

# BRIQ

Belt & Road Initiative Quarterly



## The Herald of the Asian Age: Ecological Civilization

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Environmental Policies Towards an  
Ecological Civilization

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**PHOTOGRAPH SADIK ÜÇÖK**

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## Principles of Publication

At a time when US ambitions for a unipolar world order have lost their appeal, a new order is taking shape thanks to the multipolarization of world politics and the acceleration of cooperation between developing countries, rejecting the globalism of imperialist states. Under these conditions, the new agenda of global cooperation should respond to the needs and aspirations of developing countries seeking joint development and solidarity under the guidance of public-driven projects. In particular, the Belt and Road Initiative (BRI) -put forward in 2013 by Xi Jinping, President of the People's Republic of China- provides a suitable opportunity and a sound foundation for the implementation of this new agenda of global cooperation.

BRI is an epoch-making move to re-implement the concept of the Silk Road, which dates back 2,000 years, to a time when China was immensely contributing to global prosperity and the development of trade and cooperation. The revival of this concept entails a much more comprehensive approach that also incorporates rail and sea transport, and digital systems.

BRI proposes to bring together over 60 countries across Asia, Europe, Africa, and Latin America –together accounting for nearly half of the world's gross domestic product– for prosperity and development at the initiative of China. Unlike the Western-centered world order, BRI seeks peaceful collaboration for improving global trade and production towards common goals for humanity. It firmly rejects crude imperialist exploitation. Two thousand years ago, the Silk Road was a conduit for the flow of gunpowder, spices, silk, compasses and paper to the world. Today, it offers artificial intelligence, quantum computers, new energy and material technologies, and space-age visions to developing countries. In addition, the New Silk Road provides incentives and opportunities for the development and implementation of bio-economic schemes in stakeholder countries against the threat of climate change and other environmental threats that bring the entire ecosystem to the brink of extinction.

Turkey has a significant role –real and potential– in accelerating South-South cooperation. Turkey is conveniently located as Asia's farthest outpost to the West. It assumes a critical position as a pivotal country on BRI's North-South and East-West axes. However, China's development and BRI's contribution to the future of humanity have remained to a large extent underrecognized and superficially evaluated in Turkish academia, media, and politics. This is mainly because Turkey's academics, media professionals, and policy makers have been observing China using Western sources. In the same manner, China and BRI's other potential partners have been viewing Turkey through a Western lens.

BRIQ has committed itself to developing an in-depth understanding of the present era, with a particular emphasis on the new opportunities and obstacles on the road to the New Asian Century.

BRIQ assumes the task of providing direct exchange of views and information among Chinese and Turkish academics, intellectuals, and policy makers. In the meantime, this journal will serve as a platform to bring together the intellectual accumulation of the whole world, especially developing countries, on the basis of the Belt and Road Initiative, which presents a historic opportunity for the common future of humanity.

BRIQ is also devoted to publishing research and other intellectual contributions that underline the transformative power of public-driven economies, where popular interests are upheld as the basic principle, ahead of individual profit. The fundamental tasks of BRIQ are to demonstrate how BRI can contribute to the implementation of this public-driven model, and to help potential BRI partners -including Turkey- to realize their real potential.

BRIQ stands for the unity of humanity and a fair world order. It will therefore be a publication for the world's distinguished intellectuals, especially those from Eurasia, Africa, and the Americas: the defenders of a new civilization rising from Asia on the basis of peace, fraternity, cooperation, prosperity, social benefit and common development.



## Submission Guidelines

BRIQ features a broad range of content, from academic articles to book reviews, review essays, interviews, news reports, and feature articles.

The Editorial Board can issue calls for papers for special issues and invite authors to contribute manuscripts; however, it also welcomes unsolicited submissions.

Submissions are invited in English or Turkish. All submissions are to include a short biography (150-word limit) and should be sent as Microsoft Word attachments to [briq@briqjournal.com](mailto:briq@briqjournal.com) Articles or other content that have been previously published or are under review by other journals will not be considered for publication.

BRIQ follows American Psychology Association (APA style, 6<sup>th</sup> edition, <https://www.apastyle.org>) and uses American English spelling.

BRIQ applies a double-blind review process for all academic articles.

Academic articles should be between 5000 and 9000 words in length, including abstracts, notes, references, and all other content. Please supply a cover page that includes complete author information, and a fully anonymized manuscript that also contains an abstract (200-word limit) and five keywords.

Book reviews should not exceed 1,000 words; review essays covering two or more works can be up to 3,000 words.

News reports consisting of brief analyses of news developments should not exceed 1,500 words; feature articles combining reporting and analysis can be up to 3,500 words.

Please contact the Editorial Board for interview proposals.

# EDITORIAL

## The Herald of the Asian Age: Ecological Civilization

According to the Global Climate State 2020 Report of the World Meteorological Organization, increasing trends in concentrations of greenhouse gases continued in 2019 and 2020. According to the report, in order to avert the worst impacts of climate change, we must keep global temperatures to within 1.5°C of the pre-industrial baseline. Stabilizing global mean temperature at 1.5°C to 2°C above pre-industrial levels by the end of this century, however, requires an ambitious reduction of greenhouse gas emissions, which must begin to occur during this decade. UN Secretary-General Antonio Guterres states: "...that means reducing global greenhouse gas emissions by 45 per cent from 2010 levels by 2030 and reaching net zero emissions by 2050. The data in this report show that the global mean temperature for 2020 was around 1.2°C warmer than pre-industrial times, meaning that time is fast running out to meet the goals of the Paris Agreement. We need to do more, and faster, now".<sup>1</sup>

That is the case, and the solution is obvious: Transition to renewable energy sources, radical transformations in agriculture and water management, prevention of biodiversity loss, promotion of green investment, green finance, and green architecture... There is no other option. All of this calls for a structural transformation by restoring harmony between human beings and the nature. This also necessitate massive amounts of public investment and planning, not only at the level of individual countries, but also through international cooperation.

Science and technology have now reached a level where it is possible to overcome many problems that threaten the future of our world, such as climate change, pollution and depletion of water resources, and food security problems. However, the prevailing neoliberal framework, which subjugates science and technology to private interests, is not interested in permanently solving these problems, since the resolution of these problems is not deemed a profitable investment.

The COVID-19 pandemic, which continues to affect our lives since 2019, has made us realize, once again, that the capitalist-imperialist system poses a vital threat to both the present and the future of humanity at all levels. Even the imperialist metropolises and former proponents of neoliberalism have started to discuss the severity of this vital threat, which raises the risk of total environmental and human destruction.

In May 2020, Klaus Schwab, Executive Chairman of the World Economic Forum, presented a set of proposals under the name "Great Reset", which consists of "improving capitalism" through social and environmental reforms.<sup>2</sup> Indeed, the real intention here is to save capitalism, which has nothing to do with saving the future of humanity.

Today, Asia has become the bedrock of effective proposals that are genuinely interested in saving the future of humanity and permanently solve the current problems of our world, with no recourse to an artificial agenda of saving capitalism and implementing temporal fixes. These proposals put public interest before private interests and accentuate solidarity, shared development, socialism and collaboration on the basis of equality among nation-states.

As the key component of the Sustainable Development Goals, the green development model is fast becoming an Asian trademark. In this regard, China has achieved significant success in the context of Ecological Civilization. Similarly, Turkey, one of the key countries as part of the Belt and Road Initiative, shows early signs of strengthening its will to implement green development.

Different from the previous era, China and other developing countries have started to influence the direction of world politics. The Asian Age, which has risen in the lead of countries such as China and Turkey, opens the door to a new civilization that breaks with industrial civilization: Ecological Civilization, which gives primacy to harmony between human beings and the nature!

1 World Meteorological Organization, WMO. (2020). The state of the global climate 2020. Retrieved from <https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate>  
2 World Economic Forum. (2020). The great reset. Retrieved from <https://www.weforum.org/great-reset/>

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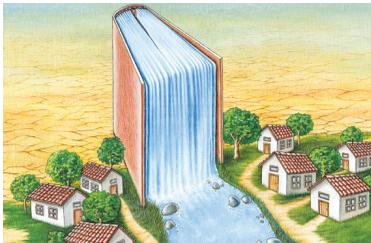
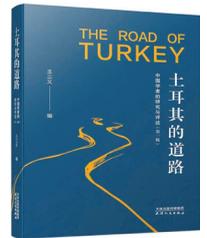
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# On the Development of China's Environmental Policies Towards an Ecological Civilization



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**EFE CAN GÜRCAN**

Assoc. Prof,  
Department of International Relations, İstinye University

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## ABSTRACT

What environmental issues occupy China's main development agenda? How does China address these crucial issues? In what direction are China's environmental policies evolving? The present article uses process tracing to answer these questions and argue that China has already developed a firm understanding of its environmental problems and their severity to the extent that it now frames them as a "matter of survival" and has brought these issues to the centre of its revised national security strategy. China's strategy is predicated on an alternative proposal for "ecological civilization", which may potentially lead to the reversal of "ecological imperialism". China is in the early stages of building an ecological civilization and requires a lot of work to reach a high level of ecological development. China's key achievements on the path towards ecological civilization involve a series of three unfolding and mutually conditioning revolutionary processes that also lead the way in international environmental cooperation, as embodied in China's role in ASEAN, the Asian Infrastructure Investment Bank, and the Green Silk Road. They include a clean energy revolution, a sustainable agricultural revolution, and a green urban revolution. China has already become a global leader in green finance. It leads the eco-city movement, with over 43% of the world's eco-cities being Chinese, and is the second leader in sustainable architecture, next to Canada. Many Chinese cities have dropped down or out of the list of the most polluted cities, leaving India and Pakistan at the top. China's cities have also joined the ranks of those with the strongest sewage treatment capacity in the world. In addition, China has the most electric vehicles, bikes, and efficient public transportation. China is considered to be not only the world's centre of electric bus production and consumption but also as having cities with the world's longest subway systems. From 2013 onwards, the share of coal in China's total energy consumption has seen a noticeable decline, accompanied by the increasing share of renewable resources in total energy consumption as a result of conscious efforts at a clean energy revolution. Key to this revolution in the making is China's strong reputation as the world's top investor in clean energy. As such, it has succeeded in creating the world's largest wind, solar, and hydroelectric systems for power generation. Finally, concerning China's unfolding revolution in sustainable agriculture, one should acknowledge, not only its adoption of green food standards and the expansion of its agricultural area under certified organic farming but especially the fact that, as a world leader in green agriculture, it now ranks third in the list of countries with the largest agricultural area under organic farming.

**Keywords:** Eco-cities; eco-farming; ecological civilization; energy revolution; green finance

CHINA IS THE WORLD'S LARGEST COUNTRY by population size and fourth-largest by surface area. Combined with the excessive demographic and geographic size is the continued legacy of Western imperialism in China as a former semi-colony, whose negative effects are amplified by current Western efforts in geopolitical and geo-economic containment. This adds to China's resource scarcity that acts as another structural adversity constraining its development po-

tential. China possesses only 7% of the world's arable land and freshwater resources and 8% of the world's natural resources, even though its population represents 22% of the world's population. Furthermore, only 19% of its surface area is suitable for human habitation and 65% of its surface area is rugged, which severely cripples China's farming capabilities and facilitates ethnic heterogeneity as a potential impediment to political cohesion (Morton, 2006; Naughton, 2018).

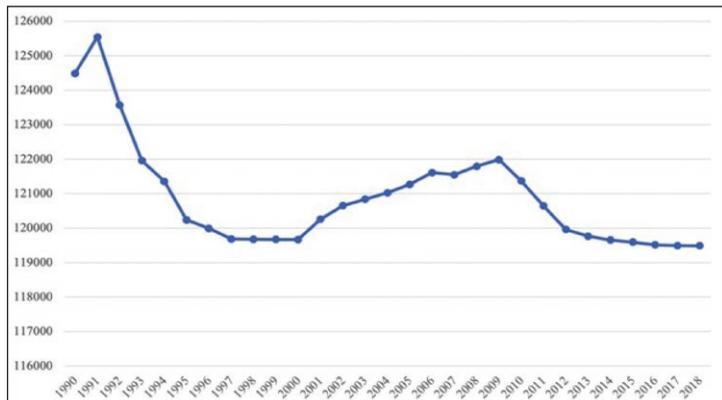
Despite such adversities, China has come to develop an exemplary model of economic development that inspires much of the developing world. The 1979-2018 period testified to an average growth rate of 9.4% in the lead of the Communist Party of China (CPC), which made China the world's second-largest economy, top producer, and the leading exporter of technological goods (X. Hu, 2020). By 2015, China came to assume the global production of 40% of washing machines, 50% of textiles, 60% of buttons, 70% of shoes, 80% of televisions, and 90% of toys. Recently, China has made significant progress in the production of added higher-value products in computer, aviation, and medical technology sectors, among others. Besides its historic success in economic growth, industrial production and technological development, the Chinese economic miracle is credited for 70% of global poverty eradication between 1990 and 2015 (Gardner, 2018).

The huge ecological cost of such a fast-paced and dramatic development –unprecedented in the history of human civilization– is nothing but expected. According to 2009 estimates, the annual economic cost of environmental pollution amounts to 3.8% of China's Gross Domestic Product (GDP) (Zhang, 2014:32-48). Over 80% of China's underground and river water resources are no longer fit for human use due to pollution (Jie, 2016). Land pollution and soil erosion are also part of China's major environmental problems. It is common knowledge that excessive use of pesticides and industrial pollution constitute a major source of land pollution, prompting the loss of organic matter and soil erosion. 2013 estimates suggest that close to 20% of China's cultivated farmland suffers from contamination and 38% of the soil is subjected to erosion-related loss of nutrient and organic matter (Scott et al., 2018:26; Gardner, 2018:9). Indeed, the contraction of arable land is a natural result of soil contamination and erosion. This also explains

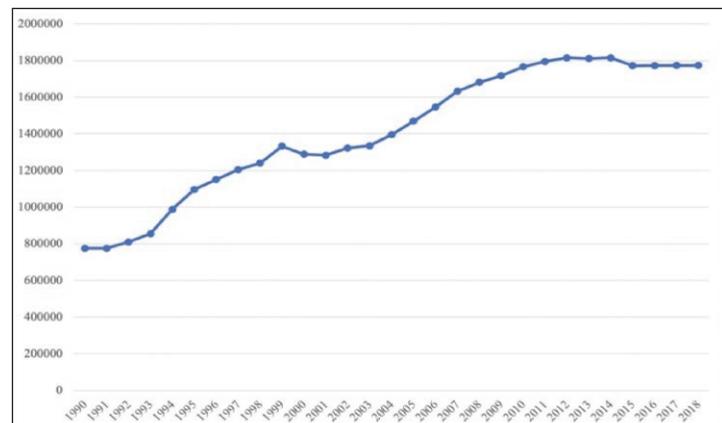
China's over 4% loss of arable land between 1990 and 2018, from 124,481,000 to 119,488,700 hectares (FAO, 2021; Figure 1).

China being the world's largest pesticide producer and consumer exacerbates this tendency. In the 1990-2018 period alone, China's pesticide use rose by 129% (FAO, 2021; see Figure 2). Furthermore, 70% of the world's electronic waste is recycled in China at the expense of environmental and public health. Industrial pollution, environmentally detrimental recycling practices, and industrial agriculture combined to create China's "cancer villages" (Gardner, 2018). Map 1 provides a more detailed outline of China's major environmental problems (Sanjuan, 2018).

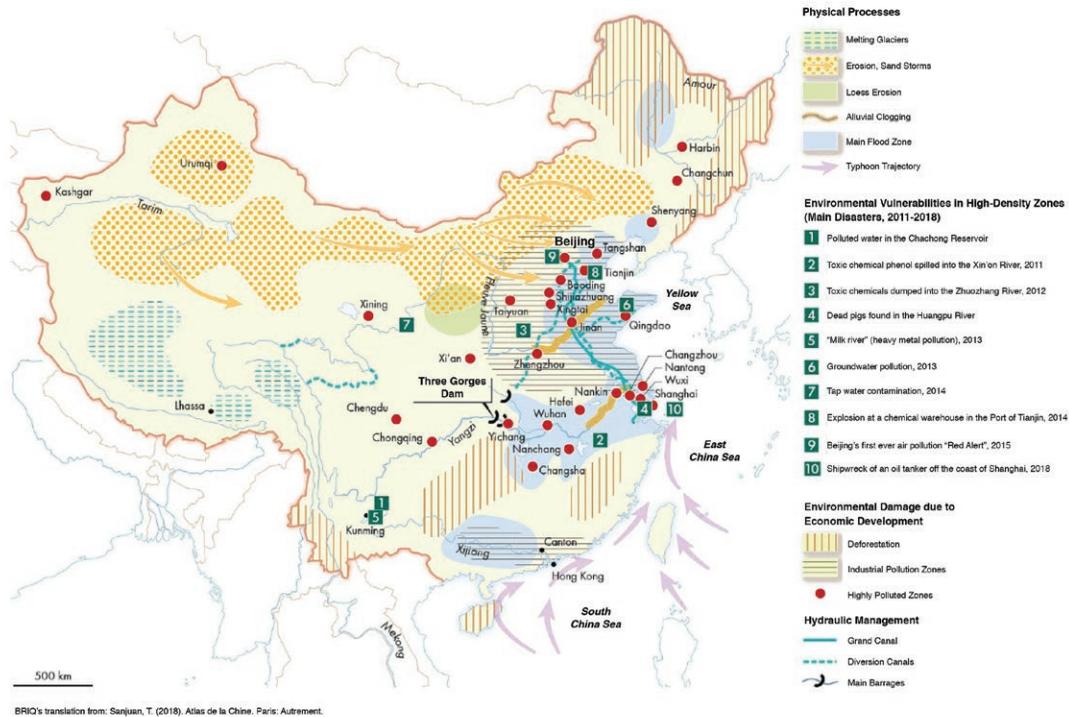
**Figure 1. China's arable land (1000 ha)**  
<http://www.fao.org/faostat/en/#data/RL>



**Figure 2. China's pesticides use (tonnes)**  
<http://www.fao.org/faostat/en/#data/RL>



Map 1. China's environmental constraints and risks



Global environmental indicators provide a general picture of the environmental question's severity in China. To elaborate, the Environmental Performance Index (EPI) is a popular indicator to assess the impact of national policies on the environment. EPI is made up of two major components: environmental health and ecosystem vitality. Environmental health looks at the negative impact of environmental pollution on human health as well as air and water quality and sanitation. In turn, ecosystem vitality focuses on variables such as carbon intensity, biodiversity, fish stocks, forest cover, wastewater treatment, and nitrogen balance (Environmental Performance Index, 2020a).

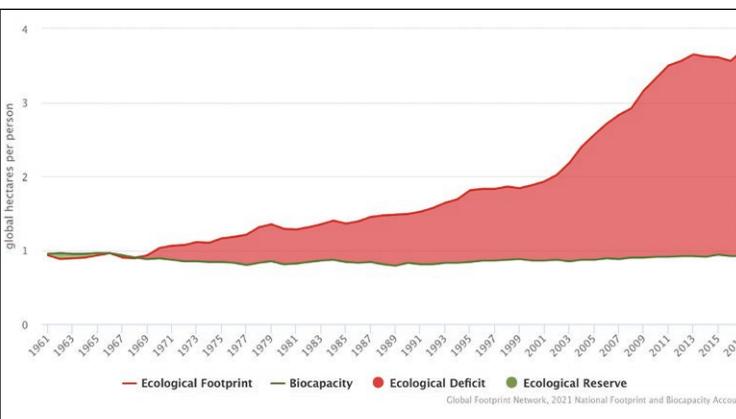
China's EPI can be compared to other BRICS (Brazil, Russia, India, China, South Africa) countries, representative of the leading developing countries, and the United States (US), as the hegemonic leader of the capitalist-imperialist system. A comparison for the period 2010-2020 shows that China has

achieved the second-largest increase in EPI scores (8.4 EPI points) after South Africa (8.5 EPI points), which testifies to China's successful efforts at improving its environmental standing (Table 1). In the same 10-year period, India has recorded no visible improvements, while the increase in EPI scores for Brazil, Russia, and the US are 4.9, 3.9 and 2.9, respectively. In the meantime, one should note that China's 2020 standing is 120 out of all the 180 countries included in EPI. China's 2020 score is 37.3, which outranks India with an EPI score of 27.6. However, China is outranked by Brazil, Russia, South Africa, and the US, whose annual scores are 51.2, 50.5, 43.1, and 69.3, respectively (Table 1). Overall, this comparison reveals that China has exhibited a strong environmental will and achieved policy success between 2010 and 2020, even though it continues to struggle with severe environmental problems (Environmental Performance Index, 2020b).

**Table 1. Environmental performance index**

	Environmental Performance Index (EPI) Scores in 2020	10-Year Change in EPI Scores	2020 EPI Ranking (out of 180 countries)
China	37.3	8.4	120
Brazil	51.2	4.9	55
Russia	50.5	3.9	58
India	27.6	0	168
South Africa	43.1	8.5	95
United States	69.3	2.9	24

Ecological footprint is another global environmental indicator. It is popularly used to assess the human impact on an environment by reference to changing natural resource demands for countries across the world. With ecological footprint, the use of ecological resources is compared with the size of biologically productive land and sea area to estimate the earth's capacity to renew the natural resources and absorb waste (Robbins, 2007:509-10). Not surprisingly, the ecological footprint of China – as a rapidly developing country – has known a constant increase, particularly in the 2000s (Figure 3).

**Figure 3. Ecological footprint of China**

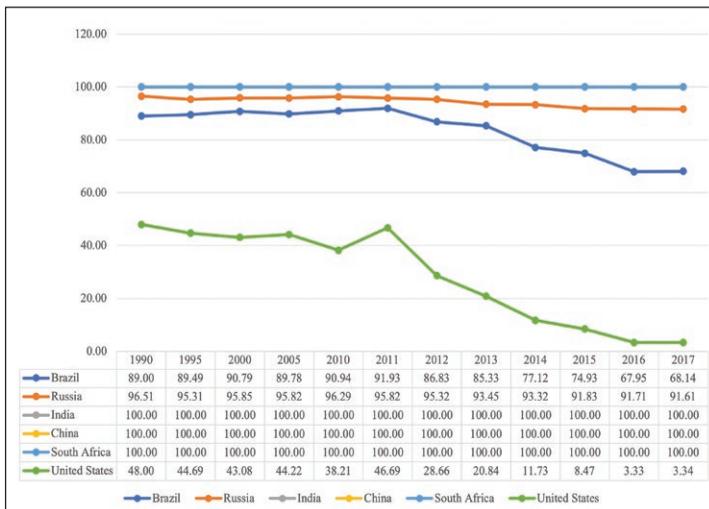
Air pollution stands out, perhaps, as the most visible environmental strain in China, which is why it is worth supplementing our analysis of EPI and

ecological footprint with what is popularly known as fine particles, or particulate matter 2.5 (PM<sub>2.5</sub>). Available data allow us to comparatively assess the performance of the BRICS countries and the US concerning the percentage of the national population exposed to PM<sub>2.5</sub> levels exceeding the World Health Organization (WHO) guideline value. One striking fact that emerges from this comparison is the successful performance of the US and Brazil, unlike China and other countries in our sample. The US and Brazil's PM<sub>2.5</sub> performance declined from 91.92% and 46.68% and from 68.12% and 3.34%, respectively (World Bank, 2021, Figure 4). Even though China failed to exhibit a successful performance by 2017, its post-2017 performance offers promising prospects. Recently, for example, Chinese cities used to occupy the forefront of the list of the world's most polluted cities. Looking at the 2020 list of the fifteen most polluted cities, however, it is now being occupied by Indian and Pakistani cities. The only Chinese city that is ranked among the top fifteen polluted cities is Hotan (Earth.Org, 2021, IQAir, 2021; Zhang, 2014).

