

Eradicating Forced Labor from Solar Supply Chains:

Eventide's Approach

Forced labor contaminates solar supply chains. This report examines the scale of the crisis and describes Eventide's proposed solution.

How Does Forced Labor Affect the Solar Supply Chain?



INTRODUCTION

At Eventide Asset Management, one of our core investment ideals is respecting the value and freedom of all people. For this reason, we take a strong stance against the use of forced labor at any stage in a company’s supply chain. For example, when we discover that one of our portfolio companies sources from a factory with labor issues, we engage the company to work with their suppliers to address this issue. If their supplier is unwilling or unable to do so and the company is unwilling to cut ties with the supplier, we would divest the company in question. But what if an entire supply chain is riddled with forced labor issues? What if an entire industry has become entangled in a state-sanctioned, ethnically motivated system of oppression?^{1,2} This is the question facing the solar industry, and investors, today.



↑ Above: Workers manually crush silicon in Jingang Circular Economy Industrial Park, Ili Prefecture, Xinjiang. Source: *Kokodala News via Weixin*.

Below: Suntech International Clean Energy Ltd. representatives visit transferred laborers at the East Hope Zhudong facility. Source: *Weixin*.

The link between forced labor and solar begins in the Xinjiang region of China, home to 12 million Uyghurs. Disguised with terms such as “surplus labor”, “labor transfer”, and “poverty alleviation”, Chinese government documents and news reports reveal an industrial-sized forced labor program.³ Under current conditions, the Uyghur people and other minority groups are denied the right to free choice of employment as stated in Article 23 of the U.N. Declaration of Human Rights.⁴

Forced Labor is part of a larger network of oppression against ethnic and religious minorities in Xinjiang (see page 4). Atrocities are directed by the Chinese Communist Party and through the Xinjiang Production and Construction Corps (XPCC), a paramilitary organization that dominates the region.⁵

IN BROAD DAYLIGHT REPORT

“Labour transfers are deployed within an environment of unprecedented coercion, undergirded by the constant threat of re-education and internment.”⁶

MANUFACTURING A SOLAR PANEL

Since forced labor enters the supply chain early on, up to 97% of all polysilicon-based solar panels are contaminated by forced labor.

1 Raw Materials



67% of raw materials come from China (2020)⁷

Forced labor enters the solar supply chain in the first step: mining quartz and making metallurgical silicon. Xinjiang accounts for about 33.4% of the world's metallurgical silicon production.⁸ Of the ten major metallurgical silicon producers in the region, seven directly use forced labor. The three remaining producers are suspected of employing forced labor and are direct beneficiaries of the XPCC.⁹

2 Polysilicon



82% of polysilicon comes from China (2021)¹⁰

Three of the primary polysilicon makers in Xinjiang directly use forced labor and have forced labor in their supply chains. A fourth has forced labor in its supply chain and directly benefits from the XPCC.¹¹ Collectively, they were responsible for about 48% of the world's polysilicon production in 2021.¹²

3 Ingots



Since these four companies supply polysilicon to up to 97% of the ingot, wafer, cell, and module manufacturers, those manufacturers also have forced labor in their supply chains. To make matters worse, in the ingot making process, manufacturers likely mix polysilicon from a variety of sources, tainting every panel downstream.¹³

4 Wafers



97% of wafers come from China (2020)¹⁴

Polysilicon is melted and shaped into ingots, which are in turn sliced into wafers and then used to construct photovoltaic cells.¹⁵

