

Press Information Bureau  
Government of India  
Ministry of New and Renewable Energy

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## Energy Security in India

*Advancing Renewable Energy and Sustainability through Key Government Initiatives*

## SYNOPSIS

India's energy security is a cornerstone of its economic and environmental strategy, with a strong push toward renewable energy and self-reliance. As of January 2025, the country's non-fossil fuel energy capacity has reached 217.62 GW. The CCDC Wind Initiative has significantly enhanced wind energy development, leading to 48.16 GW of installed capacity. The National Green Hydrogen Mission, launched in 2023, is positioning India as a global leader in hydrogen energy with investments exceeding ₹8 lakh crore. The National Solar Mission has propelled solar energy growth, with installed capacity rising from 9.01 GW in 2016 to 97.86 GW in 2025. Additionally, PM-KUSUM and PM Surya Ghar Muft Bijli Yojana are accelerating solar adoption among farmers and households. These efforts, supported by substantial government funding and policy measures, highlight India's commitment to achieving energy security while reducing carbon emissions. By leveraging technological advancements and strategic investments, India is on a path toward a cleaner, more resilient energy future.

## Introduction

India's energy security is a **critical component** of its economic growth and sustainability goals. The government has launched various schemes aimed at promoting **renewable energy, enhancing grid stability, and reducing carbon emissions**. Key initiatives such as the **National Bio Energy Mission, National Green Hydrogen Mission, PM-KUSUM, and PM Surya Ghar Muft Bijli Yojana**, reflect the nation's commitment to a cleaner and self-reliant energy future. As of January 2025, India's **total non-fossil fuel-based energy capacity** has reached **217.62 GW**.

## INSTALLED RENEWABLE ENERGY CAPACITY (MW)

<b>Sector</b>	<b>Cumulative Achievements (till 31.03.2014)</b>	<b>2014-15</b>	<b>2023-24</b>	<b>2024-25 (01.04.2024 – 31.12.2024)</b>	<b>Cumulative Achievements (till 31.12.2024)</b>
<b>Wind Power</b>	21,042.58	2,311.77	3,253.38	2,276.65	48,163.16
<b>Solar Power</b>	2,821.91	1,171.62	15,033.24	16,051.10	97,864.72
<b>Small Hydro Power</b>	3,803.68	251.68	58.95	97.30	5,100.55
<b>Biomass (Bagasse) Cogeneration</b>	7,419.23	295.67	0.00	372.86	9,806.42
<b>Biomass (Non-bagasse) Cogeneration</b>	531.82	60.05	107.34	0.00	921.79
<b>Waste to Power</b>	90.58	0.00	1.60	0.00	249.74
<b>Waste to Energy (Off-grid)</b>	139.79	9.71	30.17	34.13	370.20
<b>Total</b>	<b>35,849.59</b>	<b>4,100.50</b>	<b>18,484.68</b>	<b>18,832.04</b>	<b>162,476.58</b>

## CCDC Wind Initiative

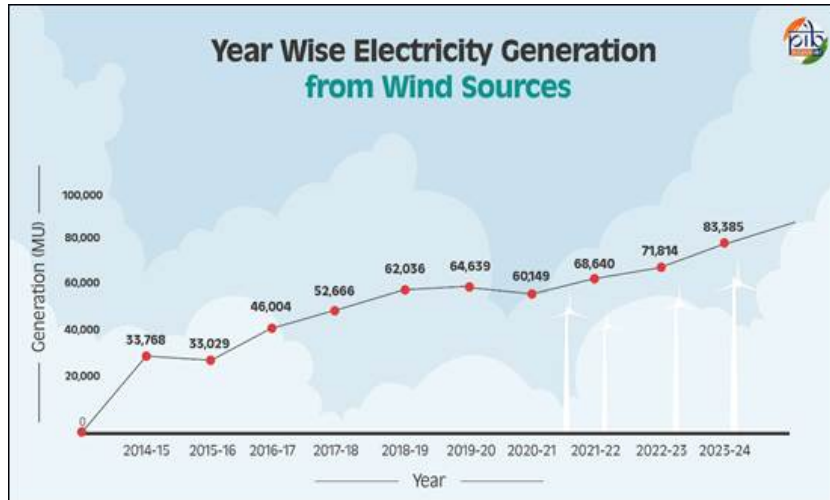
### About the Scheme:

