

SCHOLARLY ARTICLE

China's Solar Dominance: Worker Rights in the Pursuit of a Just Transition

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Abstract

This article examines the intersection between forced labour, supply chain risks and environmental, social and governance concerns that pose a threat to the 'Just Transition'. It addresses how states, businesses and other stakeholders drive or fail Just Transitions and why. Through an application of a 'policy currents framework' to the case study of solar panel supply chains originating in China, we analyse states, international organisations and civil society organisations' framing of modern slavery issues in the context of the 'Just Transition'. We focus on the framing of challenges and solutions to the nexus of forced labour and climate change. We draw attention to the fact decarbonisation risks are being achieved at the cost of labour rights abuses within supply chains, question whether the concept of renewable sources is 'just' and provide a series of recommendations for stakeholders.

Keywords: solar energy; just transition; forced labour; Uyghurs

1. Introduction

Forced labour-tainted supply chains have gained significant public attention over the last five years, largely due to allegations that China employs Uyghur and other ethnic minorities in situations of forced labour to manufacture goods entering the global supply chain—one such supply chain is that of polysilicon and solar panels, vital commodities for the green energy transition. Arguably concerned about terrorism and security in the Xinjiang Uyghur Autonomous Region (XUAR), China built a mass surveillance programme and political 're-education' training centres for its citizens.¹ Over one million Uyghurs and other ethnic minorities are estimated to be involved in 're-education through labour programs', including in the forced labour production of solar panels.² China refutes these

¹ Australian Strategic Policy Institute, 'How Mass Surveillance Works in Xinjiang' (2019), <https://xjdp.aspi.org.au/explainers/how-mass-surveillance-works-in-xinjiang/> (accessed 29 January 2025); Zainab Raiza, 'China's 'Political Re-education' Camps of Xinjiang's Uyghur Muslims' (2019) 50:4 *Asian Affairs* 488–501; Vicky Xiuzhong Xu et al, *Uyghurs for Sale: 'Re-education', Forced Labour and Surveillance Beyond Xinjiang* (Canberra: Australian Strategic Policy Institute, 2020); US Department of Labor, 'Against Their Will: The Situation in Xinjiang' (2024), <https://www.dol.gov/agencies/ilab/against-their-will-the-situation-in-xinjiang> (accessed 17 February 2025).

² Jo Smith Finley, 'Uyghur Islam and Religious "De-Extremification": On China's Discourse of "Thought Liberation" in Xinjiang,' *Oxford Islamic Studies Online* (2019), <http://www.oxfordislamicstudies.com/Public/>

allegations and explains its programme as a means of economic development and poverty alleviation. Yet the programme can include periods of detention ('internment') in government-run 'education' or 'vocational training' facilities that resemble prisons. Placements are done through forced government-funded 'labour transfer' schemes, both in the XUAR and beyond, leaving individuals unable to opt out.³

China's solar energy sector has benefited from the use of exploitative and forced labour of minority populations, as outlined above, and thereby the dependence of the international community on Chinese components to produce photovoltaic (PV) panels is also intrinsically linked to labour rights abuses. The Chinese state has strongly supported the Chinese solar industry. Initially, companies used state subsidies and access to land to attract overseas producers and acquire industry knowledge, before out-competing them through aggressive export-led growth—leading to criticism of illegal dumping.⁴ Over the years, China became the main producer at all steps of the PV supply chains, from the production of polysilicon to that of wafers, cells and modules, representing 79, 97, 82, and 76 per cent of global production capacity in 2021.⁵ Forced labour enters the supply chain at multiple production points, leading to estimates that as much as 97 per cent (in 2022) of the global supply of PV panels potentially contains components produced by forced labour pervading whole international supply chains.⁶

Solar energy is a renewable energy source vital to transitioning energy systems and for limiting global warming to 1.5° Celsius as outlined in the 2015 Paris Agreement.⁷ It will be a core energy source (growth is projected at 450 per cent by 2030) to combat the growing global demand for electricity which is expected to triple over the next three decades.⁸ Meeting this increase in demand should not come at the expense of the freedom of those employed in the lower tiers of the supply chain.

Such risks in the global solar supply chain raise the question of whether a 'Just Transition' is truly 'Just' and for whom?⁹ It addresses the extent to which forced labour in the solar energy supply chain is emerging as a critical point in the global Just Transition processes. More specifically, how do state and nonstate policy actors and businesses frame and arguably drive Just Transition in the energy sector and why?

[focus.html](#) (accessed 13 December 2023); Adrian Zenz, *Coercive Labor in Xinjiang: Labor Transfer and the Mobilization of Ethnic Minorities to Pick Cotton* (Washington DC: New Lines Institute for Strategy and Policy, 2020); Laura Murphy and Nyrola Elimä, *In Broad Daylight: Uyghur Forced Labour and Global Solar Supply Chains* (Sheffield: Helena Kennedy Centre for International Justice, 2021).

³ ITUC cited in ILO, *Application of International Labour Standards 2022. Report of the Committee of Experts on the Application of Conventions and Recommendations* (Geneva: International Labour Conference, 2022).

⁴ Joan Fitzgerald, 'Solar Eclipse? Can the U.S. Have a Coherent Solar Policy in the Face of China's Strategic Trade Moves?', *The American Prospect* (20 July 2016), <https://prospect.org/environment/solar-eclipse/> (accessed 11 December 2023).

⁵ International Solar Alliance, *Building Resilient Global Solar PV Supply Chains* (India: International Solar Alliance, 2023).

⁶ Laura Murphy and Nyrola Elimä (2021), [note 2](#); International Solar Alliance, *Global Trends in Solar Power* (India: International Solar Alliance, 2023); John Curtis and Ilze Jozepa, *UK Supply Chains and Uyghur and Turkic Muslim Forced Labour in China* (London: House of Commons, 2024).

⁷ Paris Agreement 2015 (UNFCCC).

⁸ Dmitrii Bogdanov et al, 'Low-cost Renewable Electricity as the Key Driver of the Global Energy Transition Towards Sustainability,' 227 *Energy* 120467; BNEF (Bloomberg NEF) and International Solar Alliance, *Scaling Up Solar in ISA Member Countries* (New York: Bloomberg Finance, 2021).

⁹ Elodie Aba, 'A Fast and Fair Energy Transition: How Community Legal Action and New Legislation are Shaping the Global Shift to Renewable Energy' (2023) 8 *Business and Human Rights Journal* 252.

II. Just Transition

To achieve a 'Just Transition' a movement towards 'Greening the economy in a way that is as fair and inclusive as possible to everyone concerned' is needed.¹⁰ Yet, the case of the global solar energy supply chain originating in XUAR highlights the nexus between forced labour and climate change. This nexus contains a multidirectional set of factors where the effects of climate change (i.e., greenhouse gas emissions, increasing temperatures, and extreme weather patterns) can exacerbate the vulnerabilities faced by communities to potential risks of exploitation. However, it is also noted that the actions of those subjected to forced labour may also contribute to the continued impact of anthropogenic climate change.¹¹

Both the social and environmental impacts of a transition to more 'green technologies' are needed. However, Decker Sparks et al. noted that when working to achieve Sustainable Development Goal (SDG) 7 (Affordable and Clean Energy) there were apparent constraining factors placed on the ability to successfully achieve SDG target 8.7 (end child labour, modern slavery and human trafficking) highlighting a potential unintended consequence for the green-energy transition, where poor working conditions can be fuelled.¹² This is explained by the siloed assessment of forced labour and climate change.¹³ Currently, limited action is taken to fully address the socioecological connection; however, movement toward a Just Transition requires a holistic and fully integrated approach.

The siloed responses to socioecological issues have roots in the disparities of response within environmental and social governance (ESG) where often the environmental requirements placed on company responses outweigh the social policies.¹⁴ Furthermore, where social aspects are included, they are rarely tied to clear international standards.¹⁵ Often, the social element of ESG is tacked onto the preexisting environmental governance structures, leading to an imbalanced response. Several scholars have outlined the clashes of the environmental and social aspects of ESG.¹⁶ In the case of China, this Just Transition becomes more complicated because of the human rights risks within the PV supply chain.¹⁷ Compound risks also arise from using poor-quality 'dirty' coal, defeating the ability to

¹⁰ UNDP, 'What is Just Transition? And why is it important?' (3 November 2022), <https://climatepromise.undp.org/news-and-stories/what-just-transition-and-why-it-important> (accessed 15 December 2023).

¹¹ Bethany Jackson et al, *Modern Slavery, Environmental Degradation and Climate Change: Present and Future Pathways for Addressing the Nexus* (Nottingham: Rights Lab, 2021); Chris O'Connell, *From a Vicious to a Virtuous Circle: Addressing Climate Change, Environmental Destruction and Contemporary Slavery* (London: Anti-Slavery International, 2021); Sabira Coelho, *The Climate Change-Human Trafficking Nexus* (Bangkok: IOM, 2016); David Brown et al, 'Modern Slavery, Environmental Degradation and Climate Change: Fisheries, Field, Forests and Factories' (2021) 4:2 *Environment and Planning E: Nature and Space* 191.

¹² Jessica L. Decker Sparks et al, 'Growing Evidence of the Interconnections Between Modern Slavery, Environmental Degradation, and Climate Change' (2021) 4:2 *One Earth* 181–91.

¹³ Bethany Jackson et al, (2021), [note 11](#).

¹⁴ Walk Free, *Bridging ESG Silos: The Intersection of Climate Change and Modern Slavery* (Perth: Minderoo Foundation, 2023).

¹⁵ Bernd Waas, 'The "S" in ESG and International Labour Standards,' (2021) 18 *International Journal of Disclosure and Governance* 403.

¹⁶ Alperen Gözlügöl, 'The Clash of 'E' and 'S' of ESG: Just Transition on the Path to Net Zero and the Implications for Sustainable Corporate Governance and Finance' (2022) 15:1 *The Journal of World Energy Law & Business* 1; Christos Cabolis, Maude Lavanchy, and Karl Schmedders, 'The Fundamental Problem with ESG? Conflicting Letters' 57 *The Capco Institute Journal of Financial Transformation* 110; Michael E. Porter, George Serafeim, and Mark Kramer, 'Where ESG Fails,' Institutional Investor (16 October 2019), <https://sharedvalue.org.au/wp-content/uploads/2019/11/Where-ESG-Fails--Institutional-Investor.pdf> (accessed 15 December 2023).

