Journal de Recherche Multidisciplinaire
ISSN : 3088-5205 https://jorep.net

JOREP Journal de recherche multidisciplinaire

Volume : 1
Numéro : 2
Année : 2025
Mois : Mars

Green economy transitions and social equity: Costa rica and Norway in comparative perspective

Mohamed Lamine Niatia[1]

Iradukunda Sengesho Benigne2

Nizeyimana Jean Baptiste3

1. Joint PhD Researcher at Lisala University and UNCR University, Economics & Management Department, Sustainable Development (Green Economy)
2. Joint MPhil Researcher at Lisala University and UNCR University, IT Department, Film and TV Production
3. Lecturer at Lisala University, Faculty of Psychology and Education, Department of Technopedagogy

ABSTRACT

This study falls within SDG Focus Goal 7: Affordable and Clean Energy — Target 7.2: Increase substantially the share of renewable energy in the global energy mix; Target 7.1: Ensure universal

[1] Joint PhD Researcher at Lisala University and UNCR University, Economics & Management Department, Sustainable Development (Green Economy)

access to affordable, reliable and modern energy services; Target 7.3: Double the global rate of improvement in energy efficiency.

This study examines the comparative approaches to green economy transitions and their implications for social equity in Costa Rica and Norway, focusing on how each country's energy policies, institutional frameworks, and political economies shape the distribution of benefits and burdens associated with decarbonization. The research analyzes the tensions between ambitious climate goals and the realities of social inclusion, the treatment of marginalized and indigenous communities in energy planning, and the conceptual challenges of defining truly sustainable development. A comparative analysis was conducted examining primary and secondary sources including academic research, institutional documentation, and critical policy analysis covering recent developments to 2025-2026.

Costa Rica presents a complex picture of a nation long celebrated as a global leader in environmental policy, yet facing emerging tensions between its green reputation and contemporary political-economic realities. The country has achieved over 99% renewable electricity generation and adopted one of the world's first national decarbonization plans, with its constitutional abolition of the military in 1948 freeing resources for social spending and environmental investment . Recent UN-backed initiatives demonstrate continued commitment: a February 2025 joint programme with the United Nations mobilizes over $410,000 to develop a National Biomethane Strategy, focusing on converting agricultural waste from coffee, banana, pineapple, and sugarcane into clean energy while prioritizing inclusion of women and vulnerable populations . The new UNIDO Country Programme, launched in June 2025, supports technical skills development for youth and women, industrial decarbonization, and circular economy initiatives across manufacturing, agriculture, tourism, and construction . However, critical analyses reveal mounting challenges. President Rodrigo Chaves's administration has cut budgets for environmental institutions, declined to sign the Beyond Oil and Gas Alliance it co-founded, resisted ratifying the Escazú agreement protecting environmental defenders, and sought Norwegian assistance to quantify oil and gas resources . Sociological research on Costa Rica's "green elite" explains how the country's historically egalitarian class structure and interconnected urban elite prioritized environmental investment as means of social development, yet this same concentration of power may now render the country's climate reputation fragile under political pressure . A comparative

sustainability index applying a "scalability test" finds that Costa Rica achieves very high human development (0.8 HDI) with resource use below global average, positioning it as a model that could potentially be scaled worldwide without exceeding planetary boundaries—unlike Nordic countries whose high consumption levels would be ecologically impossible for the global population to emulate .

Norway presents a contrasting picture of a nation at the forefront of energy transition technology, yet grappling with profound social equity challenges embedded within its green agenda. The country's domestic electricity system is nearly emission-free due to hydropower and expanding wind capacity, and its mineral strategy supports extraction of critical raw materials essential for green technologies . However, research on "energy citizenship" reveals that low-income households face dual challenges: increased financial burdens from energy policies and systematic exclusion from participatory processes. A qualitative study of 73 low-income participants documents how these households contribute to sustainability through frugality, low-energy mobility, and sufficiency-oriented consumption—forms of "invisible" sustainability work that remain unrecognized in policy frameworks implicitly defining participation through technology adoption and green consumption . The most acute equity challenge involves the Indigenous Sámi people, whose reindeer herding—vital to cultural identity, language, and livelihood—faces severe impacts from wind farms, hydropower plants, powerlines, and mining operations on ancestral lands. The landmark 2021 Fosen judgment found that wind power plant construction violated Sámi herders' right to practice their culture under international law . Despite Norway's legal protections including the 2007 Reindeer Herding Act, constitutional provisions, and ratification of ILO Convention No. 169, renewable energy developments continue to fragment grazing lands. The Norwegian Transparency Act, a mandatory human rights due diligence initiative covering fundamental rights including Indigenous protections, offers potential accountability mechanisms, yet excludes small and medium enterprises from its scope and implementation challenges persist . Academic research on the Nussir copper mine in Finnmark demonstrates the paradox of "green" mining: while electrification may reduce direct emissions, the mining process relies on energy-intensive operations and supply chains tied to fossil fuels, potentially creating new "sacrifice zones" that perpetuate ecological harm and social marginalization under sustainability's banner .

Both countries demonstrate significant interplay between green economy ambitions and social equity outcomes, yet with different fault lines and political dynamics. Costa Rica's strength lies in its genuinely low-impact development model that could potentially be scaled globally, its innovative biomethane and green hydrogen initiatives targeting agricultural waste, and its institutional frameworks for inclusive transition planning. Yet it faces political fragility as its "green elite" consensus fractures under a president openly questioning environmental dogmas, with budget cuts threatening the very institutions that built its reputation. Norway's strength lies in technological sophistication, financial capacity, and legal frameworks for human rights due diligence, yet it faces profound equity challenges revealed in the invisibility of low-income households' sustainability contributions and the ongoing violation of Indigenous rights despite legal protections. Neither country has fully resolved the tension between decarbonization imperatives and social justice, though both offer critical lessons for understanding what genuinely just and sustainable transitions require.

Effective integration of social equity into green economy transitions requires: (1) recognition that true sustainability must be measured against planetary boundaries, not relative national rankings; (2) visibility for the "invisible" sustainability work of low-income households through sufficiency and frugality; (3) meaningful consultation and free, prior, and informed consent for Indigenous communities whose lands host renewable energy infrastructure; (4) policy frameworks that distribute both benefits and burdens equitably; (5) protection of environmental institutions from political cycles; (6) regulatory mechanisms like human rights due diligence that hold corporations accountable; (7) diversification of energy sources to address vulnerabilities like climate impacts on hydropower; and (8) reimagining development beyond growth-based models toward genuine sustainability.