5 Cells

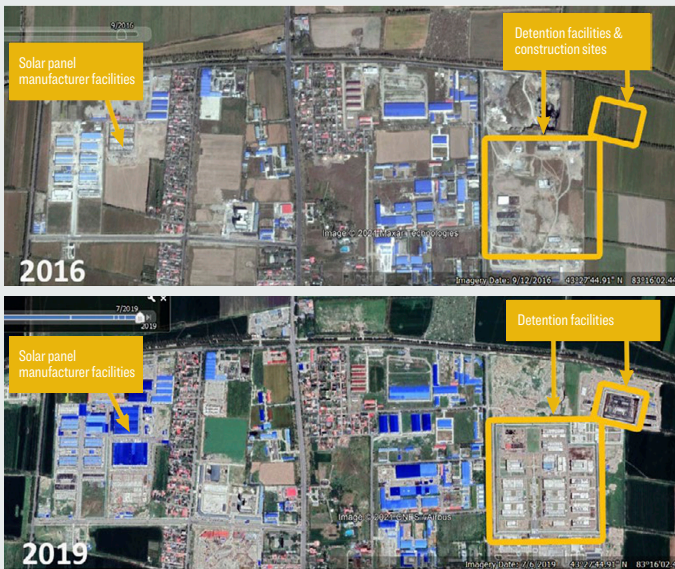


While most module makers do not directly use forced labor, at least one factory has been found to be co-located with a high security internment camp.¹⁶

6 Modules



Several countries and organizations have called the atrocities in Xinjiang a genocide.^{17,18,19} What started with incarceration of Uyghurs suspected of ties to terrorism has grown into mass imprisonment of at least one million Uyghurs detained for reasons as simple as praying.²⁰ Survivors of these camps report torture, rape, and forced sterilization, among other atrocities.²¹



Source: In Broad Daylight Report, Sheffield Hallam University

← Industry and internment camps are co-located.²²

↓ Before and after imagery of the Jafari Sadiq shrine, an example of one of thousands of religious sites that have been destroyed.²³



Source: The New York Times

“It’s not immediate, shocking, mass-killing on the spot type of genocide, but it’s slow, painful, creeping genocide.” —Joanne S. Finley, PhD, Newcastle University, UK²⁴

↓ Surveillance cameras are everywhere—in streets, doorways, shops, mosques.²⁵



Source: The New York Times

OPEN-AIR PRISON

Outside the camps, Xinjiang has become an open-air prison. Surveillance cameras use artificial intelligence to send real-time alerts when a Uyghur person leaves their neighborhood.²⁶ Uyghur families are assigned Han Chinese “relatives,” who live in their houses to monitor them for suspicious behavior like praying or abstaining from alcohol.²⁷ Ancient cemeteries, mosques, and shrines have been demolished.²⁸ Children are taken from their parents and sent to massive state-run orphanages.²⁹ The UN is also investigating allegations of organ harvesting.³⁰

China cuts Uighur births with IUDs, abortion, sterilization

By The Associated Press June 29, 2020

Source: The Associated Press³¹



Source: *The Times*

OPPRESSION OF WOMEN

Some of the worst atrocities in Xinjiang have been committed against women. “Uyghurs and Kazakhs were brought in hooded and shackled. The women spoke of beatings, inedible food, beds stained with urine ... and blood. Sabit met two women who had bruises on their wrists and ankles — marks, they told her, from shackles that were never removed.”⁴⁰

“Women were removed from the cells ‘every night’ and raped by one or more masked Chinese men. She said she was tortured and later gang-raped on three occasions, each time by two or three men.”⁴¹

Chinese Han men have been sent to stay with Uyghur women and sleep in their beds while their husbands are in the camps.⁴²

→ Shrouded in secrecy, at least one million ethnic Uyghurs in China are being held in what resembles a massive internment camp.³⁸

↓ Detainees in a Xinjiang Re-education Camp listening to “de-radicalization” talks.³⁹



