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NIKKEI ASIAN REVIEW

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CHINA'S GLIMMER OF GREEN

The world's biggest polluter bids to save the environment



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SINNER OR SAVIOR?

Battling to clean up its polluted landscape, China is emerging as an environmental protector. But its neighbors are learning that the effects cut both ways

DOMINIC FAULDER Associate editor, Nikkei Asian Review

BANGKOK/NAIROBI Business is booming for Max Craipeau. The Hong Kong-based entrepreneur has seen his company transform over the past 18 months: His number of employees has increased sixfold, and he expects his 2019 revenue to “easily double” from last year. His good fortune is largely thanks to China’s decision in January 2018 to ban the import of most types of solid waste for recycling.

China’s disruptive move led Craipeau, founder and CEO of Maxco Industries, to shift from trading rubber and metal scrap to running plastic-waste recycling plants in Indonesia and Poland -- with one more on the way, possibly in Japan. China’s ban, according to the France-born Craipeau, created “a new order” in the global plastic-waste business and was a “huge opportunity” for him.

Established players in the industry who simply bought plastic scrap overseas and shipped it straight to China were suddenly “lost.” But Craipeau, familiar with the more complicated logistics of processing rubber and metal, had a network of contacts that allowed him to establish centers to refine plastic waste. His biggest customer for the plastic pellets they produce? China.

Craipeau’s business success is a silver lining in China’s waste ban, and it may not be the only one. At first, the ban caused the filthiest business on earth to migrate elsewhere, resulting in an influx of trash into less-developed Southeast Asian countries

A photovoltaic power station is installed over a reservoir in Hefei, in China’s eastern province of Anhui.

such as Vietnam, Malaysia, Thailand and Myanmar -- helped by unscrupulous companies, smugglers and corrupt officials. But Craipeau said this inflow has forced most of these countries to develop their own regulations, and that apart from a few "cowboys," their waste-processing industries are now cleaner than before the ban; in fact, Thailand, like China, plans to end its imports of plastic waste from 2021.

Kakuko Nagatani-Yoshida, the United Nations Environment Program's regional coordinator in Bangkok for chemicals, waste and air quality, said: "I am really happy that China did this -- it is wonderful. This has been a wake-up call to the entire recycling industry, not just China's."

Indeed, the ban may be just one more way in which China's efforts to go green are setting an example for other countries. After 40 years of unbridled economic growth, it is making great strides cleaning up its environment and has taken a global leadership role on climate change: Since the U.S. walked out, Chinese President Xi Jinping has become the de facto protector of the Paris Agreement to reduce greenhouse-gas emissions and accelerate efforts toward a low-carbon future.

It is also the world's biggest investor in renewable energy technology. Some believe this once confirmed sinner on the environment could yet emerge as a savior, to counter the existential risks it has created for itself at home -- including the danger of political unrest -- and partly in a play for greater soft power.

"China is leading on a number of environmental issues," said Joyce Msuya, acting executive director of U.N. Environment Program, who played a lead role at its fourth assembly in Nairobi, Kenya, in March, where plastic waste was a key issue on the agenda. "They've made unparalleled steps to combat climate change and air and water pollution ... and accelerated the global uptake of renewable energy," Msuya told the Nikkei Asian Review. "When countries as large and as influential as China move on an issue like the environment, others take note and follow."

When it comes to what China is doing well, experts also point to its model afforestation, and soil and water improvement projects. Beijing and its environs are touted as a particular success story

"[China] has a leadership role by dint of being the biggest polluter. ... [They] are very aware that all eyes are on them"

Leo Horn-Phathanothai
Director for international cooperation at the World Resources Institute

in terms of improved air quality. China is also in the vanguard developing electric vehicles and battery technology. Indeed, Greenpeace, a nongovernmental environmental organization, reported in March that only five of the 30 most air-polluted cities in the world are in China, while 22 are in India -- the worst



Getty Images

China generated around **27%** of global CO2 emissions in 2017
Source: Global Carbon Atlas

Thousands of heliostats surround a solar-thermal power station in Jiuquan, Gansu Province.

China's new neighbors: the Belt and Road effect
Land, maritime and pipeline connections planned under BRI



Source: CSIS

being Gurugram, which is 30 km southwest of the capital, Delhi. Bangladesh and Pakistan are also gagging on urbanization and the downside of old-fashioned economic development.

CUTS BOTH WAYS But China also remains the world's biggest polluter in terms of carbon dioxide emissions, and increased both coal power generation and coal mining capacity last year; its plastic-waste ban has played havoc in some less-developed nations; and its Belt and Road Initiative is a double-edged sword. The massive infrastructure project, launched by President Xi in 2013, aims to create a modern-day Silk Road that links Asia with Europe, Africa and beyond. The program has helped to spread green tech-

nology, but China has also attracted censure from abroad, partly because of environmental damage in Africa and elsewhere.

Its damming of the Mekong, and a proposal to blow up the great river's rapids to ease navigation, have been widely condemned. Chinese hydropower projects in Cambodia have over-estimated water flows, prompting regular blackouts in Phnom Penh -- a problem only exacerbated by heavy power demand from Chinese construction projects. And renewed Chinese pressure to complete the \$3.6 billion Myitsone hydropower project on a stretch of the Irrawaddy River in Myanmar's Kachin state has caused demonstrations and widespread resentment, particularly as most of the power produced by the project would be for export



Akira Kodaka

Workers at a recycling factory in Thailand: Like China, the country will ban plastic-waste imports from 2021.

45% Share of world's plastic waste recycled by China before the 2018 import ban
Cumulative amount since 1992

Source: Brooks, Wang & Jambeck, Science Advances (2018)

to China; work begun in 2009 was suspended in 2011. In Thailand, a proposed 800-megawatt Thai-Chinese coal-fired power project in the southern province of Krabi along a relatively pristine stretch of coast has been stalled by strong public opposition.