KEYWORDS: Green economy transition, social equity, energy justice, Costa Rica, Norway, Indigenous rights, energy citizenship, just transition, SDG 7, planetary boundaries, renewable energy.

RÉSUMÉ (French Version)

Cette étude examine les approches comparatives des transitions vers l'économie verte et leurs implications pour l'équité sociale au Costa Rica et en Norvège, en se concentrant sur la manière dont les politiques énergétiques, les cadres institutionnels et les économies politiques de chaque pays façonnent la distribution des bénéfices et des fardeaux associés à la décarbonisation. La recherche analyse les tensions entre les objectifs climatiques ambitieux et les réalités de l'inclusion sociale, le traitement des communautés marginalisées et autochtones dans la planification énergétique, et les défis conceptuels de la définition d'un développement véritablement durable. Une analyse comparative a été menée en examinant des sources primaires et secondaires, y compris la recherche académique, la documentation institutionnelle et des analyses politiques critiques couvrant les développements récents jusqu'en 2025-2026.

Le Costa Rica présente un tableau complexe d'une nation longtemps célébrée comme leader mondial de la politique environnementale, mais faisant face à des tensions émergentes entre sa réputation verte et les réalités politico-économiques contemporaines. Le pays a atteint plus de 99 % de production d'électricité renouvelable et a adopté l'un des premiers plans nationaux de décarbonisation au monde, l'abolition constitutionnelle de l'armée en 1948 ayant libéré des ressources pour les dépenses sociales et les investissements environnementaux . Des initiatives récentes soutenues par les Nations Unies démontrent un engagement continu : un programme conjoint de février 2025 avec les Nations Unies mobilise plus de 410 000 dollars pour développer une Stratégie Nationale du Biométhane, se concentrant sur la conversion des déchets agricoles du café, de la banane, de l'ananas et de la canne à sucre en énergie propre tout en priorisant l'inclusion des femmes et des populations vulnérables . Le nouveau Programme Pays de l'ONUDI, lancé en juin 2025, soutient le développement des compétences techniques pour les jeunes et les femmes, la décarbonisation industrielle et les initiatives d'économie circulaire dans les secteurs de la fabrication, de l'agriculture, du tourisme et de la construction . Cependant, des analyses critiques révèlent des défis croissants. L'administration du président Rodrigo Chaves a réduit les budgets des institutions environnementales, refusé de signer l'Alliance au-delà du pétrole et du gaz qu'elle avait cofondée, résisté à la ratification de l'accord d'Escazú protégeant les défenseurs de l'environnement, et sollicité l'aide norvégienne pour quantifier les ressources pétrolières et gazières . La recherche sociologique sur "l'élite verte" du Costa Rica explique comment la structure de classe historiquement égalitaire et l'élite urbaine interconnectée du pays ont priorisé

l'investissement environnemental comme moyen de développement social, mais cette même concentration du pouvoir pourrait maintenant rendre la réputation climatique du pays fragile sous la pression politique . Un indice de durabilité comparatif appliquant un "test d'évolutivité" constate que le Costa Rica atteint un développement humain très élevé (IDH de 0,8) avec une utilisation des ressources inférieure à la moyenne mondiale, le positionnant comme un modèle qui pourrait potentiellement être étendu à l'échelle mondiale sans dépasser les limites planétaires—contrairement aux pays nordiques dont les niveaux de consommation élevés seraient écologiquement impossibles pour la population mondiale à imiter .

La Norvège présente un tableau contrasté d'une nation à la pointe de la technologie de transition énergétique, mais aux prises avec des défis profonds d'équité sociale intégrés dans son agenda vert. Le système électrique national est presque exempt d'émissions grâce à l'hydroélectricité et à l'expansion de la capacité éolienne, et sa stratégie minérale soutient l'extraction de matières premières critiques essentielles aux technologies vertes . Cependant, la recherche sur la "citoyenneté énergétique" révèle que les ménages à faible revenu font face à un double défi : des fardeaux financiers accrus dus aux politiques énergétiques et une exclusion systématique des processus participatifs. Une étude qualitative de 73 participants à faible revenu documente comment ces ménages contribuent à la durabilité par la frugalité, la mobilité sobre en énergie et la consommation orientée vers la suffisance—des formes de travail de durabilité "invisible" qui restent non reconnues dans les cadres politiques définissant implicitement la participation par l'adoption de technologies et la consommation verte . Le défi d'équité le plus aigu concerne le peuple autochtone Sámi, dont l'élevage de rennes—vital pour l'identité culturelle, la langue et les moyens de subsistance—subit de graves impacts des parcs éoliens, des centrales hydroélectriques, des lignes électriques et des opérations minières sur les terres ancestrales. L'arrêt historique Fosen de 2021 a jugé que la construction de centrales éoliennes violait le droit des éleveurs Sámis de pratiquer leur culture en vertu du droit international . Malgré les protections juridiques norvégiennes, y compris la loi sur l'élevage de rennes de 2007, les dispositions constitutionnelles et la ratification de la Convention n° 169 de l'OIT, les développements des énergies renouvelables continuent de fragmenter les terres de pâturage. La loi norvégienne sur la transparence, une initiative obligatoire de diligence raisonnable en matière de droits humains couvrant les droits fondamentaux y compris les protections autochtones, offre des mécanismes potentiels de

responsabilisation, mais exclut les petites et moyennes entreprises de son champ d'application et des défis de mise en œuvre persistent . La recherche académique sur la mine de cuivre de Nussir dans le Finnmark démontre le paradoxe de l'exploitation minière "verte" : bien que l'électrification puisse réduire les émissions directes, le processus minier repose toujours sur des opérations énergivores et des chaînes d'approvisionnement souvent liées aux combustibles fossiles, créant potentiellement de nouvelles "zones de sacrifice" qui perpétuent les dommages écologiques et la marginalisation sociale sous la bannière de la durabilité .

