Issue Brief | April 2026

Solarising Agricultural Power Demand by 2030

Financial, Social, and Environmental Gains for Discoms and State Governments

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सचिव

Santosh Sarangi, IAS
Secretary

सत्यमेव जयते

International Year of Cooperatives
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Foreword

Reliable and affordable electricity for agriculture is fundamental to rural productivity, nutrition security, and improving livelihoods. As power systems modernise, decentralised renewable energy solutions offer a practical opportunity to serve irrigation needs with cleaner and affordable supply, better daytime availability, and stronger last-mile service delivery.

PM-KUSUM has been a key step in this direction. By enabling standalone solar pumps, decentralised grid-connected solar, and feeder-level solarisation, the scheme has helped states and utilities advance implemen table approaches for aligning agricultural demand with solar generation. As we consolidate progress and refine priorities for the years ahead, it is useful to complement on-the-ground experience with clear, comparable analysis of what different pathways of agricultural solarisation could deliver for state governments, distribution utilities, and citizens-and what it would take to realise those outcomes across diverse state contexts.

In this context, I am pleased to introduce this report by the Council on Energy, Environment and Water (CEEW). The report assesses solarising projected agricultural electricity demand by 2030 across 13 major agrarian states and translates adoption pathways into decision-relevant implications for planning and programme design. It usefully frames the scale of opportunity-indicating that full solarisation of projected agricultural demand across these states by 2030 would require approximately 190 GW of decentralised solar capacity-while also quantifying the system benefits that could follow: INR 3+ lakh crore in cumulative direct subsidy savings for state governments and INR 1+ lakh crore in cross-subsidy requirement avoided. These estimates help illustrate why agricultural solarisation merits sustained attention not only as a clean energy intervention, but as a programme with meaningful implications for discom planning and financial sustainability, and affordable service delivery to consumers.

Such analysis is valuable because the decisions ahead are not only about *how much* to solarise, but *at what speed*. States and discoms are evaluating deployment approaches that can accelerate timelines, improve bankability, while strengthening long-term performance. Innovations have now started to happen-through the bidding and contracting structures, payment security arrangements, and operations and maintenance practices. A scenario-based, state-comparable assessment helps build a stronger case for these innovations and supports more deliberate sequencing-especially around grid readiness, metering and monitoring, and institutional coordination.

I hope this brief serves as evidence to scale ambition and action across states. With continued collaboration between the Union and state governments, discoms, developers, financial institutions, and farmer communities, PM-KUSUM can further strengthen its contribution to improved rural power supply and a more efficient, responsive electricity system.

(Santosh Sarangi)

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The Council on Energy, Environment and Water (CEEW)—**a homegrown institution** with headquarters in New Delhi—is **among the world's leading climate think tanks**. We use **data, integrated analysis**, and **strategic outreach** to support public policy, transform markets, shape technology, and nudge behaviour. CEEW seeks to explain—and change—the use, reuse and misuse of resources. CEEW addresses pressing global challenges through an **integrated** and **internationally focused** approach. It prides itself on the **independence** of its high-quality research and strives to **impact sustainable development at scale**.

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SELECT POLICY ENGAGEMENTS

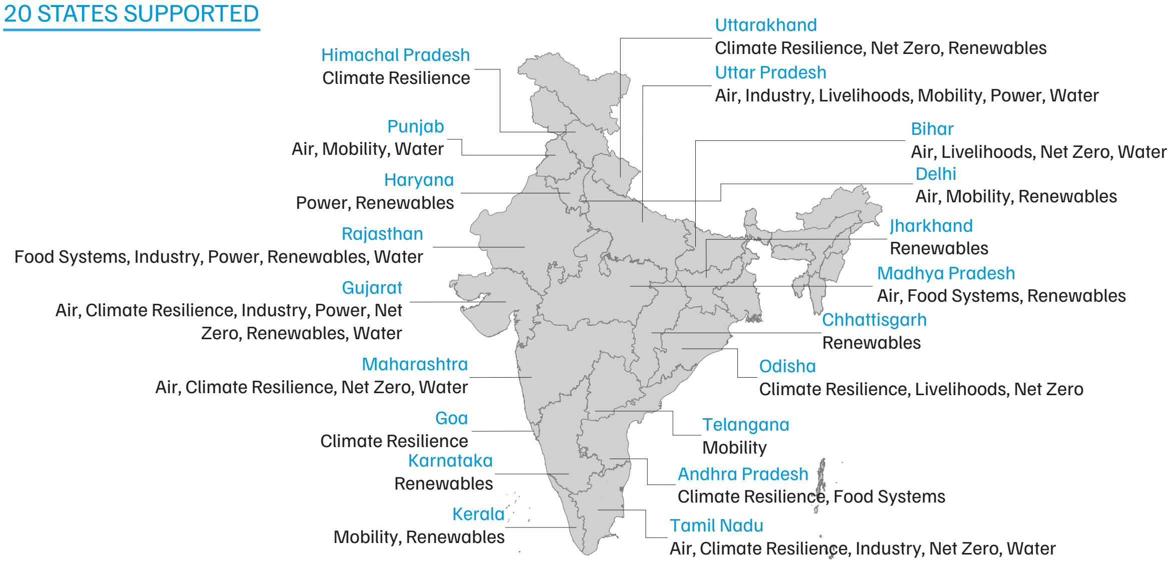
NATIONAL/INTERNATIONAL

2011 | National Water Resources Framework
2014 | 175 GW renewables target
2015 | International Solar Alliance
2016 | PM *Ujjwala Yojana*
2017 | *Saubhagya* Schemes
2019 | Climate Vulnerability Index
2021 | Net Zero by 2070
2022 | Mission LiFE
2022 | National Bioenergy Programme
2022 | E-waste (Management) Rules
2023 | G20 Green Development Pact
2023 | National Green Hydrogen Mission
2024 | Green Steel Taxonomy
2024 | PM *Surya Ghar Yojana*
2025 | National Critical Mineral Mission
2025 | Rajya Sabha guidelines on crop residue burning
2025 | National Adaptation Plan

STATE

2022 | Rajasthan Organic Farming Mission
2022 | Jharkhand Solar Policy
2022 | Uttar Pradesh *Vidyut Sakhi* programme
2023 | Rajasthan Green Hydrogen Policy
2023 | Uttarakhand Solar Policy
2024 | Net-zero roadmaps for Bihar & Tamil Nadu
2025 | Green Odisha Initiative
2025 | Maharashtra Climate Action Plan 2.0
2025 | 50 Heat Action Plans (GJ, OD, MH, TN)
2025 | Delhi Clean Air Action Plan
2025 | Delhi EV Policy 2.0

20 STATES SUPPORTED



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Executive summary

Agricultural electricity: a growing fiscal obligation

For decades, most Indian states have provided free or heavily subsidised electricity to agricultural consumers. This support has strengthened the livelihoods of millions of farmers and reinforced food security in India, delivering substantial social and economic benefits. However, the existing financing mechanism is now placing increasing pressure on state budgets and the viability of the power sector.

Agriculture accounts for nearly one-fifth of India's total electricity consumption. The **13 major agrarian states**, representing 99 per cent of national agricultural electricity sales, recorded **annual farm power subsidies exceeding INR 1.3 lakh crore in financial year (FY) 2025**. In several states, this amounted to 4–6 per cent of annual budgets. Agricultural electricity demand has grown by nearly 87 per cent over the past decade (FY 2015–24) and is projected to rise further (MOSPI 2025). The fiscal challenge is driven not only by the scale of subsidies but also by the underlying cost structure.

Agricultural power tariffs remain far below cost, or zero, requiring the gap to be bridged through direct state subsidies and cross-subsidies from commercial and industrial (C&I) consumers. In Maharashtra, for example, commercial consumers pay 50–70 per cent above the average cost of supply, while agricultural consumers pay 43 per cent below it (FY 2024) (Purohit et al. 2025). Industrial tariffs in India (INR 8–10 per kWh) remain higher than those in the United States (INR 5–7 per kWh) (CSEP 2022), raising concerns about competitiveness.

Even when states commit to compensating discoms for revenue gaps, delays in subsidy disbursement routinely strain working capital (Agrawal et al. 2023). This crowds out investment in network strengthening, ultimately undermining supply quality and reliability. As states rationalise cross-subsidies and align tariffs with cost-of-supply trajectories, a growing share of this burden is shifting directly onto state budgets. Without structural correction, rising demand and procurement costs will significantly increase fiscal exposure by 2030.

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Transforming how agricultural power is supplied can unlock significant fiscal and system-level gains.

Solarisation changes both the cost structure and the energy source

Agricultural solarisation under the *Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan Yojana* (PM-KUSUM) and allied state initiatives is underway across several states. As of January 2026, approximately 765 MW of decentralised grid-connected solar capacity has been established against a target of 10,000 MW. Further, only around 13 lakh grid-connected agricultural pumps have been solarised out of a total target of 35 lakh. Together, this represents progress of 8 per cent and 37 per cent, respectively (MNRE 2024, 2026). While the policy architecture is clearly in place, current deployment remains modest relative to the scale of agricultural electricity demand.

Solarisation provides states with the opportunity to meet agricultural demand at a lower cost. In FY 2024–25, the average power procurement cost (APPC) across the analysed states was INR 4.5–5.9 per kWh (excluding transmission cost). By contrast, decentralised solar power is available at INR 3–3.5 per kWh, nearly 30–40 per cent lower. In states where feeder segregation is complete and irrigation demand aligns with daytime hours, solar can directly substitute a higher-cost grid supply.

By lowering the cost of supply at source, agricultural solarisation narrows the persistent average cost of the supply–aggregate revenue requirement (ACoS–ARR) gap that underpins discom losses. It also reduces the reliance on cross-subsidies from C&I consumers and moderates fiscal pressure on state governments.

Scope of the analysis

This brief evaluates four solarisation pathways–25, 50, 75, and 100 per cent of projected agricultural electricity demand by 2030–across 13 states, using demand projections from the Central Electricity Authority's (CEA) 20th Electric Power Survey (CEA 2022). The year 2030 aligns with national climate commitments and ongoing resource adequacy planning cycles. Our analysis shows that large-scale agricultural solarisation can materially alter fiscal and distribution trajectories.

What large-scale agricultural solarisation can deliver by 2030

Complete (100 per cent) solarisation of projected agricultural demand across the 13 states would require approximately 191 GW of decentralised solar capacity by 2030. At this scale, our analysis indicates substantial fiscal, tariff, and system-level gains:

INR 3+ lakh crore
Cumulative direct subsidy savings for the state government.

INR 1+ lakh crore
Cross-subsidy requirement avoided, easing tariff pressure on C&I consumers.

6–24%
Reduction of the average cost of supply relative to a no-solarisation trajectory in 2030.

~160 MtCO_2e/year
Annual emissions reduction.

~8 lakh full-time equivalent (FTE) jobs
Supported across manufacturing, installation, and operations.

Even partial adoption would generate proportionate gains. At 25–50 per cent solarisation, states can realise meaningful fiscal savings while limiting upfront capital requirements.

These outcomes vary across states. Benefits scale with the size of the agricultural load, procurement cost, feeder segregation status, and alignment of irrigation demand with solar hours. We therefore present comparable state-level trajectories alongside aggregate results (see Table ES1).

> 100% solarisation of agricultural power demand across 13 major agrarian states could reduce state fiscal burden by over INR 3 lakh crore by 2030.

Table ES1. State-wise decentralised solar capacity requirements for agriculture and cumulative subsidy savings by 2030 under the 100% solarisation scenario

State	Projected agricultural demand 2030 (BU)	Required solar capacity (GW)	Cumulative subsidy savings (INR crore)
Andhra Pradesh	19.1	11.5	22,002
Bihar	9.4	5.6	9,598
Chhattisgarh	7.7	4.6	4,638
Gujarat	25.9	15.6	11,278
Haryana	10.9	6.5	14,206
Karnataka	29.5	17.7	44,339
Madhya Pradesh	37.5	22.5	36,531
Maharashtra	40.6	24.4	24,548
Punjab	16.2	9.8	14,552
Rajasthan	45.4	27.3	40,099
Tamil Nadu	22.4	13.5	18,040
Telangana	24.5	14.7	31,947
Uttar Pradesh	28.0	16.8	31,200
Total	**317**	**191**	**3,02,978**

Source: Authors' analysis

Agricultural consumption is seasonal, while solar generation is variable. A direct aggregate comparison between current procurement costs and solar tariffs does not fully capture system requirements and savings, including the need for balancing and storage during specific periods. However, even after accounting for these requirements, solarisation remains economically compelling.

In several states, discoms could deploy up to 36 GWh (9 GW × 4-hour) of BESS capacity alongside solarisation under current cost assumptions. This would help meet around 4 per cent of projected agricultural demand (317 BU) through storage by 2030, assuming daily cycling. Importantly, even after incorporating reasonable storage investments, agricultural solarisation continues to generate substantial net fiscal gains.

As agricultural demand grows towards 2030, states will need to commit progressively higher fiscal resources to maintain the current supply model. Strategic solarisation, complemented where necessary by targeted storage deployment, will provide states with a credible opportunity to moderate this trajectory.

The window to act is before rising demand and procurement costs lock in higher subsidy levels. Decisions taken over the next few years will determine whether agricultural electricity remains a growing fiscal pressure or becomes part of a deliberate strategy to stabilise state distribution finances.

1. Introduction

Agricultural subsidy and cross subsidy pressure are rising

Agriculture has long played a central role in India's development strategy. Nearly one-fifth of the country's electricity is consumed in agriculture (PFC 2025), much of it supplied free or at heavily subsidised tariffs (Aggarwal et al. 2020). Affordable power has enabled irrigation expansion, stabilised farm input costs, and supported food security and livelihoods of millions of farmers across states. Subsidised agricultural power has therefore delivered substantial social and economic gains.

Over time, however, prevailing pricing and supply arrangements for agricultural electricity have created persistent stress within the power sector. Tariffs for agricultural consumers are set far below the cost of supply, often through unmetered arrangements, leaving a significant revenue gap (Aggarwal et al. 2020). States finance this gap through direct subsidies and cross-subsidies from other consumers. While regulators have consciously adopted this structure, agricultural supply has become one of the most significant and recurring sources of under-recovery for discoms.

In several agrarian states, including Rajasthan (JVVNL 2025), outstanding subsidy dues remain substantial, reflecting a persistent mismatch between the cost of supplying farm power and its financing. Delays in subsidy disbursement strain discom cash flows, increase reliance on short-term borrowing, and crowd out investment in network strengthening. These constraints subsequently weaken supply quality and reinforce a cycle of operational inefficiency and financial stress (Agrawal et al. 2023).

Recent reforms, such as tighter disclosure requirements (MoP 2024) and advance subsidy-payment provisions under the *Revamped Distribution Sector Scheme* (RDSS), have improved transparency and fiscal discipline in some states. However, these measures do not alter the underlying exposure of discom finances to rising agricultural demand.

Historically, part of the burden has been absorbed through higher tariffs on commercial and industrial (C&I) consumers (Tyagi and Tongia 2023). While cross-subsidisation reduced immediate fiscal pressure on state budgets, it also increased electricity costs for industry and services, weakened competitiveness, and accelerated the shift towards open access and captive generation. In response, regulators in several states, including Karnataka, Rajasthan, and Maharashtra, have begun rationalising tariffs and outlining trajectories to reduce cross-subsidies (Tripathi and Aggarwal 2025). Analysis by the Energy Transition Preparedness Initiative (ETPI) indicates that several states have aligned domestic tariffs with the average supply cost, while states such as Karnataka have announced a near elimination of cross-subsidy by FY 2028 (Prayas 2024). As this transition progresses, a growing share of the cost of agricultural electricity is shifting directly onto state budgets.

This shift comes at a time when farm power subsidies are already substantial. Across major agrarian states, annual agricultural electricity subsidies exceed INR 1.3 lakh crore. These outlays crowd out other development priorities and increase fiscal exposure to fluctuations in procurement costs and demand growth. Climate variability and rising irrigation needs are likely to intensify these pressures. Without a structural change in how agricultural electricity is supplied, both discom finances and state budgets will remain vulnerable.

> Solarisation of agricultural demand offers a structural pathway to reduce subsidy burden by lowering cost of supply.

Agricultural solarisation: A structural pathway to moderate rising agricultural electricity costs

Solarising agricultural demand offers a viable structural shift. Supplying farm power through decentralised solar generation aligned with daytime irrigation can reduce the cost of serving the agricultural load. It displaces higher-cost grid procurement and can avoid a portion of transmission losses and associated charges. For discoms, this narrows the cost-to-serve gap. For states, it reduces the subsidy required per unit of electricity delivered.