Source: *In Broad Daylight Report, Sheffield Hallam University*

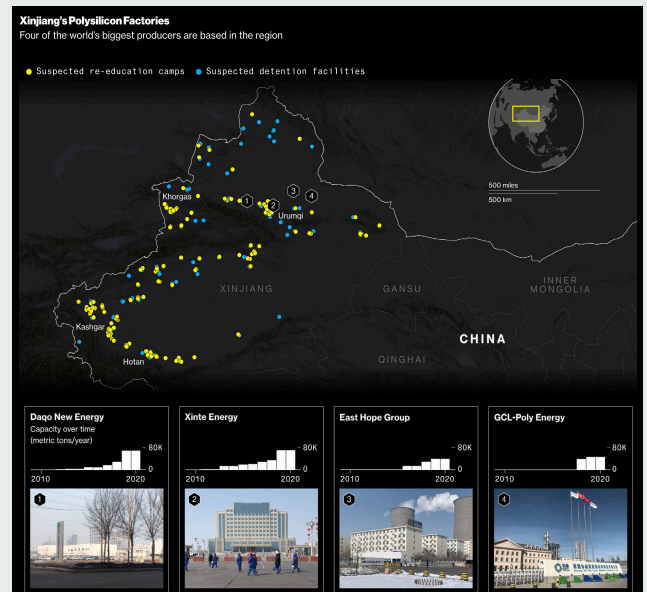


Source: *YeniSafak, original source unknown*

FORCED LABOR

Forced labor in Xinjiang is directly connected to the above-mentioned atrocities. The government transfers Uyghurs en masse from internment camps to factories across China.³² Many factories are intentionally built next to detention camps, as seen in the map to the right.³³ Furthermore, after release, some former detainees are given labor assignments and told if they don’t sign the contract, “[they will] be sent back to the camp.”³⁴

The government pays companies to receive these workers and offers various incentives, such as free electricity and tax benefits.³⁵ Chinese authorities conceal these programs using terms like “poverty alleviation,” “surplus labor,” or “vocational training.”³⁶ But, in reality, on the work site, workers face constant surveillance, long hours, mandatory indoctrination, and the threat of further detention.³⁷

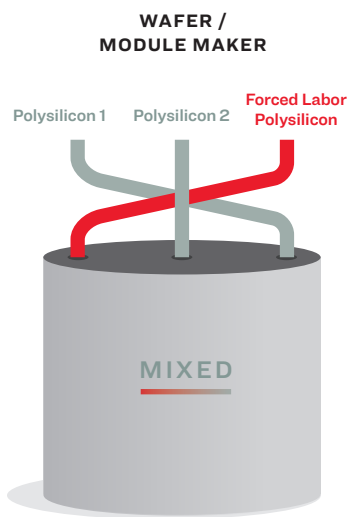


Source: *Bloomberg, April 2021*

How is Eventide Addressing This Issue?

We are directly engaging companies in the solar supply chain who have the **power to change sourcing** and asset managers who have the **power to move capital**.

We propose a phased approach that focuses first on the worst offenders — companies directly employing forced labor. We recommend three phases, each occurring over a six-month period to allow time for supply chains to respond and increase capacity.



↑ When ingots and wafers are made, polysilicon from many sources is mixed together. If one polysilicon company is exposed to forced labor, **all of the products** are contaminated.

WHAT COMPANIES AND REGULATORS ARE DOING TODAY

Many companies in the solar industry have examined their supply chains and have signed on to the Solar Energy Industries Association’s Forced Labor Prevention Pledge. This pledge supports a traceability protocol that tracks raw materials and polysilicon.⁴³ The American Clean Power Association also supports this traceability protocol.⁴⁴

Creating a traceability protocol is an important first step to complying with the U.S.’s Withhold Release Order (WRO): this WRO permits the United States Customs and Border Protection to detain or confiscate solar panels that contain products from Hoshine Silicon Industry Co. Ltd, a large raw material provider in Xinjiang, at the U.S. border.⁴⁵ Section 307 of the Tariff Act of 1930 (19 U.S.C. § 1307) prohibits the importation of “merchandise mined, produced or manufactured, wholly or in part, in any foreign country by forced or indentured labor Such merchandise is subject to exclusion and/or seizure and may lead to criminal investigation of the importer(s).”⁴⁶

On December 23rd, the United States signed into law the Uyghur Forced Labor Prevention Act, which bans the importation of products from Xinjiang unless importers can demonstrate that no forced labor was used in the production of the goods.⁴⁷ It is prudent for solar developers to ensure compliance with this policy and urgently prepare their supply chains for the years to come.

IN BROAD DAYLIGHT REPORT

“In the Uyghur region, companies create green energy...but sacrifice humane labour conditions in the bargain.”



Sourcing from companies that do not use forced labor — directly or in their supply chains— for any of their products is the long-term solution.

