

THE CASE FOR GREEN BONDS

IN A MORGAN STANLEY MINUTE

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Secrecy and Abuse Claims Haunt China's Solar Factories in Xinjiang

The world's green power surge depends on polysilicon made in China's remote

Northwest. No one really knows what's going on inside the facilities.

By Dan Murtaugh in Singapore, Colum Murphy and James Mayger in Xinjiang, China, and Brian Eckhouse in Los Angeles

April 13, 2021



In the wilderness of the Gobi Desert sit two factories that churn out vast quantities of polysilicon, the raw material in billions of solar panels all over the world. It's a four-hour drive from Urumqi, the capital of the Xinjiang region at the center of China's crackdown on Uyghurs and other Muslim minorities. The only structures that rise up among miles of rolling snow-covered fields are the chimneys of coal-fired power plants, belching white smoke.

Almost no one outside China knows what goes on inside these factories, or two others elsewhere in Xinjiang that together produce nearly half the world's polysilicon supply. State secrecy cloaks the raw material for a green boom that researchers at BloombergNEF project will include a nearly tenfold increase in solar capacity over the next three decades. Solar is set to grow by about a quarter this year after record installations in 2020 backed by almost \$150 billion in investment. That means millions of homeowners buying solar panels everywhere face moral uncertainty: Embrace the green future, and you have no way of knowing if you're purchasing products made by forced labor and dirty coal.

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Companies and governments are also growing uneasy about their reliance on a region rife with allegations of human-rights abuses. Three owners of Xinjiang's polysilicon refineries have been linked to a state-run employment program that, according to some foreign governments and academics, may at times amount to forced labor. China denies such accusations and recently insisted

that journalists and diplomats are free to go see for themselves.

That's why two Bloomberg reporters went to Xinjiang in March, after weeks of unsuccessful requests for factory tours. Such visits aren't unusual elsewhere in China. But this time a security apparatus sprang into action. Upon our landing in Urumqi, two police officers boarded the plane, one with an automatic weapon slung across his chest and a photo identifying one of the reporters in hand. After questioning on the tarmac, we left the airport. For the next three days agents followed us everywhere, obstructing all attempts to speak to locals and deleting our photos.

The veil over Xinjiang has made the search for answers about the links between China's labor program and its solar industry a job for outside researchers—who, it turns out, have found potentially telling details just by combing through public records.



Residents stop for a chat nearby the Xinjiang International Grand Bazaar in downtown Urumqi.

Photographer: Colum Murphy/Bloomberg



Shoppers walk past the Xinjiang International Grand Bazaar in Urumqi, capital of China's Xinjiang province.

Photographer: James Mayger/Bloomberg



The barricaded square in front of the Erdaoqiao Mosque. All visitors must pass a security checkpoint.

