

Equitable Climate Technology Access: Patent Law Reforms and Trips Flexibilities in the Global South

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ABSTRACT:

Climate mitigation and adaptation increasingly depend on advanced technologies that are protected by patent law, a regime built around innovation incentives and exclusivity. These incentives stimulate research and development, but they also risk restricting the diffusion of essential climate technology, particularly across the Global South. This paper examines these concerns of affordability, diffusion, and technological dependence through a socio-legal and policy lens. The Agreement on Trade-Related Aspects of Intellectual Property Rights ('TRIPS') offers a partial answer through built-in flexibilities that allow states to balance public interest against patent protection objectives without abandoning the latter. The paper critically examines why Global South countries have largely under-utilised these flexibilities and how they might be operationalised more effectively. Drawing on doctrinal analysis alongside case studies of compulsory licensing, patent pooling, government use, and technology transfer obligations, the paper argues that the limited deployment of TRIPS flexibilities in the climate domain reflects structural asymmetries in global IP governance rather than any deficit of legal authority. Effective deployment requires not only legal clarity but administrative preparedness and genuine coordination between intellectual property, climate, and industrial policy. The paper closes with a set of concrete recommendations directed at Global South governments, the TRIPS Council, and multilateral technology-transfer institutions, contributing a ground-level analysis of how patent law can better answer the urgency of climate change.

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1) Introduction

Climate change has emerged as one of the defining challenges of the twenty-first century. Intensifying heatwaves, extreme weather events, and environmental degradation have created an urgent need for technological solutions capable

of reducing greenhouse gas emissions. The 'Agreement on Trade-Related Aspects of Intellectual Property Rights' (TRIPS), concluded during the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) in

1994,¹ sits at the centre of a long-running tension between protecting intellectual property and ensuring access to the technologies that protection is meant to encourage. TRIPS required World Trade Organization (WTO) member states to enforce minimum standards of intellectual property protection, including patents, within their domestic legal systems.²

While these standards were broadly acceptable to developed economies, they sat uneasily with the socio-economic needs of much of the rest of the world. TRIPS was widely criticised as burdensome for generic industries because it required both product and process patents across all fields of technology, extending product patents to sectors, such as pharmaceuticals, where several developing countries, including India, Brazil, and China, had built domestic industries precisely because product patents did not previously apply.³ In response, TRIPS incorporated flexibilities intended to let states pursue socio-economic objectives without abandoning the Agreement's core commitments.⁴ As the diffusion of climate mitigation technology has become urgent in recent decades, this same architecture of flexibilities is now being asked to do very different work: not securing access to medicines, but securing access to solar cells, batteries, carbon capture systems, and climate-resilient agricultural technology.

Patent law grants inventors exclusive rights for a limited period, allowing them to recoup research and development costs and encouraging further innovation.⁵ Despite the flexibilities TRIPS provides, many climate technologies remain priced beyond the reach of the countries that most urgently need them. This tension is particularly acute for the Global South, where

structural challenges, including financial constraints, technological dependence, and weak research infrastructure, coincide with

disproportionate exposure to climate impacts.⁶

This paper proceeds in eight further parts. Part 2 examines the relationship between climate technology and intellectual property protection. Part 3 sets out the TRIPS legal architecture and its patent flexibilities. Part 4 analyses the specific mechanisms, compulsory licensing, patent pooling, government use, and technology transfer obligations, that could facilitate climate technology access. Part 5 presents case studies illustrating how (and how rarely) these mechanisms have been used. Part 6 examines the structural challenges to operationalising TRIPS flexibilities in the Global South. Part 7 offers a socio-legal and policy analysis of climate technology diffusion more broadly. Part 8 sets out concrete recommendations, and Part 9 concludes.

1.1 Methodology

The analysis adopts a doctrinal and socio-legal methodology. The doctrinal component examines the text of TRIPS, the Paris Convention, the UNFCCC, and the Paris Agreement, alongside the limited body of adjudicated decisions applying compulsory licensing and related flexibilities, principally *Natco Pharma Ltd v Bayer Corporation*, the only reported instance in the Global South of a patent flexibility being litigated to a final, upheld decision on facts closely analogous to those that would arise in a climate technology dispute.^{7 8} Because no climate-technology compulsory licence has yet been granted anywhere in the Global South, this paper treats that

¹ Drahos and Braithwaite (n 2).