India has sought to promote agricultural solarisation through the *Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan* (PM-KUSUM), which aims to expand solar deployment in the agricultural sector. The scheme comprises three components: Component A, which supports the installation of decentralised grid-connected solar plants; Component B, which promotes standalone solar pumps; and Component C, which enables the solarisation of existing grid-connected agricultural pumps, including feeder-level solarisation.

In states with high agricultural loads, feeder-level solarisation can therefore function as a distribution-sector intervention rather than solely a renewable energy measure. By reducing the underlying cost of supplying a structurally subsidised segment, it addresses the source of fiscal pressure rather than merely reallocating it across consumer categories.

Decentralised solar also aligns with emerging grid realities. States with high renewable penetration, such as Rajasthan, can benefit from distributed solar serving local agricultural demand, which eases network stress rather than adding to it. This approach complements grid-scale renewable expansion while addressing a long-standing distribution-sector challenge (Agrawal et al. 2023).

Despite these advantages, progress remains uneven. Agricultural solarisation continues to be implemented largely as a standalone scheme rather than as part of distribution-sector planning. A clear and comparable assessment of the fiscal relief, cost reductions, and system-level benefits achievable at different adoption scales remains limited. This brief seeks to address that gap.

2. Purpose of the brief

This brief presents a comparable assessment of how agricultural solarisation can alter fiscal and distribution-sector outcomes across states by 2030. It aims to inform policy design, regulatory decision-making, and near-term implementation at the state level.

To do so, the brief evaluates 4 solarisation pathways—25, 50, 75, and 100 per cent of projected agricultural electricity demand by 2030—across 13 major agrarian states. Together, these states account for 99 per cent of India's agricultural electricity consumption. Each pathway is evaluated against a business-as-usual scenario in which agricultural demand is met largely through conventional grid-based supply.

For each state and adoption level, the brief estimates five outcomes:

- **Direct state subsidy savings** from lower costs of serving agricultural electricity.
- **Avoided cross-subsidy requirements**, reflecting reduced tariff pressures.
- **Changes in the discom average cost of supply (ACoS)**, capturing avoided transmission losses, transmission charges, and scheduling costs that make decentralised solar competitive even at low market prices.
- **Carbon emissions abatement in 2030** from substituting coal-based generation with solar power.
- **Employment generation** associated with the deployment, operation, and maintenance of distributed solar capacity.

Presenting these results within a consistent framework enables cross-state comparison and supports more informed target-setting and implementation planning.

3. Approach for estimating state-level benefits

State selection

The brief examines 13 major agrarian states that together account for nearly all agricultural electricity consumption in India. Five states—Maharashtra, Rajasthan, Madhya Pradesh, Telangana, and Karnataka—account for nearly 60 per cent of national agricultural power consumption. By focusing on states with high agricultural load and significant fiscal exposure, the analysis identifies where solarisation can have the greatest structural impact.

Figure 1A. Geographic coverage of the 13 states included in the analysis

Source: Authors' illustration

Figure 1B. Methodology used for estimating the benefits of solarising agricultural power demand

Baseline (FY 2025)

State-wise agricultural electricity data – including the number of consumers, connected load, and energy sales–were compiled from State Electricity Regulatory Commission (SERC) tariff orders. The ACoS for FY 2025 was calculated using standard discom cost components, including power purchase costs, transmission charges, depreciation, interest on loans, and operation and maintenance (O&M) expenses. Solar tariffs were derived from recently approved PM-KUSUM orders issued by the respective states.

Demand projection

Agricultural electricity demand projection in 2030 is considered from the Central Electricity Authority's 20th Electric Power Survey (EPS). This projected 2030 demand serves as the reference level for evaluating solarisation scenarios.

Solarisation scenarios

Four solarisation pathways are evaluated for each state: 25 per cent, 50 per cent, 75 per cent, and 100 per cent solarisation of projected agricultural electricity demand by 2030. These are assessed alongside currently sanctioned PM-KUSUM capacities (Components A and C, including feeder-level solarisation). Solar capacity was assumed to be added linearly during 2025–30 across all scenarios.

Subsidy and co-benefit assessment

For each solarisation scenario–including currently sanctioned PM-KUSUM capacity (Components A and C) and 25 per cent, 50 per cent, 75 per cent, and 100 per cent solarisation by 2030–the ACoS was recalculated by incorporating the replacement of conventional grid procurement with decentralised solar supply for agricultural consumption. Resulting changes in state subsidies and cross-subsidies were estimated relative to a no-solarisation scenario, along with associated co-benefits, including employment generation, renewable purchase obligation (RPO) contribution, and CO_2 emissions reductions.

Source: Authors' analysis

4. State-wise solarisation impacts

This section presents the fiscal, cost-of-supply, and emissions implications of agricultural solarisation across 13 major agrarian states. The results highlight how outcomes vary with agricultural load share, procurement costs, feeder readiness, and existing subsidy exposure.

To facilitate comparison, this section presents results for projected agricultural demand in 2030 under a 100 per cent solarisation scenario, alongside currently sanctioned capacity under PM-KUSUM. Intermediate pathways (25, 50, and 75 per cent) reflect proportionate scaling of impacts.

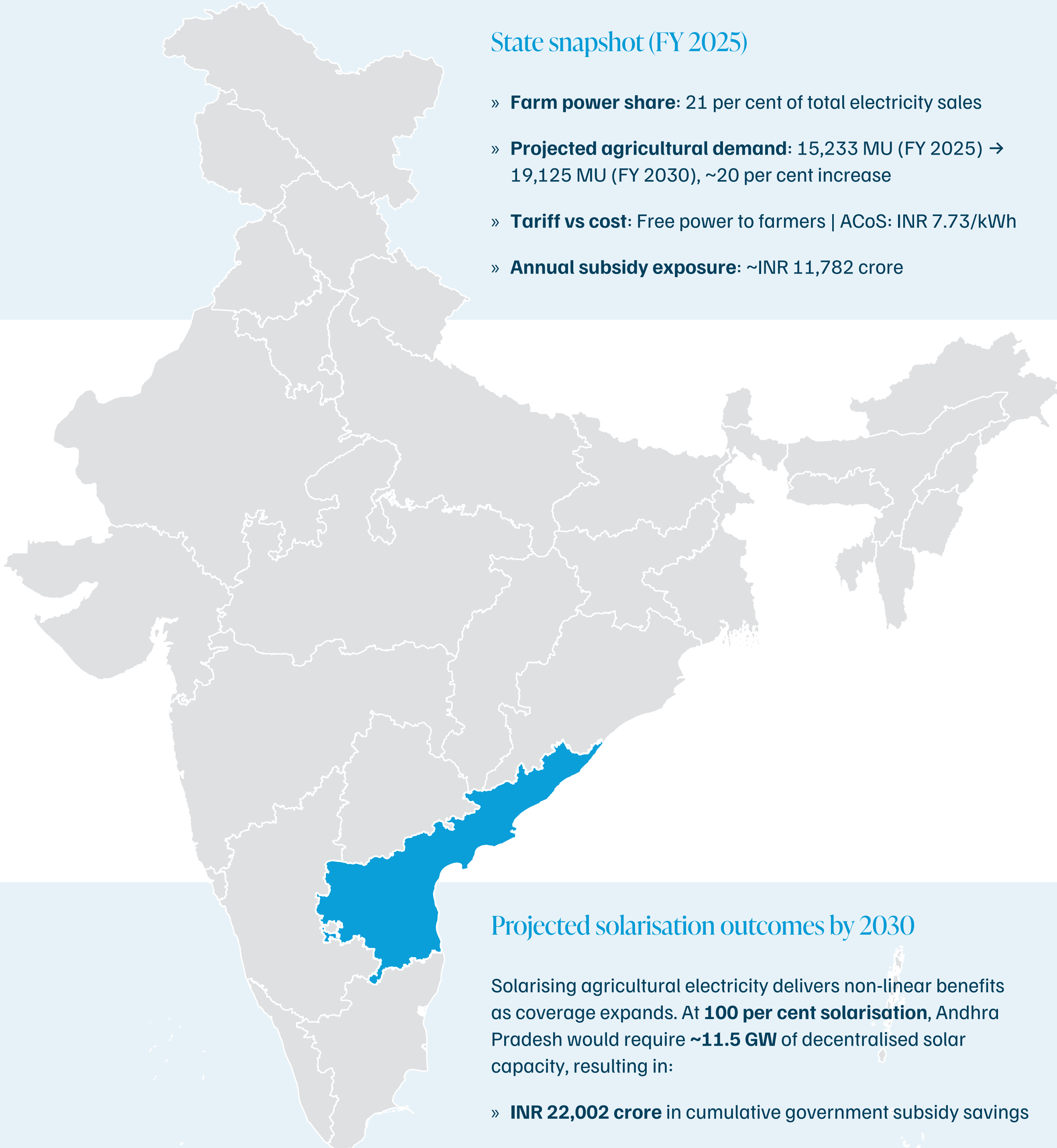
Study limitations

The analysis is subject to the following limitations:

- The analysis does not model future tariff reforms or structural changes in cross-subsidy design. Changes in tariff policy may alter discom revenue recovery, procurement incentives, and subsidy trajectories.
- Demand projections rely on the Central Electricity Authority's (CEA) 20th Electric Power Survey. Actual agricultural electricity demand may differ due to climate variability, groundwater availability, cropping patterns, or irrigation-related policy interventions.
- Solar tariffs and procurement costs are based on prevailing orders and recent trends. Future changes in technology costs, financing conditions, or fuel prices may affect the relative cost advantage of decentralised solar.
- The analysis compares aggregate cost trajectories and does not explicitly model seasonal load profiles, detailed dispatch optimisation, or storage-sizing requirements. While integration needs are acknowledged, feeder-level variability and balancing costs may differ across states.
- The assessment focuses on state-level system impacts and does not capture feeder- or district-level constraints, such as land availability, network reinforcement needs, right-of-way challenges, or local administrative capacity.
- State-level outcomes depend on prevailing policy frameworks and programme design. Variations in regulatory decisions, procurement structures, or subsidy-accounting practices may affect realised savings.
- The environmental benefits estimated in this report are limited to emissions abatement resulting from the displacement of grid-supplied electricity by solar generation.

> Full solarisation of agricultural demand by 2030 could reduce cost of supply by 6–24% across states.

4.1 Andhra Pradesh



State snapshot (FY 2025)

- **Farm power share**: 21 per cent of total electricity sales
- **Projected agricultural demand**: 15,233 MU (FY 2025) → 19,125 MU (FY 2030), ~20 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 7.73/kWh
- **Annual subsidy exposure**: ~INR 11,782 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Andhra Pradesh would require **~11.5 GW** of decentralised solar capacity, resulting in:

- **INR 22,002 crore** in cumulative government subsidy savings
- **7 per cent reduction in ACoS** (Figure 1)
- **~49,600 FTE jobs** across deployment, operations, and maintenance
- **~9.9 $MtCO_2e$** of annual emissions abatement (Table 1)

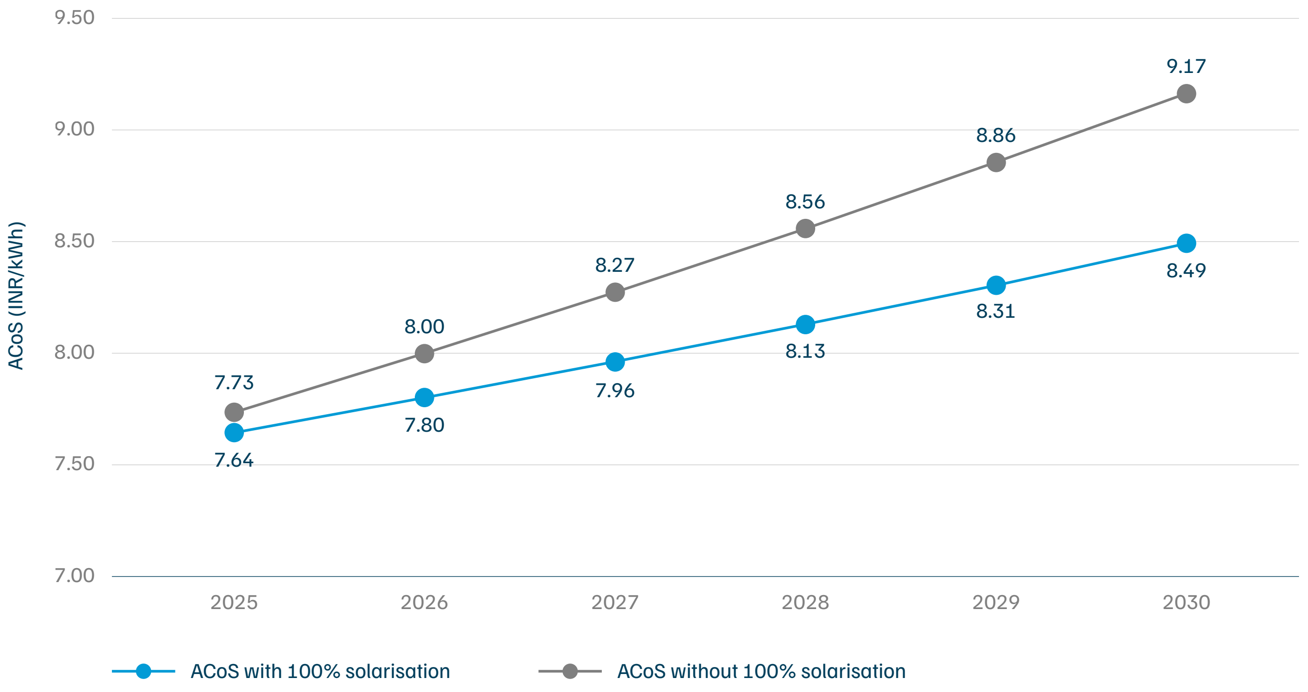
Table 1. Full solarisation could deliver ~INR 22,000 crore in cumulative subsidy savings in Andhra Pradesh by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Cumulative government subsidy savings by 2030 (INR crore)	Cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
13*	1.46	6,290	1.25	**1.25**	**0**	2.20
25	2.87	12,410	2.47	**2.47**	**0**	4.40
50	5.75	24,820	4.94	**4.94**	**0**	8.70
75	8.62	37,230	7.42	**7.42**	**0**	13.10
100	11.49	49,640	9.89	**9.89**	**0**	17.40

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Andhra Pradesh Electricity Regulatory Commission. Tariff Order, 2024.

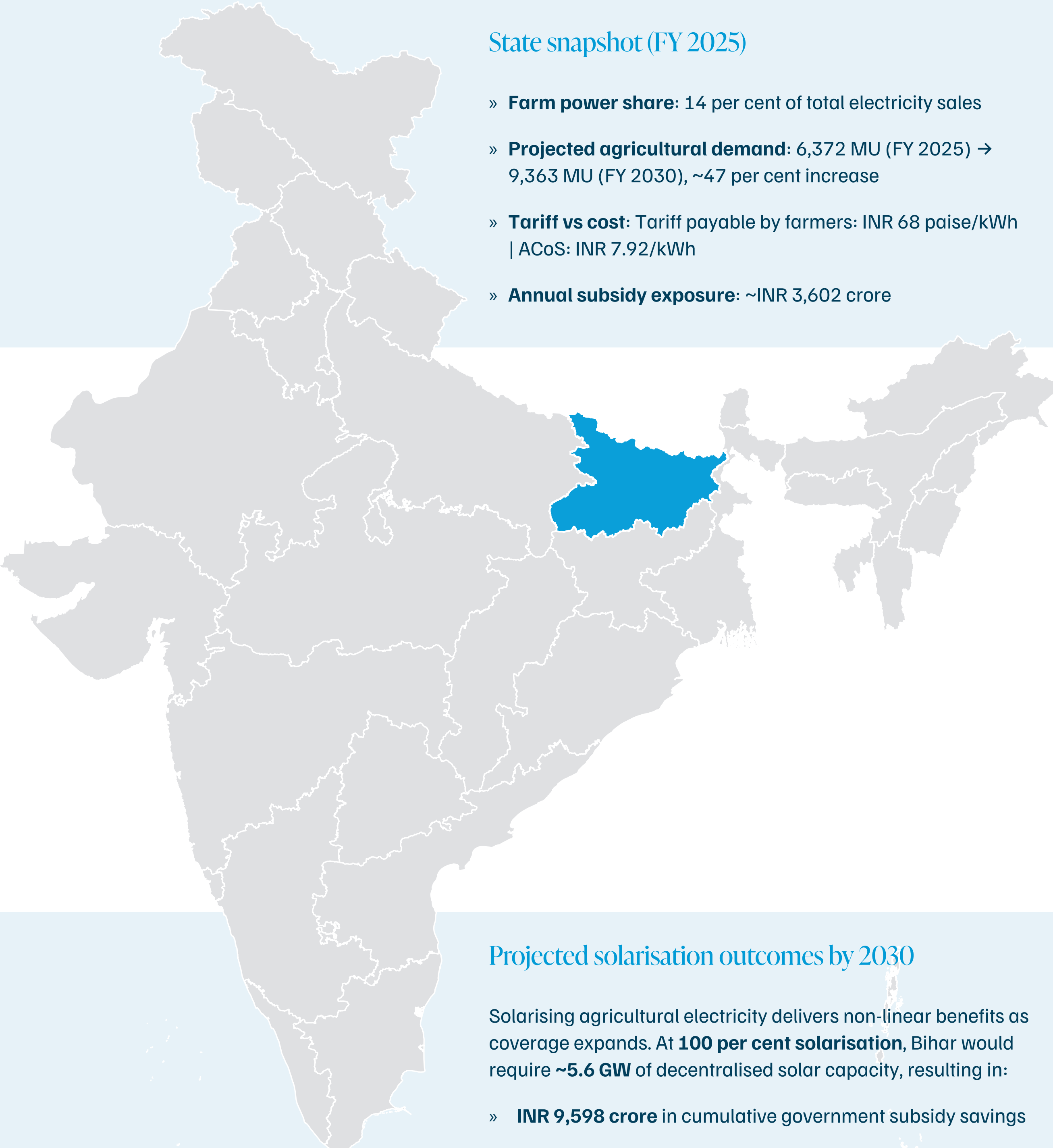
*Note: 13 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 2. In Andhra Pradesh, 100% solarisation could lower ACoS by ~7% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Andhra Pradesh Electricity Regulatory Commission. Tariff Order, 2024.