Launched in **June 2020**, the **Centralized Data Collection and Coordination (CCDC) Wind Initiative** aims to advance India's wind energy development by improving wind resource assessment through accurate data collection and research. The initiative provides valuable insights for project developers, helping them **identify the most promising locations for wind energy projects**. It supports the **efficient implementation** of large-scale wind energy projects and **encourages investments** in the wind sector. The Government, through **National Institute of Wind Energy (NIWE)**, has installed over **800 wind-monitoring stations** all over country and issued wind potential maps at 50m, 80m and 100m above ground level. As on **30 January 2024**, India's cumulative wind power capacity stands at **48.16 GW**.

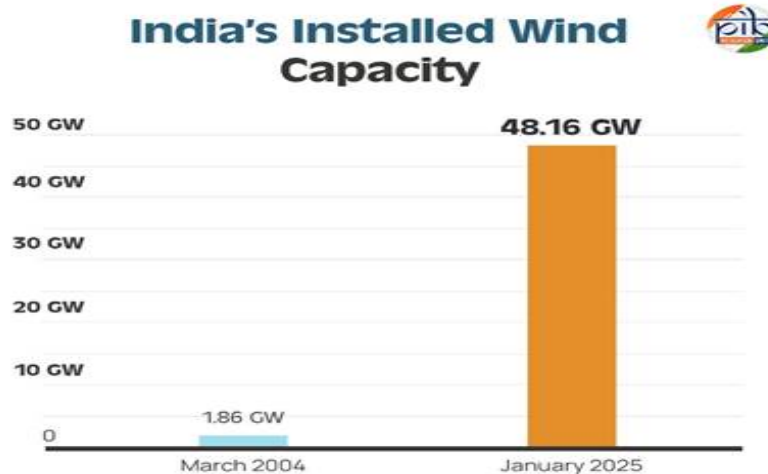
### Objective:

- Facilitate **wind energy development** through centralized data collection and research.
- Provide **accurate wind resource assessment** for better site identification.
- Promote **private sector investments** and public-private partnerships in wind energy projects.

**Key Achievements:**



- Enhanced wind resource mapping has contributed to the successful identification of over **50 potential wind energy sites** nationwide.
- Contributed to the development of **over 10 GW of new wind energy capacity** from 2020-2024, increasing India's wind energy capacity by **30%**.
- **Significant growth** in wind energy capacity, from **1.86 GW in March 2004** and **21.04 GW in December 2014** to **48.16 GW in January 2025**, reflecting the initiative's impact.
- In 2024, the Union Cabinet approved a **Rs. 7,453 crore Viability Gap Funding (VGF) scheme** to set up India's first offshore wind energy projects. The scheme includes Rs. 6,853 crores for 1 GW of offshore wind capacity (500 MW each off the coasts of Gujarat and Tamil Nadu) and Rs. 600 crores for port upgrades to support logistics for these projects.