Les deux pays démontrent une interaction significative entre les ambitions d'économie verte et les résultats d'équité sociale, mais avec des lignes de faille et des dynamiques politiques différentes. La force du Costa Rica réside dans son modèle de développement à faible impact véritablement évolutif à l'échelle mondiale, ses initiatives innovantes en matière de biométhane et d'hydrogène vert ciblant les déchets agricoles, et ses cadres institutionnels pour une planification inclusive de la transition. Pourtant, il fait face à une fragilité politique alors que le consensus de son "élite verte" se fracture sous un président remettant ouvertement en question les dogmes environnementaux, avec des coupes budgétaires menaçant les institutions mêmes qui ont construit sa réputation. La force de la Norvège réside dans sa sophistication technologique, sa capacité financière et ses cadres juridiques pour la diligence raisonnable en matière de droits humains, mais elle fait face à des défis d'équité profonds révélés par l'invisibilité des contributions à la durabilité des ménages à faible revenu et la violation continue des droits autochtones malgré les protections juridiques. Aucun des deux pays n'a pleinement résolu la tension entre les impératifs de décarbonisation et la justice sociale, bien que tous deux offrent des leçons essentielles pour comprendre ce que des transitions véritablement justes et durables exigent.

L'intégration efficace de l'équité sociale dans les transitions vers l'économie verte nécessite : (1) la reconnaissance que la véritable durabilité doit être mesurée par rapport aux limites planétaires, et non par des classements nationaux relatifs ; (2) la visibilité du travail de durabilité "invisible" des ménages à faible revenu par la suffisance et la frugalité ; (3) une consultation significative et un consentement libre, préalable et éclairé pour les communautés autochtones dont les terres accueillent des infrastructures d'énergie renouvelable ; (4) des cadres politiques qui distribuent équitablement les bénéfices et les fardeaux ; (5) la protection des institutions environnementales contre les cycles politiques ; (6) des mécanismes réglementaires comme la diligence raisonnable

en matière de droits humains qui responsabilisent les entreprises ; (7) la diversification des sources d'énergie pour faire face aux vulnérabilités comme les impacts climatiques sur l'hydroélectricité ; et (8) la réinvention du développement au-delà des modèles basés sur la croissance vers une durabilité authentique.

MOTS-CLÉS : Transition vers l'économie verte, équité sociale, justice énergétique, Costa Rica, Norvège, droits autochtones, citoyenneté énergétique, transition juste, ODD 7, limites planétaires, énergie renouvelable.

Suumis le : 17 Mars , 2026
Publié le : 29 A pril, 2026
Auteurs correspondant : *Mohamed Lamine Niatia*, *Iradukunda Sengesho Benigne and Nizeyimana Jean Baptiste*
Adresses électroniques : *mohamedlamine@cirep.ac.cd*, *benigneira0@gmail.com, nizeyimana.jb@dphu.ac.cd ,*
Ce travail est disponible sous la licence
Creative Commons Attribution 4.0 International.

1. INTRODUCTION

The global transition to green economies represents one of the most significant transformations of the twenty-first century, carrying both immense promise and profound risk. The promise lies in decarbonizing energy systems, mitigating climate change, and building sustainable prosperity. The risk lies in replicating or exacerbating existing inequalities—concentrating benefits among the already privileged while imposing burdens on marginalized communities. SDG 7 explicitly calls for affordable, reliable, sustainable, and modern energy for all, while SDG 10 targets reduced inequalities. The concept of a "just transition" has emerged to address these intertwined imperatives.

This study examines two countries that offer illuminating perspectives on the relationship between green economy transitions and social equity: Costa Rica and Norway. Both nations are widely recognized as environmental leaders, yet their pathways to sustainability, the social dynamics of their transitions, and the equity challenges they face differ fundamentally, providing critical lessons for understanding what makes a transition truly just.

Costa Rica has long been celebrated as a green pioneer. With over 99% renewable electricity, a constitutional commitment to environmental protection, and one of the world's first national decarbonization plans, it represents a model of what a low-impact, high-development society might look like . Recent UN-backed initiatives continue this trajectory, mobilizing resources for biomethane development from agricultural waste and launching comprehensive industrial decarbonization programmes targeting youth and women's inclusion . Yet beneath this green halo, tensions are surfacing. A new political administration is cutting environmental budgets, questioning long-standing protections, and contemplating a return to fossil fuel exploration . The country's vaunted "green elite," which sociologists credit with building its environmental consensus, may now be fracturing .

Norway presents a different paradox. As a technological leader in hydropower and wind energy, with ambitious mineral strategies to supply critical raw materials for the green transition, it appears to embody the high-tech, high-investment pathway to sustainability . Yet research reveals profound equity challenges embedded within this model. Low-income households, excluded from policy framings that define participation through technology adoption and green consumption, nonetheless perform "invisible" sustainability work through frugality and sufficiency—contributions that remain unrecognized and unsupported . Most acutely, the Indigenous Sámi people face ongoing violations of their rights as renewable energy developments fragment ancestral grazing lands, despite constitutional protections and international law .

The contrast between Costa Rica and Norway illuminates critical questions for SDG 7 and just transition: How do different development models shape the distribution of green transition benefits and burdens? What makes sustainability truly scalable to the global population? How can policy recognize and support the diverse ways citizens contribute to sustainability? And what protections are needed for communities whose lands host the infrastructure of decarbonization?

2. LITERATURE REVIEW

2.1 Just Transition and Energy Justice: Theoretical Frameworks

The concept of "just transition" has evolved from labor union concerns about workers displaced by environmental regulation to encompass broader dimensions of social justice in sustainability transitions. Energy justice scholarship identifies three core principles: distributional justice (fair allocation of benefits and burdens), procedural justice (inclusive decision-making processes), and recognition justice (acknowledgment of affected groups' distinct vulnerabilities and rights). Recognition justice is particularly salient for Indigenous communities whose cultural survival depends on access to ancestral lands .

A critical intervention in sustainability metrics comes from the "scalability test" framework, which argues that conventional indices measuring countries relative to one another create a dangerous mismatch with planetary boundaries. Relative scoring conflates "less unsustainable" with "truly sustainable." A genuinely sustainable country is one whose lifestyle could provide a dignified life to all of humanity while remaining within Earth's capacity to provide .

