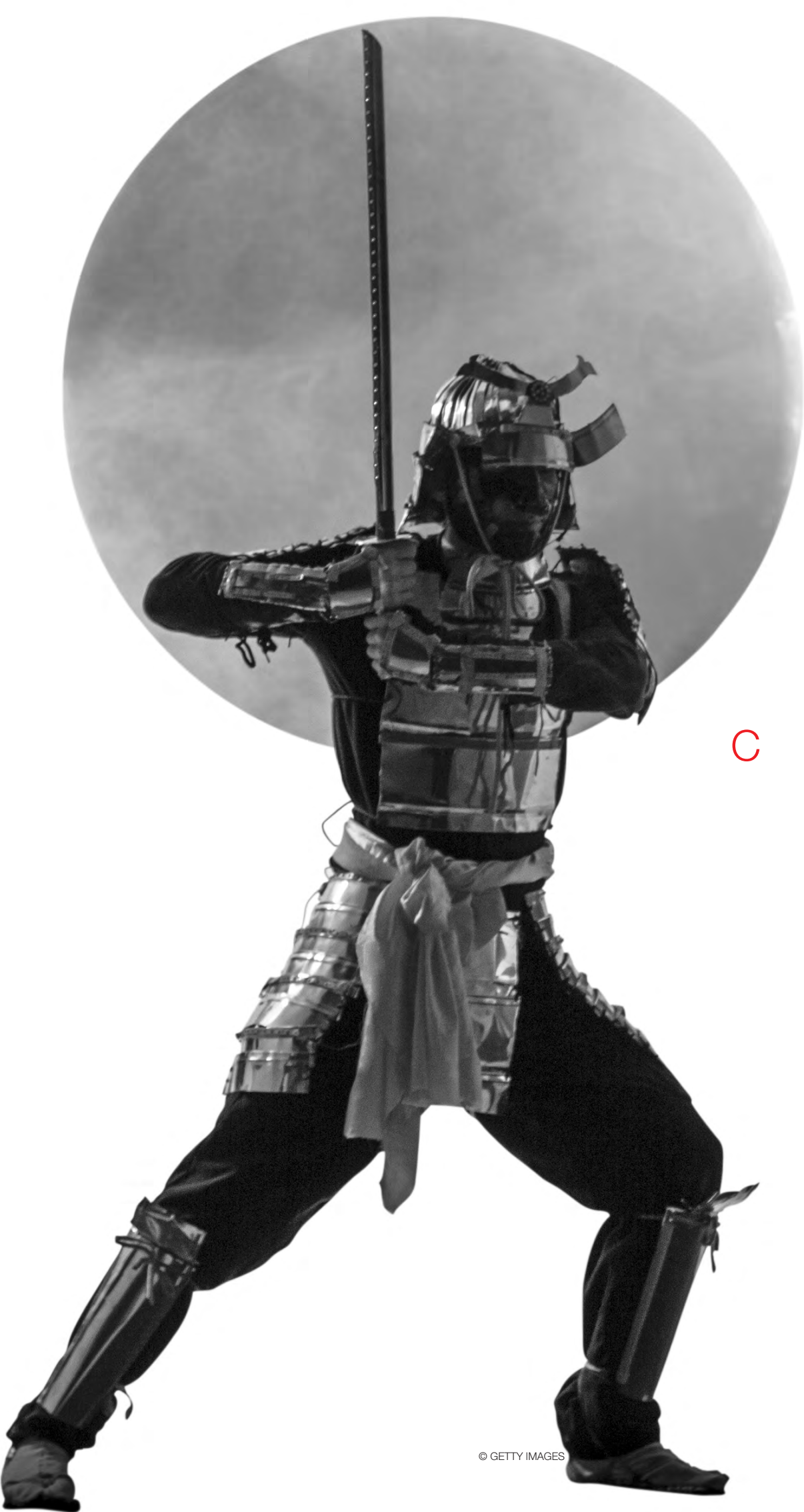




world energy we

JULY 2021 • N. 49

MARKET
GAMES



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A NEW TIME BEGINS NOW

by **Mario Sechi**

THE TOKYO 2020 OLYMPICS ARE A WATERSHED BETWEEN THE OLD WORLD OF YESTERDAY AND THE FUTURE WORLD, WHICH IS ALREADY TODAY. THEY ARE A SYMBOL OF REBIRTH AND THEY CAN TEACH US A GREAT DEAL ABOUT WHAT WE WILL BE OR WILL NO LONGER BE

THE OLYMPIC GAMES have always been a political event of enormous importance, and even more so today because in Japan we see the sundown in an old world, the dawn of a “new normal” whose shadows are already visible, the emergence of behaviors (I was going to write “lifestyles,” but it is a social marketing term from the pre-pandemic era, a thing of the past) that will shape our future. There will be an increasingly distinct separation between city and countryside starting with mobility and energy (to be clear, given the current prejudice inherent in this contrast, my preference goes to the countryside, with its authenticity and resistance to the slow wear of consumerism). This is why we have dedicated an entire issue of World Energy to Tokyo 2020: a watershed event. From here, a new time begins, one that has its roots in history.

The very name of the Games: “Tokyo 2020” describes an offset calendar. From the very start, we are in another time: they are Games of the past, competed in a post-present, projected into a different future. They are Games deferred, distanced from the Annus Horribilis, but with all the signs of the ongoing crisis (and recovery). Games in bubbles and with infections. Games with tests and vaccines. The pandemic Games. The Games conceived in the pre-Covid era and not yet in the post-coronavirus zone. Where are we? In 2020, in 2021 or in another dimension of history? These questions are not answered by looking at the calendar, where we experience the illusion of a time in motion,

Federica Pellegrini:
her last race,
in Tokyo 2020,
was her fifth
Olympic final
in the 200 meters
freestyle.

synchronized and always tending towards the future, the oblivion of the already happened, minute by minute. These Olympic Games pose a profound question: where are we going and how did we get to where we are?

Japan, with its thousands of years of culture, this archipelago of wonder, today contains all of humanity and its battle for survival. There is sport, with its joys, its pain, its feats. As I write this article, the Italian swimmer Federica Pellegrini is competing in her fifth Olympic final in the 200 meters freestyle, a record achievement she now shares with the “Baltimore Bullet,” the great Michael Phelps. We are in the pool, as I think about this epic battle over “durability,” and up pops the face of Simone Biles, surprised by her own ghost; an American gymnast, an enormous talent and words that make your blood run cold: “I’m alone dealing with demons in my head... I have to focus on my mental health.” For Simone, her Tokyo 2020 ends with withdrawal from the psycho-arena. We are in the field of Greek heroes, where everything is no limits: you are great, you fall, you go under.

It is the playground of legends, of tragedy; these are the words of William Shakespeare: “Glory is like a circle in the water, which never ceaseth to enlarge itself, till by broad spreading, it disperses to naught.”

Because this is a chapter in the tale of power. Along with running, jumping, diving, shooting, movement, the energy of the human being, there is the subtext of politics; we are of course still in Greece (origin of the Olympics), in Athens, in Aristotle’s Lyceum which taught us that “everything is political.”

The Olympics are a manifestation of soft power that often trains itself for conquest. Let’s look back in history: Adolf Hitler used the 1936 Berlin Games to strengthen his regime, to show that the rise of Nazism was unavoidable and manageable by other powers. A few years later, on September 1, 1939, Germany invaded Poland; from the javelin thrower to the armored cavalry. In those games, there was also the flare anticipating the end of the Third Reich, revealing who would defeat Germany: Jesse Owens, American, originally from Alabama, a black athlete, was the star of the Games, winning four gold medals. Hitler’s race theory met his enemy of tomorrow; there was the new world waiting for him at the gate of freedom: the United States of America that would conquer Berlin, wipe out the horror of Nazism and lead Europe to the longest period of peace in its history, and another conflict on the horizon: the Cold War.

History is always a teacher of life’s lessons. Speed is the field where power is measured. The Cold War period between 1970 and 1978 (the years of sprinter Valery Borzov) pitted the American sprinters against the Russian dragsters (and the great Italian sprinter, Pietro Mennea, who burst onto the scene). The Soviet Union shot past with its lab-enhanced racers. In 1984 came the Alabama Arrow Carl Lewis, a deluge of gold medals in Los Angeles (four), two golds in Seoul in 1988, two golds in Barcelona in 1992 and one at the end of a massive career in Atlanta in



© REUTERS/CONTRASTO

1996. Sprinting, relay, long jump: another Jesse Owens who, with the other American athletes, marked the end of an era. The Russians were gone, swallowed up in the decline of the Soviet Union. The track was dominated by the Americans, Canadians and British; the winner was the Anglosphere with the Caribbean flash of Jamaica. Someone would have said that after all, even athletics were “a thing of the past.” But Francis Fukuyama’s prophecy applied to the running track had the same fate that befell it on the gameboard of geopolitics: history got back in motion and, while one empire died (Moscow), another was born (Beijing). It is the rise and fall of the nations. It runs and glides on track and rink, in the velodrome, in the pool, on the final bend. Having boycotted the Olympic Games since Helsinki (1952), China reappeared 32 years later in 1984 in Los Angeles (where the Russians didn’t compete, counter-boycotting the American games in response to Jimmy Carter’s refusal to take part in the 1980 Olympics in Moscow). China appeared on the scene, immediately winning 34 medals, of which 15 were golds. What a surprise! In reality there was nothing to be surprised about: the long march of China was no longer led by Commander Mao; the de facto leader of the country, Deng Xiaoping, a man of great intelligence, a former political commissar of the Red Army who had been at the helm of the country since Mao left the scene some time earlier. With his reforms—the opening to capitalism, the establishment of special economic zones, the iron control of

the provinces, the invention of the doctrine of one country, two systems in order to regain control of Hong Kong—the president forged the China led today by Xi Jinping.

The Olympics are a diplomatic operation, starting with the approval of the admitted sports. With the admission of Badminton (1992), Rhythmic Gymnastics (1984), Judo (1972), Table Tennis (1988) and Taekwondo (1988), the Chinese medal table grew thanks to its long tradition in these disciplines. People would say that this is part of the culture of a people and so it was easy to acquire the advantage. This is not the case: China trains to win, it has a sports policy that matches the power of the nation; it plans its ascent and Tokyo 2020 is the test to try to overtake the United States. The challenge has already started: as we close this issue of World Energy, America leads the overall medals rankings, with China following close behind. According to the projections of FiveThirtyEight, this will be the situation through to the end of the Games, with the final victory of the US over China, third place for Japan, fourth for Great Britain and fifth place for a hitherto unknown acronym, ROC, which stands for “Russian Olympic Committee”—in short, a case of (un)masking of Russia, excluded due to the doping scandal, but competing with its (335) athletes under this formula. In Tokyo, there is neither the Russian flag nor the Russian anthem. When the athletes (considered “neutral”) step onto the podium, we hear the music of Pyotr Tchaikovsky’s “Piano Concerto No. 1” and not the Red Army choir. They are a form of political alchemy; Russia will win its medals anyway and lots of them.

What about the future? There are those who paint it dark and those who see it bright, with no lack of chronicles of Arcadia and dystopia: the moon that turns blood red, the birds that die flapping their wings and falling to the ground (a scene in the science fiction movie Aniara, taken from the poem by the Swedish Nobel laureate Harry Martinson), the billionaires of Silicon Valley who build space rockets to escape (or to save the world and build a new “home” on Mars?, so they say) from the Earth too warm, too crowded, too poor. We are in the midst of the spread of the Delta variant; the pandemic is not over. We remember reading in the history books about the black plague (Giovanni Boccaccio in 1348, after seeing his stepmother Bice, his uncle Vanni and his father Boccaccino die in Florence, remains alone with his little brother Jacopo, and writes his masterpiece, The Decameron) and here, we are bewildered by the bewilderment: the succession of disasters is part of history and there is no certainty that the coronavirus crisis is the worst (read Doom, the latest book by Niall Ferguson). We need to be ready, and the Tokyo Olympics can teach us a lot about what we will be (or will no longer be).

In 1972, a team of MIT researchers produced a study, published by the Club of Rome, which basically said this: current growth and consumption rates will become unsustainable by the year 2100. Five factors were considered: population growth, agricul-

tural production, depletion of non-renewable resources, industrial production and pollution rates. Things weren’t going well (but they could have been worse). Fifty years later, some have updated this study and brought the collapse date forward to 2040. What time is the end of the world?

The Tokyo 2020 Games were conceived yesterday, consumed today with hope for tomorrow. Games with no spectators, with virtual joy, in megapixels, manga animation, with a Japanese nation that (perhaps) will learn to love them in the end, when everything is over. With their silent stands, these Olympic Games teach us about the suspicion, the distrust of the Japanese, the political plots; they tell us a lot about the future, they contain a share of dystopia, of indefinite a-normality.

What will remain etched in our memories of Tokyo 2020 will be neither the diplomacy nor the works nor the “green” ideas nor “sustainability” nor the “transition.” These exist, they are an immediate trend (and herein lies the paradox, therefore they are very fragile), but the script for tomorrow reserves other shocks. These final terms, in their noble intentions, are all part of a new/old ecologism and are being worn out in statements and contradictions, losing their meaning with excessive use, centrifuged precisely by a new -ism, tied up neatly with a bow in the package of ideology. Faced with this Babel, in WE, we continue to preach (yes, sometimes we feel like we’re in the desert) pragmatism and realism, the optimism of homo faber against the pessimism of unhappy degrowth. We won’t have to wait long to see all the angels fall to the ground.

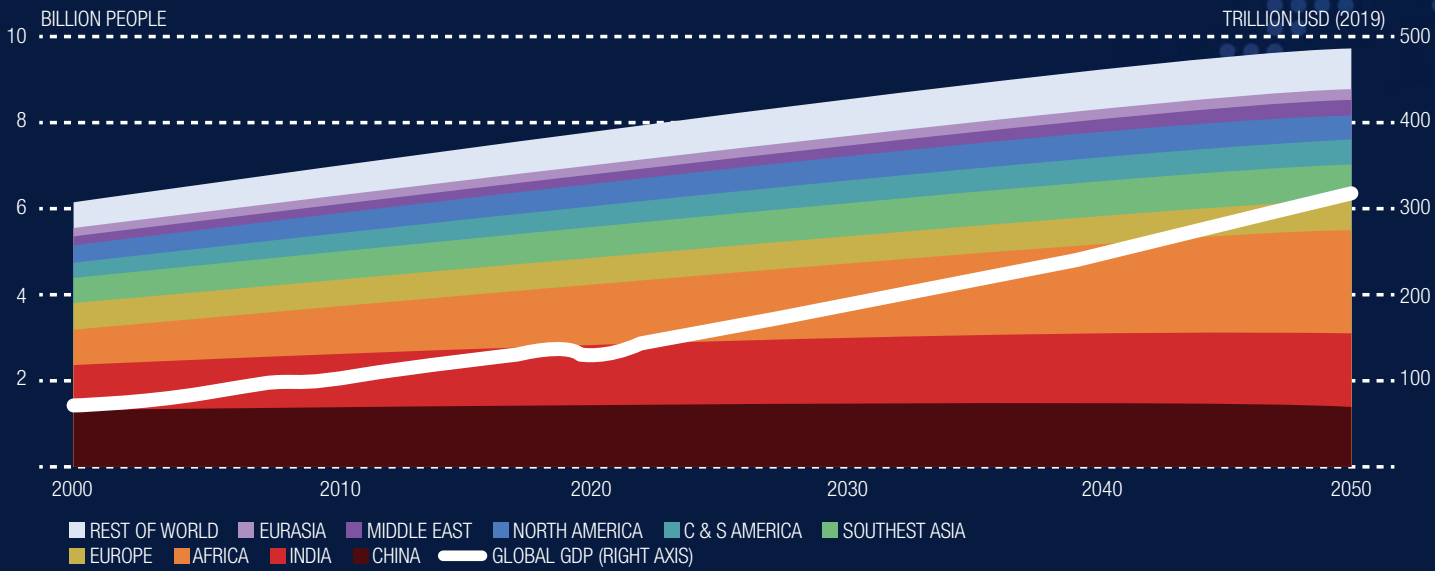
After all, Tokyo 2020 also shows us this incandescent fragment of future created by chance and undesirable, where man is absent and a sinister silence hangs in the air broken by elements of an artificial screenplay: press one button, applause; press another, music; touch nothing in the control room, silence. We are almost there; we are one step away from the door into (and out of) the Truman Show. At some point, as in Richard III, there will be a rude awakening in the reality of the battlefield and we will hear the verse: “A horse, a horse, my kingdom for a horse!” That will be the moment when, with the closure of the good old factories and the loss of jobs, people will realize that something is not right in the wonderful forecasts. Pessimists? Not at all: we are well-informed optimists.

Tokyo 2020 is a mutated and mutant event, it changes over the course of the days (like the virus); it has a changing purpose and boundary whose shape we are discovering as the competitions progress, in the unfolding of stories. The images that will remain of Tokyo are those of men and women in search of a dream. While the Delta variant runs around the world, the Tokyo scenario looks like the promise of another chapter, not the end of the tale of the pandemic. We are optimistic, it will all be OK. A year ago, there were no vaccines; today we have the shield. What we are still missing is the Samurai sword: self-control.

we

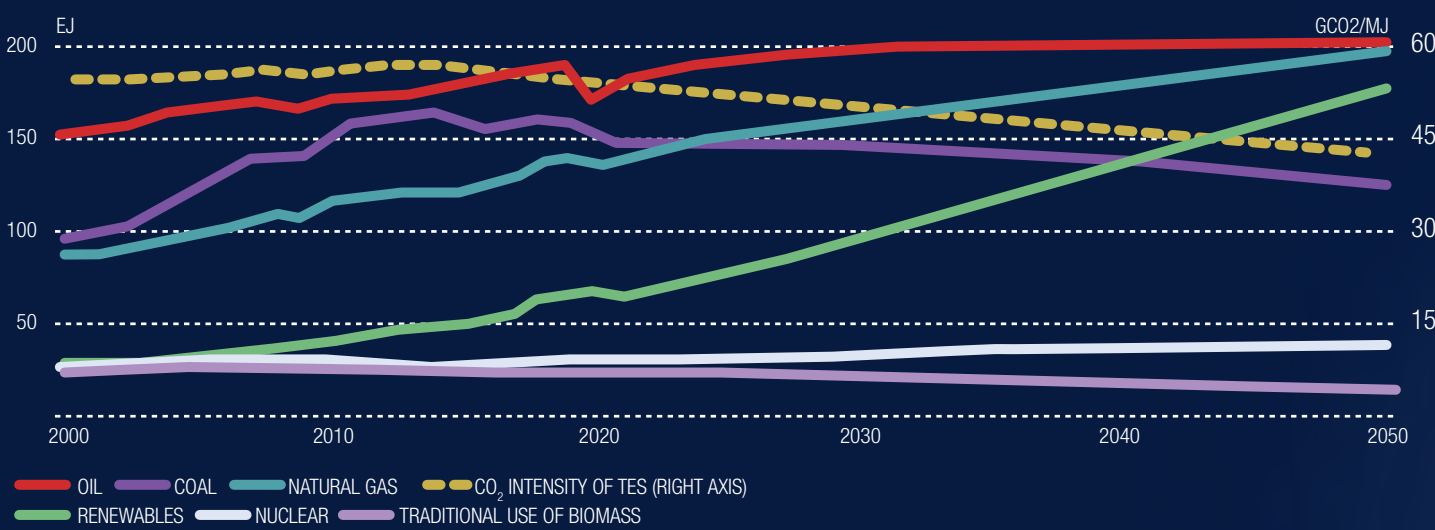
The global economy should recover rapidly from the impact of Covid-19. According to forecasts by the International Energy Agency (IEA), in line with estimates by the International Monetary Fund, from 2022, GDP will return to growth close to pre-pandemic rates (3% annual average) and will reach more than double the current rate by 2050. At the same time, however, greenhouse gas emissions, which fell dramatically in 2020 due to the crisis, will increase again significantly, distancing us yet further, without ambitious policies by all countries, from the target of net-zero by 2050. In order to achieve this target, it is fundamental that everyone get on board, starting with the Asian countries, which count for over 50 percent of global CO₂ emissions.

World population by region and global GDP in the NZE



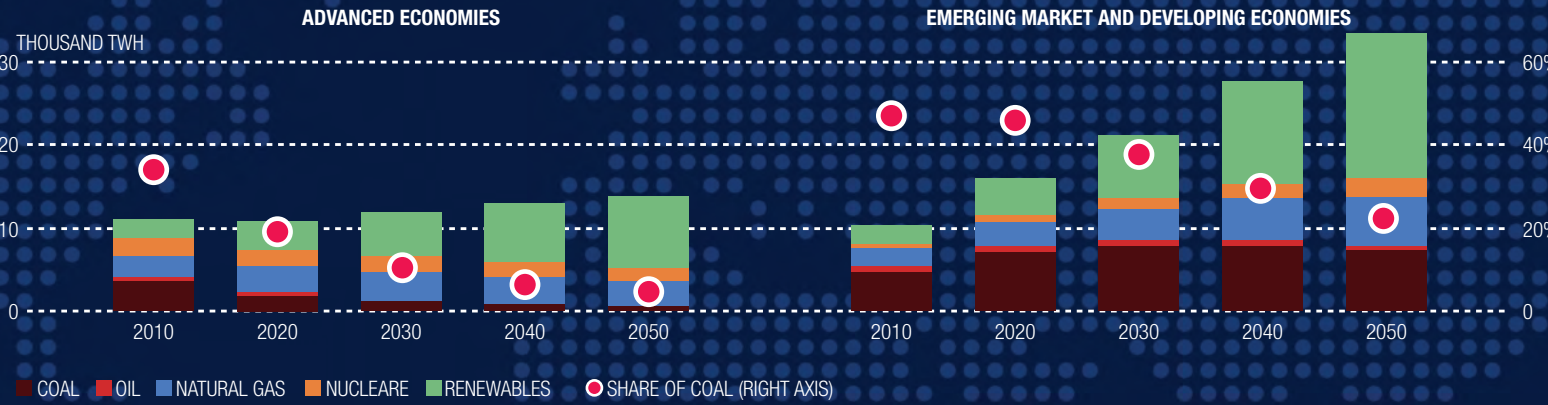
By 2050, the world's population expands to 9.7 billion people and the global economy is more than twice as large as in 2020.

Total energy supply and CO₂ emissions intensity in the STEPS



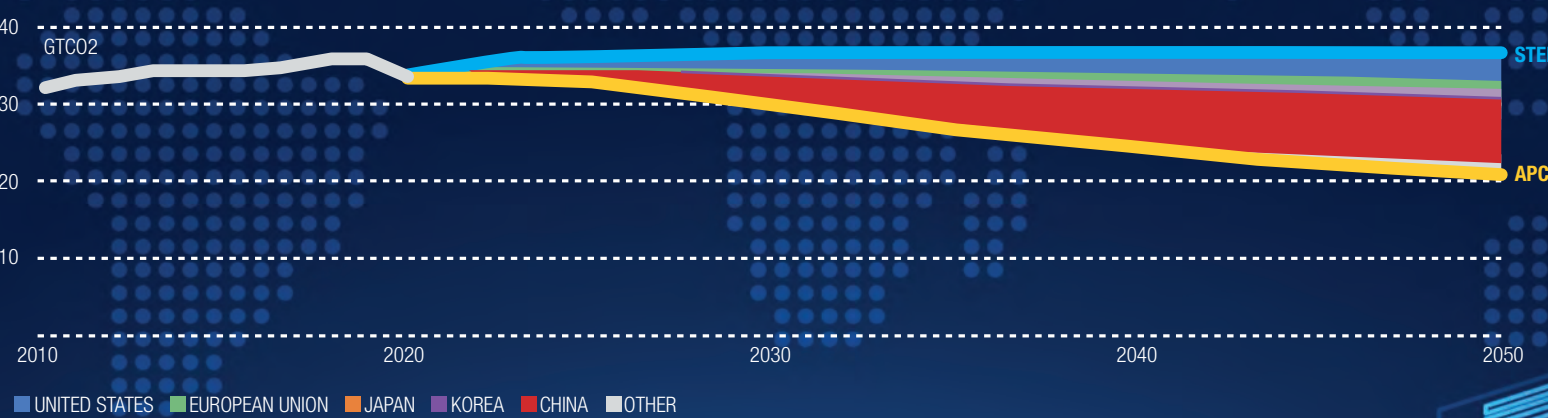
Coal use declines, oil plateaus and renewables and natural gas grow substantially to 2050.

Electricity generation by fuel and share of coal in the STEPS



Emerging market and developing economies drive most of the increase in global electricity demand, met mainly by renewables and gas, though coal remains important.

Global energy-related and industrial process CO₂ emissions



Achieving existing net-zero pledges would reduce emissions globally to 22 Gt CO₂ in 2050, a major reduction compared with current policies but still far from net-zero emissions.

SCENARIOS

NZE - The Net-Zero Emissions by 2050 Scenario (NZE) describes how energy demand and the energy mix will need to evolve if the world is to achieve net-zero emissions by 2050.

STEPS - The Stated Policies Scenario (STEPS) includes only the firm policies that are in place or have been announced by countries, including Nationally Determined Contributions.

APC - The Announced Pledges Case (APC), assumes that all of the net-zero targets announced by countries around the world to date are met in full.

ENERGY TREND

V I S U A L



ARE THE OLYMPIC GAMES STILL A GOOD IDEA?

by Moisés Naím

THE OLYMPICS ARE RUINOUSLY EXPENSIVE AND MORE LIKELY TO PRODUCE FISCAL CHAOS FOR THEIR HOST NATIONS THAN A POSITIVE LEGACY, WHILE FAILING TO DELIVER ON THEIR PROMISE OF PROMOTING WORLD PEACE. IT MIGHT JUST BE TIME TO RECONSIDER THE WAY THEY'RE RUN

EVERY FOUR YEARS, the talking heads on TV ritually remind us that the modern Olympics were launched in 1896 with the lofty goal of furthering world peace. There's little evidence that they do that, or even that they lessen diplomatic tensions between countries in conflict. As the back-to-back boycotts by the United States and the Soviet Union showed in the 1980s, the Olympics can even do the opposite, becoming more grist to the mill of diplomatic tension.

WHITE ELEPHANTS AND BUDGET OVERRUNS

Cost-overruns are almost as much a part of Olympic tradition as the lighting of the torch. The tradition started in 1976, with Montreal building a futuristic stadium with a state-of-the-art retractable roof that, alas, wasn't designed to support the weight of snow and never actually worked. First budgeted at USD 770 million, the stadium ended up costing twice as much, and was financed with a 30-year bond that Montrealers only finally paid up through their taxes in 2006, giving the stadium its sardonic local nickname: the Big Owe.

It was only the first in a long tradition of Olympics White Elephants: gleaming venues for sports like indoor cycling and swimming are expensive to keep up and impossible to fill up outside the one-time global spotlight the games bring. From Rio and Athens to Sarajevo and Beijing, Olympics venues go to seed directly after the games with disturbing regularity. Turns out spending lavishly on state-of-the-art infrastructure you'll only ever use once is not the most fiscally prudent thing to do. Bent Flyvbjerg and Alexander Budzier, researchers at Oxford University, have found that all the Olympic games (from 1960 to 2020) have suffered from high cost overruns, averaging 172 percent.