² Carlos M Correa, *Intellectual Property Rights, the WTO and Developing Countries* (Zed Books 2000).

³ Frederick M Abbott, 'The TRIPS Agreement and Access to Medicines' (2002) 5 *Journal of International Economic Law* 469.

⁴ *ibid* art 27.1.

⁵ Gervais (n 1).

⁶ Joseph E Stiglitz, *Globalization and Its Discontents* (Penguin 2002).

⁷ *Natco Pharma Ltd v Bayer Corporation*, Compulsory Licence Application No 1 of 2011, Order of the Controller of Patents (Mumbai, 9 March 2012).

⁸ *Bayer Corporation v Union of India*, Order, Intellectual Property Appellate Board (4 March 2013), affirming the Controller's grant of the licence.

pharmaceutical precedent as the closest available proxy for how a climate-technology case would likely be reasoned and received, while being careful not to overstate the transferability of a health-sector precedent to a different technological and diplomatic context.

The socio-legal component draws on secondary literature indexed in Scopus, Web of Science, and IEEE Xplore, together with primary data published by WIPO, IRENA, and the WTO Secretariat, to test whether the doctrinal availability of TRIPS flexibilities corresponds to their practical use. This mixed approach follows the methodological precedent set by earlier empirical studies of TRIPS and climate technology transfer, which combine treaty interpretation with patent-filing data to assess whether legal barriers or institutional barriers better explain observed diffusion patterns.⁹ The resulting analysis is necessarily qualitative and interpretive rather than statistically exhaustive; the patent-filing figures used in Part 5 are presented as illustrative of concentration and scale, not as a comprehensive dataset of climate-relevant patents.

2. Climate Technology and Intellectual Property Protection

Climate change has increased global demand for technologies capable of lowering greenhouse gas emissions, improving energy efficiency, and supporting sustainable growth. Technology plays a recognised role in the international climate regime: Article 10 of the Paris Agreement explicitly frames technology development and transfer as central to both mitigation and

adaptation.¹⁰ Relevant technologies include clean energy generation, carbon removal, and low-emission agricultural tools, most of which are protected by patents at some stage of their commercial life.

Patents are, at once, an incentive and a potential obstacle. They encourage investment in green innovation by assuring inventors of a return, but they can also act as a barrier to rapid diffusion, especially where licensing costs are high relative to the purchasing power of the country seeking to deploy the technology.¹¹ Climate change has visibly reshaped patent filing behaviour: several patent offices introduced expedited examination tracks for green technology applications beginning in 2009, allowing applicants who claim environmental benefits to seek faster processing.¹² Comparable schemes followed in Australia, Canada, and China.¹³ These accelerated pathways help patent holders attract investment and provide clearer legal remedies against infringement, but empirical work shows that only a small share of eligible applicants actually use them, generally between one and twenty per cent, because early publication can disclose competitively sensitive information, and delaying examination can itself be commercially advantageous.¹⁴

The relationship between intellectual property and climate law also extends beyond patents. Copyright questions arise over access to climate research and the software that manages energy systems, while trademark law increasingly reflects

⁹Antoine Dechezlepretre, Matthieu Glachant, Ivan

Hascic, Nick Johnstone and Yann Meniere, 'Invention and Transfer of Climate Change-Mitigation Technologies: A Global Analysis' (2011) 5 *Review of Environmental Economics and Policy* 109.

¹⁰Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) 3156 UNTS art 10.

¹¹OECD, *Patents and Climate Change: Innovation and Technology Transfer* (OECD Publishing

2010).

¹²UK Intellectual Property Office, *Accelerated Processing of Patent Applications for Green Technology Inventions* (launched May 2009).

¹³World Intellectual Property Organization, *Green Technology Book: Innovation and IP in Climate Adaptation* (WIPO 2022).

¹⁴Antoine Dechezleprêtre, 'Fast-Tracking Green Patents: An Empirical Analysis' (Centre for Climate Change Economics and Policy / Grantham Research Institute, London School of Economics, 2013), finding uptake of green fast-track schemes typically ranging between one and twenty per cent of eligible applications.

corporate environmental branding.¹⁵ None of this displaces the centrality of patents, however: because patents confer the right to exclude, they remain the single most consequential intellectual property instrument for climate technology diffusion, and the point at which the tension between innovation incentives and equitable access is most sharply expressed.

