

BEYOND COMPLIANCE IN THE RENEWABLE ENERGY SECTOR:

Assessing UK and Australian Modern Slavery Act statements



Sydney, Australia

A woman holds up a sign outside Town Hall voicing her protest against the Adani coal mine. The protesters are calling on the Queensland State Government to withdraw its approval of the Adani coal mine in central Queensland. The Sydney rally is part of a series of rallies around Australia against the Adani coal mine. Photo credit: Don Arnold/Getty Images.



GREEN ENERGY, RED FLAGS: CLIMATE CHANGE, MODERN SLAVERY, AND RENEWABLE ENERGY'S COMPLIANCE GAP

The demand for renewable energy is booming, and for good reason. The global renewable energy market was valued at US\$881.7 billion in 2021 and is expected to reach US\$1.9 trillion by 2030 [1]. The industry has grown at a blistering pace, increasing by 15 per cent from 2020-2021, even amid the COVID-19 pandemic [2]. Official figures show that the sector employed approximately 12.7 million people globally in 2021 [3]. Workers in the industry are vulnerable to various forms of exploitation.

In order to meet the demand for clean energy, businesses are changing their corporate strategies, operations, and supply chains.

This increasing demand is driven by a global movement to reduce greenhouse gas emissions and limit the impacts of climate change. Rising global temperatures are leading to sea level rise, more frequent and severe weather events, natural disasters, food and water insecurity, economic disruption, conflict, and terrorism [4].

As with many global challenges, the impacts are felt most acutely by the world's most vulnerable communities, including those who are living in poverty, lack access to resources and infrastructure, and rely heavily on natural resources for their livelihoods. Recognising, and responding to, the interconnection between human and environmental rights is critical, given the escalating climate crisis.

In response to these pressing challenges at the 2021 UN Climate Change Conference, more than 30 countries signed a declaration to support a "Just Transition" to renewable energy sources internationally [5]. The recommendations adopted reflect international human rights guidelines issued by the International Labour Organization [6], and include supporting workers to transition into new jobs, promoting social dialogue and stakeholder engagement between governments and representatives of workers and employers, and embedding rights-based instruments within global supply chains.

The just transition to renewable energy has the promise of sustainability at its core and has been hailed as a beacon of hope for a greener future. However, evidence already shows that modern slavery is rife in global renewable energy supply chains [7]. Many of the modern slavery risks emerge not from the production of renewable energy, but from operations to extract minerals and resources, which are required in large quantities to produce renewable energy technologies, and from the manufacture of renewable energy products such as solar panels and wind turbines [8].

Workers in the industry are vulnerable to forced labour, wage theft, hazardous conditions, and illegal overtime, among other forms of exploitation. Moreover, some parts of the world with the highest potential in terms of renewable energy sources, are also home to large numbers of labour migrants [9]. Migrant workers are more likely to work under informal contracts [10], lack legal protection and have insufficient information about their rights, which makes them vulnerable to exploitation and abuse from recruiters, employers, and authorities [11].

As a relatively new sector, and with supply chains often operating in locations where laws protecting human rights do not exist, are weak, or are not enforced by local authorities, renewable energy companies have heightened responsibilities to prevent modern slavery and protect workers within their supply chains. Governments in the end-user location also have an integral role in ensuring that markets are not tainted by forced labour.

**Kolwezi,
Democratic Republic
of Congo (DRC)**

Miners at the Shabara artisanal mine, which employs some 20,000 people in shifts of 5,000 at a time, on the hunt for cobalt, a critical component in rechargeable batteries that power mobile phones and electric vehicles. The DRC produces more than 70 percent of the global supply of cobalt, mainly through its industrial mines, but it also has hundreds of thousands of informal diggers who toil in hazardous conditions. Photo credit: JUNIOR KANNAH/AFP via Getty Images.