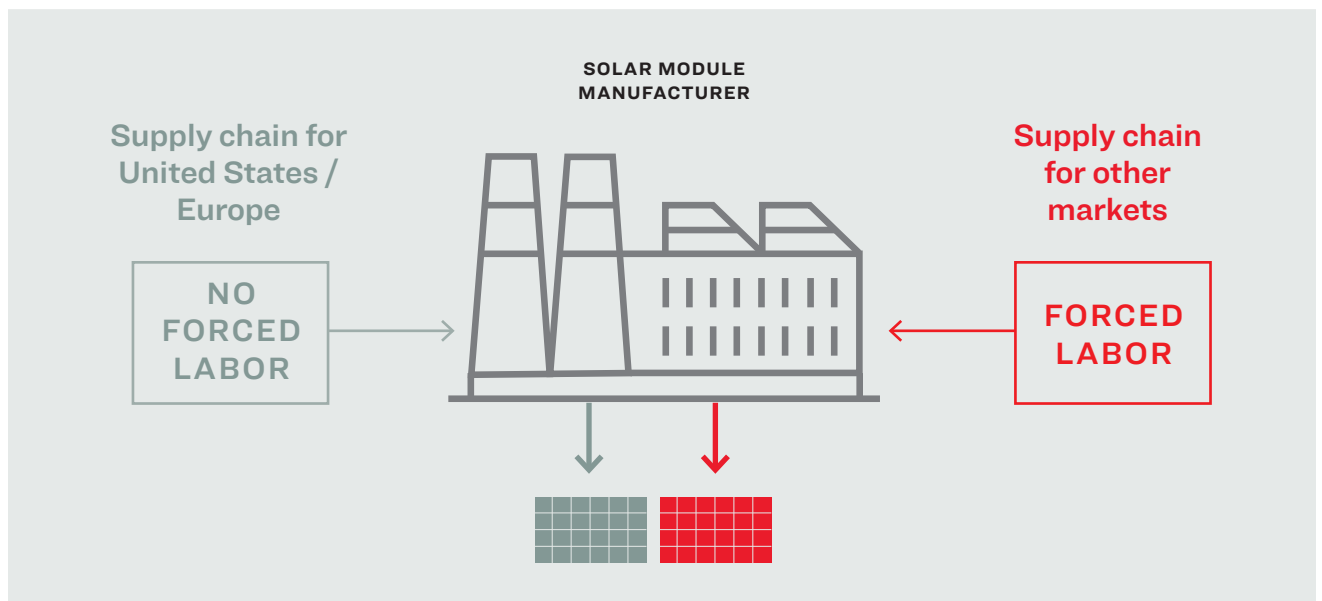
THE PROBLEM OF BIFURCATION

At Eventide, we support the implementation of traceability as a first step. However, traceability may create a problematic bifurcated supply chain that falls well short of an ethical solar supply chain with fair labor practices and justice for the Uyghur people.

In a bifurcation scenario, one company can support two separate supply chains, one with forced labor to serve markets less concerned by these practices and another without forced labor to serve the U.S. and E.U. markets. Implementing traceability alone allows the company to continue to benefit from and rely on exploitation through forced labor without losing important business due to unethical practices. Suppliers could expand their use of forced labor in Xinjiang or in other parts of China, while passing through product in a separate supply chain that meets the traceability protocol.

Sourcing from companies that do not use forced labor — directly or in their supply chains — for any of their products is the long-term solution. Otherwise, companies are participating in the cumulative destruction of the Uyghur people through the insidious nets of forced labor, family separation, and forced sterilization, among other atrocities.

↓ The issue: In a bifurcation scenario, even with traceability, one company can support two separate supply chains, using forced labor to serve markets less concerned by these practices and avoiding forced labor to serve the U.S. and E.U. markets.



At Eventide, we are pushing
for a *comprehensively*
forced-labor-free solar
supply chain.

The *future* of renewable
energy depends on it.

