Program Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 23-Jun-2023 | Report No: PIDA36432

Public Disclosure Authorized

BASIC INFORMATION

A. Basic Project Data

Country	Project ID	Project Name	Parent Project ID (if any)
India	P181032	First Low-Carbon Energy Programmatic Development Policy Loan (P181032)	
Region	**Estimated Board Date**	**Practice Area (Lead)**	**Financing Instrument**
SOUTH ASIA	29-Jun-2023	Energy & Extractives	Development Policy Financing
Borrower(s)	**Implementing Agency**		
India	Ministry of New and Renewable Energy		

Proposed Development Objective(s)

To accelerate the development of low-carbon energy in India.

Financing (in US$, Millions)

SUMMARY

Total Financing	1,500.00

DETAILS

Total World Bank Group Financing	1,500.00
World Bank Lending	1,500.00

Decision
The review did authorize the team to appraise and negotiate

B. Introduction and Context

Country Context

India's economy has been one of the fastest-growing major economies over the recent years and is expected to pursue the same trajectory. Energy demand is therefore expected to grow rapidly in the future, and India is currently relying on coal to meet that demand. Energy-consuming sectors—power, industry, transport, and buildings—contribute to three quarters of India's 2.7 gigatons carbon-dioxide equivalent (CO_2e) of annual greenhouse gas (GHG) emissions. Accelerating the development of low-carbon energy will eventually allow to phase down fossil fuels and bend the GHG emission curve, which is important not only for India but also at the global level.

India will play a key role in reaching global climate change targets, and the government of India has made strong commitments to low-carbon long-term development and already taken significant steps in this regard. The government has announced a long-term goal of achieving net-zero emissions by 2070 and short-term targets by 2030 under the Nationally Determined Contributions: (a) 50 percent of power capacity from non-fossil fuels; (b) a reduction of carbon intensity by 45 percent from 2005 to 2030; and (c) the creation of an additional cumulative carbon sink of 2.5 to 3 billion tons of CO_2e through additional forest and tree covers.

Achieving net-zero by 2070 would require: (a) electrifying the end-user sectors—particularly transport and building; (b) greening the power sector with renewable energy (RE); and (c) bringing the hard-to-abate industrial sectors into a low-carbon path with green hydrogen and carbon capture and storage (CCS). To green the power sector, RE—solar, wind, hydropower (both domestic and imported from neighboring countries)—must become mainstream power supply sources. Improving RE grid integration, particularly through energy storage—both pumped storage hydropower and battery energy storage systems—will also become increasingly important. According to analytical studies conducted by the World Bank, green hydrogen and CCS are essential to bring the fast-growing industrial sector into a low-carbon path—green hydrogen primarily for fertilizer and methanol production, refinery, iron and steel, and chemical industries, and CCS primarily for the cement industry.

The World Bank has been engaged in green hydrogen in India over the past two years through analytical studies and technical assistance that have provided inputs to the government's National Green Hydrogen Roadmap and National Green Hydrogen Mission and form the analytical underpinning for this proposed operation. For instance, the World Bank's analytical studies show that the first step of green hydrogen utilization is to replace existing grey hydrogen produced from natural gas in the fertilizer and refinery sectors.

The proposed operation is also aligned with the World Bank's current global engagement on green hydrogen. The World Bank launched a global Hydrogen-for-Development initiative at the 27th Conference of the Parties to the United Nations Framework Conventions on Climate Change, which aims to: (a) provide global knowledge, technical assistance, and financing for green hydrogen in the developing world; and (b) bring together partner countries to enable capacity building and exchange knowledge on regulatory solutions, business models ,and technologies, with a view to supporting broader adoption of green hydrogen. The World Bank is supporting green hydrogen financing in Chile, Romania, Turkiye, and Morocco, and is providing technical assistance in Tunisia, Kenya, Brazil, Uzbekistan, Colombia, and Costa Rica.

India's macroeconomic policy framework is considered adequate for Development Policy Financing. Despite the deteriorating global outlook, the Indian economy remains resilient and is projected to be one of the fastest growing major economies in FY23-24. The outlook for domestic activity has been clouded by weakening external demand, but the risks are mitigated by strong economic fundamentals and a robust policy framework. Global uncertainty and consequent risks have also heightened due to recent financial sector turmoil in the United States and Europe. However, they are unlikely to markedly impact the outlook for India. First, the financial sector turmoil seems to have been adequately addressed by the financial authorities in the US and Europe. Second, India's financial sector is well-capitalized and asset quality has improved. At the macro level, India's monetary policy framework has been strengthened and, although India is not immune to external financial developments, high reserve levels, a floating exchange rate and limited external financing needs provide adequate buffers. In support of recovery, the central government has used existing fiscal space prudently, accompanied by structural reforms. Public debt remains sustainable (and relatively resilient to different shocks) despite the large increase of public debt in FY20-21 in response to the pandemic.

