

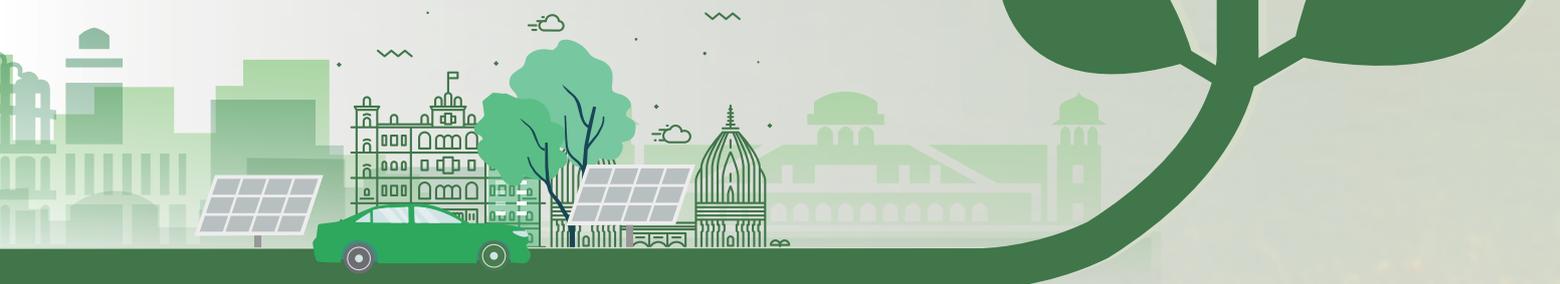


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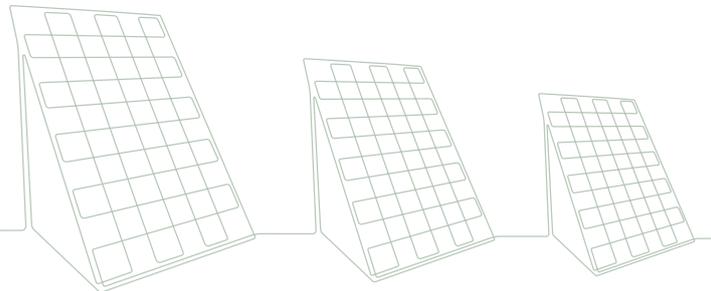
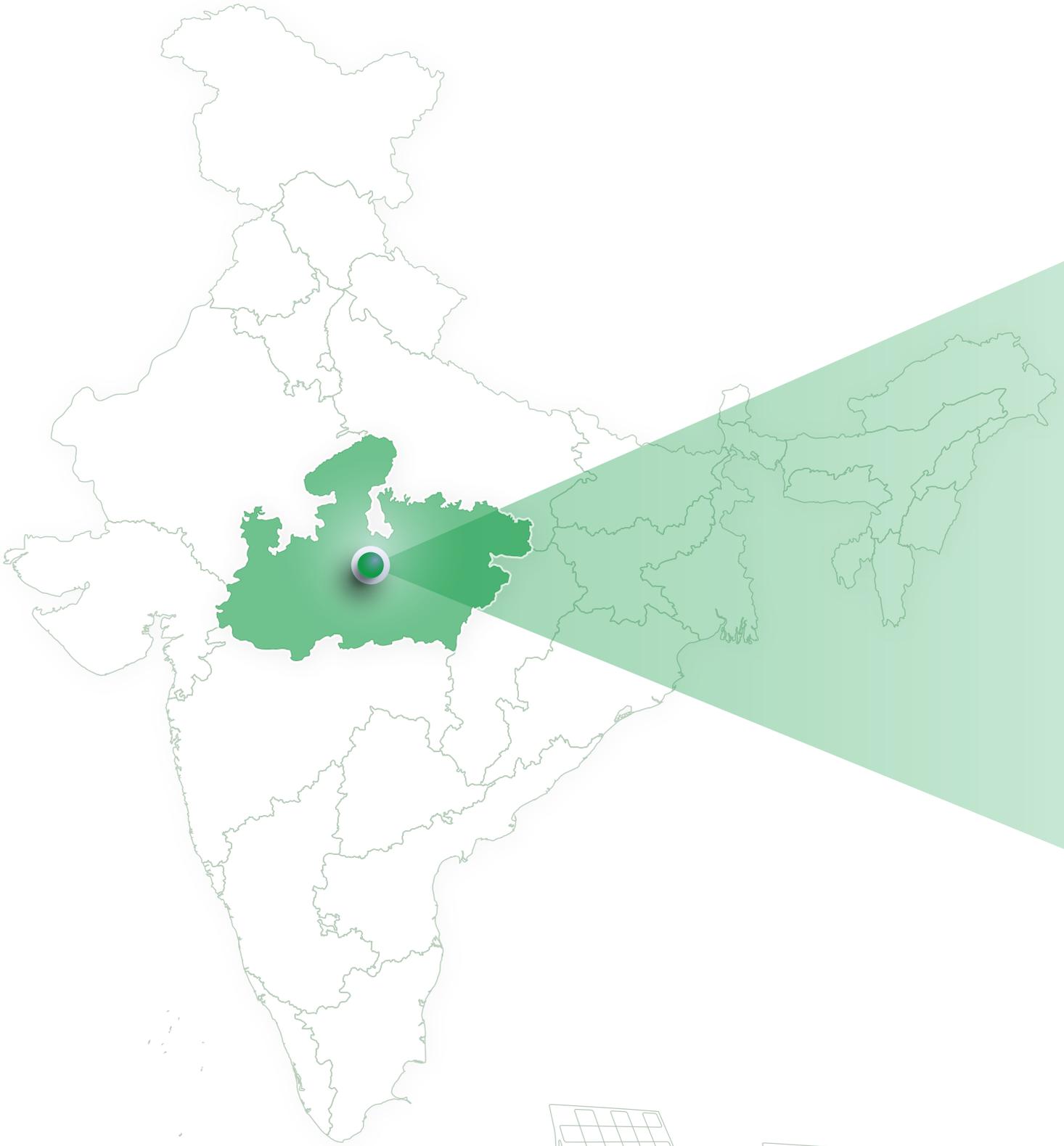
# Decarbonising Madhya Pradesh