¹⁷ Laura Murphy and Nyrola Elimä (2021), [note 2](#); Laura Murphy, Jim Vallette, and Nyrola Elimä, *Built on Repression. PVC Building Materials' Reliance on Labor and Environmental Abuses in the Uyghur Region* (Sheffield: Helena Kennedy Centre for International Justice, 2022); Alan Crawford and Laura Murphy, *Over-Exposed: Uyghur Region Exposure Assessment for Solar Industry Sourcing* (Sheffield: Helena Kennedy Centre for International Justice, 2023).

sustainably transition to greener technologies as energy transitions are fuelled by poor working and environmental practices.¹⁸

Furthermore, there are varied approaches to dealing with the ongoing socioecological risks in the supply chains linked to XUAR. Some note that engagement and targeted approaches to dealing with companies linked to human rights abuses should continue if there is some willingness to improve working conditions; investment funds, arguably, could play an important role in ESG compliance.¹⁹ However, others warn about the inability of foreign companies to conduct supply chain due diligence in the context of China, a nondemocratic country where intimidation and harassment of auditors, and stricter legal and regulatory frameworks, impair companies' ability to have visibility across their supply chain and fulfil their legal and responsible business conduct obligations.²⁰ This led to calls across the PV supply chain for stakeholders to consider disinvesting and finding alternative production systems to mitigate against risks of forced labour in their supply chains.²¹

Despite the importance of this topic, the 'field' of modern slavery research in business and management has been described as 'significantly, and disappointingly, underdeveloped,' and scholars continue to draw attention to the challenges modern slavery poses to supply chain management.²²

To fill some of these gaps, there has been a new legislative push toward combined policy responses to environmental degradation and labour abuse. Such shifts seen in the context of the US, the EU and others, place the responsibility of managing supply chains—for some of the larger companies—within their purview to ensure labour and environment compliance, or else penalties be applied.²³ For businesses within the renewable technology sector, this poses questions about sustainable and ethical sourcing, as well as the need to transition to green energy production to meet national net-zero targets. Cumulated, these legislative changes strengthen the responsibilities businesses already have under existent soft laws, such as the United Nations (UN) Guiding Principles (UNGPs) which call for businesses to respect human rights and provide victims with effective access to remedy. A transition that fails to address or tolerate forced labour in the solar energy supply chain not only endangers human rights but also risks being seen as unjust and losing legitimacy.

¹⁸ Laura Murphy, Jim Vallette, and Nyrola Elimä (2022), *Ibid*, note 17.

¹⁹ Lars Hagenbuch, 'A Closer Look at the 'S' in ESG—Especially When it Comes to Investing in China,' *Pension Funds Online* (1 October 2021), <https://www.pensionfundsonline.co.uk/articles/a-closer-look-at-the-s-in-esg-especially-when-it-comes-to-investing-in-china> (accessed 16 October 2023).

²⁰ James Cockayne, Edgar Rodríguez-Huerta, and Oana Burcu, 'The Energy of Freedom'? *Solar Energy, Modern Slavery and the Just Transition* (Nottingham: Rights Lab, 2022).

²¹ James Cockayne, Edgar Rodríguez-Huerta, and Oana Burcu, *Ibid*, note 20; Sheffield Hallam University, Unison and Stop Uyghur Genocide, *Dirty Energy. Sourcing Solar Energy Without Uyghur Forced Labour* (Sheffield: Helena Kennedy Centre for International Justice, 2022).

²² Robert Caruana et al, 'Modern Slavery in Business: The Sad and Sorry State of a Non-Field,' (2020) 60:2 *Business & Society* 251; Stefan Gold, Alexander Trautrim, and Zoe Trodd, 'Modern Slavery Challenges to Supply Chain Management,' (2015) 20:5 *Supply Chain Management: An International Journal* 485.

²³ US Customs and Border Protection, 'Uyghur Forced Labor Prevention Act' (21 July 2023), <https://www.cbp.gov/trade/forced-labor/UFLPA> (accessed 16 October 2023); Camilla Naschert, 'Solar Imports Set for Scrutiny as EU Takes Aim at Human Rights in Supply Chains,' S&P Global Market Intelligence (22 February 2022), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/solar-imports-set-for-scrutiny-as-eu-takes-aim-at-human-rights-in-supply-chains-68810066> (accessed 16 October 2023); European Commission, 'Corporate Sustainability Due Diligence,' https://commission.europa.eu/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence_en (accessed 16 October 2023).

III. Research Aims

This article explores the relationship between human rights, under the umbrella of modern slavery, and policy narratives in the context of the 'Just Transition'. The article specifically examines the intersection between forced labour, supply chain issues and ESG risks using China's PV supply chain as a case study. It addresses the question of the extent to which forced labour in this supply chain is emerging as a critical point in the Just Transition process. This includes how state and nonstate policy actors, and businesses arguably drive risks of forced labour in the green energy transition. By examining in detail how different actors frame this issue, we seek to advance the current understanding of the role of business and human rights (BHR) norms and regulations in the context of the 'Just Transition'.

IV. Methodology

Our methodology centres on conducting an in-depth case study analysis of the solar industry within the XUAR region. This focus stems from the worldwide reliance on China as a primary source of solar products, crucial for realising the objectives of a 'Just Transition', and the sanctions placed on importing goods made using forced labour by several states.²⁴ The case study provides a rich analysis of data assessing the intersection of forced labour and ESGs.

We draw on published secondary data (such as legal documents, policies, parliamentary debates, media conferences, public statements and reports) to review the narratives of key actors from nation-states (i.e., government officials, businesses and sectoral associations), international institutions and civil society organisations (CSOs) who influence international human rights and climate change policies. We first conducted a manual but extensive search in Google, and of databases such as Google Scholar and the University of Nottingham database, using a combination of key words such as 'solar', 'renewable', 'energy', 'Just Transition', 'labour', 'human rights', 'sustainable development', 'modern slavery' and '(un) fair practice/trade'. We also accessed the grey literature and searched for UN agencies reports, nongovernmental organisations (NGOs) and international organisations that were already identified, or which emerged from the initial search. Similarly, we searched specific traditional and social media sources for the same key words. Additional searches were conducted for key identified government entities, institutions and CSOs following the initial search.

First, we analysed the emerging discourse in China, the United States (US) and the United Kingdom (UK), from a state and business perspective, since they are considered 'home states' of businesses whose products or services have been linked to Uyghur forced labour. China's response to forced labour accusations and its framing of forced labour is the context for the study. The US selection was based on its prominent role of imposing sanctions on China, its pronounced criticism of China's policies in XUAR and its involvement in discussions concerning a Just Transition. Meanwhile, the inclusion of the UK was motivated by the enactment of the Modern Slavery Act in 2015, its standing as a significant global economy and its recent commitment to clean energy investment.²⁵ We then focused on the EU and UN discourses. The EU is highly relevant due to its economic weight as a bloc and its current leadership around due diligence legislation. The UN, particularly the United Nations Framework Convention on Climate Change (UNFCCC), due to its role in addressing climate change, and groups focussed on human rights within the UN were considered.

²⁴ James Cockayne, *Making Xinjiang Sanctions Work: Addressing Forced Labour Through Coercive Trade and Finance Measures* (Nottingham: Rights Lab, 2022).

²⁵ Modern Slavery Act 2015 (UK); UK Government, *Clean Power 2030 Action Plan: A New Era of Clean Electricity* (London: Department for Energy Security and Net Zero, 2024).

Last, we briefly review the most prominent CSO actors who are vocal in the Just Transition space.

Second, we identified policy currents by analysing the framing of the problems and solutions of forced labour and climate change and discussing their dynamics and implications.

The data collected are analysed through a 'policy currents' framework, previously developed by Cockayne, Rodríguez-Huerta and Burcu.²⁶ The framework draws on several contemporary policy process theory strands. For example, Multiple Streams Framework (MSF) accounts for a specific policy setting (i.e., the problem, policy and political streams) to explain why and how policies develop; it is often linked to actor perceptions of proposed solutions in relation to their feasibility, value and public acceptance.²⁷ The Advocacy Coalition Framework takes a more competitive view of policymaking with different coalitions appealing to underlying policy beliefs.²⁸ Narrative Policy Framework focuses on the setting, characters and plot of the story and appeals through rational and emotional persuasion, which is useful for comparative analysis of competing interests and influences, or for authoritarian actors that control and prevent differing voices.²⁹ Diffusion of Innovation Model informed us of the different coalition approaches to policy narratives—from coopting rival imagery and narratives to resource and strategy sharing.³⁰ Based on these theories, a series of questions were developed that led our coding process and analysis. Such questions included: How is the problem of modern slavery framed? (as a labour, human rights and security or other issue); For whom is this a problem? (for workers, businesses, government and others); What forms the solution? (fair trade, levelling the playing field, access to effective remedies for workers, strategy sharing and others); How are the solutions perceived and by which actors? Are voices of the community included?³¹

This approach resulted in a 'policy current framework' focussed on how 'modern slavery' is framed in the context of solar energy—more specifically, problem framing, key actors impacted, underlying core beliefs, proposed solutions and perceptions of problems and solutions (see Table 1). This framework advances our understanding of how different key actors frame the problem and solutions of forced labour in solar supply chains, including the signs of coordination and strategic approaches amongst actors. Each policy setting may present none, one or multiple forced labour narratives, each relevant to understanding the current policy debates. Through the prism of this framework, we analysed the policy currents of three main categories of actors noted earlier: the national policy current (China, US and UK), international organisation currents (EU and UN) and CSO (several labour and environmental focussed CSOs and multistakeholder organisations).

²⁶ James Cockayne, Edgar Rodríguez-Huerta, and Oana Burcu, [note 20](#).

²⁷ Thomas A. Birkland (1997). *After Disaster: Agenda-Setting, Public Policy and Focusing Events* (Washington DC: Georgetown University Press). Nicole Herweg, Nikolaos Zahariadis and Reimut Zohlnhöfer, 'The Multiple Streams Framework: Foundations, Refinements, and Empirical Applications' (2017) in Weible and Sabatier, (eds.), *Theories of the Policy Process*. 4th edn. (Boulder, CO: Westview Press), 17–53.

²⁸ Christopher M. Weible, Paul A. Sabatier and Kelly McQueen, 'Themes and Variations: Taking Stock of the Advocacy Coalition Framework' (2009) 37:1 *Policy Studies Journal* 121–40.

²⁹ Bryan D Jones, *Reconceiving Decision-Making in Democratic Politics: Attention, Choice, and Public Policy* (Chicago: University of Chicago Press, 1994).

³⁰ Frances Stokes Berry and William D. Berry, 'Innovation and Diffusion Models in Policy Research' in Weible and Sabatier (eds.), *Theories of the Policy Process* 4th ed. (Boulder, CO: Westview Press, 2017) 253–97.

³¹ James Cockayne, Edgar Rodríguez-Huerta, and Oana Burcu, [note 20](#).

