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China's Engagement in Global Energy Governance



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Julia Xuantong Zhu

INTERNATIONAL ENERGY AGENCY

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- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
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Foreword

As the world's largest energy consumer and producer, China is the leading player on the global energy stage. Among other historical achievements, China has brought electricity to more people than any other country in a very short period of time. China has also become the world's largest wind power market as well as largest producer of hydroelectricity and solar photovoltaic (PV) capacity.

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China is at the centre of nearly every work stream within the International Energy Agency (IEA). In my vision speech in Beijing in September 2015, I called for a new era, building on nearly twenty years of IEA – China co-operation. We have been encouraged by strong voices in support for this vision, including members of China's energy policy circle, government, academia, industry and other fields, as well as support from IEA member countries. Indeed, China became an IEA Association country at the IEA Ministerial meeting in November 2015, along with Indonesia and Thailand. H.E. Mr. Nuer Baikeli, Administrator of China's National Energy Administration, and I jointly welcomed this achievement and expressed our common desire to reinforce this strong relationship. He believed that China needs to further engage in global energy governance in a positive and constructive manner, and presenting to the world how China has engaged in global energy governance throughout the years will facilitate mutual understanding between China and rest of the world.

In this context of strengthening relations between the IEA and China, I am delighted with this IEA Partner Country Series publication on "China's Engagement in Global Energy Governance". Global energy governance is one of the topics taken up under China's G20 presidency, and the IEA, as an international organisation that analyses all aspects of energy, working with partners like China, is well positioned to play a leadership role in global energy governance.

The interests of all economies are increasingly aligned in matters of energy security, sustainability and prosperity as a result of growing interconnectivity and globalisation. As this report by Ms Julia Xuantong Zhu, a secondee from China's National Energy Administration to the IEA, rightly emphasises, global energy governance should aim to create a better energy future for all. The IEA is ready to play its role in achieving such an outcome.

Dr. Fatih Birol

Executive Director

International Energy Agency

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Executive summary

The People's Republic of China employs multiple mechanisms in its efforts to enhance international energy co-operation; global energy governance is discussed as a strategic approach to achieve this end. As the world's largest energy consumer (23% of global energy consumption), largest energy producer (19% of global energy supply) and largest oil importer and carbon dioxide (CO₂) emitter in 2014, China lies at the centre of the world's energy issues. The country is also at a turning point in its transition to low carbon energy. Traditional thinking, focusing solely on bilateral energy co-operation, has shifted to a more proactive approach which features both bilateral and multilateral energy co-operation. Chinese leadership is serious about, and engaged with, global energy governance, believing that this will help to create a better external environment for, and give impetus to, endeavours towards inclusive and sustainable development. The National Energy Administration (NEA) and other central government bodies are key participants in discussions on global energy governance, with other non-governmental players becoming increasingly interested.

China's engagement in global energy governance has important implications for the country domestically as well as globally, particularly in light of its comprehensive, market-oriented energy sector reform. It appears that China's domestic interests and the world's collective interests in energy security, economic development and sustainable growth are becoming more congruent. China can immediately benefit from international best practices and experiences in planning and implementing reform, while the international community can benefit from China's growing role in ensuring global energy security, promoting economic development and facilitating sustainable growth. There is a growing expectation that China will be increasingly engaged in global energy governance discussions, reflecting China's increasing awareness that its energy policies are aligned with global objectives.

In recent decades, China's position in global energy governance has shifted from that of outsider to insider, follower to influencer, its presence and influence increasing gradually. China is already an active participant, builder and contributor in the global energy governance system. China has sought membership in, or established co-operation relationships with, 26 entities, including specialized organisations such as the International Energy Agency (IEA), International Energy Forum (IEF), Organization of the Petroleum Exporting Countries (OPEC) and International Renewable Energy Agency (IRENA), as well as major international and regional entities with mandates broader than energy such as the Group of Twenty (G20), the Association of Brazil, Russia, India, China and South Africa (BRICS), the Asia-Pacific Economic Cooperation (APEC) and the Shanghai Cooperation Organisation (SCO). Historically, China's engagement began when it joined the World Energy Council (WEC) in 1983 as a low-key learner of international rules; it then became a more active participant in the 1990s with increased self-confidence to adapt to globalisation. In the 21st century it has become a more influential participant at many forums, offering concrete contributions.

To play a more influential role in global energy governance, China is actively participating in reform efforts, taking a leading role in drafting the G20 Principles on Energy Collaboration and joining the IEA Association, as well as taking part in the restructuring and reform procedures of the IEF and the Energy Charter. China sends permanent staff or secondees to international energy entities and encourages Chinese nationals to run for high-level positions. It has also begun initiatives such as hosting the APEC Sustainable Energy Centre (APSEC) and making proposals such as discussions on establishing global energy interconnection. In 2016, as chair of the G20 and its Energy Sustainability Working Group (ESWG), China is promoting a more effective and efficient global energy governance system through enhanced energy dialogue under the G20 framework.

China's engagement in global energy governance is shaped and reshaped continually by domestic and external developments. The three key drivers for its transformation moving from outsider to insider were: growing energy interdependence between China and the rest of the world; China's evolving global governance views and practices; and evolution of the global energy governance environment. China became a net importer of crude oil in 1993, natural gas in 2007 and coal in 2009. Rapidly rising energy demand has driven companies to seek energy sources worldwide under the "Go Abroad" strategy, and such business ties with the outside world have motivated China to promote and secure energy investment, trade and transportation routes. China's economic ascendancy has contributed greatly to its perspectives and practices in global energy governance. It has had an especially stronger presence and greater voice in global governance since the 2008 global financial crisis.

Chinese President Xi Jinping, aiming to improve the global governance system in an innovative way, has become outspoken about the need for reform. China has shown more willingness to take the initiative to address its concerns with what some perceive as a potential "global energy governance gap". His vision for the "Belt and Road Initiative" – combining the Silk Road Economic Belt and the 21st-Century Maritime Silk Road, is also inspiring the Chinese government to leverage various regional energy entities to promote energy co-operation in this ambitious and far-reaching initiative.

China is expected to play a greater role in global energy governance, gradually taking more responsibility and making a stronger contribution. Challenges still remain with respect to China's human resources. These may be addressed if China is able to dedicate additional resources towards energy security, data and statistics, and energy policy analysis, among other issues. In the new era of its relationship with the IEA and being an Association country, China can now tap into the IEA's international expertise and best practices in these areas more easily than before. With around ten Chinese experts now contributing at the IEA, better understanding can be facilitated between the two sides. In particular, as the IEA is the only international organization with the means and mandate to organize collective action in case of oil supply disruptions, as well as covering all fuels and technologies in the energy field, if China and the IEA can come closer in developing shared measures to strengthen the international regime for global energy security, that would be a viable step forward in showing how China is ready to take more responsibility and to make a stronger contribution to global energy governance.

With its growing influence, China is expected to play a crucial role in global energy governance. China's current role is significant when compared with many other countries but still lags behind considering the size of its economy and the role it desires to have in global energy issues. The country's willingness and capability to further engage in global energy governance will have a widespread impact, but it faces a steep learning curve, and will be expected to contribute more as its responsibilities increase. China would benefit from a comprehensive strategy to balance its high ambition for further engagement in global energy governance and the means of better engagement.

From outsider to insider, follower to influencer

China is undergoing a major transformation to bring new opportunities to its 1.37 billion people and to move the country to centre stage in international affairs. As the world's largest energy consumer (23% of global consumption) and largest energy producer (19% of global supply) in 2014, as well as the world's largest oil importer and carbon dioxide (CO₂) emitter, the implications of how the country engages with the rest of the world in the energy field are profound. This is why China's involvement in global energy governance matters.

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In June 2014, Chinese President Xi Jinping announced a sweeping energy revolution in China, centred on the four areas of demand, production, technology and institutional governance, and incorporating international energy co-operation—the “Four Revolutions and One Co-operation” vision. He called for “strengthening international co-operation comprehensively and realising energy security under open conditions” (Xi, 2014a). Although international co-operation had long been considered important in Chinese energy policy, this is the first time a Chinese president had recognised it officially, paving the way for China's deeper and wider engagement in global energy governance.

China's perspectives on global energy governance

Vision from Chinese leadership

After the historic speech calling for “Four Revolutions and One Co-operation” in June 2014, at the Group of Twenty (G20) Summit in Brisbane in November 2014, Chinese President Xi Jinping made reference to energy issues in his keynote speech. He stressed that:

The G20 have to, building on a strategic height of improving global economic governance, build a partnership in energy co-operation, nurture a free and open global energy market with orderly competition and efficient supervision, jointly maintain stability of energy prices and market, improve energy efficiency, and formulate and improve global energy governance principles so as to form a new co-operation pattern of equal negotiations and common development among consumer, producer and transit countries. (Xi, 2014b)

The president's emphasis on global energy governance and co-operation was not unexpected; in 2012 at the China – EU High-Level Energy Meeting, Chinese Premier Li Keqiang also remarked that:

The complex and volatile international situation makes it imperative for us to participate in global energy governance. We should step up policy co-ordination, promote the building of an open and efficient international energy market with fair competition, facilitate the establishment of a rational energy pricing system and make joint efforts towards sustainable world energy development. (Li, 2012)

During the International Energy Transition Forum held in China in November 2015, Minister Nuer Baikeli, Vice-Chairman of the National Development and Reform Commission (NDRC) and Administrator of the National Energy Administration (NEA), also called for more inclusive global energy architecture:

[All countries should] work hand-in-hand to improve the international energy governance system. The international energy governance system is shared and built by all countries around the world, and China is an active participant, builder and contributor in the existing energy governance system. With the continued advancement of the world energy transition process, the energy governance system should advance with the times and make constant improvements. All countries in the world should work together to promote the establishment of a new energy governance system which features mutual benefit,

win-win, openness, inclusiveness, fairness and orderliness, to promote global energy development in an innovative, co-ordinated and green way, so that the fruits of energy development can benefit all the peoples around the world. (Nuer, 2015)

These messages from top Chinese policy makers indicate a change in approach to global energy governance, and signal China's intention to proactively enhance its role within the existing system. Importantly, China's interests in sound global energy governance match those of other countries: a "free and open energy market with orderly competition", "stability of energy prices and markets", "energy efficiency" and other values cited by China. The question is how to achieve them.

Observations from China's five-year plans and energy white paper

China's five-year plans are a series of strategic development initiatives that provide guidelines for development over five-year periods. Studying the five-year energy sector plans offers insight into the social and economic changes in China (Table 1). Global energy governance first appears in the 12th Five-Year Energy Plan (plan for year 2010-15).

Table 1 • International energy co-operation in China's five-year energy plans

Document	Global energy governance cited	References to international energy co-operation
10th Five-Year Energy Sector Plan	No	<ul style="list-style-type: none"> • Support and encourage Chinese enterprises to develop overseas oil and gas bases to ensure energy supply security. • Offer supportive policies to overseas oil exploration and development, such as cancellation of or preferential access to import quotas and licenses for domestic processing and utilisation of equity oil produced overseas, and establishment of overseas oil exploration and development funds and credit support.
11th Five-Year Energy Sector Plan	No	<ul style="list-style-type: none"> • Expand opening up. • Strengthen international energy co-operation in accordance with the principles of equality, mutual benefit and win-win co-operation.
12th Five-Year Energy Sector Plan	Yes	<ul style="list-style-type: none"> • Improve supporting systems for international co-operation. • Encourage domestic insurance agencies to participate in businesses such as insurance for Chinese equity oil and offshore personal and property insurance. • Participate actively and steadily in trade in the international energy futures market, and reasonably avoid market risks. • Engage actively in global energy governance, make full use of international multilateral and bilateral energy co-operation mechanisms, enhance communication and dialogue in the fields of energy security, energy conservation, CO₂ emissions mitigation, climate change, clean energy development, etc. • Promote the establishment of a fair and reasonable new order of global energy, and collectively safeguard energy security.
13th Five-Year Energy Sector Plan draft	Yes	<ul style="list-style-type: none"> • Expand international energy co-operation. • Make important bilateral and multilateral mechanisms as platforms, so as to promote international co-operation in the energy field. • Promote concrete energy co-operation in the frameworks of the "Silk Road economic belt" and "21st Century Marine Silk Road," extend co-operation projects, expand areas of co-operation, and promote development in industries such as equipment manufacturing, infrastructure construction and services. • Consolidate and improve four oil and gas import channels—from the northwest, northeast, southwest and offshore—and actively promote construction of related energy channels along the Bangladesh-China-India-Myanmar (BCIM) economic corridors and China-Pakistan Economic Corridor. • Actively participate in international energy governance and rule-making, push forward to build a just and equitable global energy governance mechanism, and enhance the country's voice in the international energy sector.

Sources: 10th, 11th and 12th Five-Year Energy Sector Plans; Remarks on the Working Meeting of the 13th National Energy Five-Year Plan.

The Chinese government has published two energy white papers, *China's Energy Conditions and Policies* (2007) and *China's Energy Policy* (2012). In the 2012 white paper, the Chinese government called for international efforts in the following three respects:

- **Strengthening dialogue and exchange.** Strengthening dialogue and communication among energy exporting, consuming and transiting countries is the foundation of international energy co-operation. The international community should further cement its bilateral and multilateral ties; increase dialogue and exchange in the fields of efficient use of energy, energy conservation, environmental protection, energy management and energy policy; promote monitoring and emergency response mechanisms for the global energy market; and deepen co-operation in information exchange, personnel training and co-ordination.
- **Carrying out effective energy co-operation.** Upholding the principles of reciprocity, mutual benefit and common development, the various countries should ensure mutually beneficial co-operation in international energy resource exploration, enrich and improve co-operative mechanisms and methods, increase the international energy supply, and diversify supply channels. They should work together to minimise volatility in the prices of bulk energy commodities, secure the energy needs of various countries, and maintain the normal order of the energy market. For the sake of sustainable development, the developed countries should actively provide and transfer clean and highly efficient energy technology to developing and underdeveloped countries, and together promote green development globally on the condition that intellectual property rights are protected. The international community should strive to help the least-developed countries eliminate energy poverty, increase energy services and promote sustainable development.
- **Working together to maintain energy security.** A fair and rational international energy management mechanism is a prerequisite for a stable global energy market. The international community should work collaboratively to maintain stability in oil producing and exporting countries, especially those in the Middle East, to ensure the security of international energy transport routes and avoid geopolitical conflicts that affect the world's energy supply. The various countries involved should settle major international energy disputes through dialogue and consultation. Energy issues should not be politicised, and the use of force and armed confrontation should be avoided. (IOSC, 2012)

Features of Chinese perspectives on global energy governance

Statements from the Chinese government on global energy governance show that China's understanding has developed since 2010. The following observations stand out:

- **China has begun to pay serious and close attention to global energy governance.** The government is trying to make China an active participant, builder and contributor in the existing energy governance system, gradually shifting the country's role from that of an outsider to insider, from follower to influencer.
- **China has formed a view that global energy governance is for mutually beneficial cooperation, not a zero-sum game.** Mutual benefit and win-win are the foundations of international cooperation. China acknowledges the benefit of global energy governance as a platform to discuss multilateral energy co-operation, and thus has moved from traditional bilateral thinking towards multilateralism. The country embraces the idea that global energy governance – part of global economic governance – can serve as a strategic tool to enhance energy partnerships and leverage collective strength. The emerging awareness that energy challenges such as energy security, economic growth and sustainable development can be better addressed and solved through stronger international co-operation is shaping this view.

The country is keen to strengthen energy dialogues and negotiate on global energy governance issues on an equal footing with other countries.

- **China now recognises global energy governance as a tool to address energy challenges and opportunities in the Chinese context, in particular for energy security.** Given China's huge volume of energy imports, energy security and market stability are the primary areas of interest for China in global energy governance discussions. It is widely accepted in China that being more engaged in global energy governance will help create an environment favourable for energy security and will support China's endeavours towards inclusive and sustainable development. In addition, it is also expected that energy equipment manufacturing, energy infrastructure construction and associated energy services could spur economic growth, provided global standards are established.
- **China is clearly seeing a congruence of interests between its domestic energy agenda and the global energy agenda, which can be addressed simultaneously to support both China's and the world's sustainable growth.** Air pollution, high on China's domestic agenda, can be addressed by reducing and prohibiting the use of inefficient coal-fired plants. This is also a contribution to addressing the global challenge of climate change. Awareness is growing that international energy co-operation will help China find a viable way to address its own energy problems.

However, this growing awareness does not mean that China fully accepts the existing global energy architecture. China's view is that all countries should participate and benefit, and while the Chinese government respects the existing global energy framework, it considers it is in need of certain reforms, particularly in the area of inclusiveness. China would like to have a stronger voice and believes mutual benefit should be the foundation for co-operation in global energy governance.

China's participation in global energy governance

Historical development

China's engagement in global energy governance did not happen overnight. Development has followed a relatively clear trajectory, from the time when China was an energy-independent outsider isolated from the international community, to its present state as a huge energy consumer with strong insider influence in global affairs. The transition can be seen as that of a follower to an influencer, as China's participation turned from passive acceptance to proactive engagement and shaping.

- The country remained outside all international energy entities before the reform and opening up of the late 1970s.
- China acquired membership in the World Energy Council (WEC) and established a national WEC committee in 1983 as a first step to engaging in global energy governance. Unfamiliar with international rules and worried its own interests would be compromised, it took cautious steps in engaging with international energy entities, with the objective of exploring the outside world and learning how to abide by international rules.
- From the 1990s, China has taken a more proactive role in global energy governance with growing self-confidence to adapt to globalisation. The turning point was joining the Asia-Pacific Economic Cooperation (APEC) Energy Working Group in 1991 together with Chinese Taipei and Hong Kong, China, followed by increased co-ordination with international energy entities. Still, however, the country did not become deeply involved in international energy events, and engagement in global energy governance remained more symbolic than substantive.
- From the beginning of the 21st century, coinciding with the global shift from a unipolar to a multipolar system, China began making more concrete contributions to global energy issues

and indicated a desire to exert more influence. It has become a member, an association country, a partner country or an observer with international energy organisations such as the International Energy Agency (IEA), the International Energy Forum (IEF), the Organization of the Oil Exporting Countries (OPEC), the Energy Charter, the International Atomic Energy Agency (IAEA) and the International Renewable Energy Agency (IRENA). China also began to play a key role in major international and regional entities with mandates broader than energy, such as G20, BRICS, APEC and the Shanghai Cooperation Organisation (SCO). It became a founding member of many international energy entities, such as the IEF, Joint Organization Data Initiative (JODI), the International Partnership for Energy Efficiency Cooperation (IPEEC) and Clean Energy Ministerial (CEM). The country actively participates in and hosts many international energy conferences.

Table 2 • Development of China's engagement in global energy governance

Period	Level of engagement	Milestone events
Pre-1980s	No engagement	Began exporting oil, without communication with international energy entities.
1980s	Start of engagement	Acquired membership in the WEC in 1983. Joined IAEA in 1984.
1990s	More active engagement	Together with Hong Kong, China and Chinese Taipei, joined the APEC Energy Working Group in 1991. Signed UNFCCC treaty in 1992. Established co-operation relationship with IEA in 1996.
Since 2000	More influential engagement	Became a founding member of JODI in 2001. Established co-operation relationship with Energy Charter in 2001. Became a founding member of IEF in 2002. Established co-operation relationship with OPEC in 2005. Became a founding member of SCO Energy Club in 2007. Became a founding member of IFNEC in 2010. Involved in in-depth energy discussions under the G20 process since the early 2010s. Joined IRENA in 2014.

Source: IEA research.

Although engagement in global energy governance deepened significantly in recent years, China clearly sees that it can be further improved. The Chinese government described the country's engagement in 2006:

Overall, the level of China's participation in global energy co-operation was weaker than the level in regional energy co-operation. At the global level, China was basically excluded from major energy organisations. China had a vast market, but from the perspective of global energy organisations, China was still a small partner, which lacks an adequate voice. Although China had comparatively active energy co-operation at the regional level, due to lack of co-operation in the framework of international organisations, the level of co-operation needs to be further deepened. Therefore, China should deepen co-operation with international energy organisations and expand co-operation with regional organisations. We can consider the creation of an international political framework for energy co-operation in the existing international organisations, in particular in such organisations that China acts as an important or principal member. When the time comes, China should join some emerging energy consuming countries to create a more conducive international organisation to safeguard her interests. (NEA, 2006)

This statement indicates that in 2006 China was considering "the creation of an international political framework for energy co-operation in the existing international organisations, in particular in such organisations that China acts as an important or principal member." The

intention to make better use of multilateral platforms and to exert influence in them to become an influencer rather than a follower is clear.

- In 2014, China took a leading role in drafting the G20 Principles on Energy Collaboration. The country joined the IEA Association in 2015; it also took an active part in the restructuring and reform of the IEF and the Energy Charter.
- China began to make new proposals and create new initiatives. It was one of the first countries to promote APEC Low-Carbon Town Projects in 2010 and, during the APEC Energy Ministers Meeting held in China in 2014, China proposed to host the APEC Sustainable Energy Centre (APSEC). In 2013 China proposed to initiate the Top Ten Energy Efficiency Best Practices and Best Available Technologies Task Group (TOP TENs) in the IPEEC framework. In 2015, China proposed discussions on establishing global energy interconnection to facilitate efforts to meet the global power demand with clean and green alternatives.
- To be able to negotiate and discuss global energy governance issues effectively, China sent staff to international entities to learn their systems and better understand international energy development trends. There are a limited number of Chinese permanent staff in international energy entities, such as the IAEA. In 2010 the NEA initiated a secondment programme with the IEA, Energy Charter and APEC. The Ministry of Science and Technology (MOST) also joined the NEA in sending secondees in 2013. These staff gained valuable knowledge and experience, and in turn helped build closer ties between China and these organisations. China has recently aimed higher by seconding high-level officials to work in international energy entities, such as the IEA, and encouraging Chinese nationals to run for high positions in entities such as the IEF.

Like other economies, China believes the creation of a truly integrated global energy governance mechanism that can manage all aspects of energy is unlikely in the near term. However, China foresees the G20 possibly becoming a major platform for this purpose. Former Chinese Premier Wen Jiabao has called on participants at the World Future Energy Summit in Abu Dhabi to

consider establishing, under the G20 framework, a global energy market governance mechanism that involves energy suppliers, consumers and transit countries under the principle of mutual benefit. We need to formulate just, equitable and binding international rules through consultation and dialogue, and set up multilateral co-ordination entities covering forecast and early warning, price co-ordination, financial regulation and emergency response so that the global energy markets will be more secure, stable and sustainable. (Wen, 2012)

Although his recommendation has not yet been implemented, using the G20 forum for further alignment of global energy governance is nevertheless regarded as feasible, as it can pool the wisdom of various co-operation entities without establishing a completely new entity, and has the flexibility to examine various energy issues in response to changing international circumstances.

