

# BRIDGING THE GENDER GAP

Skilling, Policy Incentives, and Entrepreneurial Pathways  
for Empowering Women in Green Transitions



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# LIST OF ABBREVIATIONS

|         |                                                                  |
|---------|------------------------------------------------------------------|
| BRLF    | Bharat Rural Livelihoods Foundation                              |
| CEEW    | Council on Energy Environment and Water                          |
| CIL     | Coal India Limited                                               |
| CSR     | Corporate Social Responsibility                                  |
| DDU-GKY | Deen Dayal Upadhyaya Grameen Kaushalya Yojana                    |
| DMF     | District Mineral Fund                                            |
| DRE     | Decentralized Renewable Energy                                   |
| EV      | Electronic Vehicle                                               |
| FGD     | Focus Group Discussion                                           |
| FTE     | Full Time Equivalent                                             |
| GoI     | Government of India                                              |
| GoO     | Government of Odisha                                             |
| GSVA    | Gross State Value Added                                          |
| IFOREST | International Forum for Environment, Sustainability & Technology |
| ILO     | International Labour Organization                                |
| IPICOL  | Industrial Promotion & Investment Corporation of Odisha Limited  |
| ITI     | Industrial Training Institutes                                   |
| JSS     | Jan Shikshan Sansthan                                            |
| KII     | Key Informant Interviews                                         |
| LFPR    | Labour Force Participation Rate                                  |
| LMIS    | Labour Market Information System                                 |
| MEL     | Monitoring Evaluation and Learning                               |
| MIS     | Management Information System                                    |
| MSDE    | Ministry of Skill Development and Entrepreneurship               |
| MSME    | Micro, Small and Medium Enterprises                              |
| NAPS    | National Apprenticeship Promotion Scheme                         |
| NGO     | Non-Governmental Organisation                                    |
| NSDC    | National Skill Development Corporation                           |
| NSTI    | National Skill Training Institute                                |

|        |                                                                            |
|--------|----------------------------------------------------------------------------|
| NTFP   | Non-Timber Forest Product                                                  |
| O&M    | Operations and Maintenance                                                 |
| ORMAS  | Odisha Rural Development and Marketing Society                             |
| OSDA   | Odisha Skill Development Authority                                         |
| PLFS   | Periodic Labour Force Survey                                               |
| PLTP   | Placement Linked Training Programme                                        |
| PMKVY  | Pradhan Mantri Kaushal Vikas Yojana                                        |
| PRAYAS | Promoting Regular & Assisted Migration for Youth and Skilled Professionals |
| RE     | Renewable Energy                                                           |
| SCGJ   | Skill Council for Green Jobs                                               |
| SC     | Scheduled Castes                                                           |
| SDTE   | Skill Development & Technical Education                                    |
| SHG    | Self Help Groups                                                           |
| ST     | Scheduled Tribes                                                           |
| STEM   | Science, Technology, Engineering and Mathematics                           |
| ToT    | Training of Trainers                                                       |
| UNDP   | United Nations Development Programme                                       |
| WiGAP  | Women in Green Apprenticeships Programme                                   |
| WPR    | Workforce Participation Rate                                               |
| WSC    | World Skill Centre                                                         |

# EXECUTIVE SUMMARY

Odisha is entering a new phase of low-carbon development that will reshape its labour market and the opportunities available to its workforce. Demand skills are rising across renewable energy, electric mobility, sustainable manufacturing, and circular-economy sectors. At the same time, women remain significantly underrepresented in technical training, green skilling pathways, and emerging green enterprises. Odisha has always been a salient sub-national case study for understanding various development questions. As a mineral-rich and climate-vulnerable state, Odisha is at present navigating industrial restructuring, energy transition, and livelihood diversification simultaneously, and is at the forefront of climate and energy transition debates in India. As the state advances towards a just energy transition, closing gender gaps in skills, employment, and enterprise participation will be essential for ensuring that economic transformation is equitable and inclusive.

This study presents a comprehensive assessment of Odisha's skilling and entrepreneurship landscape, with a particular focus on understanding how women can participate more meaningfully in green and transition-linked opportunities. It draws on labour-market data, institutional analysis, women's self-help groups and primary surveys with trainees, instructors, employers, workers, and government stakeholders to identify systemic gaps, emerging opportunities, and priority actions for a gender-transformative green economy.

## Key Findings

Odisha has created an extensive skilling architecture and one of the strongest women's collectives in India through Mission Shakti. However, the state's skilling and entrepreneurship ecosystem is not yet positioned to prepare women for the opportunities emerging from energy transitions. While access has expanded, participation remains unequal; sectoral choices remain narrow, and institutional support systems are fragmented. The findings below highlight persistent structural gaps and emerging opportunities.



## **1. Women's enrolment in technical skilling has increased in the past decade, but participation in green and technical sectors remains low and highly clustered**

Odisha's skilling ecosystem comprises 72 Government ITIs and 418 private ITIs, together offering more than 81,000 seats. Government ITIs have a seat occupancy rate of 99%, compared to 65% in private institutions. While participation has increased, women continue to represent less than 25% of total enrolments, indicating a gender imbalance in technical education. Among a few schemes which target to address this gender imbalance, Sudakshya scheme, launched in the year 2017 by the Govt of Odisha, has significantly increased women's enrolment from 6% in 2016-17 to 22.49% in 2022-23.

Out of 637 surveyed trainees enrolled in various ITIs of Odisha, only 6% were enrolled in green skill courses. Among these, 75% were men and just 25% were women. All female trainees enrolled in green trades were concentrated solely in electrical courses linked to solar applications. No female trainees were enrolled in EV maintenance, waste management, or other emerging technical green trades. Employer interviews confirm these patterns: only two women were employed across surveyed Solar and EV enterprises, both in administrative roles. This indicates that women remain excluded at both the entry and deployment stages of green labour markets. Interviews with faculty and principals of various ITIs also confirm these patterns, and they emphasised the lack of targeted outreach, mentorship by women professionals, deeper community engagement, and raised concerns around limited scale and uneven implementation of interventions.

## **2. The main barrier to green skilling is low confidence in job prospects**

The most cited barrier to enrolling in green skills is low confidence in job prospects (28.3%), which most respondents highlighted is due to low demand and poor industry linkages. However, 16.1% respondents observed the unavailability of local green courses.

Social barriers also persist, safety and travel constraints (4.8%), lack of family support (2.2%), and the belief that green jobs are "not for women" (1.3%). These findings demonstrate that labour-market uncertainty and information gaps, rather than lack of aspiration, drive low enrolment among women.

Although 28.1% of respondents explicitly stated that women can work in green sectors, significant concerns persist. Nearly 22% view green jobs as male-dominated due to perceived physical demands or technical complexity. Safety concerns (10.9%), family restrictions (6.3%), and uncertainty about suitability (15.6%) point to the continued influence of social norms, risk perceptions, and lack of visible role models. Women's occupational decisions are shaped by a risk-averse framework that prioritises security and proximity over innovation or mobility.

### **3. Awareness of green jobs is uneven and narrowly concentrated**

While 58.2% of surveyed trainees had heard of green jobs or skills, one-third had no awareness. At the community level, understanding of green work is dominated by solar and EV sectors, which together accounted for 67% of responses. Awareness of other areas such as waste management, bioenergy, sustainable agriculture, environmental services, and circular economy functions remains limited. This narrow exposure shapes women's choices and reinforces occupational clustering within a small subset of green sectors.

### **4. Women overwhelmingly prefer government jobs due to security and predictability**

More than 72.8% of female trainees expressed a preference for government employment, citing stable income, social legitimacy, and safer working conditions. Only 12.6% were interested in self-employment, and just 7.3% preferred private-sector jobs. These findings underscore that without strong placement linkages, aspiration-building efforts, and visible success stories, women may remain reluctant to enter high-growth but less familiar green-sector roles.

### **5. SHGs are strong institutional entry points, but weak pathways into scalable green enterprises**

Women's SHGs demonstrate strong creditworthiness, work discipline, and resilience, with many groups operating consistently for over five years. Yet green-skill awareness among most SHGs is less than 10%, and enterprise activities remain concentrated in low-value segments such as mushroom cultivation, incense-stick making, tailoring, and phenyl production. Only a few groups, particularly CSR-supported Producer Groups in Angul and advanced SHGs in Sundargarh, have successfully diversified into higher-value or green-aligned activities. These cases demonstrate that when training, market linkages, and finance converge, SHGs can transition into green MSMEs.

### **6. Women face significant structural barriers to green entrepreneurship and finance is the key enabler**

Barriers identified across SHGs include limited awareness of green skills, time poverty, care responsibilities, unreliable infrastructure, weak market linkages, inconsistent training quality, documentation hurdles, and male control over financial decisions. Over 70% of women in select SHGs reported that male household members control major enterprise decisions. More than 60% cited care burdens as a constraint on training and enterprise work. Market access remains the most consistent bottleneck, with over 70% of SHGs lacking institutional or urban buyers.

Seed funding or interest-free loans are the strongest enablers (41.4%), followed by government or industry procurement assurance (15.6%) and targeted mentoring (14.3%).

Skilling alone accounted for only 2.5% of responses, reinforcing that training must be paired with finance, markets, and supportive infrastructure to increase women's participation in green enterprises. Producer groups with full green skills awareness and strong institutional linkages reported higher confidence and diversification.

Overall, despite impressive gains in enrolment, institutional coverage, and women's collective mobilisation, Odisha's workforce system continues to reproduce gendered segmentation. Women remain concentrated in low-skill, low-return activities across both skilling and entrepreneurship pathways. Without targeted gender-responsive planning, covering trade diversification, mobility support, care infrastructure, advanced training, and green-market integration, women risk being left behind in the transition without benefiting from its economic gains.

## **Recommendations for a Gender-Transformative Green Transition**

### **1. Establish a State Green Skills Mission with a gender-responsive mandate**

Odisha should establish a State Green Skills Mission with an explicit gender-responsive mandate to bridge persistent gaps in women's participation in skilling and workforce development across emerging green sectors. The Mission should offer flexible training schedules and localised training delivery to improve access for women, particularly in transition and industrial districts. Dedicated stipends, childcare support, safe transport, and hostel facilities should be integrated into programme design to address structural barriers to participation. The Mission should partner with ITIs, polytechnics, SHGs, and industry to introduce gender-responsive curricula, enable on-the-job apprenticeships, and create clear placement pathways, while incentivising employers to recruit and retain women through wage support mechanisms or preferential access to state incentives.

### **2. Set explicit targets to improve outcomes for women**

The Mission should set clear, time-bound, gender-disaggregated targets focused on improving measurable employment outcomes for women, rather than enrolment alone. Targets should cover women's participation, course completion, placement linkages, enhanced wage levels, job retention, and career progression across priority green sectors and districts. These targets should be embedded in programme design, funding allocations, and performance reviews of implementing agencies and training partners. Establish differentiated targets for priority green sectors (renewable energy, EVs, green construction, waste management, climate-smart agriculture) and transition-affected districts (coal, steel, aluminium belts), recognising varied baseline constraints.

Require implementing agencies to report sex-disaggregated data on placements, wages, job duration, and sectoral mobility, using unified MIS platforms aligned with SDTE, OSDA, and NSDC systems. Introduce structured incentives, such as higher reimbursements, bonus payments, or preferential contracting, for institutions and employers that meet or exceed women's placement and retention targets in non-traditional green roles. Reserve

minimum shares of green apprenticeships and on-site training slots for women, with explicit monitoring of transition from training to regular employment. Ensure that gender targets are supported by enabling inputs, safe transport, hostels, flexible schedules, and childcare support, so that targets do not become exclusionary or punitive. Publish annual scorecards on women's outcomes in green skilling at the state and district levels to strengthen transparency, political accountability, and course.

### **3. Support scaling of women-led green entrepreneurship**

Odisha's strong foundation in women's collective enterprises can be leveraged to expand women's leadership in green entrepreneurship. Mission Shakti SHGs and federations should be strengthened as platforms for green enterprise creation and scaling. Dedicated incubators for women-led enterprises in renewable energy services, eco-tourism, circular economy ventures, bio-based products, EV servicing, and green manufacturing should provide technical assistance, mentoring, seed funding, and market intelligence.

Access to green finance needs to be broadened through concessional loans, credit guarantees, blended finance, and risk-sharing mechanisms. Public procurement, district value chains, and digital marketplaces must consistently integrate women-led enterprises.

Mission Shakti producer companies should be supported to become major aggregators of green products and services, ensuring women obtain stable markets and higher-value opportunities. Mission Shakti guidelines prioritise SHG formation, credit linkage, and micro-enterprises, however still weak on productivity growth, technology adoption and scaling into MSMEs. Embed green technical skilling into Mission Shakti, such as solar O&M, EV charging operations, waste processing technology, bioenergy systems. Create joint protocols with SDTE, OSDA, and Green Skill Councils. Create mandatory guideline provisions for: childcare support, transport allowance for, flexible scheduling norms. Develop strong risk protection (financial and market failures) and track green outcomes of the enterprises through string monitoring mechanisms. Formal convergence mandates with: OSDA, SDTE, ITIs, just transition cells in coal districts is necessary

### **4. Gender Mainstreaming & Care-Responsive and Enabling Ecosystems**

Women's ability to participate in green skilling and entrepreneurship depends on reducing constraints associated with unpaid care, mobility, and safety. Odisha should prioritise investments in childcare and eldercare services, water and sanitation infrastructure, and time-saving clean energy solutions, particularly in transition-affected districts. Safe transportation, secure training environments, and gender-responsive workplace infrastructure should be standard across industrial clusters and training centres.

To ease the transition for women moving from informal or low-productivity work to new green opportunities, the state should introduce transition stipends and social-protection

support. Digital service platforms should be leveraged to reduce time of poverty and enhance women's access to information, training, and markets.

