EAST AND SOUTHEAST ASIAN ENERGY TRANSITION AND POLITICS

Jérémy JAMMES, Frédéric LASSERRE, Éric MOTTET et Gauthier MOULTON

The Nam Gnouang Dam on the Nam Theun River in Laos.
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Summary

Talking about the energy transition in East Asia is tantamount to placing it at the threshold of both a historical and transitional relationship with energy needs, production and consumption in the East and Southeast Asian context. For this reason, each of the articles in this Special Issue replaces, in their own way, the question of energy policies in the historical evolution experienced by the countries of the region or by regional inter-governmental bodies (Mekong Commission, the Association of Southeast Asian Nations (ASEAN), ASEAN + 2, +3, +4). Despite the endless vows to maintain a collegial and cooperative spirit amongst partners and neighbors of the region and despite international pressures/agreements, these bodies are constantly struggling in achieving their original mission. In varying degrees, diversity characterizes not only the methods of managing this energy transition, but also the strategies adopted to respond to energy and de facto environmental challenges. Furthermore, it needs to be recognized that these environmental challenges are being approached more from a domestic policy platform than from an international or global one.

The three chapters below highlight the complexity of the energy policies adopted in East and Southeast Asia, which is the subject of political and economic arbitrations being played out on several fronts (national, regional, international) in institutionalized forms (ASEAN, COP21, etc.) or otherwise (bilateral inter-ministerial decisions). The great range of actions and challenges, the insufficient coordination of energy policies and the competition between different governmental and institutional actors, have, until now, negated the possibility of a common, unified, and unidirectional Asian or Southeast Asian policy.

Keywords: energy transition, East Asia, Southeast Asia, policy, economy, region.

Résumé

Parler de la transition énergétique en Asie de l’Est revient à la placer au seuil d’une relation à la fois historique et transitoire avec les besoins, la production et la consommation d’énergie dans le contexte de l’Asie de l’Est et du Sud-Est. Pour cette raison, chacun des articles de ce numéro spécial remplace, à sa manière, la question des politiques énergétiques dans l’évolution historique vécue par les pays de la région ou par les instances intergouvernementales régionales (Commission du Mékong, Association of Southeast Nations asiatiques (ASEAN), ASEAN + 2, +3, +4). Malgré les vœux sans fin de maintenir un esprit collégial et coopératif entre les partenaires et voisins de la région et malgré les pressions / accords internationaux, ces organismes ont constamment du mal à réaliser leur mission initiale. À des degrés divers, la diversité caractérise non seulement les modes de gestion de cette transition énergétique, mais aussi les stratégies adoptées pour répondre aux enjeux énergétiques et environnementaux de facto. En outre, ces défis environnementaux sont davantage abordés à partir d’un point de vue de politique intérieure plutôt qu’internationale ou mondiale.

Les trois chapitres ci-dessous mettent en évidence la complexité des politiques énergétiques adoptées en Asie de l’Est et du Sud-Est, qui fait l’objet d’arbitrages politiques et économiques se déroulant sur plusieurs fronts (national, régional, international) sous des formes institutionnalisées (ASEAN, COP21, etc.) ou autre (décisions interministérielles bilatérales). Le large éventail d’actions et de défis, la coordination insuffisante des politiques énergétiques et la concurrence entre les différents acteurs gouvernementaux et institutionnels ont jusqu’à présent écarté la possibilité d’une politique commune, unifiée et unidirectionnelle en Asie, de l’Est ou du Sud-Est.

INTRODUCTION

Jérémy JAMMES, Frédéric LASSERRE, Éric MOTTET and Gauthier MOUTON

In these uncertain times, energy has become an increasingly important geopolitical commodity. As with all organic matter, access to abundant energy and the efficient use thereof dictates which society will ultimately prosper. Moreover, energy is not only shaping inter-state relations but also playing a role in establishing “norms” which, in turn, govern the practices of international relations (Mohapatra, 2017). The global energy landscape is undergoing a period of profound change and the first two decades of the 21st century may be remembered as the time in history when the world awoke to the fact that the political, economic and environmental cost of its 150-year addiction to coal and oil could no longer be sustained. A large-scale switch to a plentiful and readily available supply of alternatives, including renewable energy, is perceived as the only viable solution moving forward.

Countries in East and Southeast Asia are accelerating energy transition so they might build an economic system of sustainable growth in the future. However, although the challenge of energy transition is taken seriously by all, such countries lack consistency, coordination and even a spirit of “intergenerational equity”.

Let us focus on the very term, “energy transition”, which is not uncontroversial nor unanimous. For instance, in the United States, energy transition is widely interpreted as the reduction in dependence on hydrocarbons from the Middle East (Perthuis and Jouvet, 2015). Conversely, in Europe, energy transition is discussed more over the long term and the aims of such a historical perspective are primarily related to climate change issues (Grübler, 2012; Kander et al., 2013; Kander and Stern, 2014; Stern and Kander, 2012). Indeed, energy transition is hardly a new phenomenon (Gales et al., 2007; Smil, 2010:10) if one considers, as an example, the transition from wood to fossil fuels which took place over 200 years ago. The transition from one type of energy to another takes 80 to 400 years, depending on the kind of energy, the technology involved, the political commitment and the economic possibilities (Fouquet, 2010). In the short term, a transition can be influenced by the availability of energy, its cost, and pollution arising from its use as well as improvements in efficiency arising from economic activity (Solomon and Krishna, 2011). Nowadays, with global warming becoming a real threat in addition to the need to reform economic and environmental global governance, the international community finds itself at a crossroads.

Talking about the energy transition in East Asia is tantamount to placing it at the threshold of both a historical and transitional relationship with energy needs, production and
consumption in the East and Southeast Asian context. For this reason, each of the articles in this Special Issue replaces, in their own way, the question of energy policies in the historical evolution experienced by the countries of the region or by regional inter-governmental bodies (Mekong Commission, the Association of Southeast Asian Nations (ASEAN), ASEAN + 2, +3, +4). Despite the endless vows to maintain a collegial and cooperative spirit amongst partners and neighbors of the region and despite international pressures/agreements, these bodies are constantly struggling in achieving their original mission. In varying degrees, diversity characterizes not only the methods of managing this energy transition, but also the strategies adopted to respond to energy and de facto environmental challenges. Furthermore, it needs to be recognized that these environmental challenges are being approached more from a domestic policy platform than from an international or global one.

The three articles below highlight the complexity of the energy policies adopted in East and Southeast Asia, which is the subject of political and economic arbitrations being played out on several fronts (national, regional, international) in institutionalized forms (ASEAN, COP21, etc.) or otherwise (bilateral inter-ministerial decisions). The great range of actions and challenges, the insufficient coordination of energy policies and the competition between different governmental and institutional actors, have, until now, negated the possibility of a common, unified, and unidirectional Asian or Southeast Asian policy.

Since the end of the 1990s onward, the construction of dams on the Mekong river (in both Chinese and Southeast Asian areas) has been confronted by alarmist reports over the disturbance of the ecosystem, the relocation of flooded villages, forced and often failed professional retraining of agricultural personnel who become deprived of arable land, and so forth. This kind of information can only question, for more than one reason, the functioning and effectiveness of local management and governance methods and their capacity for institutional and international action. The case of the Mekong River Commission (MRC) and its attempt — largely unsuccessful — to produce a coherent hydroelectric policy, mindful of the environment and the local populations, is a revealing case study.

In their article “Resource management of the Mekong river: between strong national interests and low influential international activism”, Éric Mottet and Frédéric Lasserre are adamant that environmental issues of hydroelectric development on the main channel of the Mekong River have become an important topic of debate between the riparian countries and environmental experts and activists, most being Western. At the national level, the question of the poorly coordinated management of dam projects along the Mekong River course has triggered protest movements within civil society, but it does not lead to a weakening of hydroelectric development policies. According to the authors, this is because,
on the one hand, governments have not relinquished their desire to control the management of the resources of the basin, despite civil protests; and, on the other hand, there is the inability of the Mekong River Commission, despite a legitimate institutional framework, to develop a binding legal framework. This contributes to the gradual erosion of the Commission’s relevance in the eyes of its members, international donors and China, the latter now proposing its own model of South–South cooperation, the Lancang–Mekong Cooperation Initiative. Underlying this status quo unfolds original geopolitical strategies and a system of bilateral and international alliances (ASEAN, ASEAN + 3, + 4) which could be tested in the months and years to come.

Being the 5th largest economy in the world, ASEAN and its over 650 million inhabitants are experiencing considerable energy and environmental challenges and has set interesting targets to achieve. For instance, the ASEAN Plan of Action on Energy Cooperation (APAEC) aims to increase the share of renewable energy to 23% in ASEAN’s energy mix. At the same time, electricity consumption is projected to grow by a factor of 2.5 from 82 Mtoe1 in 2015 to 207 Mtoe in 2040 (ASEAN Center for Energy, 2017). ASEAN energy politics raise a series of questions on the modus operandi of their individual (State-level) or collective (ASEAN-level) management of energy transition, in the context of the Chinese presence and their agenda on this matter. In their article “Towards and Beyond ASEAN Energy Transitions”, Éric Mottet and Jérémy Jammes approach the ASEAN region as a geo–economical area where policies and strategies aim both to sustain production and to supply and implement an “energy connectivity” within the regional but also global cooperative agenda. Their study presents the evolution of the energy and electricity demands of ASEAN countries (and Timor-Leste) and the challenges they face in meeting the tremendous forecasted growth in energy demand and consumption. It also analyzes the various stages of development of major regional energy infrastructures and the current reorientations of these major projects. Finally, it considers the philosophical and even epistemological implications that this energy transition raises. For example, it illustrates how ASEAN countries have now transitioned into the “thermo–industrial revolution” (Grinevald and Hamilton, 2015), which, as experienced in the West in the mid–19th century, puts countries and their inhabitants into a state of energy dependence, that is to say, in a complicated relationship — spatially and temporally — with regard to their natural resources. This challenges them to find new sources of livelihood and opens up new horizons of research.

1 Million tons of oil equivalent.
Among the many stakeholders involved, China matters immensely to the future of the world’s climate, with the size of its economy impacting the global energy market as well. Looking at CO₂ emissions (not only greenhouse gases, but the largest contributor to climate change), China’s emissions expanded from 10.7% of global emissions in 1990 (the benchmark year for the Kyoto protocol in 1997) to 22.3% in 2008 and 28.5% in 2018 (International Energy Agency (IEA), 2018; IEA, 2019). In addition, although the country’s economy has entered a new phase of a slowing of economic growth, China still remains heavily reliant on fossil fuels. During the past four decades of reform and opening up, the People’s Republic of China (PRC) became one of the world’s major energy consumers and importers, from a small net exporter of oil up until 1993, to the largest net importer in 2014 onwards.

As the world’s largest consumer and importer of energy, China remains highly dependent on foreign supplies, particularly oil and gas, to maintain economic growth. This vulnerability linked to resources supply, combined with environmental degradation in rural regions and air pollution in large urban areas, have forced China to embrace energy transition. Defined as a “structural change of energy mix”, the process of energy transition in China has led the country to develop an ambitious program of clean (renewable) energies until it becomes a forerunner on global climate change issues. Being the largest contributor to climate change as well as the indisputable leader in the development of renewable energy is the Chinese energy paradox. By looking at political representations and the geopolitical implications of China’s energy transition, Gauthier Mouton argues that behind a particular environmental-oriented discourse, energy transition in China should be considered as foreign policy, dominated by geostrategic concerns.

Faced with the magnitude of the challenges, East and Southeast Asian States rarely invest heavily in the advent of advanced technologies to renew energy production with the objective (among others) to limit climate change. Thus, the ambitious Chinese lunar exploration project, Chang’e — named after the Daoist female deity exiled to the Moon for stealing immortality pills from her husband — should be highlighted and monitored by researchers. The first Chang’e 1 launch was made in 2007, and Chang’e 4 finally landed on the hidden side of the Moon on January 3, 2019. In addition to a series of scientific objectives, the Chang’e project presents itself as an innovative energy strategy on the one hand for capturing the “peaks of eternal light”, i.e., from the sectors on the hidden side of the Moon, which can receive almost constant sunlight, and are, in other words, “ideal areas for installing solar power plants and then transmitting energy to the Earth” (Huang, 2018); and exploiting the helium-3 gas abundantly present in the lunar rocks (but rare on Earth) which could “be used for nuclear power plants with controlled fusion”, on the other. According to an Artemis Project paper.
25 tons of helium-3 would meet the annual electricity consumption of the United States (quoted by Huang, 2018; see also Rivers, Regan and Jiang, 2019).

However, there are also very few states that can afford such an investment, not only financially and technologically, but politically as well. Indeed, the political stability of East and Southeast Asian States and their national governance mechanisms are factors too often neglected despite their key role in the planning of policies undertaken. Most of the ASEAN countries are born out of a bloody — even traumatic — decolonization process, and they consequently offer a large variety of political management of energy transition.

The on-going arbitrations and strategies in Southeast Asia reveal the need for a necessary evolution of regional governance in the energy sector. The current patchwork of modes of governance — and, let us not forget, of political charisms which hold such a preponderant place in this region of the world — exacerbates the problems, their formulation, as well as the political, economic and ethical responses that Southeast Asian states are opposing in the inevitable energy transition, namely: the federal military union (Myanmar), multiparty federal parliamentary monarchy (Malaysia), constitutional monarchy (Cambodia and Thailand), Malay Islamic monarchy or sultanate (Brunei), communist republic (Laos), one-Party socialist republic (Vietnam), presidential republic (Indonesia), unitary republic with a presidential democratic regime (Indonesia, Philippines), authoritarian parliamentarian (Singapore) and parliamentary democracy (Timor-Leste).

For those who have been following the evolution of Southeast Asian societies for years — like the authors of this Special Issue — the crucial role played by the armed forces and the national police is evident in the management of these countries and in the dynamics of (re)politicization of Southeast Asian societies. In the specific case of Southeast Asia, Harold Crouch (1988) made the observation — open certainly to controversy — that a dominant role left to the military in the governments of the region has most of the time contributed to the establishment of a period of political stability favorable to economic growth. But is this also the case for energy policies? If the countries of the area showed a strong capacity for adaptation to the world economic crises — and the current Covid-19 situation already appears a new case study for further analysis — it would be advisable in the future to reflect on the evolution of the place and the role of the soldiers within the current governments, with a focus on the capacity (or lack) of the latter to meet energy challenges as well as political, economic and social ones.

In a concomitant register, the demand, management and marketing of energy resources largely fuel regional tensions at the macro-sociological level and in developmental policies,
further affecting the daily life of citizens and their intergenerational relationship with the Earth, i.e., with ecology. Already, in 2006, the economist, Nicholas Stern, of the Grantham Research Institute on Climate Change and the Environment, estimated in his famous report called the *Stern Review: Economics of Climate Change*, that the measures adopted today will only have a limited effect on the climate over the next 30 years. On the other hand, “the investment that takes place in the next 10–20 years will have a profound effect on the climate in the second half of this century and in the next” (Stern, 2006: vi). In other words, the energy issue, and, more broadly, the climatic and environmental issues, are related to the question of risks and uncertainties management, inevitably implying long-term “intertemporal equity” (Stern, 2006: 41), and, more specifically, intra- and inter-generational commitment and moral considerations.

How do East and Southeast Asia’s efforts move from dirty, finite and unsustainable fuels to sustainable life and growth? Scholars in this Special Issue undertake one of the first efforts to systematically investigate the relationship between (the current phase of) energy transition and the political governance of natural resources in East and Southeast Asian economies. This issue explores the various dimensions of energy transition in this region, examining the imperatives, dynamics and implications of Asia’s rapidly expanding energy consumption and the growing need of East and South Asian countries to improve energy efficiency at a time of rising global energy demand. On the basis of various case studies, the authors explore the subject from different angles in order to reach relatively comprehensive and objective conclusions.

Too few studies reflect for the moment on energy-economic developments in ASEAN countries (Peytral and Simon, 2013; and ISEAS, 2019 for a last updated overview) and on the recent emergence in Asia — in comparison with the West — of an ecological ‘green thought’. the latter being a potential matrix of the demands of civil society at local and regional levels. This ecological doxa and praxis observable in Southeast Asia remain multifaceted, largely influenced by the symbolic mode of representation and millennial religious practices of their hydro-agricultural societies and civilizations. The success, or failure, of the implementation and application of environmental or sustainable development policies, at local as well as national or transnational scales, would benefit from being measured and understood from a multidisciplinary perspective and in the paradigm of an “ecology of relationships” (Descola, 2005). It would then be a matter of combining research both on the power relationships between humans and nations (geopolitical and economic approaches) as well as on representations and relationships between humans and non-humans — as with humans and fossil fuels, for example (anthropological approach).
For the time being, experiencing a situation of social rest — often very precarious and, in any case, unstable and supervised by the military — energy policies live at high (and sometimes unsafe) speeds, their “thermo-industrial revolution” and their investments in the long term not encouraging. Indeed, such investments are thought of as short-term risk-taking against the country’s social stability, against the growth of purchasing power, against the long-desired emergence of a consuming middle class, and, in extenso, against local or national electoral mandates or continuity of an autocratic regime. There is still a long way to go “to meet the needs of the present without compromising the capacity of future generations to meet their needs”, as the 1987 Brundtland report so aptly demanded at the start of the United Nations awareness of the problem. Such a response and search for “intertemporal” or “intra- and inter-generational equity”, at the level of each state and of international bodies, should ideally provide the ethical principle to be followed by every environmental policy in the world². In order to function effectively and in the long term, this principle requires to be based on political stability; it must also be relayed by moral and cultural codes of filiation and transmission, on the one hand, and representations of an interdependent relationship between humans and the environment on the other.

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² Our reflection continues and thus adapts to a non-Western cultural area the stimulating philosophical article by Myriam Revault d’Allonnes (2008) on Western conception of energy and environmental policies, which can be done with the contribution of comparative ethnology.
References, Introduction


CHAPTER 1
TOWARDS AND BEYOND ASEAN ENERGY TRANSITIONS

Éric MOTTET and Jérémy JAMMES

Introduction

Southeast Asia\(^3\) is increasingly becoming the epicenter of an intense geopolitical activity. However, contrary to certain studies that have been conducted for several decades, this results not only from the dynamic created by its powerful Chinese or Indian neighbors; ASEAN stands out and is competitive in a number of fields, such as hydrocarbons, its labor force and agro-food production. This situation also fuels social tensions and trafficking of all kinds (Chouvy, 2013).