Trends, Policies and Recent  
Developments









# Madhya Pradesh's Key Indicators

## Population



87.6 million (2024)<sup>1</sup>  
(~6% of India's total population)

## Population Density



284 people/km<sup>2</sup>  
(~438 people per sq. km for India)

## Gross GHG emissions



220.5 MtCO<sub>2</sub>e (2018)<sup>2</sup>  
(amounts to ~7% of India's emissions)

## Per Capita Emissions



2.65 tCO<sub>2</sub>e/capita  
(~18% higher than the national average for India (2.24 tCO<sub>2</sub>e/capita)<sup>2</sup>)

## Gross State Domestic Product



7.12 lakh crore (2024-25)  
(~4% of national GDP)<sup>3</sup>

## Forest Cover Area



77,073 sq km  
(3,124 sq km scrub)<sup>4</sup>  
(accounts to ~11% of India's total forest cover)

## Electric Vehicles



1,19,717 (FY 2024-25)<sup>5</sup>  
(~7% of the states total vehicle sales for that fiscal year)

## RE Capacity (incl large Hydro)



11 GW  
(~5% of India's RE capacity as on April 2025)<sup>3</sup>

## Electricity Consumption Per Capita



1230 kWh (2022-23)<sup>3</sup>  
(slightly lower than the national average of 1331 kWh)

# Why Decarbonisation Matters for Madhya Pradesh?

Madhya Pradesh faces increasing vulnerability to climate change, evident in the rising frequency of extreme weather events such as flooding, untimely rains, droughts and heatwaves. As a predominantly agrarian state, with a significant share of its population reliant on agriculture, its economy remains highly sensitive to shifting climate patterns—particularly erratic rainfall and rising temperatures. These disruptions not only undermine agricultural productivity but also jeopardise the livelihoods of millions. Decarbonisation of the state and investment in climate-smart infrastructure, presents a critical opportunity for the state to safeguard its natural resources, strengthen rural resilience, and meet its energy and development needs in a sustainable, low-carbon future.



# Greenhouse Gas Profile

## Economy-wide GHG Emissions

Between 2011 and 2018, Madhya Pradesh's economy-wide GHG emissions surged from 124 million tonnes of carbon dioxide equivalent (MtCO<sub>2</sub>e) to 215 MtCO<sub>2</sub>e, a significant 73 percent increase. This rapid rise signals the state's growing economic activities and energy needs.

Energy sector leads emissions across all years, nearly doubling over the period

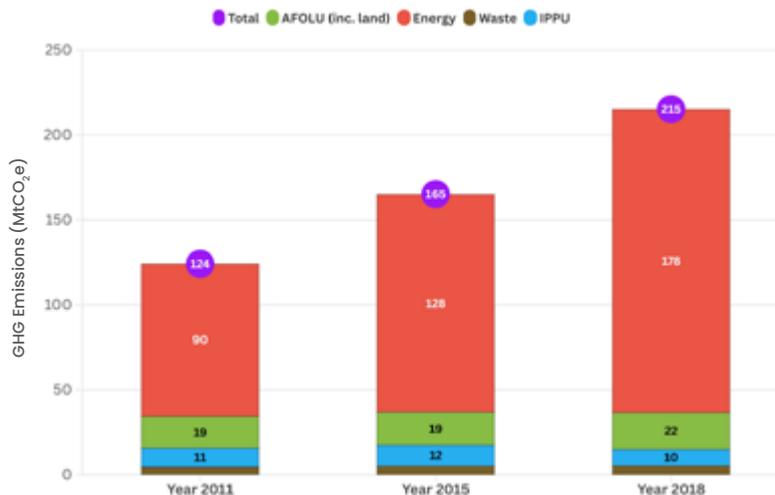


Figure 1: GHG emissions between 2011 and 2018 and sector wise share across the economy-wide emissions

## Energy-related GHG Emissions

The energy sector significantly contributes to Madhya Pradesh's emissions landscape, contributing approximately 83 percent of total emissions in 2018. Energy-related emissions nearly doubled, from 90 MtCO<sub>2</sub>e in 2011 to 178 MtCO<sub>2</sub>e in 2018, reflecting increased electricity generation, industrial fuel use and transport demand.