REGINALD SMITH
RESEARCH ANALYST



A Phased Approach to Eradicating Forced Labor

PHASE ONE

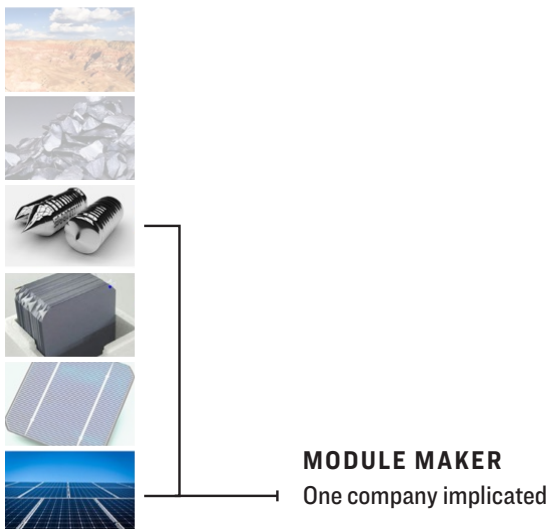
OVERVIEW

Solar developers stop sourcing from module makers that directly employ forced labor.

To get off the banned list, implicated solar panel manufacturers would need to prove they are no longer employing forced labor. During this phase, module makers can begin to procure polysilicon from companies that do not directly use forced labor or do not have forced labor in their supply chains. These suppliers could be temporary sources until they either take remedial actions or are ultimately phased out in Phase Three. However, some of these companies may still be sourcing raw materials from Hoshine and therefore may still be subject to the U.S.'s WRO.

ENGAGE OR BAN*

Module makers directly employing forced labor



PHASE TWO

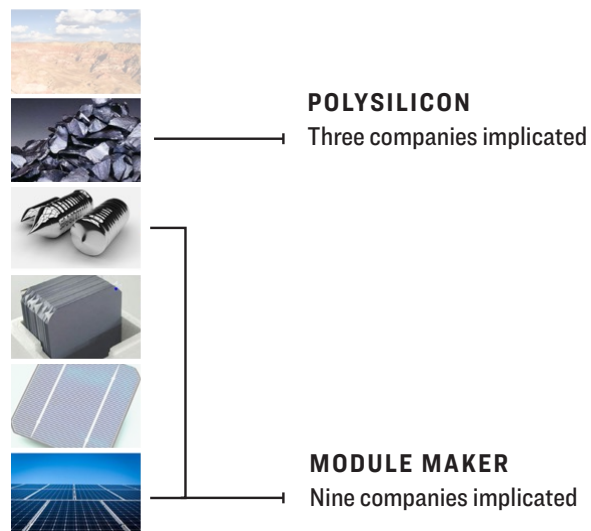
OVERVIEW

Solar developers stop sourcing from module makers that source from polysilicon providers that directly employ forced labor.

Any module maker that procures polysilicon from a company that directly employs forced labor is banned at the end of this phase. If a module maker does not shift their polysilicon supply, then solar development companies can continue to source modules from Phase Three module makers (see below), allowing their business operations to continue.

ENGAGE OR BAN*

Polysilicon providers directly employing forced labor; module makers sourcing from those polysilicon providers.



PHASE THREE

OVERVIEW

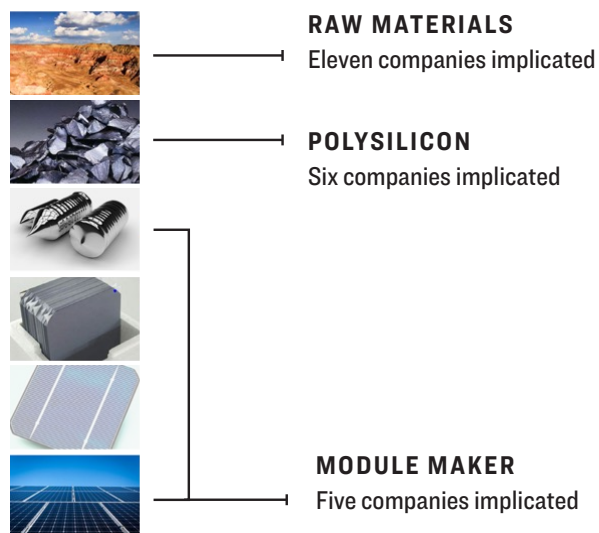
Solar developers stop sourcing from either module makers or polysilicon companies that have exposure to raw material providers who directly use forced labor or are implicated in such practices.

