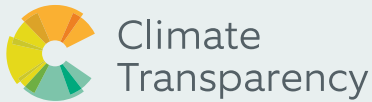


 CLIMATE POLICY IMPLEMENTATION CHECK




ACHIEVING NON-FOSSIL TARGET OF INDIA EVOLUTION OF THE ECOSYSTEM

INDIA





Climate Transparency is a global partnership with a shared mission to stimulate a “race to the top” in climate action in G20 members through enhanced transparency.

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Published on 23 November 2023

Authors and acknowledgements



Tanvi Khurana, Manish Kumar
Shrivastava



We would like to express our gratitude for inputs to Geethanjali Manohar G S

Design of template: Design for development (www.d4d.co.za).

LIST OF ABBREVIATIONS

BEE	Bureau of Energy Efficiency
CCUS	Carbon Capture, Utilization, and Storage
CERC	Central Electricity Regulatory Commission
EU	European Union
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GST	Goods and Services Tax
GW	Gigawatt
ICM	Indian Carbon Market
JNNSM	Jawaharlal Nehru National Solar Mission
PPA	Power purchasing agreements
MNRE	Ministry of New and Renewable
NAPCC	National Action Plan on Climate Change
NCEF	National Clean Energy Fund
NGHM	National Green Hydrogen Mission
NDC	Nationally Determined Contribution
PAT	Perform, Achieve, and Trade
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan
R&D	Research and Development
RPO	Renewable Purchase Obligations
SERC	State Electricity Regulatory Commissions
SNA	State Nodal Agencies

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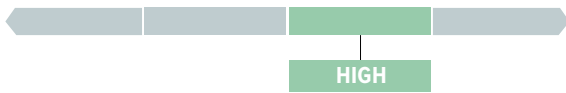
ABOUT THIS REPORT

2023 is the year of the first Global Stocktake of the Paris Agreement. With the threat of overshooting the 1.5°C limit looming ever larger, all countries need to raise their ambition to curb their emissions effectively, to a degree that is fair to their development status. But ambitious targets are not sufficient on their own. Policies need to be implemented to keep the 2023 targets within reach. Climate Transparency’s new Climate Policy Implementation Check is formulated to evaluate and categorize the implementation progress of policy tools across four dimensions: legal status,

institutions and governance, resourcing, and oversight. Supported by the European Union (EU) under the EU Climate Dialogues Project, this report introduces the Implementation Check by assessing the evolving policy ecosystem in India aimed at achieving the non-fossil energy target. In this assessment, three policy interventions, namely the National Solar Mission, Green Hydrogen Mission, and Domestic Carbon Market are appraised, and based on the evaluation, the combined ambition rating for India’s framework to attain its non-fossil energy targets is determined as high.

OVERVIEW OF POLICIES ASSESSED, OVERALL AND CATEGORY RATINGS

Ambition rating



Implementation rating 1

National Solar Mission



Implementation rating 2

Indian Carbon Market



Implementation rating 3

Green Hydrogen Mission



INTRODUCTION

India is committed to reducing the emissions intensity of its GDP by 45% by 2030 when compared to 2005. This is an improvement from the 33-35% committed in the 2016 NDC. India also committed to achieving 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, which is also an improvement from the 2016 NDC (40% in the original NDC).¹

Starting from the Cancun pledges in 2010, India has continuously raised its ambition and achieved the targets ahead of time. This has been made possible by continuous improvement in policy ecosystem to increase the pace of transition. The recent update in NDC targets is backed by a number of policy interventions. Here we assess three key policies: the National Solar Mission, Carbon Market Mechanism, and the Green Hydrogen Mission which can provide a platform for India to accelerate its decarbonization trajectory. The purpose of this assessment is to take an objective check on the long-term stability and strength of policy ecosystem that can potentially enable India to further increase its ambition.

The Solar Mission, initiated in 2010, has resulted in a notable expansion of solar capacity and a considerable reduction in solar energy costs. This strategy has not

only lessened carbon emissions but has also created job opportunities and facilitated energy access in remote areas. To increase the participation of private sector and discover lower costs of decarbonization, recently the Indian Carbon Market (ICM) has been introduced. The Green Hydrogen Mission is a recent (2023) initiative under which about 5 million metric tonne capacity is expected to be produced per annum by 2030. It is an update on the National Hydrogen Mission launched in 2021. By investing in green hydrogen, India aims to reduce its dependence on fossil fuels in energy intensive industries. Green hydrogen can be a game-changer in sectors such as transportation and industrial processes, contributing to a greener economy. Through these policies, India is steadily progressing towards its non-fossil energy targets. The nation's commitment to renewable energy, carbon pricing, and green hydrogen showcases its dedication to addressing climate change and ensuring a cleaner and more sustainable energy landscape.