But there are some pluses on the BRI balance sheet. "Top of the list undoubtedly is the way China has rolled out renewable energy," said Paul Ekins, professor of resources and environmental policy at University College London, speaking at the U.N. Environment Assembly in Nairobi. "The Chinese deployment of renewable energy has meant that Africa is getting solar power at a tiny fraction of the cost that it would have been 10 years ago," he said.

Indeed, some economists believe Africa could virtually rid itself of fossil fuels and yet have more clean energy than it needs in the foreseeable future. China leads the world in renewable energy and is the biggest producer, exporter and installer of solar panels and wind turbines. The benefits of its dive into the green economy go well beyond Africa, with its inexpensive solar panels and lighting sold across Southeast Asia, Japan and the Middle East.

Officials at the environment conference in Nairobi were often positive on redemptive possibilities. "When we talk about economic growth, it usually means more pressure on the environment and more use of natural resources," said Siim Kiisler, Estonia's minister of the environment and president of the fourth U.N. Environment Assembly. "But it doesn't have to be that way. We can change the economics by using innovation and honest,



Ken Kobayashi

Sam In and his family, who live along the Mekong River in Cambodia, are among the villagers displaced by the China-financed Lower Sesan 2 Dam.

comparable economic data, and we can decouple economic growth from resource use and environmental degradation."

"The difference with China is that it has a leadership role by dint of being the biggest polluter," Leo Horn-Phathanothai, director for international cooperation at the World Resources Institute, a global research organization, told the Nikkei Asian Review. "I think the Chinese are very aware that all eyes are upon them. There is intense scrutiny, and I would say that is a good thing."

Meanwhile, many peg China's de facto assumption of a global environmental leadership role to Jan. 17, 2017, when President Xi attended the World Economic Forum in Davos -- the first Chinese president to do so. His appearance came three days ahead of the presidential inauguration in Washington of Donald Trump, whose climate-change denials had already been well-flagged. (Trump pulled out of the Paris Agreement five months into his presidency.)

Speaking to the forum, Xi memorably alluded to Charles Dickens' "A Tale of Two Cities," his famous novel about "the best of times [and] the worst of times," set in late 18th century France and England around the time of the First Industrial Revolution and the French Revolution. Xi's main points covered global trade, growth, multilateralism and leadership, but he also touched firmly on the environment four times. "The Paris Agreement is a hard-won achievement which is in keeping with the underlying trend of global development. All signatories should stick to it instead of walking away from it, as this is a respon-

Chinese funding backs

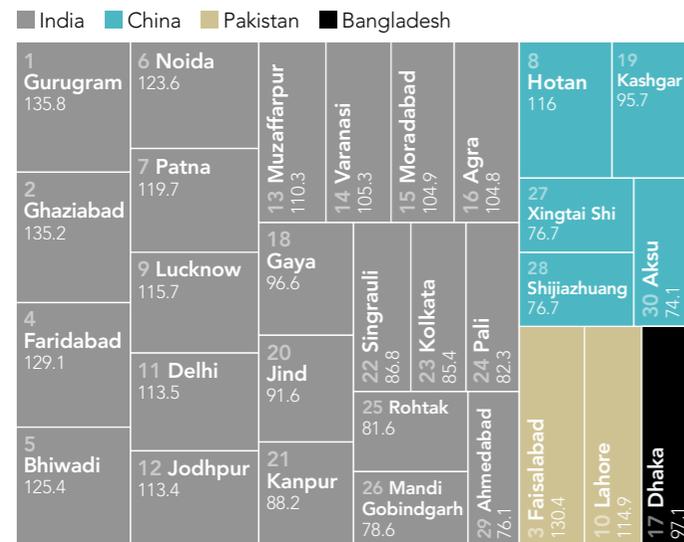
26%

of coal capacity under development overseas

Source: IEEFA, Global Coal Plant Tracker

The 30 most polluted cities in the world

Ranked by air pollution severity, measured by 2018 average PM2.5 levels (in micrograms/m³)



WHO recommended limit: 10 µg/m³ (annual mean exposure)

Source: IQAir

sibility we must assume for future generations," Xi said.

But in the same speech, Xi promised to send 700 million Chinese tourists abroad in the next five years, making no mention of the staggering carbon footprint this would involve. Indeed, tourism provides evidence that virtually whatever China does has significant economic and environmental impact. A quarter of all visitors to Thailand arrive by air from China, generating an estimated 4% of the kingdom's gross domestic product.

However, Chinese arrivals in Thailand fell more than 12% year on year in February and nearly 2% in March. Ironically, one reason is thought to be exceptionally severe air pollution, particularly in the north, where Chiang Mai has recorded some of the highest readings of PM2.5 -- or fine-particle air pollution -- in the world this year. A significant contributor to the pollution has been the unregulated burning of forest floors to facilitate the collection of wild mushrooms, demand for which is insatiable among China's increasingly affluent middle class. Major suppliers in Yunnan Province cannot meet demand from inside the country, where there are fines for lighting forest fires, and pay cash for imported black market forest products. As a

result, Thailand's environment is damaged along with its tourism prospects -- and China figures on both sides of the equation.

TOUGH LOVE At home, China is taking the issue of a clean environment seriously. In March, Premier Li Keqiang addressed the 13th National People's Congress in Beijing on the continuing struggle to build China into "a great and modern socialist country." He outlined 10 "weighty" priorities for 2019, the seventh of

"They see environmental pollution now as a political risk"

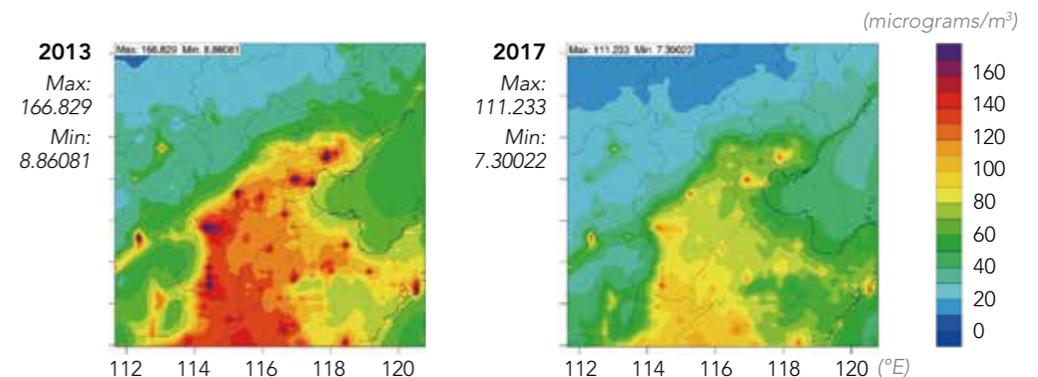
Kakuko Nagatani-Yoshida
 UNEP regional coordinator in Bangkok, on China's policy shift

which was to "strengthen pollution prevention and control, enhance ecological improvement, and make big advances in green development."