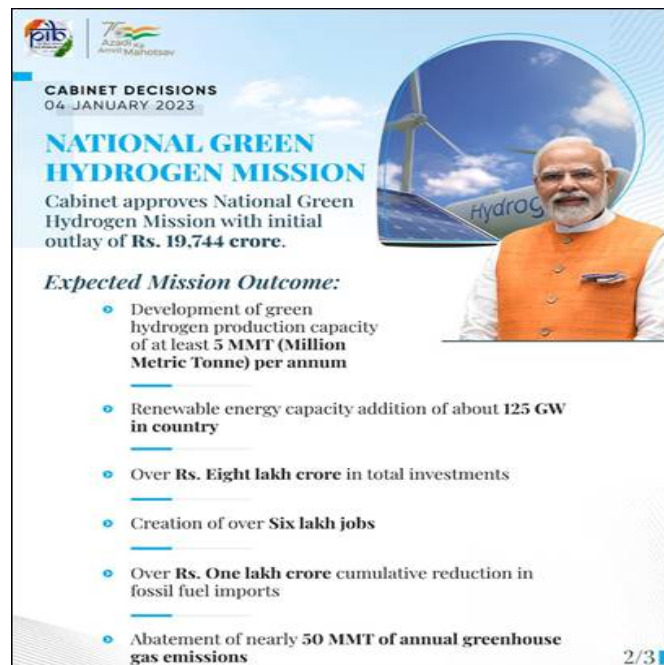
## National Green Hydrogen Mission

### About the Scheme:

Launched in **January 2023**, the National Green Hydrogen Mission is an ambitious initiative aimed at transitioning India towards a **hydrogen-based economy**. The scheme focuses on the **development of indigenous technology** for green hydrogen production, infrastructure for storage, transportation, and utilization. By promoting hydrogen as a clean energy source, the mission aims to position India as a **global leader** in green hydrogen production and export, thereby driving sustainability and reducing dependence on fossil fuels. With **over Rs. 8 lakh crores** in total investments, green hydrogen capacity is expected to reach **5 million metric tons by 2030**. This is expected to create **6 lakh jobs** by 2030.

### Objective:

- Making India a **leading producer** and **supplier** of Green Hydrogen in the world.
- Creation of **export opportunities** for Green Hydrogen and its derivatives.
- **Reduction** in **dependence** on imported fossil fuels and feedstock.
- Development of **indigenous** manufacturing capabilities.
- Attracting **investment** and business opportunities for the industry.
- Creating opportunities for **employment** and economic development.
- Supporting **R&D** projects.



The infographic features the PIB logo and the 75th Anniversary logo of India. It includes a portrait of Prime Minister Narendra Modi in an orange kurta, with a circular inset showing a wind turbine and solar panels under a blue sky with the word 'Hydrogen' written across it. The text is as follows:

**CABINET DECISIONS**  
04 JANUARY 2023

**NATIONAL GREEN HYDROGEN MISSION**  
Cabinet approves National Green Hydrogen Mission with initial outlay of **Rs. 19,744 crore**.

**Expected Mission Outcome:**

- Development of green hydrogen production capacity of at least **5 MMT (Million Metric Tonne) per annum**
- Renewable energy capacity addition of about **125 GW in country**
- Over **Rs. Eight lakh crore** in total investments
- Creation of over **Six lakh jobs**
- Over **Rs. One lakh crore** cumulative reduction in fossil fuel imports
- Abatement of nearly **50 MMT of annual greenhouse gas emissions**

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### Key Achievements:

- **₹19,744 crore** allocated for the mission's implementation, with a focus on infrastructure development and technology innovation. The Mission has an outlay of **₹600 crore** for **FY 2024-25**.
- Establishment of **3 hydrogen production hubs** in key locations across the country.

- Tenders awarded to companies for **4.12 lakh tonnes per annum** green hydrogen production.
- **Development of key policies and financial incentives**, with **50% subsidy** on electrolyser manufacturing and hydrogen production. Selection of **manufacturers** for **1,500 MW** electrolyser capacity was also conducted in 2024.
- **The International Conference on Green Hydrogen (ICGH – 2023)** took place in New Delhi from 5th to 7th July, 2023, featuring global participation from industry, academia, and government.
- From 18th to 22nd March, 2024, India hosted the **41<sup>st</sup> International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE)** Meeting in New Delhi, fostering collaboration on clean hydrogen technologies.
- From **September 11-13, 2024**, the **2nd International Conference on Green Hydrogen (ICGH)** in New Delhi emphasized advancements in green hydrogen technology and India's leadership in the sector.
- The year 2024 also witnessed India's **innovative renewable energy solutions** being showcased on international platforms such as the **World Hydrogen Summit 2024 in Rotterdam, Netherlands**.