Box 1 • China and the 2016 G20 presidency

In 2016, China will host the G20 Summit under the theme “Towards an innovative, invigorated, interconnected and inclusive world economy.” In the energy sector, the G20 Energy Ministerial Meeting and three G20 Energy Sustainability Working Group Meetings (G20 ESWG) will take place in China. The country intends to take this opportunity to address critical energy issues with a broad vision, with major outcomes such as 2016 G20 Energy Ministers’ Beijing Communiqué, Joint Action Plan on Clean Energy and Joint Action Plan on Energy Efficiency. In terms of global energy governance, issues including an enhanced energy dialogue under G20 framework, further strengthened coordination among international organisations, as well as deepening involvement of emerging and developing countries will be discussed.

Balancing bilateral and multilateral energy co-operation

Over the years, China has developed its own strategy for international energy co-operation, diversifying its foreign energy partnerships while balancing bilateral and multilateral co-operation. According to the NEA, China has established 42 bilateral energy co-operation mechanisms, covering the world's major energy consumers and producers. Meanwhile, it co-operates with 26 international energy organisations and forums, deepening international co-operation in the field of energy (NEA, 2016).

Bilateral and multilateral co-operation did not develop simultaneously: in the early phase of international energy co-operation, China preferred bilateralism focused on specific energy projects, as it was easier, more efficient and generally produced more concrete business outcomes. Bilateral entities focused mainly on facilitating the exchange of information to gain mutual understanding of energy and mineral resource policies and issues. Entities also promoted trade and investment to enhance bilateral co-operation and to stimulate commercial relationships to the benefit of both sides.

Deepening global interdependence and China's growing weight in global energy issues made the government aware of the need to better balance traditional thinking – relying only on robust bilateral initiatives – with a sound multilateral approach. This shift is understood to represent serious engagement on the part of Chinese leaders, as they consider that the complementarity of both approaches can create a better external environment for energy security, economic growth and sustainable development.

Bilateral approach

China has established bilateral energy co-operation dialogue mechanisms with nearly 30 partner countries which are generally large in size economically or rich in energy resources (Annex 2). In most cases there is a single “take-all” mechanism between China and the country, but in some cases there are energy entities that focus on specific energy sub-sectors such as coal, oil and gas, renewables and energy efficiency. Sometimes higher-level entities covering political and economic issues within energy have been created, which may provide “package solutions” to energy-related issues.

Multilateral approach

China engages with over 20 multilateral intergovernmental entities as a way of effectively and efficiently complementing its bilateral co-operation. There are two types of such entities:

- Specialized multilateral entities that are dedicated to energy issues or to a subset of energy issues. China is a member of IEF, IRENA and the International Atomic Energy Agency (IAEA), and has developed co-operation channels with the IEA, OPEC and the Energy Charter (Annex 3).
- Comprehensive multilateral entities that address energy issues as part of a wider mandate, including frameworks, platforms, partnerships, forums or other initiatives, such as the G20, BRICS, SCO, the Gulf Cooperation Council (GCC) and the Asia Cooperation Dialogue (ACD) (Annex 4).

Although most academic research on global energy governance focuses only on specialized international energy organisations or institutions, from the Chinese perspective and practice all multilateral entities are important and seen as “instruments of global energy governance.” While the specific energy technology expertise of regional economic entities may be more limited than that of specialist energy agencies in some areas, regional knowledge and strong local networks are valuable for engaging a wider range of countries and mobilising regional resources. These

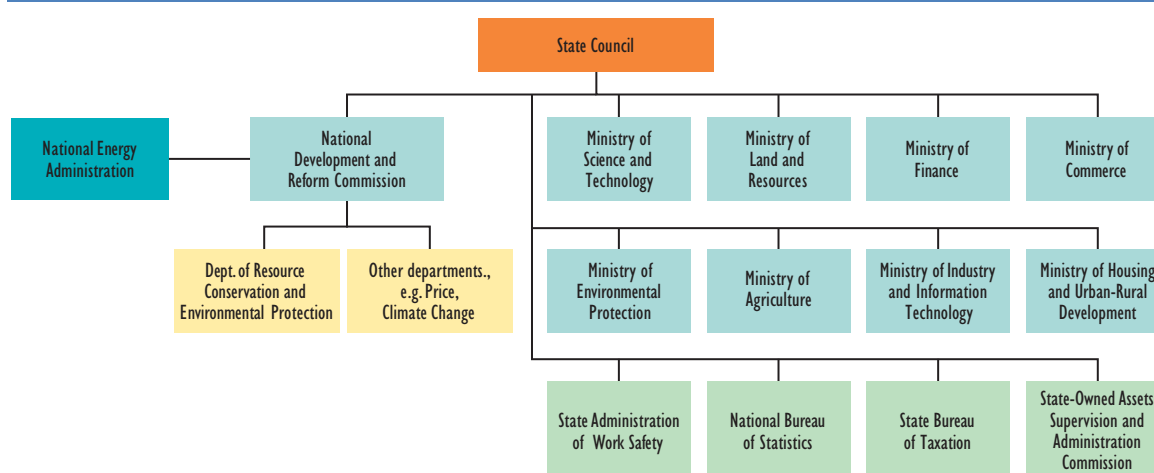
broader entities can incorporate energy with other important political or economic issues and produce comprehensive solutions (IEA, 2014a).

Chinese participants in global energy governance

The Chinese central government is a key player in global energy governance issues, led primarily by the NEA. It is responsible for 1) organising and pushing forward international co-operation in the energy sector, negotiating and signing agreements with foreign energy authorities and international energy organisations according to its division of work, and co-ordinating energy development and utilisation abroad; and 2) approving or reviewing major overseas energy investment projects (coal, oil, natural gas, electricity, etc.) according to regulations.

Many other government bodies (for example the Ministry of Foreign Affairs, Ministry of Finance, the NDRC, Ministry of Commerce and MOST) are also intensively involved in global energy governance through responsibilities assigned by the State Council (Annex 1).

Figure 1 • Key government bodies overseeing energy issues



Source: IEA research.

Although global energy governance is based on multilateral and treaty-based relations among countries, it is increasingly influenced by non-governmental actors such as companies (including public sector state-owned enterprises [SOEs] and private sector companies), non-governmental organisations (NGOs) and research institutes. For example, in recent years the largest Chinese energy companies China National Petroleum Corporation (CNPC, one of the world's largest oil companies) and State Grid Corporation of China (SGCC, the world's largest power grid company) established strong connections with many specialized energy entities.

Table 3 • Chinese non-governmental participation in specialized energy mechanisms

Mechanism	Participation
IEF	CNPC is a member of the IEF Industry Advisory Committee.
IEA	SGCC is a member of the IEA Energy Business Council and Beijing Energy Club, and was also invited to Energy in Buildings and Communities (EBC) meetings. Shenhua Group is a member of the IEA Coal Industry Advisory Board.
Energy Charter	CNPC is a member of the Energy Charter Industry Advisory Panel.
WEC	SGCC is a member of the Global Electricity Initiative, launched by WEC and World Business Council for Sustainable Development.

Source: IEA research.

Implications of China's engagement in global energy governance

China's remarkable economic development is tied to rapid adoption of international rules. China's participation in the multilateral trade regime began when it joined the World Trade Organization (WTO) in 2001. By 2013 it had overtaken the United States as the country with the largest trade volume. China is willing to take advice and technical assistance from global organisations and entities, and does not hesitate to apply it domestically if it is deemed useful and feasible in addressing domestic challenges. Despite unique domestic circumstances, it is generally observed that China is ready to accept the international rules of globalisation and to push forward domestic policy reforms for a more market-oriented economic system.

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Over a lengthy period of time, there was debate in China on whether energy is a consumer good or a social welfare/quasi-public product. It was finally concluded that energy is a consumer good, subject to market rules. During the third plenary session of the 18th Communist Party Central Committee held in November 2013, it was requested that the market play a decisive role in resource distribution by the end of 2020, including in the energy sector.

Against this background, and spurred by climate change mitigation and the transition to the “New Normal” economy, China has embarked on an ambitious and unprecedented market-oriented programme of energy reform. The basic idea of the reform is to institute a modern energy market system by 2020, founded on openness, competition and order. The reform is intended to be a solution to domestic challenges, but could also be an opportunity for wider engagement in global energy governance.

Box 2 • Main areas of energy reform in China

Energy market system: Separation of natural monopolised segments and competitive services segments is expected, leading to full opening up in competitive services segments. Investor diversity is encouraged through a market access negative list system which offers all types of market players equal access. SOE reforms will focus on improving competitiveness and creating better standards of incentive and evaluation. Crude oil futures markets and futures hedging are encouraged.

Energy prices: Pricing reforms in oil, natural gas and electricity are expected, with a focus on liberalisation of the competitive services segment. The market will determine the natural gas wellhead price and sales price, as well as feed-in tariffs and power retail price. The government will continue to determine the cost of power transmission and distribution, as well as oil and gas pipeline transportation.

Power grid, and oil and gas pipelines: The focus is on reform of the construction and operation of the power grid, as well as oil and gas pipelines, with operators newly defined as service providers. Power sector reform is to be accelerated through a competitive power trade platform encouraging direct trade between power generators and end-users.

Energy laws and regulations: Enactment of the Energy Law and revision of the Electricity Law and the Law on Coal will be accelerated. Enactment or revision of administrative regulations on protection of offshore oil and gas pipelines, nuclear power management and energy reserves will be pushed forward.

Government functions and energy regulatory system: The government's role in drafting and implementing energy strategies, planning, and enacting policies and standards is to be strengthened. Less government intervention in the detailed operation of the energy sector is advocated, and the government will streamline administration as well as cancel more administrative approval items or delegate to lower-level government authorities.

Sources: Energy Development Strategy Action Plan (2014-2020); State Council (2014).

China still has room for progress in global energy governance; further engagement in a more proactive and constructive way will have stronger implications on China. A study conducted by China ERI and others raised the following points:

- China's limited experience of international energy governance has impaired China's effectiveness in influencing international energy policy.
- China lacks an international voice in key areas such as energy prices and emergency response.
- China sometimes encounters unfair treatment in international energy investments.
- China is not able to make the most skilful use of legal means to protect its interests in international trade disputes.
- The positive contributions of China to the international energy market, including overseas oil and gas investment, and the contribution of new energy products and manufactured goods, does not receive due recognition but is rather received with suspicion and accusations. (ERI et al., 2014)

However, the situation is improving as China and the rest of the world begin to share the view that China's domestic interests and the world's collective interests in energy security, economic development and sustainable growth are compatible. Although China's role in global energy governance is larger than that of other emerging or developing countries, it is still not reflective of its importance in global energy issues. It is recognised that China's deeper engagement must be addressed to improve the structure of global energy governance, and there is no doubt that the country will pursue a greater role in years to come.

Drivers of change

China is not isolated from dynamic shifts in the global energy arena. The country's presence in global energy governance is consistent with its political and economic agenda for openness and multilateralism. It has responded to energy developments across the globe and the international call for alignment in global energy governance.

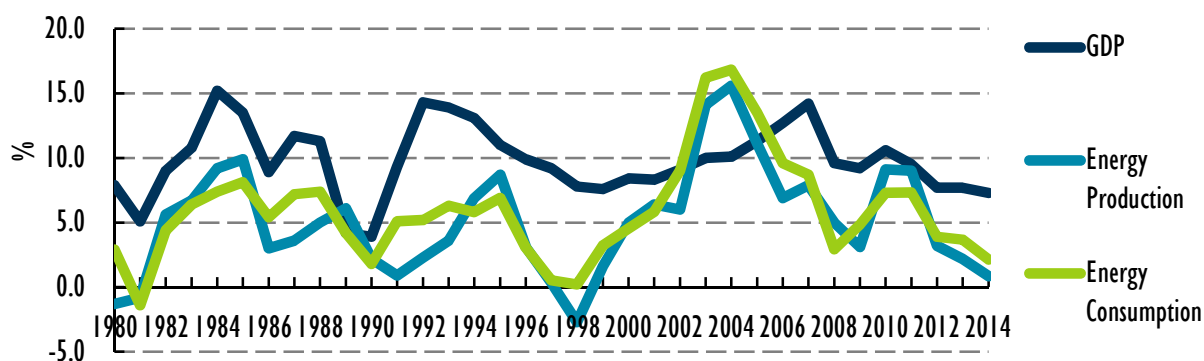
Energy interdependence between China and the world

Features of Chinese energy consumption

Surging Chinese energy demand has had global implications, as China looks to secure supplies by diversifying sources and to develop alternative energy production and conservation technologies. China's energy consumption can be summarised in five points.

First, there have been energy demand surges in the past two decades (1995-2015), but demand growth has been declining overall in recent years under the "New Normal Economy," in which old industries are in decline while goods consumption, services and technology are on the rise. The country needs to balance steady growth with structural adjustment through further reform and opening up to the rest of the world, maintaining economic momentum with a moderated rate of growth.

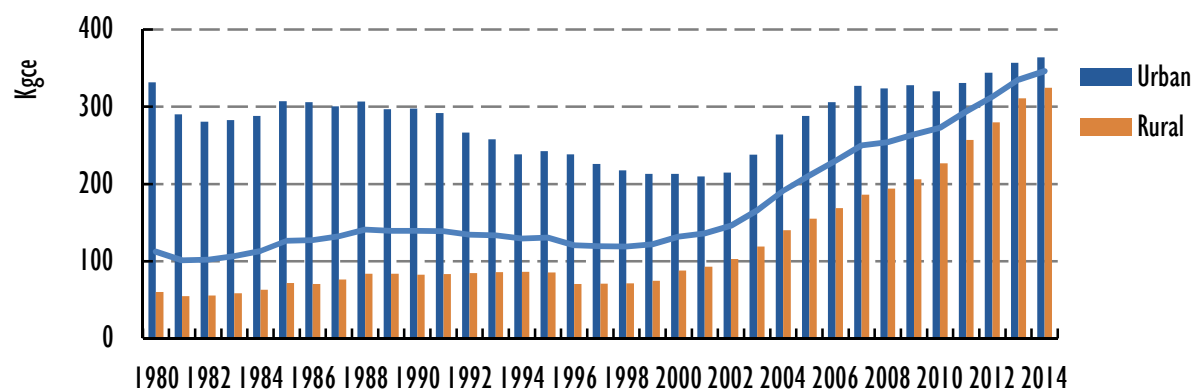
Figure 2 • Growth of gross domestic product (GDP), energy production and consumption (%)



Source: China Statistics Press (2015).

Second, with continued efforts to improve domestic energy supply, China's energy consumption per capita has surpassed the world average. Disparity between urban and rural areas has decreased dramatically.

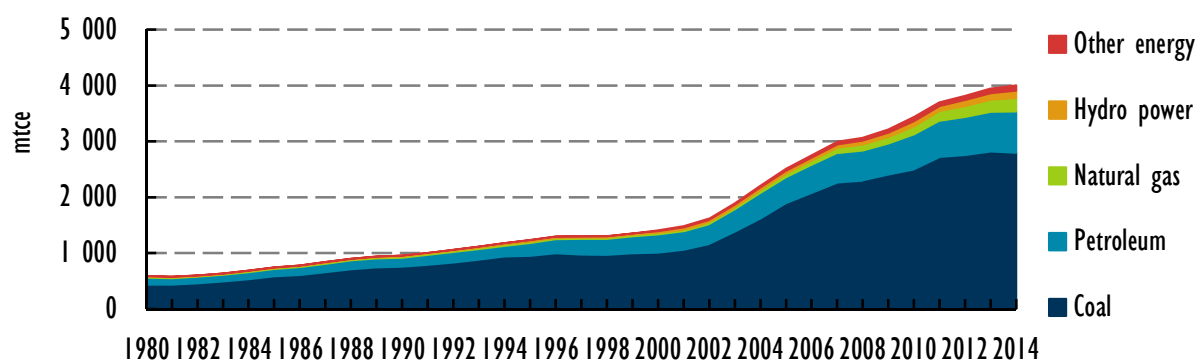
Figure 3 • Residential energy consumption per capita (kilogrammes of coal equivalent [kgce])



Source: China Statistics Press (2015).

Third, coal dominates energy consumption, but its market share is gradually decreasing as other energy sources grow rapidly. The International Energy Agency (IEA) assesses that Chinese coal use could have peaked in 2013.

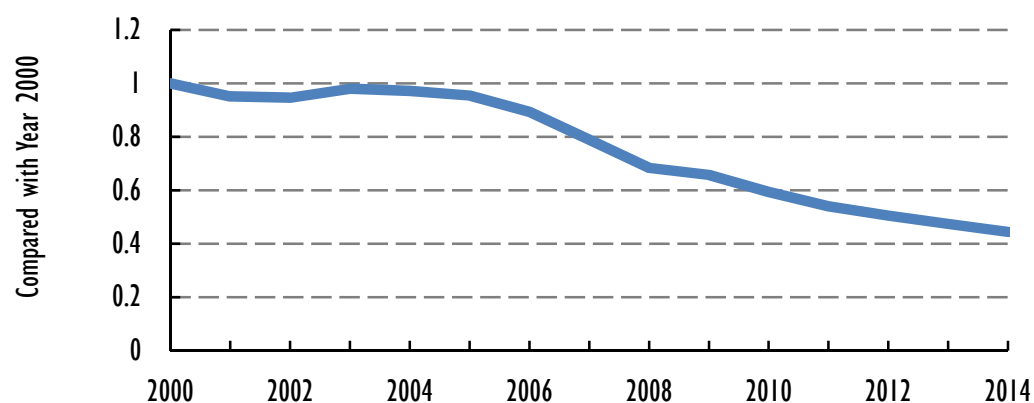
Figure 4 • Energy consumption by fuel (million tonnes of coal equivalent [Mtce])



Source: China Statistics Press (2015).

Fourth, growth in energy consumption was accompanied by a dramatic decline in energy intensity (i.e. energy consumption per unit of gross domestic product [GDP]) over the 1995-2015 period, partly from energy efficiency improvements and the development of new technologies.

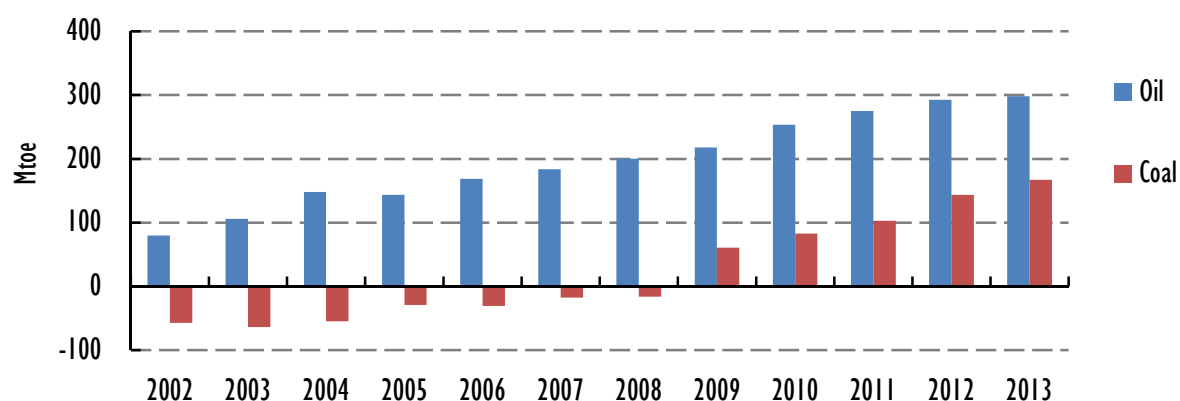
Figure 5 • Energy intensity (total energy consumption /GDP, compared with Year 2000)



Source: China Statistics Press (2015).

Finally, China was largely self-sufficient in natural resources and energy, but since the rapid economic growth of the mid-1990s it has become increasingly dependent on international markets for the resources and energy it needs to sustain growth. Coal imports increased rapidly from 2002 to make the country a net coal importer in 2009, with imports coming mainly from neighbours in Asia, Australia and Russia. Natural gas imports rose rapidly with continually increasing demand, and China became a net natural gas importer in 2007, importing mainly from Australia, Turkmenistan, Indonesia, Malaysia and Qatar. Oil demand has also increased faster than domestic production, making China a net importer of petroleum since 1993. In 2013, energy self-sufficiency in China had declined to 86%.

Figure 6 • Net energy imports (million tonnes of oil equivalent [Mtoe])



Source: China Statistics Press (2015).

More energy industry co-operation with the world

These days, the energy demand landscape is moving to the Eastern Hemisphere. Although most countries strive for energy independence, energy remains a sector that requires international cooperation, thus creating interdependence among countries. China and the world share a broadening range of energy challenges and opportunities as they are brought close in an interdependent energy relationship.

To meet the objective of providing sufficient energy supply, China must interact with other countries. The “Going Abroad Policy”(zouchuqu zhanlue) is set to play a key role in transforming China’s foreign diplomacy and its political-economic agenda. It is complemented by a reallocation of resources through a mix of government efforts and market forces.

Looking into the past, it is observed that the Chinese oil industry in particular went through a set of development stages from the early 1950’s to today – from outsider to insider in the international energy market.

Table 4 • Development of China’s oil industry

Phase	Features
1950s-1970s	Self-reliance and self-sufficiency considered the key objectives of energy policy. Historical exploration and development achievements in Daqing City of Northeast China. Domestic oil production reached self-sufficiency in mid-1960s.
1970s-1980s	In 1973, China started oil exports in exchange for foreign currency. In 1978, start of reforms and opening-up policy on a large scale. Self-reliance and self-sufficiency still considered the key objectives of energy policy. Offshore oil exploitation started with the establishment of China National Offshore Oil Corporation (CNOOC) in 1982.
1990s	Oil self-sufficiency ended in 1993 when it was forced to begin importing oil to meet domestic demand. China National Petroleum Corporation (CNPC) and China Petrochemical Corporation (Sinopec) were created after reconstruction of the oil and gas sector. Enterprises start to seek oil and gas in foreign markets. First overseas investment project by Chinese oil companies in Peru in 1993. In 1998, the government introduced “Oil & Refined Oil Price Reform Program,” which started the alignment of domestic prices to international prices. Nationwide state-owned enterprises (SOEs) reform to increase competitiveness.
2000s-present	China acceded to World Trade Organization (WTO) in 2001 and Chinese companies became more competitive globally. Government encouraged companies to compete in the international market through the “Going Abroad” policy. After the global financial crisis in 2008, China’s oil companies quickly expanded overseas businesses. China’s investment in resource and energy sectors increased dramatically, sometimes with the support of government financial measures such as loans-for-oil deals.