Photographer: James Mayger/Bloomberg

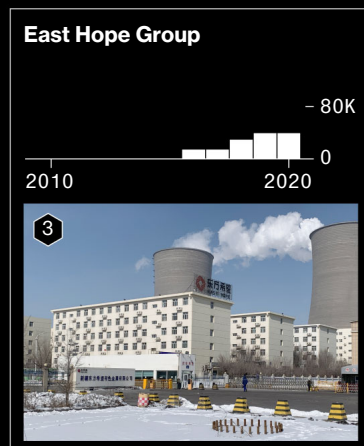
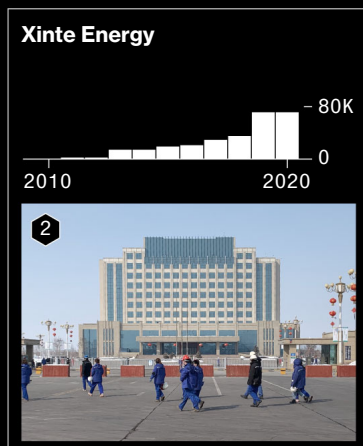
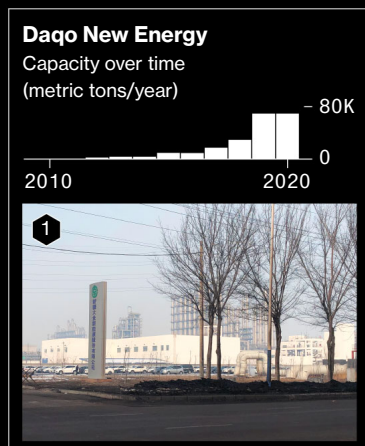
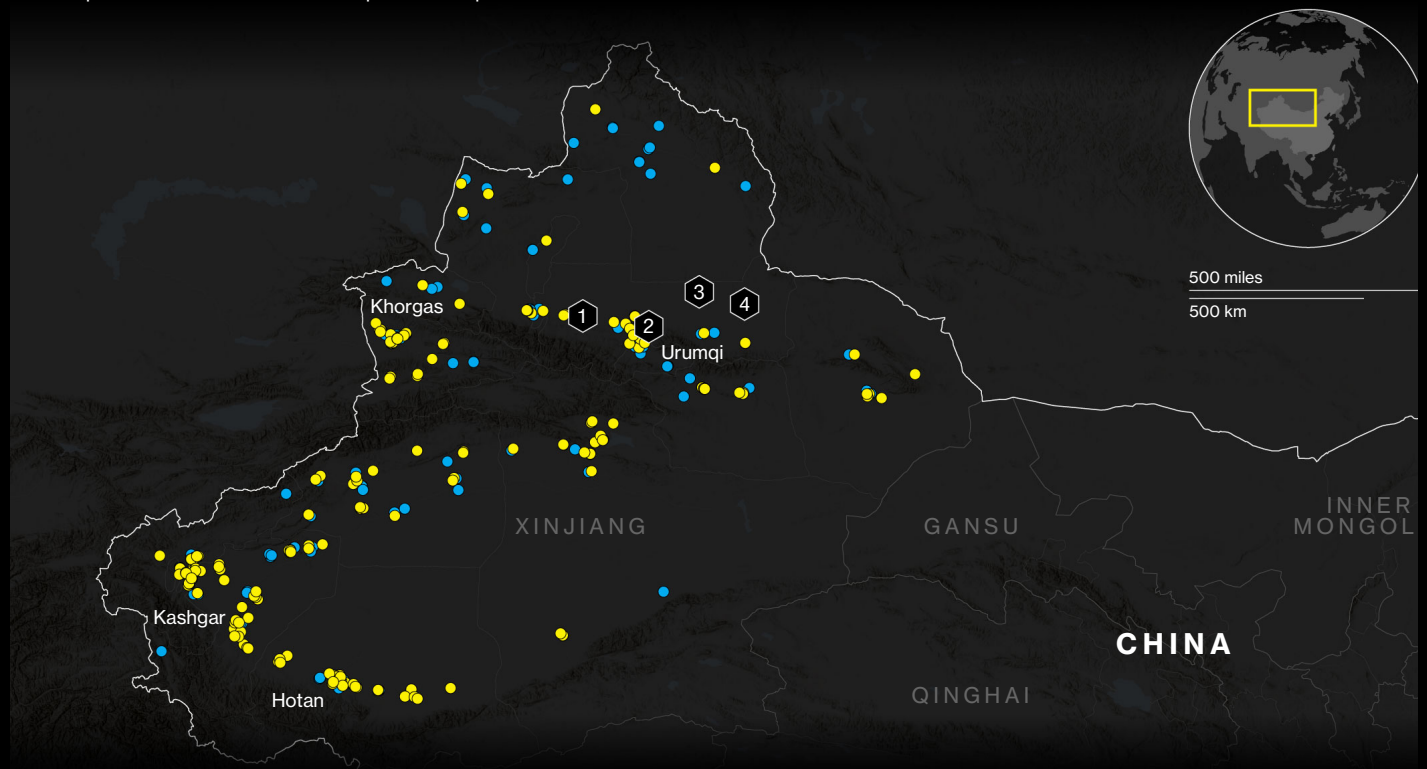
The owner of one polysilicon factory, GCL-Poly Energy Holdings Ltd., said in a 2019 report that it had accepted 121 poor minority workers from the Uyghur heartland in southern Xinjiang. Photos posted by the local government in June 2017 show workers, lined up in blue uniforms, about to be sent by the labor program to companies including East Hope Group Co., an aluminum smelter that in recent years also started producing polysilicon in Xinjiang. The previously unreported document was found by Adrian Zenz, a German researcher based in Minnesota who's become a chief source of data about the labor program in Xinjiang—and thus a focus of China's wrath.

