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Discussion Paper

# Green Jobs and Just Transition

The Role of Green Employment in Advancing a Sustainable Future



# Green Jobs and Just Transition

## The Role of Green Employment in Advancing a Sustainable Future

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# Contents

<b>Executive Summary</b>	4
<b>Introduction</b>	5
<b>01 What are Green Jobs?</b>	6
<b>02 Government Initiatives to promote Green Jobs</b>	9
2.1 Green Jobs Initiatives	10
2.2 Key Developments and Achievements	10
2.3 Current and Planned Policy Initiatives	12
<b>03 The Role of Education in Supporting Green Jobs</b>	13
3.1 Engaging the Education System	13
3.2 Key Components for Educational Reform in line with the Just Transition Framework	13
3.3 Educational Reforms and Green jobs	17
<b>04 Strategic Approaches and Considerations for Accelerating Green Jobs Creation</b>	18
4.1 Policy Frameworks and Cross-Sector Coordination	19
4.2 No One-Size-Fits-All: Diverse Paths to Green Job Creation	20
<b>05 Pathways to Green Jobs Development: Legal Frameworks, Technological Innovation, and Policy Risks</b>	21
5.1 Legal Frameworks as a Foundation for Investment Certainty	21
5.2 Legislation as a Catalyst for Technological Innovation and Green Job Growth	21
5.3 Navigating Policy Risks in Green Job Development	22
<b>06 Insights and Recommendations</b>	25
<b>Annex 1</b>	28
<b>Annex 2</b>	30
<b>Endnotes</b>	31

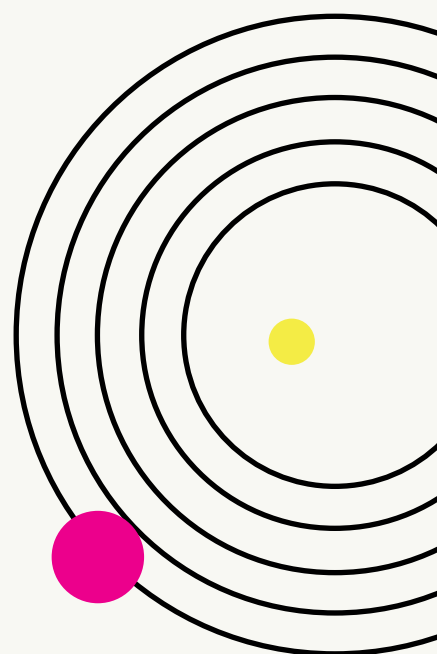
## Executive Summary

The climate crisis urgently calls for collaborative action from governments, local authorities, the private sector, and civil society worldwide to transition towards sustainable and low-carbon economies. At the core of this complex transformation, which spans socio-economic and political realms and requires widespread acceptance, lies the principle of a 'just transition'. This principle, centered on inclusivity, is designed to ensure a comprehensive approach to sustainability so that it addresses existing social disparities. It seeks to guarantee that the shift towards environmentally sustainable practices is also socially equitable, thereby benefiting all segments of society and ensuring no individual or community is "left behind".

The development of the green job sector is recognized as a crucial element in advancing global decarbonization efforts under the framework of a 'just transition' as it not only facilitates the shift to low-carbon economies but also enhances socio-economic resilience. It provides a dual pathway for addressing the challenges of climate change while advancing social equity, embodying a holistic approach to sustainable development.

The success seen in countries with supportive programs for green jobs underscores the potential for harmonizing economic development with environmental stewardship. This presents policymakers worldwide with a genuine opportunity to design a transition to a greener economy that not only addresses the challenges of climate change and environmental degradation, but also cultivates inclusive, prosperous societies with aligned socio-economic objectives.

This paper explores the potential of green employment as a key pillar of the just transition, advocating for a holistic approach that not only accelerates the transition to a green economy but also ensures that this transition is inclusive, just, and beneficial for all.



# Introduction

*History says, don't hope  
On this side of the grave.  
But then, once in a lifetime  
The longed-for tidal wave  
Of justice can rise up,  
And hope and history rhyme.*

**Seamus Heaney<sup>1</sup>**

The transition to a low-carbon economy represents a pivotal shift, transcending mere technological innovation to embody a profound societal transformation. This movement, resonant with Seamus Heaney's vision of a "tidal wave of justice," places a premium on fostering an equitable economy through the prism of sustainable development. At the heart of this transformation are green jobs, which not only promise sustainable employment opportunities but are instrumental in ensuring a fair and inclusive distribution of the green transition's benefits. This paradigm shift, fueled by rapid advancements in green technologies<sup>2</sup> and underscored by the tangible returns on clean energy investments, is particularly significant in the aftermath of Covid-19's economic disruptions, positioning green jobs as a cornerstone for resilient economic recovery.

In this vein, the creation of "decent" green jobs emerges as a strategic imperative, aligning seamlessly with the United Nations' Sustainable Development Goal 8, which champions Decent Work and Economic Growth. This strategic alignment underscores a commitment to intertwining environmental sustainability with social equity, marking a critical step towards a just transition.

The vital role of green jobs in sustainable development has garnered attention from leading global entities, including the United Nations (UN) and the International Labor Organization (ILO).

These organizations are pivotal in driving the expansion of green jobs, providing essential financial support, and crafting policies that bolster a just transition. The collaboration between the ILO and the International Renewable Energy Agency (IRENA) epitomizes this effort, as evidenced by their annual report which assesses the impact of green jobs on the energy sector. Despite the economic headwinds wrought by Covid-19, their 2022 report highlights an encouraging trend: a robust increase in green energy jobs, with a growth rate of approximately 7-8% from 2020 to 2021<sup>3</sup>. This uptick not only demonstrates the resilience of green economies in turbulent times but also affirms the transformative power of green jobs in forging a sustainable and equitable future.

This paper comprises six key sections designed to comprehensively address the topic of green jobs and the just transition to a low-carbon economy. Section 1 begins by defining green jobs and classifying their various types to establish a clear foundation. Following this, Section 2 presents case studies from Canada, Sweden, and Costa Rica to provide comparative insights into the creation of green jobs, highlighting unique strategies and outcomes. Section 3 explores the role of education in building capacity for the just transition and the expansion of green jobs. In Section 4, the paper proposes strategies for enhancing green job growth, drawing on insights from the initial sections. Section 5 discusses potential future scenarios, informed by insights from the case studies. The final section, Section 6, concludes with actionable recommendations aimed at accelerating the expansion of green jobs and ensuring an equitable transition to a sustainable economy. By offering a structured analysis and strategic guidance, this paper aims to contribute perspectives to the discourse on sustainable economic development and social equity.

# 1. What are Green Jobs?

“Green jobs” encompass a range of definitions and classifications, varying from narrow to broad in scope. However, a common theme to all is their contribution to preserving and/or restoring the environment, whether in traditional sectors such as manufacturing and construction or in emerging sectors like renewable energy and energy efficiency. Thus, the proliferation of green jobs not only holds the potential to enhance the socio-economic performance of societies across the globe, but also to mitigate employment risks, aiding governments in safeguarding the future livelihoods of their populations.<sup>4</sup>

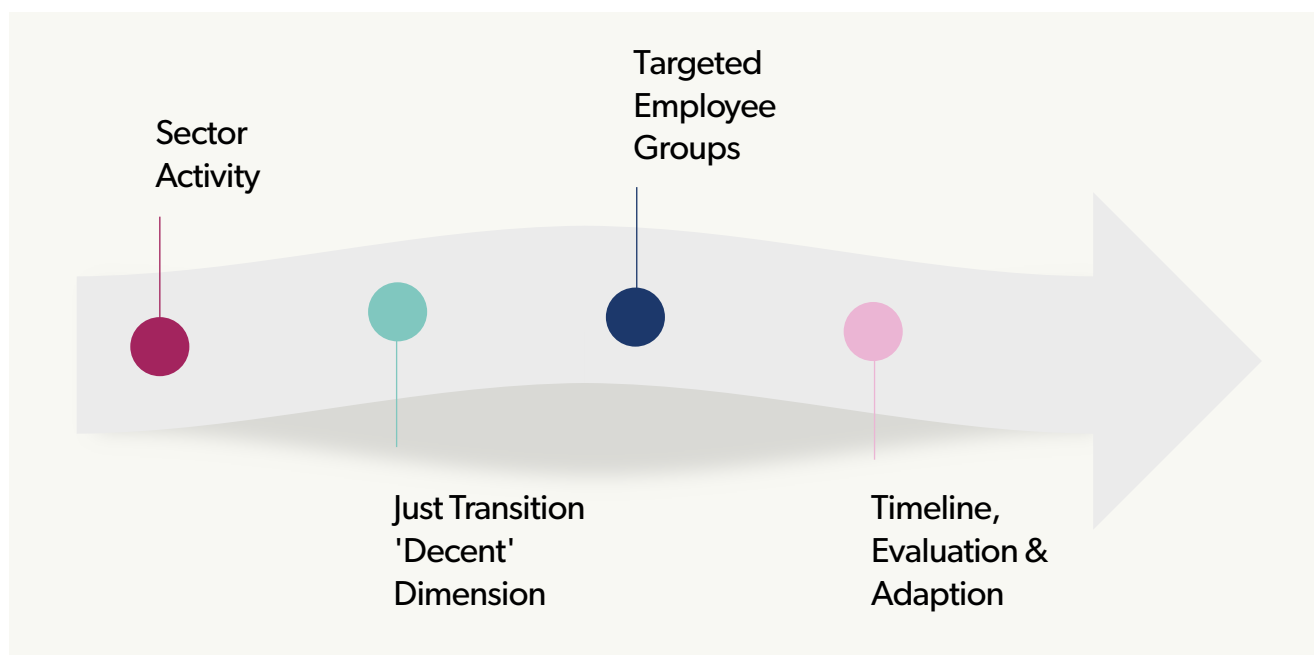
Four primary parameters are consistently identified across various definitions of green jobs. These are detailed in Figure 1, and clarified in Table 1.

The parameters presented in Figure 1 for classifying green jobs (see Table 1 for itemization) are a work-in-progress, and vary across institutions and countries. Differences include variations in what vocations and range of activities qualify as green jobs, and what constitutes “decent” in this context. Once an agreement is reached nationally on the first three key parameters, the process of taking action and considering the timeline, evaluation and adaptation can take place (this step also involves data collection in order to provide evidence for the decision-making required as part of this step). These steps are crucial in laying the foundation for systemic and successful development of green jobs as will be demonstrated in key examples below.

A prime and early instance of defining green jobs according to specific activities was when the Government in the United Kingdom in 2015 identified 17 key sectors under the umbrella of green jobs, including: alternative fuels, bioenergy,

**Figure 1.**

Four Key Parameters of Green Jobs



Source: Created by author

carbon capture and storage, energy-efficient lighting and products, energy monitoring /saving /control systems, fuel cells and energy storage, hydropower, low carbon financial and advisory services, low emission vehicles and infrastructure, nuclear power, offshore and onshore wind, other renewable electricity, renewable combined heat and power, renewable heat, and solar photovoltaic.<sup>5</sup> This classification approach typifies a traditional view of the ‘sector activity’ of green jobs, heavily linking them to the energy sector.

Over the past few years, the scope of green jobs has expanded significantly, a change partly attributed to the influential 2015 Paris Agreement and the introduction of the United Nations Sustainable Development Goals (SDGs). These international frameworks broadened the understanding of what transitioning to a low-carbon economy entails, such that green jobs now encompass not only energy-focused roles but also those related to climate and environmental concerns. The International Labor Organization’s (ILO) definition reflects this wider scope: “Green jobs reduce the consumption of energy and raw materials, limit greenhouse gas emissions, minimize waste and pollution, protect and restore ecosystems, and enable enterprises and communities to adapt to climate change. Moreover, these jobs must also be decent jobs.”<sup>6</sup>

**Over the past few years, the scope of green jobs has expanded significantly, a change partly attributed to the influential 2015 Paris Agreement and the introduction of the United Nations Sustainable Development Goals (SDGs).**

The mention of “decent” jobs by the ILO, a term sufficiently vague to invite debate, essentially refers to the concept of “just transition”, which focuses

on fostering a socio-economic transition where “no one is left behind”, prioritizing fairness, equity, equality, and inclusiveness (detailed further in Annex 1). Accordingly, green jobs are central to promoting economic justice, avoiding exploitative practices, and addressing inequalities linked to taxation, profitability, and issues of distributive and procedural justice. The importance of aligning green jobs with considerations of justice was underscored by the 2015 Paris Agreement. This international accord highlights the need for a just transition for the workforce, advocating for the creation of decent work that aligns with the development priorities set by each country.