4.2 Bihar



State snapshot (FY 2025)

- **Farm power share**: 14 per cent of total electricity sales
- **Projected agricultural demand**: 6,372 MU (FY 2025) → 9,363 MU (FY 2030), ~47 per cent increase
- **Tariff vs cost**: Tariff payable by farmers: INR 68 paise/kWh | ACoS: INR 7.92/kWh
- **Annual subsidy exposure**: ~INR 3,602 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Bihar would require **~5.6 GW** of decentralised solar capacity, resulting in:

- **INR 9,598 crore** in cumulative government subsidy savings
- **8 per cent reduction in ACoS** (Figure 2)
- **~24,302 FTE jobs** across deployment, operations, and maintenance
- **~4.8 MtCO_2e** of annual emissions abatement (Table 2)

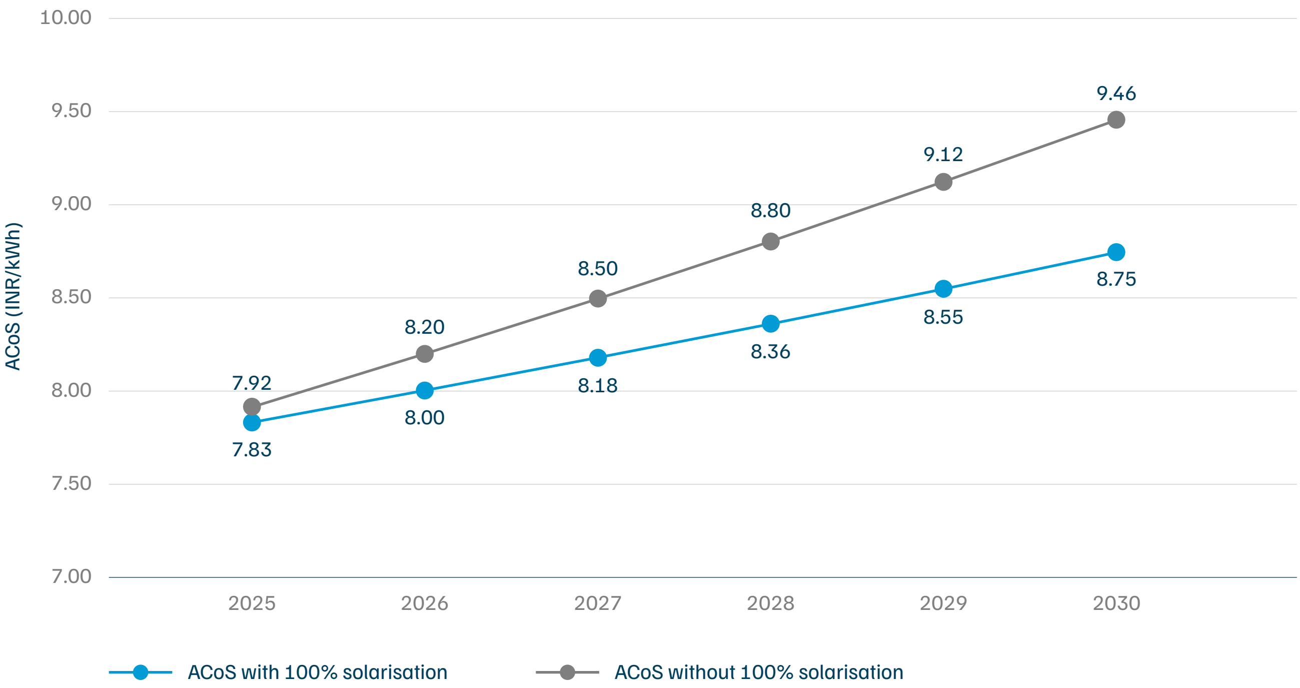
Table 2. Full solarisation could deliver INR ~9,600 crore in cumulative subsidy savings in Bihar by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
18*	1.02	4,421	0.88	**0.88**	**350**	2.40
25	1.41	6,075	1.21	**1.21**	**525**	3.30
50	2.81	12,151	2.42	**2.42**	**1,150**	6.50
75	4.22	18,226	3.63	**3.63**	**1,775**	9.80
100	5.63	24,302	4.84	**4.84**	**2,399**	13.30

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Bihar Electricity Regulatory Commission. Tariff Order, 2024.

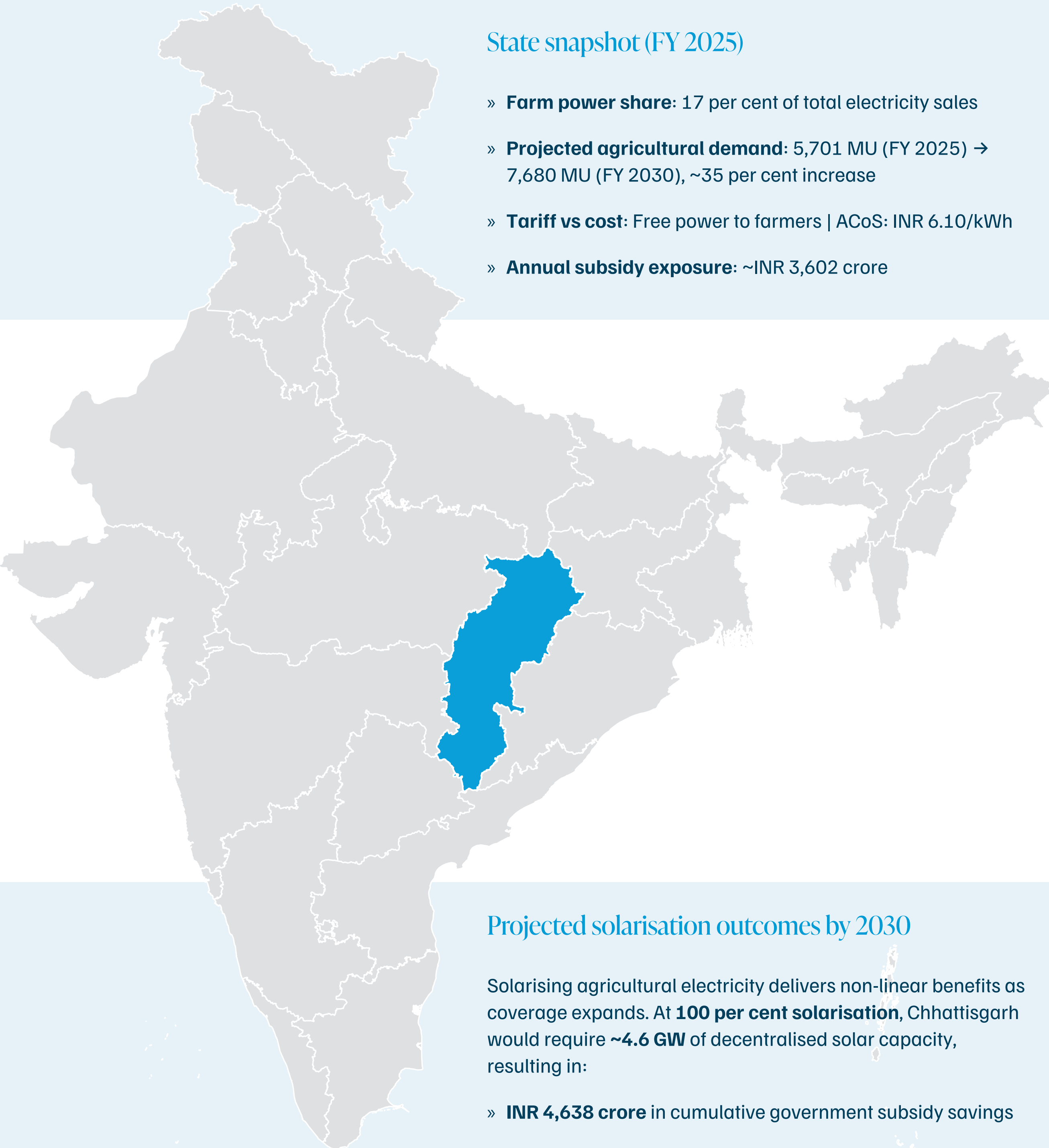
*Note: 18 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 3. In Bihar, 100% solarisation could lower ACoS by ~8% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Bihar Electricity Regulatory Commission. Tariff Order, 2024.

4.3 Chhattisgarh



State snapshot (FY 2025)

- **Farm power share**: 17 per cent of total electricity sales
- **Projected agricultural demand**: 5,701 MU (FY 2025) → 7,680 MU (FY 2030), ~35 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 6.10/kWh
- **Annual subsidy exposure**: ~INR 3,602 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Chhattisgarh would require **~4.6 GW** of decentralised solar capacity, resulting in:

- **INR 4,638 crore** in cumulative government subsidy savings
- **7 per cent reduction in ACoS** (Figure 3)
- **~19,934 FTE jobs** across deployment, operations, and maintenance
- **~3.9 $MtCO_2e$** of annual emissions abatement (Table 3)

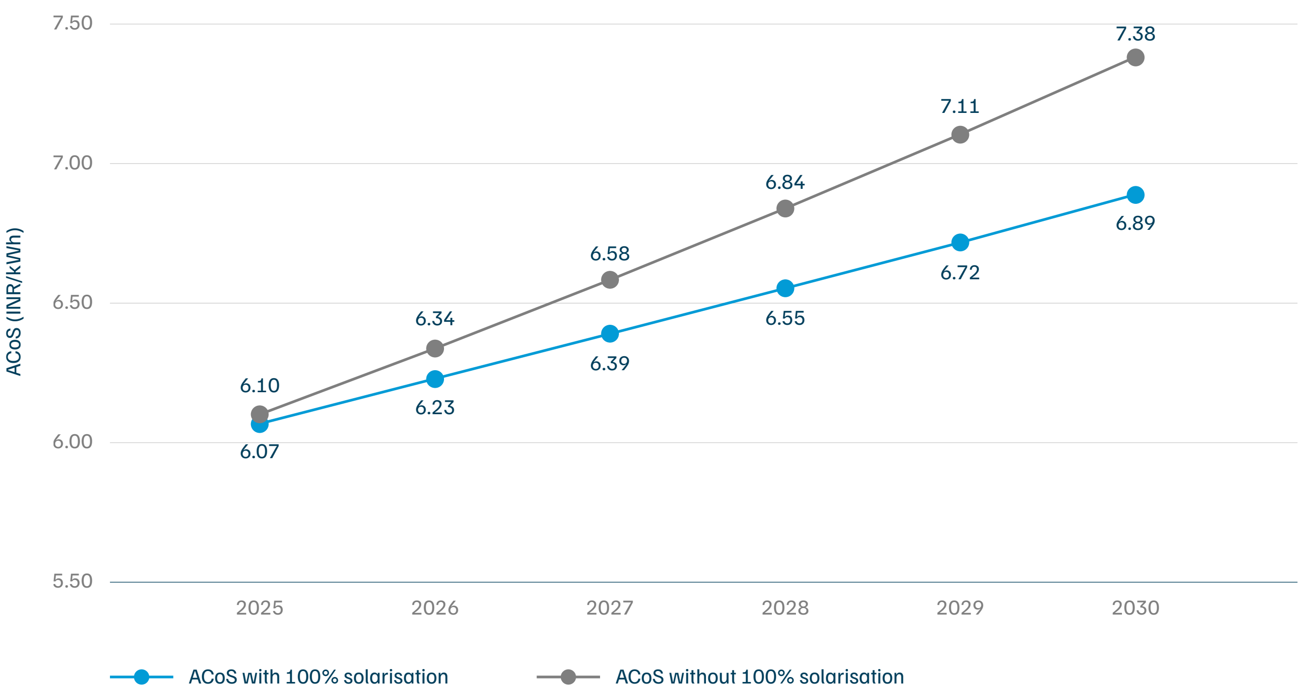
Table 3. Full solarisation could deliver INR ~4,600 crore in cumulative subsidy savings in Chhattisgarh by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
10*	0.44	1,896	0.38	**95**	**21**	1.50
25	1.15	4,983	0.99	**852**	**187**	3.90
50	2.31	9,967	1.99	**2,114**	**464**	7.80
75	3.46	14,950	2.98	**3,376**	**741**	11.70
100	4.61	19,934	3.97	**4,638**	**1,018**	15.60

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Chhattisgarh State Electricity Regulatory Commission. Tariff Order, 2024.

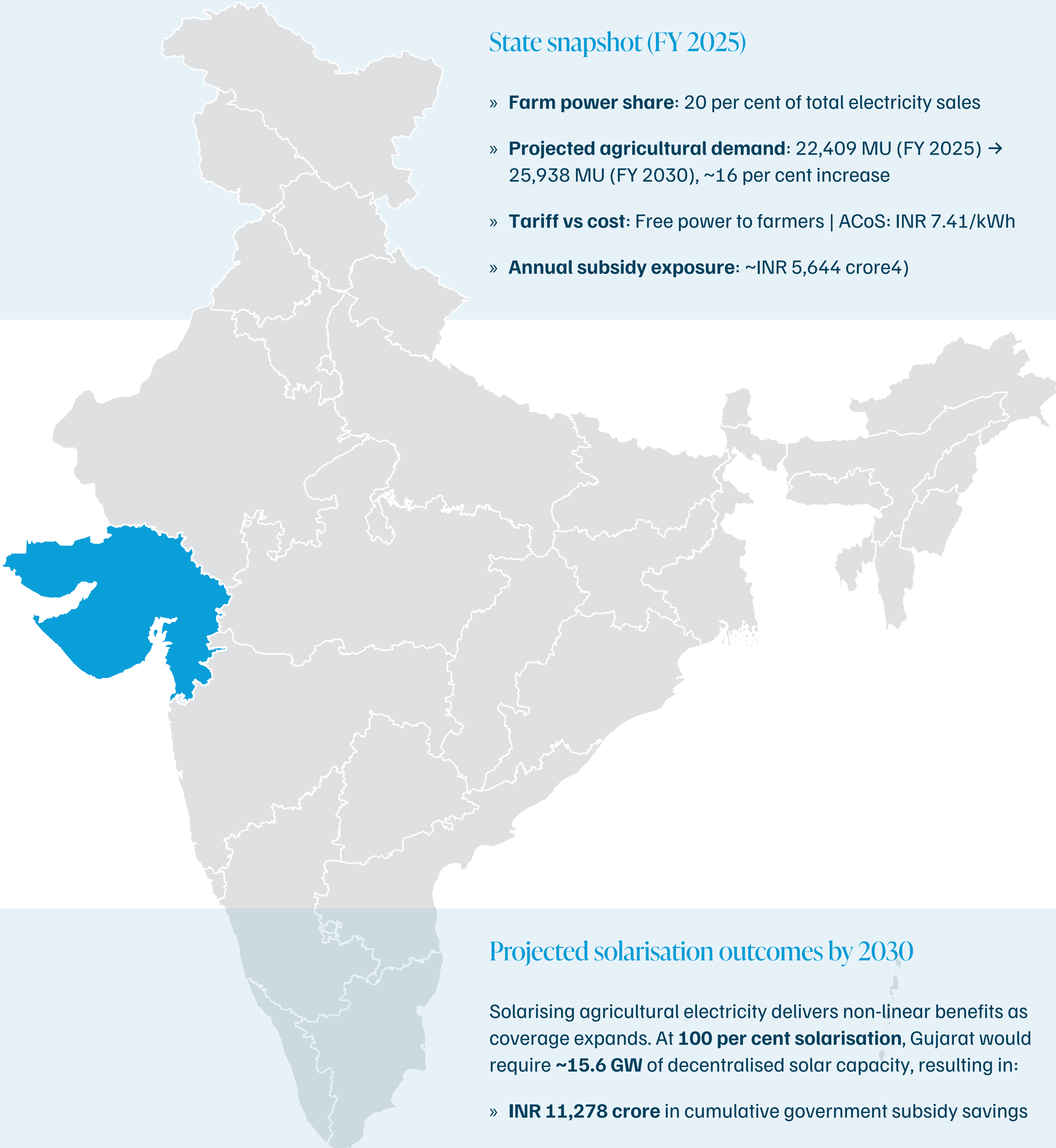
*Note: 10 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 4. In Chhattisgarh, 100% solarisation could lower ACoS by ~7% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Chhattisgarh State Electricity Regulatory Commission. Tariff Order, 2024.

