



**MUMBAI PORT AUTHORITY
MECHANICAL AND ELECTRICAL ENGINEERING DEPARTMENT**

**Request for Expression of Interest (EOI) -
Pilot Project for Harnessing Hydrokinetic Energy in
Mumbai Harbour, Mumbai Port Authority**

Disclaimer

This Expression of Interest (EOI) contains brief information about the Project/Scheme of Mumbai Port Authority (MbPA) on **“Pilot Project for Harnessing Hydrokinetic Energy in Mumbai Harbour, Mumbai Port Authority”**. This EOI is not an agreement or an offer by the Mumbai Port Authority to the Institutions, Organisations, Agencies or any other person.

The purpose of the document is to provide the Bidders with information to assist the formulation of their EOI application or response to EOI Document (the Application)

The information provided in this EOI Document, to the Bidders is on a wide range of matters, some of which depends upon interpretation of law. The Bidders may conduct their own independent assessment, site visit, investigations and analysis and check the reliability, accuracy and completeness of the information at their end.

Furthermore, the information provided in this EOI Document is not intended to be an exhaustive account of statutory or commercial requirements and should not be regarded as a complete or authoritative statement of law. MbPA shall incur no liability under any law, statute, rules or regulations as to the accuracy or completeness of the EOI Document. MbPA reserves the right to change any or all conditions/ information set in this EOI Document by way of revision, deletion, updation or annulment through issuance of appropriate addendum as the organisation may deem fit without assigning any reason thereof.

MbPA will not entertain or be liable for any claim for costs and expenses in relation to the preparation of the EOI applications to be submitted in terms of this EOI Document.

The information contained in this EOI Document or subsequently provided to the prospective Bidders, whether verbally or in documentary or any other form by or on behalf of MbPA or any of its employees or advisers, shall be considered confidential and is not to be reproduced/ adopted/ displayed for any purpose whatsoever.

This EOI Document is for informative purpose only and does not imply that MbPA is bound to select or short-list Bidders for the RFP stage or to appoint the Bidder for the Project as the case may be, it is on full discretion of MbPA and MbPA further reserves its absolute right and discretion to terminate the process at any time without assigning any reasons or explanations thereof.

1. Notice Inviting Expression of Interest (EOI)

Mumbai Port Authority (MbPA) invites EOI from Reputed Organisation/Firms/Companies for implementing **“Pilot Project for Harnessing Hydrokinetic Energy in Mumbai Harbour, Mumbai Port Authority”**.

MbPA is intending to tie-up with reputed organisations having experience in the area of Harnessing Hydrokinetic Energy from water stream or tidal variation of sea for generation of electricity.

The brief scope shall be as indicated below:

Interested Firms may explore the harbour water area in Mumbai Port Limits and preferably in and around Butcher Island / Pir Pau and identify the areas which are tentatively feasible and having potential for harnessing Tidal variation or any other water stream of Mumbai Harbour Sea for generation of Electricity.

If identified locations in the port harbour are found to be technically feasible, then MbPA may plan to provide such locations on lease/license basis as per prevailing Scale of Rates for installation of the plant and equipment for harnessing the Hydrokinetic energy. In such case the Contractor, selected through separate bidding process, shall do the supply, installation, testing commissioning of plant and equipment for harnessing the Hydrokinetic energy. Mumbai Port Authority shall make no payment for the same.

However, the Mumbai Port Authority will use the Generated Electricity and pay for the same at mutually agreed Rates and terms and conditions.

This EOI Document is being published by the Mumbai Port Authority (MbPA). The purpose of this EOI document is to provide firms with the relevant information/invite regarding the project and understand the scope of the Project and invite feedback from interested and eligible Bidders. The bidders are advised to study this EOI Document carefully before submitting their feedback & suggestions in response to the EOI Notice. The feedback & suggestions received as part of the response from the participants to this EOI Document may be used towards finalizing the tender/bid for the subject Project which is proposed to be released in the near future. This EOI document is not transferable.

