

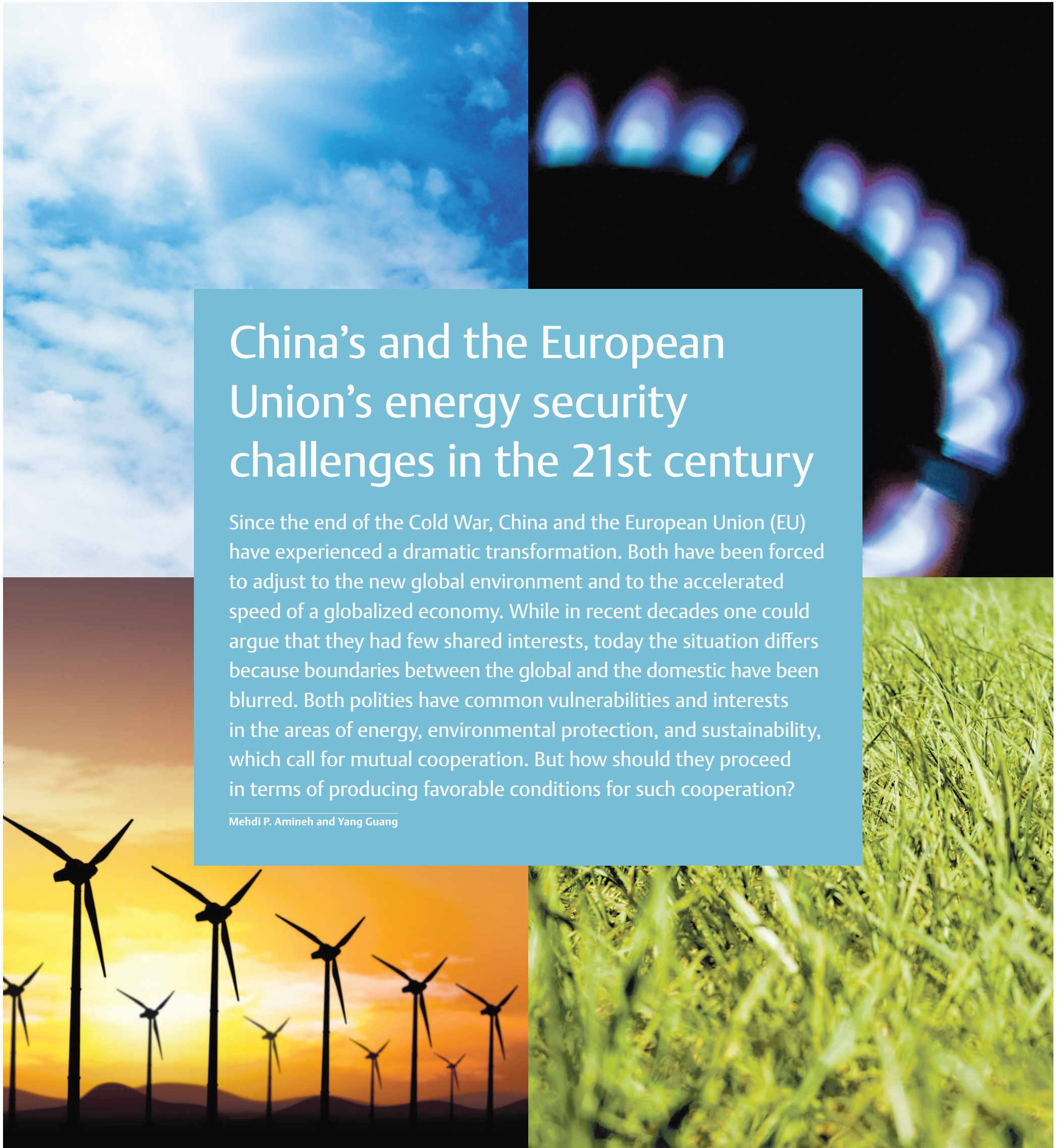
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# theFocus

## China's and the European Union's energy security challenges in the 21st century

Since the end of the Cold War, China and the European Union (EU) have experienced a dramatic transformation. Both have been forced to adjust to the new global environment and to the accelerated speed of a globalized economy. While in recent decades one could argue that they had few shared interests, today the situation differs because boundaries between the global and the domestic have been blurred. Both polities have common vulnerabilities and interests in the areas of energy, environmental protection, and sustainability, which call for mutual cooperation. But how should they proceed in terms of producing favorable conditions for such cooperation?