4.4 Gujarat



State snapshot (FY 2025)

- **Farm power share**: 20 per cent of total electricity sales
- **Projected agricultural demand**: 22,409 MU (FY 2025) → 25,938 MU (FY 2030), ~16 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 7.41/kWh
- **Annual subsidy exposure**: ~INR 5,644 crore4)

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Gujarat would require **~15.6 GW** of decentralised solar capacity, resulting in:

- **INR 11,278 crore** in cumulative government subsidy savings
- **13 per cent reduction in ACoS** (Figure 4)
- **~67,323 FTE jobs** across deployment, operations, and maintenance
- **~13.4 MtCO_2e** of annual emissions abatement (Table 4)

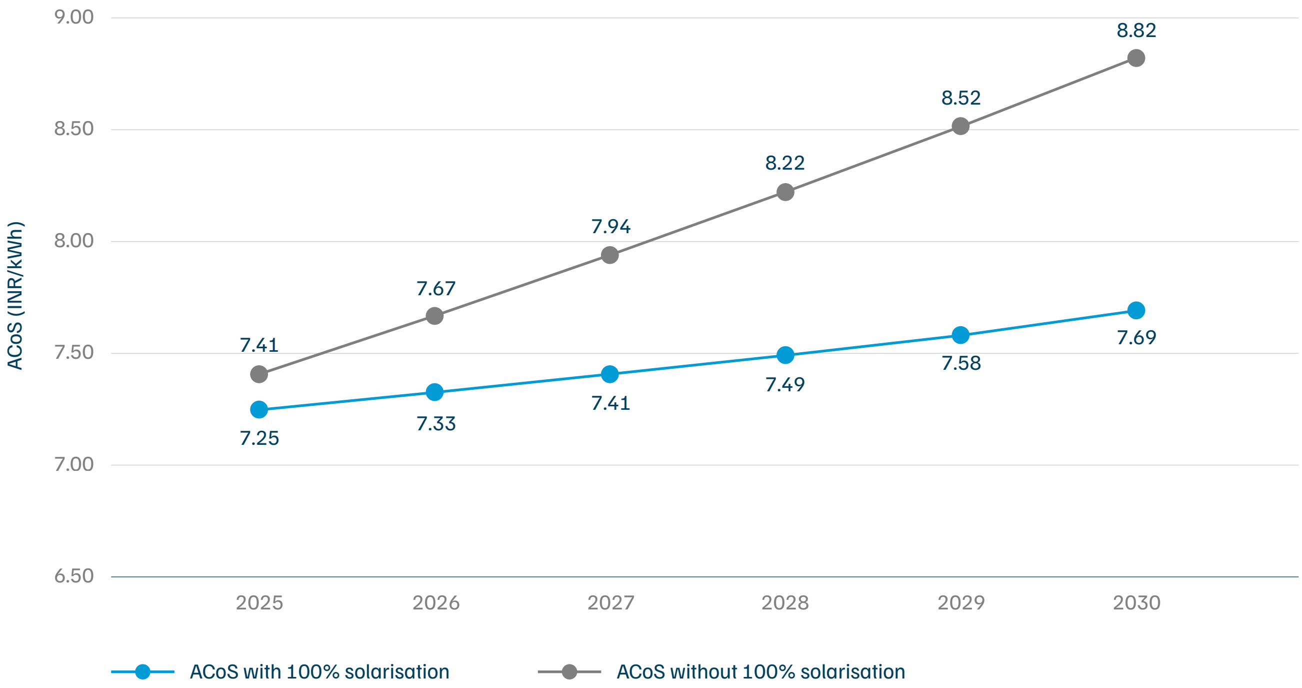
Table 4. Full solarisation could deliver INR ~11,300 crore in cumulative subsidy savings in Gujarat by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
25*	3.90	16,851	3.35	**2,666**	**5,176**	4.00
50	7.79	33,661	6.70	**5,537**	**10,748**	8.00
75	11.69	50,492	10.06	**8,407**	**16,320**	12.10
100	15.58	67,323	13.41	**11,278**	**21,892**	16.10

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Gujarat Electricity Regulatory Commission. Tariff Order, 2024.

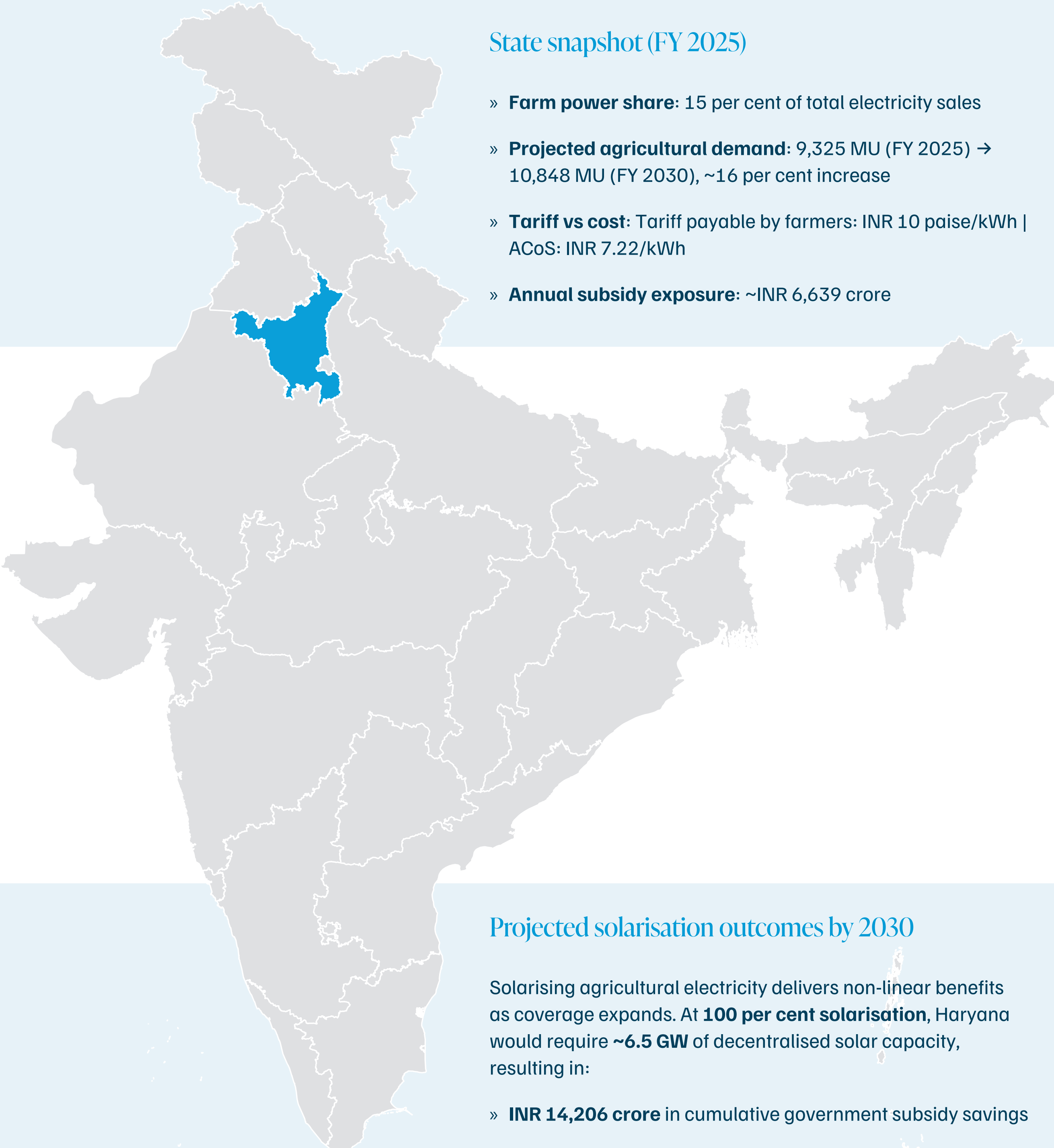
*Note: The current sanctioned capacity under the KUSUM scheme represents 25% agri-demand solarisation by 2030.

Figure 5. In Gujarat, 100% solarisation could lower ACoS by ~13% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Gujarat Electricity Regulatory Commission. Tariff Order, 2024.

4.5 Haryana



State snapshot (FY 2025)

- **Farm power share**: 15 per cent of total electricity sales
- **Projected agricultural demand**: 9,325 MU (FY 2025) → 10,848 MU (FY 2030), ~16 per cent increase
- **Tariff vs cost**: Tariff payable by farmers: INR 10 paise/kWh | ACoS: INR 7.22/kWh
- **Annual subsidy exposure**: ~INR 6,639 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Haryana would require **~6.5 GW** of decentralised solar capacity, resulting in:

- **INR 14,206 crore** in cumulative government subsidy savings
- **6 per cent reduction in ACoS** (Figure 5)
- **~28,156 FTE jobs** across deployment, operations, and maintenance
- **~5.6 $MtCO_2e$** of annual emissions abatement (Table 5)

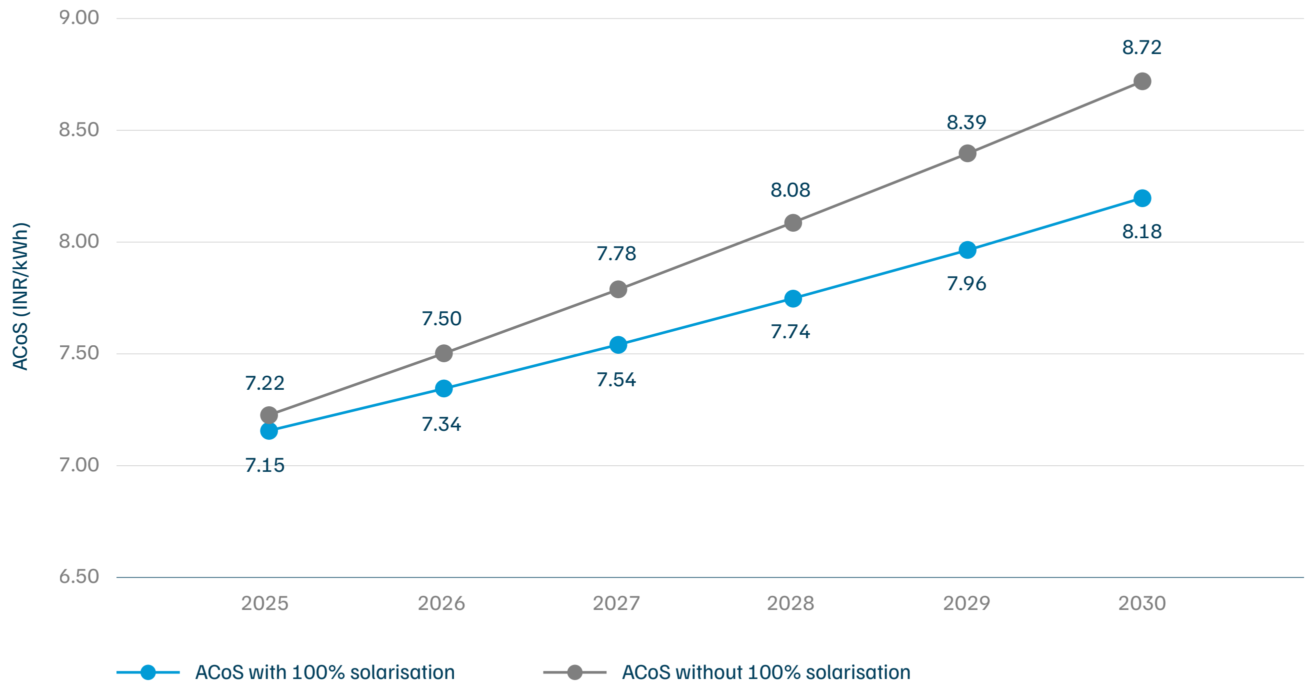
Table 5. Full solarisation could deliver INR ~14,206 crore in cumulative subsidy savings in Haryana by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
3*	0.18	774	0.15	**NIL**	**0**	0.30
25	1.63	7,039	1.40	**3,176**	**0**	3.01
50	3.26	14,078	2.80	**6,853**	**0**	6.02
75	4.89	21,117	4.21	**10,530**	**0**	9.03
100	6.52	28,156	5.61	**14,206**	**0**	10.05

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Haryana Electricity Regulatory Commission. Tariff Order, 2024.

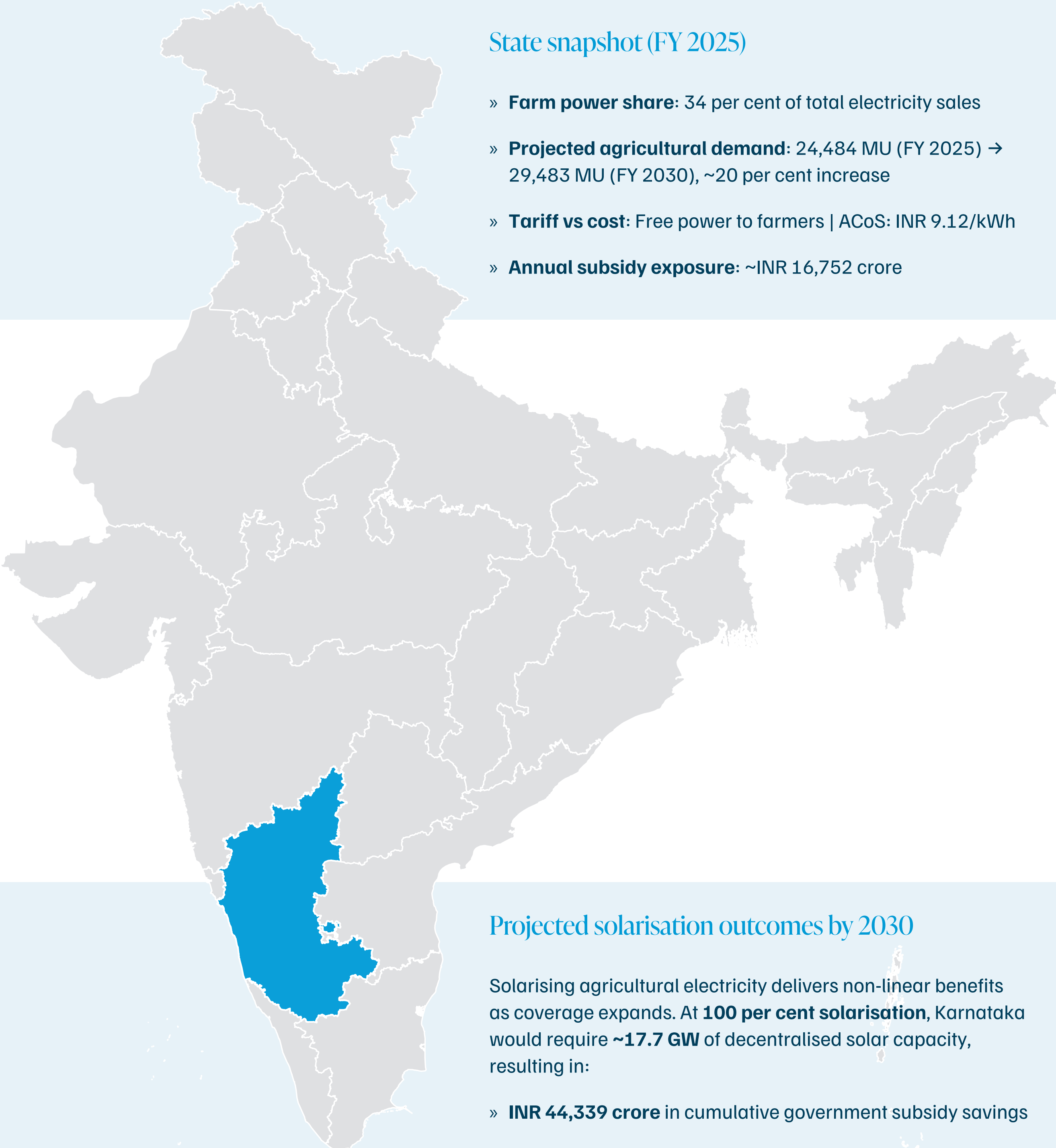
*Note: 3 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 6. In Haryana, 100% solarisation could lower ACoS by ~6% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Haryana Electricity Regulatory Commission. Tariff Order, 2024.