### Box 1.

#### Perceptions of Green Jobs in the UK<sup>7</sup>

The United Kingdom Green Jobs Taskforce Report from 2022 conducted a survey that identified the following key issues that people associate with green jobs:

- Growth and investment;
- Policy or policies;
- Skills;
- Funding;
- Net zero greenhouse gas emissions;
- “Green” transition over time.

The following table provides an overview of key economic sectors impacted by the transition to low-carbon, resource-efficient economies. It highlights sectors associated with green job growth and offers insights into the necessary standards for these jobs to ensure their development within the just transition framework. This includes considerations for decent work dimensions, targeted employee groups, and strategies for evaluating and adapting job development over time.

**Table 1.****The 4 Key Dimensions of Green Jobs**

1	2	3	4
Sector Activity	Just Transition 'Decent' Dimension	Targeted Employee Groups	Timeline, Evaluation & Adaptation
<ul style="list-style-type: none"> <li>→ Energy Supply Alternatives (Low-Carbon Energy);</li> <li>→ Buildings;</li> <li>→ Transportation ;</li> <li>→ Basic Industry ;</li> <li>→ Food and Agriculture;</li> <li>→ Forestry;</li> <li>→ Recycling;</li> <li>→ Services (Incl. Tourism).</li> </ul>	<ul style="list-style-type: none"> <li>→ Jobs should offer sustainable employment opportunities over time;</li> <li>→ Jobs should contribute to a fair distribution of the benefits stemming from the green transition;</li> <li>→ Jobs should provide an improved 'just' impact in terms of 'livelihood' from what existed before.</li> </ul>	<ul style="list-style-type: none"> <li>→ Focusing on regions with low employment rates;</li> <li>→ Prioritizing the replacement of jobs in the fossil fuel industry.</li> </ul>	<ul style="list-style-type: none"> <li>→ Establishing varying timelines for tracking the growth in green jobs;</li> <li>→ Analyzing the achievement of set objectives in periodic reviews to provide valuable insights into the success or failure of related policies.</li> </ul>

Created by author. Data source: Adapted from 'Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World'.<sup>8</sup>



## 2. Government Initiatives to promote Green Jobs

This section offers a detailed examination of the development and impact of green-job policies in three countries: Canada, Sweden, and Costa Rica. An initial overview is presented in Table 2 below, followed by an in-depth analysis of specific issues in each country.

**Table 2.**  
Quick Overview of Green Job Initiatives according to Country

Green Jobs Issue	Canada	Sweden	Costa Rica
<b>Early Discussions on Green Energy Jobs</b>	1990 <sup>9</sup>	2002, <sup>10</sup> 2010 <sup>11</sup>	2015 <sup>12</sup>
<b>Current Policy</b>	The Pan-Canadian Framework on Clean Growth & Climate Change, 2016 <sup>13</sup>	Green Jobs Program, 2004-2006 <sup>14</sup>  The Swedish Reform Program for Growth and Jobs, 2006-2008 <sup>15</sup>  Green Jobs Initiative Established in 2020 <sup>16</sup>	The Declaration of Green Economy Principles, 2018 <sup>17</sup>
<b>% Green Jobs Now</b>	In 2020, the number of people employed in the green economy was 430,500, with projections indicating a nearly 50% increase to 639,200 <sup>18</sup> by 2030	The year 2023 saw an average of 26.6% of people working in the green economy <sup>19</sup> . Regarding skill levels, only 14% of citizens felt they lacked the necessary skills for green economy jobs <sup>20</sup> .	Costa Rica's National System of Climate Change Metrics (SINAMECC) is set to launch with the aim of providing more comprehensive data on green employment in the country.
<b>Future Plans for Job Creation in the Area</b>	Sustainable jobs legislation was introduced <sup>21</sup> alongside the Just Transition Bill in 2023, <sup>22</sup> marking significant steps towards environmentally conscious employment policies.	The Green Jobs Initiative, launched in 2020, remains a pivotal force for action. It primarily targets unemployed individuals for new green job opportunities.	A new just transition strategy is anticipated in 2024. <sup>23</sup> This strategy is expected to focus on job accessibility for disadvantaged groups, assess the impacts of climate change, and aim to future-proof decision-making processes.

Source: Created by author

## 2.1. Green Jobs Initiatives

A key similarity between these three countries is the government's leading role in introducing and supporting green jobs initiatives, which in all three cases are predominantly founded on the aim to advance various aspects of the UN Sustainable Development Goals (SDGs). Another shared characteristic is the consistent use of the term 'Green Jobs' in policy documents across various phases. Each country has implemented new policy initiatives related to green jobs, particularly following the 2015 Paris Agreement, indicating a progressive approach in environmental policy development.

**In 2020, the green economy employed 430,500 individuals. Projections indicate a nearly 50% increase in this sector, with the number of green jobs expected to reach 639,200 by 2030.**

→ **Canada:** The concept of green jobs was initially mentioned in Canada's Green Plan for a Healthy Environment in 1990.<sup>24</sup> However, a substantial commitment to green job initiatives emerged only with the launch of the Future Skills Centre in 2019 by the Canadian government.<sup>25</sup> The primary objective of the Future Skills Centre is to ensure that Canada's skills development policies and programs are adequately prepared for future demands;

→ **Sweden:** Sweden's foray into green job initiatives dates back to 2002 with the National Sustainable Development Strategy. Recognized as an environmental pioneer, Sweden has consistently ranked in the "top ten" of the globally respected Environmental Performance Index (joint project of the Yale Center for Environmental Law & Policy<sup>26</sup> and The Center

for International Earth Science Information Network<sup>27</sup> at Columbia University's Earth Institute) for over a decade.<sup>28</sup> The integration of sustainable development into government policy arguably paved the way for the Swedish Green Jobs Program of 2004-2006,<sup>29</sup> as well as subsequent initiatives in this field;

→ **Costa Rica:** Similarly to Canada and Sweden, also Costa Rica stepped up its policy efforts to drive the development of green jobs with the Declaration of Green Economy Principles in 2018.<sup>30</sup> Additionally, Costa Rica has emerged as a sustainability pioneer, receiving the UN Champions of the Earth Award for Policy Leadership in 2019.

## 2.2. Key Developments and Achievements

The implementation of policies focused on expanding their respective green job sectors has yielded significant results in all three countries.

→ **Canada:** In 2020, the green economy employed 430,500 individuals. Projections indicate a nearly 50% increase in this sector, with the number of green jobs expected to reach 639,200 by 2030. Canadian environmentalism advocates have declared that green jobs "mean good, stable jobs [and that] green jobs grow Canada's middle class and strengthen its global competitiveness."<sup>32</sup> The advocacy efforts for green jobs in Canada have been fruitful, as exemplified by the Federal Government recognition of the green economy as a key catalyst for Canada's economic strategy. This recognition is mirrored in the government's substantial commitment, as highlighted in the 2023 budget, which allocated 70 billion CAD (circa 52 billion USD) to investments in clean energy, marking a significant step for Canada towards sustainable economic development.<sup>33</sup>

**Sweden has committed to invest 100-150 billion USD in the broader goal of accelerating its national green transition, a move which is expected to generate approximately 100,000 new jobs in the country alone.**

→ **Sweden:** In 2023, an impressive 26.6% of the workforce was engaged in the green economy. Additionally, Sweden has witnessed a rapid increase in demand for green jobs, outpacing non-green jobs significantly. From Q1 2019 to Q1 2022, the demand for green jobs surged by 75.5% more than for their non-green counterparts, highlighting the country's accelerating shift towards sustainable employment opportunities<sup>34</sup>. Moreover, Sweden has allocated the equivalent of 15 million USD towards a green jobs program in 2020,<sup>35</sup> reflecting the country's efforts to foster an inclusive green economy, aligning with the principles of a just transition. Such initiatives have resulted in Sweden now boasting the highest upskilling rate for the green transition in the EU, which has significantly contributed to the rapid growth of jobs in its green economy.<sup>36</sup> Further notable developments as a result of its green jobs policies now include hosting Europe's first battery mega-factory and facilities for fossil-free fertilizer and aviation biofuel. Moreover, Sweden has committed to invest 100-150 billion USD in the broader goal of accelerating its national green transition, a move which is expected to generate approximately 100,000 new jobs in the country alone.<sup>37</sup>

→ **Costa Rica:** With over 98% of its electricity generated from renewable sources, Costa Rica has become a global leader in the green energy sector. Also in the area of green employment, the country's commitment is evident through its policies and achievements. The country has adopted policies akin to those of Canada and Sweden, focusing on green jobs as a strategic approach to decrease unemployment and promote sustainability.<sup>38</sup> Research in the country has indicated that green jobs not only help in limiting greenhouse gas emissions, in line with the working assumptions of the Paris Agreement but also enhance energy and raw material efficiency, reduce waste and pollution, and contribute to the protection and restoration of ecosystems.<sup>39</sup> The country's commitment to sustainable development extends beyond the energy sector to eco-tourism, which employs a significant portion of the workforce, promoting conservation and community engagement. Furthermore, the country's National Decarbonization Plan, aiming for a net-zero carbon economy by 2050, underlines its dedication to sustainable growth and job creation in green sectors.

**In 2023, an impressive 26.6% of the Swedish workforce was engaged in the green economy. Additionally, Sweden has witnessed a rapid increase in demand for green jobs, outpacing non-green jobs significantly.**

## 2.3. Current and Planned Policy Initiatives

→ **Canada:** Canada's latest policy framework includes a significant investment of 1.6 billion CAD (circa 1.2 billion USD) over five years, initiated in June 2023, for implementing the nation's first National Adaptation Strategy.<sup>40</sup> Additionally, the 2023 budget earmarked around 20 billion CAD (circa 14.8 billion USD) over the same period for advancing the energy transition.<sup>41</sup> These initiatives are in line with the Sustainable Jobs Plan for 2023-2025,<sup>42</sup> which aims to expand the green workforce with a focus on medium to long-term sustainability.<sup>43</sup> The Just Transition Bill, introduced in June 2023,<sup>44</sup> is yet another critical step towards this goal. The Canadian government anticipates that these policy measures will be legally instituted in the near future, marking a significant stride towards a just transition to a low-carbon economy.

**A key Swedish initiative, launched in 2018 and updated annually, is the “Roadmaps for Fossil-Free Competitiveness” program, which focuses on strengthening industry and job creation through fossil-free strategies.**

→ **Sweden:** Sweden, renowned as an environmental leader, frequently ranks high on the Environmental Performance Index, reflecting its effective policies and actions against climate change. The Swedish government ensures transparency by providing easy public access to climate targets and policy developments through the Panorama Portal.<sup>45</sup> The National Energy and Climate Plan for Sweden, last updated in June 2023,<sup>46</sup> showcases a range of current and future policies that contribute to Sweden's environmental achievements. A key Swedish initiative, launched in 2018 and updated annually,

is the “Roadmaps for Fossil-Free Competitiveness” program, which focuses on strengthening industry and job creation through fossil-free strategies<sup>47</sup>. However, while these efforts are commendable, there is an opportunity to further enhance their impact by more thoroughly integrating considerations of equity and justice to align the development of green jobs more closely with the just transition principles and framework.

→ **Costa Rica:** Despite being a smaller, emerging economy, Costa Rica stands out for its effective translation of environmental pledges into concrete policies. The country's longstanding dedication to combating climate change and protecting natural resources earned it the UN Environment Program's Champions of the Earth Award for Policy Leadership in 2019.<sup>48</sup> Notably, in pursuit of its goal to achieve net-zero emissions by 2050, Costa Rica has launched several key initiatives, including the National Decarbonization Plan initiated in 2019<sup>49</sup> and the 2022 launch of the project “Transitioning to an urban green economy and delivering global environmental benefits”, aimed at decarbonizing the provinces of San José, Alajuela, Cartago, and Heredia through sustainable urban planning mechanisms.<sup>50</sup> These initiatives join the longstanding Payment for Ecosystem Services (PES) program<sup>51</sup> that was launched back in 1997. In the case of the National Decarbonization Plan, a pivotal aspect of the strategy included the integration of green jobs. This plan not only aims to transition Costa Rica to a carbon-neutral economy by 2050 but also emphasizes the creation of sustainable employment opportunities in renewable energy, sustainable agriculture, and eco-tourism sectors.