Table 1. Policy currents in the solar energy-forced labour debate

	Policy currents			
	Rights	Supply chains	Autarky & Geostrategy	Collective action
Core beliefs	Rights (human and labour rights), freedom	Market logic	Sovereignty, autonomy, protection	Sustainable development, Just Transition and holistic system thinking
Key actors impacted and interests affected	Victims/survivors <ul style="list-style-type: none"> • Violation and abuse of human rights 	Businesses <ul style="list-style-type: none"> • Supply chain resilience (where tainted with FL and affiliated risks for businesses, such as financial, reputational and legal risks) 	Political communities (governments, policymakers) <ul style="list-style-type: none"> • Political communities perceived security and global standing 	System and supply chain stakeholders <ul style="list-style-type: none"> • Broad range of stakeholders' interests
Solutions	<ul style="list-style-type: none"> • Remedial actions • Accountability mechanisms 	<ul style="list-style-type: none"> • Alternative supply chains and sourcing strategies • Mixed governance through soft and hard laws • Responsible investment pressure 	<ul style="list-style-type: none"> • National protection and resilience • Self-sufficiency initiatives 	<ul style="list-style-type: none"> • Multistakeholder initiatives • Collective action for sustainable development and climate change • Systemic transition
Proponents of the current	<ul style="list-style-type: none"> • Human rights organisations; IPAC; ILO; UN Human Rights Council 	<ul style="list-style-type: none"> • EU Commission; US Congress; human rights organisations; SEIA 	<ul style="list-style-type: none"> • UK and US 'hawks' of China; IPAC; EU autonomy camp; Solar Power Europe; SEIA 	<ul style="list-style-type: none"> • Forum for the Future; Cobalt Institute; Rainforest Alliance; UNFCCC

V. National Policy Currents

A. China

At the governmental level the Chinese political response to allegations of forced labour in the solar industry, which began surfacing en masse in 2019, has been one of vehement denial.³² The Chinese Communist Party (CCP) has cited a lack of evidence and accused the West of plotting against them. China reinforced its argument that the policies carried out in XUAR are geared towards poverty alleviation and fostering economic development and that PV production, being extensively automated, was not reliant on forced labour.³³ Yet,

³² Vicky Xiuzhong Xu et al, [note 1](#); Amy Lehr and Mariefaye Bechrakis, *Connecting the Dots in Xinjiang: Forced Labor, Forced Assimilation, and Western Supply Chains* (Washington DC: CSIS, 2019).

³³ China SCIO, 'Employment and Labor Rights in Xinjiang,' *State Council Information Office White Paper* (2020), http://english.www.gov.cn/archive/whitepaper/202009/17/content_WS5f62cef6c6d0f7257693c192.html (accessed

in-country audits conducted by Western due diligence firms have become difficult to conduct due to raids and staff detention.³⁴ As some of the largest foreign auditing companies decided to close their offices in China,³⁵ the Party encouraged domestic auditors to replace external ones.³⁶ China further responded by adopting an antisanktions law that criminalises cooperation with enquiries.³⁷ Continued disregard for the UNGPs and a lack of transparency have been central to Chinese policy response to allegations of labour rights infringements.

Much of the political response has occurred following sanctions imposed on Chinese companies by the US. For example, in June 2021, when the first sanctions against a Chinese PV company were enacted, China accused the US of using 'human rights as a disguise to ... cripple the industrial development in Xinjiang' because of Chinese economic strength and development.³⁸ Similarly, the detention of a PV shipment from China by the US, prior to COP26 in November 2021, was labelled by the Chinese Ministry of Foreign Affairs as undermining the development of XUAR and disrupting the stability of the international supply chain but also negatively impacting the global cooperation in addressing climate change.³⁹ Furthermore, Pan Cunxiang, secretary-general of the regional nonferrous metals association, warned that curbing PV development in Xinjiang may have serious implications for the global PV market.⁴⁰ Sanctions have also been viewed as a poor longterm strategy for the West as by blocking China's solar industry innovation, a pioneer in this field, developments in the entire solar sector will stall.⁴¹ Chinese businesses have been directly implicated in the usage of forced labour. Four producers, together accounting for 45 per cent of the world's polysilicon production, have been linked to forced labour. Three of the four largest polysilicon producers in XUAR—GCL-Poly, TBEA/Xinte, and East Hope Group—are accused of using forced labour in their direct operations. A fourth, Daqo New Energy Corp, allegedly presents a risk of forced labour in its supply chain.⁴²

12 December 2023); Huiming Zhang et al, 'Solar Photovoltaic Interventions Have Reduced Rural Poverty in China,' (2020) 11 *Nature Communications* 1969.

³⁴ Asia Financial, 'China Raids Office of US Due Diligence Firm, Detains Staff,' (25 March 2023), <https://www.asiafinancial.com/china-raids-office-of-us-due-diligence-firm-detains-staff> (accessed 13 December 2023).

³⁵ Jessica Seah, 'Big Four Audit Giants Shut Down Legal Operations in China Following 'Regulatory Raids,' *Law International* (13 October 2022), <https://www.law.com/international-edition/2022/10/13/big-four-audit-giants-shut-down-legal-operations-in-china-following-regulatory-raids/?slreturn=20231113062856> (accessed 13 December 2023).

³⁶ Rob Garver, 'China Said to Ask Domestic Firms to Shun Big Four Accountants,' *VoA* (28 February 2023), <https://www.voanews.com/a/china-said-to-ask-domestic-firms-to-shun-big-four-accountants/6984457.html> (accessed 13 December 2023).

³⁷ Mary E. Lovely and Jeffrey J. Scott, 'Can China Blunt the Impact of New US Economic Sanction?,' *Peterson Institute for International Economics* (2021), <https://www.piie.com/sites/default/files/documents/pb21-13.pdf> (accessed 15 December 2023).

³⁸ Matthew Funaiole and Katherine Kurata, 'The United States Can Cast Light on China's Shadowy Solar Industry,' *Foreign Policy* (1 September 2021), <https://foreignpolicy.com/2021/09/01/china-solar-industry-xinjiang/> (accessed 12 December 2023).

³⁹ Global Times, 'LONGI's Exports to US 'Unaffected' After US Customs Detains Shipment,' (4 November 2021), <https://www.globaltimes.cn/page/202111/1238109.shtml> (accessed 12 December 2023).

⁴⁰ Xinhua, 'Accusation of Forced Labour in Xinjiang Rejected as Nonsense,' (4 June 2021), http://www.xinhuanet.com/english/2021-06/04/c_139987759.htm (accessed 13 December 2023).

⁴¹ Global Times, 'Xinjiang Companies Refuted the US Sanctions Over the Hyped 'Forced Labor' Illusion and Condemned the Move as a Real Violation of Human Rights,' (14 July 2021), <https://www.globaltimes.cn/page/202107/1228694.shtml> (accessed 12 December 2023).

⁴² Laura Murphy and Nyrola Elimä (2021), *note 2*; Nava Cohen and Lukas J. Helikum, 'Shadows on Solar: A Teaching Case on the Role of Corporate Governance in Addressing Forced Labor Concerns,' (2024) 23:4 *Accounting Perspectives* 547–52.

Downstream, JinkoSolar has been accused of using forced labour at the PV module production stage; its XUAR operations appear to be colocated with a high-security prison and internment camp. Other module makers (e.g., JA Solar, Trina Solar, LONGi, Canadian Solar and Hanwha Q-Cells) have also been alleged to use polysilicon tainted with forced labour.⁴³

International responses to these business activities have followed. In 2020 and 2021, the US imposed a Withhold Release Order (WRO) for goods made with silica produced by Hoshine Silicon Industry Co., Ltd. and its subsidiaries, and later added LONGi.⁴⁴ All Chinese companies denied the accusations, with their joint statement reading: ‘This is a serious damage to the international economic order, a serious threat to the security of the global industrial chain and will ultimately harm the interests of all parties in the world’s photovoltaic industry chain.’⁴⁵

From an environmental policy perspective, China itself has taken some historically significant moves to address criticisms of environmental degradation on the international stage. The Chinese government became a signatory to the Paris Agreement in 2015, setting a goal to reach peak emissions by 2030 and achieve carbon neutrality by 2060.⁴⁶ It should be noted that this target is a decade beyond most national pledges but climate scientists are encouraged by the progress made by China, however further changes to energy consumption and emissions reductions are needed.⁴⁷ Furthermore, the Chinese National Strategy on Climate Adaptation 2022–2035 also expressly considers the linkages between the environment, health and social systems.⁴⁸

However, these pledges and strategies juxtapose with state-sponsored forced labour in solar energy supply chains as previously mentioned. Moreover, the manufacturing of solar technologies is also linked to the use of poor-quality fossil fuel supplies, suggesting that the Just Transition is tainted by poor working and environmental conditions through the reliance on coal and forced labour.⁴⁹

Furthermore, the stability of addressing climate change as part of the geopolitical system is still fragile within the Chinese government. Although climate change partnerships have been enacted jointly by China, the EU and the US, geopolitical frictions mean that the longterm viability of these agreements can be questioned.⁵⁰ For example, in August 2022,

⁴³ Laura Murphy and Nyrola Elimä (2021), *Ibid.*, note 2.

⁴⁴ US CBP, ‘The Department of Homeland Security Issues Withhold Release Order on Silica-Based Products Made by Forced Labor in Xinjiang,’ *US Customs and Border Protection* (24 June 2021), <https://www.cbp.gov/newsroom/national-media-release/department-homeland-security-issues-withhold-release-order-silica> (accessed 13 December 2023); David Wagman, ‘Border Agents Detained 40.31 MW of LONGi Solar Products, Company Says,’ *PV Magazine* (4 November 2021), <https://pv-magazine-usa.com/2021/11/04/border-agents-detained-40-31-mw-of-longi-solar-products-company-says/> (accessed 13 December 2023).

⁴⁵ Global Times, note 41.

⁴⁶ Andy Tay, ‘By the Numbers: China’s Net-zero Ambitions,’ *Nature* (5 April 2022), <https://doi.org/10.1038/d41586-022-00802-3> (accessed 17 November 2023).

⁴⁷ Lauri Myllyvirta, Qi Qin, Xinyi Shen, Chengcheng Qiu, and Belinda Schäpe, *China’s Climate Transition: Outlook 2024* (Helsinki, Finland: Centre for Research on Energy and Clean Air, 2024).

⁴⁸ The Government of the People’s Republic of China, ‘National Climate Change Adaptation Strategy 2035,’ *CSET (translation)* (29 August 2022), <https://cset.georgetown.edu/publication/national-climate-change-adaptation-strategy-2035/> (accessed 17 November 2023).

⁴⁹ Laura Murphy and Nyrola Elimä (2021), note 2; Laura Murphy, Jim Vallette, and Nyrola Elimä (2022), note 17; Alan Crawford and Laura Murphy (2023), note 17.

⁵⁰ STIP Compass, ‘EU-China Partnerships on Climate Change,’ (6 February 2023), <https://stip.oecd.org/stip/interactive-dashboards/policy-initiatives/2023%2Fdata%2FpolicyInitiatives%2F333344> (accessed 17 November 2023); US Department of State, ‘Sunnylands Statement on Enhancing Cooperation to Address the Climate Crisis,’ (14 November 2023), <https://www.state.gov/sunnylands-statement-on-enhancing-cooperation-to-address-the-climate-crisis/> (accessed 17 November 2023).

