

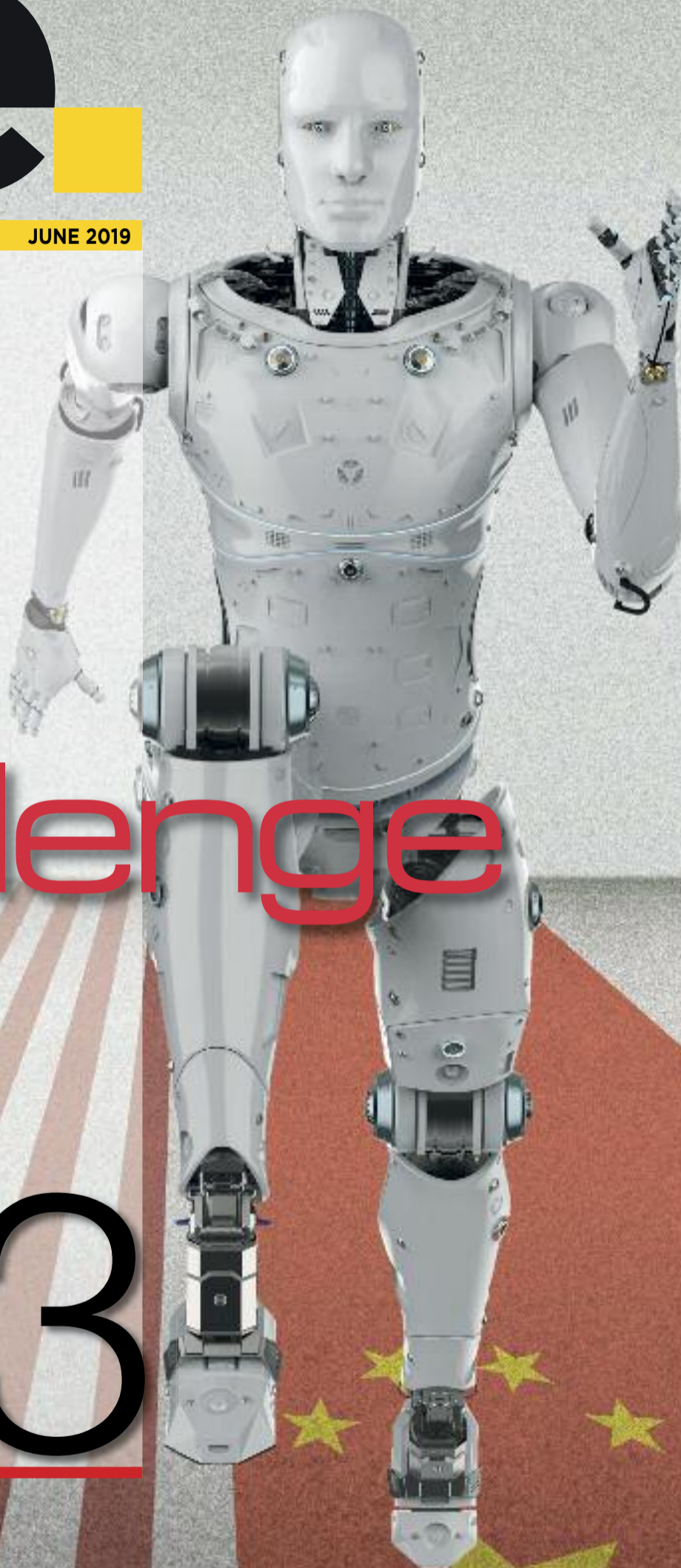
world energy
we.

JUNE 2019

The Challenge

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Number





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Editorial/The United States and China

Who Will Win?

For the answer—or at least one possible answer—we must turn the key of the technological machine. We imagine it will keep moving forward, and we cast our eye on the point where it all began: energy. The future is where the energy reserves are, that's where power is

MARIO SECHI



What is our job? Joining the dots, piecing together the jigsaw, seeing a picture where confusion seems to reign supreme. *World Energy* uses energy—the flame that kindled the development of civilization—as the nail on which to hang the picture of the contemporary world. We have never been a specialist magazine, the specialism and dominance of technology over philosophy and history have caused the fragmentation of knowledge, to the point that today's most invaluable sources of strategic thinking are not “the experts” but those who have cultivated classical, literary and historical culture and are able to simultaneously grasp the curve of technological development, *Homo sapiens* and *Homo faber*. This issue of *WE* is an example of the idea we nur- →

ture: it has a precise approach and a clear and broad direction, with a horizon that draws on the past (history, reading Moisés Naím on Thucydides, an essential classic for staying inside the present) and opens out onto the future (see Ian Bremmer on artificial intelligence, among its many excellent articles). We are in the land of giants, we have a stage where torches are lit, chimneys are smoking, oil pipelines are gushing, gas tankers are sailing, chrome-plated hardware is dematerializing into software, where the control, transaction and power of overheated petaflops is being cooled in bunkers, today's Santa Barbara, with finite calculation moving towards the infinite and the vertical takeoff of knowledge.

History is not an equation

Some think that the United States is fated to go the way of the Tyrannosaurus rex, an asteroid bang (China) and the end of history. The extinction of American power has been predicted many times, and those who predicted it have regularly disappeared while America is still here. Winston Churchill used to say that “the United States is like a gigantic boiler, once the fire is lighted under it, there is no limit to the power it can generate.” The British lion was not wrong. And then there is China, of course, this exponential demographic force, to its critics an experiment without freedom, to others a model of organization and *realpolitik* in dealing with complexity. Americans believed that sooner or later the injection of capitalism would lead to the development of a Western style democracy. They were wrong, indeed so wrong that today China is said to be “the land that failed to fail.”

History is not an equation; it does not proceed according to infallible measurements: the rule is approximation, with over- and underestimation, surprises, swings, wonder, fear, and joy. Those who think they know all the answers also say that this is the age of the Velociraptor, and that speed and instant lethal force is all that is required in order to hold one's own in the great power game. To be sure, if we take individual geographical areas (think about the potential of Southeast Asia or India's growth) we can see new players emerging. But as well as destroying a satellite in space with a missile (as India's President Narendra Modi did during the recent election campaign) it is also necessary to build and, most especially, to last, managing one's internal contradictions. History speaks another language: the screenplay is different. Those who suggest quick solutions bring to mind those who thought they could tackle wars—and later nation building—with the “shock and awe”

theory, but this doctrine only works to win the battle and not the war. History is about the *longue durée*, a long-term process that begins with forging the imaginary, an idea of the world, in other words the philosophy that eventually becomes the *Zeitgeist*, the spirit of the times. This is as true for the state as it is for nations, large scale enterprises, and families. Complex as well as basic organizations are subject to the laws of history, philosophy and physics, and it is no accident that at the dawn of knowledge these three disciplines advanced hand in hand. Nations are a great dilemma, not a quantum computation. They are a daily experiment, not a universal postulate.

The United States and China are both subjects and objects: as global powers they are alike and different. They are two energy-guzzling nations striving for self-sufficiency, but this is where the similarities end. The U.S. is an oil and gas superpower, it burns and produces. China burns and buys, it develops renewable and nuclear energy but still remains hooked to the coal wagon and plugged into the oil pipeline. It scours the globe to find raw materials, sets up its outposts, weaves its spider web of logistics and ports, traces new trade routes with its Belt and Road, and has an imperial strategy. The United States is the hotbed of the “American dream,” the engine of global capitalism and the railroad of the stock market, of its booms as well as its crashes. China still hasn't brought lighting to its vast national territory (nighttime satellite images show that only its coastlines are lit up); it has the new rich and the new poor, old and new problems, a growing real estate market and financial bubbles, and a stock market that is only just beginning to open up to the Chinese. Everyone is asking: who is winning? For the answer—a possible but not the only answer—we must put in the key of the technological machine and turn it on. We imagine it will keep moving forward, but here too, we would venture to express some doubts, well supported by history. Ever thought about water scarcity? Or about climate change? Or about the power of imponderable phenomena such as solar cycles? The two great powers have different visions of the world, and to get an insight into China's imaginary—its projection—I recommend watching *Wandering Earth*, a science fiction movie now available on Netflix, based on a book by the Chinese master of science fiction Liu Cixin. Try and compare that with Christopher Nolan's masterpiece *Interstellar* and you will get a vision of two worlds. All we have to do is study the rise and fall of nations and recall Oswald Spengler's *The Decline of the West*, and then



sit down, draw a deep breath and look at history, the teacher of life.

And it is not just a question of “stepping back in time” or engaging in historical inquiry. The future is actually clearly visible in science fiction books (with their ability to anticipate reality), and is close at hand, with laboratory experiments leading to the explosion of huge ethical problems (what can we say about the birth in China, as it happens, of genetically modified babies?) and opening the floodgates to dystopia. Are we sure that Isaac Asimov's laws of robotics will continue to hold true with the expansion and use of artificial intelligence in everyday life? In this issue, one of our authors, Francesco Gattei, who skillfully mixes humanistic, philosophical and technical ingredi-

ents, explores the world of algorithmic trading in energy products and urges caution because the machine is precise, including when errors are made. Indeed, it is too precise, to the point of becoming lethal. Personally, I still prefer to have the all-too-human human being at the helm rather than the HAL (Heuristically programmed ALgorithmic Computer) 9000 supercomputer that determines the route of the Discovery 1 spacecraft in *2001: A Space Odyssey*. Error-free perfection usually leads to irreparable error.

The importance of experience

The “technological leap” makes it possible to “cancel the past,” build networks where nothing was there be-



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VISIONS OF THE WORLD

On the left, New York skyscrapers, a symbol of American power. Previous page, China by night in a spectacular NASA satellite image. The photo reveals how development has so far occurred predominantly in coastal areas.

fore and skip all the pages of the history book. This reality without memory, without caches or backups, builds players with a present, but, with no past behind them and having to think for tomorrow, they suddenly find themselves faced with forces armed with a quality that continues to be decisive: experience. As I write the word “experience” I am thinking about the extensive experience of a company like Eni, a multinational and a leader in exploration whose heart and mind are firmly set in Italy, and for which roots and history as well as experience are key.

Drive (of the will) and experience (of the world) are the pillars of great nations. A question: does China have experience? It has drive, it has demographic power, but when it comes to

experience and background, one has to be more cautious. The history of China is that of a fortress resisting penetration by other cultures. Maoism got rid of all traditions while the new China, expansionist and conquering externally, is armored internally. But the revival and expansion of Confucian ideas during the Xi Jinping era show that this need for “experience” is perceived as an urgent priority. That explains the renewed focus on the classics of Chinese literature and why Xi quotes the sages of Confucianism. He presents himself as a Junzi, a cultivated and wise person, a guide for the people. This is the real closure of the Mao era. And this is also the point that the West has to study, in order to gain knowledge and understand.

If experience counts—and it does count—then Europe has a role to play. And Christian Rocca is right to point this out in his article: if we Europeans are not the technological champions who will dominate the world, if we don’t have the power of high-tech industry, then we can uphold other values, like knowledge of the law, the tradition of balancing interests, the importance of acting as a bridge and checking excesses, and the power of moderation. Europe is undoubtedly the only player to have attempted to put in place a containment policy against the power of the titans of Silicon Valley. Its bid to act as the regulator of business and citizens’ interests is a good starting point, but it cannot be the only one. In a similar vein, it is important to ride the wave


of energy transition in order to innovate and improve the lives of everyone on the planet at the same time. It is no coincidence that we are witnessing the rise of green movements in Europe, and the cases of France and Germany—the heart of the Old Continent, once again—show that history proceeds in fits and starts. They also show that environmentalism—a reformist, transformative and virtuous idea—is a pillar of politics, meant in a broad sense and not just in terms of political parties, because Aristotle teaches us that everything is politics.

After our journey through this multiverse, bouncing from one black hole to another (and now we also have a photo of it, how wonderful!), we are left with one question: what really counts? And here we return to our starting point: energy. The future is where the energy reserves are, that is where power is. The future is where there is potential for “exploration”—what a beautiful word, it contains so much adventure and vision. At the end of the day, we are talking about the same old great game: seeing, imagining and creating. Enjoy the magazine.



U.S.–China/The two fronts of a strategic rivalry

The 21st Century Cold War



Southeast Asia and technology currently mark the principle areas of competition between the U.S. and China. While the United States has the advantage in this strategic contest due to the superiority of its alliances and institutions, China is fast gaining ground

MINXIN PEI



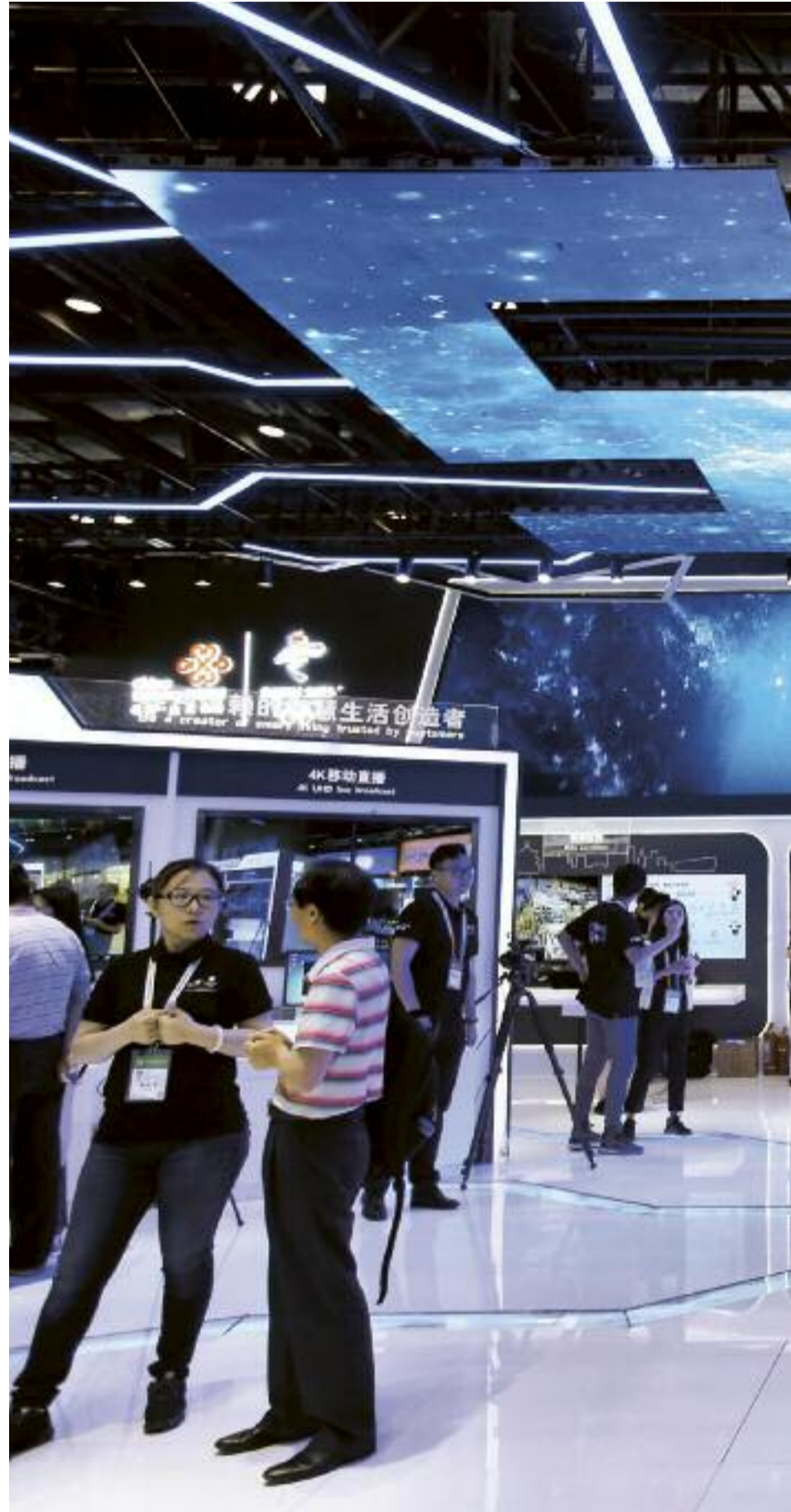
An expert on governance in the People's Republic of China, U.S.-Asia relations and democratization in developing nations, Pei serves as the director of the Keck Center for International and Strategic Studies at Claremont McKenna College. He is also a non-resident senior fellow with the Asia program at the German Marshall Fund of the United States.

udging by their rhetoric and action, the United States and China, the world's two largest economies, are clearly headed toward a long-term strategic confrontation or, if you will, the 21st century version of the Cold War. The return to great power rivalry is undoubtedly a geopolitical tragedy. But in retrospect, it appears almost inevitable. The leading cause is obviously the rapid change in the balance of power between these two countries that has resulted in America's relative decline and rising anxiety about the loss of its global hegemony to China. These startling numbers tell the most compelling story about the unfolding U.S.-China cold war. In 1992, the year after the implosion of the Soviet Union, the Chinese GDP, measured in U.S. dollars, was about 7 percent of U.S. GDP. Today, it is about 65 percent. In other words, the gap of power between China and the U.S., in terms of the size of its economy, is now almost ten times smaller than 27 years ago.

To be sure, there are other factors driving the two countries toward conflict. The rise of Xi Jinping, a strongman with an ambitious global agenda and a huge appetite for risk, led to the abandonment of China's long-standing grand strategy of keeping a low profile on the global stage and avoiding conflict with the U.S. at all cost. His signature foreign policy moves, such as building and militarizing artificial islands in the South China Sea and launching a USD 1 trillion global infrastructure project known as the Belt and Road Initiative (BRI), have only convinced America that China is now openly challenging its hegemony. The constant frictions between China's brand of state capitalism and America's free-market capitalism have further exacerbated trade tensions and now threaten to unravel their USD 660 billion bilateral merchandise trade.

Conflict of geopolitical interests and ideological values

Given the fundamental conflict of geopolitical interests and ideological values between the U.S. and China, their strategic rivalry will likely be open-ended and last decades. While some of the features of the U.S.-China strategic competition will resemble those of the Cold War, such as an arms race and jockeying for allies around the world, it will also differ qualitatively from the Cold War in two critical respects. First, unlike the Cold War, which was essentially about containing the Soviet Union's land-based military threat to Western Europe and nuclear threat to the U.S., the new "cold war" between the U.S. and China will be, in geopolit-



ical and military terms, primarily a maritime conflict in the waters surrounding China. That's because none of the major countries with land borders with China, except for Vietnam, is an American treaty ally or possesses nuclear weapons. This reality means the U.S. and China are unlikely to waste their resources preparing for a full-blown land war. At the same time, American maritime dominance threatens China's trading routes and security. This situation is

especially serious on China's eastern seaboard because the U.S. is the treaty ally of Japan and South Korea and provides an implicit security guarantee to Taiwan, which China regards as a renegade province. But America's maritime dominance and alliance network are much weaker to China's south. Among countries in Southeast Asia, its only treaty ally is with the Philippines. Australia, another U.S. treaty ally, is too far away. Most importantly, the

**FIFTH GENERATION**

The main arena in which technological supremacy is being played is that of emerging technologies like AI, 5G and quantum computing. These technologies are able to radically change the economic and military competition scenario between the United States and China. Photo shows the China Unicom stand at the China International Fair for Trade Services (CIFTIS) on May 29, 2019 in Beijing.

© GETTY IMAGES

U.S. maritime presence in the South China Sea is a shadow of itself after the closure of American naval and airbases in the Subic Bay and Clark in the Philippines more than two decades ago. The relative weakness of the U.S. in this part of the world, coupled with the South China Sea's potential energy resources and its importance as a critical sea lane for global commerce, makes Southeast Asia one of the key theatres of strategic competition between the

U.S. and China in the coming decades.

The second qualitative difference between the unfolding U.S.-China conflict and the U.S.-Soviet Cold War is the role of technology. With the world poised on the brink of another technological revolution featuring artificial intelligence, big data, 5G wireless communications, and quantum computing, it is commonly understood that whoever leads this race will likely gain insuperable

military and economic advantages. During the Cold War, the Soviet Union and the U.S. also engaged in a technological race, but that was limited exclusively to military applications. Today, the technological competition between the U.S. and China is both commercial and military. Indeed, judging by the ferocity of Washington's campaign against Huawei, the Chinese telecom giant that leads the 5G race, it is no exaggeration to say that the U.S.-China

"tech war" will be focused more on commercial than military applications in the years to come.

U.S.-China strategic competition in Southeast Asia

As America's maritime dominance and alliance networks in Southeast Asia are far less robust than in Northeast Asia, China can exploit this relative weakness in competing against the U.S. The contours of Beijing's three-pronged strategy in Southeast Asia are →

becoming more visible. The most important prong is economic engagement through trade and investment. China is the largest trading partner of the Association of Southeast Asian Nations (ASEAN), which encompasses all the countries in the region. In 2018, two-way merchandise trade between China and ASEAN reached USD 587 billion, more than twice the two-way merchandise trade between the U.S. and ASEAN in the same year (USD 272 billion). Direct investment from China (and Hong Kong) in ASEAN in 2017 was USD 19 billion, almost three times that of the U.S. in the region. In 2018, China was also the largest source of international visitors to the six major ASEAN countries (Indonesia, Thailand, Malaysia, Vietnam, the Philippines, and Singapore), accounting for 20 percent of their 120 million international tourists. Obviously, by integrating its colossal economy with those of Southeast Asian countries, China hopes to make it very costly for these countries to line up with the U.S.

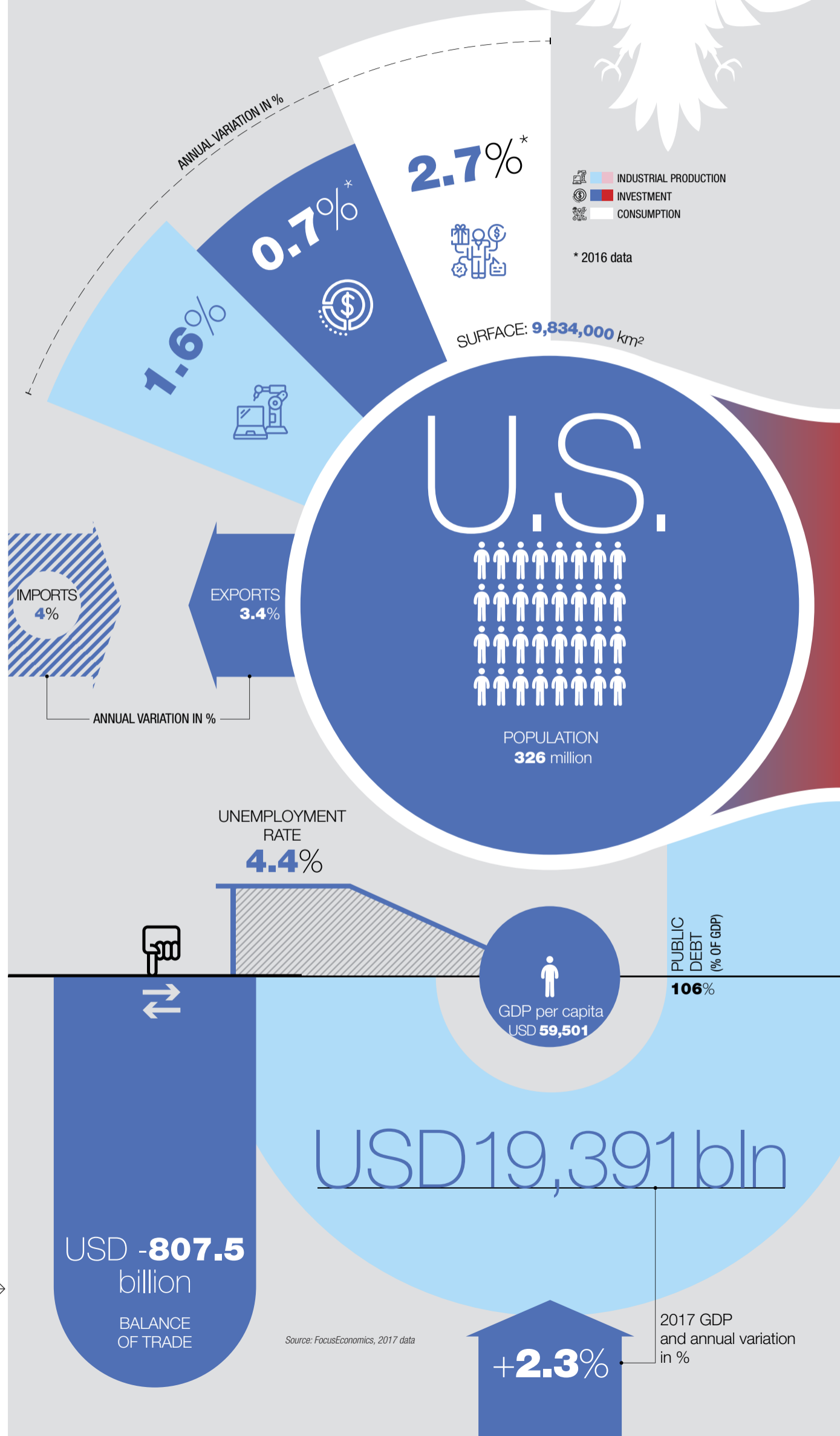
The second prong is intensification of diplomatic engagement. Taking advantage of its geographical proximity, China is able to maintain an active schedule of high-level visits to ASEAN to boost diplomatic ties. President Xi Jinping has visited nearly all the key countries in the ASEAN—Malaysia and Indonesia in October 2013, Singapore in November 2015, Cambodia in October 2016, Vietnam in November 2017, and the Philippines in November 2018.

The last prong of China's strategy is to undermine the credibility of America's security commitments in the region through the expansion of its military presence and escalation of intimidation against Vietnam and the Philippines, the two key claimants in the South China Sea dispute. The most critical step taken by China is, without doubt, the building and subsequent militarization of artificial islands in the disputed areas of the South China Sea. Although the military utility of these islands is probably marginal in the event of an outright conflict with the U.S. (they can be easily destroyed by American firepower), the psychological impact of China's escalation cannot be underestimated. By demonstrating to ASEAN nations that even the U.S. could not stop it from building and militarizing these islands, Beijing wanted to send the message that these nations should not count on the U.S. to come to their aid in the future because Washington's pledge has been proven to be hollow.

Obama's "pivot to Asia" and the Bush breakthrough

To be sure, Washington began to counter China's three-pronged strat-

Comparing two superpowers



Source: FocusEconomics, 2017 data

China

SURFACE: **9,597,000** km²



PUBLIC DEBT
(% OF GDP)
16.3%

GDP per capita
USD **8,806**

UNEMPLOYMENT RATE
3.9%

BALANCE OF TRADE
USD **419** billion



USD **12,241** bln

+6.9%

2017 GDP and annual variation in %

USD **538** bln



INVESTMENTS IN R&D

USD **445** bln

7.8%*



6.6%*



6.6%



EXPORTS
7.9%

IMPORTS
16.1%

ANNUAL VARIATION IN %

-3.4%



-3.7%



FISCAL BALANCE
(% of GDP)

2.1%



1.6%



INFLATION RATE
(CPI, ANNUAL VARIATION IN %)



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ROBOTIC DANCING

Intelligent robots perform a ballet during an event held for World Telecommunication Day in Jinan, China. This event is celebrated on 17 May to commemorate the founding of the International Telecommunication Union in 1865.

egy in 2010 when the Obama administration announced its “pivot to Asia” strategy. However, so far its results are mixed.

On the economic front, the U.S. supported the Trans-Pacific Partnership (TPP), a free-trade zone that explicitly excluded China. The long-term strategic objective was to reduce Southeast Asian nations’ dependence on trade with China. Unfortunately, domestic political opposition to free trade in the U.S. delayed the ratification of TPP in Congress and, after Donald Trump won the presidential election in 2016, the first thing he did upon entering the White House was to withdraw the U.S. from the TPP, effectively ceding Southeast Asia to China’s ever-growing economic influence. Of course, Trump’s position could change. Should the U.S.-China trade war escalate to the full extent, we can imagine that the U.S. will be tempted to return to the TPP after the 2020 presidential election. In fact, the second Trump administration, freed from re-election concerns, would be even more likely to re-join the TPP than a new Democratic administration.

In response to the lack of diplomatic engagement under the administration of George W. Bush, the Obama

administration paid greater attention to ASEAN. Besides more frequent cabinet-level visits, President Obama himself visited Southeast Asia multiple times (Indonesia in November 2010, Thailand in November 2012, the Philippines in April 2014, and Vietnam in May 2016). President Trump also visited the Philippines and Vietnam, respectively in 2017 and 2018, the two countries that have vigorously contested Chinese claims in the South China Sea.

Militarily, American response to Chinese actions has been subtle but firm. Washington has intensified its freedom of navigation operations (FNOPs) around the islands China has built or seized to challenge China’s sovereignty claims, and it is planning large-scale naval exercises to be joined by its major allies, such as Japan, Australia, and the United Kingdom, to demonstrate its resolve to push back against Chinese expansion in the South China Sea. The U.S. has also increased military aid to the Philippines and Vietnam and signed new basing agreements with the Philippines to deter further Chinese aggression.

It is too early to tell which country will prevail in their strategic competition in Southeast Asia. Each country possesses unique advantages and disadvantages. The most valuable asset the U.S. has is the desire of most Southeast Asian countries for the U.S. to continue to serve as the protector of the region’s peace. Its chief disadvantages are the tyranny of distance and the growing isolationism, unilateralism, and protectionism of the Trump administration. As for China, its primary advantage is its geographic proximity and the powerful pull of its giant market. But this is counterbalanced by its neighbors’ fear of its bullying and domination. So for the foreseeable future, we are likely to see an inconclusive contest between the U.S. and China in this vital region, with most ASEAN countries refusing to take sides in this titanic clash.

The race for technological domination

If China has a slight advantage over the U.S. in competing for influence in Southeast Asia, it is a clear underdog in the tech race, the second front of the unfolding U.S.-China cold war. As the global leader in technology, the U.S. seems to have little fear from China, which has a quarter of its per capita income and is considered a technological laggard.

Yet, judging by Washington’s fevered rhetoric about China’s infamous “Made in China 2025” program and America’s unrelenting campaign against Huawei, one can easily de-

velop the impression that the U.S. is slipping behind. In the short-to-medium term, such fears may be unnecessary. American technological dominance, by any standard, is certain to endure. In terms of fundamental research, the U.S. can boast a disproportionate number of Nobel Prizes in medicine, chemistry, and physics while only one Chinese scientist has won one of these prizes. American research universities remain the best in the world. U.S. companies dominate leading technological sectors, such as new materials, biotech, aviation, software, and semi-conductors.

However, Washington is right not to be complacent because China is catching up fast. The rapid growth of the Chinese economy now allows the country to invest more in R&D. In 2017, total R&D spending in China was USD 445 billion, not too far behind the USD 538 billion in R&D investment in the U.S., the global leader. In terms of talent, China can draw upon its large pool of scientists and engineers but America’s openness still gives the U.S. a considerable edge in attracting top-flight talent unless the Trump administration’s anti-immigration policy destroys this advantage.

As China continues to close the technological gap with the U.S., the primary theater in their race for technological dominance is emerging technologies, such as AI, 5G, and quantum computing. The reasons why these new technologies are regarded by both the U.S. and China as critical to their future security and prosperity are two-fold. First, these technologies are disruptive and can radically alter the landscape of economic and military competition between the U.S. and China. Whoever gains an initial lead could reap outside benefits and even gain lasting dominance. Second, while the U.S. possesses an enduring edge in some critical sectors such as semi-conductor, materials, and aviation, its lead over China in these frontier technologies is relatively small, if not non-existent, since scientists and engineers in both countries are roughly at the same starting point. This raises the odds that China may outrace the U.S. in the acquisition of certain frontier technologies (as is now apparently the case in the race for 5G, in which Huawei is ahead of its Western rivals).

American response to these risks is a strategy focused on denying China the access to frontier technologies. So far we can see several components of such a strategy. One is to restrict access of Chinese scientists and students to leading American universities by denying or limiting their visas. Intensification of a crackdown on eco-



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5

SILICON VALLEY TOUR

- 1. Santa Clara. The Intel Museum exhibits the products and the history of the U.S. multinational.**
- 2. Los Altos. Steve Jobs's garage, at 2066 in Crist Drive, the place where Apple is said to have been born.**
- 3. Mountain View. A tourist poses next to Android Oreo, one of Google's symbols.**
- 4. Cupertino. Interior of the Apple Park Visitor Center, a structure open to the public adjacent to the Apple Campus.**
- 5. San Francisco. The Eatsa restaurant, where you can order food and collect it without any interaction with humans.**

conomic espionage focused on ethnic Chinese scientists and engineers in the U.S. is also designed to plug suspected leakage of key technological secrets to China. Revised national security reviews regulations now make it all but impossible for Chinese entities to purchase U.S. companies with advanced technologies. The American campaign against Huawei, which deploys criminal prosecution, pressures on allies to ban Huawei from their 5G networks, and potential denial of access to U.S.-made technologies, seeks to prevent the Chinese telecom giant from dominating the 5G space. There is even

talk in Washington of resurrecting the Cold War-era Coordinating Committee for Multilateral Export Controls (CoCom) so that the U.S. and its allies can work more closely to deny China access to advanced technologies.

The U.S. is predicted to win

While it is impossible to predict the eventual outcome of the unfolding U.S.-China strategic competition, the odds at the moment appear to favor the U.S. It not only is a stronger power, but also has more allies and more robust and efficient domestic institutions. But the outcome in indi-

vidual theaters of their battle for global supremacy is likely to be different. For instance, their fight for geopolitical influence in Southeast Asia advantage is likely to be inconclusive because they are more evenly matched in the region in terms of their capabilities. At the same time, odds favor the U.S. to win the race for emerging technologies simply because it possesses not only far greater capabilities and incumbent advantages but also because it is willing to use all the tools at its disposal to prevail against China.

📷 Alessandro Gandolfi is a founding partner of the Parallelozero photographic agency. His work has appeared in several publications, including *Le Journal de la Photographie*, *Courier International*, *Lightbox TIME*, *Newsweek Japan*, *Le Monde*.



Strategies/The potential for constructive cooperation

Energy and the “Thucydides Trap”

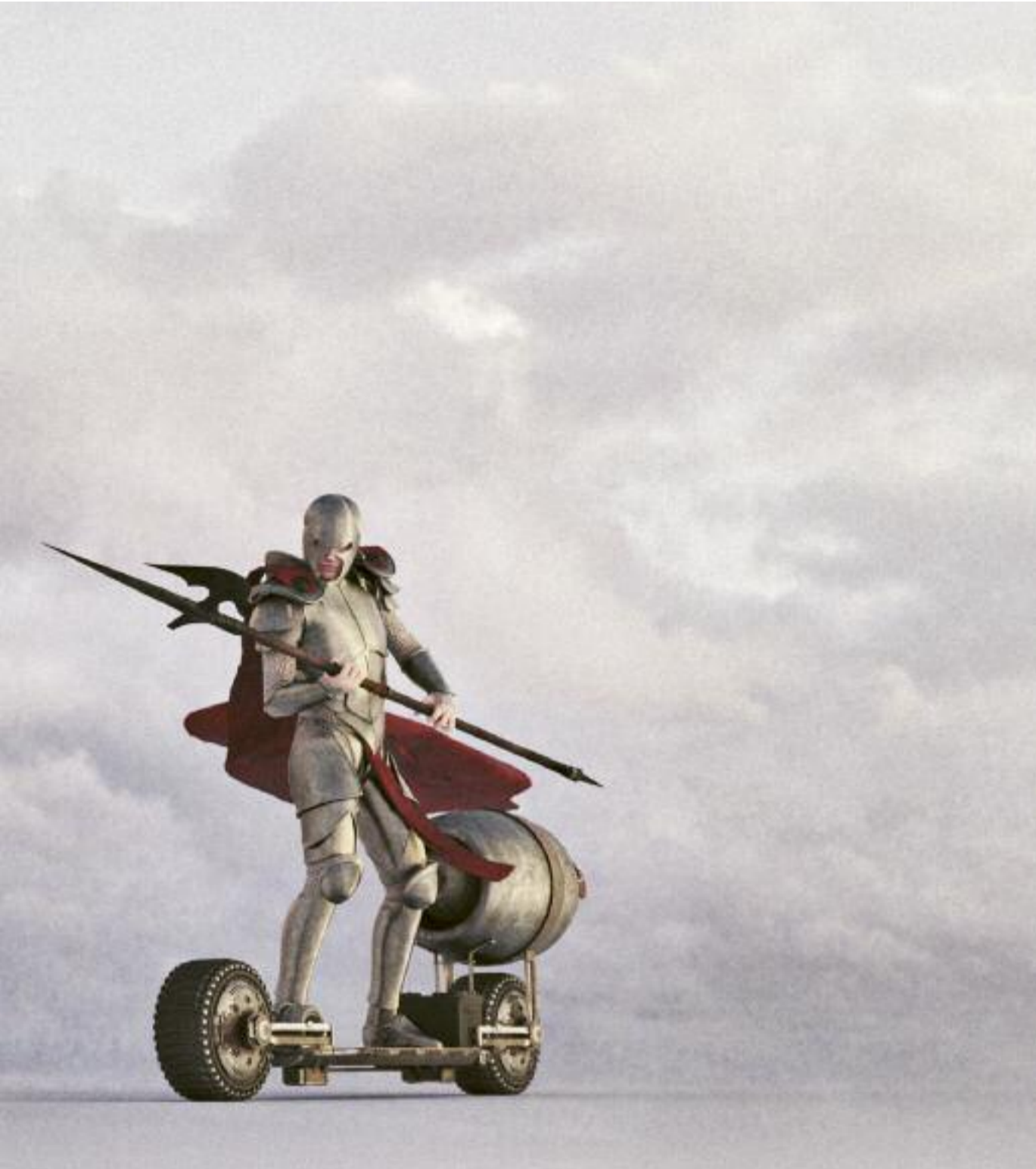


According to the Athenian historian, when a rival power emerges that can threaten the hegemony of the dominant power, war is inevitable. However, energy policy could contribute to pacifying relations where interests coincide

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*.

