Structural Challenges of Green Jobs and a Just Transition in Thailand

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Abstract

The transition toward a green economy has emerged as a paramount national agenda in Thailand, strategically underpinned by the Bio-Circular-Green (BCG) Economy Model and bolstered by substantial investments aimed at achieving ambitious climate targets. This paper aims to: (1) synthesize the current policy landscape and the mechanisms driving green jobs; (2) analyze existing structural gaps by benchmarking them against the international "Just Transition" conceptual framework; and (3) propose an integrated policy framework for future sustainable development. Utilizing a systematic literature review of policy documents and academic research from 2011 to 2025, the findings highlight the government's strong commitment through investment promotion and workforce skill development initiatives. Nevertheless, the analysis identifies four critical structural gaps that impede a truly just transition: the Skills Mismatch Gap, the Social Protection Gap, the Policy Integration Gap, and the Inclusivity Gap. To address these deficiencies, this paper proposes a four-pillared policy framework emphasizing the development of a dynamic green skills ecosystem, the institutionalization of social protection, the strengthening of policy governance, and the fostering of an inclusive green economy. Ultimately, the study concludes that the success of Thailand's green jobs agenda hinges not merely on technological advancement or financial investment, but primarily on the state's capacity to facilitate a just transition that leaves no one behind, thereby reinforcing a robust, inclusive, and sustainable Thai economy in alignment with global Sustainable Development Goals (SDGs).

Keywords: Green Jobs, Just Transition, BCG Economy Model, Labor Policy, Thailand.

1. Introduction

Over the past decade, the transition toward a green economy has become an urgent global agenda due to the escalating challenges and severe impacts of climate change. In response, the international community has accelerated its efforts to align with the Sustainable Development Goals (SDGs) and the commitments established under the Paris Agreement (UNFCCC, 2015). Within this global context, Thailand has formulated a proactive response through its climate change strategies, establishing a long-term policy framework focused on building climate resilience and fostering low-carbon economic growth (Office of Natural Resources and Environmental Policy and Planning [ONEP], 2022). To further elevate its commitment, Thailand has officially pledged to achieve Carbon Neutrality by 2050 and Net-Zero Greenhouse Gas Emissions by 2065.

To actualize these ambitious environmental targets, the Thai government has championed the Bio-Circular-Green (BCG) Economy Model as its primary national development strategy. Driven by science, research, and innovation, the BCG model capitalizes on Thailand's comparative advantages in biodiversity and agricultural richness, promoting resource circularity and environmentally friendly economic practices (Ministry of Higher Education, Science, Research and Innovation [MHESI], 2021). However, restructuring the national economy toward this green paradigm necessitates a fundamental transformation of the labor market, with "Green Jobs" acting as a critical mechanism. The International Labour Organization (ILO) emphasizes that green jobs must be firmly rooted in the concept of "Decent Work," which not only contributes to environmental preservation and restoration but also ensures a sustainable and equitable transition for all workers (International Labour Organization [ILO], 2015). Currently, Thailand's collaboration with the ILO strongly focuses on preparing the domestic labor market for these climate-induced shifts.

While the shift toward a sustainable green economy presents significant opportunities, it is a complex process fraught with multifaceted challenges. A central concern is ensuring that this macroeconomic shift is equitable and inclusive, adhering to the internationally recognized framework of a "Just Transition" (UNFCCC, 2015). A Just Transition prioritizes the fair distribution of economic benefits and the active support of the workforce—particularly those employed in traditional, carbon-intensive industries (brown jobs) and vulnerable socio-economic groups—enabling them to adapt and access new green opportunities without bearing a disproportionate burden of the transition costs.

Despite strong policy commitments, the practical implementation of the green economy in Thailand faces substantial structural obstacles. A primary barrier is the "skills mismatch gap," characterized by the incongruence between the existing skill sets of the workforce and the emerging demands of the green labor market. Research by Vona et al. (2018) indicates that the enforcement of environmental regulations significantly increases the demand for specialized engineering and technical skills. Consequently, workers in polluting or traditional industries are highly susceptible to displacement, as their conventional skills do not align with the requirements of green jobs. Furthermore, studies in the tourism and hospitality sectors have identified a distinct sustainability skills gap, revealing a disconnect between current education and training systems and the actual competency needs of the industry, particularly among small and medium-sized enterprises (SMEs) (Carlisle et al., 2021). These empirical findings highlight that targeted workforce skill development is an indispensable prerequisite for achieving a Just Transition in Thailand.

