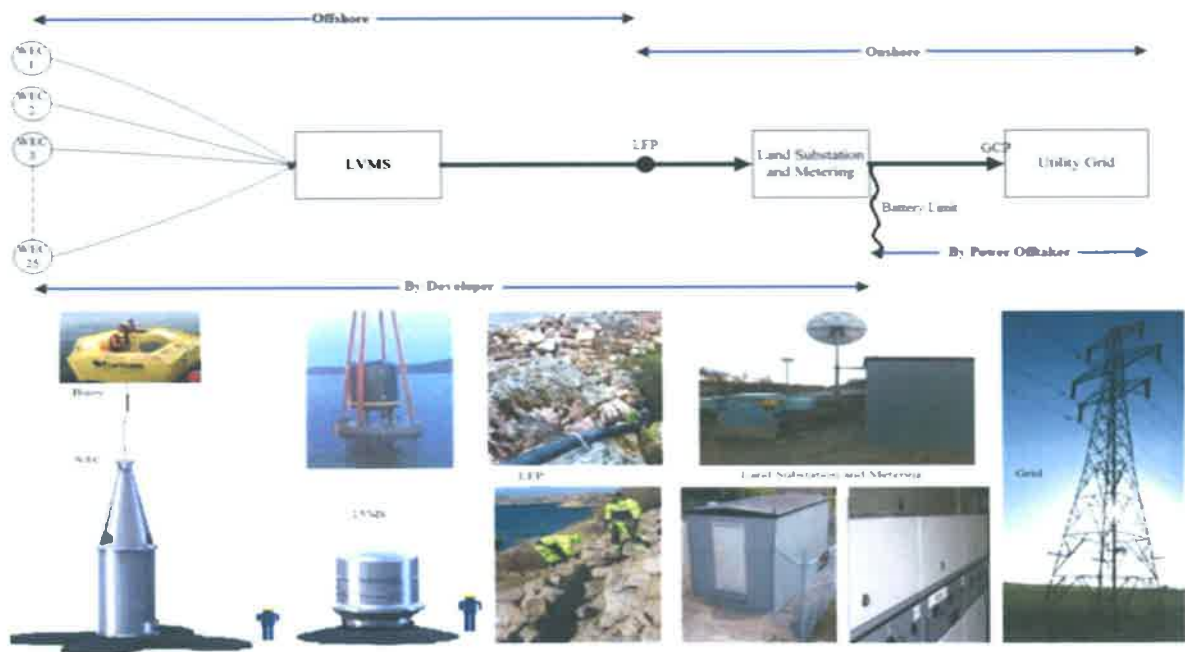


Wave Energy Plant	
Demo Wave Energy Park – Name Plate Capacity	1.125 MW
Up-scaled Wave Energy Park Capacity considering the future demand	5 MW
Seabed Area Requirement	<ul style="list-style-type: none"> Per 1.125 MW = 0.0625 km² (0.25 km x 0.25 km) For 5 MW = 0.35 km²
Onshore Area Requirement	20m x 50m
Estimated PLF	47.5% ~ 52.5%
Expected energy to be produced by the Project	4.93 MU

98. The current annual consumption of electricity at Hut Bay Island is ~10 Million Units (MU) approximately per annum with a peak load of about 2.1 MW. **This project is expected to generate about 4.93 MU of clean energy to Hut Bay, thereby, reducing the dependency on fossil fuel by about 50% per annum.**
99. The **site and size** of the Wave Energy Park has been **strategically chosen** as Hut Bay has almost a **consistent power requirement**. On the **basis of analysis of estimated monthly generation** of Wave Energy Park, it is **perceived** that the **power generated** is well **within the power requirement limits** and can be **consumed completely**. As the power required by Hut Bay is provided indicatively by the Respondent, thus there is a need for detailed assessment of the Power requirement as well. However, there are few occurrences (during monsoon season) wherein the power produced by the Wave Park is marginally higher than the indicative demand which needs to be addressed jointly with the Respondent. A copy of the Generation Profile of the Wave Energy Park is attached as **ANNEXURE P – 15**.
100. **If deemed necessary, a customized training plan** can be implemented for the Respondent's personnel. More so, **if needed** and for **better synchronization** and grid management, even **SCADA integration of RE with diesel based power generation** can be considered.