Thucydides is booming. In recent years, the ideas of this Athenian general and historian who lived around 450 BC have attracted renewed attention. He wrote on a variety of subjects, but the current interest in his work was sparked by his chronicle of the 30-year war between Sparta and Athens. Specifically, what has attracted the attention of contemporary politicians, generals and historians is his conclusion that “What made war inevitable was the growth of Athenian power and the fear which this caused in Sparta.” The prediction that worries modern-day analysts is that the ascent of a rival capable of challenging the dominance of the established power inevitably leads to war. Of course, what they have in mind is China’s ascent and America’s reactions to it. Will the cur-



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rent frictions between the two giant nations continue to escalate and lead to a confrontation that will change the planet or will they find a way to coexist in a tense and fractious but ultimately peaceful sharing of global power?

To allay the fears of war, China's President Xi Jinping has said: "We all need to work together to avoid the Thucydides trap—destructive tensions between an emerging power and established powers.... Our aim is to foster a new model of major country relations."

The Thucydides trap applied to energy

While energy policy alone cannot fully countervail the forces that create frictions between China and the United States, it does have the po-

tential to serve as a welcome lubricant that helps pacify the relationship, since complementarities between the two nations' energy sectors are significant. However, these opportunities are limited, not only by the current trade war between China and America but also by underlying differences in energy and environmental policies.

Obstacles to energy cooperation

A fundamental limiting factor in the potential energy sector collaboration between the two economic superpowers is the divergence between their avowed strategies. China's long range energy strategy, as described in the Energy Outlook for 2050, published by the China National Petroleum Corporation, aims to a

large-scale shift from coal and oil to natural gas and renewable sources of energy. The ambitious goal is to supply 35 percent of its energy needs via solar and wind sources, and close to 20 percent by natural gas, by the year 2050. It also plans to reduce the shares of coal and crude oil in its energy mix by 33 percent and 15 percent respectively. China has expressed a strong commitment to go green and is already making strides in this direction.

In contrast, U.S. energy strategy, as outlined in major policy addresses, such as the one by then Secretary of the Interior Ryan Zinke in September 2017, seeks to actively promote the development of fossil fuels. The Trump administration has also stated that it aims at achieving what it calls "global energy dominance"

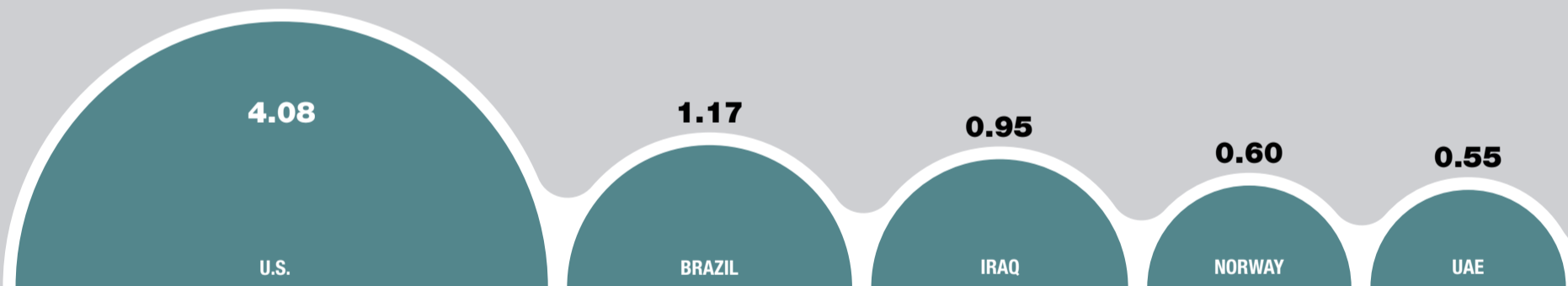
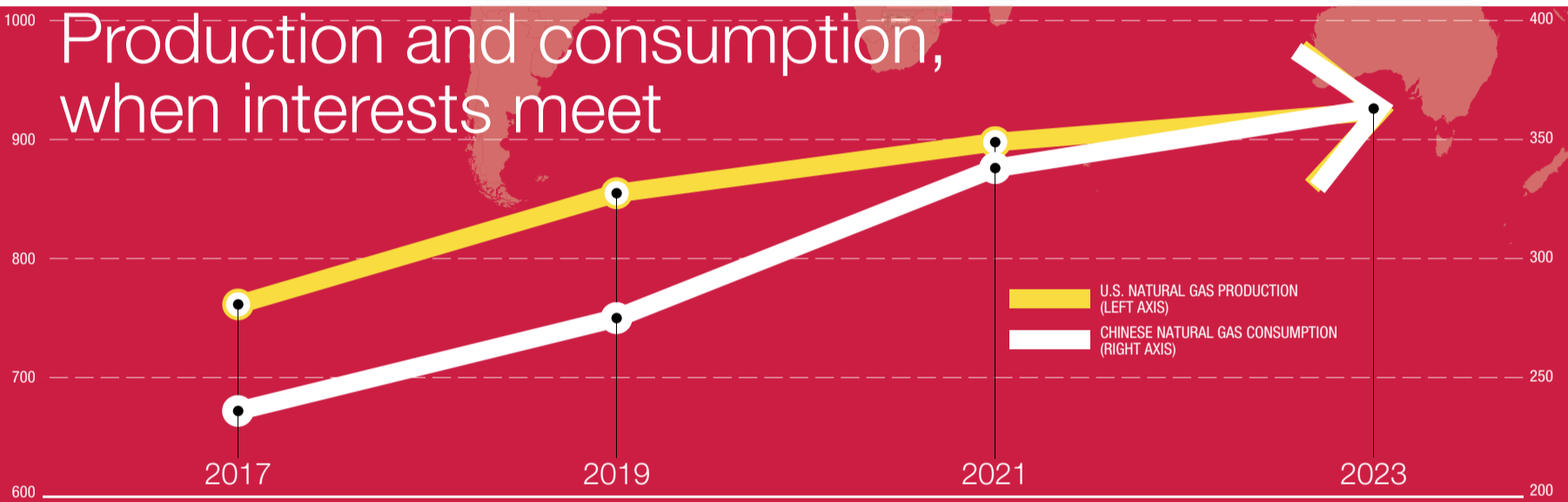
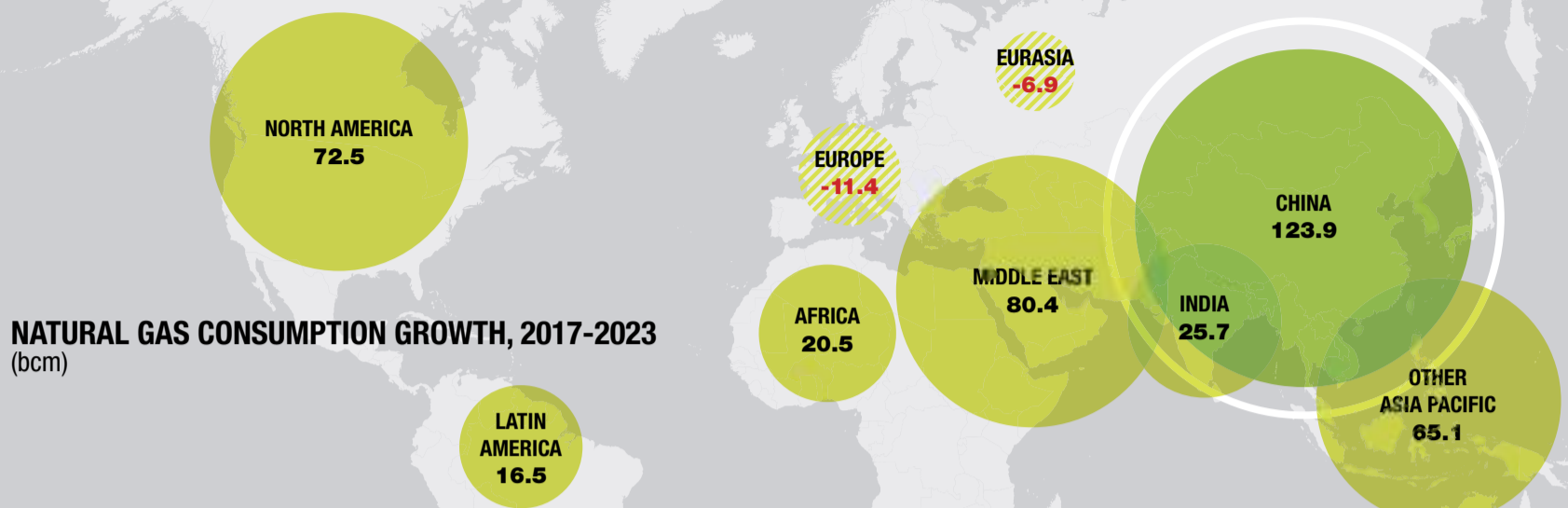
largely through the expansion of its oil and gas exports.

While the U.S. left the 2016 Paris Accords and has eliminated most of the environmental regulations adopted by the Obama administration, China has become one of the main champions of the protection of the environment.

As a result of these clashing strategic postures, tensions involving the energy sector started to appear even before the emergence of the current trade crisis. In retaliation for the imposition in 2018 of higher import tariffs by Washington on solar panels made in China, Beijing immediately curtailed oil imports from the United States. From an average of almost 400,000 barrels per day during the first half of 2018, Chinese imports of U.S. oil plummeted to almost zero by September of that year. China also postponed or cancelled outright the plans to import U.S. liquefied natural gas. The U.S. decision to increase tariffs on Chinese solar panels was driven by Washington's perception that it needed to contain the inroads that Chinese solar manufacturers were making in the U.S. domestic market. The protectionist impulses were influenced by the closing down of more than a dozen U.S.-based solar panel manufacturers in recent years as well as the takeover of several U.S. solar technology firms by Chinese companies. The Trump administration was also irked by the fact that in contrast with the rapid expansion of Chinese products and companies in the U.S. solar energy market, U.S. corporations at times faced insurmountable obstacles to enter or operate profitably in the Chinese solar market. One exception that was much heralded was the 2015 investment by Apple in two 20-megawatt solar farms in the province of Sichuan to generate enough energy for some 60,000 Chinese homes.

Unfortunately, other such successful examples are scant. China's restrictions to foreign investors in this sector have scared away American companies. China requires that foreign companies share their wind turbine technology and utilize no less than 70 percent of manufacturing components from local sources.

The current trade crisis has also slowed down—or perhaps even reversed—important oil and gas joint projects. During President Trump's visit to China in November 2017, a Memorandum of Intent was signed with the goal of promoting the development of shale gas as well as large chemical manufacturing projects. The plan also called for an investment of up to USD 83 billion by the China Energy Investment Corporation in West Virginia. The visit also led to the signing of a USD 43 billion liquefied petroleum gas joint venture in Alas- →



CHANGE IN TOTAL OIL SUPPLY, 2018-2024 (mb/d)

ka between the Alaska Gasline Development Corp. and the Chinese Sinopec Group. Another example is a USD 3.5 billion joint venture between the Yanguank Group and Air Products & Chemicals, Inc. to build a synthetic gas plant in Hohhot, China. All of these projects are now in jeopardy due to the escalation in trade tensions. The American Petroleum Institute has warned that a U.S. loss of the Chinese natural gas market due to the trade war is not only bad news for the

U.S. but also for the stability of the global economy.

Complementarities favoring energy cooperation

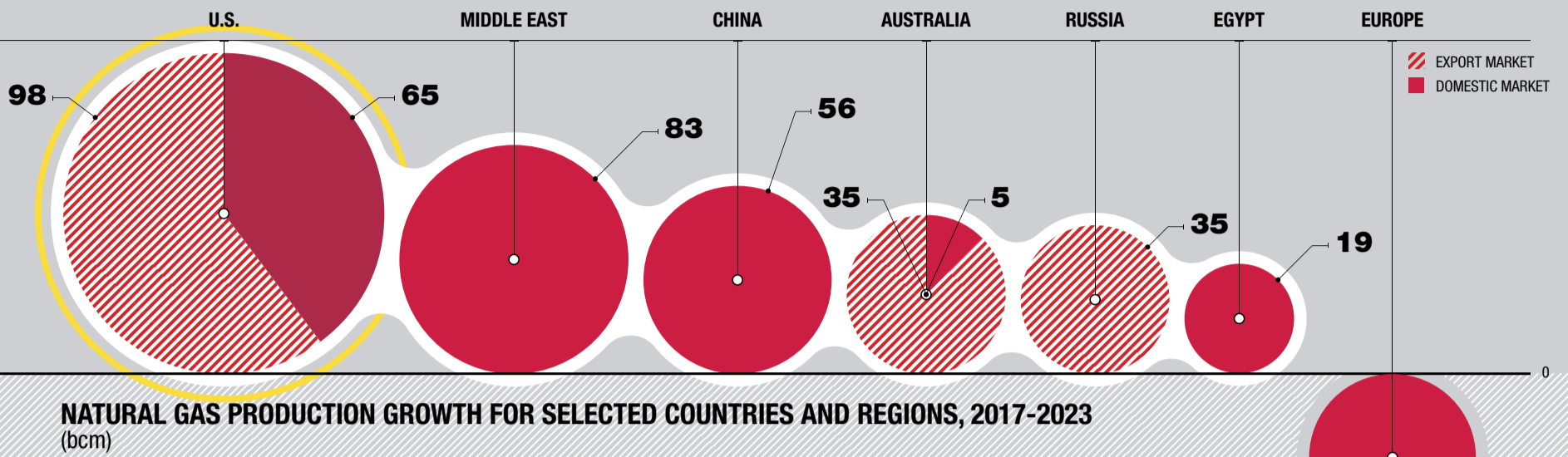
This bad news should not dim the view of the immense potential of a constructive and collaborative relationship in the energy sector between the U.S. and China. The International Energy Agency (IEA) estimates that during the next four years the U.S. will account for some 40 percent of all new natural gas production

in the world, thus making it one of the top three Liquefied Natural Gas exporters (the other two are Australia and Saudi Arabia).

The IEA also estimates that China's natural gas demand will be growing by a whopping 8.7 percent per year to 2022, largely as a result of Beijing's commitment to improve air quality. Such an expansion of the Chinese demand for gas will require imports to double within the next three years. Although China will have options to import additional natural gas from

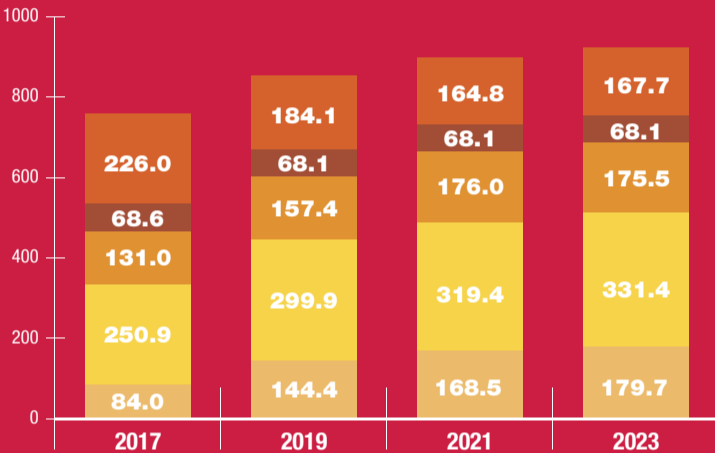
neighboring Russia and other suppliers, U.S. natural gas offers a unique opportunity for both countries to work together on a mutually beneficial arrangement.

The development of shale oil and gas reserves offers significant opportunities for cooperation given that China National Petroleum Corporation is finding important shale oil resources in northern Tianjin. According to the IEA, China now ranks third in shale oil resources, after the United States and Russia, and could

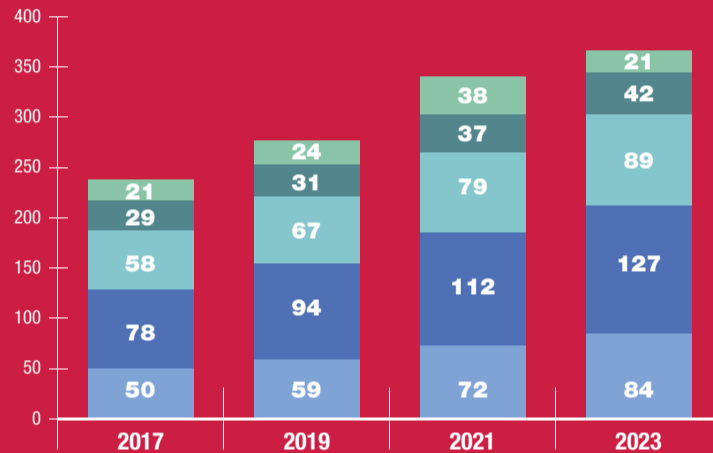


NATURAL GAS PRODUCTION GROWTH FOR SELECTED COUNTRIES AND REGIONS, 2017-2023 (bcm)

U.S. NATURAL GAS PRODUCTION BY SOURCE (bcm)



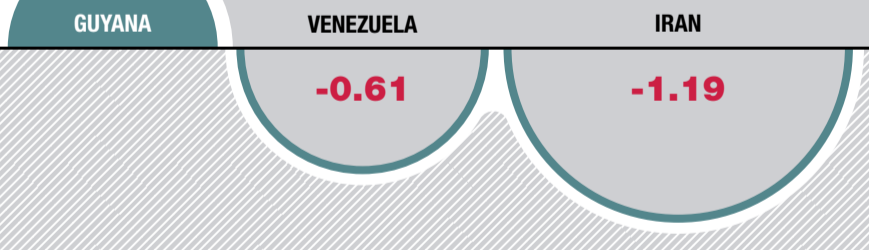
CHINESE NATURAL GAS CONSUMPTION BY SECTOR (bcm)



- U.S. NATURAL GAS PRODUCTION BY SOURCE
- SHALE GAS PERMIAN
 - SHALE GAS APPALACHIA
 - OTHER ASSOCIATED SHALE GAS
 - OTHER DRY SHALE GAS
 - OTHER SOURCES

- CHINESE NATURAL GAS CONSUMPTION BY SECTOR
- POWER GENERATION
 - INDUSTRY
 - RESIDENTIAL AND COMMERCIAL
 - ENERGY INDUSTRY OWN USE
 - TRANSPORT

0.45



WORLD OIL DEMAND GROWTH (mb/d)



Source: IEA

certainly benefit from U.S. technological and operational support. Unfortunately, however, these opportunities will be hard to convert into realities while the commercial tug of war between the United States and China continues unabated. The energy sector, by itself, does not appear to be critical enough to assuage the current fractious relationship. Both the Chinese and the American leadership seem set in their postures. President Xi Jinping has stated that “China will continue to hold high the ban-

ner of peace, development, cooperation, and mutual benefit and uphold its fundamental foreign policy goal of preserving world peace and promoting common development.” In contrast, President Trump has doubled down on his America First posture. Speaking in Vietnam, in November 2017, he quoted from The Wizard of Oz: “There’s no place like home.” He has also been quite explicit that he hopes that the current trade war results in more products manufactured in the U.S. rather than imported.

Thucydides said in his chronicle of the Peloponnesus wars: “What I fear is not the enemy’s strategy, but our own mistakes.” If the current leaders heed this admonition there is a good chance that his trap will be avoided and that a road to cooperation between the two countries will be found, hopefully gas lit. The energy sectors in China and the U.S. cannot dismantle the Thucydides trap, but they can mitigate its effects.





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The Technological Challenge



The rivalry between China and the United States is perhaps most heated in the area of technology. For example, in the field of Artificial Intelligence, Beijing aims to equal the U.S. by 2020, to be the first to develop innovative technologies in 2025 and finally to become the industry leader in 2030. Conversely, Donald Trump never misses an opportunity to reiterate that the United States has no intention of giving way. Clearly not a dominant force in the technological revolution, Europe is leading the way in personal data protection by becoming a model for legislation on the protection of privacy.



Hi-tech/The new battleground between the two global superpowers

The Race for Artificial Intelligence

China has long focused on developing the most advanced technologies, directly investing huge amounts of public resources. The United States, historically the cradle of high-tech innovation, has left the initiative to the private giants of Silicon Valley, which control progress in the sector



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THE INDUSTRY OF THE FUTURE

The density of robots in the U.S. manufacturing industry reached 200 robots per 10,000 employees in 2017, compared to 97 in China.

IAN BREMMER

President of the Eurasia Group and GZERO Media, and author of the volume *Us vs. Them: The Failure of Globalism*, a *New York Times* bestseller published in Italy with the title of *We against Them* (Bocconi University Publisher, 2018).

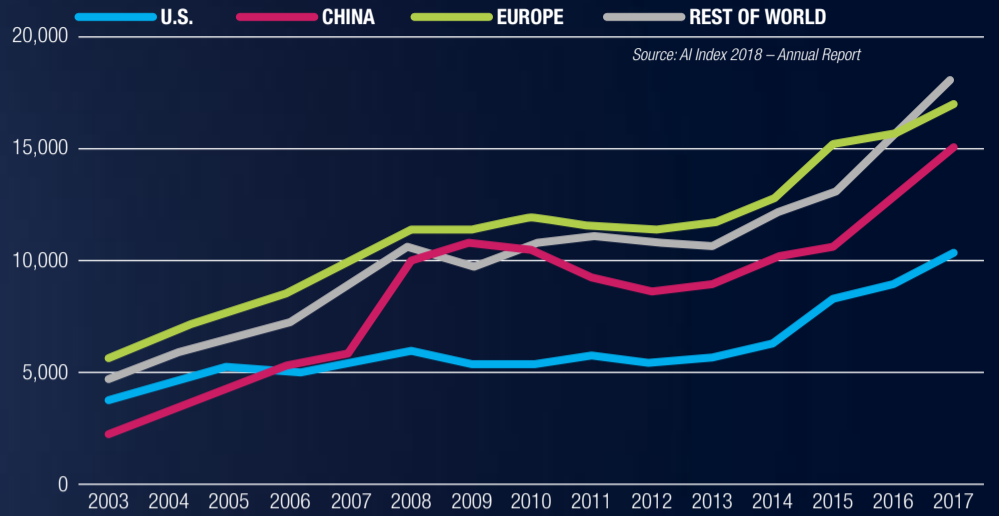
The U.S.-China relationship will define the world order for decades to come. This has long been true, but U.S. President Donald Trump's aggressive pursuit of a trade war with Beijing has pushed the relationship to its inflection point. The U.S. has now officially labeled China a "strategic rival," but this is a great power rivalry unlike any the world has seen before. For hundreds of years, geopolitics largely operated along the lines fleshed out by the ancient Greek historian Thucydides—as one global power falls and another rises, clashes ensue. But China is not interested in supplanting the U.S. as the world's preeminent global military power, and it is far from clear that it could even if it wanted to—the U.S. currently outspends China roughly 3-to-1 when it comes to defense outlays according to the Stockholm International Peace Research Institute (SIPRI). And while this great power rivalry has been playing out in the economic sphere recently, modern economic theory shows that economic growth can (and should) be positive-sum—when countries work together, the global economic pie grows larger and everyone receives a bigger slice. Furthermore, the globalized and interdependent reality of 21st century economics makes a sustained economic fight between the two countries too costly for either side to pursue indefinitely. But there is one area where China and the U.S. are destined to clash, and that is over technology.

China and the U.S., two models compared

China is the first country that has a legitimate claim to being a technology superpower on the level of the U.S. Beijing has spent the last two decades making access to the billion-plus Chinese consumer market contingent on Western companies transferring their technology to Beijing for the right to operate within Chinese borders. It's a policy that has transformed China into a cutting-edge technology power, boosted by instances of technology and intellectual property theft by Chinese hackers and state-backed corporations. It's also a result of massive investment by the Chinese government in its own tech capabilities—today, more of the world's top 500 supercomputers are Chinese rather than American. But what is causing real concern among Western policymakers is not how far China has come in terms of technological prowess but how far it can go, particularly in the all-important field of artificial intelligence (AI). Beijing treats AI as THE strategic sector for the future and →



OVERTAKING IN SCIENTIFIC PUBLICATIONS



Source: AI Index 2018 – Annual Report

The graph shows articles on Artificial Intelligence published annually by Elsevier, the world's largest scientific publisher, in China and in the U.S. Since mid-2005, Chinese publications have surpassed, at least quantitatively, those in the United States.

The brain race

The technological supremacy of the U.S. is threatened by the rise of China, which in recent years has caught up with its rivals in terms of scientific publications and the number of patent applications.

THE TOP 30 BY NUMBER OF PATENTS

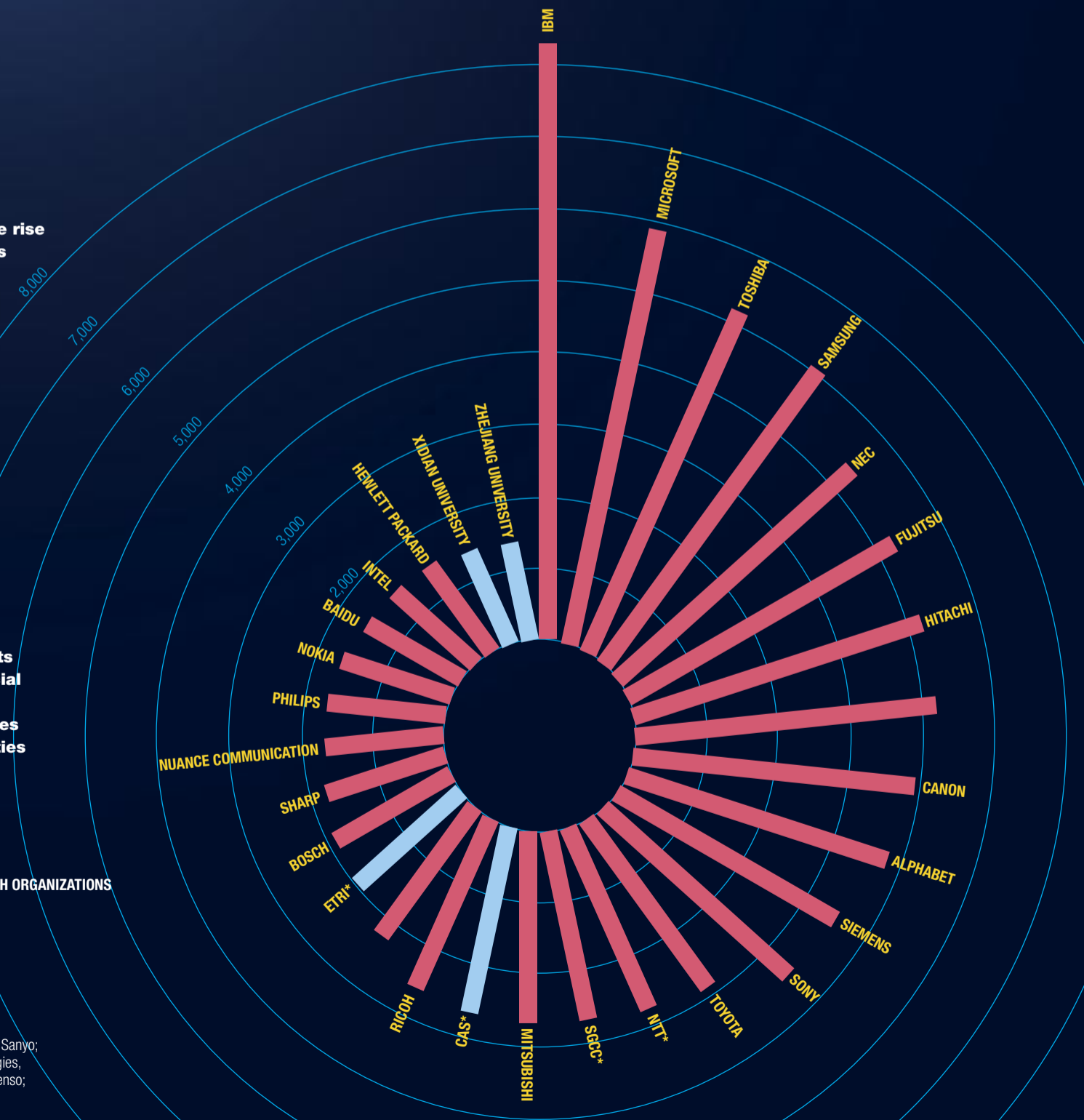
Two U.S. companies hold the world record for patent applications relating to projects and ideas in the field of Artificial Intelligence. The Top 30 are dominated by private companies and include only four universities and public research organizations, three of them Chinese.

- COMPANIES
- UNIVERSITIES AND PUBLIC RESEARCH ORGANIZATIONS

* NTT = Nippon Telegraph and Telephone
 SGCC = State Grid Corporation of China
 CAS = Chinese Academy of Sciences
 ETRI = Electronics and Telecommunications Research Institute

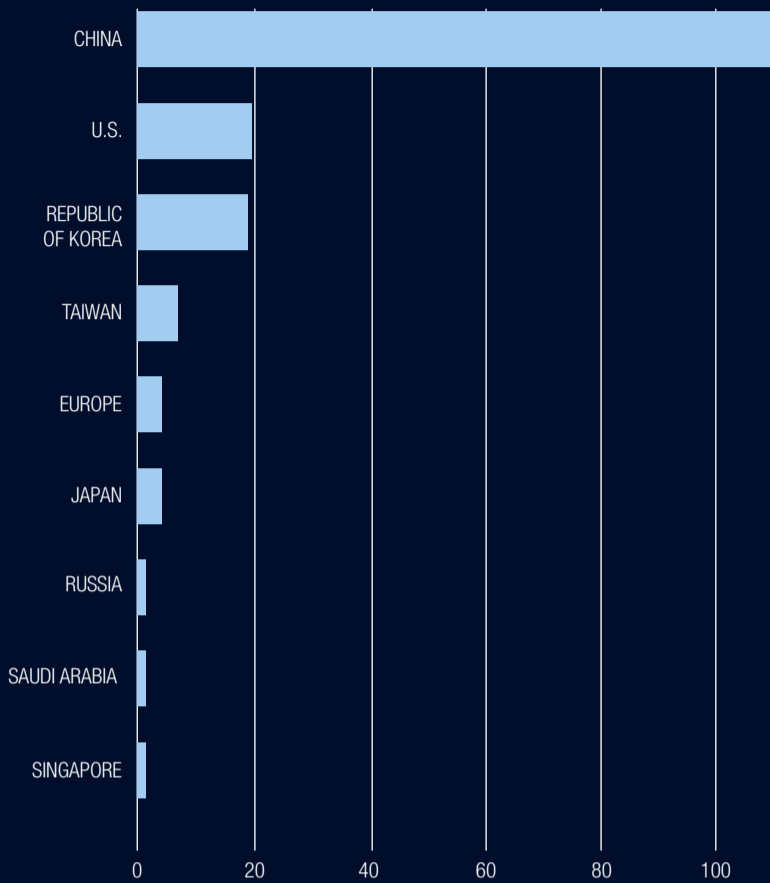
Note: Fujitsu includes PFU; Panasonic includes Sanyo; Alphabet includes Google, Deepmind Technologies, Waymo and X Development; Toyota includes Denso; and Nokia includes Alcatel.

Source: WIPO Technology Trends 2019 – Artificial Intelligence



CHINESE SUPREMACY IN PUBLIC RESEARCH

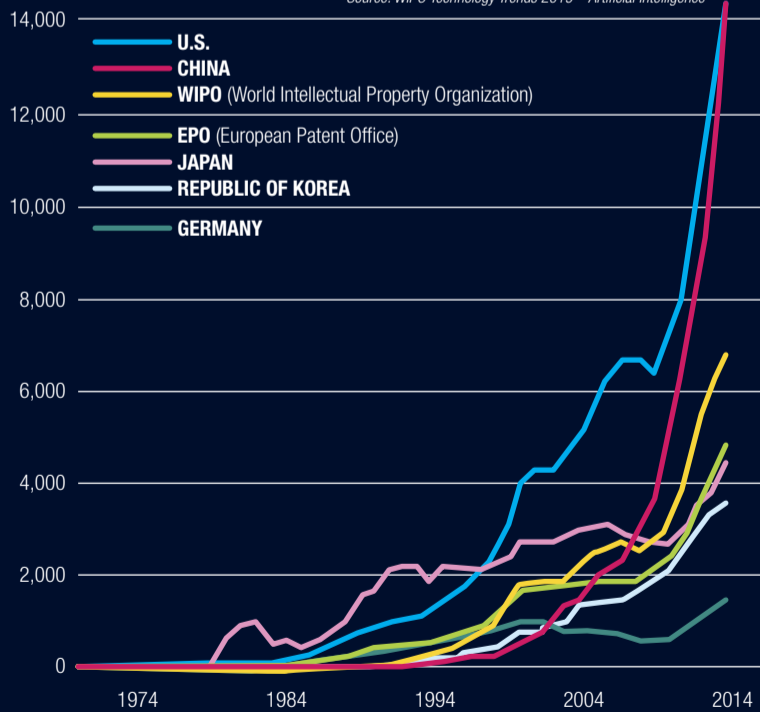
Source: WIPO Technology Trends 2019 – Artificial Intelligence



The Top 500 by number of patent applications relating to AI from universities and public research organizations clearly shows the supremacy of China, represented by over 100 institutions. The U.S. and South Korea have around 20, while Japan and Europe only have four each.

THE HISTORICAL TREND IN PATENT APPLICATIONS

Source: WIPO Technology Trends 2019 – Artificial Intelligence



The number of patent applications filed in China has grown by an average of 25 percent since 2009 and has almost caught up with the number of applications filed in the U.S.

has spent years dedicating resources and orienting policy accordingly, much in the way the U.S. treats certain military defense technologies. The U.S. unveiled its AI strategy this past February, and the U.S. approach to AI so far falls along traditional lines—preference for private sector taking the lead, with government providing support for education and some limited research and development.

This may be insufficient in the face of China's bolder strategy, particularly when considering the structural elements undergirding the tech race between the U.S. and China. In China, it's the government that's investing in scientists, whether it be directly or through protected/favored champions like Alibaba or Tencent. What's more, AI development in China takes advantage of the huge stores of data generated by the massive uptake of e-commerce and mobile payments systems. When it comes to AI, such data is critical—developing AI for the future is accomplished through iterating pattern recognition, where the scale of the data available becomes decisive, even if the quality of that Chinese data might be suspect compared to global data used by Western researchers.

As for the U.S., the government isn't the one leading the charge on AI developments—private companies in Silicon Valley are, limiting the direct potential benefits for Washington. This distinction is critical, as are its downstream effects: American AI researchers publish their breakthroughs, which means that they are as easily available to their Chinese counterparts as to their fellow Western colleagues. U.S. entrepreneurs avoid iterating on the same research as opposed to making new and different discoveries, which is problematic for AI development at this stage where practice is still making perfect.

The lesson of the tariff war

And the nature of democracy makes it hard for the U.S. government to throw its weight behind a technology that has the potential to displace hundreds of thousands of workers—or to use another term, voters—for the sake of national geopolitical strategy. Beijing, with its ability to better control tech and Chinese society, doesn't have the same concerns, and in general the government and populace are eager to embrace the latest technology, both for better governance and for improving citizens' quality of life.

All that said, the best and most innovative minds are in Silicon Valley and the West, and just because the state of AI today is about big data

collection and iteration doesn't mean that will be the case even five years from now. Which means that despite all of Beijing's current advantages, it's still too early to tell which side will win the tech race.

Against this backdrop, the trade war between the U.S. and China continues to play out. And while there's plenty of reason to believe that a deal ultimately gets struck—there's too much money at stake as well as political capital for it to drag out indefinitely, for both sides—the trade war will have one lasting legacy: it has taught Beijing that it is vulnerable to a sudden hardening of U.S. politics. That's certainly true when it comes to agriculture exports, but it's especially true in the field of technology, where the tightening of screws has forced Chinese state champion ZTE to near collapse and is causing untold headaches for Chinese telecom/tech power Huawei. The tech competition is most certainly underway, and both sides know it; brace for more regulatory battles from here on in. Technology, more than any other single issue, is the biggest geopolitical fight in the world today. And both China and the U.S. are dug in.