3. The TRIPS Agreement and Patent Law Flexibilities

Part II of TRIPS sets out the substantive standards of protection, and Section 5 of that Part addresses patents specifically. Article 27.1 requires that patents be available, and patent rights enjoyable, without discrimination as to the place of invention, the field of technology, or whether products are locally produced or imported.¹⁶ This non-discrimination principle is precisely why developing countries cannot simply exclude climate technologies from patentability the way many once excluded pharmaceuticals: TRIPS forecloses field-specific exclusion once a state accepts product-and-process patenting across all fields of technology.

What TRIPS does allow is a set of built-in flexibilities, mechanisms through which states can calibrate the practical operation of otherwise-uniform patent standards to serve domestic public policy objectives. Article 30 permits limited exceptions to patent rights, including research and experimental use exceptions. Articles 30 and 31 together provide the legal basis for compulsory licensing.¹⁷ These provisions did not emerge from nothing: the Paris Convention of 1883 already permitted contracting states to grant compulsory licences to address the non-

working or misuse of patent rights,¹⁸ and this historical lineage explains why compulsory licensing, though controversial, cannot credibly be characterised as a TRIPS-era innovation designed to weaken patent protection. Developed and developing countries have historically diverged sharply on how these flexibilities should be used: developing countries have generally favoured stronger state intervention to correct historical bargaining asymmetries, while developed countries have preferred market-based technology transfer with minimal state involvement.¹⁹

The United Nations Framework Convention on Climate Change (UNFCCC) supplies the parallel treaty architecture within which these patent flexibilities operate. Article 4.1(c) requires parties to cooperate in the development, application, and diffusion of technologies that limit greenhouse gas emissions, while Article 4.5 places a specific obligation on developed countries to transfer environmentally sound technologies to developing countries and to finance that transfer, and Article 4.7 links the effective implementation of developing country commitments to the provision of that financial support.²⁰ These obligations are informed by the principle of common but differentiated responsibilities, which recognises that all states share responsibility for addressing climate change but that the extent of that responsibility should track each state's capabilities and level of development.²¹

4. Patent Law Mechanisms Facilitating Climate Technology Access

Four mechanisms are most frequently invoked as

¹⁵World Intellectual Property Organization, 'Climate Change and Intellectual Property' (WIPO, 2020) <<https://www.wipo.int/en/web/climate-change>> accessed July 2026.

¹⁶ TRIPS Agreement, art 27.1 (n 8).

¹⁷Agreement on Trade-Related Aspects of Intellectual Property Rights (adopted 15 April 1994, entered into force 1 January 1995) 1869 UNTS 299 ('TRIPS Agreement') arts 30-31.

¹⁸Paris Convention for the Protection of Industrial

Property (adopted 20 March 1883, revised 14 July 1967) 828 UNTS 305, art 5A.

¹⁹Carlos M Correa, *Trade Related Aspects of Intellectual Property Rights: A Commentary on the TRIPS Agreement* (Oxford University Press 2007).

²⁰United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107, arts 4.1(c), 4.5 and 4.7.

²¹Lavanya Rajamani, *Differential Treatment in International Environmental Law* (Oxford University Press 2006).

pathways through which TRIPS flexibilities could improve climate technology access in the Global South: compulsory licensing, patent pooling,

government use, and technology transfer obligations.

Table 1 summarises their legal basis, operation, and the principal reason each remains under-used.

Mechanism	Legal Basis	How It Operates	Principal Barrier to Use
Compulsory licensing	TRIPS arts 1110-1121; Paris Convention art 5A	State authorises use of a patented invention without the rights-holder's consent, subject to compensation, on grounds such as public interest or non-working.	Political and trade pressure from technology-exporting states; absence of climate-specific precedent comparable to pharmaceutical cases.
Patent pooling	Private ordering, permitted within the TRIPS framework	Rights-holders voluntarily contribute patents to a shared pool for licensing on standard terms (e.g. Eco-Patent Commons, WIPO GREEN).	Voluntary participation yields low-value 'donated' patents; core enabling technologies are rarely pooled.
Government use	TRIPS art 31; domestic patent statutes	State uses a patented technology for public, non-commercial purposes without prior authorisation, subject to adequate remuneration.	Weak administrative capacity to identify, value, and implement government-use programmes at scale.
Technology transfer obligations	TRIPS art 66.2; UNFCCC arts 4.5, 4.7	Developed countries are to provide incentives to their enterprises to transfer technology to LDCs.	Article 66.2 is hortatory rather than enforceable; compliance reporting has been sporadic and largely self-assessed.