Source: IEA research.

Not only in the oil industry, but in all energy sub-sectors, Chinese companies (both public and private) invested and co-operated internationally under the framework of the “Going Abroad” policy. During this process, Chinese companies found it useful to join international industry associations, which may have spurred enthusiasm for global energy governance (China joined its first energy-related industry association, the World Petroleum Council [WPC], in 1979).

Table 5 • China's presence in international energy industry associations

Sub-sector	International industry association	Co-operation with Chinese companies and associations
Oil and gas	World Petroleum Council (WPC)	China has been a very active member of the WPC since 1979. In 1997, China hosted the 15th World Petroleum Congress in Beijing. In 2001, the first WPC Asia meeting was held in Shanghai. The first WPC Youth Forum was held in Beijing in 2004. Current members of the WPC Executive Committee include a Vice President from CNPC.
	International Gas Union (IGU)	IGU established contact with the Chinese government and gained its support to hold a natural gas forum in China in 2016. China Gas Society, based in Tianjin, is a charter member of IGU. China LNG Association, based in Shanghai, and China National Petroleum Corporation, based in Langfang, are association members of IGU.
Coal	World Coal Association (WCA)	China National Coal Association is an associate member and Shenhua Group (the largest coal producer in China) is a corporate member of WCA.
Nuclear	World Nuclear Association (WNA) World Association of Nuclear Operators (WANO)	China National Nuclear Corporation (CNNC), China General Nuclear Power Group (CGN), State Nuclear Power Technology Corporation (SNPTC) and/or their subsidiaries have memberships in WNA and/or WANO.
Hydropower	International Hydropower Association (IHA)	In 2010, IHA opened a regional office in China. Executive vice president of China Three Gorges Corporation serves as a board member of IHA. In 2015 China hosted the 5th World Hydro Congress in Beijing.

Source: IEA research.

China's evolving views and practices in global governance

Consistency with foreign policy

Global energy governance, as well as global financial governance and other areas of governance, are subfields of global economic governance, which itself is a subfield of overarching global governance. Global governance addresses, but is not limited to, geopolitics, peacekeeping, communicable diseases, cultural diversification, industry structure reform, trade and investment, finance and currency, energy landscape, environmental protection and internet governance.

Global governance has become a fashionable topic in China in recent years. A good deal of conceptual thinking about global governance is taking place, at both official and academic levels, especially in the past three decades and with the country's economic ascendancy. Chinese views on international order and global governance have been shaped and reshaped continually by domestic and international developments. Deepening involvement in the processes and systems of globalisation, the emergence and exacerbation of many transnational problems such as climate change, environmental pollution, proliferation of communicable diseases and, of course, financial turbulence, as well as the incremental dependence of China's economy on the world market, have made China realise the necessity of participating in global governance. In addition to these external factors, internal factors have motivated China to engage in global governance — or rather, internal changes have been decisive in its adaptation to global governance.

China entered the era of reform and opening up in the late 1970s. Access to the outside world enabled exceptional economic growth and dramatic changes in China's engagement in global governance. These changes were consistent with the development of China's diplomatic strategy.

- In Mao Zedong's era, China developed the Five Principles of Peaceful Coexistence and a long-lasting friendship with other developing countries in Asia, Africa and Latin America (historically identified as the "Third World bloc").
- In Deng Xiaoping's era, an opening up and reform strategy as well as his famous counsel to "keep a low profile and get things done" (*tao guang yang hui, you suo zuo wei*) guided China's foreign relations. The country had begun participating in economic multilateralism and showed a willingness to learn international rules, though it kept a low-profile in seeking membership in international institutions.
- In the 21st century, China has taken a more active role in the international community. The size of the economy, its trade surplus and financial reserves, and growing familiarity with international rules have given Chinese leaders more confidence to express views on global affairs. By 2003 China had become a member of 298 international organisations and Chinese organisations were members of 2 659 transnational organisations (Wang and Rosenau, 2009).
- Some commentaries say that the 2008 global financial crisis triggered a great challenge to the traditional architecture of global governance. China's extraordinary performance during the crisis by virtue of its unique political and economic systems elevated its role in this new international financial system. Consequently China, as an emerging power, has shown even stronger presence and a greater voice in global governance in general, and global financial governance in particular. Recently there has been outspoken demand for necessary reform of the global governance architecture by President Xi Jinping, who has injected new elements into China's foreign policy.

Box 3 • President Xi Jinping's innovations in foreign policy

- The leading role of the United Nations (UN) in global governance is emphasised, including in new co-operation areas such as counterterrorism and cyber security.
- A new concept of the Chinese Dream (*zhongguomeng*) aimed at creating a strong and wealthy China at peace with outside powers has been created.
- Major countries should adopt the "New Model of Major-Country Relations" to develop co-operative relations.
- The "Belt and Road" (the Silk Road Economic Belt and the 21st-century Maritime Silk Road), a new initiative for large-scale, cross-continental economic development inspired by historical trading routes, will be constructed.
- New international economic and financial institutions such as the Asian Infrastructure Investment Bank (AIIB), the New Development Bank and the Silk Road Fund will be established to meet changing global financial demands.

Source: Xi (2014d).

New concept of a global governance system

With its substantial economic achievements as the world's second-largest economy, China seeks out a greater voice and a share of global leadership in addressing the world's problems. Under President Xi Jinping, this drive for a broader global role and stronger influence has become explicit.

In 2015, at a study session of the Political Bureau of the Communist Party of China Central Committee, President Xi Jinping stressed an urgent need to strengthen global governance and

reform the system in light of growing global challenges. He called for establishing new entities and rules for international economic and financial co-operation and regional co-operation, and reforming “unjust and improper arrangements in the global governance system”. He also advocated democratic and law-based rules to guide global governance so that the global governance system represents the will and interests of a majority of countries in a more balanced manner (Xi, 2015a).

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A month later at the Paris climate summit (December 2015), he illustrated the Chinese perspective of global governance, stressing the need to create a future of co-operation with more sharing and more responsibility in which all economies benefit, abandoning the narrow mentality of a “zero-sum game”; a future of fairness and justice, ensuring effective compliance with and enforcement of international rules, adhering to democracy, equality and justice, and establishing international rule of law; and a future of inclusiveness, mutual learning and common development, and harmony in diversity to allow different countries to seek measures most suitable to their own national conditions (Xi, 2015b).

The Asian Infrastructure Investment Bank (AIIB) and the New Development Bank (often called the BRICS bank, with Brazil, Russia, India and South Africa; headquarters to be based in Shanghai, China), were widely regarded as the embodiment of these aspirations. The opening of the AIIB in January 2016 offered the prospect of global governance from a different perspective.

Box 4 • Establishment of AIIB

Chinese President Xi Jinping and Premier Li Keqiang announced the AIIB initiative during their respective visits to Southeast Asian countries in October 2013. The Bank was envisaged to promote interconnectivity and economic integration in the region and co-operate with existing multilateral development banks. Following this announcement, bilateral and multilateral discussions and consultations commenced on core principles and key elements for establishing the AIIB. In October 2014, 22 Asian countries gathered in Beijing to sign the memorandum of understanding to establish the AIIB. Representatives from the prospective founding members gathered in June 2015 in Beijing at a signing ceremony of the Bank's articles of agreement, and the AIIB held its opening ceremony in Beijing in January 2016. The Beijing-based AIIB has USD 100 billion in equity and 57 founding members.

Source: www.aiib.org

Transition in global energy governance

Call for effective governance

Following dynamic global changes, energy governance has been an evolving concept, initially targeting prevention of energy interruption in the 1970s, then turning to the healthy functioning of global energy markets (reducing fossil fuel subsidies, data transparency, the Extractive Industries Transparency Initiative (EITI), energy trade and investment rules), and now in the 21st century focusing on promoting clean energy and technologies, and addressing climate change. In an interdependent world, a more coherent, transparent and representative global energy governance regime is critical to achieving energy security, economic growth and sustainable development.

To be effective and responsive to new global energy priorities, global governance must be more inclusive, dynamic and able to span national and sectoral boundaries and interests (Boughton and Bradford, 2007). Some academics argue that current global energy governance is fragmented, byzantine, inflexible and largely designed as a response to the energy challenges of the 1970s. Further, no existing energy governance body brings together all economies on an equal footing,

and there is no single global institution equipped with the ability to provide “strategic thinking about rules, co-operation or policy co-ordination for global energy” (Jorgensen, 2014).

Areas that have been identified as possible blind spots of global energy governance by Chinese and other academics include:

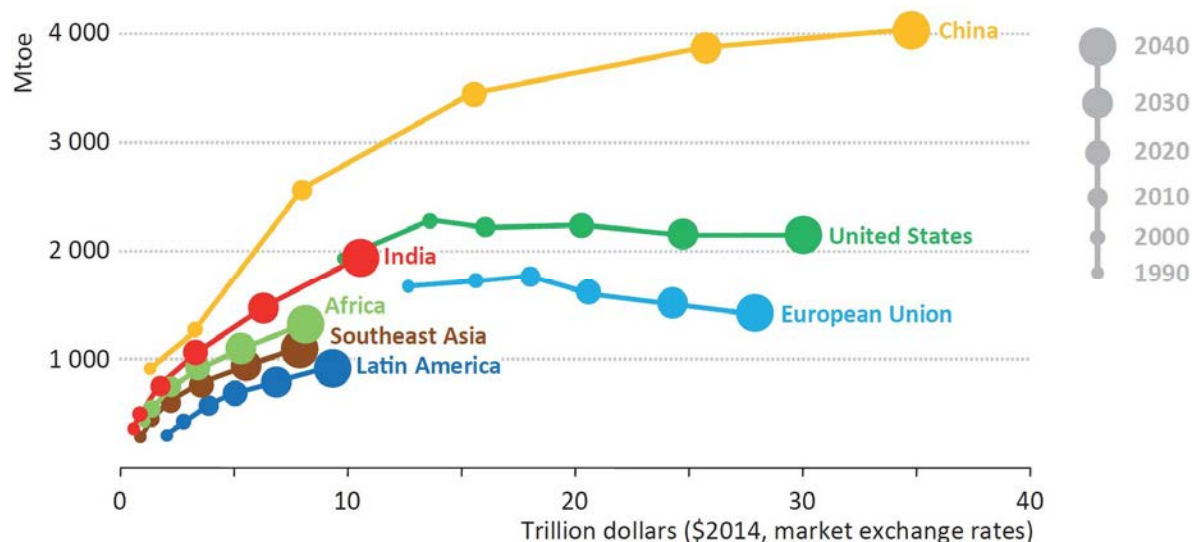
- lack of voice given to large developing countries
- lack of energy market financial regulatory mechanisms
- lack of intellectual property protection, not only to protect the energy sector but to promote technology dissemination
- insufficient attention to the problem of fuel poverty
- lack of international governance for low-carbon energy policies
- lack of energy transit governance mechanisms to resolve disputes (ERI and Grantham Institute, 2014).

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Two global energy governance needs can be identified as the most urgent:

- There is a growing consensus worldwide of the need to boost the representation and voices of emerging economies and developing countries. As emerging countries have grown in the last two decades, so has global energy governance. However global energy governance seems to have evolved at a slower pace than the world economy. Large emerging economies are calling for democratic and balanced global governance, giving developing countries an active voice in defining their own futures.

Figure 7 • Primary energy demand and GDP outlook by selected region, 1990-2040 (Mtoe)



Source: IEA (2015a), *World Energy Outlook 2015*, OECD/IEA.

- As countries transition to low-carbon energy and greater opportunities arise for energy to be produced domestically, traditional thinking on global energy governance needs to be revised in order to secure a cost-effective and sustainable energy future. Energy accounts for around two-thirds of global greenhouse gas emissions. Governance challenges to addressing climate change concerns are significant, as are the environmental costs of energy choice and use. Aligning global efforts to promote energy technology innovation and investment to support both economic growth and energy access are essential. At COP21 in Paris in December 2015, new initiatives such as Mission Innovation were launched. Clean energy technology development has become a global priority requiring global efforts, regardless of whether a country is developed or developing.

Efforts in aligning governance

Recent academic analysis has focused on the need for reforms in the current system of global governance, whether it be advancing new norms and principles or creating new institutions. Accordingly to this thinking, chief obstacles to change have typically fallen within three categories: 1) a lack of political will to change, particularly among powerful countries capable of obstruction; 2) failure to effectively design and advocate a specific policy or institutional reform; and 3) limited skill and effort invested in sustaining a reform programme through to completion (CGSJG, 2015). These could potentially also apply to reform in global energy governance.

Intermittent efforts to reform of global energy governance have resulted in three major achievements in aligning governance. First, Group of Twenty (G20) leaders endorsed the G20 Principles on Energy Collaboration in 2014, in which a common understanding was shared that international energy institutions should be more representative and inclusive of emerging and developing economies, and that coordination between international energy institutions should be enhanced and duplication should be minimised where applicable. It also identifies the importance of energy access for all, energy markets, energy data and analysis, energy security, phasing out of inefficient fossil fuel subsidies, sustainable growth and development, and innovative and clean energy technologies. China took an active and leading role in drafting and negotiating the G20 Principles on Energy Collaboration.

Box 5 • G20 Principles on Energy Collaboration

- Ensure access to affordable and reliable energy for all.
- Make international energy institutions more representative and inclusive of emerging and developing economies.
- Encourage and facilitate well-functioning, open, competitive, efficient, stable and transparent energy markets that promote energy trade and investment.
- Encourage and facilitate the collection and dissemination of high quality energy data and analysis.
- Enhance energy security through dialogue and cooperation on issues such as emergency response measures.
- Rationalise and phase out inefficient fossil fuel subsidies that encourage wasteful consumption, over the medium term, while being conscious of the necessity to provide targeted support for the poor.
- Support sustainable growth and development, consistent with our climate activities and commitments, including by promoting cost-effective energy efficiency, renewables and clean energy.
- Encourage and facilitate the design, development, demonstration and widespread deployment of innovative energy technologies, including clean energy technologies.
- Enhance coordination between international energy institutions and minimise duplication where appropriate.

Source: www.g20australia.org

Second, more non-binding energy cooperation entities have been established. In recent decades, there has been a trend of establishing lighter and more flexible non-binding initiatives, partnerships or political forums. Organisations such as IPEEC, 3GF and SE4All are either small or established in a form of open community for global dialogue. The treaty-based energy organisations, such as the IEA, create a new horizon for collaboration with emerging economies

outside of legally-binding membership (IEA, 2014a). In November 2015, the IEA activated IEA Association, welcoming China, Indonesia and Thailand as Association countries. Association countries will expand existing cooperation with IEA in areas of energy security, energy data and statistics, energy policy analysis and others.

Third, existing cooperation entities have improved coordination among themselves. The IEA, IEF and OPEC now have working level symposiums on a regular basis to discuss methodologies used in their energy outlooks. Although the outcomes of the outlooks may be different due to their distinctive mind-sets and interests, it is beneficial to have on-going, shared efforts to enhance dialogue.

Energy security

The IEA defines energy security as “the uninterrupted availability of energy sources at an affordable price”. Energy security has many dimensions. Long-term energy security mainly deals with timely investments to supply energy in line with economic developments and sustainable environmental needs. Short-term energy security focuses on the ability of the energy system to react promptly to sudden changes within the supply-demand balance. Lack of energy security is thus linked to the negative economic and social impacts of either physical unavailability of energy, or prices that are not competitive or are overly volatile.

Energy security endures as a central concern in China and the rest of the world. Although the challenge of ensuring energy security is not unique to China, in China it is particularly acute as dependence on foreign oil exceeded 60% in 2015, a new historical high. China's sense of energy vulnerability is rooted in its perspective of national security, in which energy security figures strongly. The country needs to secure reliable energy markets, energy sources and transportation routes; this requires large-scale international co-operation. Sound emergency preparedness is also a pressing issue. Fortunately, China is eager to co-operate with other stakeholders to minimise energy security costs for all, rather than focusing solely on the most beneficial solution for China. In the latest energy policy white paper by the State Council published in 2012, China urges the energy security concept of “mutually beneficial (international) co-operation.”

Energy markets and long-term security

Energy security and market stability are the foundations of global energy governance. There is rising international consensus that energy security needs to be safeguarded through the smooth functioning of international markets (Graaf, 2013). Co-operation in a free and open global energy market, with orderly competition and efficient supervision, price and market stability, and equitable negotiation among consumers, producers and transit countries is needed. Market stability levers, notably increased market transparency through data sharing, well-functioning energy pricing system and enhanced energy policy dialogue, are also necessary.

Energy dialogue

With demand for energy exceeding domestic supply, and given the risks of geo-political change, China has developed a strategy to secure long-term oil supplies from abroad through diverse transportation routes. Apart from this, China realises that energy security can only be achieved collectively, especially through dialogue to share views on the market outlook, to deepen common understanding of political and economic issues and to ease tensions in a friendly and forward-looking way. Energy dialogue has therefore served as a main policy tool for China. Globally, there have been many entities created primarily to establish and conduct dialogue on improving energy security and streamlining energy strategies, acting as the nucleus of global energy governance. Although China has membership in only some of these entities, it is nevertheless in open dialogue with most of them.

The International Energy Forum (IEF) serves as a facilitator of global energy dialogue among producers and consumers. Valuing the neutrality of the IEF's dialogue platform, China is a founding member of IEF and a permanent IEF Executive Board Member. The country has sent delegations to all IEF biennial ministerials. China was involved in the process of IEF reform and in 2011 it signed IEF Charter at the Extraordinary IEF Ministerial Meeting convened in Riyadh.

As China's energy imports surge, the International Energy Agency (IEA) is increasingly being perceived as closely aligned with China's core energy security concerns. Although not yet a member of the IEA, China has been invited by the organisation to its energy ministerial meetings for years and the bilateral relationship has grown stronger in several areas (see Chapter 5). With

the activation of Association with the IEA in 2015, China is now invited to IEA meetings and China is expected to participate proactively in various energy discussions held under the IEA umbrella.

In the wake of an urgent rise in energy demand, China has also engaged in creating energy consumer dialogue platforms. In 2006, the Five Countries Energy Ministers' Meeting (China, India, Japan, Korea and the United States) was set up in an attempt to enhance long-term energy security. The mechanism was designed as a biennial event, with the first two meetings held in China (2006) and Japan (2008).

In addition to dialogue with consumers, China has shown interest in dialogue with producers. In the mid-2010s, China recognised that there was potential competition among oil producing countries to export to China. OPEC and the Gulf Cooperation Council (GCC) therefore both initiated energy dialogues with China in 2005, with the purpose of establishing a situation beneficial to all in the oil and gas industry. Both OPEC and the GCC made use of the dialogues to improve relations with their Chinese customers. Views were exchanged on energy issues of common interest, in particular security of supply and demand, as well as co-operation outcomes and prospects for future co-operation.

In December 2005, OPEC signed a joint statement with NDRC, in which both sides agreed to hold regular China-OPEC energy dialogues. In April 2006, the first China-OPEC High-level Roundtable on Energy was held at the OPEC headquarters in Vienna, followed by the second in Beijing in October 2007. After eight years of keeping in touch at working levels, the parties resumed the dialogues and the third Roundtable was held in Vienna in October 2015.

As the Gulf region is rich in oil and gas resources, oil is the major trade commodity and the main driving force in the China-GCC economic relationship. Saudi Arabia has long been the largest crude oil exporter to China, and being that China and GCC countries complement each other economically, both sides found it mutually beneficial to establish a free trade area (FTA). In 2014, FTA negotiations recommenced after a five-year break. Under the China-GCC Energy Experts Dialogue, a framework initiated by the NEA and the GCC, four meetings were convened: in Beijing in 2005, in Riyadh in 2008 and again in Beijing in 2013 and 2015. In addition, energy co-operation is one of the major topics in almost all other China-GCC co-operation frameworks, such as the top-level China-GCC Strategic Dialogue and the China-GCC Economic and Trade Forum.

The Gas Exporting Countries Forum (GECF) is a gathering of the world's leading gas producers, with the objective of increasing co-ordination and strengthening collaboration among member countries. So far there is no public reporting on formal relations between the GECF and China.

Co-operation based on a shared-neighbourhood philosophy is helpful in mitigating energy security risks. China has played an essential role in energy security discussions at the regional and sub-regional levels with the Asia-Pacific Economic Cooperation (APEC), the Association of Southeast Asian Nations Plus Three (ASEAN+3), the East Asia Summit, the Central Asia Regional Economic Cooperation (CAREC) and the Asian Energy Ministers' Roundtable. The Asian Ministerial Energy Roundtable was set up in 2005 and six biennial events have been held in India, Saudi Arabia, Japan, Kuwait, South Korea and Qatar, with energy producers and consumers as hosts in turn. China has sent high-level delegations to all roundtables to build and sustain partnerships with other Asian countries.

China is also trying to build institutional energy dialogue ties with other regions. It has established energy dialogue entities or is in the exploratory stage of doing so with Europe, Latin America, Africa and the Arab world (Annex 4).

Energy data

International relations literature has long argued that provision of information is a key global governance function of intergovernmental organisations, whose work in gathering and analysing

data constitutes provision of a public good (Keohane, 1984). Gaps in data and information may impede accurate demand and supply forecasts in the energy sector where capital investments are high and are therefore strongly guided by long-term market trends.

China's energy statistical collection system was initially developed, and functioned well, under a planned economy. As China quickly moves toward a market economy, however, it is increasingly difficult to grasp the entire picture of China's energy sector. While the National Bureau of Statistics (NBS) faces challenges in ensuring the consistency and quality of its data, significant progress has been made by the NBS to make its energy statistics collection methodologies compatible with international best practices (IEA, 2015a). The NBS works continuously in the areas of data exchange, capacity building, joint study and personal exchange with the United Nations (UN), APEC and the IEA.