China has been undergoing a sustainable urban revolution, which actually extends beyond the fight against air pollution. It is striking to notice how China's daily capacity of urban sewage treatment rose from 125 million tons to 182 million tons in the period 2010-2015. This elevates China to be among the world's strongest capacity of urban sewage treatment (China-ASEAN Environmental Cooperation, 2018). Moreover, China has greatly improved its performance in urban sustainability by prioritising green architecture and transportation. According to the Leadership in Energy and Environmental Design (LEED) rating system prepared by the US Green Building Council, China is the world's second leader in sustainable architecture after Canada (Long, 2015).

China's strong leadership in sustainable urbanisation can also be observed in its emergence as the world's largest market for electric vehicles and bikes (Statista 2021; INSG 2014). As far as public transportation is concerned, China is the world's largest producer and consumer of electric buses (Technavio, 2019; Sustainable Bus, 2020; MarketsandMarkets, 2021). Furthermore, China has turned itself into the world leader in green transportation, with Beijing and Shanghai having developed the world's longest subway systems (Nedopil Wang, 2019).

**Figure 4. PM<sub>2.5</sub> air pollution, population exposed to levels exceeding WHO guideline value (% of total)**  
<https://data.worldbank.org>



Evidently, China's world-leading environmental achievements go unnoticed due to the prevailing discourse of "ecological imperialism" in environmental politics. Ecological imperialism describes the shift of axis in global labour and natural resource exploitation to the developing world at the expense of grave human and ecological suffering. The economic and ecological burden of this axis shift is placed on the shoulders of the developing world by Western metropolises, which essentially seek to reduce the cost of production and resource extraction (Gürçan, Kahraman, & Yanmaz,

2021). Indeed, this phenomenon has been a defining feature in the entire history of capitalism. However, the dominance of neoliberalism as a global policy paradigm since the 1970s gave a new impetus to ecological imperialism, where China emerged as the main target. This being said, China has refused to be victimised by such policies and actively took advantage of the changing policy environment without fully abandoning its socialist system, albeit at grave ecological and socioeconomic costs in the medium term. In this period, China relied on the state's strong guidance on reform and opening-up to build the "Chinese dream" of socialist welfare through gradual technology transfers and joint ventures in the longer term.

It is common knowledge that Western capitalism globalised through exploration and colonisation at the expense of grave human and ecological costs. These globalising efforts were amplified by the Industrial Revolutions, which eventually evolved into imperialist rivalries for spheres of influence and world wars. A subsequent wave of globalisation began in the 1970s as the world's axis of production shifted to Asia, based on neoliberal policies that sought to take advantage of Asia's cheap labour supply and other resources in the absence of strict political and environmental regulations. For some time, Western metropolises remained content with China's accommodating policies, only until it succeeded in using the "privilege of backwardness" to consolidate its national economy rather than become a mere US colony governed by the World Bank and the International Monetary Fund (IMF). Upon China's historic economic success and the continuation of the rule of the Communist Party of China (CPC), it seems that Western metropolises ended up developing a false sense of threat against their global hegemony, which prompted them to launch a global campaign of imperialist propaganda framing China as an environmentally irresponsible villain versus the West as the virtuous watchdog of environmental values.

**According to Hu, energy conservation and sustainable development are central to improving the Chinese population's quality of life. Hu developed a "five-in-one" strategy that combines the task of economic, political, cultural, and social construction with that of ecological civilization.**

This article seeks to transcend Western-centric ecological-imperialist biases towards China's environmental policies and provide a more balanced perspective. What environmental issues occupy China's main development agenda? How does China address these crucial issues? In what direction are China's environmental policies evolving? The present article uses process tracing to answer these questions and argue that China has already developed a firm understanding of its environmental problems and their severity to the extent that it now frames them as a "matter of survival" and has brought these issues to the centre of its revised national security strategy, particularly under the Hu Jintao and Xi Jinping administrations. China's strategy is predicated on an alternative proposal for "ecological civilization" (shengtai wenming, 生态文明), which may lead to the reversal of "ecological imperialism". Particularly noticeable in this regard is China's ongoing clean energy revolution as well as its strong leadership in green agriculture, urbanisation, and multilateral environmental cooperation. Accordingly, the present article is structured into three sections. The first focuses on the political and ideological background of China's "ecological civilization" project and the second sheds light on China's clean energy revolution. The article concludes with the third section on China's achievements in green agriculture and ecological urbanisation, explaining how they are reflected in multilateral environmental cooperation.

### **The Political and Ideological Background of Ecological Civilization**

The first uses of the term "ecological civilization" can be found in the Soviet Union in the early 1980s. This term was later adopted by Qianji Ye, a Chinese agricultural economist, and brought into official use by the State Environmental Protection Administration (SEPA). In China, ecological civilization gained popularity thanks to the efforts of the Hu Jintao administration (2003-2013) (Greene, n.d.; Pan, 2016:35). In his report to the 17<sup>th</sup> National Congress of the CPC, Hu put forth the notion of "harmonious society" by reference to China's traditional philosophical conception of harmony between humans and nature (天人合一思想) (Hu, 2007; Kitagawa, 2016a; Pan, 2016). Hu's (2007) conceptualisation of "harmonious society" goes beyond social equality and justice to embrace the "balance between urban and rural development, development among regions, economic and social development, relations between man and nature, and domestic development and opening to the outside world". Worth of note is the degree to which this notion resonates with Mao Zedong's ideas of "balanced development" and "socialism with Chinese characteristics", as were described in his speech "On Ten Great Relationships" (Mao, 1974).

Hu (2007) proposed a "Scientific Outlook on Development", where harmonious society can be achieved with a sustainable development model that puts people and the environment first by mobilising science, technology, and education. According to Hu, energy conservation and sustainable development are central to improving the Chinese population's quality of life. In this framework, Hu developed a "five-in-one" strategy (五位一体) that combines the task of economic, political, cultural, and social construction with that of ecological civilization. This strategy emphasises how ecological sustainability and other tasks complement each other.

To elaborate, ecological sustainability is an essential requisite for long-term economic growth for, without it, the higher goals of social welfare and life quality cannot be attained (Kitagawa, 2016b; Pan, 2016).

**China started to frame the environmental question as a matter of “state survival” in the Xi Jinping era, which explains why this question occupies such a strategic place in China’s revised national security strategy.**

Xi Jinping’s ascendancy to power furthered the strength of Hu’s emphasis on harmonious society and ecological civilization (Xi, 2018:233). In Xi’s thought, the task of building an ecological civilization constitutes the building block of the Chinese dream, i.e. “a dream of building China into a well-off society in an all-round way and... a dream to show the world China’s commitment to making a greater contribution to the peace and development of mankind” (Xi, 2018:179). As such, the CPC adopted the task of building an ecological civilization as a priority task in 2012, added it to the CPC constitution, and imported it into the Chinese constitution in 2018 (Goron, 2018:39).

Xi Jinping’s ascendancy to power led to the creation of the first CCP organ specialised in sustainability: the “Task Force for the Promotion of Economic Development and Ecological Civilization”. In 2015, the CPC Politburo adopted the “Central Opinion Document on Ecological Civilization Construction” in March 2015. As part of China’s new centralised environmental inspections, over 29,000 companies were penalised with fines totalling 1.43 billion RMB (US\$216 million), 1,527 individuals

were detained, and 18,199 officials were subjected to disciplinary action (Goron, 2018:41). Ultimately, the 19th National Congress of the CPC held in 2017 set the goal of greening and beautifying China based on the principles of green development and ecological-civilization building (Chinadaily, 2017; Yang, 2018).

China started to frame the environmental question as a matter of “state survival” in the Xi Jinping era, which explains why this question occupies such a strategic place in China’s revised national security strategy. In his speech during the first meeting of the Central National Security Commission of the CPC in 2013, Xi Jinping announced China’s new “Holistic National Security Outlook”, which constitutes the backbone of China’s current national security and identifies 11 areas of priority in national security. This sustainability included: political security, homeland security, military security, economic security, cultural security, societal security, science and technology security, information security, ecological security, resource security, and nuclear security. Subsequently, China published its “Blue Book on National Security” in 2014, designated as the country’s first blue book on national security. A landmark feature of this book is how it extends the scope of national security to include environmental issues as a defining theme (Corff, 2018; Raik et al., 2018).

“Made in China 2025”, China’s new techno-industrial strategy announced in 2015, is shaped by Xi’s holistic conceptualisation of national security and identifies nine areas of priority for economic development. These include enforcing green manufacturing, improving manufacturing innovation, integration between information technology and industry, strengthening the industrial base, fostering Chinese brands, advancing restructuring of the manufacturing sector, promoting service-oriented

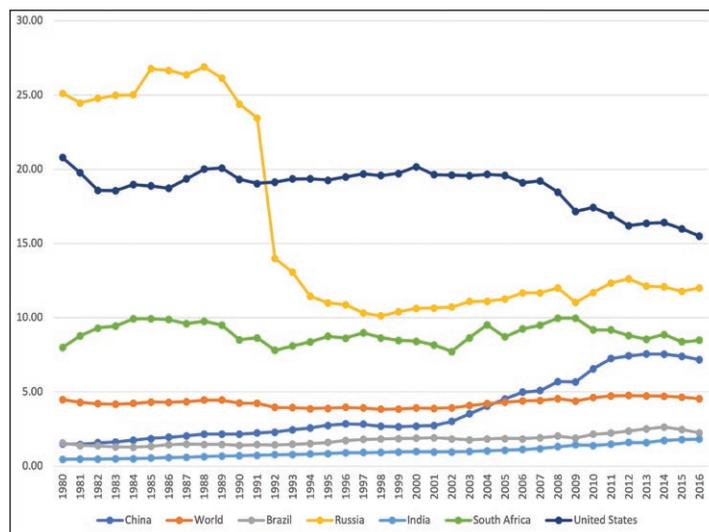
manufacturing and manufacturing-related service industries, and internationalising manufacturing. According to the Made in China 2025 strategy, the key to success in these tasks is in strategic sectors such as “new information technology, numerical control tools and robotics, aerospace equipment, ocean engineering equipment and high-tech ships, railway equipment, energy-saving and new energy vehicles, power equipment, new materials, biological medicine and medical devices, and agricultural machinery” (Ma, et al., 2018; U.S. Department of Defense, 2020).

### China's Clean Energy Revolution in the Making

In 2009, China outranked the US as the world's largest energy consumer (Guo & Marinova 2014). Chinese energy consumption greatly contributes to environmental degradation and climate change. In fact, 2016 estimates suggest that China exhibits a better performance in constraining per capita carbon dioxide (CO<sub>2</sub>) emissions in comparison with the US, Russia, and South Africa (World Bank, 2021; Figure 5). This being said, China recorded the highest rise in per capita CO<sub>2</sub> emissions (around 380%) in our sample for the 1980-2016 period. The US and Russia are the only countries that recorded a successful decrease in per capita CO<sub>2</sub> emissions (Figure 5). Moreover, China's 2018 performance reveals that coal consumption accounts for the greatest share of its CO<sub>2</sub> emissions (79.44%) as compared to the 43.7% share of coal consumption in the world's total CO<sub>2</sub> emissions (EIA, 2021). The second-largest share of China's CO<sub>2</sub> goes to oil and other liquid fuels (EIA, 2021). The remaining share concerns natural gas.

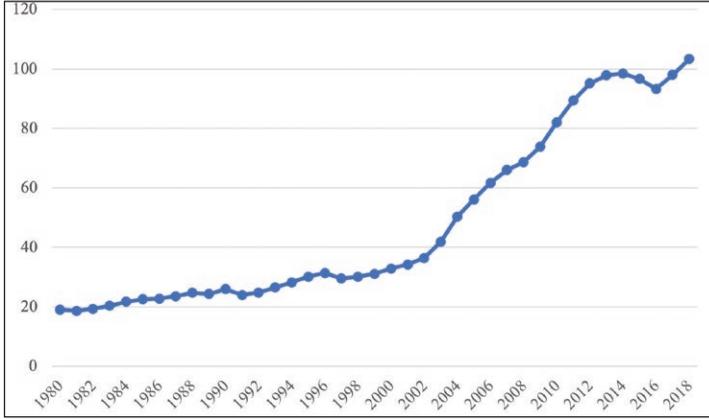
Energy intensity is an indicator that reflects per capita energy consumption. One could observe that China's energy intensity has been rapidly increa-

**Figure 5. CO<sub>2</sub> emissions (metric tons per capita)**  
<https://data.worldbank.org>

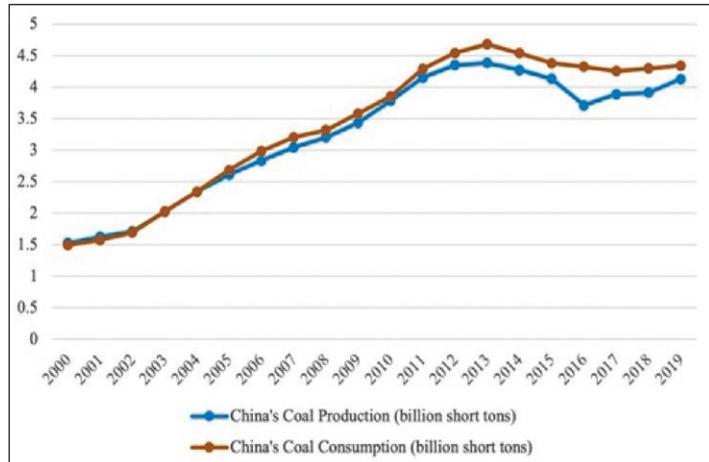


ing, particularly since 1997. The 1997-2018 period alone testified to an over 250% rise (EIA, 2021; Figure 6). Indeed, coal represents the main source of China's energy consumption, though China's coal production and consumption have been visibly decreasing since 2013. Between 2013-2019, China's coal production and consumption have decreased from 4.4 and 4.7 billion short tonnes to 4.1 and 4.3 billion short tonnes, respectively. This corresponds to a 7% decline in coal production and an 8.5% decline in coal consumption (EIA, 2021; Figure 7). However, China's oil consumption has been rising since 2013. The 2013-2019 period alone recorded a 29.5% increase (EIA, 2021; Figure 8). According to 2019 estimates, coal consumption makes up 58% of China's energy consumption and remains its largest source. In China's electricity production, the share of coal consumption is more than 65.3%. Oil and other liquids account for the second-largest share of China's total energy consumption with a share of 20%. Finally, the share of hydroelectric energy and other sustainable sources of energy has reached 13% (EIA, 2021; Figure 9).

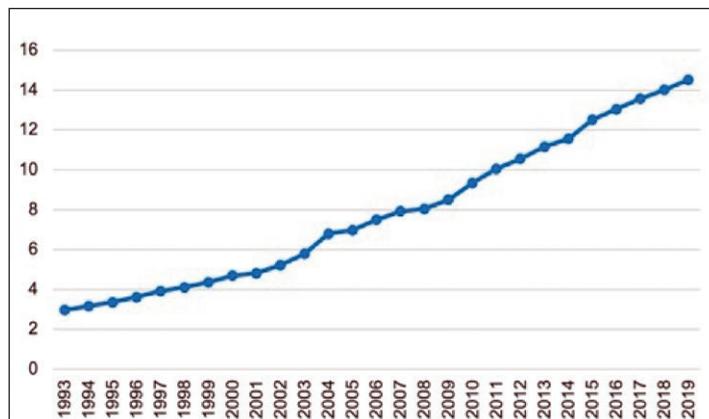
**Figure 6. China's energy intensity (MMBtu/per capita)**  
<https://www.eia.gov/totalenergy/data/browser/>



**Figure 7. China's coal production and consumption**  
<https://www.eia.gov/totalenergy/data/browser/>

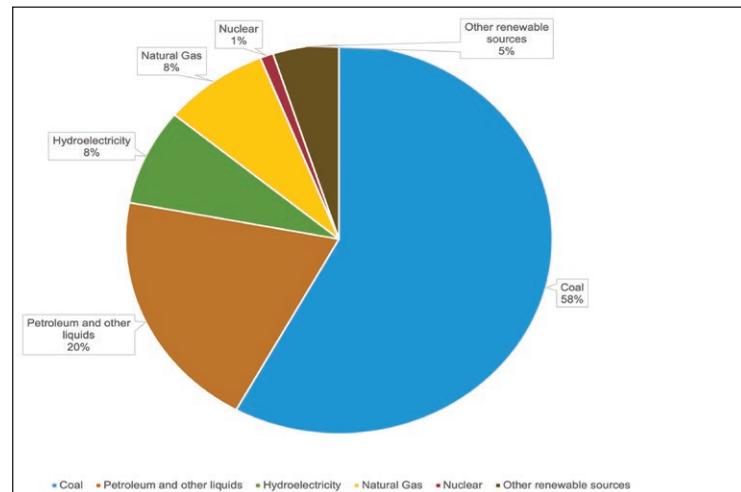


**Figure 8. China's oil consumption (million barrels/per day)**  
<https://www.eia.gov/totalenergy/data/browser/>



2015 estimates for the BRICS countries and the US suggest that Brazil, India, and South Africa led the share of sustainable energy consumption in overall national energy consumption. Since, China has increased the share of sustainable energy consumption from 11.7% to 12.4% (World Bank, 2021; Figure 10). Importantly, China is going through a clean energy revolution since adopting the 2005 Sustainable Energy Law as well as the 12th and 13th Five-Year Plans covering the period 2011-2020 (Gardner 2018; Guo & Marinova, 2014; Mathews & Tan, 2015; Su & Thomson, 2016). In as early as 2009, China became the world's leading investor in sustainable energy technology (Guo & Marinova, 2014). In 2013, China was the top investor in clean energy with a total investment of 61.3 billion (Campbell, 2014). 2015 marked the rise of China to the status of the world's largest producer of solar, wind, and hydroelectric power (Gardner, 2018). In the 2008-2018 period, furthermore, China's wind and solar energy consumption rose from 3 and 0 Mtoe to 83 and 40 Mtoe, respectively. Therefore, one could deduct that the share of China's wind and solar power in national energy consumption rose from 0.1% in 2008 to 3.7% in 2018 (BP, 2019).

**Figure 9. China's total primary energy consumption in 2019 (by fuel type)**  
<https://www.eia.gov/totalenergy/data/browser/>



### China's Green Agriculture, Eco-Cities, and Multilateral Environmental Cooperation: An Unfolding Revolution

As mentioned in the introduction, agricultural pollution constitutes a major environmental problem in contemporary China. The country suffers from a scarcity of arable land being the world's largest pesticide producer and consumer (China-ASEAN Environmental Cooperation 2018:158; Scott *vd.* 2018:26). With this in mind, China is currently increasing its focus on green agriculture to fight against agricultural pollution and other environmental strains. China's agriculture area under organic agriculture rose by over 36% in the 2005-2018 period, from 2,301,300 to 3,135,000 hectares. China's 2018 performance has even surpassed that of the other BRICS countries and the US in this area (FAO, 2021; Figure 11). That being said, China has a long way to go given that its agriculture area under organic agriculture accounts for only 2.31% of its total agriculture area (FAO, 2021). However, it is worth noting that China possesses the world's largest agriculture area under organic farming after Australia and Argentina. It is possible to argue that China has also set an example for other countries in the expansion of its certified organic agricultural land use. China's agriculture area under certified organic agriculture soared from 10 hectares to 2,558,100 hectares from 2004-2018. Due to this, China has become the world's largest consumer of organic food (FAO 2021; Willer, Lernoud, & Kemper, 2018).

China's green revolution in agriculture owes much to the efforts of central and local governments at prioritising green agriculture in their overall development strategy (Scott *et al.*, 2018:46). This also accounts for the rise of the eco-village movement in China since the late 1980s. By 1990, China created a total of 1200 "pilot eco-villages" (Liu *et al.*, 2021; Scott *et al.*, 2018:38-39). This number rose to

Figure 10. Renewable energy consumption (% of total final energy consumption)  
<https://data.worldbank.org>

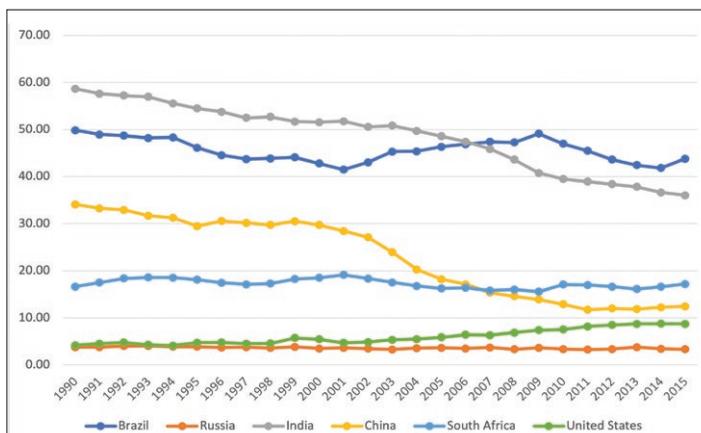
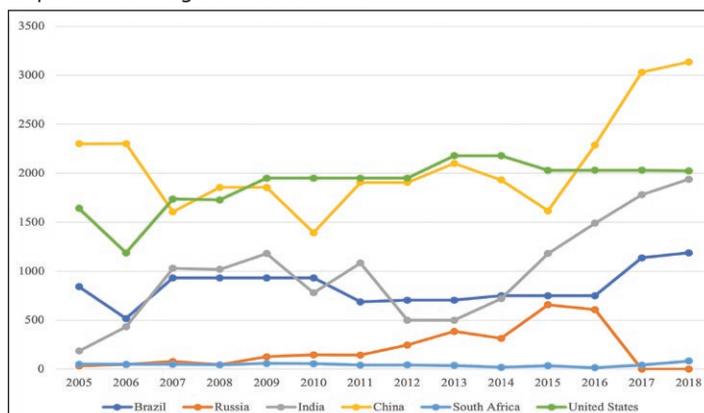


Figure 11. Agriculture area under organic agriculture (1000 ha)  
<http://www.fao.org/faostat/en/#data/RL>



2000 by the year 2011 (Liu & Wang, 2010:107). The eco-village movement was complemented by strong policy efforts emphasising the widespread adoption of green labelling standards such as green food (*lüse shipin*), pollution-free food (*wugonghai shipin*) and organic food (*youji shipin*) throughout the 1990s. Meanwhile, the Ministry of Agriculture launched a green food programme in 1990 and the China Green Food Development Centre in 1992, which assumed the task of providing the necessary technical support and quality control services to further this process (Scott *et al.*, 2018:39-41).

By 2011, China had created 42 certification offices, 38 quality control terminals, and 71 environmental monitoring centres. Moreover, China's green food programme was complemented by the Risk-Free Food Action Plan in 2001, which sought to fight chemical pollution, improve food security, and accelerate organic certification (Scott et al., 2018:39-41). Ultimately, the National Sustainable Agriculture Development Plan (2015-2030) provided a more systematic and holistic blueprint for China's efforts in green agriculture. In 2017, No. 1 Central Document, an annual policy document issued by the Central Committee of the CPC and the State Council, elevated green and sustainable development to the status of the second major development goal (Scott et al., 2018:39-41).