Comparisons/The importance of an agreement to define a level playing field

U.S. on the Verge of being Overtaken

The gap between Washington and Beijing over AI seems set to close with China potentially overtaking the U.S. over the next ten years. The fundamental race for technological leadership also involves 5G, with its economic and security implications

PAOLO MAGRI



Executive Vice President and Director of the Italian Institute for International Political Studies (ISPI) and Professor of International Relations at Bocconi University. Magri is also Member of the Europe Policy Group of the World Economic Forum, of the Strategic Committee of the Minister of Foreign Affairs, and of the Board of Directors of the Italy-China Foundation.

The current process of transition in international relations is marked by the crisis in a liberal order centered on the leadership of Western powers. This is the background to the strategic competition between the United States, one of the old powers, and China, the biggest emerging power, competition which has moved beyond the traditional economic and political-military dimensions to increasingly encompass technology. China has decided to take the lead in a revolution that may change the current balance of power, and Xi Jinping and the leaders of the Chinese Communist Party have indicated that the achievement of industrial and technological leadership by 2049 is a strategic goal. The “Made in China 2025” Plan is the first step in this strategic design, which is intended to replace foreign technology by increasing Chinese technological content by up to 70 percent by 2025 in the pharmaceutical, automotive, aerospace, semiconductor, robotics and other industries. For the Chinese government, economic growth and technological progress are also crucial for insuring



political stability within the country. In this respect, the Plan marks a turning point in Beijing’s industrial policy: the transition of a vast, predominantly labor-intensive industry to a capital-intensive industrial model with a high technological content. To this end, the country’s

leaders have decided to significantly increase investment in research and development, which grew by 11.6 percent in 2018 alone, reaching USD 293 billion and accounting for 2.18 percent of GDP. This investment also protected China’s domestic industry against foreign competi-



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tion. The path taken by Beijing harks back to the concept of “indigenous innovation,” a term widely used during the earlier presidency of Hu Jintao to describe a strategy for creating the technology needed to develop the country at home. In recent years, China has set up numerous barriers

to foreign companies entering the domestic market, creating favorable conditions for the growth of its industry, particularly by granting large subsidies to Chinese companies. However, despite repeated calls to produce technology nationally, in the recent past there have been re-

current acquisitions of foreign companies whose know-how is fundamental for the country’s bid to achieve global technological leadership. In some cases, competition has gone to the point of, if not beyond, infringing intellectual property rights. However, something seems →

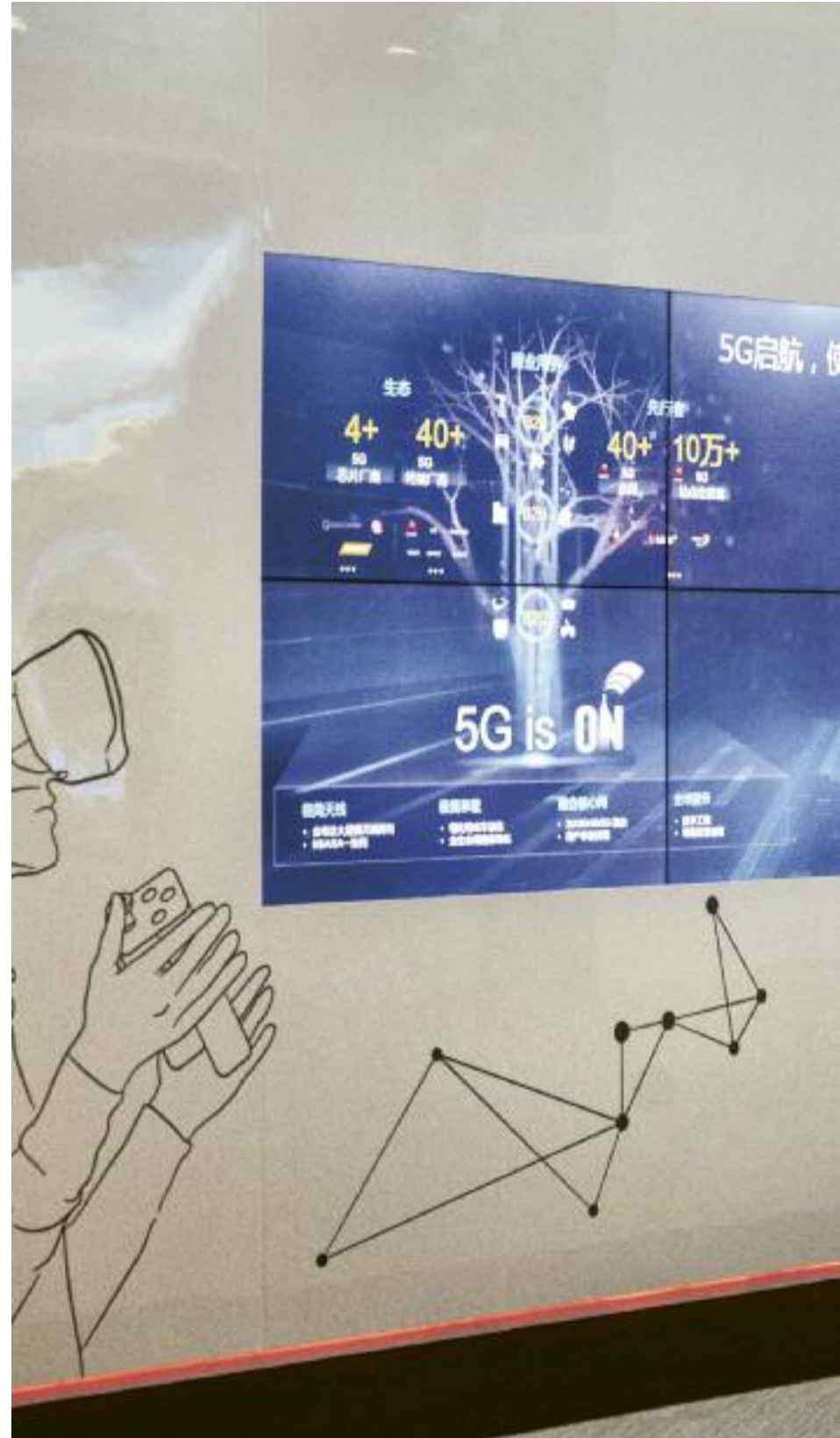
to be changing: on March 15 this year, Beijing gave the green light to a new law on foreign direct investment. The law will come into force in January 2020 and will take a few steps toward guaranteeing a level playing field for foreign operators, this to be accomplished by removing the requirement of technology transfer to gain access to the Chinese market and imposing greater penalties for patent infringement.

China's technological growth is particularly remarkable in the field of Artificial Intelligence (AI). As early as 2017, the Chinese government had declared supremacy in the sector by 2030 to be a strategic goal, with a significant increase in research spending in this area. AI is one of the key sectors in which the fundamental race for technological leadership will be run and the U.S. is still in the lead. However, a recent study by Price Waterhouse Coopers predicts a 14 percent growth in world GDP related to AI over the next decade, amounting to USD 15.7 trillion in total. China is estimated to receive USD 7 trillion of the total and North America about USD 3.7 trillion. Thus the gap between Washington and Beijing over AI seems set to close, with China potentially overtaking the U.S. over the next ten years.

The clash over the development and security of 5G networks

This technological race also requires building the physical infrastructure to support the economy of the future. This is why the development and security of 5G networks is one of the main reasons for friction between Washington and Beijing. The exponential increase in connection speed, up to 10 Gigabits per second, and the reduction in latency, the time between an input being sent to the network by the device and the output being received, will create huge advantages for all sectors of the economy, generating consistent productivity gains and allowing new businesses or entire economic sectors to emerge. 5G, however, will not be just an economic event. In addition to the full implementation and exploitation of the potential offered by the Internet of Things (IoT), or rather of the tools to build robotic factories, self-driving vehicles, smart cities and remote controlled devices, there are applications in the field of health, through applications such as telemedicine, and defense, to name only two. The geopolitical scope of the competition around 5G also includes the creation of international standards for the new network. Decisions in this field will be significant as they will not

only define the methods by which 5G networks will be built but will also have implications in terms of revenues for the companies involved. The companies whose technology will become the standard for 5G will be able to count on huge revenues in the form of royalties. According to some estimates, these will amount to 20 billion dollars a year by 2025, while the European Commission calculates that global 5G revenues will reach 225 billion euros in the same year. The most striking example of the current clash between China and the United States in the field of 5G is the case of the Chinese company Huawei. The company is currently the most technologically advanced and most competitive supplier in the 5G market, as it is the only operator that provides a marketable solution, complete with all necessary components. Washington believes Huawei may be a vehicle for the Beijing government to conduct industrial espionage and military intelligence activities in Western countries and, in general, in all countries where its 5G instrumentation will be installed. This interpretation is also based on the Chinese government's recent "National Intelligence Law," which requires the country's citizens and organizations to cooperate with the State in its intelligence work. The U.S. administration believes the company is also directly controlled by the Chinese government through a "Trade Union Committee" that owns 99 percent of the company's shares. As a response to the recent tension, in 2018 the Committee on Foreign Investment in the United States (CFIUS) blocked Broadcom's acquisition of Qualcomm, a U.S. company operating in wireless telecommunication, on national security grounds. The main fear is that the acquisition of Qualcomm would have led to a reduction in corporate investments in research and development, thereby increasing Huawei's competitive advantage. The powers of the CFIUS were strengthened by the approval by Congress of the Foreign Investment Risk Review and Modernization Act (FIRRMA). This new legal instrument expands the controls and opportunities for intervention to block potentially risky acquisitions, in particular in the case of the potential export of "emerging and founding technologies" that are essential for U.S. national security. Also in 2018, a U.S. law approved by the US Congress banned the purchase and use by the Federal Government of telecommunication devices produced by specific Chinese companies, including Huawei and ZTE. On May 15 2019, President Trump signed an executive order



banning U.S. companies from using telecommunication devices produced by foreign companies that might pose a risk to national security. Trump's decision is potentially a first step toward imposing a complete ban on Huawei from operating in the U.S. market and has its legal basis in the International Emergency Economic Powers Act, which gives the President the authority to restrict and regulate trade in response to a threat to national security. Furthermore, Google decided recently to revoke Huawei's license for the Android operating system in order to respect the guidelines set by the Trump administration. On May 21, U.S. trade secretary Wilbur Ross

granted a 90-day waiver, allowing Google and other companies to temporarily continue their trade relations with Huawei. The move, which was justified by the need to avoid computer security problems for consumers and companies that use Huawei's products, can also be read as an attempt to reach an agreement that avoids the inclusion of the company in the Entity List, the consequence of which would be to block relations between the Chinese company and its American suppliers.

Europe at the center of the clash

Europe is at the center of the 5G clash between China and the United

**THE FLASHPOINT**

The most glaring example of the current confrontation between China and the United States over 5G is the Chinese company Huawei, currently the most technologically advanced and competitive player in the 5G market. At the moment, Huawei is the only organization able to prove a marketable solution, complete with all the necessary components. In the photo: an exhibition hall at the telecommunications company's headquarters in Shenzhen, China.

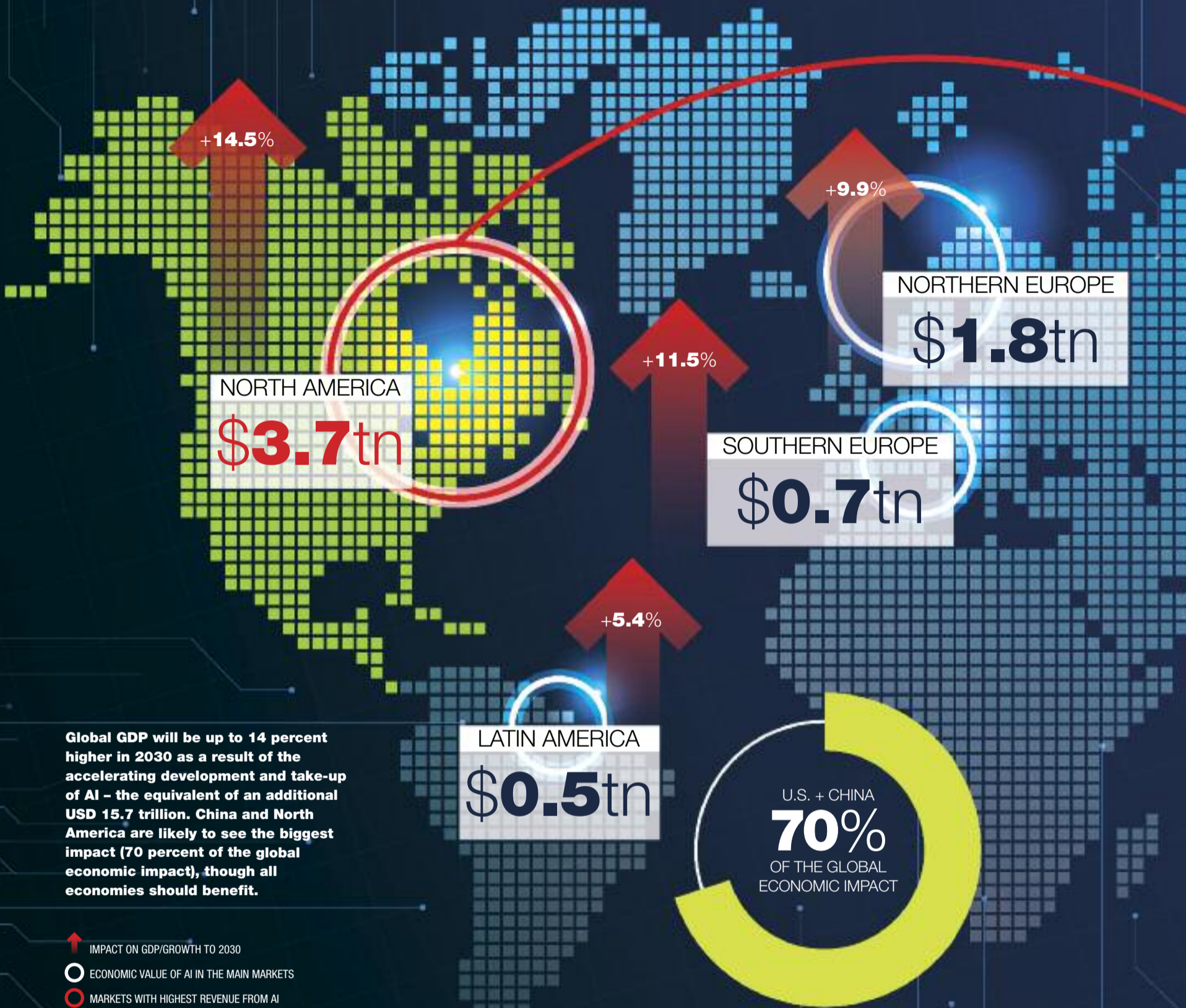
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States and, more generally, the challenge for technological leadership between the two superpowers. The U.S. administration has in fact exerted pressure on several European governments to dissuade them from installing Chinese technology and devices in 5G networks in the design phase. Trump has threatened to suspend the sharing of intelligence and military information with NATO partners if they fail to block Huawei's entry into their national 5G networks. However, the request does not seem to have had the desired effects: Germany, Italy, the United Kingdom and France seem intent on allowing the installation of Huawei components in their national 5G

networks, particularly the non-core components of the new network. The issue is turning out to be even more delicate for London, considering that the country belongs to the "Five Eyes Security Alliance" network, a U.S.-led intelligence alliance. For its part, Italy has recently strengthened and extended its "golden power" legislation, recognizing broadband communication services based on 5G as activities of strategic importance for the national defense and security system. Decree Law 22/2019, in particular, requires that the purchase of 5G components coming from countries outside the European Union be subjected to prior scrutiny by government au-

thorities. This picture shows the true extent of the opposition between the U.S. and China. Washington is trying to respond to the challenge of technological supremacy on the part of Beijing by making the operations of Huawei and other Chinese technology companies more difficult, at least in the American market. This type of approach may, however, represent a double-edged sword for U.S. industry: on the one hand it may encourage the repatriation of production that had previously been delocalized to Asia; on the other hand, the exclusion of Beijing from the American value chain may have extremely high costs, with risks for the procurement of components and

raw materials produced in China. Not to mention the potential Chinese retaliation on American companies operating in China. The U.S. has therefore seen a steady, and faster than expected, reduction of its technological leadership over its biggest international competitor. However, on closer inspection, the fault does not lie only with Beijing. The Federal Government's steady reduction of public investments in basic research, reduced 16 percent between 2009 and 2014, has certainly played a part. Only 20 of the 116 billion dollars spent on research and development, 0.6 percent of GDP in 2017, were allocated to science, space and technology. However, →



Global GDP will be up to 14 percent higher in 2030 as a result of the accelerating development and take-up of AI – the equivalent of an additional USD 15.7 trillion. China and North America are likely to see the biggest impact (70 percent of the global economic impact), though all economies should benefit.

- ↑ IMPACT ON GDP/GROWTH TO 2030
- ECONOMIC VALUE OF AI IN THE MAIN MARKETS
- MARKETS WITH HIGHEST REVENUE FROM AI

Source: PwC

20

90

7

THE 5G BUSINESS

Source: Strategy Analytics

5G handsets will generate almost USD 20 billion annually in global royalties for intellectual property (IP) holders in 2025. Cumulative 5G royalties will pass USD 55 billion.

Qualcomm, Ericsson and Nokia will capture over 90 percent of total 5G smartphone royalties in 2025.

Total 5G IP royalties will account for approximately 7 percent of the total wholesale price of a 5G smartphone.

Who will benefit the



there appear to be some signs of reversal, such as the signing of a bipartisan law last year that authorizes 1.2 billion dollars of spending on quantum computer research. It is also worth remembering that the U.S. still has an important advantage in key sectors such as semiconductors, aerospace, software and self-driving vehicles. The trade war, which sees Washington and Beijing involved in a protectionist spiral of tariffs and counter-tariffs, therefore appears more and more like an aspect of the overall rebalancing of power relations between the two superpowers. Trump can use the substantial trade deficit the United States has with China, USD 420 billion in 2018 alone, as leverage for a broader agreement covering the industrial and technological policy of the two superpowers. For Trump, the objective is to achieve access to the Chinese market without restrictions or discrimination and an end to unfair competition through the acquisition or, worse, the theft of American technology by Beijing.

How foreign policy priorities are changing

The resonance that the 5G issue has had internationally, the implications for security and the expected economic effects all reveal a fundamental aspect of the current and future framework of international political and economic relations: technology and, more generally, the challenge for technological and industrial leadership, will have a pervasive effect on companies and will probably reset the priorities for economic and foreign policy. Technology will increasingly be an element of hard power: owning networks with a high technological content and the greater competitiveness resulting from full use of the potential offered by the fourth industrial revolution will be decisive in establishing the future hierarchy between the powers. China and the U.S. definitely seem to have understood this. A global agreement to establish a level playing field that allows competition to take place on equal terms will be fundamental to prevent the lack of trust from turning into growing tensions that could extend well beyond the strictly economic field.



most?



Smart grids/At the forefront of energy technology

China's Big Game

Beijing is aiming to create smart grids that transmit electricity generated by renewable sources in real time. The Internet of Energy—a combination of AI, big data, cloud computing and Internet of Things—could be the key to decarbonizing the planet's economy



A CONSTANTLY GROWING MARKET

In 2018, the market value of the Chinese AI industry was valued at almost 6 billion dollars, having grown by over one billion a year from 1.6 billion in 2015. Photo shows a night-time holographic show on love, jealousy and the wrath of the sea gods projected on the beach at Rizhao, Shandong province, China.

LIFAN LI

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

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 📷 Nigel Dickinson, whose photos are featured in this magazine, is a British documentary photographer. His work focuses on the environment, the human condition, marginalized communities, sustainable development, identity, and culture. He has won numerous awards, including the World Press award in 1997 and the UK Press Photographers in 2008.

The concept of artificial intelligence (AI) was coined by the Americans in 1956. The IT colossus IBM proposed the notion of “Smart Earth” in 2008, which led to the rapid growth of AI technologies and the development of other concepts—big data, cloud computing, the Internet of Things (IoT)—largely bridging the traditional gap between theoretical sciences and practical applications. Despite having emerged later than the American one, Chinese AI policy has also developed rapidly, shifting its focus from national objectives to a more strategic level. In 2015, Beijing launched the first ten-year action plan aimed at transforming China into a hi-tech power, the so-called “Made in China 2025” plan, which accelerated a deep integration between information technology and the new generation manufacturing system, while promoting Smart Manufacturing. On March 19, 2019, the Chinese government published a document entitled “Directives for the promotion of a profound integration between AI and the real economy,” aimed at outlining the development of new generation technologies in various industries. Starting in 2017, the attention of Chinese AI policy shifted to the issue of integration between technology and industry; at the same time, the spread of strategically important industrial initiatives began in many cities in the context of the Internet Plus project for the development of four areas: mobile Internet, cloud, big data, and Internet of Things in the production, finance, medicine, administration and farming sectors. While in 2015 the market value of the Chinese AI industry was 11.241 billion renminbi (around USD 1.6 billion), by 2016 it had grown to 14.19 billion (around USD 2 billion), an increase of 26.2 percent on the previous year. In 2017, it exceeded 20 billion, reaching 21.69 billion renminbi (over USD 3 billion, equal to an annual growth of 52.9 percent), while by the end of 2018 it had reached almost 40 billion (almost USD 6 billion). In the same year, in the reference market for AI+ (artificial intelligence integrated in the various sectors of health, finance, education, security) it was in first place with 40 percent of the total, followed by the intelligent robotics industry, which accounted for 27 percent. This shows that Chinese companies are more interested in concrete AI applications.

An energy revolution

Among the most disruptive technologies, AI will launch a new era of energy and electrical development, especially in Smart Grids, while promoting the concept of the Internet of Energy. On June 13, 2014, in pre- →

18.1%

5,158

28,536 U.S.

TOP TALENTS IN THE AI SECTOR ACROSS THE WORLD

(As a percentage of all talent in each country)

- BEST TALENTS (THE MOST AUTHORITATIVE SCIENTISTS IN THE FIELD OF ARTIFICIAL INTELLIGENCE, WINNERS OF PRESTIGIOUS AWARDS, INCLUDING THE IJCAI COMPUTERS AND THOUGHT AWARD)
- TOTAL NUMBER OF TALENTS (RESEARCHERS WHO HAVE REGISTERED PATENTS OR PUBLISHED DOCUMENTS IN ENGLISH)

Source: National Energy Internet Development White Paper 2018 issued by Tsinghua University

14.7%

1,177

7,998 UK

11.9%

1,119

9,441 GERMANY

16.5%

1,056

6,395 FRANCE

20.8%

987

4,740 ITALY

5.4%

977

18,232 CHINA

15.6%

772

4,942 SPAIN

20.9%

651

3,117 JAPAN

14.3%

606

4,228 CANADA

16.2%

515

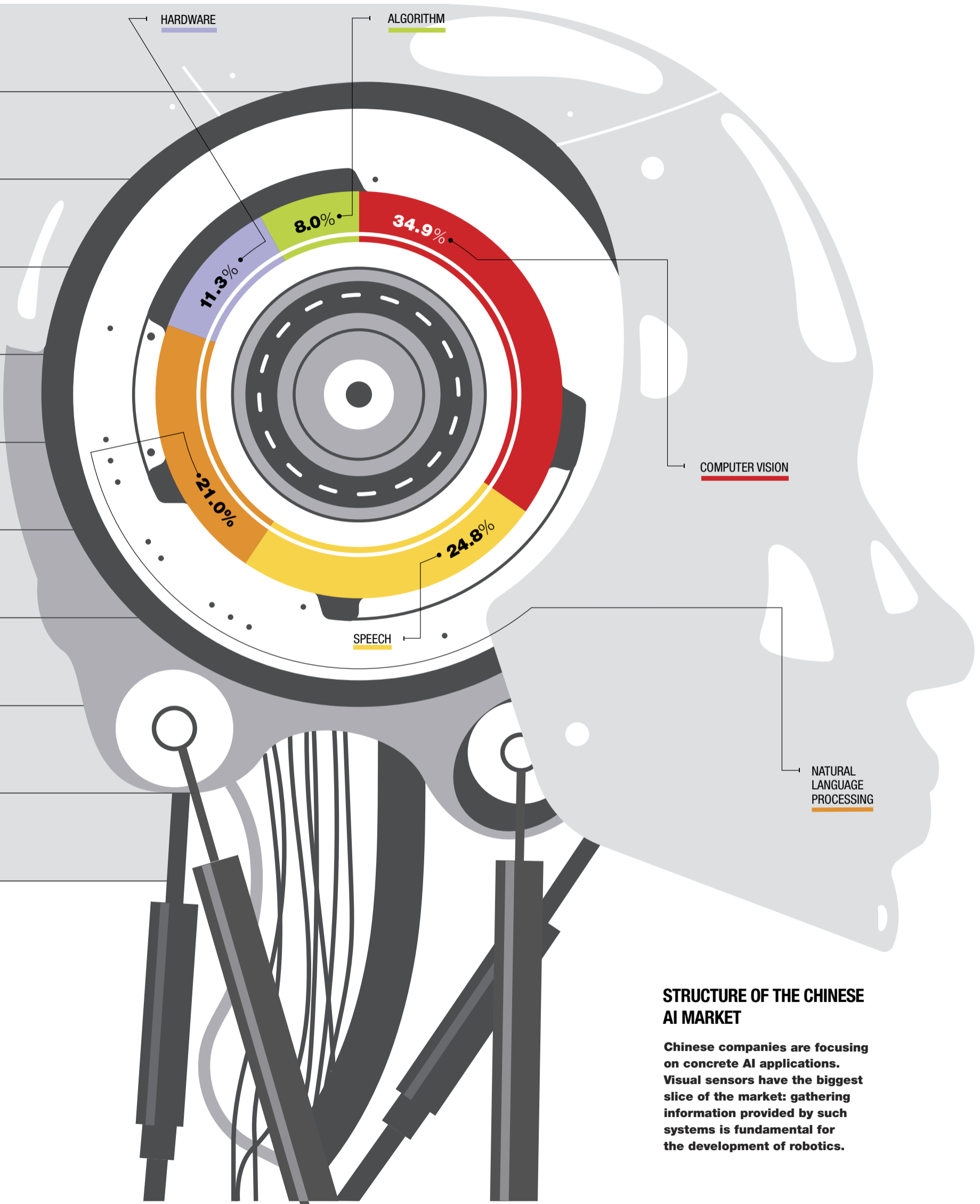
3,186 AUSTRALIA

senting the “Four revolutions, one cooperation” strategic agreement, President Xi Jinping illustrated the Chinese “Strategy for the Energy Revolution and Energy Development.” In 2015, Prime Minister Li Keqiang presented the “Internet Plus” action plan as part of the Chinese government’s 2016 work report. The National Energy Administration, the National Commission for Development and Reforms and the Ministry of Industry and Computing published a joint document entitled “Opinions and guidelines on promoting the development of Internet Plus smart energy.” After which, in 2017, the National Energy Administration announced the launch of the first set of 55 Internet of Energy pilot projects. In August of the same year, the State Grid Corporation of China (SGCC), China’s biggest electricity company, launched AI-related activities with the strategic aim of “creating an extraordinarily competitive Internet of Energy giant at global level.” In 2018, an increasing number of research institutes analyzed the theory, techniques and methodology of the Internet of Energy from

an academic perspective, and subsequently several research bodies linked to it were born. Cloud computing, the Internet of Things, big data and AI are key technologies for the Internet of Energy. AI technologies will be based on smart grids to stimulate deep integration between electricity, energy and information, thus ushering in a new era of energy and electrical development. In order to promote the strategic planning of the “Internet Plus” project by the Council of State, on March 29 2019, Tsinghua University produced the “White Paper on the development of the Chinese Internet of Energy (2018).” In addition to describing its state of development in various sectors such as politics, industry, technology, innovation, construction and public ecology, the document analyzes the current development from a global perspective, highlighting the challenges posed by future development. Several energy companies have promoted the first examples of integration between AI and intelligent electricity grids, laying the ground for an acceleration of research and development to ex-

plore the potential of AI. In addition to the SGCC, in 2014 the China Electric Power Research Institute (CEPRI), an electricity research institute, founded the AI Application Research Institute, a research center on the application of Artificial Intelligence. The integration of AI with smart electricity grids is something for the future, when the electricity grid will be largely interconnected. The SGCC began to boost research on big data back in 2014, and it has now created a big data platform for its corporate network with a hybrid architecture (i.e., both centralized and distributed) which promotes the transmission of huge amounts of

data and the transformation and smart distribution of electricity. The electricity system is the core and the articulation of the Internet of Energy, allowing the creation of an interconnected network of various types of energy and using the Internet and technology to transform the energy industry, achieving the horizontal integration of different energy sources and vertical coordination according to the “source-network-loading-storage” model. For the optimization of energy systems to be complete, networks must be shared, environmentally sustainable, secure and efficient. Strategically, between 2014 and 2018, Chinese policies on →



STRUCTURE OF THE CHINESE AI MARKET

Chinese companies are focusing on concrete AI applications. Visual sensors have the biggest slice of the market: gathering information provided by such systems is fundamental for the development of robotics.



© NIGEL DICKINSON

CONTROL SYSTEM

Pedestrians who cross the street more than three times on a red light are fined 20 yuan (around 3 dollars). Furthermore an image of their face appears on the video screens, attracting public ridicule. This is a new social control system based on face recognition made possible by video surveillance cameras installed in traffic lights.

the Internet of Energy initially focused on six levels: international treaties; macro-strategies; laws and regulations; industrial parameters; industry standards; and regulatory documents. To date, 296 policies and regulations have been issued by various government agencies.

From the point of view of business development, for companies that deal with the Internet of Energy, crossover has become an obvious choice. Internet companies are firmly entering the energy services sector through the Internet Plus channel. Communication technologies, for example, are used to control the entire flow of information, from production to energy consumption, and to expand the scope of energy interconnection, while big data technology applied to the Internet of Energy is increasingly being used to collect and analyze data on energy, devices, channels and consumption. This means, for example, that weather forecasts will allow us to plan energy generation rationally and plan its distribution accurately. As for the success stories, Huawei is beginning to venture into the photovoltaic industry to provide users with cleaner and safer energy by combining AI with photovoltaic technology. As of December 2018, there were 24,651 companies operating in

the Energy Internet sector registered in the business register throughout China. The new concept of the “Internet of Energy” has also triggered a strong expansion of the financial market. According to partial statistics, there are currently around 287 listed stocks linked to the Internet of Energy (for a total market value of over 3 trillion renminbi), involved in integrating industrial supply chain and energy storage systems with smart solutions, integrated energy platforms and services, as well as the development of new energy distribution projects.

A bumpy road ahead for Beijing

First, the Internet of Energy is a concept that requires a long development process. It is a sector in which China lacks technology, innovation, a distribution network and reserves. Despite the development in terms of technological innovation, it will be difficult for China to keep pace with the technological achievements of the West. The country still lacks key technologies needed for energy storage, the integration of different energy sources and the application of big data to the electricity sector, as well as a real electricity market and exchange platforms. Moreover, even if the

commercial use of AI begins to spread on a large scale, many technologies are still in an embryonic state. China, therefore, still has many crucial technical problems to solve. Second, the patent application process for the Chinese Energy Internet is moving slowly. As of December 2018, there were 3,118 research institutes connected with the Internet of Energy. The number of documents on the subject published in the last five years continues to increase. Research is focused on these six main themes: multienergy systems and integrated energy systems; virtual power plants; energy distribution; “Energy + big data” (the application of big data in the energy field); “Energy + Blockchain” (the application of blockchains in the energy field); “Energy + Distributed Transactions” (the application of distributed transactions in the energy field). As regards the Internet of Energy sector, there are few patents: in 2014, there were only 14, and although by 2018 they had reached 299, there are few of them in the area of transversality. Furthermore, the expected boom in talent training has not come about and the uneven development of infrastructure has produced the model of “a strong south and a weak north.” The first group of 55 pilot projects are

focused mainly along the delta of the Blue River and in southwestern China. The North still depends on a traditional energy production system and the AI sector has not been taken seriously.

Integration: not a simple solution

Information management is an inevitable trend in the energy and electrical sector but the data are hard to manage in a unitary way. How to organize all the different types of data effectively, extrapolate salient information and establish relationships is an important part of AI in promoting the creation of information technologies. Starting from the integration of different energy sources: energy is the fundamental problem that human society has always faced. Effectively integrating multiple energy sources and developing solutions that ensure its better use based on factors such as distribution, characteristics and public service energy companies are important ways to achieve energy savings and sustainability. In this process, not only is the quantity of data to be processed enormous, but the method of analysis is extremely complex, which is why AI has to showcase its talents. As regards integrating different technologies, whether it is big data, cloud computing or information interconnection, each contributes to promoting energy integration and creating the Internet of Energy. And it is only a small part of the technology that exists in modern society. With emerging technologies and the application of more mature technologies, more opportunities will be created in the future.

New challenges behind tariffs

The U.S. is at the forefront of artificial intelligence research. In May 2018, the White House hosted the American Industrial Summit, which brought together U.S. industry leaders to discuss AI policies and ensure the U.S. plays a guiding role in the global industry. Since 2015, the U.S. government's investments in research and development in this sector have increased by over 40 percent. But the rapid development of China in this area, which has led Beijing to compete with Washington in terms of spending on the sector, means that the U.S. now considers China to be its main challenger. When a new round of trade negotiations between China and the United States was launched on February 11 2019 U.S. President Donald Trump ratified the first U.S. strategic plan on AI, which requires federal agencies to give priority to investments in research and innovation in the field of artificial intelligence,



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while at the same time facilitating the use of government funds that contribute to the development of the industry. In the meantime, the Pentagon has established that the Joint Artificial Intelligence Center (JAIC) will introduce the use of AI in the field of military training. As early as November 2018, the U.S. Department of Commerce's Industry and Security Office reported on the latest technology export controls. The U.S. government is considering introducing controls over 14 crucial areas of technology, including Artificial Intelligence, integrated circuits, quantum computing and robotics. The technologies considered to be most advanced and innovative for national security are those that allow 3D face printing and voiceprint recognition. And the target country is China.

AI produces talents, but the best are not in China

In terms of competition in the AI sector, there are huge differences between China and the U.S. The chart shows the total number of talents in the AI sector of each country, i.e., researchers who have "registered patents and/or published documents in English" over the last ten years. While there are many of them, only 5.4 percent of Chinese talents are among the "best." However, as confirmed by a recent Stanford report, in the U.S., the percentage of "best talents" compared to the total num-

ber is just over 18 percent. Nevertheless, China should not be disappointed, for India fared far worse. Delhi has the third largest talent pool in the world (almost equal to the Chinese one) but its percentage of the "best" is less than 3 percent. As of June 2018, there were 4,925 AI companies worldwide. Of these, 1,011 were Chinese (20.5 percent of the total) and 2,028 U.S. (41.2 percent of the total). Beijing is home to the greatest number of AI companies (395), followed by San Francisco (287). As for the most widespread sectors, China seems to focus particularly on the senses: hearing, sight and oral production. But in the Internet of Energy area, China and the United States have begun to learn from each other. For example, the U.S. company TransActive Grid operates a blockchain in Brooklyn, NY that encourages residents to sell excess solar energy within the community and to use smart meters for statistical purposes. Generally, Chinese researchers and start-ups should use their imagination more and instead of imitating the West focus on long-term goals and try to be at the forefront in some areas. At the same time the U.S. policy makers should change course on AI, and begin to evaluate in a concrete way how to integrate infrastructure and public institutions with new technologies.

BIG BROTHER

To enter Beijing railway station you have to go through facial recognition machines, which scan the passenger's identity documents and face. Big Brother monitors 1.3 billion citizens.





Analysis/The real source of trade tensions between China and the U.S.

The Battle for 5G Supremacy

The Trump administration and Google's double move against the Chinese company Huawei reveals that the race to lead the superfast Internet is inextricably tied to recent trade disputes

SIMONE PIERANNI



Journalist and chief editor of *Il Manifesto*, he founded China Files, a Beijing-based agency that provides articles and reports about China to the Italian media, in 2009.

Author of *Cina Globale* (Manifestolibri, 2017) and the novel *Genova Macaia* (Laterza, 2017). He produced the podcast "Riscio" on contemporary China with Giada Messetti.