Thus, the Costa Rican government's promotion of renewable energy has not only positioned the country as a leader in clean energy but has also generated thousands of jobs in the sector. Additionally, Costa Rica's Payment for Ecosystem



Services (PES) program, which compensates landowners for maintaining forests, has contributed to both environmental conservation and the creation of green jobs. The PES program, alongside initiatives aimed at enhancing eco-tourism, underscores Costa Rica's commitment to linking environmental sustainability with economic and social development and the country's recognition of the importance of green jobs in achieving its environmental and decarbonization goals.

### 3. The Role of Education in Supporting Green Jobs

#### 3.1. Engaging the Education System

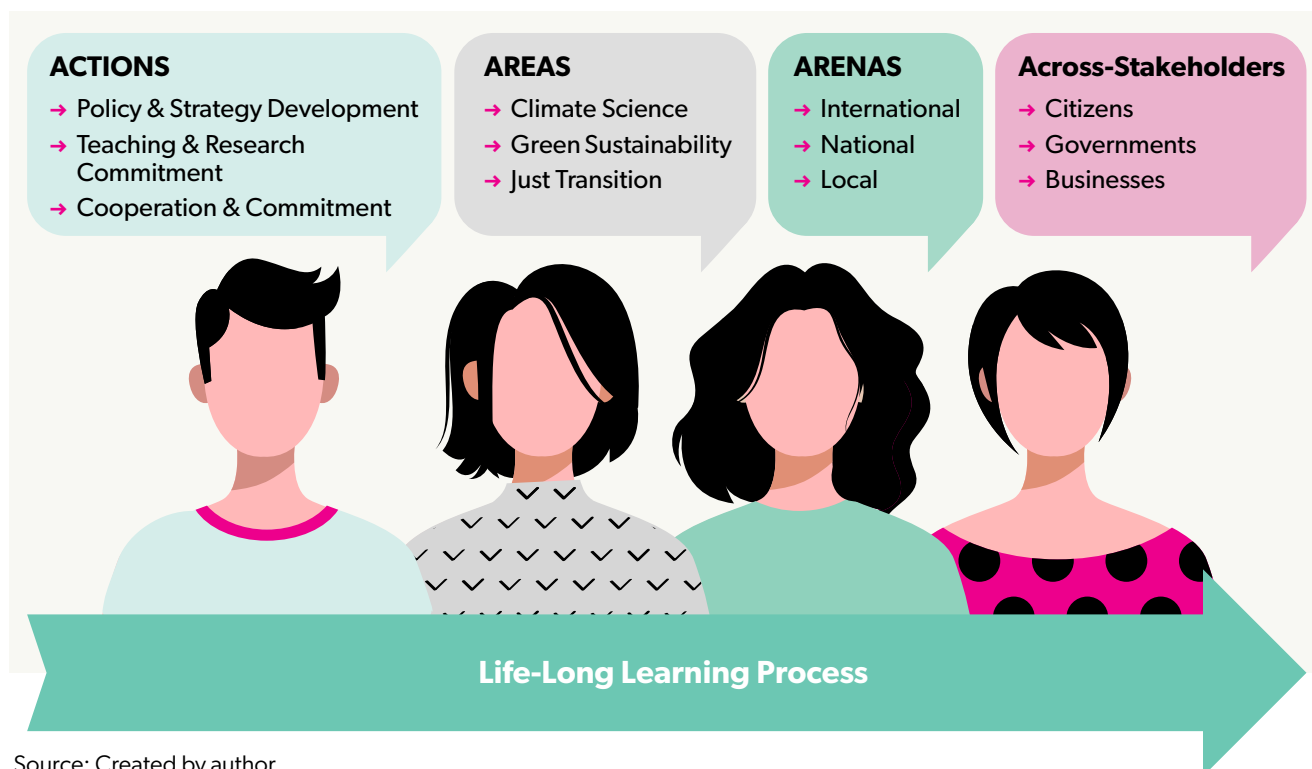
Education systems worldwide could play a significant role as part of the effort to promote a just transition to a low-carbon economy. Critiques in prominent scientific journals, and more specifically in the leading journal, *Nature*, have observed that universities in particular are slow to adopt the necessary curricula changes required in the framework of the transition to a low-carbon economy, in terms of both energy technology transition and sustainable development.<sup>52</sup> These transformations in educational approaches are progressing too slowly. As Anabella Rosenberg from the International Labor Organization stated in 2010, “Job losses are not an automatic consequence of climate policies, but the consequence of a lack of investment, social policies and anticipation.”<sup>53</sup>

**“Job losses are not an automatic consequence of climate policies, but the consequence of a lack of investment, social policies and anticipation.”**

To facilitate the creation of sustainable jobs within the context of a just transition, a key strategy is to involve the education system. This means showing a strong commitment to making decisions based on scientific evidence and predictions, while also being proactive in anticipating future developments. The goal is to adapt and future-proof the education system to align with the principles of a just transition, ensuring it prepares individuals for the evolving demands of a green economy. The International Labor Organization (ILO) has consistently advocated for investment in education, especially regarding the development of green jobs<sup>54</sup>. Additionally, the ILO emphasizes the importance of the availability of life-long learning opportunities for all workers so that they can continuously develop flexible and adaptable skills that could be utilized as part of the green economy.

#### 3.2. Key Components for Educational Reform in line with the Just Transition Framework

Generally, the adaptation of education systems to align with the principles of a just transition has been gradual, which is understandable given the complexity of such transformative changes. Such transformative changes demand a comprehensive and systematic approach that encompasses all facets of education, from curriculum design to teachers training and beyond. To effectively guide this transformation process, a novel framework, namely “The 4As of a Just Transition Education” has been developed. Illustrated in Figure 2, this original framework outlines a structured approach to weaving just transition principles into the fabric of the education system. The “4As” represent Actions, Areas, Arenas, and Across-Stakeholders, each serving as a critical component in ensuring that the education system is responsive to the current demands of sustainable development and equipped to adapt to future challenges and opportunities.

**Figure 2.****The 4As of a Just Transition Education**

Source: Created by author

The “4As” framework is foundational in enacting educational reform within the context of a just transition. **Actions** refer to the specific initiatives and interventions necessary to promote sustainable education. **Areas** denote the various subjects or fields within education that need to be targeted for reform. **Arenas** are the different contexts or settings where these changes can be applied, from local schools to national education policies. **Across-Stakeholders** emphasizes the importance of involving a wide range of participants, from educators and students to policymakers and community members, ensuring a collaborative approach to educational transformation.

This interconnected framework ensures that the push for educational change is comprehensive, addressing the multifaceted needs and challenges of transitioning towards sustainability. The operational specifics of each of the “4As” — Actions, Areas, Arenas, and Across-Stakeholders — detailed further in Table 3, provide a roadmap for stakeholders at all levels to contribute effectively to this transformative process.

**Table 3.**  
Breakdown of the 4As of a Just Transition Education

<b>Actions</b>	<p><b>Essential to this category are three core actions:</b></p> <ol style="list-style-type: none"> <li><b>1. Development of Policy and Strategies:</b> National educational institutions ought to take the lead in initiating education policies and strategies centered around the just transition;</li> <li><b>2. Commitment to Teaching &amp; Research:</b> Teaching and research should be reoriented to focus on climate change, sustainability, and energy transition issues, integrating these themes into curricula and research agendas;</li> <li><b>3. Cooperation and Communication:</b> Increased cooperation for resource sharing is vital, alongside the development of effective communication strategies that operate and engage various levels of stakeholders in the educational system (i.e., across all levels of education and in particular, beginning at the university level).</li> </ol>
<b>Areas</b>	<p><b>Key areas for focus in the education system include:</b></p> <ol style="list-style-type: none"> <li><b>1. Climate Science:</b> Ensuring a foundational understanding of climate science is crucial for all students;</li> <li><b>2. Green Sustainability:</b> Education should cover aspects of green sustainability to prepare students for future environmental challenges and opportunities;</li> <li><b>3. The Just Transition:</b> Knowledge about the just transition is essential for students to understand the shift towards a low-carbon economy.</li> </ol> <p>Education in these domains should prepare students to qualify for diverse green jobs and to be flexible enough to navigate career shifts. Ensuring that these subjects are accessible to everyone is essential. This involves not merely teaching them but also simplifying complex research into understandable content for a broader audience, including university students and the general public. Likewise, universities should enhance and expand access to technical education and skills training in these fields. This will empower individuals and businesses to swiftly adapt to the principles of a just transition, fostering a workforce that is both skilled and versatile.</p>

**Table 3. (continued)****Breakdown of the 4As of a Just Transition Education**

<b>Arenas</b>	<p><b>The necessary changes in the education system should span various arenas:</b></p> <ol style="list-style-type: none"> <li><b>1. International Level:</b> Integration of global advancements in fields like climate science into the national education curriculum;</li> <li><b>2. National Level:</b> Localization and adoption of international best practices in education policies to suit national contexts;</li> <li><b>3. Local Level:</b> Implementation of these strategies and policies at the local level, along with vigilant monitoring to assess their effectiveness.</li> </ol> <p>In this approach, it is vital to ensure that national education policies are aligned with international developments in relevant fields, and that these advancements are effectively communicated and applied at the local level, benefiting both citizens and businesses. Monitoring local implementation is crucial to determine the success and impact of these educational strategies and policies.</p>
<b>Across-Stakeholders</b>	<p><b>Educational initiatives for a just transition ought to involve a broad spectrum of stakeholders:</b></p> <ol style="list-style-type: none"> <li><b>1. Citizens:</b> Ensuring accessible education for all, including those with limited previous educational opportunities;</li> <li><b>2. Governments:</b> Implementing continuous education programs within government institutions to stay abreast of developments in sustainability and climate science;</li> <li><b>3. Businesses:</b> Facilitating educational opportunities among employees so that the corporate sector can align their business practices (and those of their value and/or supply chains) with the goals of the just transition.</li> </ol> <p>As underscored by the International Labor Organization (ILO), this strategy should embrace the principle of lifelong learning. Education should transcend the confines of traditional school or university environments to encompass government institutions and the corporate sector. It is vital to ensure that education is inclusive and accessible to all citizens, a key aspect of this transformation. This inclusivity enables everyone to engage in and contribute to the just transition. In this context, it becomes imperative for employers to also take on educational responsibilities for their employees, fostering a culture of continuous learning and adaptation across all levels of society.</p>



### 3.3. Educational Reforms and Green jobs

The most impactful level of the education system that requires initial change is third-level education, which includes universities and technical colleges. These institutions are uniquely positioned to educate and train the next generation of the workforce, equipping them with the ‘green skills’ needed for the green economy. Beyond traditional degree programs, universities and technical colleges can also play a vital role in supporting government institutions and companies. This support can be provided through short courses and collaborative learning partnerships, benefitting not only the organizations themselves but also extending to local levels, targeting a broader range of citizens.

To optimize near-term growth in green jobs, educational reform should prioritize technical green skills across five critical areas:

**1. Wind power:** Skills needed include project management, installation, commissioning, and grid integration of large-scale renewable energy projects. Wind resource assessment and techno-commercial marketing are also important, with some of these skills being applicable across various low-carbon technologies;

**2. Solar energy:** Essential skills encompass the installation of solar systems in buildings and homes, project development, integration of solar PV systems, construction and commissioning of solar thermal systems, as well as operation and maintenance, including troubleshooting of solar PV lanterns and home lighting systems;

**3. Transport:** Education in this sector should focus on vehicular emission standards, greening transport systems, and the use, training, and regulation of new green transport equipment and machines;

**4. Tourism (Hospitality):** Training in standards and certifications such as Green Globe, ISO14001, Earth Check, and Sustainable Tourism Eco-Certification is vital for promoting sustainable practices in the hospitality industry;

**5. Waste Management:** Key skills include recycling, reusing, and reducing fuel consumption in operations, responsible disposal of non-biodegradable garbage, procurement of green materials, transitioning from polythene to paper and cloth bags and using biodegradable cleaning chemicals.

A variety of global initiatives have focused on developing green skills in these areas. Key examples of both recent and longstanding initiatives are outlined in Table 4 below. The necessity for national action, with technical colleges and universities playing a crucial role, is also emphasized by the International Labor Organization (ILO) in its “Framework for Skills Development” program. Such opportunities are crucial for fostering lifelong learning, which not only enhances the employability prospects of workers but also contributes to the increased productivity of companies.