China's efforts in improving green agriculture and building eco-villages go hand in hand with its strategy of sustainable urbanisation (Hu, Liu, & Sun, 2017). The eco-city movement (生态城市) was launched in 2003 on the initiative of the Ministry of Environmental Protection. This initiative sought to create a model of a low-carbon and circular economy, expand green and protected zones, encourage recycling and energy conservation, promote sustainable architecture, prevent air and noise pollution, and improve social welfare and harmony in urban areas (Wang, 2018; Zhou, He, & Williams, 2012). According to research from 2009 conducted by the International Eco-Cities Initiative (IEI), only 6 out of the world's 79 eco-cities originated from China. In the 2011 IEI survey, China's eco-cities rose to 25. Research from 2015 conducted by China identified 658 major eco-cities across the world, 284 of which originated from China. This means that more than 43% of the world's eco-cities are currently based in China (Williams, 2017:4).

The eco-city movement also contributed to China's efforts in improving multilateral environmental

cooperation. Indicative of Chinese leadership in the global eco-city movement is the Tianjin China-Singapore Eco-City, the Sino-Dutch Shenzhen Low-Carbon City, and the Sino-French Wuhan Ecological Demonstration City. Particularly, the construction of eco-industrial parks represents central instances of environmental cooperation among developing countries in the eco-city movement. The China-Singapore Suzhou Industrial Park contains green areas and lakes, whereas the Sino-Singapore Tianjin eco-city possesses systems for energy efficiency, green transportation, green architecture, sewage treatment, and recycling (China-ASEAN Environmental Cooperation, 2018:161; Liu & Lo, 2021:12).

**The 2015 "One Belt, One Road" document pledged for the BRI to assume greater responsibility in environmental protection, biodiversity, and climate change.**

As a locomotive of multilateral environmental cooperation, China has extended its leading role to the Association of Southeast Asian Nations (ASEAN). In 2009, China and ASEAN signed the Strategy on Environmental Cooperation, which later contributed to the creation of the China-ASEAN Environmental Cooperation Centre. This was followed by the China-ASEAN Environmental Cooperation Action Plans for 2011-2013 and 2014-2015 as well as the 2016-2020 Strategy on Environmental Cooperation. These strategies and action plans sought to improve regional efforts in research & development and eco-city construction. Also included in such efforts is the Green Silk Road Envoys Program, which sought to develop staff training, scientific exchange, and political dialogue on matters of sustainability, green innovation and entrepreneurship, biodiver-

sity, and ecological protection (China-ASEAN Environmental Cooperation, 2018:viii).

China has recently accelerated its multilateral environmental cooperation through the channel of the Belt & Road Initiative (BRI). The 2015 “One Belt, One Road” document pledged for the BRI to assume greater responsibility in environmental protection, biodiversity, and climate change. The BRI developed a more systematic approach to sustainability upon Xi Jinping’s 2016 call for the construction of a “green, healthy, intelligent, and peaceful” Silk Road, which led to the publication of the “Guidance on Promoting Green Belt and Road” and the implementation of the Green Action Plan and the Maritime Cooperation Vision driven by the principle of maritime protection (Simonov, 2018). As a result, the Second BRI Forum held in 2019 formulated green investment principles (Cheung & Hong, 2021).

The BRI devotes special attention to ensure it does not impose policies on its participants and undermine their national sovereignty. The adoption of BRI’s principles on ecological civilization is left to the initiative of participant states (Ikenberry & Lim, 2017). In the Second BRI forum, BRI members were invited to join environmental initiatives such as the International Green Development Coalition, the Sustainable Cities Alliance, the South-South Cooperation Initiative on Climate Change, the Environmental Technology Exchange and Transfer Center, the Environmental Big Data Platform, and the Green Investment Fund (Garey & Ladislaw, 2019; Ikenberry & Lim, 2017). These initiatives gained momentum in response to rising criticism on the part of civil society groups against the majority of BRI investments being transferred to carbon-driven sectors and large-scale infrastructure development at the expense of local environments (Harlan, 2021).



The file photo shows a wind power plant in Zhangjiakou, North China's Hebei province. (Xinhua, 2021)

**Chinese green investment has supported environmental initiatives such as low-carbon transportation, high-speed trains, clean energy projects, projects against environmental pollution, and clean coal investments. As such, China has risen to the status of the world's top leader in green bonds and credits by outperforming the US in 2019.**

Coupled with BRI's forum initiatives is green finance, which includes financial practices involving bonds that fund sustainable projects, credits that support sustainable investments, and insurance schemes for protection against environmental disasters. Chinese green investment has supported environmental initiatives such as low-carbon transportation, high-speed trains, clean energy projects, projects against environmental pollution, and clean coal investments. As such, China has risen to the status of the world's top leader in green bonds and credits by outperforming the US in 2019 (Green Belt and Road Initiative Center, 2019b, Chinadaily 2020b; Harlan 2021; Rooney 2019).

The Asian Infrastructure Investment Bank (AIIB) –as Asia's first bank to be independent from Western hegemony and the world's fourth largest multilateral development bank– constitutes an important financial vehicle for BRI (Gürcan, 2020; Fahamu, n.d.; Koop, 2018). It started to operate in 2016 under China's initiative as “the world's first multilateral development bank (MDB) dedicated to infrastructure” (Wilson, 2017). The declared intention of the bank is to fill the “gap between supply and demand for infrastructure spending in Asia”, which was estimated at “as high as \$8 trillion by 2020” (Cai, 2018). The bank's approved projects mostly

focus on the energy, water, and transportation sectors (Chen, 2019). Almost half of these projects are co-financed with other financial institutions such as the Asian Development Bank, the European Bank for Reconstruction and Development, the Islamic Development Bank, and the World Bank (Rana, 2019; Bustillo & Andoni, 2018). In the period 2016–2017, the AIIB approved nearly \$5 billion in loans, and 35 infrastructure projects with an estimated value of \$28.3 billion (Cai, 2018; Chen, 2019). Unlike the World Bank, the AIIB does not impose political conditionality and does respect the sovereignty of claimant nations (Gürcan, 2020).

China's initiative has led the AIIB to adopt a strong stand on ecological civilization. In 2016, the AIIB adopted the Environmental and Social Framework (ESF), which encourages financed development projects to target social and environmental sustainability in tandem, including green economy, gender equality, and labor rights. As regards environmental sustainability, the ESF places a strong emphasis on balanced development, decreasing fossil fuel consumption, environmental resilience, energy conservation, and biodiversity (Gabusi, 2019). In its second annual meeting held in South Korea in 2016, the AIIB adopted the Sustainable Energy for Asia Strategy and approved its first loan for a project that seeks to reduce coal use in China. The AIIB's fourth meeting was held in Luxembourg in 2019, where the bank reiterated its commitment to supporting green economy (Altay & Zeynepcan, 2020). The AIIB's new funds that target social and environmental sustainability include “the \$75 million Tata Cleantech Sustainable Infrastructure On-Lending Facility (India), US\$75 million Asia Investment Fund (Asia-wide), US\$100 million L&T Green Infrastructure On-Lending Facility to finance wind and solar energy projects (India), US\$200 million TSKB Sustainable Energy and



A woman drops empty delivery boxes into a community recycling bin in Kunming, Yunnan province. (China Daily, 2018)

Infrastructure On-Lending Facility (Turkey), and US\$150 million to the India Infrastructure Fund to finance infrastructure projects including renewable energy (India)... [as well as] a US\$500 million AIIB Asia ESG Enhanced Credit Managed Portfolio (Asia-wide) with Aberdeen Standard Investments, to partner on developing debt capital markets for infrastructure... [and the] US\$ 500 million fund, the Asia Climate Bond Portfolio, to accelerate climate action in the Bank's members, and spur the development of the climate bond market." (Vazquez & Chin, 2019: 598) Besides energy and infrastructure, the AIIB's green framework extends to sustainable urbanization, green transportation, and rural sustainability. These efforts are clearly exemplified in a US\$329 million loan for India's Gujarat Rural Roads Project, a US\$335 million loan for India's Metro Line Project, a US\$140 million loan for India's Madhya Pradesh Rural Connectivity Project, a US\$445 million loan for India's Andhra Pra-

desh Rural Roads Project, a US\$40 million loan for Laos' National Road 13 Improvement and Maintenance Project, a US\$216.5 million loan for Indonesia's National Slum Upgrading Project, a US\$270.6 million loan for the Philippines' Metro Manila Flood Management Project, a US\$400 million loan for India's Andhra Pradesh Urban Water Supply and Septage Management Improvement Project, a US\$200 million loan for Sri Lanka's Colombo Urban Regeneration Project, and a US\$100 million loan for Bangladesh's Municipal Water Supply and Sanitation Project (Vazquez & Chin, 2019).

Finally, a word of caution: it is too early to estimate the future of the AIIB and BRI's contributions to ecological civilization, given that the Green Silk Road project was only put into action in 2019, whilst the AIIB started to operate in 2016. However, there is room for optimism considering that China has already become a leading country in multilateral environmental cooperation.



An aerial view of the Taihu Lake scenic area in Huzhou, Zhejiang province. (China Daily, 2021)

The AIIB's strategy on social and environmental sustainability has already been put into practice through green funds implemented in several Asian countries. Furthermore, China's green investments as part of the BRI have gained momentum since 2016. Cases include China's increasing investments in Vietnam's solar panels, its leading role in establishing the Quaid e-Azam Solar Park and the Jhimpir Wind Farm in Pakistan, the Aisha Wind Farm and Wolayita Sodo Power Transmission Line in Ethiopia, and other similar projects in countries such as Thailand and Malaysia (Chernysheva et al., 2019).

### Review and Discussion

As a strong expression of ecological imperialism, prompted by neoliberal globalisation and the Third Industrial Revolution, Western metropolises initiated the shift in axis for global production to Asia. This enabled Western metropolises to take

advantage of cheap labour supplies and access natural resources in the absence of strict environmental regulations (Gürçan, Kahraman & Yanmaz, 2021). China was the main target of these pillaging efforts. However, it managed to benefit from these neoliberal assaults by utilising public-driven policies, which, despite a number of liberal compromises, served to protect itself from becoming a neo-colony. Public-driven policies also served to build a strong economy driven by national interests, thus generating grave concerns for Western metropolises whose global hegemony was challenged. As a result, Western metropolises now resort to an ecological-imperialist campaign that blames environmental degradation on developing countries, particularly China, whose leading environmental efforts –as the locomotive of global welfare and the greatest enemy of global poverty– are often undermined by this Western-centric campaign.

**China is in the early stages of building an ecological civilization and still has a long way to go before it reaches a high level of ecological development.**

China has already developed a firm awareness of its environmental problems, which are realised in its revised national security strategy that incorporates the concept of “ecological civilization”. China is in the early stages of building an ecological civilization and still has a long way to go before it reaches a high level of ecological development. Perhaps the most immediate threat to ecological civilization stems from the growing aggression of US imperialism in the form of geopolitical containment strategies, techno-economic wars against China, and other factors related to the COVID-19 pandemic such as Western-fueled Sinophobia and pandemic-related economic strains (Gürcan, 2019; Gürcan, Kahraman & Yanmaz, 2021). Nevertheless, China’s key achievements on the path towards ecological civilization involve a series of three unfolding and mutually conditioning revolutionary processes that also lead the way in international environmental cooperation, as embodied in China’s role in ASEAN, the AIIB, and the Green Silk Road. They include a clean energy revolution, a sustainable agricultural revolution, and a green urban revolution.

China has already become a global leader in green finance. It leads the eco-city movement with over 43% of the world’s eco-cities being Chinese

and is the second leader in sustainable architecture, next to Canada. Many Chinese cities have dropped down or out of the list of the most polluted cities, leaving India and Pakistan at the top. China’s cities have also joined the ranks of those with the strongest sewage treatment capacity in the world. Another point worth mentioning is that China has the most electric vehicles, bikes, and efficient public transportation. China is considered, not only as the world’s centre of electric bus production and consumption but also as having cities with the world’s longest subway systems. From 2013 onwards, the share of coal in China’s total energy consumption has seen a noticeable decline, accompanied by the increasing share of renewable resources in total energy consumption as a result of conscious efforts at a clean energy revolution. Key to this revolution in the making is China’s strong reputation as the world’s top investor in clean energy. As such, it has succeeded in creating the world’s largest wind, solar, and hydroelectric systems for power generation. Finally, concerning China’s unfolding revolution in sustainable agriculture, one should acknowledge its adoption of green food standards, the expansion of its agricultural area under certified organic farming, and especially the fact that, as a world leader in green agriculture, it now has the third-largest agricultural area under organic farming. Ultimately, the continuation and amplification of all these achievements are predicated on the future determination of the Xi Jinping administration (and its successors) to build ecological civilization while facing imperialist aggression.

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# Ecological Civilization: Building a Shared Future for All Life on Earth\*

**Xi Jinping: We need to find a way for man and nature to live in harmony, balance and coordinate economic development and ecological protection, and work together to build a prosperous, clean and beautiful world.**



*We present to your attention the full text\*\* of the speech of the Chinese President Xi Jinping, on Wednesday, at the United Nations (UN) Summit on Biodiversity, September 30<sup>th</sup>, 2020:*

Mr. President,  
Colleagues,

At the special moment as the United Nations marks the 75<sup>th</sup> anniversary of its founding and countries around the world strive to emerge from COVID-19 and promote high-quality economic recovery, the UN has convened this Summit on Biodiversity. It gives us an opportunity to discuss major issues of biodiversity protection and sustainable development and therefore has both practical and far-reaching significance.

The 15<sup>th</sup> meeting of the Conference of the Parties to the Convention on Biological Diver-

sity (COP15) will be hosted by China next year in the city of Kunming. COP15 offers an opportunity for the parties to adopt new strategies for global biodiversity governance.

At present, there exists an acceleration of the global extinction of species. The loss of biodiversity and the degradation of the ecosystem pose a major risk to human survival and development. COVID-19 reminds us of the interdependence between man and Nature. It falls to all of us to act together and urgently to advance protection and development in parallel, so that we can turn Earth into a beautiful homeland for all creatures to live in harmony. To that end, I would like to make the following proposals:

First, we need to adhere to ecological civilization and increase the drive for building a beautiful world. Biodiversity affects the well-being of humanity and provides the very basis for the human race to survive and thrive.

\* The text is titled by BRIQ.

\*\* The text is retrieved from <https://news.cgtn.com/news/2020-09-30/Full-text-Xi-Jinping-s-speech-at-UN-summit-on-biodiversity-Udo37GZogE/index.html>.



Chinese President Xi Jinping addresses the United Nations Summit on Biodiversity via video on Sept. 30, 2020. (Xinhua/Ju Peng)

The industrial civilization, while creating vast material wealth, has caused ecological crises as manifested in biodiversity loss and environmental damage. A sound ecosystem is essential for the prosperity of civilization. We need to take up our lofty responsibility for the entire human civilization, and we need to respect nature, follow its laws and protect it. We need to find a way for man and nature to live in harmony, balance and coordinate economic development and ecological protection, and work together to build a prosperous, clean and beautiful world.

Second, we need to uphold multilateralism and build synergy for global governance on the environment. Since the founding of the UN, the international community has made active efforts toward global environmental governance. International instruments such as the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change and the Paris Agreement form the legal foundation for environmental governance in their respective fields. They represent important accomplishments of multilateral cooperation and enjoy broad support and participation from the international commu-

nity. Faced with the risks and challenges to the environment worldwide, countries share a common stake as passengers in the same boat and form a community with a shared future. Unilateralism finds no support; cooperation is the right way forward. We must firmly safeguard the UN-centered international system and uphold the sanctity and authority of international rules so as to enhance global governance on the environment.

Third, we need to continue with green development and increase the potential for high-quality economic recovery after COVID-19. Globally, the coronavirus has wreaked havoc on every aspect of economic and social development. We need to have our eyes on the long run, have determination and stay the course for green, inclusive and sustainable development. The UN's 2030 Agenda for Sustainable Development points the way forward, and recognizes biodiversity as an important basis, a goal and the means for achieving sustainable development. Recognizing that "our solutions are in Nature", we could strive to find development opportunities while preserving Nature, and achieve win-win in both ecological conservation and high-quality development.

Fourth, we need to heighten our sense of responsibility and strengthen the power of action to tackle challenges to the environment. Being at varying stages of development, developed and developing countries have different historical responsibilities and practical capabilities for addressing environmental issues. We need to uphold the principle of common but differentiated responsibilities, ensure fair and equitable sharing of benefits, and accommodate developing countries' concerns over funding, technology and capacity building. We need to earnestly fulfill our commitments, focus on our targets, and effectively reverse biodiversity loss so as to protect the planet we call home.

Mr. President,

“Ecological Civilization: Building a Shared Future for All Life on Earth”, which is the theme of next year's Biodiversity Conference in Kunming, embodies humanity's hope for a better future. As the host country of COP15, China is happy to share with all parties its experience of advancing biodiversity governance and ecological progress.

- *China has pursued development under the vision of building an ecological civilization.* From the traditional Chinese wisdom that the laws of Nature govern all things and that man must seek harmony with Nature, to the new development philosophy emphasizing innovative, coordinated, green and open development for all, China has always prioritized ecological progress and embedded it in every dimension and phase of its economic and social development. The goal is to seek a kind of modernization that promotes harmonious coexistence of man and Nature.

- *China has rolled out strong policies and actions.* China adopts a holistic approach to conserving the mountains, rivers, forests, farmlands, lakes and grasslands, and makes coordi-

nated efforts to advance biodiversity governance. We have stepped up national legislation for preserving biodiversity, and are drawing red lines for protecting the ecosystems. We have effected a national parks system, carried out major biodiversity conservation projects, and increased social participation and public awareness. For the last 10 years, China has topped the world in forest resource increase, with more than 70 million hectares of land afforested. We have made long-term, large-scale efforts to combat sandification and desertification, and we have effectively protected and restored the wetlands. We now have one of the world's largest banks of genetic resources reserve. Ninety percent of terrestrial ecosystem types and 85 percent of key wild animal populations are under effective protection.

**Guided by the vision of building a community with a shared future for mankind, China will continue to make extraordinary efforts to scale up its nationally determined contributions.**

- *China has taken an active part in global environmental governance.* China takes seriously its obligations under environment-related treaties, including on climate change and biodiversity. We have hit, ahead of schedule, the targets set for 2020 for tackling climate change and establishing protected areas. As the largest developing country, China is prepared to take on international responsibilities commensurate with its level of development, and contribute its part to global environmental governance. Guided by the vision of building a community with a shared future for mankind, China will continue to make extraordinary efforts to scale up its nationally determined contributions.



Xi Jinping visits Niubeiliang National Nature Reserve to learn about ecological conservation in the Qinling Mountains, Shaanxi Province. (Xinhua, 2020)

China will adopt even more forceful policies and measures and strive to peak carbon dioxide emissions before 2030 and achieve carbon neutrality before 2060, thus making greater efforts and contributions toward meeting the objectives of the Paris Agreement.

Mr. President,

As the saying goes, “Little by little, grains of soil pile up to make a mountain and drops of water converge to form a river.” To enhance

biodiversity conservation and global environmental governance require sustained efforts by all parties. I want to welcome you to Kunming, the beautiful “Spring City”, next year, to discuss and draw up plans together for protecting global biodiversity, and I look forward to the adoption of a comprehensive, balanced, ambitious and implementable framework of action. Now, let us proceed from this Summit and work in concert to build a beautiful world of harmony among all beings on the planet.

# The Policy Orientation of Turkey's Current Climate Change Strategy



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## ABSTRACT

This article aims to provide a comprehensive understanding of Turkey's approach to climate change on its path to an ecological civilisation. How does Turkey perceive climate change? What proposals does Turkey offer to tackle climate change? How have Turkey's perception and policy proposals on this matter taken their current shape? This article uses qualitative content analysis and descriptive statistics to address these questions. A fuller understanding of Turkey's climate change strategy can be gained through an integrative analysis of its recent Strategic Plan and Five-Year Plans in tandem with its key official documents related to climate change strategy and action plans. Our analysis suggests that Turkey's approach to climate change centres on an ambitious mission to place economic and social development within a sustainability framework. This mission springs from Turkey's growing perception that the key to success in the struggle against climate change is in pursuing these efforts in coordination with the Sustainable Development Goals. The selected documents reflect a growing awareness that these efforts can be enhanced through closer cooperation between the public sector, private sectors, and civil society. Moreover, Turkey exhibits a strong understanding of the need for strengthening ties between the environment and future generations on the road to "green development". The addressed documents acknowledge the current obstacles on this road, particularly those relating to scant institutional, financial, and technical capabilities. Finally, the documents' frequent emphasis on sustainable energy, energy efficiency, and clean energy technologies points to the relevance of taking into consideration Turkey's energy strategy and action plans. In this area, Turkey's efforts at improving its institutional, financial, and technical capabilities seem to have borne their first fruits, though there is still a very long way to go to attain the capabilities required for fully implementing the intended strategies and action plans. A promising development is that enhanced public support for clean energy technologies and production has led Turkey to become a leading actor in clean energy.

**Keywords:** clean energy, climate change, climate policy, sustainable development, Turkey

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IN 2015, THE UNITED NATIONS ADOPTED the Sustainable Development Goals (SDGs) to be achieved by 2030. These goals were formulated in 17 points that address different, but complementary, issues: eliminating poverty (1), eradicating hunger (2), achieving good health and well-being (3), ensuring quality education (4), attaining gender equality (5), ensuring access to clean water and sanitation to all (6), offering affordable and clean energy (7), generating decent work and economic growth (8), building quality and resilient industry, innovating base and infrastructure (9), reducing inequality (10), creating sustainable cities and communities (11), ensuring responsible consumption and production (12), combating climate change and its impacts (13), conserving marine resources (14), promoting sustainable use of terrestrial ecosystems (15), enabling peaceful and inclusive societies (16), and enhancing international cooperation (17). Goal 13 on climate action proposes to combat climate change through five different fronts: strengthening resilience and adaptive capacity to climate-related hazards, integrating climate change measures into national policies, improving education on climate change, implementing the United Nations Framework Convention on Climate Change, and



Climate change affects both nature and people's social lives.

enabling effective climate change-related planning and management (Kılıkış, 2021; UN DESA, 2021a; UN DESA, 2021b.)

Indeed, one cannot reduce the task of combating climate change to Goal 13 alone (UN DESA; n.d.). Climate change, which is increasingly felt through extreme climatic events such as droughts, violent storms, floods, and extreme warmth, affects both nature and people's social lives. Specifically, the United Nations (UN) highlights the connection between environmental and social problems and Sustainable Development Goals (SDG). Their suggestions for environmental protection include the fight against social inequa-

lities (UN DESA, 2021c). Considering that climate change will lead to fundamental problems such as lack of resources, food insecurity, shortages of safe drinking water, sheltering problems, and increasing poverty rates, health problems, and contagious diseases (UN, 2021).

This article aims to provide a comprehensive understanding of Turkey's approach to climate change on its path to an ecological civilisation. How does Turkey perceive climate change? What proposals does Turkey offer to tackle climate change? How have Turkey's perception and policy proposals on this matter taken their current shape?