Relationship to Country Partnership Framework (CPF)

The proposed operation is aligned with the first two focus areas of the CPF FY18-22 discussed by the World Bank Group (WBG) Board of Executive Directors on September 20, 2018 (Report No. 126667-IN): (a) promoting resource-efficient growth and (b) enhancing competitiveness and enabling job creation. Through the first focus area, the WBG has committed to supporting the sectors and areas that are critical for facilitating growth and poverty reduction while promoting greater resource efficiency and increase in access to sustainable energy. Through the second focus area, the WBG is aspiring to strengthen key enablers for job creation and to improve competitiveness through better business and policy environments, strengthened workforce skills, and increased firm capabilities. The proposed operation is also fully aligned with the WBG Green, Resilient and Inclusive Development framework, the WBG Climate Change Action Plan 2021–2025, and the new Global Crisis Response Framework.

C. Proposed Program Development Objective(s)

The proposed Program Development Objective (PDO) is to accelerate the development of low-carbon energy in India.

Key Results

Indicator Name	Baseline (2023)	Target (2026)
Pillar 1: Promoting green hydrogen		
Green hydrogen production capacity incentivized (million tonnes)	0	3
Domestic electrolyzer manufacturing capacity incentivized (gigawatt, GW)	0	3
Number of additional green hydrogen safety standards notified	0	10
Pillar 2: Scaling up renewable energy		
Share of renewable energy in power consumption (percentage)	25	33
Share of solar/wind with/through energy storage in total power consumption (percentage)	0	2
Additional bids for renewable energy capacity issued (GW)	0	75
Greenhouse gas emissions avoided (million tonnes per annum)	0	40
Off-shore wind sites awarded (equivalent to power capacity GW)	0	4
Capacity for domestic manufacturing of high-efficiency solar photovoltaic cells and modules added (GW)	0	48
Pillar 3: Enhancing climate finance for low-carbon energy investment		
Launch of a national carbon market	No carbon market exists	Greenhouse gas emission intensity targets allocated and carbon trading operational
Increase in issuance of cumulative onshore green debt securities (percentage)	0	30
Sovereign green bonds issued (cumulative, US$ billion)	2.3	6.0

D. Program Description

This US$ 1.5 billion program will be the first operation in a series of two Development Policy Operations (DPOs), supporting India's low-carbon energy development. It will consist of three inter-linked pillars: (i) promoting green hydrogen; (ii) scaling up RE; and (iii) enhancing climate finance for low-carbon energy investments. Pillar 1 aims to strengthen the enabling policies and regulations for green hydrogen to reduce costs and increase market demand to facilitate the decarbonization of the hard-to-abate industrial sectors. Since green hydrogen needs additional RE power supply, Pillar 2 aims to scale up RE supply and penetration in India, reduce RE costs, and improve RE grid integration to contribute to the decarbonization of the power sector in line with India's Long-Term Low-Carbon Development Strategy. To meet the large investment needs of green hydrogen and RE and to increase green financing, Pillar 3 aims to support the launch of a national carbon market and to enable private sector investments in low-carbon energy.

This programmatic series is contingent upon the achievement of a respective set of Prior Actions (PAs) and Triggers, to be implemented by the relevant public entities, with the following objectives:

(i) Pillar 1: Increasing green hydrogen production and utilization and developing green hydrogen standards and safety standards;
(ii) Pillar 2: Scaling up RE—including through energy storage—in power consumption, issuing bids for additional RE capacity—including offshore wind, and developing high-efficiency solar photovoltaic (PV), and avoiding GHG emissions.
(iii) Pillar 3: Launching a national carbon market, amending the regulatory framework for green debt securities, and issuing sovereign green bonds.

The World Bank has been collaborating with development partners during the preparation of the proposed operation.

(i) While the International Monetary Fund (IMF) does not have any active lending program in India, it carries out macroeconomic supervision and Article IV consultations annually, and the WBG and IMF teams have regular exchanges.
(ii) The United Kingdom Foreign, Commonwealth, and Development Office has expressed interest in extending a guarantee for the IBRD loan for a principal amount of US$ 1 billion.
(iii) The Asian Infrastructure Investment Bank has expressed interest in providing complementary financing to this programmatic series and will explore with the WBG complementary financing options under the second phase of the DPO.
(iv) The Deutsche Gesellschaft für Internationale Zusammenarbeit, the Kreditanstalt für Wiederaufbau, the European Investment Bank, and the Indo-German Energy Forum are also active in the green hydrogenspace in India.