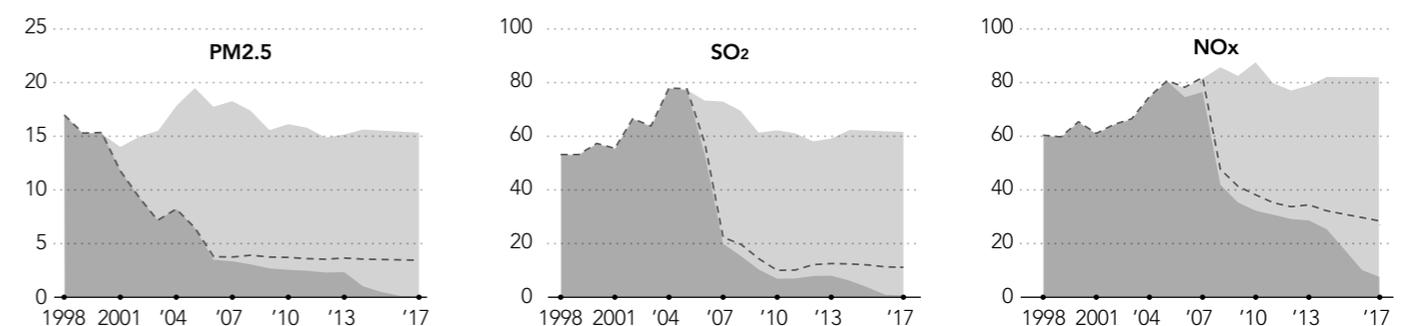
Li spoke of reducing sulfur dioxide and nitrogen oxide emissions by 3%; cutting PM2.5 concentrations in key areas, including the

Beijing's pollution progress

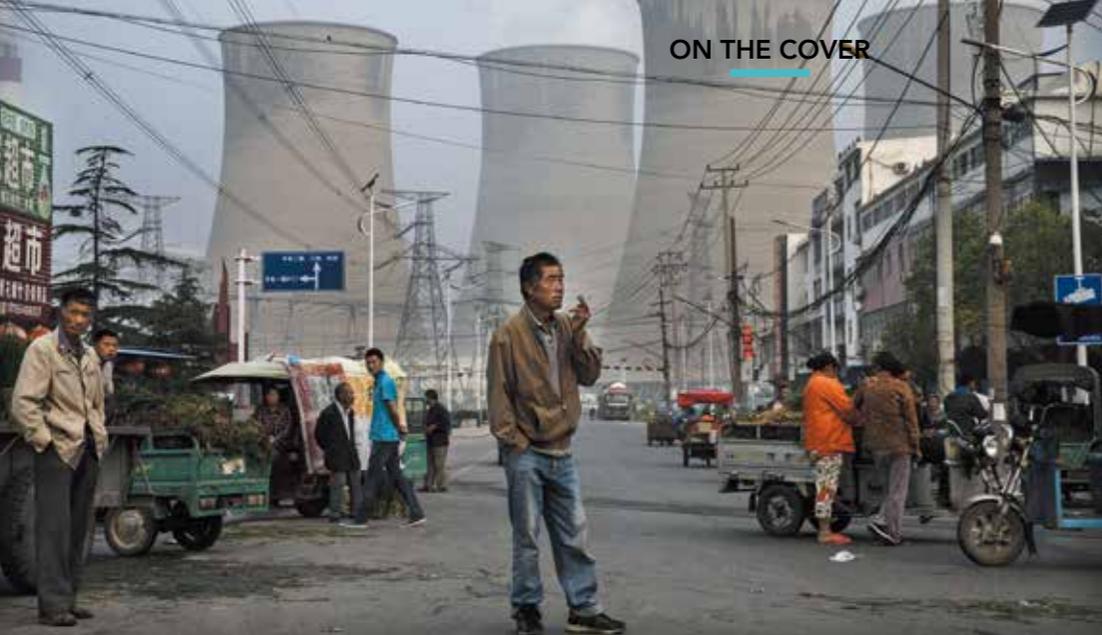
Annual average concentration of PM2.5 in Beijing-Tianjin-Hebei and surrounding areas



Emissions of major air pollutants from power plants in Beijing (in kilotons)



Source: Tsinghua University



Getty Images

◀ A state-owned coal-fired power plant in Huainan, Anhui Province: Measures against air pollution have included the retiring of plants and burning of more energy-efficient coal.

Beijing-Tianjin-Hebei region and the Yangtze River delta; and tackling the three major sources of pollution: industrial production, coal used as fuel, and motor vehicles. Soil, water, and all aspects of waste management were also on the agenda. “We will intensify efforts to achieve major scientific and technological breakthroughs in pollution prevention and control,” he promised.

When officials fail to meet these aspirations, there are increasingly grim consequences. In April, the Ministry of Ecology and Environment reported that more than 12,000 people had been punished for environmental violations and shortcomings since 2015. In the latest round, 1,035 officials from eight provincial regions were called to account. The party chief of Liaoyuan was fired outright for the polluted state of the city’s river.