The article uses qualitative content analysis and descriptive statistics to address these questions. The first section of this article provides conceptual and historical background for the study of climate change and climate policy; the second uses this background to examine the case of Turkey. Our data analysis divides the texts under study into coding segments in light of our research aims and conceptual framework. With the aim of analysing Turkey's current climate strategy, we have included in our content analysis strategic and development plans along with climate-specific strategy papers, reports, and action plans: National Strategic Plan (2019-2023), 5-Year Development Plans, National Climate Change Strategy (2010-2023), Climate Change Adaptation Strategy and Action Plan (2011-2023), 2<sup>nd</sup> Voluntary National Review (2019), National Energy Efficiency Action Plan 2017-2023, National Energy Efficiency Paper (2012-2023).

**The inability to evaluate national resources in line with the interests of the country, failure to maintain the environmental impact of increasing production, and the lack of international cooperation cause environmental problems to reach dangerous dimensions.**

Our content analysis is supplemented with descriptive statistical analysis based on data derived from the Turkish Statistical Institute (TURKSTAT) and the BP Statistical Review of World Energy.

### **Climate Change: A Brief Conceptual and Historical Context**

The basic requirement of a healthy society is safe human relations and equality in income distribution, as well as the protection of the natural, cultural, and aesthetic environment. There may be inevitable disruptions to the well-being of societies and those regarding the environment may have a significant impact. Addressing environmental problems means deciding between the needs of today's generations and those of the future. The inability to evaluate national resources in line with the interests of the country, failure to maintain the environmental impact of increasing production, and the lack of international cooperation cause environmental problems to reach dangerous dimensions. Discussing the well-being of societies amounts to discussing an environmental problem that surfaced to the agendas of all nations - climate change.

Climate change is driven by the excessive accumulation of natural greenhouse gases in the atmosphere. Indeed, anthropogenic sources increase the concentration of greenhouse gases that disrupt the solar radiation pattern and cause global warming. Global warming, in turn, affects earth-based natural patterns and systems, ocean currents, weather, and increases sea levels due to the melting of ice. In 1994, the United Nations Framework Convention on Climate Change (UNFCCC) represented the first global declaration of climate change with its ultimate goal stated as the stabilisation of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system (IPCC, 2021).

The UNFCCC is strengthened by the Intergovernmental Panel on Climate Change (IPCC), which is the scientific board for global data collec-



President of Turkey, Recep Tayyip Erdogan, joined the Climate Summit organized by the US on April 22, 2021. (Presidency of Turkey website)

tion and analysis, with its regular reportage acting as a guide to the UNFCCC's activities. According to the IPCC, climate change efforts require three distinct divisions: assessment, which represents data-based scientific assumptions on the current situation of a country; mitigation, decreasing the amount of greenhouse gases emitted from various sources, i.e. transport, buildings or industry; and adaptation, to set measures for sudden and extreme changes of weather patterns, including short- or long-term effects on regions (IPCC, 2021).

Countries in the UNFCCC come together at an annual conference, the "Conference of the Parties" (COP). COP 26 is scheduled to be held in Glasgow on November 26th, 2021, where government representatives, academia, NGOs, and others will gather to discuss the current situation. The Copenhagen Summit in 2009, COP 15, was significant, for it coincided with the Kyoto Proto-

col coming into effect, and had its own final declaration called the "Copenhagen Accord".

To date, there are two subsequent global agreements following the UNFCCC. The first is the Kyoto Protocol and the second is the Paris Agreement. These two agreements, although serving the same objective, are different in approach and expectations from the signatory countries. Two striking differences are that the Kyoto Protocol is legally binding and focuses on industrialised and developed countries while the Paris Agreement is not legally binding and targets all signatory countries. Hence, when the ultimate goal is considered, the Kyoto Protocol is targeting a 5% decrease from the 1990 emission levels, while the Paris Agreement demands countries to make their Intended National Declaration of Contributions (INDCs), with all aiming for a 1.5°C decrease from preindustrial levels.

The Kyoto Protocol introduced various climate change finance mechanisms, such as the introduction of carbon trade systems and their respective mandatory and voluntary markets (Low & Boettcher, 2020).

**Considering the importance of carbon dioxide emissions as a chief factor in contributing to climate change, the gravity of this issue can be better grasped by looking at Turkey’s carbon dioxide emissions over the years. In the 1970-2019 period, Turkey’s carbon dioxide emissions rose from 39.28 million tonnes to 383.26 million tonnes, which points to a nearly 876% increase in total emissions.**

Around the same time as the Paris Agreement, the United Nations for another global agreement, the Sustainable Development Goals, as the successor of the Millennium Development Goals. The Millennium Development Goals provided a set of 8 goals that covered areas from hunger to environment, but the Sustainable Development Goals outlined a total of 17 goals for the period of 2015-2030. Direct and indirect (i.e. Goal 7 on clean and affordable energy) effects of climate were discussed in goals, but Goal 13, “Climate Action”, was exclusively dedicated to climate change. The targets and indicators for SDG 13 briefly suggested urgent action to combat climate change and its impacts.

SDG 13 suggests “strengthening resilience and adaptive capacity to climate-related hazards and natural disasters in all countries focusing on the climate change adaptation”. It also targets “integ-

rating climate change measures into national policies, strategies and planning as well as improving education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning” (UN DESA, 2021a).

Although the UN confirmed the existence of climate change through government-level agreements and scientific data from the IPCC, there is still climate change scepticism individuals, businesses, and even in governments. Nevertheless, the push towards action resulted in a wide range of reactions from businesses and countries. For these groups, there are three main types of reactions. The first group is the proactive businesses or governments that firmly believe in climate change and its various risks. The second group would be those that, while they recognise that climate change is happening, prefer to watch from a distance to inspect and see what others will do before they make their own decisions. Finally, the last group is the climate deniers, who believe that business can go on as usual (Low & Boettcher, 2020). Over the years, governments have followed their own paths, especially those governments that are global impactors.

### **Turkey’s Approach to Climate Change: A Content Analysis**

The issue of climate change concerns all countries of the world. As a temperate zone country, however, Turkey is among the countries expected to be most affected by climate change. Considering the importance of carbon dioxide emissions as a chief factor in contributing to climate change, the gravity of this issue can be better grasped by looking at Turkey’s carbon dioxide emissions over the years. In the 1970-2019 period, Turkey’s carbon dioxide emissions rose from 39.28 million

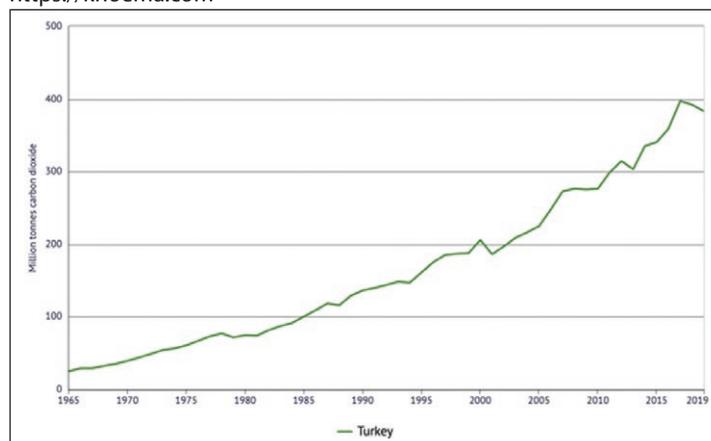
tonnes to 383.26 million tonnes, which points to a nearly 876% increase in total emissions (BP Statistical Review, 2021; Figure 1).

Turkey has not remained completely unresponsive to these developments. Turkey's expenditure on the protection of ambient air and climate has seen a considerable increase, from 338,615,571 TL to 1,139,067,476 TL between 2013 and 2019, which corresponds to an over 236% increase overall (TURKSTAT, 2021; Figure 2). Moreover, TURKSTAT data reveals that the sectors with the greatest share in Turkey's carbon dioxide emissions are, ranked in order of importance: "electricity, gas, steam and air conditioning supply", "manufacturing", "agriculture, forestry and fishing", and "households" (TURKSTAT, 2021; Figure 3). Indeed, these areas represent priority sectors to be focused on in the fight against climate change.

Examining Turkey's strategy documents and action plans would provide a firm understanding of the countries' priorities regarding climate change. National strategic plans set the general course for the policies to be pursued by Turkey. In other words, they formulate the essential principles, performance criteria, and methods to be adopted in implementing Turkey's medium- to long-term goals. It follows that these plans also set the course for Turkey's strategies and action plans in combatting climate change. By way of example, Turkey's Strategic Plan for the period 2019-2023 adopts the core mission of placing economic and social development within a sustainability framework (TC SBB, 2019a:42). The plan indicates that this mission is formulated based on SDGs and will shape Turkey's essential policy documents to come. With this aim in mind, the plan also announces the creation of the

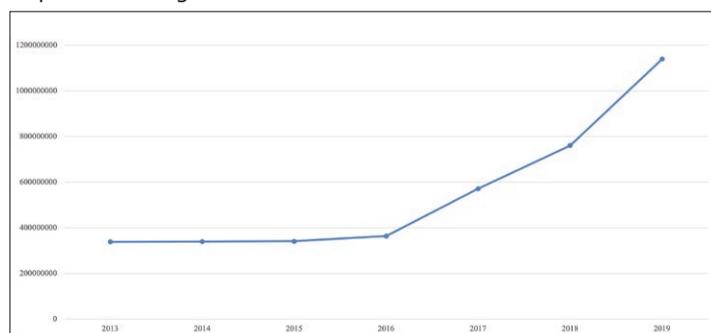
**Figure 1. Turkey's carbon dioxide emissions, million tonnes (1965-2019)**

<https://knoema.com>



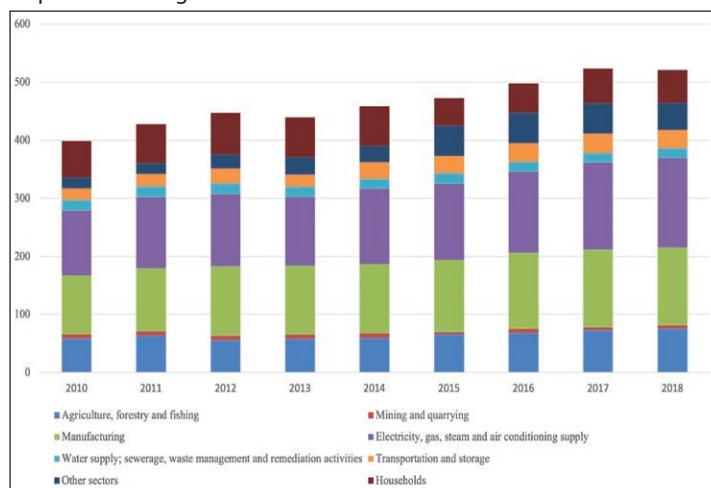
**Figure 2. Turkey's environmental protection expenditure for the protection of ambient air and climate (TRY)**

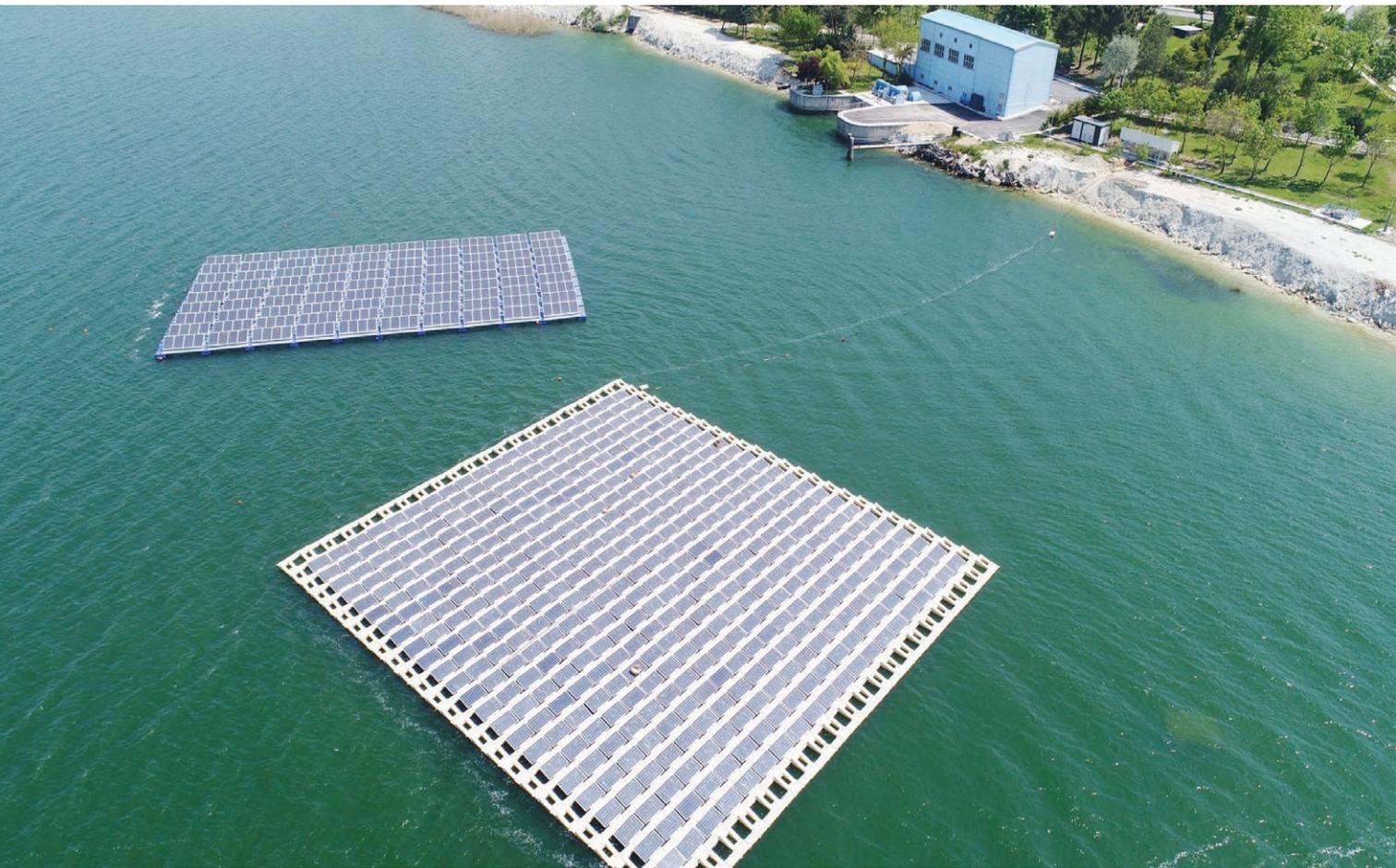
<https://data.tuik.gov.tr>



**Figure 3. Annual greenhouse gas emissions by economic activity (million tonnes CO<sub>2</sub> equivalent)**

<https://data.tuik.gov.tr>





Turkey's first floating Solar Power Plant was activated in 2017. (Istanbul Metropolitan Municipality website)

National Sustainable Development Commission, which will ensure the implementation of this mission (TC SBB, 2019a:45, 49).

Turkey's 5-Year Development Plans provide a better picture of its short- to medium-term approach to environmental policy and climate change. The First and Second 5-Year Development Plans (1963-1973) featured both direct and indirect mentions of the environmental question. However, the task of "environmental protection" was not incorporated into the 5-Year Development Plans until the 1972 UN Stockholm Conference on the environment, which later shaped the content of the Third 5-Year Development Plan (1973-1977) (Akkuş Dağdeviren,

2019: 71). This plan is Turkey's first Five-Year Development Plan to contain an entire section on the environment, which marked the creation of the Prime Ministry Undersecretariat of the Environment. The framework of sustainable development was adopted in the Fifth 5-Year Development Plan (1990-1994), strengthening Turkey's focus on the environment and sustainability. Further key cases include the Ninth 5-Year Development Plan (2007-2013), which brought to the forefront the links between the environment and future generations, and the Tenth 5-Year Development Plan (2014-2018), which accentuated the notion of "green growth" (Akkuş Dağdeviren, 2019).

**Evidence from 2013-2019 suggests that Turkey's environmental protection expenditure for research and development rose from 83.577.115 TRY to 217.983.249 TRY, which corresponds to an over 160 % increase.**

A more in-depth picture of Turkey's approach to climate change can be obtained by focusing on key official documents that specifically address this individual issue. A case in point is Turkey's National Climate Change Adaptation Strategy and Action Plan, which was prepared in 2011 by the Ministry of Environment and Urbanisation (Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, 2011). This document seeks to contribute to Turkey's efforts at increasing adaptation to climate change as part of the UN Joint Program on Enhancing the Capacity of Turkey. The document identifies Turkey's key sectors that affect climate change and regions affected by climate change-related strains.

In the meantime, it detects adverse factors that prevent the integrated development of economic strategies and climate policies. These factors include inefficient policies, poor institutional coordination, and the lack of technical capabilities. Proposed solutions for policy improvement address five main areas: water resources management, agricultural sector and food security, ecosystem services, biodiversity and forestry, natural disaster risk management, and public health. Table 1 offers a more detailed breakdown of the actions to be implemented in this framework, where research and development appear as a dominant theme (Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, 2011). At this point, it is noteworthy to mention that TURKSTAT data confirm Turkey's accentuation of research and development. Evidence from 2013-2019 suggests that Turkey's environmental protection expenditure for research and development rose from 83.577.115 TRY to 217.983.249 TRY, which corresponds to an over 160% increase (TURKSTAT 2021; Figure 4).

**Table 1. Objectives Formulated in Turkey's Climate Change Adaptation Strategy and Action Plan (2011-2023)**

<p><b>I. WATER RESOURCES MANAGEMENT</b></p> <p><b>Main Objective 1.</b> Integrating adaptation to the impacts of climate change into water resource management policies.</p> <p><b>Objective 1.1.</b> Ensuring the integration of adaptation to climate change into existing strategies, plans, and legislation.</p> <p><b>Main Objective 2.</b> Strengthening water resources management capacity, interagency cooperation and coordination with regard to adaptation to climate change.</p> <p><b>Objective 2.1.</b> Increasing the institutional capacities of agencies and organisations that are authorised and related to the management of water resources.</p>	<p><b>Objective 2.2.</b> Developing financing policies and practices.</p> <p><b>Main Objective 3.</b> Developing and expanding R&amp;D and scientific studies to ensure adaptation to the impacts of climate change in water resources management.</p> <p><b>Objective 3.1.</b> Strengthening existing systems and establishing new systems to monitor the effects of climate change.</p> <p><b>Objective 3.2.</b> Identifying the vulnerability of management of water resources and coastal management against climate change, developing alternative adaptation options, making periodical revisions based on monitoring results.</p>
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**Main Objective 4.** Integrating management of water resources in water basins for adaptation to climate change.

**Objective 4.1.** Planning basin-based development of water resources with a holistic approach that offers flexibility in meeting the changing consumer demands.

**Objective 4.2.** Addressing urban water management from the perspective of adaptation to climate change.

**Main Objective 5.** Planning renewable energy resources, taking into consideration the impacts of climate change and the sustainability of the ecosystem services oriented to increase resilience to climate change.

**Objective 5.1.** Planning and operating hydraulic and geothermal energy resources with a climate change adaptation perspective.

## II. AGRICULTURE SECTOR AND FOOD SECURITY

**Main Objective 1.** Integrating climate change adaptation into the agriculture and food security policies.

**Objective 1.1.** Reviewing existing strategy and action plans as well as legal arrangements from a perspective of adaptation to climate change.

**Objective 1.2.** Reviewing signed protocols between institutions from a perspective of adaptation to climate change.

**Main Objective 2.** Developing and expanding R&D and scientific studies to identify the impacts of climate change on agriculture and to ensure adaptation to climate change.

**Objective 2.1.** Developing and expanding R&D activities for effective crop, soil, and water management.

**Objective 2.2.** Increasing the capacities and numbers of organisations carrying out R&D and scientific studies.

**Objective 2.3.** Developing a 'Soil and Land Database and Land Information System' taking into consideration the effects of climate change.

**Objective 2.4.** Conducting and monitoring disaster analysis for agricultural droughts.

**Objective 2.5.** Determining the socioeconomic impacts of climate change on the agriculture sector.

**Main Objective 3.** Sustainable planning of water use in agriculture.

**Objective 3.1.** Increasing the effectiveness of water management in agriculture.

**Main Objective 4.** Protecting soil and agricultural biodiversity against the impacts of climate change.

**Objective 4.1.** Protecting the physical, chemical, and biological efficiency of soil against climate change impacts.

**Objective 4.2.** Protecting agricultural biodiversity and resources for adaptation to the impacts of climate change.

**Objective 4.3.** Completing land consolidation activities for the purpose of increasing agricultural efficiency in efforts to adapt to climate change.

**Main Objective 5.** Developing institutional capacity and improving interagency cooperation in Turkey with regard to adaptation alternatives in agriculture.

**Objective 5.1.** Strengthening interagency cooperation and developing the capacities of MFAL and its attached and affiliated organisations with regard to combating climate change and adaptation.

**Objective 5.2.** Increasing the awareness of civil society on the effects of climate change on the agriculture sector and the adaptation approaches.

## III. ECOSYSTEM SERVICES, BIODIVERSITY AND FORESTRY

**Main Objective 1.** Of the climate change adaptation approach to ecosystem services, biodiversity, and forestry policies.

**Objective 1.1.** Reviewing the existing strategies in terms of adaptation to the impacts of climate change.

**Main Objective 2.** Identifying and monitoring the impacts of climate change on biodiversity and ecosystem services.

**Objective 2.1.** Identifying and monitoring the effects of climate change on species in forest land.

**Objective 2.2.** Identifying the land-use changes due to the impacts of climate change in forest land.

**Objective 2.3.** Monitoring the health of forest ecosystems.

**Objective 2.4.** Carrying out R&D activities oriented to identify and monitor the effects of climate changes in protected areas.

**Objective 2.5.** Taking into consideration the climate adaptation activities in the socio-economic development of forest villagers, and thereby supporting rural development.

**Objective 2.6.** Identifying and monitoring the effects of climate change on the mountain, steppe, inland water, marine ecosystems, and the ecosystem services they provide; and developing measures for adaptation to climate change.

**Objective 2.7.** Integrating climate change adaptation into the marine and coastal zone management framework.

**Objective 2.8.** Protection of forests against fires.

#### IV. NATURAL DISASTER RISK MANAGEMENT

**Main Objective 1.** Identifying threats and risks for management of natural disasters caused by climate change.

**Objective 1.1.** Identifying risks of natural disasters caused by climate change, such as floods, overflows, avalanches, landslides etc.

**Objective 1.2.** Reviewing the legislation on natural disasters caused by climate change and determining implementation principles.

**Main Objective 2.** Strengthening response mechanisms for natural disasters caused by climate change.

**Objective 2.1.** Strengthening the capacities of local public organisations with regard to responding to natural disasters caused by climate change and reaching the level of being able to make field exercises.

**Objective 2.2.** Establishing community-based disaster management in combating disaster risks that may arise due to climate change 1.

**Objective 2.3.** Continuing the training activities that will increase public awareness and participation with regard to the disaster and risk impacts that may arise due to climate change.

#### V. PUBLIC HEALTH

**Main Objective 1.** Identifying the existing and future effects and risks of climate change on public health.

**Objective 1.1.** Researching the effects of extreme weather events on public health.

**Objective 1.2.** Conducting research on the relation between climate change and health risks.

**Main Objective 2.** Developing the capacity to combat risks originating from climate change in the national healthcare system.

**Objective 2.1.** Developing emergency response action plans in risky areas and supplying the necessary infrastructure.

**Objective 2.2.** Strengthening the capacities of health sector organisations against health risks arising due to climate change.