THE IMPACT OF ATHENS 2004 ON THE EU

Surely, though, that's only a problem for the unlucky citizens of cities whose leaders set their sights on Olympic glory, isn't it? Think again. When the historians of the deep future look back on our time, what's likely to stand out for them is the way the 2004 Summer Olympics in Athens ended up destabilizing the greatest integration project of the last hundred years: the European Union.

It's easy to forget now, but it was the 9 billion Euros it cost Greece to host the games that tipped Greek finances from "problematic" to "catastrophic." By 2004, the games had sent Greece's fiscal deficit to 6.1 percent of GDP, more than double the 3 percent that European rules set as an upper limit. The spending—much of it on White Elephant facilities that were abandoned directly after the games—set the stage for the deep fiscal crisis in 2008-2010 that destabilized the Euro, wreaked havoc on European debt markets and put an end to the golden age of European integration, eventually setting the stage for Brexit, to say nothing of its shocking impact on the wages and pensions of ordinary Greeks. In the long history of Olympic spending folly, it's hard to imagine how Athens 2004 could lose the place of honor. Perhaps the Olympics reveal the character of their hosts more than transforming them. Some venues have gotten tough on cost overruns and become adamant about making realistic plans for the venues after the games. In Vancouver, the 2010 winter games were paid almost entirely out of private funds, and the infrastructure that was built was infrastructure that was already known it was needed, regardless of the Olympics. The games turned a profit and left no unsightly messes behind. London's 2012 games and Turin's 2014 winter games also got talked about as Olympics without boondoggles.

THE STRATOSPHERIC COSTS OF SOCHI 2014

But in kleptocracies, the Olympics open alluring possibilities for the kleptocrats. The infamous 2014 Winter Games in Sochi, Russia, whose ultimate cost of \$55 billion was 4.5 times the initial estimate and more than eight times as much as the next most expensive winter games. Russian taxpayers were on the hook for 97 percent of that and continue to dish out \$1.2 billion per year to finance the debt incurred and to maintain facilities unlikely to ever be filled again in working order. Of course, not all of the \$55 billion were spent on venues. \$10 billion, for instance, was used to finance a gleaming new rail and road link between the town of Sochi and the site of most of the downhill events, some 48 km. away. Yet researchers have long known that building this kind of infrastructure in the context of the Olympics reliably sends costs skyrocketing, knowing the government is up against a hard deadline massively tips the balance of power in negotiations to the side of contractors, who are free to profiteer on the contracts. In Russia, where lining the pockets of regime-backed cronies was the point, this dynamic was treated almost like a feature, rather than a bug. In the event, non-sports



© JUSTIN LIM/UNSPLASH

infrastructure for the Sochi games ended up costing 347 percent of the initial estimate.

TOKYO, SUCCESS OR FAILURE?

Will Tokyo be remembered as one of the successes, or as one of the failures? Costs have been a problem. Despite a drastic reduction in the ambition of the main track and field venue, the cost for sporting facilities is already twice what was originally forecast, coming in at \$15 million. That's more than any other summer games. Overall costs—including infrastructure upgrades—are expected to come in at \$28 billion, also a summer record. The Covid-19 pandemic has greatly added costs and the logistics it requires are immensely complex. Professor Jules Boykoff, who has written four books on the Olympic Games, has alerted that in Japan "polls find that about 80 percent of the population opposes staging the Olympics amid a global pandemic. Japan's vaccination rate lags behind those of other developed economies, with vaccines for people under age 65 rolling out in full force only a few weeks ago. The Games will feature more than 11,000 athletes from more than 200 countries; they're not required to be vaccinated." And if experience serves as a guide, it's unlikely that the reputational boost the nation enjoys from hosting the games will be worth anything like that enormous sum of money it will have to spend to host the games. Successful, affordable Olympics that leave a positive legacy for their host cities are the exception, rather than the rule. The risk is that democracies will find it increasingly difficult to justify the expense to their voters, pushing more and more games to authoritarian nations. The solution here is almost too obvious to need stating: picking a single permanent site for the games, perhaps in Greece, by Mount Olympus, or in a neutral, wealthy, temperate country like Switzerland, already home to the International Olympic Committee. This call for a permanent Olympic site gets floated anew every few years, but never seems to get any traction. Perhaps it's just one of those ideas too obviously sensible, fiscally prudent, and environmentally smart to risk ever being actually implemented.

We

MOISÉS NAÍM

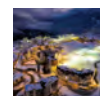
He is a distinguished Fellow at the Carnegie Endowment for International Peace in Washington, D.C. and a founding member of WE's editorial board. His most recent book is *The End of Power*.



Marcus Mepstead, British fencer, poses for a photo at the official announcement of the fencing team selected for Team GB for the 2020 Tokyo Olympic Games.



Costs are also a problem for Japan. Despite the drastic reduction in the ambitions for the Olympic Stadium, they have already doubled compared to the initial forecast and now total USD 15 billion. In the photo, Tokyo Airport.



Hotel complex built on the site of the former Olympic village, on the Rosa-Khutor Plateau, at 1170 meters above sea level, Sochi, Russia. The Sochi Olympics were the most expensive Winter Games in history.



© GETTY IMAGES

THE OLYMPIC WAGER

by Giulia Pompili

FOR TOKYO, THE OLYMPICS OFFERED AN OPPORTUNITY FOR AN ECONOMIC AND ENERGY REBIRTH AFTER THE TRIPLE CATASTROPHE OF 2011. BUT EVEN AS CLIMATE CHANGE CONTINUES TO INTENSIFY, THE COUNTRY'S GREEN INITIATIVES HAVE NOT YET PRODUCED AN ECONOMICALLY FEASIBLE WAY FORWARD

IN 2014, WHEN TOKYO won the bid to host the 2020 Summer Olympic Games, it seemed like an impossible feat for Japan. Only three years earlier, on March 11, 2011, the central area of Tohoku had been hit by a triple catastrophe: first the terrible earthquake, the most powerful ever recorded; then the tsunami, with waves over eleven meters high; finally, the accident at the Fukushima nuclear power plant. However, the Olympic gamble had been sought and won for a specific reason: the Olympics served the Japanese government above all to provide a roadmap, a reconstruction program in mandatory stages that would guide the country toward rebirth, from the point of view of economic and energy development, in time for the Olympic Games. Tokyo would have six years to get out of the emergency and take advantage of the crisis period to relaunch itself with a new green perspective.



GOALS AND REALITY

It didn't go quite to plan. Japan's return to the world scene, the reconstruction of the areas most affected by the earthquake and tsunami, but above all the rethinking of Japanese energy policy after the nuclear disaster did not achieve the hoped-for results. Former prime minister Shinzo Abe, advocate of this transformation, wanted to make Japan a leader in the global battle for reducing emissions and against climate change. Yet recent Japanese history demonstrates that politics alone is not enough. The transformation must be accompanied by the engagement of society, effective communication and the prediction of unexpected events. In 2020, renewable energy accounted for just 18 percent of Japan's national electricity production. The Land of the Rising Sun is still fifth in the world for CO₂ emissions, and, according to announcements by Shinzo Abe in 2018, the goal is to achieve 24 percent of total energy produced from renewables by 2030. Two years later, Mr. Abe's successor, his right-hand man Yoshihide Suga, upped the ante even further. On October 26, 2020, in the midst of the pandemic, Mr. Suga announced to the National Diet, the national parliament, that Japan will achieve net-zero emissions by 2050. An ambitious plan, to say the least, but which concerns above all the political competition between the countries of East Asia. In fact, in the same period of 2020, Chinese President Xi Jinping had declared that China—the country that produces the most emissions in the world—will become carbon neutral by 2060. At the same time, South Korea, led by Democrat Moon Jae-in, also announced its "Green New Deal": EUR 54.3 billion to be invested in the green transition, and carbon neutrality by 2050. Tokyo could not be outdone.

THE FACES OF THE TRANSFORMATION

Politically, the Japanese government has at least two faces representing this transformation. On the one hand, there is Taro Kono, former foreign and later defense minister, and for almost a year, Minister for Administrative Reforms. He is one of the best-known politicians abroad: an excellent diplomat and communicator, he was entrusted with the task of revolutionizing the huge hindrance to the Japanese green revival: bureaucracy. As soon as he arrived at the Ministry, Mr. Kono promised to eliminate, or at least reduce, the uniquely Japanese tradition of the hanko. Japanese stamps, which are used in place of signatures on official paper documents, are a small example of how the digital revolution in Japan never got further than the 1980s; another example is that a great many public procedures still require faxes to be sent. The use of paper in Japanese public administration has never been replaced by digital and is above all a symbolic and image problem: "The government itself must make efforts to reduce emissions and help us reach the 2050 target," Taro Kono said at a press conference in December.

日本列島

I N N U M B E R S

POPULATION 124,687,293

ECONOMY

GDP GROWTH RATE -4.83% (2020)

GDP IN BILLION US DOLLARS 5,048.69 (2020)

INFLATION RATE -0.02%

ENERGY

ELECTRICITY - PRODUCTION 989.3 BILLION KWH

COUNTRY COMPARISON TO THE WORLD: 5

ELECTRICITY - CONSUMPTION 943.7 BILLION KWH

COUNTRY COMPARISON TO THE WORLD: 4

CRUDE OIL AND PETROLEUM PRODUCTS - CONSUMPTION
3,284 THOUSAND B/D (2020)

COUNTRY COMPARISON TO THE WORLD: 5

CRUDE OIL - IMPORTS 2,416 THOUSAND B/D (2020)

COUNTRY COMPARISON TO THE WORLD: 5

NATURAL GAS - CONSUMPTION 106.97 BILLION CUBIC METERS (2019)

COUNTRY COMPARISON TO THE WORLD: 6

NATURAL GAS - IMPORTS 104.24 BILLION CUBIC METERS (2019)

COUNTRY COMPARISON TO THE WORLD: 2

PHOTOVOLTAIC ENERGY

CAPACITY 61,840 MW (2019)

COUNTRY COMPARISON TO THE WORLD: 2

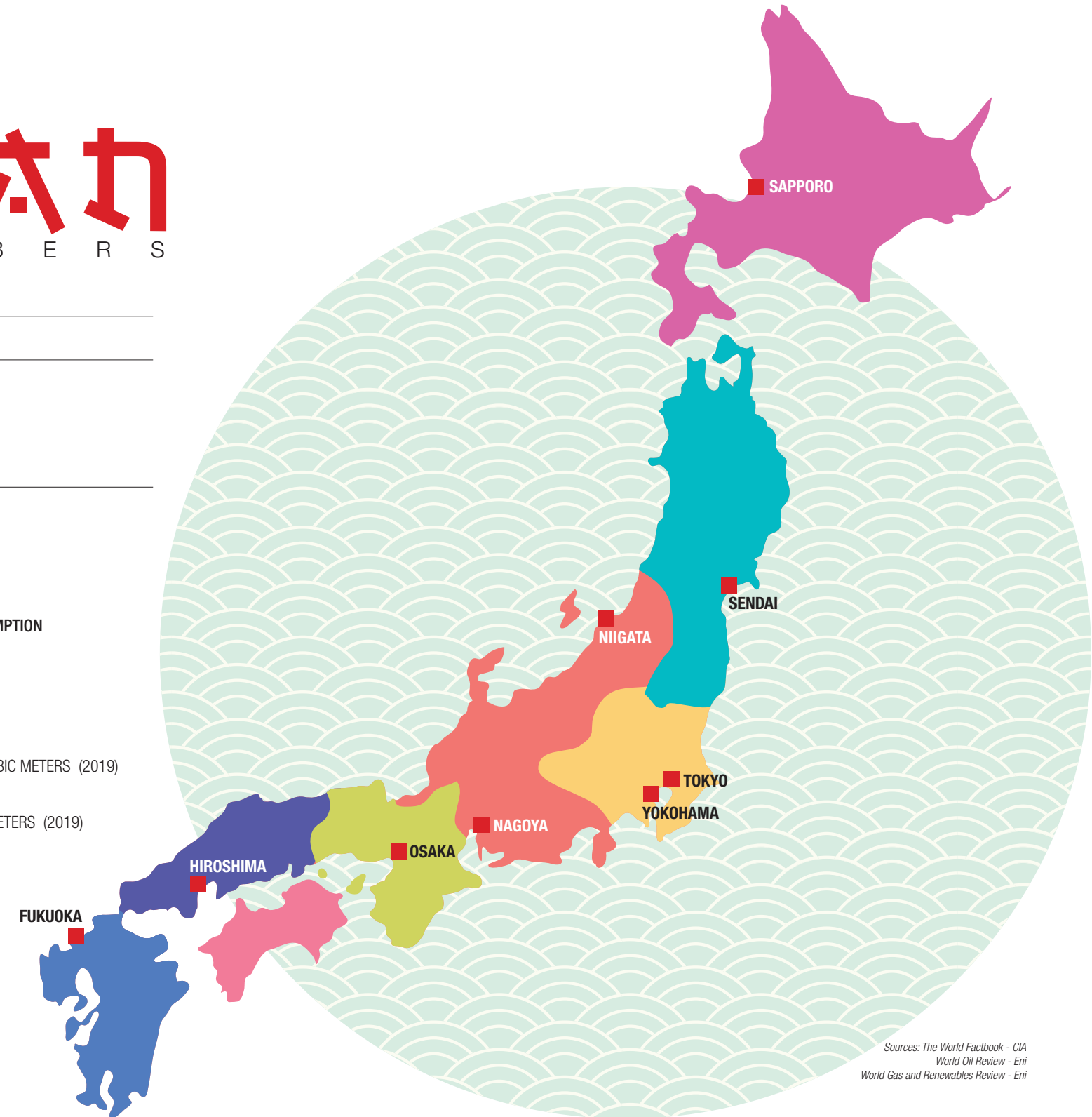
PRODUCTION 74,114 GWH (2019)

COUNTRY COMPARISON TO THE WORLD: 3

**CARBON DIOXIDE EMISSIONS
FROM CONSUMPTION OF ENERGY**
1,268 BILLION MT

"This is why we are asking ministries to increase the use of renewables to 30 percent of their total needs."

The other face of Japan's green transition is even more popular. Shinjiro Koizumi, born in 1981, is the son of the historic prime minister Jun'ichiro Koizumi. Beyond the political capital that he carries thanks to his father, Koizumi junior represents the new and young face of Japanese politics, including and above all on environmental issues. He often demonstrates an almost personal interest in certain issues, for example when he criticizes his own government, accusing it of taking too few concrete steps toward the announced goal of 2050. At the latest G7 of Environment Ministers, Shinjiro Koizumi said Japan will no longer



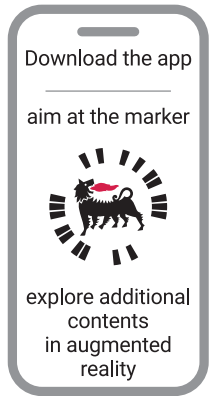
export coal-fired power plant technology, and that the exceptions authorized in recent years will no longer be allowed.

LOW-IMPACT OLYMPICS

Above all from a communication point of view, the ecological roadmap imagined first by Shinzo Abe and then by Yoshihide Suga should have coincided with the Japanese Olympic Games. The Games were scheduled for the summer of 2020, and then the Sars-Cov-2 pandemic forced the International Olympic Committee to postpone them to the summer of 2021. Central government projects should have included the first zero-impact Olympics, but the one-year postponement, with the related

THE REGIONS OF JAPAN

- HOKKAIDO
- TOHOKU
- CHUBU
- KANTO
- KANSAI
- CHUGOKU
- SHIKOKU
- KYUSHU



The new Tokyo National Stadium, designed by Kengo Kuma, main home of the 2021 Olympic and Paralympic Games. The stadium, which has a capacity of 68,000, is built mainly of wood, with 12,928 cedar boards in the roof and the three layers of eaves, and “furnished” with all kinds of plants in the various external walkways.



Tokyo Metro. Recent Japanese history proves that for effective climate action, politics alone is not enough. The transformation must also engage society.



Oritsu beach and the Kashima wind farm, in Ibaraki prefecture. The relaunch of investments in renewables in Japan is largely focused on wind power, especially offshore.

costs for plant maintenance, combined with stringent Covid-19 safety measures, greatly reduced the possibility of a truly zero impact event. The Tokyo 2020 Organizing Committee had published a “sustainability report” as early as 2019, which was then updated according to the latest Covid-19 safety regulations—for example, the use of plastic and single use articles, which were intended to be avoided altogether, was reintroduced. However, the “Towards Zero Carbon” document includes some interesting new ideas on the capacity of mega-events to reduce their impact on cities and to be transparent regarding their sustainability. First of all, renewable energies: according to that officially announced by the Committee, the electricity used to power the Games is one hundred percent renewable. The energy sources are tracked and verifiable and “will include electricity from areas affected by the 2011 earthquake and tsunami.” According to calculations by Japanese experts, the emissions produced will be lower than in previous editions of the Summer Olympic Games. The forecast is that the event will produce 2.73 million tons of emissions, “a reduction of 280,000 tons in CO₂.” With the Japanese automotive giant Toyota as Olympic partner, hydrogen will be the official fuel of the Olympics. Athletes and delegations will travel on at least five hundred electric vehicles made available by the organization, and even the Olympic torches will be powered by hydrogen. And then of course there are the more symbolic aspects involving image: the podiums used for the awards ceremonies will all be made from recycled material, as part of the promotion of the “3Rs”: reduce, reuse, recycle; much of the equipment will be rented or leased, avoiding first-hand purchases. But beyond the Olympic showcase, which will be fundamental to promote the transformation of Japan, in the Land of the Rising Sun, the theme of climate change is also increasingly felt in the daily life of the Japanese people: in recent years, the intensification of the typhoon season, drought and the heatwaves deadly for the older generations have made the issue of climate a priority above all among citizens. But for a country dependent on imports, with few natural resources, there is still the crucial problem of energy, which worsened enormously after 2011.

THE NUCLEAR DEBATE

On March 11 of that year, the accident at the Fukushima nuclear power plant paved the way for a cross-board and determined anti-nuclear movement. The management of the accident was worsened by the attempt by the company responsible for the plant, TEPCO, to minimize the damage, but also by the central government, which in the first few days after the disaster had to cope with thousands of deaths from the tsunami and thousands of others displaced. Public opinion criticized both, and within a few weeks public confidence in nuclear energy plummeted to an all-time low. Slowly, under the guise of maintenance, the Japanese government decided to shut down

46 of its 50 nuclear reactors to rethink safety levels. But in 2011, atomic energy accounted for a third of the country’s total energy needs. For the first time since the war, there was a return of rationing, megacities like Tokyo turned off their lights, even the typical drinks machines in the streets. It was then that one of the most important public debates in modern Japan began: the atomic bomb had been the symbol of the economic revival of the 1980s, how could the country return to growth after twenty years of stagnation without sufficient energy? In its energy strategy, the Japanese government led by the Liberal Democratic Party describes a production mix. To reach the goal of net-zero emissions by 2050, explains the Japanese government, we need to reactivate the reactors that comply with the new safety rules: nuclear energy is clean energy, and whilst today only 6 percent of needs are met by nuclear power plants, the goal is to return to 20 percent of energy produced by nuclear power. Then the rest of the electricity demand could be divided as follows: the biggest share, 50-60 percent, can be sustained by renewable sources; 10-20 percent from thermoelectric plants and the rest (especially as regards the industrial sector) can be produced from clean hydrogen.

Not everyone agrees with this plan. Environment Minister Shinjiro Koizumi is part of the government’s anti-nuclear movement and has repeatedly renewed the call to look to the “California model” of solar panels on homes and buildings to increase the production of renewable energy. The automotive industry, which generates 2.5 percent of national GDP, is against the Japanese government’s “Green Growth Strategy.” According to Yoshihide Suga’s green roadmap, Japan will stop selling gasoline vehicles by 2035, but car manufacturers are demanding guarantees that a zero-emission vehicle powered by clean energy can be produced. The steel industry and construction companies also criticize the plan’s feasibility.

Like many other industrial powers, especially in Asia, Japan will have to deal with the promises made at the Paris Climate Conference and with the environmental goals it has set itself. But at the same time, it will have to take care not to throttle the key industries in its economy.

We

GIULIA POMPILI

She has been a journalist for *Il Foglio* since 2010, where she covers mainly news from East Asia. In 2017, she started Katane, the first newsletter in Italian on Asian events. She is the author of the book *Sotto lo stesso cielo* (Mondadori edition).



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OLYMPIC SUSTAINABILITY

by Roberto Di Giovan Paolo

FROM THE INFRASTRUCTURE STILL IN USE MORE THAN FIFTY YEARS LATER TO THE ADVENT OF THE FIRST PARALYMPICS, ROME 1960 REMAINS A BENCHMARK FOR OLYMPIC GAMES CONDUCTED ON A HUMAN SCALE

IN LONDON 2012, they used butane instead of gasoline for the Olympic torch. In Rio 2016, among other things, they told us that all food was under the aegis of sustainability: from production to the recycling of leftovers.

For Tokyo, they even troubled the United Nations, before the Pandemic, by proposing a document over 35 pages long to guarantee that it would be the first “sustainable” Olympics according to the canons of the Paris Agreement of December 2015. Perhaps the frenzy of the recovery and the desire to get together again, even if in a Covid bubble, will get the upper hand, and a few little sins will be swept under the carpet: as happened in London, still struggling to “dismantle” of some works of 2012; or worse in Rio, where certainly the promised improvements to peripheral facilities and the favelas are still a long way off.

The truth is that if you want to see the effects of reuse, reduce and recycle in the Olympics, the Italian genius behind Cortina 1956 and more so Rome 1960, remains unsurpassed. But, as we know, we Italians are naturally inclined to belittle ourselves or to fight among ourselves for parochial reasons, rather than to capitalize on what we are good at.

THE LAST OLYMPICS ON A HUMAN SCALE

Rome 1960 was, according to many, the last Olympics on a human scale. In terms of the popular participation of the city and the organizing nation (Italy was happy with the post-war



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Stadio Olimpico. The first version was completed in 1932 and was named Cypress Stadium due to the thick crown of trees arranged on the escarpment, which formed the perimeter. The stadium was set into the hill according to the principle of integrating the work as part of the local morphology. In the following years, the stadium was enlarged with several sets of tiers (the last two layers were added for the 1960 Olympics.

miracle and the “dolce vita”) and a vision of positive relations between nations. It was on the eve of the Cold War and the USA and USSR were fighting one other with winking spies even among the athletes, but the now divided Germany participated with a single flag; while as many as 17 “decolonized” African countries took their place for the first time in the Olympic forum and there was even “accommodation” for the question of People’s Republic of China and Taiwan. But apart from this (which is no small thing) and the wonderful human stories of Berruti and Wilma Rudolph, Cassius Clay, who had not yet become Mohammad Ali, and the barefoot marathoner Abebe Bikila, it is worth remembering that Rome still leads even today in terms of the recycling and reuse of its facilities.

Ecology and sustainability ahead of their time? We are limited to “playing” with the concrete results of work for Rome 1960 and what they continue to serve even today. Think of the Via Olimpica, a high-speed road linking EUR (which is the acronym of Esposizione Universale di Roma, meaning Rome’s Universal Exposition) and Foro Italico, home to two of the most used facilities, namely the Olympic Stadium and the Palazzo dello Sport, created to cut through the city from the north to south and a departure point for other road extensions, such as for the 1990 World Cup or the Jubilee. In any case, and apart from the terrible traffic on a road designed

for a tenth of the volume that exists today, the structure is still there and fully usable.

The Stadio Olimpico, Stadio dei Marmi and Palazzo dello Sport facilities are also still in place, perhaps improved by the 1990 World Cup or still to be improved and maintained. Often in Italy, we don’t know what even “ordinary” maintenance means (think of the splendid Flaminio Stadium, now at risk of collapse, or the Olympic Velodrome, abandoned until its questionable demolition a few years ago). “Extraordinary” maintenance is performed—as mentioned—every now and then, for World or European Cups or events of great general resonance. But the facilities are there and, if they were afforded routine maintenance and were used in a more widespread and democratic manner among sports and community associations, they would perhaps be full every day.

Let’s remember, we are talking about facilities and structures designed under the coordination of the great architect Pierluigi Nervi, with other architects of the caliber of Del Debbio, Vitellozzi, Piacentini, and Clerici. They thought about the main sports facilities to be built, the training facilities, the reuse of historic spaces in the city, such as Piazza di Siena in Villa Borghese for equestrian competitions or the Basilica of Maxentius for the Greco-Roman wrestling, the reuse of works from EUR 42—an event never held due to the Second World War—in the district of the same name, with the Palazzo dei Congressi used for

Palazzo dello Sport and Via Olimpica.

Designed by Pier Luigi Nervi and Marcello Piacentini, the Palazzo dello Sport stands on a hill from which it overlooks the artificial lake and the EUR district. The reinforced concrete building, surrounded by windows, was illuminated by 1,800 lamps. The pale green anodized aluminum dome housed 12 air conditioners, making it one of the largest air conditioning systems ever built at the time. The Palazzo dello Sport was connected to the Foro Italico by via Olimpica, an expressway that runs through the city from north to south. In the photo, the inaugural ceremony in Rome 1960.



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The Foro Italico swimming complex. This includes the Olympic Swimming Stadium, designed for the 1960 Rome Olympic Games, with a 50-meter outdoor pool and another outdoors for diving; two other outdoor pools, a suspended pool and a 50-meter covered pool, decorated with fine mosaics along its walls and edge. The stadium was inaugurated with an international swim meet between Italy, Great Britain and Finland.



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Palazzetto dello Sport. Designed by Annibale Vitellozzi and Pierluigi Nervi, the building covered an area of 4,776 m² and was surrounded by iron pillars that support a dome. The construction work lasted two years, from 1956 to 1958. The building had a capacity of 3,500 seats for basketball and 5,600 for other sports, such as boxing and wrestling.

the fencing in which Italy is so successful. And not to mention the torch-lit Marathon along the historical route that ended under the Arch of Constantine and the Colosseum (other “fateful” locations included Naples and Lake Albano outside Rome for sailing—unfortunately the facilities today are in ruins although the lake is used by the Canoeing Federation). Obviously, these architects were also responsible for the construction of an Olympic village to house the athletes, bringing them together and closer to Rome itself.

THE OLYMPIC VILLAGE

The athletes’ village was a great innovation not only because it created an environment of dialog and confrontation among athletes from all over the world without them becoming the masks of foreign policy of the Cold War, but also in terms of its construction and reuse. Today, there are people living in the apartment that once belonged to Cassius Clay (perhaps they aren’t even aware of this). And there are people today who have the good fortune of living in a building of modest height carefully designed by internationally-renowned architects (forget the Corviale “green mile”) with pleasant greenery, squares and connected streets, with a village structure, fully integrated within the city, with available connections and road networks that, if properly used, could be truly efficient.