The firms shall submit their EOI with all relevant information including budgetary/estimate of cost in the format given at para 6 below along with proposal on or before the prescribed date published on the CPP portal or through email.

2. INTRODUCTION

Located on the west coast of India, Mumbai Port is a Major Port, under the aegis of Ministry of Ports, Shipping & Waterways, handling 8.61 percent of the country's sea-borne trade handled by Major Ports of the country in terms of volume. It caters to 16.07 percent of POL Traffic handled by Major Ports.

The Port of Mumbai is situated almost midway (Latitude 18o 54' N, Longitude 72o 49' E) on the West coast of India and is gifted with a natural deep water Harbour of about 400 square kilometres protected by the mainland of Konkan on its East and Island of Mumbai on its West. The deep waters in the Harbour provide ample shelter for shipping throughout the year. The approaches to the Harbour are well lighted, with the Prongs Lighthouse to the North, visible 27 kilometres and the Kennery Light House to the south visible 29

kms. The entrance of the Harbour which has approaches from the South-west is between Prongs Reef and the Thull Reef lying off the mainland to the South-east, a distance of about 9 kilometres.

Looking forward to become carbon neutral by harnessing renewable energy, the Mumbai Port is exploring options to exploit the huge tidal energy of the Mumbai Harbour Sea. The map of Mumbai harbour is shown in **Figure 2.1**