#### VI. CROSSCUTTING ISSUES IN ADAPTATION

**Main Objective 1.** Ensuring adaptation to climate change on crosscutting issues.

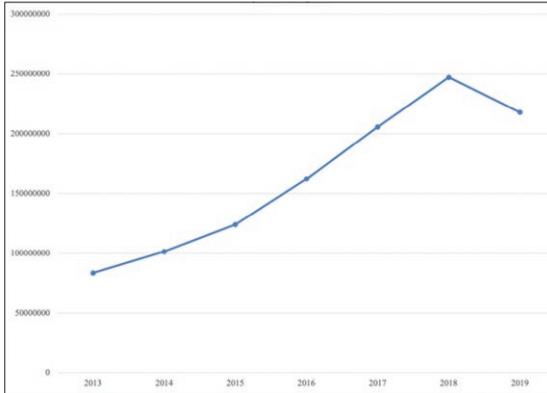
**Objective 1.1.** Integration of adaptation to climate change into national development plans, programs, and policies.

**Objective 1.2.** Identifying the required amount of financing for implementing the Climate Change Adaptation Strategy.

**Objective 1.3.** Organising training, awareness-raising, and informative activities to develop the capacity to combat and adapt to climate change.

**Objective 1.4.** Developing R&D capacity with regard to climate change adaptation.

**Şekil 4: Turkey's environmental protection expenditure for research and development (TRY)**  
<https://datatuik.gov.tr>



Conducted in 2019, the 2<sup>nd</sup> National Voluntary Review detected “medium-level” compliance of Turkey’s policies and strategies, legislation, project inventory, and implementation with SDG 13 on climate action. This corresponds to a 40-60% range. The level of compliance for Turkey’s institutional framework is described as “medium to advanced”, i.e.

60-80% of the targets set in SDG 13 (TC SBB, 2019b.). According to the review, the links between SDGs are strong in the context of Turkey, and Turkey’s performance in SDG 13 stands out as one of the strongest areas where the impact of targets set by other SDGs is observed. On average, 55% of Turkey’s SDG 13 targets are impacted by targets set by other SDGs, whereas SDG 13’s targets affect 53% of the targets set by other SDGs. The review indicates that Turkey’s performance in SDG 13 can be strengthened by consolidating the physical and human infrastructure with the legal-institutional superstructure (TC SBB, 2019a). The review that there is a considerable increase in the frequency of disasters and greenhouse gas emissions that Turkey’s struggle against climate change should devote greater efforts to adaptation to climate change, policy integration, awareness-rising, and capacity increase, which are examined in greater detail in Table 2.

**Table 2. Policies to be implemented in the context of SDG 13 on Climate Action (as Formulated in Turkey’s Second Voluntary National Review, 2019)**

<p>Improving the implementation of measures for reductions in sectors causing greenhouse gas emissions to the extent of national conditions.</p> <p>Ensuring the control of greenhouse gas emissions through new technologies and energy efficiency practices and reduction of loss and illegal use rates in electricity.</p> <p>Developing the technical and institutional capacity needed to analyse risks in priority areas to increase resilience to climate risks.</p> <p>Identifying and prioritising the impacts of climate change and adaptation needs on a national, local, and sectoral basis.</p> <p>Developing climate change mitigation and adaptation capacity at the local level.</p> <p>Increasing practices in water basins on water saving, combatting against drought, and pollution prevention by evaluating the impacts of climate change on water quantity and quality.</p>	<p>Protecting qualified agricultural lands and forest areas, in particular, natural protected areas with special importance; combatting against desertification and erosion effectively; using pastures more effectively and efficiently by speeding up pasture rehabilitation activities; developing a range of products resilient to drought and taking preventive measures by monitoring their effects on soil resources in the context of climate adaptation in agriculture.</p> <p>Prioritising transport systems that provide energy efficiency, the use of clean fuel, and environmentally-friendly vehicles.</p> <p>Increasing the share of the railway and maritime transport in freight transportation.</p> <p>Expanding energy efficiency practices in buildings.</p> <p>Making demand management effective by developing public transport in urban transportation and benefiting from the practices of intelligent transportation systems in traffic management.</p> <p>Expanding integrated waste management practices.</p>
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A closer look at the 2<sup>nd</sup> National Voluntary Review reveals that clean energy and energy efficiency occupy the forefront of Turkey's climate policy. The same goes for Turkey's National Climate Change Adaptation Strategy and Action Plan (2011-2023) (Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, 2011). In this regard, it would be worthwhile to also examine Turkey's sustainable energy strategy and action plans. For example, the 2012-2023 Energy Efficiency Strategy (Enerji Verimliliği Strateji Belgesi, 2012) aims for a considerable increase in Turkey's energy efficiency by 2023. This strategy was prepared in cooperation with the public sector, private sectors, and civil society groups, and accentuates the need for maintaining this participatory cooperation scheme.

Turkey's Energy Efficiency Strategy complements priority goals set by national strategies and development plans, particularly concerning the task of combating climate change, environmental protection, ensuring the sustainability and affordability of energy costs, and constraining national energy dependency. Meanwhile, this strategy document supports the goals stated in Turkey's Ninth 5-Year Development Plan regarding the development of energy and transportation infrastructure (Enerji Verimliliği Strateji Belgesi, 2012).

The 2012-2023 Energy Efficiency Strategy opens with a general assessment of Turkey's performance in energy efficiency and emphasizes the need for decreasing energy demand. It also identifies the key sectors and activities that lead to national energy demand, which include the building sector, manufacturing, transportation, and motorised vehicles. The main targets set in this strategy document are to "decrease at least 20% of the amount of energy consumed per GDP of Turkey in the year 2023" and "to reduce energy intensity in each industry sub-sector... [by] at least 10% ... within the 10 years

after the publication of the Document". Other targets include: decreasing energy demand and carbon emissions of buildings; promoting sustainable environment-friendly buildings using renewable energy sources; providing market transformation of energy-efficient products; increasing efficiency in production, transmission, and distribution of electricity; decreasing energy losses and harmful environmental emissions; reducing unit fossil fuel consumption of motorised vehicles; increasing share of public transportation in highways, sea roads, and railroads; preventing unnecessary fuel consumption in urban transportation; using energy effectively and efficiently in the public sector; strengthening institutional capacities and collaborations; increasing the use of state of the art technology and awareness activities; and developing financial mechanisms (Enerji Verimliliği Strateji Belgesi, 2012).

The 2017-2023 National Energy Efficiency Action Plan (Ulusal Enerji Verimliliği Eylem Planı 2017-2023, 2017) draws attention to the chief factors increasing energy consumption in the developing world, which include population growth, rising prosperity, the strengthening service sector, and industrialisation.

**Figure 5. Turkey's wind energy generation (Terawatt-hours)**  
<https://knoema.com>

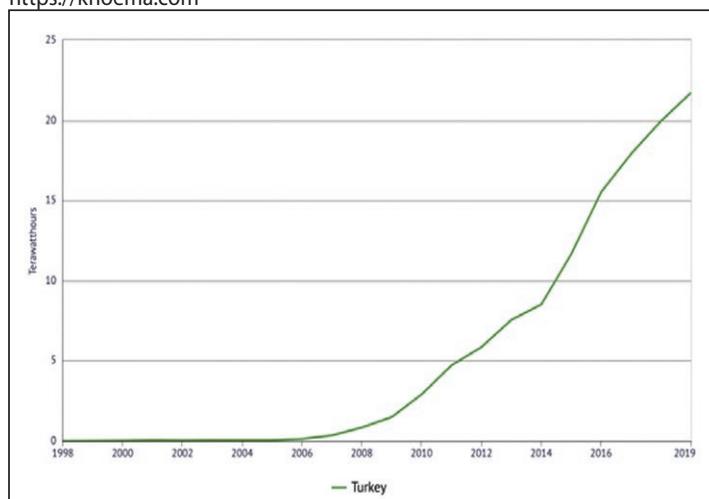


Figure 6: Turkey's solar energy generation (Terawatt-hours) <https://knoema.com>

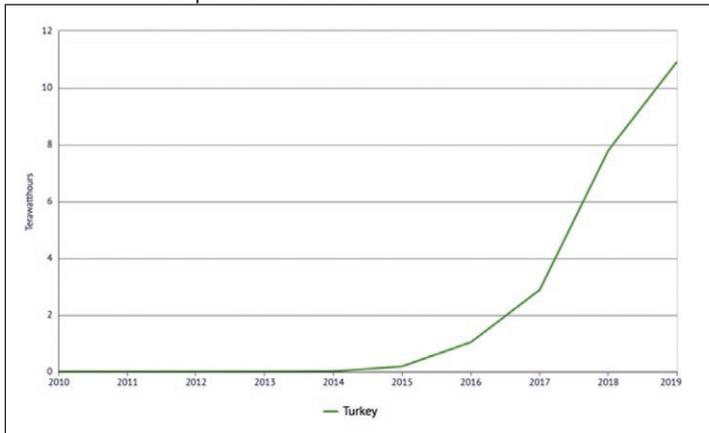
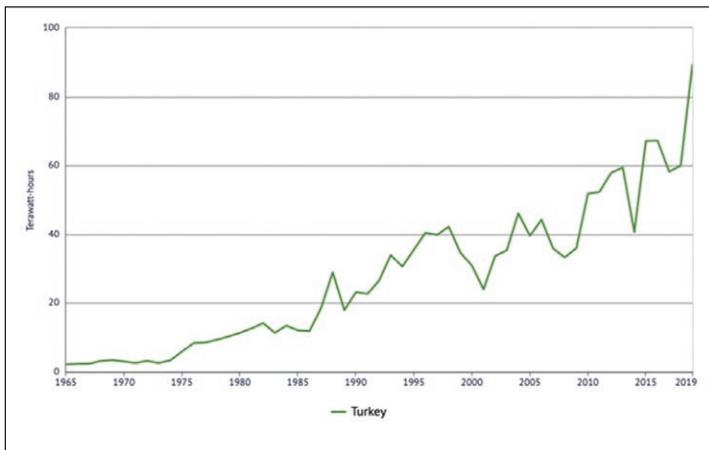


Figure 7: Turkey's hydroelectricity generation (Terawatt-hours) <https://knoema.com>



These factors led to a 46% increase in energy consumption for the period 2005-2015. The action plan rearticulates Turkey's will to enhance energy efficiency by reference to the Energy Efficiency Law adopted in 2007, the 2012-2023 Energy Efficiency Strategy, and the National Climate Change Strategy (Ulusal Enerji Verimliliği, 2017). The main target of the 2017-2023 National Energy Efficiency Action Plan is "to reduce the primary energy consumption of Turkey by 14% by 2023 ... [and] to achieve savings 23.9 Mtoe (Millions of tonnes of oil equivalent) cumulatively by 2023." (Ulusal Enerji Verimliliği, 2017). This target involves 55 different policy actions that focus on buildings and services, energy,

transport, industry, technology, agriculture, and other overlapping areas (Ulusal Enerji Verimliliği, 2017).

Realistically, Turkey has a very long way to go before it can implement many of the targets set in its climate and energy strategies. One should also keep in mind that it has a poor record of environmental protection, even before tackling climate change. This being said, Turkey has already achieved concrete results through its energy strategy and action plans. Particularly, Turkey is on the verge of a clean energy revolution in the area of wind, solar, and hydroelectric energy generation. Turkey's wind energy production rose from 0.01 terawatts/hour in 1998 to 21.7 terawatt/hour in 2019, which points to a 216% increase overall (Figure 5). Furthermore, Turkey has joined the top ten countries with the highest wind energy potential and equipment production. It exports its wind energy equipment to 44 countries in 6 different regions, whose revenues make up 70% of this sector (Cagatay, & Kaya, 2020). In the period 2010-2019, Turkey's solar energy production rose from 0 to 10.92 terawatts/hour, which corresponds to a 236% increase (Figure 6). Importantly, Turkey has become the world's third leader in solar water heating capacity after China and the United States (Renewables 2020 Global Status Report, 2020). Finally, Turkey's hydroelectric production has experienced an annual average increase of 9.88% in the period 1970-2019, from 3.3 terawatts/hour to 89.16 terawatts/hour (BP Statistical Review, 2021; Figure 7). As such, Turkey rose to the second rank in hydroelectric power generation in Europe and the ninth rank in the world ("Turkey 2nd among", 2020). Turkey's innovations in environmental and energy implementations –achieved through growing public support for research and development and technology– have played an important role in achieving these results.



Turkey clearly recognizes the need to strengthen ties between the environment and future generations on the road to “green development”.

### Review and Discussion

To conclude, a fuller understanding of Turkey’s climate change strategy can be gained through an integrative analysis of its recent Strategic Plan and Five-Year Plans in tandem with its key official documents related to climate change strategy and action plans. Our analysis suggests that Turkey’s approach to climate change centres on an ambitious mission that places economic and social development within a sustainability framework. This mission springs from Turkey’s growing perception that the key to success in the struggle against climate change is in pursuing these efforts in coordination with the Sustainable Development Goals. The selected documents reflect a growing awareness that these efforts can be enhanced through closer cooperation between the public sector, private sectors, and civil

society. Moreover, Turkey clearly recognizes the need to strengthen ties between the environment and future generations on the road to “green development”. This being said, the documents acknowledge the current obstacles faced on this road, particularly those relating to scant institutional, financial, and technical capabilities. Finally, the documents frequently emphasise sustainable energy, energy efficiency, and clean energy technologies, thus pointing to the relevance of Turkey’s energy strategy and action plans. In this area, Turkey’s efforts in improving its institutional, financial, and technical capabilities seem to have borne their first fruits, though there is still a very long way to go to fully implement the intended strategies and action plans. A promising development is that enhanced public support for clean energy technologies and production has led to Turkey becoming a leading actor in clean energy.

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# Energy - Environment Nexus in Eco-Civilization



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## ABSTRACT

In this study, electricity, heat, and biofuel production from biomass are demonstrated to be important components of the eco-civilization era. The production of fuel in farmlands and the practice of Under-Tree Agriculture (Agroforestry) in the area where “energy crops” in combination with multiple-function trees are grown are emphasised as highly effective means of combating the phenomenon of climate change. Combatting climate change to achieve the “Negative Carbon Emission” goal will characterise the eco-civilization era. The overarching aim is “Negative Carbon Emission”. Farm Forestry (Agroforestry) / Inter-cropping / Energy Farms makes up the major theme of the study to fulfil the function of biofuel production and “Carbon Sink” together. Through these practices, a reduction in greenhouse gas emissions into the atmosphere is envisaged with a simultaneous reduction in the existing greenhouse gases accumulated in the atmosphere. In this way, it will be possible to take steps towards the goal of “Negative Carbon Emission” in the way of establishing an Ecological Civilization by overcoming the existing dominant order, which is the sole responsibility of the phenomenon of global warming and the resulting climate change phenomenon.

**Keywords:** Agroforestry, biofuel, climate change, energy farm, negative carbon emission

## Introduction

WHEN THE TERM “ECO-CIVILIZATION” was first introduced in the 1980s, the concept was understood and accepted widely by various circles as a set of social and environmental reforms to be carried out within a society with no radical transformations. The broad and necessary reforms for modern societies laden with social injustices and negative contributions to the natural environment were subsumed originally under the concept of “ecological civilization”. The reforms would supposedly aim at creating a more developed social order to ensure a sustainable change in an evolving process.

Eco-civilization, with revised implications, now represents a new world order in which the relationship between man and nature is harmonised and where ruthless competition is replaced with cooperation. Eco-civilization heralds a new world order that surpasses the capitalist system, which has brought life on earth to the brink of total extinction and replaces it with a much more developed, human dignity. In this sense, the redefined concept echoes

“The City of the Sun” (by Tommaso Campanella) in which a decent order takes place across the world. For one thing, this is not a utopia. Humanity stands at a crossroads between eco-civilization and mass extinction.

Today’s dominant world-system, while consuming the resources of the world for the sake of self-actualisation (in the sense of A. Maslov), has transformed human beings into unnatural creatures that are seemingly enemies of the ecosystem. Global warming and related climate change are the sums of human actions that are guided and shaped by the collective consciousness of the capitalist system.

In the article titled “Ways of Training Individual Ecological Civilization under Mature Socialist Conditions” published in 1984 in the journal “Scientific Communism” that was being issued in the former Soviet Union, the concept of eco-civilization was expressed for the first time (Ye, 1988). Three years later, in 1987, in China, Prof. Ye Qianji (Ye, 1988) adopted the idea of eco-civilization and touched upon this concept in his works (Gare, 2009).

Later, at the 17<sup>th</sup> National Congress of the Communist Party of China (CCP) held in 2007, the term Eco-civilization was included in the Central Commission Report by Pan Yue, who was the Director of the State Environmental Protection Administration (SEPA). Since that time, it has been adopted as one of the key policy principles (Pan & Zhou, 2006).

**Ecological civilization will replace “non-ecological civilization” with a revolutionary and radical transformation in the social order.**

The 18<sup>th</sup> National Congress of the CCP in 2012 acknowledged that environmental problems in China have reached a gigantic scale, especially in big cities. These include air pollution, pollution of drinking water resources, soil erosion, and more. The phenomenon of climate change due to global warming has come to the fore as the central, growing issue.

The President of China, Xi Jinping, emphasised eco-civilization at the 18<sup>th</sup> Congress. Eco-civilization, which is expressed in the phrase “Beautiful China”, has become a topic President Xi attributes increasing importance to.

In the 19<sup>th</sup> Congress held in 2017, eco-civilization gained further priority. Since Trump’s decision to withdraw from the Paris Agreement in January 2017, it seems that China is trying to play a dominant role in the fight against climate change (Beeler, 2017). In the 19<sup>th</sup> Congress and afterwards, the issue of eco-civilization, which was previously discussed on a national scale by the Chinese Administration, has been extended to the global scale (Hanson, 2019). Today, eco-civilization is identified with combatting the phenomenon of climate change, which is now recognised as an issue of utmost importance.

Within the scope of the revised interpretation of eco-civilization discussed in this study and with emphasis on the new post-capitalist world order, the intersection of energy and environmental issues in the context of a global struggle with climate change will be examined.

**Eco-Civilization vs. “Non-Ecological” Civilization**

Before addressing future ecological civilization, it will be necessary and useful to look at civilization today. During the Davos meeting organized by the World Economic Forum in 2016, it was declared that the 4<sup>th</sup> Industrial Revolution (4IR) was taking place. In what kind of world is the 4IR thought to occur?

- Today, around 730 million people worldwide suffer from extreme poverty with an income of 1.9 dollars a day or less (World relief, n.d.).

- As of 2020, electrical energy has not reached 940 million people around the world. 3.0 billion people cannot benefit from safe and “clean” energy sources while cooking their food. Indoor air pollution threatens these people (Ritchie & Roser, 2019a).

- Based on data available at the end of 2019, 775 thousand people in the world die annually due to inadequate cleaning conditions. 2.4 billion people live in poor sanitary environments (Ritchie & Roser, 2019b).

- According to reports based on 2017 data and published by the World Health Organisation (WHO) and UNICEF in 2019, 884 million people were completely deprived of clean drinking water resources (CDC, n.d.). Due to unhealthy drinking water and unfavourable living conditions, 1.7 billion cases of diarrhoea are seen annually in children under the age of 5 and, accordingly, 446 thousand children under the age of five die annually, mostly in developing countries. It is necessary to add 3.0 million Cholera cases and 95 thousand deaths related to Cholera to this table. With 11 million typhoid fever and 129 thousand deaths resulting from it (CDC, n.d.) per annum added to the

terrifying picture, the outlook becomes even more distressing.

The list of negative indicators regarding the quality of human life can be further extended. However, we end the list here in order not to distract from the major subject of the study.

Is it possible to pierce the atmosphere with human hands? What if the earth can be warmed up by human actions? Can the oceans be contaminated by the human hand, the subject of the capitalist system? Can cities become uninhabitable because of environmental and air pollution? The answers to these questions are, unfortunately, yes because of the catastrophes caused by today's "non-ecological" civilization. With his actions destroying the ecosystem, the capitalist man gives the appearance of being the primitive ancestor of the future "civilized man".

If revolution is a term that describes the radical transformation of a society to improve human life, the 4IR cannot be described as a revolution at all. The so-called 4IR is rather an evolutionary process that finds expression in technological innovations. Technological innovations specified within the scope of the 4IR do not correspond to a leap in the development line or a fundamental break that would be an accurate indicator of the revolution. In discourse surrounding the 4IR, there is no good news of a new, humane order in which people make peace with nature.

Ecological civilization (eco-civilization) will replace "non-ecological civilization" with a revolutionary and radical transformation in the social order. Moreover, for the survival of all life on our planet and protecting an entire ecosystem, the said replacement is imperative. Symbolically stated, "tomorrow" must replace "today". This is more than a choice, it is a necessity that represents a line of demarcation between life and death.

Eco-civilization, as a generalization we accept



In the 19<sup>th</sup> Congress held in 2017, eco-civilization gained further priority. (CGTN, 2017)

here, can be characterised by tackling climate change and eventually dealing with this threat.

In fact, none of the problems stated above, which are definitively caused by today's civilization, pose a threat to the extent of abolishing life in our world altogether. Nothing compares to climate change in that respect. Also, each of these problems become more acute and pronounced as climate change worsens. Therefore, we take the imperative of combating climate change as the main axis and the foundation of eco-civilization. Thus, central to this study is the means to be used against climate change during the transition to eco-civilization.

### **Energy - Environment - Climate Change Nexus in Eco-Civilization**

In the 19<sup>th</sup> Congress, the concept of eco-civilization was redefined by President Xi Jinping in a speech delivered to the delegation (China Daily, 2017). He stated, very notably, relations between humans and nature should all be in harmony. So, what is the current state of the said relations in the prevailing world order, as hinted with the remarkable notes above?

The capitalist system, which is currently the dominant world order, has had devastating effects on the ecosystem over the past 250 years and is responsible for bringing life on our planet to the brink of total extinction. The threat to humanity and the ecosystem is the phenomenon of “anthropogenic” (originating from human actions) global warming and associated climate change.

**Today, it is clear that energy strategies/ paradigms based on fossil fuels cannot be sustained any longer. There is an absolute need for a radical transformation in energy policies.**

From the First Industrial Revolution, which can be considered a milestone, to the present day, an increase in temperature has occurred in the atmosphere and on the earth, largely due to greenhouse gas emissions resulting from energy production based on traditional fossil fuels (IPCC, 2018). Compared to the pre-industrial period, the temperature of our earth has increased by an average of 1.0 °C as of 2017. The phenomenon of climate change emerging as a result of this increase has turned into an existential threat today in terms of the consequences it is very likely to cause. In the next stage, if this process is not tackled, the entire ecosystem will likely collapse in the so-called “Sixth Mass Extinction” (Eearth.org, 2020).

However, the ecological apocalypse is not an inescapable fate. The concept of eco-civilization, redefined by President Xi Jinping, suggests the necessary measures and action plan needed to prevent a disaster. Potential mass extinction and the threat of ecosystem collapse due to climate change are stemming from the lifestyle of human beings and especially the energy production methods and consumption style. When the subject is taken into account from this point of

view, it is of great importance to examine Energy and Environment-related issues as integral parts of the same structured whole. In this context, the energy-environment-climate change nexus is the focus of this study.

Regarding the issues addressed in this study, eco-civilization represents a new world order in which the threat of climate change is gradually reduced and ultimately eliminated.