To support the above interventions, the District Mineral Foundation (DMF) should therefore be strategically leveraged as a cornerstone for gender mainstreaming with earmarked allocations for green-centric green skilling, SHG-led green enterprises, care infrastructure, safe mobility and transition income support. This also aligns with DMF's mandate of environmental sustainability, clean energy promotion, and public welfare. A long-term assessment of DMF contributions over the next four decades estimates that ongoing and planned coal mining expansions (excluding allocated coal blocks) could generate over INR 39,764 crore by 2060. Additionally, DMF funds from the extraction of other major minerals will be instrumental in supporting just transition efforts in key mining districts such as Sundargarh, Kendujhar, Jharsuguda, and others that are essential to the industrial supply chain.

## **5. Finance and Governance for a Gender-Transformative Transition**

A gender-just transition requires women's active participation in planning and governance. Women's representation should be institutionalised in district-level transition committees, climate task forces, and livelihood planning bodies. Leadership and negotiation capacities among SHG leaders, cooperatives, and women entrepreneurs should be strengthened through targeted programmes.

Gender-responsive budgeting must be embedded across departments, with dedicated budget lines for women-led skilling programmes and green enterprises. Establishing a Women's Green Career and Placement Cell within OSDA or SDTE can support counselling, placement facilitation, employer sensitisation, and mobility assistance. A Green Labour Market Information System will ensure that policy decisions reflect real-time gendered labour-market trends.

The multi-dimensional nature of just transition requires coordinated institutional action. Odisha should strengthen convergence mechanisms between Mission Shakti, SDTE, MSME, Industries, Energy, Forest and Environment, and Panchayati Raj and Urban Local Bodies. Shared indicators, joint funding plans, and aligned incentives can ensure that gender objectives are integrated across sectoral programmes. Therefore, District-level convergence committees should guide the planning and implementation of women-focused green-skilling and entrepreneurship initiatives. Embedding gender-performance indicators into departmental schemes and MoUs will strengthen institutional accountability and ensure sustained action.

## **6. Building a Gender-Responsive Green Transition Data and Monitoring System**

Odisha needs a strong evidence and monitoring ecosystem to guide a gender-responsive just transition. Establishing a statewide gender-disaggregated data system for green skills, employment, entrepreneurship and wages will allow departments to track women's

participation across districts and social groups, identify gaps early and respond with targeted interventions.

Departments should routinely collect, publish and monitor gender-disaggregated indicators on green jobs, training enrolments, enterprise outcomes and workplace conditions. Regular tracking of transition impacts on women across regions and sectors will help the state anticipate vulnerabilities and adjust programmes before challenges deepen.

Embedding a robust monitoring, evaluation and learning framework across all schemes is critical. Such a system should track progress against gender and transition indicators, support mid-course corrections, and generate insights through pilots and independent evaluations. Public dashboards and periodic reviews can enhance transparency and institutional accountability.

By institutionalising a reliable MIS and MEL architecture, Odisha will be able to design timely, evidence-based policies and ensure that women meaningfully benefit from the state's green transition.

# CHAPTER 1: INTRODUCTION

## 1.1 Context

Globally, governments and development institutions are confronting the challenge of accelerating climate action while safeguarding social inclusion, decent work, and equity.<sup>1,2,3</sup> The concept of a *just transition*, endorsed by the International Labour Organisation (ILO), the United Nations, and multilateral development banks, has emerged as a central framework to address this challenge.<sup>4,5,6</sup> It underscores that the shift towards low-carbon, climate-resilient development pathways must generate quality employment, protect livelihoods, and ensure that the costs and benefits of transition are distributed fairly.

Within this global discourse, there is growing recognition that economic and climate transitions are inherently gendered.<sup>7,8</sup> Women are disproportionately concentrated in informal employment, subsistence agriculture, natural resource-based livelihoods, and unpaid care work—sectors that are highly exposed to climate risk and economic restructuring. At the same time, women remain significantly under-represented in skilled, technical, and leadership roles within emerging green sectors. Without deliberate policy intervention, green transitions risk reinforcing existing labour market segmentation and widening gender *inequalities*. A *gender-transformative just transition* extends beyond the objective of increasing women’s numerical participation in green jobs or enterprises. It seeks to address the structural drivers of inequality, including unequal access to skills, assets, finance, technology, time, and decision-making power, while reshaping institutions, markets, and norms to enhance women’s economic agency and leadership.

Evidence from global development practice demonstrates that gender-transformative just transitions strengthen livelihood resilience and decent work, improve green growth and climate actions and contribute to better socioeconomic and environmental outcomes.<sup>9,10</sup> India’s green transition is unfolding at an unprecedented scale, driven by ambitious commitments to renewable energy expansion, climate adaptation, sustainable industrialisation, and green skills development. These ambitions are anchored in national targets and international climate commitments articulated under the Panchamrit framework announced at COP26 in 2021. Under this framework, India has committed to achieving 500 GW of non-fossil fuel-based installed electricity capacity by 2030, with non-fossil sources accounting for 50 per cent of total installed electricity capacity. This transition is expected to fundamentally reshape India’s energy system, industrial structure, and labour markets. As India accelerates its shift toward renewable energy, demand for green jobs is projected to grow rapidly, with skills emerging as a critical binding constraint.

Preparing both new labour-market entrants and the existing workforce for a low-carbon economy requires embedding green skills across the education and training continuum—from school curricula and technical education to vocational training and mid-career reskilling. Without systematic integration of green competencies into skilling systems, the pace of renewable energy deployment risks outstripping the availability of a suitably trained workforce. According to sector estimates, fully deploying the 339 GW solar and wind potential by 2030—as part of achieving the 500 GW renewable energy goal—could create up to 3.4 million new jobs across the renewable energy value chain.

Nonetheless, such projections intersect with persistent informality, regional disparities, and entrenched gender inequalities in the labour market.<sup>11</sup> Bridging the gap between climate ambition and inclusive development therefore, requires the systematic integration of gender-transformative just transition principles into policy design, programme implementation, and institutional coordination. From a just transition perspective, there is a skills gap that carries important distributional implications. If green skilling systems are not deliberately designed to be inclusive, the rapid expansion of renewable energy risks reproducing existing labour-market inequalities—particularly excluding women, informal workers, and workers from transition-affected regions.

Despite strong policy frameworks on gender equality, climate action, and skill development, these agendas remain insufficiently integrated. Green growth strategies tend to prioritise infrastructure and investment, while women's empowerment initiatives focus largely on welfare delivery, financial inclusion, and social mobilisation. This separation limits women's ability to access emerging green jobs and to scale enterprises in growth-oriented sectors. Without a gender-transformative approach, India's green transition risks reinforcing occupational segregation, with men capturing higher-productivity green jobs and women remaining concentrated in low-return activities.

A gender-transformative just transition therefore, requires moving beyond narrow participation metrics towards outcomes that enhance women's economic agency, income security, and leadership in transition processes. In this context, Odisha provides a salient sub-national case study for understanding various development questions. As a mineral-rich and climate-vulnerable state, Odisha is at present navigating industrial restructuring, energy transition, and livelihood diversification simultaneously. The state has also made sustained investments in women's collectivisation, social protection, and livelihood promotion, creating a distinctive institutional landscape through which gender-transformative green transition strategies can be examined and refined.



## 1.2 Policy Imperatives

Despite progress in women's education, self-help group mobilisation, and welfare delivery, substantial gender gaps persist in skills acquisition, labour force participation, and entrepreneurship—particularly in emerging green sectors. Women remain over-represented in informal, low-productivity activities and under-represented in technical training, growth-oriented enterprises, and formal employment. Constraints related to mobility, digital access, finance, market linkages, and high unpaid care responsibilities continue to limit women's economic choices and advancement.<sup>12</sup> Current green transition pathways risk entrenching these disparities. Green jobs and enterprises are frequently designed around formal, capital-intensive, and male-dominated sectors, while women's existing contributions to sustainability—through agriculture, forestry, waste management, and micro-enterprise—remain undervalued and under-supported. In the absence of gender-transformative and care-sensitive strategies, women are likely to bear disproportionate adjustment costs while remaining excluded from the benefits of green growth.

This report addresses this policy gap by examining how women can be positioned as active contributors, leaders and agents of change within just transition processes. Moreover, the report analyses the current status of women in the green skilling and entrepreneurship ecosystem of Odisha at the forefront of transition risks – one of the most critical states characterised by extractive industrial mono-economies, poverty, migration and legacy of socio-economic, regional and gender inequalities on one hand, and on the other hand, progressive policy making, social welfare and women SHGs system. Using Odisha as a case study, it analyses the structural and institutional conditions shaping women's participation in green skilling and entrepreneurship, with insights of relevance for India and other sub-national contexts undergoing similar transitions.

## 1.3 Objectives

The report seeks to contribute to policy and practice by operationalising a gender-transformative just transition framework at the sub-national level. Its specific objectives are to:

- Review and map the gender-responsive elements within Odisha's existing skill and entrepreneurship policy landscape, assess their effectiveness and identify the gaps and implementation challenges that affect women's participation;
- Examine women's participation in green skilling and entrepreneurship with a focus on highly industrialised and transitioning districts;
- Identify key barriers and enabling factors influencing women's engagement and progression in emerging green sectors;
- Recommend a coherent agenda of actionable policy measures to strengthen women-led pathways within Odisha's just transition strategies and expand their access to green economic opportunities.

## 1.4 Methodology

The study adopts a mixed-method, policy-oriented approach that integrates quantitative and qualitative techniques to address the core objectives. It combines extensive secondary research with primary field surveys, key informant interviews, and focus group discussions to ensure analytical depth and contextual understanding.

### 1.4.1 Secondary Research

The secondary research involved systematic data procurement, validation, and analysis from credible state, national, and international sources. An extensive review of published reports, policy documents, and institutional studies was undertaken to understand Odisha's energy transition trajectory, industrial decarbonisation pathways, and workforce-development priorities.

Sectoral data were compiled from government publications, industry departments, official dashboards, and national datasets such as the Periodic Labour Force Survey (PLFS). Descriptive statistics and comparative indicators were used to analyse women's participation in skilling and entrepreneurship within broader labour-market dynamics.

Projected employment estimates were sourced from the Industrial Promotion and Investment Corporation of Odisha Limited (IPICOL) and related state databases. A detailed skill-supply assessment was conducted to examine the capacity of Odisha's training ecosystem—including Industrial Training Institutes (ITIs), polytechnics, and state-run training centres. This assessment focused on the range of trades offered, infrastructure and laboratory readiness, availability of trainers, and institutional preparedness to meet the requirements of rapidly evolving sectors such as renewable energy, electric mobility, and sustainable manufacturing.

### 1.4.2 Primary Research

The primary research component was designed to capture on-ground perspectives on Odisha's emerging green and green entrepreneurship landscape and to assess the gender gaps. A purposive sampling approach was adopted to ensure inclusion of relevant institutions and stakeholder groups across the state.

Primary data were collected through three complementary instruments - Survey, Key Informant Interviews and Focus Group Discussions - covering a wide range of stakeholders which includes training institutions, trainees, trainers, women entrepreneurs (Self Help Groups) and industries:

**Student Surveys:** Conducted with learners in selected ITIs to understand women's perceptions of access, training quality, course relevance, awareness of green skills, and barriers to entry and retention and the potential for green entrepreneurship.

**Surveys with Trainers, Instructors, and Heads of Institutions (Principals):** Undertaken to examine the extent of gender mainstreaming in existing curricula, classroom practices, and institutional processes.

**Key Informant Interviews (KIs):** In-depth discussions with senior representatives from NSDC, SCGJ, OSDA, and the World Skill Center to gather insights on policy direction, institutional challenges, and gender-responsive training interventions.

**Focus Group Discussions (FGDs) with Self-Help Groups:** Eight FGDs were conducted with 110 women entrepreneurs to understand their socio-economic profiles, sectoral opportunities, policy gaps, and the barriers constraining women-led entrepreneurship in green and allied sectors.

**Employer and Employee Interviews:** Semi-structured interviews with companies in the solar and electric vehicle (EV) sectors to assess women's participation.

**Table 1.1: Sample distribution**

| Stakeholder category*                                                                                                   | Sample size |
|-------------------------------------------------------------------------------------------------------------------------|-------------|
| Total ITI trainees (Male + Female)                                                                                      | 637         |
| <ul style="list-style-type: none"> <li>Total Female Co-Ed ITIs</li> <li>Womens' Polytechnic</li> </ul>                  | 246<br>66   |
| Trainers and institutional representatives                                                                              | 25          |
| Officials from Odisha Skill Development Authority (OSDA), World Skill Centre (WSC), Skill Council for Green Jobs (SCGJ) | 4           |
| Women Entrepreneurs associated with 8 Self-Help Groups                                                                  | 110         |

\*Employee and Employer Survey in Solar and EV Sectors in Odisha had hardly two women workers in the non-technical roles, hence, they are not included in our primary sample, however, we draw on the insights emerging from those surveys.

### 1.4.3 Target Groups and Intersectionality

An intersectional analytical framework underpins the methodology, recognising that gender interacts with caste, tribe, geography, age, and sector to shape access to opportunities and exposure to risk. Odisha is used as an illustrative case to examine how gender transformative just transition approaches can be embedded within existing institutional architectures through an integrated and coordinated strategic approach across stakeholders, for which the following are the target groups for our study, dissemination of findings and policy advocacy:

#### For Co-creation of Study/Research:

- Women in mining- and industrial-transition districts
- Tribal, Lower Caste and forest-dependent rural women
- Women from SHGs and informal enterprises
- Young women entering the labour market

**For Dissemination & Policy Advocacy:**

- Government officials and agencies at the central level such as the Ministry of Coal, Ministry of Skill Development and Entrepreneurship, Skill Council for Green Jobs (SCGJ).
- State government departments such as Odisha Skill Development Authority (OSDA), Energy Department, Directorate of Skill Development cum Employment, Department of Mission Shakti
- Industry such as Coal India Limited (CIL)
- Civil Society Organisations

## **1.5 Expected Outcomes**

The report seeks to inform policymakers, funders, and practitioners by providing evidence-based insights and actionable recommendations to strengthen women's participation in Odisha's green economy and ensure a gender-transformative just transition.