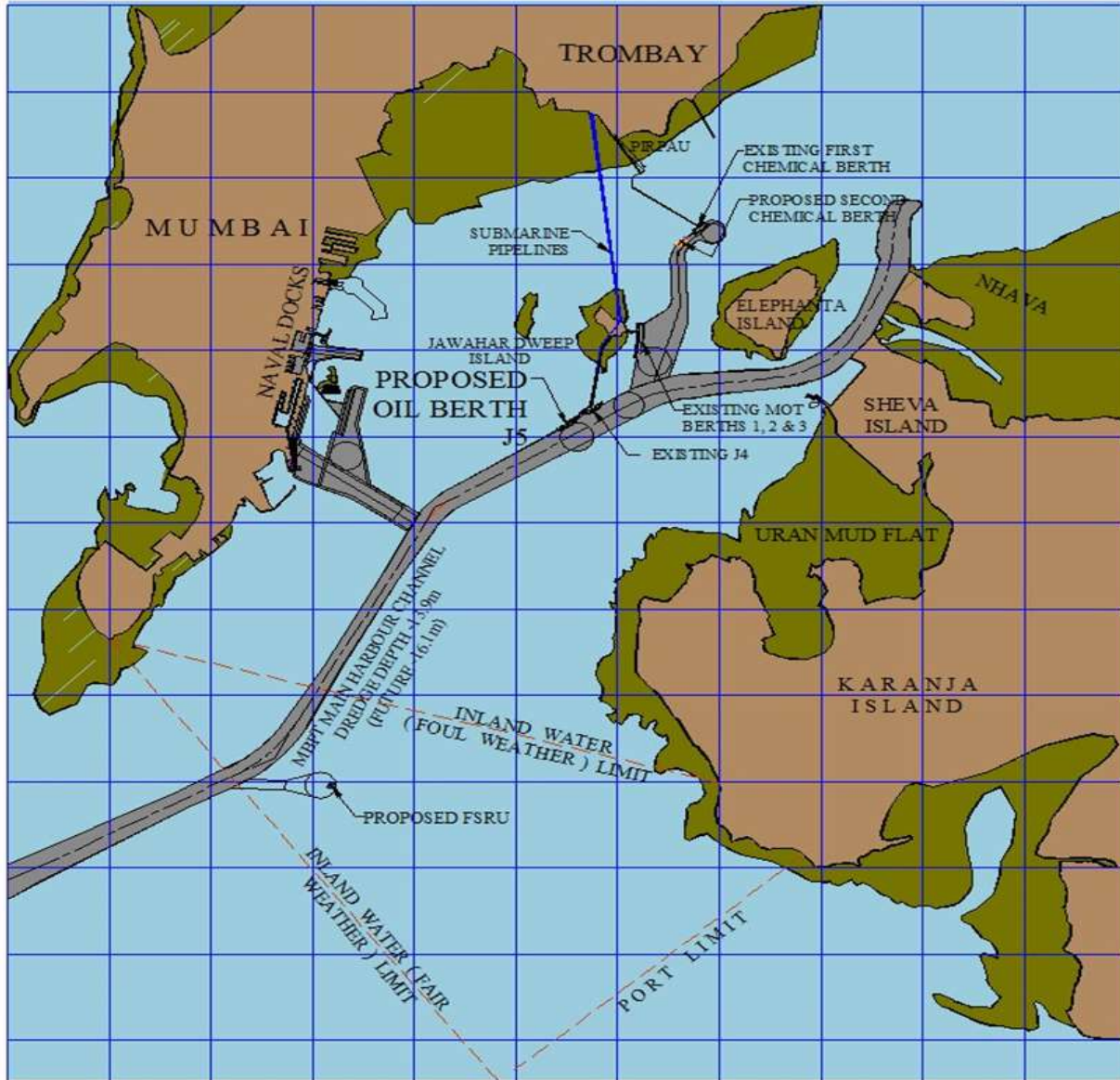


Figure 2.1 Mumbai Harbour Area

3. SITE ENVIRONMENTAL DATA

3.1 Rainfall

The climate of the region is influenced by two annual monsoon seasons : south–west monsoon (June to September) and north–east monsoon (November to March). The fair weather period is from October to May. Most of the rainfall in the region occurs during south west monsoon, the average monthly rainfall being 450 mm. The average annual rainfall over the past 20 years is about 2000 mm. The rainfall during November to March is minimal.

3.2 Relative Humidity

Relative humidity is moderate to high all around the year, 60 to 90% during summer months and reducing to 60 to 70% during November to February.

3.3 Temperature

Mean daily temperature is 25 to 33°C which falls in winter to 20 to 25°C. The hotter months are March to June.

3.4 Wind

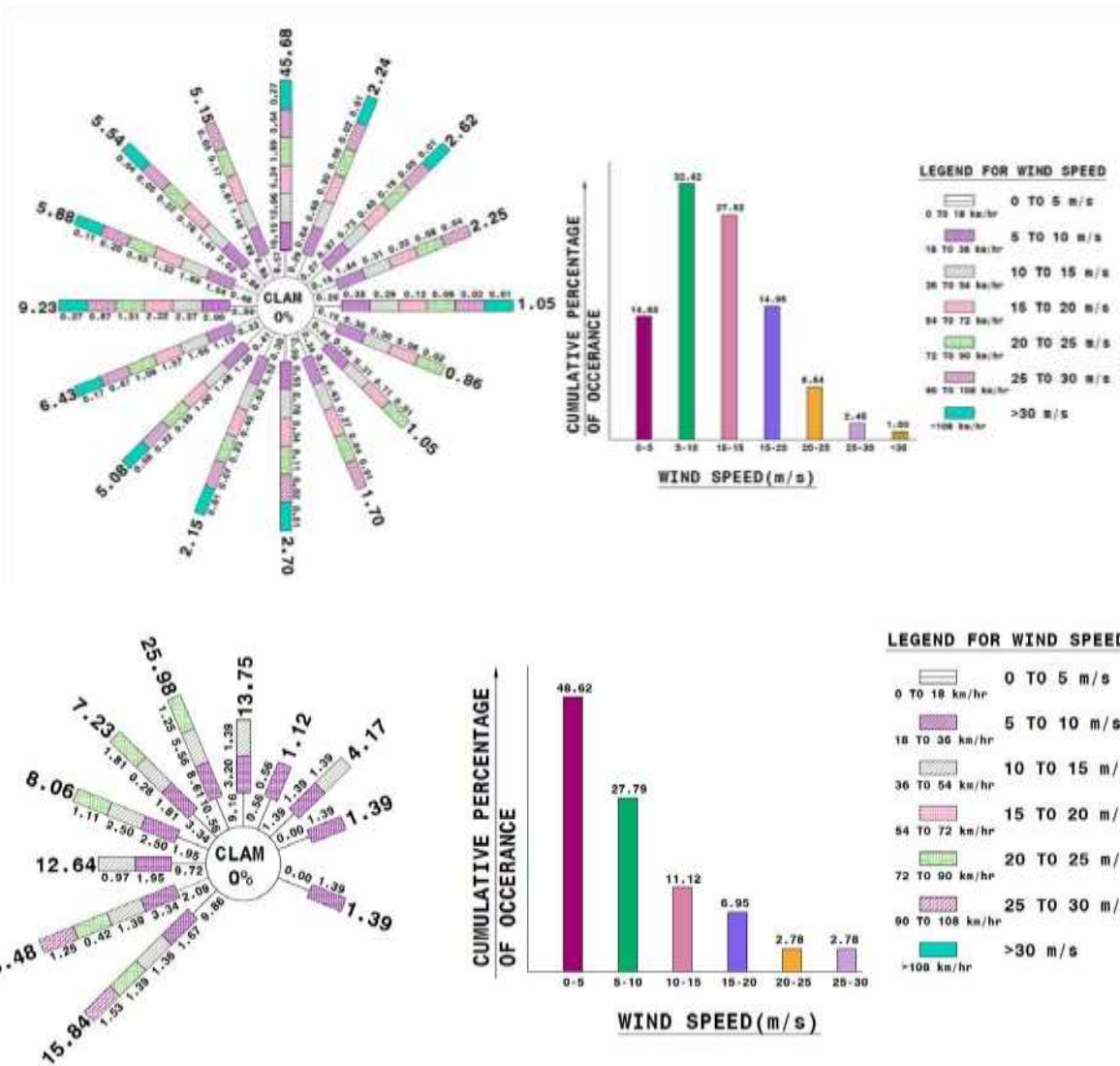
The Seasonal variations of wind direction and speed within Mumbai harbour area are as given in Table 3.1