### **Climate Change- Energy- Environment**

First, with the threat of climate change growing increasingly serious every day, these aspects all need to be regarded as a single and unified set of problems, that is a single problem: energy, agriculture, animal husbandry, forestry, and water scarcity, conservation of biodiversity, and the entire food cycle process (abbreviated as Environment hereinafter with Energy not inclusive).

On the way to eco-civilization, it is a priority to formulate “nature friendly” holistic Energy-Environment policies and implement them on a global scale. When the most necessary elements to sustain life are listed, energy comes just after air and water. Energy comes before bread in the list of essential elements for life. In fact, energy is required even to obtain safe drinking water.

In short, energy is an indispensable element for the survival of not only humans but also for sustaining the biosphere. From this point of view, the main indicator of eco-civilization will be the methods of energy production, consumption style, and the radical transformation that will occur in this field.

With air, water, and soil pollution, a disturbing environmental problem at the beginning has grown into a global disaster, a phenomenon of climate change that threatens all life and is growing day by day. The crucial factor in this process has been and continues to be energy production based on traditional fossil fuels

(coal-oil-natural gas).

Today, it is clear that energy strategies/paradigms based on fossil fuels cannot be sustained any longer. There is an absolute need for a radical transformation in energy policies. Renewable Energy Resources (RES), in other words, “clean and inexhaustible” energy sources, should replace conventional fossil fuels (CFF) in the shortest possible time. The dominant social order today is essentially a “coal-oil-natural gas” (CONG) civilization. It has become an absolute necessity to create and implement new energy policies based on RES, which is the main component of transitioning to the eco-civilization era, by overcoming the “Non-Ecological CFF Civilization”, which brings the Ecosystem and all life to the brink of total extinction.

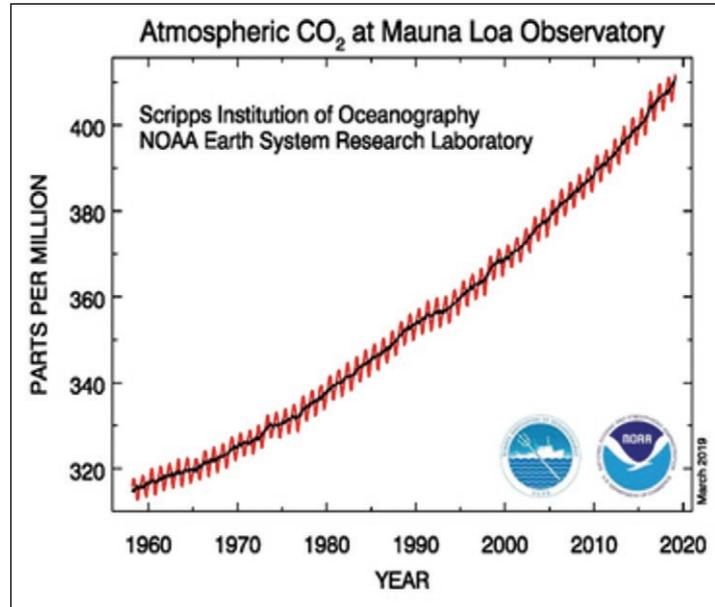
Two graphs depicting the trend in global warming and the steady increase in the level of CO<sub>2</sub> concentration are given right.

### Renewable Energy Sources (RES) and Eco-Civilization

RES range from the relatively popular solar (PV and Concentrated Solar Power, CSP) and Wind to a variety of sources including Biomass, Hydrogen, Sea Waves (including tidal energy and sea currents), and Geothermal Energy (classical and “Hot Dry Rock”). On the RES list, Sun and Wind have an intermittent character, which means that their availability time (2,000 - 3,500 hours per year) is limited and often unpredictable. In this respect, Solar Energy is relatively more predictable compared to Wind Energy.

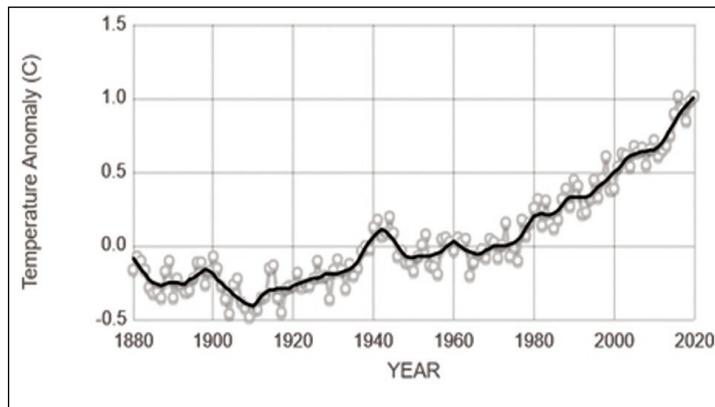
It is worth noting that biomass, hydrogen, and geothermal, to some extent, have a distinctive “Base Load” character. The technical term “Base Load” refers to the availability of any energy generation plant in a continuous manner out of a year. The energy plants with the Base Load feature, usually operate 7,000-8,000 hours a year in contrast to intermittent wind and solar. A significant advantage of biomass and hydrogen is that

Graphic 1: Atmospheric CO<sub>2</sub> concentration in ppm over the years



Source: NOAA National Centers for Environmental Information, n.d

Graphic 2: Global Warming over the past 200 years



Source: NASA Global Climate Change, n.d.

they are both storable and transportable.

Energy (electricity and heat) generation based on RES has a determinant feature in the establishment of Eco-civilization. However, there is a question that comes to mind at this point: Does RES have the potential to completely replace CFF (conventional fossil fuels)? The answer to this question is certainly positive.

RES has the potential to completely take over CFF. Moreover, RES has the potential to replace nuclear energy with its substantial risks, as evidenced from awful experiences in the past.

Through global-scale projects, a complete transition to RES while having the adverse effects of climate change mitigated and totally avoided is possible. Such project ideas are explained below:

1. The generation of Energy, the production of Biofuel from Biomass, and the reconstruction of destroyed green cover of the world through Field Forestry/ Agroforestry practices integrates with activities in this direction.

2. Energy production based on hydrogen and “green hydrogen” (the production of hydrogen using wind and solar energy). Eco-civilization, with emphasis, will also be a Hydrogen-Carbon Age. This issue needs to be discussed as a separate and standalone subject. The issues related to hydrogen-carbon will be specifically examined in a separate study that will follow the present study.

3. The establishment of a worldwide, intercontinental DC (Direct Current) “Supergrid” (Grid: Electrical energy transmission network) that will operate at a global scale has been its own individual and important agenda for some time. Like the subject of hydrogen-carbon, the Supergrid needs to be discussed separately as a specific issue. Therefore, Supergrid and related issues will be examined in a study that will ensue in the future. Supergrid will take place as an upper layer over the national grids to transmit electricity over great distances. Supergrid will function as a huge, distributed (in the sense of both geography and time) network of energy generation and transmission. Since Supergrid will be spread over a very wide area and feature a broad time difference (different time zones), RES types with an intermittent character such as wind and sun will gain a “baseload” character as a total over a gigantic, distributed network.

On this intercontinental network, there will be no need for nuclear power plants as well as power plants based on fossil fuels. The subject of this study is limited to the first item above.

### **Fighting Climate Change in Today and Eco-civilization**

As a complementary determination: it is necessary to underline that in accordance with the character of climate change and the threat, which is a global threat, the strategies to be implemented on the global scale need to be implemented urgently within the framework of harmonious cooperation of countries.

### **A Silk Road Cities Association established within the framework of the Belt and Road Initiative can achieve especially successful results by implementing concrete projects on the road to eco-civilization.**

The Conference of Parties (COP), the main decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC) platform, has been organized annually in different countries after the first (COP1) was held in Berlin in 1995. The COP26, which is planned to be held in Glasgow in 2020, will be carried out in November 2021, provided that the threat of the COVID-19 pandemic will be lessened by that time.

The clear reality of the current international system and the current policies of developed states is that central administrations, governments, and global central structures (UN) have failed to cope with the threat of climate change.

Hardly any measures that would be effective at the international level are taken by the Conference of the Parties and associated central organizations. In short,

an effective action plan still does not exist.

Cooperation among cities and local governments instead will have a significant impact on the policies of states in an effective fight against climate change and the realization of concrete plans. A Silk Road Cities Association established within the framework of the Belt and Road Initiative (BRI) can achieve especially successful results by implementing concrete projects on the road to eco-civilization.

Thus, the common understanding based on “joint development by sharing”, the underlying principle of the BRI, will be essential in the cooperation among the BRI cities. The joint projects to be developed and implemented by the cities in the spirit of the BRI will inspire not only other cities and states in the BRI but also those not involved in the BRI by then. Win-win projects as such will have resulted in success stories that will be multiplied subsequently on a global scale.

Cooperation among cities will play an essential role in facilitating and encouraging relations between central governments. Setting up close and fruitful cooperation between cities and local governments will pave the way for relations to be developed at all levels. Consequently, the cooperation platform will have an important role in the transformation of the initiative to establish an eco-civilization, which will be established through collective efforts of the countries and turned into a success story.

### **Eco-Civilization and Tools to Combat Climate Change**

Nowadays, topics related to “Transition to Low Carbon Economy”, “Bioeconomy”, “Net Zero Emission/Carbon Zero” are remarkably at the centre of the daily discussions on climate change and RES.

At first glance, the intensive discussion of these issues in the international community comprising various NGOs, relevant organizations, and academic circles gives the impression that there is high collective sensitivity in combating climate change, and that the



According to UNICEF, the climate crisis is a child rights crisis. (UNICEF's website)

right path is being pursued. It seems that the discourse in this direction has an enormous fan base.

However, reducing greenhouse gases, primarily CO<sub>2</sub> and methane emitted into the atmosphere from fossil fuel, is not sufficient to overcome the current “climate crisis”. As a hypothetical situation, even if vehicle exhausts and greenhouse gas emissions from domestic sources, power plants and factory chimneys suddenly stopped globally, even in such a hypothetical situation that characterizes the concept of “Net Zero Emission”, global warming will not be prevented. Even in the event of such hypothetical conditions, the atmosphere and the earth will continue to warm (Kehse, 2017).

This is because the system formed by the atmosphere-sea-land interaction functions like an “electronic memory element”. Although there is no additional input to the system, there is an output corresponding to the continuation of the warming. The reason for the memory-like behaviour of the system is the vast amount of greenhouse gases already accumulated within the atmosphere over the past 250 years since the First Industrial Revolution. In short, even if net CO<sub>2</sub> emissions stop, the melting of the polar glaciers and the resulting sea-level rise will continue.

With the permafrost thawing, a short-term outcome of global warming, tens of different viruses and bacteria hibernating in frozen soil layers for thousands of years will probably spread the world through air and water. Some of them may be more dangerous than COVID-19.

**Greenhouse gases, especially CO<sub>2</sub>, accumulated in the atmosphere also need to be reduced rapidly. We assert that this target can be achieved through “Negative Emission/Negative Carbon” applications.**

As the arctic ice and polar glaciers keep melting due to global warming, North Atlantic seawater will become less salty and thus lower in density. This will cause the Gulf Stream to sink into the deep layers of the ocean at latitudes closer to the equator. In that case, the result would be a catastrophe, especially for Northern Europe as the disappearance of the Gulf Stream could lead to a new Ice Age. The list of disaster scenarios can be further extended.

In the sum of the propositions and determinations expressed above, it is quite clear that goals such as “Transition to Low Carbon Economy” and “Net-Zero Emission/Carbon Neutral” will fall short in preventing the destruction and disasters likely to be caused by climate change.

In the meantime, it is necessary to note that efforts to establish production and consumption mechanisms compatible with nature, which are expressed in the term Bioeconomy, will be integral for the establishment of eco-civilization. How can the catastrophic consequences of climate change be avoided? What concrete tool can be a remedy? An effective tool as such is described in the next section.

In short, we urgently require the development of

new and alternative methods to achieve the “Negative Emission/Negative Carbon” target and the realization of the projects that will be designed based on them.

In the first stage, the primary goal is to prevent greenhouse gas emissions. This is not enough. Greenhouse gases, especially CO<sub>2</sub>, accumulated in the atmosphere also need to be reduced rapidly. We assert that this target can be achieved through “Negative Emission/Negative Carbon” applications.

### **“Negative Emission” Goal on the Road to Eco-Civilization**

According to measurements made at the Mauna Lea observatory in the Hawaiian Islands, for the first time on May 10, 2013, the CO<sub>2</sub> content in the atmosphere reached 400.0 ppm (parts per million - 400 CO<sub>2</sub> molecules out of one million air molecules). This value, which is in a continuously increasing trend, reached 420.01 ppm in the week of April 25, 2021 (Global Monitoring Laboratory, n.d.). Before the First Industrial Revolution, this value was approximately 280 ppm.

In other words, the amount of CO<sub>2</sub> currently in the atmosphere is 3,276 billion tons. If global measures are not taken in a way to halt the current course of events, this amount will increase continuously. As of 2019, the amount of CO<sub>2</sub> released into the atmosphere is 36.44 billion tons (Statista, n.d.).

CO<sub>2</sub> emissions seem to have decreased in 2020 as the pandemic disrupted the world economy. If current energy policies remain unchanged, it is estimated that the increase in the earth's average temperature will be as high as 3.0°C compared to the pre-industrial era by the end of the century. The aftermath will be nothing but an apocalypse. Once “the point of no return” is passed, global warming will sustain indefinitely (Niranjan, 2020).

Based on the above remarks, it is imperative to implement practices that will reduce accumulated greenhouse gases and prevent the increase of CO<sub>2</sub> released into the atmosphere. Is it possible to have an

implementation model that will reduce the amount of CO<sub>2</sub> present in the atmosphere while preventing fossil-based CO<sub>2</sub> emissions from entering the atmosphere? Such an application model is described in the following section.

### “Energy Agriculture” – “Energy Farms” Based on Farm Forestry (Agroforestry)

In the Farm Forestry/Agroforestry practices, which have been applied for hundreds of years in China, field crops and trees are grown together on the same agricultural land. In these applications, almost all kinds of field crops and suitable tree species are used. Below are images of typical agroforestry applications where economically valuable trees are intercropped with conventional field crops.



Poplar-Wheat intercropping (by courtesy of Prof. Zhu Zhaohua)

In the transition to eco-civilization, which will resemble revolution rather than evolution in effectively combatting climate change, the inter-cropping application highlighted here is an experiment based on Tree-Energy Plant agroforestry. Regarding a specific case, agroforestry based on Paulownia-Canola inter-cropping is described below. The “Energy Farm” application was a pioneering field

study carried out in the Bergama (antique Pergamum) district of Izmir Province of Turkey.



Agroforestry /Farm Forestry /Energy Farm pilot application based on Paulownia – Canola inter-cropping carried out in Bergama (May of 2006)

In this practice, varieties of Canola, an energy crop, were grown under the arrays of Paulownia trees, a fast-growing tree species domestic in China. In the pilot project, eight different high-quality canola species were used and tested for their adaptation and growth capabilities. Up to 400 litres of “First Generation” (esterification method - chemical process) biodiesel was produced per decare after the harvest. Today, methods for biodiesel/biofuel production are second generation “thermochemical” systems characterised by the Fischer-Tropsch method (Science Direct, n.d.(a)) integrated with pyrolysis, gasification (Science Direct, n.d.(b); Science Direct, n.d.(c)) and plasma gasification.

For Pergamon, which is located at sea level, the Harvest/Rotation Period (harvest period - the period elapsed between planting and harvest) is as short as 6 to 7 years. As a fast-growing tree species, Paulownia has the potential to permanently annually remove 2.0 tons of CO<sub>2</sub> per decare from the atmosphere on average during the harvest period. Such numerical data were among the results of the pilot project.

Paulownia-Canola inter-cropping is an excellent example of a new land-use model aiming to realise the target of “Carbon Negative /Negative Carbon Emission”.



According to reports based on 2017 data and published by the World Health Organisation and UNICEF in 2019, 884 million people were completely deprived of clean drinking water resources. (UNICEF's website, 2019)

The pilot project briefly described below, not only limited to Turkey, can well be proliferated and generalised across “the Middle Corridor” as a “Green Silk Road /Green Belt” project extending from the Mediterranean to Pacific Basin.

### **Green Belt - Green Silk Road**

The “Green Belt Project”, which will be characterised by the Tree-Energy Crop inter-cropping (Farm Forestry), is also a rural development project. Considering the example of Pergamon pilot application and the characteristics of the Paulownia tree, we can see that the following advantages have ensued for rural areas:

- In addition to the existing product range in agricultural lands, new products and agricultural methods will increase the income from cultivated lands and stabilise incomes from agricultural activities in the rural areas.
- It is possible to achieve a significant increase in the yield and thus monetary income through Farm

Forestry (agroforestry) practices.

- Planning and developing resilient agriculture and land use models against the phenomenon of climate change can be achieved.
- Thanks to the multifunctional properties of the Paulownia; the leaves, which contain high protein (25%), sugar and vegetable oil, can be used as high-quality fodder in animal husbandry.
- Fragrant Paulownia flowers are useful for producing first-class quality honey.
- Coke can be produced from pruning branches.
- As a fast-growing tree species, Paulownia can be harvested in a noticeably short period of 5 to 6 years. Its timber is used to make premium furniture and even wooden houses. Even the income from the sale of Paulownia logs and lumber provides an advantage.
- It is unnecessary to plant a new sapling after harvest, a new plant will sprout from the buds on the root to form a new tree. Resprouting (reproduction) is repeated several times after the original planting, with no

need to plant a new sapling for the next rotation period.

- In alternative applications, virtually all traditional field crops can be grown under trees. For example, regarding the case of Paulownia-Wheat inter-cropping, part of the organic waste left in the field after harvest can be used as biomass for energy and biodiesel production.

- When a multi-functional plant (forage or biomass for energy) such as alfalfa is selected as an alternative product, it will be possible to benefit from it as a forage plant or energy plant/biomass feedstock.

- Multi-functional wood and field crops will provide a wide range of application possibilities. Significant additional income is possible through forage and energy crops and multifunctional trees.

- Thanks to the production of premium quality and abundant industrial logs/timber through Farm Forestry /Agroforestry applications, the natural “green cover” and biodiversity will be preserved, with the production of timber shifted to the cultivated lands, thus eliminating the existing pressure on natural forests.

- Farm Forestry, and Energy Farming as the specific case under consideration, constitutes a model for capital transfer to rural areas due to its potential to greatly increase the income of farmers and villagers. In this way, a balance between rural and urban can also be achieved. The aforementioned applications can be evaluated as an effective tool within the scope of the “Rural Development Strategy”.

- The future balance between rural and urban parts of the country will facilitate the prevention of “population erosion” by controlling the phenomenon of migration to cities.

- One of the expected consequences of climate change in the short term is that the existing traditional crop pattern in agricultural lands cannot be sustained due to the negative environmental effects

to arise. Providing many benefits and options, Field Forestry and “Energy Agriculture” practices create “durable” (tolerant to the negative consequences of climate change) agriculture models.

- The Green Belt & Road, which will be characterised by Farm Forestry/ Energy Farming/ Agroforestry practices, will also have the function of preventing international terrorism and fundamentalist formations that originate from rural poverty.

### Result and Concluding Remarks

With the widespread use of the practices we referred to as “Energy Farming” in this study, a dynamic tool in combating climate is available. Energy farming provides a method aiming at a “carbon negative/ negative carbon emission” solution. Besides this, the application in question also makes up a “Rural Development Model”. Field Forestry and Energy Agriculture practices will make up a very important and even indispensable building block in the establishment of eco-civilization by allowing the harmony between human beings and nature to be restored. I propose to name such practices with the term Agropark, as an overarching and general concept. When Agropark projects, which will be initiated from the Mediterranean Basin and specifically from the Aegean Region of Turkey, are multiplied and reach the Pacific Basin through the “Middle Corridor”, the Green Belt - Green Silk Road will have been formed. The Green Silk Road comprising a multitude of Agroparks that cross the middle corridor represents an integral part of the BRI. The proliferation of pioneering and guiding practices to be initiated at the western gate of the New Silk Road on the Aegean coasts, reaching the Pacific Basin along the “Middle Corridor”, and forming the Green Silk Road, should be adopted as an indispensable tool and an important goal in the establishment of eco-civilization.

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# The Relationship Between Climate Emergency, Pandemics and Buildings:

COVID-19 Has A Vaccine Now But  
Climate Emergency Has Not



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## ABSTRACT

This paper identifies two types of carbon dioxide gas emissions. The first type concerns direct emissions, emanating from sources that involve fossil fuels, such as industrial process, power generation, transportation, and farm waste. The second type, which has not been accounted for so far, is concerned with exergy mismatches between the supply and demand in any given process, even if no fossil fuels are directly involved. Exergy is the useful work potential of any given amount or flow of energy. This paper presents a direct link between the climate emergency and carbon dioxide emissions due to quality (Exergy) mismatches between the energy supply and energy demand, which may be minimized by proper design, control, and system selection in the built environment. It is shown that these nearly avoidable exergy mismatches are as pressing as direct emissions from fossil fuel usage and such destructions also take place in green energy systems, including solar and wind energy systems. The paper further explains that these emissions are responsible for the climate emergency (Global warming) as direct emissions are. An example is given about a wind power-heated house, and it is shown that it is responsible for emissions despite no fossil fuel being involved on the site. The paper then establishes a direct link between emission exceedances and the additional pandemic risk to conclude that buildings are responsible for most of these additional pandemic risks.

**Keywords:** Climate emergency, CO<sub>2</sub> emissions, COVID-19, global warming, pandemic-resistant building

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## Introduction

### Climate Emergency

UN SECRETARY-GENERAL ANTONIO GUTERRES urged all countries to declare climate emergencies in his speech at the Climate Ambition Summit and asserted that more must be done to hit net-zero emissions (Reuters, 2020). He explained that global warming has already become an emergency issue, and all nations must take action. This is indeed an urgent issue, but will the wish of the UN Secretary-General come true? The answer is no, not with today's measures, theory, and understanding being without a

holistic view of the mechanism of global warming. Figure 1 shows that decarbonization measures developed so far will not be sufficient, even with carbon capture and storage (CCS). This data means a missing part in the big puzzle of sustainable decarbonization, which the Secretary-General alludes to. Current global warming data has a complete picture of the level of CO<sub>2</sub> content in the atmosphere (Figure 1), but overall potential solutions are not wholly recognized due to today's limited understanding of the root causes of CO<sub>2</sub> emissions. Figure 1 is sad proof that the wish of net-zero carbon will never come true unless a holistic picture of the root causes is drawn.