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China's and the EU's energy security challenges in the 21st century *continued*

In this Focus section of *The Newsletter* we present to you our research project, which searches for an answer to this comprehensive question; in so doing, the project adopts a comparative perspective to study the policies, practices, and challenges of both China and the EU in the areas of conventional energy security, development of alternative and renewable energy sources, and sustainable development.



ENERGY SECURITY has become a key issue for both China and the EU, thus putting pressure on policymakers to look for new responses, including diversification of both source and origin of conventional energy, with a view to encourage supply security and improve efficiency in energy use. In these endeavors, the urgency of geopolitical concerns seems to draw more attention than long-term plans for transition to renewable energy. As a result, the perception that China and the EU might be competitors in accessing foreign markets often overshadows their common interest to develop renewable and alternative energy and share efficiency-improving technology.

At the same time, the fact that both polities are placed well enough to cooperate vis-à-vis producer countries, and to compete in the development of high-end renewable technologies, is often neglected. Our research project challenges such dominant perceptions and aims to provide the wider public with a more balanced account of the China-EU energy relations. To this end, our research focuses not only on the geopolitical realities that affect energy relations among both polities, but also on energy efficiency and the development of alternative and renewable energy sources.

#### Global energy demand and supply

According to the International Energy Agency (IEA), global primary energy demand is expected to increase by 36 percent between 2008 and 2035. (The figures are naturally dependent on, among other things, the level of economic growth). Most of this growth is expected to come from the newly industrialized Asian states, such as China and India. Meanwhile, energy demand in the OECD countries is estimated to grow more modestly, given that energy use is already very high there. As a result, it is predicted that by 2035, more than 22 percent of world energy demand will come from developing countries, and especially China. (According to BP, China overtook the US as the world's biggest energy user in 2010). The IEA also anticipates substantial growth in the global demand for natural gas in the period 2008-2035; it predicts a 44 percent increase and a move towards a global consumption of 4.5 trillion cubic meters (tcm) per year. The gas import dependency of China and the EU will grow to about 70 percent of the domestic consumption by 2030, and a similar trend is expected to be seen in all major consumer markets, except in East and Southeast Asia, where it is already very high.

Due to the fact that proven oil and gas reserves are unevenly distributed in the world, and that only a few countries are surplus producers, fewer countries will be producing oil and gas in 2030. Additionally, it is expected that world oil supply will need to be increased by 15 million barrels per day (mbd)

(compared to 2009). In order to meet this demand, OPEC and non-OPEC countries will respectively have to produce 49 and 63 mbd, according to the US Energy Information Administration (EIA). This will result in OPEC countries having a market share of 46 percent by 2030, with a longstanding growth trend expected. No more than five countries – Saudi Arabia, Iraq, the UAE, Kuwait, and Iran – hold about 55 percent of global proven oil reserves. So far, the Persian Gulf has been critical for meeting global demand, closely followed by the states of the former Soviet Union. Moreover, non-OPEC supplies are maturing, resulting in increased pressure on OPEC oil in the long-term.

Proven gas reserves are slightly less concentrated than oil reserves. Russia and the Caspian Sea region and the Middle East represent about one-third and two-fifths of proven global reserves, respectively. Moreover, Russia, Iran and Qatar hold about 55 percent of the global gas reserves (data from the EIA).

Global oil and gas markets look bleak as a result of the ever-growing energy consumption, an increasing exhaustion of reserves, and an increasing geographical concentration of production. Against this background, it is likely that state and non-state actors will assign more significance to economic and resource concerns and energy relations will increasingly politicize. On the one hand, the growing energy imports of countries such as China and India can be added to those of the EU and the USA. In addition, the anticipation of future supply disturbances is reflected in generally rising oil and gas prices and, in particular, their increasing volatility and the inelastic demand by major consumers. On the other hand, based on the location and increasing scarcity of world oil and gas reserves, a geographical concentration of energy supplies is expected to materialize in the politically unstable producer countries of the Persian Gulf, Russia, and the Caspian Sea region. Moreover, internal conflicts may arise in countries where oil and gas are the main source of income, especially when accompanied by ethnic hostility, terrorism, religious fundamentalism, economic injustice, corruption, and political competition.