## National Solar Mission (NSM)

### About the Scheme:

Launched in **January 2010**, NSM is a major initiative to promote ecological sustainable growth while addressing India's energy security challenges. It is also a major contribution by India to the global effort to meet the challenges of climate change. In order to achieve the above target, Government of India have launched various schemes to encourage generation of solar power in the country like **Solar Park Scheme, VGF Schemes, CPSU Scheme, Defence Scheme, Canal bank & Canal top Scheme, Bundling Scheme, Grid Connected Solar Rooftop Scheme** etc.

### Objectives:

- Establish India as a global leader in solar energy by creating the policy conditions for solar technology diffusion across the country as quickly as possible.
- Achieve the **Nationally Determined Contributions (NDCs) target** to achieve about **50 percent** cumulative electric power installed capacity from non-fossil fuel-based energy resources and to reduce the emission intensity of its GDP **by 45 percent from 2005 level by 2030**.

### Off-Grid Solar PV Programme:

Off-grid Solar PV Applications Programme is one of the oldest programmes of the Ministry aimed at providing solar PV-based applications in areas where grid power is either not available or is unreliable. Applications such as **solar home lighting systems, solar street lighting systems, solar power plants, solar pumps, solar lanterns and solar study lamps** are covered under the programme.

### Solar Grid Connected Programme:

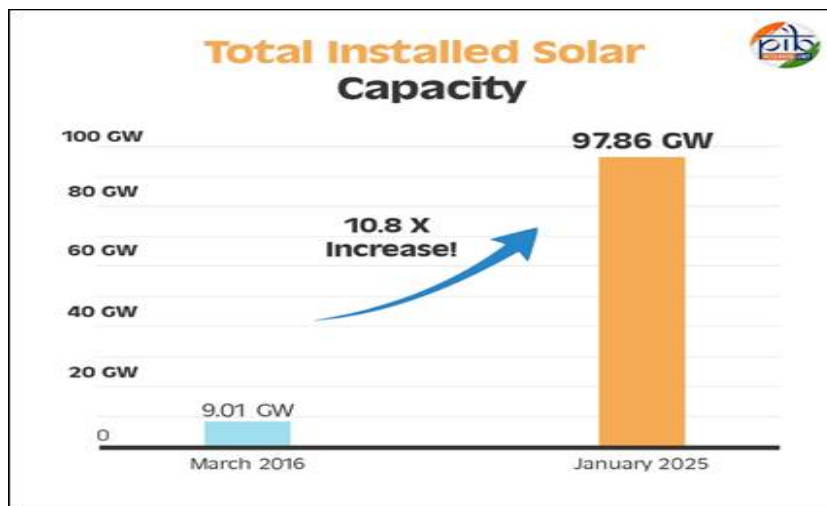
Government of India have launched various schemes to encourage generation of solar power in the country like **Solar Park Scheme, VGF Schemes, CPSU Scheme, Defence Scheme, Canal bank & Canal top Scheme, Bundling Scheme, Grid**

**Connected Solar Rooftop Scheme** etc. Various policy measures are also undertaken to promote the grid connected solar power plants. By **2023**, India achieved **5th** rank in the world in solar power deployment.

**Key Achievements:**

<b>Parameter</b>	<b>2016</b> (By March 2016)	<b>2024</b> (By March 2024)
<b>Total Installed Solar Capacity</b>	9.01 GW	*96.86 GW
<b>Number of Solar Parks</b>	34	58
<b>Total Capacity of Solar Parks</b>	20 GW	40 GW
<b>Rooftop Solar Capacity</b>	90.8 MV	11,503 MV
<b>Number of Solar Home Lights</b>	13.96 lakh	17.23 lakh
<b>Number of Solar Street Lights</b>	4.42 lakh	9.44 lakh
<b>Installed Capacity of Power Plants</b>	172.45 GW	216.86 GW