Within energy, public electricity generation consistently stands out as the largest emitter, accounting for roughly 72 percent of the energy emissions in 2018. Industries and transportation also contribute notably to the energy emissions but at much smaller shares compared to electricity generation.

Public electricity and industry contribute most to energy-emissions

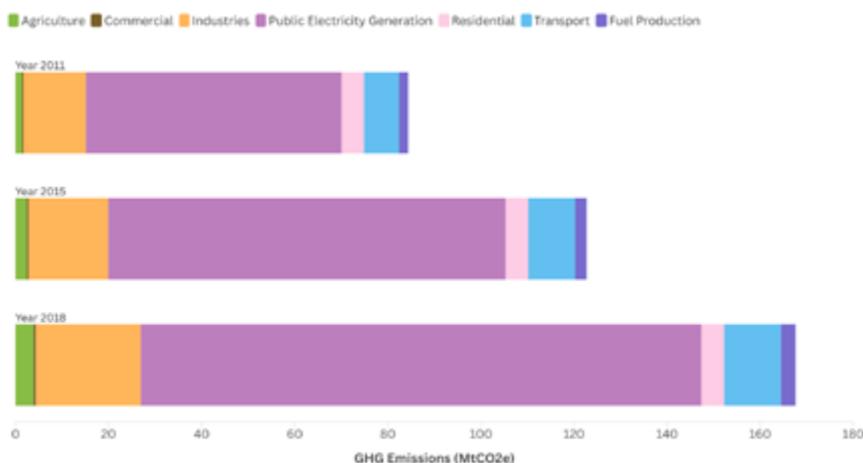


Figure 2: Sectoral contributions to the energy emissions in Madhya Pradesh over the years



## The AFOLU Sector

The Agriculture, Forestry, and Other Land Use (AFOLU) sector contributed about 20 percent of Madhya Pradesh's total GHG emissions in 2011, but this share dropped to 13 percent by 2018, even as absolute emissions rose slightly from 24 to 27 MtCO<sub>2</sub>e (excluding the land).

The land category within AFOLU acts as a carbon sink, with agricultural land contributing more to removals (61%) than forest land (33%). This indicates that while emissions have grown slightly, land-use practices still play a vital role in absorbing carbon dioxide.

**Livestock emissions are consistently the largest contributor. Land remains a carbon sink, but its ability to absorb carbon hasn't increased.**

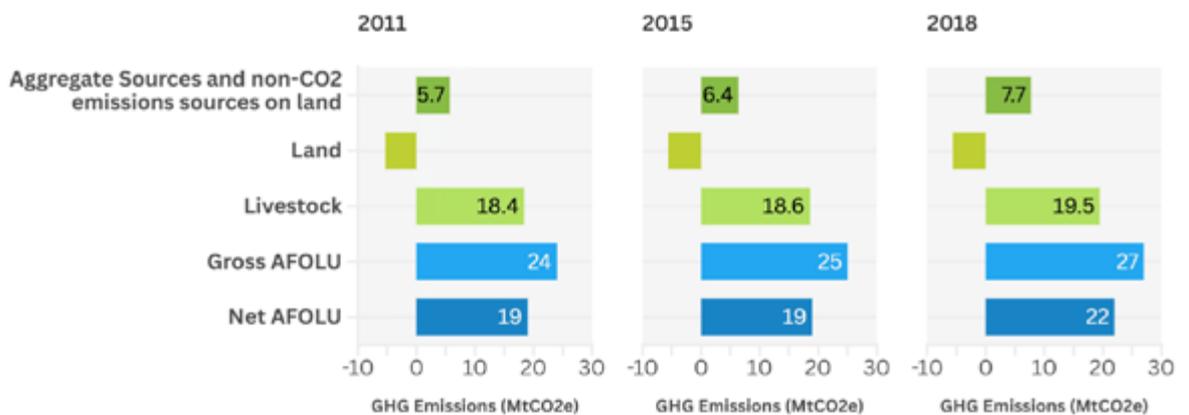


Figure 3: AFOLU sector GHG emissions in the state from 2011 to 2018



# Forest Cover of Madhya Pradesh

Madhya Pradesh boasts a substantial forest cover of 77,073 sq. km, accounting for 25 percent of the state's area.<sup>6</sup> These forests are a critical carbon sink, storing an estimated 608 million tonnes (Mt) of carbon stock, equivalent to ~80 tonnes per hectare (t/ha). Of this, the majority (359 Mt) is stored in soil organic carbon (SOC), accounting for almost a half of the total carbon stock.<sup>7</sup>

*Forest Cover of Madhya Pradesh (in km<sup>2</sup>)*

Class	Area	% of Calculated Area by Survey of India (Sol)*
<b>Very Dense Forest (VDF)</b>	7,021.31	2.28
<b>Moderately Dense Forest (MDF)</b>	33,508.64	10.87
<b>Open Forest (OF)</b>	36,543.49	11.85
<b>Total Forest Cover</b>	77,073.44	25.00
<b>Scrub**</b>	3,124.20	1.01

Madhya Pradesh has long been committed to enhancing the quality of its forests, reversing land degradation, and conserving biodiversity. As part of these efforts, the state successfully implemented the Ecosystem Services Improvement Project (ESIP) from 2017 to 2022, which was aligned with the national Green India Mission.