2.2 Costa Rica: Green Leadership, Social Foundations, and Emerging Tensions

The Green Elite and Historical Context: Sociologist Julia Flagg's research on Costa Rica's climate mitigation policy development traces the country's environmental leadership to its historically egalitarian class structure and interconnected, green-minded urban elite. This elite prioritized investment in public welfare as the means to enhance national development, leading to policy advances across four historical moments from the late 1980s through the 2010s. Investments in public goods enhanced social development, which in turn allowed state planners to pursue ambitious climate mitigation policies .

The country's constitutional abolition of the military in 1948 freed up resources for social spending and environmental investment, contributing to near-universal healthcare, 98% literacy, and life expectancy matching many developed nations—all achieved with resource use below global average .

Renewable Energy Leadership and Recent Initiatives: Costa Rica has achieved over 99% renewable electricity generation in recent years, primarily through hydropower complemented by

wind and geothermal. The 2018 National Decarbonization Plan set ambitious goals for transforming transport, industry, and agriculture .

Recent UN-backed initiatives demonstrate continued commitment:

Initiative	**Date**	**Focus**	**Equity Provisions**
National Biomethane Strategy	February 2025	Converting agricultural waste (coffee, banana, pineapple, sugarcane) to biogas/biomethane; reducing diesel dependency	Inclusion of women and vulnerable populations; consultation mechanisms with diverse sectors
UNIDO Country Programme	June 2025	Technical skills development; industrial decarbonization; circular economy; quality infrastructure	Youth and women empowerment; SME support; addressing regional disparities

Vice President Stephan Brunner articulated the integrated logic: "Costa Rica's agricultural sector accounts for approximately 27% of greenhouse gas emissions, primarily from the waste of export products... A key solution is to harness this waste to produce biogas and biomethane, which would not only reduce emissions but also help tackle the diesel dependency in our energy matrix. This is the beauty of this project: addressing two major challenges with a single solution" .

The Scalability Argument: A comparative sustainability index applying the "scalability test" positions Costa Rica as a global model. Unlike Nordic countries whose consumption levels would exceed planetary boundaries if scaled globally, Costa Rica achieves very high human development (HDI around 0.8) with resource use lower than the global average. This suggests that Costa Rica's pathway could potentially be emulated worldwide without triggering ecological collapse—a claim that cannot be made for high-consumption countries like Norway .

Political Fragility and the Green Halo Slips: Despite this impressive record, Costa Rica's green consensus is under unprecedented pressure. President Rodrigo Chaves, elected in 2022 as a political outsider, has:

- Cut budgets for environmental institutions "drastically" in some cases
- Declined to sign the Beyond Oil and Gas Alliance (co-founded by Costa Rica) at COP28
- Resisted ratifying the Escazú agreement protecting environmental defenders
- Sought Norwegian assistance to quantify oil and gas resources (Norway declined)
- Proposed formalizing open-pit mining at Crucitas, potentially opening door to wider mining
- Questioned "the dogmas of the old political elite" including "the 'fanaticism' of environmentalists"

Adrián Martínez, director of environmental NGO La Ruta del Clima, observes: "Neoliberals, conservatives, progressives, they all kept to the same environmental line. But now there's a new line of thought that breaks with tradition" . Pascal Girot, former climate negotiator, warns: "Costa Rica's climate reputation was built up over such a long time that it's enduring for now. But all of this is fragile. Another four or eight years of systematic cuts could be critical" .

2.3 Norway: Technological Leadership and Hidden Inequities

Energy System and Transition Strategy: Norway's domestic electricity system is nearly emission-free, based on hydropower capacity and expanding wind farms. The country has significant deposits of minerals and metals essential for green energy technologies, and its mineral strategy supports extraction of critical raw materials to "achieve green Norwegian and European value chains" . The Norwegian Transparency Act, adopted in 2021 and effective July 2022, mandates human rights due diligence for larger enterprises, grounded in the UN Guiding Principles on Business and Human Rights and OECD Guidelines .

The Invisible Sustainability Work of Low-Income Households: Research by Sciencedirect scholars reveals a significant disconnect between Norway's participatory ideals and the lived realities of economically marginalised groups. A qualitative study of 73 low-income participants

found that current energy policies implicitly define participation through technology adoption and green consumption—framings that render alternative sustainability practices invisible .

Low-income households contribute to sustainability through:

Practice	**Description**
Frugality	Conscious reduction of consumption
Low-energy mobility	Walking, cycling, public transport use
Sufficiency-oriented consumption	Limiting purchases to essentials

These forms of "invisible" sustainability work remain unrecognised in policy frameworks, despite representing genuine contributions to national environmental goals. The study argues for a broader conceptualisation of energy citizenship that recognises these low-tech, sufficiency-oriented engagements as legitimate and transformative. Inclusive energy transitions require not only redistributive policy measures but a fundamental shift in how participation is defined and valued .

The Sámi Rights Crisis: The most acute equity challenge involves the Indigenous Sámi people. Reindeer husbandry is vital to Sámi culture, identity, and language, sustaining thousands in Norway. It is protected by multiple legal instruments:

- The 2007 Reindeer Herding Act
- Article 108 of the Norwegian Constitution safeguarding Sámi language, culture, and way of life
- International Covenant on Civil and Political Rights (ICCPR), Article 27 on minority cultural rights
- ILO Convention No. 169 concerning Indigenous and Tribal Peoples (ratified by Norway)
- United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (endorsed)

Despite these protections, renewable energy developments—wind farms, hydropower plants, powerlines—and mining operations have fragmented and encroached on pastoral land. The landmark 2021 Fosen judgment by the Norwegian Supreme Court found that construction of two wind power plants violated Sámi herders' right to practice their culture under ICCPR Article 27 .

The Norwegian Transparency Act potentially offers accountability mechanisms. Its due diligence obligations cover "fundamental rights" including those protected in ICCPR, ICESCR, and ILO core conventions. Preparatory works explicitly reference UNDRIP and ILO Convention No. 169, thus including Sámi rights within the Act's scope. However, the Act applies only to "larger enterprises," excluding small and medium enterprises involved in mineral or renewable energy developments on Sámi lands—an inconsistency with UNGPs and OECD Guidelines, which recommend all companies conduct due diligence regardless of size .

The Nussir Copper Mine Paradox: Academic research on the Nussir copper mine in Finnmark demonstrates the contradictions embedded in "green" extraction. The project is viewed as vital to national and international climate goals, yet has sparked controversy due to environmental impacts and threats to Indigenous rights. Findings show how the Nussir project demonstrates paradoxes where efforts to mitigate climate change may perpetuate ecological harm and social injustice .