As one of the most dynamic regions in the world, Southeast Asia is experiencing high economic growth, especially in the energy sector. The region is expected to continue to see its energy demand grow strongly, increasing by 60% by 2040, driven by a regional economy that is expected to triple in size as well as a population expected to grow by more than 20% by 2040, reaching nearly 770 million people (Cornot-Gandolphe, 2017:5; International Energy Agency, 2017:11). This tremendous growth creates energy challenges in terms of policies and strategies aimed at sustaining production and supply. ASEAN,\(^4\) which formed the ASEAN Economic Community (AEC) on December 31, 2015, intends to respond to these challenges by improving energy connectivity and regional cooperation in order to ensure energy security, access to energy, the sustainability of the energy mix and, ultimately, the energy transition by means of an environmentally sustainable plan.

This chapter presents the evolution of the energy and electricity demand of the ASEAN countries and the challenges that the member states (and Timor-Leste) face in responding to the tremendous expected growth in energy demand (and consumption). It will also analyze strategies set up within ASEAN aiming to develop both renewable energies and energy cooperation, with a focus on two major integration projects of the electricity market.

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\(^3\) In this chapter we understand “Southeast Asia” as the ten ASEAN countries (e.g. Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam) as well as Timor-Leste.

\(^4\) ASEAN was established in 1967 to “accelerate economic growth and promote peace and stability” in Southeast Asia.
(ASEAN Power Grid or APG) and gas market (Trans-ASEAN Gas Pipeline or TAGP). Next, it will analyze the civil nuclear energy source that could be integrated into the regional energy mix by 2036, especially in Thailand. The chapter will then recall the various stages of development of major regional energy infrastructures, the challenges encountered during the implementation of related action plans, and the current reorientations of these major projects. The closing words of the chapter will consider the philosophical and even epistemological implications of this energy transition for our academic understanding of the temporal, spatial and technological conceptions of Southeast Asia, and with consideration of the tendency in Southeast Asian societies to cling to conventions that keep them frozen in backward regimes and modes of governance.

1.1 Energy balance in Southeast Asia

In Southeast Asia — a pivotal expanse of territory between the Chinese and Indian land masses — the question of energy demand is a major issue, especially because of the high population density in the region and its accelerated development phase. From the 1960s onwards, inspired by growth models of the new East Asian industrialized countries (Bafoil, 2012: 281) as well as by Japan, Southeast Asia has been growing as an economic power, aiming specifically to integrate Southeast Asia into the "global value chain". Especially from the 1990s onwards, Thailand, Malaysia, Indonesia and Vietnam have stood out as models of countries with successful economic growth and high exports.

Taken as a whole, the economic indices of the ASEAN zone appear consistent (Table 1). ASEAN is part of the emerging Asia, “driven by the Chinese locomotive” (Boisseau du Rocher, 2009: 21), and is one of the main growth centers of the world (5.2% average growth since 2000). As such, Southeast Asia offers a favorable investment environment for foreign companies seeking to establish a presence through political stability, a competitive workforce, an increasingly more open and transparent market, a good geographical position in the region, as well as abundant — but of course not infinite — natural resources (US$120 billion/year of FDI over the last five years). This strong growth is reflected in a

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5 Taiwan, Hong Kong, South Korea, Singapore.

6 A value chain is made up of all the companies involved in the manufacturing process, from the raw material to the final product. Depending on the case, it encompasses the processing of raw materials, R&D, second transformation, trading activities, third or fourth transformation, second trading session and, finally, the final distributor.
A strong energy demand that has increased by 70% since 2000 and 20% over the last decade (International Energy Agency, 2017: 18).

The other key factor in increasing energy needs is population growth, accompanied by an unprecedented rural exodus. Within 30 years, Southeast Asia has grown from 407 million (in 1986) to nearly 640 million inhabitants (in 2016),\(^7\) comprising 9% of the current world population. Still predominantly rural (53%), this Southeast Asian population is encouraged to migrate from the countryside to the cities and peri-urban areas, where industrial and service sectors have been mushrooming. About 150 million migrants are expected to move to these urban zones by 2040. The transport sector, particularly in cities, has also experienced explosive growth in recent decades, especially with regards to passenger cars and two-wheelers. Residential energy consumption is also growing very swiftly, as average incomes and national programs for electrification of households have increased. Thus, the rapid economic and demographic developments in the countries of Southeast Asia have induced new challenges in meeting the strong growth demand for energy.

### TABLE 1: Key economic and energy indicators in Southeast Asia

<table>
<thead>
<tr>
<th>Countries</th>
<th>Population 2016 (million)</th>
<th>Real GDP 2016 (US$ billion)</th>
<th>GDP Growth 2016 (%)</th>
<th>TPES (^1) (2015, Mtep)</th>
<th>Electricity Consumption 2015 (TWh)</th>
<th>Electricity Consumption per inhabitant 2014 (kW/h)</th>
<th>Population without access to Electricity 2016 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>52.89</td>
<td>63.2</td>
<td>5.9</td>
<td>19.8</td>
<td>13.0</td>
<td>217</td>
<td>41</td>
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<tr>
<td>Brunei</td>
<td>0.42</td>
<td>11.4</td>
<td>-2.5</td>
<td>2.7</td>
<td>3.7</td>
<td>10,243</td>
<td>0</td>
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<tr>
<td>Cambodia</td>
<td>15.76</td>
<td>20.0</td>
<td>7.0</td>
<td>7.0</td>
<td>5.0</td>
<td>271</td>
<td>40</td>
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<tr>
<td>Indonesia</td>
<td>261.12</td>
<td>932.2</td>
<td>5.0</td>
<td>225.4</td>
<td>199.0</td>
<td>812</td>
<td>9</td>
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<tr>
<td>Laos</td>
<td>6.76</td>
<td>15.8</td>
<td>7.0</td>
<td>5.15</td>
<td>4.2</td>
<td>500</td>
<td>9</td>
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<tr>
<td>Malaysia</td>
<td>31.19</td>
<td>296.5</td>
<td>4.2</td>
<td>85.9</td>
<td>133.0</td>
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<td>Philippines</td>
<td>103.32</td>
<td>304.9</td>
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<td>52.1</td>
<td>71.0</td>
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<td>Singapore</td>
<td>5.61</td>
<td>296.9</td>
<td>2.0</td>
<td>25.6</td>
<td>47.0</td>
<td>8,845</td>
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</tr>
<tr>
<td>Thailand</td>
<td>68.86</td>
<td>407.0</td>
<td>3.2</td>
<td>135.2</td>
<td>168.0</td>
<td>2,540</td>
<td>0</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1.27</td>
<td>1.7</td>
<td>5.7</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>55</td>
</tr>
<tr>
<td>Vietnam</td>
<td>92.7</td>
<td>205.2</td>
<td>6.2</td>
<td>73.8</td>
<td>134.0</td>
<td>1,411</td>
<td>2</td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>639.89</td>
<td>2,554.8</td>
<td>4.6</td>
<td>632.65</td>
<td>777.9</td>
<td>3,013</td>
<td></td>
</tr>
</tbody>
</table>

Table compiled by the authors from various sources: World Bank, International Energy Agency (IEA), World Health Organization (WHO), Organization for Economic Co-operation and Development (OECD).

1. Total Primary Energy Supply (TPES)

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\(^7\) World Bank database (https://data.worldbank.org/).
The economic and energy landscape varies considerably among the countries of Southeast Asia (Table 1). Across the region, about 65 million people live without access to national electricity production and distribution networks, although electrification rates differ widely from one country to another and significant improvements have been made in the region during the last 15 years. For example, in 2016, about 91% of the population of Laos had access to electricity, compared to 37% in 2001 (Mottet and Lasserre, 2014: 526). Nevertheless, per capita energy consumption in Laos is still well below the regional average, as it stands at 500 kW/h in 2014.

Several countries are endowed with energy resources to a greater or lesser extent. As for oil, Brunei, Indonesia, Malaysia, Thailand and Vietnam share 1.6 trillion tons, representing 0.8% of the world’s proven reserves, which is very modest. Meanwhile, Indonesia, Myanmar and Brunei have significant natural gas resources and are exporters of liquefied natural gas (LNG), while Indonesia, like Thailand and Vietnam, has significant proven reserves of coal (2.2% of world reserves) and is now the world’s second-largest exporter after Australia. Additionally, the countries that share the waters of the Mekong River, and, more particularly, Laos, exploit major hydroelectric potential (Mottet and Lasserre, 2017). However, most countries in the region are relatively poor in fossil fuels and rely on massive energy imports.

1.1.1 An expanding energy and electricity demand

Before studying future projections in terms of energy demand, it is worth reminding some orders of magnitude for energy sources and their contribution to the total consumption of the Southeast Asian countries (640 Mtoe in 2016). In 2016, the region’s countries fulfilled 74% of their energy demands with fossil fuels, including carboned fuels in both the gaseous state (natural gas) and liquid (petroleum) or solid (coal) states (International Energy Agency, 2017: 20). In 2000, the figure was around 70%. Oil remains the main source of energy (34%, 218 Mtoe), ahead of gas (22%, 141 Mtoe) and coal (18%, 115 Mtoe), most of which is used for electricity production. This illustrates not only the slowness of efforts to change the energy consumption profile but also the extraordinary difficulty (at the state and ASEAN level) of the task. Bioenergies, mainly traditional biomass (wood, waste), are still widely used in the region, with a share of 20% of the energy mix in 2016. Some 250 million people still use biomass as a source of fuel for cooking (International Energy Agency, 2017: 11).

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9 Million tons of oil equivalent
10 IEA statistics & data: https://www.iea.org/statistics/
Other non-carbon energies, mainly hydropower, now account for 6%. The top five consumers — Indonesia (35% of the total), Thailand, Malaysia, Vietnam and the Philippines — account for 90% of Southeast Asia’s energy demand. For the countries of the region, fossil fuels are at the heart of economies and of the development and modernization policies. The industry has increased its energy consumption by almost 70% since 2000, making it the largest consumer of energy (160 Mtoe in 2016), ahead of the transport sector (120 Mtoe), which counts only 7,000 electric vehicles for all countries in the region (International Energy Agency, 2017: 21). Still in 2016, Southeast Asia had 56 vehicles per 1,000 inhabitants (6% of which were powered by natural gas and biofuels), which was well below the world average of nearly 170 vehicles per 1,000 inhabitants and thus indicated significant growth potential for the countries of the region (International Energy Agency, 2017: 19). Such proportion will decrease very slowly, despite several ambitious projects on a regional scale.

FIGURE 1: Evolution and forecast of energy demand in Southeast Asia (New Scenario Policies or NPS)

The spectacular increase in energy demand is expected to peak in 2040 and to continue growing afterwards. According to the International Energy Agency New Policies Scenario (or NPS), energy demand in Southeast Asia will continue to grow rapidly, increasing by 60% by 2040 to reach 1,062 Mtoe, driven by a regional economy that will triple in size and a population


11 The New Policies Scenario became the reference scenario of the International Energy Agency. It takes into account the objectives announced by the various countries, including when the actions to be achieved by these objectives.
that will grow by more than 20% by 2040. While efforts are made to improve energy efficiency (40% by 2040) and foster development of renewable energies, fossil fuels should continue to dominate the regional energy mix (between 60% and 80% in 2040, according to the scenarios of the International Energy Agency). As the reserves are relatively well distributed across the region, the demand for coal is expected to double by 2040 (271 Mtoe against 112 Mtoe in 2016) because of its increased use for electricity production (26% of the energy mix in 2040). The share of gas should drop slightly, from 22% in 2016 to 21% in 2040. However, demand will increase by 60% over the period (141 Mtoe in 2016 to 225 Mtoe in 2040).

The electricity sector is fundamental to the energy future of the ASEAN countries. Still according to the International Energy Agency’s NPS, demand for electricity is growing faster than any other form of final energy, accounting for nearly 60% of the growth in total energy demand by 2040. Since 2000 onwards, electricity demand in Southeast Asia has increased dramatically, even faster than economic growth. During the period 2000–2016, the Southeast Asian economies grew about 5% per year, which, accompanied with a rise in the demand for electricity of about 6.1% per year, led to a production of 240 Giga-Watt (GW) in 2016 (International Energy Agency, 2017: 23). The progression of demand is expected to level off at 3.7% per year by 2040 (International Energy Agency, 2017: 22). This means that the overall demand for electricity during this period of time will have doubled in some countries like Myanmar, Cambodia, Indonesia and Vietnam. The growth in demand is driven by population growth as well as the steady pace of urbanization, high increases in industrial production and access to electricity by increasingly large segments of rural populations (Cornot-Gandolphe, 2017: 17).

Natural gas and coal are the two main sources of electricity production, accounting respectively for 42% and 35% in 2016 (International Energy Agency, 2017: 24). Oil represents no more than 4% of the electricity mix, compared to 20% in 2000. It is progressively replaced by other sources of electricity production, a substitution that takes time due to the mountainous and insular geography of most countries in the region and the lack of massive regional investment in renewable energies (excluding hydroelectricity).

At the regional level, since 2000 US$69 billion has been invested in renewable energy, which represents 18% of electricity production in ASEAN (International Energy Agency, 2017: 45). Hydropower is the main source (14%), followed by geothermal energy (2%), while energy coming from bioenergy, solar photovoltaic and wind turbines share the remaining 2%.

12 IEA Statistics & Data: https://www.iea.org/statistics/
Several countries in the peninsular region — such as Myanmar, Cambodia or Vietnam, which have large rivers originating in the Himalayas (Mekong, Red River, and Irrawaddy) — rely on hydroelectricity for more than 50% of its electricity production (International Energy Agency, 2017: 24–25). As for Laos, a country aiming to become the ‘energy hub’ of Southeast Asia, its electricity depends almost exclusively on its hydroelectric dams. 13

While natural gas dominates the electricity mix, the rise of coal has accelerated since the year 2010. As a result, the share of gas in electricity production decreased by 9 percentage points, from 49% in 2010 to 40% in 2016, while that of coal jumped from 27% to 40% during the same time. This increase is related to the price advantage and the availability of coal in the region compared to gas (Cornot-Gandolphe, 2017: 18).

According to the International Energy Agency’s NPS, total electric power production in Southeast Asia is expected to triple and to reach up to 2,219 TWh (566 GW installed capacity) by 2040. In order to meet this growing demand for electricity, all sources of production will be stepped up, with the exception of oil, to be virtually eliminated from the electricity mix by 2040. The proportion of fossil fuels in the mix will decrease from 81% in 2016 to 70% in 2040. However, electricity production continues to shift towards coal, up to reaching a share of electricity production to 40%, while that of gas will drop to 28%. Renewable electricity production is increasing its contribution to 29%, largely dominated by hydroelectricity (347 TWh), followed, much later, by bioenergy (97 TWh), solar photovoltaic (85 TWh), geothermal (75 TWh) and wind turbines (55 TWh). Nuclear power is expected to enter the electric power production/business by 2036, with Thailand commissioning its first reactors (16 TWh in 2040).

The rapid increase in energy demand will transform several net exporting countries today into net importers. The self-sufficiency of the region in gas and coal will be challenged by the depletion and exhaustion of reserves. Thus, energy security issues become crucial in Southeast Asia (Cornot-Gandolphe, 2017: 19).

To meet ASEAN’s energy demand by 2040, the investment required in the energy sector are estimated at US$2.7 trillion between 2017 and 2040, according to the International Energy Agency, of which US$1.2 trillion are dedicated to electricity production (including US$300 billion for renewable energy) and US$700 billion for the transmission and distribution of this

13 In 2015, Laos commissioned the Hong Kong lignite manufactory (1,473 MW), the only one of its kind in the country.
electricity.\textsuperscript{14} Spread over 23 years, this colossal amount represents an investment of about US$117 billion per year, or 4.5\% of the annual GDP (2016) of Southeast Asia.

As we have just seen, the rapid increase in energy needs creates significant challenges in terms of safety and finance, of course, but also of the environment. Indeed, Southeast Asia is one of the most vulnerable areas to climate change because of its high economic activity concentrated on its coastlines, and because of its high dependence on agriculture, forestry and other natural resources. Natural disasters are more and more frequent, especially in the form of cyclones, floods or droughts. Each year, torrential monsoon rains and several cyclones induce hundreds of deaths in Southeast Asia (and affect millions of people) and contribute to the rising price of rice and other food. This, and especially given the current and future importance of fossil fuels in the regional energy mix, should also explain why Southeast Asian states are increasingly eager to hone their skills in participating in international climate change negotiations (Mottet, 2012: 113–114).

\subsection*{1.1.2 A modest level of greenhouse gas (GHG) emissions}

The simplest and most common method for comparing countries’ emissions is to add up all the fossil fuels/combustibles (coal, oil and natural gas) burned by each region and/or state. The most accurate figures are on CO\textsubscript{2}.

Firstly, it should be noted that the level of CO\textsubscript{2} emissions in the region is very modest, only 3.85\%, especially compared to the global total and/or China. Table 2 highlights this finding, distinguishing between countries. In 2014, nearly 85\% of Southeast Asia’s total CO\textsubscript{2} emissions was produced by four countries alone: Indonesia (33.34\%), Thailand (22.72\%), Malaysia (17.44\%) and Vietnam (12\%). The remaining seven countries emitted as follows: the Philippines 7.59\%, Singapore 4.5\% and, more marginal, Myanmar 1.55\%, Brunei 0.66\%, Cambodia 0.48\%, Laos 0.14\% and Timor-Leste 0.03\%.