Table 1: Patent law mechanisms facilitating climate technology access under TRIPS and the UNFCCC (author's compilation)

Compulsory licensing under Articles 30 and 31 permits a government to authorise use of a patented invention without the patent holder's consent in defined circumstances, such as national emergencies, anti-competitive conduct, or failure to work the patent domestically, subject to adequate remuneration.²² Patent pooling addresses a different problem: rather than overriding a single patent, it aggregates multiple rights-holders' patents into a shared licensing

structure, lowering transaction costs for downstream users. The World Business Council for Sustainable Development's Eco-Patent Commons, launched in 2008, was an early example, inviting firms to donate patents offering environmental benefits for free public use; the initiative was discontinued in 2016, in part because donated patents tended to be peripheral to firms' core business rather than commercially central.²³ WIPO GREEN, launched in 2013, pursues a similar logic through a searchable database connecting technology providers and seekers, and by 2023 had facilitated the sharing of

²² TRIPS Agreement, arts 30-31 (n 21).

²³ World Business Council for Sustainable

Development, Eco-Patent Commons (launched January 2008, discontinued 2016); see also n 23.

thousands of green technology solutions, though matching a listing with an actual licence remains the harder step.²⁴

Government use, sometimes called public non-commercial use, allows the state itself, rather than a third-party licensee, to deploy a patented technology for public purposes, again subject to compensation. This mechanism is administratively demanding: it requires the state to identify which patented technologies are needed, value them appropriately, and manage the resulting compensation obligations, capacities that vary considerably across the Global South. Technology transfer obligations under Article 66.2 of TRIPS require developed-country members to provide incentives to their own enterprises and institutions to transfer technology to least-developed countries.²⁵ Empirical review of country submissions to the TRIPS Council between 1999 and 2007 found that reporting under Article 66.2 was inconsistent and rarely accompanied by verifiable outcomes, reflecting the provision's essentially hortatory character.²⁶

5. Case Studies from the Global South

5.1 Compulsory Licensing: The Natco v Bayer Precedent and Its Absence in Climate Technology

The clearest illustration of compulsory licensing in practice from the Global South remains pharmaceutical rather than climate-related. In March 2012, India's Controller of Patents granted Natco Pharma a compulsory licence over Bayer's patented cancer drug Sorafenib Tosylate (marketed as Nexavar), on the grounds that Bayer

had not made the drug reasonably available or affordable, nor worked the patent within India; the licence was upheld on appeal by the Intellectual Property Appellate Board in 2013.²⁷ The order relied directly on TRIPS Article 27.1 read with Article 5A of the Paris Convention, and set the price of the generic version at a small fraction of Bayer's price.²⁸

The case remains, over a decade later, the paradigm example cited whenever compulsory licensing for climate technology is discussed, precisely because no comparable climate-technology compulsory licence has yet been granted anywhere in the Global South.²⁹ This absence is itself a finding: it suggests that the legal mechanism is available and workable, since *Natco v Bayer* proves states can use it and survive the resulting diplomatic pressure, but that governments have judged the trade and diplomatic costs of invoking it for climate technology, where supply chains are more complex and international scrutiny more intense, to outweigh the benefits. Proposals for a dedicated declaration on TRIPS and climate change, modelled on the 2001 Doha Declaration on TRIPS and Public Health, have been raised for exactly this reason: to give governments the same political cover for climate-related compulsory licensing that Doha gave for pharmaceuticals.³⁰

5.2 Concentration of Green Patent Ownership

A second structural finding concerns who owns climate-relevant patents in the first place. WIPO data indicate that renewable energy patent applications approached 45,000 filings in 2022,³¹

²⁴ WIPO, Green Technology Book (n 17).

²⁵ TRIPS Agreement (n 8) art 66.2.

²⁶ Suerie Moon, 'Does TRIPS Article 66.2 Encourage Technology Transfer to LDCs? An Analysis of Country Submissions to the TRIPS Council (1999-2007)' (ICTSD Policy Brief, December 2008).

²⁷ *Natco Pharma Ltd v Bayer Corporation* (n 11).

²⁸ *Bayer Corporation v Union of India (IPAB)* (n 12).

²⁹ Khorsed Zaman, 'The TRIPS Patent Protection Provisions and Their Effects on Transferring

Climate Change Technologies to LDCs and Poor Developing Countries: A Critical Appraisal' (2013) 3 *Asian Journal of International Law* 137.