The government of Madhya Pradesh has also launched several initiatives to support agroforestry practices among farmers. One such initiative is the Kisan Laxmi Yojana (2013), which incentivises farmers to plant trees on their farmland. Additionally, the Niji Bhoomi Par Vriksharopan Protsahan Yojna promotes tree planting on private lands, further encouraging environmental sustainability at the grassroots level.

In May 2025, a significant allocation of ₹1,038.54 crore was made for the implementation of the Annual Plan of Operation 2025-26 under the Madhya Pradesh State Compensatory Afforestation Management and Planning Authority (CAMPA). This funding highlights the state's ongoing commitment to the protection and rejuvenation of its forest resources.

In line with national priorities, the state is also planning to come up with its own State Agroforestry Policy, which aligns with the National Agroforestry Policy of 2014.

\* The percentage represents the share of each category relative to the total geographical area of the state, as calculated by the Survey of India.

\*\* Scrub areas are not included in the forest cover

# Key Sectors and their Trends of the State



## The Evolution of Madhya Pradesh's Electricity Sector: A Decade of Transformation

### Decadal Growth in Installed Capacity

Madhya Pradesh's electricity sector has witnessed remarkable growth over the past decade, particularly in the expansion of renewable energy. From 2015 to 2025, Madhya Pradesh saw a substantial increase in its total installed electricity capacity, rising from 19 GW to 33 GW. The most striking development during this period has been the explosive growth in solar power (Figure 4).

Total installed capacity grew by ~73%, with solar increasing 9x and wind 4x over the decade

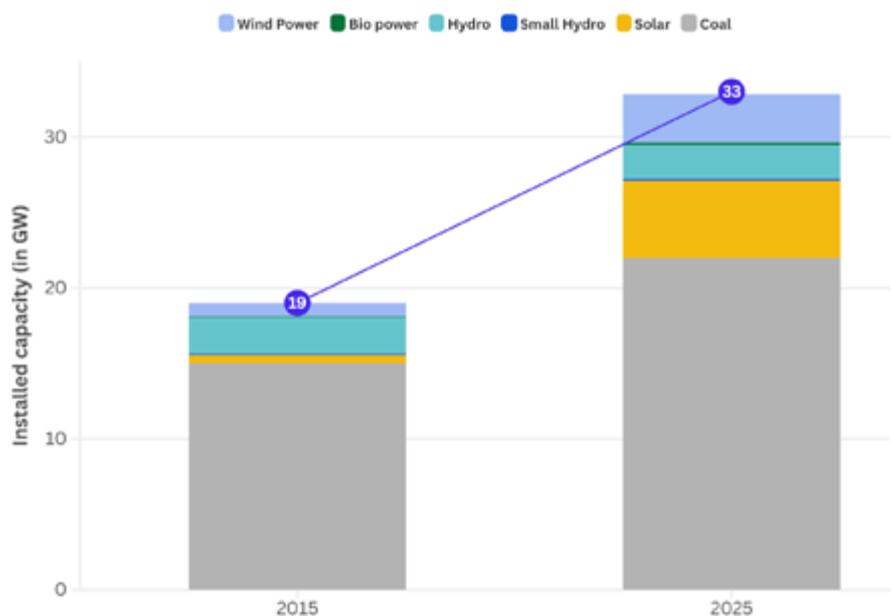


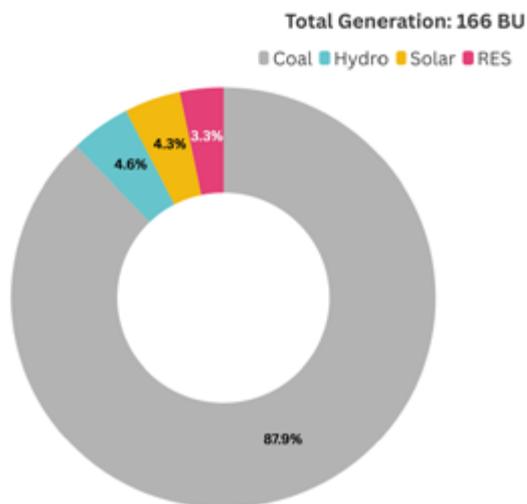
Figure 4: Decadal growth in the installed capacity (2015-2025)

As shown in Figure 4, the contribution from solar power surged from just 0.56 GW in 2015 to over 5.12 GW by 2025, while wind power grew from 0.88 GW to 3.20 GW, marking a shift toward cleaner, renewable energy sources. However, while solar and wind power has seen impressive growth, coal continues to hold a major share in the energy mix. In 2025, coal remains the largest contributor to the state's installed capacity at 22 GW (67%).