While electrification may reduce direct greenhouse gas emissions, the mining process still relies on energy-intensive operations and supply chains often tied to fossil fuels, raising concerns about final environmental impacts. The analysis highlights how the green transition can create new "sacrifice zones" under sustainability's banner, urging a shift beyond extractive models toward reduction, recycling, and meaningful Indigenous consultation .

2.4 Comparative Dimensions: Models of Transition, Equity Challenges

Dimension	**Costa Rica**	**Norway**
Development Model	Low-impact, high-wellbeing; resource use below global average; potentially scalable globally	High-consumption, technologically sophisticated; emissions and material use exceed planetary boundaries; not scalable
Renewable Achievement	99%+ renewable electricity; National Decarbonization Plan;	Near-zero emission electricity (hydro, wind); mineral strategy for critical raw materials

	biomethane from agricultural waste	
Key Equity Challenge	Political fragility of green institutions; budget cuts; potential return to fossil fuels	Invisibility of low-income sustainability work; Indigenous rights violations
Affected Populations	Vulnerable groups (women, youth) targeted in transition programmes; environmental defenders	Low-income households; Indigenous Sámi communities
Accountability Mechanisms	UN partnerships, consultation mechanisms; Escazú agreement (not ratified)	Transparency Act (human rights due diligence); Fosen judgment; ILO 169
Political Context	Fracturing of historical green consensus; populist challenge to environmental "dogmas"	Legal protections exist but implementation gaps; ongoing conflicts despite court rulings
Strengths	Scalable model; social foundations; innovative waste-to-energy approaches	Technological sophistication; legal frameworks; research recognition of equity gaps
Weaknesses	Institutional fragility; political vulnerability	Exclusion of SMEs from due diligence; persistent rights violations

3. RESEARCH QUESTIONS

This study addresses the following research questions:

1. What are the key characteristics of Costa Rica's green economy transition, and how do its social foundations, recent initiatives, and emerging political tensions shape equity outcomes?

2. What are the key characteristics of Norway's green economy transition, and how do its energy systems, legal frameworks, and equity challenges—including the invisibility of low-income sustainability work and Indigenous rights conflicts—shape just transition outcomes?
3. How do the two countries compare in terms of development model scalability, institutional frameworks for equity, treatment of marginalized populations, and political dynamics?

4. METHODOLOGY

This study employs a comparative analysis methodology to examine green economy transitions and social equity in Costa Rica and Norway. The research design integrates secondary analysis of academic research, institutional documentation, policy analysis, and critical commentary to develop comprehensive understanding of energy systems, equity dynamics, and political contexts in both countries.

Research Design: The comparative approach is appropriate for examining how different development models, political economies, and social structures shape the relationship between decarbonization and justice. Costa Rica and Norway were selected as cases that offer complementary insights: both are environmental leaders yet present fundamentally different equity challenges.

Data Sources: Primary and secondary sources analyzed include:

- Joint SDG Fund documentation of Costa Rica's National Biomethane Strategy
- ScienceDirect research on energy citizenship and low-income households in Norway
- Down To Earth comparative sustainability analysis applying scalability test
- The Observer investigation of Costa Rica's political shifts and green reputation
- Cambridge University Press analysis of Norwegian Transparency Act and Sámi rights
- UNIDO Country Programme documentation for Costa Rica
- MIT Press sociological research on Costa Rica's green elite
- NMBU research on Nussir copper mine contradictions

Analytical Framework: The comparative framework examines five dimensions:

1. **Development Model:** Energy systems, resource consumption patterns, scalability
2. **Equity Challenges:** Distribution of benefits/burdens, recognition of affected groups
3. **Institutional Frameworks:** Legal protections, accountability mechanisms, policy design
4. **Political Dynamics:** Consensus/fragmentation, institutional stability, implementation gaps
5. **Just Transition Pathways:** Approaches to inclusion, participation, and remedy

5. RESULTS

5.1 Costa Rica: Scalable Model Under Political Pressure

The Scalability Achievement: Costa Rica's most significant contribution to global sustainability thinking may be its demonstration that high human development (0.8 HDI) can be achieved with resource use below the global average. This contrasts sharply with Nordic countries whose consumption levels, if scaled to global population, would vastly exceed planetary boundaries. The "scalability test" positions Costa Rica as a model that could potentially be emulated worldwide without triggering ecological collapse .

Recent Transition Initiatives: Two major UN-backed initiatives launched in 2025 demonstrate continued commitment to green transition with explicit equity provisions:

The National Biomethane Strategy, launched February 2025 with over $410,000 in UN funding, targets agricultural waste from coffee, banana, pineapple, and sugarcane—sectors accounting for approximately 27% of national emissions. By converting waste to biogas and biomethane, the strategy addresses both emission reduction and diesel dependency. Crucially, it incorporates consultation mechanisms with diverse sectors and prioritizes inclusion of women and vulnerable populations .

The UNIDO Country Programme, signed June 2025, provides a strategic framework across four pillars: technical skills development (improving employability among youth, women, and vulnerable groups through vocational training); industrial decarbonization (leveraging clean energy leadership for innovations like green hydrogen); circular economy promotion (targeting manufacturing, agriculture, tourism, construction); and quality infrastructure enhancement. Cross-

cutting priorities include youth and gender empowerment, SME support, and addressing regional industrial disparities .

The Political Challenge: Despite these initiatives, Costa Rica's green consensus faces unprecedented pressure. President Rodrigo Chaves, elected in 2022, has:

- Cut environmental institution budgets "drastically" in some cases
- Declined to sign the Beyond Oil and Gas Alliance at COP28 (despite co-founding it)
- Resisted ratifying the Escazú agreement protecting environmental defenders
- Approached Norway to quantify oil and gas resources (Norway declined)
- Proposed formalizing open-pit mining at Crucitas
- Questioned environmental "dogmas" and "fanaticism"

Pascal Girot, former climate negotiator, warns: "Costa Rica's climate reputation was built up over such a long time that it's enduring for now. But all of this is fragile. Another four or eight years of systematic cuts could be critical" .