4.6 Karnataka



State snapshot (FY 2025)

» **Farm power share**: 34 per cent of total electricity sales

» **Projected agricultural demand**: 24,484 MU (FY 2025) → 29,483 MU (FY 2030), ~20 per cent increase

» **Tariff vs cost**: Free power to farmers | ACoS: INR 9.12/kWh

» **Annual subsidy exposure**: ~INR 16,752 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Karnataka would require **~17.7 GW** of decentralised solar capacity, resulting in:

» **INR 44,339 crore** in cumulative government subsidy savings

» **24 per cent reduction in ACoS** (Figure 6)

» **~76,523 FTE jobs** across deployment, operations, and maintenance

» **~15.2 $MtCO_2e$** of annual emissions abatement (Table 6)

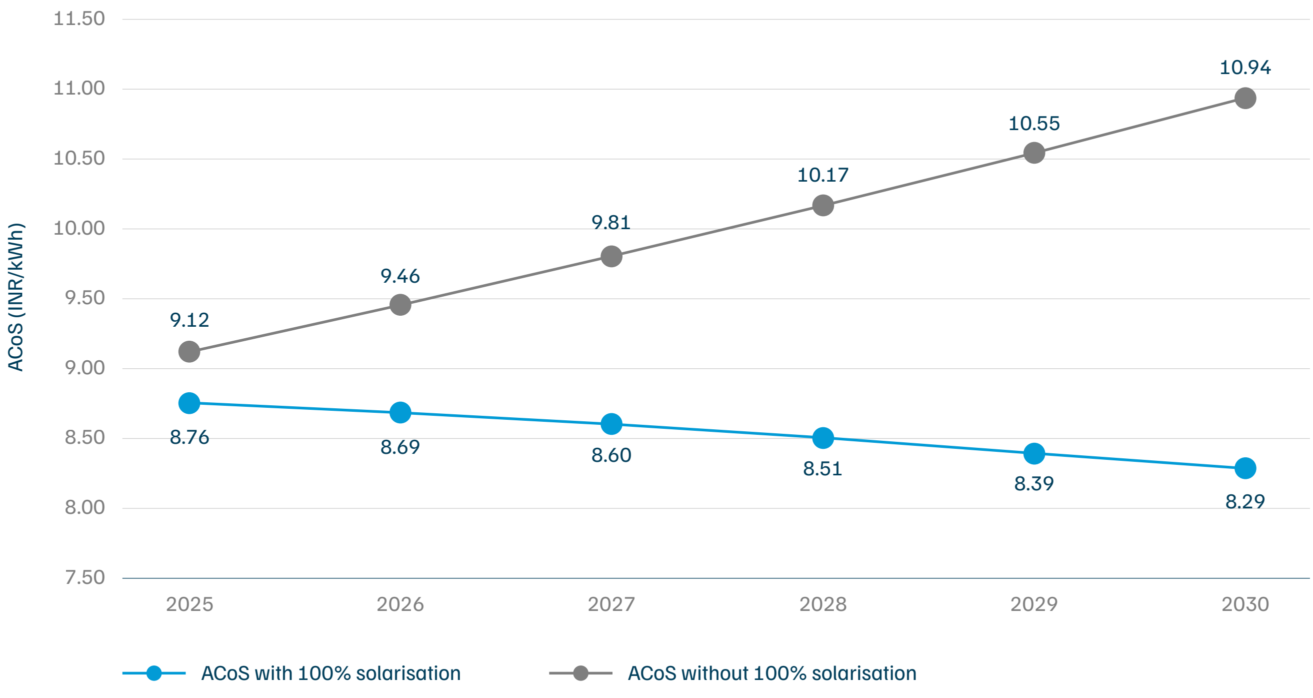
Table 6. Full solarisation could deliver INR ~44,300 crore in cumulative subsidy savings in Karnataka by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
32*	5.67	24,486	4.88	**13,933**	**4,644**	10.50
50	8.86	38,262	7.62	**21,982**	**7,327**	16.40
75	13.29	57,392	11.43	**33,160**	**11,053**	24.70
100	17.71	76,523	15.24	**44,339**	**14,780**	32.90

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Karnataka Electricity Regulatory Commission. Tariff Order, 2024.

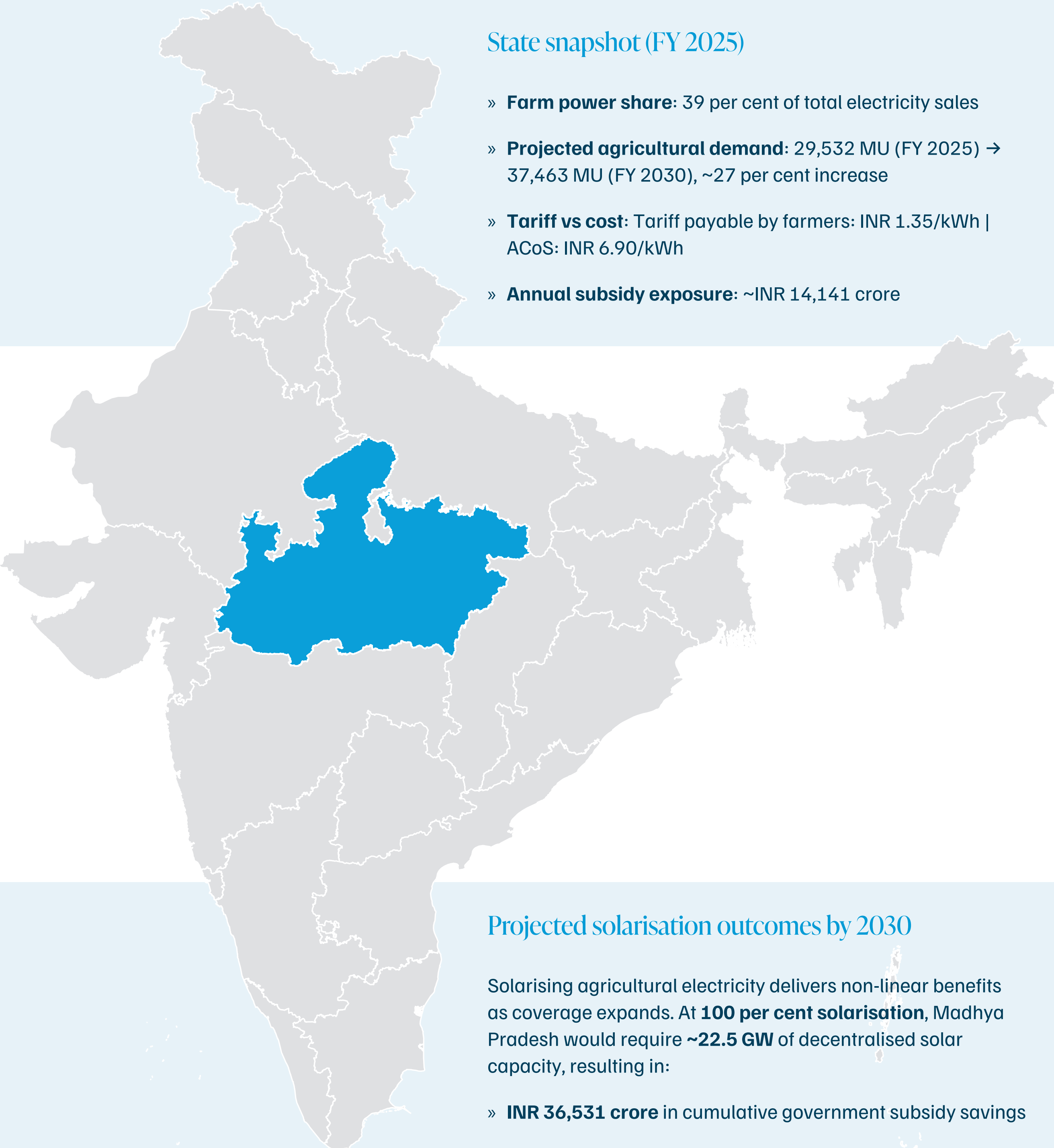
*Note: 32 per cent represents agri-demand solarisation against the current sanctioned capacity, which is more than a 25 per cent demand solarisation scenario; therefore, it is not shown.

Figure 7. In Karnataka, 100% solarisation could lower ACoS by ~24% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Karnataka Electricity Regulatory Commission. Tariff Order, 2024.

4.7 Madhya Pradesh



State snapshot (FY 2025)

- **Farm power share**: 39 per cent of total electricity sales
- **Projected agricultural demand**: 29,532 MU (FY 2025) → 37,463 MU (FY 2030), ~27 per cent increase
- **Tariff vs cost**: Tariff payable by farmers: INR 1.35/kWh | ACoS: INR 6.90/kWh
- **Annual subsidy exposure**: ~INR 14,141 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Madhya Pradesh would require **~22.5 GW** of decentralised solar capacity, resulting in:

- **INR 36,531 crore** in cumulative government subsidy savings
- **17 per cent reduction in ACoS** (Figure 7)
- **~97,236 FTE jobs** across deployment, operations, and maintenance
- **~19.4 MtCO_2e** of annual emissions abatement (Table 7)

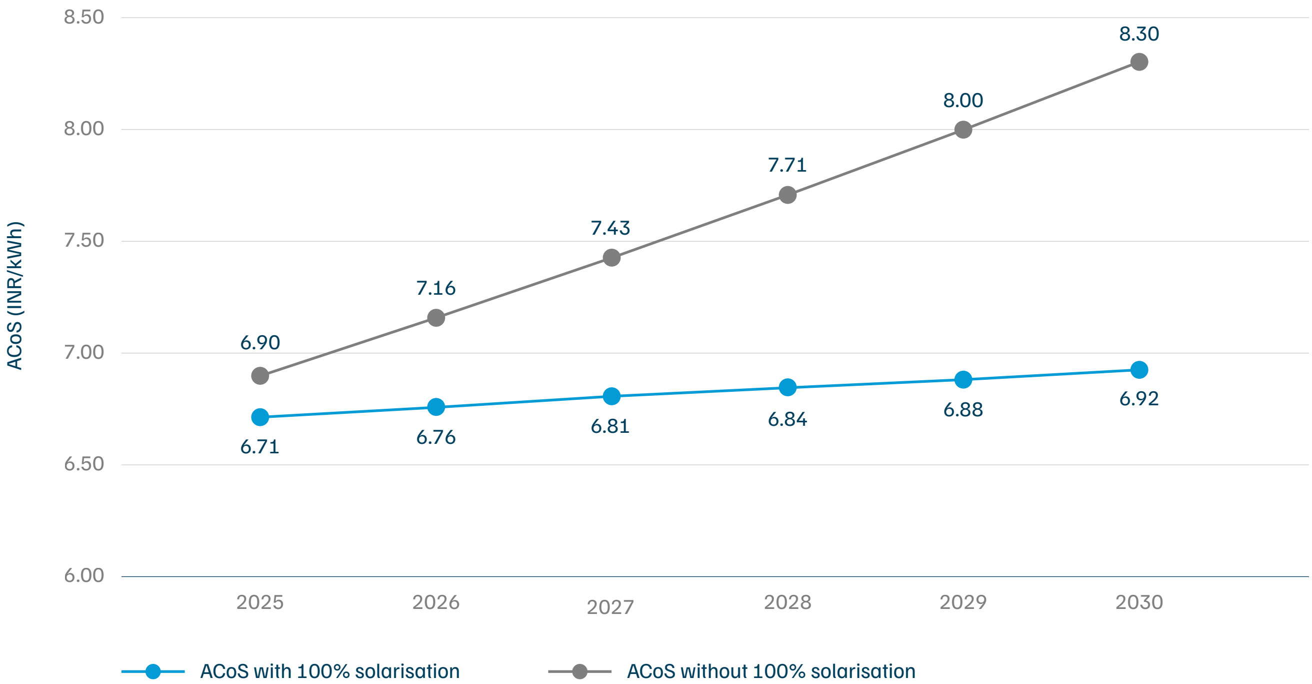
Table 7. Full solarisation could deliver INR ~36,500 crore in cumulative subsidy savings in Madhya Pradesh by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
19*	4.30	18,583	3.70	**6,581**	**813**	6.40
25	5.63	24,309	4.84	**8,799**	**1,088**	8.40
50	11.25	48,618	9.68	**18,043**	**2,230**	16.80
75	16.88	72,927	14.53	**22,287**	**3,373**	25.20
100	22.51	97,236	19.37	**36,531**	**4,515**	33.60

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Madhya Pradesh Electricity Regulatory Commission. Tariff Order, 2024.

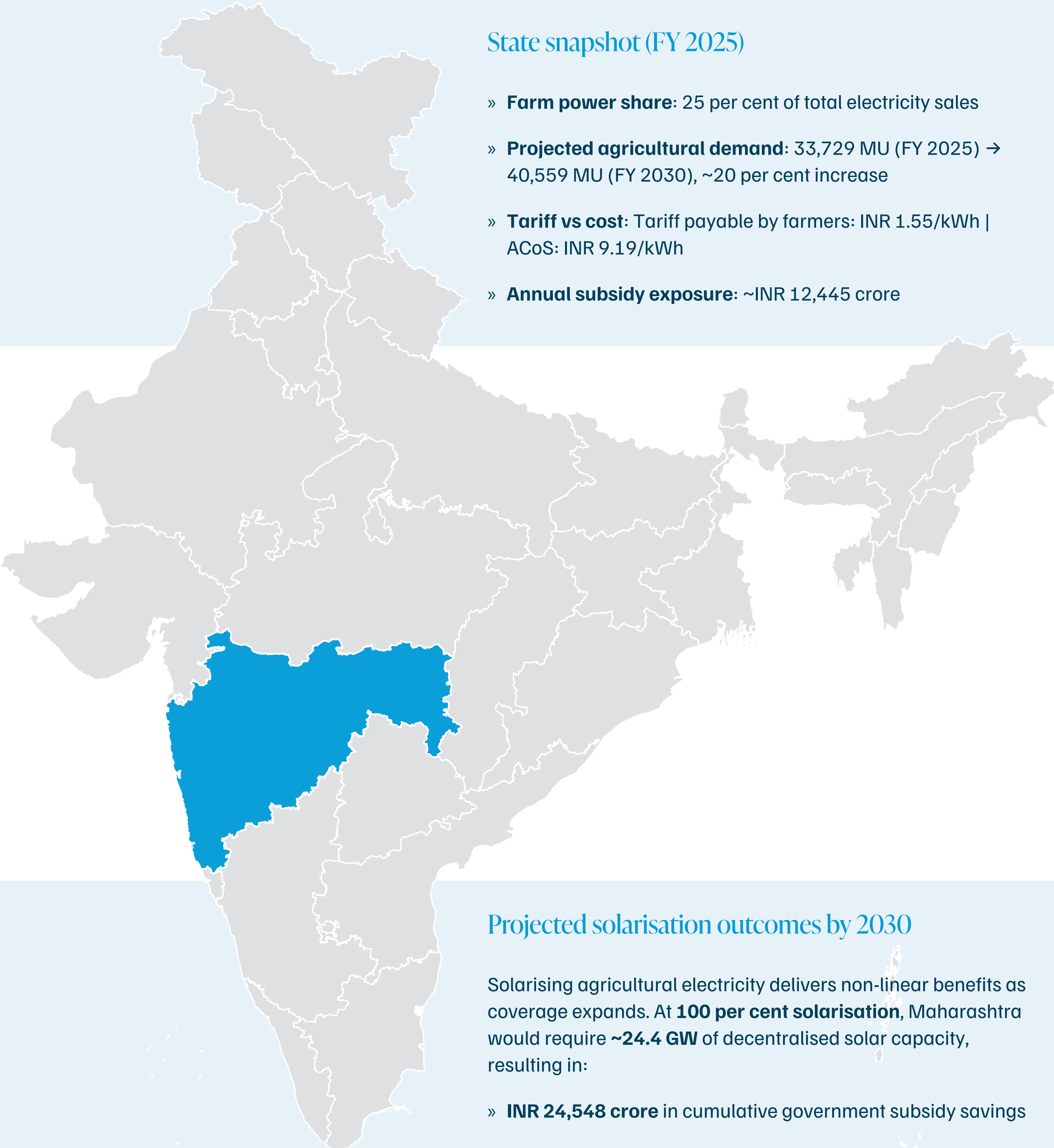
*Note: 19 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 8. In Madhya Pradesh, 100% solarisation could lower ACoS by ~17% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Madhya Pradesh Electricity Regulatory Commission. Tariff Order, 2024.