Module makers that only have forced labor in their raw material supply chains are banned at the end of this phase. Raw material providers often work with the XPCC, which executes much of the human rights abuses against people in Xinjiang.⁴⁸ Solar raw material suppliers are heavily exposed to the XPCC; many are in XPCC-controlled industrial parks, obtain services from the XPCC, or are directly subsidized by the XPCC.⁴⁹

In this step, raw material procurement must be completely removed from companies that operate in the region unless the raw material supply from Xinjiang itself becomes free of forced labor. Companies in this step will have had ample time to act.

ENGAGE OR BAN*:

**Raw material suppliers who use forced labor or are implicated in such practices.
Companies with exposure to forced labor through raw materials providers.**



Acknowledgment

We would like to give special thanks to Laura T. Murphy and Nyrola Elimä, whose “In Broad Daylight” report produced through the Helena Kennedy Centre for International Justice at Sheffield Hallam University has shed tremendous light on this difficult situation. Their work made this report possible.

At Eventide

Eventide is not invested in the companies listed in this report that directly use forced labor or are implicated in such practices. Eventide believes that companies can successfully take remedial actions on this issue. We believe that a supply chain with labor integrity is a driver of long-term business success. We are interested in being a part of the solution in the solar supply chain. We want to invest in solar supply chain companies that are making solar panels with no forced labor from start to finish. We also want to invest in solar power developers who are only doing business with companies free of forced labor.

Disclosures

The information contained in this report is obtained from third-party sources and is believed to be accurate and complete as of January 2022. This situation is rapidly evolving and circumstances may materially change in the future from what has been presented. Eventide is not legally liable for any inaccuracies, misrepresentations, or misstatements in the report as of its publishing date or in the future.

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Bibliography

1. Murphy, Laura T., and Nyrola Elimä. "In Broad Daylight: Uyghur Forced Labour and Global Solar Supply Chains." *Sheffield Hallam University Helena Kennedy Centre for International Justice*, May 2021. <https://www.shu.ac.uk/helena-kennedy-centre-international-justice/research-and-projects/all-projects/in-broad-daylight>.
2. Braw, Elisabeth. "When Clean Energy is Powered by Dirty Labor." *Foreign Policy*. April 12, 2021. <https://foreignpolicy.com/2021/04/12/clean-energy-china-xinjiang-uyghur-labor/>.
3. Birtles, Bill. "China defends 'vocational training centres' amid international pressure over mass Uighur detentions." *ABC News Australia*, October 16, 2018. <https://www.abc.net.au/news/2018-10-16/china-defends-vocational-training-centres/10384096>.
4. United Nations. "Universal Declaration of Human Rights, Article 23." *United Nations General Assembly*, December 10, 1948. <https://www.un.org/en/about-us/universal-declaration-of-human-rights>.
5. Millward, James and Dahlia Peterson. "China's system of oppression in Xinjiang: How it developed and how to curb it." *Brookings Institute*, September 2020. https://www.brookings.edu/wp-content/uploads/2020/09/FP_20200914_china_oppression_xinjiang_millward_peterson.pdf.
6. Murphy and Elimä. "In Broad Daylight."
7. "US sanctions over Xinjinag: Updates." *PV InfoLink*. June 24, 2021. <https://www.infolink-group.com/en/solar/analysis-trends/US-sanctions-over-Xinjiang-Updates>.
8. Ibid.
9. Murphy and Elimä. "In Broad Daylight."
10. Chase, Jenny, Yali Jiang, Sonia Polina Klein et al. "2Q 2021 Global PV Market Outlook." *BloombergNEF*. May 21, 2021 .
11. Murphy and Elimä. "In Broad Daylight."
12. Chase, Jenny, Yali Jiang, Sonia Polina Klein et al. "2Q 2021 Global PV Market Outlook." *BloombergNEF*. May 21, 2021.
13. Goldie-Scot, Logan, Ethan Zindler, and Pol Lezcano. "Solar PV Trade and Manufacturing." *BloombergNEF*. February 2021.
14. Bernreuter, Johannes. "Solar Value Chain." *Bernreuter Research*. June 20, 2020. <https://www.bernreuter.com/solar-industry/value-chain/>.
15. Murphy and Elimä. "In Broad Daylight."
16. Ibid.
17. BBC. "US: China 'committed genocide against Uighurs.'" *BBC*, January 20, 2021. <https://www.bbc.com/news/world-us-canada-55723522>.
18. BBC. "Uyghurs: MP's state genocide is taking place in China." *BBC*, April 23, 2021. <https://www.bbc.com/news/uk-politics-56843368>.
19. Ibrahim, Azeem, et al. "The Uyghur Genocide: An Examination of China's Breaches of the 1948 Genocide Convention." *Newlines Institute for Strategy and Policy*, March 8, 2021. <https://newlinesinstitute.org/uyghurs/the-uyghur-genocide-an-examination-of-chinas-breaches-of-the-1948-genocide-convention/>.
20. Watson, Ivan, and Ben Westcott. "Watched, judged, detained: Leaked Chinese government records reveal detailed surveillance reports on Uyghur families and Beijing's justification for mass detentions." *CNN*, February 2020. <https://www.cnn.com/interactive/2020/02/asia/xinjiang-china-karakax-document-intl-hnk/>.
21. Hill, Matthew, David Camanale, and Joel Gunter. "'Their goal is to destroy everyone': Uighur camp detainees allege systematic rape." *BBC*, February 2020. <https://www.bbc.com/news/world-asia-china-55794071>.