101. The Petitioner has considered that seabed for setting up of the Project at Hut Bay shall be allocated to the Petitioner free of cost by A&N Administration. The Grid Connecting Point (GCP) is envisaged within 500m of the landfall point. The Petitioner has considered that the works required to be carried out for the purpose of grid connection beyond the land substation shall be in the scope of the Respondent. The envisaged and considered battery limits for the Project are enumerated here under with detailed schematic of the same:



102. In view of the discussions held and as advised by the Respondent, the Petitioner has filed the present petition seeking determination of the levelized tariff of the electricity generated by the Wave Energy plant.

Clearances Required

103. The Wave Energy Project has already received the nod from the Ministry of New and Renewable Energy, Government of India. Envisaging that this being a first of its kind project being ensued in India and there being no specific policy on Ocean/Wave/Tidal Energy which clearly demarcates the list of requisite clearances for the smooth execution of the Project, the Petitioner has referred to necessary provisions as stipulated in the National Offshore Wind Policy.



104. The Petitioner wish to **bring** to the **notice** of the Hon'ble Commission that **delays, due to non – availability of necessary clearances, permissions and permits**, in an offshore project are significantly critical than onshore projects. Such a delay in clearance, permissions and permits not only **cause a huge fiscal burden** but might also **put the implementation** of the entire Project in **jeopardy**. Therefore, the Petitioner has considered not commencing any project work, unless all requisite in-principle clearances, permissions and permits are in place.
105. Based on the **past experience**, the Petitioner has prepared a list of prospective clearances, permissions and permits required for the project. An indicative list of required permissions, clearances and permits are specified in **Section 5.11 of the DPR**. The Petitioner is in discussion with A&N Admin (Ports) in relation with the Seabed Allocation and has also requested Electricity Department – A&N Islands to review the above list and advice on any additional clearances, permissions and permits as they deem fit required for the project to be executed in a smooth manner.

Capital Cost

106. In order to **test/demonstrate the suitability/ functionality** in Indian wave climate of **all the components** of the Wave Energy System namely – **WEC, marine substation, onshore facilities** and **optimize the installed capacity**, the Petitioner has proposed to install the Wave Energy Park at Hut Bay with **Name Plate Capacity of 1.125 MW** which includes:
- 25WECs
 - 1 LVMS
 - Sub-sea Composite Cable (~4.56 Km)
 - 1 Land Substation (common for any capacity wave energy park)



The following table covers the major items of Capital Cost of the Project:

Cost Head	Estimated Amount	
	(Million USD)	(INR in Lacs)*
Land and Site Development	0.05	30.80
Building and Civil Work	0.07	49.59
Plant and Machinery	4.05	2,757.17
Construction	3.09	2,098.90
Preliminary and Preoperative Expenses	0.42	283.77
Interest during Construction	0.76	515.47
Contingencies	0.23	156.61
Total	8.67	5,892.31
Rated Wave Energy Park Capacity	1.125	1.125
Per MW Cost	7.70	5,237.61

*USD to INR Conversion rate considered @ INR 68.00

107. The key cost driving factors are:

- **Plant and Machinery** – The Plant and Machinery accounts for almost ~ 47% of the overall Project cost. The technology is patented and currently is being manufactured only in Sweden. These costs are bound to drastically decrease based on demand & supply dynamics, decentralization of production (with increased demand, new facilities will be created in India, Middle East and other locations) further reducing logistic cost and driving Economies of Scale. The proven renewable such as solar & wind have gone through similar evolution in the last couple of decades.
- **Construction/Installation** – The other major component of the CAPEX is Construction/Installation, which accounts for ~ 36% of the overall Project cost. By virtue of the nature of the Project i.e. Offshore, the installation costs are bound to be more than onshore (land) installations. This phenomenon is proven and accepted for Oil & Gas exploration activities. Offshore installation cost majorly comprises of:



- Mobilization & Demobilization of the suitable marine spread
- Utilization of marine spread for the installation work
- Weather sensitive Installation Window
- Requisite specialist offshore manpower
- Specialist Sub-contractors
- Fuel and
- Other allied support infrastructure

Mobilization & Demobilization of the suitable marine spread - A&N Islands is a remotely located with approx. 1200 nautical miles from the mainland (nearest major port Chennai). A suitable marine vessel capable of executing the Project works is to be mobilized from either from East Coast or West Coast of India, Singapore, Malaysia as per availability during Project Execution and will take approx. 11-20 days to reach A&N Islands. To put it to perspective, say for a work barge required for deploying WEC on seabed would take 11-20 days (depending on the location of mobilization) to reach Hut Bay whereas actual installation duration is approx. 11-15days. Thus it shall be very well appreciated that the mob-demob charges are higher than the installation cost in this case.