NATIONAL SOLAR MISSION: PUSHING THE BOUNDARIES

Dating back to 2010, the National Solar Mission was initiated, introducing a range of nationwide schemes.

THE GLOBAL STOCKTAKE

The Paris Agreement (Art. 14) requires assessment of collective progress every five years as part of the regular process to increase the ambition of country climate commitments expressed as the Nationally Determined Contributions (NDCs). The purpose of the Global Stocktake is to be a living tool that continually informs countries' enhanced climate commitments. It will evaluate progress at the global level — not the individual country level — and identify overall trends that should inform countries' NDCs.

More specifically, the Global Stocktake will facilitate the assessment of global collective progress on three thematic areas: mitigation, adaptation, means of implementation and support, as well as efforts to minimise and address inevitable climate impacts that go beyond what people can adapt to, known as loss and damage (as agreed at COP24 in Katowice, Poland).

The first Global Stocktake kicked off in 2021 at COP26 in Glasgow and will culminate in 2023 at COP28 in the United Arab Emirates. It will inform NDCs to be brought forward in 2025.

These encompassed solar parks (large-scale solar infrastructure development), mega solar power projects, financial support for farmers through Kisan Urja Surakhsha to install solar irrigation pumps, rooftop solar projects, providing generation-based incentives, the establishment of the green energy corridor (intra-state transmission lines and substations powered by solar energy) and so on. As a result, the cost of generating solar energy has decreased by 300 percent over the past decade, achieving cost parity with coal in 2016.²

The National Solar Mission set forth a bold vision for harnessing 20GW of capacity by 2022, which was further enhanced 5 folds within 4 years in 2014. At present India has 70.1 GW solar power capacity installed.³ The significance of solar energy extends beyond mere numbers. By tapping into this abundant resource, India reduces its reliance on fossil fuels, mitigates greenhouse gas emissions, and bolsters energy security. Furthermore, solar energy projects have driven economic growth, creating jobs, especially in rural areas. The decentralized nature of solar power generation empowers communities, improves electrification in remote regions, and bolsters the resilience of the energy infrastructure. The scope of policy interventions cuts across economic sectors and stakeholders, situating India's climate policy in the context of sustainable development.

CARBON MARKET: INDIA READIES TO PUT A CAP ON TARGETED EMISSIONS

The Energy Conservation (Amendment) Bill of 2022 grants authority to the central government or any designated agency to institute a carbon credit trading scheme. Under this scheme, the government establishes emission caps (received as allowances) for various sectors during specific compliance periods. Companies with lower abatement costs can then sell their excess allowances in secondary markets to those with higher abatement costs, fostering emissions reduction at the lowest possible expense. Sectors and individual companies have the flexibility to choose between reducing emissions or continuing to emit, guided by internal assessments influenced by market costs and technological opportunities. It is important to note that while the volume of emissions is regulated, the price is determined by market supply and demand.

The Indian government recognizes the significance of implementing carbon pricing mechanisms. The Indian Carbon Market, aiming to decarbonize the Indian economy by pricing Greenhouse Gas (GHG) emissions through Carbon Credit Certificate trading is recently launched in 2023. The Bureau of Energy Efficiency under the Ministry of Power, is the nodal agency for its implementation, building on its experience of implementing the Perform, Achieve, and Trade scheme in energy efficiency. The experience with PAT and tradable renewable energy certificates scheme over the last decade reveals that the oblique introduction of carbon pricing has resulted in emission reductions across various sectors. This approach encourages businesses to adopt cleaner technologies and practices, aligning economic incentives with environmental objectives.