Evidence based proposed recommendations of the report will help Odisha in gender transformative just energy transition in the following key areas.

- Increase enrolment of women in green skill programmes such as Odisha Green Skill Mission, high-tech green skill courses and sectors.
- Enhance income, productivity, and resilience of women workers and entrepreneurs.
- Diversification of local economies in mining- and climate-vulnerable districts and growth in number and diversity of women-led green enterprises.
- Reduce gender gaps in skills, enterprise scale, and quality employment with improved access to formal finance and digital markets for women entrepreneurs.
- Greater participation of women in local economic and environmental governance and women's collectives engaged in sustainable livelihoods.

## 1.6 Expected Impact

- A gender-transformative just transition in Odisha that combines economic growth with environmental sustainability, reduces regional and social inequalities, and positions women as central contributors to the state's green and resilient development pathway. This 'Theory of Change' will guide the design, implementation, and monitoring of women-focused interventions within Odisha's just transition and green growth framework.
- Increase in employability and entrepreneurship among women in Odisha.
- Development of strategic focus areas in the state which includes green skills and workforce transition, Women-led green entrepreneurship and enterprise scaling, care-responsive economic ecosystems, Inclusive governance and leadership, evidence-based planning and adaptive learning.
- Bottom-up co-creation of gender transformative pathways of green skilling and entrepreneurship which is sensitive of intersectional nuances of gender inequalities in Odisha.
- Dissemination & Policy Advocacy with relevant authorities in particular Coal India Limited (CIL), Energy Departments, Ministries, Directorates and Councils for Skill Development.

# CHAPTER 2: WOMEN'S WORK IN A TRANSITIONING ECONOMY: THE ODISHA CONTEXT

## 2.1 Introduction

As Odisha navigates transitions in energy, industry, climate resilience, and livelihoods, particularly in mineral and agriculture-dependent regions, it is critical to ensure that women are not excluded from emerging opportunities. At present, Odisha's mineral-based industrial growth and planned energy transitions present both risks and opportunities for women. In coal and other mining-dependent districts, economic restructuring and decarbonisation raise concerns around livelihood loss, displacement, and social disruption. Women in these regions are likely to bear indirect transition costs through loss of household income, labour market exclusions, increased care burdens, and reduced access to common resources.

This chapter examines women's status within the state's existing demographic, economic, labour market and other social patterns, as well as emerging green economy and associated jobs and business opportunities. It concludes with a systematic and comprehensive review of Odisha's existing state policies, explicitly assessing their alignment with the principles of gender transformative just transition, green skills, and sustainable entrepreneurship. These insights underscore the need to position women as central actors in Odisha's transition towards a low-carbon, inclusive, and resilient economy.

## 2.2 An Overview of Odisha's Economic Structure and Labour Market Patterns

Odisha's industrial growth, driven by mining, metals, construction, and utilities, has strengthened the state's economic base and is gradually diversifying towards higher value-added sectors. However, from a gender-transformative just transition perspective, this growth model also presents structural risks for women.

As industrial and green sectors expand, demand for technical, digital, and sector-specific skills is rising. Yet the capital and skill intensive nature of these jobs can reinforce gender

gaps unless transition strategies intentionally address women’s limited access to training, mobility constraints, and unequal care responsibilities. Without care-responsive infrastructure, locally accessible skilling pathways, and targeted support for women’s entry into formal employment and enterprise, women risk facing income insecurity, increased unpaid work, and exclusion from emerging green opportunities. This reinforces the need to embed gender considerations into industrial, skilling, and green growth policies from the outset.

Modernisation across manufacturing, construction, and resource-based industries, reflected in the sector’s 43.9% contribution to Odisha’s GSVA in 2024–25 (see table 2.1), with manufacturing accounting for more than half of industrial output, combined with projections that the green economy could generate up to 10 lakh full-time equivalent jobs by 2030, highlights the importance of building a skilled and adaptable workforce. Ensuring women’s inclusion in this transition will be central to capturing new opportunities and driving equitable, long-term growth.

**Table 2.1: Sectoral composition of Odisha’s GSVA**

| Sector                 | Share of GSVA (AE in%) |
|------------------------|------------------------|
| Industry               | 43.9                   |
| Services               | 37.2                   |
| Agriculture and Allied | 18.9                   |

Source: Odisha Economic Survey, 2024–2025

### LFPR and WPR Trends

Odisha records relatively high labour market engagement, with a Labour Force Participation Rate (LFPR) of 49.4% and a Workforce Participation Rate (WPR) of 47.9% both above national averages. Recent Periodic Labour Force Survey (PLFS 2023–24) data also indicate a substantial expansion of the state’s workforce, from 38.8 lakh in 2017–18 to 58.9 lakh in 2023–24.

**Table 2.2: LFPR and WPR status**

| Indicator | Region    | %age (%) |
|-----------|-----------|----------|
| LFPR      | Odisha    | 49.4     |
|           | All India | 45.1     |
| WPR       | Odisha    | 47.9     |
|           | All India | 43.7     |

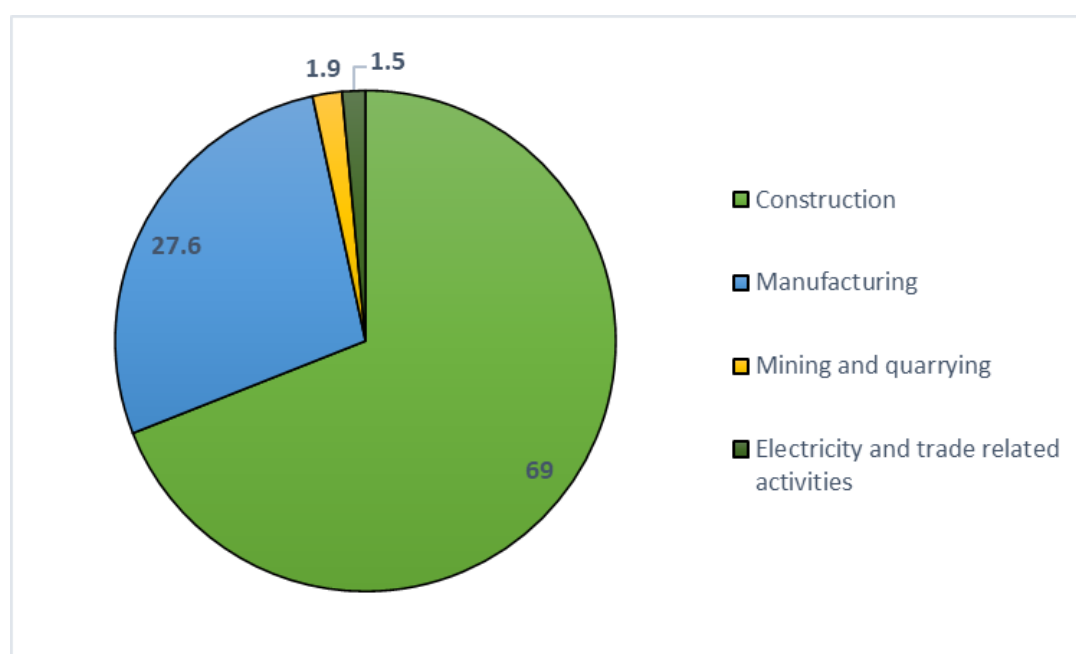
Source: PLFS Report 2023–24

However, employment remains heavily concentrated in a narrow set of sectors, particularly agriculture and construction. Approximately 49% of workers are engaged in

agriculture, while industry accounts for about 26 % and services for roughly 25% of total employment (Odisha Economic Survey, 2024-25).

Figure 2.1 shows that within the industry sector, nearly 69% of industrial workers are engaged in construction, a segment dominated by informal and low-skilled employment. Manufacturing accounts for about 28%, while mining represents less than 2% of industrial employment. Over the past decade, the sectoral composition of the workforce has shifted gradually: agriculture's share has declined from 56% to 49%, industry has risen from 23% to 26%, and services from 21% to 25%. While this suggests some structural diversification, the transition of workers into higher-productivity or skill-intensive activities remains limited. Most new entrants continue to be absorbed into informal and low-wage work rather than into formal jobs within manufacturing or modern services.

**Figure 2.1: Employment distribution in the industrial sector**



Source: iFOREST analysis based on PLFS Report 2023-24

These labour-market patterns align with the broader structural changes described earlier. The modernisation of manufacturing, construction, and resource-based industries—reflected in the industry sector's 43.9% contribution to GSVA in 2024-25, with manufacturing contributing over half of industrial output—signals both economic dynamism and the rising skill requirements of Odisha's growth model. Coupled with projections that the green transition could generate up to 10 lakh full-time equivalent jobs by 2030 across energy, circular economy, and bio-economy sectors, this underscores the urgency of strengthening the state's workforce capabilities. Ensuring that women benefit from these emerging opportunities is essential, given their current concentration in informal, low-paid, and low-mobility segments of the labour market. Without deliberate



interventions, existing gender inequalities may be reinforced rather than reduced as the economy transitions.

### Employment Dependence on Fossil Fuel Industries

Odisha's exposure to carbon-intensive value chains particularly coal mining, coal-based power generation, steel, aluminium, and associated transport and construction activities creates significant transition risks at the district level. Table 2.3 shows that more than nine lakh workers are estimated to be directly or indirectly dependent on these sectors, with livelihood concentration particularly high in Angul, Jharsuguda, Sundargarh, and parts of Dhenkanal and Sambalpur. In these districts, fossil fuel-based industries underpin local employment, informal service economies, public revenues, and household income stability.

As energy transition pathways accelerate over the next three decades, these districts face heightened risks of employment displacement, income volatility, and local economic contraction without parallel development of alternative livelihoods. While women constitute a relatively small share of formal employment in mining and heavy industry, their livelihoods are closely linked to these sectors through informal services, agriculture, forest-based activities, and household enterprises. Consequently, economic disruption in industrial districts is likely to have disproportionate indirect impacts on women, including loss of supplementary income, increased unpaid care responsibilities, and reduced access to skills and markets.

**Table 2.3: Sector-wise formal and informal workers in key industries**

| Sector                                   | No. of formal workers | No. of informal workers | Total number of workers |
|------------------------------------------|-----------------------|-------------------------|-------------------------|
| Coal mining                              | 40,515                | 65,000                  | 1,05,515                |
| Coal-based power                         | 32,293                | 60,000                  | 92,293                  |
| Factories (high and moderately impacted) | 2,45,167              | 4,90,000                | 7,35,000                |
| <b>Total</b>                             | <b>3,17, 975</b>      | <b>6,15,000</b>         | <b>9,32,658</b>         |

Source: iFOREST analysis

## 2.3 Status of Women in Odisha

Women constitute nearly half of Odisha's population and are distributed predominantly across rural areas. Odisha has maintained a favourable sex ratio with 979 females per thousand males in 2011 and 987 females per 1000 males in 2021 as compared to the national sex ratio has improved slightly from 943 in 2011 to 945 in 2021.<sup>13</sup> However, achieving gender equality remains an ongoing challenge. Women in Odisha face persistent structural disadvantages across education, work, and asset ownership. As per PLFS 2023–24, women's labour force participation rate remains low at around 32%, and nearly 46% of working women are engaged as unpaid family workers, compared to 11.6 % of men, reflecting deep gender asymmetries in economic recognition and autonomy.<sup>14</sup> Educational disparities persist, with nearly one-third of women remaining illiterate, and far fewer progressing to secondary and higher education relative to men. Access to formal employment is also limited: less than 9% of women are engaged in regular salaried work, while women-owned enterprises are overwhelmingly micro in scale and concentrated in low-productivity.

Further, the state has a distinctive social composition, with Scheduled Tribes (STs) accounting for about 22% and Scheduled Castes (SCs) about 16% of the population.<sup>15</sup> Building effective skilling and entrepreneurship pathways for women requires a clear understanding of these structural and systemic factors that shape women's educational trajectories, labour market participation, and enterprise outcomes. Consistent with ILO and UN Women frameworks, women's economic engagement is influenced not only by skills and qualifications, but by unequal access to decent work, persistent occupational segregation, the unequal distribution of unpaid care and domestic work, and barriers related to mobility, assets, finance, and voice.

This section therefore provides a comprehensive analysis of the education, skilling, entrepreneurship and employment status of women in Odisha, situating individual outcomes within the broader context of gendered labour markets and institutional arrangements. By identifying gaps in access, quality, and returns to work and entrepreneurship, the analysis aims to inform gender-responsive, care-sensitive, and rights-based policy and programme design that advances women's economic empowerment within just transition and green growth pathways.

### **Education Levels and Formal Training**

Female literacy in Odisha has improved steadily, but gender gaps persist in secondary, technical, and higher education, limiting women's access to formal training and consequently, their access to skilled and formal employment.

Table 2.4 shows the educational distribution in Odisha, which reveals a gendered pattern of attainment, with women consistently concentrated at the lower end of the education spectrum. Nearly one-third of women are illiterate compared to 22.4% men, showing that basic educational access remains a major barrier for women. At the primary and middle levels, the gender gap begins to narrow. Our analysis shows that around 27.3% of women and 29.5% of men have completed primary education, and 17.5% of women and 20.7% of men have reached middle school, indicating partial progress but still lower attainment for women in Odisha during the foundational schooling years.

At the secondary level, the shares become more comparable, with 10.3% of women and 11.5% of men having completed secondary education. However, the gender disparity widens again at higher levels of education: only 5.99% of women have completed higher secondary compared to 6.76% of men. This gap continues to persist at the graduate and postgraduate levels.