### Generation Mix in 2024-2025

In terms of actual electricity generation, the state's reliance on coal continues to be substantial. For the year 2024-2025, coal power generation stood at 146 terawatt-hour (TWh), accounting for the largest share of total electricity production.

Coal accounts for the largest share at ~88% of total generation



Note: RES includes Wind, Small Hydro and Biopower.

Figure 5: State electricity generation mix by source (2024-25)

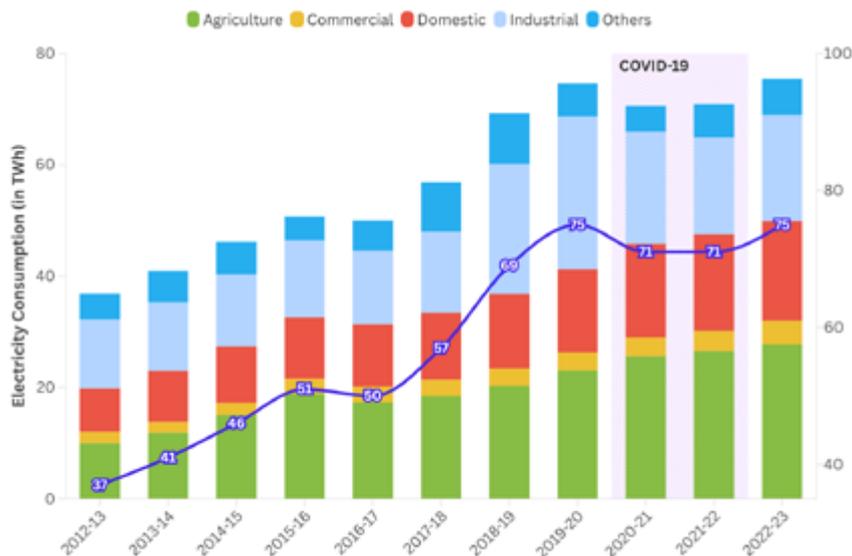
### Decadal Growth in Electricity Consumption (2013-2023)

From 2012-13 to 2022-23, Madhya Pradesh's total electricity consumption grew at a CAGR of 7 percent from 37 TWh to 75 TWh, led by agriculture and industry.

In the beginning of this period, the industrial sector held the majority share in electricity consumption in Madhya Pradesh, accounting for 34 percent, followed by the agriculture sector at 27 percent. But over the next few years, the agriculture sector surpassed industry to become the largest consumer of electricity in the state, a position it has retained consistently since.

The increased dependence on groundwater in the state (~43% of irrigated land depends on groundwater via wells and tube wells)<sup>8</sup> maybe the likely reason that has made the agriculture sector the largest consumer of electricity in the state.

Electricity consumption grew 2X over the decade, driven by agriculture and industry



The "Others" include the Public Services, Railways and the other sectors that do not fall under the main consumption categories (Domestic, Commercial, and Industrial).

Figure 6: State electricity consumption

While agriculture and industry continue to dominate electricity consumption, the rapid growth of domestic consumption highlights the state's growing urban population and the rising demand for household energy (the domestic consumption increased more than twice over the past decade).

## Peak Demand Growth

Madhya Pradesh has seen a steady increase in peak electricity demand over the past decade, rising from 11 GW in 2015-16 to 19 GW in 2024-25, growing at an average annual rate of 7 percent. While this represents an overall 74 percent increase over the decade, the growth trajectory is not entirely linear.

Peak electricity demand grew by 26% annually

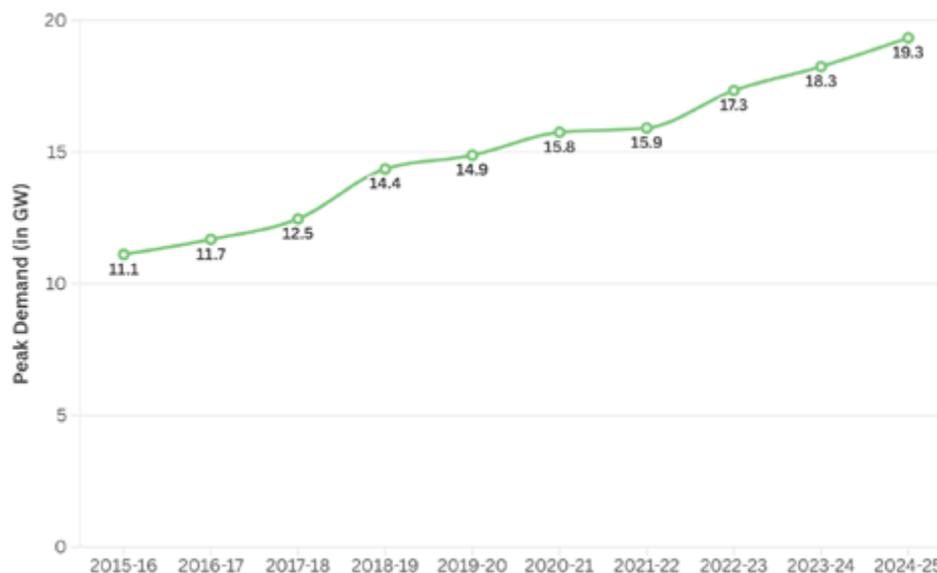


Figure 7: State electricity peak demand (in GW)