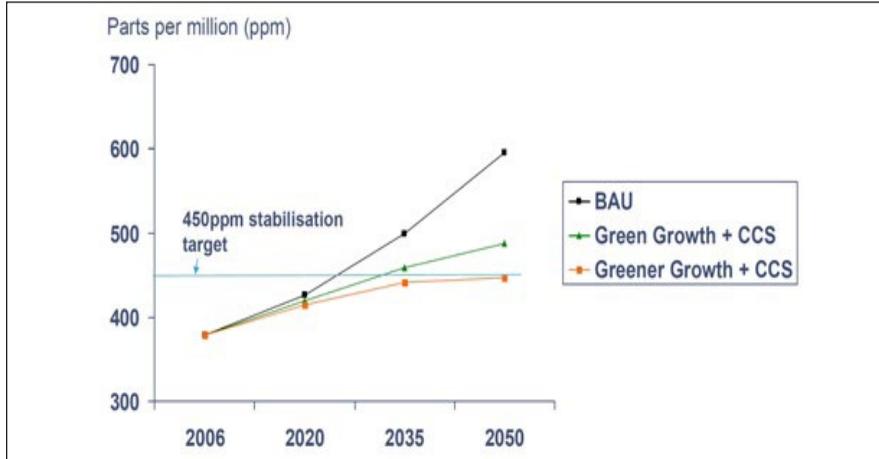


Figure 1. CO<sub>2</sub> concentration can hardly stabilize but will not decrease (Hawksworth, 2006)

### CO<sub>2</sub> Emissions, Humidity, and Ozone

According to the Author, Figure 2 shows the direct relationships between the climate, atmosphere, global warming, humidity, comfort, and ozone depletion. Consider a green energy system like a wind turbine or PV. Once the electricity is generated, it is important to trace downstream how it is utilized from an exergy point of view. For example, if this “green” electric power is used in an electric radiator for indoor comfort heating at 20°C (293 K), the unit quality (exergy) of useful work demand,  $\epsilon_{dem}$ , for heating may be calculated according to the ideal Carnot cycle:

$$\epsilon_{dem} = \left(1 - \frac{273 \text{ K}}{293 \text{ K}}\right) = 0.068 \text{ kW/kW}$$

Here, 273 K (0°C) is the reference environment condition. On the other hand, electricity is a very high-quality energy source with a unit supply exergy,  $\epsilon_{sup}$  of 0.95 kW/kW. This means that most of the useful work potential of the generated electric power is destroyed:

$$\epsilon_{des} = (0.95 \text{ kW-h/kW-h}) - (0.068 \text{ kW-h/kW-h}) = 0.88 \text{ kW-h/kW-h}$$

The exergy rationality of using wind or solar energy in comfort heating will be only 0.07 (0.068/0.95).

This amount of irreversibly destroyed exergy

(lost opportunities for useful work) must be offset by someone, somewhere, and most likely by fossil fuels. This causes more “unseen” CO<sub>2</sub> emission from “green power”:

$$\Delta \text{CO}_2 = [0.27 \text{ kg CO}_2/\text{kW-h}] \times \epsilon_{des} = 0.24 \text{ kg CO}_2/\text{kW-h}$$

This result shows that although there is not a direct CO<sub>2</sub> emission source in this example (except in manufacturing, installation, etc.), exergy destructions are responsible for large amounts of additional emissions, which are almost equal to the emissions from a natural gas condensing boiler that we can directly measure and see.

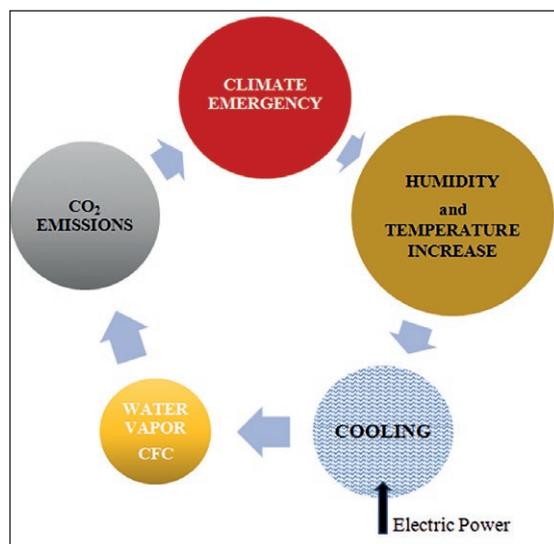


Figure 2. Climate loop with humidity and temperature increase. Drawing belongs to the author, ©2020, B. Kilkis

These additional emissions due to exergy destructions are unseen and are only revealed in the global warming temperatures. In other words, these emissions are observed in the global warming context but remain unexplained and unsolvable unless the exergy concept is recognized by scientists and engineers.

According to another research study by the Author, which mathematically relates nearly avoidable CO<sub>2</sub> emissions to exergy destructions (Kilkis, 2021a), for every destroyed exergy, the global temperature is estimated to increase by a rate of  $0.256 \times 10^{-13} \text{K/kW-h}$ . If, for example,  $2 \times 10^{13} \text{ kW-h/year}$  is a stable number of annual electric power generation using fossil fuels, it is estimated that exergy utilization rationality in the energy sector will rise to 0.8 in the coming decades;

$$\Delta \text{CO}_2 = 0.256 \times 10^{-13} \text{K/kW-h} \times 2 \times 10^{13} \times (1 - 0.8) = 0.1 \text{ K/year}$$

As this estimation shows, the unseen part of emissions is responsible for about 0.1 K global temperature rise, and all decarbonization measures must be revised accordingly by taking into account the exergy destructions.

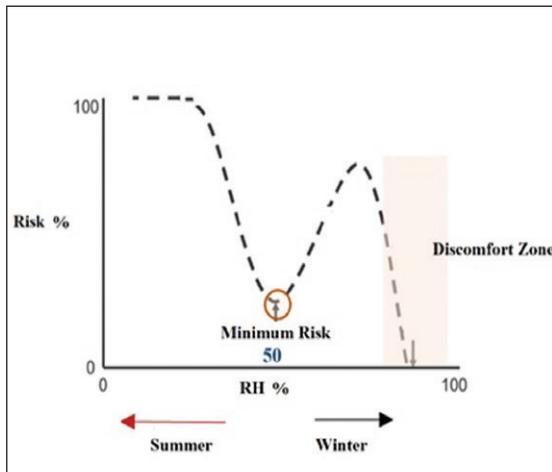


Figure 3. COVID-19 is related to CO<sub>2</sub> and relative humidity. Safest Relative Humidity is 50% (Lowen, et al., 2007).

Figure 4 shows that most of the world is too humid while some parts are too dry. There are almost no places with ideal RH values. For example, Turkey and other countries on the Belt and Road are in the humid zone, whereas China is not. These figures may partly account for the regions where the pandemic is strongest. Humidity is related to global temperature and CO<sub>2</sub> emissions.

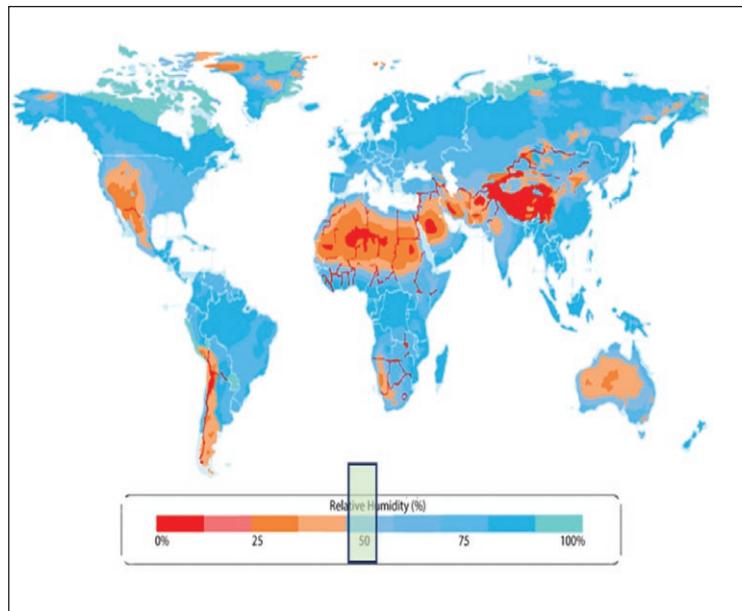


Figure 4. Worldwide relative humidity atlas (H<sub>2</sub>O, 2021)

### Climate Emergency and Virus Infections

There are already qualitatively established correlations between the air temperature, humidity, and other adverse weather conditions in addition to the well-known, well-observed air pollution on the anthropogenic side of the equation. Unfortunately, there has been little quantitative modeling about virus infections and the climate emergency elements so far. That is the main reason to develop a mathematical model, which is expected to guide scientists towards further understanding the mathematics of such a direct link.

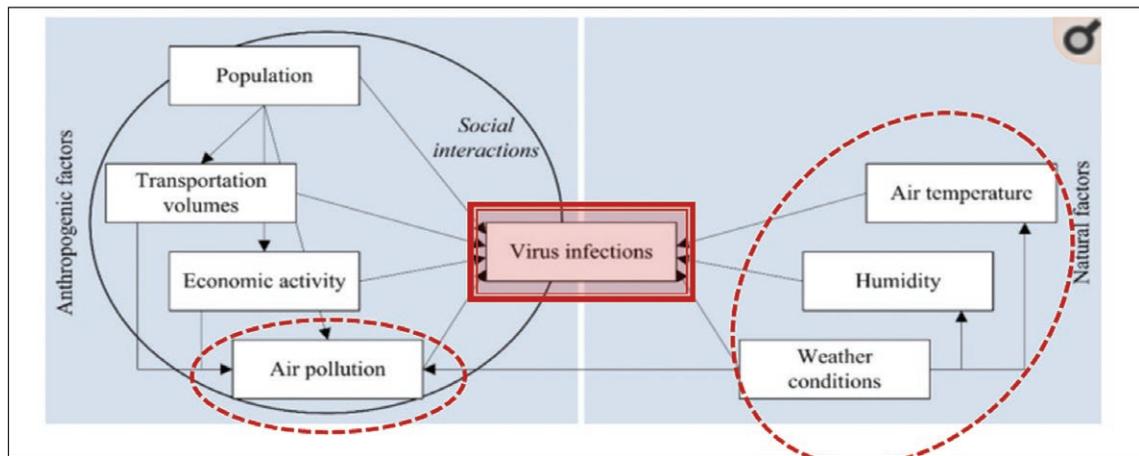


Figure 5. Anthropogenic and natural factors on virus infections adopted from: (Copiello &amp; Grillenzoni, 2020)

### A Green Building May Not Be COVID-19 Safe

Buildings are both energy-intensive and coronavirus-intensive. We spend about 90%, even more with pandemic isolation measures, of our time indoors. Buildings, especially with 100% fresh air requirements against COVID-19 spread, are responsible for approximately 45% of total energy consumption (Cao, Xilei, & Liu, 2016; Tokazhanov, et al., 2020).

Such a high level of energy consumption means exceptionally high CO<sub>2</sub> emission responsibilities, and the green energy they may use may not be green, depending upon the energy usage. For example, the Chinese government considers reducing CO<sub>2</sub> emissions in cold rural areas by replacing local coal and lignite stoves and boilers with local wind turbines. A preliminary study (Kilkis, 2021b) revealed that the direct use of wind energy for heating, even with heat pumps, is not rational as claimed by the 1<sup>st</sup> Law. The refrigerant leakage from a heat pump also has a ΔCO<sub>2</sub>-equivalent ozone depletion effect. For each kW-h of wind electricity supply, the emission responsibility based on R32 refrigerant with a global warming potential (GWP) of 677 and an assumed leakage rate, *L* of

$1.7 \times 10^{-4}$  kg/h, is calculated as follows:

$$\sum CO_2 = 0.63 \times 1 \text{ kW-h} \times \left( 1 - \frac{\epsilon_{dem}}{\epsilon_{des}} \right) + \left( \frac{L}{1 \text{ kW-h}} \right) GWP = 0.65 \text{ kg CO}_2/\text{kW-h}$$

On the other hand, for a lignite stove with  $\epsilon_{sup} = 0.8$  kW/kW for lignite and an efficiency of 0.35 without any ozone depletion potential (no refrigerants),  $\sum CO_2$  is only 0.26 kg CO<sub>2</sub>/kW-h of heat supply. Therefore, although the 1<sup>st</sup> Law indicates almost zero CO<sub>2</sub> responsibility with  $COP = 3$ , the 2<sup>nd</sup> Law shows that the nearly avoidable emissions responsibility is 2.5 times.

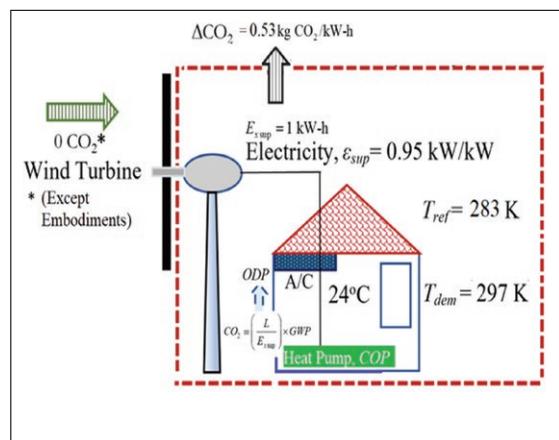


Figure 6. Wind-to-Heating in Chinese Projects. Drawing belongs to the Author, ©2020, B. Kilkis (Kilkis, 2021b)

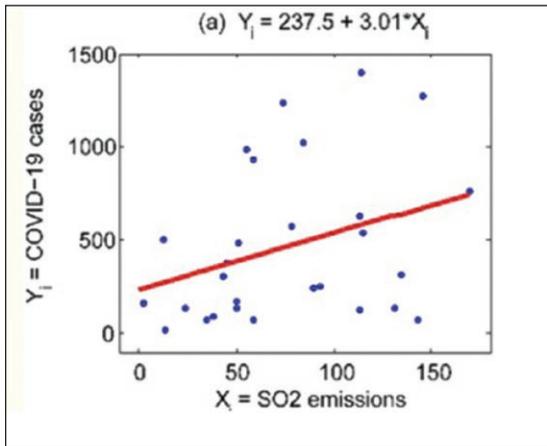


Figure 7. March 2020 preliminary data for Italy (Setti, et al., 2020)

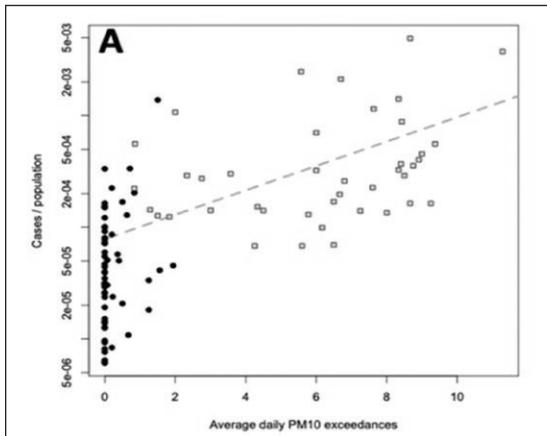


Figure 8. Cases per population correlation with daily PM<sub>10</sub> exceedance (Setti et al., 2020)

### The Need for the Present Study

The importance of such preliminary data is that in many countries, including Turkey, exceedances are high. PM<sub>10</sub> means the amount of particulate matter with diameters less than or equal to 10 micrometers (0.01 mm) in the air (EPA Victoria, 2021). It needs to be officially monitored hourly, year-round. A good air quality corresponds to less than 40 PM<sub>10</sub> µg/m<sup>3</sup> averaged over 1 hour. WHO limits this value to 20 PM<sub>10</sub> µg/m<sup>3</sup>. Any exceedance over this limit has several health risks depending on the amount

recorded; if PM<sub>10</sub> µg/m<sup>3</sup> averaged over 1 hour is above 300, then the air quality is extremely poor. For example, in Ankara PM<sub>10</sub> limits were exceeded 287 days out of 365 days in a year. This value is a clear indication of the severity and urgency of the case.

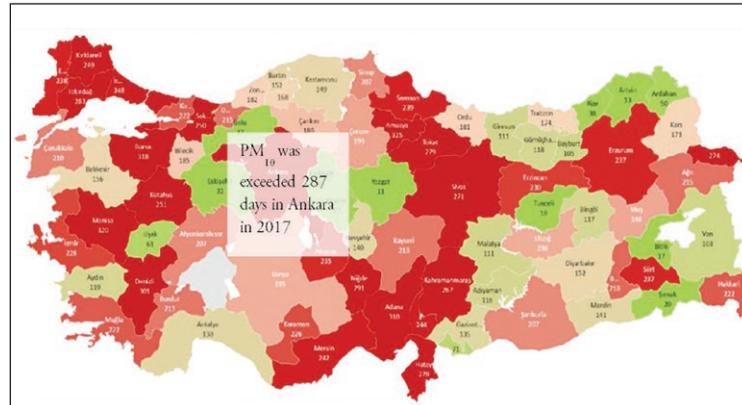


Figure 9. PM<sub>10</sub> exceedance days in one year in Turkey (Nur, 2018)



Figure 10. 50 PM<sub>10</sub> µg/m<sup>3</sup> exceedances for 2019 (UCTEA Chamber of Environmental Engineers, 2019).

According to Figure 10, only the province of Hakkari does not exceed 50 PM<sub>10</sub> µg/m<sup>3</sup> more than 35 times a year. All other provinces exceed this limit annually, and the limit of 50 PM<sub>10</sub> µg/m<sup>3</sup> is a quite high value, already corresponding to short-term unhealthy conditions, especially during the pandemic period. Grey areas are provinces where measurements are not available for more than 75% of the year.

### The Correlation Model

A model was developed based on initial data from Italy about daily COVID-19 cases per thousand people as a function of PM<sub>10</sub> and PM<sub>2.5</sub>. The difficulty in adopting their correlations to CO<sub>2</sub> versus COVID-19 cases was their unavailability. Therefore, it was necessary first to establish a relationship between PM values and CO<sub>2</sub> emission values. This is the first step in determining all the interrelations among four conflicting factors (Quadrilemma) and six vectors. The rest of the interrelationships are already available, known, or more easily determinable. Recently, the COVID-19 pandemic became a bilateral relative with all of them (See Figure 11). Therefore, it is time to include the concept of “Pandemic Resistant Buildings” to the green metrics under a broadened title of safe buildings.

PM is related to CO<sub>2</sub> emissions now, which is shown in Figure 12 and the following linear relationship in terms of the average conversion mapping factor, *f*. For example, for marine diesel engines, the proportion of PM<sub>2.5</sub> to CO<sub>2</sub>, namely the *f* factor, is 0.002 by weight. In coal or lignite-fired power plants, this ratio is about 0.1. Therefore, as long as fossil fuels will be kept in diminishing use in several sectors, ΔCO<sub>2</sub>, which has remained unaccounted for so far, is an important factor in pandemic risk.

An estimate for the factor *f* may be approximated to be 0.06 by weight. This means that 1 kg ΔCO<sub>2</sub> is responsible for an increase of 0.06 kg PM<sub>2.5</sub> increase. Depending on the limits of the local maximum number of daily exceedances, the potential COVID-19 case increase per population in that locality may be estimated. For such an endeavor, current medical reports, which are shown in Figures 8 and 9, were used.

$$PM_{2.5} = fCO_2$$

$$CP = (0.000006 \times CO_{2\text{exceedance}} + 0.0001)$$

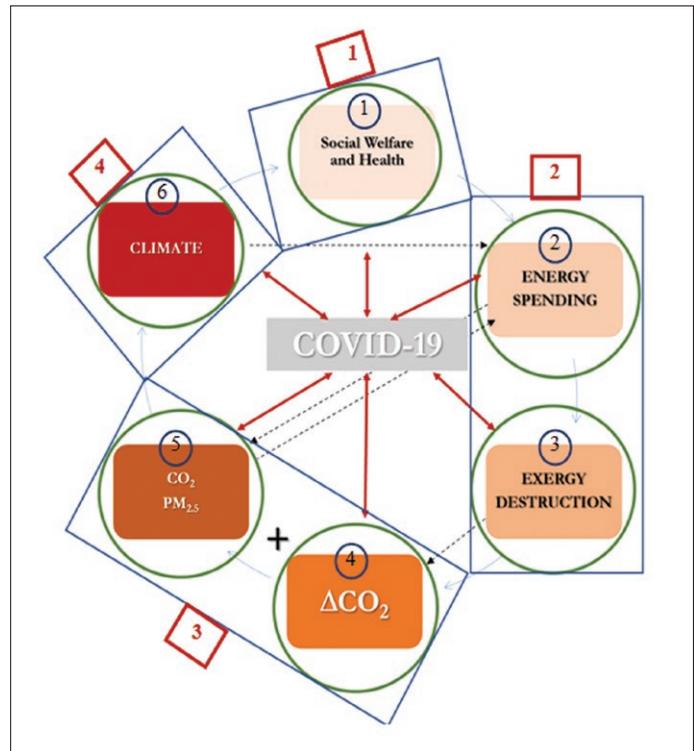


Figure 11. Quadrilemma of pandemic-resistance concept against climate emergency (Erten & Kilkis, 2021). Drawing belongs to the author, ©2020, B. Kilkis.

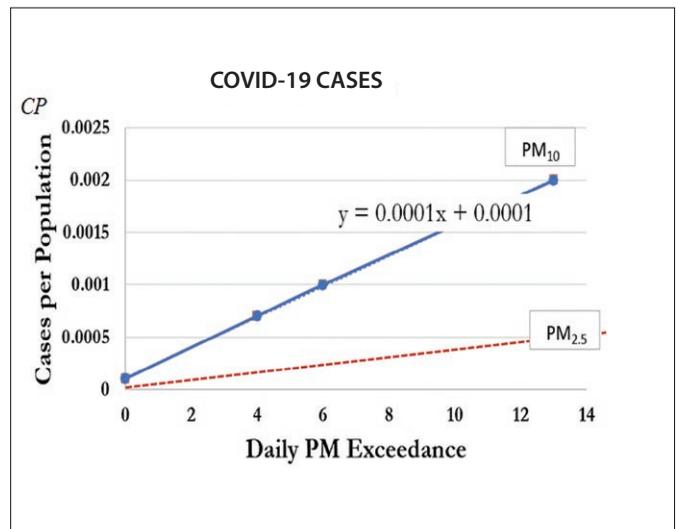


Figure 12. NO<sub>x</sub> emissions exceedance and COVID-19 cases per population, *CP*. Prepared by the author from figures 7 and 8, ©2020, B. Kilkis

Daily exceedance of CO<sub>2</sub> from local air quality measures may be determined. The exceedance limit may be established by local and national authorities. For example, if the exceedance limit is 300 ppm in a given district and CO<sub>2</sub> concentration exceeds this limit 22 times, then *CP* is 0.0002, meaning two more cases in a population of 10,000 due to CO<sub>2</sub> exceedance. This is an additional number of cases over the particulate matter exceedances. If the CO<sub>2</sub> level is always above the 300-ppm limit, then the upper case of an additional 25 cases per ten thousand population may be estimated. However, more data is needed to project the current exceedance correlation further.

### Results and Discussions

It is known that changing climatic conditions will also have significant effects on human health, even increasing the death rate. Deaths and diseases associated with weather conditions may increase due to more frequent extreme climatic events. The increase in the number of consecutive very hot days will directly affect acute health problems, especially in the elderly and those with chronic cardiovascular or respiratory disease. The increased risk of flood will also change landscapes and the spread risks of communicable diseases due to infectious and/or new disease-causing microorganisms or vectors entering new environments. Also, due to climate change, there is an increased possibility of the spread of serious infectious diseases carried by insects such as zoonoses.

This research has developed an initial correlation between additional COVID-19 cases and local CO<sub>2</sub> concentrations. This correlation may now be linked to buildings and their emission responsibilities because, currently, they are responsible for more than 45% of emissions due to the 100% fresh air requirement and increased time spent indoors. The work presented here is the first step of the ambitious research plan to complete the puzzle shown in Figure 11. This is paramount work that needs to be done by all nations, as the UN Secretary-General urged in the Paris agreement. If this goal is achieved in time, it will also reduce the risk of current and future pandemics.