GREEN HYDROGEN MISSION: A FOOT FORWARD IN FUTURE

Green hydrogen, produced using renewable energy sources, represents the future of clean energy in India. The Indian government's Green Hydrogen Mission underscores its forward-looking approach. It has the potential to revolutionize various sectors, including transportation and industrial processes. By utilizing hydrogen as a clean and versatile energy carrier, India can reduce its dependency on fossil fuels, mitigating emissions and promoting energy security. Moreover, green hydrogen holds promise in storing excess renewable energy, providing grid stability, and fostering innovation in cutting-edge technologies. For India, Green Hydrogen is considered a promising alternative for enabling this transition. Hydrogen can be utilized for long-duration storage of renewable energy, replacement of fossil fuels in industry, clean transportation, and potentially also for decentralized power generation, aviation, and marine transport. The National Green Hydrogen Mission was approved by the Union Cabinet on 4 January 2022.⁴

Green Hydrogen will play a crucial role in accomplishing the aforementioned goals as it can be applied in challenging-to-decarbonize sectors like shipping, steel, aviation, as well as in industries currently utilizing Grey Hydrogen derived from natural gas, such as refineries and fertilizers. India has established various policies and guidelines to promote green hydrogen, including

the Green Hydrogen Policy, the Niti Ayog's initiative on Harnessing Green Hydrogen, and the National Green Hydrogen Mission (NGHM). The NGHM aims to achieve a green hydrogen production capacity of at least 5 million metric tonnes per year, attract investments exceeding USD 96 billion, and generate over 600,000 jobs. The government has taken significant measures, including waiving inter-state transmission charges and granting GH2 plants open access to the grid. In the latest budget, the government has allocated USD 236.74 million for various programs promoting green hydrogen, including initiatives for domestic manufacturing of electrolyzers

and GH2 production.⁵ In addition, India has established bilateral partnerships with financial commitments, ensuring that the learning curve also benefits from experiences in other countries, particularly Germany and the USA.

In summary, India's focus on solar energy, carbon markets, and green hydrogen isn't just a policy decision; it's a strategic path toward sustainability and energy security. It is clearly aimed at creating enabling institutional, technological, and market conditions for a giant leap towards decarbonization of the economy.





UPCOMING DEVELOPMENTS

India's expansive size and substantial potential for growth translate into an anticipated surge in energy demand. In the trajectory towards achieving net-zero emissions by 2070, it is projected that a significant portion of the heightened energy demand in the current decade must be fulfilled through low-carbon energy sources.

Due to technological progress, unwavering policy backing, and a vibrant private sector, the establishment of solar power facilities has become more economically efficient than constructing coal-based counterparts. India's renewable electricity sector is expanding at a faster pace than that of any other major economy, with projections indicating a doubling of capacity by 2026.⁶ Leading Indian hydrogen-producing companies are planning substantial investments in clean energy projects and forming partnerships with foreign entities, such as Reliance Industries' INR 750 billion i.e., \$9 billion investment plan in domestic green projects and Adani Group's \$50 billion partnership with France based Total Energies SE. The steel industry has begun to pilot integrating green hydrogen as fuel. However, securing financing for green hydrogen projects remains a potential challenge, especially in a developing economy. As a leading modern bioenergy producer, India also aims to intensify its use across various sectors. New waste-to-energy guidelines provide financial assistance for large biogas, BioCNG, and power projects. Offshore wind plays a vital role in India's target of 500 GW renewable capacity by 2030 and net-zero by 2070, with a goal of installing 30 GW of offshore wind projects by 2030.

ABOUT THE CLIMATE POLICY IMPLEMENTATION CHECK

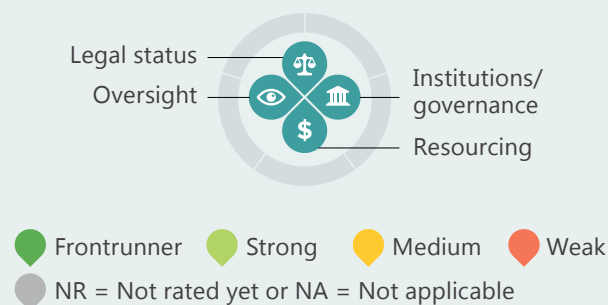
To meet the challenges of climate change, policies need to be both ambitious and implemented in a way that realises that ambition as a matter of urgency. To assess the status and quality of implementation, Climate Transparency has developed the Climate Policy Implementation Check. It assesses the implementation of policy instruments along several basic questions:

-  Does the instrument have a basis in law?
-  Has a suitable organisation been given the responsibility to implement the instrument?
-  Has the institution been given the resources to implement the instrument?
-  Is implementation being appropriately monitored to ensure success?