Given these complex dynamics, there is a critical need to evaluate whether Thailand's current labor policies and green initiatives are sufficiently equipped to facilitate an equitable workforce transformation. Therefore, this article aims to: (1) systematically review and synthesize the current policy landscape and the drivers of green jobs in Thailand; (2) analyze the structural gaps and challenges of existing policies when benchmarked against the international "Just Transition" framework; and (3) propose an integrated policy framework to guide the development of a resilient and fair green workforce that can sustainably support Thailand’s transition to the BCG economy in the long term.

2. Literature Review and Conceptual Framework

2.1 The Concept of Green Jobs and Decent Work

The transition towards a sustainable global economy is fundamentally reliant on the creation and promotion of "Green Jobs." The International Labour Organization (ILO) defines green jobs as decent work that actively contributes to the preservation, restoration, and enhancement of the environment. Importantly, the scope of green jobs is not exclusively confined to emerging green sectors, such as renewable energy; it also encompasses the ecological upgrading of traditional, carbon-intensive sectors, including manufacturing and construction. By integrating energy efficiency and minimizing waste and pollution, traditional roles are transformed into green jobs (ILO, 2019). Therefore, the green jobs paradigm necessitates a holistic approach that balances environmental sustainability with the promotion of decent work conditions.

2.2 The Imperative of a Just Transition

While the shift to a green economy is environmentally necessary, it inevitably triggers significant labor market restructuring, which can expose certain worker demographics to economic vulnerabilities if not properly managed. In response, the concept of a "Just Transition" has been elevated to a central tenet of international climate policy. Explicitly recognized in the preamble of the Paris Agreement, the Just Transition framework emphasizes the critical need to manage workforce transitions fairly while prioritizing the creation of decent and quality employment (UNFCCC, 2015). Implementing a Just Transition requires comprehensive mechanisms, notably robust social dialogue, adequate social protection floors, and strategic investments in continuous skills development, ensuring that climate action does not inadvertently leave marginalized groups behind.

2.3 Challenges in Developing Economies and the Informal Sector

In the context of developing nations, the Just Transition framework faces unique implementation challenges, particularly regarding the vast informal economy. A recent study by Manyati et al. (2024) investigating informal metalworkers in the Magaba and Gaza industrial clusters of Harare, Zimbabwe, highlights the profound green skills gaps and systemic inequalities present in these spaces. The research reveals that formal innovation hubs predominantly benefit university-educated youth, thereby excluding informal innovators who face significant educational and resource constraints. Furthermore, public Technical and Vocational Education and Training (TVET) institutions exhibit a limited capacity to systematically integrate green skills into their curricula, failing to meet the urgent needs of the informal workforce. Within this context, Manyati et al. (2024) broadly define "green skills" as the essential technical competencies, knowledge, values, and attitudes required to achieve sustainable outcomes across economic, social, and environmental dimensions. These international lessons clearly indicate that achieving a Just Transition requires comprehensive policy interventions encompassing clear funding mechanisms, broad stakeholder engagement, and targeted reskilling and upskilling programs.

2.4 Thailand’s Context: From the Sufficiency Economy Philosophy to the BCG Model

While international frameworks provide essential guidelines, Thailand's approach to the green economy is deeply anchored in its localized ideology, known as the Sufficiency Economy Philosophy (SEP). The SEP prioritizes balanced development, moderation, reasonableness, and the building of resilience, all grounded in knowledge and morality. This philosophy is widely recognized as the foundational framework for promoting long-term sustainability within Thai organizations and society (Phunpeng, 2023).