Table 3.1 Wind speed and direction

Month	Predominant direction	Wind Speed (Beaufort Scale)
March to May	From NW to N	4 to 6 (Max.10)
June to September	From SW to NW	6 to 8 (Max.10)
October to November	From NW to NE	2 to 6 (Max.8)
December to February	From ENW to NW	2 to 6 (Max.8)

During day there are short periods when the wind speed exceeds the prevailing wind speed by a substantial amount resulting in gusts of wind from directions different from that of the prevailing wind. The maximum wind occurs from the NW during the month of September and has a speed of 54 km/hr.

The yearly wind rose diagrams for the offshore wind are shown in Fig. 3.1 showing the cumulative percentage of occurrence of various wind speeds. It is seen that in this region the wind blows from the sector SW to North for 92% the time. Also, the wind speed is less than 20m/second (72km/hr.) for 95% of the time.



3.5 Cyclones

The west – coast of India is subjected to occasional severe cyclonic storms. The region experiences a very strong winds and heavy wide spread rain in May/June or in the post-monsoon months of October and November. The storms are mostly confined to the months of June and September. During strong winds, the swell can have significant effect but due to channel bathymetry the wave heights are considerably reduced. The last severe cyclonic storm having wind speed of above 48 knots was experienced in 1982.

3.6 Special Weather Phenomena

The thunder storms occur mainly in May and June and the later September to the middle of November. The squalls occur mainly in the monsoon months from June to September. During these squalls wind force goes up to 6 on Beaufort scale. On an average the squalls may occur for about 15 days in a year. The occurrences of dust storm and fog are very rare.

3.7 Tides

The tidal levels are listed in Table 3.2. The water level at the Jawahar Dweep varies between MLWS and MHWS for most period of time in a year with a range of variation of 3.66m.