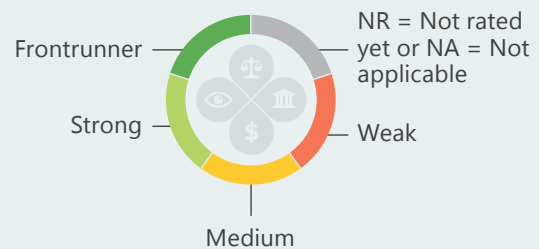
Accordingly, the assessment is grouped into four categories: legal status, institutions and governance, resourcing, and oversight. The framework can be applied to any policy in any country. This early check is important as policy outcomes and impacts on greenhouse gas (GHG) emissions are typically only measurable several years after implementation, leaving little time for course correction if implementation of the policy is weak.

For each of these categories, the framework includes specific questions that are designed so that the results are comparable across different countries. Depending on answers to the specific questions, the implementation of the relevant policy instrument in each category is rated as Weak, Medium, Strong or Frontrunner. These ratings are combined to produce an overall rating for the policy implementation. For more information, please visit our website: www.climate-transparency.org/implementation-check

The four categories



Policy assessment rating (overall)



METHODOLOGY

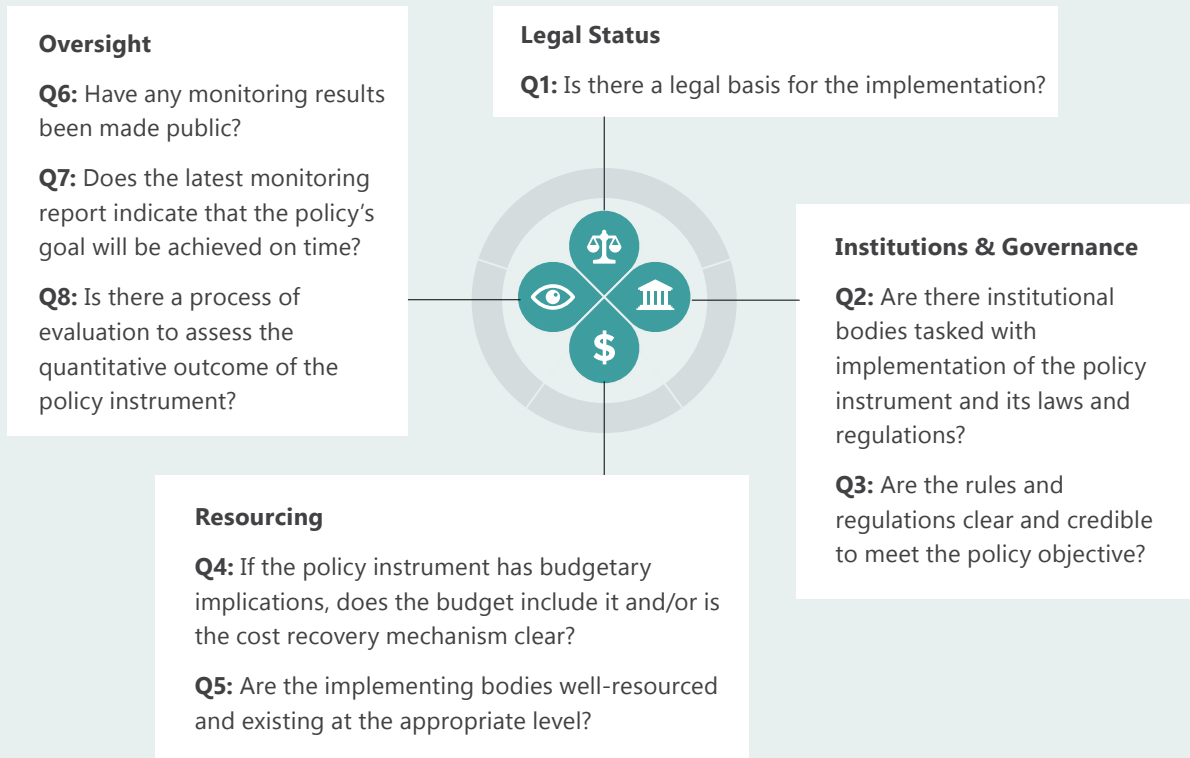
The Climate Policy Implementation Check framework has been developed by Climate Transparency as an easy-to-use tool to evaluate the implementation status and progress of specific policies and policy instruments, in particular by stakeholders in civil society and the research community. The framework checks different characteristics of policy implementation, grouped into four categories.

- 1. Legal status:** This category checks if the policy instrument is based in law, as most policy instruments require a legal basis for implementation.
- 2. Institutions and Governance:** This category checks if suitable institutions have been given responsibility to implement the policy instrument, if its processes are transparent, and if the policy instrument is suited to achieve its objective or goal.