Building upon the SEP, the Thai government has concretized these ideals into the Bio-Circular-Green (BCG) Economy Model, designating it as the primary national development strategy. The BCG model is designed to elevate the nation's competitive advantage while simultaneously optimizing

resource efficiency, mitigating environmental impacts, and ensuring the widespread and equitable distribution of economic benefits (MHESI, 2021). Therefore, the analysis of green jobs and fair transitions in Thailand must be contextualized within the specific parameters of this BCG framework.

2.5 Conceptual Framework

The conceptual framework of this study operates at the intersection of the international Just Transition principles and Thailand's BCG Economy Model. While the BCG model establishes the economic and environmental trajectory, the Just Transition framework provides the essential social safeguards required to protect the workforce during this macroeconomic shift. By utilizing this dual-lens framework, this research systematically identifies and analyzes the structural gaps in Thailand's current policy environment. These gaps serve as the analytical foundation for proposing an integrated policy framework designed to foster a resilient, inclusive, and equitable green workforce.

3. Methodology

3.1 Research Design

To comprehensively evaluate the landscape of green jobs and the readiness of Thailand's labor policies for a sustainable economic shift, this study employs a Systematic Literature Review (SLR) approach. The SLR methodology was selected due to its rigorous, transparent, and reproducible process for identifying, evaluating, and synthesizing the existing body of completed and recorded work. Given the multidimensional nature of the "Just Transition" framework—which encompasses economic, environmental, and social justice paradigms—a systematic review serves as the most appropriate method to consolidate fragmented policy directives and academic discourse into a cohesive analytical framework.

3.2 Data Collection and Search Strategy

The data collection process was strategically designed to capture a broad spectrum of authoritative perspectives, ranging from national policy implementations to international standards. The search strategy targeted key documents, academic articles, and official reports published over a 15-year timeframe, spanning from 2011 to 2025. This specific period was chosen to capture the evolution of Thailand's environmental policies, leading up to the official adoption of the Bio-Circular-Green (BCG) Economy Model and the nation's post-pandemic economic recovery strategies.

The primary data sources were categorized into three main domains:

1. **National Policy and Government Reports:** Official documents were retrieved from key Thai governmental bodies responsible for economic planning, investment, and labor. These included strategic investment reports from the Board of Investment (BOI) (2024), workforce training frameworks from the Department of Skill Development (DSD) (2023), and macroeconomic planning documents from the Office of the National Economic and Social Development Council (NESDC) (2023).
2. **International Frameworks and Assessments:** To benchmark Thailand's progress against global standards, the study incorporated pivotal reports from international organizations. Key documents included the green jobs and policy readiness assessments conducted by the International Labour Organization (ILO) (2023) and foundational climate agreements established by the United Nations Framework Convention on Climate Change (UNFCCC) (2015).
3. **Peer-Reviewed Academic Literature:** Scholarly articles published in recognized national and international journals were systematically gathered. These papers provided empirical evidence and critical analyses regarding skills mismatches, labor dynamics, and the socio-economic

impacts of environmental regulations in both global and Thai contexts (e.g., Manyati et al., 2024; Vona et al., 2018).

3.3 Data Analysis and Synthesis

The extracted data were analyzed utilizing Thematic Synthesis, a robust qualitative analytical technique designed to identify, analyze, and report recurring patterns (themes) within extensive textual data. The analytical procedure was conducted in three iterative phases:

1. **Data Extraction and Coding:** Initial coding involved extracting relevant policy statements, statistical labor trends, and theoretical arguments from the collected documents. Codes were assigned to text segments addressing job creation, skill requirements, labor protection, and policy integration.
2. **Thematic Grouping:** The initial codes were subsequently aggregated into broader descriptive themes. This phase involved cross-referencing national BCG policy objectives with the core tenets of the ILO's Just Transition guidelines to identify areas of alignment and divergence.
3. **Identification of Structural Gaps:** In the final analytical phase, the descriptive themes were synthesized to generate analytical concepts. This process systematically revealed the underlying structural barriers hindering a fair transition in Thailand. Consequently, the data synthesis crystallized into four distinct structural gaps: the Skills Mismatch Gap, the Social Protection Gap, the Policy Integration Gap, and the Inclusivity Gap. These rigorously identified themes form the basis of the results and the subsequent integrated policy recommendations presented in this study.