“They have unleashed the court system onto the issue,” said

the World Resources Institute’s Horn-Phathanothai. “The central government ... cannot possibly enforce all the regulations that have been passed down. ... They are using the judiciary to prosecute environmental offenders in a bottom-up fashion. There have been hundreds of these courts set up to address environmental offenses.”

In this way, environmental awareness, effectively, is being dictated to the masses, who have no way of having any say. Maya Wang, senior China researcher with U.S.-based Human Rights Watch, said that environmental activists still seem to have a little room to operate, compared with others. “However, the bar is really low in China under President Xi Jinping, who has severely limited the space for civil society ... through enacting draconian laws ... and through imprisoning and harassing activists.”

While the Chinese may feel their voices are constrained, out-

Q&A: JOYCE MSUYA

Acting Executive Director,
UN Environment Program

China’s moves against plastic waste are ‘crucial to global efforts’

BANGKOK When Joyce Msuya, a Tanzanian microbiologist, World Bank veteran and acting executive director of United Nations Environment Program, spoke at its fourth assembly in March, she said, “This is the time to actually make a dent -- make a difference in the environment. ... Nature is not inexhaustible. It must be viewed as we do financial capital.”

Msuya advocated waste reduction, reuse of materials, and rethinking production processes, and called on the world to move beyond fossil fuels: “They have served us well for centuries but we have technologies now, innovations, that will

give the same result with minimum impact on the planet.”

In an interview with the Nikkei Asian Review, Msuya answered questions about China’s critical role.

Edited excerpts from the interview follow:

What is the single most important lesson other countries should learn from China’s environmental experience? China has a lot to offer in terms of lessons, not least around climate change and beating pollution, and we look to share these types of lessons with other countries that are undergoing similar challenges. China’s recent steps to curb single-use plastic and prevent the import of plastic waste are crucial to global efforts to address plastic pollution.

What would you highlight? I think a big takeaway is around development models. Other countries have seen the huge political and financial investment China has now put into rehabilitating its environment and are realizing how costly it is to “develop now and clean up later.” When China first started to advance, renewable energy and other technologies that facili-

▶ Beijing and its surrounding regions have seen a 25% drop in fine-particle pollution since 2013, says the city’s environment ministry.

side environmental organizations say they have good access to officials. “It is interesting that on this issue the door remains very much open; they want to remain engaged in dialogue, in learning,” said one foreign observer, adding, “It is through constructive engagement that we are going to help them ramp up their action ... not by shaming them for where they are falling short.”

Despite its authoritarian nature, the Chinese government does face an element of accountability: Underlying popular sentiment can never be safely ignored. African swine fever has in recent months swept across China, largely through small unregulated and unsanitary pig farms. The Chinese are the world’s most voracious pork eaters, and while the fever does not affect human health directly, it kills pigs without fail and carries significant political risk in terms of possible unrest.

“They see environmental pollution now as a political risk,” said Nagatani-Yoshida, the U.N. Environment Program regional coordinator in Bangkok. “Contamination affects everyone, but often the less-developed [groups] are affected more and they can become very discontented. You would never have had high-level officials ... saying this so openly 10 years ago. They say it now, no hesitation: Environmental contamination affects political contamination.” **N**

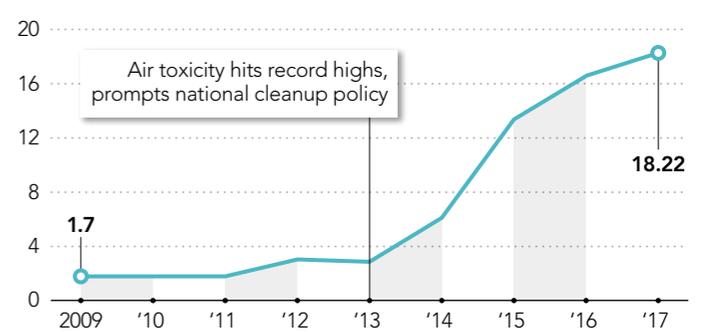
Nikkei staff writer CK Tan in Shanghai contributed to this report.



Getty Images

Blue-sky thinking: Beijing’s clean air investment soars

Spending on air pollution control, in billions of yuan



Source: U.N. Environment Program, Beijing Municipal Bureau of Finance

tate sustainable consumption and production, for example, were very expensive. Now the opposite is true, and we see China embracing a strategy that lets them grow and protect nature at the same time. China’s experience with mass afforestation, for example, has particular relevance for other countries. Nature has to be at the very center of our development model because it is our best solution to climate change. China has realized this and other countries looking for lessons in China’s experience would benefit from this realization as well.

China has had a number of successes on the environmental front, but where is it still failing? What should its top priority be? No country is winning on all fronts in efforts to protect the environment. It is not so much about where countries are failing, but more about what we can learn from each other’s experiences. What we’ve seen with China is a sincere and large-scale effort to tackle their environmental challenges. In a country as large and populous as China, sustainability will not be accomplished overnight. The priority is to keep moving forward and pick up the pace across the board to achieve the vision of the

2030 agenda [on tackling poverty] and the sustainable development goals.

Is China receptive to collaboration with U.N. Environment Program and other international environmental organizations? China has been very willing to engage with U.N. Environment on a host of issues. We appreciate how eager and open both the government and China’s business community have been to collaboration and advice.

China has made it their explicit goal to achieve an ecological civilization, and U.N. Environment is here to support that, and ensure that China’s experiences and advances can benefit both Chinese citizens and the global community. **N**

Interviewed by Nikkei Asian Review associate editor Dominic Faulder



Joyce Msuya

U.N. Environment Program

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Taiwan's election: a quiet civil war over identity

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Food delivery drivers in China are risking death to be on time

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Dec. 16-22, 2019



Market Forces

Can the new carbon economy save Asia's forests?



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PETER GUEST, *Nikkei* staff writer

Crisis credit

Economic interests have driven the destruction of forests for decades. Now, can the markets save them?

Trees have been chopped or burned down at Vuth Kith, on the banks of the Mekong River in Cambodia.