\textsuperscript{14} The International Energy Agency estimates that US$365 billion has been invested in Southeast Asia’s energy sector since 2000, including US$195 billion for expansion of distribution networks.
TABLE 2: CO₂ emissions by country in 2014 (in kilotons\(^{15}\) of CO₂ equivalent)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Total CO₂ emissions (thousand tons)</th>
<th>% in Southeast Asia</th>
<th>% in the world</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>21,632</td>
<td>1.55%</td>
<td>0.06%</td>
</tr>
<tr>
<td>Brunei</td>
<td>9,109</td>
<td>0.66%</td>
<td>0.04%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>6,685</td>
<td>0.48%</td>
<td>0.01%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>464,176</td>
<td>33.34%</td>
<td>1.28%</td>
</tr>
<tr>
<td>Laos</td>
<td>1,955</td>
<td>0.14%</td>
<td>0%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>242,821</td>
<td>17.44%</td>
<td>0.67%</td>
</tr>
<tr>
<td>Philippines</td>
<td>105,654</td>
<td>7.59%</td>
<td>0.29%</td>
</tr>
<tr>
<td>Singapore</td>
<td>56,373</td>
<td>4.05%</td>
<td>0.16%</td>
</tr>
<tr>
<td>Thailand</td>
<td>316,218</td>
<td>22.72%</td>
<td>0.88%</td>
</tr>
<tr>
<td>Timor–Leste</td>
<td>469</td>
<td>0.03%</td>
<td>0%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>166,911</td>
<td>12.00%</td>
<td>0.44%</td>
</tr>
<tr>
<td>Southeast Asia: Total</td>
<td>1,392,043</td>
<td>100%</td>
<td>3.85%</td>
</tr>
</tbody>
</table>

\(\text{China (Mainland China, excluding Hong Kong and Macau)}\)

<table>
<thead>
<tr>
<th>China (Mainland China, excluding Hong Kong and Macau)</th>
<th>Total CO₂ emissions (thousand tons)</th>
<th>% in the world</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10,291,927</td>
<td>28.48%</td>
</tr>
</tbody>
</table>

\(\text{India}\)

<table>
<thead>
<tr>
<th>India</th>
<th>Total CO₂ emissions (thousand tons)</th>
<th>% in the world</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2,238,377</td>
<td>6.19%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>World: Total</th>
<th>Total CO₂ emissions (thousand tons)</th>
<th>% in the world</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>36,138,285</td>
<td>100%</td>
</tr>
</tbody>
</table>

Compiled by the authors from World Bank data, 2018

World Bank information on global pollution generated by each country shows that people and their way of life have been responsible for CO₂ emissions per capita in a period of climate change (Table 3). Thus, these figures highlight the small countries whose economy relies mainly on the intensive production of fossil fuel. In 2014, Brunei released 22.1 tons of CO₂ per capita. In other words, a person living in this Northern-Borneo sultanate pollutes on average 55 times more than a Burmese, a Cambodian, a Laotian or a Timorese, 12 times more than an Indonesian or a Vietnamese, 5 times more than a Singaporean or a Thai, or 3 times more than a Malaysian. Although this ranking points to Middle Eastern states (Qatar, Kuwait, Bahrain and United Arab Emirates) and the Caribbean states (Curaçao, Trinidad and Tobago), we should specify that in terms of emissions per capita, Brunei’s high world rank — number seven — reflects the gap between it being a small population (around 400,000 inhabitants) and having an intensively polluting monoculture (based on hydrocarbon production).

15 One kiloton (kt) equals one thousand tons.
TABLE 3: CO₂ emissions by country and per capita in 2014 (in metric tons)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Population (2016)</th>
<th>CO₂ emissions per inhabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>52,885,220</td>
<td>0.4</td>
</tr>
<tr>
<td>Brunei</td>
<td>423,200</td>
<td>22.1</td>
</tr>
<tr>
<td>Cambodia</td>
<td>15,762,370</td>
<td>0.4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>261,115,460</td>
<td>1.8</td>
</tr>
<tr>
<td>Laos</td>
<td>6,758,350</td>
<td>0.3</td>
</tr>
<tr>
<td>Malaysia</td>
<td>31,187,260</td>
<td>8.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>103,320,220</td>
<td>1.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>5,607,280</td>
<td>10.3</td>
</tr>
<tr>
<td>Timor–Leste</td>
<td>68,863,510</td>
<td>4.6</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1,268,670</td>
<td>0.4</td>
</tr>
<tr>
<td>Southeast Asia: Total</td>
<td>639,892,640</td>
<td>Southeast Asia Average: 4.6</td>
</tr>
<tr>
<td>China (Mainland China, excluding Hong Kong and Macau)</td>
<td>1,378,665,000</td>
<td>7.5</td>
</tr>
<tr>
<td>India</td>
<td>1,324,171,350</td>
<td>1.7</td>
</tr>
<tr>
<td>World: Total</td>
<td>7,442,135,580</td>
<td>World average: 5.0</td>
</tr>
</tbody>
</table>

Source: World Bank, 2014

It should be noted that if other types of fuel/combustibles were taken into account in this ranking, the results would be very different. For example, if emissions related to deforestation and forest degradation (Meridian Institute, 2009) — responsible for nearly 20% of total CO₂ emissions — were quantified, a country like Indonesia would be in second place, just behind Brazil (FAO, 2016).

Moreover, the Paris Agreement, concluded on December 12, 2015, aims to reduce emissions of six greenhouse gases (GHGs) that constitute the bulk of the anthropogenic contribution to the otherwise non-anthropogenic, natural GHGs. Of those six, the three GHGs that are observed the most are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), as these are of great importance in GHG emissions (Table 4). In addition, there are three other

16 The “greenhouse effect” is a natural phenomenon that is essential to life on earth. Without it, the temperature of our planet would be of -18° C, against a current average of 15° C.
industrial GHGs, that is, gases that do not exist in nature but were created by humans. These are perfluorocarbons (PFCS), hydrofluorocarbons (HFCS) and sulfur hexafluoride (SF₆).

Table 4: GHG emissions by country in 2012 (in kilotons of CO₂ equivalent)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Emissions of GHG</th>
<th>% in world emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>528,416</td>
<td>1.00%</td>
</tr>
<tr>
<td>Brunei</td>
<td>14,829</td>
<td>0.02%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>127,400</td>
<td>0.24%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>780,551</td>
<td>1.48%</td>
</tr>
<tr>
<td>Laos</td>
<td>161,719</td>
<td>0.31%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>279,098</td>
<td>0.53%</td>
</tr>
<tr>
<td>Philippines</td>
<td>167,298</td>
<td>0.32%</td>
</tr>
<tr>
<td>Singapore</td>
<td>55,910</td>
<td>0.11%</td>
</tr>
<tr>
<td>Thailand</td>
<td>440,412</td>
<td>0.83%</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>959</td>
<td>0%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>310,664</td>
<td>0.59%</td>
</tr>
<tr>
<td>Southeast Asia: Total</td>
<td>2,867,256</td>
<td>5.43%</td>
</tr>
<tr>
<td>China (Mainland China, excluding Hong Kong and Macau)</td>
<td>1,245,471</td>
<td>23.60%</td>
</tr>
<tr>
<td>India</td>
<td>3,002,895</td>
<td>5.69%</td>
</tr>
<tr>
<td>World: Total</td>
<td>52,763,433</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: World Bank, 2014

In any case, regardless of whether we use statistical comparisons of global CO₂ emissions by country or per capita, or even of GHG emissions, GHG emissions from Southeast Asian countries provide important lessons for medium- and long-term objectives.

1.1.3 Differentiated national commitments

CO₂ emissions from energy activities increased from 355 Mt in 1990 to 1,278 Mt in 2016 (International Energy Agency, 2017: 136). In the NPS scenario of the International Energy Agency, CO₂ emissions increase by 60% from their current level and reach 2 Gt in 2030, then

17 One kiloton (kt) equals one thousand tons.
2.3 Gt in 2040. The largest increase in emissions comes from the electricity sector, due to the rapid growth of electricity demand and the rise of coal.

Until now, issues of availability and cost have prevailed over the environmental aspect and favored the development of coal, but the environmental issue is becoming more and more pressing (Cornot-Gandolphe, 2017). During the COP21 meeting in November–December 2015, all the developed and developing countries that signed this convention committed to respect the same legal framework in implementing their commitments to control GHGs. Yet despite common efforts, each country will ultimately have different responsibilities, scaled on the basis of the levels of their GHG emissions as well as energy, industrial and economic development. These differences are particularly visible in Southeast Asia. Indeed, apart from Timor-Leste, which rightly estimates that its GHG emissions are insignificant, the other 10 countries in the region announced, at COP21, that they would make a national contribution and commit individually to reduce their GHG emissions, again at varied degrees according to the country and the level of international aid (Table 5).

According to the Asian Development Bank (ADB, 2015), if the countries in the region do not reduce by 30% their GHG emissions by 2050 (compared to the 2010 level), Southeast Asia could lose 11% of its GDP by 2100. Faced with these alarming predictions, the adaptation to disasters as well as to the economy of international regulations, in terms of GHG emissions, is on the agenda in Southeast Asia. This applies in particular to the reduction of CO₂ emissions from forest fires and deforestation, which comprise the main factors of total regional emissions. The major challenges that Southeast Asian countries are already facing — and that will become even more challenging with time — are the control of GHG emissions and other environmental impacts as well as the guaranty of a safe and economically efficient source of energy.

18 The Kyoto Protocol was binding only on developed countries, 36 in total, with the exception of the United States and Australia, which did not ratify it.
### TABLE 5: Commitments made by Southeast Asian countries

<table>
<thead>
<tr>
<th>Countries</th>
<th>Commitments</th>
<th>Concerned GHG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>Suggests a series of sectorial measures (mainly forestry and energy) by 2030, conditional on financial and technical support.</td>
<td>No details available</td>
</tr>
<tr>
<td>Brunei</td>
<td>Suggests a series of sectorial measures (energy and transport sectors) by 2035.</td>
<td>No details available</td>
</tr>
<tr>
<td>Cambodia</td>
<td>27% reduction in GHG emissions by 2030, following a business-as-usual scenario, conditional on financial and technological support.</td>
<td>CO₂, CH₄, N₂O</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Reduction of 26% to 29% of GHG emissions by 2030, following a business-as-usual scenario. Target raised to 41%, conditional on international support.</td>
<td>CO₂, CH₄, N₂O</td>
</tr>
<tr>
<td>Laos</td>
<td>Proposes a series of sectorial measures (mainly energy, forestry and transport) by 2030, conditional to financial and technological support.</td>
<td>No details available</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Proposes to reduce the carbon intensity of its economy by 35% between 2005 and 2030. Target raised to 45%, conditional to financial and technological support.</td>
<td>CO₂, CH₄, N₂O</td>
</tr>
<tr>
<td>Philippines</td>
<td>Reduction of about 70% of GHG emissions by 2030, following a business-as-usual scenario, conditional on financial and technological support.</td>
<td>No details available</td>
</tr>
<tr>
<td>Singapore</td>
<td>36% reduction in carbon intensity of its economy between 2005 (176 grams of CO₂ equivalent per Singaporean dollar of GDP (g CO₂/S$)) and 2030 (113 g CO₂/S$).</td>
<td>CO₂, CH₄, N₂O, PFCS, HFCS, SF₆</td>
</tr>
<tr>
<td>Thailand</td>
<td>Reduction of 20% to 25% of GHG emissions in 2030, following a business-as-usual scenario. Could raise the target to 25%, conditional on financial and technological support.</td>
<td>CO₂, CH₄, N₂O, PFCS, HFCS, SF₆</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>No commitment.</td>
<td>No commitment</td>
</tr>
<tr>
<td>Vietnam</td>
<td>8% reduction in GHG emissions by 2030, following a business-as-usual scenario. Could raise the target to 25% and 30%, conditional on financial and technological support.</td>
<td>CO₂, CH₄, N₂O, PFCS, HFCS, SF₆</td>
</tr>
</tbody>
</table>

Source: United Nations Framework Convention on Climate Change (UNFCCC), 2015

### 1.2 An Energy transition between regional integration and market integration

In ASEAN, the energy strategies chosen by governments are significantly more collaborative and less individualistic, paving the way of a sort of multi-vocalities for one “energy green governance”. For instance, Cambodia, Laos, Malaysia, Indonesia, Singapore, Thailand and Vietnam are among a total of 52 countries of the Coalition for Rainforest Nations that defend and harmonize the position and interests in the governance of tropical

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19 A business-as-usual scenario (or scénario au fil de l’eau in French, literally “run-of-the-river scenario”) is designed based on both past trends that will be considered for continuation, and the policies, programs or actions implemented that are likely to influence these past trends.
forests in the various climate fora. In addition, Singapore and Timor-Leste have joined the Alliance of Small Island States (AOSIS). With 39 member countries and five observer countries, this alliance was formed in 1990 to represent the interests of small islands at the United Nations in the climate negotiations.

Since 1999, ASEAN has overseen an independent intergovernmental organization, the ASEAN Center for Energy, which represents the 10 members of the Association and serves as a forum for dialogue on regional energy challenges by providing relevant expertise and guaranteeing the energy policies and programs of the 10 countries of the region. In this context, at the November 2014 ASEAN Summit in Naypyidaw, Myanmar, member countries adopted the ASEAN Plan of Action for Energy Cooperation 2016–2025 (APAEC). The key initiatives of this plan are based on seven axes of multilateral cooperation (Figure 2).

### TABLE 6: APAEC’s seven axes of multilateral cooperation and bodies responsible for implementation

<table>
<thead>
<tr>
<th>APAEC Programme Area</th>
<th>Responsible implementing body (SSNs and SEBs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEAN Power Grid (APG)</td>
<td>Heads of ASEAN Power Utilities/Authorities (HAPUA)</td>
</tr>
<tr>
<td>Trans-ASEAN Gas Pipeline (TAGP)</td>
<td>ASEAN Council on Petroleum (ASCOPE)</td>
</tr>
<tr>
<td>Coal and Clean Coal Technology (CCT)</td>
<td>ASEAN Forum on Coal (AFOC)</td>
</tr>
<tr>
<td>Energy Efficiency and Conservation (EE&amp;C)</td>
<td>Energy Efficiency and Conservation Sub-Sector Network (EE&amp;C-SSN)</td>
</tr>
<tr>
<td>Renewable Energy (RE)</td>
<td>Renewable Energy Sub-Sector Network (RE-SSN)</td>
</tr>
<tr>
<td>Regional Energy Policy and Planning (REPP)</td>
<td>Regional Energy Policy and Planning Sub-Sector Network (REPP-SSN)</td>
</tr>
<tr>
<td>Civilian Nuclear Energy (CNE)</td>
<td>Nuclear Energy Cooperation Sub-Sector Network (NEC-SSN)</td>
</tr>
</tbody>
</table>

Source: ASEAN Centre for Energy or ACE (2018: 26).

This program is a collective response to ASEAN’s energy challenges through, among others, the development of renewable energy and an integration of the electricity and gas markets. It aims at securing supply and making it more sustainable by the exploitation of various energy resources available in the region and their proper response to different energy demand profiles. It is in this context that renewable energy and interconnection projects of production and distribution networks are part of the long-term goal of an energy transition that tends towards a more sustainable energy system.

20 See the website [www.aseanenergy.org](http://www.aseanenergy.org).

21 An energy transition is measured in decades, given the great inertia of the energy system.
1.2.1 The ambitious development of renewable energies

The ASEAN countries have set for themselves the goal of increasing the share of renewable energies in the energy mix to 23% by 2025 (ACE, 2015). To achieve this objective, the role of the electricity production sector is essential, especially the exploitation of the renewable energies potential of the region, which is significant in terms of both quantity and diversity, and largely unexploited with the exception of hydroelectricity and, to a certain extent, geothermal energy (Cornot-Gandolphe, 2017: 26) (Table 6).

<table>
<thead>
<tr>
<th>Countries</th>
<th>Targeted year</th>
<th>Renewable energies objectives</th>
<th>Main technology</th>
<th>Installed capacity of renewable energies in 2014</th>
<th>Achieved % of the objective in 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>2016¹</td>
<td>472 MW</td>
<td>Small hydropower (472 MW)</td>
<td>3,204 MW</td>
<td>n/a</td>
</tr>
<tr>
<td>Brunei</td>
<td>2035</td>
<td>954 GWh</td>
<td>Photovoltaics (954 GWh)</td>
<td>2 GWh</td>
<td>0.2%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2020</td>
<td>2,770 MW²</td>
<td>Hydropower (2,241 MW)</td>
<td>952 MW</td>
<td>34%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2025³</td>
<td>46,000 MW⁴</td>
<td>Hydropower (21,300 MW)</td>
<td>6,680 MW</td>
<td>14%</td>
</tr>
<tr>
<td>Laos</td>
<td>2025⁵</td>
<td>893 MW⁶</td>
<td>Small hydropower (400 MW)</td>
<td>80 MW²</td>
<td>9%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2025⁶</td>
<td>2,865 MW⁷</td>
<td>Biomass (1,190 MW)</td>
<td>1,517 MW³</td>
<td>53%</td>
</tr>
<tr>
<td>Philippines</td>
<td>2030</td>
<td>9,931 MW²⁷</td>
<td>Hydropower (5,394 MW)</td>
<td>5,897 MW</td>
<td>60%</td>
</tr>
<tr>
<td>Singapore</td>
<td>2020</td>
<td>350 MW</td>
<td>Photovoltaics (350 MW)</td>
<td>33 MW</td>
<td>9%</td>
</tr>
<tr>
<td>Thailand</td>
<td>2036</td>
<td>19,684 MW</td>
<td>Small hydropower (6,000 to 10,000 MW)</td>
<td>7,900 MW</td>
<td>40%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2030</td>
<td>45,800 MW</td>
<td>Small hydropower (27,800 MW)</td>
<td>17,140 MW</td>
<td>37%</td>
</tr>
</tbody>
</table>

1. Myanmar cannot be calculated because only the target for 2016 is available.
2. Hydropower, solar photovoltaics and biomass.
3. The target for 2050 is 171,000 MW.
5. Excludes large hydropower plants (above 15 MW installed capacity).
7. As of April 1, 2018, the hydroelectric installed capacity of 7,082 MW.
8. The target for 2050 is 21,300 MW, including 18,700 MW of photovoltaics (88%).
10. In 2014, hydroelectric installed capacity of 4,768 MW (large plants).
11. Hydropower, wind turbines, geothermal, photovoltaics, biomass, tidal.

Hydropower is by far the most promising renewable energy source, with an estimated potential of 170 GW, compared to an installed capacity of 41 GW in 2016 (International Energy Agency, 2017). In the ASEAN countries, the hydroelectric potential is very unevenly distributed and exploited. For example, out of the 30 GW of technically exploitable potential in the sub-basin of the Mekong River, between 13 and 23 GW belong to Laos. This explains the Vientiane policy of being exclusively focused on the valorization of rivers for the production of electricity with 53 dams in operation (7 GW) and 47 dams in planning (6 GW) by 2025‒2030. In addition, several countries in the region have either untapped potential — such as Myanmar (43 GW) — or many dam projects either under construction or under study, such as Thailand, Cambodia, Vietnam, Malaysia or Indonesia. According to the International Energy Agency’s NPS, hydropower production capacity is expected to progressively increase to 61 GW in 2025, 82 GW in 2030, 96 GW in 2035 and 105 GW in 2040. For its part, the scenario designed by the International Energy Agency’s Sustainable Development Strategy (SDS) mentions a production of 151 GW in 2040.