## Monthly Peak Demand

But peak demand doesn't just grow—it fluctuates seasonally. Analysis of monthly data reveals that highest peak loads consistently occur during the winter months—specifically from November to March. This period coincides with the Rabi cropping season, when agricultural activity in the state—and consequently electricity usage—is at its peak. In contrast, the months from April to August typically experience lower peak demands (Figure 8).

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
2015-16	7397	7435	7439	7494	7750	8733	10115	10407	11114	11019	10356	9309
2016-17	8382	8267	7643	6957	7043	8111	9000	11067	11688	11410	11105	10046
2017-18	8609	8425	7861	7508	8443	8448	10670	12021	12465	12364	11621	9976
2018-19	8851	9076	8650	7973	8775	9737	12572	13578	14019	14362	13375	12327
2019-20	9977	10143	10186	10097	14362	8898	8820	13147	14667	14729	14882	12144
2020-21	9149	10173	9124	10318	10027	10263	12784	14441	15756	15500	14983	13073
2021-22	11392	10240	9418	11194	10705	10492	11066	14481	15917	15517	15702	14257
2022-23	12751	12541	11520	10244	10957	10973	11752	16085	17141	17345	15875	14298
2023-24	12402	12286	11837	12006	13624	14873	15245	17117	17819	18252	16998	13594
2024-25	13151	14309	13953	12746	11822	12677	13603	17939	19341	18591	18596	16622

Figure 8: Monthly peak demand



## Electric Vehicle Adoption in Madhya Pradesh

Madhya Pradesh has witnessed a striking transformation in electric vehicle (EV) adoption over the past decade, evolving from a negligible presence to an emerging part of the state's transportation system.

In a decade, EV count surged from a mere 37 to nearly 120,000

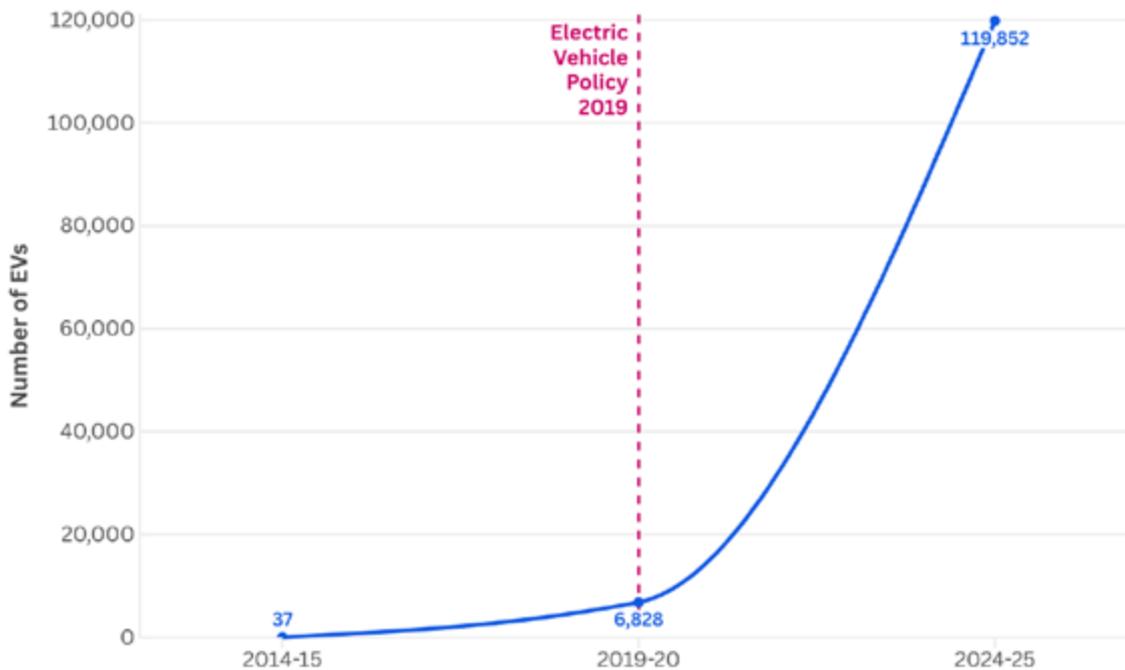


Figure 9: Growth of total evs in Madhya Pradesh

In FY 2014–15, the state recorded just 37 registered EVs—a modest starting point that underscored the nascent stage of EV penetration at the time. However, the trajectory has been upward and exponential since then. By FY 2024–25, the number of EVs surged to 1,19,852. This remarkable surge underscores the effectiveness of targeted incentives and the shifting preferences of consumers toward sustainable mobility solutions.