³⁰ Declaration on the TRIPS Agreement and Public Health (adopted 14 November 2001) WT/MIN(01)/DEC/2.

³¹ World Intellectual Property Organization, World Intellectual Property Indicators 2024 (WIPO 2024) 46, noting that patent applications for solar, wind and other renewable sources approached 45,000 filings in 2022.

and recent industry analysis of green and low-carbon patent filings between 2016 and 2023 shows an extremely concentrated distribution: China alone accounted for roughly 555,000 green patent applications over that period, compared

with approximately 200,000 for Japan and 157,000 for the United States, with the remainder of the world, including virtually the entire Global South outside China, accounting for a small residual share.³²

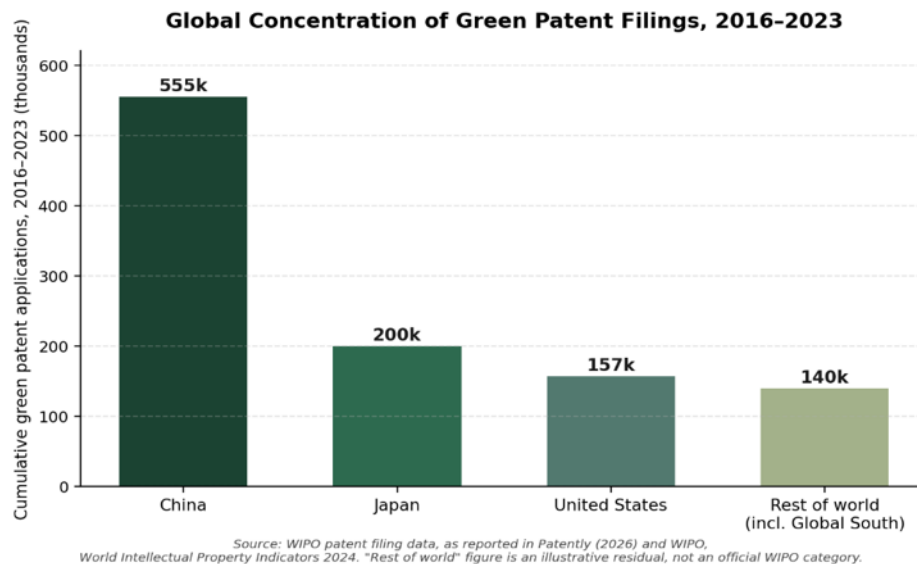


Figure 1 illustrates this concentration. *Figure 1: Global concentration of cumulative green patent filings, 1110-1121 (source: WIPO-derived data reported in Patently, 2026; WIPO, World Intellectual Property Indicators 2024)*

This concentration matters for TRIPS flexibility analysis because it means that most patents a Global South government might wish to compulsorily license, pool, or use are held by rights-holders in a small number of jurisdictions, China, Japan, the United States, and the European Patent Office member states, raising the diplomatic and trade stakes of any single flexibility-based intervention. Offshore wind patenting follows a similar pattern, dominated by European and East Asian applicants such as Siemens, Vestas, and Chinese state-linked entities.³³

5.3 India's Solar Programme and the Limits of Industrial Policy Without IP Reform

India's National Solar Mission illustrates both the promise and the limits of pursuing climate

technology diffusion through industrial policy rather than patent law reform. India's domestic content requirements for solar cell manufacturers, intended to build local manufacturing capacity, were challenged by the United States and found by the WTO Appellate Body to violate India's national treatment obligations in 2016.³⁴ The dispute was framed under trade and subsidy rules rather than TRIPS, but it demonstrates a recurring pattern: Global South governments have often reached for trade and industrial policy tools to build domestic climate technology capacity precisely because the TRIPS flexibilities discussed above are perceived as legally uncertain or diplomatically costly, only to find that those alternative tools carry their own binding constraints under other WTO agreements.³⁵

³²Patently, 'Top 5 Countries Leading Green Patent Filings: Key Statistics and Technology Focus' (Patently, 2026) <<https://patently.com/industry-news/green-patent-filings-countries>> accessed July 2026.

³³International Renewable Energy Agency and European Patent Office, Offshore Wind Energy:

Patent Insight Report (November 2023).

³⁴India - Certain Measures Relating to Solar Cells and Solar Modules, WT/DS456/AB/R, Appellate Body Report (adopted 14 October 2016).