**Table 4.**  
Notable educational initiatives to foster green jobs (according to country)

Notable educational initiatives to foster green jobs
<p><b>Australia</b></p> <p>The Australian Green Skills Agreement, launched in 2009, enlisted over 4,000 public and private educational providers. Annually, around 1.7 million individuals receive some form of education under this initiative, focusing on green skills.<sup>56</sup></p>
<p><b>United Kingdom</b></p> <p>In 2020, the UK established the Green Jobs Taskforce to reshape policies surrounding green jobs. Jointly created by the Department for Business, Energy and Industrial Strategy and the Department for Education, the Taskforce comprises 17 experts from various sectors including industry, academia, unions, and the education and skills sector. Their contributions have influenced policy documents advocating for investment in green skills and transformative education changes, including the 2022 policy document titled “Sustainability and Climate Change: A Strategy for the Education and Children’s Services Systems.”<sup>57</sup></p>
<p><b>The Netherlands</b></p> <p>A collective of 19 higher education institutions, including six universities and 13 technical colleges, formed a platform known as “Green Learning.” This platform strategically determines how curricula should evolve to meet the demands of the green economy and ensure future relevance.<sup>58</sup></p>
<p><b>United States</b></p> <p>The US introduced the Sustainability Education and Economic Development Center (SEED), which provides resources to 470 community colleges. SEED supports the establishment and development of “green curricula” aimed at re-training and upskilling workforces for green jobs.<sup>59</sup></p>

Source: Created by the author

## 4. Strategic Approaches and Considerations for Accelerating Green Jobs Creation

The development of green jobs represents a collaborative effort that spans global organizations, national governments, and the private sector, each bringing their perspectives

and interests to the table. Prominent global organizations, including the United Nations (UN) and the International Monetary Fund (IMF), have underscored the vital role of green jobs in both societal and economic contexts, highlighting their contribution to economic recovery following the Covid-19 pandemic and subsequently initiating green economy programs to boost their further development<sup>60</sup>.

In the private sector, the approach to developing green jobs is often seen through the dual lenses of risk management and economic potential. This viewpoint is consistent with the broader discourse on green jobs as a leverage to ensure future economic stability. Companies such as Zurich Insurance Group and Iberdrola exemplify this approach, projecting a positive outlook towards the shift to a low-carbon economy. Thus, the Zurich Insurance Group, aligning with the International Labor Organization's (ILO) predictions, expects the green economy to create 24 million new jobs worldwide, effectively offsetting the decline of 6 million jobs in the fossil fuel industry<sup>61</sup>. This expected net increase in jobs underlines the economic advantages of expanding the green job market. Similarly, Iberdrola views green jobs as crucial for fostering economic growth, environmental sustainability, and societal health, thereby reinforcing the belief in the comprehensive benefits of green job expansion<sup>62</sup>.

## 4.1. Policy Frameworks and Cross-Sector Coordination

Effective policy development and implementation are fundamentally linked to the acceleration of green job growth and facilitating a just transition. The case-studies of Canada, Sweden, and Costa Rica, as explored in Section 2, highlight the significance of enacting clear policies to foster the development of green jobs. Despite varying methodologies, the essential element shared among these countries is their ability to integrate green job initiatives within wider national and international frameworks concerning climate change, energy, environmental protection, and economic development.

The establishment of a robust green jobs policy framework is also crucial for unlocking investment opportunities.

**The establishment of a robust green jobs policy framework is also crucial for unlocking investment opportunities.**

Typically, governments are expected to lead the charge in this domain, setting the stage for subsequent private sector involvement. Moreover, the engagement of citizens, particularly through education—ranging from short-term training and university degrees to technical college programs and lifelong learning opportunities—plays a critical role in this ecosystem. Sweden's experience is particularly illuminating, with only 14% of the population feeling unprepared for the green economy, significantly lower than the European Union average of 38%.

This figure highlights the importance of aligning educational systems with the goals of a just transition, thereby supporting the creation of green jobs. Also Canada and Costa Rica have made notable progress and are in the process of adopting new just transition strategies, which may extend into their educational frameworks, showcasing a comprehensive approach to fostering green job growth.

**Sweden's experience is particularly illuminating, with only 14% of the population feeling unprepared for the green economy, significantly lower than the European Union average of 38%.**

## 4.2. No One-Size-Fits-All: Diverse Paths to Green Job Creation

The exploration of case studies and international practices sheds light on a pivotal insight: the journey toward green job creation is inherently diverse, with no universally applicable blueprint for success. Countries like Canada, Sweden, and Costa Rica exemplify how the promotion of green jobs can often emerge not as the primary target but as a beneficial outcome of broader policy initiatives aimed at addressing energy, climate, and sustainability challenges. This realization opens up the possibility of “hidden opportunities” for green job creation, which may become evident and actionable over time in various contexts.

For instance, Canada’s strategic focus on energy transition has evolved to recognize it as a significant engine for green job growth. Similarly, Costa Rica’s efforts to develop its tourism industry with a focus on eco-friendly and nature-based experiences have not only reaped economic benefits but also positioned green jobs as a fundamental component of the sector’s success. Sweden presents a complementary scenario, where an initial emphasis on energy solutions has led to a proliferation of green jobs across a broader spectrum of industries, thereby illustrating that green jobs can be both a direct goal and a source of additional economic benefits

**The exploration of case studies and international practices sheds light on a pivotal insight: the journey toward green job creation is inherently diverse, with no universally applicable blueprint for success.**

This nuanced landscape suggests that the path to green job creation demands both strategic intent

and the agility to recognize and adapt to emergent opportunities. While deliberate policy planning remains critical, the experiences of Sweden, Canada and Costa Rica underscore the importance of maintaining flexibility and responsiveness to the dynamic nature of green job opportunities. Embracing this diversity in approaches allows for a more comprehensive and adaptable strategy in fostering the growth of the green job sector, highlighting the multifaceted avenues through which sustainable employment can be generated and supported.

Thus, in the development of national strategies aimed at promoting the creation of green jobs, the following strategic policy focuses might be considered:

### 1. Climate, Energy, and Environment Jobs:

These positions are catalyzed by the transition towards renewable energy sources and efforts to combat climate change, aligning with international commitments like the 2015 Paris Agreement. The integration of such roles within a nation's broader green economy or energy transition strategy is crucial. Innovative frameworks such as Mongolia’s Sustainable Development Vision 2030<sup>64</sup> are examples of such pioneering initiatives. Green jobs that fall under this category encompass environmental regulation, scientific research, ecosystem restoration, and impact assessment roles;

**2. Sustainability Jobs:** The surge in sustainability-related employment is driven by the 2030 Agenda for Sustainable Development and its 17 UN Sustainable Development Goals (SDGs). The United Nations predicts that embedding the SDGs within corporate strategies could generate up to 380 million jobs globally, highlighting the vast potential for job creation in this sector<sup>65</sup>;



**3. Green Finance Jobs:** Jobs within this specialized yet vital sector pertain to the management and oversight of green finance. The educational sector plays a pivotal role in preparing individuals for careers in this field, which includes positions such as sustainability data analysts, financial aggregators, corporate and fund rating specialists, standards setters for disclosure, investment advisors, sector analysts, ESG consultants, and assurance providers;

**4. Jobs created through innovative social security schemes:** This strategy focuses on job creation through innovative social security mechanisms such as job guarantees, community ownership models, pilot policy schemes, and efforts aimed at reducing poverty; the idea behind this strategy is to provide people with social security nets while engaging them in activities that may facilitate their return to the job market in harmony with national objectives that are aligned with the green transition, thereby fostering the growth of the green economy and promoting inclusivity. This approach plays a crucial role in supporting the just transition framework.

## 5. Pathways to Green Jobs Development: Legal Frameworks, Technological Innovation, and Policy Risks

### 5.1. Legal Frameworks as a Foundation for Investment Certainty

For the effective promotion and expansion of green jobs, establishing clear and strategic pathways is paramount. Central to this endeavor is the development of a national platform designed to spearhead transformative change. This platform's core mission should involve crafting

and implementing laws and policies aimed at facilitating a just transition towards a low-carbon economy. It's vital for stakeholders, especially the business community, to have a deep understanding of, and confidence in, the national agenda's stability and direction over both the medium and long term. Such confidence is the bedrock upon which they can base their investment decisions, embracing the risks necessary to forge new opportunities for green job creation within the business sector.

**National policies that incentivize the embrace of innovative technologies, underpinned by supportive legislation, can significantly propel the creation of green jobs.**

Drawing on best practices from various countries, as outlined in Section 2, the formation of a dedicated national commission or task force emerges as a critical step. This entity, with a focus on green jobs and the broader just transition initiative, should include experts from a wide array of stakeholder groups. By doing so, it not only fosters a culture of trust and active engagement but also strengthens the legal certainty needed for stakeholders to commit their investments with assurance. This collaborative approach, underpinned by a solid legal framework, sets the stage for the sustained growth of green jobs and a resilient, environmentally sustainable economy.

### 5.2. Legislation as a Catalyst for Technological Innovation and Green Job Growth

National policies that incentivize the embrace of innovative technologies, underpinned by supportive legislation, can significantly propel the creation of green jobs. The European Union's strategy to

foster a circular economy, emphasizing the “4Rs” – reduce, reuse, recycle, and redesign – serves as a prime example of this dynamic. This approach, particularly its focus on reuse and redesign, has led to an uptick in green job opportunities as companies pivot to meet these evolving standards.<sup>66</sup>

Supportive legislation is essential for guiding businesses towards sustainability, encouraging the adoption of cutting-edge technologies that facilitate a transition to a green economy. Smart cities exemplify how legal frameworks can stimulate the development of green infrastructure, creating jobs that contribute to both environmental sustainability and urban efficiency. Similarly, policies that encourage green practices within business supply chains can significantly broaden the impact of green jobs, demonstrating the integral role of legislation in fostering an ecosystem conducive to green job growth.

**Supportive legislation is essential for guiding businesses towards sustainability, encouraging the adoption of cutting-edge technologies that facilitate a transition to a green economy.**

An illustrative example is the legislative support for the development of Smart Cities, which are designed to integrate green infrastructure and improve efficiencies, such as urban transportation systems. This not only spawns sustainable green jobs but also demonstrates how coordinated efforts can significantly amplify the number of green jobs. Furthermore, leveraging legislation to promote green practices within business supply chains opens another pathway for green job creation. This strategy involves identifying and engaging diverse stakeholders in the supply chain to commit to green initiatives, showcasing the multifaceted role of law in enabling technological

advancements and fostering the growth of green employment opportunities.

Green infrastructure not only contributes to the creation of sustainable jobs<sup>67</sup> but also exemplifies how coordinated efforts can enhance the overall impact and effectiveness of green job initiatives<sup>68</sup>. Furthermore, leveraging legislation to encourage business supply chains to adopt green practices represents an additional strategy for fostering green job growth. This approach involves engaging and motivating various stakeholders within the supply chain to pursue green initiatives actively.

### 5.3. Navigating Policy Risks in Green Job Development

Two decades ago, when green jobs began to emerge as a significant sector, their development faced considerable resistance, mainly attributed to the perceived high costs associated with the substantial economic restructuring needed for their broad implementation<sup>69</sup>—a sentiment that persists in some circles even today. However, this viewpoint has undergone a significant transformation, with current data and experiences from various countries showing that the risks associated with developing policies for green jobs are minimal. Notably, studies now suggest that green jobs are not only growing at a quicker pace compared to roles in polluting industries but also tend to offer superior wages (as outlined in Table 5). This positive trajectory is corroborated by numerous examples and comprehensive analyses provided in Table 5. Consequently, the implementation of policies geared towards the creation of green jobs is now viewed as carrying a markedly low risk of failure. This crucial understanding, however, remains to be widely recognized and integrated across pertinent sectors.