**Table 2.4: Gender-wise general education, 2023-24**

| General level of education | Men        | Women      | Total      |
|----------------------------|------------|------------|------------|
| Illiterate                 | 22.42      | 33.01      | 27.84      |
| Literate & up to primary   | 29.45      | 27.28      | 28.34      |
| Middle                     | 20.66      | 17.5       | 19.04      |
| Secondary                  | 11.49      | 10.26      | 10.86      |
| Higher secondary           | 6.76       | 5.99       | 6.37       |
| Diploma/certificate course | 1.45       | 0.26       | 0.84       |
| Graduate                   | 6.55       | 5.16       | 5.84       |
| Postgraduate & above       | 1.22       | 0.54       | 0.87       |
| <b>Total</b>               | <b>100</b> | <b>100</b> | <b>100</b> |

Source: PLFS 2023-24

Further, the vocational education profile of Odisha is represented in Table 2.5, which shows a significant gender gap in skill acquisition, with 75.5% of women reporting no vocational training compared to 52.5% of men, indicating that women enter the labour market with substantially weaker technical training.

Men are also far more likely to acquire skills through hereditary work (24%) and on-the-job training (12.7%), channels that provide practical experience and occupational identity, whereas women's access to these pathways is limited by social norms, mobility constraints, and labour market segmentation. Formal vocational training remains extremely low for both genders, around 2 %, highlighting a broader structural deficit in skill development. This unequal foundation reinforces women's concentration in low-productivity, unpaid work and limits their entry into emerging technical or green job opportunities.

**Table 2.5. Gender-wise vocational education, 2023-24**

| Vocational      | Men        | Women      | Total      |
|-----------------|------------|------------|------------|
| Formal training | 2.59       | 2.28       | 2.43       |
| Hereditary      | 24.04      | 12.09      | 17.85      |
| Self-learning   | 6.64       | 5.46       | 6.03       |
| On job training | 12.74      | 2.52       | 7.45       |
| Others          | 1.53       | 2.17       | 1.86       |
| No training     | 52.46      | 75.47      | 64.37      |
| <b>Total</b>    | <b>100</b> | <b>100</b> | <b>100</b> |

Source: PLFS 2023-24

### Female Labour Force and Workforce Participation Trends

The LFPR and WPR for female in Odisha is comparatively higher than the national figures as represented in Table 2.6, In Odisha, women are more likely to be a part of labour force and workforce. However, women's LFPR and WPR remains significantly lower than men. The male participation in Odisha stands at 85.51% which is comparatively much higher than female who shows participation at 52.38%. Similarly, WPR for males stands at 82.5% and 50.9% for female. The relatively small gap of 1.5 percentage points between Odisha's female LFPR and WPR suggests that most women who enter the labour force do end up working, unlike in some states where women remain unemployed or discouraged.

**Table 2.6: Gender-wise LFPR and WPR in Odisha and India, 2023-24**

| LFPR   | Men   | Women | Total |
|--------|-------|-------|-------|
| Odisha | 85.51 | 52.38 | 68.24 |
| India  | 82.4  | 44.02 | 63.11 |
| WPR    | Men   | Women | Total |
| Odisha | 82.53 | 50.91 | 66.05 |
| India  | 79.69 | 42.96 | 66.06 |

Source: PLFS 2023-24

The age cohort-wise LFPR analysis is represented in Table 2.6 for both India and Odisha across gender. Women in Odisha consistently participate in the labour force at higher rates than women nationally, yet sizeable gender gaps persist across all age groups. Among youth (15-29 years), Odisha's female LFPR is 37.64%, nearly 9 percentage points above the all-India average of 28.8%, while young men participate at 67.31%, about 4 points higher than the national average. In the prime working ages (30-44 years), Odisha's female LFPR rises to 62.69%, around 7 points above the Indian average of 55.9%, whereas men record near-universal participation at 99.01%. Even among older adults (45-65 years), Odisha's female LFPR remains about 8 points higher than the national norm.

While this trend indicates stronger labour-market attachment among Odisha's women, persistent gender disparities in labour market participation, income, access to skill training, and job quality continue to constrain their economic outcomes.

**Table 2.7: Age-wise LFPR in Odisha and India across Gender, 2023-24**

| Age cohorts*  | Men   | Women | Total |
|---------------|-------|-------|-------|
| <b>India</b>  |       |       |       |
| 15-29         | 63.51 | 28.8  | 46.47 |
| 30-44         | 98.54 | 55.9  | 76.71 |
| 45-65         | 88.96 | 49.06 | 68.77 |
| <b>Odisha</b> |       |       |       |
| 15-29         | 67.31 | 37.64 | 52.12 |
| 30-44         | 99.01 | 62.69 | 79.19 |
| 45-65         | 92.07 | 56.97 | 74.28 |

Source: PLFS 2023-24

\*Age cohorts have been designed from the just transition perspective where 15-29 yrs suggest young workers (future workers have green skilling opportunities and challenges), 30-44 yrs suggest middle aged women (currently available to work/employed in traditional sectors have the scope of green reskilling or upskilling opportunities and challenges) and finally, 45-65 yrs suggest aging population (near term retirement/retired requires retrenchment benefits/pensions/compensation)

Analysis by the Directorate of Economics and Statistics, Government of Odisha, shows a widening gender divergence in sectoral employment between 2017-18 and 2022-23. While the share of men employed in agriculture fell from 40.73% to 35.48%, women's dependence on the sector increased sharply, with nearly seven in ten working women now engaged in agriculture. Over the same period, women's participation in both industry and services declined substantially, even as male employment in these sectors remained stable or rose.

These shifts have significant implications for Odisha's just transition and green growth agenda. As the state moves toward decarbonisation and industrial restructuring, women are becoming increasingly concentrated in agriculture—an informal, low-productivity, and climate-vulnerable sector—while remaining largely excluded from industry and services, where many green and value-added jobs are expected to emerge. Without targeted intervention, transition pathways risk reinforcing gendered labour-market segmentation and deepening economic insecurity for women.

A gender-transformative just transition in Odisha will require deliberate measures to counter these trends, including expanding women's access to green and technical skills through SDTE-led programmes, creating gender responsive mandates in Odisha Green Skills Mission, linking Mission Shakti platforms to emerging green value chains, and strengthening care-support infrastructure to enable women's sustained participation in higher-productivity employment and entrepreneurship.

## **Women's Participation in Entrepreneurship**

Women constitute an important but structurally constrained segment of Odisha's entrepreneurship landscape. Most women-led enterprises, largely facilitated through SHGs under Mission Shakti, remain micro in scale and concentrated in low-value, low-growth activities. According to Udyam Registration data (2022-23), one in five MSMEs in Odisha is women-owned; however, these are predominantly micro enterprises with limited potential for expansion, productivity improvement, or formalisation.<sup>16</sup> Barriers in access to finance, technology, business development services, and formal markets continue to restrict women's ability to scale and integrate into higher-value chains.

These constraints differ across geographies. In rural and tribal districts, women's enterprises are closely tied to agriculture, forest-based livelihoods, and home-based production, often seasonal, informal, and vulnerable to climate and market shocks. Opportunities to diversify into manufacturing, services, or green value chains remain limited due to weak infrastructure, poor market linkages, and limited technical skills. Urban and peri-urban districts offer greater exposure to service-sector and market-oriented opportunities, yet women entrepreneurs still face barriers related to mobility, care responsibilities, safety, and access to growth capital, resulting in continued concentration in informal, low-return enterprises.

Odisha has adopted a multi-pronged strategy to promote women-led development, combining income support, entrepreneurship promotion, and enabling labour-market policies. The SUBHADRA Yojana provides ₹10,000 per year for five years, strengthening women's financial security and household resilience. Mission Shakti and the Lakhpati Didi initiative further support women through seed capital, subsidised credit, technical assistance, and market linkages. Workforce participation is enabled through expanded crèche-cum-care centres and enhanced health security, including ₹5 lakh additional health insurance coverage for women members.<sup>17</sup>

Sector-specific policies also integrate women into growth sectors. Women entrepreneurs receive an additional 5% capital subsidy under the Tourism and Food Processing Policies (raising total subsidy to 35%), preferential benefits under the Odisha Export Policy, and employment-linked incentives of ₹6,000 per female worker per month for five years under the Apparel and Technical Textile Policy. The Odisha IT and Data Centre Policies provide interest subsidies, one-time support of ₹1,000 per woman employed, ₹2,000 per woman hired, and reimbursement of training costs, while biotechnology reforms allow night and three-shift employment for women. Collectively, these policies reflect Odisha's shift from welfare-oriented interventions to a structured framework positioning women as central drivers of entrepreneurship and economic growth.

However, employment patterns within the MSME ecosystem reveal persistent gendered inequalities. Nearly half of all working women in Odisha are engaged as unpaid family workers, often supporting family enterprises without control over income or assets. This pattern is especially pronounced in mining, forest, and agriculture-dependent districts, where women's economic participation remains mediated through household-based activities rather than independent entrepreneurship. In contrast, only 11.62% of men are unpaid family workers, underscoring stark disparities in enterprise ownership, economic autonomy, and access to returns.

**Table 2.8: Gender-wise worker Category, 2023-24**

| Worker category |                         | Men   | Women | Total |
|-----------------|-------------------------|-------|-------|-------|
| Self-employed   | Own account worker      | 32.74 | 25.05 | 29.65 |
|                 | Employer                | 8.55  | 1.68  | 5.79  |
|                 | Unpaid family worker    | 11.62 | 45.86 | 25.38 |
| Regular workers | Regular salaried worker | 17.56 | 8.89  | 14.08 |
| Casual workers  | public work             | 0.11  | 0     | 0.06  |
|                 | Other                   | 29.43 | 18.52 | 25.04 |

Source: PLFS 2023-24

## 2.4 Green Economy Prospects in Odisha

Odisha's economy is entering a decisive phase of industrial transformation, shifting from resource extraction toward sustainable manufacturing and clean energy systems. As highlighted in the Odisha Economic Survey 2024-25, the state now prioritises investments in renewable energy, green hydrogen and ammonia, compressed biogas, electric mobility, battery manufacturing, circular economy activities, technical textiles, and sustainable food and packaging industries.<sup>18</sup> This transition is expected to reshape employment patterns, with significant gender implications.

Long-term projections indicate that Odisha could generate up to 10 lakh full-time equivalent (FTE) green jobs by 2030 across 28 value chains, clustered around four major areas: renewable energy and storage, green hydrogen and ammonia, electric-vehicle and battery manufacturing, and bioenergy and circular-economy activities.

Near-term estimates, based on IPICOL's 2023-25 industrial pipeline, point to nearly 98,000 green jobs emerging from investments in RE equipment, EV and battery manufacturing, green hydrogen and ammonia, and circular-economy enterprises. These roles span manufacturing, construction, installation, operations and maintenance, quality testing, recycling, agro-processing, and supply-chain support. While these functions present clear entry points for women, their participation will continue to be shaped by constraints related to mobility, safe transport, hostel facilities, workplace norms, and access to care-support infrastructure.

Together, these projections underscore both the scale of opportunity and the risk of exclusion embedded in Odisha's green transition. Without deliberate gender-responsive strategies, employment gains in capital and skill intensive green sectors may accrue disproportionately to men, reinforcing existing inequities. Targeted skilling initiatives, women-specific apprenticeships, flexible and localised training models, and enterprise-support platforms such as Mission Shakti will be essential to enable women to move from unpaid or informal work into stable, remunerative green employment.

Odisha also faces a dual challenge: managing the decline of fossil-fuel-dependent industries while capturing new green employment. In coal-, steel-, and aluminium-dependent districts, just transition strategies must explicitly address women's indirect dependence on these sectors through household livelihoods, informal services, and unpaid care work. Diversifying local economies, expanding women's access to green skills and entrepreneurship, and strengthening social and care infrastructure will be critical to ensure that the transition reduces rather than deepens gender and regional inequalities and positions women as central contributors to Odisha's green and resilient development pathway.

**Table 2.9: Projected green employment estimates**

| Sector                                                | CEEW<br>(2030 projections) | IPICOL (2023-<br>25 investment pipeline) |
|-------------------------------------------------------|----------------------------|------------------------------------------|
| RE and storage                                        | 4.0 lakh*                  | 50,946                                   |
| Green hydrogen and ammonia                            | 40,000**                   | 23,918                                   |
| EV and battery manufacturing                          | 30,000***                  | 15,408                                   |
| Bioenergy, Nature-based solution and circular economy | 5.3 lakh****               | 7,564                                    |
| <b>Total</b>                                          | <b>10,00,000</b>           | <b>97,836</b>                            |

Source: iFOREST analysis of IPICOL data and CEEW estimates

\*Utility-scale solar, rooftop solar, floating solar, onshore wind deployment, renewable-equipment manufacturing (modules, turbines), pumped-storage hydropower (PSH), battery energy storage systems (BESS), distributed renewable energy (DRE) for livelihoods.

\*\*Green hydrogen production, green ammonia manufacturing, electrolyser equipment production.

\*\*\*EV assembly and component manufacturing, battery-pack manufacturing, battery recycling (li-ion waste), EV charging infrastructure deployment.

\*\*\*\*Includes biogas/CBG production, bio-fertilisers, organic farming, eco-tourism and mangrove restoration, construction & demolition waste recycling, battery & e-waste recycling, bamboo and bio-packaging industries, agro-processing and forest-based livelihood value chains.



## 2.5 Assessing Gender Equity and Intersectional Approach in Odisha's State Policies

Odisha's women-focused skills and entrepreneurship ecosystem is strongest at the collective and micro-enterprise level, but weaker in enabling women's transition into growth-oriented, technology-intensive, and green MSMEs. Greater convergence between credit, advanced skilling, industrial infrastructure, and care support is essential to translate participation into productivity and leadership in the green economy.

The comparative mapping of women-focused entrepreneurship and skilling schemes in Odisha reveals a dense and institutionally robust policy ecosystem. However, viewed through a gender equity and intersectional lens, the table also exposes structural asymmetries in who benefits, how value is created, and how women are positioned to participate in Odisha's emerging green economy.

