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Towards a Just Transition Insurance Mechanism Integrating Climate Risk, Social Protection and Green Finance

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Introduction

"Here we are, the cleverest species ever to have lived. So how is it we can destroy the only planet we have?" with these words [1]. Dr Jane Goodall who dedicated her life to the protection of nature until her passing at the age of 91 powerfully reveals humanity's paradox in the face of the climate crisis. Despite possessing an unprecedented accumulation of knowledge and intelligence in science and technology, we are simultaneously generating a destructive impact severe enough to threaten the Earth's climate system and biodiversity. Goodall's striking question serves as an invitation to both ethical and political confrontation with the consequences of the climate crisis on nature and humanity. Today's increasingly frequent extreme weather events, ecosystem destruction, and deepening global inequalities are clear indicators of environmental devastation caused by human hands.

To develop a fair and sustainable response to the climate crisis, it is essential to adopt an intersectional approach that does not separate environmental protection from the struggle for labour rights [2].

The environmental and social dimensions of sustainable development cannot be considered separately but are in fact interwoven [3]. Indeed, in the preamble of the Paris Climate Agreement, the international community acknowledged the necessity of pursuing climate action together with "a just transition of the workforce and the creation of decent work." The concept of "just transition" aims to ensure that no worker or community is left behind during the shift to a low-carbon economy, balancing the negative impacts of phasing out fossil fuels with social policies [4]. The success of climate policies depends on workers becoming subjects not mere objects of this transformation, meaning that they actively participate in decisions that shape their own futures [5].

This article proposes an innovative private insurance model called "Just Transition Insurance (JTIS)", which has an integrated and sustainable character and undeniable "social impact." Outside the state's public social security framework, the JTIS aims to strengthen the institutional resilience of the workforce and workplaces against climate-related disasters and economic transitions by bringing together green financing mechanisms. In the following sections, the architecture, premium structure, scope, and financing model of JTIS (including carbon markets, international funds, and alternative financial instruments) will be presented in detail. Thereafter, the functioning of JTIS will be comprehensively examined, including the role of the insurance and reinsurance sectors, multilateral participation and governance, tax incentives, and the management of fund investments. Finally, the expected social outcomes of the system (poverty reduction, income security, and green skills transition) and its effects on the social acceptance of climate policies will be assessed.

Fundamental Principles and Structural Design

Conceptually, JTIS can be advanced as a voluntary, fully compensatory, multilateral, and sustainable form of insurance coverage. The core feature of entering this system is that it is not compulsory but based on the free will of the parties. By "full compensation," we mean the adequate coverage of damages suffered by workers due to climate change. The system's multilateral nature refers not only to the contributions of the parties to the employment relationship but also to the positive contributions of other stakeholders, as detailed below. Finally, sustainability implies that beyond risk coverage, accumulated funds in the portfolio should be invested in green jobs to contribute to the circular economy.

In line with these principles, JTIS aims to distribute fairly the social burden of the climate transition [6]. Since the transition to a low-carbon economy is such a large structural transformation, protecting workers during this process is both legitimate and necessary [7]. In this respect, JTIS may serve as a proactive compensation umbrella distinct from classical social security systems, one that places the climate dimension at its centre.

Covered Risks and Benefits

Just Transition Insurance can be defined as a type of private insurance that covers the social risks caused by climate change and climate policies.

During the transition to low-carbon technologies, working hours may decrease, or wages may fall in some industries [8]. JTIS compensates temporary income losses not symbolically but adequately, preventing sudden drops in workers' living standards. This includes wage support during part-time work, short-time work schemes, or periods spent in vocational training. In this way, workers are protected financially while adapting to flexible working arrangements required by climate policies.

The transition to a green economy will lead to the disappearance or profound transformation of certain occupations [9]. JTIS covers the

costs of retraining and reskilling workers, preparing them for new jobs. This support includes not only course and training expenses but also scholarships to cover living costs during training. Thus, the "green skills transition" is accelerated, enhancing workers' employability in future sectors.