4.8 Maharashtra



State snapshot (FY 2025)

» **Farm power share**: 25 per cent of total electricity sales

» **Projected agricultural demand**: 33,729 MU (FY 2025) → 40,559 MU (FY 2030), ~20 per cent increase

» **Tariff vs cost**: Tariff payable by farmers: INR 1.55/kWh | ACoS: INR 9.19/kWh

» **Annual subsidy exposure**: ~INR 12,445 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Maharashtra would require **~24.4 GW** of decentralised solar capacity, resulting in:

» **INR 24,548 crore** in cumulative government subsidy savings

» **11 per cent reduction in ACoS** (Figure 8)

» **~1,05,273 FTE jobs** across deployment, operations, and maintenance

» **~20.97 MtCO_2e** of annual emissions abatement (Table 8)

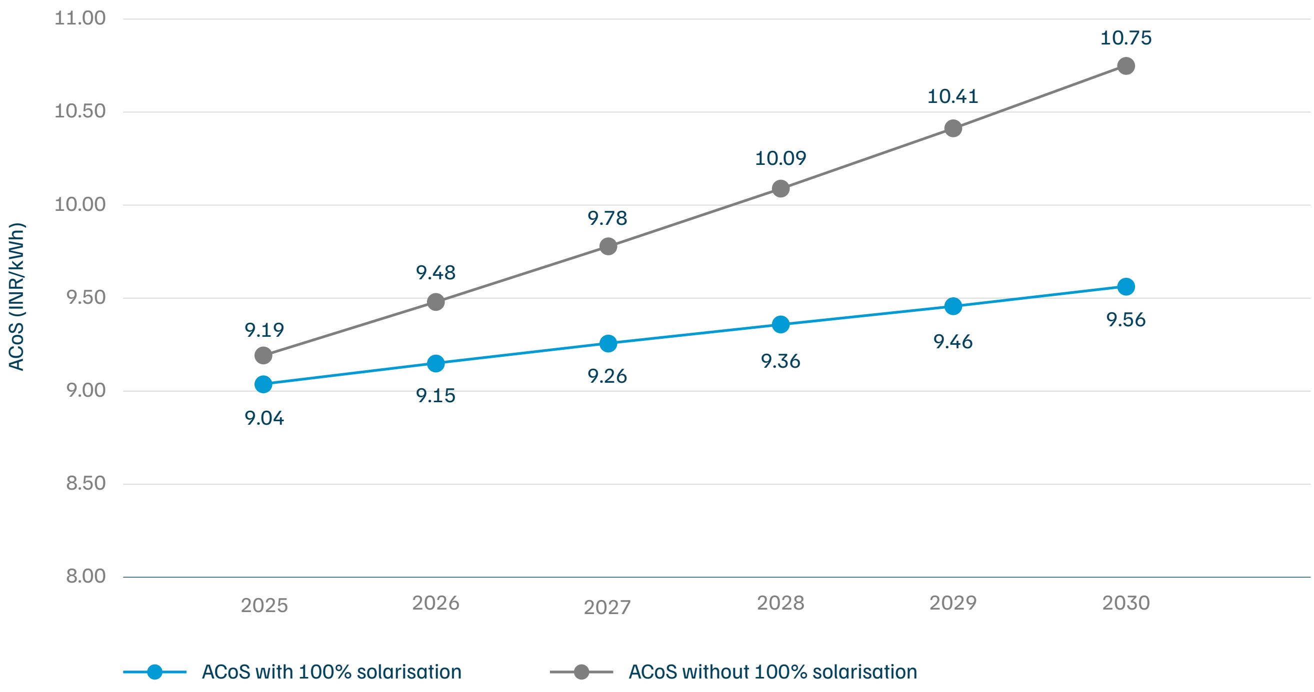
Table 8. Full solarisation could deliver INR ~24,500 crore in cumulative subsidy savings in Maharashtra by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
24*	5.90	25,497	5.08	**5,729**	**4,322**	5.70
25	6.09	26,318	5.24	**5,977**	**4,509**	5.90
50	12.18	52,636	10.48	**12,167**	**9,179**	11.80
75	18.28	78,955	15.73	**18,358**	**13,849**	17.70
100	24.37	1,05,273	20.97	**24,548**	**18,519**	23.60

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Maharashtra Electricity Regulatory Commission. Tariff Order, 2025.

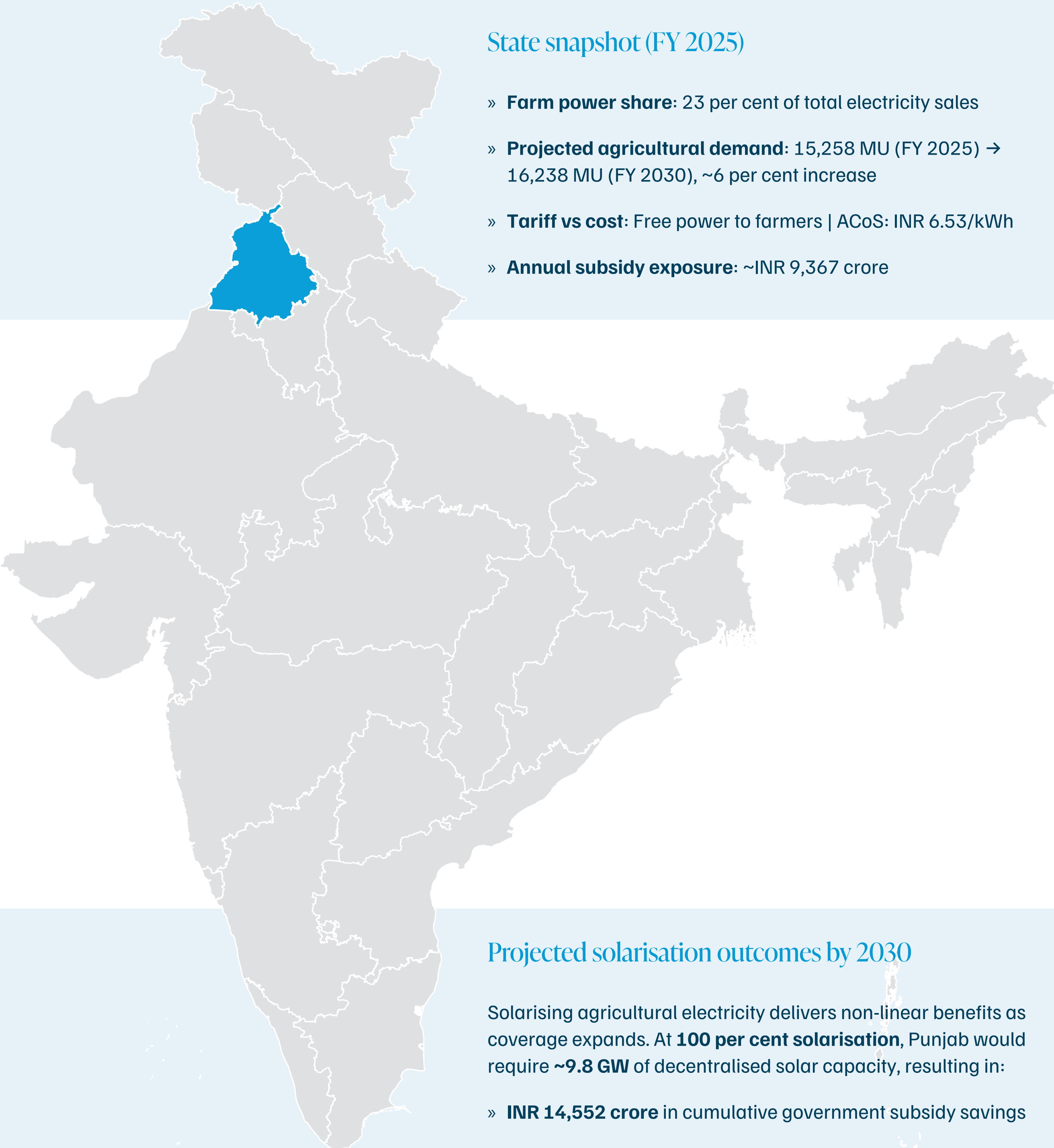
*Note: 24 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 9. In Maharashtra, 100% solarisation could lower ACoS by ~11% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Maharashtra Electricity Regulatory Commission. Tariff Order, 2025.

4.9 Punjab



State snapshot (FY 2025)

- **Farm power share**: 23 per cent of total electricity sales
- **Projected agricultural demand**: 15,258 MU (FY 2025) → 16,238 MU (FY 2030), ~6 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 6.53/kWh
- **Annual subsidy exposure**: ~INR 9,367 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Punjab would require **~9.8 GW** of decentralised solar capacity, resulting in:

- **INR 14,552 crore** in cumulative government subsidy savings
- **8 per cent reduction in ACoS** (Figure 9)
- **~42,146 FTE jobs** across deployment, operations, and maintenance
- **~8.4 MtCO_2e** of annual emissions abatement (Table 9)

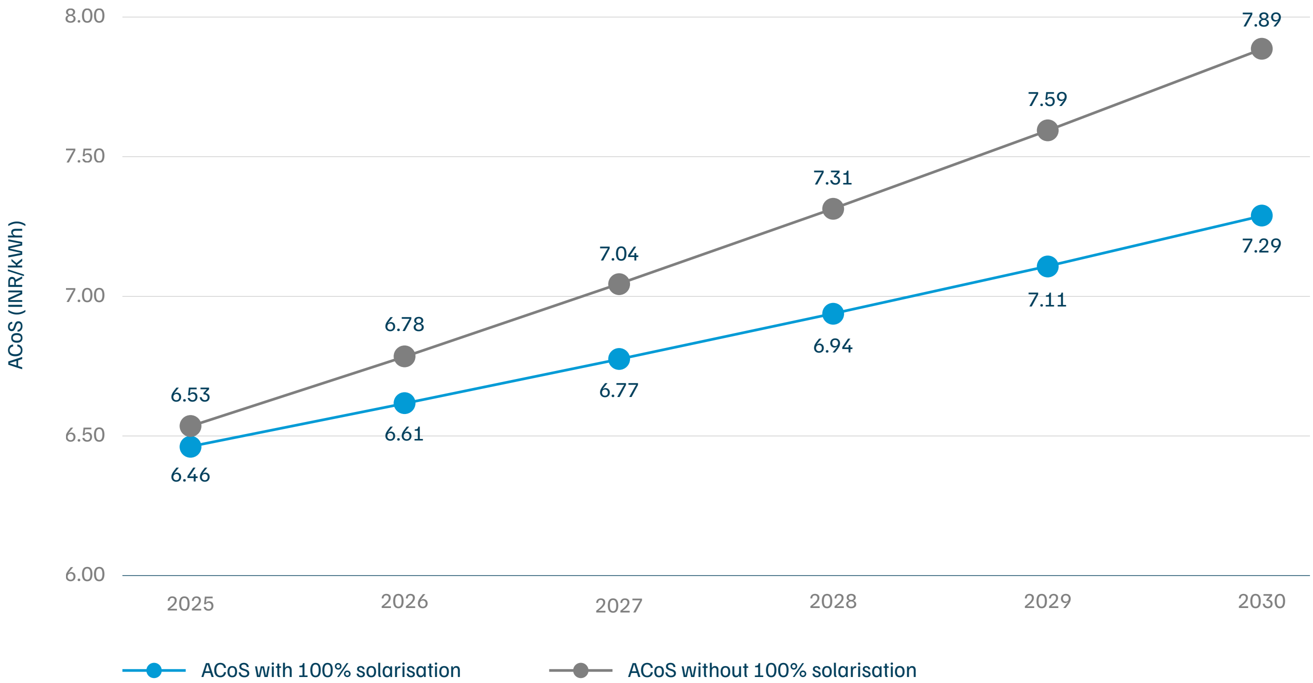
Table 9. Full solarisation could deliver INR ~14,600 crore in cumulative subsidy savings in Punjab by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
25	2.44	10,537	2.10	**3,286**	**210**	4.50
50	4.88	21,073	4.20	**7,041**	**449**	8.90
75	7.32	31,610	6.30	**10,797**	**689**	13.40
100	9.76	42,146	8.40	**14,552**	**929**	17.80

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Punjab State Electricity Regulatory Commission. Tariff Order, 2024.

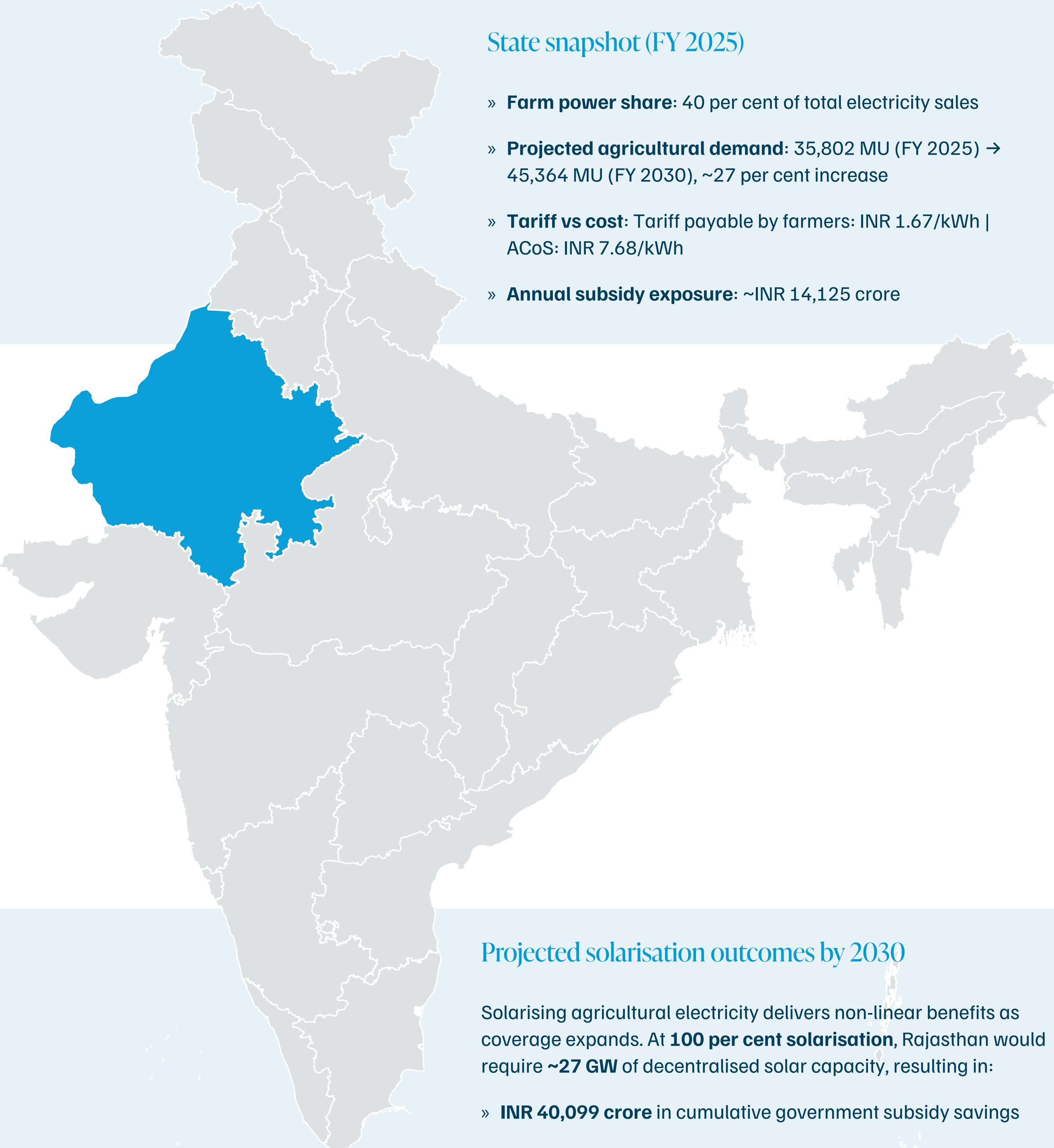
*Note: No capacity sanctioned for Punjab under Components A and C (Feeder Level Solarisation) of the PM-KUSUM scheme.