Table 3.2 Tidal levels

Tide		Tide Level (in metres)
High-High Water Level	HHW	+5.38
Mean High Water Spring	MHWS	+4.42
Mean High Water Neap	MHWN	+3.30
Mean Sea Level	MSL	+2.50
Mean Low Water Neap	MLWN	+1.85
Mean Low Water Spring	MLWS	+0.76
Low-Low Water Level	LLW	-0.44

The above tide levels refer to Chart datum which is taken as 0.0.

In many studies related to Mumbai Harbour reveal:

- i) All high tides exceed + 2.7m
- ii) About 95% of all higher high tides exceed + 3.2 m.
- iii) About 95% of all lower high tides would be greater than + 2.85 m.

3.8 Currents

The currents in the harbour waters are essentially caused by the tides. In Mumbai harbour area during ebb and flood flows normally the currents are in the range of 2 to 3 knots, through a maximum of 4 knots could be expected in the ebb during monsoon spring tide. The currents generally flow parallel to the navigational channel as shown in figure 3.2 and 3.3 for flood and ebb tide respectively.



Figure 3.2 Flood Tidal current flow



Figure 3.3 Ebb Tidal current flow

3.9 Waves

As the Mumbai harbour is sheltered, no significant wave climate exists within the harbour area. The wave height reaches a maximum of 1.5 m under normal conditions with wave period ranging from 6 to 10 seconds. The National Institute of Oceanography (NIO), Goa, have compiled and published wave data for the entire coastline of India in the form of a “wave atlas”.

The monthly wave rose diagrams published in the “wave atlas” for the area from latitude 15°N to 25°N and Longitude 70°E to 75°E show that during monsoon period the predominant wave directions are from Southwest to west. During this period, wave of 4-5 m height normally occur; however, waves up to 8.0 m in height and period of 14 seconds have also been reported. October and November are the transition months during which the predominant wave direction changes to North – Northeast.

During December and January the waves mainly occur from North to Northeast and from February to May waves predominantly come from the Northwest quadrant.

The yearly wave rose diagrams for the inshore and offshore waves are enclosed as Fig.3.4 and 3.5 respectively.