You can’t reuse much more than that. Incidentally, before the Club of Rome and the Kyoto Club, and long before the 2015 Paris Agreement, what were the rules that the architects involved had set themselves? Here they are, taken from the preparatory document by the pool of architects and construction companies:

- avoid prestigious or particularly expensive finishes (exception was granted for the Palazzo dello Sport only);
- avoid the construction of facilities on privately-owned land;
- use as subsidiary facilities, as far as possible, already existing facilities, affordably renovated and refurbished;
- take into account, in the design, the audience capacities for the Olympics and the needs of the facility after the Games are over

These rules could still be applied (we wish!) today, to ensure sustainable urban planning and Olympic Games (and daily urban planning) that are most definitely green. Of course, the materials used over 60 years ago are certainly debatable, but no one can question the great wisdom demonstrated! And we are talking about an Olympic event most certainly not small in size, because even if it is of human dimension, it is still an Olympics with 7000 athletes, accompanying persons and coaches, delegation officials, national and foreign judges, national and foreign journalists, the staff of the organizing committee, the managers



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Olympic Village. Construction began in 1958 and ended in June of 1960. The permanent works consisted of 33 buildings, of one, two, three, four or five floors, for a total of 1,349 apartments, still lived in today. The whole compound is served by 13 kilometers of asphalt roads.

of the international federations and the International Olympic Committee (IOC), guests of honor including a host of heads of state and government, with all the relative problems of accommodation and transport. The work took four years, from 1956 to 1960, with results that would be useful to rediscover even today for a modern capital and city. Obviously, there would be the addition of sustainability criteria and specifications now within the reach of modern cities and on which Paris in particular is capitalizing for the 2024 edition, by already making changes to urban mobility and urban planning in the everyday structures of the city.

THE FIRST GAMES FOR ATHLETES WITH DISABILITIES

Furthermore, and this too is no small thing, another record for Rome 1960 follows the trend of social sustainability: not many know that Rome 1960 was also the first Paralympic Games, with 400 athletes from 23 countries at the Acquacetosa, attended by the President of the Republic, Giovanni Gronchi, and with an invitation to the Vatican from Pope John XXIII. Of course, there were the difficulties of the time (the Olympic Village was not equipped for disabled athletes and it was the Italian army, still subject to compulsory military service, that made transport and connections possible) but there was also a vision of the future that today makes the Paralympics so popular on television and in the stadiums and absolutely every bit as

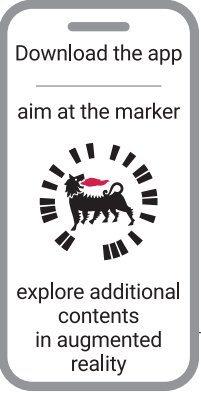


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good as the “official” Olympics. This too is a legacy, a legacy that has borne fruit. Thus sustainability, at the end of this dystopian game at the time of the first truly global Olympics still of human dimension—Rome 1960—is confirmed as a vision and a serious global commitment, with a holistic vision of the needs of humanity. Will we be able to understand this lesson in the 21st century, when we need this sort of Olympic Games to get our planet back on its feet after the global shock of the pandemic?

We

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FREE & OPEN INDO-PACIFIC STRATEGY

by Giulio Pugliese

TOKYO'S EFFORTS IN SOUTHEAST ASIA ARE INCREASINGLY IMPORTANT AS IT SEEKS TO HOLD BACK CHINA, DIRECT SIZEABLE INVESTMENTS ABROAD AND SAFEGUARD SECURITY



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UNDER SHINZO ABE, the Japanese government viewed China as Japan's foremost strategic problem, to the extent that threat perceptions in Tokyo are still higher than those in Washington DC. Japan has pushed for a "Free and Open Indo-Pacific" (FOIP) strategic vision that, among other things, entailed greater security and economic cooperation with like-minded parties, including Australia, the United States and, to a lesser extent, India and European partners such as France and the United Kingdom. At the military level, Japanese decision makers promised an expansion of the Japanese Navy's strategic port of calls, military exercises and joint interoperability with friendly forces in the Pacific and Indian Oceans. Japan's aim has been to balance China's expansion into the deep seas of the two Oceans, especially in the Pacific.

AN ECONOMIC FOCUS

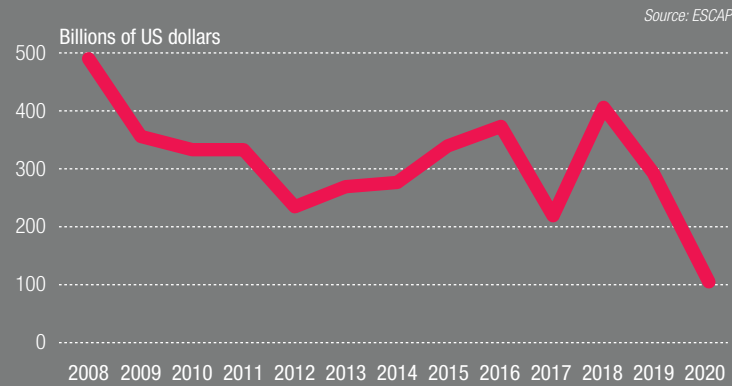
While emphasizing maritime security and greater military coordination between like-minded countries to defend a rules-based international order, Japan's Free and Open Indo-Pacific vision rests primarily on economic foundations. According to the Asian Development Bank (ADB), the Asia-Pacific reportedly needs USD 26 trillion of infrastructure investment between 2016 and 2030 and the Japanese government has been an early driving force of connectivity through grants and loans aimed at high-quality infrastructure in the region. Yet, China's entry into the game through its Belt & Road Initiative (BRI) has prompted the Japanese government to devote substantial resources to overseas infrastructure investments, either through its own agencies or via the ADB. The Abe government steadily increased Japanese funding for regional infrastructure, doubling an earlier pledge to USD 110 billion worth of investments, and providing an additional USD 50 billion to the ADB. The government of Japan is happy about the desire of governments from the Association of Southeast Asian Nations (ASEAN) to diversify donors, as evident by Japan's quiet economic diplomacy outshining its rival China in South-East Asia. According to the Wall Street Journal, Japan's holistic approach to government financing—with its triangulation with its export powerhouses and its redoubled efforts at infrastructure diplomacy in Southeast Asia—have allowed it to outstrip China's BRI in terms of owned foreign assets.

Japan's engagement with Sri Lanka also provides an excellent window into Tokyo's multi-faceted economic statecraft. In recent years, Tokyo offered decommissioned coast guard patrol vessels and infrastructure assistance for developing the Colombo and Trincomalee ports, in an evident response to China's appropriation of the Hambantota port and the potential militarization of the same. Security and geopolitics go hand in hand with economic considerations in Japan's Indo-Pacific vision. While the rhetoric surrounding the Free and Open Indo-Pacific extolled its participants' willingness to uphold the so-called lib-

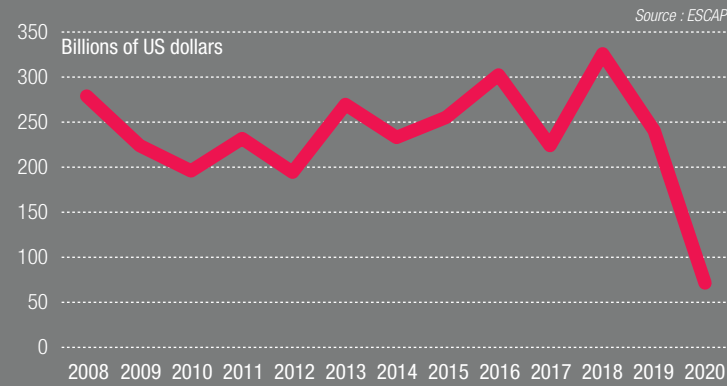
FDI GREENFIELD

The value of greenfield projects announced in Asia and in the Pacific, which is an indicator of trends in future foreign direct investment, fell in 2019 to \$285 billion, the lowest level in the past four years. The pandemic contributed to the decline in inflows of investment. In 2020, China and Hong Kong were responsible for the largest share of greenfield flows (30%), followed by Japan and Singapore (13%).

FLOWS 2008-2020



OUTFLOWS 2008-2020



eral international order, the reality was much more complicated. Japan's fears of Chinese economic influence in Southeast Asia, for instance, informed sustained engagement with states that registered substantial political involution, such as Cambodia, or even the state-sanctioned violence of Duterte's Philippines and Myanmar. Japan's "values-based diplomacy" is essentially realist in spirit and its push for infrastructure projects is aimed at killing two birds with one stone: blunt its political rival's financial inroads in the region, while aiding its own industries abroad. Abe's Indo-Pacific framing of Japan's foreign policy will endure under the premiership of Suga Yoshihide. Suga's well-known lack of interest in foreign policy grants Abe a potential role as a coach to Suga and as a go-between in his prime ministerial afterlife. In fact, Suga has vowed to continue his predecessor's work: "Prime Minister Abe's leadership diplomacy was truly amazing. I don't think I can match that. [I] will stick to my own style, while also seeking assistance from the Foreign Ministry. And of course, I will consult with (Abe)."

SUSTAINABILITY AND ENERGY INFRASTRUCTURE DIPLOMACY

Japan's infrastructure and connectivity diplomacy extends to the energy sector. According to the International Energy Agency, ASEAN economies need USD 2.7 trillion invested in their electricity transmission, power generation and energy efficiency measures through 2040 to maintain economic growth. Japan and like-minded partners are scrambling to support Southeast Asian economies along the Mekong River, as evidenced by Tokyo's emphasis on a hard connectivity push, specifically on energy infrastructure, in its ambitious Tokyo Strategy 2018 for Mekong-Japan Cooperation. In short, Japan will support a more sustainable, reliable, and affordable energy sector throughout the Mekong countries of Cambodia, Laos, Myanmar, Thailand, and Vietnam.

These monies would allow Japan to preserve a degree of political leverage vis-à-vis recipient countries, especially those in the immediate neighborhood, as well as strategic states. Japan has actively promoted its high-speed railway system, clearly also linked

to energy efficiency and sustainability throughout East and South Asia. India, for instance, by virtue of being a great power with shared borders and a complicated relationship with China, is the biggest recipient of Japanese Official Development Assistance (ODA), making Japan India's biggest bilateral donor. Yet, it's not clear whether returns on government financing abroad will prove economically sustainable for both China and, albeit to a lesser extent, Japan. After all, some of these projects are strongly clouded by political considerations and potentially noxious proximity between public and private actors. The Japan-sponsored mammoth Ahmedabad-Mumbai highspeed railway project is a case in point. The size of Japan's generous yen-denominated ODA loans for that project alone (USD 13 billion) amount to one third of Japan's ODA committed to India since 1958 (USD 39 billion), and a little less than half of the amount of all Japanese ODA loans to China (USD 30 billion) between 1979 and 2013.

The United States has also been fleshing out its economic participation to the Free and Open Indo-Pacific vision. Under the Trump administration, representatives from the Australian government and Japan's and the United States' policy banks inaugurated a trilateral partnership for infrastructure investment in the region. Japan's Bank for International Cooperation (JBIC) and the United States Development Finance Corporation (DFC) will coordinate infrastructure financing, with a DFC representative in Tokyo for this purpose. The United States is finally stepping up its infrastructure diplomacy game, following the Better Utilization of Investments Leading to Development Act, which more than doubled the DFC's budget to USD 60 billion, thus allowing the new US policy bank to work hand in hand with JBIC and its budget of roughly USD 100 billion.

FOREIGN POLICY IN COOPERATION WITH PARTNER COUNTRIES

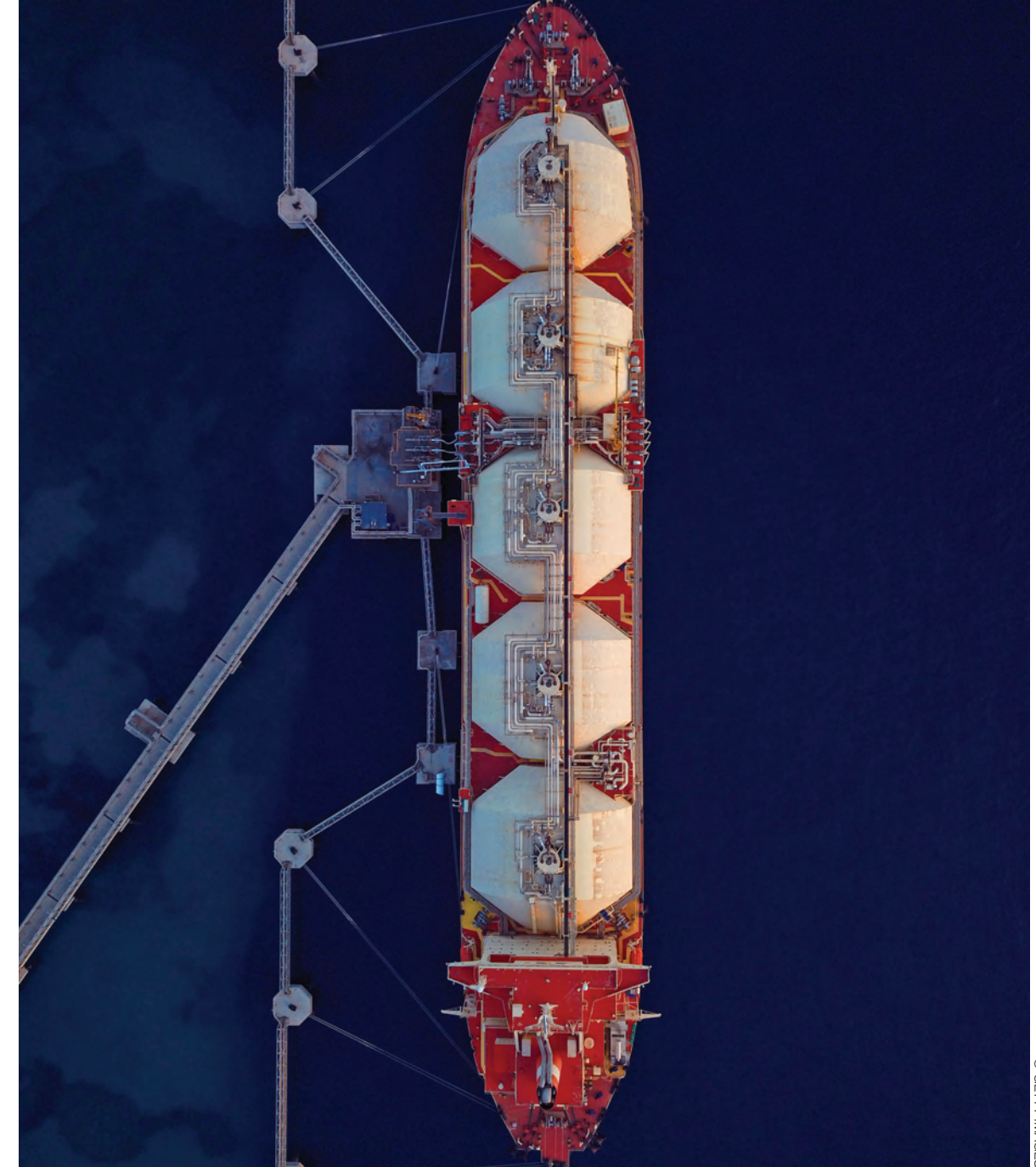
Japan's engagement in the Pacific is indicative of momentum for energy diplomacy, possibly in cooperation with like-minded partners. In 2019, the first high-level diplomatic visit in 32 years by a Japanese foreign minister to the Pacific Islands worked

in lockstep with initiatives taken in Washington, Canberra and Wellington. Vanuatu, where Japan inaugurated a new diplomatic mission in January 2020, was the most likely island country to host a Chinese military facility in the future, which would allow the Chinese navy to extend beyond the so-called First Island Chain. The Japanese government also engaged in joint infrastructure projects through public-private partnerships sponsored by the Japanese, Australian, American and New Zealand policy banks. These included an expansion of Papua New Guinea's electric power grid, as well as cofinancing of a liquefied natural gas (LNG) supply and telecommunications systems there. On its part, Canberra established the Australian Infrastructure Financing Facility for the Pacific and expanded the mandate and financial capacity of its export credit and overseas infrastructure financing agency. It is all the more remarkable that Japan's efforts in the Pacific also rested on the good offices of a major Japanese nonprofit organization, which complemented and supported the government's activities there, to "increase the effectiveness of the Japanese government's strategy for the regional security of the Pacific islands," as per one of its financed projects. The United States' Blue Dot Network, an infrastructure certification system established in 2019 in close partnership with Japan and Australia, built on the "partnership for quality infrastructure" agenda that Tokyo had consistently pushed for since the 2016 G-7 Ise-Shima Summit and 2019 G-20 Osaka summit. Japan has been a quiet leader in infrastructure diplomacy, to the extent that President Biden's G-7 agenda in favor of a Build Back Better World connectivity coordination is yet another offspring of Tokyo's diplomatic playbook.

The above being said, these initiatives are embryonic and it remains to be seen how they will pan out. EU-Japan joint efforts through the Strategic Partnership Agreement and bilateral connectivity agenda still remain toothless. The "India" leg of the Free and Open Indo-Pacific in these multilateral economic efforts should also be understood, at best, as rhetorical support. In fact, India is clearly a net recipient of Japanese, European and American economic diplomacy. Finally, there are tensions with a more protectionist and mercantilist agenda, whereas the US, Japan and EU member states are interested in promoting their national champions in booming markets, or are devoted to building a "foreign policy for the middle class," if not "strategic autonomy." Finally, cooperation on joint connectivity projects makes sense on paper, but coordination among donors and with recipient countries is no easy task.

TENSIONS AMID COOPERATION

These very obstacles are evidenced by energy infrastructure diplomacy. The venture of Australia, Japan, US and New Zealand in Papua New Guinea's electric grid has essentially entailed minor coordination for what amounted to single-country development projects. It wasn't a case of active collaboration.



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Natural gas is also an interesting case study, which for Japan means liquefied natural gas (LNG). The US has been expanding its LNG exports to Asia since Asia is the LNG's jumbo market. Australia in that sense is a competitor for the US, as it's a rival LNG exporter. Moreover, Japan as gas buyer wants to have re-selling rights for the gas it buys from Australia, but Australia doesn't want this as seller because it creates a secondary market. How will FOIP address these tensions between buyers and sellers and between rival sellers? Time will tell whether Japan and like-minded countries will be able to push for effective multilateral economic cooperation in the region.

we

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Colombo, Sri Lanka. In the foreground, the Colombo Lotus Tower, inaugurated in 2019, which casts its shadow on the Slave Island. Its summit is a lotus shape. With a height of 350 meters, this imposing communications tower is currently the tallest self-supporting structure in South Asia.

The United States has expanded its LNG exports to Asia, a huge market for liquefied natural gas. Australia in this sense is a competitor of the US, being its rival in the export of LNG. In the photo, a LNG carrier cargo ship.

THE US AND JAPAN *are charting* A NEW PATH

by Pete Ogden and Evelin Eszter Tóth

DESPITE ENORMOUS CHALLENGES, THE TWO POWERS HAVE DEMONSTRATED THAT COUNTRIES CAN MAKE HUGE PROGRESS ON CLIMATE CHANGE IN A MATTER OF MONTHS. NOW, THEY WILL HAVE TO PROVE THAT THEY CAN MAINTAIN THIS RAPID PACE

THIS PAST JANUARY the United States saw the end of the Trump administration's four year assault on the Obama administration's domestic and international climate achievements, especially the complete withdrawal from the landmark Paris Agreement on climate change. Japan, for its part, was resisting pressure to raise its national climate targets into alignment with the goals of the Paris Agreement and to stop building or financing new coal power plants at home or abroad. Since then, a sea change has taken place, and no country in the world has raised its national climate change ambition more than the United States and Japan have. The catalyst for this shift was the election of President Biden,





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US President Joe Biden and Japanese Prime Minister Yoshihide Suga at the White House on April 16, 2021. The US and Japan are accelerating efforts to tackle climate change by promoting ever greater collaboration on decarbonization.



A modern building where renewable energy is used.



An urban solar power plant in Tokyo. Japan ranks third in the world in photovoltaic power generation.

who campaigned and won on the most ambitious set of climate priorities of any candidate in US history. Japan changed leadership during this period as well—from Prime Minister Shinzo Abe to Prime Minister Yoshihide Suga— but that transition occurred within the same political party and maintained the same governing coalition, making it more difficult to assess exactly how much Japan’s approach to climate would have been different in the context of a new US administration had Prime Minister Abe remained in power.

A FUNDAMENTAL CHANGE OF VISION

Regardless, the period between January 20, the day of President Biden’s inauguration, and April 22, the day that President Biden held a virtual meeting of the leaders of all of the world’s major economies and other key actors for a global Climate

Summit, saw a complete transformation in the role of climate in both countries —domestically, bilaterally and multilaterally. In the United States, this included rejoining the Paris Agreement and establishing a bold new target of reducing greenhouse gas emissions by 50-52 percent from 2005 levels by 2030—a substantial increase from the country’s prior commitment of cutting emissions by 26-28 percent. President Biden also signed an executive order that included steps to end international financing of carbon-intensive fossil fuel-based energy and launched a whole-of-government approach to climate change, with every office and agency—from State to Treasury, from Energy to Trade—charged with elevating and advancing the issue. Japan, likewise, was moving quickly to elevate its climate ambition. At the Climate Leaders Summit, Prime Minister Suga grabbed headlines with his announcement that Japan would increase its own 2030 emission reduction target from 26 percent below 2013 levels to 46 percent and “with strong efforts” reach 50 percent. Moreover, Japan was the last of the G7 countries to be actively building coal plants domestically and abroad. But just a week after President Biden’s Leaders Summit on Climate, Japan canceled its last domestic coal power project and the following month, together with G7 partners, vowed to stop coal financing abroad by the end of this year. Climate was also interwoven with the Biden administration’s top foreign policy efforts to rebuild and strengthen its relationships with allies and partners, including Japan. This was evident early on when the leader-level statement issued on March 12 by the “Quad”—comprised of Japan, India, Australian and the US—identified climate change as a central feature of their broader Indo-Pacific strategy.

THE PROSPECTS FOR THE US-JAPAN CLIMATE PARTNERSHIP

With their climate ambitions now clearly defined and anchored at the highest political level, the next phase has begun.

TURNING PROMISES INTO REALITY. One critical test of the partnership is its focus on achieving these new targets and goals. For the United States, the Biden administration’s American Jobs Plan identifies the critical tools and investments that are needed to ramp up clean energy deployment, increase vehicle electrification, decarbonize the building sector, invest in clean manufacturing and critical land and water resources. Winning Congressional support for this package—or as much as is possible—is the near-term highest priority.

Japan, for its part, needs to revise its Basic Energy Plan this year so that it is consistent with the country’s enhanced 2030 climate target. This will require making difficult decisions about the role of nuclear energy, ramping up renewable power in the near-term, assessing the role of hydrogen and more. In addition, the government will need to close the re-



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maintaining loopholes in its official external coal financing policy to ensure that it lives up to its global commitment.

BUILDING GLOBAL SUPPLY CHAINS IN CLEAN ENERGY AND ADVANCING TECHNOLOGICAL INNOVATION. Boosting reliable and sustainable clean energy supply chains will be essential to meet the world's climate goals. In a recent report on critical minerals, the International Energy Agency warned that the desire to improve the global climate might be limited by the lack of critical materials. As an example, global demand for lithium, a critical material for electric vehicle batteries, is expected to double by 2024. But with limited international coordination and key supply chains concentrated in just a few nations, clean energy supply chains remain vulnerable. Indeed, in recent months, COVID-19 caused severe global semiconductor shortages, and with most manufacturing capacity located in mainland China and Taiwan, the global semiconductor supply chain is susceptible to further disruption and geopolitical tension.

Recognizing these threats, Japan and the US launched a new Competitiveness and Resilience Partnership with a particular focus on sensitive supply chains, including semiconductors, which play a key role in clean energy technologies. The two countries will work together to lead sustainable, green global economic growth and increase cooperation in clean energy innovation, development, and deployment. As governments around the world are beginning to put their climate pledges into action, enhanced global cooperation on stable supply chains and innovation will be essential.

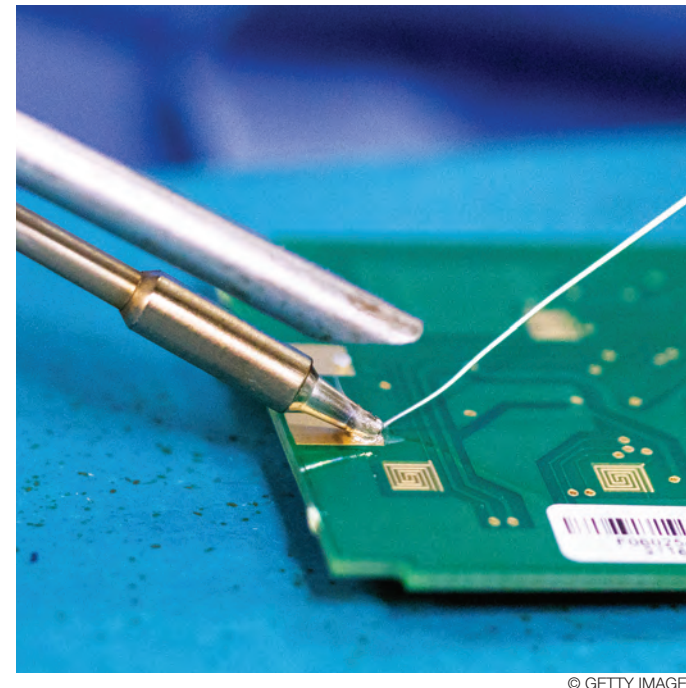
CREATING A CLEAN ALTERNATIVE TO CHINA'S BELT AND ROAD INITIATIVE (BRI). China is by far the largest financier of coal and high-carbon infrastructure. According to researchers at the Global Development Policy Center, "Chinese policy banks provided close to half a trillion dollars in development finance to foreign governments from 2008-2019, nearly matching the World Bank's lending in the same period." Moreover, from 2000-2019, its two global policy banks issued almost USD 52 billion for coal projects around the world.

There simply is no justification for this high carbon investment in the light of the deep decarbonization that needs to occur over the next decade and through 2050 to keep global temperatures from shooting far beyond the goal of the Paris Agreement and the 1.5 degree Celsius of global warming that the International Panel on Climate Change (IPCC) has warned is a critical threshold. Yet, despite growing international opposition to polluting infrastructure projects, China has failed to announce any timeline for phasing out its support for coal plants abroad or other infrastructure investments that undermine clean and sustainable economic growth.

Now with Japan, along with the US and Korea, having recently pledged to end the financing of overseas coal finance, China is isolated in this practice. The US and Japan can and must work together and with partners to ramp up pressure on China to steer a different course by using their influence and voting power in international institutions and fora, such as at the World Bank and in the G20. They also could elevate the issue in the run up to the UN Climate Change Conference (COP26) in Glasgow this November.

At the same time, however, the US and Japan also need to develop a cleaner development pathway and make available alternative financing to the countries that are currently turning to China for this investment. The good news is that some of the groundwork has been laid. In 2019, the US, together with Japan and Australia, launched the Blue Dot Network, which aims to certify infrastructure investments to ensure that they are environmentally and socially sustainable.