4. Results and Discussion

The transition toward a green economy in Thailand is propelled by a combination of macroeconomic strategies and labor market mechanisms. The findings from the systematic literature review reveal a dual-track approach: the stimulation of demand for green industries through state-led investments, and the supply-side response through human capital development. However, a critical analysis of these mechanisms against the international "Just Transition" framework exposes significant structural gaps that threaten the equity and sustainability of this economic shift.

4.1 Driving the Green Transition via Labor Market Mechanisms

4.1.1 Driving Demand through Policy and Investment

Thailand's commitment to the Bio-Circular-Green (BCG) Economy Model is tangibly reflected in its robust investment promotion policies. According to the Board of Investment (BOI) (2024), the total value of investment promotion applications reached a staggering 1,138,508 million THB across 3,137 approved projects. The majority of these investments are concentrated in targeted industries with high potential for sustainable development, such as agriculture and food processing, renewable energy, and advanced technology sectors. This massive influx of capital has the potential to generate over 200,000 new employment opportunities for the Thai workforce. In the agriculture and food processing sector alone—the cornerstone of the bio-economy—investments amounted to 87,646 million THB, driving the demand for workers skilled in modern manufacturing, automation, and sustainable quality management.

Simultaneously, the Thai capital market is acting as a powerful catalyst for green labor demand. In 2023, 193 listed companies, representing 72% of the total market capitalization, met the criteria for SET ESG Ratings, signaling a structural shift where corporate entities are increasingly compelled to upskill their personnel in environmental management, greenhouse gas (GHG) accounting, and responsible resource utilization (Stock Exchange of Thailand [SET], 2024). Furthermore, the National Energy Plan dictates a continuous increase in the proportion of renewable energy, stimulating labor demand for both high-tech roles and community-level energy projects (Energy Regulatory

Commission [ERC], 2022).

4.1.2 Meeting Supply through Human Capital and Skills Development

To accommodate this surging demand, the Thai government has initiated supply-side responses primarily driven by the Department of Skill Development (DSD). The DSD's five-year action plan (2023–2027) heavily emphasizes reskilling and upskilling the workforce to align with the BCG model and targeted S-Curve industries (DSD, 2023). Significant efforts include the development of green skills curricula, such as solar energy system maintenance and electric vehicle (EV) technology. In the long-term educational pipeline, the Office of the Vocational Education Commission (OVEC) has mandated the alignment of vocational training with national industrial targets, promoting dual vocational training systems and competency-based curricula to bridge the skills gap (OVEC, 2024).

4.2 Structural Gaps and Challenges Towards a Just Transition

Despite these proactive economic and educational measures, Thailand's green policy frameworks remain insufficiently aligned with the core principles of a Just Transition. While national strategies like the 20-Year National Strategy and the Climate Change Master Plan clearly articulate carbon reduction and green growth goals, they often prioritize economic expansion and environmental metrics over the protection of vulnerable workers (ONEP, 2022). Unlike Vietnam and Indonesia, which have begun developing specific mechanisms to support workers affected by the transition (Dung Doan et al., 2023; ILO, 2024), Thailand lacks comprehensive safeguards for workers exiting traditional fossil-fuel industries. The analysis identifies four critical structural gaps hindering a Just Transition in Thailand.

4.2.1 The Skills Mismatch Gap

The Thai labor market currently suffers from a pronounced skills mismatch, where the existing competencies of the workforce do not align with the specialized requirements of green industries. The gap is particularly evident in the shortage of "hybrid skills"—the integration of digital literacy with environmental engineering, or data analytics with sustainable management. This mismatch stems from a lack of systematic support mechanisms, such as national green skills standards and real-time green labor market intelligence. Furthermore, vocational education often prioritizes theoretical knowledge over practical application, limiting industry relevance (Chimpet, 2025). While there is a growing demand for high-voltage technicians in the EV sector and biotechnologists in the bio-economy, private sector investment in employee upskilling remains highly inconsistent, leaving vulnerable workers without the means to adapt (Ratanakumut, 2023).