The documents are troubling, because the solar power surge that's one of the great hopes in the race against global warming depends on the crucial supply of Xinjiang-made polysilicon. Some of the Western nations leading the transition to cleaner energy have also accused the Chinese government of committing genocide in Xinjiang. In March, the U.S., U.K., European Union, and Canada put new sanctions on China over alleged human-rights abuses. The U.S. has already banned imports of cotton and tomatoes from the region. The substance needed for solar panels could be next.

Xinjiang's Polysilicon Factories

Four of the world's biggest producers are based in the region

● Suspected re-education camps ● Suspected detention facilities



Note: Suspected re-education camps and detention facilities identified by ASPI.

With national leaders committing to carbon-neutral futures, a new record for solar panel installations is expected this year—more than 185 gigawatts, according to BNEF, or enough to power all of Brazil when the sun is shining. Xinjiang will produce about half of the polysilicon in these panels, based on BNEF projections, and China will account for more than 80% of the overall supply. But consumers can't track the provenance of their panels, since raw materials from multiple factories mix together along the solar supply chain. Even if they did find a link to Xinjiang, what goes on inside the four factories remains unknown.

On the second day in Xinjiang, a solicitous propaganda official from the economic zone that houses the GCL-Poly and East Hope facilities trailed behind our car, even at a petrol station. At East Hope, he told us that executives from the headquarters in Shanghai had left instructions not to host journalists in Xinjiang. A representative for the GCL-Poly plant said pandemic health regulations made a visit unsafe.

It didn't matter that China's coronavirus outbreak has been largely contained, and we'd tested negative for Covid-19 just hours before.

The Chinese government says that accusations of forced labor in Xinjiang are lies invented by rivals intent on sabotaging the world's second-biggest economy. "If it were that simple, I think at this point you'd have these companies allowing in third-party auditors alongside international journalists to give scrutiny of what they're doing," says Nathan Picarsic, co-founder of Horizon Advisory, a Washington-based consulting firm.

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Picarsic's team in January released an analysis of the Xinjiang solar industry's ties to the government's labor transfer program. Horizon's findings dovetail with many of the documents retrieved by Zenz, as does an October report by S&P Global Market

Intelligence. All three relied on information that had been out in the open, in state media reports and company statements mentioning the program.

China says its labor transfer program trains workers and sends them to factories as part of an effort to help poor ethnic minorities find better employment. But academics and activists identify the practice as part of a long history of using coercive state structures to oppress China's Muslims, strip them of their culture, and separate them from their families. The state's repression in Xinjiang intensified in the 2010s after a series of deadly terror attacks by Uyghurs seeking greater political and cultural autonomy. Chen Quanguo, the Communist Party secretary appointed by President Xi Jinping, has pursued a policy that a United Nations panel has said may have led to more than 1 million Muslims being placed in internment camps. Uyghurs who've been through the camps describe harsh conditions, including physical and sexual assault.



The Solar Industry's Xinjiang Problem

Video: Suma Hussien/Bloomberg Quicktake

“It has become almost impossible to talk of voluntary labor among a group of people who are in immediate danger of being incarcerated for no reason whatsoever,” says Rune Steenberg, a Xinjiang expert based in Berlin who works with the Uyghur diaspora.

Those who participate are sometimes given wages and a degree

of autonomy to choose the type of work they do. But there's no freedom to refuse to sign factory contracts. "There would be repercussions against your family and potentially against you," Steenberg says. "You would be marked as someone who's uncooperative." The International Labour Organization's [convention on forced labor](#), which China has yet to ratify, defines the practice as work done "under the menace of penalty."

Researchers such as Picarsic and Zenz have been trying to peek into the black box of Xinjiang for some time. Zenz's findings have already helped exacerbate a clash over human rights that's pitted China against the U.S. and Europe. Corroboration by academics, activists, and former Uyghur prisoners has provoked the Chinese government into a personal confrontation. In March it held an almost three-hour press conference to rebut claims about human-rights abuses made by Zenz, and authorities say they support lawsuits against him by several Xinjiang-based companies.

"It has become almost impossible to talk of voluntary labor among a group of people who are in immediate danger of being incarcerated"

Zenz doesn't have access to any hidden government archives or whistleblowers regarding forced labor. He and his researchers simply search for companies or products they suspect might be tied to the labor program using Google and Baidu, China's most popular search engine. Sometimes the researchers use Google's cache function, which saves copies of websites that might be blocked or taken down.