#### Geopolitical and domestic challenges

The objective of the comparative research presented here, in this section of *The Newsletter*, is to analyze the geopolitical and domestic aspects of energy security challenges for China and the EU and their impact on energy security policy. The analysis of geopolitical aspects involves research on the effects of the competition of access to oil and gas resources among the main global consumer countries and its implications for the security of energy supplies of the two polities. The research also includes an analysis of the domestic energy demand and

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supply, an analysis of policies to increase energy efficiency, and it estimates the prospects for the exploitation of renewable energy resources.

In 2010, the OPEC countries shared 40 percent of the total world oil production. BP estimates that this share will rise to 46 percent by 2030. This increase is primarily a result of the impact of the Middle East and Northern Africa (MENA) countries, which account for almost 35 percent of the total world oil production in 2010 (data from the EIA). Alongside the oil and gas producing countries, Arab countries that produce less or no oil, such as Egypt and Yemen, also contribute to the distribution of hydrocarbon fuels as hosts to important transit routes and pipelines. Therefore, major disturbances or crises in the MENA may not only (temporarily) obstruct production, but also infest important transit networks and choke points. Such obstructions could potentially result in a sharp rise in the global oil price, which would inevitably lead to increases in production and transportation costs all over the world. Moreover, civil disturbances could simultaneously trigger structural scarcity – resulting from deliberate actions by powerful actors prohibiting the free flow of energy commodities exports<sup>1</sup> – and destabilize the European energy market even further. Any significant losses of hydrocarbon energy imports will eventually hamper the EU's economic growth. Political unrest and social revolts, such as those that began in late 2012 in the MENA (and are still ongoing), have the potential to influence the supply security of polities such as China and the EU.

Environmental constraints and advances in technology also affect energy security. According to the IEA, apart from the threats connected to energy supply security, governments also need to take into account environmental harm. BP argues that global CO<sub>2</sub> emissions are expected to increase by 27 percent by 2030 (or 1.2 percent annually). Thus, emissions are growing faster than energy demand. This is alarming, because it contrasts with the 25-year-long opposite trend towards cleaner energy sources, and testifies that our future energy use will, in fact, be 'dirtier'. A likely cause for this is the switch back to coal, which has occurred in response to the oil and gas scarcity in many countries. Coal resources are more abundant and geographically less concentrated, although they have higher levels of carbon than oil and gas.

#### Transition to more sustainable energy

While pollution creates cross-border tensions, innovations in alternative and renewable resources, as well as efficiency measures, can reduce energy import dependency and contribute to reducing greenhouse gas emissions. However,





deploying new technologies involves more than simply replacing oil and gas with other energy sources. It requires the construction of new production and storage facilities, new distribution means, and new end-use applications. Besides time and capital, such energy infrastructure transitions require constant government and popular support, especially given the fact that they are likely to be driven by social, political, and environmental benefits, and that some technical and economic aspects cannot yet compete with existing fossil fuels.

Moreover, a transition to a more sustainable energy system differs essentially from past energy transitions. First of all, it is estimated that a transition to alternative energy systems will take around fifty years, rather than the ten to twenty years experienced during previous shifts. Secondly, the current transition is taking place in a liberalized market setting involving many actors, whereas past transitions were situated in a regulated setting with few actors, whose governments held the dominant position. Finally, the current transition has a very diverse set of technologies and complex solutions in mind, whereas past transitions had comparatively simple technological goals. Consequently, the general public was more supportive of past transitions than they are of the shift to sustainable energy.

Thus, it is expected that even by 2030 the role of the renewables in the global energy mix will be marginal. IEA suggests that while renewables and alternatives today cover 19 percent of global primary energy supply (including nuclear and biomass energy; renewables alone account for only 3 percent), by 2030 this will be almost one-third. This is not due to the lack of development of renewable energy, but rather because global oil, gas, and coal consumption will also continue to rise. Nevertheless, as oil and gas become increasingly scarce, developing innovative technologies remains as the only long-term alternative.