3. Oversight: This category checks whether a system for monitoring the implementation of the policy instrument is in place, examines if it is generating publicly accessible results, reviews whether the monitoring results show progress towards achieving the established goals, and determines if the instrument includes provisions for evaluating the effectiveness of implementation.

4. Resources: This category checks whether the policy instrument, should it need one, includes a clear budget in its setup or if it includes mechanisms to recover potential costs, and if the implementing bodies have the human and financial resources needed to implement the policy instrument.

THE CHECK IN A NUTSHELL



KEY

- Frontrunner
- Medium
- NR = Not rated yet or NA = Not applicable
- Strong
- Weak

Overall ratings:



Category ratings:



IMPLEMENTATION CHECK SUMMARY

National Solar Mission

RATING

FRONTRUNNER



OVERSIGHT

STRONG

The Solar Mission's transparency is exemplified through the public availability of monitoring results. Both the MNRE and state agencies consistently release progress reports, accessible on official government websites and public platforms. These reports offer insights into the status of solar projects, capacity increases, and overall mission advancement. These reports are indicative of progress toward fulfilling policy objectives. The mission has achieved substantial growth in solar capacity, with these documents highlighting key accomplishments. However, the attainment of goals within stipulated timeframes can fluctuate, influenced by state-level

implementation and funding availability. Furthermore, a systematic process of evaluation is in place to assess the mission's quantitative outcomes. Regular evaluations occur at multiple levels to gauge policy effectiveness, identify obstacles, and propose enhancements. Quantitative data, such as installed capacity and power generation, are analyzed, ensuring the mission remains aligned with its targets. These evaluations serve as a vital instrument for course correction and continuous improvement, making certain that the Solar Mission remains on track and adaptable to evolving needs and challenges.



LEGAL STATUS

STRONG

The implementation of India's Solar Mission is firmly grounded in a robust legal framework. The National Solar Mission, inaugurated in 2010, draws its strength from a constellation of legal and policy structures. Foremost among these are the National Action Plan on Climate Change (NAPCC), 2008, and the Electricity Act of 2003. These underpin the mission, providing a sturdy legal foundation. Furthermore, state-level policies and regulations often synergize with and bolster the overarching mission. The Electricity Act of 2003 and the National Electricity Policy of 2005 constitute the legal backbone for the proliferation of renewable energy

within India. These legislations establish the framework within which renewable energy sources can thrive. In conjunction with these, the National Action Plan on Climate Change (NAPCC) and the National Solar Mission (NSM) set forth the definitive targets and guidelines for the development of renewable energy, ensuring that India's solar aspirations align with its broader environmental and energy policies. This comprehensive legal and policy framework underscores India's commitment to sustainable and eco-friendly energy sources.⁷



RESOURCES

STRONG

Budgetary considerations and cost recovery mechanisms play a pivotal role in the execution of the Solar Mission. Government budgets encompass the financial aspects of the mission, covering subsidies, incentives, and infrastructure development. Cost recovery strategies are delineated within policies and involve mechanisms such as feed-in tariffs, power purchase agreements, and revenue generation models. The 2023-24 Union Budget, for instance, has earmarked USD 879.79 million for the solar power sector, encompassing grid, off-grid, and PM-KUSUM projects, exemplifying the government's financial commitment. The institutions responsible for implementation, both at the central and state levels,

are generally well-equipped with resources. The central government, chiefly through the MNRE, extends support, technical expertise, and financial allocations. State-level agencies also receive funding and support to fulfil their roles in solar project implementation. While the availability of resources might vary between states, the unwavering commitment to resource allocation remains a constant feature. This seamless flow of budgetary provisions, coupled with strategic cost recovery mechanisms, forms a crucial backbone of the Solar Mission, ensuring that financial support is efficiently channelled for its successful realization.



INSTITUTIONS & GOVERNANCE

STRONG

The Solar Mission's execution involves various institutional bodies, both at the national and state levels. At the national level, the Ministry of New and Renewable Energy (MNRE) takes a central role in policy formulation. State-level nodal agencies are responsible for putting solar projects into action. Additionally, state electricity regulatory commissions, power distribution companies, and relevant government entities ensure policy adherence. Institutional bodies involved in renewable energy regulation encompass the MNRE, Central Electricity Authority (CEA), State Electricity Regulatory Commissions (SERCs), and State Nodal Agencies (SNAs). Environmental clearance follows the guidelines of the Environment Impact Assessment (EIA) Notification 2006. Land acquisition and compensation require approvals

from agencies like the Ministry of Environment and Forests. Power purchasing agreements (PPAs) adhere to MNRE guidelines, while Renewable Purchase Obligations (RPO) mandate electricity distribution companies to buy a specific share of power from renewable sources. Grid connectivity is overseen by the Central Electricity Regulatory Commission (CERC) and SERCs, while net metering, a vital mechanism, is regulated by State Electricity Regulatory Commissions. The Solar Mission's rules and regulations are typically clear and credible, fostering its policy goals. They include incentives, subsidies, net metering, RPOs, and PPAs. Nonetheless, it's important to note that regulatory frameworks may differ among states, with some having more robust systems than others.