Though the initiative has been largely dormant, it has gathered momentum under the Biden administration. In June, the US, Japan, and G7 partners went even further and launched the Build Back Better World (B3W), a new partnership "to help narrow the \$40+ trillion infrastructure need in the developing world." Now they have to develop and implement a strategy for the B3W so that it can truly compete with the BRI (China's Belt and Road Initiative), a feat that will require unprecedented levels of strategic cooperation with international financial institutions such as the World Bank, International Monetary Fund, and Green



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In recent months, Covid-19 has caused a severe shortage of semiconductors the world over. Japan and the US have launched a new partnership aimed at improving the competitiveness of sensitive supply chains, including that of semiconductors. Photo: welding a component on a printed circuit board (PCB).

The South Beach complex in Singapore, designed by Norman Foster. A rippling wave of steel and aluminum tracks the length of the complex channeling the winds towards the areas open restaurants and bars, significantly reducing consumption of air conditioning.

Climate Fund, as well as the mobilization of new public and private resources.

ACCELERATING THE CLEAN ENERGY TRANSITION IN SOUTHEAST ASIA AND ACROSS THE INDO-PACIFIC. While B3W must be able to compete globally, the US and Japan can have an especially positive impact on Southeast Asia, where electricity demand is growing at one of the fastest rates in the world. It is also one of the few regions where coal capacity has been expanding, with nearly 20 GW of new coal-fired generating capacity under construction. With a growing need for new infrastructure development, there is an opportunity to shift the energy future of the region by phasing out investments in fossil fuels. Japan is particularly well-positioned in this respect, as it has been working to increase infrastructure project development in Southeast Asia, despite China's massive investments in the region.

The US and Japan can also work together to shape the future of global infrastructure development on an even wider regional scale. The "U.S.-Japan Climate Partnership on Ambition, Decarbonization, and Clean Energy," launched in June, will have a particular focus on driving net-zero emissions in the Indo-Pacific. The partnership will promote the development of climate friendly infrastructure and the flow of public-private capital toward climate-aligned activities. With several highly vulnerable countries in the region—including small island developing states like Fiji, East Timor, and the Maldives—Japan and the US will need to ensure that resilience is at the heart of these new projects. Ultimately, while enormous challenges remain, the US and Japan have demonstrated that countries can make significant progress on climate change in a matter of months when the will and determination is there—now they need to show that their pace of progress can be maintained until the climate crisis is, at last, under control.

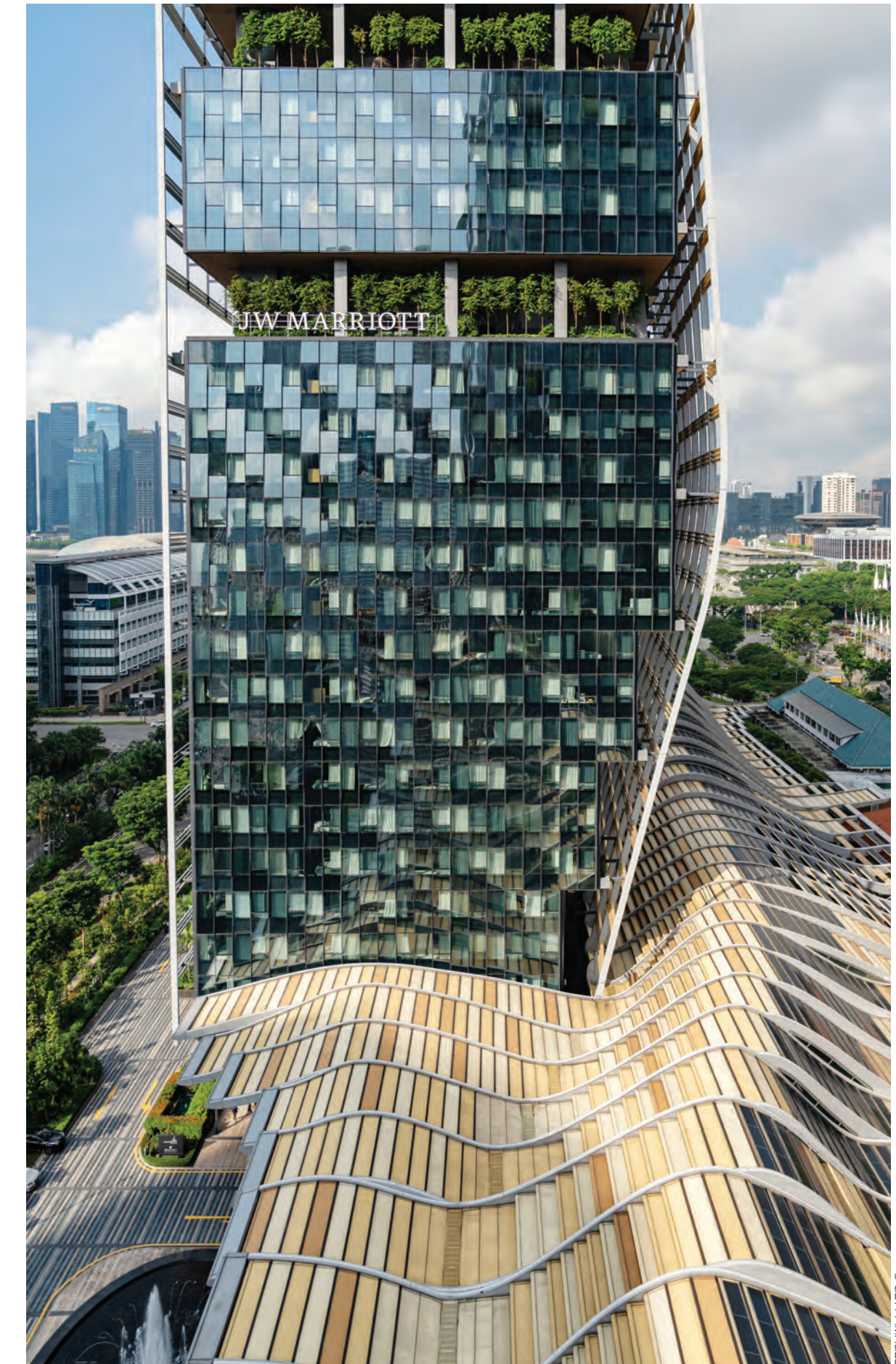
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JAPAN'S ENERGY TRANSITION

by Tatsuo Masuda

THE EFFICIENT DECARBONIZATION OF THE WORLD'S THIRD LARGEST ECONOMY IS CRUCIAL TO THE ENTIRE WORLD. BUT IT WILL NOT BE POSSIBLE WITHOUT A SENSIBLE APPROACH TO NUCLEAR POWER

JAPAN IS INCREASINGLY moving towards a mature society with a declining population. However, it is still the third largest global economy, with a business network that extends the world over, one supported by large and small companies equipped with the latest technology. How Japan will contribute to the common goal of halting climate change by achieving carbon neutrality by 2050 is an issue of crucial importance for the whole world.

ON THE WAY TO CARBON NEUTRALITY BY 2050

Along with the European Union, Japan was among the leaders of the climate initiative until the Fukushima nuclear accident in March 2011. The accident was a fatal blow, as it deprived

Japan of nuclear power, the most powerful source of carbon-free energy in the country. Competitive pressure on Japan to take the initiative on climate eased to some extent with the election of climate change denier Donald Trump as US president. In June 2019, as the host country of the G20 summit (in Osaka), Japan successfully secured a good position thanks to its hydrogen initiative, and despite its obvious delay in the climate initiative, the country is at the forefront on hydrogen issues and was therefore unshaken by the announcement of the European Green Deal in December 2019 that called for carbon neutrality by 2050.

The prospect of a possible presidential victory by Joe Biden, a

lation. Overall, Japan has managed to kickstart the path to carbon neutrality by 2050.

THE MIXED RECORD OF THE ENERGY TRANSITION

I served as director of the International Energy Agency (IEA) from 1996 to 2001, and previously served at the Japanese Ministry of Economy, Trade and Industry (METI), holding various energy related posts. During that time, Japan's energy and climate policy enjoyed a good reputation and was seen as a role model. Indeed, Japan succeeded in improving its energy efficiency and expanding its nuclear fleet, the most powerful source of carbon-free energy. In June 2010, the government set itself the very ambitious target of expanding nuclear power to 50 percent of the electricity generation mix by 2030: a bullet straight to the heart of climate change. In March 2011, however, the government's plan was dramatically overturned by the Fukushima nuclear accident, which destroyed public confidence in the safety of nuclear energy.

Since then, much has been done in the field of energy, promoting renewable energies (especially solar power) and the enhancement of gas-fired power generation. Hydrogen has become a strong candidate for achieving decarbonization, thanks to the sophisticated hydrogen technology developed by various Japanese companies.

THE BASIC ENERGY PLAN

The government is currently working hard on the 6th Basic Energy Plan, which defines key principles, policies, measures and time horizons. This time around there is a strong focus on the positioning of nuclear power compared to other energy sources. In December 2020, the government published the Green Growth Strategy, a roadmap for the industry towards a positive cycle of economic growth and environmental protection aimed at achieving carbon neutrality by 2050. The roadmap boldly envisages a 2050 energy generation mix that assumes the complete decarbonization of electricity: 50-60 percent from renewable energy, 30-40 percent from nuclear and fossil fuels combined with Carbon Capture, Utilization and Storage (CCUS), 10 percent from hydrogen and ammonium (see Figure 1).

ENERGY EFFICIENCY

Given the shortage of national fossil sources for energy production, since the oil shocks of the 1970s Japan has made constant and intensive efforts to improve energy efficiency, and that effort has become the norm in all industrial and social activities and in every aspect of daily life. Anyone who has been to Japan will have noticed its modest way of life. Energy efficiency is commonly seen as a low-hanging fruit, but this is no longer true of Japan, as most of this fruit has been picked over the decades. However, thanks to technological innovation, including digital transformation (DX) and artificial intelligence (AI), and the

climate change believer, was decisive in driving Japan to renew its climate initiative by going far beyond hydrogen. In October 2020, Prime Minister Yoshihide Suga, not wishing to lag behind the world trend, unexpectedly declared Japan's intention to reduce greenhouse gas emissions to zero by 2050. This declaration was made without prior consultation of public opinion or the business community (at least, not in depth) and was rather unusual in a consensus-oriented society such as Japan's. Mr. Suga's declaration had a very positive impact on both the business community and local governments: the former sees it as an important business opportunity, while the latter hopes it will make their respective areas of governance greener and attract popu-



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Three-dimensional rendering of the interior of a reactor. The direction that the Japanese government takes on nuclear power is of utmost importance for carbon neutrality.



Photovoltaic system by the sea. Kamakura, Japan. The post-Fukushima energy policy foresees, among other things, an acceleration in renewables.

Japanese lifestyle, energy efficiency is one of Japan's strengths, one that provides a reference model for the climate initiative.

NUCLEAR ENERGY

In the latest edition of the Long-term Energy Outlook, 2015, the government plans a 2030 electricity generation mix with 20-22 percent nuclear energy, a goal that requires around 30 nuclear reactors. The stark reality is that only nine of 33 reactors have been restarted so far, and by 2030 there will be as many as 14 with more than 40 years' in service. Therefore, the number of plants that can obtain the 20-year operational extension license will be decisive, given the difficulty of building new GW-class reactors. The Green Growth Strategy therefore encourages the industry to develop Small Modular Reactors (SMRs) in partnership with foreign investors, but overall the future of nuclear power looks bleak. Public confidence in nuclear power, shattered by the Fukushima accident, shows no signs of recovery for the following reasons:

- a) In September 2019, it was disclosed that executives of the Kansai Electric Company received more than \$3 million in murky money from a nuclear works contractor.
- b) In March 2021, the Nuclear Regulation Authority (NRA) criticized The Tokyo Electric Power Company for its lengthy tolerance of the malfunctioning of the anti-terrorism security system at the Kashiwazaki-Kariwa plant.

c) In April 2021, the government authorized the release into the sea of treated radioactive water from the site of the Fukushima No. 1 nuclear power plant. In September 2013, in Rio, at the meeting with the International Olympic Committee in which Tokyo was chosen to host the 2020 Olympics, Prime Minister Shinzo Abe, despite the above incident, confirmed that the situation in Fukushima was "under control."

But the important fact is that Japan has no other way to achieve carbon neutrality by 2050 than the efficient use of its nuclear power plants. To resolve the stalemate, the government needs to insist on the fundamental role of nuclear energy in the next (6th) Basic Energy Plan, and this issue is a tough test for the political will and courage of the government.

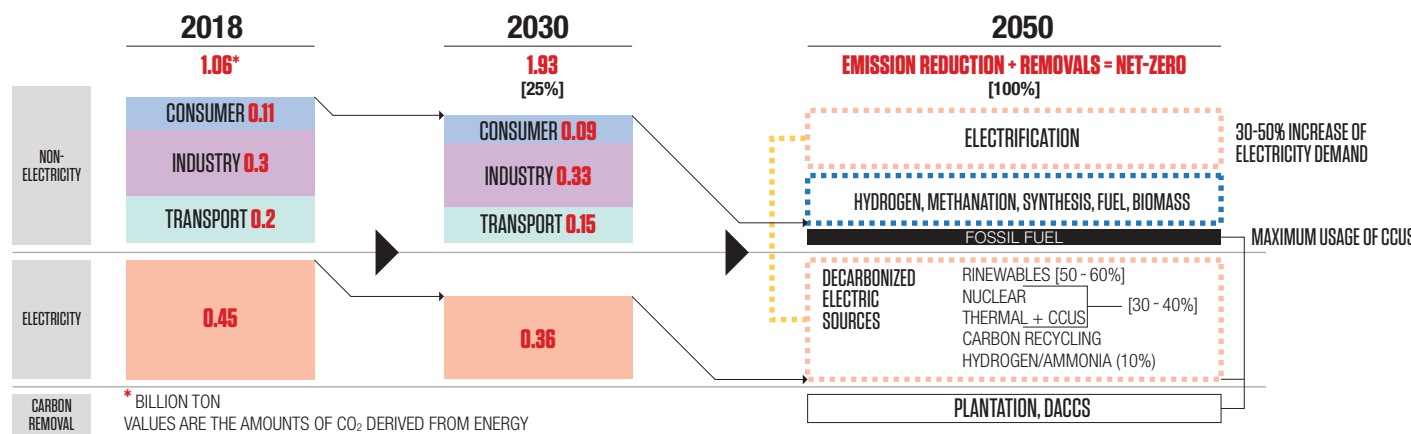
RENEWABLES

The post-Fukushima energy policy is geared, among other things, to the accelerated introduction of renewable energy. The Renewable Energy Sources Act of July 2012 makes available incentives such as feed-in tariffs, as in Germany. As a result, the share of renewables, including hydro, in the electricity generation energy mix increased from 6 percent in 2010 to 14 percent in 2019 (see Figure 2). Among renewables, solar power has seen significant growth, because it is relatively easy to install and the cost of photovoltaic panels has fallen rapidly due to strong in-

1. GREEN GROWTH STRATEGY

The roadmap presented in 2020 by the Japanese government envisages an energy generation mix for 2050 that presupposes the complete decarbonization of electricity: 50-60% from renewables, 30-40% from nuclear and fossil energy combined with CCUS, 10% from hydrogen and ammonium.

Source: Japan's Green Growth Strategy (December 2020)



ternational competition. However, the growth of renewables is not enough to reduce the share of coal (36 percent in 2019) and natural gas (34 percent in 2019).

The Green Growth Strategy points to offshore wind as the potential new champion of renewables and sets quantitative targets of 10 GW by 2030 (the equivalent of 10 nuclear reactors) and 40-45 GW by 2040 (40-45 nuclear reactors). The rationale behind all this is the almost unlimited availability of suitable sites for the construction of offshore wind farms, given Japan's extensive coastline, and the limited availability of land for on-shore sites. Informed by European best practices, the option appears very attractive. Furthermore, intense national competition in offshore wind opportunities will accelerate technological innovation and cost reduction. Siemens, Vestas and GE are already considering this business opportunity. The Offshore Renewable Energy Act, passed in April 2019, testifies to the government's commitment to developing this opportunity.

HYDROGEN

Shortly after the Fukushima nuclear accident, hydrogen rose to prominence both as a new energy source and as one for use in carrying and storing energy. This strategy is supported by Japan's global competitiveness in the field of fuel cells and hydrogen, attested by the world record in number of patent applications filed by the country for hydrogen technology. The government has developed a very ambitious strategy and a comprehensive roadmap, in close collaboration with the industry. Japan also took the lead internationally by hosting the first Hydrogen Energy Ministerial Meeting in October 2018, which paved the way for the inclusion of hydrogen in the G20 Osaka Leaders' Declaration in June 2019.

Today, all energy operators invariably talk about hydrogen, something unimaginable only two years ago. Japan has effectively triggered the global hydrogen boom, and global hydrogen competition and cooperation has added dynamism to the world economy. Ideally and environmentally, hydrogen should be sourced from decarbonized energies such as renewables, nuclear and fossil fuels processed using CCUS (Carbon Capture, Uti-

lization and Storage). The transition still has a long way to go before "green" hydrogen becomes predominant; in the meantime, we will have to make do with "brown" hydrogen and "blue" hydrogen.

IT'S NEVER TOO LATE

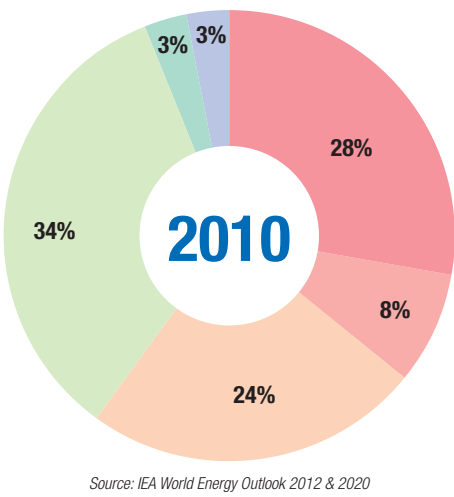
- a) The declaration on carbon neutrality by 2050—from a global leader such as Japan—came with some delay; however, it is never too late to change to the right path and take efforts to halt climate change, the biggest common challenge for the human race.
- b) The Green Growth Strategy advocates addressing climate change as an occasion for further growth, an opportunity that can be seen in the global competition and cooperation on hydrogen among the various actors around the world.
- c) Major countries, including the European Union, share similar objectives, such as carbon neutrality by 2050: this will inevitably accelerate cross-border cooperation among governments, companies, the world of research and citizens. This shared goal will ultimately help heal divisions between nations.
- d) Political will matters a lot, both positively and negatively, as the United States demonstrated so clearly under Trump's presidency. Political will is a powerful tool for establishing direction and defining a broad framework for action. In this regard, the decision the Japanese government takes on nuclear power is of critical importance for achieving carbon neutrality by 2050.
- e) Japan is the third largest economy in the world: the efficient decarbonization of its energy system is a matter of crucial global importance.

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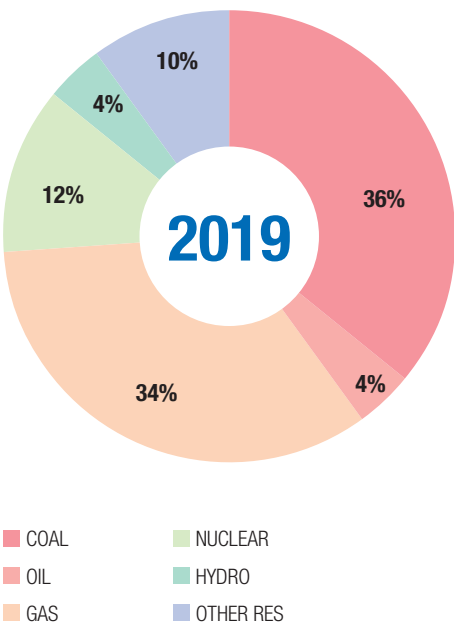
TATSUO MASUDA

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2. ENERGY MIX



Source: IEA World Energy Outlook 2012 & 2020



The share of renewables, including hydroelectricity, in the electricity generation mix increased from 6% in 2010 to 14% in 2019.



by Yasuko Kameyama

NET ZERO TARGET

UP TO NOW, THE JAPANESE
PATH TO CARBON NEUTRALITY HAS
BEEN DICTATED MAINLY BY EXTERNAL
PRESSURES. BUT IN ORDER TO KEEP TO ITS
PLEDGES FOR 2050, THE COUNTRY WILL NEED
TO UNDERSTAND THE INTRINSICALLY CRITICAL
NATURE OF CLIMATE CHANGE

IN OCTOBER 2020, Prime Minister Yoshihide Suga announced that Japan would aim for net-zero by 2050. For decades, Japan had been reluctant to set ambitious emission reduction targets, arguing that it has already achieved the highest level of energy efficiency in the world, and that any activities to further reduce emissions would burden Japanese industries and final consumers. The majority of the population have basically acknowledged the science of climate change, but they also sympathize with arguments that the largest greenhouse gas emitters, particularly China and the United States, should start reducing their emissions first. Some also insist that Japan's emissions count for merely three to four percent of global emission and thus even phasing out emissions altogether would add nothing to resolving climate change. Therefore, the sudden announcement by Prime Minister Suga was a surprise to many.

Have Japanese policy makers suddenly gone green? Were there internal or external pressures to pledge to achieve carbon neutrality? This short essay summarizes the social and political dimension of Japan's path towards net-zero.

FROM THE 1992 FRAMEWORK CONVENTION TO THE FIRST REDUCTION TARGET

Japan has responded continuously to international debates on greenhouse gas emissions since the negotiation of the UN Framework Convention on Climate Change in the early 1990s. Whenever Japan was called upon to set emissions reduction targets, however, discussions were mostly narrowed down to energy saving potentials. "Energy savings" were expressed in terms of "energy per GDP," and, at least until in the early 2000s, Japan's energy per GDP was relatively better than in many other developed countries; on this consideration, Japanese industries raised objections to setting ambitious emission reduction targets. Meanwhile, Japanese energy policy was established prior to the setting of emission reduction targets, and coal was always preferred as the most abundant and least expensive energy source. Nuclear power was also chosen as the most efficient way to mitigate climate change without affecting industry activities. Renewable energies such as solar and wind were considered too expensive and geographically unfit for the mainly mountainous topography of Japan. Japan's first emission reduction target for 2030 was set in July

2015, just before the Paris Agreement was adopted in December of the same year. The mindset of Japanese policymakers had not changed, and they simply came up with an emissions reduction figure that would look good without significantly reducing emissions in absolute terms. As the base year they chose 2013, because it was the year that Japan recorded its highest emissions since 1990, due to closing nuclear power plants after the Fukushima Daiichi accident in 2011 and replacing them with fossil fuel power plants. Choosing as base year the year with the highest emissions allowed Japan to make a pledge that appeared as ambitious as those of other countries: the target was to reduce emissions by 26 percent by 2030 compared to 2013 levels.

The Paris Agreement, adopted in December 2015, set the long-term objective of keeping the rise in global temperatures below

2 degrees Celsius and pursuing efforts to limit the increase to 1.5 degrees Celsius. At the time, Japan's position on the long-term objective was ambiguous. Some in Japan expected the United States to pull out of the Paris Agreement as soon as Donald Trump won the presidential elections in 2016, and the Paris Agreement to be therefore rendered ineffective, just like what happened with the Kyoto Protocol.

THE IPCC REPORT AND THE DEBATE ON NET-ZERO

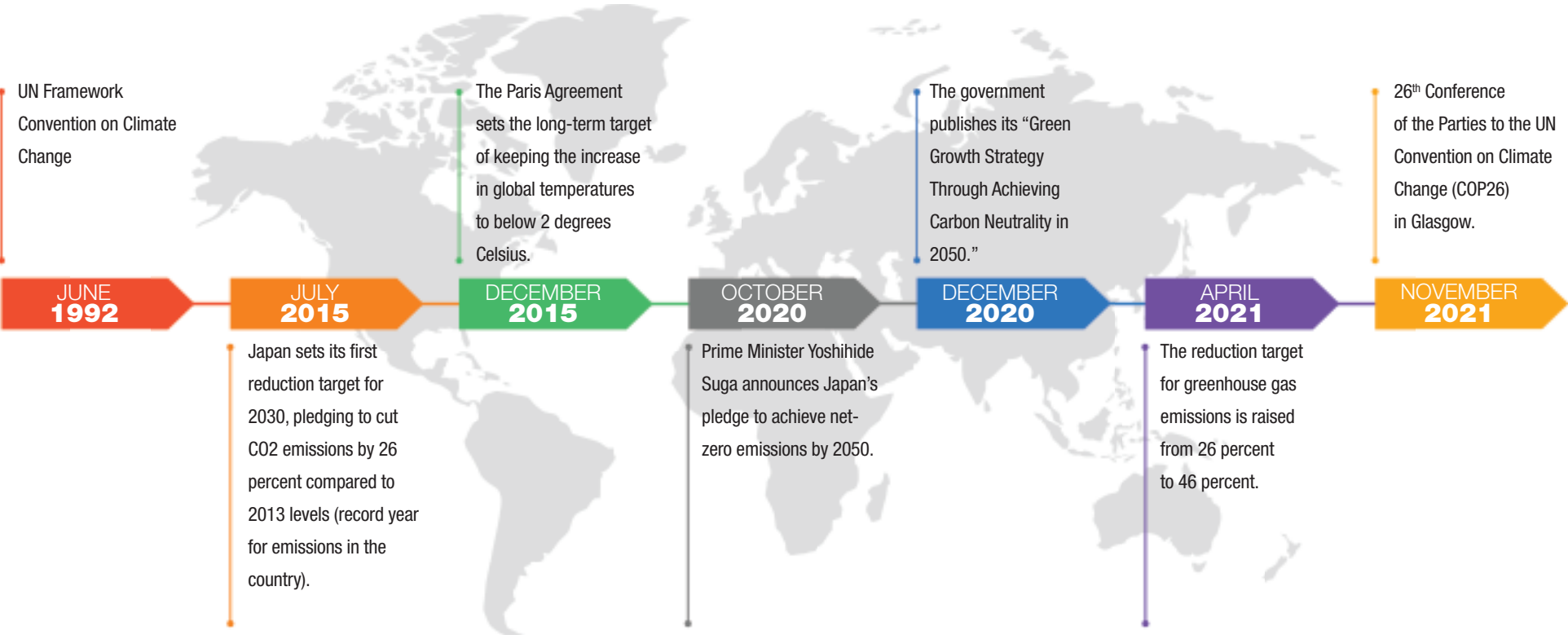
However, after the Intergovernmental Panel on Climate

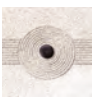
Change published a special report on the 1.5 degrees target in fall 2018, many countries started declaring targets of net-zero by 2050. In addition, it was non-state actors such as businesses, local governments and private individuals that took the lead in the debate on net-zero. In Japan, an increasing number of private companies saw their counterparts overseas voluntarily setting emission reduction and renewable energy targets, and therefore they started putting pressure on the Japanese national government to support similar targets. International initiatives, such as the Task Force on Climate-related Financial Disclosures (TCFD) and Environment-Social-Governance (ESG) investments had a strong impact on Japanese private companies. Similarly, Japanese local governments joined world-wide local government movements on climate and put pressure on Japanese national governments to support the promotion of renewable energy. These voluntary actions taken at





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FIGHT AGAINST CLIMATE, THE STAGES



 Japanese Zen garden. Its main feature is the absence of water. Stones, gravel or sand are used to represent streams or ponds metaphorically.