Yet this basic method has turned up an [April 2018 statement](#) on the Xinjiang government's website with a reference to TBEA Co., parent company of the Xinte Energy Co. polysilicon factory, accepting as many as 300 poor workers from Hotan. This is an area with a large Uyghur population that's been [targeted](#) by the government's assimilation policies. Another TBEA document, from [August 2019](#), indicates the company's open participation in the labor transfer program. It's an upbeat account of a corporate

official who'd been stationed in Hotan for two years, with details about how he aided government agents by going into villagers' houses to "spread the Party's policies" and "prescribe the right medicine" to alleviate poverty.

"It shows the company not only accepting transferred laborers but being directly implicated in the coercive and intrusive recruitment usually done by the government," says Zenz. "The No.1 medicine prescribed is the labor transfer program."



Photo taken near the entrance to the Xinte plant



Sources: Satellite image via Maxar Technologies, Bloomberg reporting

That corporate pride about uplifting the poor people of Xinjiang turns to secrecy when journalists show up. A policeman stood at the government office near the Xinte facility, and two men carrying leather briefcases stepped out from a gray car following behind. A guard at the complex said all the polysilicon executives were busy in a meeting. "Don't take any pictures," he said.

Back in Beijing, Xu Guixiang, a spokesman for the Xinjiang

government, said at a briefing that the government “would never” interfere in journalists’ reporting. “I don’t think such things exist,” he said of the armed officers who met us on the plane and cars that followed us around. “If you encounter any of the scenarios you mentioned, please let us know.”

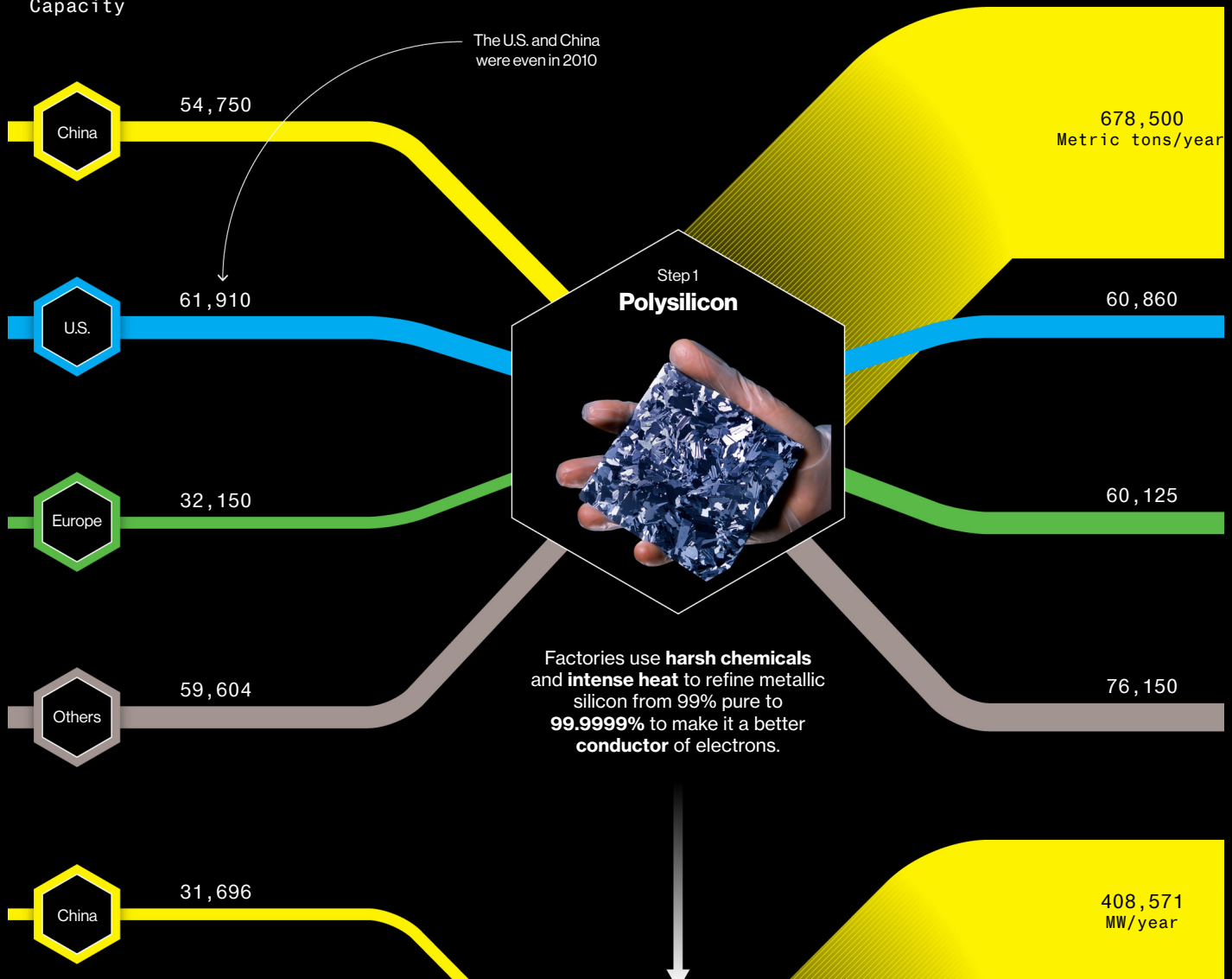
No nation produces as much as China along every step of the solar supply chain. And because the global solar industry needs all the polysilicon it can get, it won’t be able to turn its back on Xinjiang anytime soon. “Any silicon-based solar panel may have at least a small amount of Xinjiang silicon,” says Jenny Chase, head of solar analysis at BNEF. “Only a few modules can be guaranteed free of it.”