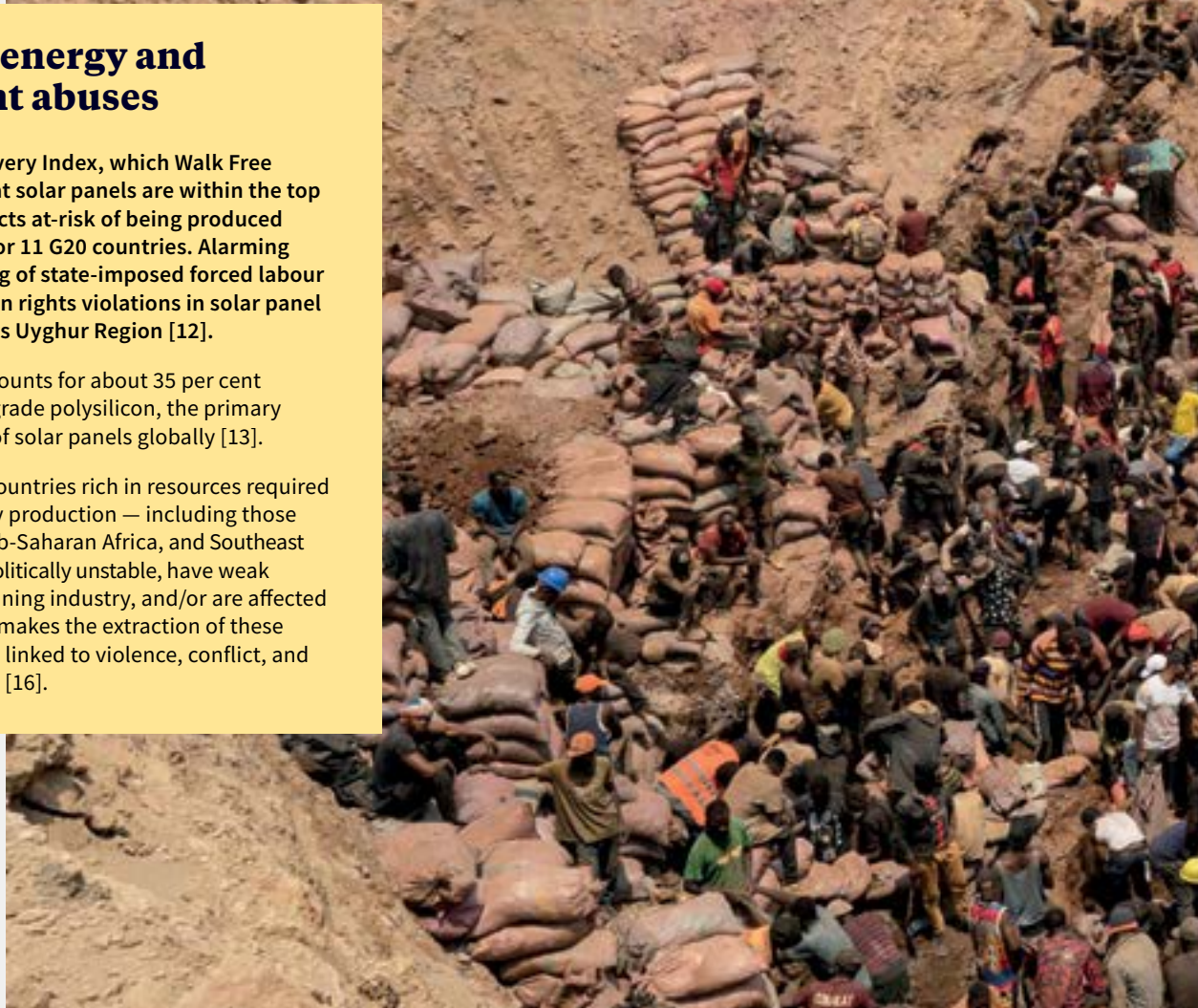


Renewable energy and human right abuses

The 2023 Global Slavery Index, which Walk Free publishes, found that solar panels are within the top five imported products at-risk of being produced with forced labour for 11 G20 countries. Alarming evidence is mounting of state-imposed forced labour and egregious human rights violations in solar panel production in China's Uyghur Region [12].

The region alone accounts for about 35 per cent of the world's solar-grade polysilicon, the primary input in 95 per cent of solar panels globally [13].

Additionally, many countries rich in resources required for renewable energy production — including those in South America, sub-Saharan Africa, and Southeast Asia [14] — are also politically unstable, have weak governance of the mining industry, and/or are affected by conflict [15]. This makes the extraction of these minerals inextricably linked to violence, conflict, and human rights abuses [16].





HOW WE ANALYSED MODERN SLAVERY STATEMENTS

Modern Slavery Acts (MSAs) place obligations on companies in all sectors to report on how they are addressing the risks of modern slavery in their direct operations and supply chains.

To gain an understanding of how the renewable energy sector is complying with these obligations, we assessed the statements produced by the largest and most influential companies reporting under the UK and Australian MSAs in 2020, 2021 and 2022.

This included those working with only renewable energy sources (wind and/or solar and/or hydropower) (44 per cent), and “traditional” energy companies (those dependent on fossil fuels) expanding into the renewables space (56 per cent).

We identified 63 companies required to produce a MSA statement but were unable to find a statement for three of those. The remaining 60 company statements were assessed against a core set of metrics developed based on the legislation and accompanying guidelines. Through a comprehensive literature review and engagement with industry stakeholders, we identified core modern slavery risks that exist in the renewable energy sector, which were developed into metrics for the sector-specific modern slavery risk analysis.