E. Implementation

Institutional and Implementation Arrangements

This proposed operation has been prepared through intensive policy dialogue with the government of India, including on the development of the program objectives and results indicators. The Ministry of New and Renewable Energy (MNRE) will be leading and coordinating the preparation and implementation of the proposed operation, which will also be supported by the Department of Economic Affairs (DEA) from the Ministry of Finance. The MNRE will be responsible for monitoring and evaluation, while the Borrower will be represented by the DEA for withdrawal applications.

F. Poverty and Social Impacts, and Environmental, Forests, and Other Natural Resource Aspects

Poverty and Social Impacts

The proposed operation's overall impact on poverty is expected to be neutral to positive. By facilitating green growth, the proposed PAs can induce significant economic, equity, and health benefits. Promoting green hydrogen and scaling up renewable energy could expand households' employment opportunities in the RE sector and secondary labor markets. In addition, the climate co-benefits of the proposed policies can also be a key mechanism to create welfare and equity gains, simultaneously. The transition to green hydrogen and RE can mitigate households' health costs from air pollution and reduce their exposure and vulnerability to heat waves and other climate-related risks. In addition to reducing risks of impoverishment associated with health and climate shocks, these long-term co-benefits would likely be progressive, with significant gains for poor and vulnerable populations.

Some risks could still lower the poverty-reduction impacts of the PAs, and the World Bank will undertake a technical assistance program for the proposed operation to build the capacity of the MNRE and various stakeholders to mitigate these risks. In the immediate term, the main risks to poverty reduction are disruptions to local economies and employment losses during the transition from grey hydrogen and fossil-based industries. There are also substantial risks associated with land acquisition, relocation, and freshwater availability for green hydrogen production. The Ministry of Skill Development and Entrepreneurship has developed initiatives targeting engineers and researchers to better understand the basics of green hydrogen production. The Bank will help to design detailed programs educating engineers and technicians on design, engineering, operations and maintenance, and storage and transportation, and on-the-ground trainings on safe handling of hydrogen supply and end-use systems. The World Bank will provide technical assistance to bring in global best practices and use and mitigating the environmental and social risks to build institutional capacity both at the federal and state levels.

Environmental, Forests, and Other Natural Resources Aspects

This proposed operation is likely, in aggregate, to have a positive impact on India's environment, forests, or other natural resources. The proposed operation will also provide a range of co-benefits for public health from cleaner air to reduced water and solid waste pollution in addition to the targeted GHG reduction. At the same time, given that all PAs target large-scale sector development, there are significant risks that could stretch the capacity of the relevant institutions to avoid or minimize risks to ecological resources, forests, or other natural resources.

India has a well-developed environmental legal and regulatory framework. Current environmental legislation in India, along with the regulations and standards approved by the central government/line ministries, create a favorable legal framework for environmental protection. The Ministry of Environment, Forest and Climate Change is the national regulatory entity in charge of formulating, implementing, and enforcing environmental policies and regulations of industrial projects, while regulatory responsibilities for RE projects are delegated to the MNRE.

G. Risks and Mitigation

The overall risk of the proposed operation is rated Substantial.

(i) Green hydrogen is still at a nascent stage: creating domestic market demand will require consensus from the industries and stakeholders beyond the MNRE. The proposed operation intends to enhance the green hydrogen and RE policies and regulations, such as the bulk procurement for green hydrogen to increase demand and reduce off-taker risk.

(ii) There are still uncertainties around green hydrogen technologies and costs, electrolyzer manufacturing capacities, and storage and transportation of hydrogen. The proposed operation aims to incentivize green hydrogen

production and consumption to kick-start the market, pilot the technologies, bring down the costs, and reduce the technology risks through learning-by-doing.

(iii) The entire operation is aiming to replace the use of fossil fuels and to subsequently reduce air pollutants and GHG emissions. Yet, some environmental and social residual risks need to be addressed. The World Bank will provide technical assistance to mitigate environmental and social risks.

(iv) During consultations, stakeholders highlighted the high costs of green hydrogen as a major constraint, raising concerns about industry competitiveness and increased end-user costs. This proposed operation supports government programs which will provide a substantial amount of government incentives to bring down the costs of green hydrogen to mitigate this risk.

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APPROVAL

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