³⁵Dechezlepretre et al, 'Invention and Transfer of Climate Change-Mitigation Technologies' (n 13).

5.4 Patent Pools in Practice: Reach and Limits

WIPO GREEN's own reporting suggests meaningful reach in connecting technology providers with seekers, particularly in South and Southeast Asia and Sub-Saharan Africa, but independent commentary notes that the technologies most needed for grid-scale decarbonisation, such as advanced battery chemistries and next-generation photovoltaic materials, are rarely the technologies voluntarily pooled, since rights-holders continue to treat these as core competitive assets rather than candidates for donation.^{36 37} The pattern across all four case studies is consistent: legal mechanisms exist and are occasionally used at the margins, but the technologies of greatest strategic value to climate mitigation remain the technologies least likely to be compulsorily licensed, pooled, or transferred.

6. Challenges in the Operationalisation of TRIPS Flexibilities in the Global South

The private sector plays a central role in developing and diffusing environmentally sound technologies and depends on predictable intellectual property protection to justify investment. During the 1992 Rio Conference, the Group of 77 argued that intellectual property protection should be relaxed for climate-relevant technologies, since strict protection could restrict developing-country access, while developed countries accepted the case for promoting technology transfer but opposed creating field-specific exceptions within the IP regime itself.³⁸ That basic disagreement has persisted largely unchanged for three decades.

Emerging economies grouped under the BASIC framework, Brazil, South Africa, India, and

China, have separately argued that innovation is essential to addressing climate change while also emphasising the need for an intellectual property system capable of meeting global climate objectives, including proposals for an international IP pool for climate mitigation and reduced patent terms for climate technologies.³⁹ Developing countries further sought explicit reference to intellectual property rights within the Paris Agreement negotiations and proposed an international framework to support clean technology adoption; these proposals were not incorporated into the Agreement's final provisions on technology transfer, owing to sustained opposition from developed countries.⁴⁰

Three structural obstacles recur across the Global South in explaining why the flexibilities that do exist remain under-used. First, political economy: governments that invoke compulsory licensing or aggressive government-use provisions risk retaliatory trade measures or diplomatic friction with technology-exporting states, a risk vividly illustrated by the international reaction to the *Natco v Bayer* decision even though it concerned pharmaceuticals rather than climate technology.⁴¹ Second, administrative capacity: identifying which patents cover a needed technology, valuing fair compensation, and managing subsequent litigation risk all require technical and legal expertise that many patent offices in the Global South lack.⁴² Third, legal uncertainty: the scope of key TRIPS flexibility provisions, particularly what counts as a sufficient public interest ground for compulsory licensing outside the pharmaceutical context, has never been authoritatively tested for climate technology, leaving governments to act, if at all, without clear

³⁶Jorge L Contreras and Meredith Jacob (eds), *Patent Pledges: Global Perspectives on Patent Law's Private Ordering Frontier* (Edward Elgar 2017) ch 4, 'Patent Pledges in Green Technology'.

³⁷Centre for Climate Engagement, University of

Cambridge, 'Intellectual Property Law and Climate Change' (2023) <<https://climatehughes.org/law-and-climate-atlas/intellectual-property-law-and-climate-change/>> accessed July 2026.

³⁸ Drahos and Braithwaite (n 2).

³⁹United Nations Development Programme, *Human Development Report* (UNDP, various years).

⁴⁰Matthew Rimmer, 'Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice' (2019) 8 *Laws* 7.

⁴¹ *Natco Pharma Ltd v Bayer Corporation* (n 11).

⁴²Keith E Maskus, *Private Rights and Public Problems: The Global Economics of Intellectual Property in the 21st Century* (Peterson Institute for International Economics 2012).

precedent.⁴³

These obstacles are not evenly distributed within the Global South itself. Least-developed countries occupy a distinct position: their trade interests are generally less affected by intellectual property protection than those of larger emerging economies, since they neither export significant patented technology nor host substantial generic manufacturing capacity, yet they remain among the most exposed to climate impacts.⁴⁴ For this group, the binding constraint is less often the diplomatic risk of invoking compulsory licensing and more often the complete absence of a domestic manufacturing or technical base capable of absorbing a licensed technology even if a licence were granted; South Africa, India, Brazil, and China, by contrast, possess enough industrial capacity that the diplomatic and legal risks of invoking flexibilities dominate their calculus.⁴⁵ Any reform agenda, including the recommendations advanced in Part 8, must therefore distinguish between capacity-building measures suited to least-developed countries and political-cover measures suited to larger emerging economies, rather than treating the Global South as a single undifferentiated category of TRIPS flexibility user.