Southeast Asia also has significant geothermal potential, concentrated mainly in Indonesia (29 GW), the Philippines (4 GW) and, to a lesser extent, Malaysia. The region is home to a quarter of the world’s geothermal output, with the Philippines (1.9 GW) and Indonesia (1.5 GW) ranked second and third respectively (International Energy Agency, 2017). To realize its potential, Indonesia has adopted a development plan promoting investments in the geothermal sector to reach a production of 6 GW in 2020 and 13.5 GW in 2040. The Philippines, whose potential is more modest, plans to double their production capacity. According to the NPS of the International Energy Agency, Indonesia and the Philippines will increase geothermal production to 11 GW in 2040. On the other hand, the Sustainable Development Strategy (SDS) of the International Energy Agency refers to a production of 27 GW in 2040.

Similarly, the capacity of hydropower, geothermal energy and wind turbines varies greatly from country to country, with the highest technical potential in the Philippines (70 GW) (International Energy Agency, 2017: 90). Aware of its potential, in 2011, Manila set wind turbine production targets to around 2.3 GW by 2030, a target reassessed by the Ministry of Energy at 4.5 GW in 2013. With 3,000 km of coastline, Vietnam also has significant wind power potential (27 GW). Nevertheless, only a small fraction of this potential is currently exploited (1 GW). Vietnam’s ambitious wind turbines policy is expected to boost production to nearly

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22 Figures vary from single to double depending on sources.


22 GW by 2040. However, despite clear regional potential, the International Energy Agency’s NPS and SDS scenarii estimate that wind turbines will only be able to generate 22 GW to 100 GW, representing between 4% and 15% of the total regional energy production capacity around 2040.

Located in the inter-tropical zone, Southeast Asia has a potential for photovoltaic energy that varies between 1,400 kWh/m²/year and 1,900 kWh/m²/year (International Energy Agency, 2017: 89). Climate conditions seem excellent for this type of energy, especially given the region’s abundant sunlight for a large part of the year. According to the NPS scenario of the International Energy Agency, photovoltaics is expected to grow by around 11% per year by 2040, at which point it will have reached an installed capacity of 53 GW (4 GW in 2016). Several countries in the region have ambitious targets for photovoltaics, especially as this industry has made technological progress and can now produce solar electricity at a lower cost than coal.

This is the case of not only Thailand, which projects an installed capacity of 10 GW in 2036, but also of Indonesia (5 GW in 2020), Vietnam (12 GW in 2030) and Malaysia (1 GW in 2020). In March 2016, the Philippines inaugurated the largest solar farm in Southeast Asia, in Occidental Negros (a province in the region of Western Visayas), which has 425,000 solar panels installed over an area of 170 hectares (132 MW). The optimistic scenario of the International Energy Agency’s SDS foresees a regional production capacity of 60 GW in 2030, followed by more than a doubling of that capacity by 2040 (161 GW).

Moreover, ASEAN countries have diverse stocks of biomass from agriculture to forest products (7 GW in 2016). Playing an important role in isolated, mountainous and island regions, this biomass is expected to retain a significant part by 2040, whether one considers the NPS scenario (19 GW) or the SDS scenario (24 GW) of the International Energy Agency. In addition, there is an increasing use of biofuels in the transport sector, particularly those derived from palm oil cultivation (Malaysia, Thailand).

25 A city like Montreal, Canada, has a potential for photovoltaic energy of 1,185 kWh/m²/year, and that of Quebec City 1,135 kWh/m²/year. As for European cities, the average horizontal radiation is 940 kWh/m²/year for Paris and 1,100 kWh/m²/year for Lausanne.

26 “Le solaire moins cher que le charbon?”, RFI, 5 January 2017.

In recent years, policies and regulations have been adopted to promote the deployment of renewable energies and attract private investors in the sector, including purchase prices, tax breaks and subsidies. Several governments in the region have set medium and long-term targets for renewable energy in their energy and electricity mix (Table 6). The priority regarding the type of renewable energy and their contributions varies considerably from one country to another, depending on their resources and needs. ASEAN countries’ national renewable energy development plans have a cumulative target of between 93 GW and 102 GW by 2025, compared to an installed capacity of 57 GW in 2016 (41 GW for hydropower).

Whatever the scenarii of the International Energy Agency (NPS or SDS), hydropower and photovoltaics should dominate future renewable energy developments. According to the International Energy Agency, the current characteristics of renewable energy, in terms of costs and technical characteristics, will probably not lead to significant investments in this area (excluding hydraulics), without additional financial incentives and support programs. An exception remains for photovoltaics, which can be affordable in certain circumstances (in remote/isolated locations and for replacing diesel generators). Brunei, Malaysia, Myanmar, Singapore and Thailand have predominantly solar-based programs, while hydropower dominates in Cambodia, Indonesia, Laos, the Philippines and Vietnam (Damar Pranadi, 2016; Cornot-Gandolphe, 2017: 27–28) (Table 6).

1.2.2 Electrical integration (APG) and gas cooperation (TAGP) to increase supply security and sustainability

The ambition of the ASEAN Power Grid (APG) was initially to develop bilateral electrical interconnections between the different ASEAN member states. The establishment of a cross-border interconnection system was adopted at the 1997 Kuala Lumpur Summit through ASEAN Vision 2020 (ACE, 2015: 15). These interconnection projects have been supervised since 2003 by leaders of electrical enterprises/authorities in ASEAN countries (HAPUA or heads of ASEAN power utilities/authorities). The adoption of the 2016–2025 ASEAN Plan of Action for Energy Cooperation in 2014 accelerated the implementation of the APG and the development of multilateral interconnections for an integrated single market. This market would allow efficient use and sharing of resources, further integration of renewable (especially hydropower) energies, electricity trade across borders between neighboring countries, and greater access to energy services in the region (ACE, 2015, Phase I: 2016–2020). Thus, the implementation of the APG, initially established on a bilateral basis, has been extended to multilateral trade, under the shadow of this integrated regional system (Cornot-Gandolphe, 2017: 22).
ASEAN member states have recognized the crucial role of an efficient, reliable and resilient electricity infrastructure to stimulate economic growth and regional development (Cornot-Gandolphe, 2017: 21). HAPUA has selected 16 projects to be completed (4 are already in operation), including 46 cross-border lines by 2020 (Figure 3). The first bilateral connections were built in the 1980s, well before the formulation of the APG. 13 cross-border lines are already working for a transmission capacity of 5,212 MW. The studies show that

28 Hapua (nd), About ASEAN Power Grid Consultative Committee (APGCC), http://hapua.org/main/apgcc/about-apgcc
the integration of the ASEAN electricity grid will allow electricity exchanges to double by 2020 (10,800 MW) and then to increase to 20,000 MW beyond 2020 (ACE, 2015: 19).

So far, APG projects are essentially bilateral. That is why the Laos-Thailand-Malaysia-Singapore Multilateral Interconnection (LTMS) has been designated as a pilot project entitled PIP (Power Integration Project). This pilot project involves electricity trading between Laos and Singapore, via the Thai and Malaysian power grids. If successful, it should serve as a model for multilateral electricity trade beyond neighboring borders and pave the way for other multilateral integration projects within the region (Cornot-Gandolphe, 2017: 23). Under this project framework, the existing interconnections of the four countries will be used to transfer 100 MW of electricity from Laos to Singapore.

Although the required physical infrastructure is already in place and the project seems technically viable, the underlying model for multilateral electricity trade remains to be finalized in Southeast Asia. This involves, for instance, the signing of a power purchase agreement between Laos and Singapore, as well as transit agreements between Thailand and Singapore and between Malaysia and Singapore. The purchase agreement between Laos and Singapore currently faces commercial difficulties due to the different market structures of the two countries. Thus Singapore has an open market and a price of electricity that varies according to supply and demand, while Laos offers a fixed price. In addition, Singapore currently has surplus electricity. A Memorandum of Understanding (MoU) between three countries involved, Laos, Malaysia and Thailand, was signed in September 2016. It involves the purchase by Malaysia of 100 MW of electricity from Laos via Thailand, currently limiting the PIP to three countries (Cornot-Gandolphe, 2017: 24).

For Laos, the construction of cross-border lines has accelerated its electricity exports to neighboring countries in line with its policy of developing water resources. Vientiane positions itself as a key regional supplier of hydropower, with Laos having signed several MoUs to export electricity to Thailand (9,000 MW in 2025) and to Vietnam (5,000 MW in 2030).

The integration of electricity markets has many benefits: (1) increased energy security; (2) reliability of the electricity network; (3) more affordable energy; (4) the development of renewable energies; (5) less carbonaceous energy. In terms of electricity trade, the 2013 ASEAN Energy Cooperation study, published by ERIA (Economic Research Institute for ASEAN and East Asia), indicates that Myanmar, Laos and Cambodia are main exporters.

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29 “Laos seals Malaysia energy deal”. The Nation, 30 September 2017.
whereas Thailand, Malaysia, Vietnam and Singapore are the main importers. Thailand, in particular, is expected to emerge as a major trading hub for electricity, from Myanmar, Laos and Cambodia, and to be exporting to Malaysia, Singapore and the insular Southeast Asia.

Although it is now envisaged to further the integration of the electricity market in the region, this integration still faces many challenges, both technical (due to a complex geography) and financial (lack of resources) or institutional (differences in inter-country market and interest structures; regulatory, legal and commercial issues). As a result, ASEAN is currently studying the possibility of developing an electrical integration system that operates on the basis of an exchange of electricity and optimizes energy resources between countries.30 This system, whose harmonization of standards between countries is a distant but omnipresent and essential goal within the ASEAN Economic Community (AEC), would allow a progressive and consensual approach without profound changes (Cornot-Gandolphe, 2017: 31).

As for the TAGP project, it was originally intended to strengthen the security of gas supply in the region by interconnecting the pipelines of the various ASEAN countries. Gas — which is very versatile in its uses and little polluting — is expected to play a growing role during the energy transition in Southeast Asia. Gas-fired power plants should gradually replace coal-fired power plants. Indeed, the demand for regional gas has grown rapidly from the 1990s onwards in connection with the economic development of the countries and their growing needs in electricity. In 2015, regional production was dominated by Indonesia (67.5 Mtoe), Malaysia (64.5 Mtoe) and Thailand (35.4 Mtoe), for a total of 204.7 Mtoe (BP, 2017: 30). Regional gas consumption increased from 74 Mtoe in 2000 to 141 Mtoe in 2016 (International Energy Agency, 2017: 134). It is mainly the electrical and industrial sectors that consume gas, with the residential/commercial sector making next to no use of it (Cornot-Gandolphe, 2017: 34).

Southeast Asia has 6,400 billion cubic meters of proven natural gas reserves as of January 1, 2016 (BP, 2017: 26), or 3.5% of global reserves. The cap on gas production has led to recurring shortages in the producing countries (Indonesia, Malaysia, Thailand, Brunei, Vietnam, Myanmar), which have reduced their exports. From 2011 onwards, the region turned to the import of LNG (liquefied natural gas) to complete and secure its gas supply (Thailand, Indonesia, Singapore, Malaysia). Essentially offshore, the reserves have a high cost of development, which, correlated with the low price of gas and the decline in the price of oil, has led to a reduction in investment spending on exploration and prospecting as well

30 This system exists in different parts of the world: Nord Pool (Europe), Southern African Power Pool.
as a stagnation of production. Over the past five years, significant gas discoveries have been discovered in the Rakhine Basin (Myanmar) and off the coast of Vietnam. However, gas reserves are probably much larger than recent discoveries suggest.

While intra-regional gas pipeline trade is not new (the Malaysia-Singapore gas pipeline has been in operation since 1991), it is indeed the implementation of the TAGP project, conceived in 1997 as part of the 2020 Vision of the ASEAN, that has created an integrated regional pipeline system that now has 13 bilateral interconnections (3,673 km in total) to link gas reserves in Southeast Asia to the rest of the region (Figure 4). Formulated in 2002 by the signing of an MoU between ASEAN member states and public-private partners, the TAGP project entered into force in 2004 for a period of 10 years. In 2013, it was extended by 10 years, until 2024.

**FIGURE 3: Operational gas resources and interconnections**

![Map of Southeast Asia showing gas resources and interconnections.](source: International Energy Agency (2017: 84))
Although supported by the ASEAN ministers of energy and member states, the TAGP has set up but not by following the initial direction of an integrated network. Generated interconnections remain only bilateral in nature. Beyond the 13 interconnections mentioned, four new interconnections are planned between the East Natuna gas field (6 trillion cubic feet) and a group of countries consisting of Thailand (two interconnections), Malaysia and Vietnam. Although discovered in the 1970s, East Natura is still not exploited. On the one hand, the development of the gas field is estimated at nearly US$40 billion. On the other hand, the cost of extraction would range between US$10 and US$15 per one million BTU (million British Thermal Units), which is twice the current price. Consequently, several companies withdrew from the project (Petronas, Total and Exxon). At the same time, this delay in the development of the field has postponed the completion of the TAGP in its final version.

Moreover, while the regional physical connectivity of the gas networks is well advanced (except for East Natura), the integration of the markets is far from being finalized, especially since the implementation of the interconnection of gas pipelines of ASEAN countries, as for electrical interconnections, faces technical (gas quality), regulatory (lack of third parties to the network), economic (subsidies), legal and commercial obstacles (Cornot-Gandolphe, 2017: 40). Gas production in ASEAN countries also tends to falter (mostly because of lack of investment in upstream gas). Simultaneously, LNG imports in the region are rising sharply, pushing ASEAN to include LNG in its TAGP strategy (to ensure free access to certain regasification terminals within different member countries), albeit without calling into question the initial vision of the TAGP. The goal of the TAGP remains the same, namely to strengthen security of supply and energy cooperation within ASEAN, but its strategic focus has slightly shifted. Instead of focusing on the gas transport to consumption centers only by gas pipeline, the TAGP now aims to explore other ways to move gas to the consumption centers, particularly through the management of buffer stocks and the development of gas resources present in Southeast Asia (Cornot–Gandolphe, 2017: 41). This new orientation gives full meaning to the TAGP and its objective of securing gas and LNG exchanges between the countries of the region.

Presently, the ASEAN action plan is focusing less on interconnection infrastructures and more on the gas integration of the region (regulatory, economic and technical factors), which will ultimately enable to realize the vision of the TAGP. The strategic axes of the ASEAN Plan of Action for Energy Cooperation 2016–2025 (APAEC) are three in number: (1) to allow free access to a system (import terminal/network) in at least one country (Singapore, in this case); (2) to make the destination clauses in the LNG contracts more flexible, to allow
shipments to be redirected to markets offering a better price; and (3) to minimize the environmental impact of CO₂ related to gas production and transportation.

In Southeast Asia, LNG import prospects are growing and will make the region a major importer by 2030. For example, the opening of the Panama Canal to large LNG carriers, thanks to its expansion in 2016, will allow US LNG to take the road to Southeast Asia. In addition, export prospects are equally important, as China could import within the short and medium term LNG from Indonesia and Malaysia through both land and sea “gas routes.” In summary, the new orientation of the TAGP makes it possible to prepare this evolution towards flexibility, diversity and the security of gas supplies.

1.2.3 Towards a revival of nuclear power plant construction projects (NEC)?

The region has a wide variety of natural fossil and energy resources, but most of them remain in limited supply. According to medium-term forecasts, the region’s coal, natural gas and oil resources will not be able to meet national demands. As a result, several member countries of the Asia-Pacific Economic Cooperation (APEC), or at least those that have mastered nuclear technology (Russia, China, Japan, United States), are considering pursuing a domestic energy policy focusing on civilian nuclear power and are strongly encouraging South Asian countries to examine the potential of this energy in the fight against climate change (Mottet, 2016: 122–125) (Table 7).

<table>
<thead>
<tr>
<th>Countries</th>
<th>Project</th>
<th>Power in MW (planned)</th>
<th>In-Service Date (planned)</th>
<th>Agreement/Partnership/Exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>Yes/No</td>
<td>10 research reactors</td>
<td>n/a</td>
<td>Russia</td>
</tr>
<tr>
<td>Brunei</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cambodia</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Yes/No</td>
<td>10–30 research reactors</td>
<td>2027</td>
<td>Russia / China</td>
</tr>
<tr>
<td>Laos</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Malaysia</td>
<td>Yes</td>
<td>n/a</td>
<td>n/a</td>
<td>Japan</td>
</tr>
<tr>
<td>Philippines</td>
<td>Yes</td>
<td>n/a</td>
<td>n/a</td>
<td>Russia</td>
</tr>
<tr>
<td>Singapore</td>
<td>Yes/No</td>
<td>n/a</td>
<td>n/a</td>
<td>Japan / France</td>
</tr>
<tr>
<td>Thailand</td>
<td>Yes</td>
<td>2,000–5,000</td>
<td>2036</td>
<td>Japan / China</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vietnam</td>
<td>Yes then No</td>
<td>8,000–15,000</td>
<td>2030–2035</td>
<td>Russia / Japan</td>
</tr>
</tbody>
</table>

Table 8: Nuclear reactor projects in Southeast Asia

Table constructed by the authors from various National Energy Plans (2018).
ASEAN members, for their part, have been discussing this energy option since 2008 within the Nuclear Energy Cooperation Sub-Sector Network (NEC-SSN) (ACE, 2015: 41), a forum that provides information on safety issues through visits to nuclear power plants in South Korea, Japan, the United States, Russia, China and Canada. Currently, there is no installed nuclear capacity in the countries of the region, and ASEAN members have little or no concrete nuclear power plant manufacturing projects (Table 7). Nevertheless, the 2016–2025 ASEAN Plan of Action for Energy Cooperation scenario makes it clear that nuclear power should be part of the region’s energy mix with a production of 1 GW in 2035 and between 2 GW (NPS scenario) and 5 GW (SDS scenario) in 2040, which corresponds to the installed capacity of two to five reactors.

A handful of Southeast Asian countries are considering introducing nuclear into their energy mix to meet the growing demand for electricity. Initially, Vietnam presented the most ambitious and advanced civilian nuclear program, in the context of plans to make its first nuclear power plant operational between 2023–2025. However, the Vietnamese National Assembly voted in November 2016 to halt its nuclear power plant construction, initially programmed in cooperation with Russia and Japan in Ninh Thuan province. The arguments put forward are above all economic: after the Fukushima disaster in Japan in 2011, plant costs have risen to the extent that Vietnam has deemed the human and financial investments required by a nuclear program to be too vast, especially given the long time it would take to see a return on investment.

Apart from Vietnam, Thailand is showing a keen interest in nuclear energy. It too has integrated a capacity of 2 GW from nuclear power to its national energy development plan 2036.31 In the same vein, Malaysia and Indonesia recognize nuclear power as an attractive energy option in their national development plans, although there is no quantitative target or specific plan to introduce it.