These findings will help governments and companies to:

- understand the extent to which companies in the renewable energy sector are meeting their basic requirements under the two laws, and where they are going beyond compliance.
- explore how companies in the industry are responding to the essence of the just transition by creating decent work opportunities and leaving no one behind.
- support the industry to improve transparency and drive better practice.
- highlight gaps in legislation that should be addressed to raise reporting standards.



Sydney, Australia

Workers install solar panels on the roof of a house in May 2021. Solar panels are crucial in the switch from fossil fuels to renewable energy, but their production poses modern slavery risks. There are allegations that many working in the global supply chain are subjected to forced labour, which is why it is crucial to protect human rights and ensure a just transition and decent work for all. Photo credit: Brendon Thorne/Bloomberg via Getty Images.

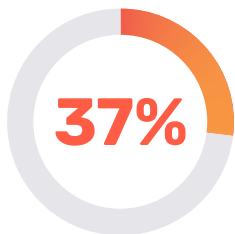
KEY FINDINGS

We analysed 60 company statements produced under the Australian and UK Modern Slavery Acts and these are the five major gaps we discovered.

Note that for some indicators, multiple answers could be selected in the assessment, so in this case totals do not add up to 100 per cent.

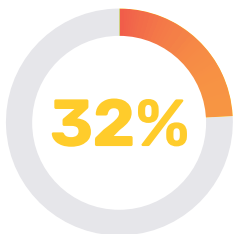
01

Energy companies are failing to effectively meet their reporting obligations under modern slavery legislation.



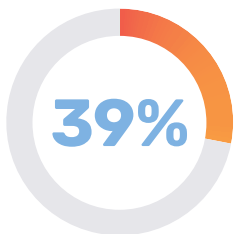
Only 37 per cent of companies meet the minimum requirements for the legislation they are reporting under.

AUS
MSA



32 per cent of companies reporting under the Australian Act met the minimum requirements, compared to 39 per cent reporting under the UK MSA. Minimum requirements differ significantly between each jurisdiction, as outlined in the below table.

UK
MSA



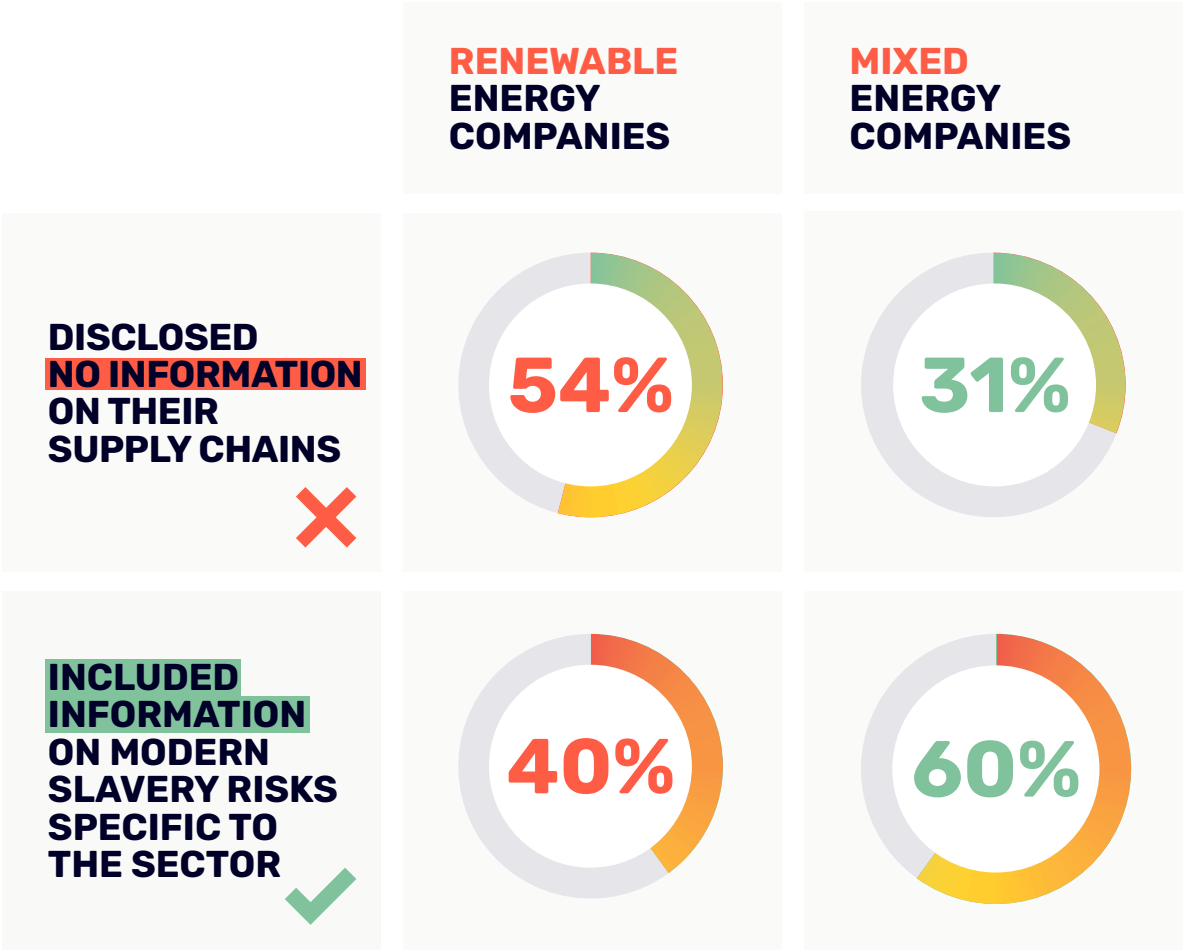
Australia MSA minimum requirements	UK MSA minimum requirements
Statement is submitted to the Australian Modern Slavery Register	Statement is signed by appropriate person
Statement has been approved by the Board	Statement has been approved by the Board
Statement has been signed by the appropriate person	There is a link on the company’s website homepage to the statement
Statement describes the organisational structure and discloses details about its supply chain	
Statement describes the actions taken by the reporting entity, including a modern slavery policy, whistleblowing mechanism, any incidents of modern slavery or a remediation policy	
Statement describes how the reporting entity assesses effectiveness, including Key Performance Indicators	
Statement describes how they have consulted with their owned/controlled entities	