**Table 2.10: Women-focused entrepreneurship & skills schemes relevant to Odisha's green transition**

| Scheme Cluster                                                   | Lead Agency              | Primary Support                                       | Women's Entry Point                               | Green / Just Transition Link                                     |
|------------------------------------------------------------------|--------------------------|-------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------|
| Mission Shakti (incl. Green Shakti, Producer Companies)          | Govt. of Odisha          | SHG collectivisation, procurement, enterprise support | Collective women-led micro & producer enterprises | Platform for women in NTFP, agro-processing, waste, eco-services |
| Stand-Up India                                                   | Gol; Banks               | Loans ₹10L–₹1Cr                                       | Formal credit for women entrepreneurs             | Enables women-led MSMEs in greenfield sectors                    |
| State Enterprise Support (Nano Unicorn, Sudakshya, PRAYAS, PLTP) | Govt. of Odisha / IPICOL | Seed grants, incubation, local skilling               | Transition from SHGs to growth-oriented MSMEs     | District-level pilots for green entrepreneurship                 |
| Green College Odisha                                             | BRLF + GoO               | Climate-smart farming, value addition                 | Tribal women as green entrepreneurs               | Climate-resilient agriculture & NTFP value chains                |
| Skilling & Apprenticeships (PMKVY, DDU-GKY, NAPS, SDTE)          | MSDE; SDTE Odisha        | Technical training, placement, apprenticeships        | Entry into certified trades Women's reservation   | Workforce pipeline for RE, EV, green manufacturing               |
| Jan Shikshan Sansthan (JSS)                                      | MSDE / NGOs              | Doorstep vocational skills                            | Marginalised & low-literacy women                 | Local green services (waste, agro, bio-inputs)                   |
| Women Industrial Park (Proposed)                                 | IPICOL; GoO              | Plug-and-play industrial infrastructure               | Formalisation & scaling of women MSMEs            | Enables women-led green manufacturing                            |

Source: iFOREST Analysis

## **Strong Reach, Uneven Empowerment Outcomes**

From a gender equity perspective, schemes such as Mission Shakti, JSS, PMKVY, and Stand-Up India have succeeded in expanding access—particularly for women from rural, tribal, Scheduled Castes (SCs), and low-income households. The scale of outreach is significant, with SHGs and doorstep skilling platforms effectively lowering entry barriers related to literacy, mobility, and social norms.

However, the equity of outcomes remains limited. Most women beneficiaries are concentrated at the micro-enterprise or subsistence skill level, with minimal transition into growth-oriented enterprises, formal employment, or asset-intensive green sectors. This reflects a familiar policy pattern: women are included numerically but remain structurally positioned at the lowest rungs of value chains, reinforcing what UN Women terms inclusive participation without economic power.

## **Intersectional Segmentation Across Schemes**

Table 2.10 illustrates a de facto segmentation of women by social location:

- Tribal and rural women are primarily reached through Green College Odisha, Green Shakti Producer Companies, JSS, and Mission Shakti, anchoring them in agriculture, forestry, and NTFP-based livelihoods.
- Urban and peri-urban women, particularly those with higher education, are more likely to access Nano Unicorn, Startup Odisha, PMKVY technical tracks, and proposed industrial parks.
- Women in transition-affected districts (coal, steel, aluminium belts) remain weakly integrated across both streams, with few schemes explicitly addressing their reskilling needs.
- While such differentiation responds to contextual constraints, it also risks institutionalising occupational segregation, where caste, geography, and education predetermine the ceiling of women's economic childcare support,
- Provides flexible training schedules, safe transport and hostels, proximity-based industrial infrastructure but limits women's sustained participation—particularly in technical advancement rather than enabling mobility across sectors and scales.

## **Persistent Care, Mobility, and Time Poverty Constraints**

- Across schemes, unpaid care work remains largely unaddressed. This reproduces what the ILO identifies as a “care penalty” in labour market transitions, disproportionately affecting rural, married, and low-income women.

## **Credit Without Capability Can Deepen Risk**

While Stand-Up India emerges as a powerful gender-equalising instrument in credit access, the table 2.10 also highlights a capability gap. Credit is often extended without parallel investments in:

- advanced technical skills,
- market intelligence,
- enterprise formalisation,
- Risk mitigation mechanisms.

For first-generation women entrepreneurs—especially from SC/ST backgrounds—this can increase indebtedness without commensuration of income gains, raising concerns from a feminist economics perspective about financial inclusion without empowerment.

## **Green Transition Opportunities: Narrow Entry Points for Women**

- Although many schemes are nominally “green-relevant,” women’s roles remain concentrated in labour-intensive, low-carbon but low-return segments—organic farming, NTFPs, waste sorting, and eco-services. Entry into higher-value green domains—renewable-energy equipment, EV manufacturing, battery systems, and green construction—remains largely mediated through male-dominated skilling and apprenticeship pathways.
- This reflects the skills-sector’s misalignment, where women’s training pathways are insufficiently linked to the technical requirements of emerging green industries, undermining the promise of a gender-transformative just transition.

## **Governance Fragmentation and Missing Convergence**

- From an intersectional governance standpoint, table 2.12 suggests parallel but weakly convergent systems:
- SHG and livelihood institutions operate largely outside industrial and skilling ecosystems;
- skilling schemes are insufficiently aligned with district-level transition risks;
- enterprise promotion is decoupled from labour-market planning and care infrastructure.
- This fragmentation disproportionately disadvantages women who face multiple, intersecting barriers—low education, caste disadvantage, geographic isolation, and care burdens—making navigation across schemes difficult without strong institutional handholding

## **Implications for a Gender-Transformative Just Transition**

Taken together, table 2.12 reveals that Odisha's current ecosystem is gender-inclusive but not yet gender-transformative. Advancing equity will require:

- shifting women from subsistence to strategic sectors;
- enabling cross-sector mobility rather than reinforcing social segmentation;
- embedding care-sensitive design across skilling, enterprise, and industrial policies;
- aligning women's training pathways with high-growth green value chains, particularly in transition-affected districts.
- Without these shifts, women risk remaining participants in Odisha's energy transition but not beneficiaries of its economic gain.

# Chapter 3: Women in Green Skilling and Entrepreneurship in Odisha

## 3.1 Introduction

Odisha's energy transition, driven by investments in renewable energy, green manufacturing, electric mobility, circular economy systems, and low-carbon industrialisation, will create significant new employment opportunities while also exposing fossil-fuel-dependent districts and workers to transition risks. The spatial and sectoral distribution of green jobs is likely to be uneven, with women facing a heightened risk of exclusion unless skilling and entrepreneurship pathways are intentionally designed to be gender responsive and transformative.

Against this backdrop, the chapter assesses whether Odisha's existing skilling ecosystem and entrepreneurship architecture are adequately preparing women to participate in emerging green economic opportunities. The analysis draws on primary surveys, focus group discussions (FGDs), and key informant interviews (KIIs) conducted with training institutions (trainees, trainers, principals, solar and EV enterprises), Officials from Odisha Skill Development Authority (OSDA), World Skill Centre (WSC), Skill Council for Green Jobs (SCGJ) and Self-Help Group (SHG) members. The objective was to understand the multiple layers shaping women's readiness for green work, including awareness levels, institutional capacity, access barriers, and aspirations.

The primary research covered 637 trainees enrolled in ITIs and skill centres, including 246 female trainees, of whom 66 were enrolled in women's polytechnic institutes. It also captured insights from 25 faculty members and institutional representatives, as well as 110 women entrepreneurs associated with SHGs, alongside consultations with key ecosystem actors, and 4 interviews with officials from Odisha Skill Development Authority (OSDA), World Skill Centre (WSC), Skill Council for Green Jobs (SCGJ).

Together, these data offer a detailed view of how inclusive, and gender transformative Odisha's current policies and programmes are in practice. They highlight the enabling conditions that can catalyse women's participation in the green economy, while also identifying persistent structural barriers that limit women's access to green skilling and enterprise pathways despite a strong institutional foundation. If these gaps remain unaddressed, they risk reinforcing gendered segmentation within Odisha's green labour markets.

## 3.2 Primary Findings: Women in Green Skilling

### 3.2.1 Low Enrolment Ratio

Odisha has built a strong foundation for skill development through an extensive network of technical and vocational institutions, positioning the state as a leader in eastern India. As the demand for workers increasingly shifts toward renewable energy, electric mobility, green manufacturing, and circular-economy activities, the state's skilling architecture will play a decisive role in determining whether local workers, particularly women, can move into these sectors.

The Skilled in Odisha initiative has significantly improved the quality and relevance of vocational education by enhancing ITI performance, expanding enrolments, and establishing Odisha as a nationally recognised skilling leader. Investments in modern training infrastructure and advanced institutions such as the World Skill Center (WSC), Bhubaneswar have broadened pathways into high-skill occupations. Partnerships with organisations such as Tata STRIVE, Autodesk, and Microsoft have introduced digital and industry-aligned curricula, strengthening the alignment between training and technological change.

However, the findings of this chapter indicate that while the overall skilling system is evolving with emerging industries, its gender responsiveness has not kept pace. As Odisha moves away from coal-dependent growth pathways and into green industrialisation, the skilling ecosystem must not only respond to new sectoral requirements but also address the gendered barriers that continue to restrict women's participation. Private ITIs, despite offering a larger share of training seats, continue to report high vacancy rates due to affordability concerns and perceptions of lower quality. Women's enrolment remains significantly lower in these institutions than in government ITIs, even with the support provided through the Sudakshya scheme.

These patterns underscore a central challenge for Odisha: expanding access alone is insufficient unless women are actively supported to enter and remain in sectors that will define the state's green economic future.

**Table 3.1: Number of ITIs and seat occupancy rate**

| Type of ITI | Total No. | Total Seats | Seat Occupancy |
|-------------|-----------|-------------|----------------|
| Government  | 72        | 23,560      | 99%            |
| Private     | 418       | 57,490      | 65%            |

Source: SDTE, Odisha - Activity Report 2024-25

**Table 3.2: Share of female enrolment in government ITIs Odisha (2016-17 to 2022-23)**

| Year    | Female Enrolment Share (%) | Policy Context                                                                  |
|---------|----------------------------|---------------------------------------------------------------------------------|
| 2016-17 | 6.0                        | Pre-Sudakshya period; limited gender-specific incentives                        |
| 2019-20 | 12.0                       | Initial rollout of Sudakshya (stipend, transport, hostel support)               |
| 2022-23 | 22.49                      | Expanded Sudakshya coverage; targeted mobilisation; structural barriers persist |

Source: SDTE Activity Report 2022-23, Government of Odisha

Despite a near fourfold increase in women's enrolment in Government ITIs since 2016-17, female trainees still account for less than one-quarter of total enrolments. This suggests that while policy incentives such as Sudakshya have improved women's access, they have not shifted underlying gender norms that shape participation in technical trades. For a green transition that relies heavily on ITIs as entry points into renewable energy, EV maintenance, and green manufacturing, this persistent gender gap risks reinforcing exclusion. Unless Sudakshya is more deliberately aligned with green-trade diversification, safe mobility, and placement-linked pathways for women, the expansion of green skilling is likely to bypass a large segment of potential female workers. In turn, this will limit women's entry into higher-productivity green jobs and weaken the equity objectives of Odisha's just transition.

Primary survey findings reinforce this concern. Women's participation in green skilling remains extremely limited and clustered in a narrow set of traditional or lower-paying trades, with very low representation in technical or emerging green occupations. Out of 637 trainees surveyed, only 6% were enrolled in green skill courses. The gender imbalance within this group is stark: men account for 75% of enrolments, while women constitute only 25%. Among the women who did enrol in green trades, all were concentrated in electrical courses related to solar applications, with no participation in EV maintenance, waste management, or other advanced green sectors.

These training-stage disparities are mirrored in the labour market. Employer surveys in the solar and EV sectors found only two women employed across the participating enterprises, both in administrative and HR roles. Technical roles in installation, operations and maintenance, and servicing continue to be dominated by men. This indicates that women face both entry barriers into tech-driven green trades and distributional barriers within green labour markets, limiting their participation even when they possess foundational skills.

### **3.2.2 Barriers to Enrolment in Green Skills**

The decision to enroll in green skill courses is shaped primarily by uncertainty about employment outcomes rather than by financial constraints. The largest share of trainees, 28.3%, reported low confidence in securing a job after training. Limited local availability of green courses (16.1%) and weak company engagement or industry exposure (15.2%) further restrict enrolment. An additional 9.6% felt that green jobs are “too new or uncertain,” underscoring widespread apprehension about the stability and future prospects of green-sector work.

Social barriers play a smaller but important role in shaping women’s participation. Safety and travel concerns were cited by 4.8% of respondents, lack of family support by 2.2%, and the perception that green jobs are “not for women” by 1.3%. These figures indicate that gender norms continue to influence choices, but the most decisive deterrents stem from structural constraints such as limited course availability, weak industry linkage, and unclear employment pathways.

Faculty insights reinforce these patterns. Low awareness of green career options, affordability concerns, and family hesitation remain significant barriers. Many trainees continue to prefer traditional trades viewed as more stable or familiar, reflecting broader uncertainty about emerging green sectors. Faculty also noted that female trainees face compounded barriers, including mobility restrictions, safety considerations, and entrenched norms that discourage participation in male-dominated or field-based trades such as EV maintenance, waste management, and environmental services. The absence of women role models or visible success stories in green jobs further deepens risk aversion among both trainees and families.

Perspectives from ITI principals highlight the systemic nature of these constraints. Male trainees constitute more than 80% of total enrolment across most institutions, demonstrating persistent gender imbalance in technical education. While some ITIs have introduced gender-inclusive measures such as women’s hostels, scholarships, and counselling, these interventions remain limited in scale and unevenly implemented.

Structural factors continue to shape enrolment decisions, particularly in rural and tribal areas where household-level awareness is low, and mobility restrictions are stronger. Principals emphasised the need for targeted outreach, mentorship by women professionals, safer learning environments, and deeper community engagement. Partnerships with SHGs, NGOs, and local institutions were widely recognised as essential for expanding awareness, building confidence among families, and enabling women to enter technical and emerging green skill pathways.



### **3.2.3 Lack of Institutional Support**

Awareness of green jobs and green skills remains uneven across training institutions. While 58.2% of respondents reported having heard of green jobs or green skills, nearly one-third of female trainees (31.6%) had no awareness, and a further 10.2% were unsure. This fragmented awareness base indicates that green skilling concepts and courses have not yet been systematically integrated into ITI and skill-centre curricula, limiting informed decision-making among women trainees.