TOKYO/PREY LANG, Cambodia A rough trail leads from the village of Toal, on the edge of the vast Prey Lang nature reserve in northeastern Cambodia, to the ranger station at Spong in its interior. Traversing the road -- a slalom of shifting white silt, punctuated by slippery riverbeds veined with tree roots -- takes an organ-jarring two hours on the rangers' Honda motorbikes, first through broken forest and farmland, then into denser woodland.

Torch Vichet, the head ranger, rides pillion on the lead bike with a rifle balanced on one hip. Just under halfway to the station, he calls for a halt: A few paces from the track, a dipterocarp tree, nearly a meter in diameter, has been felled. Its base is sheared cleanly, the upper reaches half-buried in the undergrowth. The midsection has been cut into rings and dragged away.

As the patrol stops to examine the scene, Torch Vichet is visibly shocked. Most of the station's rangers had been out of the forest the previous night, attending a colleague's wedding in the provincial capital of Stung Treng. In the few hours they were away, loggers had entered the protected area with chain saws and brazenly harvested the tree.

One of Southeast Asia's last remaining evergreen woodlands, Prey Lang's 430,000 hectares sprawl across four Cambodian provinces. The ecosystem has been under threat for decades, but the country's economic lurch forward has accelerated the destruction, as roads reached deeper into the reserve and foreign markets -- mainly China and Vietnam -- opened up, hungry for cash crops and timber.

"People just think this is an economic opportunity, and if you're far from the rangers, the land is cheap," says Naven Hon, a researcher with the U.S. environment organization Conservation International who has worked for years in Prey Lang.

Huge areas of land have been illegally claimed. The rangers tasked with stopping the encroachment often lack equipment, training, transportation -- and, with wages as low as \$50 per month, motivation.

But for the rangers at Spong and elsewhere in Stung Treng Province, that is finally changing. Since 2018, their wages have shot up ninefold. They have motorbikes and the fuel to power them, training, GPS devices and new outposts. They can measure the success of their efforts by the moldering piles of confiscated chain saws, snares, nets and rifles

11.2 gigatons

Carbon sequestered by natural landscapes per year,

nearly double the total emissions of the U.S.

Source: Intergovernmental Panel on Climate Change

that fill the storerooms of their stations and the environment ministry. "It is happening slowly," Torch Vichet says. "But we are winning."

Remarkably, the rangers' equipment upgrades and their jump in pay have mostly been bankrolled by a private company, the giant Japanese trading house Mitsui & Co. The three-year project, overseen by Conservation International, is not philanthropic. It is an investment. If it succeeds in slowing the destruction of Prey Lang, it will generate carbon credits, which Mitsui will then be able to sell on the Japanese market.

Mitsui's funding is the tip of an iceberg. Billions of dollars are poised to flow into carbon offset over the next few years, as growing recognition of a global failure to rein in greenhouse gas emissions, despite the threat of catastrophic climate change, drives a renaissance in the market.

All across Southeast Asia, the Nikkei Asian Review spoke to conservation organizations that have been offered funding from companies ranging from oil majors to automakers, tech companies to theme park operators. All are looking to gain access to carbon credits, whether to meet their own climate change pledges, to absolve themselves in the eyes of their customers, or to get ahead of the emissions regulations that many believe are inevitable.

And forests are the best way to generate credits, fast. "Forest carbon is where the volume is," says Jim Procanik, co-founder of InfiniteEarth, which operates the Rimba Raya Biodiversity Reserve in

Indonesia. "If market-based conservation is proven to work, the amount of money that could be unleashed into the market is huge. ... We're seeing people coming to the market looking to lock up millions and millions of tons."

'BACCHANALIA' The carbon market has had a false dawn before. In the toppy pre-financial crisis years of 2007 and 2008, markets and industry became convinced that cap-and-trade rules on carbon emissions were imminent. Analysts -- experts in a market that, until that point, had barely existed -- breathlessly predicted surging prices and hundreds of billions of dollars worth of credits changing hands. Hedge funds and other speculators bought in. Projects, some legitimate, some less so, proliferated.

"There was some bacchanalia stuff going on back then. Cargill was setting up a trading desk.

“It is happening slowly, but we are winning”

Torch Vichet Head ranger at Spong station in Prey Lang Forest, northeastern Cambodia

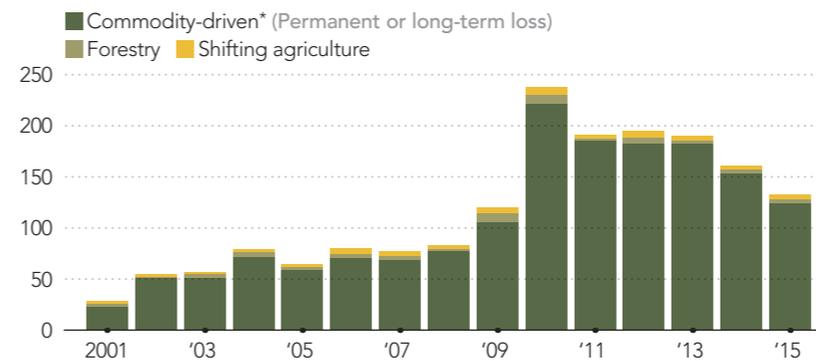
Shell was forming their trading desk. Deutsche Bank had a trading desk. It was going huge," says Gabriel Eickhoff, CEO of Lestari Capital, a Singapore-based company that links companies to conservation projects. "You could buy carbon credits from anybody off the street, it seemed like. No matter who you ran into in a hotel lobby, someone was doing carbon credits."

It didn't last. The market was new, poorly understood, poorly regulated and lacked the proper frameworks to validate, price and trade offsets. Negotiators at the 2009 Copenhagen climate summit could not reach a new agreement on carbon markets. The credit crisis, and subsequent global recession -- incidentally, the only time this century that greenhouse gas emissions have actually fallen year on year -- put an end to the fervor.