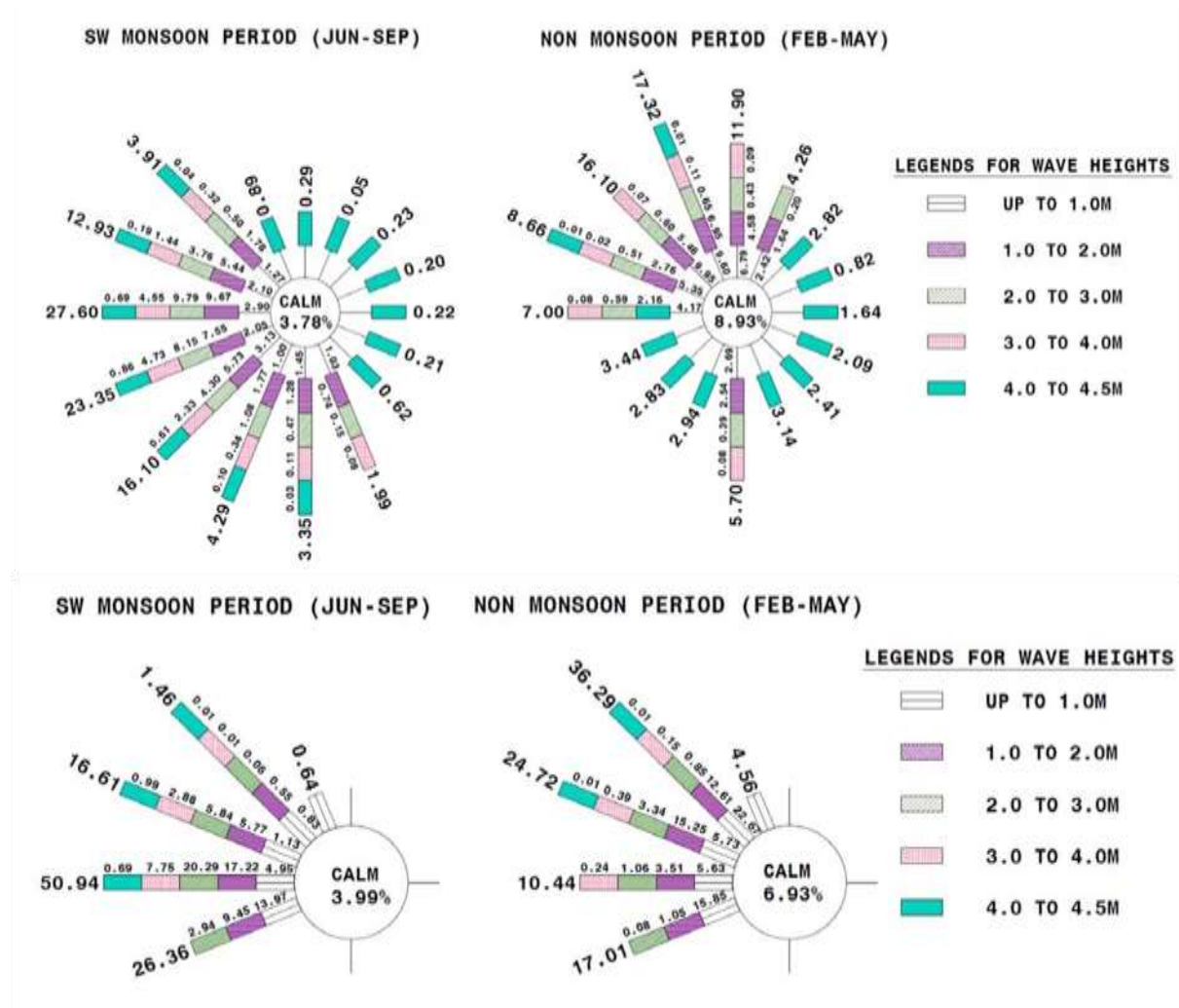


Figure 3.4 Wave rose diagram for inshore area

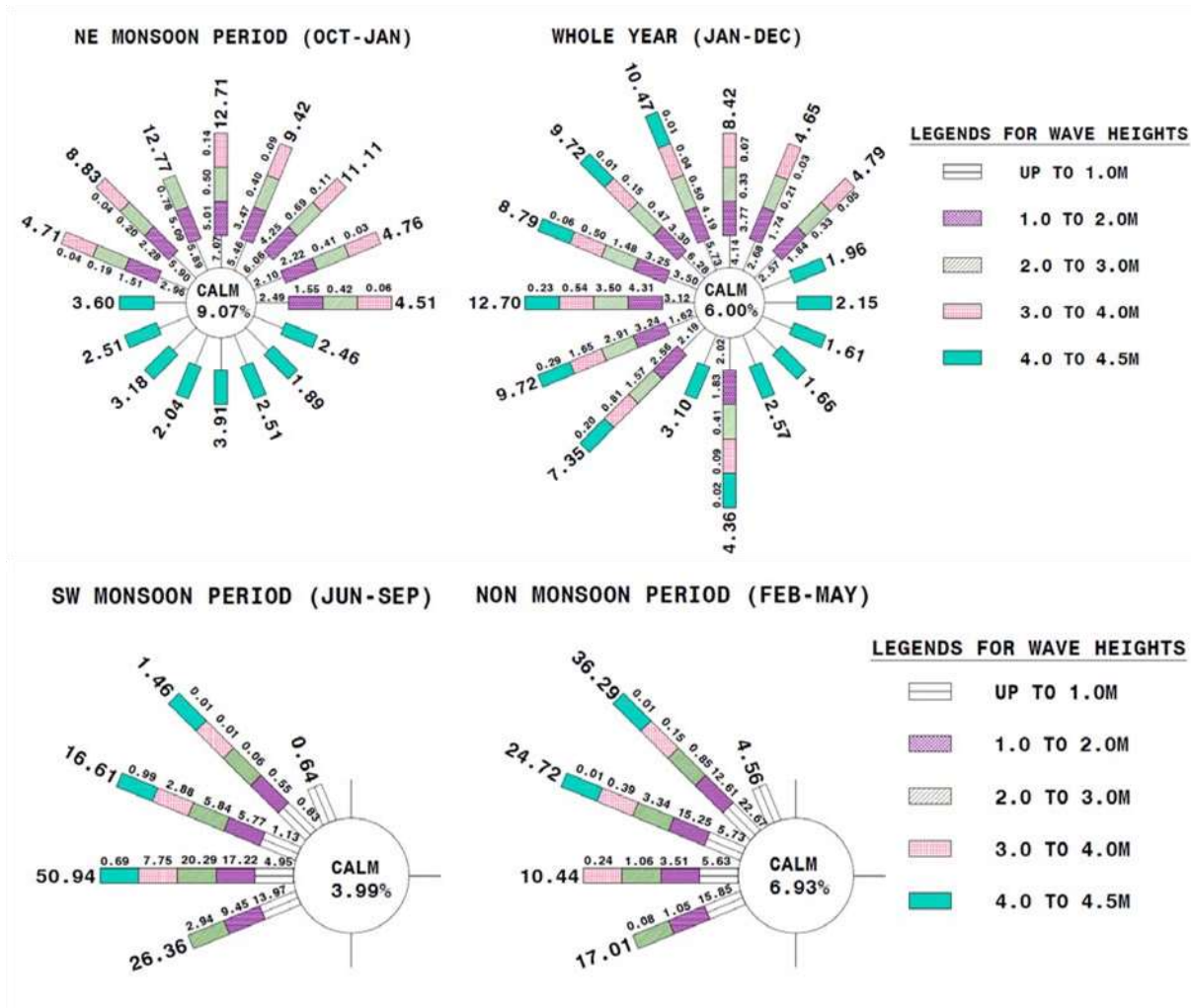


Figure 3.5 Wave rose diagram in offshore area

3.10 Visibility

The visibility in the Butcher Island area is generally good throughout the year, except for a few days during winter season and during periods of heavy rain. On an average, the visibility is less than 4 kms for about 18 days in a year. Most often in the months of November to march, shortly after sunrise and occasionally in the evenings, smog may hang over the land obscuring the view for short period.

4. Scope of EOI

MbPA is intending to tie-up with reputed organisations having experience in the area of Harnessing Hydrokinetic Energy from water stream or tidal variation of sea for generation of electricity.

The brief scope shall be as indicated below:

Interested Firms may explore the harbour water area in Mumbai Port Limits and preferably in and around Butcher Island / Pir Pau and identify the areas which are tentatively feasible and having potential for harnessing Tidal variation or any other water stream of Mumbai Harbour Sea for generation of Electricity.

If identified locations in the port harbour are found to be technically feasible, then MbPA will plan to provide such locations on lease/license basis as per prevailing Scale of Rates for installation of the plant and equipment for harnessing the Hydrokinetic energy. In such case the Contractor, selected through separate bidding process, shall do the Design, supply, installation, testing commissioning of plant and equipment for harnessing the Hydrokinetic energy. Mumbai Port Authority shall make no payment for the Project.

However, the Mumbai Port Authority will use the Generated Electricity as per the requirement of MbPA and pay for the same to the successful bidder selected by quoting lowest price per unit rate to MbPA.

Firms having experience of similar work may submit their response/proposal with complete details and references in writing within 30 days from publication of this notice to Chief Mechanical Engineer, MbPA as per the format given at para 6 below.

The selected firm, after invitation of RFP/RFQ, shall Study, Design, Develop, Implement, Operate & Maintain, the plant and equipment for harnessing the tidal energy at technically feasible location, in the Port Harbour.

The overall scope of work of the selected firm after invitation of RFP shall comprise Assessment and Location survey, documentation, procurement, design, supply, implementation, testing, installation and commissioning, training, operation and maintenance of the Envisaged Solution. The successful contractor shall be wholly responsible for the performance of the implemented solution.