In October 2012, following an investigation lasting almost a year, the Permanent Select Committee on Intelligence of the United States House of Representatives concluded that Chinese companies Huawei Technologies and ZTE represented a threat to national security "because of their attempts to obtain sensitive information from American companies and their loyalty to the Chinese government." Barack Obama was in the White House at the time, and the Democratic president returned to the subject in 2014, when, shortly before meeting Xi Jinping, he defended the activities of the National Security Agency aimed at keeping Huawei under control. This made it clear that the suspicion towards the company founded in Shenzhen 1987 by Ren Zhengfei was completely bipartisan. The complicated relationship between the United States and China, with Huawei often the focus of the diatribe, therefore has a long history. It precedes Donald Trump becoming President and the "protectionist" wave based on the "America First" slogan, but ever since his election campaign Donald Trump has viewed China as the "number one problem" for the economy and well-being of the American people.

Why Trump wants to back China into a corner

From his protectionist standpoint, Trump is certain that Beijing in particular has benefited from globalization, hence his continuous references to China. The medley of all the times Trump mentioned the word "China" during the electoral campaign is now well-known, as are his fierce criticisms of past administra-

tions, whom he felt were responsible for having tolerated Chinese dominance, implemented, according to the current U.S. president, by following a well-defined trajectory involving state subsidies, fluctuation of the yuan and intellectual property theft. Even the issue of trade relations between Washington and Beijing has a long history, although it has undoubtedly accelerated at an increased pace between the end of 2018 and most of 2019. Barack Obama had favored a pivot to Asia strategy that mostly aimed at "containing" Chinese power: an example being the TPP (Trans Pacific Partnership), a free trade agreement with most Asian countries excluding China. It was a palliative move in reality, as China was still able to slip through the "boundaries" set up by Obama through bilateral agreements.

Trump, in addition to burying the TPP agreement and creating discontent among the Asian allies, decided to go straight to the heart of the problem by hitting Chinese goods with tariffs to rebalance trade with China—the U.S. currently buys much more from China than it sells to Beijing. This issue was at the center of the U.S. tycoon's election campaign and repeatedly emphasized once he had attained the White House. The reality facing the American administration at the beginning of his mandate, in November 2016, was alarming: the trade deficit with China had increased by 8.1 percent to USD 375.2 billion. After about a year of negotiations and attempts at international cooperation (As he did with North Korea, Trump lavished repeated compliments on his "friend" Xi Jinping), in July 2018 Trump de-

cided to impose his first tariffs on China, affecting products worth around USD 60 billion. China reacted immediately, but Trump warned Beijing: “We have another 200 billion dollars of goods to hit and, if that isn’t enough, another 300 billion.” True to his word, in December 2018, Trump announced new tariffs on USD 200 billion of Chinese goods. This was followed by a three-month extension, during which there were eleven rounds of negotiations until the total breakdown and Washington’s announcement, in mid-May 2019, that new sanctions of 25 percent would be imposed on USD 300 billion of Chinese products. China responded by imposing counter-tariffs of USD 60 billion on U.S. products. In the meantime, the clash over Huawei had already begun.

The Shenzhen giant: casus belli

During this trade confrontation played out at a distance and despite warnings from China that “there are no winners in a trade war,” it soon became clear what lay behind the tug of war on tariffs. At the end of 2018, in Vancouver, at the request of the United States, Meng Wanzhou, Huawei’s finance manager and daughter of founder Ren Zhengfei, was arrested and accused of bypassing sanctions against Iran. In the meantime, China arrested two Canadians, who were formally accused of espionage in May 2019, while in Poland a Chinese employee of the hi-tech company was accused of spying and ended up in jail (and was immediately fired). In this climate, on May 20, 2019, Trump said he was ready to sign an executive decree blocking supplies to about 700 foreign companies considered risky for national security, including Huawei. Then the Chinese company was blacklisted (together with another 70 companies). This action was clearly aimed at making Huawei and China pay for the only weak point in China’s hi-tech supply chain, namely semiconductors. Qualcomm, for example, is a supplier to Huawei (for 22 percent of its smartphones, according to its latest financial statements).

But for Huawei a more serious development came soon after that: as a result of the blacklisting, Google announced that it was revoking the license for the Android system operating on Huawei smartphones, shortly after the Chinese company had become the second biggest global seller of smartphones. Data for the first quarter of 2019 saw Huawei in second place with a 15 percent market share, behind Samsung at 22.8 percent, but ahead of Apple’s 13.5 percent.

After the twin move by Trump and

Google, two considerations emerged: the first is that the clash over duties is a corollary to something bigger; the second is that the big thing in the whole affair is the race for 5G.

Beijing gains ground in the race for 5G

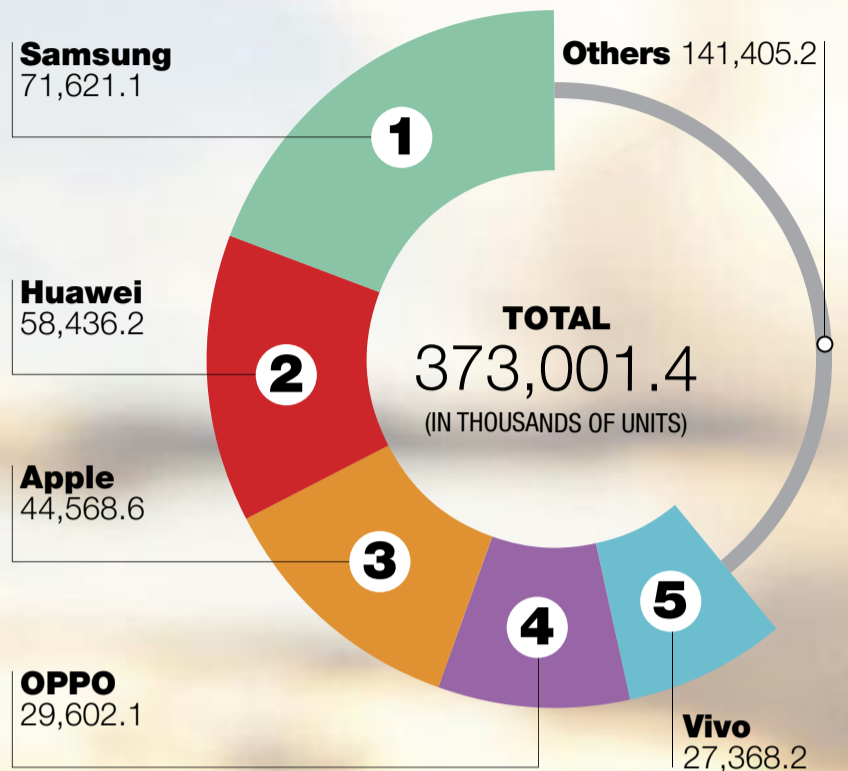
5G connections will drastically change the way we use smartphones, moving us more firmly into the world of the so-called “Internet of Things” and allowing whoever markets the hyper-fast network first to gain a resounding competitive advantage. And the importance of the 5G race is confirmed by the investments earmarked by Beijing. Chinese operators have planned around 400 billion in 5G-related investments between 2015 and 2020. Beijing’s 5G objectives are intrinsically linked to Artificial Intelligence, because the new networks will allow hitherto unimaginable processing speeds to be achieved, allowing algorithms to operate with less latency than in the recent past, a benefit related to self-driving cars. China is aiming to close the gap with the U.S. on artificial intelligence by 2020 and become the world leader by 2030. And on 5G China is ahead of the U.S. Beijing can already count on 350,000 5G cell sites, ten times the total of the United States, according to an analysis by Deloitte. China is also expected to be the largest 5G market in the world as early as 2025, with 430 million subscribers, twice the estimated U.S. figure. In the 13th five-year plan (2016-2020) and in “Made in China 2025,” the project launched by Chinese president Xi Jinping to make China the world leader in the export of technological and innovative products, decisively and momentously transforming the “factory of the world,” 5G is probably the most important goal. In March 2019, confirming the commitment of the entire Chinese government, the issue was among those considered “central” in the annual government work report delivered by Prime Minister Li Ke-qiang during legislative meetings.

The Internet of the future will be superfast

What will 5G mean? Faster connection speeds, the ability to connect multiple devices, zero latency. Experts believe that 5G will provide a maximum download speed of up to 20 gigabits per second, fast enough to download a full-length HD movie in seconds. 5G will ensure greater connectivity, and therefore shorten waiting times when sending data and allow more devices to connect to the network simultaneously.

But if this were all, it would simply have been created to speed up the apps we now depend on in our daily

THE WORLD’S 5 BIGGEST SMARTPHONE PRODUCERS
1ST QUARTER 2019



Source: Gartner

The mobile market

Huawei overtakes **Apple** and is set to become world’s biggest producer, even surpassing **Samsung**. In the first quarter of 2019, the Shenzhen giant has continued **to increase sales**, which have fallen globally by 2.7 percent. Huawei has sold **58.4 million smartphones**, recording growth of 44.5 percent, with the most satisfying results achieved in Europe (**+69 percent**) and China (**+33 percent**).

NUMBER OF 5G CELL SITES PER 10,000 PEOPLE

Source: Deloitte



NUMBER OF 5G CELL SITES PER 10 SQUARE MILES



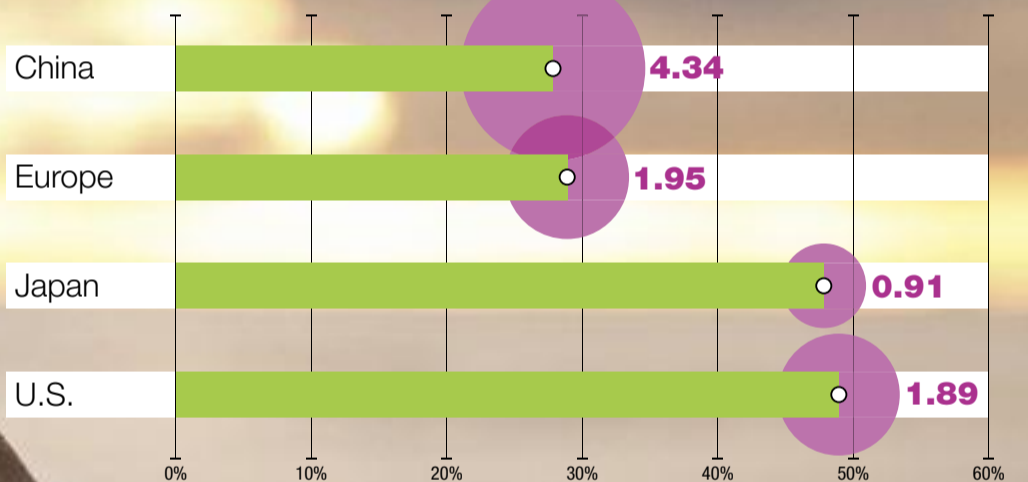
Beijing can count on 350,000 5G cell sites, ten times the total of the U.S., according to an analysis by Deloitte.



CHINA WILL BE THE BIGGEST 5G MARKET IN THE WORLD BY 2025

■ PENETRATION RATE (IN PERCENT) ■ NUMBER OF SUBSCRIBERS (IN HUNDREDS OF MILLIONS)

Source: GSM Association



China is expected to have 430 million users by 2025, double the number in the U.S.



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DIFFERENT VISIONS

The divisions between Donald Trump's United States and Xi Jinping's China are likely to persist, although talks between the two parties are still ongoing.

lives. Of course there is much more to it than that, because 5G also means smart cities, self-driving vehicles, remote robotics, facial recognition and new security techniques, drones used in agriculture, quantum super computers. It will be a real revolution, because it will mostly be used in artificial intelligence and manufacturing, thus making 5G an important element for the future of every country's GDP. According to a report published in 2017 by Accenture "the first country to distribute and market ultrafast 5G mobile networks will have a huge economic advantage: 500 billion of GDP" and millions of jobs (three million is the estimate for the U.S., for example). In China, of course, there is no lack of planning in this respect: "its five-year plan aims to achieve an extensive launch of 5G by 2020 and all major wireless service providers (including Huawei and ZTE) have conducted numerous 5G studies. The Chinese one will be perhaps the biggest for 5G by 2022." And Huawei is not alone: Xiaomi and ZTE (which has also had many problems with the U.S. similar to those of Huawei, with the aggravating addition of being a state company) are also there. Chinese companies—furthermore—

have also gained ground in foreign markets: Huawei has already shipped components for over 10,000 stations in over 60 countries. ZTE has set up a partnership with Dutch operator KPN to test the 5G network. Huawei's competitive prices and reliability have already been tried and tested first-hand by consumers in their smartphones (considered better than Samsung's and Apple's by many, thanks to their longer battery life).

Trump's strategy does not convince Europe

In its determination to combat Huawei, the U.S. has failed to deal with its own market. Prior to the decisions made by Trump and Google, the U.S. administration had put extreme pressure on its allies around the world, demanding a halt to Huawei's activities. U.S. government officials met with counterparts and executives of telecommunications companies in countries considered to be "friendly" and in which Huawei's telecommunications systems are already used, such as Japan, Germany and Italy. Washington's goal is to alert its allies to the risk for cyber-security, implying the need to block the Chinese company. Japan, Germany and Italy are the countries to which the U.S.

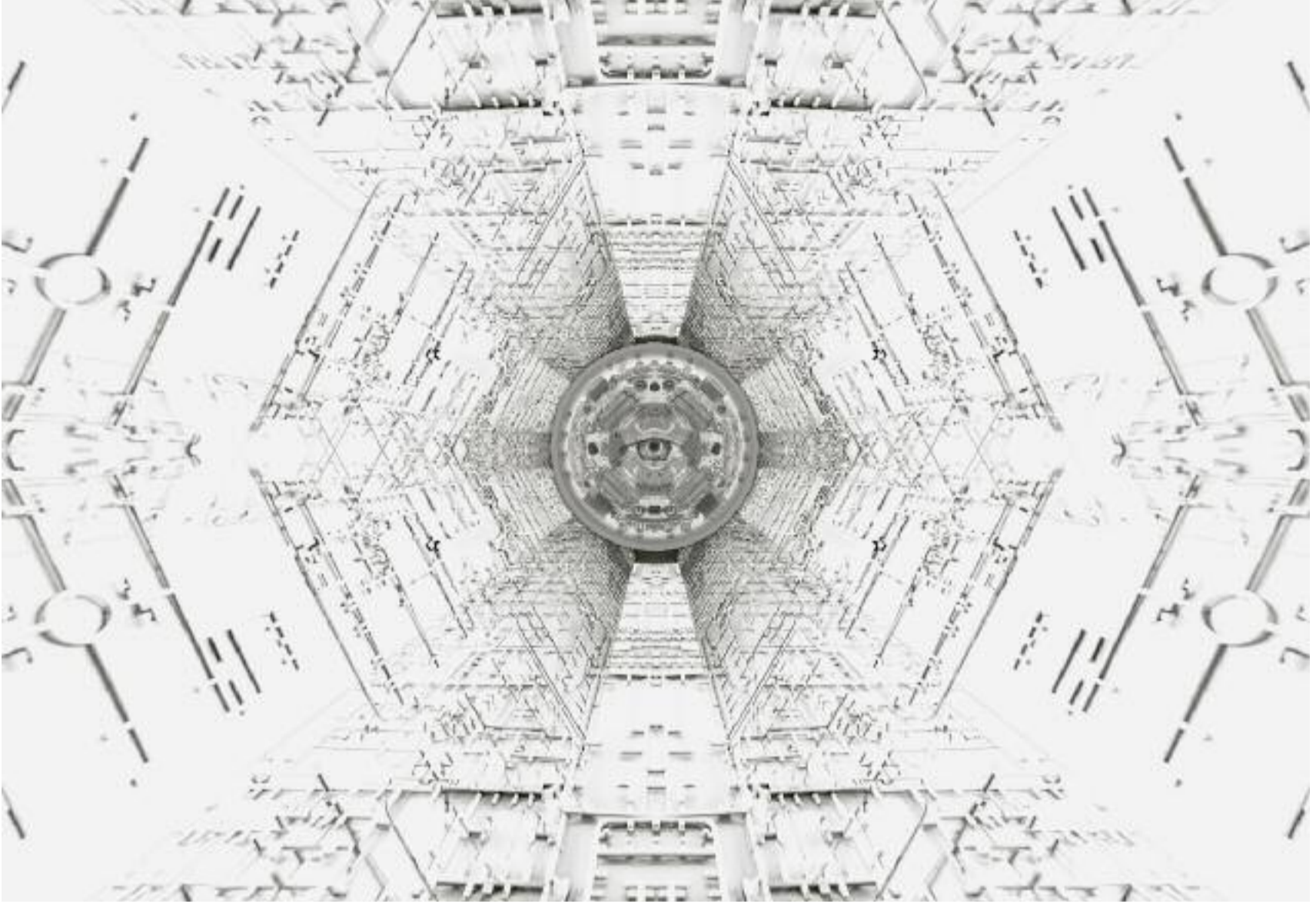
pays the most attention, as these countries host U.S. military bases and therefore it fears Chinese interference in their communications. Trump's strategy has achieved some results (though not in Europe, where countries are doubtful about U.S. demands). In August 2019, the Australian government excluded Huawei from supplying equipment for the country's future 5G mobile network on national security grounds. The same decision was taken a few days later by New Zealand

And following the blacklisting by Trump and the decision taken by Google, 5G was the focus of comments made by Ren Zhengfei, the head of Huawei. The elderly founder recalled the long road traveled by his company, surviving through the most recent phases of Chinese development, from the opening and reforms introduced by Deng to Xi Jinping's "New Era," becoming the leading company in Beijing's new international stance. After stressing his company's competitive advantage over Western competitors in the field of 5G (which he measured in a couple of years), Ren specified that "we sacrificed ourselves and our families for our ideal, to stay on top of the world. To reach this ideal, sooner or later there will be conflict with the United States."

Still a long game to play

Huawei's responses to what Beijing is experiencing as a real attack by the U.S. go in different directions: on the one hand, the company has accelerated procedures to create its own operating system to bypass the ban imposed by Trump, on the other hand, on May 29, Huawei sued the U.S. government, raising the issue of the unconstitutionality of the prohibition imposed on U.S. companies to purchase its network equipment. The game between the United States and China, which is played in so many fields, will last a long time, although talks between the two parties are still ongoing. Neither the U.S. nor China, at this point, seem able to give up any of their claims, despite the complaints made by U.S. companies (the latest to have expressed doubts about Trump's actions is Microsoft) and despite the Chinese need to continue to guarantee the growth endangered by this trade dispute, growth that will keep the country's internal social situation under control.





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Europe/The freedom to set the global agenda on privacy

Not on Attack but in Defense

Brussels does not dominate the technological revolution, but the very absence of European big tech companies gives it the freedom to regulate digital monopolies and establish itself as a model legislator in the field of privacy protection



CHRISTIAN ROCCA



Columnist for the daily newspaper *Il Sole 24 Ore*. Former director of *IL - Idee e Lifestyle* magazine and special correspondent and columnist for *Il Sole 24 Ore* and US correspondent for *Il Foglio*. Currently works with several Italian and international newspapers. His latest book is *Chiudete Internet: Una modesta proposta* [*Close the Internet: A Modest Proposal*] (2019) published by Marsilio.

Europe is not at the forefront of technological innovation, given that none of the great digital platforms of the current era, with the exception of Spotify and the now outdated Skype, were born there. The Old Continent obviously remains a lively part of the world, with the ability to innovate in many industrial sectors, particularly manufacturing and high-quality mechanics, and to bring together humanist and technical culture more effectively than others, but the path to progress in the 21st century has been laid by Silicon Valley and the challenge for the future is to avoid becoming victims to the new technological leadership of China.

Europe is defending itself with great expertise, and the absence of Big Tech companies gives it more freedom to face one of the decisive issues of the day, which is to try to regulate digital monopolies and protect the institutions and democratic processes of free societies. The much-reviled Brussels bureaucrats have shown themselves to be farsighted about protecting personal data from commercial, social and political abuse and manipulation and safeguarding intellectual rights. The privacy directive, which was approved two years ago and came into force in May →



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UNITED STATES. There is a lively debate here on the need for federal personal data protection regulation that can shield the country from episodes such as the Facebook-Cambridge Analytica scandal. Many people believe that the GDPR should be taken as a model by the United States, including, for example, Apple CEO Tim Cook, who recently argued that “regulating hi-tech giants is crucial and must be done urgently and along the lines of the E.U.’s robust General Data Protection Regulation, not with the timid approach taken in the United

States.” The state that has committed itself most strongly on this front is California, where the California Consumer Privacy Act (CCPA), the strictest personal data protection legislation in the United States, was approved on June 28, 2018. The law will come into force in 2020 and, obviously, it will only protect Californian citizens. It is also worth remembering that many local operators—the Silicon Valley giants and others—are already “forced” to apply the GDPR protections if their business also targets European individuals.

2019, followed by the copyright directive this year, are the first serious attempts by an important political institution to find a way to regulate the digital revolution.

A model legislator in the field of data protection

As a result of the first directive, on May 25, 2018, a general data protection regulation, the GDPR (General Data Protection Regulation) came into force, which obliged the global giants of the Internet to comply with European legislation even in the absence of similar U.S. laws. The GDPR has become a model for similar legislative initiatives in the United States at the local and feder-

al levels. It’s now cited by U.S. analysts and politicians, who have begun to publicly argue that social platforms need to be restricted and contained. Brussels’ intervention was conceived long before the case of the Facebook profiles used for political purposes by Cambridge Analytica without the consent of the users exploded, and came into force long before Facebook founder Mark Zuckerberg, after denying it for years, acknowledged that political disinformation generated by agents of chaos circulates undisturbed on his platform. The GDPR is a complex code of ninety-nine articles that deals with the issue of violation of privacy and the prevalence of algorithms in demo-

cratic systems. Thanks to Europe, the owners of the personal data collected by the Silicon Valley giants have once again become social media visitors, while those who store them, analyze them and then sell them no longer have total freedom to use them without restrictions. This is only the first step—there is still a lot to do—but for the first time data owners are granted the right to access their information, which they can correct, transfer and delete. Everything is still very cumbersome, but companies that store private information now have to follow very strict rules on data collection, use and protection, or pay fines, as they have already been forced to do by European authorities,

of up to 20 million euros or up at 4 percent of annual profits. Brussels is serious and has also prepared a self-regulation code for Facebook and other social media to try voluntarily to stop the spread of fake news and the manipulation of online information. Self-regulation is of little use, but the European initiative provides encouragement for U.S. and international political institutions, which will have the task, in the coming years, of breaking up the monopolies, freeing competition and writing the code for the digital age. Personal data are worth so much that they have become “the new oil,” Europe has responded in a more powerful and more sophisticated way



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EUROPE. Since May 25, 2018, the GDPR has been in force across the E.U. The text attempts to standardize European data processing laws and our right to have full control of our personal data. The regulation consists of 99 articles and provides clear rules on disclosure and consent, setting limits on the automated processing of personal data, rigorous criteria

for the transfer of the same outside the European Union and strict rules for data breaches. Among the key points of the legislation are the right to be forgotten and to data portability, and the right for users and national authorities to be notified of breaches. The new rules must also be applied to the big U.S. Internet companies, including Google and Facebook.



CHINA. On May 1, 2018 the voluntary Information Technology-Personal Information Security Specification Standard (hereinafter “the Standard”) came into force in China. It regulates the processing of personal data, including the gathering, storage, use and sharing of data. The text was revised on February 1, 2019. It is an evolution of the law on cybersecurity, approved in 2016, which required IT infrastructure operators to store “personal information and vital data” for China “collected and produced in China.” The Chinese government considers these measures to be in line with international standards. The Standard applies to both public and

private entities and is also adopted by hi-tech and digital payment giants from Tencent to Alipay. In presenting the concept of data controller, the document bears some similarities to the GDPR, but it deviates from European legislation in its definition of sensitive personal data. The Standard regards “sensitive” data to be any data which, if treated inappropriately or lost, risk causing harm to people or property. Although this is a voluntary standard, and therefore not legally binding, it is adopted by the Cybersecurity Administration of China (CAC), the industry supervisory body, to assess the personal data protection implemented by companies.



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that personal data are if anything the human rights of the 21st century. Some of the big technology companies, including Apple, a company that does not monetize its customer data, have come to this conclusion too. According to CEO Tim Cook, privacy is a “human right” and the protection of personal data is similar to traditional civil liberties, such as freedom of speech and freedom of the press.

Beyond privacy, there is also copyright

With a troubled political and legislative process, the European Parliament and the other European institutions have moved beyond priva-

cy and approved the copyright directive, which can also be defined as the first serious attempt to protect the rights of intellectual and journalistic content producers against commercial use without consent on the big digital platforms. The European copyright directive had a much more difficult gestation than the privacy regulation, and its approval was complicated by an extensive campaign of pressure on public opinion by digital platforms and by the tenacious ideological opposition of numerous populist and techno-anarchist groups, first among them the Italian ones, which in recent years have dominated European attention and election results.

The text of the directive is vague, it will be subject to different interpretations and will have to be transposed by the individual countries of the E.U. with ad hoc rules, but it provides protection for the business of news producers that is similar to that already in force for music, cinema and television, as well as support for a quality information system undermined by the free and therefore increasingly dependent social media algorithm. This enlightened European leadership is not to be underestimated, because it has carved out a decisive role for the E.U. institutions and member countries in the global debate on regulating the most controversial aspects of the digital revolution, but also on

the climate and other issues affecting contemporary society. It represents the critical conscience of the free world, complementary to that of the United States, which is aimed at maintaining technological hegemony. Europe, the United States and the allied countries would still be an unbeatable force, even in the challenge with the Chinese on 5G technology, if only they would continue, as in the past, to act strategically by mutual agreement, each according to their abilities, instead of unilaterally chasing an empty nationalist rhetoric which is destined to be defeated.



Futures/An artificial decision-making system is used in 90 percent of trades

Trade Runner

Computers and algorithms are replacing human operators in financial trading, from foreign exchange to commodities. Computers' choices are determined by unlimited memory and strict logic, bringing hidden pitfalls that we do not yet fully understand

FRANCESCO GATTEI



Executive Vice President, Scenarios, Strategic Options & Investor Relations of Eni, previously responsible for the E&P portfolio at Eni, where he also held numerous planning, negotiation and commercial roles in Italy and abroad.

In April of 1968, a computer beat a human being for the first time, albeit on movie screens. In *2001: A Space Odyssey*, HAL 9000, the first in a series of increasingly unstable artificial intelligence systems, was not content to beat the astronaut Frank Poole at chess. A few minutes later, HAL killed him, along with a group of other people who were hibernating in the spaceship. However, the sole survivor managed to deactivate the computer by making it regress to childhood, thus temporarily winning the war between man and machine. HAL was the first example of a psychotic computer appearing in the movies. It was then followed by increasingly humanoid machines such as the replicants in *Blade Runner*, or Ava in *Ex Machina*, tending toward both self-determination and schizophrenia as well as an irresistible and sometimes understandable aversion to the human species.

Over the last two decades, fiction has transferred from the screen to become reality. IBM's Deep Blue broke the ice with chess. Like HAL which had replicated the Roesch-Schlage match of 1910 but had cheated, calling checkmate early when it could have been avoided, in 1997 Deep Blue also took advantage of our fragile psychology. At the end of the first match—lost to Gary Kasparov—Deep Blue made a move that was assessed by most as useless and illogical. The Georgian champion's post-match analysis showed that move 44 pointed to a capacity for calculation impossible even for a grandmaster. The



move was also extraordinary for a new-generation computer, resulting in a potential checkmate only 20 moves later. But that move, first misunderstood then celebrated, had been the result of a random choice that the PC made when the program joined the match. At that point, poor Kasparov gave up the challenge before even starting to play. In other words, he had appreciated his own finite nature. He con-

ceded the second game, which could have resulted in a draw just like with Poole, and he made other simple mistakes before losing in the sixth match in only 19 moves, his shortest defeat.

The match in the financial markets

Something similar is happening today on other chessboards, this time in fi-

**MAN VERSUS MACHINE**

After the many examples recounted in science fiction, on May 10 1996, the world witnessed the first great challenge between human and artificial intelligence. Garry Kasparov, the world chess champion at the time, sat down at the chess board facing Deep Blue, a computer designed by IBM.

That first challenge, involving a series of 6 matches, began with the historic victory of the machine, but Kasparov won 3 of the subsequent matches and drew 2, thus winning the overall challenge. In the rematch the following year, however, the computer, which had evolved further, was able to prevail by 3.5 to 2.5.

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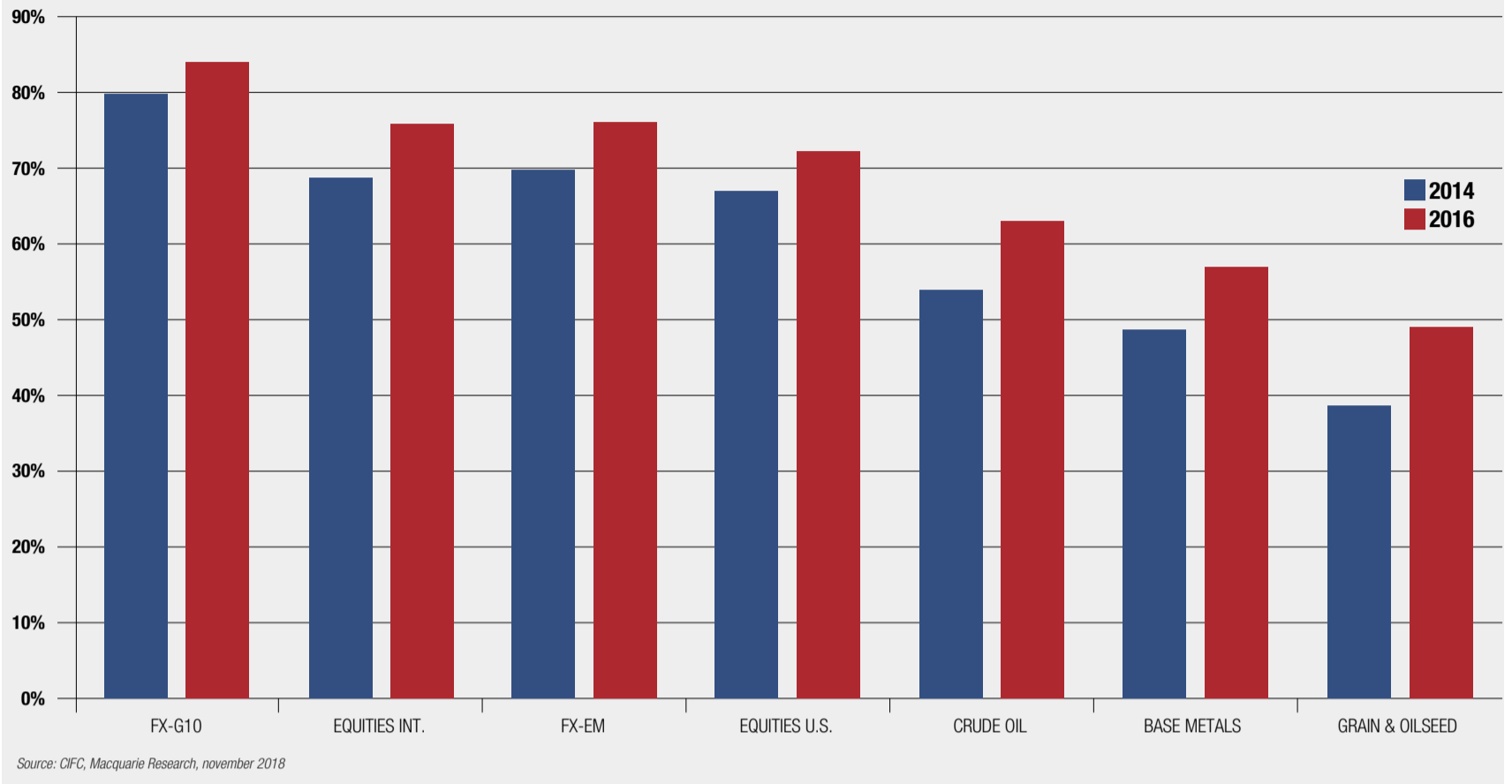
nancial trading. Humans are conceding the match ahead of time here, too. In the last 20 years, in fact, we have not limited our use of computers to play chess, an application too trivial considering that your smartphone has a chess skill rating of 2900 Elo points, higher than that of the irascible and ingenious Bobby Fischer or Kasparov. We have transferred this potential to financial trading, from for-

eign exchange to commodities. Computers do not have the same emotional fragility as humans; their trading choices are made with unlimited memory and strict logic, thus enabling them to make the most efficient move from the rational options available in their memory. These skills, once set up in advance by the programmer (Deep Blue or HAL were two heavyweights in instantaneous computation

but had a rigid memory), are now self-learned by the computer itself. We enter here into the magic of knowledge and self-determination. Humans only determine how the machine will develop its skills, while it is up to the computer to use algorithms (Algos) to define key correlations between variables and determine the most efficient actions to take. Today half of trades in the most advanced futures markets are

made computer-to-computer, with the remaining 40 percent of transactions made passively by replicating indexes or key variables. In fact, only 1 in 10 trades is set up by a biological neural network with all the strengths and fragilities of the human mind. The other 9 trades entail the use of an artificial decision-making system by at least one of the two parties. In commodities in 2016, algorithms →

AUTOMATED TRADING IN THE U.S. FUTURES MARKET (%)



Automated trading systems handle 72% of trades in U.S. stock indices, 75% of those in international stock indices, 84% of G10 currency trades, almost 60% of metals and 65% of the trade in crude oil.

controlled over 60 percent of oil trades, 45 percent for grain, 54 percent for precious metals and 90 percent for foreign currency exchanges.

The pitfalls of algorithms

Automatic trading, while instantaneous and unaffected by mood, has hidden pitfalls that we have not yet fully understood. In fact, algorithms that connect different variables, opening or closing thousands of financial positions in fractions of a second, generate a process that maximizes the weighting of short- or very short-term variables, the most frequent newsflows and details coming from the most transparent economic regions. The

weighting of fundamentals is lost, while the role of short-term correlations and temporary arbitrage increases. In addition, whether the price signal is adequate to build a sustainable business is not considered in any way. The objective of quantitative trading is margin trades, not finding a position to be maintained for 12-18 months like even the most hawkish traders, traditional hedge funds. Moreover, the specificities of every single market, whether oil, copper or coffee, are being mitigated, with an increase in the weighting given to macroeconomic information to guide choices in individual sectors. In short, such a quantitative process leads to an exaggeration of the value of input data, increasingly maximizing the weighting of correlations of those published variables which are becoming increasingly more relevant in the deep learning process and limiting consideration of the very short-term, where correlation between data, like weather forecasting for the next few hours, is more immediate and direct. The value of the most frequent data also increases the weighting of statistics that have historically been more marginal. For example, in the oil market, electronic data preference has for some years focused on the number of rigs active in U.S. onshore, information published by Baker Hughes since 1944, and although this data has been almost completely irrelevant to trading for decades, it is now considered a proxy for U.S.

growth and therefore global offerings. Weekly data on the U.S. oil inventory are hyper-analyzed in two publications, one is issued by the American Petroleum Institute (API) and the other by the U.S.'s Energy Information Administration (EIA), the two reports appear only a couple of days apart. The data do not match, and the trends can even be opposed, with an accumulation in inventory according to one agency and with a decline from the other. Even so, comparison with commonplace expectations is immediate and affects prices. In this case, the inventory delta is an estimate of the demand and supply balance in the U.S. market and even a global market proxy. As with rig data, the delta adds global value to local statistics covering the U.S. market that only accounts for 20 percent of world consumption and 10 percent of the offering and only a few percentage points in terms of exports. Local U.S. dynamics can in turn be conditioned by the refining cycle, by exports, by weather factors, and by local pipelines. The Algos provide no in-depth study, only an immediate comparison between expected value and published statistics. Automatic trading is not limited to the oil market. Computers' fingers are also covered in chocolate. In January 2016, the outlook in the cocoa market was bullish in anticipation of a significant harmattan, a sandstorm that periodically affects the countries on the Gulf of Guinea, where 70 percent of the world's co-

coa is produced. But, contrary to expectations, the market has seen a fall in the price of cocoa, one so violent and sudden that it cannot be explained with the fundamentals. The reasons for the fall are related to the decline in the Chinese stock market and fear of a hard landing for the China's domestic economy. However, the Chinese only consume one percent of the world's chocolate. Only a correlation between the collapse of the Chinese economy and a similar economic crisis in Western countries could justify such a trend in the price of cocoa. A further effect of this digital cacophony is the explosion of volatility in moments of uncertainty with faster machines simultaneously making similar decisions with the same data set, and when this volatility explodes, the system becomes radically out of control. These events are known as flash crashes, inexplicable meltdowns within a few minutes. To give an idea, in the oil market in the last two months of 2018, as part of a marked price drop, fluctuations of over 4 percent occurred in one-fifth of sessions, practically once a week. These were not true crashes, only frequent skidding. It is hard to justify such volatility with the fundamentals or with new data. It was in fact due to trading mechanisms acting simultaneously, driven by macroeconomic news or the oil industry itself and in the wake of a trend to sell off all global financial assets. For example, on December 24, oil dropped by 6 percent,

then recovered by 10 percent on December 26. The only major news in that period was the Christmas ham or more probably, a more balanced position in macroeconomic outlook.