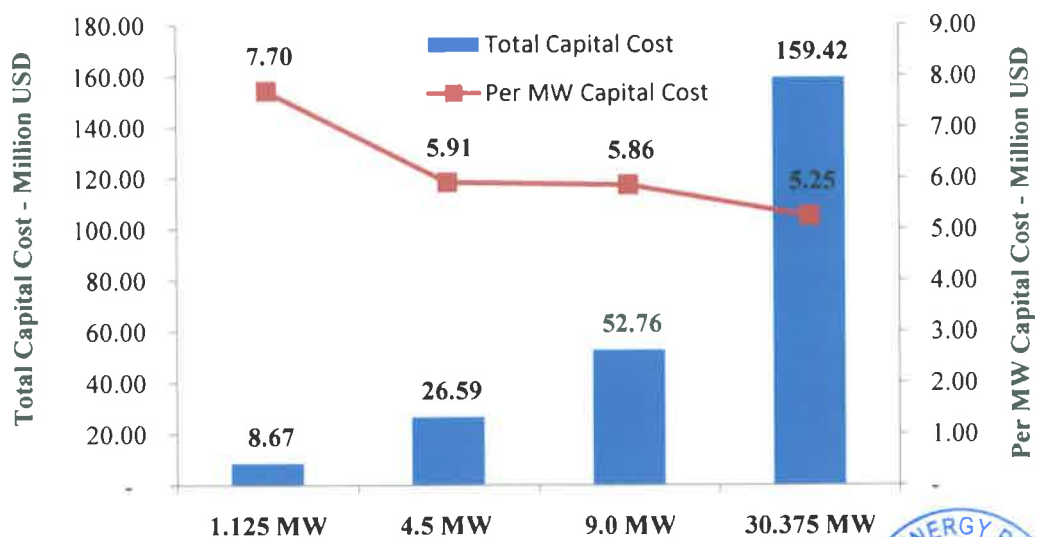
This brings about a very critical point that with the scaled up installation with a single mob-demob, the resultant per MW CAPEX can be substantially reduced. Surely there is a possibility to achieve higher productivities with larger installations thereby reducing installation time and cost as well. The cumulative effect of the above is depicted in para 111 of the Petition.

Thereby it may also be noted that mob-demob time and rental rate of marine spread will vary from location to location and will increase/decrease based on the proximity of the Project location from major port and the scale of installation.

- **Financial Costs** – Though not evident from the CAPEX as only IDC is the part of the CAPEX, the rate at which financing is available plays a pivotal role in determining the LCOE. This phenomenon is spread across the globe and does affect other RE as well unless and until foreign currency funding at low interest rate is available.



108. **Our CAPEX/MW even** for Project at a **remote location** like A&N Islands is only **7.70 Million USD/MW** which is **lower** than the **International Benchmarks** for similar as discussed in para 47 of the Petition and is **bound to decrease** with **increased scalability** of the Wave Energy Parks.
109. At present, Cost of Energy from Wave is relatively high compared to proven renewable energy technologies, that are at a more advanced stage of development (such as solar and wind). However, significant reduction in Cost of Energy is expected as deployment increases. Credible paths to reduce capital and operating costs are being identified. **In the long term, wave energy has larger overall resource potential and shall deliver at a competitive LCOE and in order to achieve the same, we need to start today!**
110. The Petitioner has **considered that seabed for Wave Energy Park, seabed Right of Use (ROU) for cable laying offshore, ROU from Land Fall Point (LFP) to substation, and land for substation** shall be provided **free of cost** for the Project.
111. The Petitioner **intends to scale up** the Project to **5 MW** and a **subsequent installation** of about **30 – 50 MW** is targeted for South Andaman region. With scaling up the Project, the Capital Cost per MW is bound to come down. As shown in the graph below, with present estimates, the Petitioner expects that per MW Capital Cost of the Wave Energy shall reduce by approximately one-third (32%) from USD 7.70 Million to USD 5.25 Million, by scaling up from 1.125 MW to 30.375 MW.