5.2 Norway: Technological Leadership and Hidden Inequities

Energy System and Legal Framework: Norway's near-zero emission electricity system (hydropower, wind) and mineral strategy for critical raw materials position it as a technological leader in the green transition. The 2021 Transparency Act mandates human rights due diligence for larger enterprises, grounded in UNGPs and OECD Guidelines, with preparatory works explicitly including Indigenous Sámi rights within its scope .

The Invisibility of Low-Income Sustainability Work: Qualitative research with 73 low-income participants reveals a fundamental disconnect between policy framings and lived realities. Current policies implicitly define energy citizenship through technology adoption and green consumption—solar panels, electric vehicles, smart home devices. This framing renders invisible the sustainability contributions of low-income households through frugality, low-energy mobility, and sufficiency-oriented consumption .

These households face dual challenges: increased financial burdens from energy policies designed for technology adopters, and systematic exclusion from participatory processes that define engagement in ways they cannot access. The research argues for a broader conceptualization of energy citizenship that recognizes low-tech, sufficiency-oriented engagements as legitimate and transformative .

The Sámi Rights Crisis: Despite extensive legal protections—Reindeer Herding Act, constitutional provisions, ICCPR Article 27, ILO 169 ratification, UNDRIP endorsement—renewable energy developments continue to violate Sámi rights. The 2021 Fosen judgment found wind power plant construction violated Sámi herders' cultural rights under international law, yet conflicts persist .

The Transparency Act offers potential accountability. Its due diligence obligations cover "fundamental rights" including those in ICCPR, ICESCR, and ILO conventions. Preparatory works explicitly reference UNDRIP and ILO 169, thus including Sámi rights. However, the Act applies only to "larger enterprises," excluding small and medium enterprises involved in many renewable energy and mining developments on Sámi lands—inconsistent with UNGPs and OECD Guidelines .

The Nussir Paradox: Research on the Nussir copper mine reveals contradictions in "green" extraction. While positioned as vital to climate goals, the project demonstrates how efforts to mitigate climate change may perpetuate ecological harm and social injustice. The mining process relies on energy-intensive operations and supply chains tied to fossil fuels, challenging assumptions about inherent sustainability of renewable technologies. The analysis warns of new "sacrifice zones" created under sustainability's banner, urging priority for reduction, recycling, and meaningful Indigenous consultation .

6. DISCUSSION OF RESULTS

6.1 Scalability vs. Technological Sophistication

The contrast between Costa Rica and Norway challenges conventional assumptions about what constitutes a sustainable development model. Costa Rica's achievement of high human wellbeing with resource use below global average suggests a pathway that could potentially be scaled worldwide. Its approach—investing in public goods, abolishing military expenditure, building social consensus around environmental values—demonstrates that strategic choices can decouple human development from excessive consumption .

Norway's model, for all its technological sophistication, cannot be scaled. Its consumption levels, if emulated by the global population, would vastly exceed planetary boundaries. The irony is that countries most celebrated in conventional sustainability rankings are often those whose lifestyles are ecologically impossible for the world to replicate .

This insight has profound implications for SDG 7 and just transition. Truly sustainable energy systems must be designed not only for efficiency and low-carbon operation but for scalability to global population. Costa Rica's biomethane strategy, converting agricultural waste to energy, represents precisely the kind of circular, locally embedded approach that could work across the Global South .

6.2 Two Forms of Invisibility

Both countries reveal forms of invisibility in their green transitions, though of different kinds. In Costa Rica, the "green elite" that built the country's environmental consensus may now be fracturing, rendering invisible the institutional foundations that made sustainability possible . The current administration's budget cuts and policy reversals threaten to erase decades of progress, yet these threats remain under-appreciated in international celebrations of Costa Rica's green halo.

In Norway, the sustainability work of low-income households remains invisible to policy frameworks that define participation through technology adoption and green consumption. The frugality, sufficiency, and low-energy mobility practiced by economically marginalized groups constitute genuine contributions to national environmental goals, yet these contributions go unrecognized and unsupported . This invisibility compounds the material burdens these households already bear from energy policies designed for technology adopters.

Both forms of invisibility undermine just transition. Costa Rica's institutional fragility threatens the very capacities needed to ensure equitable outcomes. Norway's policy blind spots exclude the sustainability practices of the poor from the definition of citizenship itself.

6.3 Rights, Recognition, and Implementation Gaps

Norway's experience with Sámi rights reveals the gap between legal protection and implementation. Despite constitutional provisions, international law, and a landmark Supreme Court ruling, renewable energy developments continue to encroach on ancestral lands . The Fosen judgment has not prevented ongoing violations. The Transparency Act, while potentially valuable, excludes small and medium enterprises from its scope, leaving many developments unregulated for human rights impacts.

This implementation gap reflects what recognition justice scholarship identifies as a failure to genuinely acknowledge Indigenous peoples' distinct relationships to land and culture. Renewable energy developments are not merely infrastructure projects; they threaten reindeer husbandry on which Sámi communities depend for livelihood and cultural survival. Treating such impacts as externalities to be mitigated rather than rights to be respected perpetuates injustice even as it advances climate goals.

Costa Rica's refusal to ratify the Escazú agreement, which would protect environmental defenders, similarly signals a gap between rhetorical commitment and practical protection . Environmental defenders face threats across Latin America; Costa Rica's hesitation to join the agreement bearing its own capital's name undermines its regional leadership.

6.4 Political Economy of Green Transitions

Both countries demonstrate that green transitions are not merely technical processes but deeply political. Costa Rica's long-standing environmental consensus was not natural but constructed by an "interconnected, green-minded urban elite" that prioritized public investment as development strategy . That consensus is now fracturing under a populist challenge that reframes environmental protection as "fanaticism" and "dogma" standing in the way of economic development .

Norway's conflicts over Sámi rights reveal the political economy of green extraction. The Nussir mine is justified by reference to national and European climate goals, yet benefits accrue to corporations while burdens fall on Indigenous communities. The designation of certain lands as "sacrifice zones" for the greater good reflects political choices about whose interests count .

These dynamics suggest that just transition requires not only technical solutions and legal frameworks but robust democratic institutions capable of resisting capture by interests that would externalize costs onto marginalized communities. Costa Rica's institutional fragility under political pressure and Norway's implementation gaps despite legal protections both signal the need for deeper attention to political economy.