China suspended all discussions with the US on topics including climate change because of former House of Representatives Speaker Nancy Pelosi visiting Taiwan.⁵¹ Negotiations resumed and joint climate activities including the Working Group on Enhancing Climate Action in the 2020s have continued.⁵² However, criticism of labour exploitation being committed against the Uyghur population is likely to continue to create pushback from the Chinese government.

Overall, the Chinese state and business community claim that the problem of forced labour is nonexistent. The voices of the workers themselves are silenced in China. The problem of forced labour is addressed primarily through the lens of 'slander' by Western governments against China and its businesses. The solutions proposed are to fight back against forced labour 'defamations,' in some cases by persuading the West that its supply chains are slavery-free and increasingly tapping into the domestic market to reduce dependency on external international markets. Nonetheless, several state actors have highlighted the link between the imposition of sanctions due to alleged forced labour claims, hence the disruption of global supply chains and the negative impact on climate.

B. United States

The US has been a vocal critic of China over the use of forced labour and spearheaded the coalition of countries that imposed sanctions on China. The US section 307 of the Tariff Act of 1930 (19 U.S.C. §1307) grants authority to US Customs and Border Protection (CBP) to prohibit specific goods produced with forced labour from entry into the country, unless the producer can prove that they were not made with forced labour.⁵³ Since 2018 when XUAR forced labour camps gained global attention, the US began detaining goods entering the country on the basis that they were produced with forced labour. In 2021, polysilicon was added to the US Department of Labor's List of Goods produced using Forced or Child Labor,⁵⁴ and remains on the most recent list published in 2024.⁵⁵ In June 2021, goods made with silica produced by Hoshine Silicon Industry Co., Ltd. and its subsidiaries were withheld.⁵⁶ Hoshine, and four other solar entities operating in XUAR, were added to the US Department of Commerce 'Entities List,' which barred their access to certain US-sourced commodities and technology.

The discussions on the US dependence on China's solar supply chain have intensified. In 2021, new pieces of legislation were proposed. The Democrats put forward the Reclaiming

⁵¹ Yimou Lee and Sarah Wu, 'China Halts Military, Climate Dialogue with U.S. Over Pelosi Trip,' *Reuters* (6 August 2022), <https://www.reuters.com/world/asia-pacific/taiwan-premier-evil-neighbour-next-door-is-showing-off-her-power-our-door-2022-08-05/> (accessed 17 November 2023).

⁵² Ellen Knickmeyer and Seung Min Kim, 'China, US to Resume Climate Talks Halted After Pelosi Trip,' *AP* (14 November 2022), <https://apnews.com/article/biden-taiwan-indonesia-united-states-asia-14f620ad8539cb89ae630b39f6c3a623> (accessed 17 November 2023); US Department of State, 'Second Meeting of the U.S.-China Working Group on Enhancing Climate Action in the 2020s,' *US Mission China* (9 September 2024), <https://china.usembassy-china.org.cn/second-meeting-of-u-s-china-working-group-on-enhancing-climate-action-in-the-2020s/> (accessed 16 January 2025).

⁵³ US CBP, 'CBP Issues Region-Wide Withhold Release Order on Products Made by Slave Labor in Xinjiang,' *US Customs and Border Protection* (13 January 2021), <https://www.cbp.gov/newsroom/national-media-release/cbp-issues-region-wide-withhold-release-order-products-made-slave> (accessed 13 December 2023).

⁵⁴ US Federal Register, *Notice of Update to the Department of Labor's List of Goods Produced by Child Labor or Forced Labor*, (2021) 86:118, <https://www.govinfo.gov/content/pkg/FR-2021-06-23/pdf/2021-12894.pdf> (accessed 10 June 2024).

⁵⁵ US Department of Labor, *2024 List of Goods Produced by Child Labor or Forced Labor* (Washington DC: Bureau of International Labor Affairs, 2024); US Department of Labor (2024), note 1.

⁵⁶ US CBP, *Ibid*, note 53.

the Solar Supply Chain Act, aimed at expanding the domestic manufacturing of solar components in the US and supporting global competitiveness.⁵⁷ The Republicans proposed the Keep China Out of Solar Energy Act; this would prohibit federal funds from being used to purchase solar panels from Chinese companies that use forced labour or have ties with the CCP. ‘Beijing has made it clear that to do business in China, you must leave American values behind,’ Senator Rubio said.⁵⁸ Republican Senator Scott also stressed ‘Communist China is not our friend. [...] must work to fully decouple our supply chains and end our reliance on products from Communist China. That’s the only way to truly build American independence and self-sufficiency and bring economic growth back to the U.S.’⁵⁹

In January 2022, the White House Press Secretary at the time, Jen Psaki, called on businesses to oppose ‘human rights abuses and genocide in Xinjiang’ and to consider ‘legal, reputational, and customer risk.’⁶⁰ In June 2022, several Republicans amplified this plea, urging the Biden administration not to prioritise green energy goals over human rights abuses, and advocated for the enforcement of the Uyghur Forced Labour Prevention Act. In a letter to the Homeland Security Secretary and the CBP Commissioner, a group of Democrats led by Representative Ryan expressed concerns over why only certain Chinese companies’ shipments were withheld: ‘We recognize the increasing importance solar energy will assume in reducing future greenhouse gas emissions and mitigating the effects of climate change [...] However, this recognition, along with the relative underdiversification of the solar industry’s supply chain, cannot cause the U.S. to compromise on values as fundamental as our commitment to upholding human rights.’⁶¹ The second Trump administration appears to be signalling a shift toward economic sanctioning more broadly through tariffs on imported goods, including those needed for the US transition to reach net zero—it remains unclear whether some tariffs will also be linked to human rights concerns.⁶²

The Solar Energy Industries Association (SEIA), which describes itself as ‘the national trade association for the U.S. solar industry’ and has around 1,000 corporate members, reacted to forced labour allegations by labelling them ‘abhorrent’ and ‘a direct contrast to our values.’⁶³ SEIA’s Traceability Protocol encourages its members to identify and address forced labour risks in their supply chains, including potentially cutting ties with suppliers

⁵⁷ Catherine Cortez Masto, ‘Cortez Masto Leads Colleagues in Introducing Legislation to Bolster the Solar Manufacturing Supply Chain in the U.S.’ (26 May 2022), <https://www.cortezmasto.senate.gov/news/press-releases/cortez-masto-colleagues-introduce-legislation-to-bolster-the-solar-manufacturing-supply-chain-in-the-us/> (accessed 13 December 2023).

⁵⁸ The Economic Times, ‘US Senators Introduce Bill to Prohibit Funds from Being Used to Buy Chinese Solar Panels’ (31 March 2021), https://economictimes.indiatimes.com/news/international/world-news/us-senators-introduce-bill-to-prohibit-funds-from-being-used-to-buy-chinese-solar-panels/articleshow/81774171.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst (accessed 14 December 2023).

⁵⁹ Kevin Derby, ‘Rick Scott Bring Back “Keep China out of Solar Energy”’, *Florida Daily* (27 March 2023), <https://www.floridadaily.com/rick-scott-brings-back-keep-china-out-of-solar-energy-act/> (accessed 14 December 2023).

⁶⁰ Morgan Keith, ‘Days After Tesla Opened a Xinjiang Store, White House Press Secretary Jen Psaki Says Private Sector “Cannot Look the Other Way” When it Comes to Human Rights Abuses of Uighur Muslims,’ *Business Insider* (5 January 2022), <https://www.businessinsider.in/politics/world/news/days-after-tesla-opened-a-xinjiang-store-white-house-press-secretary-jen-psaki-says-private-sector-cannot-look-the-other-way-when-it-comes-to-human-rights-abuses-of-uighur-muslims/articleshow/88701065.cms> (accessed 13 December 2023).

⁶¹ Reuters, ‘U.S. Lawmakers Ask Biden Administration Why Some China Solar Giants Left Off Slave Labor List,’ (12 July 2022), <https://www.reuters.com/legal/government/us-lawmakers-ask-biden-administration-why-some-china-solar-giants-left-off-slave-2022-07-12/> (accessed 13 December 2023).

⁶² George Magnus, Sophia Gaston, and Felix Brender, ‘As the Experts: What does Trump 2.0 mean for China?’, *London School of Economics* (21 November 2024), <https://blogs.lse.ac.uk/cff/2024/11/21/ask-the-experts-what-does-trump-2-0-mean-for-china/> (accessed 16 January 2025).

⁶³ SEIA, ‘Supply Chain Ethics & Sustainability,’ *Solar Energy Industries Association*, <https://seia.org/initiatives/supply-chain-ethics-sustainability> (accessed 13 December 2023).

from XUAR. In March 2021, SEIA also highlighted the benefits of 'bolstering our domestic manufacturing capacity throughout the entirety of the solar value chain [which] would help promote transparency, reduce the need to rely on imported products and create good-paying jobs here at home.'⁶⁴ SEIA president Ross Hopper warned that the WROs, together with price increases and other supply-chain disruptions, could 'significantly exacerbate supply chain constraints and increase solar system prices.'⁶⁵

The US has taken steps to address climate change which have promoted directional changes for supply chains. For example, the Inflation Reduction Act (IRA) signed into force by the Biden administration in August 2022 showed encouraging signs of addressing climate change, particularly through the domestic production of renewable energy technologies including solar and the provision of tax credits; efforts were focused on transitioning away from international supply chains including those in China.⁶⁶ The transitional goals in the IRA align with other legislation such as the WROs that have been placed on Chinese-made products and make the case for domestic production being cleaner for both energy and worker rights. This came on the back of the US rejoining as a signatory to the Paris Agreement and trying to reestablish its position as a leader in the response to climate change, which is often a point of tension between the US and China during geopolitical summits.⁶⁷ This was swiftly altered on the first day of President Trump's second term via Executive Order.⁶⁸ Meanwhile, efforts have also been made to address environmental challenges including the transition to a clean-energy economy and recognitions of labour rights abuses linked to this transition have been discussed.⁶⁹

While the present legislation encourages domestic production and transition to clean energy, much of the green energy supply chain remains embedded in Chinese supply chains. The US seems much more focussed on tackling forced labour and on geopolitical tensions with China, but weak on the climate side, raising questions over its ability to complete a 'Just Transition'.

C. United Kingdom

Human rights abuses and labour exploitation allegations in XUAR have been widely discussed in the UK; for example, a UK-based Uyghur tribunal concluded that the actions

⁶⁴ SEIA, 'Solar Industry Letter to Senators Rubio & Merkley on Labor Concerns in the Solar Supply Chain,' *Solar Energy Industries Association* (23 March 2021), <https://www.seia.org/research-resources/solar-industry-letter-senators-rubio-merkley-labor-concerns-solar-supply-chain> (accessed 13 December 2023).