Nevertheless, the countries of the region interested in civilian nuclear power are mainly targeting Evolutionary Power Reactors (EPRs), which are third-generation nuclear reactor projects that have been constructed in China, Finland and France. The EPR is a modernized version of PWRs (second-generation water pressure reactors), using more efficient and safer techniques. This third generation of reactors is intended to pave the way for the technological breakthrough for ushering in the fourth-generation fast neutron reactors (aka “breeder reactors”), which are currently in the pre-industrial development stage and

announced for the post-2025–2030 period. Indeed, the fast reactors sector is quite promising because of its potential to significantly rein in the problem of waste and to utilize virtually all uranium involved in the process. The technology would be able to directly use natural or depleted uranium and produce 50 to 100 times more electricity with the same amount of ore as current nuclear reactors. If its reliability was established, it would revolutionize nuclear energy on a global scale.

Finally, one can observe that civilian nuclear program projects remain at an embryonic stage in Southeast Asia. In addition, while the South Asian states, especially Thailand, show political will to implement these programs, the programs pose formidable security challenges and lead to increased technological dependence. Given the lack of skilled personnel and a culture of safety, the management of South Asian nuclear power plants (if they emerge) is likely to rely primarily on strategic partnerships with a handful of countries. However, this would reduce the geopolitical margin of maneuver for ASEAN countries, in turn leading to the opposite of the sought-after effect of politico-energy self-sufficiency (Iffly, 2014).

**Conclusion and Beyond**

According to medium-term forecasts, the fossil fuel production of ASEAN countries will be unable to meet the strong growth in demand, especially for electricity. Thus, in a context of sustained growth in energy demand, the inflation of operating and production capacities cannot be the only solution, particularly because these are all limited capacities in the Southeast Asian context. As a result, ASEAN member states are planning the deployment of national energy policies that focus efforts in two directions: the promotion of renewable energies (including hydropower), thus reducing CO₂ emissions, on the one hand; and interconnection and integration of energy markets, on the other. In reality, these strategies are much more modest than the official discourse might suggest.

Most countries are experiencing a high rate of energy wastage due to outdated technologies of exploitation, transmission and use. The overall losses of the entire power grid, arguably underestimated, are problematic in a region that suffers many power outages and other periods of energy shortage. To address this problem, ASEAN is promoting the integration of energy markets and the construction of new interconnections, which require huge political and financial investments. This explains why the construction of the APG and the TAPG has been slower than expected, limiting the bilateral and multilateral physical integration
between member states due to numerous financial, institutional, regulatory and technical obstacles that ultimately prevent the harmonization of the regional energy network.

With this in mind, ASEAN is now orienting its energy strategy on market connectivity and creating the necessary conditions for this connectivity in the framework of the entry into force of the economic market (AEC), which will ultimately allow multilateral trade in electricity and gas between the 10 countries and Timor-Leste that make up the region. The potential creation of an ASEAN electricity exchange system could accelerate the energy integration of the subregion. The South Asian example shows that the energy transition requires the adoption of a progressive, coordinated and integrated approach, without which it would become very difficult for a state, and even more so for a region, to strengthen its energy and environmental security.

The energy question is often, especially in this Southeast Asian part of the world, apprehended, even systematically, either in the very positive terms of “growth” and eventually “economical, demographical growth” or in the very negative terms of “security issue” and “global warming vulnerability.” The paragraphs above draw a more complex and nuanced picture.

The role of the researcher here is to create a distance between the object studied and our own habits, mass media and modes of thought. In other words, we need to be aware of the modest time and space from which we speak, our conjuncture, in order to understand things. What is crucial here is to recognize the role of energy and how, or that, Southeast Asia — alongside other global trends — has become energy dependent, that is to say, spatially and temporally complex in its relation to natural resources. Likewise with the countries of the West, ASEAN countries and their peoples are largely experiencing this dependence today, even at their remote ethnic margins, which was not the case 50 years ago when ASEAN was born.

Some historians have traced the genesis of the link between energy and human development to the domestication of fire about 500,000 years ago. The very notion of energy in its modern sense is also relatively recent. It is connected to the transformation of physics in Europe in the first half of the 19th century, in close relation with the new technology of thermal and electro-dynamic engines. The constitution of the mechanical theory of heat circa 1840–60 ushered in a new science of energy, thermodynamics, built on two fundamental principles: the principle of energy conservation and the principle of the dissipation or degradation of energy.
It is worth insisting on this historical transformation, as it constitutes an unprecedented phenomenon, a discontinuity in the history of humankind that gave rise to what is called "the acceleration of history" and the "thermo-industrial revolution" (Grinevald and Hamilton, 2015). Essentially, it is this moment in time that decisively forged and sealed the relationship between energy and modern economic development (Fouquet, 2008; Ayres, 2009). Significantly, this change in the socio-energetic paradigm is also described by the famous French anthropologist Claude Lévi-Strauss, who emphasized the contrast between "cold societies" and "hot societies." Cold societies are characterized by the way in which they use their natural environment, protecting both their modest living standards and their natural resources. By contrast, hot societies correspond to thermo-industrial civilization. Interestingly, in ASEAN countries we still find both cold and hot societies.

Nowadays, ASEAN countries unanimously experience their so-called "thermo-industrial revolution" — which was not the case in 1967 — and this revolution is plunging them into a new historical dynamic with decisive socio-ecological, geopolitical and anthropological implications and challenges. For instance, social sciences have not yet fully realized the importance of oil in the extraordinary phase of growth that populations have experienced — very unequally — in the 20th century.

**FIGURE 4. The golden age of oil over the long term: 0–2500 years (in millions of barrels per day)**

![Graph showing the golden age of oil over the long term](Campbell (1991: 15))
This phenomenon is unprecedented in the history of humanity and in the geological and biological history of the earth. The energy-intensive development model has facilitated the demographic and scientific-technological boom of the mid-20th century in ASEAN countries. This energy model lies at the very heart of the way of life of the majority of Southeast Asian peoples, not only in terms of energy but also in terms of their goods, food production, consumption habits and their health.

One of the criteria used to analyze this thermo-industrial revolution is the change of speed, which basically expresses a change in the human relation between time and space; but this passage also expresses an evolution in the energy capacity required to inform an individual, move an object, or share an idea or culture.

From prehistoric times to the mid-19th century, humankind traveled at an average speed of one meter per second. Any time prior to 1850 in Europe (or prior to 1920–80 in the ASEAN countries, according to their degree of colonial or post-colonial industrialization), was the time of the so-called “animal” speed of chronometry, as time was understood in meters. It was the time of “homogeneous slowness”, according to Jean Ollivro (2000: chapter 1): humankind reached about 300 meters in 5 minutes, between 3 and 7 kilometers per hour, or a maximum of 259 kilometers per day by boat and about 40 km per day by cart or camel. In

32 The author provides a series of insightful comparative speeds throughout time and space, but these data are mostly approached in Western context (especially in Brittany). We quote in this paragraph some comparative speeds from Ollivro’s volume that could make sense in our understanding of 20th-century Southeast Asian passage from homogeneous slowness to differentiated speed — which is an area of research that needs further investigation.
1840, it took between 120 and 150 days to travel from London to Bombay, India (Siegfried, 1948: 78, quoted by Ollivro, 2000: 13). But the year 1850 then opened for the world the path of what is called “differentiated velocity” or “differentiated speed”, that is to say, the process of traveling synchronously different territories at different speeds.

To give an example of what “differentiated speed” means, we just have to visualize an individual walking at a speed of 1 meter per second but inside an airplane that flies at an average speed of 230 meters per second, while on the telephone with his friend on the other side of the planet at a speed of thousands of kilometers per second. It is in the same way that the notion of time becomes compressible; the traveler who leaves today from Bangkok (or any capital from Southeast Asia) to Washington DC arrived yesterday! An individual can, in this case, experience four different and differentiated speeds simultaneously.

The epistemological difficulty today for the researcher is to take a step back from this interconnecting and multi-level system that can be conceived of as a kind of space-time Russian doll. Living and working for years in the “differentiated speed” of current-day ASEAN, we have regularly been meeting with some scholars in Europe and North America who are reluctant to see and take into account in their research this space-time Russian doll and dynamics, opting instead for fieldwork on supposedly “cold societies” or the “pre-thermo-industrial revolution”, and thus contributing to perpetuating or reviving a dated orientalist approach. However, the growth of differentiated speed in the world, and, of course, in ASEAN, is undoubtedly one of the elements that has changed most deeply the organization of territories, the extraction and consumption of fossil fuel, the way of governance of the countries and their political stability, and, ultimately, the identity of individuals. Such sensible differentiated speed has fundamentally changed some practices and has transformed the relationship of the ASEAN societies to their space, by shaking up their mobility practices, and by encouraging migration and drawing people to urban centers where differentiated speed is the most accessible.

In this context, we need to recognize that the ASEAN countries must be studied not only in terms of economic growth, demographic boom, the Third World, their colonial past and pre-colonial heritage, or low GDP Index (or other economic progress indices), but also in terms of their individual and collective relationships between energy and economic development, and, following that, in their contemporary — and often new — experiences of differentiated speed and high energy demand and consumption. For example, according to Prasenjit Duara, in the today global world (and subsequently also in ASEAN), the notion of a “green governance” is expressed in “dialogical” terms (Duara, 2015). This means that a core role is dedicated to the idea of a dialogue or an acceptation of other cultures in the negotiations and
the governance themselves. It follows that ASEAN and its great diversity of languages, cultures, and political models, all operating within the same “energy transition” agenda, might appear to be suitable for providing “dialogical” and alternative modes for the rest of the world and for solving today’s environmental problems with an approach of aligning many different ways of life with universal goals. By saying that, ASEAN societies and people as well as scholars who study contemporary ASEAN carry a huge and global responsibility.

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CHAPTER 2
CHINA’S ENERGY TRANSITION: ACTORS, DISCOURSES AND GEOPOLITICS

Gauthier MOUTON

Among the many actors involved, China matters immensely to the future of the world’s climate and the size of its economy impacts the energy global market as well. Looking at CO₂ emissions (not the only greenhouse gas, but the largest contributor to climate change), China’s emissions expanded from 10.7% of global emissions in 1990 (the benchmark year for the Kyoto protocol in 1997) to 22.3% in 2008 and 28.5% in 2018 (an increase of 343% since 1990) (International Energy Agency (IEA), 2019). Besides, although the country’s economy has entered a new phase described as “new normal” — meaning slower rates of economic growth — China still remains heavily reliant on fossil fuels. During the past four decades of reform and opening up, the People’s Republic of China (PRC) became one of the world’s major energy consumers and importers, turning from a net exporter of oil up until 1993, to the largest net importer in 2014 and thereafter.

Even though the pattern of China’s actions in global environmental governance over the last ten years reveals a high degree of involvement, China’s huge increases in energy consumption, together with the international dimension of China’s energy policy shed light on the fact that overseas supply — particularly of oil — remains increasingly important (Zhang, 2003; Xu, 2006). As Robert J. Samuelson put it in 2011: even with diversification and increasing renewables, “(c)ompetition for global oil supplies will intensify. We cannot escape that reality”. In this regard, China’s diversification strategy is incorporated within the framework of the “going-out” strategy, adopted in 2002, encouraging its national oil companies (NOCs) “to build up secure supplies abroad through purchasing equity shares in overseas markets, exploring and drilling abroad, constructing refineries, and building pipelines to Siberia and Central Asia” (Leverett & Bader, 2005: 193).

Maximilian Mayer, assistant professor of International Studies at the University of Nottingham in Ningbo (China) and expert on China’s foreign energy policy, outlines that China’s energy dependency led the PRC to develop “the topmost supply diversification system, which refers to both energy sources and partner countries, as well as roads and investment spaces” (Interview 1). In others words, China’s growing demand for energy, especially fossil fuels translates into a concern with energy security, which in turn is closely linked with national security. Such discussions about "threats" are underpinned by (often
implicit) geographical representations which "geo-graph" or "write the earth" (Dalby, 2010: 52), this is one of the main reasons why geopolitics is particularly useful when analyzing such issues. The methodology of geopolitics underlines the importance of discourses and representations (Lasserre, Gonon & Mottet, 2020). As Katzenstein (1996) and Duffield (1998) have noted, political representations provide the cultural–institutional context of strategic action. It is the domestic political field that defines which goals should be pursued and what means are appropriate. Viewing discourse and policy as mutually constitutive leads this research to ask different questions. Rather than asking "why" energy transition is constructed in a particular way, this research focuses on "how" questions, following Doty (1993: 303). Thus, this research asks: how has China’s energy transition been domestically portrayed in Chinese officials’ discourses? And then, how has China’s energy transition influenced its foreign policy?

By looking at political representations and the geopolitical implications of China’s energy transition, this article argues that behind a particular environmental-oriented discourse, energy transition in China should be considered as a foreign policy, dominated by geostrategic concerns. Defining energy transition as "structural change of energy mix" works to limit energy transition conceptually, effectively closing off and limiting the parameters of the debate. In March 2016, China published its official 13th Five-Year Plan (FYP) (2016–2020), which sets out the course of the country’s development over the next five years. This is a key moment for the global development of a clean energy economy. Progressively turning into a real renewable energy superpower, China is willing to become an "Ecological civilization". This article will begin by looking briefly at China’s energy revolution which would turn the country toward a green economy and allow it to take global leadership in fighting climate change. It will then analyze the social and economic implications of this "green shift". Finally, this study will show that China’s energy transition is aimed at solving its energy insecurity dilemma.

2.1 Mapping Energy Policy in China: Actors, Relations and Structures

Because of China’s coal–based economic model, its limits and the environmental damages caused by its development path, the country’s energy system is undergoing a major transition. Arnulf Grübler (2004) defines energy transition from three perspectives — growth in energy use quantities, changing energy structure and changing energy quality. Drawing on Vaclav Smil’s work (2010: 10), he describes energy transition as a complex
system consisting of three interrelated components — a specific mix of types of primary energies, the energy transformation/storage/distribution chains and patterns of energy consumption. More precisely, Grübner depicts the transition as evolving from solid to liquid to grid energy, in terms of physical forms; from non-commercial to commercial energy; from the economic point of view; and from a low to a high hydrogen–carbon ratio in the context of the carbon components of energy (i.e., decarbonization).

The structural change of China's energy mix is underway. Last year, this country was the top investor in clean energy technology, spending 132.6 billion US$, a 24 percent increase from 2016 (Bloomberg, 2018). In 2017, about half of the total global investment in solar energy was spent in China, adding 53 GW of newly installed photovoltaic (PV) capacity. As the pattern of Chinese economic growth changed, towards less energy-intensive activity and less emissions-intensive energy, Chinese leaders seized this moment of opportunity — what the Greeks would call "kairos" — to propel their country as a forerunner on global climate change issues.

To understand China's global energy diplomacy, it is crucial to examine the domestic politics of its energy policy-making. The most powerful stakeholders are the National Development and Reform Commission (NDRC) — whose status is equivalent to that of a Ministry —, NOCs, and to a lesser extent, the Ministry of Foreign Affairs. The interagency coordination between central government and provinces is also a key feature of energy policy in China. Provinces on the outskirts play a decisive role — Heilongjiang with Russia, Yunnan with Myanmar — partly because civil servants in local bureaucracies speak certain local languages (Interview 2, 2019; Lieberthal & Oksenberg, 1988: 339–390). The PRC’s institutional structures have changed over the years. In 1998, for example, the Ministry of Coal Industry and Ministry of Electric Power Industry were abolished and the State Administration of Coal Industry was formed under the State Economic and Trade Commission (SETC). More recently, on March 10, 2013, the State Council was once again reorganized (Gueldry & Wei, 2016: 224). Although energy bureaucracies were redesigned to improve their domestic efficiency, the National Energy Administration (NEA) needs to address problems that still persist today and justify the need for China to enact energy transition: reduce coal consumption and dependency to foreign energy imports.

In addition, NOCs and State-owned enterprises (SOEs) are undoubtedly major actors, who enjoy support from the government, which makes them influential in determining China's energy policy, both at home and abroad. Interpersonal relations between Chinese officials and NOC’s and SOE’s leaders illustrate to a certain extent the concept of guanxi. The term literally means "relations" or "relationships", it is a specifically Chinese idiom of social
networks, integrally linked to other building blocks of Chinese sociality such as *ganqing* (sentiment), *renqing* (human feelings), *mianzi* (face), and *bao* (reciprocity) (Gold, Guthrie, Wank, 2002: 3). As Chang and Holt (1996: 1496) sum up:

> Kuan-hsi [Guanxi] functions as a convenient linguistic label for Chinese to describe the importance and utilitarian value of their interpersonal relations: when there is kuan-hsi [guanxi], it is easier to get things done because relationship often must be acknowledged in and of itself.

When applying this notion of *guanxi* to Chinese politics, some Western works leap to the conclusion that administration is plagued by cronyism. This view is largely accurate. For instance, a senior ethnic Uighur official, Nur Bekri, was the head of the National Energy Administration from 2014 until October 2018. He was swept away by a corruption scandal, particularly present in the energy sector in China (*The Straits Times*, 2019). However, all things considered, the Chinese concept of *guanxi* is not all that different from "networking" in the West. In fact, the *guanxi* system is above all a system of social obligations, so it is a little more complex than a simple network of corruption.

Because of these overlapping structures and the existence of shared-interests between the several actors involved, energy issues in China, and by extension energy transition, are fairly difficult topics to analyze and understand, even for those who are located "in the box". As a researcher in China admitted during an interview (Interview 3, 2019):

> Whether the decision comes from the Politburo, the Ministry of Foreign Affairs, the National Energy Administration, the National Development and Reform Commission, or the State companies, the process is extremely dispersed and nontransparent, we do not have a very detailed understanding of the Chinese decision-making process in energy policy.

The opacity of Chinese energy policy should not be considered as an insurmountable obstacle for analysis. Rather, it is useful and relevant to approach this object of study diagonally, at different levels of scale, including in terms of discourse. Discourses are understood following Milliken (1999: 229), as "structures of significations which construct social realities". Discourse and materiality stand in a "co-constitutive", rather than a causal relationship as traditionally understood: "representations and policy are mutually constitutive and discursively linked" (Hansen, 2006: 28), they enable each other. Thus, discourse and materiality cannot be separated. Throughout, I therefore use the word
“construction” in this dual sense, with the phrase “energy transition constructions” referring to both discursive and policy practices.