IMPLEMENTATION CHECK SUMMARY

Indian Carbon Market



RATING

STRONG



OVERSIGHT

NOT RATED YET/NOT APPLICABLE

At its early stage, the carbon market is yet to formally launch monitoring results to the public. Nevertheless, promoting transparency in disseminating these results and progress reports becomes a vital component of any efficient carbon market. The trajectory and advancements in reaching the objectives will significantly rely on the pace of policy implementation and the specific targets established. It is envisaged that both the government and relevant agencies will institute assessment mechanisms to scrutinize the quantitative

outcomes arising from the carbon market policy. This encompassing evaluation will encompass gauging emissions reductions, the market's performance, and other pertinent metrics, ensuring that the carbon market aligns with its intended goals while fostering accountability and sustainability. Having said that, the oversight experience with the PAT scheme from which the ICM evolves, is likely to ensure strong oversight for ICM as well.



LEGAL STATUS

STRONG

The legal framework for the Indian Carbon Market is anchored in the 2022 amendment to the Energy Conservation Bill, which was initially enacted in 2001. This amendment, passed through the parliament, introduces new clauses authorizing the establishment of a domestic carbon credit trading scheme. Importantly, in line with India's climate objectives, these carbon credits will not initially be available for export, focusing on domestic application. Under these provisions, public and private sector entities in India are empowered to generate carbon credits with the primary goal of reducing emissions. These carbon credit certificates will find traction within the country, facilitating trade

among companies and individuals, ultimately creating a compliance market. The amendment to the Energy Conservation Bill represents a significant step toward implementing a robust carbon credit trading system in India. It was passed by the Lower House in August 2022 and subsequently endorsed by the Upper House in December 2022, making it an established legal framework. As a result, entities in India that are allocated carbon credits will have the opportunity to engage in domestic trading, fostering a sustainable and market-driven approach to emissions reduction. This legislative action underscores India's commitment to environmental conservation and sustainable development.



RESOURCES

NOT RATED YET/NOT APPLICABLE

The establishment of a carbon market carries inherent budgetary implications and necessitates well-defined cost recovery mechanisms, contingent on the market's design and regulatory framework. It is imperative that these financial aspects are explicitly articulated within the policy framework to ensure transparency and effective implementation. Resource availability for the entities responsible for implementing the carbon market hinges on government funding and support. The successful operation of such a market entails financial resources for tasks like regulatory enforcement,

continuous monitoring, and capacity enhancement. The degree of resource allocation to these implementing bodies may fluctuate in accordance with the government's specific priorities and level of commitment to the carbon market's success. In conclusion, while the inception of a carbon market carries financial considerations and relies on government backing, it is essential that these financial implications and resource allocations are meticulously outlined within the policy framework to provide a clear roadmap for sustainable and effective market operation.



INSTITUTIONS & GOVERNANCE

STRONG

The Central Electricity Regulatory Commission assumes a pivotal role in overseeing the market, with a mandate to regulate and facilitate the Indian carbon market. Its responsibilities encompass registering power exchanges and periodically endorsing the trading of carbon credit certificates within the market. Power exchanges, in turn, are required to seek the Commission's approval for their trading rules and bylaws, ensuring alignment with the Commission's regulations. The Bureau of Energy Efficiency (BEE) plays a nodal role, forming technical committees as necessary for the compliance mechanism. Additionally, the Bureau develops trajectories and targets for entities falling under the compliance mechanism. This involves recommending greenhouse gas emission intensity targets for notification under the Environment Protection Act, 1986, in consultation with the Ministry of Environment, Forest and Climate Change.⁸