KEY FINDINGS

02

Companies working with only renewable energy sources are falling behind.

While an initial evaluation shows that reporting rates of companies are high under both Acts — **with 95 per cent of companies having published a modern slavery statement** — further analysis reveals a shallow response and raises concerns over how seriously companies are taking their obligations.

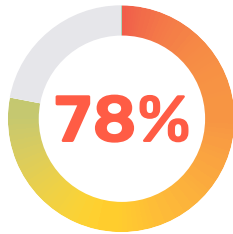


Companies within this assessment with a “renewables only” offering (**44 per cent**) are performing worse than those with mixed offerings across most metrics. This includes considerably lower disclosure rates related to mapping supply chains, identifying supply chain risks, and responding to sector-specific modern slavery risk.

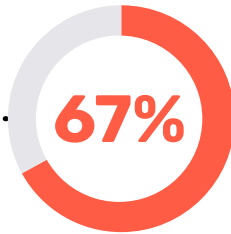
This is a particularly shocking finding, given the transition to renewable energy has sustainability and fairness at its core. It raises serious concerns that renewable energy companies are failing to protect people in the pursuit of protecting the planet.

03

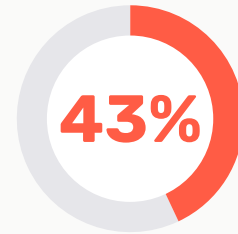
Ineffective disclosures by companies render millions of workers invisible.



78 per cent of companies disclosed having a modern slavery policy in place.



Of those, **67 per cent** did not apply them beyond their tier one (direct) suppliers.



43 per cent of companies disclosed no information on their supply chains, and not a single company disclosed the names of their suppliers [17].

By only applying modern slavery policies to direct suppliers, and not disclosing details of their supply chains, companies are failing to recognise or protect and safeguard numerous workers. This is especially concerning given the complex and fragmented nature of energy sector supply chains.



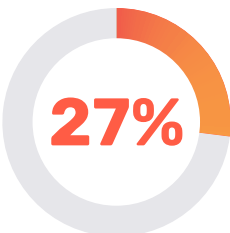
Akto, Xinjiang Province, China,

Vehicles pass through a checkpoint on a road near a facility believed to be a government re-education camp detaining Uyghur peoples. Various reports allege that Uyghurs, and other Muslim ethnic groups, are forcibly held in a network of internment camps in the province, where they reportedly face abuses including forced labour. The government claims the facilities are simply “vocational education centres” to steer people away from extremism. Photo credit: Greg Baker/AFP via Getty Images.

KEY FINDINGS

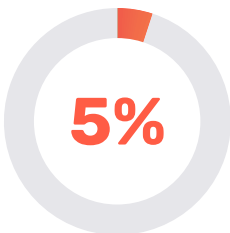
04

Companies are not approaching due diligence or remediation with a worker-focused lens.