**Table 5.**  
Examples of Green Job Growth

#### **Higher Earnings in Green Jobs**

A study of 31 countries found that individuals working in green energy-intensive jobs earn, on average, over 7% more than those in pollution-intensive jobs<sup>70</sup>;

#### **Renewable Energy Job Creation**

Transitioning to renewable energy is projected to create more than 28.6 million jobs globally, a significant increase compared to the business-as-usual scenario, based on data from 143 countries<sup>71</sup>;

#### **Job Growth from Fossil Fuels to Clean Energy**

Shifting every 1 million USD from fossil fuels to clean energy is expected to create an additional 5 jobs in clean energy (i.e. clean energy jobs now create more jobs than fossil fuels per dollar invested)<sup>72</sup>;

#### **Renewable vs. Fossil Fuel Job Creation in the US**

In the United States, investment in renewable energy creates 10 times more jobs than the same investment in fossil fuels and nuclear energy<sup>73</sup>;

#### **Indirect Job Creation from Green Technologies**

Indirect Job Creation from Green Technologies: In the European Union, about 6.7% of total jobs are indirectly linked to the electric vehicle industry, illustrating the wider impact of green technologies on job creation<sup>74</sup>;

#### **Jobs from Green Building Transformation**

Transforming buildings into more energy-efficient structures is anticipated to create 2 million jobs in the EU and US alone.<sup>75</sup>

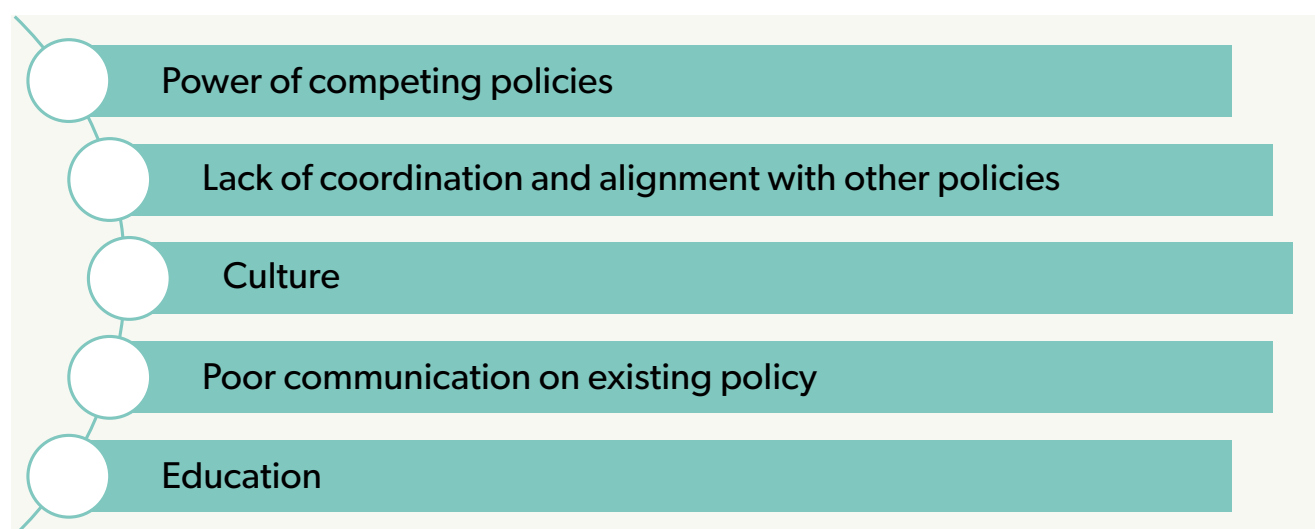
Fostering an environment where managing policy risk is a central concern that is properly addressed will empower policymakers to adopt bold measures in rolling out new initiatives. With the climate crisis demanding urgent action, it's imperative that policymakers have the leeway and adaptability they need. Establishing a solid foundation for green job policies ensures that should a policy not deliver as expected, it can be promptly reevaluated and substituted with a more effective solution from the repository of "green job creation policies." Successfully implemented policies in support of green jobs will, consequently, strengthen the green economy and contribute to the vital societal objectives of climate action, sustainability, and equitable transition.

In this context, it is important to learn from examples of policy failures, often resulting from lack of financial or cultural support, poor policy presentation, inadequate policy coordination, or the dominance of competing policies. In one case involving a Native American community in the US, a local community's rejection of green job promotion was attributed to factors such as competing policy power, lack of policy

coordination, cultural attachment to certain forms of governance, subpar presentation of the green jobs policy, and the need for more education among stakeholders to facilitate better communication.<sup>76</sup> These five elements of policy failure in the realm of green jobs<sup>77</sup> are detailed in Figure 3 below. Recognizing and avoiding these pitfalls is crucial in the effective design of new green job policies.

**Fostering an environment where managing policy risk is a central concern that is properly addressed will empower policymakers to adopt bold measures in rolling out new initiatives.**

**Figure 3.**  
Interlinked Policy-Risk Pitfalls for Green Jobs



Source: Created by author



## 6. Insights and Recommendations

The transition to a low-carbon economy is not just a necessity but an imperative for societies across the globe in the 21st century. Central to the concept of a just transition is its inclusiveness, ensuring that no one is left behind. A pivotal strategy to achieve this inclusivity is by “future-proofing” citizens’ livelihoods through the development and expansion of green jobs.

**For countries aiming to systematically cultivate green jobs and leverage their multifaceted benefits, the starting point is to initiate a national action plan and form a commission or taskforce committed to green job promotion.**

Reflecting on the journey of various countries towards implementing green jobs policy reveals a tale of two phases. The initial phase, spanning 2007 to 2010, was marked by significant policy challenges and failures, as illustrated in Figure 3. In contrast, the subsequent phase, from 2018 to 2022, was characterized by learning from past failures and the adoption of a dedicated, national approach to green job development. This recent phase has been significantly influenced by the global urgency of addressing climate change and advancing sustainability, underscored by the adoption of two pivotal international frameworks in 2015: The Paris Agreement and the UN 2030 Sustainable Development Agenda, which anchors the 17 UN Sustainable Development Goals (SDGs).

For countries aiming to systematically cultivate green jobs and leverage their multifaceted benefits, the starting point is to initiate a national action plan and form a commission or taskforce committed

to green job promotion. This initial step is critical for engaging the “10-Step Pathway to Green Jobs,” detailed in Figure 4. This comprehensive approach provides a strategic roadmap for all stakeholders involved, ensuring the effective development and broadening of green job opportunities.

The foundational steps towards fostering green job growth include creating a national institutional framework that embraces the principles of a just transition. This framework should be supported by efficient data management systems, the establishment of a dedicated national commission or taskforce, and the enactment of forward-thinking laws and policies, as demonstrated by international best practices. For example, robust data management is essential for tracking and understanding the dynamics of green job growth. Additionally, the education system must be closely aligned with the just transition principles, adapting to support the changing landscape of green employment through the incorporation of anticipatory skills and future-oriented strategies within educational programs.

Subsequently, it is imperative to develop an investment framework that identifies and engages key stakeholders, including specific business sectors and the education system. With such institutional structures in place, forming a robust foundation for green jobs, attention turns towards fostering investment. A collective commitment from all segments of society—governments, individuals, and the private sector—is crucial. Mutual assurance of commitment among these groups is necessary to ensure that green job initiatives are in harmony with wider efforts in climate action, sustainability, and transitioning to a low-carbon economy. Establishing confidence in the stability and longevity of these policy directions is essential for encouraging further investments. Here, the government’s role in providing legal certainty for investments becomes paramount.

## 10 Key Steps in the Pathway to Green Jobs in the Just Transition

**Figure 4.**

10 Step Pathway to Green Jobs

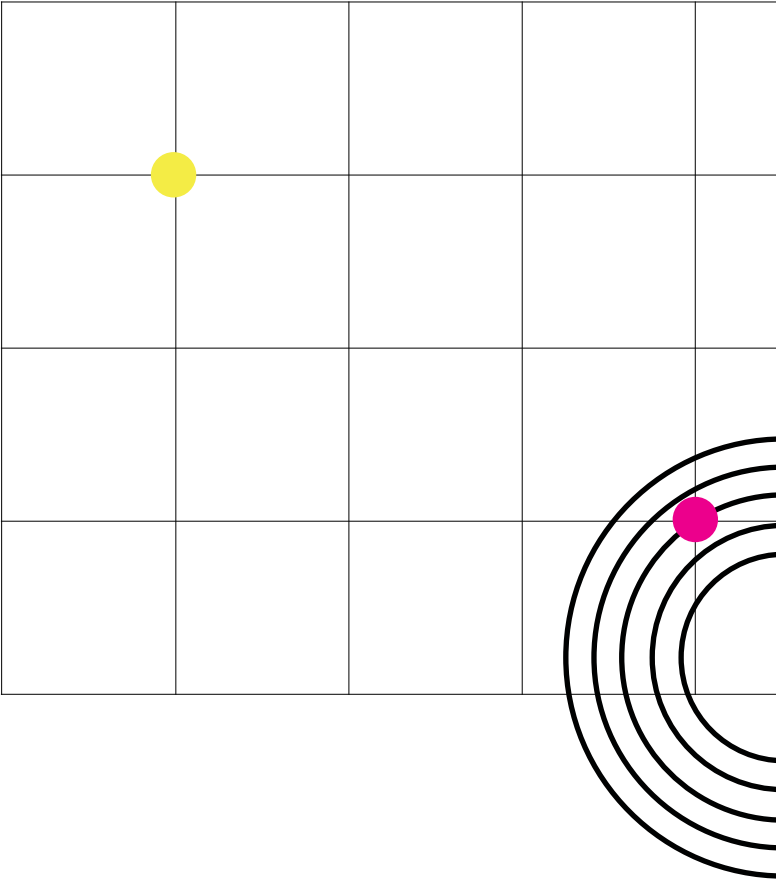
1	<b>Clarifying the Vision for a Just Transition and the Role of Green Jobs</b>	Clarify the vision for a just transition to a low-carbon economy within the country, emphasizing the critical role of green job creation. This clarity will foster trust among all stakeholders involved in the process.
2	<b>Defining Green Jobs Data Collection and Reporting Strategies</b>	Establish the types of data to be collected on green jobs by defining their categories and setting up mechanisms for reporting.
3	<b>Establishing an Expert Task Force for Green Job Policy Recommendations</b>	Form a new unit or agency, comprising a task force of experts, to evaluate and propose recommendations on policies for creating green jobs. This method will ensure a more inclusive approach to policy-making, aiming to leave no one behind.
4	<b>Enhancing Legal Certainty for Investor Confidence Through Policy</b>	Recognize the importance of laws and policies in providing legal clarity, which is essential for boosting investor confidence and, subsequently, investment.
5	<b>Financing Green Jobs and Skills Development</b>	Secure government funding and/or seek external financial support to bolster green job initiatives, as well as education and skill development in green sectors.
6	<b>Identifying and Engaging Key Stakeholders in Green Job Promotion</b>	Identify key stakeholders across various sectors responsible for fostering and promoting green jobs and skills, ensuring an inclusive strategy that upholds the core objective of a just transition.
7	<b>Adhering to the 4As Framework in Just Transition Education</b>	Adhere to the 4As framework in just transition education, covering Actions, Areas, Arenas, and stakeholder engagement (Across Stakeholders), to ensure a comprehensive approach.
8	<b>Aligning Green Jobs Policy with Broader Economic Strategies</b>	Coordinate green job policies with other existing policies, such as those aimed at enhancing business value chains to encourage companies to adopt green technologies and expand the number of green jobs.
9	<b>Increasing Awareness of Policy Risks Affecting Green Jobs</b>	Raise awareness about the five interconnected policy risks related to green jobs, including the influence of competing policies, coordination challenges, cultural factors, inadequate communication on existing policies, and educational gaps.
10	<b>Implementing Monitoring for Effective Just Transition Strategies</b>	Implement a monitoring phase to assess the effectiveness and shortcomings of the measures taken, ensuring that steps 1-9 are in alignment with national just transition strategies laid out for 2030, 2040, and 2050, in addition to the goals of the Paris COP21 agreement.

Source: Created by author

The subsequent phase is dedicated to the seamless integration of green job policies with other national strategies, emphasizing the pivotal role of technology in generating green employment opportunities. Policy alignment, coherence and coordination are key, enabling the widespread adoption of innovative green technologies across different sectors to stimulate green job creation. Coordinated business activities, responsive to the challenges of climate change, sustainability, and the just transition, are expected to lead to the creation of new job opportunities. Policymakers are urged to adopt bold measures to accelerate green job growth, given the relatively low policy risk associated with such initiatives. Research consistently shows that green jobs can grow rapidly, surpassing traditional sectors, and typically represent “decent” employment, crucial for a fair transition.

The policy challenges highlighted in Figure 3 warrant a cautious approach. Implementing a monitoring phase to foresee and adapt to potential impacts ensures policy flexibility and alignment with long-term energy and climate targets, like those envisioned for 2050. For instance, to set the foundation for the creation and expansion of green jobs, it’s essential to establish an institutional platform. This step involves developing a comprehensive investment strategy, followed by progressing into the implementation stage. Establishing an institutional framework is a critical first step, followed by crafting a comprehensive investment strategy and moving towards policy implementation.

In conclusion, embracing the principles of a just transition to cultivate green jobs not only paves the way for significant economic benefits but also serves as a pivotal step toward bridging socio-economic gaps, mitigating climate change, and reducing environmental degradation. As countries worldwide demonstrate the feasibility and low policy risks of such initiatives, the focus intensifies on optimizing and accelerating the growth of these vital positions. This shift towards sustainable development promises not only economic diversification but also strengthens social and economic resilience against global challenges, heralding a future where economic prosperity and environmental sustainability go hand in hand.