Clarity and Credibility of Rules and Regulations

Referred to as a carbon credit trading scheme, this legislation empowers the central government to

establish a national carbon credit trading system. India's Power Ministry has initiated the development of this scheme by releasing a draft framework, inviting input from diverse stakeholders. The scheme emphasizes energy efficiency and, although not formally integrated at present, it indicates future inclusion of Carbon Capture, Utilization, and Storage (CCUS). In a notable development, the Ministry of Power recognized CCUS as a removal activity, part of its finalized list of activities under the Article 6.2 mechanism of the Paris Agreement.⁹ This inclusion will facilitate the international financial mobilization and the transfer of emerging technologies through carbon credit trading. Additionally, methodologies for emissions reductions and removals fall within the mandate of the Indian Carbon Market, emphasizing a holistic approach to carbon emissions management. This policy endeavor reinforces India's commitment to credible, effective, and transparent regulation in its pursuit of sustainable energy practices.

IMPLEMENTATION CHECK SUMMARY

Green Hydrogen Mission

RATING **STRONG**

OVERSIGHT

NOT RATED YET/NOT APPLICABLE

Transparency in Monitoring Results: Monitoring results and progress reports linked to the Green Hydrogen Mission are regularly disseminated to the public. These reports, encompassing mission progress in areas such as capacity augmentation, investments, and technology advancement, are typically accessible through official government websites and other public platforms.

Assessment of Policy Goal Attainment: As of now, the Green Hydrogen Mission might lack an exhaustive monitoring report explicitly indicating the on-time achievement of its goals. The realization of these policy objectives hinges on factors such as the pace of

implementation, investment inflow, and technological advancements.

Quantitative Outcome Evaluation Process: It is anticipated that the government will institute evaluation mechanisms to scrutinize the quantitative outcomes of the Green Hydrogen Mission. This evaluation encompasses gauging aspects like hydrogen production, capacity expansion, and the integration of green hydrogen across diverse sectors. The systematic evaluation ensures that the mission aligns with its objectives while fostering accountability and quantitative progress assessment.



LEGAL STATUS

STRONG

The implementation of the Green Hydrogen Mission, like many government initiatives, hinges on established legal and regulatory frameworks. India's legal underpinning for clean energy and environmental policies comprises the Electricity Act of 2003 and the National Hydrogen Energy Roadmap. These legislative pillars provide the necessary support for the government's endeavors in promoting green hydrogen. In accordance with these legal foundations, the Government of India will execute the Green Hydrogen Mission through a comprehensive and integrated approach, leveraging various central and state government agencies. The Ministry of

New and Renewable Energy assumes the pivotal role of coordinating the mission's implementation. Concurrently, other ministries and departments will undertake specific measures to ensure the successful realization of the mission's objectives. This collaborative and legally grounded approach ensure that the Green Hydrogen Mission aligns with India's broader energy and environmental goals. It highlights the importance of a coordinated effort among different government bodies to drive the adoption and integration of green hydrogen in the country's energy landscape.



RESOURCES

STRONG

The Green Hydrogen Mission, inaugurated on August 15, 2021, possesses a well-defined budget of USD 236.74 million. While the mission's budget allocation is explicit, the document does not specify a direct cost recovery mechanism. Nevertheless, there is an underlying anticipation of returns on the initial investment, considering the mission's focus on leveraging substantial private investments and the potential economic advantages.¹⁰ If the Green Hydrogen Mission carries any budgetary implications, they would typically find expression in the national budget or mission-specific financial allocations. These budgets should ideally encompass provisions for cost recovery mechanisms, which may include subsidies, incentives, or revenue-generation models, designed to foster green hydrogen production and utilization.

The Green Hydrogen Mission also involves international partnerships alongside domestic efforts. This mission boasts a robust budget, along with the announcement of a 4 million rupees R&D roadmap by MNRE (Ministry of New and Renewable Energy). Of the initial outlay of USD 236.74 million, a significant portion, amounting

to USD 209.75 million USD, is designated for the SIGHT program (Strategic Interventions for Green Hydrogen Transition). Additionally, USD 175.98 million is earmarked for pilot projects, USD 48 million for research and development, and USD 46.56 million for other components integral to the National Green Hydrogen Mission.

Resource Availability for Implementing Bodies

The Mission encompasses the active participation of various ministries, departments, agencies, and institutions at both the central and state government levels. This comprehensive approach underscores the mission's intergovernmental collaboration, minimizing dependence on a single ministry or department. The implementing bodies involved in the National Green Hydrogen Mission appear to be well-equipped and strategically positioned, given the clear financial allocation, collaboration among key government entities, and the multifaceted initiatives outlined for the mission's success. This collective effort ensures a robust foundation for the mission's execution.