112. Furthermore, the Petitioner states that pursuant to the **provisions** under the **MNRE's RDD&D scheme for private sector power project developers**, a **grant of 50%** of the **capital cost** is provided for any approved/accepted new technology for demonstration and the same has been considered while evaluating the financials of the Project.
113. **Operating and Maintenance (O&M)** costs represent a fair share of the LCOE whether it is RE or fossil fuel based Power Plant. However, as explained in the paragraphs above, due to the **nature of the offshore works**, the **risks** associated with **unprecedented weather conditions** is also **required to be build in**. Leveraging its Offshore expertise and experience, the Petitioner has been able to bring down the O&M costs, significantly lower as compared to International Benchmarks for Wave & Tidal projects. It is **prudent to mention** that with **scaled up plants, O&M Costs per MW** is expected to **reduce further**. The significance of a well maintained plant cannot be undermined as the quality of operations & maintenance is directly proportional to the output and life of the plant.
114. The Petitioner duly submits to the Hon'ble Commission that it proposes to **enter** into a **tripartite MOU** between **MNRE**, the **Respondent** and **themselves**; with the Respondent expressing their intent to procure the power generated from the Wave Energy Project at the tariff determined by the Hon'ble Commission, inter-alia, MNRE expressing their intent to fund up to 50% of the capital cost and Petitioner expressing its intent to setup the Wave Energy project as per agreed schedule for the Project completion and disbursement of Grant on terms and conditions mutually acceptable.
115. The Petitioner wish to submit to the Hon'ble Commission that for the **purpose of computation of tariff**, the Petitioner has **considered 50%** of the **capital cost** as **grant** from MNRE and **balance capital cost** to be **funded** in a **normative debt-equity ratio of 70:30**. It is **worth mentioning** here that **till release** of the **grant portion** by MNRE, the same shall also be **funded through debt only**. Accordingly, capital cost and the sources (post release of grant amount) considered by the Petitioner for tariff computation is summarised as under:



Particulars	% share of the Project Cost	Amount (Rs. in Lacs)
Capital Cost of the Project (1.125 MW)	100%	5,892.31
Grant from MNRE under RDD&D	50%	2,946.15
Balance amount of Capital Cost to be funded through Debt and Equity	50%	2,946.16
Debt	35%	2,062.31
Equity	15%	883.85

Cost of Generation

116. The Petitioner wishes to draw the kind attention of the Hon'ble Commission to its various past orders, wherein, in the absence of any specific tariff regulations for RE technologies, the Hon'ble Commission has relied on the corresponding RE Tariff Regulations issued by Central Electricity Regulatory Commission (CERC).
117. Wave Energy being a new renewable technology and in the absence of any specific tariff regulations for the same, the Petitioner submits to the Hon'ble Commission that for computation of generation tariff for the project, it has considered the cost plus approach as stipulated by the CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012. Accordingly, parameters considered while computation of generation tariff, in lines with CERC Tariff Regulations, has been summarised as under:

Sl. No.	Assumption Head	Sub-Head 1	Sub-Head 2	Unit	Figure
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1.125
			Capacity Utilization Factor (CUF)	%	50%
			Useful Life	Years	25
2	Project Cost	Capital Cost – 1.125 MW	Tariff Period	Years	25
			Power Plant Cost	Rs Lacs	5,892.31
			Grant from MNRE	Rs Lacs	2,946.15



Sl. No.	Assumption Head	Sub-Head 1	Sub-Head 2	Unit	Figure
			under RDD&D Scheme @ 50% of Capital Cost		
			Power Plant Cost (net of Grant amount as above)	Rs. Lacs	2,946.16
3	Financial Assumptions	Debt Equity	Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	2,062.31
			Total Equity Amount	Rs Lacs	883.85
		Debt Component	Loan Amount	Rs Lacs	2,062.31
			Moratorium Period	Years	1
			Repayment Period (Incl Moratorium)	Years	12
			Interest Rate	%	12.50%
		Equity Component	Equity Amount	Rs Lacs	883.85
			RoE Period	Years	10
			Return on Equity for First 10 Years	% p.a	20.00%
			Return on Equity 11th Year onwards	% p.a	24.00%
			Weighted Average of ROE	% p.a	22.40%
Discount Rate (Post Tax WACC)	%		10.52%		
4	Financial Assumptions	Fiscal Assumptions	Income Tax	%	34.61%
			MAT Rate	%	21.35%
		Depreciation	Depreciation Rate for First 12 Years	%	5.83%
			Depreciation Rate 13th Year Onwards	%	1.54%

Sl. No.	Assumption Head	Sub-Head 1	Sub-Head 2	Unit	Figure
5	Working Capital	For Fixed Charges	O&M Charges	Months	1
			Maintenance Spare (%age of O&M Expenses)	%	15%
			Receivables from Debtors	Months	2
			Interest on Working Capital	%	13.50%
6	Operation & Maintenance	O&M Expense	% of Total Capital Cost (including Grant Portion)	%	3.20%
		Power Plant	3.20% of Rs. 5,892.31 Lacs	Rs Lacs	188.55
		O&M Expense Escalation		%	5.72%