7. Socio-Legal and Policy Analysis of Climate Technology Diffusion

A socio-legal perspective shows that climate technology diffusion is not purely a legal or economic question but is shaped by the interaction of formal rules with institutional capacity and political will. Empirical work on the actual determinants of technology transfer finds that market demand, trade openness, institutional strength, and domestic policy frameworks explain adoption outcomes at least as well as, and often better than, the formal availability of patent flexibilities.⁴⁶ This is consistent with the broader finding that only a small proportion of eligible

green patent applications actually use accelerated examination schemes,⁴⁷ suggesting that patent-law mechanisms, however well designed, interact with a wider set of institutional variables that ultimately determine whether a technology reaches the country that needs it.

This does not mean that legal reform is unimportant. It means that legal reform alone is insufficient. A country with a legally sound compulsory licensing statute but no patent examiners capable of assessing a solar-cell patent's validity, no industrial base capable of absorbing the licensed technology, and no diplomatic capacity to withstand pressure from the licensor's home state, gains little from the statute's mere existence. Addressing climate technology access therefore requires treating TRIPS flexibilities as necessary but not sufficient, one input among several including institutional capacity-building, coordinated industrial policy, and international cooperation.⁴⁸

The expedited green-patent examination schemes discussed in Part 2 illustrate the same point from a different angle.⁴⁹ These schemes were adopted, in part, on the theory that faster patent grant would accelerate green innovation and, indirectly, diffusion. Yet low uptake rates of between one and twenty per cent⁵⁰ suggest that applicants do not treat examination speed as the binding constraint on their innovation or commercialisation decisions; market access, financing, and manufacturing capacity matter considerably more. The lesson for Global South policymakers is that legal-procedural reforms calibrated to the priorities of technology-exporting states, such as faster examination, will not by themselves close the access gap that concerns technology-importing states; the two groups of countries are, in effect, optimising for different variables within the same treaty text.

⁴³ Hutchison (n 4).

⁴⁴ UNDP, Human Development Report (n 43).

⁴⁵ Ibid.

⁴⁶ Dechezlepretre et al, 'Invention and Transfer of Climate Change-Mitigation Technologies' (n 13).

⁴⁷ Dechezlepretre, 'Fast-Tracking Green Patents' (n 18).

⁴⁸ OECD, Patents and Climate Change (n 15).

⁴⁹ UK IPO, Green Channel for Patent Applications (n 16).

⁵⁰ Dechezlepretre, 'Fast-Tracking Green Patents' (n 18).

8. Recommendations

Building on the preceding analysis, four sets of reforms would materially improve the operationalisation of TRIPS flexibilities for climate technology in the Global South.

8.1 A Doha-Style Declaration on TRIPS and Climate Change

The single highest-value reform would be a WTO Ministerial declaration on TRIPS and climate change, modelled explicitly on the 2001 Doha Declaration on TRIPS and Public Health.⁵¹ Such a declaration would not need to create new legal rights; its function would be political, confirming that WTO members regard the use of compulsory licensing, government use, and related flexibilities for climate technology as legitimate exercises of existing TRIPS rights, thereby reducing the diplomatic risk that currently deters Global South governments from invoking mechanisms that *Natco v Bayer* confirms are legally available.⁵²

8.2 Regional and South-South Patent Pooling with Binding Contribution Rules

The Eco-Patent Commons experience shows that voluntary, unconditional pooling tends to attract peripheral rather than core patents.⁵³ A reformed patent pool for climate technology, whether organised regionally (for example, through ASEAN, the African Union, or Mercosur) or globally through an expanded WIPO GREEN mandate, should experiment with conditional contribution rules: for instance, requiring firms that receive public climate finance or carbon-market revenue to pool a defined share of resulting patents as a condition of that funding, rather than relying on unconditional corporate goodwill.

8.3 Dedicated Administrative Capacity within Patent Offices

Weak administrative capacity is a recurring, and remediable, barrier.⁵⁴ WIPO and regional development banks should fund dedicated climate-technology units within the patent offices of Global South states, tasked specifically with patent landscaping (mapping which patents cover a given climate technology, along the lines already piloted through the EPO-IRENA offshore wind patent reports⁵⁵), valuation for compensation purposes, and government-use case preparation. This is a narrower, more achievable capacity-building target than general patent office reform.