 A bus leaves a biogas filling station close to the wastewater treatment plant in Higasinada in Kobe, Japan.

 "Solar parking" for electric bicycles, an initiative launched in 2010 from the Setagaya district of Tokyo with the Japanese electronics Company Sanyo. The rental station incorporates solar panels on the roof and lithium ion battery systems for the 100 pedal-assist electric bikes.

local level have proved to be effective. Japan's greenhouse gas emissions in 2019 were down 14 percent from 2013; in the first six years, the country's emissions were already halfway to the 2030 target.

2021, TOKYO RAISES THE BAR

Pressured by domestic businesses and local governments, the Japanese national government decided in summer 2020 to phase out all inefficient, out-dated coal power plants. In September, China announced its long-term objective to reach net-zero by 2060 and Biden's chances of securing the presidency improved; this caused concerns to mount in Japan that failure to set a 2050 net-zero target could mean the country would be lagging behind other countries and economies. These internal and external pressures drove Japan to present its 2050 target; two months after Prime Minister Suga's announcement (in October 2020), the government published the report "Green Growth Strategy Through Achieving Carbon Neutrality in 2050." At the time, the government was not in much of a hurry, as it believed that the introduction of investments for innovative hydrogen and ammonia technologies would be sufficient to meet the targets given in the report. However, when newly elected US President Biden announced that the United States would set its 2030 emission target by the Leaders' Summit on Climate to be held in April 2021,

Japan had to become more ambitious in its 2030 target. As a result, the previous target of 26 percent reduction was increased to 46 percent. This new goalpost is essential for Japan to achieve its 2050 net-zero target, but measures to achieve the new 2030 target are still under debate. This was the first time that Japan established its energy policy after setting the emission reduction target. I would argue that, unlike the 2050 net-zero target, the new 2030 target was purely the result of external pressure, particularly from the new US administration. There is little objection from inside Japan as to the decision itself, but there are also few people in the government willing to take full responsibility for achieving this new goal. More crucial still is the lack of voice among the Japanese people. Japan has been severely affected by heavy rainfall and strong typhoons in the past few years and many have lost their lives or their properties. People are starting to realize climate is changing, and that this is likely due to global warming. However, unlike in many other countries, it is rare to see school strikes by youth, or climate marches by Japanese citizens. This is perhaps related to Japanese culture, which prefers to avoid self-assertion and conflict. While they have enough knowledge to understand the relation between greenhouse gas emissions and extreme weather patterns, the majority still seem to think that they can leave the issue up to the government, which should successfully deal with it by introducing new technolo-

gies. Earthquakes have little to do with global warming, but Japanese people tend to unite extreme weather events and earthquakes under a single umbrella requiring "disaster prevention"; there is less of an inclination to link extreme weather events with cutting emissions. Similarly, a proportion of Japanese businesses that support the net-zero target are merely interested in not being left behind their partners in the West and the creation of new business opportunities. They do not seem to grasp fully why we need to reach net-zero and what may happen if we exceed the thresholds of 1.5 and 2 degrees.

UNDERSTANDING CLIMATE CHANGE AND ENGAGING THE POPULATION

As the 26th Conference of the Parties to the UN Convention on Climate Change (COP26, to be held in Glasgow, UK, in November 2021) draws near, countries are expected to demonstrate how they will achieve their respective emission targets. However, in Japan, the government's most pressing issue at the time of writing this essay (early July 2021) is the Tokyo Olympic Games. Public focus is still on Covid-19. A general election is expected in the fall and politicians are unwilling to get off the fence on the issue of nuclear power plants and it is expected that neither government officials nor politicians will take the initiative in discussions relating to carbon neutrality. Another external pressure prior to COP26 is perhaps the need for Japan to restart in-depth discussion on how to incorporate a net-zero society. In addition, the involvement of citizens in climate-related discourse, such as the citizen's assembly in the United Kingdom and France, could serve as a launchpad for raising public awareness of the importance of engaging in climate movements. Public acknowledgement of the critical nature of climate change is what Japan needs most in order to achieve carbon neutrality by 2050.

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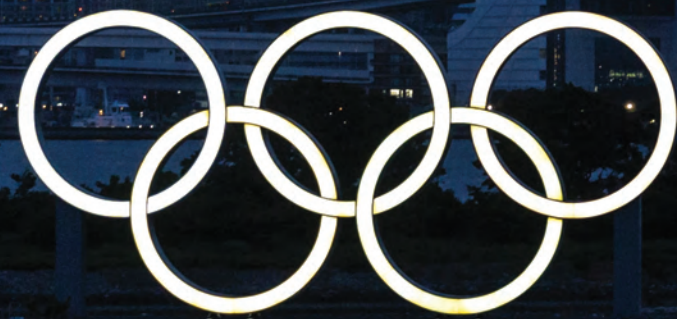


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THE LONG GOODBYE TO COAL

by Rachel Kyte

FOR A MORE RAPID, AMBITIOUS AND EFFECTIVE ENERGY TRANSITION, JAPAN MUST ABANDON COAL AND STOP FINANCING IT ABROAD. THE COUNTRY GOT OFF TO A SLOW START BUT CAN STILL WIN THIS RACE, WITH BENEFITS FOR THE WHOLE REGION



DESPITE EFFORTS by the Japanese government, the Tokyo Olympics are sort of an empty shell, without the usual adoring crowds encouraging the athletes to go faster, higher, further. It is a very different event from that initially planned by the organizers before the pandemic.

Japan is also struggling to respond to the other risk that marks this decade—climate change. Its erstwhile efforts to lead an energy transition at home and overseas risk falling flat as it searches for internal consensus and ways to project influence in the region.

Energy transitions, essential to driving the decarbonization critical to combat climate change, to extending energy access to all and to building resilience into energy systems, are underway. Recent political announcements from leading advanced economies have given credence to a “race to zero” goal for net emissions by mid-century. Critical climate talks are scheduled in Glasgow, Scotland, in November 2021, where governments should indicate increased ambition.

The financial sector has begun to internalize the risks of stranded assets. Central banks and regulators including Japan’s FSA have embarked on stress testing and scenario planning. The recommendations of the Task Force on Climate-Related Disclosures have grown in influence, across advanced economies, including Japan, and they have become a central plank of G7 and G20 leadership on climate finance. Private investors have marched out of carbon-intensive assets at an unprecedented speed and scale in the past two years. Asset owners, asset managers, banks, and insurance firms have all seen growing leadership efforts, all of which involve leading Japanese entities.

A TRANSITION PATH THAT LACKS CONSISTENCY

As the impacts of climate change and science spur the need for urgent climate action and focus on building back better from the dislocation of the global COVID-19 pandemic, the pressure intensifies on the necessary leadership of advanced economies. The to-do list is clear. First, commit to net-zero emissions by 2050 or before and have a science-based robust

mid-term target for 2030. The pathway to success for both runs through aggressive energy transitions and the first step in the transition is to phase out coal domestically and end coal financing overseas.

Phase-out poses a significant challenge for Japan, whose hesitancy and qualified commitment to exiting coal hampers their transition and international standing. There has been progress since 2020. But those pushing for progress are aware of the damage incurred by the lack of clarity and coherence, especially Japan's support for coal in other countries at the same time it pushes for an energy transition that will spur green growth. At the last climate talks in December 2019 in Madrid, Minister Koizumi reported back, after a bruising trip, that Japan was already cast as a global pariah on coal and coal financing. The diplomatic damage has accelerated as a "race to zero" carbon emissions emerged between the EU, the US and China, with a Biden administration reasserting US leadership credentials on climate action.

In October 2020, Prime Minister Suga announced Japan would aim for carbon neutrality by 2050. In April 2021, at President Biden's Leaders Climate Summit, Japan, under pressure to be more precise, offering a 2030 target of 46-50 percent emission reductions, compared with 2013 levels, an improvement on the previous 26 percent pledge. A new bilateral deal between the US and Japan focuses on a joint partnership that promotes public and private capital flow toward climate-aligned and away from high-carbon investments. Prime Minister Suga said that Japan is determined to take the lead in solving the challenge of climate change for the whole of humankind.

The direction of travel is clear. In mid-June, Japan reluctantly signed onto a G7 communique that committed G7 countries to end new direct government support for unabated international thermal coal power generation by the end of 2021, whether through Official Development Assistance, export finance investment, and financial and trade promotion support. Compared with many of its peers, the difficult path Japan must follow was noted by the International Energy Agency (IEA) recently: "The carbon intensity of Japan's energy supply remains one of the highest among IEA members. It will need to move quickly to make headway on the steep emissions reductions that are needed to achieve its recently announced ambition of reaching carbon neutrality by 2050."

THE ANTICIPATED ENERGY STRATEGY REVIEW

The detail on how Japan's net-zero pledge will be met means all eyes are on the energy strategy review, currently underway, with a first draft expected soon. There are signs of change, but not yet a good step change. While in April, Japan canceled the last coal projects at the planning stage, Japan's utility companies still have six GW of new coal power under construction. Current estimates of Japan's energy mix in 2030 include 40 percent from

PROJECTS FINANCED ABROAD

The gradual elimination of coal is a big challenge for Japan. In 2020, the country committed to limiting publicly funded foreign investment in coal, but there are still a number of active projects. The map shows the largest projects underway and planned for the near future.



coal and gas. To phase-out coal by 2030, the G7 commitment necessary to meet climate goals and a leadership benchmark will require a very different strategy to the current continued embrace of "efficient and clean" coal. There are plenty of progressive businesses calling for change at home and some sub-national entities showing leadership. Tokyo and Kyoto both have clean energy targets. Tokyo has a net-zero by 2050 plan and Kyoto has joined the British-Canadian originated Powering Past Coal Alliance.

However, overseas, much more needs to be done to close, once and for all, the door on Japan's financing of coal. Though Japan committed in principle in 2020 to restricting public overseas

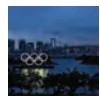
coal finance, it left open the opportunity to support high-efficiency projects based on host country circumstances. This language is a hangover from the pre-Paris commitments towards coal except in extreme circumstances made by development banks and development finance organizations. It is no longer aligned with the science behind "net-zero" and it is out of step with country commitments and the direction of public and private finance. For example, the Asian Development Bank, an essential pillar of Japan's economic diplomacy in the region, issued a new energy policy in May 2021 that ends coal-fired power and heat financing. It throws its weight behind clean energy transitions for its members.

THE DINOSAURS OF FINANCE

Japan's hedging extends from government positioning to public and private finance overseas. Since 2020, leading banks from Japan have made statements to put more conditions on lending to coal projects. Most recently, Sumitomo Mitsui Banking Corporation (SMBC) announced that it would no longer finance ultra-supercritical coal. However, on June 18th, 2021 Sumitomo, in stark contrast with the shareholder pressure on western financial institutions, rejected a proposal to align its business with global climate change targets as it continues to engage in coal projects in Bangladesh and Vietnam. As global trading houses embrace more aggressive climate goals than ever, this



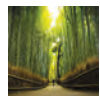
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Japan aims to eliminate inefficient coal-fired power plants by 2030 and double energy from renewable sources. In the photo, the illuminated Olympic rings in Odaiba Marine Park in Tokyo, open water swimming and triathlon venue.



The commercial area of Shibaura, a redeveloped area on the banks of Tokyo Bay.



The Sagano Bamboo Forest, or Arashiyama Bamboo Grove, in Kyoto.

would seem to place Sumitomo in the coal dinosaur bracket. It is, however, the dogged work by NGOs and think tanks that has increasingly pieced together the complex picture of who finances which coal. What emerges in addition to the continued engagement of Japanese government funding of coal, despite the commitment to net zero and the cooling of the demand for coal from recipient countries, such as Bangladesh, is the extent of the engagement of Japanese institutional investors and commercial banks. Despite commitments to decarbonize, the three largest commercial lenders to coal from October 2018 to October 2020 are from Japan (Mizuho, SMBC and MFUJ for a combined USD 76bn). This is in addition to sizeable investment in coal from the Japan government pension fund (GPIF). Japan is then the second-largest funder of coal in the year where from the G7 to COP26, coal is out. Financing coal-powered energy assets when the market signals are clear that modern renewables are cheaper and offer a better financial return risks a backlash from countries that desperately need help with their clean energy transitions. These countries also need to provide clean energy to firms who need to compete within increasingly decarbonizing global value chains due to their own climate pledges and pressure from investors.

Time then for Japan to position itself to win the race to zero. This would mean accelerating its policy to phase out less efficient coal units by 2030 and its energy strategy review should

be based on scenarios that phase out coal by 2030. It should end all coal financing this year. And it should come to the table with the US and the EU and be part of the scaled-up vision for financing the clean energy transition in developing countries, where Japan's prowess and experience in technology and especially energy efficiency would be a real benefit. Time too for the G20 to place official tracking systems of transparency that ensure full disclosure of cross-border fossil fuel financial flows. To use an Olympic racing analogy, Japan has been slow out of the blocks in shifting its energy transition to net-zero. Still, the race is not over, and there is nothing to stop Japan from overtaking others. If they did, they and their region and the world would do better.

we

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ENERGY TRENDS IN ASIA

by Davide Tabarelli

IT WAS AUGUST 2008 and China presented itself to the world in its modern guise with the 29th Olympic Games in Beijing, a showcase of its desire and capacity to compete with the West. Its booming economy drove the consumption of energy and in particular oil, which a few days earlier had reached USD 140 per barrel. In 2021, with prices almost halved to USD 75, we return to Asia with the Tokyo Olympics. In these 13 years, a lot has happened in Asia and a comparison is useful to understand the direction of this area, which is crucial for the future energy consumption of the entire planet.

OPPOSITE TRENDS FOR CHINA AND JAPAN

China, first of all, has confirmed its world leadership in terms

MUCH HAS CHANGED IN ASIA BETWEEN THE 2008 BEIJING OLYMPICS AND THE 2021 TOKYO GAMES, BUT NOT THE THIRST FOR ENERGY OF THE REGION'S EMERGING COUNTRIES, WHICH CONTINUE TO RELY HEAVILY ON FOSSIL FUELS TO KEEP THEIR ECONOMIES MOVING

of the growth in energy demand. In just 8 years, between 2001 and 2008, it had more than doubled its energy consumption, going from just over one billion metric tons of oil equivalent (toe) to over 2.2 billion, while in 2020 it reached 3.5 billion, with a growth trend that not even the 2020 pandemic interrupted. As in the early 2000s, even in the last decade, Beijing has largely relied on its most convenient energy source, coal, which is more polluting but less expensive and is widely available in huge internal reserves, mined by millions of workers. Yes, renewable sources have increased, to 13 percent of the total, but coal remains firmly the main source to cover Chinese energy demand.

The Western model, or rather that of the industrialized economies, of which Japan is strongly representative, compares with that of the rest of Asia, where economic growth, essential for the billions of poor people who live there and for those yet to come, leads to higher energy consumption. The per capita energy consumption of the majority of Asian countries does not reach 1 toe, one third that of Europe or Japan, and it is inevitable that this will tend to rise in the coming years. Rich countries, with the European Union in the lead, have for years harbored the need to reduce greenhouse gas emissions from the consumption of fossil fuels. Announcing green revolutions is easy when energy consumption is falling, as has been the case for years in Japan and Europe. However, for those in the initial phase of development, as is the case for much of Asia, the mod-

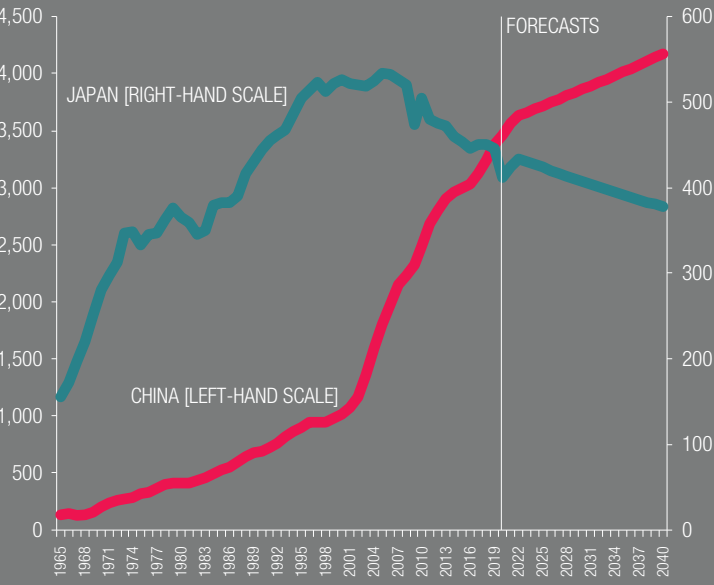


CONSUMPTION
TO 2040

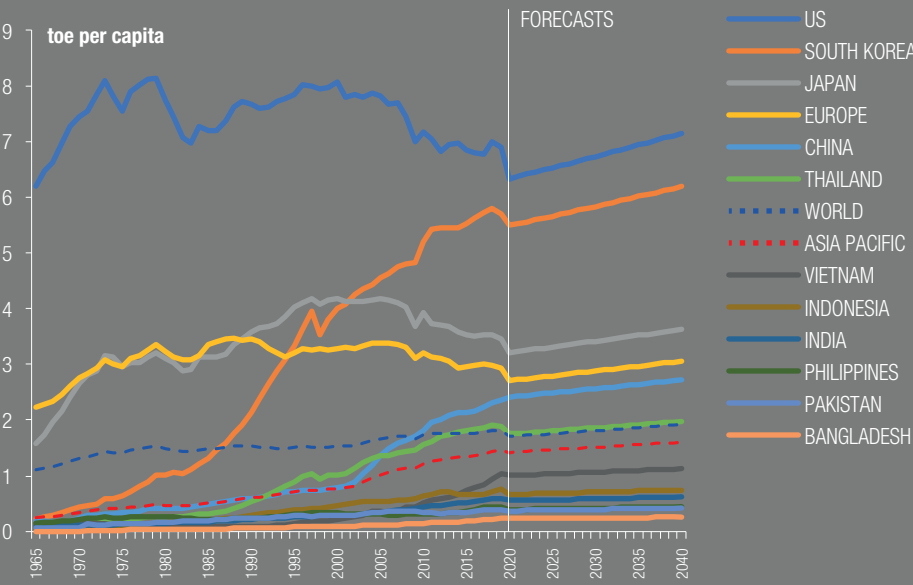
In the next 20 years, the Asia-Pacific region will record high growth rates in energy consumption, mainly driven by demand in China. Consumption in Japan, a mature economy, bucking the trend, will continue to fall.

Source: BP Statistical Review and NE Nomisma Energia elaborations

CHINA AND JAPAN: PRIMARY ENERGY CONSUMPTION AND FORECASTS FOR 2040 [million toe]



ANNUAL CONSUMPTION OF PRIMARY ENERGY PER CAPITA



els that can satisfy the explosive growth are always the same, i.e., those that we too exploited during our boom years, based on large production plants. These allow for economies of scale that ensure low unit costs and the waterfall distribution of downstream energy: first with gigantic transmission systems, then with retail distribution systems.

THE CASE OF ELECTRICITY AND THE ASIAN LESSON

The typical case is that of electricity and it is also the most interesting because, on the one hand, it involves the attempt to abandon coal, the most polluting energy source, and on the other, because it is electricity that can form the launchpad for the new renewable sources that everyone would like more widespread: solar and wind.

What has happened in the last 13 years in Asia clearly confirms that the models for producing and distributing electricity are always the same, which some may call traditional, and which cannot really be changed. They can become more efficient; we can apply new, cleaner technologies, even with the contribution of distributed production from renewable sources, but the substance does not change. It is the large power plants, which in Asia run mainly on coal, that make it possible to meet the demand for electricity and make life easier for billions of people. Other large generation plants rely on gas, mostly imported, and also on nuclear power, while the large renewable source, hydropower, plays an important role, but with the problem that, like other renewables, it requires huge surface areas. From large production plants, electricity is distributed via a waterfall system in the transmission system: from the large transmission towers to the dispatch stations, where the smaller power lines are attached to reach towns and cities, or rural areas, where small dis-

tribution networks are connected that reach homes or factories. The principle is that upstream there must be a large capacity to produce power, which per unit of time becomes energy, which can then be distributed downstream, following the laws of physics that also resemble those of the human blood circulation system. It's simple: large capacity can only be provided by fossil fuels or nuclear, while renewable sources are dispersed, poorly concentrated and, equally important, can neither be programmed nor stored. This is why coal-fired power plants continue to be built in Asia, despite the fact that everyone agrees on the urgent need to cut CO₂ emissions. The rule applies the world over: to make 1000 kilowatts of photovoltaics, you need around 1.6 hectares of land, almost two football fields, which, however, only work when it is sunny (normally 1500 hours a year with a production of 1.5 million kilowatt hours). On the same surface of 1.6 hectares, you can install a traditional 800,000-kilowatt gas-fired plant that works almost continuously, normally 7,000 of the 8760 hours that there are in a year. This means that it can produce up to 5.6 billion kilowatt hours, 3700 times that produced by the photovoltaic system, which is moreover intermittent and not programmable. Sure, the panels are more beautiful, they catch sunlight and they are clean; but that's not enough to cover the demand of Asia's billions of people, who need electricity to light cities at night, to stay cool in the summer, to run their factories, their shopping centers and their hospitals.

SOLAR, HYDROGEN AND NUCLEAR: HISTORICAL COURSES AND RECOURSES

This is also true in Japan, a country that for decades has been trying to reduce dependence on fossil fuels by moving to renew-

ables, both because it has always lacked internal resources and thus has to import everything and because it was hit hard by the energy crises of the 1970s. It was one of the first to attempt the development of photovoltaics in the 1970s, thanks to its leading position in semiconductor technology. However, the results are partial to date and the electricity production from photovoltaics is less than 8 percent of the total. Wind power, for geographical reasons, has never been important in Japan, while there have been much more interesting attempts over the years to exploit hydrogen as a vector in the transport sector. Here too, after the enthusiasm of the 1970s and a revival in the 1990s, developments have been marginal, while in 2021, forgetting the difficulties of the past, it is once again central to hopes for the future, a bit like what is happening in Europe.

Japan had relied heavily on nuclear power, but the serious Fukushima accident of March 11, 2011 broke this relationship of trust. The accident, it is worth remembering, was not due to a malfunction of the system, but to the trivial error of having put the diesel engines below sea level. When the tsunami hit, the engines were covered with water, they stalled, the reactor cooling system stopped and the reactor exploded. The incident sparked a backlash against nuclear power that led to the temporary closure of most of Japan's more than 50 nuclear power plants, driving even greater enthusiasm for renewables. Nuclear power generation went from nearly 300 billion kilowatt hours in 2010, when it accounted for 30 percent of total electricity generation, to 40 billion in 2020, 4 percent of the total. The fall in consumption of around 200 billion to 1000 billion in 2020 absorbed much of the nuclear decline, but there was an increase in both gas and coal consumption, currently accounting for 35 percent and 30 percent of overall production respectively. Intermittent renewable sources, which form the basis of the hypothetical new models of electricity production, on which Japan has been insisting for decades, remain at 12 percent of the total. Thus, 13 years after the Beijing Olympics, the electricity that will also be used for the Tokyo games will continue to be produced by large power plants in which traditional energy sources ensure the necessary energy density. The rest are theories and hopes that are, however, becoming a little dated.

we

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The photo, taken in Tokyo about a year ago, shows the countdown of the days to the start of the Japanese Olympic Games in 2021.



Aerial view of heliostats in a 50 MW molten salt solar power plant, in Hami, in the Chinese autonomous region of Xinjiang Uygur.



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GREEN COMBUSTION

by **Francesco Gattei**

THE GREEN TRANSITION IS MUCH MORE INDUSTRIAL AND ENERGY-INTENSIVE THAN ENTHUSIASTS THINK. IMMATURE TECHNOLOGIES, THE PRICE OF THE MATERIALS NEEDED TO MAKE THEM AND THE NEED TO USE RARE-EARTH ELEMENTS WILL ENCOURAGE INFLATION

THE VERY FIRST to experience the risk of excess currency were Croesus and then Midas; and many others followed including the worthless paper currency (Papiermark) of the Weimar Republic and the oil crisis inflation of the 1970s. But for more than twenty years, inflation has disappeared, and although many developed countries have tried for decades to relight the fire, inflation has long been a wet fuse. However, in recent months the flames seem to be taking hold.

THE REBOUND IN DEMAND FOR GOODS AND SERVICES

The world today is faced with a phenomenon almost unknown to traders under the age of 40 and the algorithms that are replacing them: a rebound in the demand for goods and services. There are many factors fueling this situation. The post-pandemic rebound in demand for goods and services is already underway. It is a V-shaped recovery, similar to the one that occurred after the Lehman crash in 2008, but now it's a capital V. After last year's enormous record collapse, minus 3 percent in global GDP compared to minus 0.1 percent in 2009, the 2021 rebound will also reach a historic level of between 5 and 6 percent. After all, production capacity is intact and the injection of liquidity by the central banks has preserved access to credit and

cash. Furthermore, a year and a half of pandemic, with monetary policies helicoptered in and combined with a forced halt in leisure and tourism, have resulted in a record world accumulation of savings in excess of USD 5.4 trillion, 6 percent of GDP. If all this consumption capacity were released on the market, the result—without further stimulus—would be the highest growth rate since the 1960s. But there are two further elements that will boost prices.

The first is the recovery plans that have been announced in various countries to restore economic growth and facilitate debt relief, a global Super Marshall Plan. The US will provide USD two trillion, Europe EUR 750 billion and China USD 500 billion over the next four years. The second element is another phenomenon of discontinuity typical of the present time: the green transition, which has been promoted in many economies and is continuously being relaunched with targets set with shorter deadlines.

In short, we are in the midst of post-war and above all psychological reconstruction, in itself a good injection of Keynesian spirit for economic growth as well as a complete overturn of our energy and industrial structure. And while the many factors mentioned above suggest that the inflationary effect will be temporary (the inebriated rush of people released from lockdown to travel and spend), the green

revolution, if fast tracked, will have structural inflationary impacts.

THE IMPLICATIONS OF THE TRANSITION TO NET-ZERO

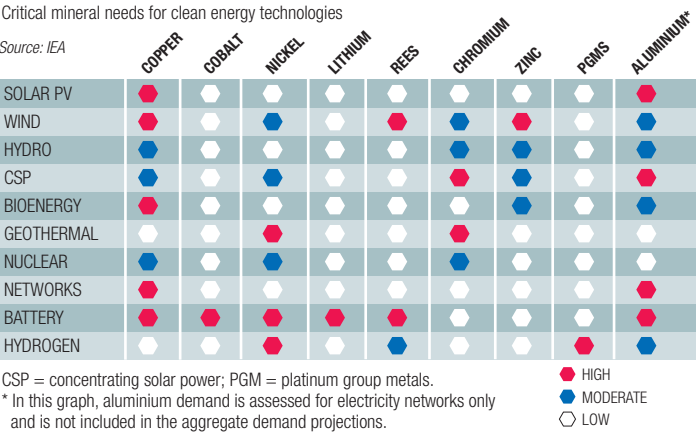
The transition to net-zero, if not calibrated, would in thirty years totally disrupt both the energy and industrial chain of supply, transport and consumption and the private demand, both domestic and mobile, that has been established over 250 years. There are new sources, engines, vehicles, storage tools, new networks with different injection nodes and a new almost unprecedented energy vector (hydrogen). And many more materials and minerals are now needed for production. The cost implications would be numerous but the first risk lies in pressure on the price of the materials needed to build the new technologies. In fact, green energy hides a lot more materials in the construction phase than we might imagine.