4.2.2 The Social Protection Gap

The transition to a green economy in Thailand exposes severe inadequacies in the social protection system. The gap is characterized by inadequate coverage, particularly for the more than 20 million informal workers in the country (National Statistical Office [NSO], 2023). For example, workers in the renewable energy sector are frequently employed on short-term contracts, leaving them outside the formal social security safety net compared to their formally employed counterparts (Boonyarattanasoontorn, 2022). Furthermore, the current system is ill-equipped to handle the structural unemployment resulting from the decommissioning of brown industries, such as coal power generation. There is a distinct absence of dedicated "transition funds" or targeted income compensation measures for displaced workers, forcing them to rely on generalized social security frameworks that impose high contribution barriers and offer insufficient relief (Lohwiritanon, 2024; Ratanakumut, 2023).

4.2.3 The Policy Integration Gap

Thailand's approach to green jobs suffers from severe policy fragmentation. Although ministries such as the Ministry of Labour, Ministry of Education, Ministry of Energy, and the Ministry of Natural Resources and Environment all play roles in the transition, their efforts are largely

siloed. There is no central coordinating mechanism that systematically links GHG reduction targets with skills development and social protection policies (ILO, 2023; Ratanakumut, 2023; Thailand Development Research Institute [TDRI], 2025). Vertically, green policies are heavily centralized at the national level, leaving local governments without the resources or frameworks to implement localized transitions (Sucharitphan et al., 2024). Horizontally, policy instruments remain disconnected; for instance, green skills training initiatives are rarely linked to tax incentives or green industry funds, thereby limiting their scalability (Green Economy Policy Research Center, 2019). Moreover, the formulation of these policies suffers from a lack of meaningful stakeholder participation, particularly marginalizing the voices of labor unions and vulnerable communities (Sathon, 2023).

4.2.4 The Inclusivity Gap

Finally, the green labor market in Thailand reflects and potentially exacerbates existing socio-economic inequalities. Access to green jobs is highly skewed toward formal workers and urban populations, as green infrastructure investments are geographically concentrated in major economic zones (Ratanakumut, 2023). In contrast, rural agricultural workers remain trapped in precarious, informal roles without adequate social protection. Gender disparities are also evident; despite national gender equality policies, women remain underrepresented in high-skill green sectors such as clean technology and energy engineering (ILO, 2023). Access to lifelong learning and reskilling programs is similarly unequal, disproportionately benefiting employees of large corporations while leaving SMEs and informal workers—who lack the financial and temporal resources to participate in urban-centric training programs—severely disadvantaged (Tantichariyaphan, 2023).

In summary, while Thailand possesses the economic ambition and foundational policies to drive a green transition, the pervasive structural gaps in skills, social protection, policy integration, and inclusivity indicate that the transition is currently far from "just." Addressing these gaps is imperative to ensure that the shift toward a BCG economy fosters equitable and sustainable development without leaving marginalized populations behind.

5. Policy Recommendations for a Just Transition

To effectively bridge the identified structural gaps and propel Thailand towards a genuinely equitable transition, this study proposes an integrated policy framework consisting of four strategic pathways. These recommendations are designed to foster a resilient, inclusive, and sustainable green labor market ecosystem that aligns with the Bio-Circular-Green (BCG) Economy Model.

5.1 Pathway 1: Developing a Dynamic Green Skills Ecosystem

To address the persistent skills mismatch, the Thai government must shift from a reactive problem-solving approach to a proactive, dynamic ecosystem that anticipates future labor demands. Firstly, the establishment of "Sectoral Green Skills Councils" is highly recommended. Led by private sector entities within targeted industries—such as the Federation of Thai Industries, the Electric Vehicle Association, and the Renewable Energy Association—these councils would serve as the primary mechanism for skills forecasting and providing direct feedback to educational institutions. Secondly, the Ministry of Education and the Ministry of Higher Education, Science, Research and Innovation should implement a "Flexible Education System". By utilizing a Credit Bank System and modular, stackable credentials, the workforce can engage in lifelong upskilling and reskilling without the constraints of traditional full-time degree programs. This flexibility will rapidly integrate workers into emerging technologies while mitigating the risk of structural unemployment, directly fulfilling the core tenets of a Just Transition.