### 2.2 The Chinese “Green Shift” Acknowledged in the 13th Five-Year Plan

Even though the Chinese climate strategy was already integrated in the 12th FYP, the 13th FYP is seen as the key driver for China’s forward-looking industrial, energy, and innovation strategies (NG, Mabey & Gaventa, 2016: 3). The release by National Energy Administration of the *Renewable Energy 13th Energy Five-Year Plan* appears as the real political aggiornamento in the matter. The document’s opening sentence is unequivocal: “可再生能源是能源供应体系的重要组成部分” (NEA, 2016: ii), which could be freely translated as “renewable energy is an important part of the energy supply system”. Investing massively into a new green economy, the People’s Republic of China has adopted a leapfrogging strategy that allows to avoid expensive outlays in soon-to-be-obsolete infrastructure. As Yves Tiberghien (2018: 111–112) writes: “A green approach can be a great method to develop backward and remote areas by directly introducing solar panels and wind turbines”. In 2016, when the 13th FYP entered into force, solar photovoltaic (PV) new capacity reached over 50 gigawatts (GW). In 2017, this new capacity added in China alone is equivalent to the total solar PV capacity of France and Germany combined (IEA, 2018). In 2020, Chinese hydro capacity will be 340 GW, wind 210 GW, and solar 110 GW of which distributed PV is to be 60 GW.

Under the 13th FYP, the PRC is ramping up its low carbon economic ambitions further and the Plan seeks to accelerate the Chinese government’s strategy of using China’s vast internal market to create domestic demand and champions. For example, China’s State Grid established a Global Energy Interconnection (GEI) that seeks to serve as a platform for extensive development, deployment and utilization of clean energy globally through the building of interconnected smart grids using ultra high voltage (UHV) technology (Xinhua, 2016). Aiming to create a strong foundation for China’s green, robust and resilient economy over the next two decades, the government made the commitment that by 2020 non-fossil energy will account for 15 per cent of its total primary energy consumption.

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33 Among the main objectives of the 13th FYP, some of them are not related to energy policy, such as: lifting 70 million people out of poverty, doubling its GDP growth (compared to 2010) to RMB 90 trillion (€12.6 trillion) (with annual average growth rate of between 6.5%-7%), and increasing its urbanization rate to 60%.
China is targeting a drastic reduction in coal by 2020: NDRC aims for production of 3.9 billion tons in 2020 (amounted to 3.75 billion tons in 2015). The reduction in coal production in China in April 2017 had an impact on the price of thermal coal (used in power plants) which more than doubled, reaching 110 US$ per ton in Asia (Financial Times, 2017). Specifically, the effort to reduce dependence on coal has become a hallmark of the ongoing energy transition in China. The 13th FYP notably calls for capping the share of coal at about 55% of the total energy mix and for limiting the addition of new coal-fired power generation capacity to 200 GW to a total installed coal capacity at 1 100 GW (Nakano, 2019: 14). By 2020, gas capacity will be limited to 110 GW.

Additionally, nuclear power development in China has seen a remarkable growth since the early 2000s, due to the rapid growth of electricity. As March 2020, there were 45 nuclear power reactors in operation, meeting roughly 7% of the country’s electricity needs. With twelve reactors under construction, China’s ambition, as outlined in its Energy Development Strategy Action Plan 2014-2020, is to expand its nuclear power generation capacity to 58 GW by this year. Meanwhile, China’s push for clean energy technologies, or “green shifts”, is also helping to drive down the global costs of clean energy equipment and components, facilitating the decarbonization of energy systems in many parts of the world (Bloomberg, 2018). Since 2012, the PRC is the country with the largest installed power capacity, overtaking the United-States. China has a major advantage in this area compared to its American rival. Whereas in the United States nuclear power plants are over 30 years old, in China almost 70% of the fleet was built within the last decade.

Despite China’s massive investments in renewable energy and nuclear power, the success of the structural transition is full of hazards. Indeed, even if strong measures have been taken to increase the share of non-fossil fuels in Chinese primary energy consumption mix, the country still relies on coal for about 60% of its primary energy needs and about 70% of its electricity needs, and this for the years to come. To this is added the dominance of state-owned enterprises in China’s coal sector, as well as local governments interests in tax revenue and employment from coal sector activities. In this context of a traditional preference for infrastructure investments and energy-intensive industries, it will take time before a genuine “green shift” will shake up the political and economic structures of energy governance in China.

In its quest for energy transition, the party leadership is pursuing another goal: capping carbon-dioxide emissions and reducing carbon intensity by 60 to 65 percent by 2030 against the 2005 level, whose impact is observable as much in the national framework as on a global scale. The 13th FYP states that the principle of ‘ecological civilization’ (which emphasizes
sustainable development) will guide China’s growth and the implementation of development plans going forward. Facing severe environmental degradation, China's energy model has undergone a paradigm shift within a mere decade. At the same time, the country has played an increasingly instrumental role in multilateral arenas to defend climate change efforts, as was the case in the successful conclusion of the Paris Agreement in November 2015.

2.3 China’s Environmental Discourse: Domestic Target but International Audience

While a new model of economic development has been emerging in China over the past decades, discourses on ecology have been seeping into the official stance, with increasing recognition of the environmental costs of rising demand for energy. In the early 2000’s, the NDRC pointed out that “China's coal-dominated energy structure is not conducive to environmental protection” (Nyman, 2018: 119). Party leadership has recognized increased concern in China about environmental issues. Thus, the damaging effects of carbon pollution on health and longevity became more important in the public debate, reinforced by scientific evidence that greater environmental degradation associated with more intense use of coal and other fossil fuels contributed substantially to lower life expectancy in those parts of China that used them most intensively (Huchet, 2016). Because the development and use of energy provoke ecological destruction and environmental pollution, the PRC realized that the deployment of clean energy is essential to “adjust our energy structure, cope with global climate change, and ensure energy security” (Xinhua, 2010). The development in 2010 of a solar-powered town in Xinjiang autonomous region and other low-carbon emission pilot cities illustrates the changes operated in China’s energy policy toward renewable technologies.

What makes China so special is that, considering its demographic and economic weight in global affairs, the degradation of the environment in China and the increase in greenhouse gas emissions that have an impact beyond Chinese borders. This is a relatively new situation because in 1992, when the United Nations meeting in Rio de Janeiro made human-induced climate change a major focus of international cooperation, the average Chinese greenhouse gas emissions were less than for the world as a whole — and the average historical contribution much less. China went from being a quiet participant in climate negotiations (Copenhagen, 2009) to the avowed advocate of the global climate order in 2020 (Tiberghien, 2020).
China's positions at the United Nations (UN) related to global warming point in this direction of increased activism.

At the 67th session of the UN General Assembly in September 2012, China — supported by the “Group of 77” — highlighted efforts made to speed up "the building of a resources-conserving and environment-friendly society" (Nyman, 2018: 119), announcing binding targets both for increasing non-fossil fuels as a part of total consumption and decreasing CO2 emissions. It also expressed a willingness "to establish a long-term energy cooperation mechanism and make its due contribution to ensuring global energy security and tackling climate change" (Nyman, 2018: 119).

Even outside the framework of its "climate diplomacy", Chinese officials emphasize their country’s goal of guiding it along the path of sustainable development, as announced in China's Energy Policy (2012). The document notices the need for energy reform in China to move towards "a comprehensive, balanced and sustainable development of its energy, economy, society and eco-environment", with sustainability noted as an "important strategic task", including reducing consumption and pollution to provide "economical, clean and secure development" (The State Council of the People’s Republic of China, 2012). Nevertheless, sustainability is often used as a catch-phrase to describe China's ongoing energy development, which is clearly not sustainable in practice, so it is difficult to see how far this represents any actual change. Then again, open recognition that climate change is interrelated with energy and should be addressed in integrated manner represents a clear change in discourse, if not necessarily reflected in policy (The State Council of the People’s Republic of China, 2007; Ministry of Foreign Affairs of the People’s Republic of China, 2008).

Since the promulgation of the 12th FYP (2011-2015), President Xi Jinping and Premier Li Keqiang endorsed an ambitious program of sustainable development and ecological conservation. Although officially intended for Chinese population, the PRC discourses on climate change and energy transition — i.e. structural change of the energy mix — have been highly scrutinized by other countries. China is aware that its new model of economic growth will provide sound foundations for major reductions in the trajectory and absolute level of Chinese greenhouse gas emissions (Garnaut, 2010). Consequently, by being a first mover and central player in the future green economy, the country is looking for a global competitive advantage. At the 19th Party Congress in October 2017, Xi Jinping summarized China’s position in the following terms: "taking a driving seat in international cooperation to respond to climate change, China has become an important participant, contributor, and torchbearer in the global endeavor for ecological civilization" (2017: 4).
If China’s new model of development improves the chances of the international community meeting the 2 degrees climate target, the current reforms involve some changes that flow inevitably from China’s demographic and economic circumstances. Beijing foresees a decline in the investment share of expenditure and an increase in the consumption share, especially consumption of services, leading to overall growth being several percentage points lower than in the first decade of the century. Large structural change is associated with uncertainty and, more importantly, it introduces public opinion pressures to retreat from new directions. The Chinese government is also facing pressures from special economic interests resisting such changes.

2.4 Beyond Words, the Social and Economic Implications of Building “Ecological Civilization”

Finally, although public opinion is not the core driver, it is certainly, especially that of the urban middle class, a supportive factor in China’s shift toward a green economy and climate policies. The 2016 Pew Survey asked Chinese citizens about their top global concerns. Climate change scored highly as the third most important concern with 34% of citizens mentioning it (following concern with the US global power at 45% and global economic instability at 35%) (Pew Research Center, 2016: Question 22-b). On the domestic front, 73% of Chinese citizens cited water pollution and 70% cited air pollution as big problems, following closely issues such as corruption, inequality, and health (Xu & Dong, 2018). In big cities such as Beijing, Shanghai, Guangzhou, Chongqing, or Chengdu, urban citizens are increasingly upset about pollution and expect very rapid and robust action from the government. This reinforces support for climate policy.

Consequently, the environmental discourse has evolved a lot, most likely because of the growing number of public protests over environmental issues threatening to undermine Communist Party rule. For instance, lawsuits have been brought against local governments, including Beijing’s, by a few Chinese lawyers for failing to effectively manage pollution. In addition, the 2016 environmental protests in the city of Chengdu reportedly drew security forces in riot gear and resulted in detention of some protesters (The Economist, 2017). One of the most famous demonstrations is the Dalian PX protest march, which took place in 14 August 2011, locally known as "the 8-14 event" (大连8-14抗议) (The New York Times, 2011). Tens of thousands of people gathered in People’s Square in Dalian, demanding that a paraxylene (PX) chemical factory — Dalian Fujia Dahua Petrochemical (大连福佳大化石油化工) — be immediately shut down and relocated, and that investigation into the factory be
made public. Many other protests and unrest have occurred in China in the recent years, without necessarily being covered by the Western media. However, according to one Chinese environmental expert:

Pollution and energy issues are not as sensitive as in Hong Kong, Taiwan or Xinjiang. Government control is less drastic and therefore some information goes through the censorship filter. Nevertheless, what has changed is the scale of these events, the speed with which information is disseminated through social media and the importance of environmental awareness. According to me, the breaking point of China’s environmental awareness happened when the level of air pollution, the “airpocalypse”, became too high. (Interview 4, 2019)

The building of an "ecological civilization" — which is also part of China’s energy transition — is also being shaped by the need to alleviate energy-related air, land, and water pollution. Between 2000 and 2006 alone, sulfur dioxide emission in China rose by 53 percent. A recent study led by Robert A. Rohde and Richard A. Muller, shows that outdoor and household air pollution are believed to have accounted for 1.6 million premature deaths in China per year, equivalent to 4 400 deaths a day (Rhode & Muller, 2015).

The largest study of the pollution’s economic impact was conducted in 2007 by the World Bank and the Chinese Ministry of Ecology and Environment (prior to 2008 known as the State Environmental Protection Administration). Some results would probably have been censored and modified before the publication of the study, which however estimated the annual cost of pollution at 5.8% of GDP, or 128 billion US dollars for 2007, or the equivalent of 549 billion dollars for 2014 (World Bank, 2007: 151). A previous World Bank report published in 1997 reported a cost varying between 3.5% and 8% of GDP (Johnson, Liu & Newfarmer, 1997). A report by the United Nations Industrial Development Organization (UNIDO) and the Stockholm Environment Institute published in 2002, which incorporated more variables and used other calculation methods, indicated that the calculation of the World Bank in 1997 significantly underestimated the cost of pollution (Stockholm Environment Institute, UNPD, 2002). As for the Chinese Academy of Social Sciences, it estimated the economic cost of pollution in the early 2000s for the northwestern provinces of China at 13% of the region’s annual GDP (Huchet, 2016: 14).

The importance of energy for social, and economic development is emphasized continually in Chinese discourses. The new model of economic growth embedded in the notion of "ecological civilization" is expected to diminish state-owned enterprises' benefits that have been taken for granted for a long time. By implementing carbon reduction strategies and
policies, the PRC jeopardizes the hegemony of oil and coal sectors. Among the dozens of interviews I conducted in China in 2019 with experts, professors, and diplomats, insistence on the “inherent relation between energy and economy” was one of the most recurring elements. As Professor Guangqing Xu from the Renmin University in Beijing put it:

The consequences of a shutdown of coal-fired power plants would be disastrous for China’s economy. If we consider the entire supply chain, including coal mining, transportation, electricity generation, the closure would impact approximately 300 million workers. It’s a spiral that drives a whole swath of the economy, as it did in the United Kingdom with the shutdown of coal mines, with the impact we know on the economic health of mining towns. The Government cannot afford to take such a risk for the social and economic stability of the country. It should be borne in mind that the economy and development are part of the cardinal principles of the Chinese Communist Party. (Interview 5, 2019) 

China’s energy dependency — the country became a net oil importer in 1993 and still remains heavily reliant on imported coal — also raises economic questions. In this regard, the economic dimension of China’s energy security should never be underestimated. For example, China experienced a natural gas shortage in the winter of 2018 in Hebei, Shandong and Shanxi provinces. This natural gas supply shortage from Turkmenistan drove up natural gas prices in China. Consequently, top state-owned energy companies — such as the China National Petroleum Corporation (CNPC), the China National Offshore Oil Corporation (CNOOC) and Sinopec Shanghai Petrochemical Co. — bought gas at a higher price from other suppliers like Australia and Qatar to resell it more cheaply in the Chinese market. In other words, SOEs have lost a lot of money and this “economic patriotism” illustrates one of the specifics of the Chinese energy system (Interview 6, 2019). What is valid for the gas sector is also valid for petroleum, as Boekestein and Henderson (2005) write: “Chinese oil executives are told to put their country’s oil security above the economics of their business. [...] Clearly, energy security is national security”. Because China’s energy transition means a structural transformation of its energy mix, it surely implies to securitize and diversify its foreign supplies.
2.5 China’s energy transition: a diversification and security-driven process

Energy is increasingly considered a foreign policy issue, and the Chinese case is no exception (Downs, 2000; Yang, 2004; Cheng, 2008; Andrews-Speed, & Dannreuther, 2011; Mayer, & Wubbeke, 2013; Leung, Aleph Cherp, & Wei, 2014; Taylor, 2014; Nyman, & Zeng, 2016; Gueldry, 2018; Trombetta, 2018). The state is the central actor considered, and the object to be secured by a constant energy supply at a stable price. In China, energy transition means a better balance between the various sources of energy which should reduce the importance of coal in favor of natural gas and civil nuclear power. This strategy of diversification of energy sources and therefore of partner countries occupies an increasingly important place in China’s foreign policy. Securing maritime energy shipments is a critical energy-security priority for China. Because of over 80 percent of Chinese maritime oil imports by sea pass through the Strait of Malacca, this strategic waterway represents a potential risk to China should it be unable to protect its shipping interests (Mauldin, 2017). The development of land pipelines then allows China to reduce the threats related to the risk of transit in the straits that weigh on maritime supplies.

Although China holds the world’s largest shale gas reserves, the amount of natural gas readily available for extraction is much lower due to geographical complexities. China currently relies on foreign natural gas delivered via land pipelines and carriers in the form of liquefied natural gas (LNG). The evolution of China’s energy mix in the horizon of the energy transition offers a special place to natural gas, as evidenced by the increase in its consumption at an annual rate of 12.6% since 2010. Gas has become the main alternative to coal, particularly in the most polluted urban areas. However, it is also a resource from which China suffers from an increasingly high rate of external dependence (from around 30% in 2014 to 43% in 2018). China’s energy transition must therefore adapt to a very strong increase in demand for natural gas (more than 600 billion cubic meters (bcm) by 2040), bringing this resource from 6% to 12% of the primary energy mix on the same period (Martin-Amouroux, 2019).

In recent years, this dependence on gas has strongly influenced the relationship between Beijing and Moscow in this area (O’Sullivan, 2018, 2019a, 2019b). On May, 21 2014, after a decade of negotiations, Chinese company CNPC and Russian gas giant, Gazprom, signed a 30-year, $400 billion deal to deliver Russian natural gas to China (Le Monde, 2014). The most recent gas pipeline project, the US$55 billion "Power of Siberian", which will ultimately strengthen Sino-Russian gas cooperation, sent its first shipments of natural gas from Russia to China in December 2019. This pipeline will supply China with 38 bcm of natural gas.
per year, for thirty years. In the energy sector, Beijing has also signed a contract with the Russian corporation Rosatom to build civil nuclear power plants in China (notably the Tianwan and Xudabao nuclear power plants). This agreement was reached in June 2018 as part of a Shanghai Cooperation Organization (SCO) summit (Sputniknews, 2018).

Through bilateral and multilateral arrangements, China has actively ramped up natural gas imports via pipelines over the last decade. Today, the Central Asian Gas Pipeline (CAGP) and the China–Myanmar Oil and Gas Pipeline are the only two gas pipeline systems that flow into China. Line D of the CAGP is scheduled to come online in 2020. Line D will connect another gas field in Turkmenistan with China’s cross-country West–East Gas Pipelines, adding another 30 bcm of capacity to the CAGP. However, China also imports LNG from several other countries, including Australia (47%), Qatar (21%), and Malaysia (11%) in 2017. The International Energy Agency predicts that in 2030, over 60% of China’s natural gas demands will have to be met through imports (Jiaqi, & Qi, 2018). In late 2019, China became the world’s top importer of LNG, overtaking Japan for two consecutive months (Jaganathan, 2020).