NO SUPPLY CHAIN DUE DILLIGENCE IN PLACE

More than a quarter (27 per cent) of companies have no supply chain due diligence in place. This means there is no risk management (such as conducting audits or site visits) nor remediation process, seriously impeding their ability to detect or respond to exploitation.



NO DIRECT WORKER REMEDIATION

Only 5% of companies disclosed direct worker remediation policies. Such policies prioritise the well-being, rights, and dignity of affected workers, and is the response most likely to foster long-term solutions to prevent future exploitation.

Companies in the renewable energy sector are operating in a high-risk environment, yet **32 per cent** did not disclose any measures to identify modern slavery risks. Further, **only three companies** disclosed detecting an incident(s) of modern slavery in their supply chains. Unfortunately, we know the number of incidents is likely to be far higher, suggesting that either risk assessment and identification processes are inadequate, or companies are not being transparent.

Only 67 per cent of companies disclosed having a whistleblowing mechanism, meaning the remainder may have no means for supply chain workers to raise concerns. It is encouraging to see some inclusion of a focal point (**17 per cent**), especially given that this has been an extremely low performing metric within all other sectors we have previously assessed (hotels, asset managers, and garment industries).

BP plc. Acting on workplace grievances in Azerbaijan

BP disclosed that a group of its contractors raised complaints through its confidential grievance hotline about issues that included non-payment of salaries and overtime. The average amounts owed were equivalent to three months' salary.

The contractors also reported issues with contracts and lack of resolution when they brought these matters to their employer's attention.

BP responded by carrying out assessments which substantiated the complaints and identified further issues. Over the course of the following six months, the central BP team worked with the contractor to address the findings, provide backpay of outstanding wages, make updates to their terms and conditions, improve time and pay records, provide payslips, and strengthen workplace communication mechanisms.

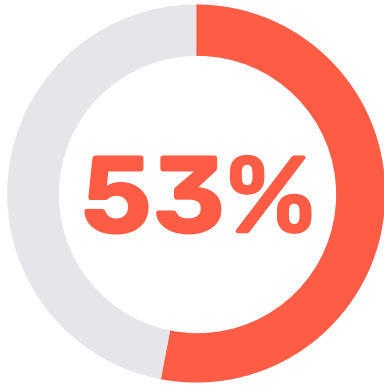


The BP case study (see left) represents good practice in terms of incident identification and worker remediation through continuous engagement with suppliers to improve standards. However, **only 5 per cent** of companies disclosed direct worker remediation policies. Concerningly, across all companies, the most common form of remediation was to cancel contracts (**32 per cent**).

Cancelling contracts when a risk or incident is identified should be a last resort — simply cutting ties with a factory or supplier could increase the risk that workers are exposed to forced labour or other forms of exploitation. These results suggest that many companies are approaching worker remediation as a risk cutting exercise for the company itself, perhaps to protect their own reputations, rather than placing individual workers' wellbeing as central to the remediation process.



THE MOST COMMON FORM OF REMEDIATION WAS TO CANCEL CONTRACTS.

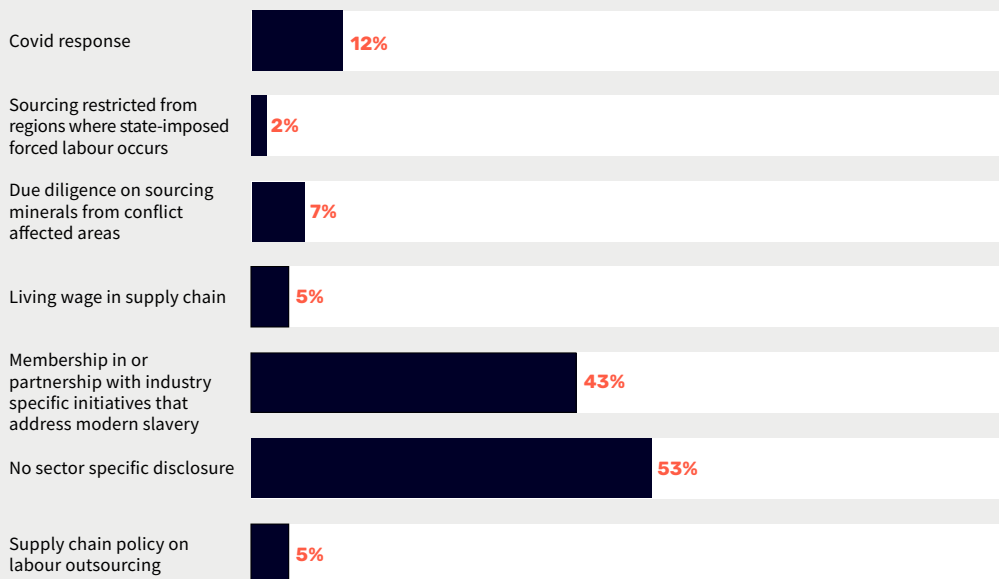


MORE THAN HALF OF COMPANIES DID NOT INCLUDE ANY DISCLOSURES ON SECTOR-SPECIFIC MODERN SLAVERY RISK.