# Annex 1

## Understanding 'Justice' in Just Transition

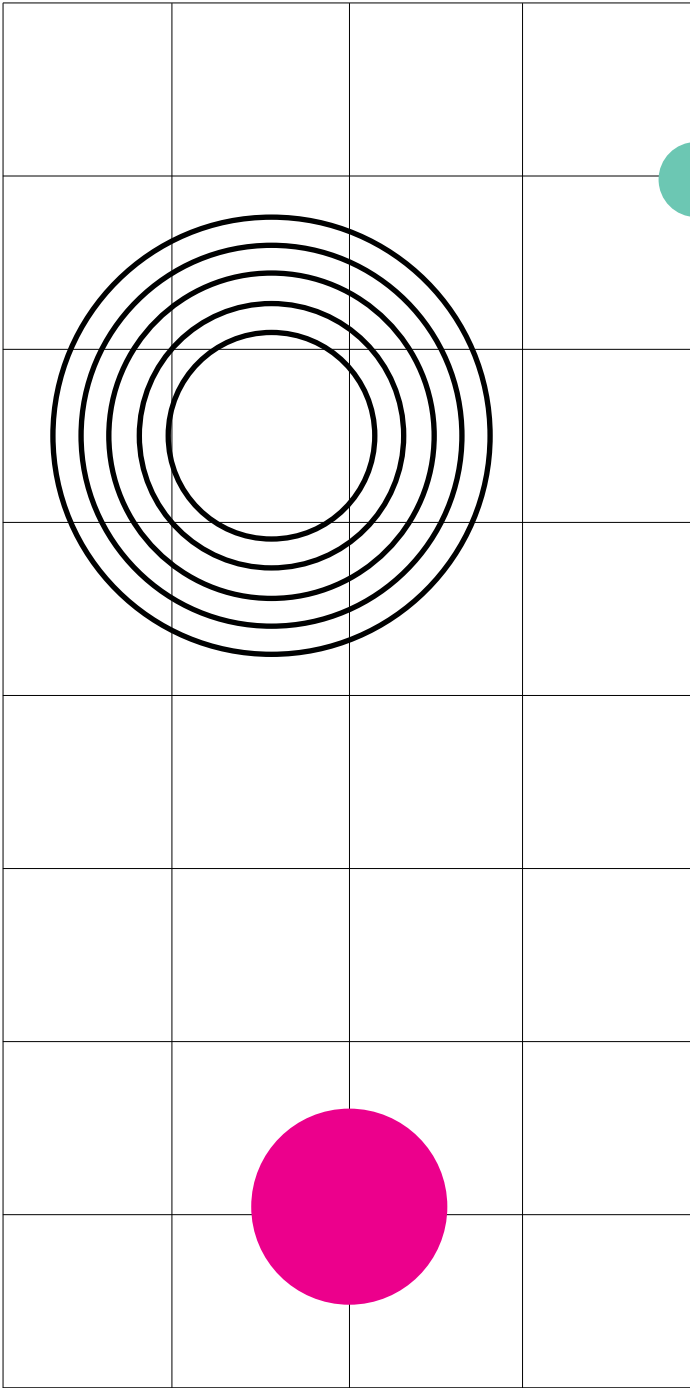
Defining a concept is crucial for driving action among stakeholders (government, citizens, and businesses). A shared understanding of “justice” in this context fosters clarity in objectives and their underlying reasons. The term “just transition” has been in use in policy circles for approximately 10-15 years, gaining prominence since the 2015 Paris Agreement.<sup>78</sup> Initially, its focus was on job transitions due to climate change and societal shifts. Today, “just transition” primarily refers to the shift towards a low-carbon economy.

The key characteristics of the just transition, as it stands today, are outlined in Figure 1A below.

**Figure 1A.**  
Key Characteristics of the Just Transition



Source: Created by the author

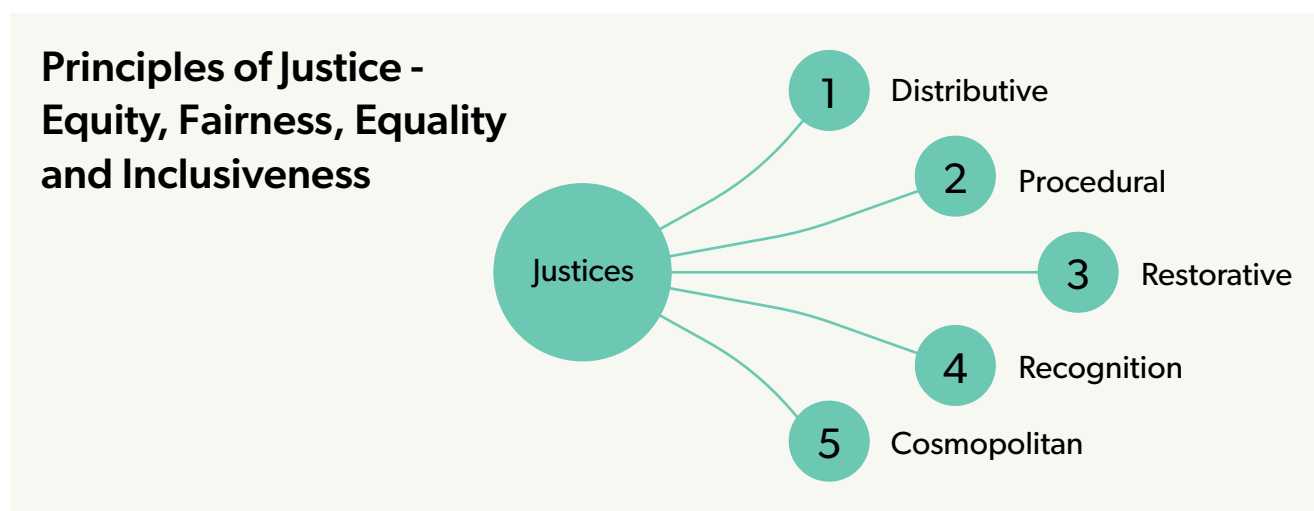


Based on insights from United Nations policies and research, five key principles of justice are identified: distributive, procedural, restorative, recognition, and cosmopolitan justice. These are

elaborated in Figure 2A. Each principle of justice is explored separately, giving an overall shape to the foundational concept of “justice” as it pertains to the transition towards a low-carbon economy.

**Figure 2A.**

The Five Principles of Justice<sup>79</sup>



Source: Created by the author

### Distributive Justice

This principle addresses significant societal and energy system transformations, focusing on aspects including finance and cost distribution. A key parameter, for example, is the fair allocation of energy revenues. Distributive justice intersects with other forms of justice, in evaluating the positive and negative impacts of policy actions on different stakeholders. It also delves into what constitutes a decent job, considering salary and disposable income as metrics for adequacy.

### Procedural Justice

Procedural justice emphasizes systematic change, starting with legal reform. It scrutinizes legal processes and access to justice, assessing whether procedures are adhered to properly, and identifying institutions responsible for initiating change.

### Restorative Justice

Restorative justice advocates for rectifying injustices, in this case caused by the energy sector, for example (e.g. inadequate decommissioning practices). It assesses both intended and unintended impacts in climate and sustainability, among others, emphasizing the need to address them. Restorative justice also involves foreseeability in project planning and policymaking, modeling decisions to also ensure the longevity of just outcomes.

### Recognition Justice

Recognition justice focuses on identifying those who are affected by the transition to a low-carbon economy. For example, it emphasizes the rights of various groups, particularly local and indigenous communities, and examines how green jobs will be



distributed and how they are evaluated to qualify as decent jobs for these groups.

### Cosmopolitan Justice

Cosmopolitan justice, grounded in the belief of global citizenship, considers the cross-border and regional effects of energy and climate-related activities. It obliges decision-makers to account for national, regional, and international impacts. This form of justice ties into international commitments like the 2015 Paris Agreement and the UN SDGs, questioning whether energy policies align with 2030 and 2050 climate targets. It also links to distributive justice, scrutinizing the reallocation of capital towards low-carbon initiatives and away from fossil fuels.

## Annex 2

### India and the UK: Reducing Costs in Low-Carbon Energy

India and the UK exemplify how low-carbon energy transition costs can significantly decrease through coordinated policy actions, by boosting investor confidence and green job growth.

Both countries implemented two crucial policy measures: (1) offering subsidies and (2) ensuring long-term contract durations. These policies, coupled with electricity auctions, have led to increased competition, economies of scale, and innovation, thereby reducing construction costs of low-carbon energy projects (solar and wind respectively). This approach has maintained and even heightened investor interest in Indian and UK energy markets.

Another benefit of these renewable energy policies is the development of domestic business value chains. The UK, more successful than India in this regard, has aligned its industry strategy

with energy policy, leading to job growth and manufacturing in offshore wind.<sup>80</sup> India, while recognizing its missed opportunity in solar energy's industry value chain, has still seen job growth in installation and services, though the full potential of a solar industry has so far remained unfulfilled.

These examples show that substantial investment and green job creation are possible without necessarily building an entire industry from scratch. India's growth in solar energy, largely dependent on foreign suppliers, underscores that a long-term, well-designed low-carbon energy plan can still yield significant benefits, even when the solar panels themselves are all imported.

A crucial insight gained from both countries is the possibility of achieving a swift and transformative shift in energy production and consumption. Due to policy developments around 2012, solar costs in India<sup>81</sup> and wind costs in the UK<sup>82</sup> have dropped dramatically within a span of 8 to 9 years. While other factors played a role, these two countries successfully leveraged them through targeted policies, leading to transformative impacts in their respective energy sectors. This rapid policy implementation has catalyzed the rise of green jobs and marked significant progress in the just transition.

## Endnotes

- <sup>1</sup> Heaney, S. 2018 (First published in 1990). *The Cure at Troy: Sophocles' Philoctetes*. Faber & Faber: London, UK.
- <sup>2</sup> Two examples of this are highlighted in the Appendix B with India and the United Kingdom as the examples.
- <sup>3</sup> International Renewable Energy Agency, 2022. *Renewable Energy and Jobs-Annual Review, 2022*. Available at: <https://www.irena.org/Publications/2022/Sep/Renewable-Energy-and-Jobs-Annual-Review-2022> (last accessed 17 December 2023).
- <sup>4</sup> Friends of the Earth, 2023, "What's a green job and how can we create more of them?" Available at: <https://friendsoftheearth.uk/climate/whats-green-job-and-how-can-we-create-more-them> (last accessed on 17 December); United Nations Environment Programme, 2021, "Future-proofing Infrastructure to Address the Climate, Biodiversity and Pollution Crises." Available at: <https://www.unep.org/resources/publication/future-proofing-infrastructure-address-climate-biodiversity-and-pollution> (last accessed 17 December 2023); and Heffron, R. J. 2023, "Repurposing for the just transition: energy companies need to future-proof their structure and strategy." *Journal of World Energy Law and Business*, 16 (3), 302-307.
- <sup>5</sup> Office of National Statistics, 2021, "Low carbon and renewable energy economy." Available at: <https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalesimates/latest> (last accessed on 17 December 2023)
- <sup>6</sup> Open Edition Journals, 2019, "International Development Policy. Promoting Green Jobs: Decent Work in the Transition to Low-Carbon, Green Economies." Available at: <https://journals.openedition.org/poldev/3107> (last accessed 17 December 2023).
- <sup>7</sup> UK Statistics Authority, 2022, Office for National Statistics. "Defining and measuring green jobs. Feedback," updated 29 November 2022. Available at: <https://consultations.ons.gov.uk/external-affairs/defining-and-measuring-green-jobs/> (last accessed 17 December 2023).
- <sup>8</sup> United Nations Environment Programme (UNEP), International Labour Organization (ILO), International Organization of Employers (IOE), International Trade Union Confederation (ITUC), 2008, "Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World," Available at: <https://www.unep.org/resources/report/green-jobs-towards-sustainable-work-low-carbon-world> (last accessed on 17 December 2023).
- <sup>9</sup> Government of Canada, 1990. "Canada's Green Plan: Canada's Green Plan for a Healthy Environment, 1990." Available at: <https://cfs.nrcan.gc.ca/pubwarehouse/pdfs/24604.pdf> (last accessed 17 December 2023).
- <sup>10</sup> "Sustainable Development in Sweden – A Success Story," 2009. Available at: <https://www.cairn.info/revue-l-europe-en-formation-2009-2-page-157.htm> (last accessed 17 December 2023).
- <sup>11</sup> UK Government, 2010, UK and Sweden to create "green jobs": Britain and Sweden will work together to create new green jobs, Prime Minister David Cameron has said today. Available at: <https://www.gov.uk/government/news/uk-and-sweden-to-create-green-jobs> (last accessed 17 December 2023). UNCLEAR whether the title includes the quote.
- <sup>12</sup> Green Economy Tracker, 2023, Costa Rica. "Global Green Leader Nears Net Zero Goal." Available at: <https://greeneconomytracker.org/country/costa-rica> (last accessed 17 December 2023).