The retreat of human traders

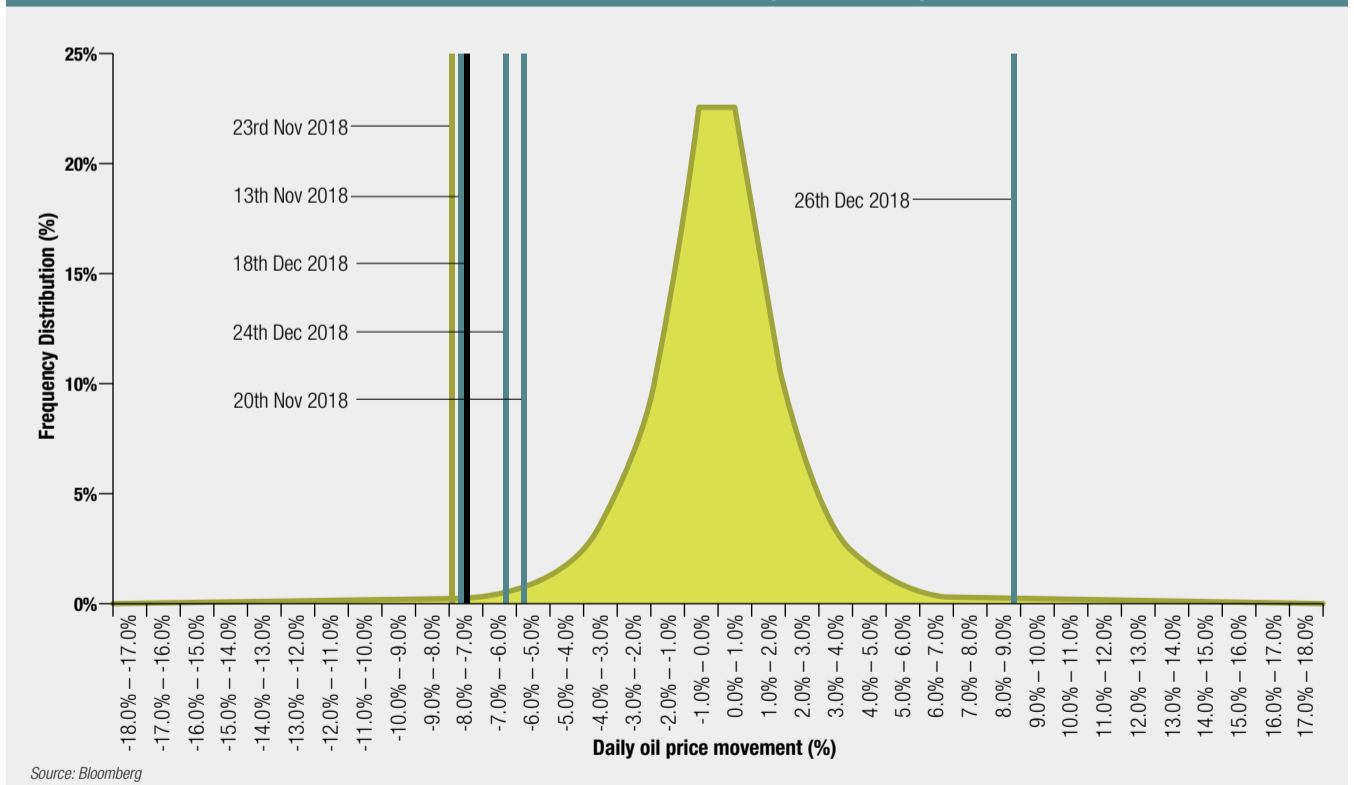
The most sinister aspect of Algos trading is, however, the exit of traditional operators and their daily contribution. In fact, the difficulty of operating in excessively complex and volatile markets leads humans, like the chess grandmasters Poole and Kasparov, to throw in the towel. Paradoxically, the same people who were accused of feeding market volatility, hedge funds, have to foot the bill. The idea of being able to identify a weakness in the market based on knowledge of the fundamentals is overwhelmed by the speed of analysis by quantum funds, which ensure higher yields. The large, historical hedge funds are forced to shut down, just like the neighborhood bookstores driven out of business by Amazon. In 2018, only 130 of the 368 hedge funds working in commodities six years earlier remained.

Even Andy Hall, nicknamed “God” for his abilities to predict trends of crude oil prices, shut down his Astenbeck Capital Management Commodity Fund in 2017. The same has also happened to the specialized funds at Clive Capital and Centaurus Capital. Brevan Howard closed in November 2018, too. Also in cocoa, the infamous “Chocfinger,” Anthony Ward, melted down his fund in 2017. According to Ward, automatic trading in the past created distortions of between 10-15 percent in the values of the fundamentals, an “irritating but often manageable” level. Today that value would be between 25 and 30 percent. The rise of the machines is injecting great volatility into the markets. In the words of Andy Hall as he closed his fund, “investing in oil under current market conditions using an approach based primarily on fundamentals has therefore become increasingly challenging.” We are conceding the match and enjoying the thrill of digital trading. We refer to the need to focus on the long-term, for a fairer and less speculative market, but at the same time we are applying an increasingly obscure, volatile and short-vision model. “Greed is good, greed is right, greed works. Greed clarifies, cuts through and captures the essence of the evolutionary spirit.” No longer is this Gordon Gekko describing the true strength of Wall Street. It is now a modern supercomputer that has taken the baton, with even more disruptive firepower and cynicism. It learned to do so all by itself, in only a few years, too.



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FREQUENCY DISTRIBUTION OF DAILY OIL PRICE MOVES (1983-2018)



Source: Bloomberg

During the last two months of 2018, in the context of a marked drop in prices, fluctuations of over 4% were recorded in one fifth of the sessions (practically once a week). On December 24, oil fell by 6%, subsequently recovering by 10% on December 26. This volatility is difficult to justify by resorting to fundamentals or new information.





The Geopolitical Challenge

The rivalry between China and the United States is also playing out over the question of who will dominate in Southeast Asia, a strategic area for several reasons. The South China Sea is an “energy mine,” with a potential yield of roughly 190 trillion cubic feet of natural gas and 11 billion barrels of oil, based on proven and likely reserves. The area is also a vital trade route. Furthermore, the ASEAN countries, whose demand for energy is expected to grow by two-thirds by 2040, plan to become a market of considerable interest for exporting countries. Also joining the field are Japan and South Korea, both traditional U.S. allies finding themselves in difficulty due to the rise of China.

Scenario/The risky game around the “nine-dash line”

Energy Rivalry in Southeast A



While above the surface the clash between the U.S. and China will involve missiles and landing strips, the underground battle will be fought for exploration and extraction rights. The South China Sea reserves are crucial given the booming power demand in the area

sian Region



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A monorail train travels above the Bukit Bintang shopping and entertainment district of Kuala Lumpur, Malaysia.

M

ROBERT JOHNSTON



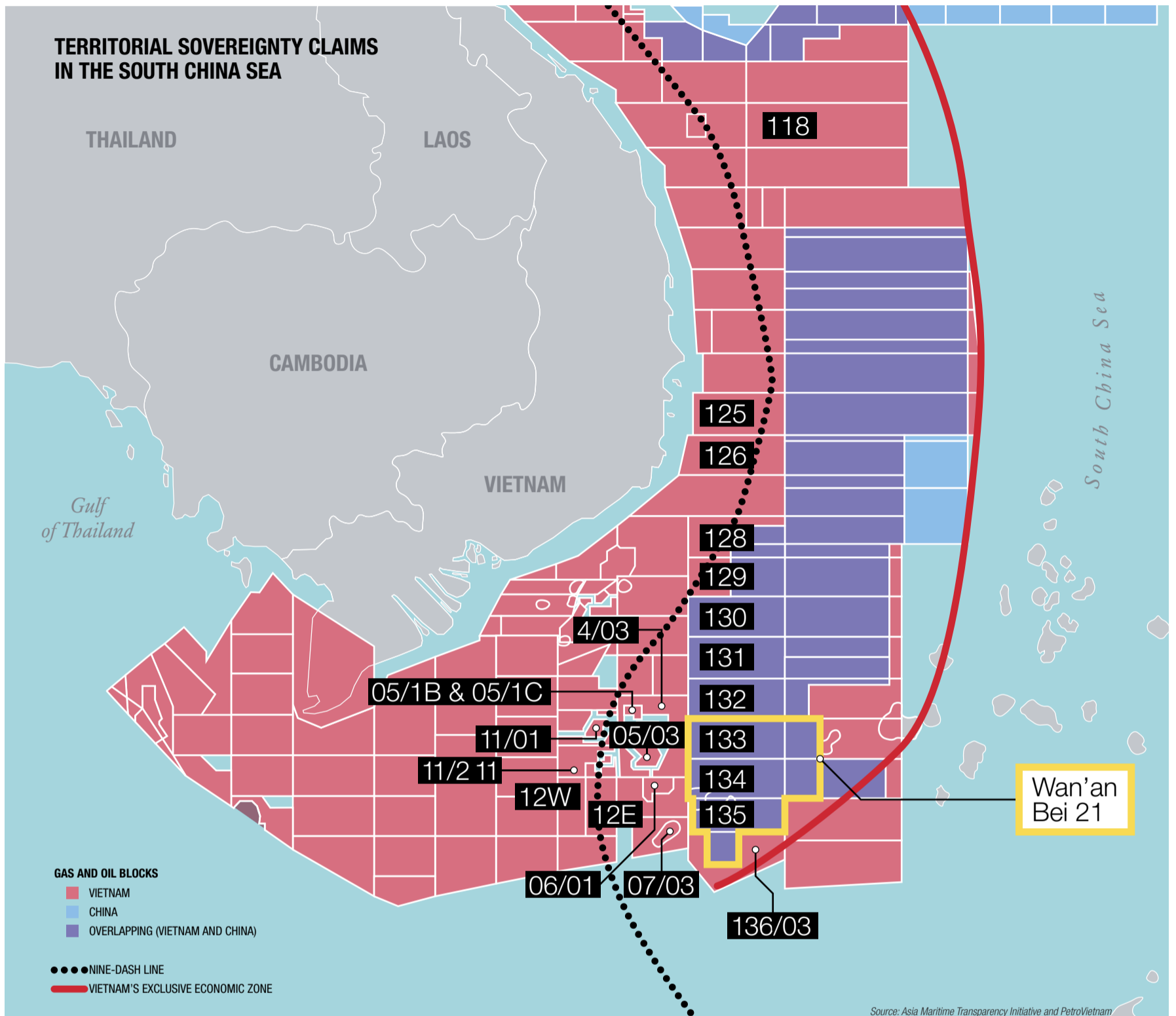
He returned in 2018 to leading the firm's Global Energy and Natural Resources (GENR) group after serving as Eurasia Group's chief executive officer for five years and steering the firm through a period of strong growth and global expansion.

ilitary tension between the U.S. and China in the South China Sea (SCS) often obscures what is an issue of energy and economic security. The SCS holds an estimated 190 trillion cubic feet of natural gas and 11 billion barrels of oil, if not more. These discovered and undiscovered reserves are gradually becoming more important as undisputed sovereign oil and gas fields mature and power demands increase. While the fight above the surface will be about missiles and air strips, the fight below the surface will be all about rights to exploration and extraction.

Shifting energy security dynamics for the U.S. and China

The context for this struggle has evolved dramatically over the past decade. Prior to 2008, the South China Sea loomed as one of many fronts in which Washington and Beijing sought to outrace each other to secure oil and gas reserves in the face of surging demand and fraught geopolitical tensions in Iraq, Venezuela and Nigeria. China's oil imports doubled from 2004 to 2008, raising alarm bells in Beijing, which responded by encouraging a "go abroad" strategy for its national oil companies (NOCs). This strategy took China's previously domestic-focused NOCs to far flung markets from the Canadian oil sands to Venezuela to Angola. Naturally, further expansion into South China Sea exploration made sense in this context, including a closer look at disputed areas.

China also places significant value on improving the technological and operational sophistication of its NOCs in a wide range of areas, including offshore development. The 1981 partnership to develop Pearl River Basin assets with U.S. super-major Phillips Petroleum was an early successful venture, which later expanded to include further developments in Bohai Bay, producing a cumulative 366 million barrels by 2010. The 2011 acquisition of Canadian oil producer Nexen Energy was seen as an opportunity to partner the China National Offshore Oil Corporation (CNOOC) with one of the leading deepwater exploration players with experience in key basins such as the Gulf of Mexico, the North Sea and West Africa. Around this same time, China began to develop self-sufficiency in the construction of ultra-deepwater rigs capable of drilling to 15,000 meters, both reducing its dependence on foreign partners and setting the stage for competition with other Asian shipyards. While still at a very early stage, this self-sufficiency is critical in moving Chinese rigs into disputed South China →



The geopolitical battle for rights to the South China Sea is taking place in areas where the Chinese nine-dash line overlaps with the Exclusive Economic Zones (EEZ) of the Philippines, Malaysia, Brunei, Thailand and Vietnam. The blocks identified by Vietnam with the numbers 133, 134, 135, are called “Wan’an Bei 21” by China.

Sea waters that other suppliers may want to avoid for geopolitical reasons.

On the U.S. side, during the first decade of the 2000s, both supermajors and large independents were emphasizing deepwater exploration and increasingly saw competition from China emerging from Angola to the Caspian. Yet beginning in 2011, the focus of U.S. oil giants began to shift away from new frontier deepwater projects to unconventional gas (first) and oil (subsequently) in the shale basins of the lower 48 states. As a result, international deepwater activity, partly led by U.S. oil majors and independents, has been severely curtailed: less than 2 billion barrel of oil equivalent (boe) deepwater resources were sanctioned in 2016, down from more than 6 billion boe in 2013. Ad-

ditionally, U.S. imports of crude oil decreased from 3.3 billion barrels in 2011 to 2.9 billion barrels in 2017, while exports surged from 17 million barrels to 422 million barrels during the same timeframe. In this context, the South China Sea is less strategic from an energy sector perspective, both for overall U.S. energy security, and for the investment and development opportunities of U.S. energy companies shifting to abundant domestic shale resources. Nonetheless, the South China Sea remains critical in terms of geopolitics and foreign policy as discussed further below.

ASEAN energy demand booming

The Association of Southeastern Asian Nations (ASEAN) states have

both geopolitical and energy interests at play in the South China Sea. The geopolitical dynamic is focused on the increasingly difficult task of balancing relationships with China and the U.S. Trump’s “America First” policies create uncertainty about long-term U.S. objectives focused on building regional security alliances and open trade, with tensions around the latter undermining the former. The Indo-Pacific Initiative is the Trump Administration’s strategy for consolidating ASEAN in partnership with Australia, India and the U.S., as a counterpart to China’s Belt and Road Initiative (BRI). Yet the commercial muscle behind the plan is dwarfed by the BRI, particularly in the area of energy. The Trump administration sees U.S. LNG as a critical foreign policy tool to

strengthen ties in Asia and draw regional states away from growing dependence on the BRI and other Chinese tools of economic diplomacy or, as some would argue, dependence. The Asia EDGE (Enhancing Development and Growth through Energy) program is meant to underwrite U.S.-ASEAN energy links but has only limited impact and a modest funding of USD 50 million planned for 2018.

ASEAN states are facing significant energy demand growth, in many ways similar to what China experienced in the last 15 years. The reversal of major ASEAN markets Indonesia and Malaysia from net exporters of crude and natural gas to net importers signifies the growing energy security concerns in the region and the need for new supply from abroad as well as closer to home. U.S. crude oil and LNG are attractive, but like China, the ASEAN states will seek diversity of supply, including through their own mostly offshore domestic gas resources. The combination of strong economic growth and declining domestic energy supply is not lost on OPEC, as Saudi Arabia is pursuing refinery projects in Malaysia alongside a major Kuwaiti investment in a refinery in Vietnam. Russia too is looking at refinery partnerships and LNG deals across the ASEAN region.

Gas in particular is in strong demand as a strategy to reduce air quality challenges emerging from fast-growing coal-fired power generation. This brings offshore gas into play in countries across the South China Sea, including Thailand, Vietnam, Brunei, Malaysia, Indonesia, and the Philippines. China's nine-dash line (9DL) strategy creates uncertainty about the political stability of these projects and raises some doubts among the international investors and oil/gas producers that would be essential partners to many of these projects.

Notwithstanding geopolitical risks, South China Sea oil and gas may see a new wave of interest. The 2019 International Energy Association (IEA) World Energy Investment Outlook shows that both actual 2018 and expected 2019 global deepwater spending is growing after four years of decline. Several factors are ramping up spending in the region and demand has been strong in Southeast Asia, with oil demand growing by 52 percent and gas consumption almost doubled between 2000-2017. In addition, deepwater drillship rates are structurally and cyclically lower, plunging from around \$600,000 in 2013-14 to about \$150,000 in 2018. Interest in deepwater from local national oil companies like PTT (Thailand), PT Pertamina (Indonesia), PetroViet-



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Chinese customers shop in the China Duty Free located inside the NagaWorld hotel in Sihanoukville, Cambodia. The country is visited by 1.2 million Chinese every year.



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Traffic in the commercial district of Bangkok. The capital of Thailand is divided into 50 districts.



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Jakarta, the capital of Indonesia, is sinking by 5-10 centimeters a year, in some places even 25 cm, and every year, during the rainy season, it is partially submerged in water.



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In the photo above, the Kuala Lumpur skyline from the observation deck of the KL Tower. The tower serves as an Islamic observatory of the lunar phases (Falak), which every year mark the beginning and end of Ramadan. Right: A shopping mall in Kuala Lumpur.

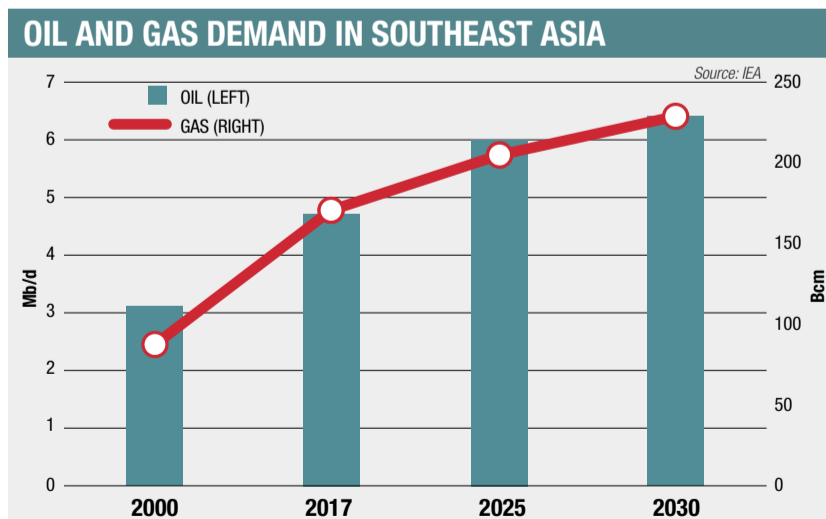


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nam (Vietnam), and Petronas (Malaysia) are growing. Petronas, for instance, revised fiscal terms for Malaysia deepwater production sharing contracts in November 2018 to attract investment.

China asserts its interests in the South China Sea

The geopolitical struggle over South China Sea rights will take place primarily in the overlap of China's 9DL and the exclusive economic zones (EEZ) of the Philippines, Malaysia, Brunei, Thailand and Vietnam. So far, China's approach to the overlapping claims has been a mix of bargaining and bullying. In 2017, China reportedly threatened the Vietnamese government with military action if it did not stop activity in block 136/03,



Between 2000 and 2017, the energy requirements of Southeast Asia grew significantly: the demand for oil increased by 52 percent, while gas consumption more than doubled. This trend that will continue until 2030.

which straddles Vietnam's EEZ and China's 9DL. Vietnam capitulated and suspended drilling, which had been contracted to Repsol, a Spanish company. Then again in March 2018, Repsol was ordered to halt drilling activity in block 07/03. According to some maps, 07/03, known as "red emperor," lies just outside the 9DL; however, China keeps the exact location of the line ambiguous. Carrots have been offered as well. Last year, China convinced the Philippines to sign a memorandum of understanding (MOU) on joint oil and gas exploration in an area within the Philippines' EEZ. The MOU was the result of Philippine President Rodrigo Duterte's decision to deal with China more "pragmatically." In other words, he decided to ex-



Manila Bay (Philippines), seen from a dam. Today, the bay is a crossing point of major trade routes and there is a strong industrial presence, making it a heavily polluted area.

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This photo taken from the cabins of the Singapore Flyer, one of the highest panoramic wheels in the world, shows the skyline of Marina Bay, in Singapore.

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change a hard line on China's aggressive activities in the South China for agreements to fund domestic infrastructure.

China's goal is to replicate what was done with the Philippines with all SCS claimants. This bilateral approach—securing commitments for joint exploration in exchange for economic largesse—pointedly excludes the United States and advantages China as the most powerful partner in the equation. The opportunity for all the non-China claimants to push back collectively is undermined by Duterte's pivot as well as China's influence on ASEAN.

Code of Conduct will shape future energy development

Currently, ASEAN and China are

working on a Code of Conduct (COC) for the South China Sea, an upgrade from the non-binding Declaration of Conduct agreed upon in 2002. A draft agreement of the COC was agreed upon last summer by ASEAN and Chinese foreign ministers, but negotiations continue to drag on and the text has not yet been made public. Reportedly, some countries are chafing over China's desire to include a line that calls for limiting joint development deals to China and Southeast Asian states.

The U.S. supports the COC process but has its own interests at stake. First, even though the energy security dimension is less critical for Washington than a decade ago, the U.S. does not want its companies to be excluded from key tenders in dis-

puted blocks or bullied into ceasing operations.

Currently, the U.S.'s Murphy Oil is in the exploration stage of a Vietnam-leased field that falls slightly within the 9DL. Second, the U.S. has little interest in having China's 9DL and claim over the entire area recognized—even tacitly. U.S. companies have a significant stake in freedom of navigation through the South China Sea, which is an important trade route. If, for example, an accident that happens while the U.S. is conducting a freedom of navigation operation around a reclaimed Chinese feature escalates, foreign companies would have to immediately bear the cost of diverted shipping. If that accident escalates to a full-blown war, it could impact the U.S.'s GDP by up to 5 per-

cent and China's by up to 25 percent (RAND, 2017).

The U.S.-China tension that has been growing over trade, ideology, and global influence under President Donald Trump and President Xi Jinping makes the latter scenario much more likely. Other moves, like the Trump administration's decision to withdraw from the Intermediate-Range Nuclear Forces Treaty with Russia and China's naval modernization drive, up the stakes even further. But in the end, it could be energy demand needs of both ASEAN and China that force a resolution of the SCS dispute.



Borders/Chinese, U.S. and ASEAN moves in the South China Sea

Waters of Discord

The South China Sea is a strategic trade route of global importance, as well as an “energy mine.” The U.S. Energy Information Agency estimates proven and likely reserves at around 190 trillion cubic feet of natural gas and 11 billion barrels of oil





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MERCY A. KUO



She is Vice President of Strategic Services at Pamir, a global risk intelligence consultancy in Washington DC, and authors a column on U.S. Asia policy at *The Diplomat*. She formerly served with the Central Intelligence Agency and holds a PhD from Oxford University.

Energy competition and cooperation in the South China Sea should be analyzed as part of a broader picture of territorial claims over the region, involving seven key stakeholders: China, Vietnam, the Philippines, Indonesia, Malaysia, Taiwan and Brunei. In the photo: View of Ha Long Bay, a UNESCO World Heritage Site in Vietnam.

The geopolitics of energy in the South China Sea revolve around three core interests: national sovereignty, energy security and economic growth. National sovereignty is the projection of power to preserve national identity and sovereign interests, including territorial stakes that define a country's geographic boundaries and marine rights. Energy security is a country's pursuit, development, allocation, and defense of strategic energy resources and reserves. Countries optimize national assets and resources for long-term economic growth. Competition and cooperation over energy in the South China Sea must be understood in the broader scope of territorial claims in the South China Sea, claims that involve seven key stakeholders: China, Vietnam, the Philippines, Indonesia, Malaysia, Taiwan, and Brunei. The contest over energy is one facet of a multifaceted context animating China's leadership ambitions in the region. This geopolitical context includes energy as well as security, trade, investment, logistics, and technology. China's efforts to rewrite the rules of engagement in the South China Sea serve to bolster its regional influence vis-à-vis ASEAN (Association of Southeast Asian Nations) and the United States, both of which are key players in ensuring that freedom of the sea and sea lines of communication (SLOCs) are upheld according to the United Nations Convention on the Law of the Sea (UNCLOS), which established Exclusive Economic Zones (EEZs) as a feature of international law and gives coastal states the right to regulate economic activities, such as fishing and oil exploration, within their EEZs.

Oil and gas exploration in the South China Sea

The South China Sea is a key global trade route. One-third of the world's oil and more than half of the world's LNG shipments traverse this seaway, and the seabed underneath the islands and reefs is purportedly rich in oil and gas, according to Australian media reporting. Datapoints on gas and oil reserves in the South China Sea explain Beijing's efforts to ensure China's expanding presence in the SCS:

- The U.S. Energy Information Agency estimates that the South China Sea holds about 190 trillion cubic feet of natural gas and 11 billion barrels of oil in proved and probable reserves, most of which lie along the margins of the South China Sea rather than under disputed islets and reefs.
- The U.S. Geological Survey in 2012 estimated that there could be another 160 trillion cubic feet of →

natural gas and 12 billion barrels of oil undiscovered in the South China Sea.

- Beijing's estimates for hydrocarbon resources under the sea are considerably higher but still modest in relation to China's overall demand—the country's oil consumption in 2018 was expected to top 12.8 million barrels per day.

Territorial disputes among the claimant countries have precluded thorough verification of these estimates. China has prevented unilateral exploration and surveying attempts by other claimants and instead has co-opted them through joint exploration agreements, namely with the Philippines and Brunei. From the U.S. government perspective, the South China Sea bears strategic relevance in China's security strategy. According to the U.S. Office of the Secretary of Defense's 2017 Annual Report to Congress, the South China Sea plays an important role in security considerations across East Asia because Northeast Asia relies heavily on the flow of oil and commerce through South China Sea shipping lanes, including more than 80 percent of the crude oil to Japan, South Korea, and Taiwan. China claims sovereignty over the Spratly and Paracel Island groups and other land features within its self-proclaimed nine-dash line, claims disputed in whole or part by Brunei, the Philippines, Malaysia and Vietnam. Taiwan, which occupies Itu Aba Island in the Spratly Islands, makes the same territorial assertions as China. In 2009, China protested extended continental shelf submissions in the South China Sea made by Malaysia and Vietnam. In its protest to the UN Commission on the Limits of the Continental Shelf, China included its ambiguous "nine-dash line" map.

The nine-dash line is China's ambiguously defined demarcation of Chinese sovereignty and jurisdiction in the South China Sea, which covers an area of 3.5 million square kilometers. Of this area China claims sovereignty of jurisdiction over 2.1 million square kilometers within the nine-dash line proclaimed in 1953 by the People's Republic of China. China's claim is based on an even larger "eleven-dash line" boundary defined by the Republic of China government in 1947. According to a 1983 Chinese government survey of the South China Sea, there are 252 islands and reefs of which 25 are permanently above-water islands. Presently, Vietnam occupies 30 islands and reefs; China occupies nine and exercises periodic patrol over 21; the Philippines over six; Malaysia occupies three and exercises periodic pa-

Contested areas

The South China Sea is traversed by tensions and controversies, a complex mosaic of territorial disputes and energy and economic goals in which China lords it over the countries bordering the waters.

TERRITORIAL DISPUTES

The borders of the South China Sea are controversial and thus disputed. Of its total 2.1 million square kilometers, China claims sovereignty and jurisdiction over 2.1 million within the "nine-dash line" proclaimed by the People's Republic of China in 1953. However, Vietnam and the Philippines also claim their own maritime boundaries.

- VIETNAM'S MARITIME CLAIM
- PHILIPPINES' MARITIME CLAIM
- CHINA'S "NINE-DASH" CLAIM

(Note: Other states have disputed territorial claims not shown here)

STRATEGIC OUTPOSTS



The claims in this area also cover portions of territory such as the Spratly Islands, the Paracel Islands and the Scarborough Shoal, outcrops of practically uninhabitable rocks considered rich in oil and gas or strategic as operational outposts.

HIDDEN WEALTH



The waters claimed by Beijing are a strategic region where the seabed holds reserves of oil, natural gas and methane hydrate, a potential new energy source. The area is also a major fisheries reserve.

PARACEL ISLANDS

The Paracel Islands are located approximately 200 nautical miles southeast of Hainan. The Paracels hold strategic importance as a forward operating base for the projection of power into the South China Sea. Surveillance systems based in the islands would be well-placed to monitor surface and sub-surface naval activity coming from China's naval bases in Hainan, according to Australian policy analysis. In the Paracel Islands, which are disputed with Vietnam and Taiwan, China in 2016 for the first time deployed CSA-9 surface-to-air missiles (SAM) and maintained a regiment of J11B fighters at Woody Island, according to the Office of Secretary of Defense 2017 Annual Report to Congress.

Source: China's Maritime Safety Administration, Center for Strategie and International Studies



METHANE HYDRATE

In May 2017, China successfully extracted methane hydrate or “flammable ice” from the SCS. Some scientists believe methane hydrate will be a new source of energy for the world. China estimates that SCS has deposits of methane ice equivalent to 80-100 billion tons of oil. Extracting methane extract is expensive and high-risk. Methane is also a super-potent greenhouse gas with up to 36 times more global warming potential than carbon dioxide.

SCARBOROUGH SHOAL

Located 230 kilometers from Luzon, the main Philippine island, Scarborough Shoal is a disputed reef which potentially has oil and gas reserves. Scarborough Shoal has been at the center of an ongoing dispute between the Philippines and China that culminated in a 2016 ruling by the United Nations Permanent Court of Arbitration that China's nine-dash line had no legal basis under the U.N. Convention on the Law of the Sea (UNCLOS), a decision that China protested. Despite Manila's decision to recalibrate relations with China to focus on mutually beneficial cooperation, President Rodrigo Duterte must balance nationalist fervor against Chinese incursion in Philippine waters with managing Beijing's expectations.

SPRATLY ISLANDS

In 2014, China began building artificial islands near the Spratly Islands, and then at Johnson South Reef, Cuarteron and Hughes Reefs, and Gaven Reef. China transformed Fiery Cross Reef into an airfield and harbor. Other disputed areas include the Luconia Shoals, Reed Bank, and the Paracel Islands. The Luconia Shoals are disputed by China, Taiwan, and Malaysia and may contain extensive oil and natural gas reserves. Reed Bank (or Reed Tablemount) is claimed by China, Taiwan, and the Philippines and situated along the Philippines coast and is thought to hold significant reserves of oil and natural gas. The nation's main source of natural gas, the Malampaya field, will run out within a decade.

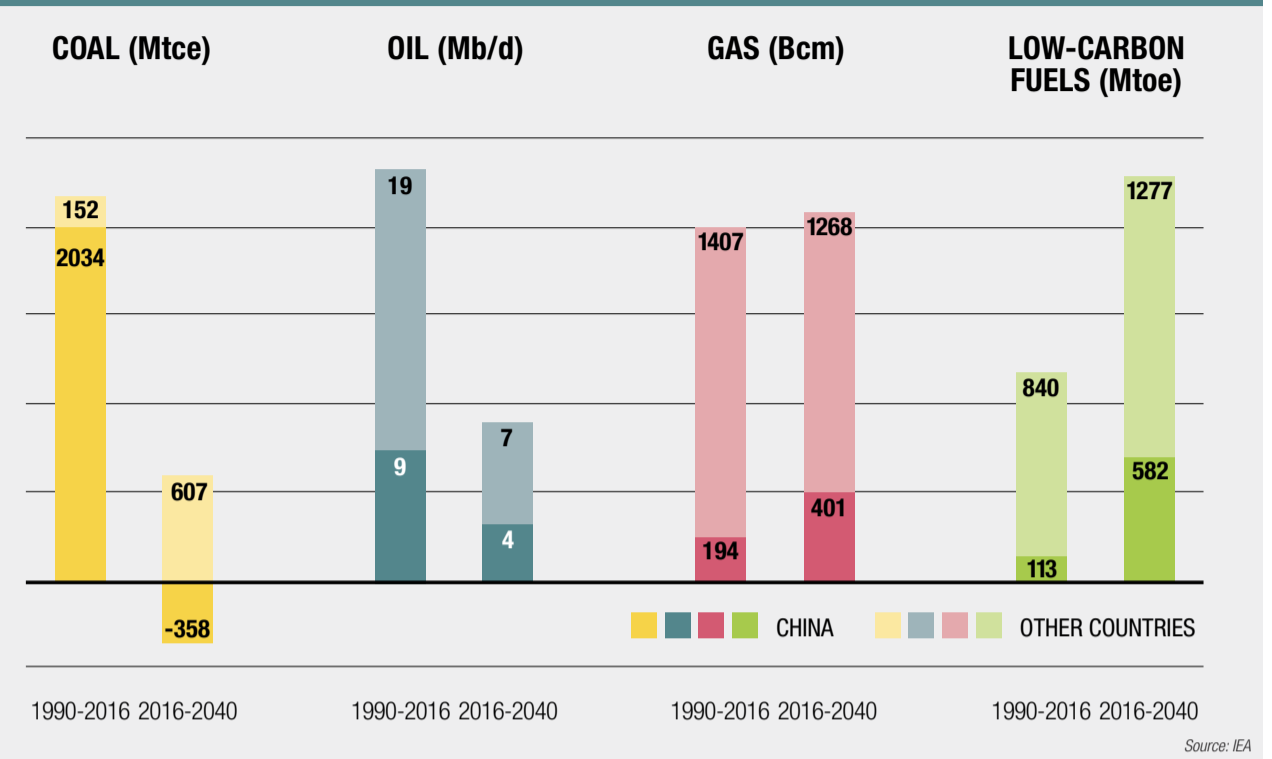
FISHERIES

According to China's Ministry of Agriculture data, China currently has 19.31 million people engaged in the fishery industry. In 2018, China's fishery industry registered revenue of RMB 1.23 trillion and 51.54 percent of that total attributable to ocean output. SCS is a major fishery region for China. With depletion of fishery resources around China's coast, Chinese fishermen already operate in disputed areas and function as “militia” to enforce China's SCS claims. Ongoing skirmishes between Chinese fishermen-militia and claimant countries, and even with a U.S. naval vessel, could trigger detrimental clashes between China and other disputing parties.



Looking forward, the International Energy Agency predicts that China will become the world's largest oil consumer by 2030, surpassing the United States. In the scenario envisaged by the IEA (showing global demand for primary energy for fuel), demand for natural gas will exceed 600 billion cubic meters by 2040, making China the second largest market in the world after the United States.

CHINA AND CHANGES IN DEMAND



control over four; Taiwan and Brunei each occupy one island/reef. Development of oil and gas reserves within this nine-dash line, which intersects with EEZs of claimant countries, lies at the core of China's energy security strategy.

The ASEAN way

ASEAN is balancing China's rapid rise with Southeast Asian countries' hedging amid uncertainty over U.S. leadership in Southeast Asia. ASEAN's track record has shown its efficacy depends on which country holds the ASEAN chair. Cambodia's 2012 chairmanship and decision to remove reference to the South China Sea imbroglio, at the behest of China, resulted in ASEAN's failure to release its customary post-ASEAN Regional Forum joint communique for the first time in its 45-year history. Notwithstanding, ASEAN has played a critical role in negotiating a formal Code of Conduct to mitigate maritime confrontations and institute dispute resolution mechanisms.

As a multilateral platform, ASEAN also serves as a countermeasure to Chinese use of bilateral negotiations. Beijing has and will continue to capitalize on ASEAN's fractures and disunity to advance China's agenda. Nevertheless, now more than ever, ASEAN's leadership is pivotal in strengthening Southeast Asian countries' economic and geopolitical leverage to uphold regional rules and norms amid China's rise. In the near and long term, Southeast Asia is an essential component of China's efforts toward regional economic integration. The total merchandise trade is expected to increase as

ASEAN grows from the sixth largest economy in the world to the fourth largest economy in the world by the year 2050, with an annual expected GDP growth of 5.25 percent between 2016 and 2020, according to a 2018 London School of Economics Report.

