PROJECT CLIMATE RISK ASSESSMENT AND MANAGEMENT REPORT

I. Basic Project Information

Project Title: IND: Clean Energy Finance Investment Program
Project Budget: $500 million multitranche financing facility (financial intermediation loans)
Location: Throughout India
Sector: Renewable energy
Theme: Infrastructure finance
Brief Description *(particularly highlighting aspects of the project that could be affected by weather/climate conditions)***:**

II. Summary of Climate Risk Screening and Assessment

A. Sensitivity of project component(s) to climate/weather conditions and sea level

[describe how climate/weather condition (e.g. temperature and seasonal contrast, rainfall amount and seasonality, wind, solar radiation, etc.)and sea level could affect the relevant project component(s)]

Project component	*Sensitivity to climate/weather conditions and sea level*
1. *Hydro Power Projects - 25: Himachal Pradesh (18), Sikkim (3), Karnataka (1), Uttarakhand (2), Maharashtra (1), Kerala (1).* 2. *Solar PV - 11: Madhya Pradesh (1), Andhra Pradesh (3), Bihar (1), Gujarat (1), Tamil Nadu (1), Rajasthan (2), and Maharashtra (2).* 3. *Wind – 8: Tamil Nadu (2), Gujarat (3), Karnataka & Tamil Nadu (1), Gujarat & Karnataka (1), Gujarat+ Mahrastra+Rajasthan (1).* 4. *Co-Generation - 23: Karnataka (2), Maharashtra (13), Tamil Nadu (2), Haryana (2), Uttarakhand (2), Maharashtra (1), Uttar Pradesh (1).*	*Hydropower Projects* 1. *Increased variability in river runoff;* 2. *Increased sedimentation;* 3. *Increasing risks of GLOF;* 4. *Reduced runoff in the long term.* *Solar PV* 1. *Increased solar intermittency;* 2. *Reduced efficiency due to rising temperatures.* *Wind* 1. *Increased wind speed exert a positive impact on power generation;* 2. *Reduce aerodynamic efficiency due to rising temperatures;* 3. *Increased risks to physical structures due to increased cyclone intensity.*

B. Climate Risk Screening

Risk topic	Description of the risk
1. *Temperature increase* 2. *Rainfall increase*	1. *Annual mean temperature is projected to rise by 2.40C for the continental India. Temperature rise during January to May period is projected to be higher. Spatially, temperature rise is projected to be lower in coastal regions as well as southern states, and higher for central and northern states. The highest rise is projected to occur within higher altitudes including the state of Himachal Pradesh (>3.10C).* 2. *Annual precipitation is projected to increase on average by 70mm (~5%). The northeastern states (including Sikkim) and northern Western Ghats (Maharashtra) are projected to experience a greater amount of precipitation increase (>100mm) while the northern states (Himachal Pradesh, Rajasthan, Uttar Pradesh, Haryana, and Uttarakhand) are projected to see a lesser amount (<40mm). In terms of percentage increase, Rajasthan, Gujarat, Maharashtra, Karnataka, and Andhra Pradesh are projected to experience >10% increase in annual precipitation*

Climate Risk Classification: *Medium (since this is an FI)*

C. Climate risk assessment

Hydropower Projects

Hydropower projects within the pipeline are overwhelmingly located within Himachal Pradesh. Main likely climate change impacts include 1). Erratic river flow patterns due to increased rainfall variability which can affect hydropower production to a large extent; 2). Reduction in runoff in the long-term due to glacier retreat; 3). Increase sedimentation due to projected increase in rainfall intensity combined with accelerated melting of snow/glaciers during the summer season.

Solar PV

The number of rainy days is projected to increase over several project states. Solar intermittency is likely to increase.

Wind

1). Increased wind speed exerts a positive impact on power generation; 2). Reduced aerodynamic efficiency due to rising temperatures; 3). Increased risks to physical structures due to increased cyclone intensity.

III. Climate Risk Management Response within the Project

1. *Due to the nature of the facility as a financial Intermediation loan in which the subprojects are originated and structured purely on commercial basis, the capacity of ADB to influence project design and incorporate climate adaptation measures is limited. As such, a climate risk screening was conducted and was used to generate a project selection matrix. In contrast to the normal screening report, this matrix does not intend to recommend adaptation options (in response to the risks identified) due to the uncertainty of the actual subprojects that will be financed. It is intended to inform and assist IREDA (IA) to consider the possible risks due to climate change when choosing or prioritizing subprojects it intends to finance.*