At the community level, perceptions of green skills are narrowly concentrated around solar energy and electric mobility, which together accounted for 67% of responses among female trainees, with solar emerging as the most clearly recognised domain. Awareness of other green sectors, such as bioenergy, waste management, sustainable agriculture, environmental services, and circular-economy activities, remains limited or scattered. Further, 26.80% of trainees confirmed that there is no institutional support for green careers or starting a green entrepreneurship.

These patterns suggest that women's low participation in green skilling is shaped more by restricted exposure than by limited aspiration. The narrow understanding of green career pathways also explains why all surveyed female trainees enrolled in green courses were concentrated exclusively in electrical trades linked to solar applications, reinforcing occupational clustering even within the emerging green economy.

### **3.2.4 Suitability of Green Jobs among Young Female Trainees**

Perceptions of women's suitability for green jobs are mixed but clearly evolving. While traditional norms continue to shape attitudes, there is growing evidence of a generational and aspirational shift. A plurality of respondents (28.1%) explicitly stated that women can work in green sectors, indicating broader acceptance of gender equality in technical and environmental occupations. A further 9.4% viewed green jobs as positive opportunities for women, associating them with meaningful, safe, and socially valued work.

At the same time, 21.9% perceived green jobs as male-dominated, often linking them to physical labour, outdoor tasks, or technical complexity. These views are reinforced by safety concerns (10.9%) and family or social restrictions (6.3%), reflecting how mobility constraints and household norms continue to shape women's occupational decisions, especially in rural areas.

A notable 15.6% of respondents expressed uncertainty or lack of awareness, suggesting that hesitation stems less from opposition and more from limited exposure to real examples of women working in green sectors. Skill and physical work-related concerns

(7.8%) further highlight gendered assumptions about technical competence rather than actual capability gaps.

Overall, the findings indicate that green jobs are no longer uniformly viewed as “male work,” but remain socially negotiated spaces where acceptance is growing, yet uneven and heavily influenced by weak exposure, norms, and perceived risks.

### **3.2.5 Enabling Factors for Women’s Participation in Green Skill Courses**

Feedback from female ITI trainees’ points to a clear set of factors that would strengthen women’s participation in green skilling. The most influential enabler is access to reliable information about green careers. Trainees consistently emphasised that better awareness of job prospects, training pathways, and sector opportunities would significantly increase women’s interest in green skills. This is followed by the need for nearby and affordable training centres, as well as safe and reliable mobility options. Together, these findings reveal that women’s low participation is shaped less by hesitation and more by the absence of accessible, credible, and locally visible pathways into the green economy.

While attitudes toward gender equality are gradually becoming more supportive, safety concerns, mobility challenges, and prevailing social norms continue to limit women’s choices. The coexistence of progressive aspirations and structural barriers highlights the importance of visible role models, community sensitisation, and safe training-to-employment pathways. Strengthening these enablers will be essential to convert emerging acceptance into sustained

### 3.2.6 Voices from the Ground: Young Trainees' Future Employment Aspirations

#### GENDER TRANSFORMATIVE PERSPECTIVES FROM TRAINING INSTITUTIONS

- Female trainees view solar, EV and other recycling sectors as inclusive and aspirational spaces which is not restricted by gender.
- Strong confidence exists that women can excel in technical green roles with proper training, safety, and encouragement.

As Sushma Kumari, a 27-year graduate polytechnic student believes that “females can work in sectors like solar energy, electric vehicles (EVs), and recycling if they are properly trained and supported. These fields require technical knowledge, problem-solving skills, and innovation—areas where women can excel equally as men. With the right guidance, hands-on training, mentorship, and a safe, inclusive work environment.”

- Green sectors are also viewed as safe, socially useful, future-oriented opportunities offering pathways to skill development, independence and environmental protection.

As one student said she would join because “green jobs save our earth from pollution,” while another saw it to “gain knowledge and support her future.”

- Overall, women have high aspirations and self-belief to participate in green sectors; however, they also point out the systemic enablers of sustained participation such as accessible and affordable green skilling programs, fair wages, safe mobility and credible employment opportunities.
- Strong institutional support can translate intent to gender transformative outcomes.

Pushpa Sahu, age 21, a graduate polytechnic student, says, “Because women are not less than men. If they are given opportunities, then whatever boys do, girls can also do. It’s just that the world is still not aware, even now people believe that girls should study only to a limited extent, and this is seen more often in villages.”

Post-training aspirations among female trainees reveal a strong preference for government employment. Nearly 72.8% of respondents identified public-sector jobs as their most desirable pathway, reflecting long-standing perceptions of government work as more stable, socially legitimate, predictable, and safer factors that carry weight for women navigating mobility and security constraints.

Interest in entrepreneurship is comparatively low. Only 12.6% expressed an intention to start their own enterprise, a trend shaped by limited exposure to successful role models,

perceived financial risk, and inadequate access to start-up support, mentoring, and market linkages. Similarly, just 7.3% preferred private-sector employment, suggesting that emerging industry roles—including those in the green economy are not yet viewed as secure or attractive alternatives to government jobs.

A smaller share of trainees remains undecided about their future plans (4.1%), underscoring the need for stronger career counselling and clearer information on potential pathways within the green economy. Very few respondents reported no intention to work (2.4%) or plans to join family businesses (0.8%), indicating relatively high labour-force aspirations among young women and minimal inclination toward non-participation.

These patterns reflect a broader risk-averse decision-making framework, where employment security is prioritised over potentially higher-growth but less familiar opportunities. For Odisha’s green transition, this has significant implications. Expanding women’s participation in emerging sectors will require more than training provision. Visible role models, stronger placement systems, industry exposure, and confidence-building interventions will be essential to shape aspirations and shift perceptions about career viability in areas such as solar servicing, EV maintenance, waste recycling, and green entrepreneurship. Without such efforts, women may acquire green skills but remain hesitant to enter the sectors where demand is growing fastest.

**Table 3.3: Post-training employment aspirations of female trainees in Odisha**

| Employment Pathway                 | Share of Respondents (%) | Key Takeaways                                                                                                      |
|------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------|
| Government employment              | 72.8                     | Strong preference driven by perceived job security, social legitimacy, stable income, and safer working conditions |
| Self-employment / entrepreneurship | 12.6                     | Limited entrepreneurial aspiration due to risk aversion, lack of role models, and weak start-up support            |
| Private sector wage employment     | 7.3                      | Low confidence in private and green-sector jobs as stable or long-term career options                              |
| Undecided                          | 4.1                      | Indicates need for career counselling and better visibility of green job pathways                                  |
| No intention to work               | 2.4                      | Very small share; labour force aspiration remains high                                                             |
| Join family business               | 0.8                      | Minimal reliance on informal family enterprises                                                                    |

Source: Primary Survey of Female Trainees, iFOREST Analysis

**Table 3.4: Summary notes from KIs with OSDA, NSDC & SCGJ: policy gaps in women's inclusion in green skilling**

- Key gaps identified include the absence of mandatory gender provisions in skilling frameworks
- Weak monitoring of post-training outcomes, persistent access barriers despite geographic coverage
- Narrow sectoral concentration of women
- low retention linked to workplace conditions
- limited incentives for providers and employers, and underinvestment in early pipeline interventions such as STEM exposure and role-model development.
- Fragmented coordination across skilling, livelihood, and women-focused institutions further compounds these challenges.

Source: iFOREST Analysis based KIs

## **3.3 Primary Findings: Women in Green Entrepreneurship**

### **3.3.1 SHGs and Their Role in the Entrepreneurship Ecosystem**

SHGs continue to be the primary institutional entry point for women into entrepreneurship in Odisha. Across districts, SHGs operate as micro-enterprises in handicrafts, agri-processing, mushroom cultivation, phenyl production, tailoring, incense sticks, and eco-friendly agriculture. High repayment rates (often 100%), regular work participation (5–8 hours per day), and long SHG tenures, especially in mature groups, demonstrate that women-led collectives are economically active and creditworthy.

**Table 3.5: Profile of women's SHGs covered under FGDs**

| District   | SHG / Group            | Members | Education (Majority) | Main Activity                     | SHG Experience | Training Exposure    | Green Skills Awareness |
|------------|------------------------|---------|----------------------|-----------------------------------|----------------|----------------------|------------------------|
| Dhenkanal  | Nabajivanpur           | 13      | Primary              | Brass moulding, handicrafts       | 1–3 yrs        | Basic (100%)         | None                   |
| Dhenkanal  | Nilatailasahi          | 10      | Primary              | Mushroom cultivation              | 3–10+ yrs      | None                 | None                   |
| Angul      | Mahin Guda             | 12      | Secondary            | Incense sticks                    | 5+ yrs         | NGO-led (100%)       | <10%                   |
| Angul      | Maa Gayatri            | 13      | Secondary            | Terracotta, brassware             | 1–3 yrs        | NGO + Mission Shakti | Low                    |
| Angul      | Jindal Producer Groups | 14      | Mixed                | Stitching, food, recycling, solar | 16+ yrs        | Advanced (CSR)       | 100%                   |
| Jharsuguda | Maa Sharda             | 10      | Above primary        | Phenyl, tailoring, agriculture    | 5+ yrs         | <20%                 | <10%                   |
| Sundargarh | Group 7                | 36      | Up to Class 10       | Organic farming, vermicompost     | 5+ yrs         | Govt. (100%)         | 100%                   |
| Sundargarh | Maa Bina Pani          | 36      | Secondary            | Phenyl, agriculture               | 5+ yrs         | 10%                  | 10%                    |

Source: iFOREST primary survey and FGDs with women entrepreneurs, 2025.

**Table 3.6: Survey responses from Green-businesses SHGs**

| District   | SHG / Group            | Green Skills Awareness | Transition Potential                 |
|------------|------------------------|------------------------|--------------------------------------|
| Angul      | Maa Gayatri            | Low-Moderate           | Eco-crafts, digital marketing        |
| Angul      | Jindal Producer Groups | 100%                   | District-level trainers, scaling     |
| Sundargarh | Group 7                | 100%                   | Value addition, institutional buyers |

Source: iFOREST primary survey and FGDs with women entrepreneurs, 2025

Most SHGs continue to operate at the subsistence or micro-enterprise level, with limited progression into growth-oriented MSMEs. Mission Shakti has played a pivotal role in financial inclusion, collective mobilisation and access to small loans, as seen in groups such as Maa Gayatri and Nabajivanpur. Yet only a few SHGs, most notably the Jindal Producer Groups and Sundargarh Group 7, have successfully transitioned into diversified, green-oriented enterprises with higher skill intensity, greater value addition and stronger institutional confidence.

These advanced groups illustrate the MSME potential of SHGs when credit is supported by technical training, market exposure, and coordinated ecosystem support. In contrast, the majority of SHGs operate with little awareness of green skills, limited exposure to value

chains beyond local markets, and weak integration with skilling or industrial policy frameworks. This significantly restricts their ability to participate in higher-value segments of the emerging green economy.

### 3.3.2 Barriers and Challenges to Green Entrepreneurship

Barriers to women-led green entrepreneurship are predominantly structural rather than individual. Across both groups - female trainees and SHGs, lack of awareness of green skills and enterprises is a pressing challenge. Further, the most frequently cited challenges include limited market access, lack of branding and packaging support, documentation hurdles, and low awareness of subsidy schemes. Even economically productive groups, such as mushroom cultivators, operate with constrained ownership and decision-making power, as key financial and marketing decisions are often controlled by male household members. Female trainees also expressed that lack of finance is a key barrier to start an enterprise.

**Table 3.7: Barriers and challenges in women-led Green Business**

| Barrier                                   | FGD Evidence (Across SHGs)                                                                 | Implication for Green Entrepreneurship                 |
|-------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Low awareness of green skills</b>      | <10% awareness in most SHGs despite eco-friendly activities                                | Women remain confined to traditional livelihoods       |
| <b>Time poverty &amp; care burden</b>     | 60%+ cite household responsibilities limiting training/work hours                          | Constrains skill upgrading and enterprise growth       |
| <b>Infrastructure gaps</b>                | Unreliable electricity, water, workspace, lack of access to land (50–80% members affected) | Limits productivity and adoption of green technologies |
| <b>Weak market linkages</b>               | 70%+ lack access to urban/institutional markets                                            | Green products fail to scale or earn premiums          |
| <b>Limited advanced training</b>          | Mostly basic or one-time training; few technical upgrades                                  | Low diversification into higher-value green MSMEs      |
| <b>Male control over decisions</b>        | >70% report male dominance in financial decisions (select SHGs)                            | Weak women's ownership and leadership                  |
| <b>Credit &amp; documentation hurdles</b> | 30–40% face paperwork, guarantor, subsidy access issues                                    | Restricts enterprise scaling and formalisation         |
| <b>Lack of role models</b>                | Absence of visible women-led green enterprises                                             | Reduces confidence and aspiration                      |
| <b>Market saturation risks</b>            | Falling margins in organic farming/vermicompost                                            | Need for value addition and diversification            |
| <b>Fragmented scheme convergence</b>      | Limited linkage across Mission Shakti, ORMAS, skilling                                     | Slows SHG-to-MSME transition                           |

Source: iFOREST Analysis based on FGD among SHGs 2025

Time poverty and unpaid care responsibilities further restrict women's ability to participate in advanced training or market-facing activities. Several SHGs reported that women could engage in livelihood activities for only a few hours each day, limiting their capacity to scale operations. Seasonal fluctuations, particularly in agriculture and craft-based livelihoods, add income volatility and discourage risk-taking.

Green entrepreneurship pathways remain weakly institutionalised. Women are rarely linked to higher-value green sectors such as renewable energy components, waste-to-value enterprises or sustainable manufacturing. Where green activities do exist, they are concentrated in low-return segments such as organic farming, vermicompost, phenyl production or eco-crafts, reinforcing occupational segmentation even within the green economy.