Figure 10. In Punjab, 100% solarisation could lower ACoS by ~8% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Punjab State Electricity Regulatory Commission. Tariff Order, 2024.

4.10 Rajasthan



State snapshot (FY 2025)

» **Farm power share**: 40 per cent of total electricity sales

» **Projected agricultural demand**: 35,802 MU (FY 2025) → 45,364 MU (FY 2030), ~27 per cent increase

» **Tariff vs cost**: Tariff payable by farmers: INR 1.67/kWh | ACoS: INR 7.68/kWh

» **Annual subsidy exposure**: ~INR 14,125 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Rajasthan would require **~27 GW** of decentralised solar capacity, resulting in:

» **INR 40,099 crore** in cumulative government subsidy savings

» **20 per cent reduction in ACoS (Figure 10)**

» **~1,17,742 FTE jobs** across deployment, operations, and maintenance

» **~23.45 $MtCO_2e$** of annual emissions abatement (Table 10)

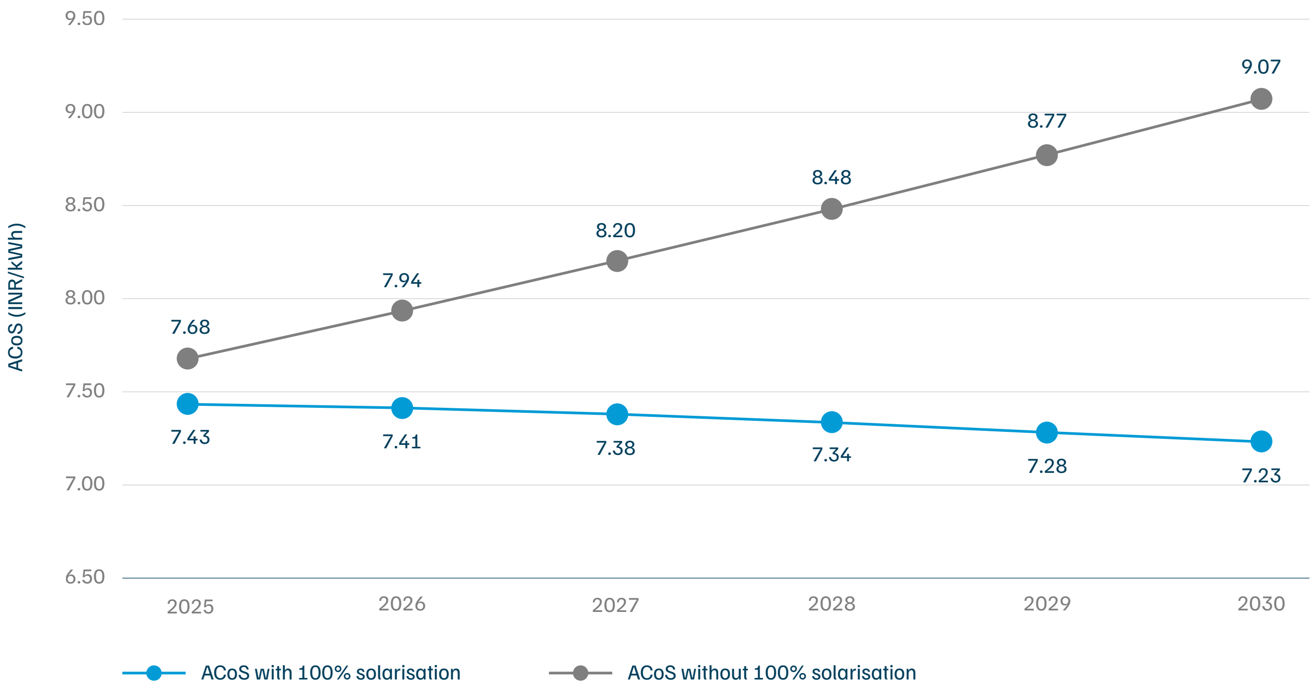
Table 10. Full solarisation could deliver INR ~40,100 crore in cumulative subsidy savings in Rajasthan by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
30*	8.16	35,260	7.02	**7.02**	**4,136**	10.90
50	13.63	58,871	11.73	**11.73**	**6,979**	18.20
75	20.44	88,307	17.59	**17.59**	**10,534**	27.30
100	27.26	1,17,742	23.45	**23.45**	**14,089**	36.50

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Rajasthan Electricity Regulatory Commission. Tariff Order, 2024.

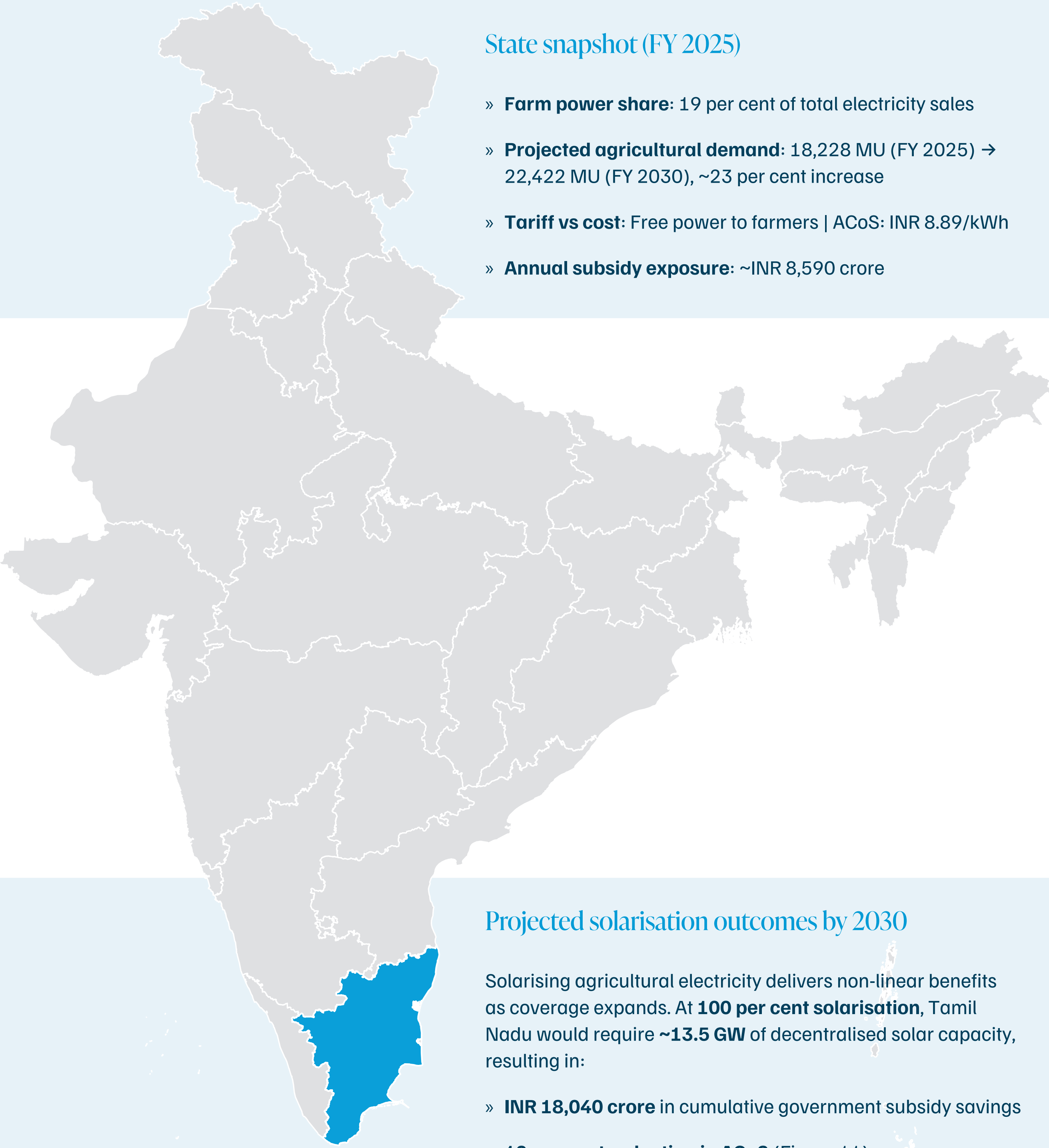
*Note: 30 per cent represents agri-demand solarisation against the current sanctioned capacity, which is more than a 25 per cent demand solarisation scenario; therefore, it is not shown.

Figure 11. In Rajasthan, 100% solarisation could lower ACoS by ~20% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Rajasthan Electricity Regulatory Commission. Tariff Order, 2024.

4.11 Tamil Nadu



State snapshot (FY 2025)

- **Farm power share**: 19 per cent of total electricity sales
- **Projected agricultural demand**: 18,228 MU (FY 2025) → 22,422 MU (FY 2030), ~23 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 8.89/kWh
- **Annual subsidy exposure**: ~INR 8,590 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Tamil Nadu would require **~13.5 GW** of decentralised solar capacity, resulting in:

- **INR 18,040 crore** in cumulative government subsidy savings
- **12 per cent reduction in ACoS** (Figure 11)
- **~58,198 FTE jobs** across deployment, operations, and maintenance
- **~11.6 $MtCO_2e$** of annual emissions abatement (Table 11)

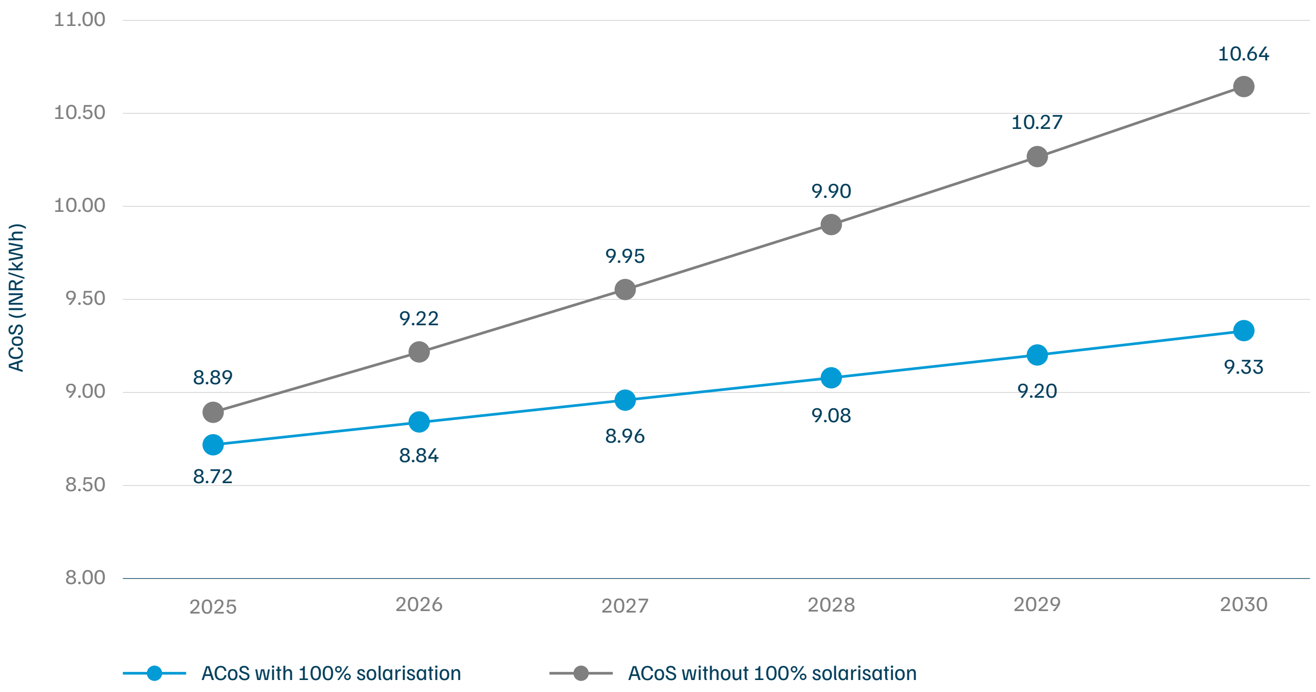
Table 11. Full solarisation could deliver INR ~18,000 crore in cumulative subsidy savings in Tamil Nadu by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
25	3.37	14,550	2.90	**4,311**	**3,823**	4.40
50	6.74	29,099	5.80	**8,887**	**7,881**	8.90
75	10.10	43,649	8.69	**13,463**	**11,939**	13.30
100	13.47	58,198	11.59	**18,040**	**15,997**	17.80

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Tamil Nadu Electricity Regulatory Commission. Tariff Order, 2022.

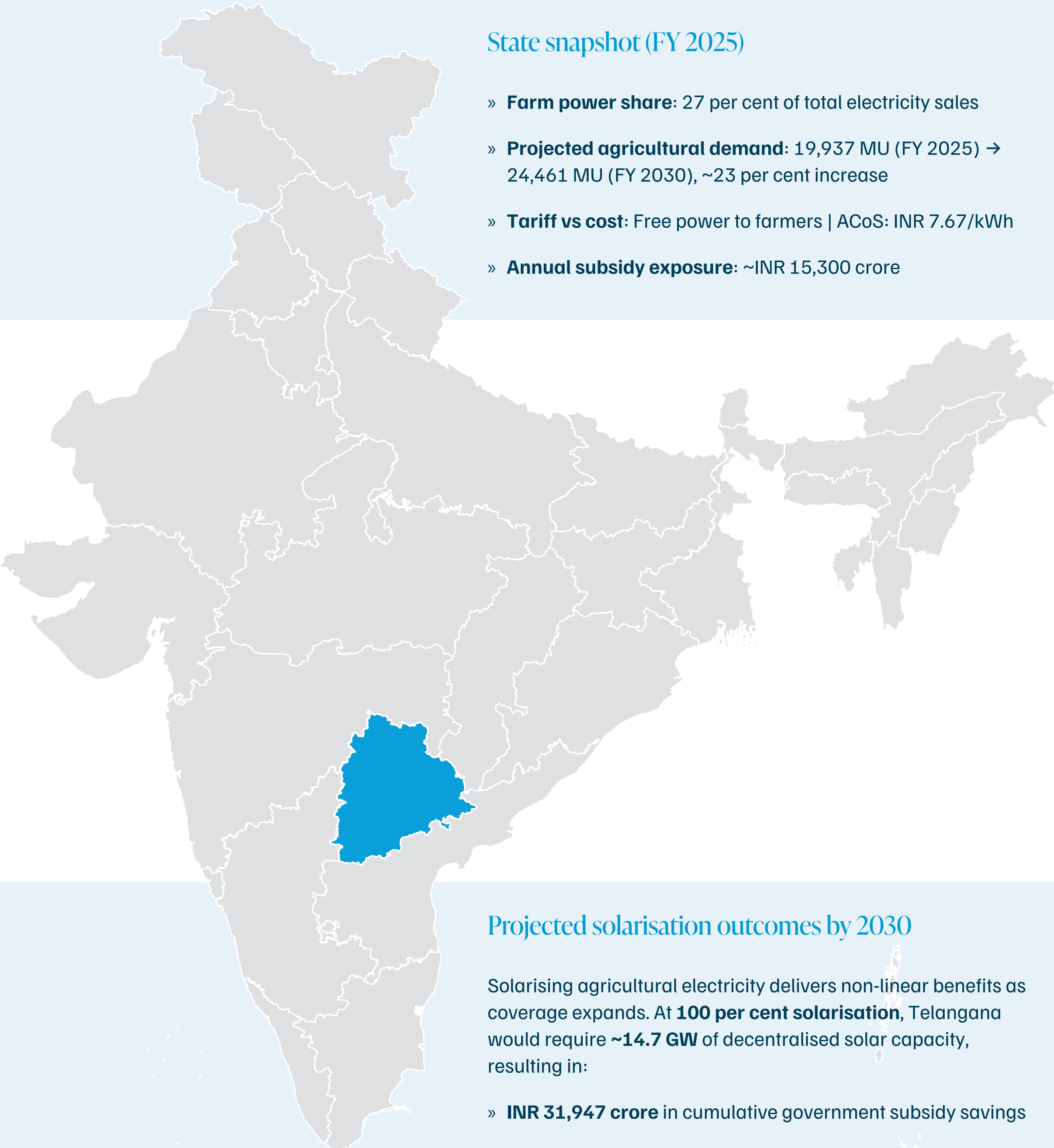
*Note: Capacity sanctioned under Component A is minimal (3 MW); therefore, there are no tangible benefits.