Consider, for example, wind and solar plants that, according to the IEA's net-zero scenario, are expected to grow in terms of capacity from 1,500 GW today to 8,000 GW by 2030, an average growth rate of 17 percent per year. The construction of a 100 MW wind farm requires 30,000 tons of iron ore (the equivalent of 4 Eiffel Towers), 50,000 tons of concrete and (yes, really!) 900 tons of plastic and resins. A solar installation of similar capacity requires triple the iron and steel, while the quantity of concrete is halved. All of this new consumption would be in addition to the traditional use of these materials. In the last decade alone, the quantity of minerals required for a new-capacity MegaWatt has increased by 50 percent, due to the progressive increase in the weight of green power. Producing the new involves construction the old way.

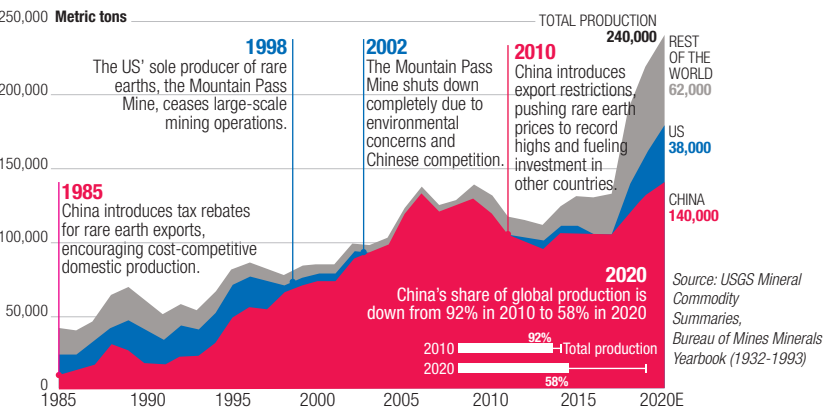
Then there is the further effect on construction of the transport and storage network of new technologies: the integration of intermittent sources in electrical systems, or the penetration of new energy carriers such as hydrogen, requires new transmission networks. It is estimated that globally there are 1 million kilometers of pipelines for gas, while for oil the length of the network is shorter because crude oil travels mostly by ship. But for electricity, hydrogen and carbon capture and storage, new networks will have to be built because we can only partially reuse the existing grid. Green production sites are far from cities and increasingly offshore and electricity and new molecules, hydrogen or carbon for storage, do not share the same modes of transport as the old hydrocarbons. In short, for every thousand kilometers of new pipelines, we need a thousand tons of steel for piping. Or tons of copper for power lines. Added to this, we need gigafactories for producing batteries. The Tesla gigafactory in Nevada is the largest industrial site in the world and the IEA projects the need for 20 such factories per year for the next ten years for energy storage or electrolyzers, all new, and all physically demanding.

A third element of inflation lies within the earth's crust and

1. MINERAL NEEDS VARY WIDELY ACROSS CLEAN ENERGY TECHNOLOGIES



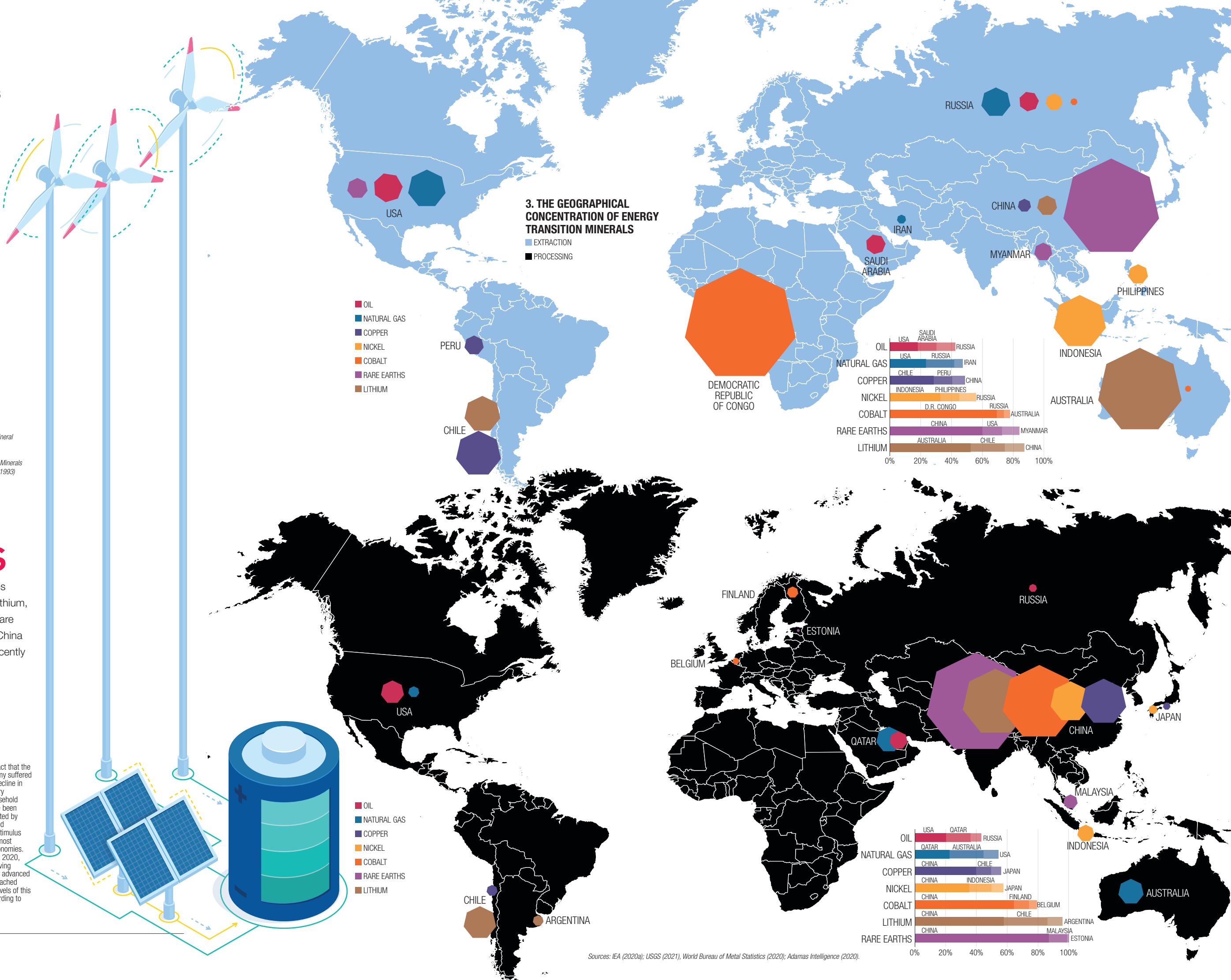
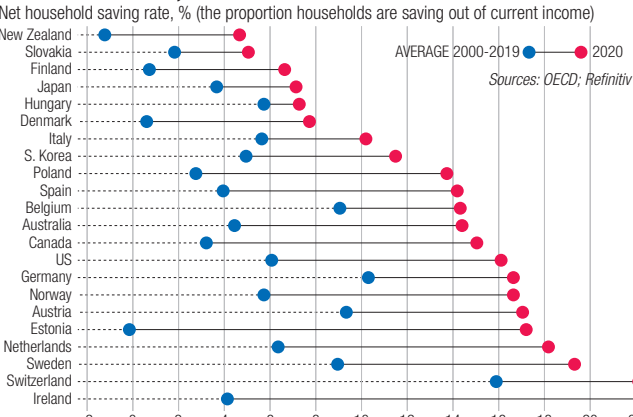
2. MINE PRODUCTION OF RARE EARTH OXIDES



TRANSITION AND CRITICAL MINERALS

The transition to net-zero requires a lot of minerals to build new technologies (Figure 1). These are 17 elements of the periodic table with the addition of lithium, cobalt, manganese, nickel, graphite and copper. They are called critical or rare minerals because they are extracted using high-impact mining processes. China is the main source of rare-earth elements; however, other countries have recently upped their production to reduce dependence on China (Figure 2). Today, the production of many energy transition minerals is geographically more concentrated than the production of oil or natural gas (Figure 3).

ECONOMY DOWN, SAVINGS UP



concerns the magic of all things electrical: the minerals needed to generate or store electrons. With fossil sources, the energy we use is molecular. It is released by burning and breaking chemical bonds and is deposited underground at a depth of 2-5 kilometers if we are talking about hydrocarbons: stock energy. It is captured with the equivalent of a straw; but, if we are talking about crude oil and gas, it does not involve intense mining activity.

In contrast, with renewable sources, energy is a flow of electrons to be captured and used immediately. After the moment passes, we go back to a state of energetic rest. But wind and sun are only able to generate an electric field thanks to the magnetic properties of certain minerals. These minerals are 17 elements of the periodic table, the very little-known lanthanides and the equally foreign scandium and yttrium, that we have actually been using massively for a few decades. To these, we add lithium, cobalt, manganese, nickel, graphite and copper and we have an overview of what we need to create electrical flow and to store it in batteries. They are known as critical minerals or rare-earth elements, but they are actually not rare. They become so because they are usually found within other minerals, not like coal, which is a more concentrated deposit, and their extraction requires costly and high-impact mining processes and is therefore limited to a few areas in the world. Do you want a kilo of vanadium?

You have to process 8 tons of rock, a kilo of gallium takes 50 tons and lutetium as much as 200 tons. Processing involves mining and then “refining” the rock using solvents in several washing cycles. Whilst oil is concentrated geographically in one region, China is the Middle East of rare-earth elements, with two thirds of global production.

Electric machines are the most tangible example of this nineteenth-century materiality in the new energy world as they combine electric motors and highly digitized tools. EVs (electric vehicles) are in fact a concentrated mix of critical minerals: 200 kg of its weight are minerals necessary for the battery, its protection and the magnetic magic that makes it silent and zero-emissions, six times the quantity found in traditional cars. Even in wind or solar plants, there are between four and eight times the minerals used in gas plants of similar size. These minerals are also found to a large extent in electronic products, in electricity networks, in household appliances and therefore the effect of inflationary pressure for the production of these materials would fall on many consumer sectors.

LONG-TERM INVESTMENTS STILL LACKING

Finally, we have a traditional energy structure that will gradually become strained due to the lack of long-term investments in sources that today account for 80 percent of final consumption. The prospect of a radical change in the energy system already produces a transition. Investing in coal, oil and perhaps gas is perceived as potentially risky, and the time return on investment needs to increase in speed. But it is a complex balance, especially if production follows a natural decline. For example, 7-10 percent for crude oil or 4-5 percent for gas. In short, adopting a just-in-time approach for fossil fuels could prove impractical and, suddenly we may find that supply is falling faster than demand is actually being displaced by new sources. This would have a cascade effect on industrial processes, on the cost of transport and on final goods. And this

would increase the cost of the transition, which, as mentioned, is much more industrial and energy-intensive than we think.

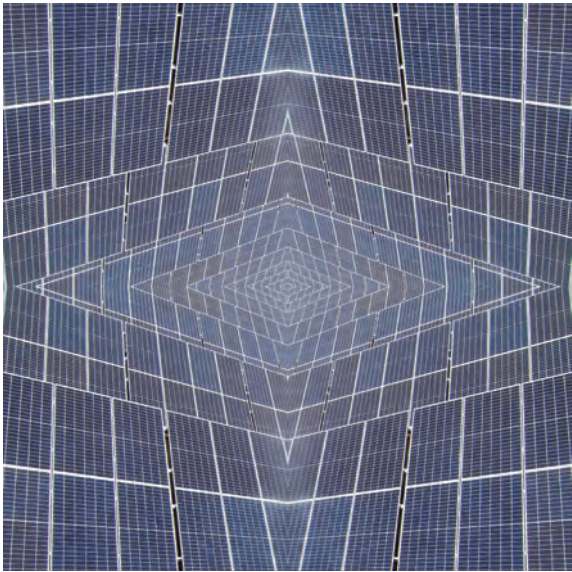
Some observers have already caught on to the link: “Most people have ... only seen declining inflation over the last 30-plus years. So this is going to be a pretty big shock. If our solution is entirely just to get a green world, we’re going to have much higher inflation, because we do not have the technology to do all this yet. That’s going to be a big policy issue going forward too: Are we going to be willing to accept more inflation if inflation is to accelerate our green footprint.”

These are the words of Larry Fink, CEO of BlackRock—the largest investment fund in the world—who clearly outlines a link of which many feign ignorance. In short, after years of trying, perhaps we have found the fuel to ignite inflation. It is green and apparently emission-free.

we

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Three-dimensional rendering on the concept of renewable energy storage. Modern, black solar panels, modular battery energy storage systems and wind turbine systems.

The detail of a photovoltaic solar system. The main mineral used in photovoltaics is silicon.



by Margherita Bianchi
and Lorenzo Colantoni

FUTURE ASIA

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PERSPECTIVES ON CLIMATE AND ENERGY POLICIES ARE MANY AND VARIED ACROSS ASIA. THE EXCEPTIONAL CIRCUMSTANCES OF 2021 MEAN THAT A SERIES OF CHANGES CAN BE INITIATED TO SUPPORT THE TRANSITION AGENDA, STARTING WITH COP26

COP26 IN GLASGOW is an important moment in the fight against climate change; an opportunity to define the latest rules of the Paris Agreement after the slow progress of the past few years, in a year full of events significant for environmental policies, both within and outside The United Nations Framework Convention on Climate Change (UNFCCC). A good part of the results in Glasgow will depend on the ability of states to relaunch their economies with post-pandemic stimulus packages that support the transformation of current development models, the adaptation of infrastructure necessary for the energy transition and green industrial policies.

While in recent times the European Union led by Ursula von der Leyen has significantly accelerated the fight against climate change with the European Green Deal and the Biden administration is slowly trying to rebuild its climate leadership, positive moves by the great and heterogeneous Asian continent remain

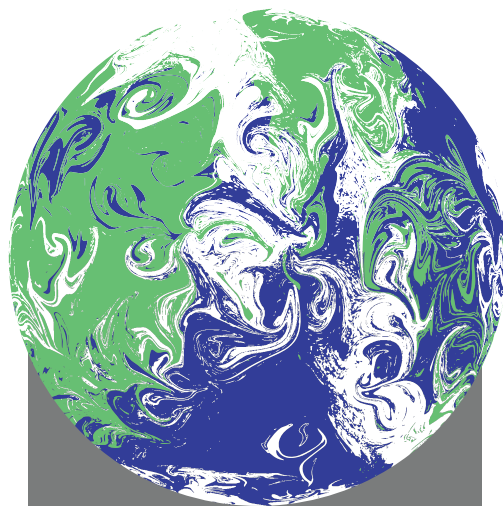
crucial and current steps taken are uncertain. In 2020, China and India accounted for 36 percent of global emissions. It is estimated that China will generate 40 percent of the increase in emissions between 2020 and 2052 in a business-as-usual scenario, and India 15 percent, figures that clearly demonstrate the need for a sharp climate turnaround in Asia in the short, medium and long term.

TRENDS AND REGIONAL CONTRADICTIONS

Asia is at the center of demographic, economic, social, political and energy trends that make sustainable change fundamental for the future of the planet. It is the most populous region in the world, both in absolute terms and in terms of density, with relatively strong growth (+0.92 percent between 2019 and 2020 according to the UN). While this growth remains below that seen in other regions (Sub-Saharan Africa in particular), the growth is combined - differences between countries taken into consideration- with a widespread increase in well-being, consumption and GDP in general (+3.7 percent between 2018 and 2019 according to the World Bank for Asia and Pacific), and that improvement results in an increase in energy demand. This growth is also reflected in emissions, which are rising constantly in the continent (with the exception of the brief pause in the first quarter of 2020), as it is home to some of the “heaviest” emitters in the world in absolute terms: in particular China, India, Japan and South Korea. When compared with the low emissions per capita in some of these countries (still low), these values underline the great potential for increased energy consumption in the future.

Although renewables are now the cheapest option for the greater energy needs in the vast majority of Asian countries, the increase in emissions is exacerbated by the presence of several relatively new coal plants, including some under construction. China, India, Indonesia, Japan and Vietnam alone plan to build 600 coal-fired power plants over the next twenty years, totaling 80 percent of the world's new solid fuel fired capacity, according to Carbon Tracker. Coal is also a strong element of contradiction between the domestic targets that many Asian countries are setting and the consistent flows of foreign investment to the resource. Since 2013, public funding from China, Japan and South Korea has accounted for more than 95 percent of total foreign investment in coal-fired power plants. However, over the course of the year, there have been good signs in this regard: at the Leaders Summit on Climate, South Korea announced its intention to stop investments in coal energy in foreign states and not long after, Japan finally joined the other G7 countries in the pledge to end international coal financing by 2021.

The pandemic also appears to have accelerated long-term efforts in a positive direction, similar to what happened in the United States and, above all, in Europe. In 2020, South Korea launched its own Korean Green New Deal (part of a broader Korean New



TOWARD GLASGOW 2021: ARTICLE 6

Article 6 of the Paris Climate Agreement was designed to allow voluntary international cooperation in relation to climate action. It foresees the possibility for countries to trade emission reductions with one another and could provide the basis for an international carbon market. To date, however, no agreement has been reached on the rules for making this article operational. This issue will be one of the key topics at this year's United Nations Climate Change Conference in Glasgow.

Deal), proposing a target of climate neutrality by 2050, one similar to the target proposed by Japan in its relaunch of investment in renewables largely focused on wind power, a part of the global boom in this resource, especially offshore.

While further clarifications from Asian countries are awaited in terms of the Nationally Determined Contributions (NDCs) they will present ahead of COP26, their stimulus packages are worrying due to the few environmental constraints and the explicit financing of fossil fuels. While the Indonesian package, for example, risks further promotion of agricultural-driven deforestation, the Indian recovery plan combines the promotion of solar energy and reforestation with a USD 5.5 billion investment in coal. China is the most worrying case, as post-pandemic support for its industries has so far not introduced many green constraints and the country's inability to curb investment in fossil fuels in many provinces, such as Hebei, is certainly no help in achieving climate neutrality by 2060, the target announced by Xi Jinping in September 2020. However, these actions contrast with the significant involvement of many of these countries in the energy transition. For example, Beijing has for years been the world's biggest investor in renewables (USD 83 billion in 2019 according to UNEP/Bloomberg, almost double the USD 55.5 billion in the United States and USD 54.6 in Europe) and is also the leading producer of wind infrastructure and solar photovoltaics.

The very strong exposure to extreme weather events, the evident impact of climate change in recent years and the growing risk for the coming decades have resulted in a generally higher awareness of climate risk than in the rest of the world, an awareness revealed in numerous studies, in particular by UN organizations such as ILO and UNDP. This positive outlook in some countries is balanced by climate action that is in some cases lower than that seen in Europe and the United States, due to both a strongly perceived trade-off between growth and sustainability, and the immaturity of environmental movements which are not yet well established in many countries. Xi Jinping's China is trying to tackle this problem by promoting the ethical and philosophical vision of ecological civilization. Other countries, due to the disproportionate effects of global warming, have become the main global spokespersons of certain aspects of the climate negotiations. Think, for example, of Bangladesh and the battle, within COP26, over compensation for the irreversible effects of climate change, referred to as “loss and damage.”

FOR EFFECTIVE MULTILATERAL ACTION

The next COP26 will require a considerable effort by the international community to make progress on the remaining details of the Paris Agreement - unresolved by the previous COP25 in Madrid - and on some issues such as climate finance that are of interest to many Asian states. On many fronts, the Asian coun-



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tries turn up to negotiations with heterogeneous starting positions and interests, starting with the thorny issue of the operationalization of Article 6—seen by some as a source of revenue for adaptation—or the deadlines for presenting the next national targets. In view of the greater long-term commitments presented in recent months by China, Korea and Japan, it is believed that some Asian countries may be more open to discussing issues still on the table, including higher standards of transparency on climate action, usually a priority for the EU and increasingly also for the US now that it has rejoined the Paris Agreement.

Beyond the position on individual negotiations, broad-reaching multilateral climate cooperation action, in particular US-EU-China trilateral cooperation, will be crucial for achieving the major Paris objectives, even if this will increasingly intersect with the geo-economics of individual objectives, especially in trade and technology. In recent years, the race to develop green technologies has already led to competition between powers, in particular involving the EU-US on the one hand, and China on the other. However, the climate dialog with China is slowly bearing fruit despite tensions on various thorny fronts such as the Chinese repression of the Uyghur Muslim minority. US Secretary of State Antony Blinken and EU High Representative for Foreign Affairs and Security Policy Josep Borrell have renewed the US-EU dialog with China, and the Italian G20 presidency's invitation to China and the US to co-chair the working group on sustainable finance is a further attempt to establish stronger foundations for this trilateral cooperation.

Another common factor in EU and US action is the renewed

interest in India; and in May, the EU signed the India-EU Connectivity Partnership with a clear reference to the implementation of the objectives of the 2030 Agenda and the Paris Agreement. The US has also highlighted its desire to collaborate with India in its race for renewables and the decarbonization of the country. In early 2021, the need to improve climate cooperation between the USA and India had been emphasized when in April the US-India Climate and Clean Energy Agenda 2030 Partnership was announced, an agreement which refers explicitly to India's commitment to install 450 GW of renewable energy by 2030.

The points of view and challenges in Asia surrounding climate and energy policies, both before and after the Glasgow Climate Change Conference, are many and varied. While it is clear that the COP will not in itself solve many of the problems and contradictions within and outside the continent, the exceptional circumstances of 2021 mean that a series of fundamental changes can be initiated, including at the tables of COP26, changes that can support the important Asian climate agenda.

we

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Sunset in Calcutta, India. It is estimated that India will generate 15 percent of the increase in emissions between 2020 and 2052 in a business-as-usual scenario.



Immersion of Ganesh, the elephant god revered by Hindus, in the Ganges river. Thousands of Indians participate in the ceremony.



between DEMAND & SECURITY

by Sabrina Moles

ENERGY SECURITY HAS BECOME A PRIORITY FOR THE TEN SOUTHEAST ASIAN COUNTRIES. TO IMPROVE ENERGY SECURITY, THE INTERNATIONAL ENERGY AGENCY AND THE ASEAN CENTER FOR ENERGY AGREE THAT NETWORKING CAN LAY THE FOUNDATIONS FOR A SECURE AND ECONOMICALLY SUSTAINABLE ENERGY SUPPLY SYSTEM

THERE IS NO DOUBT that the Association of Southeast Asian Nations (ASEAN) represents a growing region. It is growing from a demographic point of view, with a population that has nearly doubled in the last thirty years from 350 million to 650 million. It is growing from an economic point of view, with trade in goods reaching a value of USD 2.8 trillion, while foreign direct investments rose from USD 41.9 billion in 2005 to USD 154.7 billion in 2018. These two trends form the basis of the different directions taken on the energy issue in Southeast Asia, with new opportunities and challenges that have—and will continue to have—an impact not only on the region, but also on the entire planet. Although effective energy demand is still low compared to the global average, what is particularly interesting is the time span in which this demand has increased for ASEAN and the effects it could have on future political and economic decisions.

Greater industrial output, expansion of population centers and an increase in the quality of life (from access to safe and high-quality energy sources to the most sophisticated home appliances) are just some of the elements that increase the energy demand in ASEAN countries. The response to this is increasingly immediate needs, which fall mainly under the term “energy security.”

Energy security plays a leading role in the development of modern economies and societies, given that access to energy resources has become the cornerstone of most human activities. Traditional research on energy security usually revolves around nations and their efforts to ensure the required amount of energy at an appropriate price. Energy resources are also a commodity exchanged between countries and often play a key role in shaping diplomatic and commercial relations. Precisely to meet these needs, the same group of the ten nations of Southeast Asia has decided to establish a mechanism for dialog and cooperation called the ASEAN Centre for Energy (ACE).

A HETEROGENEOUS GROUP

In the nations of the ASEAN group, energy demand has grown by 80 percent since the year 2000, but problems have also in-

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creased. The first of these problems concerns continuous access to energy sources, risk free and as cheap as possible for the member states. The geography of the ASEAN countries is extremely varied and the distribution of population is uneven: for some member states, the resources are abundant and not sufficiently exploited, in others creating a widespread basic electricity grid is still a challenge. For example, Indonesia produces 835,000 barrels of oil per day, while in Cambodia only 17.4 percent of the population has access to stable and safe sources of energy for cooking.

The second factor is the nature of the energy mix, i.e., the breakdown of a country's energy demand. A heavy dependence on imports can be a serious threat to national energy security. Furthermore, the type of energy used can play a decisive role in social and economic areas, in terms of public spending on infrastructure and supplies, as well as its impact on the environment and health. Coal, for example, has been the main choice for years because it is abundant and affordable, while green technologies until a few years ago seemed inaccessible because of the huge initial investments which are often described as "sunk costs."

GROWING SECTORS AND TRENDS

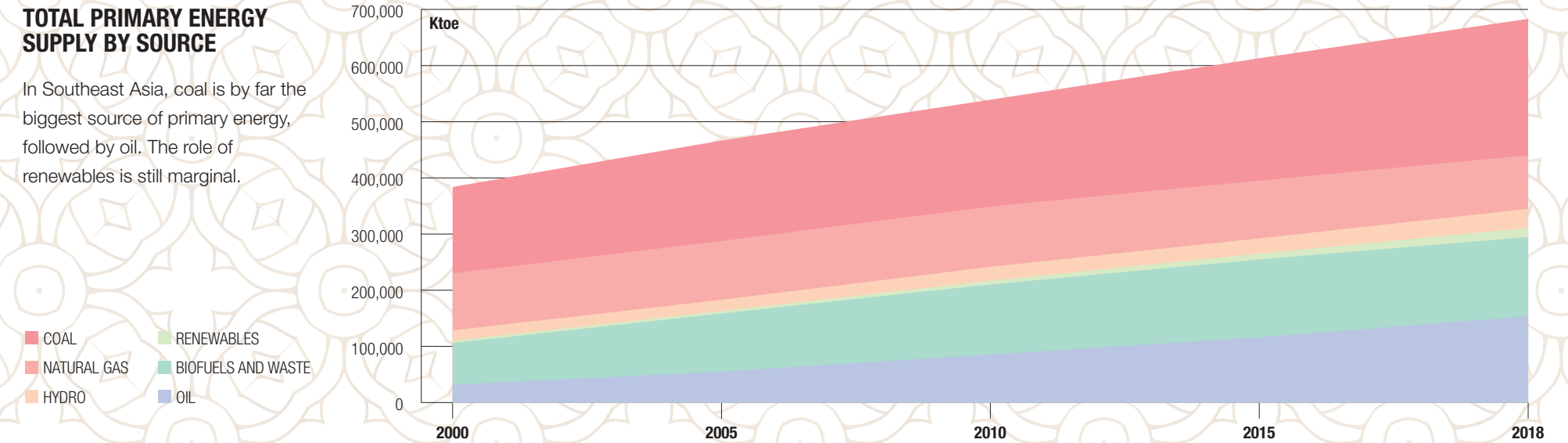
The sectors most affected by energy demand are those that are growing the fastest. Where there is rapid and massive development, reports the International Energy Agency (IEA), the demand for access to greater quantities of electricity is growing dramatically. Industry, transport and construction are among the critical variables in ASEAN energy consumption trends. The most energy-intensive industry (predicted to grow by 70 percent) is manufacturing, with peaks in demand especially in electronics, automotive, chemicals, steel and iron. Transport, on the other hand, now accounts for 50 percent of the energy demand of the ten Southeast Asian countries. According to the latest data, by 2040, ASEAN will reach 200 million tons of oil equivalent (Mtoe), slightly less than Europe, which today requires 289 Mtoe. Finally, the construction sector will grow by 35 percent, and in this case, energy demand will be influenced above all by purchases of household appliances and air conditioners, the latter linked to the history of climate change in the region.