5. Process

To facilitate submission of EOI Proposal, MbPA shall arrange for Pre-proposal site meeting and inspection of Mumbai Port Harbour areas in and around Jawahar Dweep / Butcher Island and Pir Pau on 30.07.2024 from 10.00 AM to 1.00 PM for all those who are interested in participation and submission of their proposal against the subject EOI. For this visit, the interested firms may contact and send their request by email alongwith their ID Proof (Aadhar Card) to 1) Mr. S.S. Kharche Mobile: 09869870268 email: ss.kharche@mumbaiport.gov.in or 2) Mr. R.K. Rathore Mobile: 9920710877 email: rk.rathore@mumbaiport.gov.in before 30.07.2024.

The EOI Document/Proposal shall be prepared by the interested Firms as per the format given at para 6 below and submit the same **on or before the prescribed date on the CPP portal or through email**. There is no cost or Fees for submission of EOI Proposal. MbPA shall also not liable to pay any cost for preparation and submission of EOI Proposals.

Upon receipt of EOI Documents/ Proposals, the Applicant Firms may be asked to make presentation before the Competent Authority of MbPA in order to understand and get clarification of Project Proposal submitted by respective Firm.

The Project Proposals received against the subject EOI will be examined by MbPA and if the Project is feasible and viable, RFP/ RFQ will be prepared based on the information/ data gathered from EOI submissions. During RFP/RFQ stage the evaluation of offers received will be carried out on the basis of bidder's experience and capacity to handle the project effectively.

6. EOI Submission Format

- A. Cover letter illustrating the Authorised Official's signature.

B. EOI Document/ Proposal may include but not limited to following

- i) Firm / Company Profile Details: (Name, Address, Contact Persons with phone/email, etc.)
- ii) Financial Standing: (Turnover for last 3 years, etc.)
- iii) Legal Standing: (Legal Status i.e. Private / Limited/ Partnership/ Proprietorship/ etc.)
- iv) Resources (Manpower/Plant & Machinery/etc.)
- v) Certifications by various agencies/ authorities
- vi) Experience (Detailed List of Projects completed or under execution with Project Completion Certificates)
- vii) Expertise in related field of Hydrokinetic Energy
- viii) Credit Ratings, if any.
- ix) Additional Information, if any.
- x) Detailed Project Proposal for tentatively identified location(s) for Harnessing Hydrokinetic Energy from water stream or tidal variation of sea for generation of electricity in Mumbai Port Harbour. Such proposal shall include:
 - Brief of the proposed project;
 - Tentatively Identified Location(s);
 - Water and Land Area requirements;
 - Methodology for Implementation of the Project along with technical specifications;
 - Project Completion Schedule/Period;
 - Estimated Life of the Plant/Machinery/Project;
 - Tentative Cost Estimates of the Project (indicate Capital and Operation Costs separately);
 - Estimated Electric Power Generation Capacity of Project (in KW or MW);
 - Estimated units of electricity generation per day;
 - Tentative Financial Model for Electricity generated which shall indicate tentative Cost per unit of electricity generated from the project;
 - Tax Exemptions/ Concessions available, if any, for such Renewable Energy Projects;
 - Firm's role/scope in implementation of the Project;
 - Expected support from MbPA;
 - List of Statutory Permissions required and Agencies/ Authorities who issues them.

[Note: Attach supporting documents, wherever applicable, for the above]

7. Proposals invited

Interested firms are invited to inspect the Mumbai Port Harbour areas as stated at para 5 above and submit their proposals as per the EOI Document format given at para 6 above. Based on wider stakeholder consultation, Mumbai Port will prepare the project implementation structure. As a part of process, it is expected from applicants to survey the Port Harbour and provide an approximate per module cost. Detailed cost and BOQ will be expected in tendering stage.

For all correspondences regarding this EOI (including queries and inspection), firm shall contact following officials:

- 1) Mr. S.S. Kharche, Materials Manager,
Contact no. 022-66566505,
email Id: ss.kharche@mumbaiport.gov.in
- 2) R.K. Rathore, Sr.Dy. Materials Manager,
Contact no. 022-66566512,
email Id: rk.rathore@mumbaiport.gov.in