Maldives Seawater Floating Solar PPP Project
Project Background

• ADB has been supporting the Ministry of Environment, Climate Change and Energy (MOE) of the Government of the Republic of Maldives (GoM) since 2014 to help increase solar PV penetration in the country.

• MOE has mandated the ADB to provide transaction advisory services on two projects to develop a land and rooftop solar project of 14.7MW and a marine solar PV project with a total capacity of up to 5 MW under a public-private partnership (PPP) modality (the “Project”)

• The 5MW Project will be spread across 4 outer islands of Maldives and will be the single largest private sector investment project in the marine energy sector in Maldives

• The key project documents include the Power Purchase Agreement (“PPA”) which will be signed by FENAKA Corporation (“FENAKA”) as the offtaker of electricity, while the Implementation Agreement (“IA”) will be signed by MOE.
**Project Background**

- Apart from transaction advisory support for the PPP Project, ADB is also processing a sovereign project named Accelerating Sustainable System Development Using Renewable Energy Project ("ASSURE").

- ASSURE aims to deliver the deployment of battery and energy storage systems (BESS) of about 44 MWh capacity, energy management systems, and grid upgrades in outer islands (Green box on the right below – **to be procured in EPC mode separately**) to support the successful deployment of the PPP project (blue box below).
# PPP Project Structure and Key Parties

<table>
<thead>
<tr>
<th><strong>Project Scope</strong></th>
<th>Design, Build, Finance, Own, Operate and Maintain a floating Solar PV Power Project in 4 outer islands of Maldives</th>
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<tbody>
<tr>
<td><strong>PPA Term</strong></td>
<td>15 years from commercial operations date (COD) with transfer to FENAKA or decommissioning at FENAKA’s election</td>
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<tr>
<td><strong>Private Partner</strong></td>
<td>Single entity, group of companies, or consortium offering the lowest tariff and meeting minimum criteria for technical solution, financial resources and experience of developing similar solar projects</td>
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<tr>
<td><strong>Public Partner</strong></td>
<td>FENAKA to be signatory of the PPA</td>
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| **Risk Mitigation Support** | It is expected that the Project Company will be offered:  
1. Political risk insurance for equity investment from the sponsor  
2. Escrow account with acceptable bank for ongoing payment obligations of FENAKA  
3. Non reimbursable performance incentive for timely and within cost delivery of the Project at COD |
PPP Project Structure and Key Parties

Sponsor(s) -> Equity -> Finance Agreements

Lenders -> Project Finance Debt

Contractor -> EPC Contract

Project Company (SPV) -> O&M Contract

Operator

Power Purchase Agreement (PPA) -> Offtaker (FENAKA)

Implementation Agreement (IA) -> MOE

Equity

Project Finance Debt
Project Sites
Challenges of developing Marine FPV in Ocean Environments

- The key challenges for marine FPV include presence of strong currents and waves which may cause problems with system stability and anchoring of the FPV system

- **Currents:**
  - Predictable and directional movements of water that persist for long periods of time
  - A combination of wind, sun, gravity, and the earth’s rotation influences currents
  - Prevailing winds create peaks and valleys in the ocean water

- **Waves:**
  - While ocean currents take water thousands of miles around the globe, waves move on the ocean surface and water at a much smaller scale
  - Ocean waves form due to the force of the wind rushing across the surface of the water. They are distinct from currents and tides because of their shape, longevity, and direction
  - The wind speed, duration of gust, and the area of water that the wind blows over impact the wave height
Challenges of developing Marine FPV in Ocean Environments

Strong wave action and currents can result in FPV system failure
Measuring waves and currents for FPV system design

Measuring Currents using Nortek Eco profiler
Equipment using doppler effect to measure currents speed and direction

Measuring Waves using Sofar Spotter buoy
Min, max and average wave height, wave frequency and direction
Thank You