China’s Solar Dominance

Its manufacturers have far surpassed other countries’ at every step of the supply chain

2010

Capacity





U.S.

352



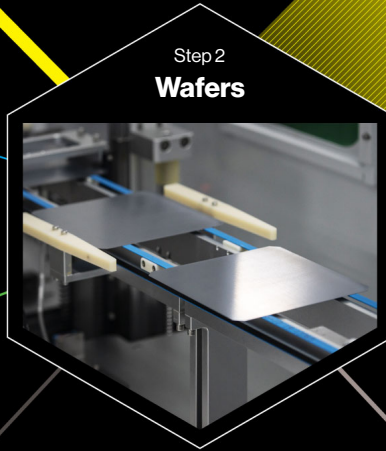
Europe

971



Others

8,410



Step 2 Wafers

57

565

10,460

That ultra-refined polysilicon is melted into long bars called **ingots** and then sliced into thin squares known as **wafers** by firms such as **Longi Green Energy Technology Co.** and **Tianjin Zhonghuan Electronics and Information Group Co.**



China

15,862



U.S.

370



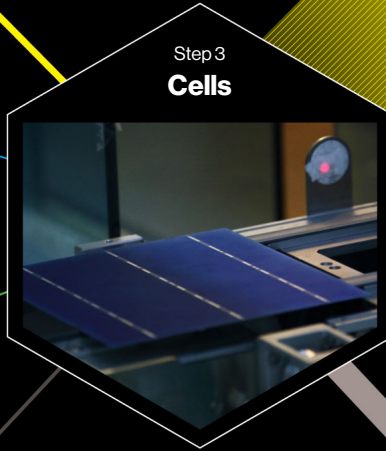
Europe

400



Others

8,402



Step 3 Cells

386,986
MW/year

2,030

1,530

61,594

Wafers are infused with a few non-silicon atoms to provide extra **electrons** to zoom around when they're excited by **sunlight**. They're then wired up by firms such as **Tongwei Co.** and **JA Solar Technology Co.** into grid-like cells with material like silver to catch those **electrons** and **convert** them into **electricity**.