Although reporting on these risks is not included in government guidance accompanying either legislation, we would, in the spirit of the law, expect to see companies actively engaging in modern slavery risks that are well known within this sector.

Despite the grave human rights violations and evidence of state-imposed forced labour associated with solar panel production in the Uyghur Region in China, only one company disclosed that they require confirmation by suppliers that they do not use polysilicon or other components originating from the Uyghur Region.

Companies addressing sector-specific modern slavery risk (per cent)



RECOMMENDATIONS

There is significant room for improvement for companies working in the renewable energy sector across the UK and Australia.

Governments have a crucial role to play in ensuring that supply chains are not tainted by exploitation, and that corporate compliance is strengthened.

*Cape Jervis,
South Australia, Australia*

The area houses the first wind farms built in South Australia, generating energy to meet the needs of tens of thousands of households. The site was selected due to having consistently high winds, being sparsely populated and having been previously cleared for farming and grazing.



Companies should:

Improve reporting under the MSAs

Review the Home Office guidance and requirements of the Act (UK) and Border Force minimum reporting standards (Australia) to ensure compliance with modern slavery legislation.

Facilitate analysis of their statements by clearly stating which legal entities it applies to, including the financial year it refers, and provide historic records of their statements to facilitate year-on-year review.

Provide their statement in a machine-readable format, either html or digital PDF.

Improve supply chain transparency

Map their supply chains to gain better visibility of all tiers to identify risks and disclose these in MSA statements.

Disclose specific incidents of modern slavery and steps to remedy these. Steps should focus on worker remediation.

Engage with industry and non-industry initiatives

Industry initiatives can be a valuable opportunity for companies to learn from experts and peers. These also help lift the industry standard for preventing, identifying, and mitigating modern slavery risks, and facilitates effective remediation.

Conduct due diligence to address modern slavery sector-specific risk

Inadequate national labour laws

Many countries do not enshrine international standards set out in ILO Conventions, including the 1929 ILO Forced Labour Convention and the 2014 ILO Forced Labour Protocol as well UN Guiding Principles on Business and Human Rights. In the absence of these, companies should implement extra due diligence to uphold labour rights and human rights in their supply chains.

State-imposed forced labour

Owing to the known state-imposed forced labour risks in renewable energy supply chains, companies should not source, should restrict, or avoid supply chain operations within these regions and disclose this in their statements.

Conflict minerals

Companies must recognise the significant risks associated with sourcing minerals from conflict-affected areas and implement best practice — such as those found in OECD guidelines [18] — in responding to and mitigating these.

Migrant workers

Companies should review all policies regarding increased risk for migrant workers, including prohibiting the use of recruitment fees in their supply chains.

Supply chain wages

Low and underpayment of wages are an indicator of forced labour. Companies should audit the wages of all workers in their supply chains to ensure living wage is applied.



The Australian and UK governments should:

- 1** Strengthen reporting, compliance, and the relevant MSA through improved guidance, monitoring, review, and enforcement.
- 2** Address the weak compliance and lack of enforcement action by using existing compliance measures proactively where reporting entities are failing to report or comply with reporting requirements (i.e., approval and signing provisions and including the mandatory reporting criteria). New regulatory enforcement tools should also be established — including financial penalties, debarment from government procurement and injunctive relief — to compel entities to report or comply with the reporting requirements.
- 3** Implement a review schedule to ensure the legislation is updated to reflect international standards and learning from the effectiveness of supply chain transparency and mandatory human rights due diligence laws.
- 4** Issue additional guidance to companies operating in high-risk areas or sectors.

The Australian government should:

- 1** Lower the monetary threshold for reporting entities to AU\$50 million to be in line with the UK Act monetary threshold of GB£36 million and the New Zealand Act's monetary threshold for large entities of NZ\$40 million.
- 2** Revise the mandatory criteria and the Commonwealth Guidance for Reporting Entities to require risk assessment of and actions to be taken across the value chain and reporting on the impact of actions taken.