A key milestone in this journey was the introduction of the state's Electric Vehicle Policy in 2019. This policy laid the groundwork for EV growth by offering incentives, subsidies, and targeted infrastructure development. The impact of this policy is evident, with EV registrations growing 18-fold from FY 2019–20 to FY 2024–25. In 2025, the state took another giant step forward by introducing a new Electric Vehicle Policy, which is expected to accelerate adoption even further, focusing on expanding charging infrastructure and creating more incentives for both manufacturers and consumers.

Interestingly, two-wheelers have been the driving force behind the state's EV growth. As of FY 2024–2025, the majority of registered EVs are two-wheelers. (Figure 10) This makes sense, as two-wheelers are often seen as an ideal entry point for consumers transitioning to electric mobility, given their lower cost, energy efficiency, and ease of use in urban areas.

2-Wheelers have the highest EV share at 61%

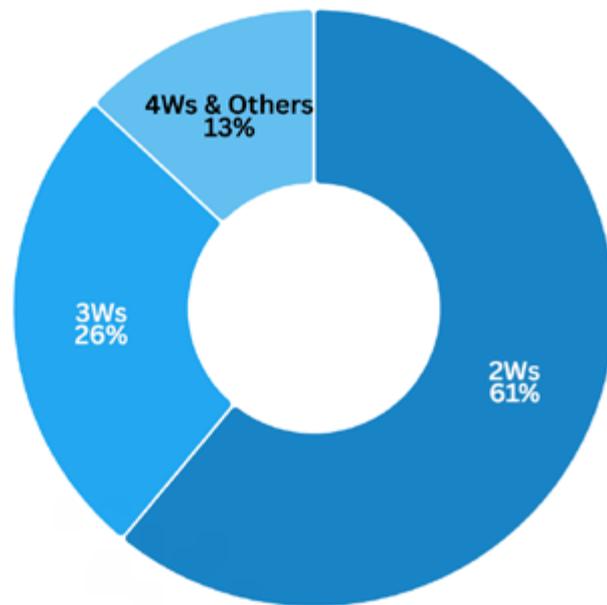


Figure 10: Distribution of EVs across vehicle categories



## Industrial Profile of the State

While agriculture remains the backbone of Madhya Pradesh's economy, contributing 32 percent to the sectoral GVA, the industrial sector is rapidly growing, contributing around 28 percent to the state's GVA.<sup>9</sup> Within the industrial sector, manufacturing remains a major cornerstone, contributing ~11 percent to the GVA. The state hosts a range of manufacturing activities, particularly in cement, automobiles, pharmaceuticals, textiles and food processing.

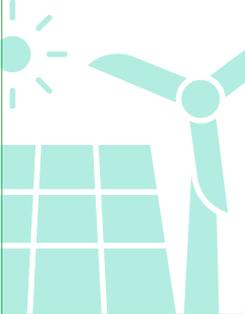
Mining, with a contribution of about 3 percent to the state's economy (2024-25), also plays a key role. The state possesses abundant mineral reserves, including large deposits of coal, iron ore, manganese, bauxite, limestone, dolomite, copper, fireclay, and china clay. Among these, limestone, manganese ore, and copper ore constitute the major share of the state's mineral production.<sup>10</sup>

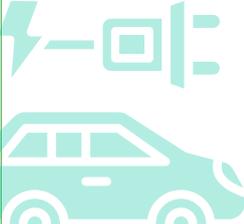
These resources fuel a thriving metal and mineral industry in the state which contributes to both the state's industrial output as well as its carbon emissions. In fact, the mineral industry is the largest source of industrial carbon emissions, accounting for 92 percent of IPPU emissions in the state as of 2018.<sup>11</sup>

Cement production, in particular, has been identified as a key emitter of industrial carbon emissions, accounting for about 95 percent of all IPPU emissions between 2005 and 2018. This is largely due to the presence of limestone in the state, which not only fuels cement manufacturing but is also used in other industries such as sugar, paper, steel, and lime production.<sup>12</sup>