The Joint Organisations Data Initiative (JODI) allows different stakeholders to share data and thereby encourages greater transparency in the energy sector. Six international organisations – APEC, Eurostat, the IEA, the Latin American Energy Organization (OLADE), OPEC and the UN Statistics Division (UNSD) – in April 2001 launched the Joint Oil Data Exercise. Progress was immediate: within six months, 55 countries were participating in the exercise and China was one of the first countries to contribute to JODI. The IEF Secretariat took over co-ordination of JODI in January 2005, and JODI was one of the most lauded achievements of the IEF. China participates not only in JODI-Oil but also in the newly founded JODI-Gas by reporting data every month to JODI-Gas, one of the very few of the 77 partner economies of JODI-Gas to have provided data since the beginning. The NBS, as the official statistical body and responsible for publishing China's national energy balance, takes a leading role in the process. It reports energy data to JODI through APEC, which is one of the seven JODI partner organisations.

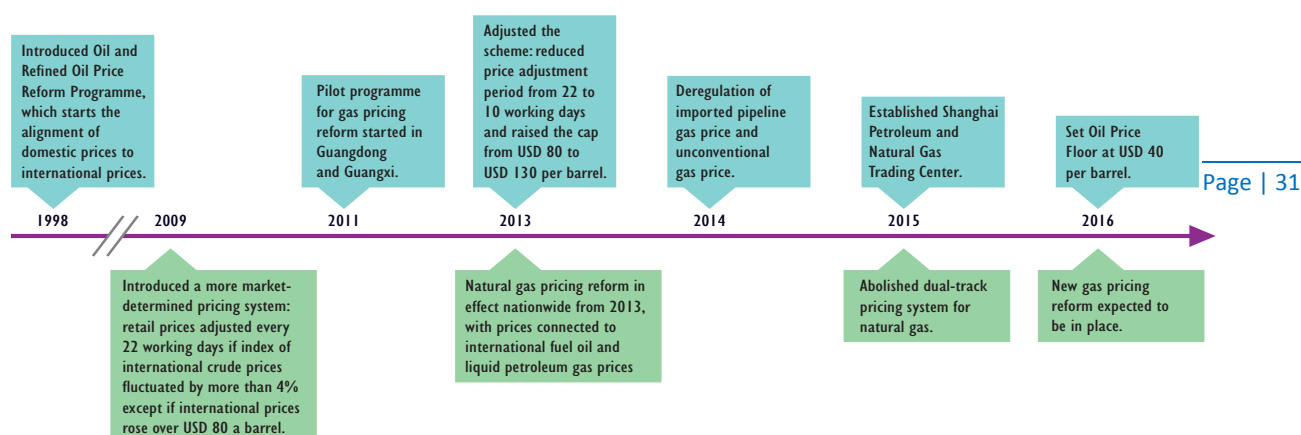
China has met the JODI-Oil requirements on quality and timeliness but not on completeness, as oil stock data is lacking. Energy data transparency has been on the agenda of Group of Twenty (G20) energy meetings and has appeared repeatedly in G20 communiqués. At the 9th G20 Leaders' Summit in 2014, President Xi Jinping announced that China will release oil stock data regularly in accordance with the consensus reached by the G20 on transparency of data. This news of China's contribution to the world economy was welcomed around the world, as greater transparency is a key avoiding misinterpretation.

Still, further improvements in energy data collection, data transparency, reporting standardisation and analysis are needed in China. China should enhance energy data quality not only for the purposes of international co-operation but also because this is an important step in improving market efficiency. Improved data quality also raises the transparency and quality of the energy statistics system. Some also argue that it is almost impossible for China to participate in any international co-operation activities on energy market efficiency without making its own data available (ERI and Grantham Institute, 2014). Calls have also been made for better arrangements to allow energy data to be properly shared across government agencies.

Energy price

The market generally determines prices in China, but the energy sector has been one of the few exceptions to date. Pricing has been comparatively deregulated for oil since 1998 and for coal since 1993, leaving electricity and natural gas as the next major targets for liberalisation. Under the current oil pricing mechanism, China will adjust domestic prices of refined oil products when international crude prices translate into a change of more than CNY 50 per tonne for gasoline and diesel for a period of 10 working days, but will not do so if international prices go below USD 40 or above USD 130 per barrel.

Figure 8 • Oil and gas sector pricing reform



Source: IEA research.

Given the drastic oil price fluctuations of recent decades, mitigating global energy price volatility is a key task for global energy governance. Some observers argue that the phenomenal increase in financialisation of commodity markets during 2006-08, particularly in the oil market, led to speculation (Hamilton, 2009). From 2011 to 2014, discussion of Principles for Oil Price Reporting Agencies in the G20 energy framework was welcomed and accepted by China. Energy price has never been an easy topic for China, as it has endured being a price taker and therefore desires a co-ordinated and predictable energy market free from oil price manipulation or collusion.

Another important issue related to price is subsidies. G20 leaders agreed in 2009 to phase out inefficient fossil fuel subsidies over the medium term to improve energy security, encourage investment in clean energy sources, promote green growth and free up resources for pressing social needs such as health, food security and environmental protection. They also recognised the importance of preventing adverse effects on the poorest by providing them with targeted cash transfers and other appropriate forms of support. This reform does not apply to support for clean energy, renewables or technologies that dramatically reduce greenhouse gas emissions (G20, 2009).

Eliminating fossil fuel subsidies has not been an easy decision for many countries. In 2012, G20 leaders asked finance ministers to explore options for a voluntary peer review process on fossil fuel subsidies. At the end of 2013, China and the United States took the lead in committing to voluntary peer reviews in the G20 framework. The two countries have worked on their self-review reports and invited several countries and international organisations as peer reviewers; review outcomes will be presented during the 2016 Chinese G20 presidency. A similar commitment on phasing out inefficient fossil fuel subsidies was also pledged by APEC Leaders in November 2009, and China has been a contributor to the APEC voluntary peer review decision.

Energy emergency and short-term security

IEA member countries are required to meet two key obligations: to hold oil stocks equivalent to at least 90 days of net oil imports and to maintain emergency response measures that can contribute to an IEA collective action in the event of a severe oil supply disruption. Response measures include stockdraw, demand restraint, fuel switching and surge oil production.

China also shares with the IEA the view that when there is an energy disruption, it is simply not enough for countries to rely solely on market forces. When compared with IEA members, China was late in initiating its strategic petroleum reserve (SPR). The top Chinese leadership made

statements “to build national SPR to protect national energy security” in the 10th Five Year Plan (2001-05). By mid-2015, the first and second phases of the National Petroleum Reserve had been completed and put into use (NBS, 2015). China aims to finish its energy storage and emergency preparedness system by 2020 (SC, 2014). Apart from its national strategic petroleum reserve, China also has an obligatory enterprise petroleum reserve and a business petroleum reserve.

Table 6 • Petroleum reserves in China

Timeline	Facility	Storage capacity (million cubic metres [mcm])
First phase	Zhoushan	5
	Zhenhai	5.2
	Dalian	3
	Huangdao	3.2
Second phase	Dushanzi	3
	Lanzhou	3
	Tianjin	3.2
	Huangdao Underground	3
Total		28.6

Source : NBS (2015).

The IEA is the major institution with which China is developing co-operation in the field of energy emergency preparedness. The ability to respond collectively in the case of a serious oil supply disruption with short-term emergency response measures has remained one of the core priorities of the agency since its inception in 1974. *Oil and gas emergency policy – China 2012 update*, an IEA publication was published in 2012. In 2014, the IEA published *Energy Supply Security: The Emergency Response of IEA Countries*, providing a picture of oil and gas emergency response systems in member and key partner countries, including China, based on confirmed knowledge. The IEA and its members regularly conduct Emergency Response Exercises (ERE) at IEA headquarters in Paris; since 2004, Chinese experts have been invited to take part. From the perspective of Chinese participants, exercises like this enhance the ability to respond to energy emergencies such as oil disruptions. At the invitation of China, the IEA held an ERE in China in 2015.

Box 6 • Emergency response exercise in China

A breakthrough in IEA – China co-operation on energy emergency preparedness took place in 2015, when an ERE was held in the Chinese port city of Ningbo. It was the first time the IEA had carried out an ERE in China, and one of the few that took place outside Paris. The two-day exercise drew participants from 13 countries and included Chinese government and industry representatives. As a part of the ERE, all participants were invited to visit Zhenhai, the very first national petroleum stockpiling facility in China, constructed in 2004. More than 70 energy experts and foreign diplomats took part in the site visit, making it the first time a national petroleum reserve base was exposed to a large international audience, and demonstrating China's increasing willingness to share SPR information.

China has also shown its readiness to co-operate in other geographically inclusive frameworks on energy emergency, namely with APEC and ASEAN+3. In the 2014 APEC Energy Ministerial Beijing Declaration, ministers committed to gradually raising the emergency response capability of the oil and gas industry to ensure oil and gas security and supply stability in the region. In 2008, ASEAN+3 ministers announced the proposal to develop an “oil stockpiling roadmap.” China made valuable inputs to the ASEAN+3 Oil Stockpiling Roadmap Workshop.

Historically, energy security was primarily associated with oil supply. While oil supply remains a key issue, the increasing complexity of energy systems requires systematic and rigorous understanding of a wider range of vulnerabilities. Disruptions can affect other fuel sources, infrastructure or end-use sectors. Thus, oil supply security alone is no longer sufficient for the world's energy security situation as a whole.

The IEA has noticed this emerging challenge and the IEA ministerial meeting in 2015 discussed broadening the mandate of energy security to take into an account the continued evolution of global oil markets but also to factor in the rising role of liquefied natural gas (LNG) in the global energy trade. This broadened energy security perspective goes in line with China's growing gas demand and its effort to promote energy transition, including from coal to gas. As China attended this IEA ministerial meeting, it appears that China is keeping an eye on this new trend and is likely to join the relevant international discussion when appropriate.

Energy and economic growth

Economic and technological globalisation has created a hyper-connected global economy with significant benefits. Today's global economy is characterised by increasing openness and integration of markets, and transnational flows of trade, capital and labour intensified by technological advances. All countries, including China, benefit from an atmosphere that improves conditions for energy trade and investment and facilitates energy technology and innovation.

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In the past decade, China has been portrayed as a giant “buyer” due to trade and foreign direct investment (FDI) in the energy and mining sectors. Sometimes ignored is its role as a rising “seller” of energy, in the forms of energy equipment manufacturing, energy infrastructure construction and associated energy services. The country is already moving to take advantage of its manufacturing experience to retool itself as a leader in the clean energy technologies of the future: wind, solar, nuclear generation, advanced coal technologies, electric vehicles, smart grid technology and more energy-efficient lighting and appliances.

Energy investment and trade

The more that China interacts with the world in the energy sector, the better it appreciates the benefits of global rules that protect investments and trade. In the past decade, China has often been viewed as a huge energy consumer and importer. In the coming decade its role as an energy production capacity producer and exporter, in particular in the renewables sector, must not be neglected. The creation of stable and predictable conditions for a free and open global energy market among consumer, producer and transit countries with orderly competition and efficient supervision is in alignment with the country's economic interests.

Given the lack of a global investment framework, China is currently in the process of bilateral investment treaty (BIT) and multilateral investment treaty (MIT) negotiations with various partners. In 2013, a major breakthrough occurred as China signalled its willingness to provide market access to foreign investors on a national treatment basis in all sectors and industries, except where explicitly excluded on a “negative list”. The “negative list” approach will change the domestic investment governance mind-set.

The Energy Charter Treaty (ECT) is a multilateral intergovernmental energy agreement that has legally binding rules backed up by a dispute settlement mechanism. It is the first binding multilateral agreement on the promotion and protection of foreign investment in the energy field, and the first multilateral instrument to set forth detailed principles of energy transit (Selivanova, 2010). China has favoured the ECT as it tries to ensure functioning of the cross-border energy transit essential for unconstrained energy flows into China. In 2001, China was invited to become an observer to the Energy Charter Conference and was later invited to participate in relevant activities and to send secondees to the Energy Charter. In late 2013, the Energy Charter Conference launched negotiations on an updated version of the European Energy Charter adopted in The Hague in 1991, and China was involved in the negotiation and revision process of the new Energy Charter Treaty. In May 2015, China signed the revised Energy Charter Declaration and became an observer to the Energy Charter Conference. As an energy investor, China National Petroleum Corporation (CNPC), one of the three largest national oil companies in China and the largest shareholder in pipelines, applied for a seat on the Energy Charter Industry Advisory Panel.

The World Trade Organization (WTO) provides comprehensive authority over all trade issues, including energy. China has been active in the WTO since 2001. In the area of energy-related WTO negotiations, China is proactive in further strengthening market entities and market access

to its clean energy technologies and products through ongoing negotiation of the Environmental Goods Agreement (EGA).

There are also energy organisations that act as important stakeholders in the energy sector and its sub-sectors. Founded in 1923, the World Energy Council (WEC) is the oldest energy-related global organisation, with its Secretariat in London. A working group of the WEC is currently dealing with energy trade and investment rules, which China welcomes. China joined the WEC in 1983, and in the same year the Chinese National Member Committee, composed of 16 relevant government ministries and companies, was established. Chinese Taipei and Hong Kong, China, are also members of the WEC. China has frequently sent high-level delegations to the World Energy Congress (an influential energy event hosted by the WEC) and to WEC Standing Committee meetings, and has also hosted WEC Standing Committee meetings as well as the Asian Energy Summit in 2010, the World Energy Scenarios Workshop (members' meeting) and WEC China International Summit (regional event) in 2013.

The Belt and Road Initiative

The “Belt and Road Initiative”, combining the Silk Road Economic Belt and the 21st-Century Maritime Silk Road, is considered one of the top national strategic priorities and is one of the most frequently mentioned topics in China. The Belt and Road Initiative was first presented by Chinese President Xi Jinping in his keynote address at Kazakhstan's Nazarbayev University in the fall of 2013. The initiative's priorities include: policy co-ordination, facilitating connectivity, unimpeded trade, financial integration and people-to-people relations. On 8 November 2014, President Xi announced that China would contribute USD 40 billion to its new Silk Road Fund, designed to improve trade and transport links in Asia. In his keynote address in March 2015 at the 2015 Boao Forum for Asia, he explained for the first time China's vision on the initiative in depth.

Box 7 • Action plan for energy co-operation in the Belt and Road Initiative

- We should promote co-operation in the connectivity of energy infrastructure, work in concert to ensure the security of oil and gas pipelines and other transport routes, build cross-border power supply networks and power-transmission routes, and co-operate in regional power grid upgrading and transformation
- We should increase co-operation in the exploration and development of coal, oil, gas, metal minerals and other conventional energy sources; advance co-operation in hydropower, nuclear power, wind power, solar power and other clean, renewable energy sources; and promote co-operation in the processing and conversion of energy and resources at or near places where they are exploited, so as to create an integrated industrial chain of energy and resource co-operation.
- We should enhance co-operation in deep-processing technology, equipment and engineering services in the fields of energy and resources ... We should push forward co-operation in emerging industries. In accordance with the principles of mutual complementarity and mutual benefit, we should promote in-depth co-operation with other countries along the Belt and Road in new-generation information technology, biotechnology, new energy technology, new materials and other emerging industries, and establish entrepreneurial and investment co-operation mechanisms.

Source: NDRC (2015).

The Belt and Road will run through Asia, Europe and Africa, connecting the East Asian economic sphere at one end with European economies at the other. The initiative aims to rebuild and revive maritime and overland trade routes, encouraging growth and co-operation. The initiative is expected to benefit China and all the nations along the inland and maritime links through efficient resource-sharing and regional integration of infrastructure. Chinese investment in these

countries, in particular in central Asian countries, is growing rapidly. The Belt and Road Initiative would enable Chinese companies and products to gain wider market shares and access, as better connected transportation infrastructure for trade and outward investment creates a more integrated market.

Energy plays an important role in this initiative: China has announced a series of major energy and transportation infrastructure projects in Asia and plans to invest in upstream projects such as oil and gas pipelines and liquefied natural gas terminals to high-voltage power lines, nuclear power and renewable energy, thus creating a more efficient and better integrated energy network.

Energy co-operation is essential to achieving the Initiative's goals of energy infrastructure connectivity, energy trade and investment in resources and promotion of new energy technology. For example, by providing both technological and physical assistance to energy infrastructure development in Asia, the Initiative is expected to strengthen the capacity of less-developed Asian countries through mutual co-operation to create affordable access to more energy resources. This promotes sustainable economic and social development among the nations involved. However, the area indicated under the Initiative is huge and encompasses economies at varying levels of development and socio-economic circumstances. China appears determined to overcome these challenges by mobilising regional co-operation bodies. The Chinese government has decided to leverage various existing frameworks to promote the initiative.

We should enhance the role of multilateral co-operation entities, make full use of existing entities such as the Shanghai Cooperation Organisation (SCO), ASEAN Plus China (10+1), Asia-Pacific Economic Cooperation (APEC), Asia-Europe Meeting (ASEM), Asia Cooperation Dialogue (ACD), Conference on Interaction and Confidence-Building Measures in Asia (CICA), China-Arab States Cooperation Forum (CASCF), China-Gulf Cooperation Council Strategic Dialogue, Greater Mekong Sub-region (GMS) Economic Cooperation, and Central Asia Regional Economic Cooperation (CAREC) to strengthen communication with relevant countries, and attract more countries and regions to participate in the Belt and Road Initiative. (NDRC, 2015)

Energy co-operation at the regional level has a key role to play in global energy governance and often acts as the nucleus for further developments since enlargements or mergers are more easily done on a regional basis (initially involving a limited number of stakeholders). The best-known evidence for this is the evolution of the European Coal and Steel Community (ECSC), the European Economic Community (EEC) and the European Atomic Community (Euratom), all established in the 1950s, into first the European Community (EC) and then the European Union (EU) in 1993.

The following section will be specialised to discussion on China's engagement in some of the regional multilateral co-operation entities mentioned above.

The Shanghai Cooperation Organisation (SCO) is a Eurasian political, economic and military organisation founded in 2001 in Shanghai. Given the important role of energy resource extraction for many SCO member economies, energy co-operation has arisen naturally from economic co-operation among SCO members. The SCO brought China, the world's largest energy consumer, together with a range of energy exporting economies, many of which were seeking diverse export markets for their energy resources at the time of the SCO's formation. Thus, despite initially beginning with a focus on regional security issues, energy is now at the heart of the SCO, and it has proved mutually beneficial for its members: energy importing members like China have benefitted from access to strategically important sources of gas and oil, while energy exporters like countries in Central Asia and Russia have found new export markets for their

products. The SCO initiated energy discussions in 2004, and expressed the intention to promote joint energy projects during the Moscow Summit in 2005. Russian officials proposed creation of an “Energy Club” a year later, and SCO members finally agreed on creation of an Energy Club in 2013. Areas for increased collaboration through the SCO Energy Club include energy processing – including oil refining, refined oil processing and processing in the coal and chemical industries – and renewable energy projects such as wind, solar and hydropower, to comprehensively safeguard energy security (Li, 2014).

The Asian Cooperation Dialogue (ACD) is an Asia-wide co-operation framework founded in 2002, aimed at developing a “Pan-Asian Community”. China joined in the same year and is a leading member in the energy area together with Bahrain, Indonesia, Kazakhstan, Qatar and the Philippines. From a long list of areas in which co-operation could be fostered, energy and food security issues rose to prominence at the first ACD Summit in 2012. The ACD corresponds with the Belt and Road Initiative and energy connectivity is an essential part of potential co-operation. In terms of a more integrated energy network, the design of the Belt and Road Initiative offers an opportunity for all Asian countries to get better energy connectivity. Connectivity can be a catalyst for the development of energy infrastructure and enhanced energy access through a more comprehensively connected energy grid (Gongsakdi, 2014). The result will be strengthened energy security, as well as a more stable regional energy market.

The China-Arab States Cooperation Forum (CASCF) has been a strong link between China and the Arab States. At a CASCF conference in Beijing in 2014, President Xi explained that China's strategic co-ordination with the Arab world is an important part of the Belt and Road vision, and China has proposed a comprehensive co-operation strategy known as 1+2+3. “One” refers to the need for increased co-operation on energy, covering a range of issues including oil and natural gas production, ensuring the safety of energy transport routes and establishing a mutually beneficial, long-term China-Arab energy relationship. “Two” stands for the two wings of infrastructure development/construction and trade/investment facilitation. “Three” relates to breakthroughs that need to be made in the high-tech areas of nuclear energy, aerospace satellites and new energy to upgrade practical co-operation between China and the Arab world (Xi, 2014d). The China-Arab Energy Conference is a biennial mechanism established in 2008 under the CASCF framework. The first four conferences were held in China (2008), North Sudan (2010), China (2012) and Saudi Arabia (2014), with wide participation from Arab countries. From the very first meeting, discussion has not been limited to oil and gas, which is the major investment and trade type among the parties. Power generation, including renewable and nuclear power, has been an integral part of discussion. This shows that China is increasingly interested in expanding trade and economic ties with the region, particularly in developing industries like nuclear power.

The Greater Mekong Subregion (GMS) Economic Cooperation Program, launched in 1992, groups Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, Viet Nam and the Guangxi Zhuang Autonomous Region and Yunnan Province of the People's Republic of China (PRC). Power interconnection was at the heart of the inception of the GMS Energy Program. To lay the groundwork for physical interconnection, the preparation of the Regional Indicative Master Plan on Power Interconnection was initiated with assistance from Asian Development Bank (ADB). An Intergovernmental Agreement (IGA), signed by all GMS countries during the First GMS Summit in 2002, provided the legal authority and broad framework to implement power trade among the GMS members. To follow up on the IGA implementation, the Regional Power Trade Coordination Committee (RPTCC) was established, and within the RPTCC framework Yunnan Province is trying to make itself home to the Power Dispatch Centre of the sub-region, to further facilitate power interconnection and the establishment of an integrated sub-regional power market.