The UK government should:

- 1** Enact reforms to the MSA announced in 2020, including establishing mandatory reporting criteria and a single reporting deadline, extending the legislation to apply to the public sector, and making submission to the UK government registry compulsory.
- 2** Publish a list of companies required to report under the MSA and create or nominate a body to monitor compliance.

WHERE TO FROM HERE?

Modern slavery is the antithesis of sustainable development and responsible business [19]. And yet, the sustainable future is being built on exploitation [20]. It is vital that progress in this area does not equate to a shift from environmental to human exploitation [21]. Clean energy must mean exactly that – for both the environment and the people in global supply chains.

Modern slavery legislation in the UK and Australia is only effective in so far as it is meaningfully engaged with by companies. Our assessment reveals that, too often, companies in the renewable energy sector are failing to meet the true essence of both MSAs and the just transition. At the same time, our research highlights the inadequacy of mandatory human rights disclosure that has no consequence for substandard reporting standards. Both companies and government need to take action.

A truly just transition places equal emphasis on social justice and environmental protection. To fail to meaningfully engage with the protection of workers in supply chains is to undermine the very principles that underpin the renewable energy movement.

As we look to commitments made on the global stage in the pursuit of a greener future, it is imperative that the systems we put in place to address the climate crisis are equally as committed to protecting the human rights of those involved. For a truly sustainable solution, the future must be powered responsibly.

Hebei, China,

*A farmer tends his sheep near solar panels installed on a hillside. Modern slavery risks permeate the supply chains of renewable energy products like solar panels and wind turbines.
Photo credit: Greg Baker/AFP via Getty Images.*