THE ENERGY MIX TODAY AND TOMORROW

Fossil fuels make up over half of the ASEAN energy mix, with fluctuations reaching 80 percent of the total in some years. The percentage occupied by renewables is still low, but, considering the current pro-green energy policies, it could reach at least 40 percent of the energy mix by 2040. Coal consumption doubled between 2000 and 2018 and is now 40 percent of the total source used for the production of electricity. Consumption will continue to grow over the next twenty years, thanks to investments in technologies for what is being called "green

TOTAL PRIMARY ENERGY SUPPLY BY SOURCE

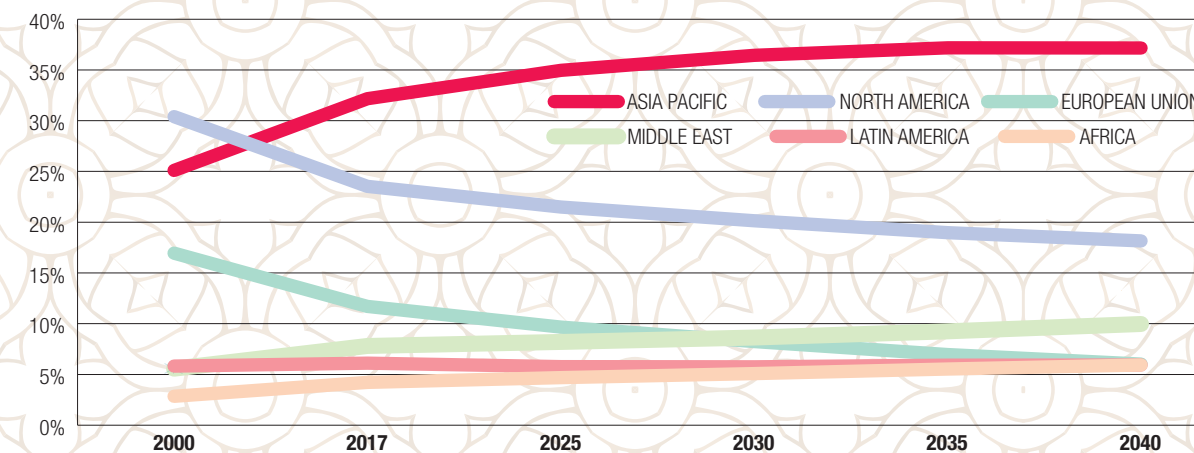
In Southeast Asia, coal is by far the biggest source of primary energy, followed by oil. The role of renewables is still marginal.



ASEAN ENERGY

Source: IEA

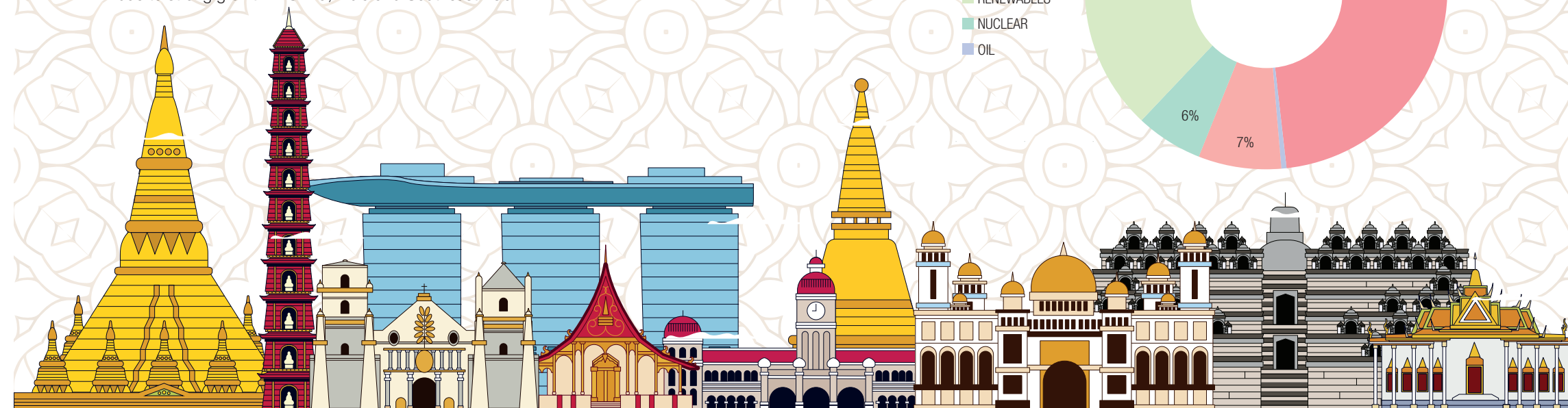
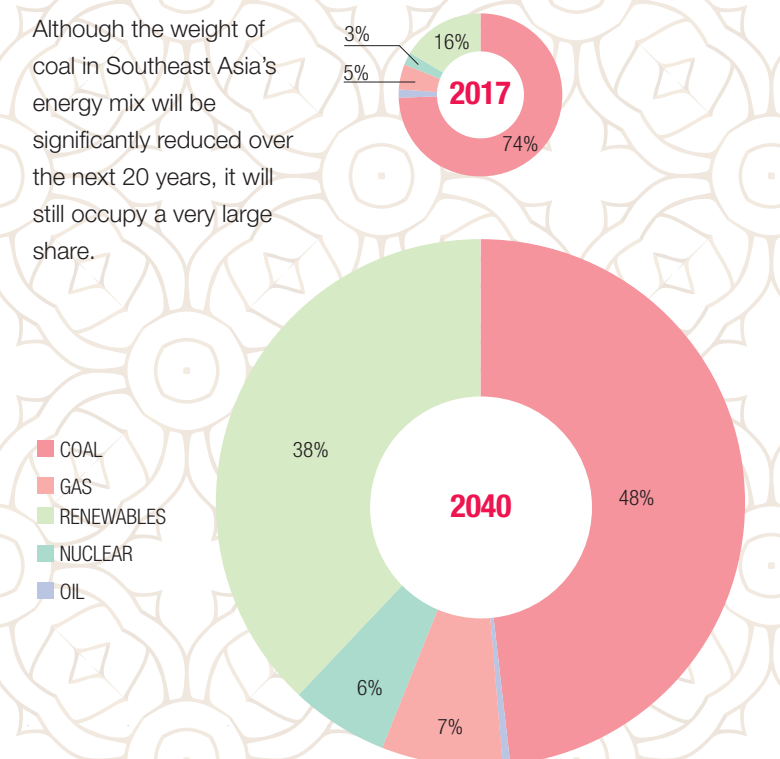
EVOLUTION OF THE REGIONAL SHARE OF GLOBAL OIL DEMAND



Between now and 2040, the Asia-Pacific share of global oil demand is expected to increase to 37% of the total, due to strong growth in China, India and Southeast Asia.

ELECTRICITY GENERATION MIX

Although the weight of coal in Southeast Asia's energy mix will be significantly reduced over the next 20 years, it will still occupy a very large share.





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Cooperation and dialog can play a decisive role in the development of the ten countries of Southeast Asia in terms of energy. In the photo, a temple in Bali, Indonesia.



A view of the skyscrapers in Jakarta, Indonesia.



Fishermen in Prey Veng, in southeastern Cambodia.



The Golden Bridge, in the hills of Ba Na, Vietnam. The bridge is supported by two gigantic stone hands that have an old and worn finish that makes them appear ancient.

producers of biofuels, which are cheap to produce relative to their efficiency. Today, the role of biofuels is brought into question due to the environmental impact of the crops used to produce them, as they are still planted on land reclaimed using “slash and burn,” which destroys the habitat of wildlife and generates carbon dioxide that often affects neighboring countries in the form of toxic fumes.

The drive toward renewable energy in the official statements of the ASEAN countries remains positive and promises to cover 70 percent of the energy mix. This is why the nuclear option makes an appearance. The idea of focusing on nuclear energy as an alternative to the zero emissions goal is very attractive within the ASEAN energy cooperation scheme. Today, none of the member countries has reactors in operation, with the exception of the Philippines, which has one completed plant that has never been put into operation. However, the optimism toward the high efficiency of nuclear energy is dampened by the initial costs for plant construction, as well as by the challenges related to public acceptance of nuclear power and the level of technical knowledge available in each country. This is why, in March 2021, ACE signed a Memorandum of Understanding with the World Nuclear Association (WNA) to cooperate at group level on the issue.

ENERGY FOR THE ASEAN OF TOMORROW

Given its fundamental role and the mobilization of resources it requires, energy has become one of the priority issues on the ASEAN agenda. In this area, cooperation and dialog can play a decisive role in the development of the ten countries of Southeast Asia. To improve energy security, the IEA and ACE agree that networking can serve to lay the foundations for a secure and economically sustainable energy supply system. The proposals on the table include regional import schemes where fossil fuel storage and transport capacity is lacking. Work on the distribution of electricity is also of primary importance, and it already counts for more than half of energy investments. It is also important to specify that in Southeast Asia, the goal is not only to reach all families, but also to prevent and limit damage: Asia-Pacific is among the regions most exposed to natural disasters, with UN forecasts estimating at least USD 160 billion in losses per year by 2030.

we

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HYDROBOOM

by Valerio Bordonaro

HYDROPOWER IS AMONG THE PRINCIPAL POTENTIAL SOURCES OF CLEAN ENERGY IN SOUTHEAST ASIA, IN ADDITION TO GEOTHERMAL AND BIOENERGY. HYDROPOWER PLANTS HAVE BEEN THE MAIN DRIVER OF GROWTH IN RENEWABLES IN THE REGION

THE DEVELOPMENT of renewable energies is a challenge for countries in Southeast Asia, one of the regions of the world worst affected by climate change. It is therefore of primary importance that governments in the region pursue sustainable development and abandon fossil fuels as soon as possible. The regional geography plays a strategic role, as its river basins make the development of hydropower an attractive prospect. However, a trade-off on the regional political agenda cannot be ignored: in addition to adopting more virtuous energy policies, Southeast Asian economies need to support the growth of thriving emerging markets. The spread of well-being among local populations has led to an increase in energy demand, which in

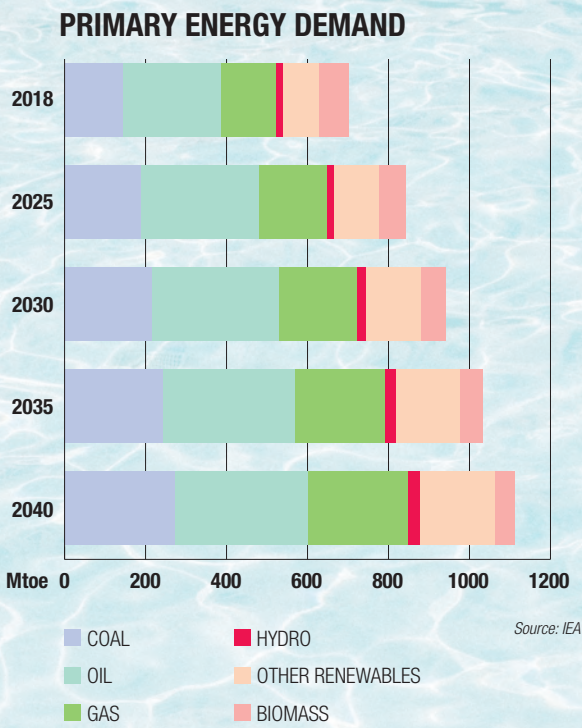
recent years has surged dramatically, growing at twice the rate of the global average. According to the International Energy Agency (IEA), Southeast Asia will have a strong impact on global energy trends, in part due to its enormous demographic potential. Even if hydropower is a significant resource for satisfying energy demand and sustainable development requirements, diversification of the regional mix without compromising economic development will involve addressing a combination of economic, social and environmental issues.

THE ENERGY MIX AND RENEWABLE ENERGY SOURCES

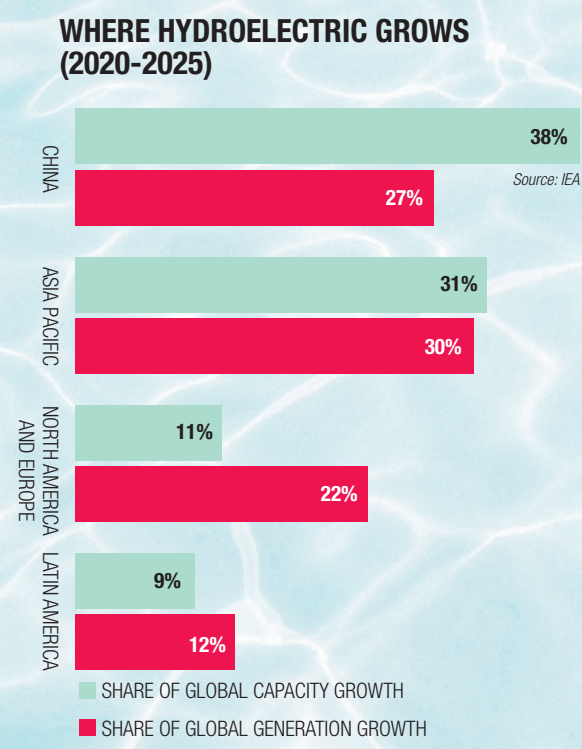
The growing demand for energy in Southeast Asia includes both

fossil fuels—which account for more than half of the regional energy supply—and renewable energy sources, depending on each country's energy mix. At the regional level, coal and natural gas sustain the demand for electricity generation and oil the demand for transport. Hydropower is among the principal potential sources of clean energy in the region and is associated with geothermal energy and bioenergy. According to a 2018 report by the International Renewable Energy Agency (IRENA), renewable energy sources in 2015 accounted for 17 percent of the region's total electricity production, with hydropower as the leading sector with over three-quarters of the renewable energy produced. Hydropower plants have been the main driver of

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In Southeast Asia, the demand for hydroelectricity by 2040 will be almost double that registered in 2018 (from 16 to 31 Mtoe).



Over the next 5 years, most of the growth in capacity and power generation in hydroelectricity will occur in Asia. In particular Southeast Asia will account for 31% of the growth of capacity worldwide and for 30% of the power generation growth.

growth in renewables in the area. Between 2000 and 2016, according to the report, the region's hydroelectric capacity grew from nearly 16 GW to 44 GW, with the coastal countries of the Mekong basin, Cambodia, Laos, Myanmar and Vietnam leading the way. Vietnam has also made huge investments in the hydropower sectors of neighboring countries for export purposes. Overall, power generation in 2015 included natural gas (41 percent), coal (33 percent) and hydropower (16 percent). The increase in economic well-being in Southeast Asian countries was the main growth factor for regional energy demand. According to IRENA, between 1995 and 2015, energy consumption grew at a rate of 3.4 percent per year, an increase driven by rising incomes. The report predicted that energy demand would grow an average of 4.7 percent annually by 2035. Furthermore, economic growth goes hand in hand with energy security: if, to support demand, most of the emerging economies rely on the import of energy sources such as oil and gas, supply is an issue of strategic importance. Many of these resources arrive in Southeast Asia through the Straits of Hormuz and Malacca. In the case of oil, dependency on imports will exceed 80 percent in 2040, up from 65 percent in 2018, according to the IEA. For this reason, Southeast Asian countries are urged to build regional energy security networks, and the Association of Southeast Asian Nations (ASEAN) is, in this regard, a hub of inestimable importance. Moreover, in addition to not being an infinite source of energy, fossil fuels are also responsible for climate change and environmental deterioration. These considerations open the way to energy diversification and are linked to the enhancement of renewable energy sources in the regional energy mix. The result combines sustainable commitment and social and economic advantages for indigenous populations.

THE REGIONAL POTENTIAL OF HYDROPOWER

In 2018, the IEA reported that 18 percent of Southeast Asia's energy comes from the hydropower sector, an advantage that enables energy production both on a large and small scale. Small scale projects, those independent of the national electricity network (off-grid), can be implemented with lower start-up costs and are considered the optimal solution for rural areas, where electrification is still a challenge. In addition to being very expensive, hydroelectric power also requires significant technical and logistical resources. According to the Alliance for Rural Electrification, the competitive advantage of hydroelectric power lies in the fact that, unlike fossil fuels, it has a carbon footprint close to zero. Combined with these rural electrification systems, this energy source could prove an optimal solution to meet growing regional demand and at the same time promote the sharing of the benefits of economic growth with rural Asia. When it comes to hydropower in Southeast Asia, the debate revolves around the strategic importance of the Mekong, one

of Asia's largest rivers. Starting from the Tibetan Plateau, the Mekong crosses southern China, Myanmar, Laos, Cambodia and Vietnam and is an irreplaceable source of food, water, income and energy for local populations. The Mekong River Commission predicts that the demand for energy with regard to the Lower Mekong Basin (LMB) will grow by 6-7 percent a year, thanks to increased investment in electricity infrastructure. Dams are constructed to generate hydroelectric power, and have lower operating costs compared to the infrastructures used for the production of other types of energy. According to the Alliance for Rural Electrification, those places where the river meets steeper points generate even more energy. That is why countries such as Laos have dozens of hydropower plants and can achieve a total hydropower capacity of 7 GW. Dams are used to control water flow, store energy potential and could play a crucial role in water supply, although most of the projects in progress have been slowed or suspended due to last year's health crisis. There are a number of social and environmental costs associated with building this infrastructure on river basins. Although they are designed to generate clean energy and start regional economies on the path to sustainable development, the dams built along the rivers can cause irreparable damage to the river itself, its fauna and to local communities whose livelihoods depend on river resources. There is a price to pay for damming water courses, as it stops the flow of nutrients essential for the well-being of ecosystems and obstructs fish migration. Indigenous communities also have to deal with the danger of flooding, which can cause damage to local social and economic systems. The hydropower sector can thus involve the risk of deteriorating the same environment that renewables would like to protect.

ADVANTAGES AND DISADVANTAGES OF HYDROPOWER

According to the Mekong River Commission, there are advantages and disadvantages to hydropower in Southeast Asia. While on the one hand, the Commission estimates that the sector could record economic gains of over USD 160 billion by 2040, involving the development of other sectors, including agriculture—linked to food safety and reduced poverty—there are a number of dire consequences related to its development. The Commission notes that the decline in fishing could cost nearly USD 23 billion by 2040, and the loss of forests, wetlands and mangroves could cost up to USD 145 billion. This development would also be at the expense of rice farming along the Mekong, a source of livelihood for indigenous communities. Some experts believe that the use of energy agreements could be a solution, as it would reduce the number of dams needed to meet regional demand. ASEAN plays a fundamental role in this solution, for the ASEAN Power Grid is an infrastructure project designed to connect the area's economies by creating an integrated electricity grid. The idea was first discussed in the 1990s




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and is still under development. The initiative aims to meet the growing demand for electricity and improve access to energy services in the region—to date six bilateral interconnections have been made, linking Singapore and the Malay Peninsula, Thailand and Peninsular Malaysia, Thailand and Cambodia and finally Laos and Vietnam. According to some observers, this will allow the main sources of energy demand (first of all, cities) to be connected to multiple production sites, and it is hoped that this will reduce the pressure on river basins and associated risks. The regional cooperation promoted by ASEAN could thus be a solution to the eternal trade-off between economic growth and environmental protection and mitigate the risks associated with

hydropower, an invaluable resource given the peculiar geography of the region.

we

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 Magat Dam, a stone dam on the island of Luzon Philippines, is one of the largest in the country. It is mainly used for power generation through the Magat hydroelectric power station. The water stored in the reservoir is enough to provide about two months of normal energy requirements.

 Aerial view of Mekong River and the forest, Thailand.



THE INCREASINGLY AMBITIOUS CLIMATE GOALS ANNOUNCED BY XI JINPING ARE IN CONFLICT WITH CHINA'S QUEST FOR SELF-SUFFICIENCY IN LIGHT OF INCREASED COMPETITION WITH THE US

CHINA'S "DUAL" STRATEGY?

by Alicia Garcia Herrero

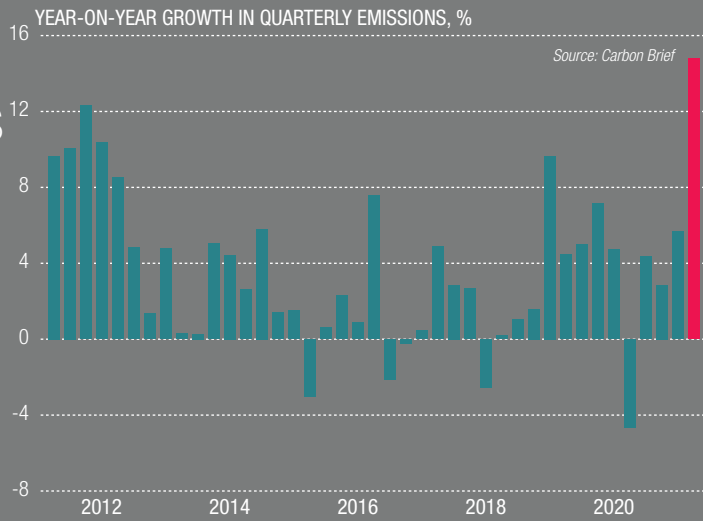
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AS THE WORLD'S largest greenhouse-gas emitter (its share of total emissions is 27 percent), China's decisions regarding its carbon neutrality strategy affect the whole world, in some cases even more than each country's own decisions. In fact, China's policies will make or break the global quest for climate neutrality by the middle of the century. Consequently, President Xi's announcement last September about emissions peaking before 2030 and achieving carbon neutrality by 2060 was welcomed. Some details of how China might approach its targets were provided at the December 2020 Climate Ambition Summit with preliminary elements of the new Nationally Determined Contribution that China is due to submit—like all other Paris

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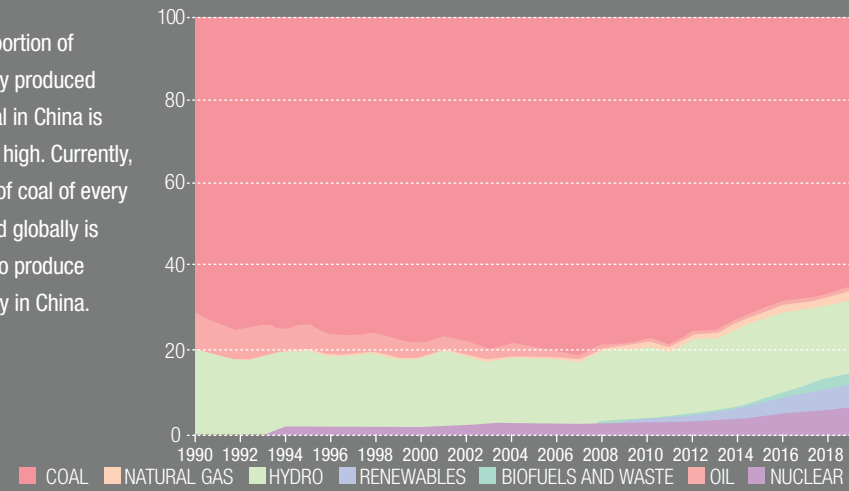
THE RACE TO ZERO EMISSIONS

In the first quarter of 2021, China's carbon dioxide emissions grew at the fastest pace in over a decade, increasing by 15 percent year-on-year.



ELECTRICITY GENERATION BY SOURCE

The proportion of electricity produced from coal in China is still very high. Currently, one ton of coal of every four used globally is burned to produce electricity in China.



Agreement signatories—ahead of COP26 in late 2021. At this event, President Xi stated that China would aim by 2030 to cut carbon intensity per unit of GDP by more than 65 percent from 2005 levels (compared to the existing target of 60d-65 percent by 2030) and would increase the share of non-fossil fuels in energy consumption to 25 percent by 2030 (compared to the existing target of 20 percent).

These targets are not path-breaking and raise doubts about the feasibility of China peaking its emissions before 2030 and securing carbon neutrality by 2060. Furthermore, China's continuing investments in coal, from which more than 70 percent of China's electricity is generated, reinforce those doubts. In fact, instead of cutting its reliance on coal, China put 38 gigawatts (GW) of new coal-fired power capacity into operation in 2020, equal to the entire coal-fired power generation capacity currently installed in Germany. While one could argue that the pandemic made 2020 a difficult year for China to focus on climate goals, it remains to be seen when and how China will reveal how it intends to peak emissions by 2030 and achieve carbon neutrality by 2060.

THE 14TH FIVE-YEAR PLAN

The most obvious place to look for such information is China's 14th Five Year Plan (FYP), which was announced at the National People's Congress in March 2021. Five Year Plans are the main guiding force behind policy in China at all levels of government. Unfortunately, on climate measures, the 14th FYP fell short of offering enough detail on how the previously mentioned targets may be achieved. In fact, the FYP only outlines a continuation of existing trends, rather than an acceleration of climate action. Strongly focused on the development of the manufacturing sector (notably through strict targets on state-led innovation), the plan mentions neither a coal cap nor an emissions cap. It should also be noted that the 14th FYP makes

several references to the development of coal, emphasizing its "clean and efficient utilization."

The lack of emphasis on climate change targets does not come in a void. In fact, it goes hand in hand with the FYP's strong orientation towards ensuring China's self-sufficiency in the context of an increasingly hostile external environment and, in particular, US-China strategic competition. The most important landmark for China's quest for self-sufficiency is the dual circulation strategy. Circulation refers to the production and consumption of goods and services. The first circulation in the dual formulation is about maintaining integration with the rest of the world. The second circulation, in the consensus view of economic observers, centers on increased reliance on domestic demand and reducing economic dependence on the rest of the world. This runs counter to the idea of reducing emissions, as with this approach China needs to step up its own production, and it is difficult to do so while reducing emissions.

But it's not all bad news. One factor that can help is population aging, which should naturally reduce the demand for goods and services and, thereby, emissions. The new policy to allow for a third child might slow ageing and thereby make it harder to achieve emissions targets, other things being equal.

While climate change targets remain difficult, especially when linking it to the dual circulation strategy, China has recently announced that peak installed coal-fired power capacity will reach 1,150 gigawatts by 2025 from 1,095 gigawatts in 2020. This suggests that China is on track to reach peak coal consumption target by 2025, in line with President Xi's commitment made at the UN. To achieve this target, though, more stringent measures to cut emissions within the period of 2021-2025 are expected, both at central and local levels. However, China's recent economic history shows that local governments push for higher rather than lower growth and would hamper progress in cutting carbon emissions.