⁶⁵ David Wagman, 'Price Increases Hit Solar as Trade Uncertainties with China Cloud Growth Goals,' *PV Magazine* (14 September 2021), <https://pv-magazine-usa.com/2021/09/14/price-increases-hit-solar-as-trade-uncertainties-cloud-aggressive-growthgoals/> (accessed 14 December 2023).

⁶⁶ Inflation Reduction Act 2022 (US).

⁶⁷ Antony Blinken, 'The United States Officially Rejoins the Paris Agreement' US Department of State (19 February 2021), <https://www.state.gov/the-united-states-officially-rejoins-the-paris-agreement/> (accessed 17 November 2023); STIP Compass (2023), note 50; US Department of State (2023), note 50; Yimou Lee and Sarah Wu, note 51.

⁶⁸ Sara Schonhardt, 'Why Trump's 2nd Withdrawal from the Paris Agreement Will Be Different,' *Politico* (10 November 2024), <https://www.politico.eu/article/donald-trump-paris-agreement-climate-sustainability-us-cop29-global-pact-warm/> (accessed 16 January 2025); Matthew Daly, and Seth Borenstein, 'Trump Signs Executive Order Directing US Withdrawal from the Paris Climate Agreement – Again,' *AP* (21 January 2025), <https://apnews.com/article/trump-paris-agreement-climate-change-788907bb89fe307a964be757313cdfb0> (accessed 24 January 2025).

⁶⁹ Council on Environmental Quality, 'National Environmental Policy Act Implementing Regulations Revisions Phase 2,' (2023) 88:145 *Federal Register* 49924; US Department of State, *Forced Labor and the Clean Energy Transition: Finding A Responsible Way Forward* (Washington DC: Office to Monitor and Combat Trafficking in Persons, 2022).

of the Chinese government against the Uyghur minority amount to genocide.⁷⁰ Furthermore, two House of Commons Committees were established to assess allegations of forced labour in China. The Foreign Affairs Committee flagged in 2021 that the solar energy sector is at ‘substantial risk of using forced labour’ but did not focus on the links to climate policies and the energy transition.⁷¹ A further report, commissioned by the Business, Energy and Industrial Strategy Committee into Uyghur forced labour in Xinjiang and UK supply chains called on the UK government to toughen its stance on China but it did not cover the solar energy sector.⁷²

The Conservative Party Human Rights Commission has been vocal in its criticism of China and lobbied for a reevaluation of British-Chinese relations, with some of the members of Parliament (MPs) involved being subject to Chinese sanctions. Nusrat Ghani has been an advocate for clean supply chains and raised repeated concerns about the global solar energy supply chain’s reliance on Chinese polysilicon. A fellow MP, Tom Tugendhat also warned against the world’s dependence on China’s rare mineral supply, pointing out the vulnerability of solar and wind energy industries, and more specifically the UK’s Net Zero Strategy.⁷³ A letter signed by 12 cross-party MPs and directed to Boris Johnson, then Prime Minister, warned against XUAR’s cotton and solar technology being embedded in international supply chains and representing a ‘very real threat that goods produced tainted with Uyghur forced labour are bought and sold by firms and consumers across the UK.’⁷⁴

The trade association Solar Energy UK, representing over 350 businesses, has also issued a statement condemning modern slavery. They restated their members’ commitment to transparency, sustainability and the development of an industry-led traceability protocol to eliminate and prevent human rights abuses in their supply chains.⁷⁵

To establish a Just Transition, combined action on forced labour and climate change are required. However, addressing climate change and forced labour in the UK context is currently siloed.⁷⁶ The primary environmental legislation in the UK continues to be rooted in the Climate Change Act (adopted in 2021).⁷⁷ The focus is on setting the UK’s net-zero agenda by 2050.⁷⁸ The Act has been expanded upon in both the Scottish and Northern Irish devolved iterations. These devolved administrations have worked to include the ‘Just Transition’ within their respective laws through the inclusion of decent work being

⁷⁰ Uyghur Tribunal, ‘Judgment,’ (9 December 2021), <https://uyghurtribunal.com/wp-content/uploads/2022/01/> (accessed 14 October 2023); John Curtis and Ilze Jozepa (2024), note 6.

⁷¹ Foreign Affairs Committee, *Never Again: The UK’s Responsibility to Act on Atrocities in Xinjiang and Beyond* (London: House of Commons, 2021).

⁷² Business, Energy and Industrial Strategy Committee, *Uyghur Forced Labour in Xinjiang and UK Value Chains* (London: House of Commons, 2021).

⁷³ Tom Tugendhat and Julia Pamilih, ‘Depending on China for Rare Earth Metals Leaves Britain Vulnerable,’ *The Times* (9 November 2021), <https://www.thetimes.co.uk/article/depending-on-china-for-rare-earth-metals-leaves-britain-vulnerable-03t2k6vxxk> (accessed 15 December 2023).

⁷⁴ IPAC, ‘Cross-party MPs Slam UK Government Inaction on Uyghur Forced Labour Ahead of G7 Summit,’ *Inter-Parliamentary Alliance on China* (10 June 2021), <https://ipac.global/cross-party-mps-slam-uk-government-inaction-on-uyghur-forced-labour-ahead-of-g7-summit/> (accessed 13 December 2023).

⁷⁵ Alice Grundy, ‘UK Solar Industry Backs Anti-forced Labour Calls,’ *Solar Power Portal* (13 April 2021), https://www.solarpowerportal.co.uk/news/uk_solar_industry_backs_anti_forced_labour_calls (accessed 12 December 2023).

⁷⁶ Bethany Jackson, *Climate Change, Migration and Human Trafficking: Assessing the Impact of Climate Change, Migration, and Human Trafficking Risks for Populations in the Bangladesh and India Sundarbans* (Nottingham: Rights Lab, 2023).

⁷⁷ Climate Change Act 2008 (UK).

⁷⁸ Nuala Burnett, Tamsin Edwards, and Nicole Watson, *The UK’s Plans and Progress to Reach Net Zero by 2050* (London: House of Commons, 2023).

an inherent part of the transition towards a green economy.⁷⁹ This devolved approach has not been actively adopted at the UK level, leaving a gap in holistic legislative mechanisms on forced labour and co-occurring issues such as climate change.⁸⁰ All environmental legislation outlined mainly aligns with the transition to green economies, with little consideration for the social rights concerned.

It has previously been suggested that the UK introduce an import ban on goods linked to Uyghur forced labour, however, this has not been implemented.⁸¹ Although the UK Modern Slavery Act includes financial penalties for businesses in breach of Section 54 (according to which businesses with an annual turnover of £36 million must publish a modern slavery statement that details the preventive steps taken to address modern slavery), it lacks enforcement capacity. Moreover, the act has not been updated in line with the EU's Corporate Sustainability Due Diligence Directive (CSDDD), which contains explicit legal penalties for companies not in compliance with climate targets or standard working practices for large companies with supply chains based or operating within the EU market.⁸² Meaningful action to tackle supply chain risks in solar supply chains is thus limited for now.⁸³

VI. International Organisational Policy Currents

A. European Union

In March 2021, the European Union (EU) sanctioned Chinese officials involved in XUAR human rights violations. In turn, the Chinese government sanctioned European think tanks, scholars and Members of the European Parliament (MEPs), targeting particularly those on the European Parliament's Subcommittee on Human Rights. The EU Parliament responded by freezing efforts to ratify the Comprehensive Agreement on Investment in May 2021 and called for the adoption of an EU import ban on forced labour goods. EU Commission President Ursula von der Leyen then announced in September 2021 that the EU would adopt a ban on the sale and import of goods made with forced labour; the Forced Labour Regulation (FLR) was formally adopted in November 2024.⁸⁴ The EU through new legislation and the leverage of its bloc can set regulatory standards, forcing foreign competitors to raise standards in return for market access, whilst protecting compliant domestic producers.

In May 2021, the EU also announced its intention to support the solar industry, among 14 other 'industrial ecosystems,' considering the surging demand for solar PV and the need for 'genuinely sustainable competitiveness.'⁸⁵ In January 2022, eight prominent energy companies wrote to the European Commission and Council urging the development of a

⁷⁹ Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (UK); Climate Change Act (Northern Ireland) 2022 (UK).

⁸⁰ Bethany Jackson et al, *Integrating Policies Addressing Modern Slavery and Climate Change* (London: Modern Slavery PEC, 2024).

⁸¹ Import of Products of Forced Labour from Xinjiang (Prohibition) Bill 2021-22 (UK).

⁸² Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859 (text with EEA relevance), (European Union).

⁸³ Modern Slavery Act 2015 (UK).

⁸⁴ European Council, 'Products Made with Forced Labour: Council Adopts Ban,' *Council of the European Union* (19 November 2024), <https://www.consilium.europa.eu/en/press/press-releases/2024/11/19/products-made-with-forced-labour-council-adopts-ban/> (accessed 16 January 2025); Sofia Gonzalez De Aguinaga, *Effectiveness of Forced Labour Import Bans in Addressing Modern Slavery in Global Supply chains* (Oxford: Modern Slavery PEC, 2025).

⁸⁵ Liam Stoker, 'EC Gives 'Much-awaited Signal to Re-ignite' European Solar Manufacturing,' *PV Tech* (5 May 2021), <https://www.pv-tech.org/ec-gives-much-awaited-signal-to-re-ignite-european-solar-manufacturing/> (accessed 14 December 2023).

solar supply chain strategy to emphasise its importance for meeting European climate targets and ensuring the resilience of European supply against disruptions.⁸⁶ By May 2022 the EU launched the Solar Energy Strategy with the goal of doubling the EU's current output by 2039. SolarPower Europe, an association of over 300 European solar PV members, welcomed the strategy and in September 2022 issued a position paper iterating their goal of tackling forced labour and commitment to responsible, transparent and sustainable supply chains; and highlighted their sustainability assurance programme partnership with Solar Energy UK.⁸⁷

Moreover, in December 2022, the European Commission launched the EU's solar photovoltaic industry alliance aimed at transitioning from 'made in China' to 'made in Europe'.⁸⁸ Thierry Breton, the EU's market commissioner, explained what he described as the 'green paradox': although solar energy is critical for Europe's decarbonisation, Europe is dependent on China for manufacturing. The synergy between politics and business was notable.