REFERENCES

- 1 Spherical Insights LLP 2022, *Global Renewable Energy Market Size to grow USD 1930.6 Billion by 2030*. Available from: <https://www.globenewswire.com/en/news-release/2022/10/05/2528569/0/en/Global-Renewable-Energy-Market-Size-to-grow-USD-1930-6-Billion-by-2030-CAGR-of-8-5-Spherical-Insights-Consulting>. [15 August 2023]., International Energy Agency 2021, *Renewable electricity growth is accelerating faster than ever worldwide*. Available from: <https://www.iea.org/news/renewable-electricity-growth-is-accelerating-faster-than-ever-worldwide-supporting-the-emergence-of-the-new-global-energy-economy>. [15 August 2023].
- 2 Forbes 2022, *Renewable Energy Grew At A Blistering Pace In 2021*. Available from: <https://www.forbes.com/sites/rrapier/2022/08/23/renewable-energy-grew-at-a-blistering-pace-in-2021/?sh=242dd0b82025>. [15 August 2023].
- 3 International Renewable Energy Agency 2022, *Renewable Energy Jobs Hit 12.7 Million Globally*. Available from: <https://www.irena.org/News/pressreleases/2022/Sep/Renewable-Energy-Jobs-Hit-12-7-Million-Globally>. [15 August 2023].
- 4 International Labour Organization (ILO), Walk Free & International Organization for Migration (IOM) 2022, *Global Estimates of Modern Slavery*, p. 53. Available from: https://cdn.walkfree.org/content/uploads/2022/09/12142341/GEMS-2022_Report_EN_V8.pdf. [21 September 2022].
- 5 The UN Climate Change Conference 2021, *Supporting the conditions for a Just Transition internationally*. Available from: <https://web.archive.nationalarchives.gov.uk/ukgwa/20230313132211/https://ukcop26.org/supporting-the-conditions-for-a-just-transition-internationally/>. [21 August 2023].
- 6 International Labour Organization n.d., *Frequently Asked Questions on just transition*. Available from: https://www.ilo.org/global/topics/green-jobs/WCMS_824102/lang--en/index.htm. [26 October 2022].
- 7 Grist 2021, *The renewable future is being built on exploitation*. Available from: <https://grist.org/energy/renewable-energy-companies-dont-recognize-human-rights-obligations/>. [15 August 2023].
- 8 Deberdt, R & Billon, PL 2022, *The Green Transition in Context—Cobalt Responsible Sourcing for Battery Manufacturing, Society & Natural Resources : An International Journal*. Available from: <https://www.tandfonline.com/doi/abs/10.1080/08941920.2022.2049410>. [15 August 2023], Anti-Slavery International and Dublin City University 2021, *From a vicious to virtuous cycle: Addressing climate change, environmental destruction and contemporary slavery*. Available from: https://www.antislavery.org/wp-content/uploads/2021/04/ASI_ViciousCycle_Report_web2.pdf. [19 April 2023], Cockayne, J, Huerta, ER & Burcu, O 2022, *'The Energy of Freedom'? Solar energy, modern slavery and the Just Transition*, University of Nottingham Rights Lab, pp. 5-27. Available from: <https://www.nottingham.ac.uk/research/beacons-of-excellence/rights-lab/resources/reports-and-briefings/2022/march/the-energy-of-freedom-full-report.pdf>. [12 July 2022].
- 9 ODI 2022, *Migration for climate action: how labour mobility can help the green transition*. Available from: <https://odi.org/en/insights/migration-for-climate-action-how-labour-mobility-can-help-the-green-transition/>. [15 August 2023].
- 10 International Labour Organization, *Labour Migration*. Available from: <https://www.ilo.org/moscow/areas-of-work/labour-migration/lang--en/index.htm>. [15 August 2023].
- 11 As above
- 12 Morton, A 2022, *'Evidence grows of forced labour and slavery in production of solar panels, wind turbines'*, The Guardian. Available From: <https://www.theguardian.com/environment/2022/nov/29/evidence-grows-of-forced-labour-and-slavery-in-production-of-solar-panels-wind-turbines> [15 August 2023].
- 13 Crawford, A & Murphy, LT 2023, *Over-Exposed: Uyghur Region Exposure Assessment for Solar Industry Sourcing*, Sheffield Hallam University. Available from: <https://www.shu.ac.uk/helena-kennedy-centre-international-justice/research-and-projects/all-projects/over-exposed>. [15 August 2023].
- 14 International Institute for Sustainable Development 2018, *Green Conflict Minerals: The fuels of conflict in the transition to a low-carbon economy*. Available from: <https://www.newsecuritybeat.org/2018/09/green-conflict-minerals-investigating-renewable-energy-supply-chains-fragile-states/#:~:text=Green%20Conflict%20Minerals%3A%20The%20fuels,in%20the%20worst%20cases%20E2%80%94%20violence>. [15 August 2023].
- 15 Church, C & Crawford, A 2020, *'Minerals and the Metals for the Energy Transition: Exploring the Conflict Implications for Mineral-Rich, Fragile States', The Geopolitics of the Global Energy Transition*. Available from: https://link.springer.com/chapter/10.1007/978-3-030-39066-2_12. [15 August 2023].
- 16 OECD 2016, *OECD Due Diligence Guidance for Responsible supply Chains of Minerals from Conflict-Affected and High-Risk Areas*. Available from: <https://www.oecd.org/daf/inv/mne/mining.htm#:~:text=Investment%20policy,-OECD%20Due%20Diligence%20Guidance%20for%20Responsible%20Supply%20Chains%20of%20Minerals,Affected%20and%20High%20Risk%20Areas&text=The%20OECD%20Due%20Diligence%20Guidance,mineral%20purchasing%20decisions%20and%20practices>. [15 August 2023].
- 17 This did occur in other sectors we researched. For example, 24 per cent of assessed companies in the garment sector disclosed the names of their suppliers.
- 18 OECD 2016, *OECD Due Diligence Guidance for Responsible supply Chains of Minerals from Conflict-Affected and High-Risk Areas*. Available from: <https://www.oecd.org/daf/inv/mne/mining.htm#:~:text=Investment%20policy,-OECD%20Due%20Diligence%20Guidance%20for%20Responsible%20Supply%20Chains%20of%20Minerals,Affected%20and%20High%20Risk%20Areas&text=The%20OECD%20Due%20Diligence%20Guidance,mineral%20purchasing%20decisions%20and%20practices>. [15 August 2023].
- 19 Cockayne, J, Huerta, ER & Burcu, O 2022, *'The Energy of Freedom'? Solar energy, modern slavery and the Just Transition*, University of Nottingham Rights Lab, pp. 5-27. Available from: <https://www.nottingham.ac.uk/research/beacons-of-excellence/rights-lab/resources/reports-and-briefings/2022/march/the-energy-of-freedom-full-report.pdf>. [12 July 2022].
- 20 Rubiano, MP 2021, *The renewable future is being built on exploitation*, Grist. Available from: <https://grist.org/energy/renewable-energy-companies-dont-recognize-human-rights-obligations/>. [15 August 2023].
- 21 Riquelme, M, Metcalf, K & Vaughan, J 2022, *Addressing Human Rights Risks in Renewable Energy Supply Chains*, BSR. Available from: <https://www.bsr.org/en/blog/addressing-human-rights-risks-in-renewable-energy-supply-chains>. [15 August 2023].

Cover image:

Jiangsu, China

A renewable energy farm producing wind and solar energy. In recent years, the installed capacity of renewable energy in Jiangsu has been developing rapidly. Jiangsu is among the leading regional economies in eastern China, which often act as models or pilot zones to test and scale policy initiatives, such as the low-carbon energy transition.