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Notwithstanding the "coal cap" by 2025, China is more likely to take a phased approach to a carbon-emissions market along with its carbon-trading scheme. The carbon-trading system has a limited initial scope as the economic planning office prioritizes economic growth rather than climate targets, and this could be a headwind for output growth in the short term.

AN UNCERTAIN PATH

All in all, China's climate targets are important both for China and the whole world. Without China's full commitment to carbon neutrality, there is not much the world can do that will achieve its climate change targets. This is simply because of China's major role in emissions. China has so far offered a 2060 target to become carbon neutral, which is welcome, but it is hard to see how such a target will be achieved as the short-term targets are ill-defined. Most importantly, the recently announced 14th Five Year Plan does not pay enough attention to

climate change targets while it focuses on China's desire for self-reliance. The latter is hardly a positive factor for climate change objectives as it basically implies that more of the value added is to be produced in China. Finally, as China's labor force continues to shrink, this should help climate change targets, but it seems difficult to believe it will be enough. Clearly, more than a stagnating—if not shrinking—population is needed to mitigate climate change and only China holds the key for such an endeavor.

we

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Cars on the bridge above the Huangpu River in Shanghai, China.



China aims for self-sufficiency with the "dual" circulation strategy. The first "circulation" is about maintaining integration with the rest of the world. The second "circulation" centers on increased reliance on domestic demand and reducing economic dependence on the rest of the world. In the photo, the port of Yantian, in Shenzhen, China.

GREEN REVOLUTION

RESPONDING TO CLIMATE CHANGE HAS BECOME CHINA'S BIGGEST CHALLENGE IN IMPLEMENTING SOCIALIST MODERNIZATION, BUT IT IS ALSO THE COUNTRY'S GREATEST OPPORTUNITY TO MODERNIZE ITS INDUSTRY AND ECONOMY

by Lifan Li

THE WORLD HAS ENTERED the era of global climate change, which has become the biggest non-traditional security challenge facing human development. In November of 2021, the United Nations Climate Change Summit, COP26 will be kicking off in Glasgow. It will surely become the focal point of global “green diplomacy.” As the world’s most populous country, China is also the world’s largest carbon emitter. China has made commitments on the issue of carbon neutrality. Will these promises change and will the goals be achieved? What are the paths to realizing those goals? Which are the biggest obstacles and challenges ahead?

CHINA'S COMMITMENTS ON REDUCING CARBON EMISSION

On September 22, 2020, Chinese President Xi Jinping announced at the 75th United Nations General Assembly that China will strive to reach peak carbon dioxide emissions by 2030 and achieve carbon neutrality by 2060. China has put forward the idea of promoting the green recovery of the world economy in the Post-COVID-19 era, and bringing together a strong force for sustainable development.

This is the first time that China has proposed the goal of achieving carbon peaking and carbon neutrality, which has attracted great attention from the international community. Since China is the world’s largest carbon emitter, accounting for 28.8 percent

of the world’s total energy carbon emissions, it plays a vital role in global carbon peaking and carbon neutrality.

FROM RELATIVE EMISSION REDUCTION TARGETS TO ABSOLUTE EMISSION REDUCTION TARGETS

Traditionally, China has the advantage of a nationwide system to do big things. China has set an example in responding to COVID19: exerting collective strength, embodying organizational capacity, and implementing promised goals, which have all demonstrated China’s efficiency. It will also need to be realistic and scientifically grounded to achieve the goal of carbon neutrality.

China’s commitment to carbon neutrality has a clear historical context. In September 2009, when Former Chinese President Hu Jintao attended the United Nations Climate Change Summit, he proposed that the country strive to achieve a 40-45 percent reduction in carbon dioxide emissions per unit of GDP by 2020 compared to 2005. Fossil fuels account for about 15 percent of primary energy consumption. Forestation has increased by 40 million hectares since 2005, and the forest stock volume has increased by 1.3 billion cubic meters. This means China committed to vigorously develop a green economy, a low-carbon economy and a circular economy.

In November 2014 and September 2015, President Xi Jinping and U.S. President Barack Obama twice issued joint statements



on climate change, announcing their respective actions to address climate change after 2020. In November 2015, at the summit of the 21st United Nations Climate Change Conference (COP21), President Xi explained his expectations and views on the Paris Agreement and global governance. He said that carbon dioxide emissions will peak around 2030 and that China would strive to reach the peak as soon as possible. He held that carbon dioxide emissions per unit of GDP will be reduced by 60-65 percent compared with 2005, and the proportion of non-fossil energy in primary energy consumption will reach about 20 percent. Finally, he reported that the amount of forest stock will increase by about 4.5 billion cubic meters from 2005.

Developed countries have chosen 2050 as the time node, an easier timeframe for them than for countries not as far along on the path to development and thus not yet at peak carbon emissions. However China has made a political commitment to achieve carbon neutrality by 2060 before reaching the peak of carbon emissions.

Moreover, political commitment depends on the country's governance practices. By 2019, China's carbon dioxide emissions per unit of GDP had dropped by approximately 18.2 percent and 48.1 percent compared with 2015 and 2005, respectively, the latter figure exceeding China's commitment to the international community to reduce 40-45 percent by 2020 compared with 2005. China reversed the rapid growth of greenhouse gas emissions, significantly exceeding the 20 percent decline in India's carbon intensity over the same period. In addition, the proportion of non-fossil energy in primary energy consumption in China increased from 7.4 percent in 2005 to 15.3 percent in 2019, while the proportion of total renewable energy consumption in the world has increased from 2.3 percent in the same period. 22.9 percent of the country's area being forests has exceeded the proportion of the United States (20.1 percent); the forest area has increased by 45 million hectares from 2005, and the forest stock has also increased by 5.1 billion cubic meters. These achievements indicate that China's commitments can be basically realized on the whole.

CHINA'S PLAN AND DEVELOPMENT STAGE FOR ACHIEVING CARBON PEAKS

In the nearly 40 years between now and 2060, China's emission reduction has more opportunities than challenges, and it is more capable of turning the biggest challenges into the biggest opportunities. China will implement the "two-step" strategic vision of carbon peaking and carbon neutrality, forcing the country to carry out reforms and realize the green industrial revolution. China's mid-term goal of reaching carbon peaks by 2030 and the ultimate goal of achieving carbon neutrality by 2060 are phased targets. The binding targets and indicators proposed for each phase after decomposition are mainly reflected in following four phases.



● THE FIRST STAGE (2021-2030): The core goal is to achieve carbon peaks and shift from a high-carbon economy to a low-carbon economy. By 2030, the carbon dioxide intensity of China's GDP will be reduced by 65-70 percent compared to 2005, with an average annual rate of decline of 4.5-5.0 percent; in 2030, non-fossil energy will account for 50 percent of total electricity. The proportion of primary energy consumption is about 25 percent; the annual reduction rate of carbon dioxide intensity per unit of energy consumption has risen from the current 1.2 percent to about 2.0 percent; at the same time, the shift from high-carbon energy (mainly coal consumption) to low-carbon energy (the proportion of



Farmers pray for a favorable climate and a bumper crop before starting the tea leaf picking in Dazhou, in the Chinese province of Sichuan.



Aerial shot of green rice terraces in Guizhou, China.

coal consumption has significantly declined), from high-carbon industries (things such as steel, building materials, non-ferrous metals, and petrochemicals) to low-carbon industries (strategic emerging industries), from a high-carbon economy shift to a low-carbon economy, as well as from a high-carbon society to a low-carbon society.

● THE SECOND STAGE (2031-2040): The core goal is a substantial reduction in carbon emissions. China has basically realized a low-carbon industrial economic and social system. With the adjustment of the international economic structure and the development of a low-carbon economy, the world is entering a new energy transition period at this time. The

global energy landscape from 2031 to 2040 will be a critical stage for testing the results of the energy transition.

- THE THIRD STAGE (2041-2050): The carbon emissions of major industries, especially energy, are reduced to zero. The recent prediction made by Tsinghua University holds that China can achieve its greenhouse gas emission peak before 2050. The Energy Transition Commission report predicts that China's total energy consumption by 2050 will be 2.2 billion tons of standard coal, nearly 30 percent lower than the 2016 level; power generation will increase from the current 7 trillion kilowatt-hours to 15 trillion kilowatts in 2050. Zero emissions can be achieved at about this time; of which, direct industrial electrification accounted for 52 percent, direct building electrification accounted for 21 percent, direct transportation electrification accounted for 9 percent, and hydrogen production and ammonia synthesis accounted for 18 percent. This marks the realization of a green industrial revolution in China.
- THE FOURTH STAGE (2051-2060): We achieve the goal of carbon neutrality and basically build a zero-carbon industry, a zero-carbon economy, a zero-carbon society, and a zero-carbon country.

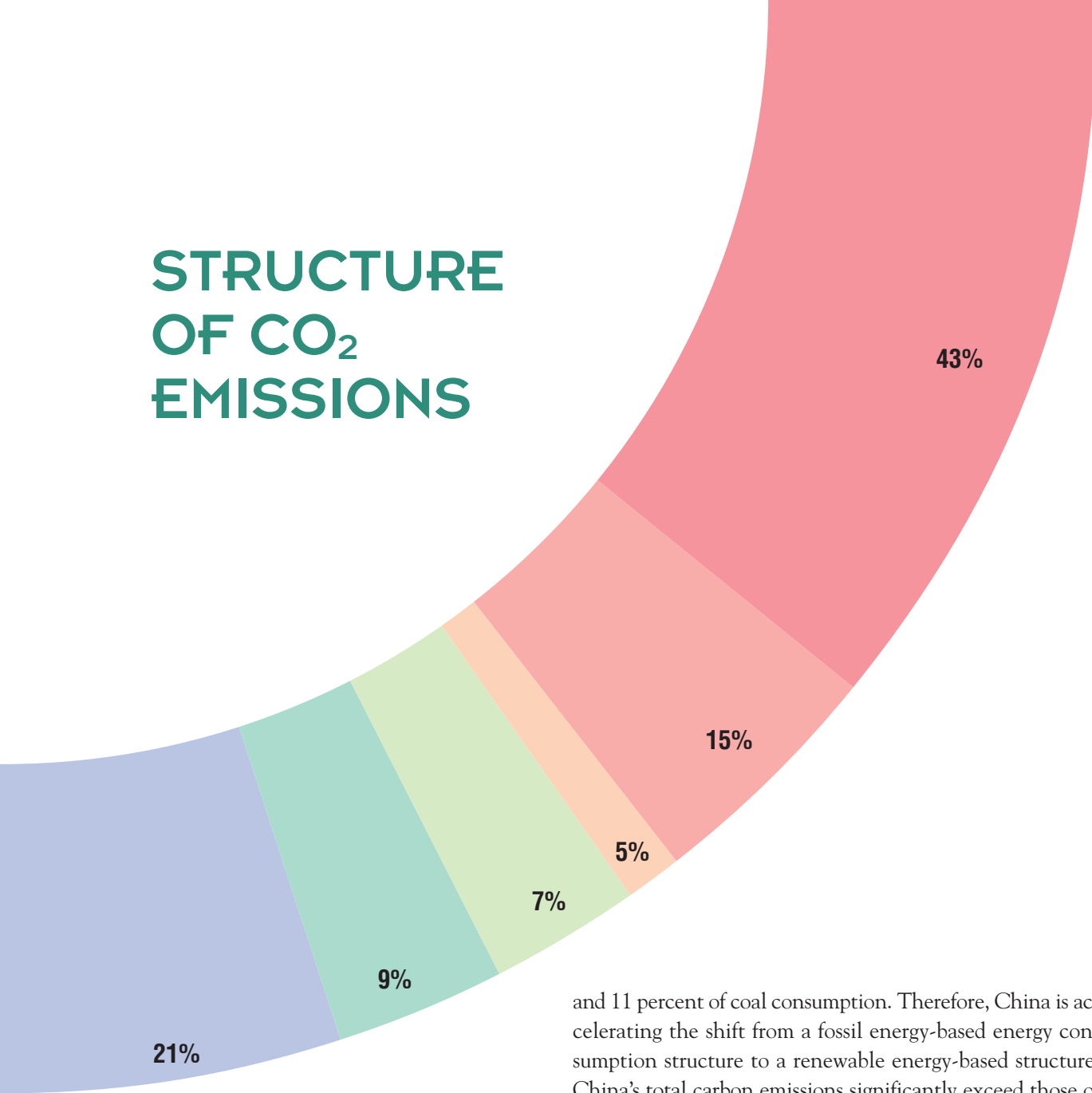
Therefore, for China to realize its emission reduction commitments and targets, it will need at least four ten-year stages, and eight five-year plans to achieve the binding targets of carbon peak, carbon reduction, and carbon neutrality, which can be gradually distributed and implemented locally, from the production side to various departments, industries, large and medium-sized enterprises, etc., from the demand side to the consumer.

CHALLENGES OF THE ENERGY INDUSTRY: EMPTY TALK OR COMPREHENSIVE REFORM

China's carbon emission structure is mainly thermal power (43 percent), oil (15 percent), natural gas (5 percent) and steel (9 percent). Traditional energy has become the main carbon emission industry. As the largest carbon emission company in China, CNPC ranks 11th among global energy companies in terms of carbon emissions, at about 1.17 percent. Its carbon peak plan has proposed the goal of achieving carbon peak in 2025 and carbon neutral by 2050, but it will be difficult to implement this target. The energy industry supports the rapid development of China's economy, but under the pressure of climate change commitments, it has carried out unprecedented reforms. It is facing tremendous reform pressure and affecting China's economic development.

● CHALLENGE 1. Under international pressure, can new energy dominate China's energy market in the future? China is dominated by fossil energy, which is as high as 85 percent in 2019, of which coal consumption accounts for 58 percent and oil consumption accounts for 19 percent; while the United States and the European Union account for only 12 percent

STRUCTURE OF CO₂ EMISSIONS



■ THERMAL POWER
■ OIL
■ NATURAL GAS
■ CONCRETE
■ STEEL
■ OTHER

Source: WIOD database. Data for China, 2018.

and 11 percent of coal consumption. Therefore, China is accelerating the shift from a fossil energy-based energy consumption structure to a renewable energy-based structure. China's total carbon emissions significantly exceed those of Europe and the United States. As China's carbon emissions inventory is too high (energy carbon emissions in 2019 were as high as 9.8 billion tons of carbon equivalent), to achieve a reduction in carbon emissions or even zero emissions, the total base is large, the technical difficulty is high, and the time left is tight.

- CHALLENGE 2: Is the goal too high and too fast? China is a developing country with a large population. The next five years will be an important window for achieving carbon peak and carbon neutrality. China's total energy demand and CO₂ emissions will continue to increase. China is the world's largest developing country. Over the past 40 years of reform and opening up, the economy has continued to grow rapidly. In 2019, China's nominal GDP totaled 98.65 trillion RMB, making it the world's second largest economy, but its per capita GDP has just exceeded 10,000 US dollars, and in 2019, China's total energy consumption was 4.835 billion tons of standard coal, and CO₂ emissions were 9.826 billion tons. Different industries will also affect the timetable for car-

bon emission reduction. For example, at present, China's construction sector carbon emissions are about 2 billion tons per year, accounting for about 20 percent of the country's total carbon emissions. If the current building energy conservation policy standards are maintained, the peak time for carbon is expected to be around 2038, which is significantly behind the peak time for total national carbon emissions.

- CHALLENGE 3: China and Western countries are at different stages of economic growth. If the world GDP growth rate (3.5 percent in 2009-2019) is used as the relative standard, EU countries belong to the low-speed type (1.6 percent in 2009-2019), and the United States has a medium-low speed (2.6 percent in 2009-2019), while China is a high-speed (7.7 percent in 2009-2019). Objectively speaking, the continuous growth of China's energy consumption is inevitable. China needs green energy innovation, and renewable energy growth is significantly higher than economic growth. From 2008 to 2018, China's average annual growth rate of renewable energy consumption reached 33.4 percent, setting a world record, equivalent to 4.18 times the average annual GDP growth rate (8.0 percent). Therefore, China needs to make the development of green energy a top priority as it enters a phase of medium-to-high-speed growth. This is not only an important source of economic growth, but also the most important measure to achieve carbon peaks. It has also become an important basis for tax reduction, tax exemption, and carbon trading for green energy.
- CHALLENGE 4: China and Western Countries have different industrial structures. In 2006, the added value of the service industry accounted for 63.7 percent of GDP when the EU carbon peaked; in 2007, the added value of the service industry accounted for 73.9 percent of GDP when the US carbon peaked. On the one hand, the proportion of China's service industry's added value in GDP has risen from 53.9 percent in 2019 to about 62 percent in 2030, which is lower than the EU and the United States; on the other hand, even by 2035, the proportion of China's service industry's added value will be able to reach about 65 percent. In 2006, the EU's manufacturing value added accounted for 15.8 percent of GDP; in 2007, the US manufacturing value added accounted for 12.7 percent of GDP. In 2019, the added value of China's manufacturing industry accounted for 27.2 percent of GDP, and it will still be around 22 percent by 2030. The demand for energy consumption is large and the proportion is high; in addition, in 2017, industrial energy consumption accounted for the proportion of the country's total 65.6 percent of GDP, which is significantly higher than the 33.1 percent of industrial added value in GDP (data in 2017), which is equivalent to two times the energy consumption per unit of GDP in the country (1.98 times in 2017). This not only reflects the high proportion of China's industrial and manufacturing produc-

tion structure, but also the high energy consumption per unit of value-added industry and manufacturing, and therefore has become the top priority of energy conservation and emission reduction in the country. This indicates that China will face a 40-year period to reduce 57.6 percent of coal and 85.1 percent of fossil energy carbon emissions to a level that can neutralize carbon sinks (including carbon removal).

- CHALLENGE 5: Various uncertainties about the level of government support and the intensity of industry implementation. The development of enterprises and changes in the pattern of industry will affect China's commitments. For example, from the general laws of developed countries, the carbon peak time of the transportation industry often lags behind a country's overall carbon peak time. Taking into account China's population, development speed, economic scale, and resource endowments, the difficulty may be further increased. In addition, the implementation of enterprises is affected by government policies and support. The uncertainty in the future has increased significantly.

Unlike the major energy companies in Europe, China's three major energy companies (CNPC, Sinopec, CNOOC) have not come up with specific carbon neutrality plans, nor phased implementation plans.

THE GENERAL TREND OF THE ENERGY REVOLUTION

Achieving carbon peak and carbon neutrality is essentially an unprecedented green industrial revolution. It is the general trend of the green energy revolution in the 21st century. It requires a continuous green reform, which is bound to touch and affect the short-term energy-intensive industries. Benefits and the "performance theory" of local governments may be a "Mission Impossible" in the short term, but national commitment is one of China's international responsibilities, and China will certainly make efforts. At the same time, it is also necessary to further explore the main ways to achieve the above goals, which requires the resolution of alternatives, the cost of transformation, the means to overcome, and the willpower to achieve the promise. Responding to climate change has become the biggest challenge for China to basically realize socialist modernization, but it has also become the biggest opportunity for my country to realize green industrialization, clean energy, urbanization, and agricultural and rural modernization.

We

LIFAN LI

He is associate research professor at the Shanghai Academy of Social Sciences and Secretary General of Center for Shanghai Cooperation Organization Studies.



View of Shanghai, China. Shanghai, on the central coast of China, is the largest city in the country, as well as a financial hub of global importance.



TOKYO STORY

PHOTOALLERY

📷 Laura Liverani is a documentary photographer who divides her time between Italy and Japan. Her work has appeared in festivals and solo exhibitions around the world. Her reports have been published in *The Guardian*, *Washington Post*, *D Repubblica*, *Marie Claire* and *Geo*. Her long-term project on the Ainu, the indigenous people of northern Japan, won the Voglino Prize in 2015. Today Laura is part of the international agency Propekt. Photographers and teaches photography in Italian and foreign universities.

STARTING WITH THE ANNOUNCEMENT THAT JAPAN WOULD HOST THE 2020 OLYMPIC GAMES, TOKYO BEGAN TO UNDERGO A PROFOUND TRANSFORMATION; SLOWLY AT FIRST, THEN ACCELERATING.

THE MOST EVIDENT CHANGE, IN ADDITION TO THE OLYMPIC CONSTRUCTION SITES DOTTED AROUND THE CITY, CONCERNED THE CITY CENTER: AROUND THE TOKYO STATION, IN SHINJUKU AND SHIBUYA, HUGE NEW COMMERCIAL COMPLEXES APPEARED THAT CHANGED THE SKYLINE.

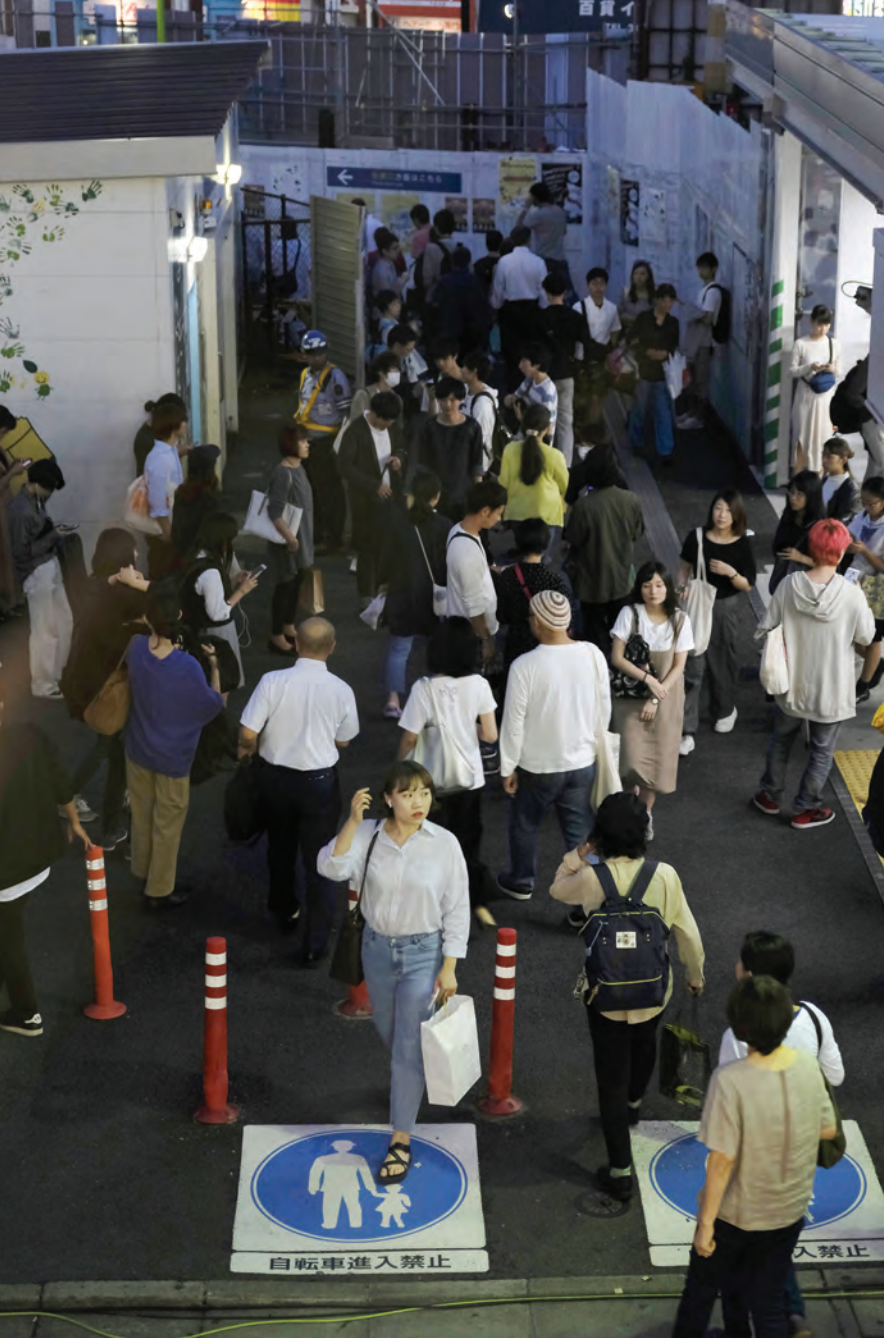
THE IMAGES PUBLISHED IN THESE PAGES SEEK TO CAPTURE THE SIGNS OF THIS TRANSFORMATION, SOMETIMES ALMOST IMPERCEPTIBLE, OFTEN INSTEAD MACROSCOPIC.

THE CHANGING CITY

A group of young people take selfies along a newly completed freeway not yet open to traffic, near Tokyo Bay, home of the Olympic village then under construction.

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MORE TRANSPORT

Passengers going in and out of Shimokitazawa Station. In view of the Games, several metro stations and other urban and suburban lines that make up Tokyo's complex transport network, used daily by millions of passengers, have been adapted to accommodate an even greater number of people.



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THE RESTYLING OF SHIMOKITAZAWA

Young people in the square in front of a shopping complex in Shimokitazawa, a bohemian neighborhood subjected to an urban restyling that has irremediably altered its characteristic features.



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THE LAST TRAMWAY

A tram carriage on the Toden-Arakawa line that crosses the city. This is the only surviving line of Tokyo's extensive tram network.

THE NEIGHBORHOODS ARE CHANGING

Skyscrapers under construction in Marunouchi, a central neighborhood of Tokyo experiencing major transformations ahead of the Olympics.



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MULTILINGUAL ANDROID

Chihira Junco, an android produced by Toshiba, welcomes customers to the Aqua City shopping mall in the Odaiba neighborhood. Junco is 165 cm tall and is 26 years old, even if she was created in 2015.

She wears different clothes every day and is able to provide information to visitors in Japanese, English and Chinese.

BIONIC WELCOME

The humanoid robot Pepper, made by Japanese SoftBank, wearing the uniform of the Keikyu suburban line, welcomes passengers at the airport station of Haneda. The company has produced almost thirty thousand Peppers since 2014, stopping production in 2021. Until 2019, humanoid robots like Pepper were ubiquitous in cities, especially in Tokyo. They could be found in shopping malls, public and private transport stations, shops, restaurants and hotels. In the Tokyo administration plans, bilingual androids (Japanese and English) were to help welcome foreign visitors during the 2020 Olympics.

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A TRADITION PERSISTS

Girls take selfies amidst the cherry blossoms in the central Shinjuku Gyoen park in Tokyo, one of the preferred places for *hanami*, the practice of viewing *sakura*, or blossoming cherry trees. From a solitary stroll to a picnic with friends, there are many ways of celebrating the flowering of cherry trees, but all are accompanied by shots of the blossom or, very often, by selfies.



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PERSONALIZED STICKERS

In the Shibuya neighborhood, two girls in a *purikura* (instant photo) booth, printing sticker photos enhanced with digital filters, which are very popular with the young and very young in Japan and East Asia more generally.

SHINJUKU

Neon signs in the central neighborhood of Shinjuku, before the profound transformation of the area ahead of the 2020 Olympics.



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ENERGYGAMES

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