While not directly addressing the risks of forced labour in XUAR, the European Union is leading the way through combined action to address human rights and climate change issues. The CSDDD was ratified in 2024.⁸⁹ Within this legislation, penalties can be applied for noncompliance (large EU companies with more than 1,000 employees, and €450million turnover; and non-EU companies operating within the union with over €450million turnover, and subsidiary activities). Forced labour, child labour and the exploitation of workers are all denoted as a risk that EU-based companies should be proactively seeking to manage. Furthermore, risks include environmental degradation and climate change, with the CSDDD linking directly to the targets included in the Paris Agreement.⁹⁰

The CSDDD builds on a series of national due diligence legislation from member states. For example, the German Due Diligence in the Supply Chain Act requires qualifying companies internationally to respect human rights obligations and environmental standards—including identifying and reporting on risks within their supply chains and the measures taken to avert risks.⁹¹ France also has a Duty of Vigilance Law meaning certain companies must identify and prevent human rights concerns and environmental impacts by their own company, any controlled subsidiaries and suppliers.⁹² Finally, the Netherlands also introduced a Responsible and Sustainable International Business Conduct Act; similar to the French legislation, it stipulates that businesses should act if suspected human rights and environmental violations occur in their direct operations or supply chain.⁹³

Notably, there have also been shifts to the priorities the EU places on its forced labour requirements to ensure energy security for member states. For example, rapid transition is

⁸⁶ Sean Rai-Roche, 'European Solar Developers Call for Solar Supply Chain Strategy, Target 20GW of Manufacturing Capacity by 2030,' *PV Tech* (27 January 2022), <https://www.pv-tech.org/european-solar-developers-call-for-solar-supply-chain-strategy-target-20gw-of-manufacturing-capacity-by-2030/> (accessed 14 December 2023).

⁸⁷ SolarPower Europe, 'European Commission Forced Labour Ban,' (16 September 2022), <https://www.solarpowereurope.org/advocacy/position-papers/statement-on-european-commission-forced-labour-ban> (accessed 15 December 2023).

⁸⁸ Frédéric Simon, 'EU Commission Launches Industry Alliance for 'Made in Europe' Solar PV,' *Euractiv* (11 December 2022), <https://www.euractiv.com/section/energy/news/eu-commission-launches-industry-alliance-for-made-in-europe-solar-pv/> (accessed 15 December 2023).

⁸⁹ Directive (EU) 2024/1760 of the European Parliament and of the Council, *note* 82.

⁹⁰ Paris Agreement 2015 (UNFCCC).

⁹¹ Act on Corporate Due Diligence Obligations in Supply Chains 2021 (Germany); Markus Krajewski, Kristel Tonstad, and Franziska Wohltmann, 'Mandatory Human Rights Due Diligence in Germany and Norway: Stepping, or Striding, in the Same Direction,' (2021) 6 *Business and Human Rights Journal* 550.

⁹² Law on the Duty of Vigilance 2017 (France).

⁹³ The Responsible and Sustainable International Business Conduct Act 2021 (Netherlands).

required when political and economic shocks occur. Following the Russian invasion of Ukraine, the EU transitioned to mass purchases of solar panel goods following the divestment of energy sourcing from Russia but much of this sourcing came from China and thus undermined the principles outlined in the proposed FLR, at that time.⁹⁴ As such, there is increased exposure of the EU to Uyghur forced labour through importing Chinese solar supplies and increasing the social risks of the green energy transition.

While EU legislation works to address social and environmental concerns, it has not gone so far in any action to address specific risks related to the transition to green technologies that may be exposed to risks of Uyghur forced labour specifically.

B. United Nations

At the international level, the UN has a mandate to address both human rights and climate change.⁹⁵ Solar energy is framed within the context of cleaner energy that is cheaper, more sustainable and affordable and has the potential for job creation. For example, at COP26 (2021, Glasgow), the Green Grids Initiative was proposed by Australia, France, India, the US and the UK and stressed the importance of 'creating a global ecosystem of interconnected renewables that are shared for mutual benefit and global sustainability.'⁹⁶ This is focussed on the achievement of SDG 7 which promotes affordable and clean energy.⁹⁷ However, it failed to reference the risks of forced labour—which are at odds with SDG 8 (decent work, which includes the elimination of forced labour). Such risks echo concerns of the energy Just Transition fuelling forced labour.⁹⁸

Very rarely did statements highlight the connection between climate change and human rights or labour conditions. The statement 'Supporting the Conditions for a Just Transition Internationally' issued by the UK, EU, Canada, New Zealand and the US urged businesses to ensure supply chains are free from human rights abuses, that decent work practices occur, and that due diligence procedures are observed (such as the OECD Guidelines for Multinational Enterprises, UN Guiding Principles on Business and Human Rights, and ILO's Principles on Multinational Enterprises and Social Policy).⁹⁹

Within the UN system, the UN Framework Convention on Climate Change (UNFCCC) leads the multilateral efforts to tackle climate change. The largest amount of progress on this topic culminated in the enactment of the Paris Agreement in 2015.¹⁰⁰ However, specific references to modern slavery or labour exploitation in the context of China, or otherwise, rarely appear in official COP26 (Glasgow) or COP27 (Egypt) documents. Some labour rights and social protections were included at COP28 (United Arab Emirates [UAE]), and at COP29 (Azerbaijan) when the International Labour Organization (ILO) stressed that enforcing labour rights and decent work in the climate change context is essential for a Just

⁹⁴ Camilla Naschert, 'Solar Supply Chain Braces for Reshuffle as EU Embarks on Forced Labor Ban,' *S&P Global* (12 October 2022), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/solar-supply-chain-braces-for-reshuffle-as-eu-embarks-on-forced-labor-ban-72209997> (accessed 17 November 2023).

⁹⁵ OHCHR, 'Understanding Human Rights and Climate Change,' (2015), <https://www.ohchr.org/sites/default/files/Documents/Issues/ClimateChange/COP21.pdf> (accessed 15 December 2023).

⁹⁶ UNFCCC, 'Green Grids Initiative – One Sun One World One Grid: One Sun Declaration,' COP26 (2 November 2021), <https://web.archive.nationalarchives.gov.uk/ukgwa/20230106144941/https://ukcop26.org/one-sun-declaration-green-grids-initiative-one-sun-one-world-one-grid/> (accessed 15 December 2023).

⁹⁷ UN, *Transforming our World: The 2030 Agenda for Sustainable Development* (New York: United Nations, 2015).

⁹⁸ Decker Sparks et al, *note 12*.

⁹⁹ UNFCCC, 'Supporting the Conditions for a Just Transition Internationally,' COP26 (4 November 2021), <https://ukcop26.org/supporting-the-conditions-for-a-just-transition-internationally/> (accessed 12 December 2023).

¹⁰⁰ Paris Agreement 2015 (UNFCCC).

Transition.¹⁰¹ For example, Section 36 of the Glasgow Climate Pact (outcome of COP26) references the 'Just Transition' through the lens of clean power generation, phasing out fossil fuels, and providing targeted support for the poorest and most vulnerable when transitioning.¹⁰² The recent discussion at the UNFCCC over loss and damage finance has shown progress, and it is now recognised as a mechanism for supporting communities impacted by climate change.¹⁰³ The research and CSO communities have called for such financing to directly support communities facing impacts linked to both climate change and vulnerabilities to forced labour increasing as a result of climate change impacts (e.g., loss of livelihoods, and migration to sectors with forced labour issues).¹⁰⁴ For now, funds only remain assigned to climate change mitigation and adaptation strategies, but do not address human rights abuses within the supply chains of the means required for a Just Transition.

Another way in which the UN promotes and leads on climate change at the multilateral level is via the UN-Energy Plan of Action, which commits to supporting communities globally in improving access to energy, increasing renewable capacity and generating new employment opportunities in the renewable energy sector by 2025.¹⁰⁵ Whilst this plan encourages growth in green technologies, it does not address the risks highlighted within high-value supply chains across the sector, such as those in China. Other plans being enacted include a series of Just Energy Transition Partnerships, which support developing countries to transition to green renewable sources in collaboration with developed countries; whilst these partnerships consider retraining and job provision for affected communities transitioning from fossil fuels to renewable sources, working conditions or worker rights are not at the forefront.¹⁰⁶

Furthermore, out of dozens of published COP statements, with very few exceptions, most make no reference to the link between the solar industry and modern slavery or labour exploitation. NGO coalitions and academics have called on policymakers at the last several UNFCCC COPs to recognise the links between climate-induced migration and climate change with modern slavery, including modern slavery responses in climate adaptation plans, and

¹⁰¹ Bethany Jackson, *Response to the Outcomes of COP26* (Nottingham: Rights Lab, 2021); Alex Balch, 'COP27 and Modern Slavery,' Modern Slavery PEC (29 November 2022), <https://modernslaverypec.org/latest/cop27-modern-slavery> (accessed 12 December 2023); ITUC, 'COP28: Progress for a Just Transition But Big Gaps Remain' International Trade Union Confederation (14 December 2023), <https://www.ituc-csi.org/COP28-Progress-for-a-just-transition-but-big-gaps-remain> (accessed 14 December 2023); ILO, 'ILO at COP29' International Labour Organization (11-22 November 2014), <https://www.ilo.org/ilo-cop29> (accessed 16 January 2025).

¹⁰² Glasgow Climate Pact 2021 (UNFCCC), <https://unfccc.int/documents/310475> (accessed 4 March 2024).

¹⁰³ UNFCCC, 'COP27 Reaches Breakthrough Agreement on New "Loss and Damage" Fund for Vulnerable Countries,' (20 November 2022), <https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries> (accessed 17 November 2023); Fiona Harvey and Nina Lakhani, 'Agreement on Loss and Damage Deal Reached on First Day of Cop28 talks' *The Guardian* (30 November 2023), <https://www.theguardian.com/environment/2023/nov/30/agreement-on-loss-and-damage-deal-expected-on-first-day-of-cop28-talks> (accessed 15 December 2023).

¹⁰⁴ Stacey-ann Robinson et al, 'Vulnerability-based Allocations in Loss and Damage Finance' (2023) 23 *Nature Climate Change* 1055; Bethany Jackson, note 76; Jackson et al, note 80; Fiona Harvey and Nina Lakhani (2023), *Ibid*, note 103.

¹⁰⁵ UN Department of Economic and Social Affairs, 'UN Organizations Launch Plan to Catalyse Action by 2025 on Energy Commitments,' <https://www.un.org/en/desa/un-organizations-launch-plan-catalyse-action-2025-energy-commitments#:~:text=In%20line%20with%20the%20milestones,cent%20increase%20in%20renewables%20capacity> (accessed 15 December 2023).