Due to the physical effects of the climate crisis or the geographical distribution of green investments, some workers may be forced to leave their regions. For instance, the closure of a coal mine may lead to the depopulation of mining towns, or wind energy projects may redirect labour to other regions. In such cases, JTIS provides relocation and resettlement assistance. Policyholders who must move to find new employment are offered coverage such as moving expenses, settlement costs, and rent support. In this way, the social costs of internal migration caused by climate policies are mitigated.

Extreme weather events (floods, hurricanes, wildfires, droughts, etc.) may bring regional economic activity to a standstill, creating waves of temporary unemployment. JTIS also covers disaster-related job and income losses by making rapid compensation payments to affected workers. For example, if a hurricane leaves agricultural or factory workers jobless, the insurance fund promptly provides adequate income support. This is critical in healing the social wounds of disasters, enabling workers to meet basic needs and accelerating regional economic recovery.

The scope of Just Transition Insurance should not be limited to income losses alone but should also cover the direct and indirect health impacts of climate change. Heat stress, air pollution, water and food insecurity pose risks to both workers and their families. For instance, heatstroke, respiratory illnesses, or vector-borne epidemics are significant factors that undermine labour continuity [10]. Medical expenses for climate-related health issues are included in JTIS coverage. Thus, the insurance becomes a comprehensive social solidarity mechanism that protects not only economic security but also the health of workers and their families.

These areas of coverage extend JTIS beyond traditional unemployment, health, or disability insurance mechanisms. Existing social insurance compensation systems may fall short in the face of climate-induced mass job losses, regional economic collapses, or occupational transformations. JTIS is designed precisely to fill this gap. By defining risks before they occur and pre-financing them, it functions as a proactive adaptation mechanism. In this way, individual workers' grievances are prevented, and public trust in climate policies is reinforced.

Functioning and Governance

Just Transition Insurance (JTIS) is a private insurance model that goes beyond existing social insurance programs. First, it defines in advance which events trigger coverage and under what conditions entitlements arise. For instance, "closure of a workplace due to a carbon-reduction policy" or "cessation of operations for at least X days due to a climate disaster" would be clearly stated in the policy. When these conditions are met, the insurance automatically kicks in, and workers receive support payments. Thus, workers secure entitlements based on the principle of contribution from the fund to which they have previously paid premiums.

Participation in JTIS is voluntary, and private insurance companies act as insurers. The state assumes a regulatory and supervisory role. A purely state-run insurance system risks becoming bureaucratic and slow-moving, with payments often remaining symbolic. Moreover, maintaining such continuous social transfers may cause serious resource challenges for governments, with costs ultimately burdening society at large. Therefore, a private-sector-driven model under state regulation with pre-defined rules is the most effective path.

Integration with climate goals is one of JTIS's most significant innovations [11]. The system does not encourage workers to remain in fossil-fuel-based sectors; rather, it facilitates their transition to clean energy, energy efficiency, and green industries. For instance, compensation payments could be structured to incentivize workers to move into renewable energy fields. Participation in retraining and upskilling programs could be made a condition for continued payments. In this way, JTIS becomes not merely a passive compensation tool but an active transformation mechanism.

From a legal perspective, various national regulations may be necessary. For example, workplace closures due to climate action or job losses caused by disasters may need to be defined outside the scope of "force majeure" in order for workers to access JTIS. Occupational health and safety legislation could also include special provisions on working in extreme weather conditions. For effective implementation, national employment strategies and climate adaptation plans must be harmonized. Institutional cooperation mechanisms should be established between Ministries of Labour and Social Security and environmental and climate authorities.

Financing Model

The sustainability of such an insurance system depends on a multi-sourced financing model [12]. Premium payments for JTIS can be shared among the state, employers, workers, carbon markets, international climate funds, and insurance companies, based on the principle of fair distribution of social responsibility. Moreover, knowing from the outset that the stakeholders included in this architecture will benefit from the system's outcomes will significantly contribute to its effective functioning. The more individuals or institutions trust that they will receive a return on their sacrifices, the more functional and impactful the system they belong to will become.

Given the public outcomes of JTIS, part of the premiums should be covered by the state. State contributions can support the fund in the form of premium subsidies for low-income workers or initial seed capital. Additionally, when unexpected large shocks occur (sudden sectoral contraction, a major disaster, etc.), the state can transfer additional resources to maintain the solvency of the fund. Sharing the social costs of climate policies through public resources can be seen as a requirement of climate justice; while measures against the climate crisis are implemented in the public interest, the compensation of their side effects must also be a public responsibility. In this way, the state will transfer part of its responsibility and cost; while allocating the resources it would have spent here to other public services.