China

18,177



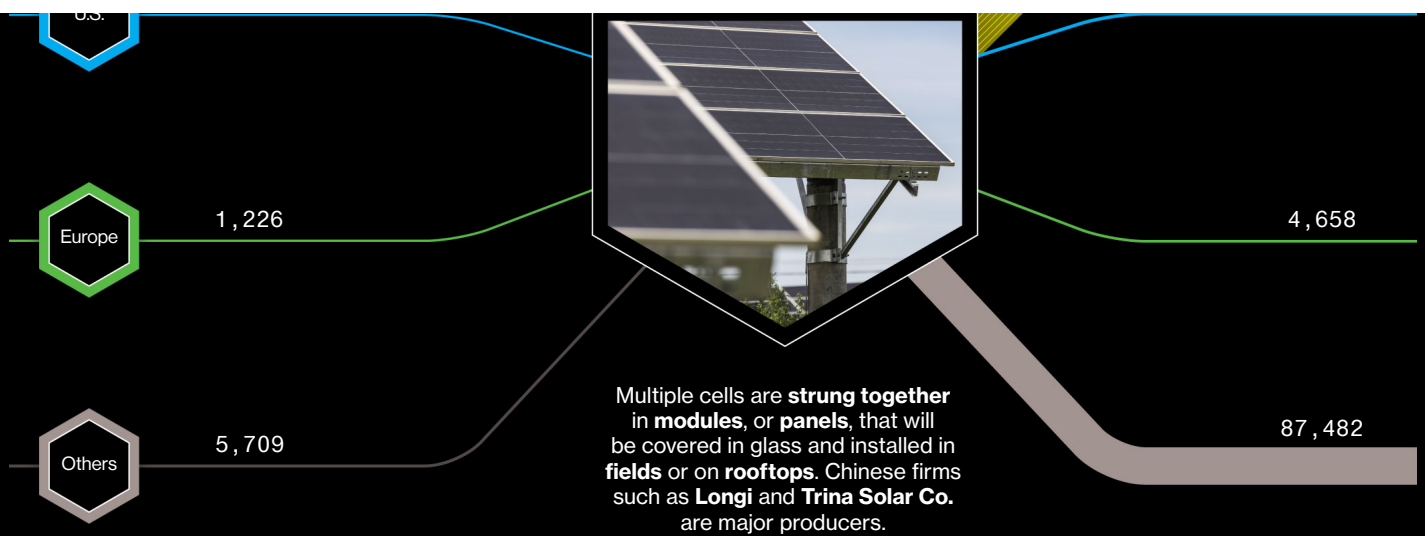
U.S.

832

444,399
MW/year

Step 4 Modules

7,085



Note: Capacities include plants that have been commissioned, are under construction or have been announced.
Source: BloombergNEF

Corporate customers from California to Vietnam and South Australia to Spain are scrambling to set eyes on most of their key solar suppliers. That's where a guy from St. Louis named Andy Klump comes in.

Klump arrived in Beijing in 2003 and wound up in a job that had him roving around solar factories that were just starting out. He witnessed the rise of the industry firsthand, back when China was still an underdog facing U.S. and German manufacturers. As the supply chain shifted, foreign companies that wanted to tour Chinese facilities and review records would fly in advisers, some of whom were jet-lagged and didn't speak the language.

"There are a ton of problems you can run into when you don't have someone on the ground," Klump says. "A paper trail isn't enough." He founded Clean Energy Associates to offer audits and now runs a team of about 145 people. Klump has never been to the polysilicon factories in Xinjiang, as CEA clients only recently began making requests for visits and haven't contracted a trip yet, even as published reports about other industries in the region have made clear the risk of abuses.

"The elephant in the room is the lack of information"

Even the one producer in the region that hasn't been linked to the

labor transfer program by researchers rebuffed our efforts to get a clearer view. Daqo New Energy Corp. is a U.S.-listed company that has described its Xinjiang subsidiary as a pilot program of Xinjiang Production and Construction Corps, a government-run organization that's been sanctioned by the U.S. for ties to alleged human-rights abuses including mass arbitrary detention.