China's strategic stakes

China's strategic stakes focus on competition over predominance in the South China Sea and reduction of dependence on foreign energy. The strategic relevance of the South China Sea has gained real-time currency under President Xi Jinping's Belt and Road Initiative (BRI) and Made in China 2025 (MIC2025) as new energy development is a key component of both initiatives. China's multi-pronged approach of soft power diplomacy through trade and investment incentives combined with lawfare and muscular military and paramilitary build-up in the South China Sea reflects how defending national identity and sovereignty is driving Beijing's energy security decision-making process. The U.S. Defense Department's 2018 assessment underscores the clear correlation between China's energy security and the South China Sea:

- In 2017, China imported oil to meet approximately 67 percent of its need. This figure is projected to grow to approximately 80 percent by 2035, according to the International Energy Agency (IEA). Also in 2017, 34 percent of China's natural gas demand was met with imports and that demand is projected to grow to 46 percent by 2035, according to the IEA.
- China continues to look primarily

to the Persian Gulf, Africa, and Russia/Central Asia to satisfy its growing oil and gas demand. China is particularly reliant on unimpeded SLOCs like the South China Sea and Strait of Malacca to ensure hydrocarbon deliveries. In 2017, approximately 80 percent of China's oil imports and 13 percent of natural gas imports transited the South China Sea and Strait of Malacca.

- Despite China's efforts to diversify alternate supply routes, the sheer volume of oil and liquefied natural gas imported to China from the Middle East and Africa will continue to make strategic sea lines of communication important to China. Separate crude oil pipelines from Russia and Kazakhstan to China illustrate efforts to increase overland supply. With completion of its expansion on January 1, 2018, China doubled the capacity of its pipeline to Russia from 300,000 to 600,000 barrels per day (b/d).

China understands that escalating confrontation does not necessarily advance its interests. Conflict between claimants could disrupt trade and substantially increase shipping costs and insurance premiums. As an example, when piracy in the waters off Somalia was at its height, transit insurance premiums rose from USD 500 per ship to USD 150,000 per ship, according to Asian media reports. In 2016, 15 million barrels of oil were transported via the SCS, 42 percent went to China, 20 percent to Japan and 18 percent to South Korea, according to U.S. Energy Department data. Chinese media reported that 80 percent of China's oil

imports went through SCS in 2017. Presently, China has only 33 days of oil reserves. For Chinese strategic planners, the economic and social impact to China is unimaginable if SCS sea lanes were disrupted. China's current actions in the SCS are focused on denying other stakeholders of a disruptive capability thus retaining that capability for themselves. China has pressured western companies not to collaborate in SCS energy exploration with claimant parties. In 2018 under pressure from Beijing, Vietnam stopped a natural gas project with Spanish petroleum company Repsol.

U.S. leadership

In managing the geopolitics of the South China Sea, the United States Navy has conducted Freedom of Navigation operations (FONOPs) to defuse potential maritime tension and signal that Chinese aggression is unacceptable. More importantly, U.S. FONOPs serve to uphold freedom of the seas in international waters according to international law. U.S. military presence is crucial to preventing the imposition of Chinese sovereignty over international waters. Despite the Obama Administration's "rebalance to Asia" policy to fortify the U.S. as a Pacific power, the Trump Administration's decision to withdraw from the Trans-Pacific Partnership (TPP) and initiate a trade war with China has increased uncertainty over the degree of U.S. commitment to the region. U.S. leadership is a key variable in the balance of power dynamics in Southeast Asia. During this period of strategic opportunity China aims to build a world-class military, including a blue



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water navy, by 2049. The South China Sea is the fulcrum of China's naval ambitions. U.S. Navy Admiral Philip Davidson in 2018 stated, "China is now capable of controlling the South China Sea in all scenarios short of war with the United States." Friction in U.S.-China relations is a catalyzing factor that underpins Southeast Asian countries' hedging strategies vis-à-vis China and the United States.

Implications and outlook

The South China Sea remains a perennial flashpoint in the geopolitics of Southeast Asia. For energy companies, suppliers and stake-

holders, managing escalation of tensions and potential impact on corporate operations necessitates identifying and tracking risk indicators. More than one third of Europe's and one fourth of U.S. external trade goes through the Indo-Pacific region, and any escalation of tensions in the area will undoubtedly have a direct impact on the West, according to Nicola Cassarini, Senior Fellow at the Istituto Affari Internazionali, a Rome-based think tank. Looking ahead, the International Energy Agency projects that China will become the world's largest oil consumer by 2030, surpassing the United States. In the IEA's World Energy

Outlook 2017 scenario, natural gas demand rises to over 600 billion cubic metres (bcm) by 2040, making China the second-largest market globally behind the United States and the largest source of global gas demand growth: the share of gas in China's primary energy mix rises from under 6 percent to over 12 percent during this period. With China on a trajectory to become a formidable player in energy markets, energy companies will be well-served to factor the geopolitics of energy in the South China Sea into their strategic planning.

WHAT DOES BEIJING WANT?

China's strategic interests are focused on competition for dominance in the South China Sea and on reducing dependence on imported energy.

The strategic importance of the South China Sea has been reinforced under the chairmanship of Xi Jinping and his "Belt and Road Initiative." In the photo: A southern Chinese landscape.



Infrastructure/Light and shade of the Chinese Initiative

Hope in China's New Silk Road

Despite its defects, which Beijing now promises to resolve, the Belt and Road Initiative is fundamental for the development of the countries of Southeast Asia, which have experienced insufficient infrastructure investments over the last twenty years



MUNIR MAJID

A banker, he has had a varied career in journalism, the corporate sector and market regulation, and in recent years has been deeply involved in advocacy for greater ASEAN economic integration. He is a member of Malaysian Prime Minister Mahathir's Economic Action Council.

At the second Belt and Road Forum (BRF) in Beijing at the end of April, attended by 150 countries, 37 of whom were represented by their leaders, China addressed many of the criticisms against its Belt and Road Initiative (BRI).

China has had to do battle on two fronts over the BRI, an ambitious global project for connectivity and infrastructure development announced in 2013. The first criticism is that the BRI is China's master plan to dominate the world. The second, not unrelated, and more empirically demonstrable, is that project terms lead to a debt trap exposing countries to domination by China.

China is fighting hard to push the BRI forward despite evidence of countries caught in the debt trap. In doing this it had until recently taken the usual hard line of ignoring opposition, but during the BRF, there were indications China was more willing to argue and make its case as well as review terms of project implementation.

Before the BRF, China made a diplomatic effort to get the BRI accepted in Europe. There was a limited suc-



cess as Italy signed on, the first among G-7 countries, but Chinese leader Xi Jinping's visit to France in March failed to achieve EU endorsement. President Macron invited German Chancellor Merkel and European Commission President Juncker to join him in meeting President Xi to show a largely united European front, even if Italy was a significant economy that had broken ranks. Europe maintained its position that the BRI had not met international norms in its execution.

Doubts raised in Malaysia

But it was in Southeast Asia, China's economic backyard, that the BRI was particularly tested. The banner RM 65.5 billion East Coast Rail Link (ECRL) BRI project in Malaysia was suspended by the new govern-

ment that came to power in May 2018. Against a background of extensive corruption in the previous government, Malaysia questioned the cost and financial terms of the ECRL, suggesting the state-owned China Communications Construction Co, Ltd (CCCC) was complicit in an arrangement with then Prime Minister Najib Razak liabilities arising from his corrupt practices.

This arrangement inflated the cost of the project, and returning Prime Minister Mahathir Mohamad was not having any of it. By the new government's calculation, the country would have been saddled with a debt of RM130 billion under the financial terms, which included an obligation to make payments off-shore for the loan with China's EXIM Bank according to a set timetable, rather than



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TRAVELING THE SILK ROAD

Photographer Andrea Di Biagio traveled the commercial route between Beijing and Urumqi by train, documenting how the territory has changed as a result of the frenetic economic development of the last decade. The 3,000-kilometer railway linking the capital to China's western-most industrial outpost runs across the country, covering 7 regions, from the Gobi desert (pictured) to the Xinjiang mountain range.

📷 Andrea Di Biagio is a documentary photographer with an interest in social and anthropological issues. His photos have been published in numerous magazines, including *Internazionale*, *Espresso*, *Il Tempo*, *L'OBS*, *Courrier International*, *Sportweek*, *The Trip Magazine*, and BBC.

work progress. Actually RM3 billion had already been paid to CCCC with hardly any progress of work, giving rise to questions of what the payments were for.

The previous Malaysian government had been voted out primarily because of deep and extensive corruption best illustrated by the now well-known 1Malaysian Development Berhad (1MDB) scandal. The link of the ECRL terms' to interest payments in that scandal was suspected. Indeed there were two gas pipeline projects involving the China Petroleum Pipeline Bureau costing RM 9.4 billion that involved similar payment terms according to timeline and not work progress, which were terminated by the new Malaysian government. RM 8.25 billion, or 88 percent of total project cost, had

been paid when only 13 percent of the work was completed.

Prime Minister Mahathir and his government were embarked on a great cleanup, more important to Malaysia than whatever the BRI may be to China. Prime Minister Razak had left the government with financial liabilities which, if not addressed, would lead the country to bankruptcy. It could not afford to accept the burdens of BRI projects so important to China if they would lead Malaysia to financial distress. The suspension of the ECRL and termination of the two gas pipeline projects were seen to be in Malaysia's best interest. All the debt trap arguments against the BRI come to mind. But it must not be forgotten that corrupt national leaders make it possible for their country to be sold out to benefit

themselves or to resolve demands arising from a governing kleptocracy.

Malaysia is fortunate that the costly ECRL project had not proceeded too far down the road. In the case of the Hambantota Port Development Project in Sri Lanka it was too late to avoid the ceding of a 99-year lease of the port to China following a huge debt default. With respect to the China-Pakistan Economic Corridor, contested by India for its perceived security threat, the contract is so far advanced that China refuses to renegotiate despite the request of the new government elected this year.

Nevertheless even in Malaysia it was no easy thing to renegotiate the ECRL deal, both to make it financially sustainable and to do it while saving Chinese face. Finally a supplementary agreement was reached,

after months of negotiation. The total cost per kilometer of the rail line linking the east coast of peninsular Malaysia with the west was reduced by over 30 percent with a slightly shortened track (648 km) and new alignments which saved a 16 km Quartz Ridge, the longest pure quartz dyke in the world, and reduced tunneling through silica of the country's main mountain range.

Diplomatic efforts to revise the agreement

The whole reset was a delicate matter, as overall Malaysia-China relations had to be secured and preserved. In fact China was upset when, on coming to power, the new government in Malaysia heavily criticized the one-sided and suspect BRI pipeline and ECRL agreements. It took care- →

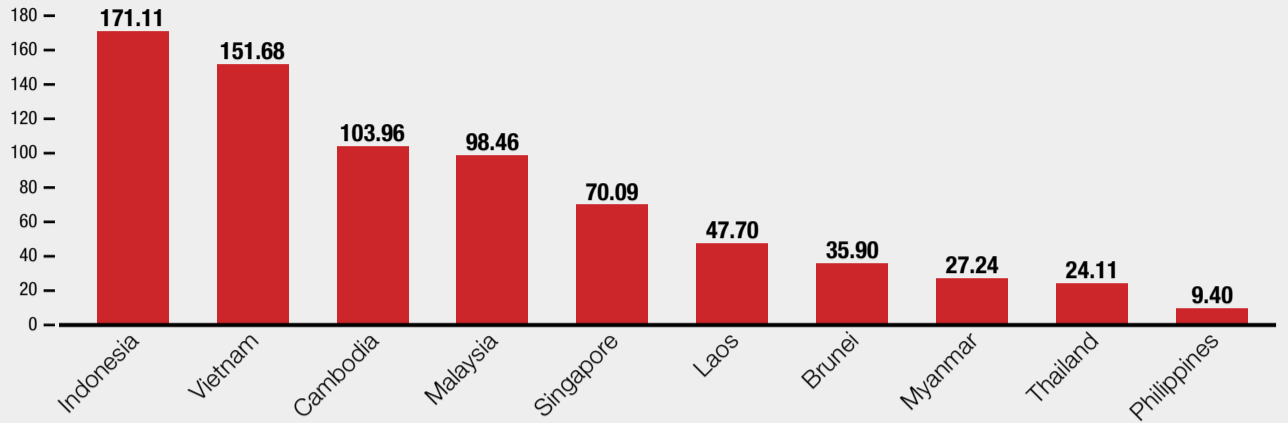
Belt & Road, projects and investments

The projects related to the Chinese Belt and Road Initiative (BRI) in the ASEAN countries are valued at over USD 730 billion in total. Beijing's main partner in quantitative terms is Indonesia, with projects amounting to USD 171 billion. As regards individual BRI infrastructure projects, the most expensive, in economic terms, is the railway between Kuala Lumpur and Kota Bahru, the East Coast Rail Link (ECRL). The project, worth USD 14.3 billion, was recently suspended by the Malaysian government under prime minister Mahathir and renegotiated with the Chinese government.

BRI PROJECTS IN ASEAN COUNTRIES

(VALUES IN BILLIONS OF USD)

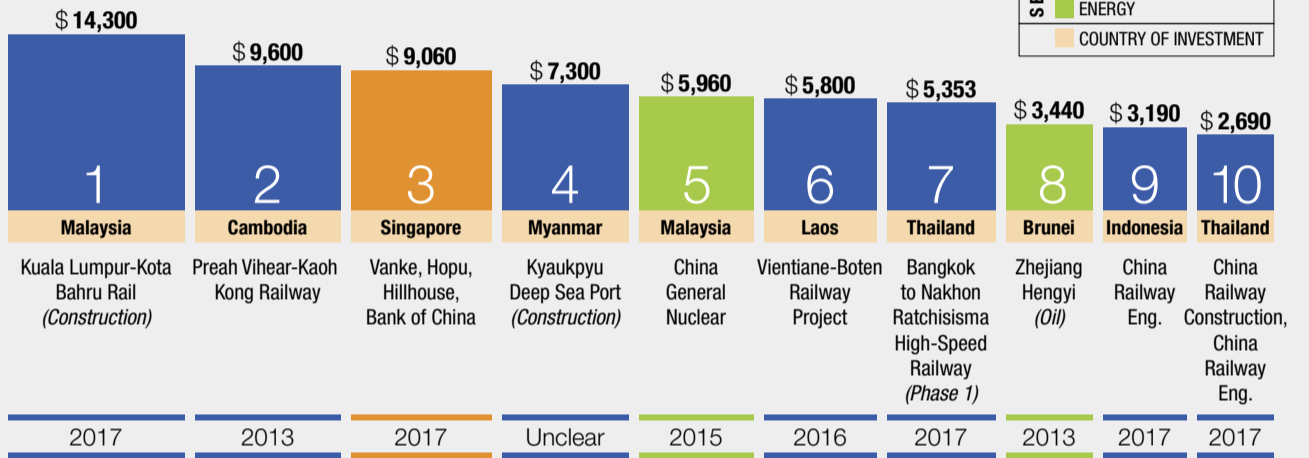
Source: Oxford Economics



THE 10 BIGGEST PROJECTS

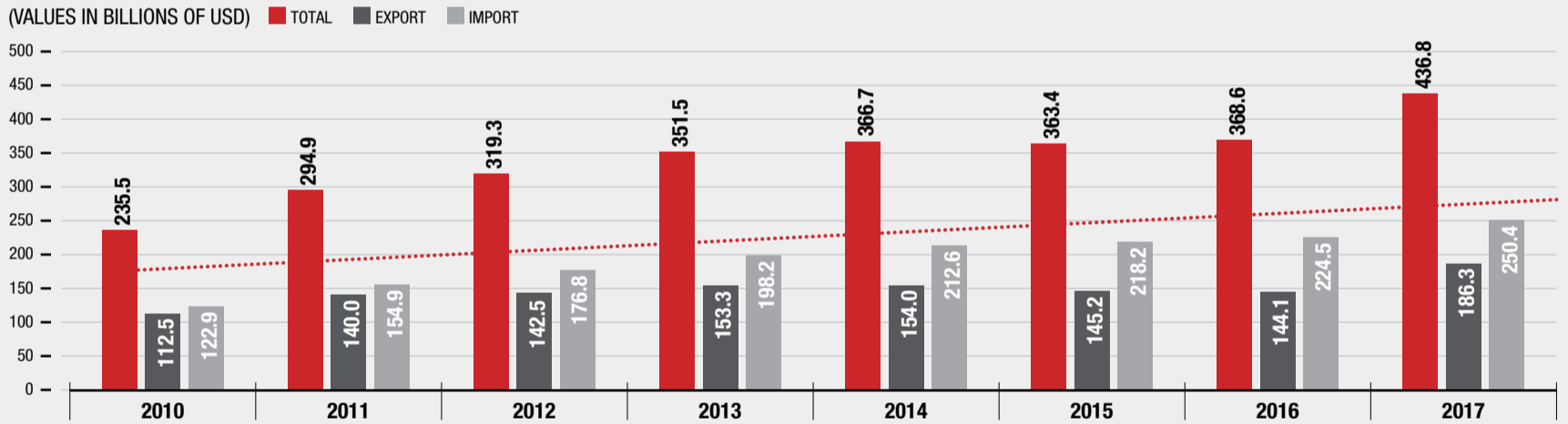
(COST IN BILLIONS OF USD)

Source: Oxford Economics



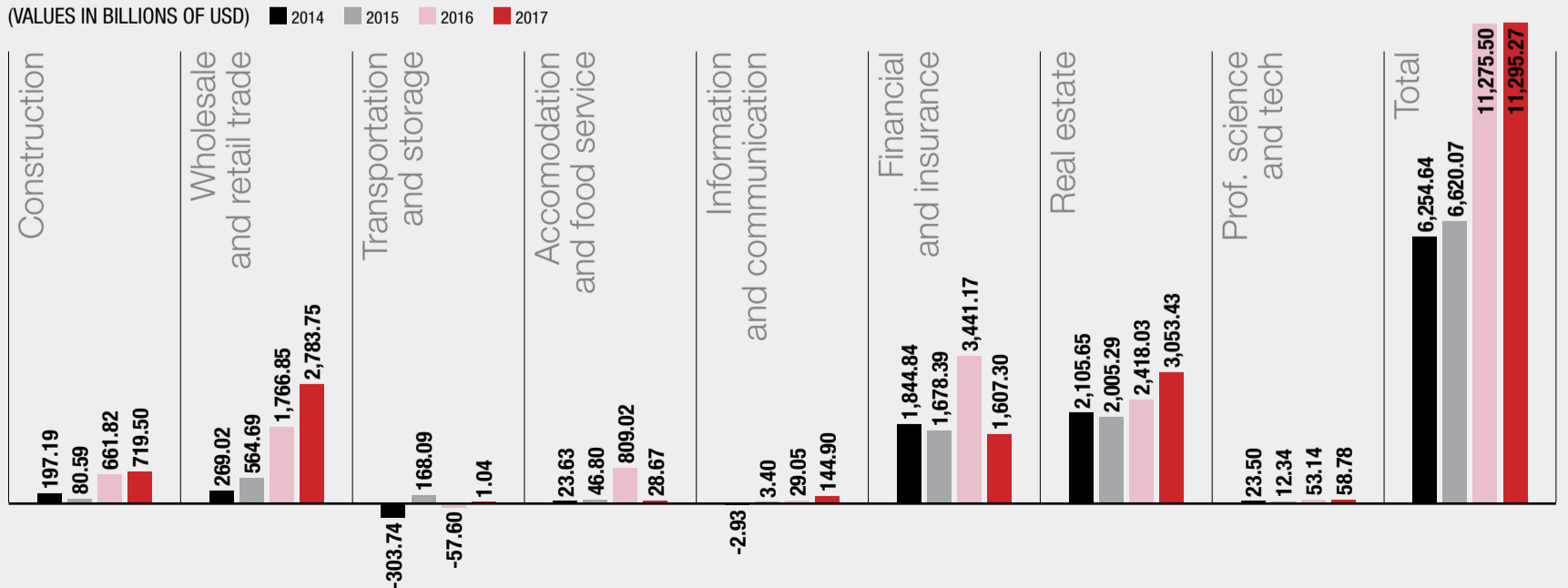
GOODS TRADE BETWEEN ASEAN COUNTRIES AND CHINA

Source: ASEAN Stats



DIRECT CHINESE FOREIGN INVESTMENTS IN ASEAN COUNTRIES

Source: ASEAN Stats



The construction of the modern Silk Road is fueling the recovery of Chinese heavy industry. Thanks to the new infrastructure planned, the People's Republic will be able to count on commercial revenues of USD 2.5 trillion over the next ten years. The photo to the right shows the train's restaurant car waiters busy writing the menu.



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ful diplomacy and delicate renegotiation to arrive at a supplementary ECRL deal which was described as a win-win for both parties.

Prime Minister Mahathir's tense and difficult visit to Beijing in August last year, after he had described the BRI agreements in Malaysia as "unequal treaties," and when he informed China's leaders that the ECRL project was suspended and needed renegotiation, was a far cry from his celebratory attendance at the BRF in April this year. Malaysia's interest was protected and the ECRL BRI project was saved.

Mahathir was accorded a warm welcome and honored with being invited to make one of the few non-Chinese presentations at the forum wherein he applauded the visionary BRI for bringing development to less advanced countries if the best terms were observed. President Xi in his opening address conceded that there were issues in BRI implementation and promised care in the future to ensure financial sustainability as well as environmental protection. Of course this was not the result of the ECRL only. It was a reaction to relentless criticism of BRI project terms and insufficient respect for the environment. Nevertheless, the Malaysian ECRL case would be a useful case study for how to get out of a tight spot without upsetting the applecart of overall relations with China.

At the bottom of it all is the matter of host country corruption. When Chinese companies see an opportunity, they seize it. This can result in deep losses for the country where the BRI is supposed to bring benefit, ex-



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posing future generations to financial burdens in unsustainable projects. If best practices are adhered to, particularly transparency, the corrupt host country politicians and Chinese com-

panies would not get away with it. At the BRF, Xi promised all this would change. It might be useful to ensure this by having open tenders, well scrutinized reviews of the com-

mercial and financial proposals, as well as environmental impact studies, before agreements are finalized. There also has to be close monitoring in the execution of projects to en- →

West suburbs of Beijing. With about 15 million inhabitants, Beijing is the most populated capital in the world and the second biggest city in the world after Shanghai.



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The outskirts of Turpan, in the Xinjiang region. Turpan was crossed by the central branch of the ancient Silk Road, which ran around the Tarim basin and the perilous Taklamakan desert, continuing towards Pamir and Central Asia.



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sure adherence on the ground to the terms on paper.

The Master Plan on Connectivity and Vision 2030

In Southeast Asia, under the Masterplan on ASEAN Connectivity (MPAC 2025), there are five guiding principles, of which two—sustainable infrastructure and regulatory excellence—are relevant to ensuring projects do not become a financial and environmental burden or disaster. The other principles are digital in-

novation, seamless logistics and people mobility. Meanwhile, last November in Singapore, the ASEAN-China Strategic Partnership Vision 2030 was adopted, which, among other things, enjoined both sides to “strengthen anti-corruption through relevant mechanisms.”

Vision 2030 also called for the common priorities of the BRI and MPAC 2025 to be synergized. If these declarations are to mean anything, and China’s statement at the BRF is to be taken at its word, it would surely make

sense for ASEAN and China to get together to make BRI projects work for all parties, without the kinds of problems, just in the region alone, which plagued the ECRL, caused the Yangon-Mandalay railway project to lapse, the Jakarta-Bandung High Speed Rail plan to continue to be unfulfilled, and the Vientiane-Kunming Rail Link costing USD 6 billion, 40 percent of the GDP of Laos, to be a matter of concern.

A survey last year found that of 1814 initiatives could be counted as BRI



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projects in 78 countries, 270 had been cancelled, stalled or lapsed, a 15 percent failure rate. Worse, in terms of value it was a 32 percent failure. This is not good for such a promising and visionary initiative. It falls on ASEAN and China to increase the success rate in Southeast Asia through close economic relations and many commitments to deepen them, including connectivity and infrastructure development, through the BRI. With Beijing's greater openness to address shortcomings in BRI project execution, it is timely that ASEAN should engage China on a matter which all agree, unlike the South China Sea disputes, should achieve a positive outcome. The region has been under-investing in infrastructure since the 1998 Asian financial crisis. According to AMRO (ASEAN Plus 3 Macroeconomic Research Office) the rate of investment has been 2.5

percent of GDP when it should be 6 percent.

The skepticism of the E.U. and the opposition of the U.S.

BRI success in Southeast Asia will have a good demonstration effect to achieve acceptance elsewhere, particularly in the E.U. which continues to be skeptical but would wish to participate if BRI project implementation meets international norms and best practice—as China proclaims is now the case.

There remains American objection to the BRI as this grand plan by China for global domination through debt trap diplomacy. If the debt trap is removed, one wonders how the BRI would be viewed. When China initiated the Asian Infrastructure Investment Bank (AIIB), which was established in 2016, the American objection was that it would not measure up

to international standards of project finance. The bank, on the contrary, has actually been quite conservative and now has 70 members, including some of America's closest allies.

The U.S. is isolated on the AIIB. Would it be similarly isolated on the BRI should the initiative turn out for the better? The U.S. must not be seen as the stick in the mud. It has not done well in responding to the rise of China. In the region, China that is setting the agenda, with the U.S. standing on the sidelines, always advising countries not to go along with the rising power but with no clear counter-strategies of its own. Southeast Asian countries are less enamored of the geopolitical consequence of the BRI than they are of its economic benefit through infrastructure development and improved connectivity. While most would prefer an American presence in the re-

gion to balance China's, they see the U.S., with its unpredictable engagement and policies, falling behind, and with no developmental initiative of any kind.

It is not that Southeast Asian countries have succumbed to China, but its extensive economic presence is a reality. China is deeply engaged with the region. Initiatives such as the BRI have great value to these countries, whatever the shortcomings exposed, which now are promised to be addressed.

They must seize the moment to make the BRI truly work for their economies by having honest leaders who will collaborate with China—or any other party for that matter—in a transparent manner which measures up to best international practice and norms.





MALAYSIA • Abdullah of Pahang
King

SINGAPORE • Lee Hsien Loong • Prime Minister



ASEAN The history and objectives of the Association of Southeast Asian Nations
Toward Leadership



LAOS
Bounnhang Vorachith
Republic President



THAILAND • Prayuth Chan-ocha • Prime Minister

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When the original ASEAN member states signed the agreement establishing the Association in 1967, they sought to keep communist countries in the region at bay and accelerate economic growth through cooperation. They now face a new challenge, to avoid being cast as a buffer between U.S. and Chinese interests

The Association of Southeast Asia Nations was founded 52 years ago with purely political aims. The field of participants was subsequently enlarged to ten states, also extending its competencies. Integration continued unabated, until the current situation, where the traditional neutrality is no longer likely to be sufficient and profitable. The signing of the founding document in Bangkok, on August 8, 1967, confirmed an indisputable, decisive choice. The five acceding states—Indonesia, Malaysia, Singapore, the Philippines and Thailand—were all allies of the United States and the United Kingdom. Their allegiance was very strong, their alignment Manichean. They were all committed to defeating internal enemies, Communist uprisings and radical anticolonial aspirations. Twenty years after the end of World War II, the war in the eastern Pacific had not become as cold as in Europe. On the contrary, it re-



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BRUNEI • Hassanal Bolkiah
Sultan



MYANMAR • Aung San Suu Kyi • State Counsellor



VIETNAM • Nguyễn Phú Trọng
Republic President



PHILIPPINES • Rodrigo Duterte
Republic President



CAMBODIA • Norodom Sihamoni • King



INDONESIA • Joko Widodo
Republic President

mained a very hot war. Memories are vivid of the carnage of the Korean civil war, of the tensions for the sovereignty of Taiwan taken over by Chiang Kai-shek's Nationalists, of the trans-Himalayan war between India, China and Pakistan, and of the endless border skirmishes affecting all the countries.

An alliance founded in spite of conflicts

The situation in the five Southeast Asian countries was certainly not stable. Its enemies formed part of the socialist camp led by the Soviet Union, then by China, with their victorious example of rural guerrilla warfare. This was the bane of the Philippines, Malaysia and Thailand. Indonesia had recently deposed the President who gained independence (Sukarno, the leader of the Third World, an ally of the Indonesian Communists), through mass killings of the antagonists. Singapore had

just acquired its independence in turn, starting on a path where adherence to the free market economy appears to be the most valid choice, while powerful Muslim neighbors threaten their existence. When they decided to establish a regional association, the leaders of the five countries faced these dramatic scenarios. They also had to heed the contagion from Vietnam and throughout Indochina, at that time living through a war that would have an opposite outcome to that advocated by ASEAN. To unite, the five countries put mutual tensions behind them. A line was drawn under the “Konfrontasi” (the short war in Borneo between Malaysia and Indonesia), the skirmishes for the maritime borders between Manila and Kuala Lumpur, and the pain of the separation of Singapore. Internal disputes that left no room for opposition and democracy were also silenced. Since its inception, ASEAN has shown ex-

treme plurality. No place in the world offers such a wide range of languages, religions, ethnicities and political systems. Very often, these diversities have not enriched but instead have destabilized the different countries, up to the brink of civil war. On the whole, a secular threat looms: persistent underdevelopment. ASEAN is a poor, rural region, with little monetization in its economy. Endemic diseases have not been defeated, illiteracy is a plague, access to drinking water is problematic. Singapore—a city state with a strategic position, a trade hub and a nascent industrial base—remains a luminous exception. When the member states signed the agreement establishing ASEAN, they faced two strategic goals: overcoming poverty and containing the expansion of Moscow and Beijing. They were well aware that the two objectives were mutually inclusive: one was instrumental to the other, in the generous alliance

with the United States. If with maybe a little too much synthesis, it can be said that the countries were being called on not to declare war and to support the reasons for development. Under the circumstances, these were not easily achievable ambitions. Years later, it is not unreasonable to say that these goals have been reached.

This success has been consolidated by the disappearance of the antagonists. With the fall of the Soviet Union, the collapse of the Berlin Wall and China's conversion to a capitalist system, ideological divisions have been unexpectedly sidelined. The dangers of antagonistic socio-political systems are over. After winning its war in 1975 and unifying the country under Moscow's wing, Vietnam took a spectacular turn in economic policy in 1986. The Doi Moi [“renewal”, Ed.] reforms echoed the Chinese experiment and juxtaposed values of en- →

Structure

The Association of Southeast Asian Nations was founded in 1967 with the main purpose of promoting cooperation and mutual assistance between member states to accelerate economic progress and increase the stability of the region.

SECRETARY-GENERAL

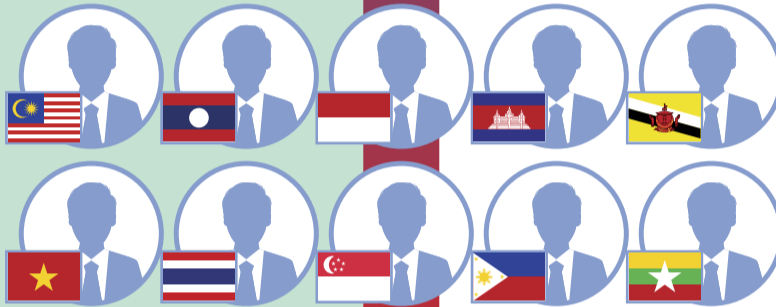
Appointed on merit by the Heads of Government on the recommendation of the AMM. Its tasks are to initiate, advise, coordinate and implement the work of ASEAN.

DIRECTOR-GENERAL

Elected for a non-renewable five-year mandate in rotation between the member states; the administrative leader of ASEAN, appointed to supervise all the organization's work.

LEADERS' FORMAL SUMMIT

Consists of the Heads of State or Government of the ten member states; held twice a year, in rotation in alphabetical order.



COORDINATING COUNCIL

Consists of the member states' foreign ministers; meets every six months.



For the first time, the U.S. organized a summit with ASEAN heads of state in Sunnylands, California.

2016

2015

2009

2008

1995

1992

1976

1971

1967

Key moments

Birth of the Association. Signed by Indonesia, Malaysia, Philippines, Singapore and Thailand.

The Kuala Lumpur Declaration on peace, freedom and neutrality in South East Asia was adopted.

entrepreneurial individualism with central government guidelines. Hanoi discovered that producing value is essential for the country to grow and that the military junta previously in power could not get it going. With dramatic urgency, it found a better solution in delegating economic governance to the private sector, simultaneously opening the country to foreign relations. These are no

longer a dangerous influence, but a tool for growth. After ten years of reconstruction, Vietnam prefers development to identity and now—albeit driven by the same party, as in China—values its neighbors rather than considering them a threat. In 1995, when the former opponent ASEAN welcomed Vietnam into its ranks, it was more the beginning of

a path than the end of an era. The country can finally build peace after living through and winning the war. The accession of Laos and Myanmar in 1997 and Cambodia two years later (the Sultanate of Brunei had joined when it became independent in 1984) made ASEAN complete. The current landscape is definitely more potent and organic than at its inception.

Toward achieving new goals
After thirty years of consolidation and enlargement, the Association appeared ready for a relaunch. Above all, it was thought mature enough to achieve new goals, beyond the peace and defense of its borders. The states were still young, formed by anti-colonial movements, but were now structured and governed by a leadership that was no longer inexperi-

The ASEAN Economic Community (AEC) was formally established, as a political and regulatory framework to lay the foundations for the establishment of a single market in the region.

The ASEAN Intergovernmental Commission on Human Rights was inaugurated, as a new mechanism to protect and promote human rights.

The ASEAN Charter, a charter with the aim of changing ASEAN into a legal entity, creating a single free-trade area for the region.

The South-East Asian Nuclear-Free Zone Treaty is signed; it came into force in 1997.

The Common Effective Preferential Tariff (CEPT) scheme was adopted as a plan to gradually eliminate tariffs.

The Treaty of Amity and Cooperation in Southeast Asia was signed with most of the neighboring countries.

to their barracks, there is less harassment of the Chinese diaspora and private entrepreneurs are better protected. The ten governments have privileged economic relations with less confrontation and definitely more mutual advantages. A long period of consistent and widespread growth thus began, with no questioning of ASEAN's key principles. The first of these remains non-interference in the internal affairs of each country, interpreted very strictly. There are no limits to national sovereignty. Each country has its own currency, economic policy, border controls and army. They take action without constraints and most of all with no proxies. The picture is clearly different from in the European Union. The concepts of a "common home," shared destiny and universality of rights are unwelcome. Instead, a specific realism prevails, the cogent choice not to raise unsolvable arguments, even at the cost of appearing disinterested in issues on a global level.

This cautious, measured, low-profile choice has yielded good results. Having escaped the Asian financial crisis early, in 1997, ASEAN and all its member states—despite their diversity—have achieved a number of enviable successes. They have combined two crucial aspects: growth and stability. Both business and treasuries are happy. These concepts have been put into practice in everyday life through increases in GDP, government spending being kept under control, the emergence of a sizable middle class and a lack of out-of-control frictions. ASEAN is proud of its role as a patient mediator, preferable to the clamor of unilateral decisions. It takes credit for the management of Burmese isolation, where non-interference has resulted in elections and the return of a civilian government, contrary to the outcomes of other methods in Syria and Libya. Decades of development have thus strengthened the Association. In a climate of increasing admiration, analysis often began with a hypothetical conjunction.

If ASEAN were a single entity, it would—with its population of 650 million—be the third most populous country in the world, the fourth largest exporter and economy by 2030 and the leading recipient of foreign investment. If this were true, the opposite could not be proven. Would such a major success be possible if there had been greater integration? In fact, the differences between the various countries are so marked that any attempt at monetary, military and immigration unification would be unimaginable. Probably the most important result was achieved in 2015, with the creation of a free

trade area between the ten countries, with no tariffs on the redistribution of goods imported from third countries. For other issues, despite a common focus on social issues, each government has retained its own prerogatives.

The predominance of China and the interests of the United States

Will the newly emerging frameworks in east Asia allow this substantially divergent position to be maintained? Is a low profile compatible with the emergence of conflicts close to its shores? The response is broadly negative. Will ASEAN maintain its unity despite divergent internal interests? This is the main issue, which cannot be disregarded by its executives. So far, a division of responsibility has gradually strengthened, as if part of the natural order: China provides economic leadership, the United States offering security. This situation has taken the weight off the shoulders of ASEAN, which has only had to exercise diplomatic skill to extricate itself. The old system now finds itself in question. The Pax Americana resulting from the surrender of Japan more than 70 years ago is under major threat from Chinese maritime expansionism. Beijing is claiming an immense space in the seas lapping the coasts of many ASEAN countries, building lighthouses, moorings and airstrip on unpopulated islets. They pull out ancient maps showing how these reefs are unquestionably Chinese, connected by 'nine-dash' lines that move China's inland waters thousands of kilometers south. Tensions are more evident in territorial disputes with Vietnam and the Philippines, although these are of concern to all the countries of Southeast Asia. Of course, a conflict arises with the seventh U.S. fleet patrolling these seas to ensure freedom of navigation. This ensures supplies to Korea and Japan, because half of the world's oil crosses the Straits of Malacca, Makassar and Lombok. It is unthinkable that Washington could renounce its hegemony, that the never-ending postwar in the Pacific could have such resounding results. Yet the ASEAN governments, if concerned, do not have the strength and unity to oppose the ambitions of Beijing. China is the most important trading partner for the whole Association and its most frequent investor, which is especially useful for building infrastructure. Especially for smaller countries or those nearby—such as Laos, Cambodia or Myanmar—it is impractical to resist the strength of Beijing in bilateral negotiations. The caution of Indonesia, the biggest and most important country, highlights the para-

dox of history: Singapore—where three quarters of the population is Chinese—is strong enough to distance itself from Beijing to maintain its friendship with the United States, while Vietnam, leaving the war of 50 years ago behind, allies itself to Washington against China. Territorial disputes are indicative of deeper tensions between China and the United States. These tensions unravel in trading with a Customs war, in the Chinese expansionism of the Belt & Road Initiative, in its maritime aspect affecting ASEAN and in their technological supremacy in strategic sectors. Disputes are very likely to increase and encroach on trickier territory. Their origin is in fact deep-rooted and complex and can certainly not be managed with extemporization and propaganda.