#### This Focus section

The Focus in this issue of *The Newsletter*, published by IIAS, consists of this introduction followed by 11 short essays originating from the research program "Domestic and Geopolitical Challenges to Energy Security for China and the European Union", jointly run by the Energy Programme Asia of the International Institute for Asian Studies (IIAS), Leiden and the Institute of West Asian and African Studies of the Chinese Academy of Social Sciences (CASS). All essays are based on the contributions to the edited volume *Secure Oil and Alternative Energy: The Geopolitics of Energy Paths of China and the European Union*<sup>2</sup> and briefly present their research and results.

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In the first of the essays, Robert Cutler analyzes the post-Cold War transformation of the geopolitics in Central Eurasia and the Caspian Region in relation to the emerging 'complex system' of hydrocarbon networks, with a focus on Azerbaijan and Turkmenistan. Frank Umbach takes over by using a comparative perspective to analyze the contradictory strategic trends and developments in Central Asia and the Caspian Region. He focuses on the growing interdependencies with the states' energy partners, and analyzes the strategic implications for the EU's declared energy partnership with the region and its energy supply strategies.

Given the important role that Iran plays in China's foreign energy security policy, Yu Guoqing explores China's energy relations with the Islamic Republic. Indeed, ever since the establishment of bilateral relations in 1971, the two countries have maintained good political and economic relations. In the following essay, Zhao Huirong and Wu Hongwei explore the significance of the Caspian region for China's energy security and the prospects for cooperation in the light of recently heightened geopolitical competition. They focus on China's energy policy in relation to Kazakhstan, in particular, in the context of China's foreign policy strategy towards the Caspian region.

Chen Mo discusses China's external relations with Angola in the context of its overall energy supply security strategy. Angola is an emerging oil producer which recently recovered from the scourge of war. Thus, the energy cooperation between China and Angola, built upon exchanging loans and infrastructure projects for oil resources, has unique features. In the last piece to discuss China's energy relation with other states, Sun Hongbo analyzes the energy ties between China and Venezuela. In pursuit of the growing energy interest across various countries, Chinese companies employ different forms of energy cooperation. In comparison with other Latin American countries, the Sino-Venezuelan model stands out as a unique example.

Raquel Shaoul analyzes the energy relations between Japan and Iran in the period 1979-2010. Shaoul's contribution evaluates Japan's energy security supply strategies, outcomes, and prospects throughout the building of its relationship with Iran.

Daniel Scholten analyzes the relationship between energy transition governance paradigms and renewable innovation processes in the Netherlands. Key in this effort is the idea of focusing on establishing general patterns at a higher abstraction level, i.e., sacrificing the detailed insights of in-depth case studies for the possibilities of generalization on an aggregate level.

Li Xiaohua examines China's policy experiments in the area of the development of a solar energy industry. China's photovoltaic and solar thermal industries have demonstrated rapid development in recent years, but the utilization of solar electricity and solar heat are quite different. The author compares the differences, and the causes of the differences, between the development characteristics of China's photovoltaic and solar thermal industries.

Mairon G. Bastos Lima examines the development of the Brazilian biofuel industry in recent decades and the associated geopolitical challenges, by analyzing the importance of geopolitics when it comes to the energy transition from fossil to renewable fuels, and the environmental implications of the large-scale biofuel production. The focus of his research is Brazil, the global leader in biofuel utilization and policymaking.

Edward Vermeer provides an analysis of China's hydropower development and the associated economic and ecological challenges. During the past few years, the Chinese government has formulated ambitious plans for building a large number of hydropower stations, but so far it has withheld final approval for the construction of the majority of these.

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#### Notes

- 1 Amineh, M. & Houweling, H. 2007. "Global Energy Security and Its Geopolitical Impediments: The Case of the Caspian", in Amineh, M.P. (ed.) 2007. *The Greater Middle East in Global Politics: Social Science Perspectives on the Changing Geography of the World Politics*. Leiden: Brill
- 2 Amineh, M.P. & Yang Guang (eds.) 2012. *Secure Oil and Alternative Energy: The Geopolitics of Energy Paths of China and the European Union*. Leiden-Boston-London: Brill Academic Publishers.