¹⁰⁶ Clara Ferreira Marques, 'Just Energy Transition Partnerships and How They Work,' *Bloomberg* (15 August 2023), <https://www.bloomberg.com/news/articles/2023-08-15/what-are-just-energy-transition-partnerships-jetps-and-how-do-they-work> (accessed 17 November 2023); Katherine Kramer, 'Just Energy Transition Partnerships: An Opportunity to Leapfrog from Coal to Clean Energy,' *IISD* (7 December 2022), <https://www.iisd.org/articles/insight/just-energy-transition-partnerships> (accessed 15 December 2023).

address the adverse impacts of climate change.¹⁰⁷ Moreover, the voices of the communities exposed to forced labour in the solar industry are often not heard or present; a representative of the Uyghur Human Rights Project poignantly noted 'We felt they were sacrificing Uyghurs to convince China to come to the table [at COP26] for climate change.'¹⁰⁸

Other areas of the UN system are therefore working to raise concerns within the human rights domain. Most recently, the Human Rights Council adopted a resolution which addresses human rights and climate change. The adoption reiterated the work being undertaken across the UN systems (including the ILO and UNFCCC) in relation to these two interconnected issues, and to the SDGs and Paris Agreement; the resolution also noted the need for continued and strengthened dialogue surrounding the barriers and solutions facing a Just Transition.¹⁰⁹ The ILO has also issued updated guidance related to forced labour imposed by state actors, which is central to how UN member states may respond to issues of exploitation in XUAR.¹¹⁰ As a result, multilateral systems should engage in coordinated efforts to address the risks of exploitation within key transitional supply chains to effectively ensure workers' rights are protected in the solar supply chain through the centring of affected worker experiences and expertise.¹¹¹

VII. CSO and Multi-Stakeholder Initiative Policy Currents

Within the CSO space, several actors have taken a critical leadership role in addressing Uyghur forced labour in supply chains more broadly and those that have taken umbrage with the solar supply chain itself.

Anti-Slavery International, for example, has a history of calling on companies to engage in addressing risks of Uyghur forced labour within their supply chains.¹¹² They have also criticised world leaders for their failure to take combined action against forced labour and climate change at UNFCCC conferences.¹¹³ Similarly, organisations such as the Uyghur World Congress criticised the lack of human rights considerations by government bodies leading multilateral climate negotiations.¹¹⁴ The Coalition to End Forced Labour in the Uyghur Region, formed of CSOs and trade unions, focuses on highlighting human rights abuses occurring in Xinjiang; they call on companies to apply a single global standard and exit supply chains linked to the Uyghur region, refrain from reexporting such goods and not

¹⁰⁷ Unseen, 'Open Letter to Rt Hon Alok Sharma,' (26 October 2021), <https://www.unseenuk.org/alok-sharma/> (accessed 13 December 2023); Adéla Mackie, 'At COP26, Governments Must Recognise the Links Between Climate-induced Migration and Modern Slavery,' *Anti-Slavery International* (26 October 2021), <https://www.antislavery.org/latest/cop26-governments-must-recognise-climate-induced-migration-and-modern-slavery/> (accessed 12 December 2023); Anti-Slavery International, 'COP27: The Impact of Climate Change on Modern Slavery Must Not Be Ignored,' (7 November 2022), <https://www.antislavery.org/latest/cop27-the-impact-of-climate-change-on-modern-slavery-must-not-be-ignored/> (accessed 12 December 2023); Anti-Slavery International, 'Towards COP28: Why the UN Climate Negotiations Must Consider Forced Labour and Human Trafficking,' (18 July 2023), <https://www.antislavery.org/latest/towards-cop28-why-the-un-climate-negotiations-must-consider-forced-labour-and-human-trafficking/> (accessed 12 December 2023); Balch, note 101.

¹⁰⁸ World Uyghur Congress, 'COP26 is Silent on Human Rights in China,' (8 November 2021), <https://www.uyghurcongress.org/en/cop26-is-silent-on-human-rights-in-china/> (accessed 13 December 2023).

¹⁰⁹ UN General Assembly, Resolution Adopted by the Human Rights Council on 10 July 2024. A/HRC/RES/56/8.

¹¹⁰ US Department of Labor (2024), note 1.

¹¹¹ Jackson et al, (2021), note 11.

¹¹² Chloe Cranston, 'Why Companies Must Act to End Abuses of the Uyghur People in China in Their Supply Chains,' *Anti-Slavery International* (23 July 2020), <https://www.antislavery.org/latest/uyghur-people-supply-chains/> (accessed 12 December 2023).

¹¹³ Adéla Mackie (2021), note 107; Anti-Slavery International (2022), note 107; Anti-Slavery International (2023), note 107.

¹¹⁴ Uyghur World Congress, note 108.

bifurcating their supply chain,¹¹⁵ the Coalition also encourages the introduction of legislation that prevents both human rights and environmental abuses.¹¹⁶

Critiques have also been made regarding environmental CSOs which have continued working with China despite reported human rights violations.¹¹⁷ The environmental CSO sector is nonetheless beginning to act on the connections of forced labour and the environment, collaborating with key organisations in the human rights space. For instance, in 2021 the Rainforest Alliance called for a Just Transition to renewable energy systems. This call requires assurances around work standards, including supply chains clean from forced labour—with both solar panels and mineral extraction specifically cited.¹¹⁸

Coordinated labour-environmental action has included lobbying intergovernmental conferences focussed on climate change to include forced labour risks on the agenda and integrate action on forced labour into climate change frameworks.¹¹⁹ Businesses and investors have also been identified as a key group to lobby as they hold financial power over supply chain decision-making that can alter supplier behaviour through incentivisation (both positively and negatively, i.e., support for change, or disengagement with the supplier).¹²⁰ Anti-Slavery International, for example, has targeted investors providing guidance to improve practices related to renewable technologies, including the alleged use of Uyghur forced labour.¹²¹ A different approach is the one taken by the Ultra-Low Carbon Solar Alliance, a group that brings together companies across the solar photovoltaic supply chain. The Alliance promotes business compliance with ESG labelling and certification to ensure minimum standards on emissions are met, including the need to use green energy when producing green technologies; but labour concerns remain siloed.¹²²

Multistakeholder groups are also leading in systems change around risks of forced labour in their supply chains. The Forum for the Future is actively working to address risks of climate change through the transition to renewable sources but they noted that these should be equitable (through affordability) as well as environmentally and socially beneficial—thus mitigating and working to eliminate such risks in the supply chain.¹²³

¹¹⁵ The Coalition to End Forced Labour in the Uyghur Region, Solar Industry, <https://enduyghurforcedlabour.org/solar/> (accessed 10 January 2025).

¹¹⁶ Coalition to End Forced Labour in the Uyghur Region – Written Evidence (MSA0064), (2024), <https://committees.parliament.uk/writtenevidence/129155/pdf/> (accessed 30 January 2025).

¹¹⁷ Uyghur World Congress, *Ibid*, note 108.

¹¹⁸ Rainforest Alliance, 'Forced Labour,' <https://www.rainforest-alliance.org/issues/human-rights/forced-labor/> (accessed 13 December 2023).

¹¹⁹ Unseen (2021), note 107.

¹²⁰ Unseen (2021), *Ibid*, note 107; Walk Free and WikiRate, *Beyond Compliance in the Renewable Energy Sector: Assessing UK and Australian Modern Slavery Act Statements* (Perth: Minderoo Foundation, 2023); Walk Free and AllianceBernstein, *Bridging ESG Silos: The Intersection of Climate Change and Modern Slavery* (Perth: Minderoo Foundation, 2023); Nava Cohen and Lukas J. Helikum (2024), note 42.

¹²¹ Modern Slavery PEC, 'Uyghur Forced Labour in the Production of Green Technology,' <https://modernslaverypec.org/research-projects/forced-labour-uyghurs-muslim-turkic-majority-peoples-production-green-technology> (accessed 12 December 2023); Anti-Slavery International, 'Uyghur Forced Labour in Green Technology' (23 January 2024), <https://www.antislavery.org/reports/uyghur-forced-labour-green-technology/> (accessed 16 January 2025).

¹²² Joan Fitzgerald, note 4; Renewable Energy World, 'Op-Ed: IPCC Report Proves Why We Can't Rely on Coal-fired Solar to Solve the Climate Crisis,' (26 August 2021), <https://www.renewableenergyworld.com/opinion-and-commentary/op-ed-ipcc-report-proves-why-we-cant-rely-on-coal-fired-solar-to-solve-the-climate-crisis/#gref> (accessed 15 December 2023).

¹²³ Forum for the Future, 'Responsible Energy Initiative: How the Responsible Energy Initiative Works to Ensure Renewable Energy Reaches its Full Potential,' (12 January 2023), <https://www.forumforthefuture.org/case-study-responsible-energy-initiative> (accessed 15 December 2023).

Beyond renewable energy groups, active work is being undertaken in other supply chains which could provide learnings for the energy sector. Lessons from the cobalt—a critical component in solar panels—extraction industry could be helpful. For example, the Cobalt Institute has a programme associated with responsible sourcing that emphasises both the health and safety of workers, and environmental protections; businesses have hence worked towards combined sustainability in these supply chains.¹²⁴ Some of this work has included China as an active participant (e.g., as a stakeholder of the Responsible Cobalt Initiative [RCI]).¹²⁵ Despite these efforts, it must be acknowledged that there are still myriad issues involving forced labour in cobalt supply chains.¹²⁶ Yet, the actions being undertaken present learning opportunities for the solar supply chain to encourage better business and industry responses to forced labour and environmental risks.

VIII. Analysis and Implications

When applying the 'policy current framework' to the solar sector and modern slavery discourses presented, four policy current frames emerged: human rights, supply chains, autarky and collective action. Each presents competing perspectives on problems and solutions to the nexus between forced labour and climate change.

A. 'Human Rights' Policy Current

The Rights policy currently frames modern slavery as a people-centred and human rights issue; violations in energy supply chains are taken seriously. These narratives are substantiated with evidence from the ground and testimonies from the affected communities and individuals. This policy currently upholds communities' and individuals' right to grievance and remedy as per the UNGPs. The international human rights community, affected populations and, to some extent, some of the political actors such as the Inter-Parliamentary Alliance on China (IPAC) in the UK and the Congressional-Executive Commission on China in the US, are the main proponents of the human rights current.

China denies accusations of forced labour in XUAR issued by the West and construes them as 'dirty tricks' employed to destabilise the country.¹²⁷ China's response to 'human rights' specifically has always been to focus on economic development and collective well-being rather than on individual human or workers' rights. The expectation of responsible business conduct is placed on rights enforcement but corporate actors, who may face allegations of forced labour and be asked to provide remedies to affected individuals or groups, are relatively absent from this current. The challenge is that effective access to remedy remains limited, and where it has been put in place, businesses have often pushed the costs of remediation onto their suppliers. Remediation through courts on the other hand can be extremely slow. In the case of state-sponsored forced labour remediation is significantly more difficult to attain.

¹²⁴ Cobalt Institute, 'Responsible Sourcing,' (2021), <https://www.cobaltinstitute.org/cobalt-sourcing-responsibility/> (accessed 15 December 2023); BASF, 'Project by BMW, BASF, Samsung SDI and Samsung Electronics to Enhance Sustainable Cobalt Mining,' <https://www.basf.com/gb/en/who-we-are/sustainability/we-source-responsibly/cobalt-initiative.html> (accessed 15 December 2023).

¹²⁵ RESPECT International, 'Responsible Cobalt Initiative (RCI),' (2016), <https://respect.international/responsible-cobalt-initiative-rci/> (accessed 15 December 2023).

¹²⁶ US Department of State (2023), note 50.