6.5 Implications for SDG 7 and Just Transition

The findings have important implications for achieving SDG 7 targets and broader just transition goals:

Target 7.2 (Increase renewable energy share): Costa Rica's achievement of 99%+ renewable electricity demonstrates feasibility, but the source of that renewable energy matters. Hydropower vulnerability to climate variability and biomass potential from agricultural waste both require attention . Norway's near-zero emission electricity shows technological possibility, but the social impacts of wind and hydro on Indigenous lands must be addressed .

Target 7.1 (Universal access to affordable, reliable energy): Affordability requires attention to distributional impacts. Norway's low-income households face increased burdens from policies that do not recognize their sustainability practices . Costa Rica's transition programmes explicitly targeting women, youth, and vulnerable populations offer models for inclusive design .

Target 7.3 (Energy efficiency): Efficiency must be understood beyond technological metrics. Low-income households' sufficiency-oriented consumption represents a form of efficiency through reduced demand, yet remains unrecognized in policy .

Target 7.a (Clean energy research and technology): Research must attend to social as well as technical dimensions. Norway's INCLUDE research centre focusing on social justice in energy transition represents important recognition .

Target 7.b (Infrastructure for developing countries): Costa Rica's scalable model suggests pathways for developing countries to achieve high wellbeing without high consumption, while Norway's technological expertise could support appropriate technology transfer when combined with human rights due diligence.

7. CONCLUSION

This comparative analysis of green economy transitions and social equity in Costa Rica and Norway reveals profound insights into the possibilities and contradictions of building sustainable and just societies. The two countries, each celebrated as environmental leaders, illuminate different dimensions of the just transition challenge—and different pathways to addressing them.

Costa Rica's experience demonstrates that high human development can be achieved at ecological costs that could potentially be scaled to the global population. Its near-universal healthcare, 98% literacy, and life expectancy matching developed nations, combined with resource use below global average, offer a genuine model of sustainable development . Recent UN-backed initiatives continue this trajectory, targeting agricultural waste for biomethane production while prioritizing inclusion of women and vulnerable populations, and launching comprehensive industrial decarbonization programmes with youth empowerment at their core . The country's "green elite," emerging from a historically egalitarian class structure, built this environmental consensus through sustained investment in public goods .

Yet this achievement is fragile. President Rodrigo Chaves's administration has cut environmental budgets, questioned long-standing protections, and contemplated returning to fossil fuel exploration . The Escazú agreement protecting environmental defenders remains unratified. Costa Rica's green halo is slipping, and with it the institutional foundations that made its success possible. The lesson is that environmental progress requires not only good policies but resilient institutions capable of surviving political shifts.

Norway's experience reveals different contradictions. Its technologically sophisticated energy system, near-zero emission electricity, and ambitious mineral strategy position it as a leader in green technology . Yet beneath this surface lie profound equity challenges. Low-income households, whose sustainability contributions through frugality and sufficiency remain invisible to policy frameworks, face exclusion from participatory processes and increased financial burdens . The Indigenous Sámi people, despite extensive legal protections including constitutional provisions, ILO Convention 169 ratification, and a landmark Supreme Court ruling, continue to see their ancestral lands fragmented by renewable energy developments . The Nussir copper mine exemplifies how "green" extraction can perpetuate ecological harm and social marginalization under sustainability's banner . Norway's challenges are not of institutional fragility but of implementation gaps—the distance between legal protection and lived reality.

Several cross-cutting insights emerge from this comparison:

First, true sustainability must be measured against planetary boundaries, not relative rankings. Costa Rica's model passes the "scalability test"; Norway's does not. This fundamental difference challenges assumptions about which countries should serve as role models .

Second, equity requires visibility. Norway's low-income households perform sustainability work that remains unrecognized because policy defines participation through technology adoption . Just transition demands that we see and value the diverse ways citizens contribute.

Third, rights require implementation, not merely declaration. Norway's legal protections for Sámi rights, despite their sophistication, have not prevented ongoing violations . The gap between law and enforcement must be closed.

Fourth, institutions matter as much as policies. Costa Rica's environmental progress was built on resilient institutions and sustained consensus. The current political assault on those institutions threatens to undo decades of achievement .

Fifth, green transitions create winners and losers. Both countries demonstrate that decarbonization benefits some while imposing burdens on others—whether low-income households excluded from

participatory processes or Indigenous communities facing land fragmentation. Just transition requires explicit attention to distributional outcomes.

Sixth, meaningful consultation requires power sharing. Norway's "consultations" with Sámi communities have not prevented rights violations. Free, prior, and informed consent—not merely notification—is essential .

Seventh, scalable solutions lie in circularity and sufficiency, not high consumption. Costa Rica's biomethane strategy, converting agricultural waste to energy, represents the kind of locally embedded, circular approach that can work across the Global South . Norway's model, for all its sophistication, cannot be replicated globally.

For Costa Rica, priorities emerging from this analysis include:

1. Protect environmental institutions from budget cuts and political interference, recognizing that institutional resilience is essential for long-term progress.
2. Ratify the Escazú agreement to protect environmental defenders and demonstrate commitment to regional leadership.
3. Resist pressures to return to fossil fuel extraction, building instead on biomethane, green hydrogen, and circular economy initiatives.
4. Maintain and strengthen equity provisions in transition programmes, ensuring women, youth, and vulnerable populations benefit.
5. Share Costa Rica's scalable model with other countries through South-South cooperation.

For Norway, priorities include:

1. Expand Transparency Act scope to cover small and medium enterprises, closing the loophole that excludes many renewable energy and mining developments from human rights due diligence.
2. Implement the Fosen judgment fully and ensure no further renewable energy developments proceed on Sámi lands without free, prior, and informed consent.
3. Redesign energy policy frameworks to recognize and support the sustainability contributions of low-income households through frugality and sufficiency.

4. Prioritize reduction and recycling over new extraction, as urged by Nussir research .
5. Ensure meaningful participation of Sámi communities in all decisions affecting their lands, moving beyond consultation to genuine power sharing.

For the international community, the lessons are clear: just transition requires attention to scalability, visibility, implementation, and institutional resilience. Costa Rica's scalable model and Norway's equity challenges both offer critical insights. SDG 7's targets on affordable, reliable, sustainable energy cannot be achieved without parallel attention to SDG 10 on reduced inequalities.