5.2 Pathway 2: Institutionalizing Social Protection for a Just Transition

To close the social protection gap and ensure that "no one is left behind," Thailand must institutionalize concrete support mechanisms. A primary recommendation is the creation of a dedicated "Just Transition Fund". This fund should draw from diverse and sustainable revenue streams, including

government allocations, private sector contributions, and potential future revenues from a Carbon Tax. The fund's objective must explicitly target workers displaced by the decommissioning of traditional industries (e.g., coal and fossil fuels), providing them with financial compensation, training subsidies, and career counseling. Furthermore, strengthening tripartite "Social Dialogue"—involving the state, employers, and labor representatives—is crucial. Establishing these dialogue platforms at both the national and sectoral levels will help design context-specific mitigation measures, thereby reducing social friction and building long-term trust in the transition process.

5.3 Pathway 3: Strengthening Policy Integration and Governance

Overcoming the current fragmented, siloed approach to policy implementation requires a robust institutional architecture. This study proposes the establishment of a "National Green Workforce Development Committee" to serve as the central policy-making body. To ensure effective cross-ministerial coordination and authority, this special mechanism should be chaired by the Prime Minister or a designated Deputy Prime Minister. The committee must include representatives from key agencies, including the Ministry of Industry, Ministry of Labour, Ministry of Energy, the Office of the National Economic and Social Development Council (NESDC), and the Board of Investment (BOI). Its mandate would encompass setting national green workforce strategies, integrating ministerial action plans, allocating consolidated budgets to eliminate redundancies, and implementing shared indicators for rigorous Monitoring and Evaluation (M&E).

5.4 Pathway 4: Fostering an Inclusive Green Economy

A Just Transition must explicitly target the vulnerabilities of Small and Medium-sized Enterprises (SMEs) and the informal workforce. For SMEs, targeted support is necessary to overcome cost and knowledge barriers. As highlighted by Siriyasap (2023), establishing "Managerial Awareness Programs" regarding the return on investment of green innovations, coupled with financial mechanisms such as low-interest loans or venture capital for adopting clean technologies, is vital. For the informal sector, particularly those in the circular economy such as recycling waste pickers, the state should promote the formation of Social Enterprises. These entities can act as intermediaries to formalize waste management, provide safe sorting skills, and facilitate access to the social security system. Additionally, specific inclusive measures—such as providing childcare facilities for female workers and targeted training programs for youth and persons with disabilities—must be integrated into green policies to ensure equitable access to new economic opportunities.

6. Conclusion

Thailand’s transition toward a green economy under the BCG Economic Model reflects a strategic commitment to fostering sustainable development and enhancing long-term global competitiveness. The unprecedented influx of capital into renewable energy, circular resource utilization, and bio-based industries underscores the nation’s proactive stance on climate action. However, the findings of this study reveal that this macroeconomic momentum is currently hindered by profound structural gaps when evaluated against the international "Just Transition" framework.

The empirical analysis highlights that a significant portion of the Thai workforce faces a critical skills mismatch, compounded by the inability of marginalized groups—particularly informal workers and rural populations—to access emerging green opportunities. The existing social protection systems are inadequately equipped to support workers displaced by industrial restructuring, while SME operators remain constrained by knowledge and capital barriers. Furthermore, the lack of policy integration and cohesive governance exacerbates these inequalities, as fragmented ministerial efforts fail to deliver systemic, sustainable impact.

Addressing these structural deficiencies requires an urgent paradigm shift. The success of Thailand's green agenda cannot be measured solely by technological advancements or the volume of foreign direct investment. Instead, it must be evaluated by the state's capacity to ensure social equity

and inclusivity. By implementing a dynamic green skills ecosystem, institutionalizing a Just Transition Fund, reforming policy governance, and prioritizing public participation, Thailand can effectively close these structural gaps. Ultimately, an evidence-based, integrated policy framework will empower Thailand to cultivate a resilient, globally competitive economy that authentically embodies the ethos of leaving no one behind, fully realizing the global Sustainable Development Goals (SDGs).

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