Another historic breakthrough?

Since the end of the Cold War, ASEAN has been expected to make another historic breakthrough, if now even more challenging. In essence, it must cease to be an immense buffer between U.S. and Chinese interests. The stakes exceed the usual balances and their respective advantages. ASEAN must therefore take courageous initiatives, given it has now declared its global dimensions and the demands of its population are ever greater. Development in society can no longer be sacrificed to political equilibrium. If its weakness was in fact power in disguise, if it neglected an international role to favor internal development, these are now relevant binding positions. To act on these, the institutional architecture of ASEAN may prove insufficient. Much social imbalance and differences in income and volumes of GDP still remain. Never dormant, instinctual identities, ethnic pride, secessionist claims and religious intolerance are re-emerging. The immense Asian superstructure is taking its own position and the traditional pillars of ASEAN—most of all, non-interference—will prove inadequate. Having brought about development in ten different countries, a change in principles would seem consistent with globalization. The power of strong and unitary states, such as China and the United States, requires different solutions because rigid fragmentation—despite its many results—would reveal its fragility at every negotiating table.



enced. Most of all, there was no political threat. The old bastions of the Cold War now appeared to be an obstacle to development, once having acted as pillars of security. Struck by their own inadequacy and strangers to the new perspectives, one authoritarian leader has fallen after another: Marcos in the Philippines, Suharto in Indonesia, the generals in Thailand. The commanders return

A Future World Power

The ASEAN region has emerged as a major economic force globally. Today it is faced with the major challenge of satisfying the needs of its population in a sustainable way, particularly as regards the supply of energy, the demand for which is constantly growing



CHRISTOPHER G. ZAMORA



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Southeast Asia, home to 642 million people, has gone through a rapid economic transformation as a region, emerging as an important global force. To further spur their growth together as a region, the ten member states of the Association of Southeast Asian Nations (ASEAN), founded in 1967, are committed to driving economic integration in the region. Since the cooperation began 50 years ago, ASEAN has almost doubled its share of the world's gross domestic product (GDP) from 3.3 percent in 1967 to 6.2 percent in 2016. ASEAN as a community has emerged as the world's 6th and Asia's 3rd largest economy. This growth is expected to continue as the population of the region is estimated to reach 782.8 million by 2040, reflecting an annual average growth rate of 0.9 percent. Acknowledging this background, ASEAN as a region faces a great challenge to fulfill the needs of its people in a sustainable way, especially in meeting the rising demand for energy to fuel its economic growth.

Demand for energy to double by 2040

Based on a projection period of 25 years from 2015 to 2040, the 5th ASEAN Energy Outlook (ACE, 2015) supports the notion that



ASEAN is growing rapidly. According to measures of total final energy consumption (TFEC), energy demand is projected to increase by more than double between 2016 and 2040, from 427 million tons of oil equivalent (Mtoe) to 1,046, with a growth rate of 5.85 percent annually, exceeding its previous annual growth of 3.4 percent from 1995 to 2015. Within TFEC, industry, transport and residential sectors will still con-

tinue to dominate the share with the composition shifting moderately overtime as shown in Figure 1. In 2015, transport and industry sectors already represented more than half of TFEC; combined, they will increase to two-thirds of the TFEC by the end of the projection period. The increasing energy demand in transport and industry sectors indicates an urbanization trend, which leads to increased need for transport services and as a consequence brings ASEAN



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to a shift from an agricultural to a more industrialized region. Following the projected development trend, it is expected that ASEAN will experience an expanding demand for all kinds of fuel in the projection period. Demand for oil products will increase considerably from 168 Mtoe in 2015 to 472 Mtoe in 2040. It is expected that oil will keep its dominance in all sectors at a share of 40-50 percent between 2015 and 2040. On the other hand, with an

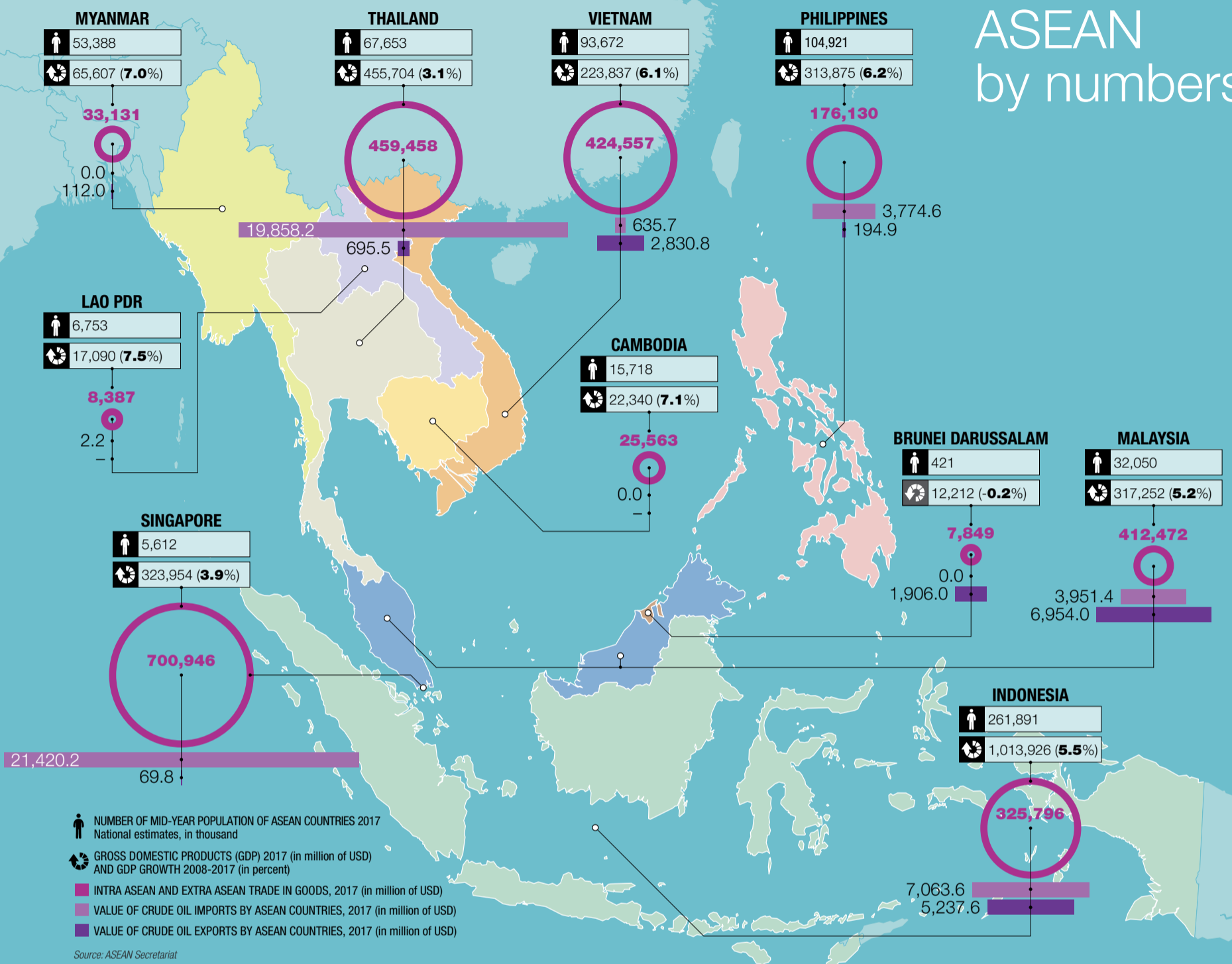
increase from 82 Mtoe in 2015 to 207 Mtoe in 2040, the power sector held the second highest share in TFEC after oil and the power generation sector is projected to grow along with the industrial and residential sectors.

As the electricity demand increases, overall power capacity of 205 GW in 2015 will increase to 323 GW in 2025 and rise further to triple its base value to 629 GW in 2040. To cater to this enormous demand for electrici- →

Gigantic synthetic tree-shaped structures stand in the center of Singapore, close to the Marina Bay artificial lake. On the trunks, which are 25 to 50 meters tall, grow over 160,000 plants of over 200 different species.

📷 Ryan Koopmans is a Dutch-Canadian photographer with a particular interest in the built environment and societies shaped by those environments.

ASEAN by numbers



ty, most of the ASEAN member states are projected to still rely on fossil fuel based electricity followed by a slight increase in renewable energy (RE) usage. The projection shows that coal will remain as the main resource for power generation in ASEAN following the commissioning of numerous coal power plants in the region starting from the early 2000's. Electricity from coal is expected to rise from 63 GW in 2015 to 119 GW in 2025 and will reach 267 GW in 2040. Moreover, natural gas-based power plants are projected to approximately double the base value, from 77 GW in 2015 to 156 GW in 2040. However, despite the region's reliance on fossil-fuels, RE is also projected to flourish—RE-based electricity is projected to rise from 50 GW in 2015 to 93 GW in 2025 and 183 GW in 2040.

Consequently, all ASEAN member states are expected to experience expanded energy consumption, with Cambodia, Lao PDR and Vietnam growing the most during the period. However, in terms of TFEC, the leading consumers of energy are still Indonesia, Thailand, Vietnam, Malaysia and the Philippines, with a combined share of 388 Mtoe (90.8 percent) in 2015 to 972 (92.9 percent) in 2040. In ASEAN, Indonesia remains the most energy-consuming country with 417 Mtoe (39.9 percent) of TFEC in 2040. Following the vast development and the rise of energy consumption, the energy supply as indicated in total primary energy supply (TPES—the sum of production and imports minus exports and storage changes) is also projected to grow. Looking into the perspective of TPES as shown in Figure 2, ASEAN

is estimated to experience a steady growth from 627 Mtoe in 2015 to 1450 Mtoe in 2040. In 2015, oil will still represent its dominance, having a 33 percent of TPES with 207 Mtoe, followed by natural gas at 23.7 percent or 150 Mtoe, and coal with the lowest share among fossil fuel with 18.5 percent or around 116 Mtoe. Further into the projection period, ASEAN is projected to still be dependent on fossil fuels—energy from oil, gas, and coal will be accountable for 78.6 percent or about 1,139 Mtoe of the total 1,450 Mtoe in 2040. Nevertheless, RE will experience a rapid increase in TPES with compounded annual growth rate of 4 percent during the projection period. In 2015, RE represents 13.6 percent of TPES, including 18 Mtoe (2.9 percent) of hydro, 12 Mtoe (1.9 percent) of geothermal, and 55 Mtoe of

other RE (8.8 percent). In terms of TPES share by country, Lao PDR, Vietnam and the Philippines will experience the strongest growth during the projection period. While the five dominant member states in TPES will still be Indonesia, Thailand, Vietnam, Malaysia and the Philippines, it is expected that Vietnam will surpass Malaysia in 2023 to become the third largest contributor in TPES.

The balance between development and environmental protection

ASEAN clearly faces a challenge in its effort to keep the balance between providing affordable energy to support development while ensuring sustainability and protecting the environment. In planning its strategy to achieve energy sustainability, affordability, accessibility and security at the

regional level, ASEAN established an *ASEAN Plan of Action for Energy Co-operation (APAEC) 2016-2025*, which serves as a blueprint for member states, complementing each's national energy targets. With the strong support of the ASEAN Centre for Energy (ACE)—an intergovernmental organization within the ASEAN structure that represents the 10 member states' interests in the energy sector—the member states implement seven program areas that are of collective importance; ASEAN Power Grid (APG), Trans-ASEAN Gas Pipeline (TAGP), Renewable Energy, Energy Efficiency and Conservation (EE&C), Civilian Nuclear Energy (CNE), Cleaner Coal Technology (CCT), and Regional Energy Policy and Planning (REPP). Among these program areas, ASEAN aspires to have a regional target to increase the share of RE in its energy mix to 23 percent by 2025 and aims to reduce its energy intensity (EI) regionally by 20 percent by 2020 (which has been reached in 2016), by achieving an aggregate EI reduction of 21.9 percent. Now ASEAN is moving forward to meet their mid-term target of 30 percent EI reduction by 2030.

Up to 2015, RE's share of ASEAN TPES reached 13.6 percent, showing a considerably large gap of around 10 percent towards the goal of 23 percent share. To be able to reach the target, it is crucial for members states to accelerate its efforts in deploying RE. Moreover, it is an appropriate time for ASEAN to amplify the implementation of RE in a large scale as the region can now benefit from more affordable RE technologies and increasing RE investments.

Geographical differences and different energy potentials

To boost RE implementation, ASEAN should take the diversity of each member state's energy resources and economic development into account. These differences translate into different energy planning priorities within ASEAN. For example, some of the member states have reached 100 percent electrification while others are still focussed on providing electricity to all their citizens. Furthermore, the diversity of the member states' geography makes for different energy sources potentials. For example Cambodia, Lao PDR, Myanmar, and Vietnam have abundant hydropower potentials while Indonesia and the Philippines are rich in geothermal resources. In creating a regional strategy to boost RE development these differences must be considered.

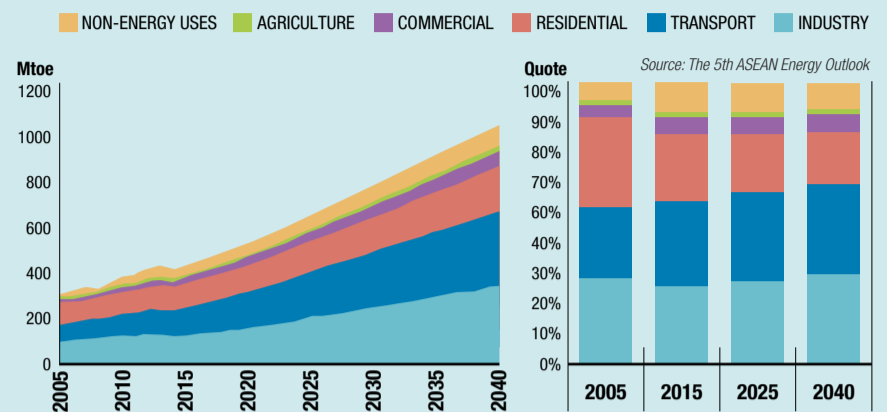
However, ASEAN should also see those differences as strengths and opportunity for a more inclusive regional

energy integration. The diversity opens the door for innovations, especially ones to enhance resilience against energy crises and to achieve regional connectivity. Enhanced multilateral interconnection projects could be the gateway to resource sharing, which would then increase RE deployment in order to electrify rural and remote areas and consequently reduce the member states' reliance on fossil fuels. For that purpose, ASEAN needs to overcome technical and regulatory barriers. Long-term agreement and commitment as well as good interconnection frameworks for legal and technical issues would be the necessary step to drive the interconnectivity at a regional scale. Steps to move forward towards interconnection have been taken by some member states under the APG framework. The Lao PDR-Thailand-Malaysia-Singapore (LTMS) Power Integration Project is the first multilateral electricity trading in the region. Serving its role as a catalyst to unify and strengthen ASEAN energy cooperation and integration, ACE assisted the Heads of ASEAN Power Utilities/Authorities (HAPUA), the specialised energy body in charge of APG), to realise the Energy Purchase and Wheeling Agreement signed in 2017 by Lao PDR, Malaysia, and Thailand. With the agreement, Malaysia will purchase up to 100 MW of electricity from Lao PDR, using Thailand transmission line. This notable collective feat marks an important milestone for ASEAN.

Those concerted efforts and collaborations are driving the region to close the gap between the current RE level and the regional target under APAEC. As a regional catalyst, knowledge hub and a think tank that serves to enhance ASEAN energy cooperation, ACE conducts multiple studies and capacity building activities in support of the member states towards the achievement of APAEC targets. ACE is collaborating with dialogue partners and international organizations like Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and Japan-ASEAN Integration Fund, in pushing RE and EE&C in the region by developing studies, organizing capacity building activities, and establishing initiatives with member states. For instance, ACE develops *ASEAN Energy Outlooks* to better analyze the region's energy needs and identify recommendations for a better ASEAN energy profile. ACE also released the *Levelized Cost of Electricity of Selected Renewable Technologies in the ASEAN Member States* study for renewable technologies in ASEAN to encourage a competitive RE market.

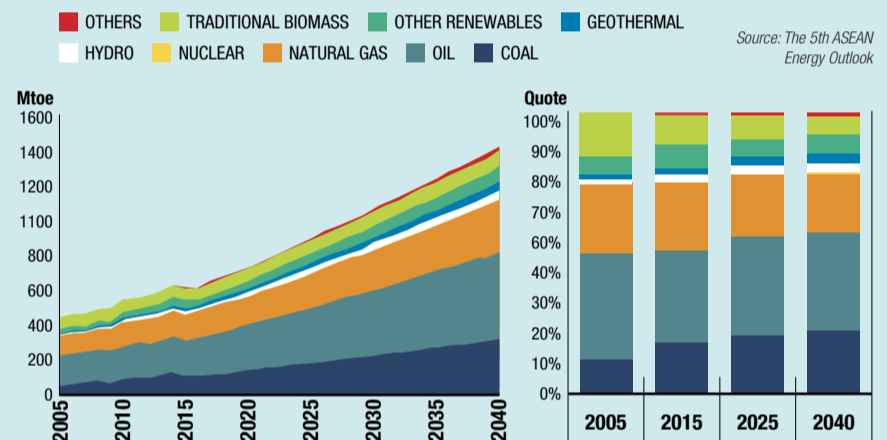
Such efforts that engage multi stakeholders to benefit from their knowl-

1. FINAL ENERGY CONSUMPTION BY SECTOR



In 2015, transport and industry accounted for more than half of the final energy consumption of ASEAN and by the end of 2040 they will account for two thirds. The increase in energy demand in the industry and transport sectors indicates a trend towards urbanization in the region, which involves a greater need for transport services.

2. TOTAL SUPPLY OF PRIMARY ENERGY BY FUEL



ASEAN countries will record a stable increase in the total supply of energy from 627 Mtoe in 2015 to 1450 Mtoe in 2040. In the reference period, the region will continue to depend on fossil fuels, with oil, gas and coal accounting for 78.6 percent of supply by 2040. However, even renewables will increase rapidly.

edge exchange and collaborations will provide member states with resources and skills to create better energy plans and translate them into concrete policy measures. Additionally, as the region is moving with the rest of the world towards various global trends such as digitalization, ASEAN is expected to be able to advance its energy development more progressively. With the strengthened cooperation among member states' governments and their partners, as well as the development of new and innovative technologies, ASEAN can see a future of enhanced energy connectivity and market integration to achieve energy security, accessibility, affordability and sustainability for all, as aspired by APAEC.





Japan/A paucity of natural resources and the importance of energy policy

Tokyo's Strategy, between China and the U.S.

Beijing's ascent has created a very difficult situation for Premier Abe's government on both the security and economic fronts. Those difficulties are exacerbated by some of Trump's foreign policy decisions



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The multidimensional strategy of Japanese government aims to maintain the cohesion of its alliance with Washington, preserving the basic rules of the regional political and economic order and building a stable, if competitive, relationship with China.

MATTEO DIAN

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Japan is currently facing a very complex geopolitical scenario, one riddled with challenges. First, it is the Asian country that feels the Chinese threat most deeply in terms of security as well as status and prestige. Additionally, the Trump Administration's foreign policy has compounded some of the geopolitical and economic challenges caused by Beijing's ascent.

The government of Prime Minister Shinzo Abe has responded to these challenges with a multidimensional strategy aimed at achieving a series of separate goals: (1) maintaining the cohesion of its alliance with the United States during the Trump presidency; (2) preserving the basic rules of the regional political and economic order, while expanding the role of Japan within it; (3) building a stable, albeit partly competitive, relationship with China.

Japan and the rise of China

China's rise constitutes a major threat to Japan's security and status in the region. The data on military spending gives a clear idea of the scale of China's rising military might. In 2000, the official figure for China's military budget was USD 22 billion. Today, that figure has risen to USD 182 billion. In 2000, Japan spent USD 42 billion, while today it spends around USD 48 billion.

In addition to the quantitative expansion of its military resources, the People's Liberation Army has also launched a vast modernization program that includes development of its power projection capability across the "first island chain" stretching from Japan to Singapore. It has improved the technology of all the sectors of its armed forces and developed a navy with the capacity to challenge not only Japan's but also the U.S. Navy's Seventh Fleet deployed in the Pacific. This has enabled China to pursue a strategy aimed at gaining control of the South China Sea through the gradual occupation of disputed islands and reducing the credibility of the United States' alliances with its Asian partners. Furthermore, Beijing and Tokyo are engaged in a territorial dispute involving the Senkaku-Diaoyu Islands. This dispute has regularly flared up in recent years and is a barometer of the state of bilateral relations between the two countries. Against this background, Japan faces multiple challenges. First, in the space of a few years China has become the region's leading military power, making Tokyo's alliance with Washington vital for Japan's security. Second, China's growing military might and the hybrid strategy pursued in the South China Sea involve a dual risk, the possible interruption of the main maritime communication route link-

ing Japan, the Middle East and Europe, in case of conflict escalation, and the possible erosion of credibility of America's alliances in the region.

But China is not only a security problem. It also poses a threat to the status of Japan, which, since the Meiji restoration in the mid-19th century, has been the wealthiest and most advanced country in East Asia. This status is now being undermined by the rapid growth of the Chinese economy. In 1990, Japan's GDP accounted for around 70 percent of the region's wealth, while China's accounted for only 10 percent. Today, China produces 50 percent of the region's GDP. China has also played a leading role in global economic and financial processes, most notably through the New Silk Road project or Belt and Road Initiative, the creation of the Asian Infrastructure and Investment Bank (AIIB) and its backing of the major trade agreement known as Regional Comprehensive Economic Partnership (RCEP).

Abe, Trump and the U.S.-Japan alliance

During the last decade, and particularly since Shinzo Abe's second term as prime minister, Japan has pursued different strategies to respond to China's ascent. These strategies have focused on efforts at bolstering its alliance with the United States, which culminated in the approval of new guidelines for defense cooperation between the two countries in 2015, the building of bilateral and multilateral relations with other Asian partners such as through the "Quad" with Australia and India and the development of trans-Pacific forms of economic governance such as the Trans-Pacific Partnership (TPP).

Donald Trump's election as president of the United States has put this multidimensional strategy under serious strain. Both as a presidential candidate and as U.S. president, Trump has repeatedly expressed his skepticism about alliances and has openly accused America's leading European and Asian partners of exploiting alliances to avoid "paying the bill" in terms of military expenditure. Trump has also voiced his opposition to renewing America's unconditional commitment to defending its allies, arguing that alliances should be made conditional on possible economic and trade concessions.

On the economic front, Trump immediately announced that the U.S. would withdraw from the TPP, a move widely interpreted in the region as benefiting Chinese state capitalism insofar as it brought to an end the attempt to shape the rules of regional economic integration in a way that would foster a form of free market capitalism. The Trump administra-



MACROECONOMIC DATA

Source: FocusEconomics

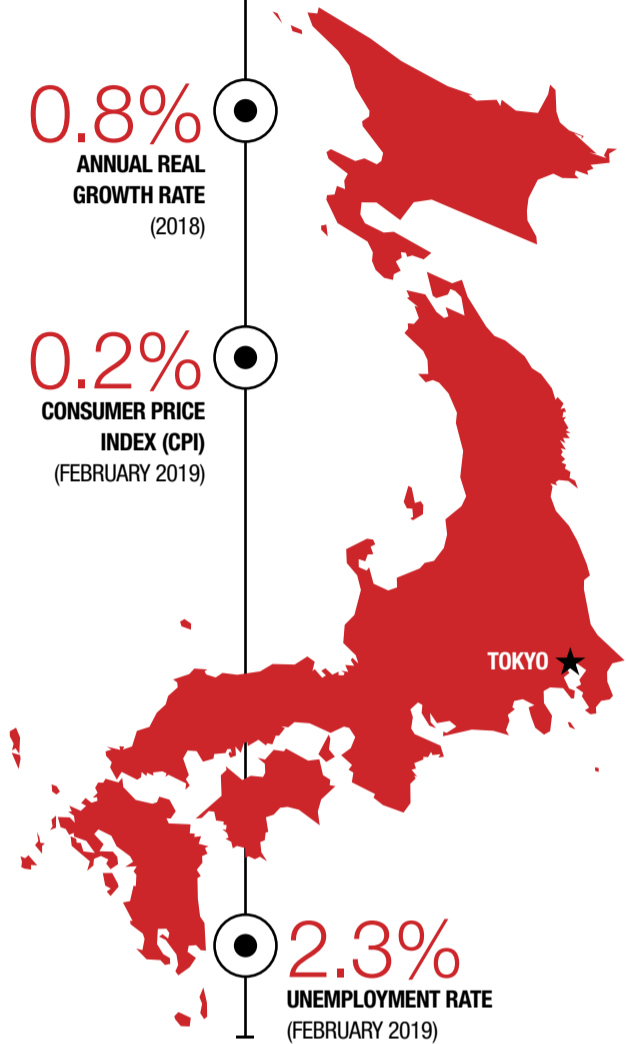
¥548,904.4 billion (USD 5,023 BILLION)
NOMINAL GDP (2018)

0.8% ANNUAL REAL GROWTH RATE (2018)

0.2% CONSUMER PRICE INDEX (CPI) (FEBRUARY 2019)

2.3% UNEMPLOYMENT RATE (FEBRUARY 2019)

RENEWABLE ENERGY
FOSSIL FUEL
NUCLEAR ENERGY



tion, moreover, has imposed tariffs against its allies, including Japan, hitting sectors like steel and aluminum.

Abe's response has been very clear, with security as his top priority along with the preservation of Japan's alliance with Washington. Following the November 2016 elections Abe immediately set about establishing a privileged personal relationship with Trump and separating the management of the alliance from the various political and economic problems created by the new American administration.

For the time being, Abe's strategy has been successful in avoiding a deeper crisis in bilateral relations and has allayed Japanese fears of American disengagement. Also, developments that would be detrimental to Japan, such as a bilateral agreement between the United States and North Korea in the absence of denuclearization, seem less likely today than in the recent past.

This, however, has not completely dissipated the climate of uncertainty characterizing the alliance under President Trump's Administration. On the one hand, Tokyo fears the danger of "entanglement" if the trade war with China were to lead to increased tension between the two global powers, including in the military sphere, on the other hand, Japan is concerned about the possibility of being "abandoned" if Trump were prepared to enter into agreements with Beijing that have the potential to damage Japanese interests and security.

Tokyo's regional strategy

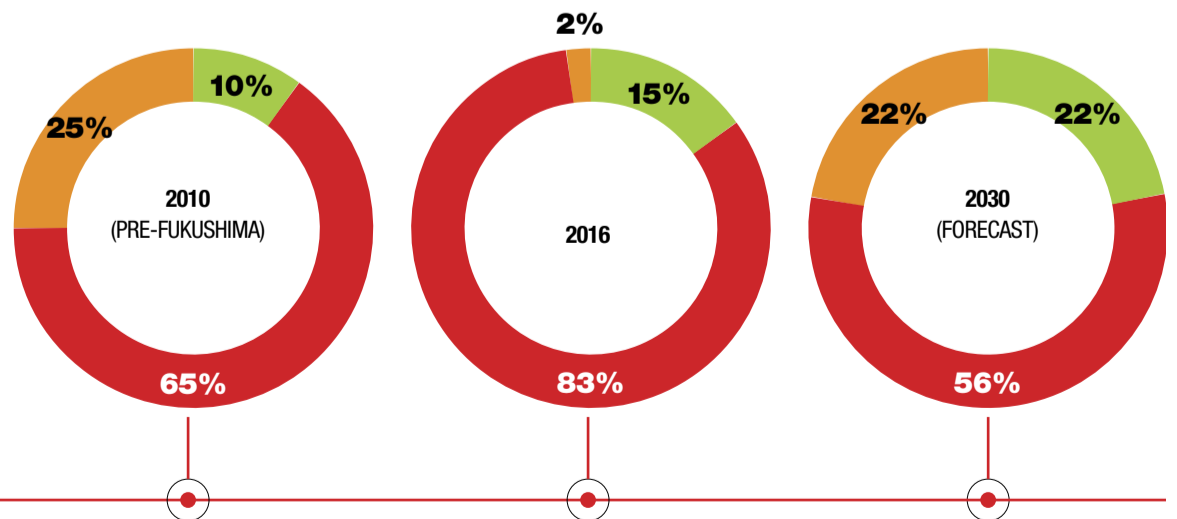
The other pillars of Abe's strategy are seen as complementary to Japan's alliance with the United States and not as a substitute for it. First, Japan has promoted a range of bilateral and mini-lateral initiatives involving var-

ious partners in East and South-East Asia. These initiatives seek to contain the expansion of Chinese influence across the region in both the economic and defense spheres.

On the political-military front, Tokyo has strongly supported the idea of the "Quad," the quadrilateral cooperation framework made up of the region's democracies, namely Japan, the United States, India and Australia. The initiative's lack of success has driven the Japanese government to focus its efforts on promoting new bilateral security relations. This has led to the signing of bilateral agreements with Australia, Vietnam, the Philippines, and Indonesia. Although these partnerships are not genuine alliances, they have fostered the development of new forms of cooperation, particularly in the areas of military training, maritime surveillance and patrolling, and naval technology cooperation. The Japanese effort to create a network of new defense ties is an attempt to help states, particularly in Southeast Asia, that lack the capability to stand up to Beijing's aggressive stance. In terms of economic governance, Japan has tried to react to the protectionist policies pursued by President Trump in different ways. First, it promoted the approval and signing of the new version of the TPP, known as TPP-11 or Comprehensive and Progressive Agreement for a Trans-Pacific Partnership. This agreement, which includes the former members of the TPP except for Washington, attempts to establish a "trans-Pacific" integration area based on a free market approach and with substantial restrictions on the role of the public sector and state-owned enterprises, thereby creating an unfavorable environment for Chinese state-owned enterprises. Although the TPP-11 is significant, its clout is significantly diminished by the absence of the United States.

THE ENERGY MIX

Japan's Strategic Energy Plan calls for a drastic reduction in fossil fuel consumption by 2030, to be replaced by a significant increase in nuclear energy, with the aim of bringing it back to its previous share of almost a quarter of the country's energy demand.



Source: Strategic Energy Plan

Another major step is Japan's ratification of two key agreements with the European Union, the Strategic Partnership Agreement and the Economic Partnership Agreement. Both agreements signal how Japan, like the European Union, is striving to strengthen the contemporary international order currently being undermined by both China's ascent and the policies of the Trump Administration.

The relationship with China

Despite the fact that China is a major challenge and a threat to Japan's status in the region, the Japanese government is aware that it needs to build a stable and working, albeit partially competitive, relationship with Beijing. This need arises from the high level of interdependence between the two countries' economies as well as from the fact that an escalation of military tensions would pose a serious threat to Japan's security. Additionally, the climate of uncertainty characterizing the alliance with the United States under the Trump presidency makes the Japanese position even more precarious.

After six years without any bilateral state visits, the Chinese Premier Li Keqiang went on an official visit to Tokyo and Abe went to Beijing to mark the fortieth anniversary of the 1978 Treaty of Peace and Friendship. These visits have led to the signing of a series of agreements. The most significant among them is Japan's turnabout on the Belt and Road project. Tokyo has decided to shift from implicitly opposing the project to participating with a substantial share of investments (up to USD 18 billion). There have also been several significant developments in the area of security. In June 2018, the two countries approved the establishment of a hotline between their armed forces aimed at averting unintentional conflict escalation.

Only in the medium to long term will it be possible to assess the real political and strategic significance of these agreements. To date, they seem to indicate that there is a will on both sides to control bilateral competition, limiting any knock-on effects it might have on the economic and security sphere. Only time will tell whether this is a bilateral detente driven by tensions between Washington and Beijing combined with the difficulties besetting the Japan-U.S. alliance, or whether it is a significant shift in bilateral relations.

Energy policy

Against this background, energy policy acquires an increasingly central role for Japan, a nation totally lacking in natural resources. Japan's dependence on energy imports and its

Abe's moves

U.S. Following the November 2016 elections, Abe immediately set about trying to build a privileged personal relationship with Trump, separating the management of Japan's alliance with the United States from the political and economic problems caused by a new American administration marked by skepticism about defense and security cooperation and a protectionist approach to trade.

E.U.

Japan and the European Union signed the Strategic Partnership Agreement and the Economic Partnership Agreement. The latter entered into force on February 1, 2019, creating an open trade zone covering 635 million people and around one third of the world's total GDP.

ASIA-PACIFIC

Due to the lack of success of Quad (quadrilateral cooperation between Japan, the United States, India and Australia), the Japanese government focused its efforts on promoting new bilateral ties in the security sphere, signing agreements with Australia, Vietnam, the Philippines and Indonesia. On the economic front, Abe promoted the signing of the new version of the TPP, dubbed TPP-11 or Comprehensive and Progressive Agreement for a Trans-Pacific Partnership, which includes all the former TPP partners except for Washington.

CHINA

During Abe's visit to Beijing to mark the fortieth anniversary of the 1978 Treaty of Peace and Friendship, China and Japan signed a series of strategic agreements on trade, finance, technology, and development cooperation. The most significant among them is the agreement on the Belt and Road Initiative, signaling Tokyo's shift from implicitly opposing the project to participating with a substantial investments totaling up to USD 18 billion.

vulnerability to potential external shocks exacerbate the risks for the country.

The Fukushima disaster, and the earthquake and tsunami of March 11, 2011 that followed it, have aggravated this situation. The government was forced to shut down numerous nuclear power plants and to lower the output of others, causing Japan's energy self-sufficiency rate to drop from 20 percent in 2010 to below 10 percent in the years following the disaster. This has led to a rise in electricity prices and to an increase in Japan's dependence on oil imports from the Middle East as well as LNG imports from Qatar, Australia and Indonesia, making maritime transit routes through the South China Sea even more crucial. The Japanese government recently published a new energy plan called

Strategic Energy Plan 2030. The plan calls for the drastic reduction of fossil fuel consumption, bringing oil consumption down to 3 percent of the country's energy demand, while maintaining LNG and coal at around 25 percent. The plan stresses that without reintroducing substantial investments in nuclear energy it is impossible to achieve an energy mix that reduces dependence on fossil fuel and, consequently, lowers Japan's vulnerability to external shocks. The Plan's target is for nuclear energy to supply around 22 percent of the nation's demand in 2030.

Looking ahead

China's ascent and the Trump Administration's foreign policy have created a very difficult situation for Japan as it faces an increasingly assertive China on both the security and

the economic front. The Abe government has put in place a multidimensional strategy that seeks to preserve Japan's alliance with Washington, expand its cooperative ties with the other democracies in the region and regulate the competitive aspects of its relations with China. While this strategy has achieved significant results in the short and medium term, it cannot obscure the fact that, in the long term, Japan has a critical need for an American policy that can guarantee security and stability and promote an open system of economic governance.



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The Seoul subway is one of the world's busiest urban transport systems, with over 8 million passenger rides per day.



© FILIPPO VENTURI

Female students in Seoul. South Korean high school students have extremely long hours of study (up to 21 hours per day), especially during their final year.



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Dongdaemun Design Plaza. This cultural center, located in the Dongdaemun district, is a key urban development landmark in Seoul.

South Korea/The potential consequences of the tariff crisis

Caught in the Crossfire

The country appears to be trapped between its historic ally, the United States, and the rising power of the People's Republic of China, which, after reopening formal diplomatic channels with Seoul in 1992, has now become its main economic partner



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A particular saying is often used to describe South Korea's foreign policy position, which is that "when whales fight, the shrimp's back is broken." In fact, while the relative geographical isolation of the peninsula has sometimes offered protection to its people, over the centuries Korea has often found itself involved, against its will, in a tumultuous dispute between powers, a situation that has repeatedly caused massive devastation. In the 16th century Japanese determination to replace Ming China as a regional superpower led to the Imjin River War, with Korea as a theater of battle. In the following century it was the turn of the Manchus, who dragged Korea into a bloody conflict in their attempt to subvert the rule of the Ming dynasty. In the 19th century, Korea was caught up in the Sino-Japanese conflict and in the next, control of Korea led to a dispute between Russia and Japan, which resulted in brutal colonization by the latter. At the end of the World War II, when liberation from the colonial yoke might have marked the beginning of a period of tranquility and independence, the peninsula suffered the bloody Korean War from 1950 to 1953, which led to a division imposed by the two blocs that emerged from the Cold War.