# Key Policies and Announcements

Theme	Policies/ Interventions/ Announcements	Description
<b>Renewable Energy</b> 	Madhya Pradesh Renewable Energy Policy, 2025	<ul style="list-style-type: none"> <li>▶ Aims to increase the RE share in the energy mix to 20% by 2024, 30% by 2027, and 50% by 2030               <ul style="list-style-type: none"> <li>» Develop 10,000 MW of RE/RE hybrid parks under GoI/GoMP schemes by FY 2027</li> <li>» Set up 4,000 MW RE projects for export by 2024 and 10,000 MW by 2027</li> <li>» ₹15,000 crore by 2024 and ₹50,000 Cr by 2027 to be invested in RE generation</li> <li>» ₹4,000 crore by 2024 and ₹10,000 crore by 2027 in RE equipment manufacturing</li> </ul> </li> <li>▶ Create over 10,000 jobs by 2024 and 50,000 jobs by 2030 in the RE sector</li> </ul>
	Scheme for implementation of Biofuel Projects in Madhya Pradesh	<p>Aims to promote biofuel production, set up biofuel dispensing outlets in urban and rural areas, develop bio-refinery clusters and infrastructure for biomass collection and support research and innovation in biofuel technologies.</p> <p>Incentives:</p> <ul style="list-style-type: none"> <li>▶ Investment assistance (up to ₹200 crore) (IPP 2025)</li> <li>▶ Infrastructure development support (up to ₹5 crore)</li> <li>▶ Green industrialisation assistance (up to ₹5 crore for waste management, ₹10 crore for Zero Liquid Discharge ETP)</li> <li>▶ 100% IPR assistance (up to ₹10 lakh for the initial 5 years)</li> <li>▶ Electricity duty and energy development cess exemptions for 10 years</li> </ul>
	Scheme for implementation of Pumped Hydro Storage (PHS) project in Madhya Pradesh	<p>Aims to develop a holistic ecosystem for the implementation and growth of Pumped Hydro Storage (PHS) projects to enhance grid stability and support renewable energy integration</p>

Theme	Policies/ Interventions/ Announcements	Description
	Omkareswar Floating Solar Project	Planned capacity: 600 MW; 278 MW commissioned. Expected to generate over 4,600 million units of clean energy over 25 years <sup>13</sup>
	Morena Solar Park	Bids invited for a 600 MW grid-connected ground-mounted solar power project with Battery Energy Storage System (BESS) <sup>14</sup>
	SECI-MP MoU (Dhar Solar Project)	SECI signed MoU with MP Government for 200 MW solar project under CPSU Scheme and 1,000 MWh battery storage. Announced at Global Investors Summit 2025
	Pradhan Mantri Krishak Mitra Surya Yojana	Target to install 2 lakh solar pumps for the farmers of the state in the next 5 years
<b>Electric Mobility</b> 	Madhya Pradesh Electric Vehicle Policy 2025	<ul style="list-style-type: none"> <li>▶ Aims to designate Bhopal, Indore, Jabalpur, Gwalior, and Ujjain as model EV cities. Implement intra-city public bus electrification, pilot initiatives and policy provisions.</li> <li>▶ <b>Electric Two-Wheelers:</b> <ul style="list-style-type: none"> <li>» 40% of new registrations to be electric by policy end</li> <li>» 100% electric for commercial fleets by policy end</li> </ul> </li> <li>▶ Electric Three-Wheelers: 80% of new registrations (passenger &amp; freight) to be electric by policy end</li> <li>▶ Electric Four-Wheelers: 15% of new registrations to be electric by policy end</li> <li>▶ Electric Buses: 40% of new bus registrations to be electric by policy end</li> <li>▶ State Government Vehicles: 80% of state govt. vehicles (2W, 3W, 4W) to be electric by policy end, if EV options are commercially available</li> </ul>

## Endnotes

- 1 "Population Projections for Indian States 2011-2036" by the Technical Group on Population Projections, National Commission on Population, Ministry of Health and Family Welfare, Government of India [https://nhm.gov.in/New\\_Updates\\_2018/Report\\_Population\\_Projection\\_2019.pdf](https://nhm.gov.in/New_Updates_2018/Report_Population_Projection_2019.pdf)
- 2 GHG Platform India, India's Greenhouse Gas Emissions Estimates <https://www.ghgplatform-india.org/>
- 3 NITI Aayog, India Climate and Energy Dashboard (ICED) <https://iced.niti.gov.in/>
- 4 Forest Survey of India (Ministry of Environment Forest and Climate Change), India State of Forest Report 2023, 18th edn, vol 2 [https://fsi.nic.in/uploads/isfr2023/isfr\\_book\\_eng-vol-2\\_2023.pdf](https://fsi.nic.in/uploads/isfr2023/isfr_book_eng-vol-2_2023.pdf)
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- 11 GHG Platform India, India's Greenhouse Gas Emissions Estimates <https://www.ghgplatform-india.org/>
- 12 Indian Bureau of Mines, Limestone: Indian Minerals Yearbook 2022 (Part-III: Mineral Reviews, 61st edn, March 2024) [https://ibm.gov.in/writereaddata/files/170989686965eaf4a543505Limestone\\_2022.pdf](https://ibm.gov.in/writereaddata/files/170989686965eaf4a543505Limestone_2022.pdf)
- 13 <https://pib.gov.in/PressReleasePage.aspx?PRID=2090177#:~:text=%E2%82%B949.85%20crore.,Union%20Minster%20Joshi%20said%20that%20Madhya%20Pradesh%20is%20one%20of,impressive%20capacity%20of%20600%20MW.>
- 14 <https://www.mercomindia.com/rumsl-invites-bids-for-600-mw-solar-project-with-energy-storage>





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