As a reflection of the "polluter pays" principle, carbon-intensive sectors and employers should contribute more to the costs of transition . In this regard, companies operating in fossil fuels, heavy industry, and mining could be required to pay an additional JTIS premium for each worker included in the system. Premium rates could be tiered according to the company's carbon footprint or the severity of the expected transition in the sector. For example, highly carbon-intensive industries such as coal mining or oil refining would pay higher premiums, while low-carbon sectors such as renewable energy would pay less. This arrangement would also create an economic incentive for employers to invest in clean

technologies. Tax advantages for premiums paid by employers, and even gradually increasing these tax advantages as premium rates increase, would make the application of JTIS more attractive for employers.

As in the classical logic of social insurance, it may also be envisaged that workers contribute a small portion of their income to premiums. This reinforces a sense of ownership of JTIS and ensures workers have a say in the system. However, worker premiums must be kept reasonable and low, especially for low-income and vulnerable groups. For minimum-wage earners or poor workers, premiums should either be kept highly symbolic or subsidized by the state. Thus, JTIS can be financed in a spirit of solidarity without placing an additional burden on workers. "Covering workers' premium contributions through trade unions can also be proposed as an alternative [13].

One of the innovative financing pillars of JTIS is allocating part of the public revenues obtained from carbon pricing mechanisms to the premium pool. Emissions Trading Systems (ETS) or carbon taxes generate revenue by pricing greenhouse gas emissions. Allocating part of this revenue directly to the Just Transition Fund is consistent with the ethical and economic logic of the system.

Global climate finance envisions developed countries providing financial support to developing countries for climate mitigation and adaptation. In this context, there are multilateral funds, primarily Climate Funds, as well as bilateral support mechanisms. The JTIS financing model can be designed to receive shares from these international funds. Proportional to their contributions to the system, tax advantages, incentives, or other encouraging measures may be provided for financial instruments issued by these funds.

In addition, insurance companies may also be encouraged to contribute to part of the premium payments. Tax advantages and various support mechanisms for companies that assume such contributions can make active participation in the system attractive. In this way, both the involvement of the insurance sector in the process is facilitated and the financial sustainability of JTIS is strengthened.

Within this multi-contributor model, the distribution of burdens must be dynamically monitored and updated. The actuarial balance of the fund should be projected by taking into account possible large-scale transformations in the future. For example, if many coal power plants are planned to close in the same year or if carbon prices are expected to rise suddenly, premium rates or state contributions for that year could be temporarily increased. Similarly, employer and worker premiums could be adjusted according to economic conditions.

JTIS aims to accumulate certain reserves to ensure continuity and financial sustainability. Premiums and revenues not used for compensation payments in the short term will form a fund portfolio. Investing these reserves in safe and green financial instruments is ideal from both financial return and social benefit perspectives. For example, a portion of fund assets could be directed into green bonds, renewable energy projects, or sustainable infrastructure investments. Thus, while the fund grows its resources for future obligations, it also provides capital to climate-friendly projects. In a sense, the JTIS fund can evolve into an innovative financing platform that combines the functions of social security and a development bank.

In summary, the financing model of JTIS is based on the principle of "multi-stakeholder – multi-source," ensuring the fair distribution of risks and costs. The combination of contributions from the state, employers, workers, and carbon markets will make the fund financially strong and capable of operating across generations. Supplemented by international support, this model will provide a resilient structure capable of covering the social costs of the climate crisis in the long term.

Roadmap for Insurance Companies and Reinsurance

The success of Just Transition Insurance (JTIS) depends not only on the efforts of public authorities but also on the active participation of the insurance sector. With its expertise in risk assessment, claims management, and financial protection, the traditional insurance industry can play critical roles in the design and implementation of JTIS.