The ultimate measure of success is not renewable energy percentage or emissions reductions alone, but whether transitions deliver dignified lives for all within planetary boundaries. Costa Rica points toward what such a future might look like. Norway reveals the equity challenges that must be addressed along the way.

8. LIMITS OF THE STUDY

This study has several limitations that should be acknowledged. First, the comparative analysis relies primarily on secondary sources rather than primary empirical research. Direct observation of energy policies and community impacts in both countries, interviews with policymakers, affected community members, and civil society organizations, and participatory research would provide valuable additional perspectives and ground-truth the findings from published literature. Second, data availability and comparability vary between countries. Costa Rica benefits from extensive documentation through UN partnerships and academic research, while Norway's equity challenges are well-documented through qualitative research and legal analysis. Third, the study focuses on recent developments (2021-2026) that are still unfolding; longer-term outcomes of Costa Rica's political shifts and Norway's implementation efforts remain to be seen. Fourth, the voice of affected communities—particularly low-income households in Norway and environmental defenders in Costa Rica—is mediated through research reports rather than captured directly. Future research should prioritize participatory methodologies that center community perspectives. Fifth, the study does not comprehensively address the political economy dimensions—the interests, power relations, and structural forces that shape transition outcomes in

both countries. Understanding why Costa Rica's green consensus fractured or why Norway's legal protections remain unimplemented requires deeper political economy analysis. Sixth, the transferability analysis is necessarily speculative. While principles can be identified, actual transfer of transition approaches depends on countless contextual factors including political systems, institutional capacities, cultural values, and economic structures that cannot be fully anticipated. Despite these limitations, the comparative analysis provides valuable insights into green economy transitions and social equity, with implications for both countries and for broader efforts to achieve SDG 7.

9. ACKNOWLEDGMENTS

The author acknowledges the invaluable contributions of researchers, institutions, and journalists whose work forms the foundation of this analysis. The Joint SDG Fund and United Nations for documentation of Costa Rica's National Biomethane Strategy . The ScienceDirect authors whose research on energy citizenship and low-income households in Norway reveals invisible sustainability work . Chirag Dhara, Soumyajit Bhar, and Down To Earth for the critical scalability analysis reimagining sustainable development metrics . The Observer for investigative reporting on Costa Rica's political shifts and green halo fragility . The Fridtjof Nansen Institute for documentation of Norway's INCLUDE research centre on social justice in energy transition . UNIDO for comprehensive Country Programme documentation for Costa Rica . Chiara Morfea and Cambridge University Press for essential legal analysis of Norwegian Transparency Act and Sámi rights . Julia A. Flagg and MIT Press for sociological research on Costa Rica's green elite . NMBU researchers for critical analysis of Nussir copper mine contradictions . The broader community of scholars, practitioners, and activists working to ensure that green transitions serve justice as well as climate.

10. AUTHOR CONTRIBUTIONS

The author conceived the study, designed the research methodology, conducted the literature review and document analysis, synthesized findings across countries, and drafted the complete

manuscript. The author takes full responsibility for the accuracy of information presented and interpretations offered.

11. COMPETING INTERESTS

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential competing interest. No funding was received from organizations with interests in energy policy, green economy transitions, or related sectors.

12. AUTHORS' CONTRIBUTIONS

As sole author, I performed all roles including conceptualization, methodology development, investigation, formal analysis, writing, review, editing, and project administration.

13. FUNDING INFORMATION

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

14. DATA AVAILABILITY

All sources analyzed in this study are publicly available documents, including UN agency reports, academic research articles, investigative journalism, legal analysis, and institutional publications. Primary sources are cited in the bibliography and accessible through the referenced publications and organizations.

15. DISCLAIMER

The views expressed in this article are solely those of the author and do not necessarily reflect the views of any institution or organization with which the author may be affiliated. The analysis is

provided for scholarly purposes and should not be construed as policy guidance or investment advice. Green economy transitions, energy policies, and social equity dynamics are subject to change, and readers should consult current sources for specific information about Costa Rica, Norway, and just transition.

16. BIBLIOGRAPHY

1. Joint SDG Fund. (2025). United Nations and Costa Rica Launch Joint Programme to Accelerate Energy Transition Through the National Biomethane Strategy. https://jointsdgfund.org/es/node/1824
2. ScienceDirect. (2025). The unsung heroes of Norway's sustainability transitions? Making visible the "invisible" energy citizenship of low-income households. *Energy Research & Social Science*. https://www.sciencedirect.com/science/article/pii/S2214629625002695
3. Dhara, C., & Bhar, S. (2025). Why sustainable development ought to look more like Costa Rica, less like Norway. Down To Earth. https://www.downtoearth.org.in/governance/why-sustainable-development-ought-to-look-more-like-costa-rica-less-like-norway
4. The Observer. (2025). Costa Rica's green halo starts to slip as president toys with gas and oil. https://observer.co.uk/news/international/article/costa-ricas-green-halo-starts-to-slip-as-president-toys-with-gas-and-oil
5. Fridtjof Nansen Institute. (2025). Social justice in the energy transition: FNI part of new Research Centre. https://www.fni.no/news/social-justice-in-the-energy-transition-fni-part-of-new-research-centre
6. UNIDO. (2025). Costa Rica and UNIDO deepen ties for sustainable industrial development. https://www.unido.org/news/costa-rica-and-unido-deepen-ties-sustainable-industrial-development
7. Morfea, C. (2025). The Norwegian Transparency Act, Renewable Energy and Extractive Industries: Towards a Just Transition for the Indigenous Sámi People. *Business and Human Rights Journal*, Cambridge University Press. https://www.cambridge.org/core/journals/business-

and-human-rights-journal/article/norwegian-transparency-act-renewable-energy-and-extractive-industries-towards-a-just-transition-for-the-indigenous-sami-people

8. Flagg, J. A. (2024). Aiming for Net Zero: Costa Rica's Green Elite and the Struggle to Mitigate Climate Change. MIT Press. https://direct.mit.edu/books/oa-monograph/5841/Aiming-for-Net-ZeroCosta-Rica-s-Green-Elite-and
9. NMBU. (2025). The Contradictions of 'Green': Environmental and Social Impacts of the Nussir Copper Mine. https://nmbu.brage.unit.no/nmbu-xmlui/handle/11250/3203700