22. Murphy and Elimä. "In Broad Daylight."
23. Buckley, Chris, and Austin Ramzy. "China Is Erasing Mosques and Precious Shrines in Xinjiang." *The New York Times*, September 25, 2020. www.nytimes.com/interactive/2020/09/25/world/asia/xinjiang-china-religious-site.html.
24. The Associated Press. "China cuts Uighur births with IUDs, abortion, sterilization." *The Associated Press*, June 29, 2020. <https://apnews.com/article/ap-top-news-international-news-weekend-reads-china-health-269b3de1af34e17c1941a514f78d764c>.
25. Buckley, Chris, and Paul Mozur. "How China Uses High-Tech Surveillance to Subdue Minorities." *The New York Times*. May 22, 2019. <https://www.nytimes.com/2019/05/22/world/asia/china-surveillance-xinjiang.html>.
26. Bhuiyan, Johana. "Major camera company can sort people by race, alert police when it spots Uighurs." *Los Angeles Times*, February 9, 2021. <https://www.latimes.com/business/technology/story/2021-02-09/dahua-facial-recognition-china-surveillance-uighur>.
27. Kang, Dake, and Yanan Wang. "China Uighurs told to share beds, meals with party members." *The Associated Press*, November 30, 2018. <https://apnews.com/article/ap-top-news-international-news-prayer-weddings-occasions-9ca1c29fc9554c1697a8729b-ba4dd93b>.
28. Buckley, Chris, and Austin Ramzy. "China Is Erasing Mosques and Precious Shrines in Xinjiang." *The New York Times*, September 25, 2020. www.nytimes.com/interactive/2020/09/25/world/asia/xinjiang-china-religious-site.html.
29. Human Rights Watch. "China Children Caught in Xinjiang Crackdown." Human Rights Watch, October 16, 2018. <https://www.hrw.org/news/2018/10/16/china-children-caught-xinjiang-crackdown#>.
30. Martin, Will. "China is harvesting thousands of human organs from its Uighur Muslim minority, UN human-rights board hears." *Business Insider*, September 25, 2019. <https://www.businessinsider.com/china-harvesting-organs-of-uighur-muslims-china-tribunal-tells-un-2019-9>.
31. The Associated Press. "China cuts Uighur births with IUDs, abortion, sterilization." *The Associated Press*, June 29, 2020. <https://apnews.com/article/ap-top-news-international-news-weekend-reads-china-health-269b3de1af34e17c1941a514f78d764c>.
32. Lehr, Amy K. "Connecting the Dots in Xinjiang: Forced Labor, Forced Assimilation, and Western Supply Chains." *Center for Strategic and International Studies*, October 16, 2019. <https://www.csis.org/analysis/connecting-dots-xinjiang-forced-labor-forced-assimilation-and-western-supply-chains>.
33. Murtaugh, Dan et al. "Secrecy and Abuse Claims Haunt China's Solar Factories in Xinjiang." *Bloomberg Green*, April 13, 2021. <https://www.bloomberg.com/graphics/2021-xinjiang-solar/>.
34. Byler, Darren. "How companies profit from forced labor in Xinjiang." *SupChina*, September 4, 2019. <https://supchina.com/2019/09/04/how-companies-profit-from-forced-labor-in-xinjiang/>.
35. Lehr, Amy K. "Connecting the Dots in Xinjiang: Forced Labor, Forced Assimilation, and Western Supply Chains." *Center for Strategic and International Studies*, October 16, 2019. <https://www.csis.org/analysis/connecting-dots-xinjiang-forced-labor-forced-assimilation-and-western-supply-chains>.
36. Birtles, Bill. "China defends 'vocational training centres' amid international pressure over mass Uighur detentions." *ABC News Australia*, October 16, 2018. <https://www.abc.net.au/news/2018-10-16/china-defends-vocational-training-centres/10384096>.
37. Buckley, Chris, and Austin Ramzy. "Inside China's Push to Turn Muslim Minorities into an Army of Workers." *The New York Times*, December 30, 2019. <https://www.nytimes.com/2019/12/30/world/asia/china-xinjiang-muslims-labor.html>.
38. deHahn, Patrick. "More than 1 million Muslims are detained in China—but how did we get that number?" *Quartz*, July 4, 2019. <https://qz.com/1599393/how-researchers-estimate-1-million-uyghurs-are-detained-in-xinjiang/>.
39. Hoshur, Shohret. "Uyghur inmates in iconic Xinjiang detention camp photo identified." *Radio Free Asia*, April 26, 2019. <https://www.rfa.org/english/news/uyghur/camp-photo-04262019171258.html>.
40. Khatchadourian, Raffi. "Surviving the crackdown in Xinjiang." *Foreign Policy*, April 5, 2021. <https://www.newyorker.com/magazine/2021/04/12/surviving-the-crackdown-in-xinjiang>.