As negotiators meet in early December for the United Nations' climate conference in Madrid, many of those problems have still not been solved. The Paris Agreement, the landmark 2015 treaty

Cambodia's disappearing forests

Deforestation by cause (in kilohectares)



These estimates do not take tree cover gain into account *Where forest is cleared to make way for expansion of crops or livestock Source: Global Forest Watch

that committed countries to cutting their emissions and keeping global heating to less than 2 C above preindustrial levels, does include a pledge -- Article 6 -- to establish an international carbon market. Four years on, however, the actual mechanism has not been negotiated, and there is still very little consensus on how it should work.

On a broader scale, though, what has changed is that nothing has changed. Continued inaction on carbon emissions is pushing the planet ever closer to crisis, say multiple high-level organizations, and has made mitigating the worst effects of climate change considerably more costly. The planet is already halfway to the 2 C threshold -- anything above which scientists predict catastrophic impacts -- while emissions have continued to rise at an average of 1.5% per year this decade.

To prevent 2 C of heating, the U.N. Intergovernmental Panel on Climate Change says that global net carbon emissions have to fall to 80% of 2010 levels by 2035, and all the way to zero by 2075. At current levels, the U.N. says, global emissions now need to be reduced by 7.6% per year from now until 2030.

"The lack of progress on climate change 10 years ago now means that we need to act twice as fast, and cut emissions twice as fast," says Leo Roberts, senior research officer at London-based think tank

Funding from Mitsui & Co. has enabled the Spong rangers to upgrade their equipment and receive higher salaries.

57 carbon pricing initiatives have been implemented, or are scheduled to be, around the world

In all, they cover **20%** of greenhouse gas emissions

Source: World Bank

Overseas Development Institute.

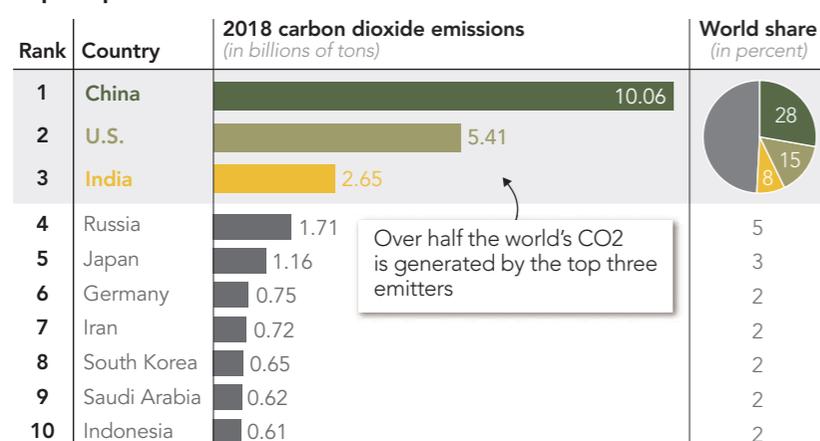
Faced with rising public anger about this failure to act, several countries, including G-20 nations France, Germany, Italy and the U.K., have passed, or are in the process of passing, laws mandating that they must achieve net-zero carbon emissions by 2050. Japan has committed to an 80% reduction by 2050 and carbon neutrality at the "earliest opportunity" thereafter. And although the U.S. is withdrawing from the Paris Agreement, six states and territories, including California, its wealthiest state, are aiming for net-zero by or before 2050.

Carbon pricing and carbon markets are included in most national strategies as a way to compel companies to act. Forty-six countries now have pricing or trading schemes in operation or scheduled to begin, covering around 20% of global emissions.

Companies -- even entire industries -- are setting their own targets. In September, We Mean Business, a group of major international companies with a combined market capitalization of more than \$2.3 trillion, including Nestle, L'Oreal, Danone, Ikea and Nokia, committed to reaching net-zero emissions no later than 2050.

In 2016, the International Civil Aviation Organization, an umbrella group of airline operators, agreed to cap the sector's net emissions at 2020 levels. The scheme, Carbon Offsetting and Reduction Scheme for International Aviation, or Corsia, means that all future growth in the industry -- whose passenger numbers are expected to almost double to 8.2 billion by 2037 -- will need to happen without generating any additional net greenhouse

Top 10 polluters



Source: Global Carbon Project



Peter Guest



Peter Guest

Companies, having barely begun the painful emissions cuts needed to meet their targets, are turning to carbon offset programs like the Prey Lang conservation project.

Scenarios

The Paris Agreement target seeks to contain a global rise in temperature to 1.5 C above preindustrial levels

1.5 C increase	2 C increase
Insects, vital for pollination of crops and plants, likely to lose half their habitat	Habitat loss twice as likely
Arctic Ocean would likely be bare of ice once per century	Ice loss to occur once a decade
Over 6 million people live in coastal areas vulnerable to sea level rise	Would affect 10 million more by the end of the century;
Frequency and intensity of droughts, storms and extreme weather events increasingly likely	sea-level rise will be 100 cm higher than at 1.5 C

Source: U.N. Environment Program

Indonesian children walk through pollution-induced haze in Jambi Province.

gases. Commercial air travel is responsible for 2% of all global carbon emissions.

Reaching net-zero through emissions cuts would mean fundamental shifts in business models and technology for many businesses, particularly in heavy industry, transportation and energy. As the emissions data shows, those transitions have barely begun, meaning that, to achieve net-zero, companies need to focus on the other side of the carbon equation: offsets.

The scale of this could be staggering. Analysts estimate that Corsia alone will require offsets equivalent to 2.6 billion tons of carbon between 2021 and 2035. In 2016, the total amount of carbon traded on voluntary markets worldwide was less than 65 million tons, according to Ecosystem Marketplace.

"I haven't seen the level of interest and engagement in the carbon space since 2008. But it's more sober now," Lestari's Eickhoff says. Much of



Reuters

that excitement is directed at forests. "When you look at the cost of abatement curve, the cheapest, highest-impact [offsets] come from the forestry sector in tropical areas."

Keeping forests standing, restoring and replanting them is the most effective way to sequester carbon at scale. Forests and other natural landscapes sequester -- draw down from the atmosphere -- more than 11 gigatons of CO2 per year, nearly twice the total carbon emissions of the U.S.