Infrastructure access is a decisive constraint. Across FGDs, SHGs highlighted unreliable electricity, water scarcity, inadequate workspace, lack of access to land, poor road connectivity and limited access to equipment as recurrent challenges. A common barrier which also appeared as a key response among 38.5 % female trainees to start a green enterprise. These barriers disproportionately affect production-intensive and semi-mechanised activities, including incense stick making, phenyl production, terracotta work and agro-processing.

Training exposure is similarly uneven. While most SHGs had attended at least one basic training, the quality, depth and relevance of these sessions varied widely. In traditional SHGs, training is often disconnected from green concepts, market expansion or technological upgrading. Awareness of green skills remains negligible despite many groups already working in low-carbon or eco-friendly domains.

In contrast, green-oriented SHGs demonstrate the cumulative impact of sustained training and institutional support. Groups with full green skills awareness reported higher confidence, diversification into recycling or solar repair and readiness to serve as peer trainers. These experiences suggest that women's transition into green entrepreneurship is driven more by access to structured and continuous capacity-building than by any inherent capability gaps.

### **3.3.3 Enabling Factors for Green Enterprises**

The primary findings from FGDs among SHGs reveal that women's participation in green entrepreneurship in Odisha is shaped by constraints with respect to finance, infrastructure, markets, and care responsibilities. Across districts, women-led SHGs are actively engaged in eco-friendly activities—organic farming, NTFPs, handicrafts, recycling, and clean products—yet remain clustered in low-return, informal segments of green value chains. Limited access to scale finance, weak market linkages beyond local geographies, inadequate infrastructure (electricity, water, workspace, land), and heavy



unpaid care burdens constrain productivity and enterprise growth. While platforms such as Mission Shakti, Green Shakti, and ORMAS have significantly expanded access and participation, they have not yet enabled systematic graduation of women from subsistence enterprises to growth-oriented green MSMEs.

Field evidence from women SHGs across Odisha shows that access to finance has improved substantially through Mission Shakti and bank linkages, yet this access has not translated into sustained enterprise growth or leadership in green value chains. While most SHGs can secure small loans, barriers such as documentation requirements, lack of guarantors, weak market linkages, and limited enterprise capability continue to constrain scaling. As a result, women remain concentrated in low-return, labour-intensive activities despite producing environmentally sustainable goods.

Further, the primary research among female trainees show that seed finance, assured procurement and mentoring are far more influential enablers than skilling alone, highlighting that women prioritise income security before engaging in emerging green sectors (see table 3.8). Without stronger convergence that links green skilling to assured markets, women-focused mentoring, care-sensitive infrastructure and district-level green value chains, women risk being included in Odisha's green transition without experiencing real economic upgrading. Advancing a gender-transformative just transition therefore requires moving beyond participation toward productivity, security and leadership for women within green MSMEs.

**Table 3.8: Enablers for green entrepreneurship among Female Trainees**

| Enabling Factor                                           | Share (%)    | Policy Interpretation                                 |
|-----------------------------------------------------------|--------------|-------------------------------------------------------|
| <b>Seed funding / interest-free loans</b>                 | 41.4         | Finance is the strongest catalyst for entry and scale |
| <b>Government / industry procurement assurance</b>        | 15.6         | Market security reduces perceived risk                |
| <b>Mentoring / business guidance</b>                      | 14.3         | Confidence and capability gaps persist                |
| <b>Woman-focused mentoring programmes</b>                 | 9.8          | Gender-specific support improves retention            |
| <b>Support through entrepreneur groups / cooperatives</b> | 6.6          | Collective platforms ease market entry                |
| <b>Safe workspace &amp; transport</b>                     | 3.7          | Infrastructure remains a binding constraint           |
| <b>Being part of a women's cooperative</b>                | 3.3          | Institutional affiliation matters, but is secondary   |
| <b>Family / community support</b>                         | 2.9          | Social acceptance remains relevant but not dominant   |
| <b>Short-term green skilling courses</b>                  | 2.5          | Skills matter once finance and markets are secured    |
| <b>Total</b>                                              | <b>100.0</b> |                                                       |

Source: iFOREST Analysis based on Female Trainees Survey 2025

The diagnostic analysis (table 3.9) highlights a structural gap between credit provision and capability building. Advanced producer groups supported through CSR demonstrate that when finance is combined with training, branding, and assured markets, women-led green enterprises can become financially viable and scalable. However, this model remains the exception rather than the norm. Schemes such as Mission Shakti and ORMAS expand access, but without strong convergence with Green Shakti and district-level infrastructure investment, they risk reinforcing subsistence entrepreneurship.

District Mineral Foundation (DMF) resources offer a critical opportunity to correct this imbalance. By directing DMF funds toward women-only green enterprise clusters, shared infrastructure, patient capital, and care-support services in transition-affected districts, Odisha can move from inclusion to transformation. Aligning these investments with explicit gender targets would ensure that women are not only participants in the green transition, but primary beneficiaries of its economic gains and green transformation.

From a gender-transformative just transition perspective, these gaps are particularly critical in mining and industrial districts undergoing structural change. The District Mineral Foundation (DMF) represents a pivotal but underutilised financing instrument for

gender-responsive transition planning. DMF funds—generated from mineral extraction and explicitly mandated for local development and sustainability—can be strategically deployed to address the binding constraints identified in this study. Targeted investments in women-led green enterprise infrastructure, childcare and care-support services, water and energy access, common facility centres, and safe transport can directly reduce time poverty and productivity barriers for women. Aligning DMF allocations with women’s green livelihoods would ensure that transition-affected districts do not reproduce gender exclusion as coal and mineral-dependent economies diversify.

Finally, the findings underscore the need to move beyond enrolment-focused inclusion towards outcome-oriented gender targets within Odisha’s green transition strategy. Explicit, time-bound targets for women’s enterprise growth, income gains, market access, and participation in higher-value green sectors should be embedded across Mission Shakti, Green Shakti, ORMAS, and DMF-funded programmes. Gender-disaggregated monitoring of enterprise scale, procurement participation, and leadership roles is essential to ensure accountability. Without deliberate integration of gender targets and transition financing, women risk remaining peripheral participants rather than economic beneficiaries of Odisha’s green transformation.

**Table 3.9: Financial Reform Levers for Green Entrepreneurship among SHGs**

| Key Barrier                                 | Evidence from Field & FGDs                                                  | Primary Scheme / Instrument       | Priority Reform Lever                                                             |
|---------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------|-----------------------------------------------------------------------------------|
| <b>Procedural barriers to credit</b>        | SHGs face documentation and guarantor hurdles for loans beyond micro-credit | Mission Shakti; Banks             | Introduce simplified, collateral-free green enterprise loans for women SHGs       |
| <b>Credit without enterprise capability</b> | Loans accessed, but weak business planning, costing, and scaling capacity   | Mission Shakti; ORMAS             | Mandate bundled support: credit + enterprise mentoring + market readiness         |
| <b>Lack of growth-stage finance</b>         | Expansion constrained; reliance on CSR or internal capital                  | Green Shakti; ORMAS               | Create DMF-backed patient capital window for women-led green MSMEs                |
| <b>Weak market access</b>                   | 60-70% SHGs lack access to urban and institutional buyers                   | ORMAS; Mission Shakti procurement | Expand assured procurement and long-term offtake for eco-products                 |
| <b>Infrastructure deficits</b>              | Power, water, and workspace shortages limit productivity                    | DMF; District Administration      | Use DMF funds for women-only green enterprise clusters with shared infrastructure |
| <b>Low green-skills awareness</b>           | Traditional SHGs unaware of green skilling pathways                         | Green Shakti; JSS                 | Integrate green skills certification into SHG livelihood programmes               |
| <b>Time poverty and care burden</b>         | Training and scaling limited by unpaid care work                            | Mission Shakti; DMF               | Invest DMF funds in childcare, water, sanitation, and clean energy solutions      |
| <b>Male-dominated decision-making</b>       | Women lack ownership and control despite labour contribution                | Mission Shakti; Stand-Up India    | Enforce women's ownership, bank signatory, and enterprise leadership norms        |
| <b>Fragmented scheme convergence</b>        | Only CSR-supported groups successfully scale                                | Mission Shakti; ORMAS; SDTE       | Establish district Green Enterprise Facilitation Cells for women                  |

Source: iFOREST Analysis based on FGD 2025

### 3.3.4 Voices from the Ground: Young Entrepreneurs Aspirations

#### GENDER TRANSFORMATIVE PERSPECTIVES OF WOMEN ENTREPRENEURS

- Women entrepreneurs across Odisha's SHGs demonstrate strong agency, resilience, and growing interest in environmentally sustainable livelihoods, even when formal awareness of 'green skills' remains limited.
- Aspirations are high, with a clear demand for formal training, branding support, institutional market linkages, and information and exposure to new green enterprises. However, information gaps remain a critical constraint.

*"We are already doing eco-friendly work, but we don't know that this is called green skills."* – SHG member, 41-year-old, Swapna in Dhenkanal

*"If we get training and market support, we can make better products and earn more."* – Gitima, 35-year-old woman entrepreneur, Angul

As Neelima Mishra, a 28-year-old waste recycling start up shared "We want to scale up our enterprise, but we do not have much information. Neither there is any portal easily accessibly with key resources or schemes nor any we could reach out to any department for guidance. Going forward, information and awareness is going to be the stepping stone".

- Systemic exclusion of women in green economy may be just a reflection of their vulnerability to job displacement with new technology.
- On the other hand, new technology like decentralised solar technology can be integrated into traditional livelihoods to raise incomes and expand women's technical participation in value chains.

Neelima further pointed out "We want to recruit more women, but they hardly come to us. As the waste collection modes are four-wheeler vehicles, women often do not know how to drive them, and many do not even own vehicles".

Damyanti, 41-year-old, solar entrepreneur herself suggested, "Access to decentralised renewable energy system with land/workspace can facilitate creation of rural enterprises at relatively low cost and enable employment of many young women".

Women in Odisha are ready to lead the green transition—but without timely access to information, skills, infrastructure, and markets, their aspirations will remain unrealised, turning opportunity into another form of exclusion rather than empowerment.

Narratives from women entrepreneurs reveal strong aspiration tempered by structural realism. Across SHGs, women expressed interest in eco-friendly products, organic farming, recycling, improved packaging, digital marketing and institutional buyers. Environmental values such as sustainability, cleanliness and community benefit emerged as important motivators, particularly among younger members.

At the same time, risk aversion remains high. Limited exposure to successful women-led green enterprises, fear of market failure and weak support systems constrain ambition. Where women have witnessed tangible success through CSR-backed training, exhibitions or government procurement, their confidence and willingness to diversify increase sharply. These voices show that aspiration exists, but the enabling ecosystem lags behind.

The primary findings suggest a critical insight. Odisha's SHG ecosystem is inclusive but not yet transformative for women in green entrepreneurship. While Mission Shakti and related platforms have expanded participation, most women remain located in low-skill, low-return segments of the green economy. Green entrepreneurship outcomes are closely linked to access to infrastructure, sustained training, market linkages and coordinated institutional support.

Without deliberate convergence across Mission Shakti, Green Shakti, ORMAS and skilling institutions, women's enterprises risk remaining peripheral to Odisha's green growth trajectory. A gender-transformative just transition will require moving beyond numerical inclusion toward capability building, sectoral upgrading and value-chain integration, enabling women not only to participate in the green economy but also to capture its economic gains and leadership opportunities.

### **3.4 Synthesis of Key Findings**

Odisha has expanded women's access to skilling and entrepreneurship platforms, yet this has not translated into equitable participation in technical, high-productivity or green sectors. Despite a nearly fourfold increase in women's enrolment in Government ITIs since 2016-17, women still represent less than one-quarter of total enrolments. Only 10 female trainees out of 246 were enrolled in green skill courses, and all female trainees in these tracks were concentrated in solar-linked electrical trades. This clustering reflects that access has improved, but equity has not.

The barriers limiting women's participation in green skilling are primarily structural rather than motivational. Labour-market uncertainty, limited local course availability, weak industry exposure and information gaps are the most significant deterrents, rather than lack of interest or capability. Awareness of green skills remains narrow across communities and institutions, dominated by solar and EV-related roles, with limited understanding of sectors such as bioenergy, waste management, sustainable construction and environmental services.

Gender norms continue to shape occupational choices. While many trainees view green work as gender neutral, persistent concerns about mobility, safety, family approval and the absence of women role models restrict women's entry into non-traditional and field-based green occupations. These constraints are especially pronounced in rural and tribal regions.

Women's Self-Help Groups (SHGs) remain strong entry points for economic participation but weak launchpads for green enterprise growth. SHGs demonstrate high participation, financial discipline and livelihood resilience, yet most operate at the subsistence or micro-enterprise level with limited progression into scalable green MSMEs. Training alone has limited effect. Women entrepreneurs consistently identify seed funding, assured procurement, mentoring and market access as stronger enablers than skilling, reflecting risk-averse decision-making shaped by livelihood insecurity and care burdens.

Institutional support for women's green livelihoods remains fragmented. The lack of convergence between Mission Shakti, Green Shakti, ORMAS and skilling institutions weakens pathways from training to sustainable green enterprise or employment. Without intentional alignment across these platforms, inclusion remains disconnected from economic transformation.

Taken together, the findings show that inclusion alone is insufficient. Without gender-responsive design that addresses mobility, care infrastructure, trade diversification and placement-linked pathways, green growth risks reproducing existing segmentation in labour markets. A gender-transformative shift is therefore essential. Advancing a just transition in Odisha requires moving beyond enrolment targets to building capabilities, integrating women into value chains and creating leadership opportunities, ensuring women are not only participants in the green economy but beneficiaries of its growth.