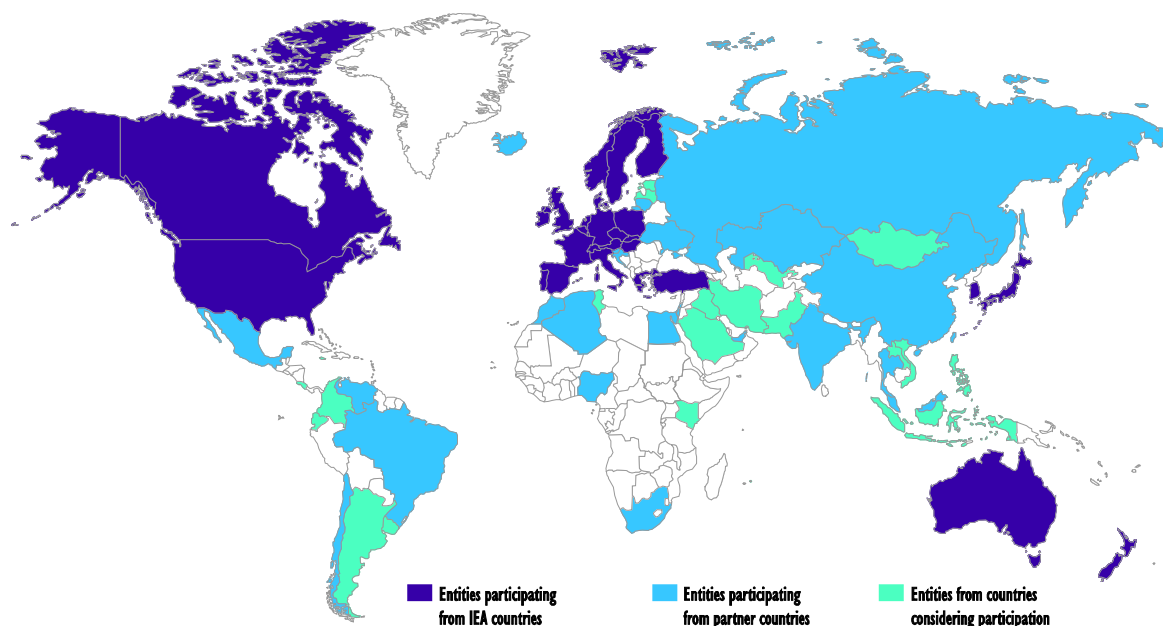
China's far-reaching and ambitious "Belt and Road" initiative will have impacts on China's engagement in global governance, as the initiative is one of China's top priorities and many energy related cooperation were leveraged to this end. However, as a trans-regional – instead of global – initiative, it may only serve as a good starting point, not as an ending point, in global governance. Having said that, it would be still useful to bear in mind that the "Belt and Road" initiative can potentially play an essential role in pushing forward China's engagement in global energy governance, given its scale and magnitude.

Energy technology

Energy technology is widely accepted as providing solutions to energy security, economic development and sustainable growth. This is good for China, which is a willing recipient of energy technology transfer and committed to becoming an important energy innovator. The number of energy-related patents being filed worldwide by Chinese patent-holders is increasing rapidly (Bettencourt, Trancik and Kaur, 2013), as energy has long been a main focus area of China's science and technology strategies, developed by the Ministry of Science and Technology (MOST). In the first two decades after opening up in 1978, FDI in joint ventures with local partners was considered the main avenue to cutting-edge technology. More intensive transfers of know-how and technology are crucial for an adequate response to energy and climate issues.

The International Energy Agency (IEA) has a critical role in supporting energy technology agreements and projects. With Association status, China is now regularly invited to participate in meetings of IEA Standing Groups, Committees and Working Parties, including the IEA Committee on Energy Research and Technology (CERT). MOST and the IEA have shown great interest in co-operating with each other, through high-level bi-lateral agreements, co-hosting annual working meetings and energy technology seminars, and through MOST sending secondees to work at the IEA. Today Chinese entities participate in 18 out of the 39 IEA Technology Collaboration Programmes (TCPs),¹ more than any other IEA non-member country, and more than many IEA member countries. China's striking increase in TCP participation, from two in 1995 to 18 in 2015, is testimony to the appeal of the TCPs for fast-growing economies outside the IEA membership base.

Figure 9 • Worldwide participation in IEA Technology Collaboration Programmes



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

¹ A TCP is formally organised under the auspices of an IEA Implementing Agreement.

The Clean Energy Ministerial (CEM) fosters clean energy collaboration and innovation among its 23 participating countries and the EU since its origin in 2009; MOST, the NDRC and the National Energy Administration (NEA) of China are engaged in the mechanism. Since the beginning of CEM in 2009, both the IEA and China have played very important, synergetic roles. Today China is leading the Electric Vehicle Initiative (EVI) and participating in the Smart Cities Initiative and the Smart Grids Initiative. At the Sixth Clean Energy Ministerial (CEM6) held in 2015, energy ministers announced an enhanced second phase of work under CEM, referred to as “CEM 2.0”, and China was selected to serve on the Steering Committee. China will host CEM8 in 2017.

Box 8 • China's role in global energy technology innovation

China's current strengths lie in the final part of the innovation chain – adapting, deploying at scale and incrementally improving existing low-carbon technologies, as it has done successfully in solar photovoltaic (PV) and wind. It has made great contributions to the global low-carbon innovation effort, primarily by helping to rapidly reduce production costs for renewable energy technologies. As an emerging economy, China's participation in global energy innovation efforts in the near-term is likely to be characterised as follows:

- Continuing to benefit from high-quality energy technology transfer from other countries. Global climate change and sustainable development goals have a greater chance of being achieved if developed countries transfer clean and highly efficient energy technologies to developing and emerging countries, such as China. Of course, technology transfer can only succeed on the condition that intellectual property rights are well protected.
- A shift in focus on early-stage energy technology innovation. Becoming an innovative and sustainable economy requires increased efforts in the first two stages of the innovation chain: use-inspired basic research, applied research and development of low-carbon technologies; and piloting, commercial demonstration and early-stage deployment of commercially available technologies.

Energy and sustainable development

China has grown rapidly for more than three decades by following a strategy of high investment, energy-intensive manufacturing and strong export orientation. In recent years, China has entered a new stage of economic growth – the “new normal” – a term used by President Xi Jinping to refer to slower economic growth with the aim for better quality and sustainable development. China's ambitions for more sustainable development, its urbanisation plans and strategic emerging industry policy suggest potential for a vision of over one billion people living and working in appealing cities, in which services, high-technology industries and innovation are the engines of growth and prosperity.

Aligning policies to facilitate sustainable development is crucial in global energy governance. Energy is an essential factor for sustainable transformation and poverty eradication. China has realised the importance of the energy–environment relationship, and that climate change policies cannot be considered in isolation. The transition to low-carbon energy, including the development of renewables, nuclear energy and energy efficiency, should be viewed in a broad policy context. Sustainable development is not easily achievable for China, so energy policy has to mobilise all stakeholders to contribute to tangible progress in air quality and other aspects of the environment. Given the entrenched and competing interests in China's current energy system, bringing about policy change will not be easy or smooth, but with firm leadership, reform will yield dividends in environmental protection and energy efficiency (Zha, 2013).

Climate change

Climate change is the most obvious and pressing energy policy-related externality. Since about 2007, the climate change driver has increasingly influenced energy policy and affected how energy and global energy governance are discussed. It has played an important role in moving the China's energy and environmental agenda forward in the foreseeable future. The country's new climate and environmental strategy aims to achieve peak carbon dioxide (CO₂) emissions by 2030 or earlier.

Table 7 • China's climate change commitments

	2020 Target	2030 Target
CO ₂ intensity of gross domestic product (GDP) falls, compared with 2005 level	40-45%	60-65%
Share of non-fossil fuels in the primary energy mix	about 15%	about 20%
Peak CO ₂ emissions		2030 or sooner

In recent years, China has confirmed its role as a constructive and collaborative global partner by increasingly addressing climate change issues. The country is trying to shoulder growing responsibility for climate change, although its emissions per capita, historic responsibility for the problem and comparative ability to fund the transition to a low-carbon economy need to be considered when coming to a balanced assessment of liability and capacity for action. Recent proactive co-operation between China and the world, such as the US-China Joint Announcement on Climate Change and the EU-China Statement on Climate Change, were widely lauded in the international community. China is also preparing for establishment of the East Asia Centre for Climate Change Response and International Cooperation based in China.

Emissions in China declined in 2014 for the first time since 1999: according to the International Energy Agency (IEA), energy-related CO₂ emissions in China in 2014 totalled 8.6 gigatonnes (Gt), the highest in the world, but 2014 emissions figures signal weakening – although not complete

decoupling yet – of the link between economic and emissions growth (IEA, 2015b). Transformation of energy consumption modes in China has been crucial to the emissions decline, thanks partly to the coal strategy. The country's energy-related emissions are dominated by coal (more than 80% of the total), but over the 11th Five-Year Plan period (2005-2010), 77 gigawatts (GW) of small, inefficient coal-powered plants were closed and 20 GW were targeted in the 12th Five-Year Plan (2010-2015). In 2014, coal consumption declined for the first time in many decades.

Significant progress has been made in putting a price on CO₂ emissions. Seven pilot emissions trading schemes (ETSs) were launched in 2013, covering a total of 2 000 companies. China plans to launch a national ETS in 2017, covering the key industry sectors of iron and steel, power generation, chemicals, building materials, paper-making and nonferrous metals. This will be the world's largest cap-and-trade programme.

As the United Nations Framework Convention on Climate Change (UNFCCC) is the body responsible for co-ordinating national-level policy responses, China has insisted on pursuing climate change negotiations within this framework. China signed the treaty on 11 June 1992, and ratified it on 5 January 1993 (one of the first countries to ratify); the treaty entered into force on 21 March 1994. China has taken part in the meetings of the UNFCCC Conferences of the Parties (COP) from COP1 to COP21, and played an important role throughout negotiations, particularly with the G77+China negotiating group. As the first developing country to have promised to put a cap on CO₂ emissions, China contributed to the successful outcome of COP21 in Paris in late 2015, resulting in the Paris Agreement and a single framework to track progress toward and achievement of Intended Nationally Determined Contributions (INDCs) for all countries, with flexibility for Parties' different capacities.

The Intergovernmental Panel on Climate Change (IPCC) is the leading international body for the assessment of climate change. As a scientific body under the auspices of the United Nations (UN), it reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. China has IPCC membership and many Chinese scientists have contributed to the work of the IPCC on a voluntary basis.

Financing is a key issue in addressing climate and environmental challenges. As a signatory of the Kyoto Protocol, China is a major beneficiary of the Clean Development Mechanism (CDM). According to the UNFCCC website, more than USD 81 million in grants were committed to support over 200 projects under the China Clean Development Mechanism Fund (CCDMF), which means direct reduction of over 7 million tonnes of CO₂-equivalent (MtCo₂e) through funding enterprises, mobilising market capital and achieving verified emission reduction effects. The Global Environment Facility (GEF) was established in 1991 as the financial mechanism of the main multilateral environmental agreements. By the end of 2014, China had received GEF grants totalling USD 1.62 billion for 141 national projects. Similarly, China participated in 41 regional and global projects financed by the GEF. These projects include the areas of climate change, biodiversity, persistent organic pollutants, international waters and land degradation.

Regarding finance under the Paris Agreement, in addition to developed-country Parties providing financial resources to assist developing-country Parties, other Parties are encouraged to provide or continue to provide support voluntarily. China recognises the importance of mobilising finance to support low-carbon, climate-resilient development in developing countries and is increasingly offering financial help. It prioritises climate-related assistance to developing countries, especially through the South-South co-operation framework. In 2015, China announced that it will make available RMB 20 billion (around USD 3.1 billion) for setting up the China South-South Climate Cooperation Fund to support other developing countries to combat climate change, including

enhancing their capacity to access the UN Green Climate Fund (GCF). This commitment matches an earlier sum pledged by the United States to the GCF.

China has also taken technological measures to combat climate change, especially related to coal. While coal use is expanding, so is clean coal deployment. Progress has been made in carbon capture and storage (CCS), and government bodies, companies and academics from China account for one-seventh of Global CCS Institute (GCCSI) membership.

Low-carbon energy

Facing the challenges of increasing constraints on resources and environment, the transition to a low-carbon economy is, an official goal of the Chinese government. China needs to reduce GHG emissions and address climate change issues quickly with a concerted approach to low-carbon energy. To address all challenges and transform to low-carbon and clean energy requires strong political direction to set clearly defined national targets and enhance international collaboration.

The goal of low-carbon energy structure adjustment is clean energy development, with increased non-fossil energy consumption, gradually increasing natural gas consumption, CO₂ emissions reductions, construction of a modern low-carbon, clean, safe and efficient energy system, and an ecologically conscious society. It requires contributions from renewable energy, clean coal, nuclear, natural gas, and energy efficiency. Overall, low-carbon power generation accounted for one-quarter of China's electricity supply in 2014, up from around one-fifth in 2013. As in the past, there are signs that future economic growth will be dominated by consumption, particularly for services, rather than investment in energy-intensive industries.

Table 8 • Development of non-fossil electricity in China, 2014

	Electricity by non-fossil fuels	Growth rate	Total domestic electricity	Growth rate	Share of electricity by non-fossil fuels in total domestic electricity
Installed capacity	450 GW	33.3%	1360 GW	8.7%	33%
Electricity generated	1.42TWh	19.6%	5.55TWh	3.6%	26%

Source: China Electricity Council (2015).

Although changing an industrial culture based on fossil fuels – particularly coal – is not a quick or easy process, China has shown determination in taking a lead in the shift to low-carbon energy and pursuing worldwide low-carbon energy co-operation. It can claim participation and leadership in international energy forums such as the Clean Energy Ministerial (CEM; see Energy Technology in Chapter 4) and the Global Green Growth Forum (3GF), and in regional co-operation entities such as the East Asia Summit.

The 3GF was initiated by the Danish government in 2011 in collaboration with the Republic of Korea and Mexico. China, Kenya and Qatar joined the partnership the next year, and in 2014 Ethiopia become the seventh partner. These governments and a number of public and private partners launched the Global Public–Private Partnership to realise the potential for long-term global, inclusive green growth. As one of the seven government partners, China has been one of the most active participants of the forum, and many Chinese companies and associations are also actively involved. The 3GF also links clean energy with other inclusive green-growth issues.

China, together with the Association of Southeast Asian Nations (ASEAN) Centre for Energy, initiated the Clean Energy Forum of the East Asia Summit (EAS) to explore clean energy issues facing East Asia, with the intention of facilitating closer energy co-operation and promoting clean energy technology exchanges. The first forum was held in Chengdu, China in August 2014 and the

second in November 2015 was in Haikou, China. Topics such as nuclear energy, solar photovoltaic (PV), bioenergy, electric power, clean coal and Smart Energy Cities are covered in the forums.

Besides being active in international and regional forums, China explores ways to produce concrete outcomes through centres of excellence, either by joint management (e.g. US–China Clean Energy Research Center and Europe–China Clean Energy Centre) or leadership.

The Asia-Pacific Economic Cooperation (APEC) Sustainable Energy Centre (APSEC) was established under the leadership of China, by consensus of APEC members at the 11th APEC Energy Ministers Meeting in China in 2014. Chinese Vice-Premier Zhang Gaoli said at the meeting, “We will witness the establishment of [the] APEC Sustainable Centre. We will help to construct and maintain the centre and make contribution[s] to Asia Pacific energy sustainable development” (Zhang, 2014).

Box 9 • China's involvement in APEC energy issues and establishment of APSEC

The APEC Energy Working Group (EWG), established in 1990, is one of the oldest APEC sub-groups. APEC economies currently account for around 60% of world energy demand, and the APEC region includes four of the world's five largest energy users (China, the United States, Russia and Japan). The Low Carbon Model Towns (LCMT) project is one of the task force projects under the EWG. At the 9th APEC Energy Ministers Meeting in Japan in 2010, Yujiapu Financial District of Tianjin City, China, was declared the first low-carbon model town in the APEC region. In 2010 and 2011, Chinese leaders proposed LCMT projects at the APEC Leaders' Summits. In 2012, China's National Energy Administration (NEA) submitted its “Report of Chinese development on APEC low-carbon model town projects” to the 20th APEC Summit.

In 2014, under its APEC chairmanship, China proposed to set up APSEC. APSEC was approved by all APEC member economies, and at the APEC Energy Ministers Meeting the establishment of APSEC was approved. Tianjin University took the lead in establishing the centre.

Renewable energy

China has made important achievements in the field of renewable energy, particularly in hydropower, wind and solar. It has become a world leader both in technology manufacturing, and in the use of wind, solar and hydropower. The country's rapid growth in renewables has been achieved through huge investment and development incentives.

China is strongly interested in promoting renewables, both domestically and globally, as it is in an excellent position to share its knowledge and know-how and further leverage its financing, technology and manufacturing advantages in promoting renewable energy worldwide.

The IEA works closely with China in the area of renewables. It co-published the *China Wind Energy Development Roadmap 2050* with the China National Renewable Centre as the result of joint research. The IEA also co-operates with China on the Grid Integration of Variable Renewables (GIVAR) project, and a joint IEA and State Grid Corporation of China (SGCC) working group focused on the Global Energy Interconnection in July 2015.

The International Renewable Energy Agency (IRENA) is a very important part of global renewable energy development, and provides a good platform for China's engagement in international renewables co-operation. China took a pragmatic approach in seeking co-operation with IRENA: it participated in the preparatory meetings for the establishment of IRENA and the first three sessions of the IRENA Assembly as an observer. At the fourth session of the IRENA Assembly in 2013, the NEA announced that China intended to join IRENA. On 2 January 2014, China became an official member, confirming its high renewable ambitions. China is now one of the top financial contributors to IRENA, and at the fifth assembly in 2015 China was elected to serve on the IRENA

Council. Within a short time after China's accession, many co-operative activities had taken place between China and IRENA including China Day on 20 January 2014 in Abu Dhabi. In late 2014, IRENA published *REmap 2030: Renewable Energy Prospects* (compiled by IRENA in association with the China National Renewable Energy Centre).

In November 2015, the International Forum on Energy Transition co-hosted by the NEA, IRENA and Jiangsu Provincial Government of China, was held in Suzhou, China. A proposal to establish a global coalition of partner countries undertaking energy transition, and to set up an "IRENA-China Research and Co-operation Centre for Energy Transition" to support the activities of the proposed global coalition was announced in the Suzhou Declaration.

The Renewable Energy Policy Network for the 21st Century (REN21) is an international non-profit association based at the UN Environment Programme (UNEP) in Paris. As a global renewable energy policy multi-stakeholder network, its goal is to facilitate knowledge exchange, policy development and joint action towards rapid global transition to renewable energy. The Director General of the National Centre of Climate Change Strategy Research (China's official research institute on climate change) is now a member of the steering committee.

Transformational change in renewable energy infrastructure will require large-scale business engagement and investments; private Chinese companies have played a very important role in promoting the renewables business. Although private Chinese companies do not normally take an active part in global energy governance, the approach with renewable energy has been different. Thanks to private companies pursuing strong international collaboration, China has emerged as the global leader in capacity and manufacturing of renewable energy products.

Nuclear power

After hydropower, nuclear power is the second-largest source of low-carbon electricity generation worldwide. It provides a reliable and clean energy supply to sustain rapid economic growth, especially in the eastern and southern coastal areas of China which used to rely heavily on fossil fuels. It figures in China's clean energy initiative, and at the end of 2014 China has 21 nuclear power reactors in operation (19 GW) and 27 reactors under construction (29.5GW), leading in nuclear power capacity additions worldwide.

In nuclear energy, safety and technology are the two main areas of international co-operation for China. China places high importance on nuclear security and non-proliferation, and in 2014 President Xi Jinping attended the Nuclear Security Summit.

The International Atomic Energy Agency (IAEA) is central to global nuclear energy governance; in 1984, China became an IAEA member and sent a permanent mission to Vienna. China works to fulfil its relevant obligations and uses IAEA guidelines in monitoring the safety of its mainland nuclear power stations. China has played an active role in IAEA activities, such as drafting and implementing the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste.

The Nuclear Energy Agency is an intergovernmental agency that facilitates co-operation among countries with advanced nuclear technology infrastructure to seek excellence in nuclear safety, technology, science, environment and law, under the Organisation for Economic Co-operation and Development (OECD) framework. Although China is not a member of the OECD, thus not a member of the Nuclear Energy Agency, it is involved in its Multinational Design Evaluation Programme (MDEP). The programme develops innovative approaches to leverage the resources and knowledge of national regulatory authorities who are (or will be) tasked with the review of new reactor power plant designs. China is a founding member of the MDEP, and now participates in two design-specific working groups, the European Pressurised Reactor (EPR) working group and the AP1000 working group.

In June 2010, in Ghana, the Global Nuclear Energy Partnership was transformed into the International Framework for Nuclear Energy Cooperation (IFNEC). China played a significant role in the transformation of GNEP into IFNEC, and the first IFNEC executive committee meeting was held in China in 2009. An NEA official now serves as vice-chair of the IFNEC Steering Group. IFNEC provides a forum for participating states to explore mutually beneficial approaches to ensure that the use of nuclear energy for peaceful purposes is efficient and meets the highest standards of safety, security and non-proliferation.

The Generation IV International Forum (GIF) carries out the research and development needed to establish the feasibility and performance capabilities of the next generation of nuclear energy systems. China has participated in the GIF by signing the GIF Charter in 2006 and is a partner in three out of the four GIF system arrangements: the sodium-cooled fast reactor system (SFR), the supercritical-water-cooled reactor system (SCWR), and the very-high-temperature reactor system (VHTR).

China has also made use of regional energy governance platforms to promote nuclear energy safety, especially in the neighbouring areas of East Asia and Southeast Asia. There is a high-level official meeting mechanism for nuclear safety in the Trilateral Cooperation of the People's Republic of China, Japan and the Republic of Korea. As all three countries have nuclear power, they play significant roles in global nuclear safety issues. The fourth summit meeting of the Trilateral Cooperation, held in the wake of the Fukushima nuclear accident and natural disaster in Japan, led to an agreement to establish an emergency notification system, enhance co-operation among experts and share information in emergencies. This agreement followed the framework of the ASEAN+3 (China, Japan and the Republic of Korea), abbreviated as "10+3", for the "10+3 Forum on Nuclear Energy Safety" mechanism.

Unconventional gas

Unconventional gas, including shale gas, has significantly changed the energy sector. Shale gas sparked an energy revolution in the United States; because of its unprecedented success there, and because of huge potential shale reserves (and huge potential gas demand) in China, China has been especially interested in unconventional gas in recent years, from technology to policy. This has led to close co-operation between the United States and China in this field, particularly through the China-US Oil and Gas Industry Forum, a public-private partnership that convenes business and government leaders from the petroleum and natural gas sectors of the United States and China annually, and which has served as an example of China-US energy co-operation.