- In March 2016, the total installed solar capacity was 9.01 GW and by March 2024, the total installed solar capacity stood at **81.81 GW**. \*As of **28 January 2025**, the total installed solar capacity is **97.86 GW**.
- As of March 2024, the total estimated solar potential of the country stood at **748.98 GW**.
- As of March 2024, there are a total of **58** solar parks in India with a sanctioned capacity of **40 GW**, in contrast to March 2016, when there were only 34 solar parks with 20 GW sanctioned capacity.
- In March 2016, there was only 90.8 MV installed solar capacity under the Rooftop PV and Small Solar Power Generation Programme (RPSSGP). In March 2024, the total installed capacity has reached **11,503 MV**.
- In 2024, for off-grid projects, India has **17.23 lakh solar home lights, 84.59 solar lamps, 9.44 lakh solar street lights and an installed capacity of 216.86 GW from solar power plants**. This has increased from 2016, when 13.96 lakh solar home lights, 4.42 lakh solar street lights and 172.45 GW of installed solar capacity from power plants.



**PM-KUSUM Scheme: (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan)**

**About the Scheme:**

Launched in **March 2019**, the PM-KUSUM Scheme supports farmers by **offering financial assistance** for installing **solar-powered irrigation systems**, including solar pumps and grid-connected solar power plants. By shifting to solar energy, the scheme also helps to reduce carbon emissions and improve energy access in rural agricultural areas. Under the Scheme, **central government subsidy upto 30% or 50%** of the total cost is given for the installation of standalone solar pumps and for the solarization of existing grid-connected agricultural pumps.

Component	Target Setup	Creation of RE Capacity targeted (GW)
Component A	10000 MW of Decentralized Ground Mounted Grid Connected Solar Plants	10
Component B	Installation of 14 lakh Standalone Solar Powered Agriculture Pumps	7
Component C	Solarisation of 35 lakh existing individual Grid-connected Agriculture Pumps including Feeder Level Solarisation	17.8

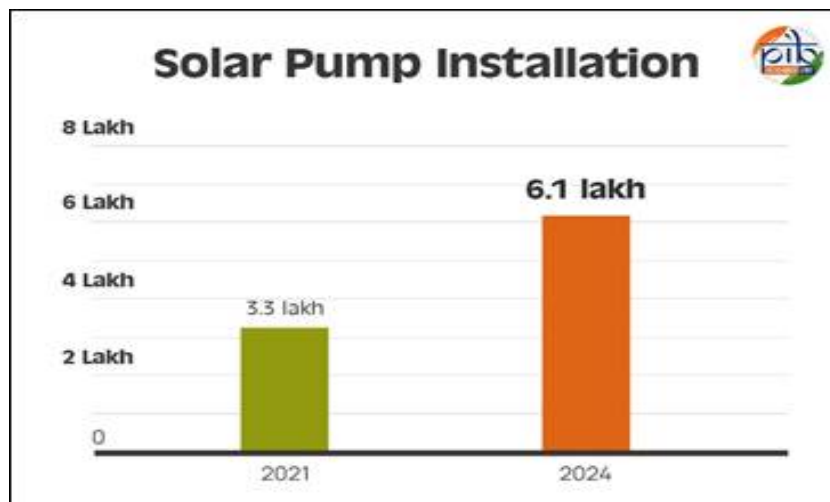
**Objective:**

- Promote **solar energy adoption** among farmers by subsidizing solar-powered irrigation.
- **Reduce dependency** on diesel pumps, leading to lower fuel costs and **improve energy access** in rural agricultural areas.
- Enhance **income generation** through surplus solar energy sales.

Component A Achievements As On 31.12.2024	Component B Achievements As On 31.12.2024	Component C Achievements As On 31.12.2024	
Total Sanctioned Solar Capacity (MW) <b>9,962</b>	Total Sanctioned Standalone Pumps (Nos.) <b>12,32,327</b>	Total Pump Sanctioned for Individual Pump Solar - IPS (Nos.) <b>1,31,640</b>	Total Pumps Sanctioned For Feeder Level Solar - FLS (Nos.) <b>34,35,874</b>
Total Installed Solar Capacity (MW) <b>396.98</b>	Total Installed Standalone Pumps (Nos.) <b>6,16,210</b>	Total Pump Solarised Under Installed Individual Pump Solar - IPS (Nos.) <b>5272</b>	Total Pumps Solarised Under Feeder Level Solar - FLS (Nos.) <b>1,07,184</b>

### Key Achievements:

- **Over 6.1 lakh solar pumps** installed nationwide by **December 2024**, as compared to 3.3 lakh solar pumps installed by December 2021.
- **35 lakh** grid-connected agriculture pumps solarized.
- As of **June 2024**, more than **4 lakh farmers** nationwide have benefited from the PM-KUSUM scheme.