# Chapter 4: Pathways to Gender Transformative Green Economy

## 4.1 Introduction

Odisha, like many states, lacks comprehensive gender-disaggregated data on participation in green jobs and entrepreneurship. Without such metrics, it is difficult to evaluate progress, design targeted skilling pathways, or tailor enterprise support packages to women's needs. Current state interventions must equally prioritise traditional or resource-based green enterprises (forest products, sustainable agriculture) along with integrating women into emerging green industries such as renewable energy, environmental tech, and sustainable supply chains. Lack of multi-sectoral and comprehensive approach limits women's access to high-value green jobs and growth segments. Social norms that restrict women's mobility, decision-making authority, and access to high-tech fields continue to hinder participation in technical training and leadership roles. These norms intersect with care responsibilities and infrastructural deficits (e.g., childcare facilities, safe transport) that constrain women's skilling and entrepreneurial pursuit.

## 4.2 Agenda for Strategic Interventions

As Odisha advances towards a climate-resilient and low-carbon development pathway, there is a clear policy imperative to integrate gender considerations into transition planning. A women-focused policy aligned with just transition principles must prioritise outcome-oriented interventions that enhance women's capabilities, reduce vulnerability, and expand access to green livelihoods. Key policy priorities include promoting green skills and reskilling in transition-affected regions, enabling women-led green entrepreneurship through finance and market access, reducing unpaid care burdens through supportive infrastructure, and strengthening women's participation in local planning and decision-making. Aligning women's empowerment with Odisha's green growth and just transition agenda will ensure that economic transformation is both socially inclusive and environmentally sustainable. Odisha's transition towards a low-carbon, climate-resilient economy is occurring in a context of high informality, regional inequality, and gendered socio-economic constraints. Women—particularly those from Scheduled Tribes, Scheduled Castes, and mining- and climate-affected regions—face limited access to green skills and entrepreneurship opportunities, productive assets, finance, markets, and decision-making spaces. Without targeted intervention, economic and energy transitions risk deepening existing gender inequalities by excluding women from emerging green livelihoods and shifting transition costs onto unpaid care work.



**Table 4.1: Women's entry points in Odisha's green economy – illustrative just transition framework**

| Green Sector                                           | Women's Entry Points                       | Skills / Roles                                                        | Key Gender Barriers                                                  | Policy Enablers (Odisha)                                                            | Expected Outcomes                                                       |
|--------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Renewable Energy (Solar, Wind, DRE)</b>             | Employment, local service provision        | Installation support, O&M, energy auditing, community energy services | Low technical training access, mobility constraints, safety concerns | SDTE green skilling programmes; local DRE pilots; care support for trainees         | Paid technical jobs; women's participation in clean energy value chains |
| <b>Green Hydrogen &amp; Advanced Manufacturing</b>     | Wage employment, apprenticeships           | Plant operations, quality control, lab technicians                    | Male-dominated industrial spaces, lack of STEM exposure              | Industry-linked ITI training; gender targets in industrial incentives               | Entry of women into high-productivity industrial green jobs             |
| <b>Electric Mobility &amp; Battery Ecosystem</b>       | Employment, MSME participation             | Assembly, testing, battery recycling, charging infrastructure         | Limited capital access, skill mismatch, safety                       | EV Policy incentives; SDTE-industry partnerships; Mission Shakti enterprise support | Formal employment; women-owned service MSMEs                            |
| <b>Circular Economy &amp; Waste Management</b>         | Formalisation of informal work, enterprise | Waste segregation, recycling, bio-energy, composting                  | Informality, health risks, lack of recognition                       | Urban local body partnerships; SHG-led waste enterprises; social protection         | Safer, paid green jobs; formalisation of women's work                   |
| <b>Sustainable Agriculture &amp; NTFP Value Chains</b> | SHG enterprises, producer companies        | Climate-resilient farming, agro-processing, bamboo & NTFPs            | Land ownership gaps, low technology access                           | Mission Shakti aggregation; forest & agri value-chain support                       | Higher incomes; resilient women-led rural enterprises                   |
| <b>Eco-Tourism &amp; Nature-Based Solutions</b>        | Community enterprises, wage work           | Eco-tourism services, afforestation, conservation                     | Seasonal incomes, mobility constraints                               | Vision Odisha livelihoods; community forest management                              | Local green livelihoods; inclusive rural development                    |

Source: iFOREST Analysis

## 4.3 Strategic Priorities and Actionable Interventions

This study seeks to position women as central actors in Odisha's just transition towards a low-carbon, climate-resilient, and inclusive economy. It aligns women's empowerment objectives with the state's priorities on green growth, employment generation, and regional equity. To operationalise gender transformative green transition, the following seven are the areas of priorities:

- State Green Skills Mission with a gender-responsive mandate
- Gender based explicit targets to improve outcomes
- Support scaling of women-led green entrepreneurship
- Gender Mainstreaming & Care-Responsive and Enabling Ecosystems
- Finance and Governance for a Gender-Transformative Transition
- Building a Gender-Responsive Green Transition Data and Monitoring System

### **Priority 1: State Green Skills Mission with a gender-responsive mandate**

**Objective:** Enable women's equitable access to emerging green and transition-related employment.

#### **Key Interventions:**

- Integrate green skills (renewable energy, climate-smart agriculture, NTFP value addition, waste management, sustainable construction) into state skilling programmes with explicit gender targets.
- Prioritise women's participation through affirmative actions in ITIs, polytechnic institutes and various reskilling initiatives in mining/industrial and climate-affected districts.
- Establish women-friendly training infrastructure, including flexible schedules, stipends, safe mobility, and digital access.
- Partner with industry, cooperatives, and local governments to align training with demand.
- Develop short-term and long-term strategies to link green labour markets and skilling programmes intra and interstate to encourage more women job aspirants.
- Establish a State Green Jobs, Skills & Gender Mission to provide strategic direction, set measurable gender targets, and drive convergence across SDTE, MSME, Mission Shakti, Energy, and Forest & Environment Departments.
- Create Women-Focused Regional Green Skill Hubs in transition-vulnerable districts (Angul, Jharsuguda, Sundargarh, Dhenkanal, Sambalpur), equipped with advanced labs, women-only batches, safe hostels, industry-led modules, and digital training tools.
- Introduce a Women in Green Apprenticeships Programme (WiGAP) linked to NAPS, with mandatory seats for women in RE, EV, hydrogen, and circular-economy sectors.

- Build a Women Trainer Cadre across ITIs and polytechnics through targeted ToT programmes in RE, EV, battery assembly, automation, hydrogen labs, and safety training.

## **Priority 2: Set explicit targets to improve outcomes for women:**

**Objective:** Position women as central economic actors in Odisha's Green Skill Mission by shifting from numeric inclusion to measurable, sustained outcomes in employment, income, and career mobility across the green transition.

### **Key Interventions:**

- Move beyond enrolment metrics to set time-bound, gender-disaggregated targets for: course completion rates, job placement within 3–6 months, wage thresholds relative to male counterparts, job retention at 6 and 12 months, progression into supervisory or technical roles.
- Establish differentiated targets for priority green sectors (renewable energy, EVs, green construction, waste management, climate-smart agriculture) and transition-affected districts (coal, steel, aluminium belts), recognising varied baseline constraints.
- Embed Targets in Programme Design and Financing: Link achievement of gender outcome targets to: release of tranche-based funding, performance ratings of training partners, renewal of empanelment under state and national skilling schemes.
- Require implementing agencies to report sex-disaggregated data on placements, wages, job duration, and sectoral mobility, using unified MIS platforms aligned with SDTE, OSDA, and NSDC systems.
- Introduce structured incentives—such as higher reimbursements, bonus payments, or preferential contracting—for institutions and employers that meet or exceed women's placement and retention targets in non-traditional green roles.
- minimum shares of green apprenticeships and on-site training slots for women, with explicit monitoring of transition from training to regular employment.
- Ensure that gender targets are supported by enabling inputs—safe transport, hostels, flexible schedules, childcare support—so that targets do not become exclusionary or punitive.
- Publish annual scorecards on women's outcomes in green skilling at the state and district levels to strengthen transparency, political accountability, and course.

### **Priority 3: Support scaling of women-led green entrepreneurship**

**Objective:** Promote women as owners and leaders of green and sustainable enterprises.

#### **Key Interventions:**

- Strengthen Odisha Mission Shakti SHGs as platforms for green entrepreneurship and collective enterprises.
- Provide incubation, mentoring, and technical assistance for women-led green MSMEs. Building on the Green Shakti Producer Company model, Odisha can establish sector-specific incubators for women – including renewable energy startups, eco-tourism ventures, and green manufacturing enterprises. These should be coupled with seed funding, market linkages, and business advisory support.
- Facilitate access to green finance, including concessional credit, guarantees, and blended finance.
- Integrate women-led enterprises into public procurement, local value chains, and digital marketplaces.
- Expand Mission Shakti's green value-chain integration by linking women's collectives to RE supply chains, EV-servicing clusters, recycling hubs, agro-processing units, and eco-tourism circuits. Mission Shakti producer companies should be supported to become major aggregators of green products and services, ensuring women obtain stable markets and higher-value opportunities.
- Mission Shakti guidelines prioritise SHG formation, credit linkage, and micro-enterprises, however still weak on productivity growth, technology adoption and scaling into MSMEs.
- Embed green technical skilling into Mission Shakti, such as solar O&M, EV charging operations, waste processing technology, and bioenergy systems.
- Create joint protocols with SDTE, OSDA, and Green Skill Councils. Create mandatory guideline provisions for: childcare support, transport allowance for, and flexible scheduling norms.
- Develop strong risk protection (financial and market failures) and track green outcomes of the enterprises through strong monitoring mechanisms.
- Formal convergence mandates with: OSDA, SDTE, ITIs, just transition cells in coal districts is necessary.

#### **Priority 4: Gender Mainstreaming & Care-Responsive and Enabling Ecosystems**

**Objective:** Reduce unpaid care burdens and structural barriers limiting women's economic participation.

##### **Key Interventions:**

- Recognise and address unpaid care work in programme design and monitoring.
- Invest in childcare, eldercare, water, sanitation, and clean energy solutions in transition-affected regions.
- Promote safe transport and workplace infrastructure for women.
- Leverage digital platforms to reduce time poverty and improve market access.
- Introduce transition stipends and social-protection measures for women shifting out of fossil-fuel-dependent work or informal sectors into green skilling programmes.
- The District Mineral Foundation (DMF) funds should be strategically leveraged as a cornerstone for gender mainstreaming with earmarked allocations for green-centric green skilling, SHG-led green enterprises, care infrastructure, safe mobility and transition income support. A long-term assessment of DMF contributions over the next four decades estimates that ongoing and planned coal mining expansions (excluding allocated coal blocks) could generate over INR 39,764 crore by 2060. Additionally, DMF funds from the extraction of other major minerals will be instrumental in supporting just transition efforts in key mining districts such as Sundargarh, Kendujhar, Jharsuguda, and others that are essential to the industrial supply chain.

#### **Priority 5: Finance and Governance for a Gender-Transformative Transition**

**Objective:** Ensure women's meaningful participation in transition planning and local governance. Further, Effective implementation of women-centric green skilling and entrepreneurship programmes requires convergence and institutional flexibility across departments and programmes such as follows:

##### **Key Interventions:**

Convergence and institutional flexibility across departments and programmes:

- Department of Women & Child Development / Mission Shakti for SHGs, enterprise support, leadership development
- Skill Development & Technical Education Department for Green skilling, upskilling and reskilling pathways
- MSME, Energy & Industries Department for enterprise incubation, market access, and procurement
- Energy, Forest & Environment Departments for coordinated and synthesised action on Renewable energy, NTFPs, climate action

- Panchayati Raj & Urban Local Bodies for Local planning, service delivery, care infrastructure
- District-level convergence committees can coordinate planning and monitoring in transition-affected regions.
- Institutionalise women's representation in district-level transition, climate, and livelihood planning bodies.
- Build leadership and negotiation capacities of women leaders, SHG federations, and cooperatives.
- Strengthen community-level institutions to enable co-creation process and participatory planning and accountability.
- Align gender-responsive budgeting at sub-national level with just transition priorities. Establish dedicated budget lines for women-led green enterprises and skilling programmes.
- Establish a Gender-Disaggregated Green Labour Market Information System (Green LMIS) to forecast demand, map women's participation, track emerging occupations, and identify regional skill gaps.
- Create a Women's Green Career and Placement Cell within OSDA/SDTE for counselling, placement support, employer sensitisation, and mobility assistance.

### **Priority 6: Building a Gender-Responsive Green Transition Data and Monitoring System**

**Objective:** Strengthen evidence-based policymaking and accountability.

#### **Key Interventions:**

- Develop gender-disaggregated and intersectional data systems (*disaggregated by district, rural-urban location, and social group*), and knowledge portals for green skills, employment, and enterprises.
- State departments should collect, publish, and monitor gender-disaggregated data on green jobs, training enrollments, entrepreneurship outcomes, and wages to inform policy decisions and measure results over time.
- Track transition impacts on women across regions and sectors.
- Embed monitoring, evaluation, and learning (MEL) systems to enable course correction. A robust MEL system will: Track progress against gender and transition indicators, enable adaptive management and mid-course correction, Support learning through pilots and evaluations, ensure transparency and accountability.
- Periodic reviews and public dashboards can strengthen institutional accountability

## 4.4 Conclusion

Odisha stands at a pivotal juncture to bridge the gender gaps in green skilling and entrepreneurship. With targeted policies such as *Green Shakti Producer Companies* and cross-sectoral empowerment programs like *Lakhpati Didi*, the state has laid foundational steps toward inclusive sustainable development. Yet, achieving gender parity in the green economy requires deeper systemic reforms: integrating gender into policy design, expanding access to high-value green sectors, and empowering women with skills, finance, and market agency. Ultimately, a gender-just energy transition will not only enhance economic opportunities for women but also strengthen Odisha's low-carbon development pathway through ecological resilience and long-term prosperity.

A targeted just transition policy planning and implementation on green skills and entrepreneurship must aim to enable women in Odisha as economically empowered agents of a just transition by 2036 – the centenary year of Odisha – equip them with relevant green skills, support to build and scale sustainable enterprises, protect from transition-related risks, and actively participate in local governance and economic decision-making.

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