Table 9 • Unconventional gas development in China

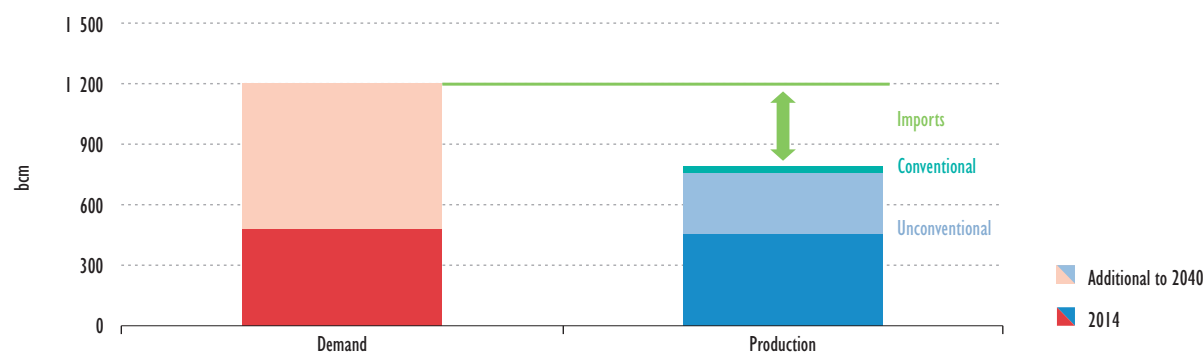
	Shale gas	Coalbed methane (excluding coal mine methane)
First contracts	2011	Early 1990s
First production	2013	2005
2013 production	0.2 billion cubic metres (bcm)	3.0 bcm
2015 target	6.5 bcm	16 bcm
2020 target	30-50 bcm	30 bcm

Source: IEA research.

In April 2015, China's NEA and the IEA, with the support of the CNPC Economics and Technology Research Institute, co-hosted the third IEA Unconventional Gas Forum in Chengdu, China – the capital of Sichuan Province where most shale gas is exploited in China. The Forum discussed the nature and extent of China's unconventional gas resources, examined policies that could enable these resources to be developed and considered the potential impact on China's energy outlook and on regional and international energy dynamics.

Although unconventional gas has not changed the entire global energy landscape, due partly to low oil, gas and coal prices, high gas demand is expected to be a domestic production driver in China. Further international co-operation is needed to ensure the safe and sustainable exploitation of unconventional gas (and oil), including to address environmental and water issues as well as community relations; global energy governance therefore has a significant role to play in this field.

Figure 10 • Natural gas demand and supply in developing Asia, 2040



Source: IEA (2015a).

Energy efficiency

Energy efficiency has traditionally been a countermeasure to energy insecurity for importers, viewed as a tool of energy demand control; today it is also viewed as the “first fuel.” China clearly understands that transforming the energy system through enhanced policies and measures to improve energy efficiency will bring both short- and long-term benefits for the economy. The country is intently pursuing energy efficiency strategies, as the government has made reducing energy intensity one of its top priorities and has embarked on one of the most aggressive energy conservation campaigns in the world. In fact, China accounted for more than half the world’s entire energy savings in the past 20 years: from 1980 to 2010, while China’s economy increased 18-fold, energy consumption increased only fivefold. This means that energy intensity per unit of GDP declined by 70% during that period of time.

China has made substantial efforts toward achieving a 20% reduction in energy intensity per unit of GDP over the past five years by working towards aggressive goals outlined in the 12th Five-Year Plan. Energy efficiency efforts are focused on improving building codes and minimum standards for efficiency, increased product energy efficiency labelling and certification, and launching of successful industrial efficiency programmes such as the Top-1000 Energy-Consuming Enterprises Program (“Top-1000 Program”). More recently, the promotion of energy service companies throughout various economic sectors, and formalised demand-side management policies, have begun to take shape. Although China’s leaders have expressed determination to improve industrial and commercial energy efficiency, additional gains will be difficult as the most accessible improvements have been made.

The IEA plays an important role in global energy efficiency governance. China has been a major beneficiary of the IEA’s many training programmes on energy efficiency, and in 2010 China was included in the IEA publication *Energy Efficiency Governance* based on a global review. In 2015, the IEA and Tsinghua University co-published *Building Energy Use in China* based on three years of joint research. In 2016, the IEA initiated the China Energy Efficiency Roadmap 2050 project in cooperation with the Energy Research Institute of the National Development and Reform Commission (NDRC).

The Group of Twenty Energy Sustainability Working Group (G20 ESWG) is a platform at which energy efficiency has been a core topic since the G20 started discussing energy issues in 2011. China has been active in sharing its energy efficiency practices in the G20 in recent years, and at

the G20 meeting in Brisbane in November 2014, G20 leaders announced the G20 Energy Efficiency Action Plan (“the Action Plan”) with support from China. The Action Plan is a practical plan to strengthen voluntary energy efficiency collaboration, allowing countries to share knowledge, experiences and resources by choosing, on an opt-in basis, preferred activities that best reflect their domestic priorities. The three areas targeted by G20 members for enhanced international co-operation are finance (large-scale energy efficiency financing), networked devices (devices with built-in Internet connectivity) and transport (heavy-duty vehicles). China has expressed the intention to join all three, and is expected to once again make energy efficiency a priority and take measures toward even greater global energy efficiency engagement during its 2016 G20 presidency.

The birth of the International Partnership for Energy Efficiency Cooperation (IPEEC) was the result of the 2008 vision of ministers from G8 countries, China, India and South Korea to promote energy efficiency. As a founding member, China signed the IPEEC Terms of Reference (TOR) and made voluntary contributions to facilitate rapid deployment of clean energy technologies worldwide. China has served as vice-chair of the IPEEC Policy Committee since 2012, and of the Executive Committee since 2013, and is a participant or observer in many IPEEC working groups and has hosted many meetings and workshops. In 2013 China proposed to initiate the IPEEC Top Ten Energy Efficiency Best Practices and Best Available Technologies Task Group (TOP TENS). In 2014, the IPEEC China secretariat was established.

The emerging economies of Brazil, Russia, India, China and South Africa (BRICS) have proposed to promote energy co-operation among their economies since the first BRICS Summit in 2009. As the five countries are distant geographically and have diverse development conditions and cultures, they individually face different challenges and opportunities in the energy sector. It is for this reason that energy efficiency was chosen as the point of entry for energy co-operation, as they can learn from each other in the field to achieve dynamic and inclusive co-operation. The first official meeting on energy efficiency was in May 2015, followed by the first BRICS Energy Ministerial in Moscow six months later, when a memorandum of understanding (MoU) on energy efficiency co-operation was signed and a working group was established. This work helps prioritise investments from the BRICS New Development Bank which is expected to be operational in 2016 (oil, gas and power projects will also be eligible for funding).

While important progress has been made in cost reductions and deployment of clean energy technologies, the pace of innovation and the scale of transformation and dissemination remain significantly short of what is needed.

Energy access

Defining energy access as a Sustainable Development Goal and formulating an implementable roadmap for universal energy access are vital. Providing universal energy access is congruent to fighting energy poverty, which is essential in a modern society. Universal access can only be achieved through promotion of adequate policies, skills development, innovative business models and financing schemes.

In China, per capita energy consumption for living doubled between 2000 and 2010. Providing electricity access to half a billion new customers in recent decades was a significant achievement, in which rapid economic development and strong top leadership were decisive factors. People without electricity access resided primarily in the remote parts of western China. In March 2006, the project “electricity for every household” was initiated. The project has been successful in providing electricity access in two formats: distributed power (such as solar) for households located in extremely remote areas, and power grid connection in less remote areas. By the end of 2015, all people in China had electricity access.

Table 10 • Traditional use of biomass for cooking, 2012

Region	Number of people relying on traditional use of biomass (million)	Percentage of total population relying on traditional use of biomass (%)
Developing countries	2 679	49%
Africa	728	67%
Sub-Saharan Africa	727	80%
North Africa	1	1%
Developing Asia	1 875	51%
China	448	33%
India	815	66%
Latin America	68	15%
Brazil	13	6%
Middle East	8	4%
World	2 679	38%

Source: IEA (2014b).

Nearly 2.7 billion people worldwide rely on traditional biomass for cooking. In this regard, there is much room for progress in China, with around half of the Chinese population still relying on solid fuels for cooking and heating with traditional stoves. The Chinese government has taken proactive steps to address this issue: in the 1980s and 1990s, China's National Improved Stoves Program (NISP) – the world's largest and most successful national improved stoves programme – distributed 180 million improved stoves. Today China has the world's largest biomass stove industry, the greatest number of installed biogas digesters, and the largest stock of solar cookers. Other programmes include the Green Energy Demonstration Counties programme, having the dual objectives of energy conservation and industrialization, and the One Solar Cooker and One Biomass Stove Program, which aims to solve the household energy problems of herdsmen and farmers living in the Tibet Autonomous Region and neighbouring provinces of Sichuan, Qinghai, Gansu and Yunnan. In its urgency to partner more actively with the international community in accelerating clean cooking, China recently joined the Global Alliance for Clean Cookstoves (GACC) and integrated clean stove promotion into the action plan for energy conservation and emissions reductions in the 12th Five-Year Plan.

Table 11 • Electricity access in 2012, regional aggregates

Region	Population without electricity (millions)	Electrification rate %	Urban electrification rate %	Rural electrification rate %
Developing countries	1 283	76%	91%	64%
Africa	622	43%	68%	26%
North Africa	1	99%	100%	99%
Sub-Saharan Africa	621	32%	59%	16%
Developing Asia	620	83%	95%	74%
China	3	100%	100%	100%
India	304	75%	94%	67%
Latin America	23	95%	99%	82%
Middle East	18	92%	98%	78%
Transition economies & OECD	1	100%	100%	100%
World	1 285	82%	94%	68%

Source: IEA (2014b).

The Chinese success story shows that although there are huge challenges to universal energy access, they are not insurmountable, and China is ready to share best practices and expertise. Worldwide, 1.3 billion people continue to live without access to electricity, nearly 97% of whom live in sub-Saharan Africa and developing Asia.

Building on the success of the electricity access story, China is prepared to co-operate with the UN Sustainable Energy for All (SE4All) initiative. In 2011, UN Secretary-General Ban Ki-moon launched the SE4All initiative and shared his vision to make sustainable energy for all a reality by 2030. When he visited China to promote the initiative, the Chinese government immediately gave a positive response. High-level officials from the NEA have attended and addressed SE4All summits and the Chinese Energy Minister Nuer Baikeli serves as co-chair on the SE4All advisory board.

China's ambitious goals for 2030 not only meet but surpass SE4All's three global targets of ensuring universal access to modern energy services, doubling the global rate of improvement in energy efficiency and doubling the share of renewable energy in the global energy mix. Beyond meeting these goals domestically, China's leading role in the combat against energy poverty involves contributing to other parts of the world, including Africa and developing Asia; in 2014, Chinese President Xi Jinping promised over USD 20 billion to African countries in infrastructure, farming and business loans over three years.

In addition to the UN framework, the G20 Energy Sustainability Working Group is a platform to promote universal energy access. China has been a key supporter of the G20 Energy Access Action Plan: Voluntary Collaboration on Energy Access, made public during the 2015 G20 Ministerial. During its 2016 G20 presidency, China is also prioritising energy access.

Case study: IEA–China engagement

China and the International Energy Agency (IEA) concluded a Memorandum of Policy Understanding in the Field of Energy in 1996; 2016 therefore marks the 20th anniversary of the IEA-China relationship. This relationship has grown stronger over the past 20 years, providing a better common future for energy security, technological research and development, higher-quality statistics and environmental sustainability. In recent years especially, co-operation with China has become a key priority of the IEA. In 2015, China became one of the first IEA Association countries, along with Indonesia and Thailand, heralding a new era of co-operation and institutional ties.

IEA and its changes

Over 40 years of history

The IEA is an autonomous organisation which works to ensure reliable, affordable and clean energy for its 29 member countries and beyond. The IEA's aspiration for global energy engagement is exemplified in the addition of the fourth "E" – engagement worldwide – to the existing 3Es of energy security, economic development and environmental awareness. These 4Es are now the IEA's main focus, building on the main objectives of the IEA set down when it was founded:

- to maintain and improve systems for coping with oil supply disruptions
- to promote rational energy policies in a global context through co-operative relations with non-member countries, industry and international organisations
- to operate a permanent information system on the international oil market
- to improve the world's energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use
- to promote international collaboration on energy technology
- to assist in the integration of environmental and energy policies.

In 1974, when the Organization of Arab Petroleum Exporting Countries implemented an embargo cutting supplies to major consumer countries, 17 Organisation for Economic Co-operation and Development (OECD) member countries formed the IEA to respond to future disruptions and to serve as a counterweight to the Organization of the Petroleum Exporting Countries (OPEC). Oil powered the global economy then, and the 24 OECD member countries at the time accounted for 72% of global demand. The producer group, OPEC, provided 50% of the world's oil. To achieve its main objective of securing access to reliable and ample oil supplies, the IEA first set up its emergency response capability (oil stocks equivalent to at least 90 days of each member country's prior year's net imports and – in the event of a major supply disruption – to release stocks, restrain demand or increase supply, or some combination of these three). Three co-ordinated stock releases have taken place to date: in the run-up to the First Gulf War in 1991, after hurricanes Katrina and Rita in 2005, and when civil war halted Libyan production in 2011.

The IEA has achieved great success in the 40 plus years since its creation, including but not limited to: establishing a strategic oil stock requirement and response mechanism as a protection against sudden oil supply disruptions; providing an important energy information tool through the collection and publication of timely and reliable data; providing global energy policy analyses and recommendations; serving as an energy policy alignment platform for its members; being one of the first to advise on the transition of energy policies that encourage greater diversification of energy supplies; and promoting clean energy technology, energy efficiency and dialogue.

IEA modernisation

Although the core mission of the IEA remains intact, the organisation has evolved and expanded over the decades. It is at the heart of global dialogue on energy, providing authoritative statistics and analysis. The IEA examines the full spectrum of energy issues and advocates policies that enhance the reliability, affordability and sustainability of energy in its 29 member countries and beyond. The IEA also works with a broad range of groups, committees and advisory bodies, for which the legal bases vary. Some of these groups include private-sector and IEA non-member country representatives.

Box 10 • Dr Kissinger's comments on the IEA's future

In 2009 on the 35th anniversary of the IEA, Dr Henry A. Kissinger, former US Secretary of State and one of the leaders behind the creation of the IEA, delivered a speech on the future role of the IEA centred around two pivotal questions.

First, given the critical connections between energy and environmental issues, how should the IEA integrate climate change within its priorities and assist governments in their efforts to transform the energy system? Dr Kissinger's view was that clearly there is a continued and necessary role for the IEA to pursue those activities directed toward improving our collective energy security. Within its role of helping governments to formulate better energy policy, the IEA can also be a highly effective organisation on the climate change front.

Second, how can the IEA as an institution engage and better integrate non-member nations that nonetheless will play key roles in shaping our collective energy system going forward? Dr Kissinger suggested that the IEA must evolve to incorporate those countries that will drive the future of global energy. While expanding an organisation may be disruptive to the status-quo, we must be willing to adapt to changing realities. All member countries will need to carefully contemplate the principles upon which the IEA was founded and ask themselves how it might be made to include a new, broader set of key energy players.

Source: Kissinger (2009).

At the IEA Ministerial meeting in November 2015, three main pillars were identified as a means of modernising the IEA in the transformed global energy landscape. The first pillar is to further open the doors of the IEA to emerging economies. Mexico's announcement to pursue IEA membership was therefore warmly welcomed, and the IEA also welcomed China, Indonesia and Thailand as Association countries. In addition, the IEA renewed a number of bilateral work programmes with Brazil, Chile, China, Indonesia, Mexico and South Africa. The second pillar is to broaden the IEA core mandate of energy security – in part to take into account the continued evolution of global oil markets, but also to factor in the rising role of liquefied natural gas (LNG) in global energy trade. The third pillar involves transforming the IEA into a global hub for clean energy technologies and energy efficiency, including strengthening the role of the IEA's Technology Collaboration Programmes, a network of 6 000 energy technology experts worldwide.

The two-day Ministerial meeting was a unique opportunity for government ministers and industry leaders to discuss major energy-related issues, and the future of a world energy system transitioning in response to the threat of climate change. To discuss how this transformation will be realised in the context of an energy system that is increasingly defined by emerging economies, the 2015 IEA Ministerial meeting convened ministers and delegations from 29 IEA member countries and 9 partner countries – Brazil, Chile, China, India, Indonesia, Mexico, Morocco, South Africa and Thailand – together with the European Union. Around 30 executives from the IEA Energy Business Council (EBC) also took part.



Group photo at the 2015 IEA Ministerial meeting.

Brief history of China–IEA co-operation

20 years of co-operation

In the Memorandum of Understanding the State Planning Commission (forerunner of the National Development and Reform Commission [NDRC], responsible for managing China's command economy) signed with the IEA in Beijing in 1996, both parties agreed to co-operate in the following areas:

- energy conservation and efficiency
- rational and efficient production, extraction, transport, distribution and use of oil, gas, coal, electricity (including hydro and nuclear) and other sources of energy including renewables
- foreign investment and trading in the energy sector
- energy supply security
- information and statistics
- energy research and development and technology deployment
- energy and the environment
- any other area to which they agree.

Since then, China and the IEA have established in-depth bilateral co-operation in various forms of exchanges and co-operation, and on a wide range of topics including energy security, energy statistics, energy markets (coal, oil, gas and renewables), energy efficiency, the IEA Technology Collaboration Programmes, cleaner coal and carbon capture and storage (CCS) technologies, industry, buildings and transportation. Co-operation has been beneficial for both parties: energy development in China has offered the IEA a broader perspective in its research, while China has also benefitted from IEA views and recommendations.

Publications on China

A special focus has been put on China in IEA publications since 2000, with many publications having chapters on China and dozens dedicated to China specifically.

Table 12 • IEA publications dedicated to China

<i>Title</i>	<i>Year</i>	<i>Content</i>	<i>Hard copy</i>	<i>Chinese version</i>
<i>China's Worldwide Quest for Energy Security</i>	2000	Whole		
<i>Coal in the Energy Supply of China</i>	2000	Whole	Yes	
<i>China's Power Sector Reforms: Where to Next?</i>	2006	Whole	Yes	
<i>Raising the profile of energy efficiency in China: Case study of standby power efficiency</i>	2006	Whole		
<i>World Energy Outlook 2007</i>	2007	Chapter		
<i>Cleaner Coal in China</i>	2009	Whole	Yes	Yes
<i>Coal mine methane in China: A budding asset with the potential to bloom</i>	2009	Whole		
<i>Natural gas in China</i>	2009	Whole		
<i>China Wind Energy Development Roadmap 2050</i>	2011	Whole	Yes	Yes
<i>Integration of renewables: Status and challenges in China</i>	2011	Whole	Yes	
<i>Overseas investments by Chinese national oil companies: Assessing the drivers and impacts</i>	2011	Whole		
<i>Medium-Term Coal Market Report 2012</i>	2012	Chapter	Yes	
<i>Electricity in Climate-Constrained World: Data and Analysis</i>	2012	Section	Yes	
<i>Energy Technology Perspectives 2012</i>	2012	Section	Yes	
<i>Facing China's Coal Future: Prospects and Challenges for CCS</i>	2012	Whole	Yes	Yes
<i>Gas Pricing and Regulation: China's Challenges</i>	2012	Whole	Yes	Yes
<i>Oil and gas emergency policy – China 2012 update</i>	2012	Whole		
<i>Policy Options for Low-Carbon Power Generation in China: Designing an Emissions Trading System for China's Electricity Sector</i>	2012	Whole		
<i>Resources to Reserves</i>	2013	Section	Yes	
<i>Developing a Natural Gas Trading Hub in Asia</i>	2013	Section		
<i>CO₂ Emissions from Fuel Combustion 2013</i>	2013	Section		
<i>Transition to Sustainable Buildings: Strategies and Opportunities to 2050</i>	2013	Section		
<i>Energy Investments and Technology Transfer Across Emerging Economies: the Case of Brazil and China</i>	2013	Whole	Yes	
<i>World Energy Investment Outlook</i>	2014	Data	Yes	
<i>Tracking Clean Energy Progress 2014</i>	2014	Data		
<i>Medium-Term Oil Market Report 2014</i>	2014	Section	Yes	
<i>Energy Statistics of Non-OECD Countries 2014</i>	2014	Section		
<i>Medium-Term Gas Market Report 2014</i>	2014	Section		
<i>Medium-Term Renewable Energy Market Report 2014</i>	2014	Section		
<i>Emissions Trading in the People's Republic of China: A Simulation for the Power Sector</i>	2014	Whole	Yes	
<i>Emissions Reduction through Upgrade of Coal-Fired Power Plants: Learning from Chinese Experience</i>	2014	Whole	Yes	

<i>Update on Overseas Investments by China's National Oil Companies: Achievements and Challenges since 2011</i>	2014	Whole	Yes	
<i>The Impact of Global Coal Supply on Worldwide Electricity Prices</i>	2014	Whole		
<i>Energy Efficiency Market Report</i>	2014	Section	Yes	
<i>Energy Use in the Chinese Building Sector</i>	2015	Whole	Yes	
<i>Energy Technology Perspectives</i>	2015	Chapter	Yes	
<i>Redrawing the Energy–Climate Map</i>	2015	Chapter	Yes	

Personnel exchange

The IEA was one of the first international energy organisations to receive secondees from the Chinese government, and has received the most. Since 2010, the IEA has welcomed five secondees from the National Energy Administration (NEA), and since 2013 three secondees from the Ministry of Science and Technology (MOST), to work in the organisation for six months to one year. In 2015, the IEA started receiving secondees from Chinese energy companies and plans to enlarge the Chinese secondee programme to receive more, especially from companies.

Table 13 • Secondees from China to IEA

	2010	2011	2012	2013	2014	2015
Secondees from government	1	1		2	2	2
Secondees from energy companies						1
Interns				1	1	2
Total	1	1		3	3	5

Note: Secondees from academia not included.