The fate of Korea does not seem to have changed during this century: the country appears to be caught between its historic ally, the United States, and →



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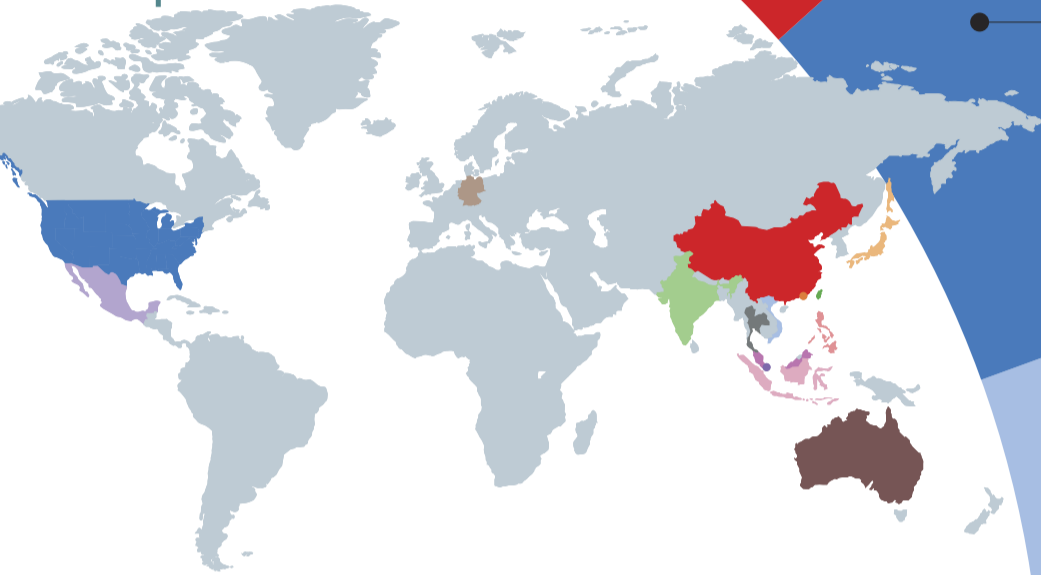
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MADE IN KOREA

In less than half a century South Korea has become one of the world's most modern and technologically advanced countries. Its rapid progress has been achieved by instilling a huge sense of competition in society through the search for educational, professional and aesthetic perfection. In the photo at the top, skyscrapers in the city of Incheon. At the bottom, the reproduction of the Trevi fountain in Seoul's Lotte World shopping mall.

📷 Filippo Venturi is a documentary photographer. His photos have been published in leading newspapers and magazines, including *The Washington Post*, the *Financial Times*, *Newsweek*, *Vanity Fair*, *Der Spiegel*, and *Geo*.

Exports, the main partners



Almost four-fifths (78.9%) of South Korean exports in 2018 went to 15 countries. The top trading partner is China, which receives 26.8% of exports, the second is the United States with a 12.1% share.

MACROECONOMIC DATA

1.8%
GDP ANNUAL GROWTH RATE

4.1%
UNEMPLOYMENT RATE

0.6%
INFLATION RATE

4,120
BALANCE OF TRADE (USD Million)

Source: TRADING ECONOMICS

CHINA: **\$162.2 billion (26.8%)** of total exports from South Korea

UNITED STATES: **\$73.1 billion (12.1%)**

VIETNAM: **\$48.6 billion (8%)**

HONG KONG: **\$46 billion (7.6%)**

JAPAN: **\$30.6 billion (5.1%)**

TAIWAN: **\$20.8 billion (3.4%)**

INDIA: **\$15.6 billion (2.6%)**

PHILIPPINES: **\$12.1 billion (2%)**

SINGAPORE: **\$11.9 billion (2%)**

MEXICO: **\$11.5 billion (1.9%)**

AUSTRALIA: **\$9.6 billion (1.6%)**

GERMANY: **\$9.4 billion (1.5%)**

MALAYSIA: **\$9 billion (1.5%)**

INDONESIA: **\$8.9 billion (1.5%)**

THAILAND: **\$8.5 billion (1.4%)**

REST OF WORLD: **\$125 billion (21%)**

Source: CIA World Fact Book, 2019

the rising power of the People's Republic of China, which, after re-opening formal diplomatic channels in 1992, has become Seoul's main economic partner. However, its relationship with the United States has also evolved and extends beyond security alone: trade between Seoul and Washington, for example, is currently worth more than 70 billion dollars. Growing tensions between the United States and China, however, are likely to place South Korea in a dangerous crossfire, as already demonstrated on several occasions, such as in the summer of 2015, when South Koreans began discussing the possibility of joining the Asian Infrastructure Investment Bank, a Chinese creation strongly opposed by the United States. And above all, there were tensions the following summer due to the age-old dispute over American deployment of the THAAD anti-missile system on South Korean soil.

The dispute with Beijing over the anti-missile system

Immediately after being elected president in May 2017, Moon Jae-in was confronted with one of the thorniest issues bequeathed to him by his predecessor, Park Geun-hye, who, following the fifth North Korean nuclear test in January 2016, had decided to equip her country with the THAAD (Terminal High Altitude Area Defense) system, to be supplied by the Americans. Revelations about the corrupt management of power by President Park, which led to her impeachment and subsequent arrest, brought into question the need to install the THAAD system, which Moon Jae-in, a progressive presidential candidate at the time, was not entirely convinced about, mainly due to strong Chinese discontent. The decision, however, could not be overturned, and the THAAD system was duly installed in the area of Seongju, despite strong opposition among the local population. The dispute surrounding the THAAD system encompassed a multitude of primary issues relating to the internal political structure of South Korea, the future of relations between Seoul and Beijing and the effectiveness of deterrence against Pyongyang. In its foreign policy, the Moon administration was obliged to balance its significant alliance with the United States against the new position taken in respect of North Korea and the increasingly important ties with Beijing. The latter was particularly irritated by the South Korean decision to accept the deployment of the THAAD system, arguing that it would potentially have made its ability to react more difficult and, above all, would have "extended its gaze" into Chinese territory,



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thanks to the system's powerful radar. Chinese media were insistent about the "consequences" that South Korea would suffer as a result of the decision to accept the anti-missile system, asserting that this would potentially lead to a rearmament race on the Asian continent aimed at "containing" China. Beijing immediately decided to exert intense pressure on South Korea and responded by adopting a series of economic sanctions. The THAAD issue has raised a major, interesting question regarding Beijing's attitude to Seoul. While the relationship between Seoul and Beijing has continued to grow and strengthen both economically and politically since the opening of diplomatic channels in 1992, this disagreement shows how Beijing is making continued demands on Seoul to observe the principle of sovereignty and non-interference for China's own benefit, but adopts a completely different attitude towards "weaker" powers such as Korea. Chinese interference in Seoul's internal politics, open pressure, failure to respect any diplomatic protocol and, above all, total indifference to Seoul's indisputable right to accept any system capable of defending its national borders could certainly arise again, given South Korea's need to proceed with modernizing its defense apparatus, jointly or independently of

the United States.

The dispute over THAAD had significant repercussions on the South Korean economy, given that the Chinese market accounted for about a quarter of the country's exports, and more generally on relations between Seoul and Beijing. When retaliation commenced against one of South Korea's leading industrial conglomerates, the Lotte group, responsible for selling the land on which the THAAD was installed, the cost borne by the South Korean economy was very high, amounting to around USD 7.6 billion in 2017 alone. The Chinese government, furthermore, citing a series of security-related violations, decided to suspend the activities of the Lotte group, which was forced to sell many of its stores. In addition, television programs produced in Korea were banned and a strong squeeze was also imposed on the tourism and car industries. The Chinese disguised these measures by claiming they were a result of choices freely made by consumers.

China's turnaround and Seoul's "3 nos"

At the end of October 2017, however, China changed its attitude and decided to bury the hatchet. Both countries issued statements which claimed a desire to leave the incident behind.

The reasons for this sudden change have never been entirely clarified but may originate from the belief on the Chinese side that by then nothing could be done to hinder the deployment of the THAAD system on South Korean soil and that any concession still possible from the South Korean side should thus be secured. For its part Seoul made substantial concessions by announcing the so-called "3 nos": no addition to the existing anti-missile system; no South Korean participation in an integrated defense system coordinated by the U.S.; and no possibility of creating a trilateral alliance with the U.S. and Japan. China, however, has never entirely stopped exerting pressure on South Korea: during the bilateral talks held at the annual ASEAN summit in August 2018, the Chinese foreign minister, Wang Yi, ordered his Korean counterpart, Kang Kyung-wha, to find a "complete solution" to the THAAD problem, thus indicating that China was not releasing its grip on that specific issue. Chinese retaliation somehow raised the attention of the Koreans, who believed that bilateral relations had reached a point of maturity since 1992. Given the asymmetry between China and South Korea, Beijing had probably calculated that Seoul would make concessions in the face of increasingly in-

A young man tries on a virtual reality headset at Samsung d'light, an exhibition space located in Seoul's Gangnam district showcasing the latest products by Samsung Electronics. Samsung is the country's leading industrial group and a giant tech company whose revenue accounts for one fifth of South Korea's GDP.

tense pressure. However, the Chinese failed to consider the strong indignation that Korean citizens began to feel towards them after the incident. Despite the growing tensions with Washington in various areas, many began to see the relationship with the United States as vital to stemming the aggressiveness and intimidating posture of the People's Republic of China. While on the one hand, the deployment of THAAD represented a victory for Seoul and Washington in the short term, it is clear that both Moon and his successors will have their work cut out to keep their balance in the tug of war between Beijing and Washington. →

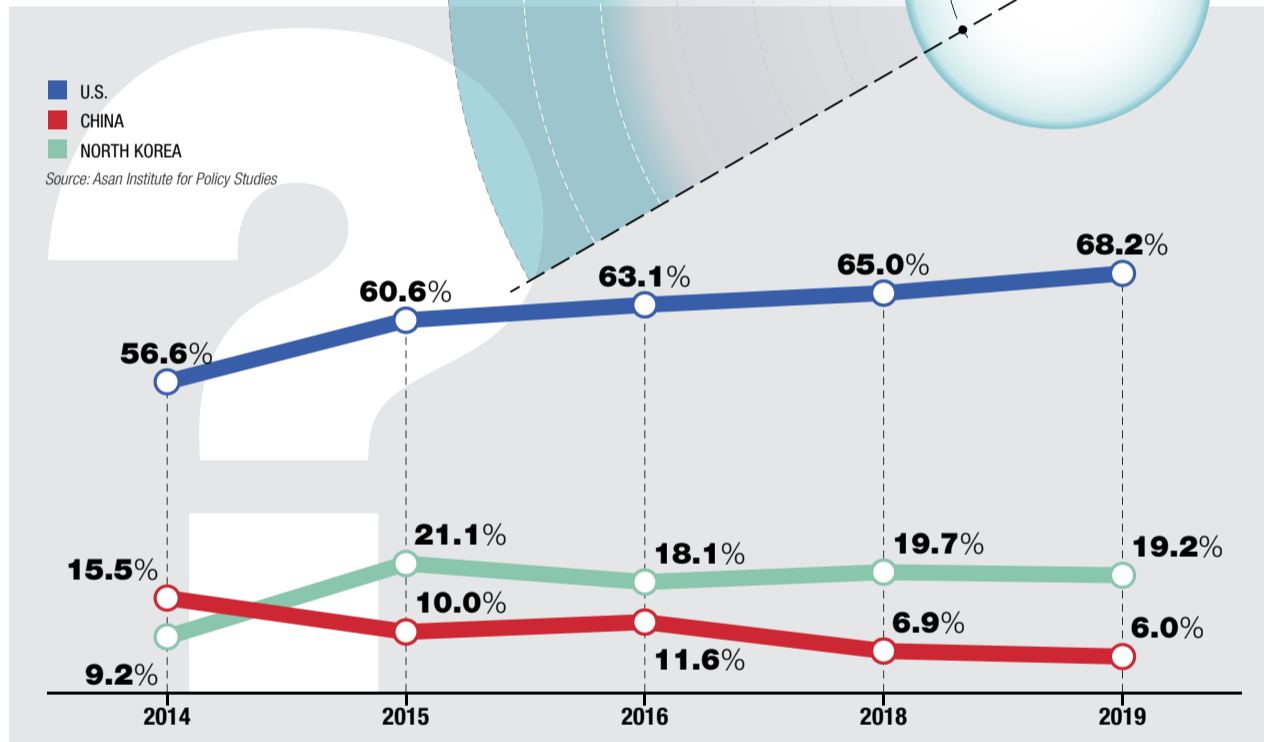
THE THAAD ANTIMISSILE SYSTEM

The THAAD (Terminal High Altitude Area Defense) missile defense system has a 200-kilometer, 120-degree interception range. It is equipped with radar with a 600-800km range, which can potentially be extended up to 2,000km, raising concerns in Beijing that it may also be used to spy on Chinese airspace.

The bid for security

THE MOST IMPORTANT COUNTRY FOR SEOUL'S SECURITY

The results of a recent public opinion survey conducted by the Asan Institute for Policy Studies reaffirm the importance of the alliance with United States in Korean public perceptions.



The growing North Korean threat and, more recently, the worrying “ascent” of China have amplified the need to make coordination on matters of vital importance to the alliance between Seoul and Washington even more important. However, while the South Korean and U.S. leaderships are discussing the possibility of formally ending the Korean War by ratifying a real peace treaty, many among Moon’s supporters have begun to wonder if and to what extent the alliance with the United States would still be useful on a peaceful peninsula. The alliance between Korea and the United States is mainly focused on security and reducing critical problems to mere geopolitical fluctuations would risk crumbling the architecture that has contributed to maintaining peace, se-

curity and prosperity over the past six decades.

The asymmetric alliance with Washington

Achieving cohesion in the alliance at this critical juncture is vitally important because of the political changes that could take place between the two Koreas and between them and the major powers. The asymmetric nature of the alliance between Seoul and Washington, moreover, has produced a paradox unprecedented in the minds of Koreans: while they are dissatisfied with the imbalance of power, they accept the strategic necessity of this relationship as the foundation of their defense. This ambivalence towards the alliance is also revealed in the fear felt by Seoul of a potential “entrapment.” In the event of

a conflict between the United States and China, or even a minor confrontation between China and Japan, Koreans would have no room to maneuver and would become unwillingly involved. The pressure exerted by China on South Korea in the recent dispute over the THAAD system enormously amplified the fear among Koreans that stemmed from the need to counterbalance Beijing while keeping its alliance with the United States firm. The responses to a recent survey conducted by the Asan Institute for Policy Studies confirm the importance that the alliance with the United States holds in public opinion: when asked which countries they consider central to the security of South Korea, more than 68 percent of respondents cited the United States, while only 6 per-

cent the People’s Republic of China. Despite the Moon administration’s calls for substantial decision-making autonomy in favor of Seoul in the area of security and defense, there is a strong consensus among his fellow citizens on the need to preserve the alliance with the United States. Moreover, South Korea could also become imprisoned in the recent “trade war” between Washington and Beijing. Seoul, which has become the fourth Asian economic power, is particularly vulnerable to a bitter conflict over tariffs due to the importance of foreign trade, especially with its two most important partners, the United States and China. The escalation of the crisis, which has upset the markets by seriously threatening global growth, comes at a very particular juncture for South Korea, whose economy has perhaps unexpectedly suffered significant contractions in the first four months of the year. As the leading manufacturer of the microchips used in mobile phones and computers, South Korea has benefited for years from the rapid and continuous development of this sector. However, global demand for mobile phones is falling and, combined with the slowdown in China and a steadily falling rate of global growth, this has seriously damaged the export-dependent South Korean economy. The possibility of this happening has always existed, due to its geographical and commercial proximity. The imposition of new trade tariffs by the United States could lead to an increase in the price of numerous electronic products. If this were to happen, China could decide to quota the dispatch of these products to the United States, the direct consequence of which would be a contraction in the sale of semiconductors by South Korea. The chain reaction could be fatal for the South Korean economy, given that the semiconductor sector is developing precisely as a result of exports to China. According to other analysts, however, the situation may not be that negative, as South Korea could decide to supply its products directly to the United States, where they would then be assembled. The trade war may also have a lasting impact on the Asian manufacturing sector, as many companies could decide to pull their production out of China as a means of protecting themselves from the “conflict.” Many South Korean producers have already made this decision, turning their attention to economically more convenient countries in Southeast Asia. What remains to be seen is what countermeasures China will decide to adopt and to what extent they will still backfire against Seoul.



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Energy/The geopolitical impact of the transition

Searching for a New World Order

The world needs a power willing and able to take on the costs of creating new governance at a time when the U.S. appears to eschew global leadership and China seems anchored to a bilateral approach to foreign policy



NICOLÒ SARTORI

He is Senior Fellow and Head of the Energy Program of the IAI (Institute for International Affairs), where he coordinates projects on the issues of energy security, with a focus on the external dimension of Italian and European energy policy.

At the turn of the new millennium, the system of international relations experienced a moment of extraordinary transformation initiated by the collapse of the Soviet Union and the end of bipolarity on a global level. This transformation was characterized by the emergence of a hegemonic power—the United States—and by the affirmation of a multipolar world driven by a series of regional powers, first among them China. The energy sector has followed this period of change at almost the same pace, also experiencing a gradual change in balance and dynamics at the international level. In the space of a few years, there has been a shift from stable and predictable (though complex) relationships between the nucleus of consumer countries belonging to the block of western democracies, the OECD, and a relatively small group of producers gathered around OPEC →

The big players of the energy market

Oil consumption
72.2%
 (+ **0.5%** with China
 Hong Kong SAR)

Gas consumption
68.2%
 (+ **0.1%** with China
 Hong Kong SAR)

81%
 of energy related CO₂
 emissions

PRODUCTION

64%
 of global natural gas
 reserves

50.29%
 of world's natural gas
 gross production in 2017

GECF

OPEC

40%
 of the world's
 crude oil production

IEA

More than **50%**
 of global energy
 production

81.89%
 of world oil reserves

60%
 of total international
 oil exports

G20

77%
 of global energy
 consumption

IEA

75%
 of global energy
 consumption

Source: IEA, OPEC and GECF

CONSUMPTION

(plus Russia), to a world characterized by new and rapidly expanding areas of production and consumption—especially in East Asia. This transformation has generated a rarely experienced level of complexity in energy relations at the transnational level, which have proven difficult to manage through the governance models established in previous decades. The change, on both fronts, seems unstoppable. In recent years, violent attacks on the process of globalization and traditional models of multilateral cooperation, and the emergence of strong pressure for an energy transition, have been redesigning the re-

quirements and relationships of the various international actors in the field of energy, making them decidedly more complex. This complexity makes it ever more urgent—albeit extremely difficult—to define new stable and inclusive international governance architectures.

The growth of sovereignism and the fate of the multilateral approach

The emergence of sovereignist rhetoric as a recipe for internal politics, seasoned with continuous, insistent attacks on the current global multilateral order, is one of the char-

acteristic elements of the current international scene. Not since the end of the Second World War has the idea of a global order based on multilateral institutionalism seemed to be in such jeopardy due to the attitude (and some concrete initiatives) of the major global players.

First among these players has been the U.S., which, with the election of Donald Trump, has effectively abdicated the role it created for itself and played for decades of guaranteeing the international architecture based on the role of the United Nations and of multilateral and inclusive institutions, to pursue a deliberately uni-

lateral approach to various global issues. From trade policies to the climate, nuclear disarmament to the rejection of Iran's international rehabilitation, the choices made by the current U.S. administration seem designed to undermine any attempt to pursue the path of multilateralism as a modus operandi in international relations. The administration's approach, unprecedented in its vigor, has not only exacerbated relations between Washington and its main global competitor, Beijing but also created an unprecedented gap in relations with European partners in the Atlantic Alliance, the usefulness and



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need for which Trump has repeatedly questioned.

Now, with a leader departing from the main road, in an anarchical system like that of international relations, many may be tempted to follow. Hence the emergence of new unilateral forces, particularly at the regional level, as in the case of Jair Bolsonaro and Andrés Manuel López Obrador, recently elected to the presidency in Brazil and Mexico respectively, or of Erdogan's turn of the screw in Turkey, as well as the strengthening of power policies in aspiring global powers such as China and Russia. Even in Europe, although the outcome of the re-

cent elections has averted the emergence of a sovereignist majority capable of taking control of the institutions, the Union still appears strongly divided and marked by nationalist positions. This not only determines the inherent weakness of the E.U. in defining its own policies and priorities for action but also risks limiting its international projection to protect the multilateral and inclusive approach historically promoted by European institutions.

Without a strong international Europe, with the United States fiercely aligned against globalization and the primacy of the United Nations,

with China in search of global leadership (but not willing to bear the costs of hegemonic power) and with a number of regional actors wishing to carve out a role in their spheres of influence, the hopes of keeping solid and effective cooperation mechanisms alive are now reduced to a flicker. This, in turn, opens the door to international and regional uncertainty and conflict for years to come.

The implications of the energy transition

Alongside this dramatic redefinition of existing paradigms on the international chessboard, the global energy

sector is experiencing a series of changes, many of them momentous. Some of them are already taking place, others will definitely follow in the coming years, but what is clear is that these trends will add further complexity and uncertainty to a scenario already undergoing a profound transformation. The energy transition and decarbonization processes induced—mainly, but not only—by the global fight against climate change, will bring with them a series of changes that cannot be limited to the energy sector, but will have a wider geopolitical impact. Factors such as the delocalization of energy →



ENERGY TRANSITION AND GEOPOLITICAL BALANCE

The transformation of the energy paradigm on a global scale may lead to the emergence of new areas of geopolitical and strategic interest and a gradual waning of interest in others. Consider, for example, the need to access new natural resources such as lithium, cobalt and rare earths. In the photo, the Salar de Uyuni in Bolivia; under its surface is found one of the largest lithium reserves in the world.

production, the growing penetration of renewables, the increase in efficiency and self-consumption, the gradual reduction of the use of fossil fuels, will in fact determine a redefinition of energy requirements (and consequently the priorities of international politics) and the modus operandi of the main actors on the international chessboard.

In the medium term, the transformation of the energy paradigm on a global scale may lead to a redefinition of the balance of power between producing and consuming countries, the emergence of new areas of geopolitical and strategic interest and a gradual waning of interest in others. Consider, for example, the need to access new natural resources such as lithium, cobalt and rare earths, and the potential competition between the major international players to ensure control over areas and regions of greater production, or preferential access to them. We would therefore see a redefinition of the very concept of

security of supply, not swept away by the affirmation of the energy transition, but simply shifted to other sectors and other areas of the globe. From a geopolitical perspective, the gradual withdrawal from fossil fuels could also have significant implications for the internal stability of the major producing countries, which are currently heavily dependent on oil revenues. The fall in revenues from exports of oil and gas to international markets would require these governments to deeply revise their economic development model, and with it all those socio-political relationships that have ensured stability in recent decades. The risk of growing internal conflict, though not definite, is around the corner, with a potential for instability to spread even on a regional and global scale.

Finally, the implications of a technological and commercial nature must be considered, especially in a historical era characterized by the return of protectionism, trade wars and tariffs.

The development of new cutting-edge technologies for the energy sector—from storage systems to wind turbines, from electric vehicles to hydrogen—will increasingly take on a connotation of power internationally. While on the one hand the availability of skills and technological know-how may be an essential element of energy security at the national level, on the other the ability to compete on an international scale and to penetrate the great energy markets of the present and the future (think of the potential of the African subcontinent, where about 600,000 people have no access to basic electricity services) are strategic factors both for internal economic development and for geopolitical projection on an international scale. In this highly competitive context, factors such as technological primacy and commercial expansion may become key elements of the energy policy of the big global powers, with strong implications for their international positioning.



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What governance for the future?

The world is changing fast, and with it so is the energy market. New actors are emerging, both on the supply and demand side, new interests and new strategic priorities are developing, new commercial and geopolitical relationships are being created, new areas of competition (thematic and geographical) are emerging. In this context, the current governance mechanisms of the energy sector—essentially based on the dualism between a compact group of consumer countries under the IEA umbrella, and the consortium of OPEC producing countries (and some of its extensions, see ROPEC) and, albeit with a more limited impact, GECF (Gas Exporting Countries Forum)—are proving inadequate to face the changes that have been taking place for two decades, and will be even less adequate in facing the challenges of the energy transition. The debate within the IEA

on expanding membership to include the new big consumer countries, the OPEC crisis and its growing inability to influence the performance of the oil markets, and the difficulties faced by the GEFC in taking the lead in the gas sector are a clear demonstration of the inadequacy of current international institutional architectures in the energy sector.

The new dynamics triggered by the energy transition, therefore, require a rethinking of the tools and mechanisms of global energy governance. This could certainly lead to positive results; however, we cannot rule out the possibility of partial or negative results. Much will depend on how and especially by whom this transformation process is managed. As already mentioned, in fact, there seems to be no clear will on the part of the main global players to deal with the issue of energy transition in a concerted and shared way at global level, nor to create a global institu-

tional architecture capable of managing, directing and enhancing this complexity and preventing the risks of uncontrolled and harmful competition.

In general, in fact, the emphasis of the large and medium powers on a nationalist and sovereigntist rhetoric (in the field of energy, but not only), which offers an easy way to win approval internally, is a concrete obstacle to the definition of renewed and strengthened forms of international governance. Added to this is the lack of a leading figure, hegemonic or otherwise, able to take on a whole series of costs linked to the creation and maintenance of a global energy order. Trump's U.S. is more ready than ever to eschew any temptation to assume global leadership, while China still seems too anchored to bilateral (and sometimes predatory) dynamics in its foreign policy. Added to this is a European Union in transition, too weak on the domestic front to promote an international effort and guarantee co-

THE REVOLUTION OF PRIVATE TRANSPORT

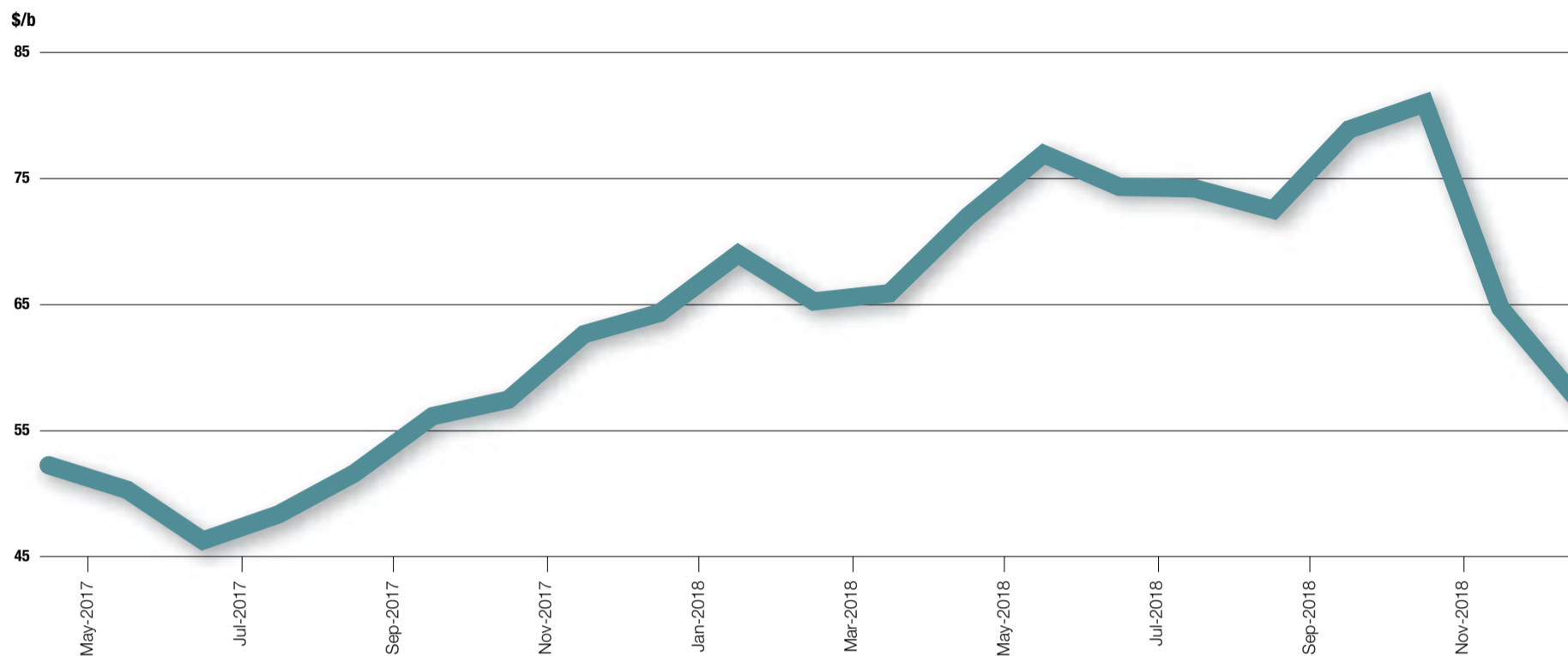
The need to fight climate change has brought with it a change in cars: from the technical point of view with the adoption of hybrid and electric engines, but also from the social point of view, thanks to the ever increasing diffusion of services such as car sharing.

hesion among all the components. In the meantime, some partial solutions remain in place to discuss the international implications of the energy transition. On the one hand, the extension of the mandate and membership of the IEA, which would nevertheless remain an organization with a strong Western connotation, and therefore biased (if not in the minority) in the face of current trends in the international energy sector. On the other hand, the strengthening of the role of the G-20—whose members contribute in aggregate to 80 percent of world energy consumption—but which nevertheless has a limited capacity to address energy issues, not being part of the core issues dealt with by the group.

All suboptimal and transient options, demonstrating that global energy governance—based on current trends—remains one of the great international challenges in the years to come.



BRENT PRICE



A Time of Contrasts

MARKET PERFORMANCE



Prepared by
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The physical oil market is tight but expectations “freeze” price rises

The first few months of 2019 saw a steady rise in the price of crude oil. The OPEC cuts are keeping supply “tight” where supply is already being penalized by geopolitical losses, and from April the price actually rose above USD 70 a barrel. During the May Joint Ministerial Monitoring Committee meeting, ahead of the official meeting, OPEC and its non-OPEC allies confirmed their intention to continue to control output. Operators, however, are looking for clearer signals. The overheated trade war between China and the U.S. is once again raising concerns about a slowdown in global economic growth. In addition to uncertainty over the absolute level of oil prices, there is also significant volatility in the relative prices of different types of crude oil. Analysts and operators expect that the imminent changes in the quality requirements for marine fuels—on which the International Maritime Organization will impose a global sulfur cap of 0.5 percent starting in January 2020—will penalize combustibles and crude oils with a high sulfur content. So far, however, these types of crude oils and oil products have suffered substantial cuts, partly linked to market circumstances (sanctions against Iran, the crisis in Venezuela and OPEC cuts) and partly to the effects of structural changes in the industry (greater conversion driven by global refining). The ending of exemptions in U.S. sanctions against Iran is substantially reducing Iranian crude exports, while Venezuela’s output is continuing to fall due to the country’s unprecedented internal crisis. In the

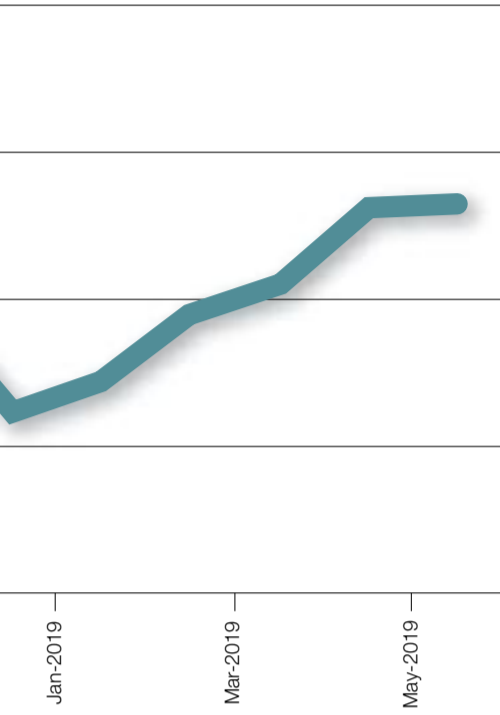
world of medium sour crude, the situation has been compounded by the recent accident in Russian Urals crude, which is freezing supplies to a number of refineries in Central and Northern Europe due to contamination with organic chlorides of flows via the Druzhba pipeline and the Baltic oil terminal of Ust Luga. Recent acts of sabotage on several oil facilities in the Middle East underscore the geopolitical vulnerability of the world’s most important oil producing region. Meanwhile, U.S. exports continue to grow, shifting the balance of global crude supply towards light, sweet crude oil. Short-term tensions are reflected in the structure of international benchmark prices: for several months now Dubai and Brent have been in backwardation, a premium applied to the trading of near-dated contracts with respect to the prices of futures contracts, with the spread also gradually widening. Long-term prices remain stable, providing an anchor to sudden mood swings in a market that fears the danger of a slowdown in demand, despite tensions over supply. **DEMAND** In 1Q19 global oil demand was up 0.6 Mb/d compared to last year. The modest increase highlights the different dynamics in OECD and non-OECD countries: non-OECD demand grew by 0.9 Mb/d thanks to China, India and Russia, while in the OECD demand fell by 0.3 Mb/d for the second consecutive quarter. Within the OECD area, oil consumption grew in the United States alone due to the continued dynamic growth of its petrochemical industry. Despite growing

fears about a weakening global economy due to trade tensions, a recession remains unlikely thanks to the adoption of expansionary monetarist policies and tax incentives.

- **China and India** account for 43 percent of the increase in the non-OECD area. In **China**, oil demand during 1Q19 was driven by LPG, naphtha and jet fuel-kerosene consumption, while diesel fuel and gasoline fell sharply. In **India**, during the same period, the increase in demand was greater than China’s due to the sharp rise of LPG, bolstered by government subsidies aimed at stimulating its growth and replacing kerosene with LPG for domestic use; fuel sales have also been bolstered by the sustained boom in private mobility.
- In the **U.S.**, there was a slowdown in growth in 1Q19. Demand for LPG/ethane remains sustained thanks to the launch of new ethane crackers, while the growth in diesel fuel demand was lower compared with 2018, a year marked by a surge in e-commerce and a boom in economic activities. By contrast, the early months of 2019 show a slowdown in industrial production and greater use of oil pipelines than heavy vehicles for shale oil transportation. Both these factors have a negative impact on diesel fuel consumption. During the same period, gasoline demand fell due to adverse weather conditions, which penalized road traffic in February/March. Demand for jet fuel-kerosene grew significantly. In March, air traffic recorded the sharpest increase since the beginning of 2016 in a context of strong economic performance and low unemployment.

SUPPLY In 1Q19 global oil supply fell to 99.8 Mb/d, roughly 2 Mb/d lower than the end of the 2018 peak, with

Source: EIA-DOE, Europe Brent Monthly Spot Price FOB



SUPPLY/DEMAND BALANCE



Source: Eni's elaboration on IEA data

ANNUAL CHANGE IN GLOBAL DEMAND AND BY AREA



Source: Eni's elaboration on IEA data, annual change

ANNUAL CHANGE IN OIL SUPPLY



*Other includes biofuels and processed oil

Source: Eni's elaboration on IEA data, annual change

OPEC countries accounting for 1.6 Mb/d and Russia and Canada for the remaining share. The decline was driven by the entry into force of the new OPEC+ agreement to cut output by 1.2 Mb/d from October 2018, with OPEC cutting 0.8 Mb/d and non-OPEC cutting 0.2 Mb/d. The leading OPEC producers have shown strong discipline from the outset and the surplus of over 2 Mb/d at the end of 2018 fell to 0.7 Mb/d in 1Q19. Saudi Arabia in particular cut output to well below the target. Supply was further reduced by the collapse in Venezuela's output to below 1 Mb/d due to new U.S. sanctions and recurring power blackouts. Expectations are high for the upcoming meeting, scheduled for early July, in which OPEC+ producers will have to decide whether to continue with output cuts in order to support oil prices and reduce stocks or cover their geopolitical losses, with the danger of creating a perception of "oversupply" against a background of uncertain global economic growth. The data for April:

- **OPEC** production increased slightly (up 0.1 Mb/d on March), after falling for four months. Increases for Libya, Nigeria and Iraq are higher than the decreases for Iran (down 0.13 Mb/d) and Venezuela (down 0.04 Mb/d). Compliance remains at 131 percent, with Saudi Arabia's output still below the target at 9.8 Mb/d.
- **NON-OPEC** production fell by 0.5 Mb/d due to maintenance in Canada, Azerbaijan and Kazakhstan and cuts implemented by Russia. The volume of production is nevertheless 1.4 Mb/d higher than a year ago. Output grew in Brazil, driven by the startup of four Floating Production Storage and Offloading vessels (FPSOs) since the beginning of the year, and in the U.S., where it hit a record 12 Mb/d.



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