Another means through which China is seeking to mitigate its dependence on foreign oil is by building a strategic petroleum reserve (SPR), which is designed to insulate China from external market shocks. Daily demand for oil in China is around 20 million barrels (Collins, 2018: 54). While the volume of imports is 8.4 million barrels per day (Mbd), China relies on its crude oil reserves, the quantities of which have probably been underestimated. These reserves would exceed 600 million barrels (Bloomberg, 2016), roughly equivalent to a hundred days of oil imports by sea, which would meet the Organization for Economic Cooperation and Development (OECD) standard of 90 days of import reserves.

**Conclusion**

Whereas the Western conception of the energy transition testifies to the systematic use of so-called green or renewable energies, China’s energy transition strategy reflects different ambitions, on distinct spatial spaces and analytical scales: encouraging decarbonization of electricity generation and deployment of renewable energy sources on the domestic level; addressing environmental issues and implementing climate policies both in the country and abroad; promoting the transformation of China into an “Ecological civilization” on the discursive level; and finally, securitizing domestic and international energy supplies (especially gas and oil) on which China’s economic sustainability depends. Gasification of electricity production in China is subordinated to rapid expansion of domestic and international supplies. New pipelines from Russia and Central Asia and are supporting rapid
growth in imports, as well as pipelines to distribute LNG from Australia, Southeast Asia, Papua New Guinea, the Middle East and eventually North America. The share of overland energy sources is likely to increase in the coming years.

Interestingly, the nature of the relationship between Russia and China is debated by Chinese experts. Some academics underline the "ideological proximity" between the two powers, illustrated in particular by similar votes in the UN Security Council, and their regular cooperation in the part of the BRICS and the Shanghai Cooperation Organization. Conversely, other analysts relativize the strategic importance of the partnership with Russia for China, highlighting the isolation of Moscow on the international scene and the systemic limits of the Russian economy.

Now that China has obligations to curb greenhouse gas emissions under the 2016 Paris Agreement, the Chinese government strives to address domestic environmental problems caused by coal-fired power generation. General Secretary Xi Jinping has been a main promoter of building "Ecological civilization", a combination of improving both physical and social environments, living standards, and social peace. "Ecological civilization" is a means to arrive at what has been officially termed a "Beautiful China". However, beyond China’s words and declarations of intent, energy transition is confronted with economic and social realities whose scope raises questions about the future of the country and even maybe the survival of the regime.

Defended in official discourses as the signal for a "green" shift, China’s energy transition extends electricity to rural communities away from established grids through decentralized systems based on renewable hydro, solar, wind and biomass power. This example is already being influential in rural South Asia and Africa. Thus, the nature and causes of China’s energy transition, and above all, the possibility of replication of its model are critical research questions for the years to come.
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CHAPTER 3
THE MEKONG RIVER, AXIS OF ENERGY TRANSITION AND
GEOPOLITICAL TENSIONS

Éric MOTTET and Frédéric LASSERRE

The Mekong, the “mother of all waters”, is a sacred and vital river for six Asian countries. Rising at an altitude of 5,200 metres above sea level on the Tibetan high plateaus and 4,900 km long (12th longest river in the world), of which 2,130 km are located in China, a catchment area of 800,000 km² spread over six countries (China, Burma, Laos, Thailand, Cambodia and Vietnam), with an average flow of 15,000 m³/s (8th), the Mekong contributes to the development of South China (Yunnan Province) and part of the South-East Asian peninsula. The Mekong waters China, where it takes the name Lancang, runs along the Burmese territory, then along 1,800 km of Laos, where it forms the natural border with Thailand, before feeding Cambodia and the famous Tonle Sap, the largest freshwater lake in Southeast Asia. On arriving in Vietnam, the Mekong takes the name Cuu Long (Nine Dragons), which is supposed to represent the nine branches that flow into the South China Sea. As it occupies an important place in the popular culture of the local people, many festivals pay homage to it throughout its journey. From the Luang Prabang Canoe Festival to the Bon Om Touk (Water Festival) in Phnom Penh, all celebrate the end of the rainy season, the fertility of the land and the abundant catch of fishermen. This is particularly true in Cambodia, especially for the fishermen of the Tonle Sap Lake and in Laos, where fish consumption contributes to food security by providing a major part of protein intake. The life of the people living along the Mekong River, which has remained almost unchanged for centuries, has been radically transformed in the last twenty years.

The main course of the Mekong owes its importance to the issues at stake (production and energy independence, food security, economic and industrial growth, axis for development and communication, etc.), the number of countries it crosses (six), the multiplication and diversity of the actors at play (local populations, public and private sector, international donors, NGOs), the divergence of their interests (economic, commercial, diplomatic, security), and the asymmetry of power struggles between actors that make transnational and multilateral environmental cooperation conflictual (Delahaye, 2013).

To meet these challenges, the Mekong riparian countries are discussing ways to improve energy connectivity and cooperation to ensure energy security, access to energy, sustainability of the energy mix and ultimately energy transition in an environmentally friendly and sustainable design. As such, hydropower is by far the most promising
renewable energy source in the Mekong River Basin. However, within the countries of this region the hydropower potential is very unevenly distributed and exploited, which creates geopolitical friction between state and non-state actors. In the face of these tensions, the Mekong River Commission (MRC) is showing little political and legal clout (Middleton, Garcia and Foran, 2009). How is the governance of the river basin evolving given the stronger emphasis placed on hydropower production in a context of energy transition?

3.1 The Mekong Commission: a lack of political and legal legitimacy

Former Mekong Committee, established in 1957 under the aegis of the United Nations, the Mekong River Commission (MRC) whose vocation was to direct technical studies for the development of the river basin (Affeltranger, 2008), exists in its form since the founding treaty of 1995. Formed by the countries of the lower basin, i.e. Laos, Thailand, Cambodia and Vietnam (China and Myanmar have chosen to remain observers), the MRC works to improve knowledge of the river (data and publications), sustainable intra-regional planning and effective cooperation between the four members (AFD, 2015).

Decisions within the MRC are validated and ratified by Council members and the Commission’s Joint Committee. Operational functioning is provided by a two-headed Executive Secretariat (MRC Secretariat) based in both Vientiane (Laos) and Phnom Penh (Cambodia). The decision-making power of the MRC, which is 90% financed by international aid34, belongs to the four members countries, but reflects the important influence of international donors on the strategic decisions taken within the Commission (AFD, 2015).

Yet, despite its institutional legitimacy, the MRC is struggling to develop a binding legal framework for its members. For example, if one of the four countries plans to build a hydroelectric dam development on the Mekong river Basin, procedures (called Procedures

34 Over the period 2005-2015, according to the Danish Agency for International Development (DANIDA), the donors are Denmark (28%), Finland (12%), Sweden (11%), Germany (11%), Australia (7%), Belgium (7%), World Bank (6%), Switzerland (5%), the Netherlands (5%), Japan (3%), EU (3%), France (2%) and the United States (1%).
for *Notification*\(^{35}\), *Prior Consultation*\(^{36}\) and *Agreement Process*\(^{37}\), or PNPCA) are planned to build consensus on the outcome of the project (AFD, 2015). In other words, the RCM does not have the power to compel a country to abandon a dam project on the lower main course despite the disagreement of the other members. Moreover, the scope of the MRC's political coordination is limited because of the absence of Myanmar and, above all, China, who refuse to become full members and thus to comply to the rules of the Commission.

### 3.1.1 Hydropower, the most controversial issue

The combination of strong economic and demographic growth in the neighboring countries of the Mekong means — as a direct consequence — an increase in energy demand. Indeed, the demand for electricity in the Mekong basin has experienced a tremendous increase over the last twenty years, in relation with the rapid economic growth of the countries in the region. For example, with an annual GDP growth rate of 9.2% since 2000 (World Bank, 2018), China's energy appetite has never been higher. The strong Chinese energy demand is undoubtedly one of the driving forces for the development of hydroelectric projects in the Mekong basin (tributaries and main course). Besides, one needs to add the growing energy demand emanating from Thailand, Vietnam, Cambodia, Myanmar and Laos. Thus, while electricity consumption is increasing in all the countries of the Mekong basin, China, Laos and, to a lesser extent, Cambodia are turning to hydropower production to achieve energy self-sufficiency and position themselves as key regional suppliers.

In addition, the Mekong River basin area is very vulnerable to climate change because of its high economic activity concentrated along the main river and its tributaries, and because of its high dependency on fisheries, agriculture, forestry and other natural resources. It is then only logical for countries in the region to be individually and collectively in favor of national policies for the construction of hydroelectric dams, since hydropower is renewable, flexible, efficient, low in carbon (reputed low emitter of GHGs) and cheap, and that it also has an immense potential for regulation of floods and periods of drought. Hydroelectric developments are therefore seen as both a mean to fight against climate change and a way

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35 *Notification* is required for projects involving water use on the Mekong or its tributaries. It only involves notifying the proposed development to neighboring countries by sharing related data (feasibility studies, provisional schedule, etc.)

36 *Prior Consultation*, the higher level, is required for "water use projects in the main Mekong watercourse in the dry season or water diversion from the main watercourse outside the river basin". The "notifying country" must provide all the data allowing the other members of the MRC to assess impacts on the basin. A period of 6 months is planned for this process. Unlike the *Notification*, *Prior Consultation* aims to reach an agreement within the MRC Joint Committee on the project. However, this objective has no legal nor binding value.

37 The *Agreement Process* applies for a project deviating waters of the Mekong Basin to another river basin. As its name indicates, an agreement is required between the four member countries for this type of project. The case has never been seen before.
to mitigate its effects on the flow of the river, while participating in the energy transition. Of course, however, in China and Southeast Asia, as everywhere in the world, big dams are strongly opposed, and carry high diplomatic stakes, as we will see.

3.1.2 Dam projects on the main course of the Mekong River

As a precursor, China has already built ten reservoir dams on the upper course (20,800 MW), and four more are in preparation and/or planned (11,400 MW). These projects are carried out in an opaque manner by Beijing, who does not share any information about the design of the structures, the turbines or the storage capacities of the reservoirs (AFD, 2015). In Vietnam, in Thailand, the tributaries have already been largely developed, the MRC being much less constraining on the development of tributaries of the Mekong than on that of the main course of the river (MRC, 2010), which explains a much later appearance of major dam projects on this one. In Laos, where many tributaries have also been developed (about 30 dams are in operation including Nam Theun 2), no less than nine cascade dams are planned for a total installed capacity of about 10,000 MW, Vientiane having already launched the construction of two dams, Xayaburi (1,285 MW) and Don Sahong (240 MW), while launching the pre-construction phase (site preparation) in the case of Pak Beng (1,230 MW). Cambodia plans as well in the medium term the construction of two dams (Stung Treng and Sambor) on the lower main course to supply electricity to Vietnam, whose demand is exploding in connection with its economic development — in order to benefit, like Laos, from the hydroelectric rent.

In Laos, unlike China, dam projects have been submitted to the MRC’s Prior Consultation process. Nevertheless, for Xayaburi and Don Sahong, discussions about the designs of those projects did not result in a consensus.

For the Xayaburi dam (US $ 3.8 billion), the first dam to go through the Prior Consultation process (2010-2011), Cambodia and Vietnam deemed that the negative impacts of the dam (fish resources, sedimentation, flow modification, etc.) were insufficiently accounted for. By the end of 2012, and despite the lack of agreement needed in PNPCA procedures, Laos considered that it could still resume construction – which had been suspended for 18 months (May 2011). The impact study carried out by the multinational consulting and engineering company Poyry (Finland) has been widely criticized, forcing the Laotian government to entrust the Compagnie Nationale du Rhône (CNR) and its branch specializing in hydroelectric and fluvial engineering (CNR Ingénierie) to revise it. It appears however that this revision was entirely carried out from France, without even a field visit. As the CNR evaluated and validated Poyry’s conclusions, not without making recommendations related to hydrology, sediment transport and navigation, construction of Xayaburi resumed (quietly) in November 2012, after Cambodia and Vietnam gave their agreement. Negotiations were greatly facilitated by the sharing of hydroelectric rent (and its production). It then seemed
more attractive to resume construction than abandon the project altogether (AFD, 2015). Thailand finances the Xayaburi dam (CH Karnchang Public Company Limited) and buys Laotian electricity through bilateral agreements (Electricity Generating Authority of Thailand or EGAT), thus positioning itself as the main promoter and benefactor of the hydroelectric policy adopted in Laos. The Xayaburi Power Company Limited (XPCL), the managing company, announced that the dam will be fully operational by October 2019, even though modifications to the dam designs recommended by the Prior Consultation process (and by the CNR) are yet to be made public by the Lao government and the MRC.

Commissioned on October 29, 2019, the Xayaburi hydroelectric dam is the first operational mega-dam (1,285 MW of installed capacity and 820 meters long) in Laos on the main course of the lower Mekong river basin. This does not include hundreds of other smaller tributary infrastructures, 63 of which are in Laos alone (7,207 MW of installed capacity). For 2019, Laos was targeting a production of 33,874 billion kWh worth nearly US$2 billion, of which about 25,625 million kWh were to be sold abroad (mainly Thailand and Vietnam), i.e. 80% of the production. Vientiane has also set up a dam safety management centre (20 dams were inspected in 2019, and 50 more will be inspected by 2021) following the failure of two dams in 2017 and 2018, those of Nam Ao and Xe Pian–Xe Nam Noy.

The Xayaburi dam, built, financed (US$4.47 billion) and managed (CKPower) by Thai companies and banks, attracted criticism and administrative and environmental controversy even before construction began in 2012. The dam is a serious threat to sediment transport, the volume of fisheries resources, aquatic biodiversity and water levels in the Mekong River. As such, even before Xayaburi became operational, according to a report by the MRC, the Mekong River reached a historically low level that summer, due to persistent drought and the construction of upstream hydroelectric power plants in China and Laos, according to a report by the MRC (MRC, 2019b). In recent years, the monsoon has not seen much rainfall, despite recent rainfall due to Typhoon Wipha (August 2019), which did not allow the water level to rise. In Vientiane, the water level painfully reaches one meter at the end of October, compared to six meters in previous years at the same time, again according to the MRC. The situation is likely to deteriorate further with the start of the dry season.

The Don Sahong Dam (Champassak Province), near the Lao-Cambodian border (2 kilometers), is more modest (260 MW) and is not entirely located on the main course of the lower Mekong River, but on one of the arms of the river: the Siphandone site (or ‘4,000 islands’). Here as well, environmental impact studies are strongly challenged by Cambodia (who sent a letter to Laos requesting the abandonment of its construction — which had began in 2013) and a coalition of local and international NGOs. Developed and built by two Chinese firms (Power China and SinoHydro) at a cost of US$ 720 million (commissioned in 2019), the dam project is located on one of the most favorable fish migration channels, and
one kilometer from the favorite habitat of the Irrawaddy dolphins, a highly endangered freshwater mammal species (only 85 individuals left) living in the Lao-Cambodian border. Having only a partial read of PNPCA procedures, Vientiane has considered since the beginning that the Don Sahong's project, which occupies an arm of the Mekong and not the entire riverbed, does not have to undergo the Prior Consultation process, but only the Notification procedure. However, strong tensions around the Xayaburi dam project and many protests emanating from neighboring states, NGOs, and the media forced Vientiane to agree to submit the Don Sahong project to a Prior Consultation, at a meeting of the MRC Council in June 2014. This postponed works on the dam by several months. However, Vientiane deemed that obtaining a consensus was both illusory and not really necessary — especially since the Prior Consultation did not meet the concerns of downstream countries. The construction of a temporary dam was therefore unilaterally launched in October 2015. And against all odds, Cambodia's Prime Minister Hun Sen announced in November 2016 that Cambodia was now supporting the construction of the Don Sahong Dam. It must be noted that Laos exports electricity to Cambodia in areas poorly connected to the national network of the Electricity Authority of Cambodia (EAC), in poor condition after 20 years of armed conflict. Very modest, Laotian electricity exports (at very competitive rates) to Cambodia should increase by 2020, once the dam of Don Sahong completed.

With 37 other dams under construction (5 170 MW), which should be completed by 2020–2021, and 55 planned (2 570 MW), Laos should eventually have nearly 150 dams for an installed capacity of about 15 000 MW, i.e. the total technically exploitable potential of the Mekong watershed belonging to Laos.

3.1.3 Other conflicting issues

Hydroelectric developments pose a four-fold threat to the Mekong River Basin: a degradation of the environment, a decline in food production, the impoverishment of the population, and, ultimately, technological risks.

First, the planned succession of dams would create as many obstacles to the transport of sediments and prevent the transport of the heaviest of those along the river route (160 million tons/year). If all the planned dams on the Mekong mainstem do get constructed, then the cumulative reduction of delta sediments would be between 51% and 96% (Kondolf et al., 2014, Piman and Shresta, 2017). Yet these sediments are crucial for the stability and geomorphology of the delta (coastal erosion, shoreline weakening, saline intrusion), an actual agricultural "factory" and Vietnam's economic lung (Anthony et al., 2015).

Second, dams constitute a serious threat for the fish resource. Indeed, hydroelectric developments can alter or even block migratory routes for some species, retain the necessary nutrients, and ultimately modify the hydrological regime of the river. If the impact
of dams is poorly known, due to lack of transnational studies, the MRC still estimates the losses of fishing volumes at 25% for the entire basin — if Lao and Cambodian planned dams get constructed (ICEM, 2010). The Mekong being the largest freshwater fishing area in the world (2.2 million tons), dams concentrate the concerns of a population whose fish consumption is twice the global average — between 29 and 39 kg/inhabitant/year (Hortle, 2007). This is especially true in Cambodia, particularly for Tonle Sap fishermen (80% of the 1.2 million people living around the lake are fishermen), and in Laos, where fish consumption contributes to food security by providing the main share of the protein intake (47 to 80% of animal protein). As a matter of fact, since the consumption of meat has long remained exceptional (influence of Buddhism, low purchasing power and scarcity of pastures), halieutic resources have always constituted an essential food supplement (Mottet, 2017).

Third, it is to be noted that the Mekong is second behind the Amazon for its aquatic biodiversity and its migratory and rare species (Irrawaddy dolphin, giant Mekong catfish, etc.). As such, it also concentrates the fears of many NGOs (WWF, in particular) and researchers (Dungan et al., 2010), whose concerns focus on Chinese and Lao dam projects. 80% of the current population of the Mekong basin is rural, living out of fishing and rice farming. The rapid population growth combined with a decline in agricultural productivity (irrigation problems, deforestation) and fish farming risks leading to a massive rural exodus. As the number of jobs in urban areas remains limited; social conflicts may emerge.