118. The Petitioner submits to the Hon'ble Commission that while determination of the tariff using cost plus approach all the parameters have been considered to be in lines with the parameters as specified under CERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012, as amended from time to time. These include applicable RoE, tenure of RoE, Depreciation rate, O&M expenses, O&M escalation rate, components of normative working capital requirement - Maintenance Spares, Receivables from Debtors and O&M Expenses.
119. Regarding the applicable rate for Interest on Long Term loan and moratorium period thereof, the Petitioner is presently expecting to get the debt from a financial institution. Pursuant to the CERC RE Tariff Regulations, 2012 the interest on Working Capital has been considered as Interest on Long Term Loan plus 100 basis points. The rate of Income Tax and Minimum Alternate Tax is considered as currently applicable in the FY 2016-17 as on date of submission of this petition.



120. For the purpose of levelized tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital has been considered.
121. As there is no specific mention about the useful life and tariff period in the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012, thus, the Petitioner has considered Useful Life of 25 years which is the minimum Design Life of the components of Wave Energy as Tariff Period of the Project.
122. Henceforth, considering the above said parameters the levelized cost of generation is **INR 15.69/kWh**. A copy of the Tariff Model is attached as **ANNEXURE P – 16**.

Tariff Parameters and Design

123. The determination of Tariff from RE based projects has been linked to the Cost Plus methodology across the Central and State/UT specific level. Key advantages of the Cost Plus mechanism are presented below:
- i. Simple Approach: This approach enables the generator to derive per unit cost of electricity in an easier and logical manner by giving due considerations to all the associated costs in the project.
 - ii. Justifiable: The cost plus methodology is justifiable approach with regards to the rise and/or fall in the price associated on year on year basis as the cash flow streams are determined for the entire useful life of the project based on the assumptions as stipulated by the appropriate Commission such as RoE, Rate of Depreciation, etc. and actual values such as the CAPEX, Rate of Interests, etc.
124. The Petitioner most humbly submits it to the Hon'ble Commission that unlike RE technologies having a fuel cost component such as Biomass and Non-Fossil fuel based Co-generation Wave Energy does not have any dependency on any kind of fuel. Henceforth, the Petitioner has considered a Single Part tariff regime (a Cost Plus approach) consisting of the following fixed cost components for determination of per unit tariff of electricity.
- Return on Equity;
 - Interest on Long Term Loan;
 - Depreciation;



- Interest on Working Capital;
- Operation and Maintenance Expenses.

125. The Petitioner has determined the Levelized Cost of Electricity (LCOE) of the project as **INR 15.69/kWh**, taking into consideration, 50% grant component from MNRE under RDD&D scheme. In addition to the LCOE, the Petitioner submits to the Hon'ble Commission that it has also calculated the Front Loaded and Back Loaded Tariff over the useful life of the project. Detailed working with regards to the LCOE, Front and Back loaded calculations are available in the Tariff Model are attached as **ANNEXURE P – 16**.

Jurisdiction of the Hon'ble Commission

126. It is respectfully submitted that as per the provisions of Sections 61, 62 and 64 of the Electricity Act, 2003, the determination of tariff for the Petitioner's generation plant for sale of electricity to the Respondent is well within the jurisdiction of the Hon'ble Commission.
127. The Petitioner craves leave to place on record any additional information/ documents which may be required by this Hon'ble Commission at a later stage.
128. The present petition is bona-fide and made in the interest of justice.



P R A Y E R S

In view of the aforementioned facts and circumstances of the present case it is, therefore, most respectfully prayed that this Hon'ble Commission may, graciously, be pleased to:

- (i) allow the Petitioner to submit this Petition, for determination of Capital Cost and Project specific Tariff for the 1.125 MW Project, on the behalf of the Generating Company, within the meaning of Section 2 (28) of the Act, which shall be incorporated by the Petitioner as its subsidiary company and shall be a Special Purpose Vehicle (SPV) for this Project.
- (ii) approve the Capital Cost as submitted by the Petitioner;
- (iii) approve the Cost Plus mechanism and Single Part approach of tariff determination as submitted by the Petitioner;
- (iv) determine the tariff payable by the Respondent for sale of electricity from the Petitioner's Project;
- (v) allow the Petitioner to submit further data, correction(s), corrigendum(s) as the Hon'ble Commission may deem fit and proper keeping in view the facts and circumstances of the case;
- (vi) pass such further and other orders, as the Hon'ble Commission may deem fit and proper, keeping in view the facts and circumstances of the case.