- Under Components B and C of PM-KUSUM: **30% CFA provided** (or 50% for North Eastern/Hilly regions/Islands) for installing standalone agriculture pumps and solarizing grid-connected pumps.
- About **11.34 GW** of **solar energy capacity** has been installed during January to November 2024.

### PM Surya Ghar Muft Bijli Yojana

#### About the Scheme:

Launched in **February 2024**, the PM Surya Ghar Muft Bijli Yojana, the **world's largest domestic rooftop solar initiative**, is designed to promote rooftop solar energy adoption in residential areas. By providing financial incentives and subsidies for solar panel installation, the scheme enables households to generate their electricity, reducing their dependence on the

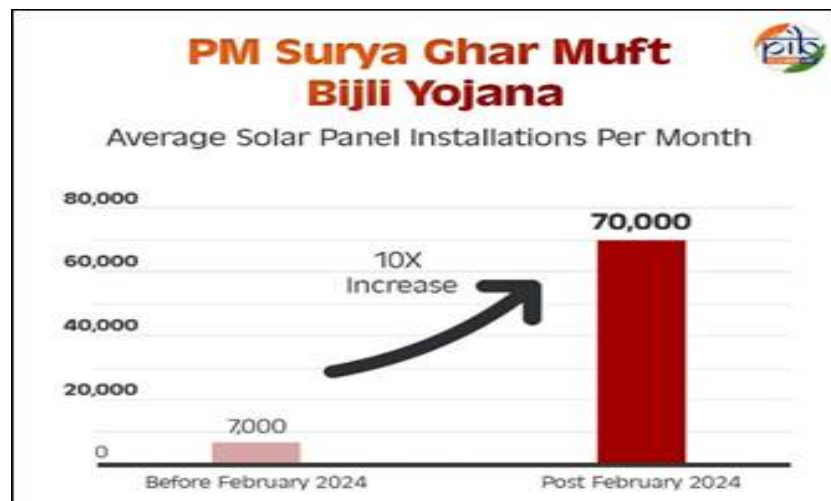
national grid and lowering electricity bills. The initiative has a bold vision to supply solar power to **one crore households by March 2027**.

#### Objective:

- Encourage **rooftop solar adoption** in residential sectors.
- Provide **financial incentives** and **subsidies** for solar panel installation.
- Enable households to **generate their own electricity**, reducing dependency on the grid.
- **Reduce electricity bills** by allowing households to generate and sell surplus solar energy to the grid.

#### Key Achievements:

- **Increased participation** in the distributed solar energy ecosystem, with over **1 lakh homes** installing rooftop panels in the first year.



- Households benefiting from **20-30% reduction** in electricity bills due to self-generated solar power.
- Within just **10 months** of PMSGMBY, **7 lakh installations** have been achieved—an average of **70,000 per month**. This marks a **ten-fold** increase in monthly installations compared to the average of 7,000 per month prior to the launch of the scheme in February 2024.
- States such as Gujarat, Maharashtra, Kerala, and Uttar Pradesh have demonstrated exceptional progress, reflecting robust infrastructure and stakeholder collaboration.
- Issuance of **Operational Guidelines** for the 'Model Solar Village' scheme, with a total outlay of **₹800 crore**, granting ₹1 crore grant for the winning village in each district. It aims to promote solar energy adoption and make villages self-reliant in energy. Villages with populations over 5,000 (or 2,000 in special states) can compete based on their renewable energy capacity.

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