8.4 Binding Timelines and Independent Reporting under Article 66.2

Article 66.2's hortatory character has produced inconsistent and largely self-reported compliance data.⁵⁶ ⁵⁷ The TRIPS Council should adopt binding reporting timelines and commission independent, third-party verification of developed-country technology transfer incentive programmes, comparable to the periodic review mechanisms already used elsewhere in the WTO system, so that Article 66.2 compliance becomes independently auditable rather than self-assessed.

8.5 A Public Climate-Patent Landscaping Database

Much of the difficulty documented in Part 5 stems from an information gap: Global South governments and firms often cannot easily determine which patents cover a given climate technology, in which jurisdictions those patents are in force, and when they expire. The EPO-IRENA offshore wind patent insight reports demonstrate that this kind of landscaping is technically feasible at a sector level.⁵⁸ WIPO, working with IRENA and national patent offices, should extend this model into a standing, publicly accessible database covering the priority

⁵¹ Doha Declaration on TRIPS and Public Health (n 34).

⁵² *Natco Pharma Ltd v Bayer Corporation* (n 11)

⁵³ WBCSD, Eco-Patent Commons (n 27).

⁵⁴ Maskus (n 46).

⁵⁵ IRENA and EPO, Offshore Wind Energy Patent

Insight Report (n 37).

⁵⁶ Moon (n 30).

⁵⁷ TRIPS Agreement, art 66.2 (n 29).

⁵⁸ IRENA and EPO, Offshore Wind Energy Patent Insight Report (n 37).

technology areas identified by the UNFCCC Technology Executive Committee, updated on a rolling basis rather than produced as one-off sector reports. Such a database would lower the fixed cost of the patent landscaping step that currently precedes any exercise of compulsory licensing, government use, or informed licence negotiation, and would benefit least-developed and emerging economies alike, addressing the capacity distinction identified in Part 6 without requiring either group to develop landscaping expertise entirely on its own account.⁵⁹

9. Conclusion

The case for strong intellectual property protection as a driver of technological advancement must be balanced against the growing need to transfer climate-related innovation to the Global South.⁶⁰ Although TRIPS contains language supportive of sustainable development,⁶¹ the protection of intellectual property rights has, in practice, been given greater institutional weight than the developmental objectives of poorer states. TRIPS should be read, and where necessary reformed, to create a framework that promotes not only innovation but also the wider implementation and use of that innovation, rather than concentrating primarily on exclusivity.

As climate change approaches the scale of a genuine global emergency, intellectual property protection should not be permitted to needlessly restrict the flow of technologies that support

environmental resilience.⁶² The case studies examined in this paper, the *Natco v Bayer* precedent and its telling absence in the climate context, the extreme concentration of green patent ownership, the limits of industrial policy pursued without accompanying IP reform, and the modest reach of voluntary patent pooling, all point to the same conclusion: the barrier is not primarily a lack of legal authority under TRIPS, but a lack of political cover, administrative capacity, and enforceable accountability for the obligations that already exist.^{63 64}

Several intellectual property issues relevant to climate technology diffusion, including traditional knowledge and utility models of particular relevance to the Global South, remain outside the scope of TRIPS altogether, either because consensus was not reached during the Uruguay Round or because these areas had not yet matured into significant trade concerns.⁶⁵ A revised declaration on TRIPS and climate change, combined with conditional patent pooling, dedicated administrative capacity, and independently audited technology transfer reporting, would together address both the legal and the practical dimensions of this gap. Achieving equitable access to climate technology ultimately requires not only legal reform but sustained coordination between intellectual property law, climate policy, and industrial development strategy, an approach essential to advancing sustainable development and genuine fairness in global climate governance.⁶⁶

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⁵⁹ Maskus (n 46).

⁶⁰ Ibid.

⁶¹ TRIPS Agreement (n 8) preamble and arts 7-8.

⁶² Maskus (n 46).

⁶³ Hutchison (n 4).

⁶⁴ Zaman (n 33).

⁶⁵ UNCTAD-ICTSD (n 3).

⁶⁶ Marrakesh Agreement Establishing the World Trade Organization (adopted 15 April 1994, entered into force 1 January 1995) annex 1C.

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