Insurance companies must first prepare a roadmap for the actuarial analysis of climate and transition risks. For example, parameters such as how many workers would be affected by the planned closure of a thermal power plant, the potential compensation amounts, and the payment periods can be modelled by insurance experts. In this way, JTIS's premium rates and reserve targets can be determined more accurately. In addition, the insurance sector can assist in creating different risk categories: by differentiating premiums between high-risk sectors (e.g., coal mining) and low-risk sectors (e.g., solar energy), a fairer and more balanced premium structure can be developed. This resembles the logic of auto insurance, where high-risk drivers pay higher premiums.

Although JTIS may initially operate on a local scale, over time the transfer of large-scale risks to global markets through reinsurance could be considered. Reinsurers can provide financial protection in scenarios where the system might come under excessive strain. For instance, if an unexpectedly rapid fossil fuel exit were to create compensation claims for tens of thousands of workers in a single year, reinsurance could step in to preserve the fund's solvency. Thanks to the capacity of the reinsurance sector to spread major global risks, burdens that a national fund cannot carry alone can be shared. Ultimately, risk is distributed on an international scale, enhancing the resilience of the system.

Insurance and, in particular, reinsurance companies can also contribute to the professional management of JTIS's reserves with their large investment portfolios and long-term perspectives. Many global reinsurers have in recent years pioneered the trend of sustainable investments, pledging to reduce coal assets in their portfolios while increasing renewable energy holdings. Accordingly, an investment advisory partnership could be established between the JTIS fund and the reinsurance sector. If the reserves of the fund are directed under the guidance of reinsurance companies toward green bonds and environmentally friendly infrastructure projects, both secure returns and support for climate-friendly transformation will be achieved.

The insurance industry also carries a mission to spread a culture of risk management. In this respect, it can raise awareness in business and society about climate change and economic transition risks. For example, insurance experts could offer "climate risk audits" to factories or mines, proposing preventive measures to reduce future transition risks. They could advise a thermal power plant to adopt a phased staff reduction plan or to start guiding its workers toward alternative skills in advance. Through this proactive consulting role, risks are reduced before they occur, and consequently, insurance claims are also lowered. Indeed, in insurance, the ideal scenario is not paying compensation after damages occur, but ensuring that damages do not happen at all.

In conclusion, the insurance and reinsurance sector is critically important as a partner that strengthens the financial backbone of the just transition process. Its expertise in risk-sharing and capital provision will help make JTIS scalable and resilient. Considering the global reinsurance market's growing interest in climate change, an innovative model such as JTIS is also likely to find support at the international level.

Social and Economic Outcomes

The implementation of Just Transition Insurance (JTIS) will not be limited to providing material support to individual insured workers but will also generate broader social and economic benefits. JTIS has the potential to reduce the social costs of climate policies on the one hand, while on the other hand increasing the speed and quality of the transition, thus producing multidimensional outcomes.

The most concrete outcome of JTIS is ensuring satisfactory income continuity for workers negatively affected by the climate transition. An insured worker who loses their job or suffers a reduction in income will be able to maintain minimum living standards thanks to JTIS support. This is especially critical for small communities dependent on a single sector or for vulnerable regions. For example, the closure of a coal mine in a town where it is the main employer would create mass unemployment and poverty risks. JTIS payments buffer this impact and prevent regional social collapse. In this way, households will not have to sacrifice expenses such as children's education or essential health costs until they find a new source of income. In the long term, this prevents a rise in poverty across society and protects social justice. In short, JTIS is a tool that brings together climate policies with the objective of poverty alleviation.

The JTIS mechanism also encourages workers' safer and more flexible participation in the labour market. Normally, when a contraction in a sector is expected, workers may resist change due to uncertainty or may hesitate to move to new jobs. However, the existence of JTIS gives workers a sense of a "safe harbour," making it easier for them to decide to change sectors or enter training programs when necessary. As a result, structural economic transformation occurs more smoothly, and rigidities in the labour market are reduced. Workers with income security can take risks such as moving into new sectors or starting their own businesses without the fear of future unemployment. This, in the long run, increases economic dynamism and productivity. In summary, JTIS establishes a structure of "flexicurity" in the labour market, minimizing the social costs of transition while supporting productivity [14].