41. Hill, Matthew, David Camanale, and Joel Gunter. "‘Their goal is to destroy everyone’: Uyghur camp detainees allege systematic rape." *BBC*, February 2020. <https://www.bbc.com/news/world-asia-china-55794071>.
42. Mistreanu, Simina. "Uyghur Women Are China's Victims—and Resistance." *Foreign Policy*, March 12, 2021. <https://foreignpolicy.com/2021/03/12/uyghur-women-are-chinas-victims-and-resistance/>.
43. "Solar Companies Unite to Prevent Forced Labor in the Solar Supply Chain." *Solar Energy Industries Association*, February 4, 2021. <https://www.seia.org/news/solar-companies-unite-prevent-forced-labor-solar-supply-chain>.
44. "American Clean Power Association Supports SEIA Solar Supply Chain Traceability Protocol." American Clean Power Association, April 29, 2021. <https://cleanpower.org/news/american-clean-power-association-supports-seia-solar-supply-chain-traceability-protocol/>.
45. "The Department of Homeland Security Issues Withhold Release Order on Silica-Based Products Made by Forced Labor in Xinjiang." *U.S. Customs and Border Protection*, June 24, 2021. <https://www.cbp.gov/newsroom/national-media-release/department-homeland-security-issues-withhold-release-order-silica>.
46. "Forced Labor." *U.S. Customs and Border Protection*, July 27, 2021. <https://www.cbp.gov/trade/programs-administration/forced-labor>.
47. Dr. Ewelina U. Ochab. "Biden Signs The Uyghur Forced Labor Prevention Act Into Law." December 23, 2022. <https://www.forbes.com/sites/ewelinaochab/2021/12/23/biden-signs-the-uyghur-forced-labor-prevention-act-into-law/?sh=701ba11f476d>
48. "Treasury Sanctions Chinese Entity and Officials Pursuant to Global Magnitsky Human Rights Executive Order." U.S. Department of the Treasury, July 31, 2020. <https://home.treasury.gov/news/press-releases/sm1073>.
49. Murphy and Elimä. "In Broad Daylight."



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