Projects like Prey Lang can generate credits under a U.N. mechanism called "reducing emissions from deforestation and forest degradation," or REDD+. The amount of credits is calculated using the differential between the national rate of deforestation and the rate in the conservation area. The more the project beats the spread, the more credits it generates.

Private sector interest in REDD+ projects is spiking. InfiniteEarth's Rimba Raya Biodiversity Reserve, spanning some 65,000 hectares of peatland rainforest in Central Kalimantan, has sold carbon credits to Microsoft, insurance giants Allianz and Zurich, and to State Street Bank and Trust. Since this summer, demand has spiked "fourfold," according to Procanik.

U.S. technology company Salesforce.com has bought "blue carbon" from Worldview International Foundation's mangrove restoration projects in Myanmar; in Cambodia, the Wildlife Conservation Society has sold credits generated from a project in the Keo Seima Wildlife Sanctuary

to multinational companies. Lestari, which runs a platform that allows palm oil companies to buy into reforestation projects, is now working on a similar one to aggregate demand for carbon, with interest from the oil and gas industry.

And the market's long slump means that demand far outstrips supply. Currently, only around \$100 million per year goes into "nature-based" carbon projects via the voluntary markets. Just one company, the oil major Shell, has said that it will invest \$300 million into forest carbon in the next three years.

It was this desire for scale that drew Mitsui -- whose core business revolves around trading in energy and minerals -- to Prey Lang. Daiki Sato, general manager of Mitsui's NexGen Energy department, which made the investment, told Nikkei that the "co-benefits" -- the social and biodiversity outcomes from the project -- and the opportunity to buy carbon at volume outweighed its relatively complex economics.

"There could be more moving parts than in a typical project, but right now, the amount of carbon offsets that could potentially be generated from what we are doing in Prey Lang is fairly sizable," he says. Mitsui is looking for other, similar projects, in the knowledge that Japanese companies may well struggle to meet their emissions ambitions and will have to turn to offsets.

"When you go near 2030 or maybe mid-2020s, there could be some limitations in reducing more greenhouse gases," Sato says. "And Mitsui would like to be one of the solution providers in those situations."

DEVIL'S BARGAIN Saving forests is not just a question of money, but money helps.

On the trunk roads running south from Stung Treng toward Cambodia's capital of Phnom Penh, sawn timber is hauled on trucks and on trailers hooked to motorbikes. Tipper trucks are piled with cassava. Wherever the roads touch the forest, cash crops have sprung up, with ordered lines of cashew, mango and rubber trees replacing the natural chaos. Here, the boundaries between legal and illegal trade are murky. Timber taken from protected areas is laundered into international supply chains; mining companies have been granted exploration licenses within the nature reserve. The temptation to take quick and easy money is everywhere.

"I think the biggest challenge is having a

"We're seeing people coming to the market looking to lock up millions and millions of tons [of carbon]"

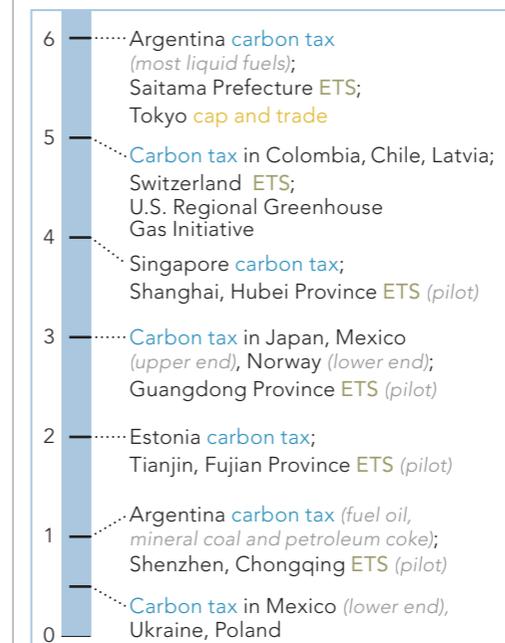
Jim Procanik Co-founder of InfiniteEarth, which runs forest conservation programs to provide carbon credits

Carbon coping

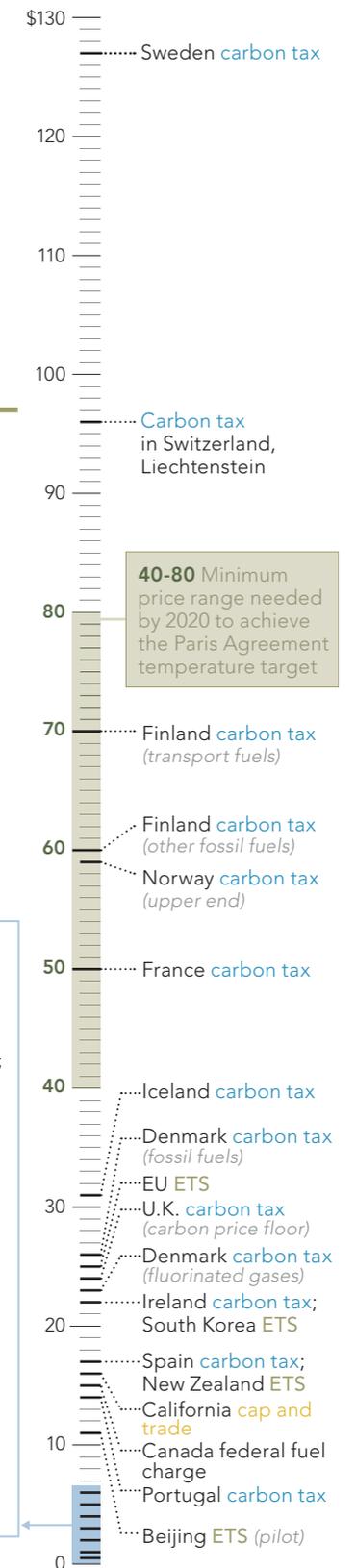
Carbon pricing by different initiatives (nominal prices on April 1, in dollars per metric ton CO2-equivalent)

Carbon tax: Imposes a price per unit of emissions. Incentivizes polluters to emit less and, in the longer term, to invest in cleaner technologies

Emissions trading and cap-and-trade schemes: More flexible. Sets a total emissions cap, where governments give permits to polluters that allow them a certain amount of emissions. Polluters can trade permits among themselves; this gives emissions-heavy industries more leeway in adjusting their pollution levels lower



Source: World Bank



40-80 Minimum price range needed by 2020 to achieve the Paris Agreement temperature target

\$44 billion

Revenue gained from carbon pricing schemes in 2018

Source: World Bank

long-term viewpoint. What we're trying to do takes a long time," says Srabani Roy, Conservation International's regional director for the Greater Mekong. "It's not like mining or infrastructure development, where you sign a contract and you get an immediate payout right there."