Figure 12. In Tamil Nadu, 100% solarisation could lower ACoS by ~12% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Tamil Nadu Electricity Regulatory Commission. Tariff Order, 2022.

4.12 Telangana



State snapshot (FY 2025)

- **Farm power share**: 27 per cent of total electricity sales
- **Projected agricultural demand**: 19,937 MU (FY 2025) → 24,461 MU (FY 2030), ~23 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 7.67/kWh
- **Annual subsidy exposure**: ~INR 15,300 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Telangana would require **~14.7 GW** of decentralised solar capacity, resulting in:

- **INR 31,947 crore** in cumulative government subsidy savings
- **12 per cent reduction in ACoS** (Figure 12)
- **~63,489 FTE jobs** across deployment, operations, and maintenance
- **~12.7 $MtCO_2e$** of annual emissions abatement (Table 12)

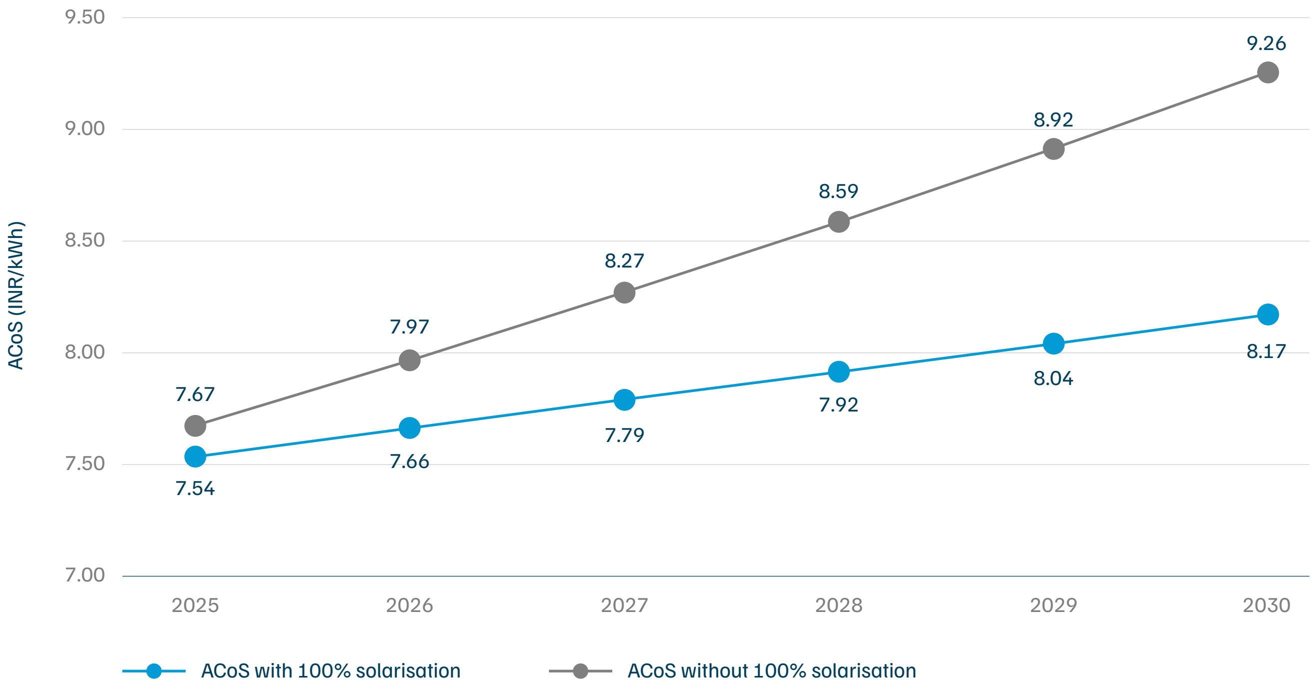
Table 12. Full solarisation could deliver INR ~32,000 crore in cumulative subsidy savings in Telangana by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
11*	1.7	7,128	1.42	**3,069**	**0**	2.80
25	3.67	15,872	3.16	**7,612**	**0**	6.30
50	7.35	31,745	6.32	**15,724**	**0**	12.50
75	11.02	47,617	9.48	**23,836**	**0**	18.80
100	14.70	63,489	12.65	**31,947**	**0**	25.00

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Telangana State Electricity Regulatory Commission. Tariff Order, 2024.

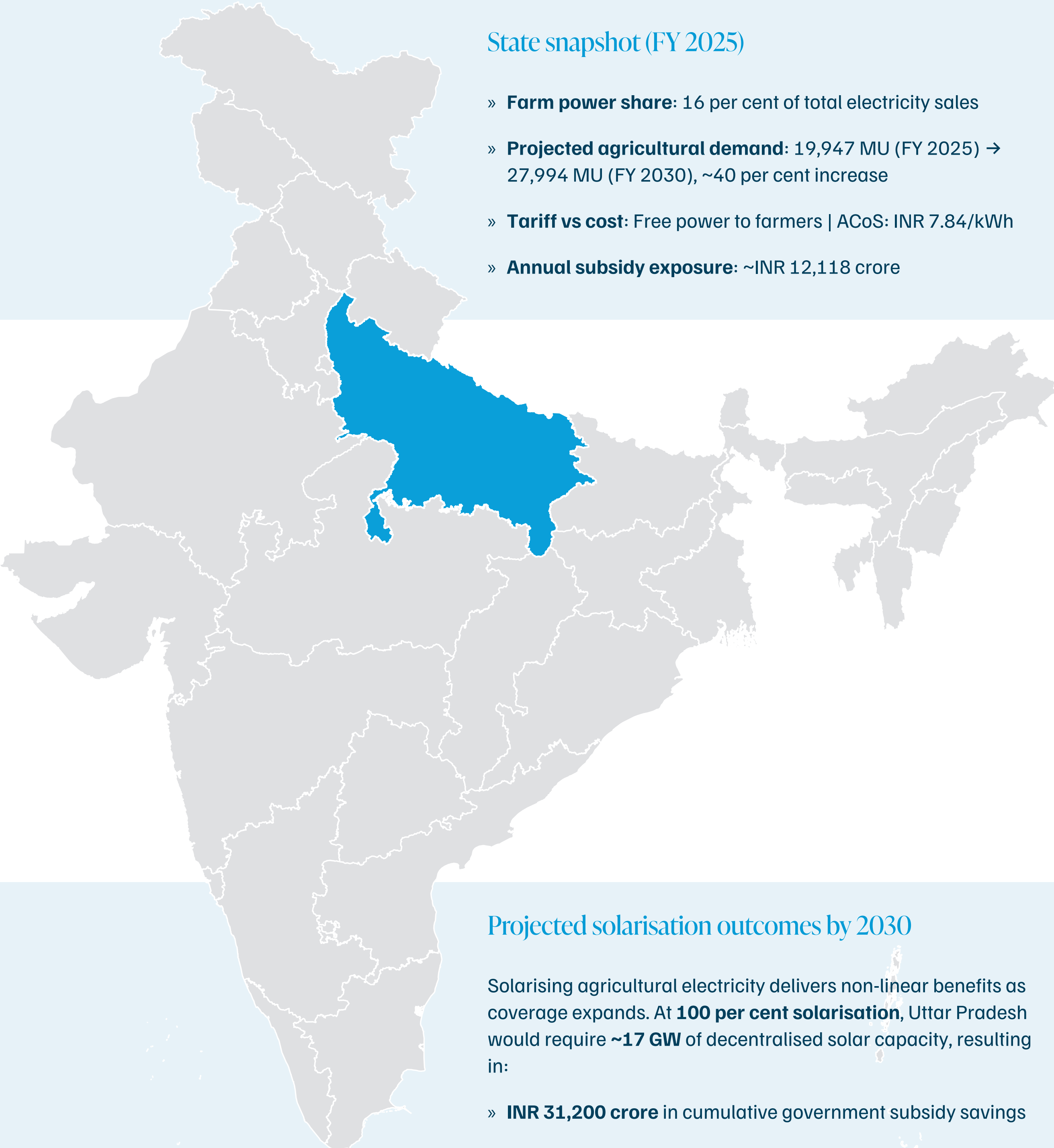
*Note: 11 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 13. In Telangana, 100% solarisation could lower ACoS by ~12% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Telangana State Electricity Regulatory Commission. Tariff Order, 2024.

4.13 Uttar Pradesh



State snapshot (FY 2025)

- **Farm power share**: 16 per cent of total electricity sales
- **Projected agricultural demand**: 19,947 MU (FY 2025) → 27,994 MU (FY 2030), ~40 per cent increase
- **Tariff vs cost**: Free power to farmers | ACoS: INR 7.84/kWh
- **Annual subsidy exposure**: ~INR 12,118 crore

Projected solarisation outcomes by 2030

Solarising agricultural electricity delivers non-linear benefits as coverage expands. At **100 per cent solarisation**, Uttar Pradesh would require **~17 GW** of decentralised solar capacity, resulting in:

- **INR 31,200 crore** in cumulative government subsidy savings
- **10 per cent reduction in ACoS** (Figure 13)
- **~72,658 FTE jobs** across deployment, operations, and maintenance
- **~14.5 MtCO_2e** of annual emissions abatement (Table 13)

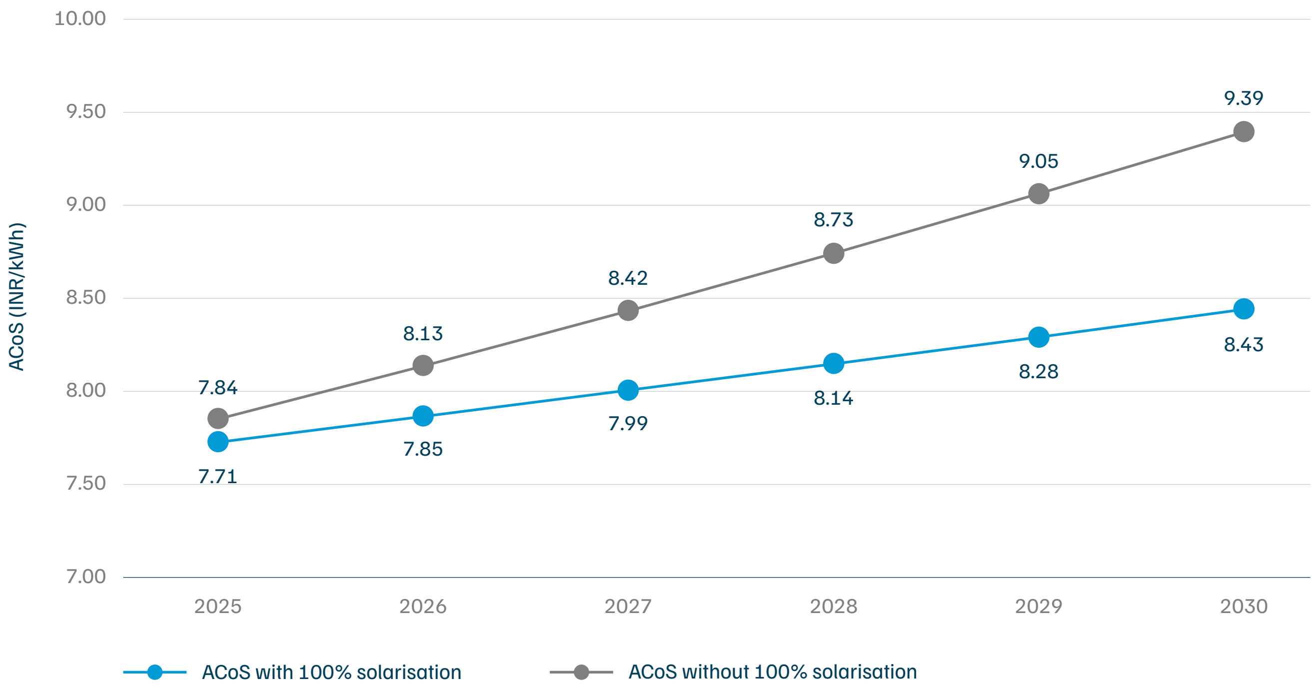
Table 13. Full solarisation could deliver INR ~31,200 crore in cumulative subsidy savings in Uttar Pradesh by 2030

Agri-demand solarisation scenarios (%)	Solar capacity (GW)	Employment potential (FTE)	Emissions abatement potential in 2030 ($MtCO_2e$/year)	Expected cumulative government subsidy savings by 2030 (INR crore)	Expected cumulative cross-subsidy savings by 2030 (INR crore)	Contribution to state RPO (%)
16*	2.70	11,641	2.32	**4,666**	**1,355**	2.60
25	4.20	18,165	3.62	**7,509**	**2,180**	4.00
50	8.41	36,329	7.24	**15,406**	**4,473**	8.10
75	12.61	54,494	10.85	**23,303**	**6,765**	12.10
100	16.82	72,658	14.47	**31,200**	**9,058**	16.10

Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Uttar Pradesh Electricity Regulatory Commission. Tariff Order, 2024.

*Note: 16 per cent represents agri-demand solarisation against the current sanctioned capacity.

Figure 14. In Uttar Pradesh, 100% solarisation could lower ACoS by ~10% by 2030 (vs no solarisation)



Source: Authors' analysis based on Central Electricity Authority. Report on Twentieth Electric Power Survey of India (Volume I). New Delhi: Ministry of Power, Government of India, 2022; and Uttar Pradesh Electricity Regulatory Commission. Tariff Order, 2024.

Conclusion

Agricultural electricity already represents one of the largest recurring fiscal expenditures across the 13 states assessed in this brief. In FY 2025, annual agricultural power subsidies exceeded INR 1.3 lakh crore across these states, with agricultural electricity demand projected to continue rising through 2030. As regulators progressively rationalise cross-subsidies, an increasing share of agricultural supply costs will be borne directly by state budgets rather than remain absorbed by C&I consumers.

Under a business-as-usual trajectory, rising agricultural demand met entirely through conventional grid procurement would substantially increase annual subsidy requirements, exceeding INR 2 lakh crore by FY 2030. This growth would be driven both by higher consumption volumes and exposure to prevailing procurement costs. Agricultural solarisation alters this trajectory by lowering the per-unit cost of supplying agricultural feeders. Full solarisation of agricultural demand across these states by 2030 through decentralised generation would reduce the corresponding annual subsidy requirements, generating cumulative fiscal savings of over INR 3.3 lakh crore during FY 2025–30. In states with large agricultural loads and a significant differential between grid procurement costs and decentralised solar tariffs, these gains are structural rather than incremental.

Two system-level considerations are essential when interpreting these results. First, agricultural demand is seasonal, while solar generation is concentrated during daytime hours; aggregate energy comparisons therefore do not fully capture integration and balancing requirements. Second, higher levels of feeder-level solarisation require closer alignment with distribution-level resource adequacy planning. Changes in net load profiles, procurement strategies, and balancing arrangements must be incorporated into planning decisions. These factors affect implementation pathways but do not alter the underlying economic case for solarisation.

The 13 states analysed account for nearly all of India's agricultural electricity consumption, and their supply choices will materially shape the distribution sector's fiscal trajectory through 2030. Where feeder segregation is already complete, solarisation can be scaled more rapidly. Elsewhere, deployment will need to be aligned with ongoing infrastructure upgrades under the *Revamped Distribution Sector Scheme* (RDSS) and related programmes.

The window for influencing the subsidy trajectory is before 2030. As agricultural demand continues to grow, delaying structural adjustments increases fiscal exposure for state governments. Solarisation does not replace broader tariff or governance reforms, but it directly addresses one of the largest cost drivers in state power systems while preserving support for farmers.

> Without solarisation, state subsidy for agricultural power supply could exceed to INR 2 lakh crore annually by 2030 under business-as-usual trajectory.

Acronyms

ACoS	average cost of supply
APPC	average power procurement cost
ARR	aggregate revenue requirement
BESS	battery energy storage system
BU	billion units
C&I	commercial and industrial
CEA	Central Electricity Authority
CSTEP	Center for Study of Science, Technology and Policy
EPS	Electric Power Survey
ETPI	Energy Transition Preparedness Initiative
FLS	feeder-level solarisation
FTE	full-time equivalent
FY	financial year
GW	gigawatt
INR	Indian rupee
kWh	kilowatt-hour
MNRE	Ministry of New and Renewable Energy
MoP	Ministry of Power
MOSPI	Ministry of Statistics and Programme Implementation
$MtCO_2e$	million tonnes of carbon dioxide equivalent
MU	million units
MW	megawatt
O&M	operations and maintenance
PM-KUSUM	*Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan*
RDSS	*Revamped Distribution Sector Scheme*
RPO	renewable purchase obligation
SERC	State Electricity Regulatory Commission

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