Finally, recent news in Laos were largely marked by the collapse of a secondary dam of the Xe Pian-Xe Nam Noy hydroelectric project on the night of 23 July 2018. This structure under construction, located in the southern provinces of Attapeu and Champassak, comprises two main dams and five secondary dams. The accidental breakage released five billion cubic metres of water into rivers that were already flooding themselves due to a well underway rainy season. The breach engulfed seven villages, officially leaving dozens of people dead and missing. A total of 19 villages were affected by the disaster, representing nearly 14 500 people. Since the rupture of the Xe Pian-Xe Nam Noy dam, the Laotian government has embarked on a policy of a moratorium on planned hydroelectric projects only.

3.2 Low efficient cooperation and the defense of national interests

As a simple observer, China does not respect the rules established by the MRC nor does it invest much in its functioning. Downstream countries even suspect that the country deliberately refuses to cooperate, for example by refusing to transmit hydro-meteorological data from the upper Mekong (Affeltranger, 2008; Thu and Wehn, 2016), or by deciding if and when to share data (Rein, 2017). Indeed, in April 2002, Beijing finally agreed to
transmit hydro-meteorological information to the MRC during the rainy season (high water period, with a view to improving the flood forecast along the river) — but however not during the dry season, despite formalizing this exchange of data in formal agreements in 2002, 2008, 2013 and 2019 (MRC, 2019). This is prejudicial: with an extremely large total holding capacity, access to this data would theoretically favor the development of irrigation during the dry season downstream. Recently, Laos and Thailand have expressed concerns about the possibility of floods coming from China after large amounts of water would be released over a short period of time, causing large waves and fast floods. Besides, China remains very reluctant to share any technical information (specificities and operation of dams) about the construction of its hydroelectric dams (Yunnan Province) whether on tributaries or the main course of the Mekong, as the country considers this information to be strategic and thus top secret (Delahaye, 2013). This attitude shows that Beijing is not ready to cooperate with the MRC on every level, out of fear of seeing its hydroelectric development policy curbed or limited by neighboring countries. On a larger scale, it also undermines the principles of river basin management and sustainable development defended by the MRC and the New York Convention as no information on the progress of dams on the Mekong is provided (Affeltranger and Lasserre, 2003) 38.

On the lower maincourse of the Mekong River, the MRC faces an important moment in its development. The case of the Laotian dams of Xayaburi and Don Sahong, the firsts in the lower basin on the Mekong River, effectively demonstrates the difficulties the MRC faces in setting up a regional dialogue on hydroelectric issues. Indeed, the PNPCA process provisions that the four member countries have to notify neighboring countries and take their concerns into account when proposing a project for the main course of the Mekong, including for projects located on cross-border tributaries. However, the agreement cannot prevent the construction of a dam if the proposing country insists39 (this would be perceived by the country in question as interference). Thus, despite the disagreement of both Cambodia and Vietnam40, two members out of four, and without the approval of the MRC, Laos unilaterally decided to start the construction of the two dams (2012 and 2015), prompting criticism and manifestations of disapproval. Challenged, the MRC then announced, with the approval of the four countries concerned, that the construction of any dam on the lower Mekong River would be placed under its control. This decision is beneficial on wo accounts: first, it legitimizes the MRC in its role as a key player in the management of

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39 In 1995, Bangkok systematically blocked negotiations to retain the veto power of member countries, a proposal supported by Vietnam. Faced with the blockage, the two parties reached an agreement transforming the right of veto into "strong obligation of prior information".

40 Vietnam and Cambodia are particularly concerned about a decline in their fish stocks and sediment transport. Thailand does not oppose the projects.
the Mekong river basin and, second, it reinforces the still fragile cross-border cooperation in the Indochinese peninsula.

That being said, observers know very well that what is at stake in the management of the crisis of regional cooperation sparked by the construction of the Laotian dams is the MRC’s legitimacy (and its interstate consultation mechanism). Today, the hydroelectric issue is a cringe on relations between members of the MRC, but it must be said that regional geopolitics are complex, and that cooperation is difficult in part because of the weight of history and the political trajectories of countries at play. Laos and Vietnam are both led by a single party subject to internal struggles, while Thailand is plagued by political instability and the military junta, which leads the country since 2014, has a hard time mastering it, in spite of a new Constitution (2017). Cambodia, under a democratic appearance, remains governed by an authoritarian regime.

In this regional context, it is not surprising to see Laos play its own game. On the one hand, politics in Laos, a small landlocked state, aim at maintaining a balance between neighboring powers. The point is to defend its interests by putting in competition potential investors (state and / or private) that are China, Thailand or Vietnam. On the other hand, by promoting massive investments in the hydropower sector, Laos bets on an increase in exports and royalties, but also expects to strengthen its role as an unavoidable regional supplier through bilateral agreements and the planned interconnection of power grids between ASEAN countries. It is through this program that Malaysia and Singapore should — in 2020 or 2021 — become customers of Laotian electricity.

As far as Cambodia is concerned, disputes over the Laotian (and Chinese) dam projects have been progressively muted as Phnom Penh also hopes in the medium and long term to derive income from the sale of electricity to neighboring countries via the construction of its two dams on the lower Mekong River, financed and designed by Chinese and Vietnamese interests.

As for Thailand, who, on the one hand, has built a large number of hydraulic structures on its rivers and who, on the other hand, is facing opposition from the population to any new dam project, it is a major potential customer (ADB, 2008). Thailand thus intends to gradually buy several thousand megawatts from a group of countries composed of Laos (9 000 MW/year), Myanmar (8 200 MW/year), China (3 000 MW/year), Cambodia and Malaysia (EGAT 2009, EGAT 2012). Beyond the purchase of electricity on very attractive terms, Thais are also present in Lao hydropower projects as investors. In return for a concession for the operation of a dam, the Thai partners invest in the construction and management of hydroelectric facilities, thus ensuring, on the one hand, Laos compliance with bilateral EGAT agreements, and on the other hand, the repatriation of profits from exploitation.
Regarding Vietnam, in order to meet the demand, Hanoi resorts to the import of hydropower from China (4,000 MW/year), and by 2030, from Cambodia and Laos as well (Li, 2012). Vientiane and Hanoi thus signed a memorandum of understanding for the purchase by Vietnam of 5,000 MW/year by 2030. Just as Thailand, Vietnam invests in the construction of dams in Laos. Mainly located in border areas and financed entirely by Vietnamese interests, many dams are under construction or in advanced planning (Mottet and Lasserre, 2014).

The unilateral hydroelectric policy of Laos is therefore only an appearance. Member countries of the MRC show a very ambiguous attitude: on the one hand, they resort to the MRC when they see that a Laotian project thwarts theirs (Cambodia), but on the other hand, they are the customers and investors in Laotian hydropower (Thailand, Vietnam ... but also China). Laos judiciously exploits these contradictions, trying to balance influences by subtly putting them in competition. Vientiane would even have obtained the agreement of the member countries for the Xayaburi project in exchange for counterparts whose content has not been made public. In sum, these "secret agreements" saved the sharing of regional hydroelectric rent between states, but not really the management of the resources of the Mekong. What does the civil society have to say about it?

3.3 A mix of little influential NGOs and a quasi-absence of public debate

NGOs, including Western ones, are numerous in the region of the Mekong basin. They mainly aim at sensitizing governments, the population and the international community to the problems of resource management. NGOs are also essential actors in the management of the Mekong River, whether it is to protect fisheries resources, to manage flood risks or the development of public participation in political activities (Delahaye, 2013). However, in countries like China and Laos, the only countries with active or under construction developments on the main course of the Mekong River, the pressure on societies is such that NGOs and civil society have a hard time making environmental activism truly influential.

3.3.1 In China: an environmental mobilization considered – at least officially

Anyone interested in Chinese society — even just a little bit — would be fully aware that it is not the monolithic block that usually gets portrayed, often in a caricatural way. The environmental anti-dam mobilizations observed in recent years reveal on the contrary a complex society with internal conflicts. The environmental mobilization which has been contesting the construction of 13 dams on the Nu river (Yunnan province) for about fifteen years now, acutely shows how dynamics of mobilization carried by multiple actors actually exist and persist (Peuch, 2012). Since 2004, an environmentalist coalition has obtained a suspension of the projected dams on the Nu, the last major untamed watercourse of China.
whose valley was recognized as exceptional by UNESCO in 2003 because of its biodiversity and its landscapes. This mobilization brings together a multitude of actors, including an environmental NGO from Yunnan (Green Watershed), national environmental NGOs (Green Earth Volunteers, Global Village Beijing, Friends of Nature) organized in a network and established in Beijing under the name of China River Network, and international environmental NGOs based mainly in Thailand where environmental and political activism is tolerated (International Rivers, etc.). This list is not exhaustive and many Chinese actors have participated in the dissemination of information about the opposition campaign to the project of dams on the Nu, including journalists and the media (non-traditional), intellectuals (especially academics and engineers) but also social networking bloggers (Qzone, Sina Weibo, Renren, Tencent Weibo, Kaixin, etc.), even though they are under the cybercensorship of the Chinese government.

Facing an intense and negative public campaign, former Prime Minister Wen Jiabao suspended in April 2004 the 13 dams program, later confirmed in 2009. However, this moratorium was canceled in February 2011 as the Chinese government reinstated the project in its five-year plan (2011-2015) — a severe setback for opponents to the project. Five dams are now operational, and eight other dams are officially planned, including one in Tibet and seven in Yunnan (International Rivers 2014, Bompan et al. 2017). Despite years of environmental impact studies and independent reports, which remain cautious and critical about the construction, Beijing and Yunnan Province have not completely abandoned the project of dams on the Nu. If this environmental mobilization can be seen as a (temporary?) victory of a coalition of actors, this episode seems to minimize the hierarchy between the different levels of government and the protesters: even under pressure, the government keeps control on the agenda. The State organizes the debates, decide if arguments are admissible, and ultimately holds the possibility of continuing or suspending any dam project (Peuch, 2012). In China (and in the Yunnan province), it is therefore not possible to strain the authorities, even if the protesters’ motive is the protection of the environment of a course of water, and that they rely on the previous negative experience of the impacts of the Manwan dam built on the Lancang-Mekong. No one outside the Party leadership knows for sure whether the hydroelectric project on the Nu River is actually cancelled or not (Juilien, 2019).

41 The first environmental NGO founded in China in 1994.
42 Since the creation of the People’s Republic of China (1949), the country has built more than 80,000 dams for an installed capacity of 320 GW, or nearly 25% of the world total.
43 In 2002, when the project of the dams on the Nu was announced, the local NGO Green Watershed invited villagers of the Nu to visit the villages relocated by the construction of the dam of Manwan.
44 In China, the Mekong is named Lancang Jiang or ”Rush River”.

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3.3.2 Laos: a methodically locked society

In Laos, the government’s policy on civil liberties and political rights of the population, in particular that of civil society and development actors, is becoming tougher each year. This is especially obvious among NGOs and non-profit organizations that receive international funding. This dramatic deterioration in the leeway associations and NGOs have in the country, especially on environmental issues, began to intensify when Anne-Sophie Gindroz, the Head of the Swiss NGO Helvetas was officially expelled on December 9, 2012, after a 48 hours notice.

At the origin of this decision was a letter from Mrs Gindroz sent to all donor countries and other donors the day before a working meeting, bringing together 35 countries and 42 organizations, on the conditions of granting Laos international aid — on which the country still largely relies. In this letter, the head of Helvetas underlined that the Laotian government creates “an hostile environment for the development of civil society by stifling freedom of expression”. She added that the country is “led by a single-party regime, where there is little space for meaningful democratic debate, and when taking advantage of that limited space, repercussions follow”. If the expulsion was virtually unnoticed by the international community — except among development agencies present in Laos and some Swiss dailies — the mysterious disappearance of Lao activist Sombath Somphone, December 15, 2012, only 6 days later, got much more attention. Sombath Somphone was not just a random activist though. Winner in 2005 of the Ramon Magsaysay Award — the Asian equivalent to the Nobel Prize — in the Community Leadership category, he is a prominent figure in Laotian civil society. As an environmental activist and committed defender of the rural communities and the poorest peasants in Laos, he is a world-renowned figure among his peers. He was arrested on a street in Vientiane by traffic police (paper check) before being taken away in a white van by unidentified individuals. According to the international community present in Laos, Sombath Somphon’s problems would have started in October 2012 at the 9th Asia-Europe Peoples’ Forum held in Vientiane before the November 2012 ASEM Summit. During the forum, jointly organized by Sombath Somphon and the Laotian government, the debates would have allegedly quickly highlighted concerns raised by the participants after a series of development projects (hydroelectricity, mines, rubber, etc.) encroached on villagers’ lands and damaged the environment. Defending the villagers, Sombath Somphon was reportedly intimidated by government officials at the forum. He has never resurfaced since. The Laotian authorities deny any involvement in his disappearance. Since this mysterious affair, the actors of the civil society are cautious, and criticism directly directed against the Laotian government, particularly on hydroelectric projects, are muted (Mottet, 2016).

45 The Asia Europe Meeting gathers 51 member countries: almost all of Europe and Asia-Oceania.
3.4 Towards an increased cooperation or more environmental conflicts?

Despite institutional legitimacy, the MRC is struggling to develop a binding legal framework, and that is gradually eroding the relevance of the Mekong Commission in the eyes of its members, international donors and China. The latter has, since 2016, developed its own model of cooperation, very attractive financially. It does not guarantee, however, a future free of environmental conflicts between neighbors.

3.4.1 The MRC: loss of legitimacy and window dressing reform?

As we have seen, although its mission is to support sustainable management and development of the river's water resources, the MRC does not have any actual decision-making capacity or coercive capacity, regarding whether the use of water or hydroelectric developments. In addition, China and Myanmar are only observers and dialogue partners in the MRC since 1996. Although recent developments have allowed slight improvements in the MRC-China cooperation, particularly with regard to the exchange of information on Mekong flows, Beijing's transparency efforts remain largely inadequate. In addition, international donors have an important influence on the MRC's orientations as they finance nearly 90% of the budget. As for the civil society of the four countries at play, it is not really represented. The MRC does occasionally invite environmental NGOs (in practical terms, only the WWF and the IUCN) to some of its meetings, but in reality, its policy remains very little influenced by civil society, despite pressures coming from both the media and international environmental NGOs (AFD, 2015).

The MRC’s 2011-2015 Strategic Plan projected to reach financial autonomy by 2030. The objective of the MRC is to function in the medium term without international assistance. The 2016-2020 Strategic Plan thus organizes major structural reforms. The main idea is to allow the four member countries to actually lead the Commission, in which foreign influence is deemed too important (especially in the eyes of foreign donors who wish to withdraw gradually). This consists, on the one hand, in progressively reducing the use of external financial and human aid, and on the other hand, in the gradual decentralization of governance towards four National Committees. The Secretariat would then only keep the core management functions, that is, mainly the coordination of the National Committees, whose Secretary General is now a national of one of the four member countries. In Cambodia, Pich Hatda became the Chief Executive Officer (CEO) of the MRC in January 2019, a position held until 2016 exclusively by Westerners.

46 Prior to Pich Hatda, the CEO position was held by the Vietnamese Pham Tuan Phan between 2016 and 2019 (3 years mandate).
If the process of decentralization is on track, the main challenge of the MRC will be to reconcile interests of the various partners whose relations are not simple and asymmetrical, while ensuring the financing of the budget without the international aid — and while China offers another Mekong basin management model that does not favor, at first glance, sustainable hydropower cooperation.

3.4.2 Can China impose its new model of cooperation?

China’s refusal to fully participate as a member of the MRC’s work led to the Lancang-Mekong Cooperation initiative (LMCI). Premiered by Prime Minister Li Keqiang at the 17th China–ASEAN Summit in November 2014 (Naypyidaw, Myanmar), this Chinese initiative, which picks up on a Thai proposal from 2012, was confirmed on March 23 2016 during the first LMCI Summit Leaders Meeting (Sanya, Hainan), at the official launch of the regional cooperation mechanism bringing together the six Mekong riparian countries (China, Cambodia, Laos, Burma, Thailand and Vietnam). The LMCI has since been confirmed by the six foreign ministers at the 2nd meeting that took place on the 22–23 December 2016 (Siem Reap, Cambodia). This inter-state cooperation is structured around three pillars, namely: (1) policy and security; (2) economy and sustainable development; and (3) cultural exchanges. To this are added five priority areas for cooperation: (a) water resources, (b) production capacities, (c) interconnectivity, (d) cross-border economy, and (e) agriculture and poverty reduction. Based on a five-year development plan of action (2018–2022) and the creation of a US$ 300 million cooperation fund to support the projects, financed exclusively by Beijing, the LMCI must first address the lack of collaboration among member countries and the different government agencies in charge of Mekong management (Middleton and Allouche, 2016). This is a situation Beijing is ironically reportedly largely responsible for, despite more nuanced evaluations of its behavior with the MRC, see Ohnishi (2007) or Han (2017).

Considered as a new model for South-South cooperation, the LMCI is a political project which challenges existing institutions such as the MRC while reflecting an economic and geopolitical agenda that goes beyond the Lancang-Mekong. Of course, the LMCI is to be understood as the Southeast Asian extension of new trade routes, generally referred to as the Xi Jinping’s flagship Belt and Road Initiative (BRI) announced in 2013. Beijing aims at developing a vast network of commercial roads, both on land and at sea, as maritime trade constitutes the vast majority of the world trade. The creation of the Asian Infrastructure Investment Bank (AIIB), and the massive injection of cash into infrastructure projects (roads, bridges, railways, railways) navigable, etc.) gives Beijing unprecedented leverage. Beijing thus gets into position as the prime contractor for the Mekong hydroelectric development — following the logic of commercial and geopolitical expansion of China.
Conclusion

Development of the hydroelectric potential of the Mekong river’s main course fits the development objectives of the riparian countries that wish, on the one hand, to reduce their dependence on non-renewable energy sources (China), and on the other hand to diversify both their sources of income (Laos, Cambodia) and electricity supply (Thailand, Vietnam). Despite much criticism, mainly from Western environmental NGOs, about how to use and manage the resources of the Mekong, nothing seems to slow down the construction of hydroelectric developments.

If in other parts of the world, environmental issues are now the subject of intense debates and sometimes very harsh conflicts, the civil society of Mekong countries is struggling to make environmental activism really influential: governments, even under pressure, control unilaterally the management of the river basin resources. This does not mean that the Mekong is not a vector for political protest and claims for more democratic decision-making processes - examples do exist in the region. But a joint development of hydropower, under the technical and financial aegis of countries with ever-increasing energy needs (China, Thailand, Vietnam), makes it clear that politico-economic and national development arguments are central to the management of the Mekong.

Translated by Pauline Pic
References – Chapter 3


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