Many within the conservation movement acknowledge the irony of allowing market forces, which have often driven deforestation, to fund the fightback, and of relying on the budding altruism of some of the world's largest polluters. There is also the question of whether a market structure, which could be volatile and driven by speculation, can really provide the kind of funding that complex and sensitive conservation projects need.

"From a conceptual, theoretical, academic point of view? No, they can't," says Peter Kanowski, professor of forestry at the Australian National University's Fenner School of Environment and Society. "But I guess that's not the world we're living in."

A century of extraction of short-term economic value has pushed global forests into a sustained crisis. The World Resources Institute, which tracks forest loss, estimates that 30% of the world's forest cover has now been completely cleared, and a

Confiscated chain saws are piled at the regional Ministry of Environment building in Stung Treng.

Timber taken from protected areas is laundered into international supply chains; mining companies have been granted exploration licenses. ... The temptation to take quick and easy money is everywhere



Peter Guest



Reuters

Fires tore through the Amazon rainforest this year, drawing international outcry over the effects of climate change.

further 20% degraded. Of the remaining half, most is fragmented and vulnerable; just 15% is functionally intact. In 2018, 12 million hectares of tropical forests were lost; in 2019 the figure could be higher, after devastating fires across the Amazon and the Indonesian archipelago.

A 2014 report prepared by McKinsey & Co., Credit Suisse and the World Wildlife Fund estimated that between \$300 billion and \$400 billion is needed to fund conservation and ecosystem restoration each year, but that only \$52 billion in funding is available. Just 2% of all climate finance goes to forest conservation and rehabilitation.

That deficiency is replicated at a national level. In Cambodia, the Ministry of Environment struggles to manage 40% of the country's land area with under 0.5% of the national budget. Cambodia lost 2.2 million hectares of forest between 2001 and 2018, a quarter of its tree cover, according to WRI. More than 90% of deforestation was "commodity-driven," WRI found.

Conservation projects have to either compete economically with farmers and other groups who covet the land, or fight a constant -- and probably doomed -- rearguard action against destruction.

At Vuth Kith station, on the banks of the Mekong River, an eight-strong squad of rangers patrol a huge area by small boat, on foot and on the ubiquitous Honda bikes. Here and there, areas of trees have been chopped or burned down. In one patch, cleared a year before, mango seedlings have recently been planted.

The biggest obstacle to the rangers' work

is, in fact, the opposition they face from local communities. Locals monitor the squad's movements and inform on them, so that perpetrators can avoid the patrols. Once, when the rangers confiscated a tractor used to illegally clear land, villagers set up a roadblock and demanded its return. On the patrol routes, signs warning of the penalty for illegal clearance or harvesting have been defaced or obscured.

"We need the communities on our side 100%," CI's Hon says. "But they understand the short term better than the long term. ... They have to pay for education, for medical expenses. They owe money to loan sharks."

Conservation International has invested in a program that helps villagers grow higher-value organic rice, aimed at increasing incomes without requiring additional land, but it is limited to around 200 households. When the proceeds from Mitsui's carbon sales come through, CI hopes



Peter Guest

they will have more money to spread around, though the organization is yet to decide exactly how to divide the pot. Similar projects, such as InfiniteEarth's Rimba Raya project, have used their capital as a kind of venture fund to invest in small businesses and services. Others have experimented with direct cash payments.

The eventual shape of the Prey Lang program -- and its success -- rests on whether there will be enough money coming back down to the ground to make the case for conservation. "And that all depends on the market in Japan, basically," Roy says.

The price of carbon currently varies wildly around the world, from a floor of \$3 in Tokyo to \$17 in New Zealand and \$25 in the European Union. However, most markets do not yet admit credits generated overseas. The Tokyo market does, but only via certain bilateral agreements between the Japanese government and developing nations.

"The truth of it is that all of us have been in the wilderness on pricing since Copenhagen failed," says Todd Stevens, executive director for the Wildlife Conservation Society's Conservation Science and Solutions program.

Stevens says that bulk buyers in the market are currently paying \$1-\$3 per ton, while "more enlightened" companies are offering \$4-\$8. Echoing other project developers, he judges that \$10 a ton would be "the type of money where you would begin to overcome the opportunity costs at scale" -- in other words, that the income would be competitive with clearing the land for agriculture.

The International Monetary Fund estimates that the price of carbon needs to be within the range of \$40-\$80 per ton by 2020, rising to \$50-\$100 per ton by 2030, for market-based mechanisms to deliver the emissions reductions necessary to prevent global heating of 2 C.

Even a few dollars extra per ton could drive real change on the ground. CI's Roy, who used to work in the development sector, compares the challenge to the long struggle to try to convince Afghan opium farmers to give up their crops.

"Nobody could figure out what would be more profitable for the farmers than producing opium," she says. "It's kind of similar. What is the price point at which this is going to be economically viable, that you're not going to do other things, not going to chop down the tree? Because, sadly, now the climate argument alone is not winning." **N**

2050

Deadline to reach net-zero carbon emissions for multinational companies including:

- Nestle
- Danone
- Ikea
- Nokia

Source: We Mean Business

Some farmers have been funded to grow higher-value rice, removing the incentive to clear land for more crops.