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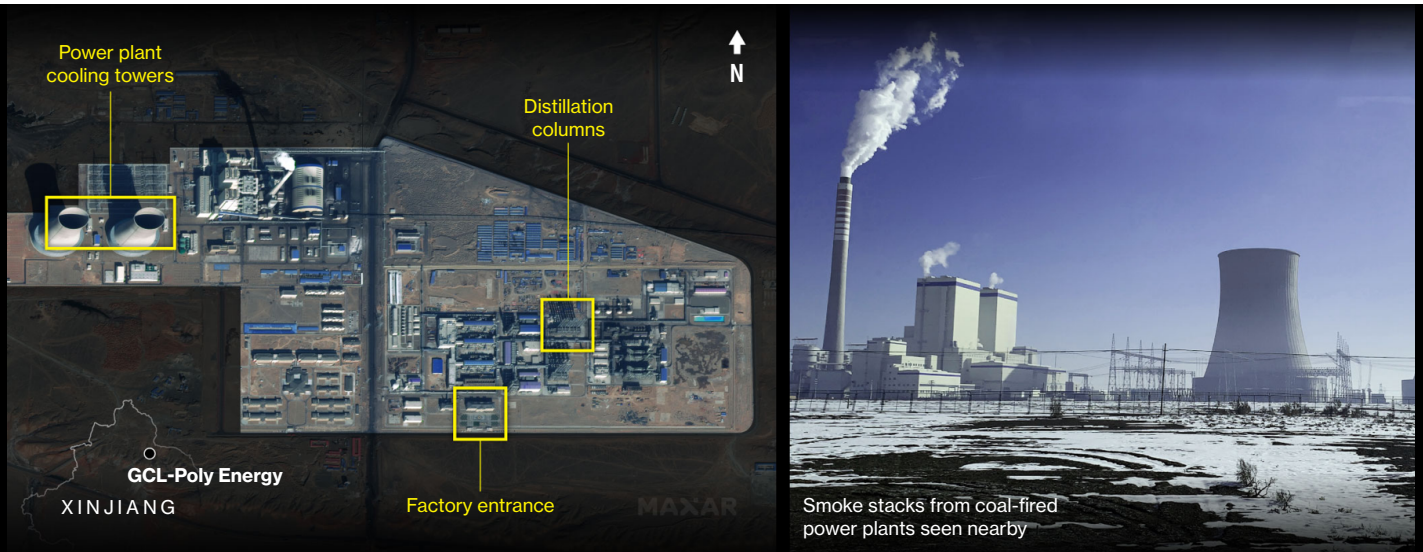
At the Daqo facility, about an hour outside Urumqi by train, guards in brown camouflage ordered away would-be observers. Daqo, along with the other three polysilicon companies, didn't respond to multiple attempts to seek comment on our trip and the documents uncovered by researchers. (In an earlier statement the company said it has a "zero-tolerance policy" toward forced labor.)

The murkiness of working conditions in Xinjiang is reason enough for solar companies and investors to be wary. A further complication comes from why those factories are in the region in the first place: an abundance of cheap coal power.

Turning sand into polysilicon is an extremely energy-intensive process. Electricity accounts for about 40% of a factory's operating costs, which is what makes Xinjiang so appealing. It has some of the cheapest power rates in the country, even if burning the dirtiest fossil fuel taints the climate benefits of the solar panels eventually produced. All four factories are located near coal power plants in Xinjiang, where cities such as Urumqi and Kashgar have at times had some of the worst air quality in China.

Cheap Coal

Xinjiang has some of the lowest power rates in China



Sources: Satellite image via Maxar Technologies, Bloomberg reporting

Unable to determine the working conditions in these Xinjiang factories, some governments and companies have decided it's safer to steer clear of the region altogether. At least 175 companies, including global utility giants Duke Energy Corp. and Engie SA, have signed a nonbinding pledge by a U.S. trade association to avoid forced labor. The same organization has urged members to move supply chains out of Xinjiang.

Units of Chinese solar giants Longi Green Energy Technology, JA Solar Technology, and JinkoSolar Holding also signed the document; all three had multiyear contracts to buy polysilicon from Xinjiang-based manufacturers at the time. The companies didn't respond to questions about the agreements.

The supply chain is already shifting as scrutiny increases. Xinjiang's polysilicon producers are planning new factories outside the region. Firms are setting up tracing networks so companies can document whether their solar panels contain Xinjiang polysilicon. That would allow for a two-track export system: one for countries that don't want any polysilicon from the region, the other for those that don't mind it.

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This might merely be a fix on paper. There are many ways for polysilicon from Xinjiang to find its way into the final product. Some wafer companies that buy the material operate huge factories that might mix it up with polysilicon from elsewhere in China. Even if the supply chains are kept completely separate, profits ultimately flow back to the four polysilicon companies—meaning they'd face little economic punishment for any participation in the labor transfer program.

Global demand will keep growing. Prices for the material have more than doubled since a year ago, and previous supply

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factories in Xinjiang, it's not going to come from trying to speak to the workers there now. Only at Xinte's plant near Urumqi did we even see a group of workers as they streamed in for afternoon shifts, dressed in hard hats and dark-blue overalls. Some stopped to listen to questions. They all gave the same response: The company wouldn't allow them to speak to outsiders.

—With assistance from Saijel Kishan and Philip Glamann

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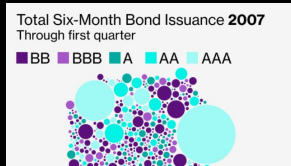
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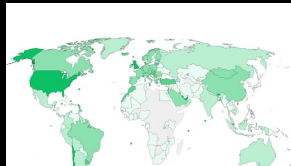
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Redlined, Now Flooding