The JTIS premium pool has the capacity not only to provide passive compensation but also to finance active labour market programs. Part of the fund's resources may be directed into strategic green investment projects (e.g., renewable energy cooperatives, energy efficiency projects, or electric transportation infrastructure). Such investments create direct employment while also contributing to the decarbonisation of the economy in the long run. For example, providing credit for the establishment of solar panel production plants or funding vocational training centers to train wind turbine technicians could be possible through JTIS. In this way, while JTIS provides income support to workers, it also updates human capital, preparing them for the green jobs of the future. This synergy accelerates the transition to green sectors nationwide and makes the employment structure more sustainable. In addition, training and skill programs organized under JTIS can increase the participation of young unemployed people or women in green jobs, thereby improving social inclusion. As a result, JTIS will support the goal of creating green employment, a key element of the "just transition" vision.

Perhaps one of the most important macro-outcomes of JTIS is increasing the social acceptance of climate policies. Workers and trade unions will view climate action more positively if taken without the fear of losing livelihoods. Historically, tensions have sometimes arisen between the labour movement and the environmental movement (for example, workers resisting the closure of a factory). JTIS seeks to minimize such conflicts by sending the message that "no one will lose their job and if they do, they will still be secure." With the establishment of the insurance mechanism, climate actions will be perceived as fairer and more acceptable, encouraging policymakers to adopt more ambitious emission-reduction targets without hesitation. This represents a genuine win-win scenario: even if strict measures are taken against the climate crisis, their social costs can be managed. In the eyes of society, the discourse of "making sacrifices for the climate" will be replaced by the understanding of "preparing fairly for a green future." In this way, climate policies will be perceived not as a threat but as a shared opportunity. Ultimately, JTIS will preserve social peace while building broad-based support for climate action.

JTIS also enhances society's resilience against climate shocks. When the JTIS fund quickly steps in after a major flood, storm, or wildfire to provide cash support to workers in the affected region, economic recovery will accelerate significantly. This is a direct climate benefit: the shorter the recovery time, the sooner people can begin reconstruction and rehabilitation activities. A JTIS model designed with parametric policies could make automatic payments when certain climate data are triggered (for example, when wind speed exceeds a certain level), enabling rapid post-disaster intervention. Finally, by protecting both the financial and psychological well-being of workers and their families, JTIS contributes to the maintenance of social peace.

The outcomes listed above demonstrate that JTIS is not merely an "unemployment insurance," but a strategic instrument at the intersection of social policy and climate policy. JTIS strengthens social justice by ensuring income security, while at the same time accelerating the transition to a green economy through training and investment opportunities. While preserving social peace, it increases climate resilience. In this respect, JTIS may represent an institutional role of climate justice and an innovative approach that transforms the struggle against climate change into a "social project."

Conclusion

We must take concrete and decisive steps without delay in order to save our planet. This global mobilization requires a transformative mind set of social policies. JTIS emerges as a vital instrument in this regard, assuming the social costs of economic transformation in the fight against climate change.

Building a bridge between climate justice and social justice is one of the most critical governance challenges of our century [15]. To pass this test, a paradigm shift is needed one that places human dignity and harmony with nature at the heart of the economic system. JTIS should be considered a concrete implementation of this paradigm shift.

Naturally, the design and implementation of such a new policy tool will involve various challenges and learning processes. It is

essential that JTIS be designed with flexibility and openness to adaptation, subject to continuous improvement through monitoring and evaluation mechanisms. Yet, all of these efforts aim at realizing the transformation made inevitable by the climate crisis ensuring that "no one is left behind." Governments, international organizations, employers, and trade unions must work hand in hand to build a resilient and equitable world of work against the climate crisis. In this way, climate policies can progress in a sustainable and determined manner, supported by broad social consensus.

In conclusion, JTIS may be proposed as an innovative insurance architecture that institutionalizes social solidarity in the struggle to safeguard the future of our planet. By operationalizing the principle of a "just transition of the workforce" enshrined in the Paris Agreement, this model can grant social legitimacy to climate action. From the perspective of reducing inequalities deepened by the climate crisis, preventing poverty, and protecting workers' rights, JTIS represents a viable alternative. Every policy we develop against climate change is, in fact, a choice that shapes the future of humanity. To recall Dr. Jane Goodall's words: "What you do makes a difference, and you have to decide what kind of difference you want to make [16]."

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