¹²⁷ Embassy of the PRC in the UK, 'Important News: The Information Office of the People's Government of Xinjiang Uygur Autonomous Region Holds the 12th Press Conference on Xinjiang-related Issues,' (5 September 2020), http://gb.china-embassy.gov.cn/eng/PressandMedia/202009/t20200905_3278222.htm (accessed 15 December 2023).

B. 'Supply Chains' Policy Current

The second current identified is focussed on supply chains. In comparison with the 'rights current,' here the focus of policy action changes from victims' rights to businesses' risks. The focus is on the risks posed by modern slavery to businesses and supply chain governance. Solutions are centred on the governments that could regulate business behaviour, and on businesses that are encouraged to conduct thorough due diligence throughout their supply chains, i.e., to map, trace, pre-empt and address risks to modern slavery. These solutions are in alignment with key international frameworks, including the UNGPs on Business and Human Rights and OECD Guidelines for Multinational Enterprises and echo many government responses.¹²⁸

Multiple actors support this current, but the solar energy industry associations SolarPower Europe and Solar Energy UK are some of the main proponents of the supply chain current. However, in September 2023, Action Sustainability, supported by these two solar associations among others, published a new report on 'Addressing Modern Slavery and Labour Exploitation in Solar PV Supply Chains.'¹²⁹ This may indicate that industry associations are willing to more substantively integrate elements of the 'human rights current' within the supply chain current.

SEIA also focuses on the importance of 'cleaning' supply chains from forced labour, but its discourse is also infused with elements of autarky, arguing in favour of boosting domestic production to enhance supply chain transparency. Somewhat similarly, the EU adopts a mixed approach, of both the supply chain and autarky currents, as noted through the Solar Energy Initiative.

One challenge remains for all actors involved—the ability to exercise sufficient control further down the tiers of the supply chain into which they may have little insight or may not exercise sufficient leverage, as it happens in the case of polysilicon production in XUAR. An emerging issue is that some Chinese companies are bifurcating their polysilicon supply chain. For example, LONGi, a Chinese manufacturer sanctioned by the US, claimed that US market needs can be fulfilled with non-Xinjiang silicon, i.e., with products from their factories in Malaysia and Vietnam, and plans to build plants in India, Saudi Arabia and the US.¹³⁰ Thus, they produce solar energy with both 'free' and 'forced labour' in different geographical locations to avoid sanctions. The move of production site may not necessarily be in a country that upholds high labour standards but where prices meet the business model. This raises two questions: 1) Should markets accept the purchase of the 'clean' goods of a producer despite knowing that forced labour continues to be used to produce other commodities? and 2) To what extent are states and businesses willing to risk a major supply chain disruption?

C. 'Autarky and Geostrategic' Policy Current

The third current stems from the realisation that the global supply chains of polysilicon are dependent on China. The focus here is somewhat geopolitical as the risk is discussed by and

¹²⁸ Rosa Polaschek, 'Responses to the Uyghur Crisis and the Implications for Business and Human Rights Legislation,' (2021) 6 *Business and Human Rights Journal* 567.

¹²⁹ Helen Carter, Anna Cantwell, and Emma Jane Allen, *Addressing Modern Slavery and Labour Exploitation in Solar PV Supply Chains* (London: Action Sustainability, 2023).

¹³⁰ Michael Copley, 'Solar-panel Supplier's Links to Alleged Abuses in China Imperil US Climate Goal,' *S&P Global* (26 July 2021), <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/solar-panel-supplier-s-links-to-alleged-abuses-in-china-imperil-us-climate-goal-65519164> (accessed 15 December 2023); Zhang Dan, 'Chinese Solar Giant Eyes Overseas Plants,' *Global Times* (11 November 2021) (accessed 15 December 2023). <https://www.globaltimes.cn/page/202111/1238781.shtml> (accessed 15 December 2023).

in relation to political communities, rather than individuals or businesses. The narrative changes from the 'supply chains' risks businesses face to the risk dependency poses at a security and self-sufficiency level. The policy solutions also shift from the adoption of operational risk management supply chain strategies to industrial policy questions around onshoring or re-shoring. The US has been investing in onshoring, while the EU took a different approach by encouraging foreign producers to respect labour rights within their production via the CSDDD and FLR.

This current has been widely used in the US, emphasising support for domestic production and distancing from China, viewed as a geopolitical rival and a nation not aligned with liberal values. Modern slavery is therefore framed as a defence of the liberal paradigm, defined by free trade. In contrast, state-sponsored forced labour not only does not align with democratic values but also provides an unfair competitive advantage to businesses that disregard workers' rights. The former US Treasury Secretary Janet Yellen hinted at this when she proposed to move towards friend-shoring, or ally-shoring, i.e., manufacturing and sourcing components from a group of countries with shared values.

The challenge to a current driven by geopolitical interests or values is that it can sit at odds with free trade and may not be conducive to research and innovation for businesses. Siemens Chief Executive Officer (CEO) Roland Busch warned that a 'confrontational foreign policy' with China, embodied for example in the adoption of 'export bans,' could mean that 'the energy transition [i.e., to renewables] will come to an end at this point,' a point highlighted by the Chinese themselves.¹³¹ This is only likely to increase as nationalist protectionism through economic tariffs by the Trump administration has been touted, with high rates proposed for Chinese goods.¹³²

D. 'Collective Action' Policy Current

The collective action currently argues that forced labour risk and 'Just Transition,' understood as a reduction in the carbon footprint, should not be competing goals, but complementary and reinforcing. It recognises existent tensions between actors and the need to address them. Forced labour is seen as a problem within the current production system, which can only be addressed by the collective action of stakeholders until new and more sustainable production sources are established across supply chains.

Collective action could transform the solar energy production system so that it is just and equitable for all stakeholders, promoting not only the freedom of consumers from fossil fuel dependence but also freedom, human rights, dignity and respect of workers. In the polysilicon space, this current is in its incipient stage. The Responsible Energy Initiative (REI), a project of the Forum for the Future, includes efforts to create a supply chain that is safe and respects rights in a socially just manner across multiple renewable energy sectors with many of the efforts focussed on emerging economies.¹³³ Generating changes in China are not explicitly mentioned but undertaking systems change may eventually address risks in areas like XUAR.

Voices from influential political communities supporting the collective policy current are limited for the time being, their policy currents being defined mainly by the supply chain, and autarky and geopolitical currents. The latter current is likely to increase with the

¹³¹ Roland Busch, 'Siemens-Chef warnt Baerbock vor „konfrontativer Außenpolitik“ gegenüber China,' *Handelsblatt* (30 December 2021), <https://www.handelsblatt.com/unternehmen/industrie/zwangsarbeit-siemens-chef-warnt-baerbock-vor-konfrontativer-aussenpolitik-gegenueber-china/27936968.html> (accessed 15 December 2023).

¹³² George Magnus et al, note 62.

¹³³ Forum for the Future, note 123.

arrival to power of governments appeasing popular desires for self-sufficiency and sovereignty.

IX. Conclusion

Solar energy is central to decarbonisation efforts and Chinese manufacturers are dominant in many tiers of the solar panel supply chain. Their engagement is critical, but Chinese actors' ability to speak and act freely and independently of that of their government is questionable. The government continues to incentivise businesses to use Uyghur and other ethnic minorities in the workforce, and the reduction of modern slavery risks seems unlikely for now. We support the UNGPs approach that downstream companies should engage with suppliers to prevent, mitigate and address human rights abuses before ending that relationship, but in the context of state-sponsored forced labour, this may prove difficult, if not impossible. While businesses and states should continue to engage China, both should also consider developing alternative sourcing options and address the challenge of bifurcated supply chains. States should provide businesses not only legislative guidance but also the necessary support to design new business models in critical sectors and equip themselves with the necessary tools to monitor responsible business conduct. We have noted initial efforts to connect forced labour and climate change, but there is a significant need for a more formal and robust integration of these responses. The four policy currents identified are generally dominated by the supply-chain narrative, with stronger autarkic narratives present particularly in the US through reshoring and in the EU through a normative stance. The collective action current is incipient but promising in its encouraging collaborations across the supply chain. The current highlights at least two areas for future research that focus on lessons of good practice for effective access to nonjudicial remedy, and how climate change mechanisms, such as loss and damage, could respond to the consequences of the energy transition also being a driver of forced labour.

X. Recommendations

As seen from the analysis of the four policy currents, different policy actors frame the challenge and solutions of modern slavery and its intersection with ESGs along four main currents. We propose a set of recommendations that link to the current developments of integrated social-ecological governance in supply-chain assessments and move beyond a supply-chain approach into one that resembles collective action.

A. Business

- **Due diligence**—businesses engaged in the solar global supply chain should implement international standards on human rights due diligence as laid out by the UNGPs. Traceability protocols should become standard and promoted by industry associations.
- **Collective action**—companies should combine forces and share knowledge of risky supply chains to improve working conditions.
- **Withdrawal**—where other practices have failed, business withdrawal from a particular country should be considered. Milestones for disengagement should be established to avoid unintended consequences of immediate withdrawal (such as increased danger to workers in the supply chain, and precarity), and ensure that alternative funding and resource access can be obtained to diversify the solar supply chain.
- **Bifurcation of the supply chain**—companies which engage with suppliers that produce both 'clean' and 'tainted' products should be engaged positively to improve

their sourcing decisions and remove forced labour from their supply chains. Only where this is not achieved through a lack of agreement should businesses withdraw from those suppliers.

- **Remedy**—providing support to individuals and communities who have been affected by forced labour is important for ensuring sustainable supply chains in the future. Workers should have access to both state-based judicial and non-judicial remedy mechanisms. In line with UNGPs and OECD Guidelines for Multinational Enterprises, businesses should provide access to effective remedies for the human rights abuses they caused or contributed to. Examples of good practice should be shared within and across industries.
- **Investment in alternative technologies**—investing in circular economies and alternative resources should be a priority for both private and public funding to diversify supply chains away from XUAR.
- **Leverage**—investors can exercise increasing pressure on businesses to ensure they invest responsibly and provide transparency in their supply chains.

B. Governance

- **Combined legislative responses**—as noted in this article, there is already a shift toward engagement in legislation that addresses climate change and human rights in multiple jurisdictions. Further expansion of these legislative actions for those not engaged in addressing supply chain issues should be penalised.
- **Implementation of forced labour import bans**—these have been functionally operational within the US for several years with commodities including solar panels being prevented from entering the US. Similar proposals have been made by other governance bodies globally and should be considered.
- **Credible sectoral pathways**—governance actors should work together with businesses to establish credible timelines for establishing new sourcing streams, technology types, procurement structures, and financial support needed for businesses to transition away from sourcing goods from solar supply chains linked to forced labour.
- **Dirty list**—following the Brazilian example, the international community should consider a mechanism to alert the international community (both governance and business) to risks of forced labour and environmental degradation; this could include limiting access to financing options for repeat offenders, targeted governance action and support for workers, and would provide key information to ensure equitable sourcing decisions for companies to comply with due diligence mechanisms.

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