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# All Quiet on the Western Front

Lambsdorff, A.G. (2021).

Wenn elefanten kämpfen:  
Deutschlands rolle in den kalten  
kriegen des 21. Jahrhunderts.  
Berlin: Propyläen Verlag.



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TWO DECADES OF ACCELERATED change have completely altered the world and our concerns about it. Ecological issues have gained undeniable importance for our survival. World hunger is a potential reality again. The rise of East Asia, particularly China and India, have redefined geostrategic reality by challenging the conditions of the Pax Americana in the Pacific. Russia, considered once again as the political antagonist of Western democracy, is of growing diplomatic and decreasing economic importance. Digitization is the new driving force of civilization, completely

overturning organizational, political, and economic limitations of the past.

A new equilibrium, with new alliances and forms of international cooperation, is necessary to identify and face these unprecedented global challenges. Power, hegemony, liberal pluralism, and consumerism ought to be reconsidered under the light of a new global or “terrestrial” perspective (Bruno Latour).<sup>2</sup> This scenario, our new reality, might have been a promising starting point for a book on liberal ideas and political practices in a changing world.



<sup>1</sup> Since 2012, Dominik Pietzcker, Dr. phil., is a fulltime professor at Macromedia University of Applied Sciences, Hamburg and Berlin Campuses and a member of the Media Faculty. He studied comparative German literature, philosophy and history at the University of Freiburg/Br., Trinity College Dublin and in Vienna. From 1996-2010, he worked as a creative director for political public institutions (E.U., the German Government's Federal Press Department) and taught at Universität der Künste (UdK) Berlin, Hochschule für Technik und Wirtschaft (HTW) Berlin and Technische Universität (TU) Dresden. Since 2014, he is an honorary juror at the Foundation of German Entrepreneurs (Stiftung der Deutschen Wirtschaft, SDW). Since 2017 he holds lectures at universities in China, at Zhejiang University City College (Hangzhou) and Tongji University (Shanghai). He publishes regularly on intercultural, Sino-German, and socio-economic topics.

<sup>2</sup> In his essay “Down to Earth” (2018), French philosopher Bruno Latour argues for the necessity of a new era of international cooperation. Ecological challenges in the age of Anthropocene demand, to follow Latour, require not a common or “global”, but a planetarian or “terrestrial” political approach. Latour stresses the responsibility of human beings, of *all of us*, not only for ourselves but particularly for the earth as long as our lifestyle and actions have ecological consequences.

Readers who look for fresh ideas in Alexander Graf Lambsdorff's latest book, however, are to be thoroughly disappointed. Lambsdorff, a member of the German Bundestag and expert in foreign affairs, reiterates Europe and Germany's political options in the 21<sup>st</sup> century.

**Liberal political ideas have lost all their former charms. They are neither courageous, liberating, nor inspiring anymore.**

Unsurprisingly, Lambsdorff defends Western wealth, values, and privileges. For him, they together form a role model of universal meaning. In Chapter 9, the "European way of life", as Lambsdorff puts it, offers a very convenient although totally unrealistic option: that it is possible for the West to carry on in the same way as before (pp. 269–294). The "good Europeans", as already Nietzsche recognized, are those who claim all privileges for themselves and leave the problems to others. Former European colonies and nations whose frontiers were defined by European diplomats, ignorant to all ethnic, geographic and historical singularities, might have a very different view of the "European way of life" than Lambsdorff (pp. 97–148). To keep economic privileges without taking political responsibility is unfeasible, indeed.

In Chapter 9, Lambsdorff, board member of the influential pro-American organization *Atlantik-Brücke*, is well aware of the fact that only American hegemony can guarantee Europe's position as an economic powerhouse without true strategic sovereignty (pp. 279–282). The Atlantic alliance, led by the US, is for Lambsdorff the last legitimate political heritage of the 20<sup>th</sup> century. Undeniably, the US has been a shield

for Western European democracies against authoritarian and totalitarian aggressors since 1916. But is there, here and now, not an option for Europe in the 21<sup>st</sup> century to stand as the third player between America and China (so-called "Chimerica" by historian Niall Ferguson)?

European unity (although increasingly utopian) bears at least the potential of European sovereignty in its own right. But political liberalism, the ideology of individual freedom and responsibility, apparently has its limitations in *Realpolitik*. In Chapter 9, Lambsdorff is far from even considering a strategic change in European policies (p. 282). Yet, what is true sovereignty if not the willingness to take political risks? The whole idea of political and societal progress is based on the necessity to embrace change. To quote Italian novelist Giuseppe Tommasi di Lampedusa (*The Leopard*): "Everything must change for everything to remain the same."

Reading Lambsdorff's book leaves the unpleasant impression that even Western liberalism might have lost its ability to free the human mind of the ideas, patterns, and prejudices of the past. The liberal "European way of life", which Lambsdorff is endlessly endorsing, embodies the inner contradictions of a system and its representatives that desire both a good life and a clear conscience. Lambsdorff's book is written by a shortsighted liberal reactionary who has little to add to the rapidly changing world and its necessary struggle for a new global order. If Europe has nothing more to offer than the political recipes of the Cold War era, it might have become too old for its own future. Liberal political ideas have lost all their former charms. They are neither courageous, liberating, nor inspiring anymore. "Riding the tiger" is a much more poignant metaphor of European politics than "Fighting elephants".

# Turkey as a Role Model in Chinese Newspapers of 1920-1930s

Wang Sanyi (Ed.). (2021).

The Road of Turkey: Research and  
Review of Chinese Scholars. Tianjin:  
Tianjin People's Publishing House.



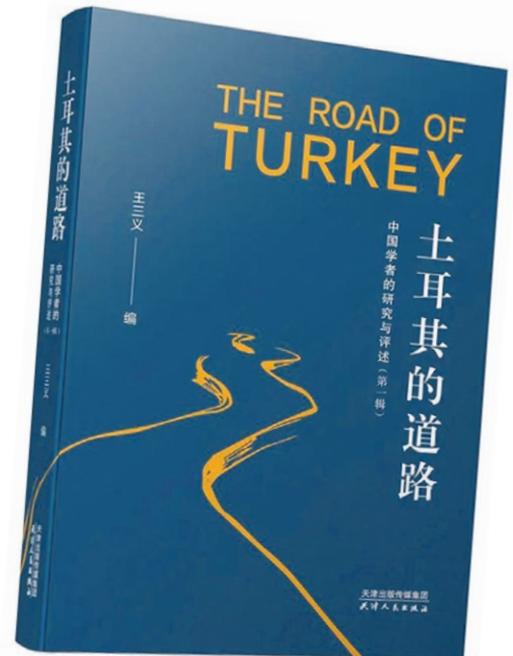
**YE ZHANGXU\***

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BY THE 1920S, TURKEY SUCCESSFULLY transitioned from an empire to a republic, becoming a model of national independence and modernisation. This transformation inspired Chinese scholars in the late Qing Dynasty and the Republic of China to publish articles in newspapers, translate foreign news, and compile books on the Turkish revolution and reform. They introduced Turkey and Mustafa Kemal Atatürk's historical achievements to the Chinese public. This not only reflected the Chinese public's desire to have a deeper understanding of the world but also laid the foundations for Chinese academia to pay persistent attention to Turkey.

The Road of Turkey: Research and Review

of Chinese Scholars (2021), edited by Professor Wang Sanyi from the Center for Turkish Studies at Shanghai University, is a new contribution to the limited work on this topic. The book contains 46 articles published in newspapers and periodicals of 1920-1930s, including political commentaries, translations, reports, and more. It focuses primarily on the four important stages of Turkey's national independence and national rejuvenation: the Turkish Revolution of 1908, the Collapse of the Ottoman Empire, the Turkish National Liberation Movement, and the Modern Reform of Mustafa Kemal Atatürk. These articles demonstrate that Chinese scholars praised Turkey's road of rejuvenation highly at that time.



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The first topic addresses the origin, process, result, and influence of the Turkish Revolution of 1908 through seven articles. There are two interpretations about the cause of the 1908 Revolution. One attributes it to the serious, widespread dissatisfaction with the authoritarian rule of Sultan Abdulhamid II. For example, “All public rallies, whether in the metropolis or in the provinces, are suspended as a strict ban” (p.3); “Sultan implemented the secret detective system, which is extended to the army, causing dissatisfaction among officers” (p.5). Meaning, before the revolution broke out, “Turkish politics is completely controlled by Abdul Hamid II; the people of Turkey succumb to autocracy every day” (p.3).

The second interpretation explains how patriotism and a new ideology emerged in reaction to the stimulating concept of nation-states forming in the West. For the Turks who studied abroad or fled to Europe, “They accepted the advanced ideology and culture of western countries and became more and more dissatisfied with the situation of their motherland. Therefore, they contacted each other and plotted to overthrow the autocratic system, hoping to restore the constitutional system” (p.44). Alongside this, “the invasion of Turkey by the European powers made Turkish revolutionaries feel more and more that the country was in crisis and that it was time for revolution” (p.45).

Two newspapers describe in detail the process of the revolution, *The History of Turkish Revolution* (p.3), *The Record of the Abdication of the Turkish Emperor Hamid* (p.22). Professor Wang Sanyi believes that there is a lot of speculation involved and that the stories about the Ottoman Sultan believing treacherous officials and disturbing politics are not uncommon, just like the ancient Chinese palace coups.

In addition, scholars had different opinions

**Some compared the Turkish people’s general reaction to the constitutional regime to that of the Chinese in the Preparatory Constitutionalism: “most people who have the right to vote do not know what a constitutional government is.”**

regarding the development and impact of the Young Turks Revolution. In the article, *On the Difficulties of the Young Turks* (p.29), the author’s comments were as follows: firstly, the power held by Young Turks after the revolution was still weak and unstable; secondly, the religious and ethnic policies of the Young Turks were unpopular; thirdly, the European Powers continued to invade Turkey, as Italy occupied Tripoli. Other scholars believed that “the constitutional regime implemented after the revolution is nothing more than to preserve the Sultan’s own rule”, “because the remnants of feudal despotism are still not gone” (p.17). Some compared the Turkish people’s general reaction to the constitutional regime to that of the Chinese in the Preparatory Constitutionalism: “most people who have the right to vote do not know what a constitutional government is” (p.33). Moreover, some scholars hold the idea that Turkey’s revival cannot be attributed entirely to Kemal and Inonu, that “the road to revival could not be completed in a short time, but was the result of the efforts of the Young Turks over the past 20 years” (p.94).

The second topic addresses the reasons for the collapse of the Ottoman Empire. Although the decline of the Ottoman Empire began in the 17th century, its demise was directly related to World War I. First of all, Turkey’s strategic geography was an important reason for the Western powers

to plunder: “Located in the center of Europe, Asia and Africa continent, Ottoman-Turkey played an important role in military, religious and economic aspects, so it was the key point for the great powers to seek hegemony”(p.33). Secondly, internal strife among the great powers and the pursuit of self-preservation were also important reasons for Turkey to join Germany’s side:

**With 24 articles, the book highlights how contemporary Chinese scholars praised the Turkish Road and that Turkey became a model for the Chinese to follow. In essence, worries about China’s future and fate were the driving motivation for Chinese scholars to pay attention to Turkey.**

The article, Carve up Turkey in Paris Peace Conference (p84), explains in detail the competition and cooperation among the powers of Russia, Britain, and Germany on the issue of Turkey. Russia wanted to occupy the Marmara Sea, Britain wanted to maintain the air route from the western Mediterranean to the colonies in India, and Germany planned to establish a Great Germanic empire in the east. More importantly, the new army of the Young Turks, the backbone of the Turkish Revolution in 1908, was educated by Germans: “Therefore, Turkey helped Germany in this War entirely because of its long-term good relations with Germany, and they believed that Germany would win the final victory” (p.90). It is self-evident that pinning all hopes on Germany’s victory was unwise: “The weak Turkey has not only failed militarily, but also had a shortage of domestic materials, and the people’s living difficulties

have reached to the extreme” (p.91). Eventually, Turkey had to sign an armistice with the allies in October 1918. At the Paris Peace Conference that followed, the Ottoman Empire was dismembered as a defeated country.

The third topic discusses how to evaluate the national independence of Turkey and the reform of Mustafa Kemal Ataturk. With 24 articles on this subject, it highlights how contemporary Chinese scholars praised the Turkish Road and that Turkey became a model for the Chinese to follow. In essence, worries about China’s future and fate were the driving motivation for Chinese scholars to pay attention to Turkey.

In the view of Western powers, Turkey and China were the sick men of Europe and East Asia, “But in the Greek occupation of Smyrna (Izmir), the Turkish nation used an unprecedented force to get rid of the shackles of the European powers for more than a hundred years; during the Conference of Lausanne, it took advantage of the division of the great powers to recover the territorial and economic rights that have always been lost by the Turkish state” (p.94); “However, our country was still under the cruel oppression of imperialism” (p.103). China had a similar situation with Turkey, though the former had a long way to go in exploring the road of national independence at that time.

The reforms implemented by Ataturk after the founding of the People’s Republic of Turkey opened a new era for Turkey’s development. Compared with Turkey, China was still afflicted by warlords. Chinese scholars hoped to learn from the successful experience of Turkish national independence and modernisation reforms. In order to achieve independence, it first was necessary to learn from Turkey and remove the unequal treaties with European powers.

## BOOK REVIEW



Chinese scholars hoped to learn from the successful experience of Turkish national independence and modernisation reforms. (Atatürk High Institution of Culture, Language and History's website)

“Turkey went from a semi-colony to a fully independent country through the war of national liberation and the Conference of Lausanne, while China’s unequal treaties have not been abolished, and extraterritoriality has not been fully recovered” (p.103). While praising the excellent diplomatic work of Ismet Inonu at the Conference of Lausanne, scholars expected the Chinese government and diplomats to make a difference. “Now we should strive to demand the revocation of the consular jurisdiction of the great powers in China and, like Turkey, unilaterally declare the abolition before signing a new multilateral treaty to solve the problem” (p.163).

For independence, the next lesson comes from Turkey's census policy. “Kemal and his colleagues eliminated all difficulties to carry out the census at the beginning of the Republic because Kemal fully understood that if you want to grasp the future road of a country, you must know the size of a country’s population first. While China has always ignored this important issue in history” (p.140).

Additionally, developing the domestic economy is of key importance. In articles such as New tax system in Turkey (p.101), Turkey’s reform policies (p.147), Turkey’s New Economic Construction and its Economic Rich Source

(p.173), a series of policies from the Kemal government to promote the development of a capitalist economy were handled. They included rectifying finance, rewarding industry, developing transportation, and so on. "In particular, Turkey's practice of introducing foreign capital to develop its economy coincided with Sun Yat-sen's industrial plan" (p.116). "Therefore, in the eyes of scholars, we should choose the advantages of Turkey's reform policy to imitate" (p.167).

**Modern Turkey and China have had similar national destinies. The rise of modern Turkey was not only an earth-shaking change for Chinese scholars at that time but also a successful modernisation movement.**

Certainly, not all Chinese scholars entirely appreciated Kemal's reforms. The most contentious issue was the reform of the writing system. Some thought that this reform was too radical for quick success and immediate benefits. "More haste, less speed. And it brought a lot of problems" (p.156). Other scholars were concerned with the issue of Turkish women's veils and their right to participate in politics. "The reform of removing the veil of women by Kemal has never been a complete success. First, it is not easy for the Turkish people to accept the good intentions of the government at this point; Second, the government is not so determined about this reform" (p.120). "For the sprout of the feminist movement, Kemal is not very radical either" (p.123). Generally speaking, however, scholars highly praise the road of Turkey's revival: "Its national liberation movement pioneered the success of the Asian national revolution. Its reform seems to be an example for China" (p.147).

Modern Turkey and China have had similar national destinies. The rise of modern Turkey was not only an earth-shaking change for Chinese scholars at that time but also a successful modernisation movement. When we explore the views of the scholars on the image of Turkey in the late Qing Dynasty and the Republic of China, we cannot make comparisons without the use of historical materials of newspapers and periodicals. Therefore, through the collection, selection, and arrangement of newspapers from this period, Professor Wang Sanyi has created an important and comprehensive guide.

Overall, the selected articles in this book represent the achievements of Chinese scholars' research on Turkey in the 1920-1930s and act as an important witness to contemporary Chinese scholars' research on Turkish academic ideas. These articles not only give us a more intuitive understanding of the evolution of Chinese scholars' views on Turkey but also build a stronger historical understanding of the development of modern Sino-Turkish relations.

A slight deficiency of the book is that most of the included articles are taken from *The Eastern Miscellany*. The book does not include other articles about Turkey published by other popular newspapers from this period, such as *Shun Pao*. Moreover, in addition to the newspapers and periodicals founded by Han people, there were also newspapers such as *Yuehua* and *Tujue* founded by Hui intellectuals. These have unique insights on Turkish studies, are of considerable value for reference, and therefore deserve a place in this history.

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## EKREM KAHRAMAN



**The Tragedy of Gilgamesh, 2016**

**Oil On Canvas (95 x 125 cm)**

*Ekrem Kahraman has opened more than a hundred exhibitions in domestic and abroad. He has joined a lot of mix and group exhibitions in the national and international fairs. He won 16 awards. He was selected "Artist of the Year" in 2016 by UPSD. He was granted an award of the artist of the year with Mehmet Güteryüz and Ergin İnan with their contribution to contemporary art in 2. Artshow Art Fair in 2019. He was awarded a plaque of "Golden Lion of the World Art Day" in 2021. His artworks are subjected to different kinds of brochures, catalogues and books and four documentary films were produced about his art. He has written theoretical papers about plastic arts. His papers are published in art magazines such as Sanat Çevresi, Türkiye'de Sanat, Genç Sanat, Çekirdek Sanat, CEY Sanat, rh+ Sanat, and Artist as well as newspapers such as Bosphorus SANAT. He published a magazine, Sanat Atölyesi, in 2007-2008. Since 2011, he has been writing on contemporary art, the ideology of art and art of ideology, contemporary art museums etc. in Aydınlık daily.*

How to cite: [Painting by Ekrem Kahraman]. The tragedy of Gilgamesh. *Belt & Road Initiative Quarterly*, 2(3), 78.



## SADIK ÜÇOK



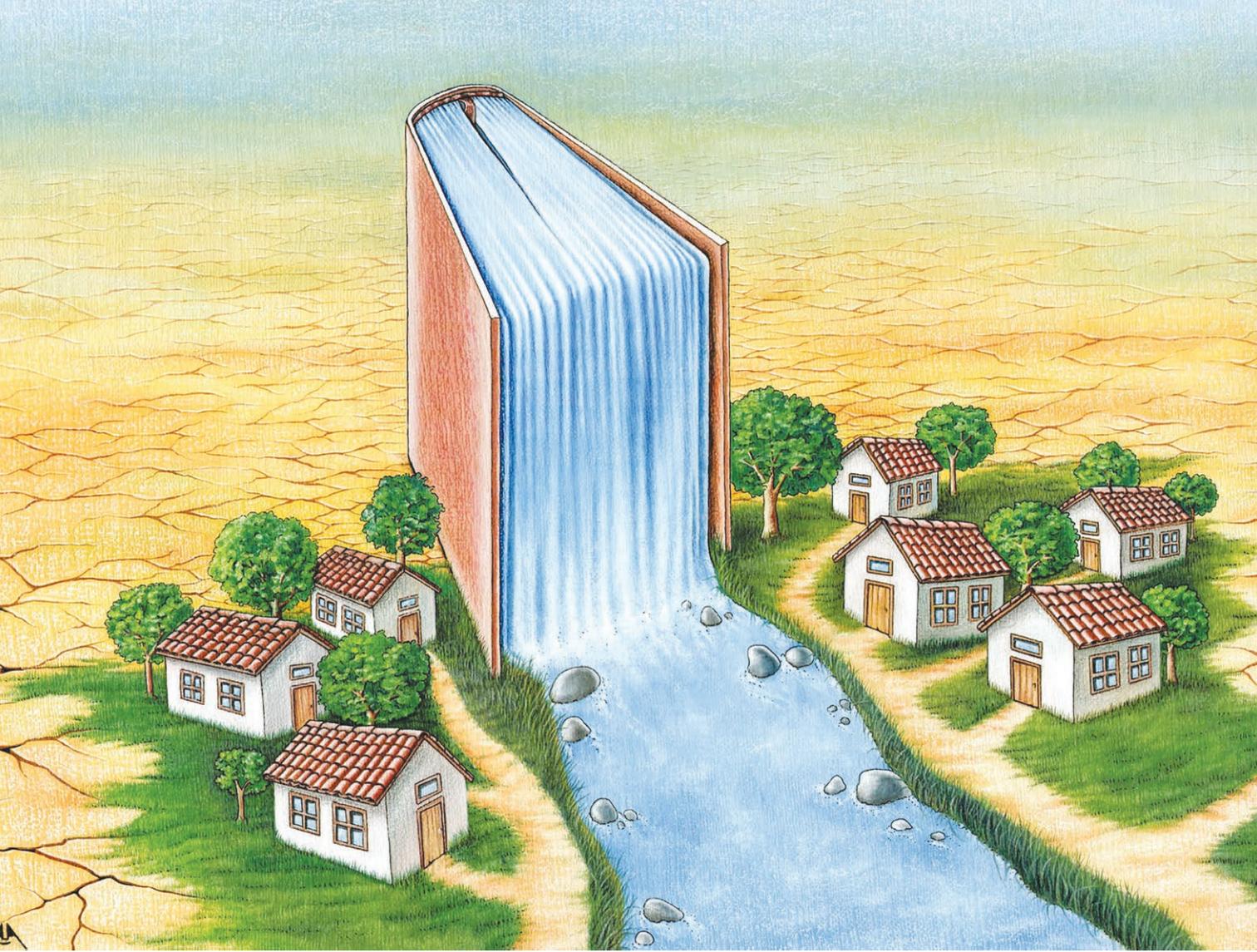
MUŞ, VARTO

*Sadık Üçok began his professional cartoon career in the Çarşaf humor magazine of Hürriyet Gazette in 1980. He has also drawn professional cartoons in various cartoon magazines such as "Gırgır" and "Fırt". He has developed a serious interest in photography since 1985 and he has been working as a professional photographer since 1992. He has been awarded "the Sami Guner" trophy in 2013, one of the prestigious photography awards in Turkey, for his presentations of "The Blacksmith of Safranbolu", "Pavli Fair" and "The old and the New Galata Bridge". He organized six co-exhibitions in Germany together with photographer Ralf J. Diemb between 2014 and 2018 and they also published a photography book "Hayat- Leben" (Life). They opened a photograph exhibition at the Istanbul Photography Museum in 2018.*

How to cite: [Photograph by Sadık Üçok]. Muş, Varto. *Belt & Road Initiative Quarterly*, 2(3), 79.



## AŞKIN AYRANCIOĞLU



*Aşkın Ayrancıoğlu graduated from Department of Painting at Samsun Ondokuz Mayıs University. He became a juryman in national and international cartoon contests as such in the international China Guangxi City College Cartoon Contest in 2009. In 2017, Ayrancıoğlu was granted an award of the international “Best Humor Artist Award” in China. He took place as a “guest artist” in the first and second International İzmir Art Bienial in 2011 and in 2013. He has been educator since 1992. He still serves as a teacher of “Visual Arts” in a public boarding school in Boyabat/Sinop.*

# 1 **SINOLOGY** **AND CHINESE** **STUDIES** **SYMPOSIUM**

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