- <sup>13</sup> Green Economy Tracker, 2023, Canada. "National Ambition Meets Provincial Pushback." Available at: <https://greeneconomytracker.org/country/canada> (last accessed 17 December 2023).
- <sup>14</sup> European Employment Observatory, 2009, "EEO Review: The Employment Dimension of Economy Greening- Sweden." Available at: <https://ec.europa.eu/social/BlobServlet?docId=12291&langId=en> (last accessed 17 December 2023).
- <sup>15</sup> The Swedish Reform Programme for Growth and Jobs, 2007, "Progress Report, 2007." Available at: <https://www.government.se/contentassets/a8e0f10a01384cabcba198cf14adc7c97/the-swedish-reform-programme-for-growth-and-jobs---progress-report-2007> (last accessed 17 December 2023).
- <sup>16</sup> London School of Economics, Grantham Research Institute on Climate Change and the Environment, 2020. "Climate Change Laws of the World. Green Jobs Initiative. Sweden." Available at: [https://climate-laws.org/document/green-jobs-initiative\\_4f68](https://climate-laws.org/document/green-jobs-initiative_4f68) (last accessed 17 December 2023).
- <sup>17</sup> Sustainable Stock Exchanges Initiative, 2018. "Exchange in Focus: Costa Rica Celebrates First Green Economy Summit, signs Green Economy Principles." Available at: <https://sseinitiative.org/all-news/exchange-in-focus-costa-rica-exchange-celebrates-first-green-economy-summit-signs-green-economy-principles/> (last accessed 17 December 2023).
- <sup>18</sup> Clean Energy Canada, 2021, "The New Reality – The Future of Canadian Energy Looks Bright, with Clean Energy Job Growth Projected to Outpace Losses in Fossil Fuels amid a Shifting Global Landscape." Available at: <https://cleanenergycanada.org/report/the-new-reality/> (last accessed 17 December 2023).
- <sup>19</sup> Organization for Economic Cooperation and Development, 2023, "How Green are Labour Markets in Sweden?" 2023. Available at: <https://t4.oecd.org/cfe/leed/SWE.pdf> (last accessed 17 December 2023).
- <sup>20</sup> The European Commission, 2023, "Country Report. Sweden." Available at: [https://economy-finance.ec.europa.eu/system/files/2023-05/SE\\_SWD\\_2023\\_627\\_en.pdf](https://economy-finance.ec.europa.eu/system/files/2023-05/SE_SWD_2023_627_en.pdf) (last accessed 17 December 2023).
- <sup>21</sup> Aljazeera, 2023. "Canada Presents Sustainable Jobs Bill for Green Transition," June 2023: <https://www.aljazeera.com/economy/2023/6/15/canada-presents-sustainable-jobs-bill-for-green-transition> (last accessed 17 December 2023).
- <sup>22</sup> Aljazeera, 2023. "Canada Presents Sustainable Jobs Bill for Green Transition," June 2023. Available at: <https://www.aljazeera.com/economy/2023/6/15/canada-presents-sustainable-jobs-bill-for-green-transition> (last accessed 17 December 2023).
- <sup>23</sup> United Nations Development Programme, 2022, "A Green Costa Rican COVID-19 Recovery. Available at: [https://www.undp.org/sites/g/files/zskgke326/files/migration/cr/undp\\_cr\\_A\\_Green\\_Costa\\_Rican\\_COVID-19\\_Recovery\\_22.pdf](https://www.undp.org/sites/g/files/zskgke326/files/migration/cr/undp_cr_A_Green_Costa_Rican_COVID-19_Recovery_22.pdf) (last accessed 17 December 2023).
- <sup>24</sup> Government of Canada, 1990, "Canada's Green Plan for a Healthy Environment, Minister of Supply and Services Canada." Available at: <https://cfs.nrcan.gc.ca/pubwarehouse/pdfs/24604.pdf> (last accessed 17 December 2023).
- <sup>25</sup> Government of Canada, 2020, "Backgrounder: Future Skills Council and Future Skills Centre." Available at: <https://www.canada.ca/en/employment-social-development/news/2020/11/backgrounder0.html> (last accessed 17 December 2023).
- <sup>26</sup> <https://envirocenter.yale.edu/>
- <sup>27</sup> <http://www.ciesin.columbia.edu/index.html>
- <sup>28</sup> Environmental Performance Index, 2022, "EPI Results, 2022." Available at: <https://epi.yale.edu/epi-results/2022/component/epi> (last accessed 17 December 2023).

- <sup>29</sup> European Employment Observatory, 2009 “EEO Review: The Employment Dimension of Economy Greening, Sweden, 2009.” Available at: <https://ec.europa.eu/social/BlobServlet?docId=12291&langId=en> (last accessed 17 December 2023).
- <sup>30</sup> Sustainable Stock Exchanges Initiative, 2018, “Exchange in Focus: Costa Rica Celebrates First Green Economy Summit, Signs Green Economy Principles.” Available at: <https://sseinitiative.org/all-news/exchange-in-focus-costa-rica-exchange-celebrates-first-green-economy-summit-signs-green-economy-principles/> (last accessed 17 December 2023).
- <sup>31</sup> Clean Energy Canada, 2021, “The New Reality – The Future of Canadian Energy Looks Bright, with Clean Energy Job Growth Projected to Outpace Losses in Fossil Fuels amid a Shifting Global Landscape.” Available at: <https://cleanenergycanada.org/report/the-new-reality/> (last accessed 17 December 2023).
- <sup>32</sup> The Green Party of Canada. 2023, “Invest in the Green Economy.” Available at: <https://www.greenparty.ca/en/our-vision/green-economy#:~:text=The%20green%20economy%20means%20good,and%20strengthen%20its%20global%20competitiveness> (last accessed 17 December 2023).
- <sup>33</sup> The Conversation, 2023, “Canada Needs to Set its Businesses up for Success in the Clean Energy Transition.” Available at: <https://theconversation.com/canada-needs-to-set-its-businesses-up-for-success-in-the-clean-energy-transition-206276> (last accessed 17 December 2023).
- <sup>34</sup> Organization for Economic Cooperation and Development, 2023, “How Green are Labour Markets in Sweden?” Available at: <https://t4.oecd.org/cfe/lead/SWE.pdf> (last accessed 17 December 2023).
- <sup>35</sup> Green Economy Tracker, 2023, Sweden. “Inclusion Driving Green Ambition.” Available at: <https://greeneconomytracker.org/country/sweden> (last accessed 17 December 2023).
- <sup>36</sup> The European Commission, 2023, “Country Report, 2023, Sweden.” Available at: [https://economy-finance.ec.europa.eu/system/files/2023-05/SE\\_SWD\\_2023\\_627\\_en.pdf](https://economy-finance.ec.europa.eu/system/files/2023-05/SE_SWD_2023_627_en.pdf) (last accessed 17 December 2023).
- <sup>37</sup> The Washington Post, 2023, “Climate Solutions. The Green Revolution Sweeping Sweden.” Available at: <https://www.washingtonpost.com/climate-solutions/interactive/2022/sweden-green-revolution-steel-climate-change/> (last accessed 17 December 2023).
- <sup>38</sup> The Tico Times, 2022, “Green Jobs in Costa Rica: A Way to Reduce Unemployment and Achieve Sustainability.” Available at: <https://ticotimes.net/2022/06/07/green-jobs-in-costa-rica-a-way-to-reduce-unemployment-and-achieve-sustainability> (last accessed 17 December 2023).
- <sup>39</sup> International Labour Organization, 2018, “Skills for Green Jobs in Costa Rica.” Available at: [https://www.ilo.org/wcmsp5/groups/public/---ed\\_emp/---ifp\\_skills/documents/publication/wcms\\_706936.pdf](https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_706936.pdf) (last accessed 17 December 2023).
- <sup>40</sup> International Institute for Sustainable Development, 2023, “Report June 2023” <https://www.iisd.org/articles/policy-analysis/canada-budget-freshwater-adaptation#:~:text=Budget%202023%20commits%20approximately%20CAD,emission%20vehicles%20sectors%2C%20to%20reduce> (last accessed 17 December 2023).
- <sup>41</sup> International Institute for Sustainable Development, 2023, “What does Canada’s 2023 Budget Signal for the Future of Fresh Water, Adaptation, and Natural Infrastructure on the Prairies?” Available at: <https://www.iisd.org/articles/policy-analysis/canada-budget-freshwater-adaptation#:~:text=Budget%202023%20commits%20approximately%20CAD,emission%20vehicles%20sectors%2C%20to%20reduce> (last accessed 17 December 2023).

- <sup>42</sup> The Government of Canada, 2023. "Sustainable Jobs Plan." Available at: <https://www.canada.ca/en/services/jobs/training/initiatives/sustainable-jobs/plan.html> (last accessed 17 December 2023).
- <sup>43</sup> Sustainability, 2023, "Canada Implements Measures to Grow Green Workforce,". Available at: <https://sustainabilitymag.com/articles/canada-implements-measures-to-grow-green-workforce> (last accessed 17 December 2023).
- <sup>44</sup> Aljazeera, . 2023, "Canada Presents Sustainable Jobs Bill for Green Transition." Available at: <https://www.aljazeera.com/economy/2023/6/15/canada-presents-sustainable-jobs-bill-for-green-transition> (last accessed 17 December 2023)
- <sup>45</sup> Panorama. 2023, "Transition for Sweden." Available at: <https://app.climateview.global/v3/public/board/ec2d0cdf-e70e-43fb-85cb-ed6b31ee1e09> (last accessed 17 December 2023)
- <sup>46</sup> European Commission, 2023, National Energy and Climate Plan for Sweden. Available at: [https://commission.europa.eu/system/files/2023-07/EN\\_SWEDEN%20DRAFT%20UPDATED%20NECP.pdf](https://commission.europa.eu/system/files/2023-07/EN_SWEDEN%20DRAFT%20UPDATED%20NECP.pdf) (last accessed 17 December 2023).
- <sup>47</sup> Fossil-Free Sweden, 2021, "Roadmaps for Fossil-Free Competitiveness – Follow-Up 2021." Available at: [https://fossilfrittseverige.se/wp-content/uploads/2022/01/Roadmaps\\_follow\\_up\\_2021\\_ENG.pdf](https://fossilfrittseverige.se/wp-content/uploads/2022/01/Roadmaps_follow_up_2021_ENG.pdf) (last accessed 17 December 2023).
- <sup>48</sup> United Nations Environment Programme, 2019, "Costa Rica: The 'Living Eden' – Designing a Template for a Cleaner, Carbon-Free World." Available at: <https://www.unep.org/news-and-stories/story/costa-rica-living-eden-designing-template-cleaner-carbon-free-world#:~:text=Many%20countries%20have%20promised%20to,of%20economic%20and%20social%20benefit> (last accessed 17 December 2023).
- <sup>49</sup> United Nations Environment Programme, 2023, "Costa Rica Launches a Project to Strengthen its Sustainable Finance Framework." Available at: <https://www.unep.org/news-and-stories/press-release/costa-rica-launches-project-strengthen-its-sustainable-finance> (last accessed 17 December 2023)
- <sup>50</sup> Global Environment Facility, 2022, "Costa Rica Aims to Transition towards an Urban Green Economy with GEF Support." Available at: <https://www.thegef.org/newsroom/news/costa-rica-aims-transition-towards-urban-green-economy-gef-support> (last accessed 17 December 2023)
- <sup>51</sup> United Nations Framework Convention on Climate Change, 2023, "Payments for Environmental Services Program | Costa Rica" Available at: <https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly-investment/payments-for-environmental-services-program#:~:text=Costa%20Rica's%20Payments%20for%20Environmental,the%20country%20and%20the%20region.> (last accessed 17 December 2023)
- <sup>52</sup> There are two examples here from the journal Nature recently in 2022: (1) Heffron, R. J. & Foley, A. 2022. Promote clean-energy transition in student education. Nature, 607, 32; and (2) Leahy, P. G. and Sovacool, B. K. Decarbonize pedagogy — apply sustainable development goals. Nature, 608, 266
- <sup>53</sup> Rosemberg, Anabella, 2010, "Building a Just Transition: The Linkages between Climate Change and Employment." International Journal of Labour, 2 (2), 125-162 (International Labour Office, Geneva).
- <sup>54</sup> United Nations Framework Convention on Climate Change, 2020, . "Just Transition of the Workforce, and the Creation of Decent Work and Quality Jobs." Available at: <https://unfccc.int/sites/default/files/resource/Just%20transition.pdf> (last accessed 17 December 2023).