Key Chinese counterparts

Table 14 • IEA co-operation with key counterparts

Category	Organisation	Major co-operation areas
Government	NEA	All areas, with focus on energy policy, energy emergency response and global governance
	MOST	Energy technology research and development (R&D)
	National Bureau of Statistics (NBS)	Energy statistics
Industry	China National Petroleum Corporation (CNPC)	Oil and gas
	State Grid Corporation of China (SGCC)	Global energy interconnection, renewable energy
	Shenhua	Coal
Academia	NDRC Energy Research Institute (ERI)	All areas of energy research
	Chinese Academy of Social Sciences (CASS)	Energy security, global governance
	Tsinghua University	Energy efficiency

Major co-operation areas

Table 15 • Major co-operation areas

Co-operation area	Co-operation profiles
Energy policy and security	<p>China and the IEA have frequent high-level visits and co-ordination at the working level. Although not yet a member of the IEA, China has been invited by the organisation to its energy Ministerial meetings since 2009, and four bi-annual joint IEA–NEA statements have been signed since. Diverse energy policies issues have been discussed between the two sides.</p> <p>Since 2004, Chinese experts have been invited to take part in energy emergency preparedness exercises and training sessions. The NEA and the IEA have agreed to share up-to-date information during times of threats to global oil and gas supplies and actual supply disruptions. Both parties will continue to exchange information on new developments in emergency policy, regulation and planning concerning oil, natural gas and electricity. In the process of building its strategic petroleum reserve (SPR), China has learnt from the IEA and made use of IEA member countries' experiences. <i>Oil and gas emergency policy – China 2012 update</i>, an IEA publication was published in 2012.</p> <p>Both parties continue to share constructive information and views on global energy markets, including assessment of best practices and preparation of market outlooks (oil, natural gas, coal, electricity and renewable energy), as well as issues such as price volatility, on a frequent basis. Both parties are concerned about unwarranted oil price fluctuations and agree to support internationally agreed actions designed to combat manipulation and improve the transparency and predictability of markets, and thus to help minimise market distortions and price volatility.</p> <p>Both sides share experiences in energy market development and reform (e.g. natural gas and power sector reform) with a view to studying regulatory practices, market-based instruments and/or transitional changes that may be required to ensure that markets work efficiently. The Chinese government has invited the IEA to provide input in its 13th Five-Year Plan and its G20 presidency.</p>
Energy technology	<p>China already participates as a full member in 18 IEA international energy technology collaboration programmes (TCPs) and as a sponsor in two. MOST organises a China–IEA Science and Technology Co-operation Workshop every year to discuss the progress of TCPs and possible co-operation in the future. MOST has already established and funded a liaison office, located at the China Coal Research Institute, to facilitate closer participation in IEA energy R&D-related activities. The IEA International Low-Carbon Energy Technology Platform offers additional opportunities for co-operation.</p> <p>IEA and Chinese experts continue to work together on the China-related aspects of the IEA's <i>Energy Technology Perspectives</i> and, together with experts from other countries, will collaborate on the development of international roadmaps for a suite of innovative and clean energy technologies.</p> <p>Both parties strengthen co-operation on energy technology activities in the framework of the Clean Energy Ministerial and other multilateral forums, e.g. the Electric Vehicles Initiative, which China and the United States co-lead, and the Combined Heat and Power (CHP) and Efficient District Heating and Cooling (DHC) Working Group.</p>
Energy data	<p>The NBS of China participates fully in the annual cycle of statistical exchanges organised by the IEA, and has made significant progress in providing monthly statistical data to the Joint Organisations Data Initiative (JODI) and the IEA.</p> <p>The IEA has worked extensively with China's NBS for many years to better understand China's energy data and to encourage NBS alignment with international standards. In the early years, a very small team was in place (two statisticians), exclusively dedicated to energy statistics. Through various venture capital-funded initiatives the IEA has been able to build capacity and train a new group of energy statisticians in the NBS, leading to an increased number of energy statisticians working at the national level.</p> <p>The <i>Energy Statistics Manual</i> was translated into Chinese, and Chinese versions of two other guidebooks—<i>Energy Efficiency Indicators: Fundamentals on Statistics</i> and <i>Energy Efficiency Indicators: Essentials for Policy Making</i>— are to be launched soon.</p>
Renewable energy	<p>The IEA works closely with China in the renewables area; it co-published with the China National Renewable Energy Centre the <i>China Wind Energy Development Roadmap 2050</i> as an outcome of joint research.</p> <p>The Agency also co-operates with China on the Grid Integration of Variable Renewables (GIVAR) project.</p>
Energy	China has been a major beneficiary of the IEA's many training programmes on energy

efficiency	<p>efficiency. The IEA has a very active energy efficiency programme with China engaged in a range of activities including modelling energy efficiency potential, assessing the impact of energy efficiency policies, studying specific energy efficiency policy measures and continuing collaboration on building energy efficiency.</p> <p>In 2010, the IEA published <i>Energy Efficiency Governance</i> based on a global review, and China was included in the publication. In 2014, the <i>Energy Efficiency Market Report</i> included a chapter on China. In 2015, the IEA and Tsinghua University (China) co-published <i>Building Energy Use in China</i> based on three years of joint research. In 2016, the IEA initiated the research project <i>China Energy Efficiency Roadmap 2050</i> with the Energy Research Institute of the NDRC.</p>
Climate change	<p>The IEA has done climate change research with a focus on China.</p> <p>During COP21 held in Paris in 2015, the NDRC and the IEA co-hosted the IEA-China High Level Side Event.</p>

A new era of co-operation

IEA Executive Director's first visit destination

Reflecting the increasing importance of China – and of all major developing countries – in the spectrum of IEA work, Dr Fatih Birol made China his first official visit destination shortly after taking office as IEA Executive Director in September 2015, breaking with the tradition of travelling to an IEA member country.

In his first open speech as Executive Director at the Chinese Academy of Social Sciences (CASS) in Beijing, Dr Birol called for a “new era” of institutional ties between China and the IEA, one in which China participates fully in the Agency’s work. He said he considered his visit to Beijing a tangible demonstration of his vision to modernise the IEA, and a key part of that vision is to develop a truly *international* energy agency. His aim is that China become not just a partner but a full participant in the work of the IEA; while recognising that this may take time, the moment to initiate the process is now (Birol, 2015).

During his visit, he met with ministers and vice-ministers from the NEA, MOST, the NBS, the vice-chairman of CASS, the vice-president of Tsinghua University, and presidents of China’s largest energy companies.

In 2015, Dr Birol also published two articles in *People’s Daily (renmin ribao)*, the most influential Chinese newspaper. The articles on China’s governance of renewables and climate change have led to positive and enthusiastic responses in China.

2015 IEA–China events

The NEA, the MOST and the NBS have made high-level visits increasingly frequent, growing direct links with these primary counterparts of the IEA.

In January 2015, the IEA held the first-ever Emergency Response Exercise (ERE) in China, also one of the few to be held outside Paris. The two-day exercise drew participants from 13 countries, and included Chinese government and industry representatives. As a part of the ERE, all participants were invited to visit the very first national petroleum stockpiling facilities in China. It was the first time a national petroleum reserve base was opened to a large international audience.

The IEA was invited by Chinese government bodies to provide inputs for the drafting of the 13th Five-Year Plan as well as the 2016 G20 Energy Sustainability Group agenda.

Table 16 • 2015 major events

Event	Place
COP21 China–IEA High Level Side Event	Paris, France
<i>World Energy Outlook 2015</i> launch	Beijing, China
IEA Ministerial and signing of the bilateral joint statements	Paris, France
Joint IEA–NEA workshop on oil and gas development in China	Beijing, China
IEA–SGCC Dialogue Workshop on Global Energy Interconnection: Smart Grids and Beyond	Paris, France
IEA Executive Director's public speech in China Academy of Social Sciences	Beijing, China
IEA Executive Director's public speech in Tsinghua University and Signing of IEA–Tsinghua Co-operation letter of intent	Beijing, China
IEA–SGCC Dialogue Workshop on Global Energy Interconnection: Smart Grids and Beyond	Beijing, China
Book Launch of <i>Redrawing the Energy–Climate Map (World Energy Outlook Special Report)</i>	Beijing, China
Emergency Response Exercise	Ningbo, China
3rd IEA Unconventional Gas Forum	Chengdu, China

Activation of Association status

At the IEA Ministerial meeting in Paris in November 2015, the IEA and China, Indonesia and Thailand jointly declared activation of their IEA Association status. Minister Nuer Baikeli, Vice-chairman of the NDRC and Administrator of the NEA, headed a high-level Chinese delegation to attend the Ministerial and he was the first Chinese energy minister to attend the biennial meeting in person.

The issuing of the Joint Declaration on the Activation of IEA Association marks the formal establishment of association relationships of the three countries with the IEA. This is an historic milestone in the development of global energy governance, as activation of Association status of these countries is expected to serve as a bridge and platform for wider-ranging and deeper co-operation and collaboration between IEA member and Association countries. It is a key step towards building a truly global international energy organisation, fully reflective of future energy trends and the interests of both IEA member and Association countries, who have a critical expanding role across the entire range of global energy issues.

According to the Declaration, the initial shared areas of co-operation under Association include energy security, energy data and statistics, and energy policy analysis. Energy efficiency, energy technologies, renewables, electricity security, grid integration and other issues are of mutual interest in the scope of Association. For future development, Association is open for additional issues to be included, based on mutual benefits in pursuit of common interests (Annex 5).

This new relationship is founded on the Joint Declaration on Association issued at the November 2013 IEA Ministerial meeting. The IEA and Brazil, China, India, Indonesia, Russia and South Africa (key partner countries) announced their intention to pursue closer co-operation on the basis of a common understanding that global energy challenges and energy security require shared solutions by producer, consumer and transit countries, and after two years of negotiations, China, Indonesia and Thailand took the lead in activating the association.

Association is defined as a non-binding and progressive relationship that will evolve and that will serve as a basis for higher levels of mutual co-operation in the future. As the joint declaration set the stage for the IEA and Association countries to work together under this strengthened institutional tie, the Association could potentially be developed as a main arena for global energy governance.

China's attitude to becoming an Association country is active and open. In its newsletter, China's NEA states that:

The establishment of the association relationship is a step further compared with the previous partner relationship. It is conducive to deepening mutual trust and understanding between China or other emerging economies and the IEA, to enhancing the level of co-operation in various fields, and to serving the overall situation of development and reform in China. Based on the association, further enhancement of the bilateral relations depends on the IEA's own reform and modernisation process, as well as on the actual needs of China's engagement in global energy governance. (NEA, 2015)

Further engagement

Over the past 20 years, the IEA has worked with China to assist the country in its transition to a more sustainable energy economy, and to integrate it into global energy discussions to share experiences and best practices through various IEA meetings and activities. The relationship between China and the IEA has become stronger over the years for better common energy security, technological research and development, higher-quality statistics and environmental sustainability, among other benefits. China-IEA co-operation expanded last year particularly, with breakthroughs and achievements such as activation of IEA Association country status. Nevertheless, IEA Association should be considered only the first step towards further deepening and broadening mutual engagement, as "Association is a non-binding and progressive relationship that will have an evolving nature and that will serve as a basis for higher levels of mutual co-operation in the future." (IEA, 2015c)

This is an opportunity for China to demonstrate its willingness to play a more prominent role in global energy governance, with increased responsibility and greater contributions. Although it has made outstanding progress in energy data and statistics, gaps still exist. China may need to invest more in human resources to increase the number of Chinese officials able to explain China's energy policy on the international stage, and the Association arrangement with the IEA offers much easier access to the needed expertise and information.

In the area of energy security, China is quickly building up its strategic oil reserves. The IEA is the only international organisation with the means and mandate to organise collective action in case of oil disruptions. Hence, if China and the IEA can come closer in developing shared measures to strengthen the international regime for global energy security, it would demonstrate China's readiness to assume greater responsibility and make greater contributions to global energy governance. The IEA's unique system to collectively address global oil supply emergencies has evolved over the years to be more effective and flexible, and the IEA views China as being well positioned to join the system, a clear signal that China is willing to contribute tangibly on global energy security, well beyond its domestic energy security concerns.

By deepening co-operation through developing common interests and respecting divergent ones, the partnership can have a far-reaching impact on the global energy landscape and global energy governance.

Options for joint co-ordinated actions:

- Intensifying the joint effort to upgrade and develop the Association arrangement would be a useful next step, to make it a platform for further IEA-China engagement and to upgrade China's capability to play a greater role in global energy governance, as well as to make the IEA a more inclusive and representative energy organisation at the centre of global energy governance. More structured and regular high-level consultation entities may provide a regular and efficient venue to discuss Association and IEA-China co-operation comprehensively.

- As IEA-China co-operation enters a new era, accelerating the effort to expand and enrich institutional and personnel ties should be further encouraged. Building a China-IEA Joint Centre in Beijing would be an innovative model of co-operation, providing a tangible site serving various purposes for both parties. For the IEA, hosting a high-level official from China, a first for any international energy organisation, building upon the already established and successful secondee programme, would provide further impetus and a multilateral dimension for future co-operation. For China, as the Association arrangement enables Association countries to participate in many IEA meetings, more attendance of these meetings would be beneficial. To attend more IEA meetings, stationing an energy advisor in the Chinese embassy in Paris as well as dedicating more resources to global energy co-operation should be considered.
- To demonstrate the benefit of closer IEA–China co-operation to the world, the recommended first area of new co-operation is energy security. The IEA and China can begin discussing how China can contribute more to global energy security and how the IEA can support China to upgrade its capability to assume a greater role in global energy security and global energy governance. In practical terms, the IEA and China may start consultation on how to integrate China's oil stockpiles into the IEA's collective emergency response system.
- Further co-operation to support China's transition to a more sustainable energy economy is mutually beneficial. Expanding areas of collaboration could include climate change, air pollution, renewables and data and statistics. The Association arrangement provides ample scope for both parties to pursue further co-operation in non-traditional areas and issues to find comprehensive solutions to both China's and the world's energy challenges.
- Further strengthening co-operation in clean energy technologies and energy efficiency, including through the IEA's TCPs, will bring China in closer contact with the IEA's broader global network to the benefit of both. China is already party to 18 TCPs, but this can be further broadened as China plays a key part in the global network of energy technology. This matches the IEA's vision to become a global hub for clean energy technology and energy efficiency.
- IEA-China co-operation is important not only in a bilateral context, but in the multilateral context of global energy governance. Further strengthening co-operation in major international energy forums and events would bring IEA-China co-operation to a higher level. The Chinese presidency of both the G20 in 2016 and the Clean Energy Ministerial in 2017 are good opportunities.

It is important that the IEA and China share the same platform to discuss these options for advancing the IEA-China relationship and to discuss global energy governance in a constructive and forward-looking manner. Many researchers point out that not to accord major emerging economies the degree of influence in global energy governance that they merit would risk further fragmentation. The IEA's invitation of deeper involvement for emerging economies will therefore not only benefit those economies but also reinforce the IEA's prominent position in the global energy framework. Although there are still various challenges for the IEA and China on how to turn the vision into reality, it is in the shared interest of all to continue making progress.

Looking forward

Looking forward, the strategies China adopts will have widespread impact on global energy governance. Will its dynamism translate into further integration of China into the global energy governance system? Will its behaviours influence the system's goals and operations positively or negatively? The answers rely primarily on two factors: China's willingness, and its capability to further embrace the system.

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China has clearly shown its willingness to engage and understands that global energy governance has a major role to play in meeting common challenges head-on. Regarding its capability to engage and lead, China is engaged in a steep learning curve. There are several measures China could take to ensure its engagement and influence in global energy governance correspond to its economic and energy developments:

- **Adhere to the multilateral approach and work closely with the international community.** In today's globalised and connected world, no country can enjoy prosperity in isolation. This is especially true for a country with a huge size and economy, such as China. China benefits more in adhering to multilateral norms, sharing interests and concerns with international parties and acting as a positive and inclusive member in global energy governance.
- **Further increase influence in global energy governance.** The rise of dynamic emerging countries as global economic and political actors, including China, will bring about changes worldwide. China's role in global governance overall is likely to expand, so it follows that it will also be more influential in global energy governance specifically. Chinese tradition holds that obtaining more say or voice (*Huayuquan* in the Chinese discourse system, directly translated as "the right to speech") is vital to meeting the country's own development needs. With continued engagement, China will arrive at a new and higher stage of global energy management and act as a constructive influencer.
- **Enhance capacity building and increase financial, technical and manpower investment.** As President Xi Jinping said, "China should defend its own interests as well as the common interests of developing countries, and focus not only on its needs as it develops, but also on the expectations the international community places on China" (Xi, 2015a). In response to the call of the international community, China will take on more responsibility and make greater contributions to global energy governance by providing more input in various ways. This will require China to dedicate more resources to areas such as energy security, data and statistics, and energy policy analysis, among others. Additional financial, technical and manpower investments are essential to improve China's global energy governance engagement capabilities.
- **Integrate further into global energy markets and make more contributions to global energy security.** As part of its energy reforms, China's energy market will be further opened to foreign capital, and the Belt and Road Initiative will help China to be networked with neighbouring transit countries. By being more integrated into global energy markets, China can synchronise its domestic energy security concerns with those of global energy security. The country can aid the global pursuit for collective energy security through further international energy co-operation, improving both regional and global market stability, as well as taking part in the global oil supply emergency system.
- **Take a leading role in global energy affairs and share Chinese experience in energy development.** As the country embraces the vision of a global community, China can take a leading role and provide demonstration effects in areas of international interest, for instance in the international energy transition to a low-carbon economy, addressing climate change and energy access for all. This sharing of experiences and knowledge would demonstrate to the rest of the world China's eagerness to engage in global energy governance. In addition, Chinese leaders have shown more and more willingness to make firm (and in some cases binding)

international commitments to tackle these problems. China has more to gain than lose in the process of learning global best practices and sharing Chinese experiences with the world, so it is worthwhile to be more proactive and skilful in promoting the world's better understanding of the country and its energy sector.

Annexes

Annex 1. China's government institutions overseeing energy issues

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Acronyms	Ministries	Responsibilities	Remarks
NEA	National Energy Administration	Established in 2008 under the aegis of NDRC. State Electricity Regulatory Commission (SERC) merged into NEA in 2013. Responsible for planning the long-term energy development in China and implementing its annual energy development target. It also runs regulatory responsibilities in the energy sector. Designated ministry for most energy-related international affairs.	Subordinate agency of NDRC.
NDRC	National Development and Reform Commission	Leading ministry in economic affairs. Balances the country's energy development with other sectors of the economy, sets energy prices and ensures smooth operation of energy sector and transportation sector. Leading role in climate policy formulation and implementation and energy efficiency.	NEA's parent ministry.
MIIT	Ministry of Industry and Information Technology	Formulates and implements industrial development plan and industrial policy for energy related sectors, including electric vehicles, petrochemicals and coal chemicals; regulates energy equipment manufacturing and sets industrial standards; overseas energy conservation and energy intensity reduction in industrial sectors.	SASTIND and CAEA's parent ministry.
MOST	Ministry of Science and Technology	Supervises energy research, development, demonstration, and deployment (ER&3D) and promotes energy technology innovation.	
MOLR	Ministry of Land and Resources	Oversees mineral surveys and appraisals, including utilization plans, grants licenses for mineral exploration and production, and administers the registration and assignment of exploration and production licenses.	SOAO's parent ministry.
MOF	Ministry of Finance	Allocates fuel subsidies in China and promotes renewable energy development through tax credit and financial subsidies.	
MOA	Ministry of Agriculture	Guides development and deployment of renewables in rural areas	
SAT	State Administration of Taxation	Regulates taxes related to the production, sales, exports and consumption of energy products and services, such as Valued-added tax of energy companies, resource tax, and fuel tax.	
MOHURD	Ministry of Housing & Urban & Rural Development	Supervises building efficiency issues	
MOFCOM	Ministry of Commerce	Issues quotas and licenses for energy imports and exports; partly regulates foreign investment in China's energy sector and Chinese energy investment overseas.	
MOT	Ministry of Transportation	Supervises and coordinates energy transportation by road and water.	
MOWR	Ministry of Water Resources	Supervises hydropower development and oversees the safety issues involved in building dams; reviews and approves large- or medium-scale dam projects.	
MEP	Ministry of Environmental Protection	Responsible for energy-related environment issues in China, including nuclear safety.	NNSA's parent ministry.
SAWS	State Administration of Work Safety	Overseas energy production safety issues, especially coal mine safety.	Parent ministry of SAWS.
SACMS	State Administration of Coal Mine Safety	Overseas coal mine safety issues.	Subordinate agency of SAWS.

SOAO	State Oceanic Administration Offshore	Regulates offshore oil and gas development.	Subordinate agency of MOLR.
NNSA	National Nuclear Safety Administration	Operates under Ministry of Environmental Protection. Responsible for nuclear safety issues in China.	Subordinate agency of MEP.
SASTIND	State Administration of Science, Technology and Industry for National Defence	Involves in policy-making of civil nuclear use. Performs intergovernmental and international atomic energy cooperation in the name of CAEA.	Subordinate agency of MIIT.
CAEA	China Atomic Energy Authority	The regulatory agency that oversees the development of atomic energy China.	Subordinate agency of MIIT.
SASAC	State Asset Supervisory and Administration Commission	Supervises the state-owned assets of all centrally-owned energy SOEs. Appoints their top executives of SOEs.	
GAQSIQ	General Administration of Quality Supervision, Inspection and Quarantine	Standardization of energy equipment, Supervision of special energy equipment, and etc.	
NASMG	National Administration of Surveying, Mapping and Geo-information	Responsible for surveying, mapping and geo-information of energy resources.	Subordinate agency of MOLR.
GAC	General Administration of Customs	Customs issue related to energy.	
NBS	National Bureau of Statistics	Data survey, collection and processing of energy data.	