INSTITUTIONS & GOVERNANCE

STRONG

The implementation of the Green Hydrogen Mission encompasses various institutional bodies, ensuring a coordinated and effective approach. At the central level, the Ministry of New and Renewable Energy plays a pivotal role, assuming overall responsibility for mission coordination. State-level agencies and relevant ministries complement these efforts. The Government of India adopts a comprehensive and integrated approach to implement the National Green Hydrogen Mission, with the MNRE at its core, ensuring policy directions and objectives are met. An Empowered Group, chaired by the Cabinet Secretary, oversees mission activities, offers guidance, monitors progress, recommends policy interventions, and approves necessary adjustments. The Mission Secretariat, situated within the MNRE and led by the Mission Director, manages policy formulation, project funding, risk monitoring, and other operational aspects in close collaboration with the EG and Advisory

Group. The National Green Hydrogen Advisory Group, comprising experts from academia, research, industry, and civil society, provides specialist insights into the mission's scientific and technological aspects. Various bodies, including the Bureau of Indian Standards and the Ministry of Road Transport and Highways, are actively engaged in developing standards and regulations pertinent to hydrogen applications. Collaboration among ministries, government agencies, standardization bodies, and industry stakeholders, under the auspices of MNRE's Working Group, aims to establish a national framework for hydrogen-related standards and regulations. While the specific rules and regulations for the Green Hydrogen Mission are under development, their clarity and credibility will be forged through policy formulation and stakeholder consultations, ensuring a robust and trustworthy regulatory framework.

SYNTHESIS

OVERVIEW

This report applies Climate Transparency's Climate Policy Implementation Check as an independent evaluative tool. While the tool is designed to assess individual policy instruments, this report explores its usability to assess a complex ecosystem. A standalone strong rated policy instrument may not be effective if necessary supporting policies are missing. Whereas, medium rated complementing policy instruments can yield better implementation results. The primary objective of this assessment is to gain insights into the implementation capability status of long term policy targets in India. This required bringing in more qualitative judgements about the dynamic interplay between a set of policies, an area that the Climate Policy Implementation Check tool needs significant improvement.

The three instrumental policy instruments, namely the Solar Mission, Carbon Market, and Green Hydrogen Mission, collectively depict a promising trajectory towards reduced fossil fuel dependency and the establishment of a sustainable energy landscape. These initiatives underscore India's commitment to combating climate change, fostering renewable energy, and driving economic growth while diligently working towards carbon emission reduction. Despite challenges related to diverse state-level implementations and budgetary constraints, India has made substantial strides toward achieving its clean energy objectives. The country has experienced noteworthy growth in renewable energy capacity, with the emergence of green hydrogen as a viable energy carrier.

The Solar Mission stands as a testament to India's commitment to harnessing solar power, diminishing its carbon footprint, and electrifying remote regions. This instrument is rated as a frontrunner according to the implementation check framework.

The Indian Carbon Market, though still in the developmental stage, promises a market-based approach to emissions reduction, aligning economic interests with environmental goals and generating

revenue for sustainable development. Encouragingly, India already possesses legal and institutional backing for carbon market strategies, including diverse mechanisms such as carbon taxes, cap-and-trade systems, and emissions trading schemes like Perform, Achieve and Trade (PAT). Notable examples include the National Clean Energy Fund (NCEF) and the Goods and Services Tax (GST) Compensation Cess. Consequently, the obtained ratings are strong.

The Green Hydrogen Mission's regulatory framework will gain strength and credibility through policy formulation and stakeholder consultations, ensuring a reliable structure. Despite potential cost challenges in green hydrogen production due to the energy-intensive electrolysis process, this mission maintains a strong rating. Its substantial budget, supported by both international partnerships and domestic efforts, fortifies its position.

These missions are backed by legal frameworks and institutional bodies dedicated to their implementation, showcasing the government's proactive stance on renewable energy adoption. Budgetary allocations and cost recovery mechanisms highlight a proactive approach towards renewable energy adoption.

In summary, the three policy intervention discussed here together delineate a clear and resolute path toward reducing reliance on fossil fuels and establishing a sustainable future. While challenges persist, India's commitment to addressing climate change remains unwavering. Achieving the goals is plausible, provided India sustains its momentum and adapts to evolving circumstances. At the developing country level, where promised funds and technology from international institutions may not materialize, hastening the transition necessitates a decentralized, consumer-based approach to renewable energy. Solar energy technology, in particular, is well-suited for early gains in combating climate change.

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