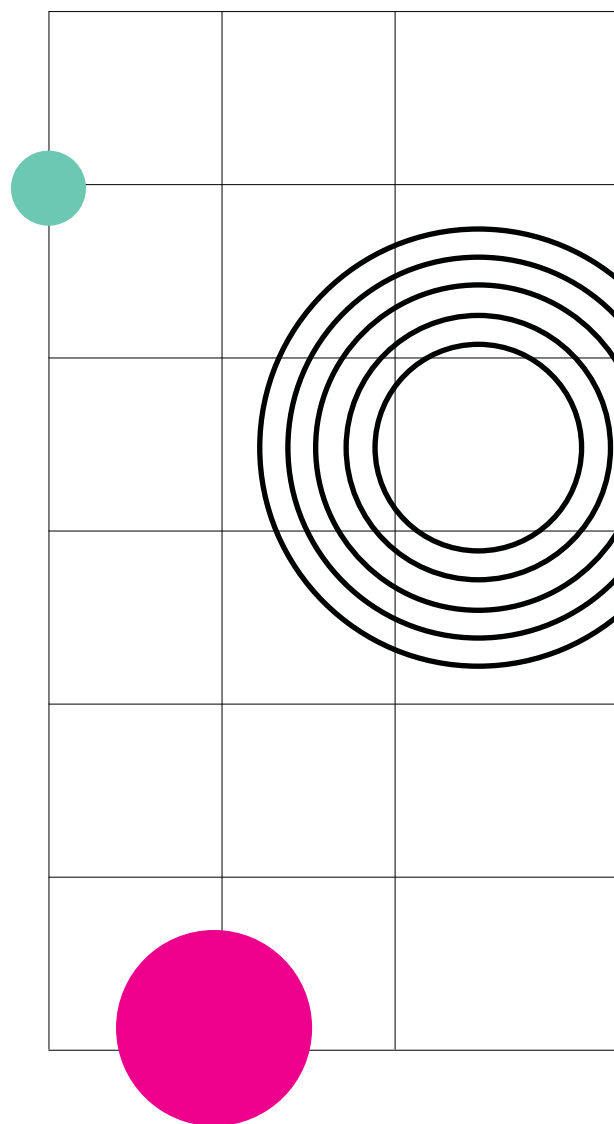


- <sup>55</sup> Principles for Responsible Management Education, 2023. "PRME Working Group on Climate Change and Environment." Available at: <https://www.unprme.org/working-group/prme-working-group-on-climate-change-and-environment> (last accessed 17 December 2023).
- <sup>56</sup> United Nations Department of Economic and Social Affairs Sustainable Development, 2023. Available at: <https://sdgs.un.org/partnerships/green-skills-agreement> (last accessed 17 December 2023).
- <sup>57</sup> UK Government, 2022, "Policy Paper – Sustainability and Climate Change: A Strategy for the Education and Children's Services Systems." Available at: <https://www.gov.uk/government/publications/sustainability-and-climate-change-strategy/sustainability-and-climate-change-a-strategy-for-the-education-and-childrens-services-systems> (last accessed 17 December 2023).
- <sup>58</sup> Green Jobs Taskforce, 2021, "Report to Government, Industry and the Skills Sector." Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1003570/gjtf-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003570/gjtf-report.pdf) (last accessed 17 December 2023).
- <sup>59</sup> United Nations Educational, Scientific and Cultural Organization, 2016, "The Implications of Greening Industries on Education Systems and Training Policies in Developing and Advanced Economies." Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000245731> (last accessed 17 December 2023); Sustainability Education & Economic Development. 2023. Available at: <https://theseedcenter.org/> (last accessed 17 December 2023).
- <sup>60</sup> International Monetary Fund, 2020, "How Governments Can Create a Green, Job-Rich Global Recovery." Available at: <https://www.imf.org/en/Blogs/Articles/2020/12/04/blog-how-governments-can-create-a-green-job-rich-global-recovery> (last accessed 17 December 2023); and United Nations Environment Programme, 2023. Green Economy. Available at: <https://www.unep.org/explore-topics/green-economy> (last accessed 17 December 2023).
- <sup>61</sup> Zurich Insurance Group, 2023, "Green Jobs: How Will Climate Change Impact Employment Trends?" Available at: <https://www.zurich.com/en/media/magazine/2021/5-green-jobs-of-the-future> (last accessed 17 December 2023).
- <sup>62</sup> Iberdrola, 2023, "Green Jobs: Good for You, For the Environment and For the Economy." Available at: <https://www.iberdrola.com/sustainability/what-are-green-jobs> (last accessed 17 December 2023).
- <sup>63</sup> European Commission. 2023. 2023 Country Report – Sweden. Available at: [https://economy-finance.ec.europa.eu/system/files/2023-05/SE\\_SWD\\_2023\\_627\\_en.pdf](https://economy-finance.ec.europa.eu/system/files/2023-05/SE_SWD_2023_627_en.pdf) (last accessed 17 December 2023).
- <sup>64</sup> Green Economy Tracker, 2023, "How Well are we Going? Green Jobs." Available at: <https://greeneconomytracker.org/policies/green-jobs> (last accessed 17 December 2023).
- <sup>65</sup> United Nations, 2020, "Companies Can Create 380 Million Jobs by Integrating Sustainable Development Goals into Business Strategies, Secretary-General Tells International Employers Summit. Available at: <https://press.un.org/en/2020/sgsm20226.doc.htm> (last accessed 17 December 2023).

- <sup>66</sup> Moreno-Mondéjar, L. et al., 2021. "Exploring the Association between Circular Economy Strategies and Green Jobs in European Companies." *Journal of Environmental Management*, 297, 113437.
- <sup>67</sup> Rutkowska, M. and Sulich, A., 2020,. "Green jobs on the Background of Industry, 4.0." *Procedia Computer Science*, 176, 1231-1240.
- <sup>68</sup> This is also supported in a seminal paper from the US on smart cities: Moss Kanter, R. and Litow, S. S. 2009, "Informed and Interconnected: A Manifesto for Smarter Cities." Harvard Business School, Working Paper, 09-141. Available at: [http://www.alternativesynergy.org/SEDEV-work/Project/smarter\\_cities.pdf](http://www.alternativesynergy.org/SEDEV-work/Project/smarter_cities.pdf) (last accessed 17 December 2023).
- <sup>69</sup> Furchtgott-Roth, D., 2012, "The Elusive and Expensive Green Job." *Energy Economics*, 34, (1). S43-S52.
- <sup>70</sup> Bluedorn, J. et al. 2023, "Transitioning to a Greener Labor Market: Cross-Country Evidence from Microdata." *Energy Economics*, 106836 (Advance Access);
- <sup>71</sup> M. Jacobson, et al. 2019, "Impacts of Green New Deal Energy Plans on Grid Stability, Costs, Jobs, Health, and Climate in 143 Countries, One Earth, 1, 449-463
- <sup>72</sup> Heidi Garrett-Peltier, 2017, "Green versus Brown: Comparing the Employment Impacts of Energy Efficiency, Renewable Energy, and Fossil Fuels using an Input-Output Model." *Econ. Model*, 61, 439-447
- <sup>73</sup> Heidi Garrett-Peltier, 2017, "Green versus Brown: Comparing the Employment Impacts of Energy Efficiency, Renewable Energy, and Fossil Fuels using an Input-Output Model." *Econ. Model*, 61, 439-447
- <sup>74</sup> Daniel M. Kammen, Kamal Kapadia, and Matthias Fripp, 2004, "Putting Renewables to Work: How Many Jobs can the Clean Energy Industry Generate?" RAEI Report
- <sup>75</sup> Daniel M. Kammen, Kamal Kapadia, and Matthias Fripp, 2004, "Putting Renewables to Work: How Many Jobs can the Clean Energy Industry Generate?" RAEI Report
- <sup>76</sup> Curley, A., 2018, "A Failed Green Future: Navajo Green Jobs and Energy "Transition" in the Navajo Nation." *Geoforum*, 88, 57-65.
- <sup>77</sup> These mirror some general failures in energy policy that have been witnessed in the sector: Sokolowski, M. M. and Heffron, R. J., 2022, "Defining and Conceptualising Energy Policy Failure: The When, Where, Why, and How." *Energy Policy*, 161, 112745.
- <sup>78</sup> Heffron, R. J., 2021, *Achieving a Just Transition to a Low-Carbon Economy*. Springer: Heidelberg, Germany.
- <sup>79</sup> Heffron R. J. and McCauley, D., 2018, "What is the 'Just Transition'?" *Geoforum*, 88, 74-77.
- <sup>80</sup> See for example: (1) UK HM Government. 2015. *Building Offshore Wind in England*. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/405959/CoreBrochure\\_2015.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/405959/CoreBrochure_2015.pdf) (last accessed 17 December).; and (2) UK Department for Business, Energy & Industrial Strategy. 2020. *Energy white paper: Powering our net zero future*. Available at: <https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future> (last accessed 17 December).
- <sup>81</sup> EA., 2021, "India Energy Outlook, 2021" (February). Available at: <https://www.iea.org/reports/india-energy-outlook-2021> (last accessed 23 August 2023); and Mercom (Shukla, H.), 2021, "Solar Power to Cost 15% to 25% Less in the Upcoming Decade: Report." Available at: <https://mercomindia.com/solar-power-cost-less-decade/> (last accessed 17 December).
- <sup>82</sup> CarbonBrief, 2019,. "Analysis: Record-low price for UK offshore wind cheaper than existing gas plants by 2023." Available at: <https://www.carbonbrief.org/analysis-record-low-uk-offshore-wind-cheaper-than-existing-gas-plants-by-2023> (last accessed 17 December).

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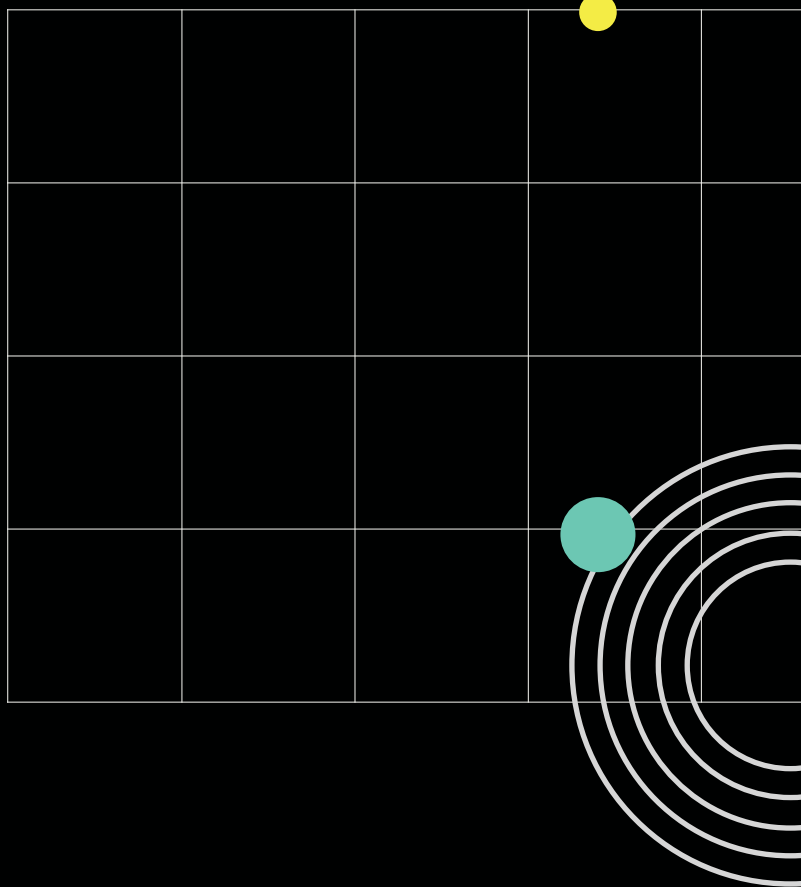
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