Annex 2. China's bilateral energy co-operation mechanisms

Country	Energy Dialogue Mechanisms with China
Australia	China-Australia Bilateral Dialogue for Resources Co-operation China-Australia Joint Coordinating Group on Clean Coal Technology
US	China-US Strategic and Economic Dialogue (In both Strategic and Economic tracks, energy is an essential topic) China-US Climate Change Working Group Framework (Smart Grids Initiative, CCS Initiative, Efficiency in Buildings and Industry Initiative are included among others) China-US Ten Year Framework (TYF) for Cooperation on Energy and Environment (Electricity Action Plan and Energy Efficiency Action Plan are included among others) Energy Policy Dialogue between USDOE and NEA of China Oil and Natural Gas Forum. Coal Forum (its forerunner focused on clean coal) Renewable Forum Advanced Biofuel Forum Energy Efficiency Forum Clean Energy Research Centre
Japan	Energy Co-operation under the framework of China-Japan High-Level Economy Dialogue China-Japan Energy Conservation and Environmental Protection Forum
South Korea	Energy Co-operation under the framework of China-South Korea Economy and Trade Dialogue
Russia	Energy Co-operation under Framework of the Regular Meeting between Chinese Premier and Russian Prime Minister China-Russia Energy Negotiation Mechanism (Vice Premier Level) Working Group on Coal Cooperation Nuclear Issues Sub-Commission under Framework of the Regular Meeting between Chinese Premier and Russian Prime Minister
Kazakhstan	China-Kazakhstan Energy Co-operation Sub-Committee under the framework of China-Kazakhstan High-Level Cooperation Committee
Turkmenistan	China-Turkmenistan Energy Co-operation Sub-Committee under the framework of China-Turkmenistan High-Level Cooperation Committee
Uzbekistan	China-Uzbekistan Energy Co-operation Sub-Committee under the framework of China-Uzbekistan High-Level Cooperation Committee
Canada	China-Canada Mining Investment Forum China-Canada High-Level Investment Policy Forum China-Canada Energy Conservation and Environmental Protection Working Group
Myanmar	China-Myanmar Electricity Co-operation Commission
India	Energy Co-operation in the framework of China-India Strategic Economic Dialogue
Indonesia	China-Indonesia Energy Forum
Pakistan	Energy Co-operation Under the China-Pakistan Economic Corridor China-Pakistan Energy Working Group
Mongolia	China-Mongolia Joint Energy Commission
Brazil	Energy and Mineral Resources Sub-commission under the framework of China-Brazil High-Level Coordination and Co-operation Commission
Venezuela	Energy and Mineral Resources Sub-commission under the framework of China-Venezuela High-Level Coordination and Co-operation Commission
South Africa	Energy Sub-commission under the framework of China-South Africa High-Level Bilateral Commission
France	Energy Co-operation in the framework of China-France High Level Economic and Financial Dialogue
UK	China-UK Energy Dialogue
Germany	Energy Co-operation in the framework of Sino-German Forum for Economic and Technological Cooperation
Denmark	Renewable Energy Research Co-operation in the framework of Sino-Danish Strategic Research Sino-Danish Renewable Energy Development Programme
Bahrain	China-Bahrain Oil and Gas Cooperation Commission
Saudi Arabia	China-Saudi Arabia Nuclear Cooperation Joint Committee
Thailand	China-Thailand Energy Working Group
Turkey	China-Turkey Renewable Industry Forum

Note: Based on open sources

Annex 3. China's energy co-operation with specialised multilateral entities

Acronyms	Entities	Level of Co-operation	Major Milestones
IEF	International Energy Forum	Member	China is a founding member of IEF and permanent IEF Executive Board Member. The country was involved in the process of IEF reform and signed IEF Charter at the Extraordinary IEF Ministerial Meeting in 2011.
IRENA	International Renewable Energy Agency	Member	China attended most sessions of the IRENA Preparatory Commission as an observer. In 2014, China became a full member. China was elected to serve on the IRENA Council in 2015 at the IRENA's fifth Assembly.
IEA	International Energy Agency	Association on Country	China initiated its cooperation with the IEA, first formalised in a MoU in 1996, followed by in-depth cooperation. China attended the IEA Ministerials in 2009, 2011, 2013 and 2015, signing bilateral cooperation MOUs each time. China sends secondees to the IEA consecutively. In 2013, China signed a Joint Declaration on Association and in 2015 formally joined the Association together with Indonesia and Thailand.
ECT	Energy Charter Treaty	Observer	In 2001, China became an observer by invitation to the Energy Charter Conference. China is involved in the negotiation and revision process of the new Energy Charter Treaty. In 2015, China signed the revised Energy Charter Declaration and became observer to the Energy Charter Conference. China sends secondees to the Energy Charter consecutively.
OPEC	Organization of the Petroleum Exporting Countries	Dialogue partner	China initiated its cooperation with the IEA, first formalised in a MoU in 2005. Three China-OPEC High-level Roundtables were held in 2006, 2007 and 2015, respectively.
WEC	World Energy Council	member	China joined WEC in 1983 and China National WEC Committee was established. Chinese Taipei and Hong Kong are also members of WEC. In 2003, World Energy Scenarios Workshop (members' meeting) and WEC China International Summit (regional event) were held in Beijing, China.
IPEEC	International Partnership for Energy Efficiency Cooperation	Member	China is a founding member of IPEEC. In 2014, IPEEC China secretariat was established. China has served as vice chair of both IPEEC Policy Committee and Executive Committee committees since 2012 and 2013 respectively. In 2013 China proposed to initiate the IPEEC Top Ten Energy Efficiency Best Practices and Best Available Technologies Task Group (TOP TENS).
IAEA	International Atomic Energy Agency	Member	China joined IAEA in 1984. China sends a permanent delegation to IAEA.
CEM	Clean Energy Ministerial	member	China is a founding member and inaugural member of the Steering Committee of CEM. China has attended previous Clean Energy Ministerials and will host CEM8 in 2017.
3GF	Global Green Growth Forum	partner	In 2012, China joined the 3GF as a partner country. The vice minister from NEA gave keynote speeches in the previous forums. 3GF Asian Regional Meeting took place in Guiyang, China on 26 June 2015
SE4ALL	Sustainable Energy for All	member	NEA's current administrator is a co-chair of the Advisory Board of SE4ALL. NEA's current vice-administrator gave a keynote speech at the First Annual Sustainable Energy for All Forum in New York in 2014.
JODI	Joint Organization of Data	member	As a founding member of JODI, China participated in JODI-Oil and JODI-GAS since they were established.
	Asian Energy Ministers' Meeting	member	China has sent high level delegations to all six roundtables held biennially since 2005, in order to build and sustain partnerships with other Asian countries.
	Five Countries' Energy Ministers' Meeting	member	Five-Countries' Energy Ministers' Meeting was created in 2006 and included energy ministers from China, India, Japan, Korea and US. Two ministerials have been held.

Annex 4. China's energy co-operation with comprehensive multilateral entities

Acronyms	Entities	Major Milestones
G20	Group of Twenty	China has been actively involved in G20 energy related issues, even before the G20 Energy Sustainability Working Group was established. In 2014, China and the US started a peer review on fossil fuel subsidy. In 2014, China took a leading role in drafting the G20 Principles on Energy Collaboration. In 2016, China will host the G20 Summit under the theme "Towards an innovative, invigorated, interconnected and inclusive world economy." In the energy sector, the G20 Energy Ministerial Meeting and three G20 Energy Sustainability Working Group Meetings will take place in China. The country intends to take this opportunity to address critical energy issues with a broad vision.
UNFCCC	United Nations Framework Convention on Climate Change	China has insisted on having climate change negotiations in the framework of UNFCCC. China signed the treaty on June 11, 1992, and ratified it on January 5, 1993 (one of the first countries to ratify it). The treaty entered into force on 21 March 1994. China has taken part in the meetings of the UNFCCC Parties (Conferences of the Parties) (COP) from COP1 to COP 21, and played an important role all along the negotiations, in particular through the negotiating group called "G77+China". As the first developing country to have promised to put a cap on CO2 emissions, China has made key contributions to the successful outcome at COP21 held in Paris in late 2015, during which the Paris agreement was agreed and a single framework to track progress toward and achievement of nationally determined contributions for all countries with built-in flexibility for Parties' different capacities.
APEC	Asia-Pacific Economic Co-operation	China became a member of APEC Energy Working Group (EWG) in Oct, 1991. Chinese Taipei and Hong Kong are also member economies of APEC EWG. China has been very active in APEC WEG, participating in most EWG meetings and all APEC Energy Ministers Meetings. China sends secondees to the Asia Pacific Energy Research Centre (APEREC) consecutively. The APEC Energy Security Initiative (ESI) signed by Leaders of APEC Member economies in 2001 in Shanghai, China. APEC Energy Ministers met in Beijing, China on 2 September 2014. This is one of the few Energy Ministers Meeting ever took place in China. During the 2014 APEC Energy Ministers Meeting in Beijing, Beijing Declaration was issued. APEC Sustainable Energy Centre (APSEC) was established in Tianjin, China in September 2014 with endorsement of the 2014 APEC Energy Ministers Meeting. Many APEC forums, working group meetings, workshops and expert group meetings on issues such as Net Zero Energy Building & Community, Efficiency and Conservation, New and Renewable Energy Technologies, Low Carbon Model Town took place in China.
BRICS	Brazil, Russia, India, China and South Africa	Promoting energy cooperation within the BRICS framework has been proposed since the first BRICS Summit in 2009. The first BRICS energy efficiency and the first BRICS Energy Ministerial convened in 2015. An MoU on energy efficiency cooperation was signed and a working group would be established.
ASEAN +3	Association of Southeast Asian Countries plus China, Japan and South Korea	ASEAN+3 cooperation began in December 1997 and institutionalized in 1999. China is actively engaged in interconnectivity, emergency response cooperation under the framework.
EAS	East Asian Summit	China, as a founding member of EAS, attended all EAS Energy Ministerials. And China together with ASEAN Centre for Energy initiated the EAS Clean Energy Forum to explore clean energy issues facing East Asia as well as to promote clean energy technology exchanges. Two forums have taken place in China in 2014 and 2015 respectively.
SCO	Shanghai Cooperation Organization	China is a founding member of SCO, a Eurasian political, economic and military organisation founded in 2001 in Shanghai. The SCO started to delve into the energy sphere in 2004, when members made consensus on 11 cooperation areas including energy. During the Moscow Summit in 2005, members expressed an intention to promote joint energy projects, and Russian officials floated the idea of creating "an "Energy club" a year later. SCO members ink memo on creation of Energy Club finally in the end the 2013.
CAREC	Central Asia Regional Economic Cooperation	China is a member of the CAREC Energy Sector Coordinating Committee Meeting (ESCC). The committee holds two meetings each year. The 18 th ESCC Meeting was held in Beijing in 2014.
ACD	Asian Development Dialogue	China joined ACD in 2002, the year of its foundation and is a co-prime mover in the energy area together with Bahrain, Indonesia, Kazakhstan, Qatar, and the

		Philippines.
GMSEC	Great Mekong Sub-region Economic Cooperation	An Intergovernmental Agreement (IGA), signed by all GMS countries in 2002, provided the legal authority and broad framework to implement power trade among the GMS members. To follow up on the IGA's implementation, Regional Power Trade Coordination Committee (RPTCC) was established and within RPTCC framework, Yunnan Province is trying to make itself home to the Power Dispatch Centre of the sub-region, in order to further facilitate power interconnection and the establishment of an integrated sub-regional power market.
ASEM	Asia-Europe Meeting	ASEM has been a main multilateral channel for communication between Asia and Europe since 1996. High level official from NEA attended the first ASEM Ministerial Conference on Energy Security held in 2009 in Belgium.
TC	Trilateral Cooperation among the People's Republic of China, Japan and the Republic of Korea	In 2003, the three governments agreed to expand their mutually beneficial cooperation in the field of energy. A statement named Cooperation toward Sustainable Growth Through Promotion of Renewable Energy and Energy Efficiency was adopted at the Fourth Trilateral Summit Meeting in 2011.
EU	European Union	<p>China-EU Energy cooperation is one of the earliest Sectoral Dialogues between the European Commission and its Chinese from 1994 on. Two main bilateral forums on energy allow for close cooperation: one is the EC-China Biannual Energy Conferences between the Directorate-General for Energy of the European Commission and the Chinese Ministry of Science & Technology (MOST) take place on a bi-annual basis, alternating between China and Brussels since 1994, to discuss aspects of energy-related research; the other is the annual EC-China Energy Dialogue between the European Commission and the National Energy Administration (NEA) of China launched in 2005.</p> <p>The Europe-China Clean Energy Centre (EC2) is a five-year cooperation project funded by the European Union and founded in April 2010 by the European Commission, the National Energy Administration of China and the Ministry of Commerce of China. The centre is a good example of China-EU cooperation. With a definite termination date, the centre is terminated in 2015.</p>
FOCAC	Forum on China-Africa Cooperation	China and the African Union cooperated to launch the Forum on China-Africa Cooperation (FOCAC) in 2000 in Beijing as tri-annual collective dialogue platform. Energy and natural resources have been a major topic of the forum and many energy projects such as Grand Inga Dam were mentioned in summit declarations. In the 6 th FOCAC Summit held in South Africa in 2015, the two sides encouraged the establishment of a forum on energy and natural resources under the framework of FOCAC. In the same summit, the two sides agreed to establish a training program for the capacitation of African energy practitioners through research and development exchanges.
CASCF	China-Arab States Cooperation Forum	The China-Arab Energy Conference is a biennial mechanism established in 2008 under the China-Arab States Cooperation Forum framework. The outcome of the Conference is reported directly to the Forum. The responsible counterparts of the conference are NEA of China and League of Arab States. The first four conferences have been held in China, North Sudan, China and Saudi Arabia in 2008, 2010, 2012 and 2014 respectively. For each of the past conferences, there had been wide participation from Arab countries. From the very first meeting, discussion has not limited to oil and gas, which is the major investment and trade type between the parties. Power generation, including renewable and nuclear power, has been an integral part of discussion. This shows that China is increasingly interested in expanding trade and economic ties with the region, particularly in developing industries like nuclear power.
GCC	Gulf Cooperation Council	China-GCC Energy Experts Dialogue is a framework initiated between NEA (China) and the GCC. Four meetings have been convened under this framework, in Beijing in 2005, in Riyadh in 2008 and in Beijing in 2013 and 2015, respectively. In addition, energy cooperation is always one of the major topics in almost all other China-GCC cooperation frameworks, such as the top level China-GCC Strategic Dialogue and China-GCC economics and trade forum.
CELAC	Community of Latin American and Caribbean States	The first meeting of the Forum China-CELAC was held in 2015 in Beijing. In the China-Latin American and Caribbean Countries Cooperation Plan (2015-2019) adopted at the meeting, the two sides agreed to foster a closer cooperation in energy and explore the possibility of inaugurating the China-LAC Energy and Mineral Resources in due time. China-LAC Business Summit was founded in 2007 with an annual summit held in a LAC country and in China in turn, which hosts many discussions on energy cooperation so far.

Annex 5. IEA Association Declaration 2015

Joint Ministerial Declaration on the occasion of the 2015 IEA Ministerial Meeting expressing the Activation of Association

Paris, France

November 18, 2015

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1. We, the IEA and China, Indonesia and Thailand, met at the IEA Ministerial meeting in Paris on 17 and 18 November 2015 and jointly declare the activation of IEA Association. We strongly welcome the achievement of this historic milestone in the development of global energy governance and hereafter China, Indonesia and Thailand will be called Association countries.
2. Activation of Association is expected to serve as a bridge and platform for wider-ranging and deeper cooperation and collaboration between IEA member and Association countries in the future. It is a key step towards building a truly global international energy organization, fully reflective of future energy trends and the interests of both IEA members and Association countries, who have a critical expanding role across the entire range of global energy issues. To support the momentum of this profound transformation, the IEA will adopt an inclusive approach, adapting and evolving for the mutual benefit of IEA members and Association countries.
3. This new relationship builds upon the Joint Declaration on Association issued on the occasion of the November 2013 IEA Ministerial meeting. The 2013 Declaration stated that Association would provide a common forum for regular dialogue between the IEA Members and Association countries through the participation of Association countries in meetings of various IEA Standing Groups and Committees as well as IEA Ministerial meetings. As laid out in the 2013 Declaration, Association is intended to build upon the extensive bilateral work programmes that have been jointly developed and agreed by the IEA and individual Association countries in recent years.
4. This declaration on the Activation of Association follows extensive and comprehensive consultations carried out between the IEA and Association countries over the past two years, aimed at reaching an understanding on how to develop Association in a manner that captures both the benefits for and the responsibilities of IEA members and Association countries.
5. The success of this joint work, reflecting the best endeavours of all Parties to Association, acknowledges that strong and fruitful cooperation already exists, but also that the energy challenges of the future call for even stronger collaboration. We share the understanding that Association is a non-binding and progressive relationship that will have an evolving nature and that will serve as a basis for higher levels of mutual cooperation in the future. We will continue to work together to this end under this strengthened institutional tie.
6. In order to provide an efficient platform to work together in areas of mutual interest, the initial shared areas of cooperation under Association include, Energy Security, Energy Data and Statistics, and Energy Policy Analysis. Energy Efficiency, Energy Technologies, Renewables, Electricity Security, Grid Integration and other issues of mutual interest are

of equal importance in the scope of Association. For its future development, Association is open for additional issues to be included, based on mutual benefits in pursuit of common interests.

7. China, Indonesia and Thailand are the first countries to become Association countries. We jointly express our strong desire to welcome more major emerging countries to join Association in the future acknowledging that global energy challenges require global solutions. With the activation of Association today, we jointly recognize a new era for the IEA, for Association countries and for all.

What Association provides

- Participation in the IEA Meetings

8. Association countries are able to participate in the meetings of the IEA Groups, Committees and Working Parties listed below. Details of the procedure to attend these meetings will be specified later based on this declaration.
 - Standing Group on Emergency Questions (SEQ)
 - Standing Group on the Oil Market (SOM)
 - Standing Group on Long-Term Co-operation (SLT) and Energy Efficiency Working Party (EEWP) under this Group
 - Standing Group on Global Energy Dialogue (SGD)
 - Committee on Energy Research and Technology (CERT) and Working Party on Energy End-Use Technologies (EUWP), Working Party on Fossil Fuels (WPF), Working Party on Renewable Energy Technologies (REW) and Fusion Power Co-ordinating Committee (FPCC) under this Group

- Training and Capacity Building

9. Association countries are prioritized when the IEA provides opportunities for training and capacity building in accordance with its purpose and constraints.

- Opportunities to work as secondees at the IEA Secretariat

10. Association countries are prioritized when the IEA provides secondee positions in accordance with their purposes and constraints.

- Energy Technology Network, Implementing Agreements and others

11. Association countries are prioritized in activities carried out under the IEA's Energy Technology Network, participation in Technology Implementing Agreements and special experts' events, and the provision of related publications.

- Energy Efficiency Programme

12. Association countries are prioritized in activities carried out under the IEA's Energy Efficiency Programmes and the provision of associated publications.

Association will mark a new era of enhanced collaboration in three initial shared areas

- Energy Security

13. We reaffirm our shared priority on the importance of taking common effective measures to meet oil supply emergencies by developing emergency response systems, taking into consideration the respective domestic circumstances of the Association countries.

14. We acknowledge our common intention to build and maintain emergency reserves and to collaborate with the IEA in their use at the time of emergencies, taking into consideration the respective domestic circumstances of the Association countries, including net exporters.

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15. We highly value and share the intention to test the level of our preparedness to supply disruptions through the IEA's Emergency Response Exercises, Emergency Response Assessments or other means, taking into consideration the respective domestic circumstances of the Association countries, including net exporters.

- Energy Data and Statistics

16. We share the common interest in improving the consistency, coherence and timeliness of energy data at national level.

17. We highly value the role played by the IEA in global energy data and statistics and Association countries share the intention to further cooperate with the IEA in this area.

- Energy Policy Analysis

18. We share the common understanding on benefits of sharing best practices and challenges through the IEA's energy policy analysis.

19. We welcome the opportunity for such an analysis to be done for Association countries at a mutually convenient time and under agreed conditions.

Next Ministerial Meeting

20. We strongly welcome the activation of Association at this landmark IEA Ministerial meeting held today in Paris and express our intention of deepening our collaboration and cooperation before next IEA Ministerial Meeting in 2017.

(END)

Acronyms, abbreviations and units of measure

Abbreviations and Acronyms

ACD	Asian Development Dialogue
AIIB	Asian Infrastructure Investment Bank
APEC	Asia-Pacific Economic Co-operation
APSEC	APEC Sustainable Energy Centre
ASEAN	Association of Southeast Asian Countries
ASEAN+3	ASEAN plus China, Japan and South Korea
ASEM	Asia-Europe Meeting
BRICS	Brazil, Russia, India, China and South Africa
CAREC	Central Asia Regional Economic Cooperation
CASCF	China-Arab States Cooperation Forum
CASS	Chinese Academy of Social Sciences
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CELAC	Community of Latin American and Caribbean States
CEM	Clean Energy Ministerial
CGN	China General Nuclear Power Group
CNOOC	China National Offshore Oil Corporation
CNNC	China National Nuclear Corporation
CNPC	China National Petroleum Corporation
CO ₂	Carbon Dioxide
EAS	East Asian Summit
ECT	Energy Charter Treaty
EU	European Union
ERE	Emergency Response Exercise
FOCAC	Forum on China-Africa Cooperation
GACC	Global Alliance for Clean Cookstoves
GCC	Gulf Cooperation Council
GCCSI	Global Carbon Capture and Storage Institute
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEFC	Gas Exporting Countries Forum
GEF	Global Environment Facility
GIF	Generation IV International Forum
GMSEC	Great Mekong Sub-region Economic Cooperation
G20	Group of Twenty
G20 ESGW	G20 Energy Sustainability Working Group
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IEF	International Energy Forum
IFNEC	International Framework for Nuclear Energy Cooperation
IGU	International Gas Union
IHA	International Hydropower Association
IPCC	Intergovernmental Panel on Climate Change
IPEEC	International Partnership for Energy Efficiency Cooperation
IRENA	International Renewable Energy Agency
JODI	Joint Organization Data Initiative
LNG	Liquefied Natural Gas

MOST	Ministry of Science and Technology , People's Republic of China
MOU	Memorandum of Understanding
NBS	National Bureau of Statistics, People's Republic of China
NDRC	National Development and Reform Commission, People's Republic of China
NEA	National Energy Administration, People's Republic of China
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of the Petroleum Exporting Countries
REN21	Renewable Energy Policy Network for 21st Century
SCO	Shanghai Cooperation Organization
SGCC	State Grid Corporation of China
SE4ALL	Sustainable Energy for All
SINOPEC	China Petrochemical Corporation
SNPTC	State Nuclear Power Technology Corporation
SOE	State-Owned Enterprise
SPR	Strategic Petroleum Reserve
TC	Trilateral Cooperation among the People's Republic of China, Japan and the Republic of Korea
UN	United Nations
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WANO	World Association of Nuclear Operators
WCA	World Coal Association
WEC	World Energy Council
WEO	World Energy Outlook
WNA	World Nuclear Association
WPC	World Petroleum Council
WTO	World Trade Organization
3GF	Global Green Growth Forum

Units of measure

Bcm	billion cubic meters
GW	gigawatt
Gt	gigatonne
Kgce	kilogrammes of coal equivalent
Mcm	million cubic metres
Mtce	million tonnes of coal equivalent
Mtoe	million tonnes of oil equivalent
MW	megawatt
TWh	terawatt hour

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China's Engagement in Global Energy Governance



The world's largest energy consumer and producer as well as the top oil importer and carbon dioxide emitter, the People's Republic of China is in the centre of the global energy landscape – and at a turning point towards a low-carbon future. There is an increasingly clear congruence of China's domestic interests and the world's collective interests in terms of energy security, economic development and sustainable growth. In global energy governance, the country is gradually transforming from outsider to insider and from follower to influencer, with instrumental implications for the country and the world. This book provides a historical perspective on China's approach to global energy governance and highlights how greater positive and constructive Chinese engagement can be a step towards a better energy future for all.