Chapter 12 Conclusions: Domestic structure and international impacts of China's climate-energy policy

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Abstract

This concluding chapter wraps up the main findings of the chapters, highlighting the linkage between China's domestic policy process to address climate-energy conundrum and Asian-Pacific energy exporters' higher dependency on China and their moves toward a high CO_2 pathway. Then it presents possible ways to redirect the high CO_2 pathway as future challenges in research and in action.

As an intermediate conclusion, we would like to summarize by saying that China's climate-energy policy, which is created as a policy outcome of its climate-energy conundrum, provokes conflict of interests among the main stakeholders, and that technological, institutional, and political barriers in settling the conflicts have brought about "going global" of coal and power industries and CO_2 emission, not to mention to oil and gas industries.

China's notion of energy security has been depended upon the macroeconomic and state of enterprises reform. In the process energy security is recognized as the appropriate mix of energies and the way to access them, both from a geographical and technological point of view (Di Meglio and Romano 2016). Greenhouse gas (GHG) emissions reduction requirement is reframed and added on the top of it, turning into climate-energy policy, taking a balance among main stakeholders: local governments that have interests in their own coal industries, national oil companies (NOCs) that are motivated to acquire assets and resources, renewable energy manufacturers and developers that are emerged as a new growth point, and the Ministry of Environmental Protection that is responsible for air pollution. Tightening CO_2 emission and/or air pollution control to gain visible improvements requires price reform and transformation of energy infrastructure system that can destroy the balance and provoke conflicts of interests among them.

The slowdown of the growth in embodied CO_2 emission or embodied energy export before 2012, as confirmed in chapter 2 and other recent literatures (Zhao et al. 2008; Wu et al. 2015; Yu and Chen 2017), does not help resolve the conflicts. Given its close association with rapid export growth, economic structural change and a tax on energy intensive exports will have a limited impact without imposing limitation on export volumes in CO_2 intensive sectors (Qi et al. 2014). However, restructuring trade may not be cost effective or realistic. It is estimated to reduce CO_2

emission by 3.3 percent under a reasonable scenario (Tang et al 2017), while have significant implication on employment, because CO_2 intensive sectors are also labor intensive and export-oriented (Tang et al 2016).

This is why the change in the energy mix becomes a main measure in the climate-energy policy.

The central research question in this volume is then, how effective the resultant climate-energy policy in China is in changing the energy mix and CO_2 emission, and what impacts the conflicts of interests among main stakeholders have brought on energy mix and CO_2 emission in China and energy exporting countries.

1. Domestic conflicts and the change in energy mix in China

As symbolized in the continuous decline in coal consumption in 2014-6, China shows a change in energy mix. Chapter 4 finds that the decline in coal consumption is a result of transformation of economic structure from industrial to service sector and coal price reform, and that it will not be easily go back unless coal price drops significantly. Tang et al. (2018) reached the same conclusion, insisting that changes of both industrial structure and the energy mix started to reduce China's coal consumption significantly since 2012.

To accelerate a change in energy mix, alternative clean energies should further replace coal consumption. Wind and solar power manufacturing sector emerges as a new growth point, surpassing nuclear power to account for four percent in power generation in 2015. As described in chapter 3, however, they clash with provinces interests' in their own coal industries, resulting in a large curtailment and suspension of new installation and access to grid connection. They have made minor contribution to CO_2 emission reduction at best.

Meantime, the Chinese government has motivated NOCs to develop domestic gas resources and to acquire assets and resources in foreign countries for the purpose of securing oil and gas to sustain economic growth. However, massively imported gas through pipeline and liquidation has been and will be mostly used for replacing transport fuel and coal for regional heating system, contributing little to CO_2 emission reduction.

Nonetheless, the Chinese government perceives increasing supply of gas as the only realistic option to achieve the stated goal of lowering coal dependency and carbon intensity (Di Meglio and Romano 2016), employing the same strategies and agencies used for enhancing energy security for the purpose of transforming energy mix as well.

Chapter 7 indicates that China has secured enough natural gas to satisfy the CO_2 emission reduction targets described in its Nationally Determined Commitment (NDC). It also suggests that high price elasticity of Chinese energy-intensive industries enables the government to charge only a tiny rate of carbon-energy pricing, i.e. US$3.2-3.6 per CO_2 ton, to satisfy the NDC and sufficient domestic demand.

In view of achieving both the 2030 CO_2 and air pollutants emission reduction targets, however, the gas development should be more aggressive. Chapter 5 indicates that a 3.5 times larger gas import is required to attain the targets, suggesting a conclusion of long-term natural gas purchase contracts with Russia for West Siberian pipeline.

A large import of gas resources, however, raises the issue of prices reform. On the one hand, the government has long offered a subsidized price to them and required energy suppliers to cross-subsidize to tame the potential repercussion of residential consumers against energy price hike. As long as carbon-energy pricing has regressive distributional impacts of both on urban and rural households, as analyzed in the chapter 6, complementary measures are required to avoid energy poverty, such as a differentiated carbon-energy pricing by type of fuel. On the other hand, such price regulations discourage both NOCs and downstream suppliers from investing in gas and infrastructure development. NOCs are reluctant to import gas at a high price, because it will fall them into deficit. This is a part of the reason China continues to negotiate Russia over the sales price even after the agreement on a 30 years natural gas purchase contract for East Siberian pipeline in May 2014 despite of eight years of negotiation (Romano, Yin and Zhang 2016). However, snail's progress in infrastructure development makes the coal ban and forced switch from coal to gas bring about disastrous results on residential and commercial consumers, as symbolized in the winter heating crisis in 2017.

2. China's trade and investment implications on energy exporting countries

To avoid intensifying the conflicts amid tightening CO_2 emission and air pollution control, the Chinese government restricts coal import, and encourages export and foreign direct investment (FDI) of energy and construction industries. These measures, however, had significant, but varied impacts on resource-rich countries. Our findings can be highlighted as follows.

First, most of the Asian-Pacific energy exporting countries suffers from the resource curse, but to a varied extent. The curse differs by the country's initial industrial and trade structures, diversification of trade partners, as well as type of major fuel for export: Countries with high specialization in the mineral sectors in industrial and trade structure, high trade dependency on China, high coal export and less preparedness against resource burst, went through deindustrialization and higher trade dependency on China. Countries that increased coal export to China are hit the most by China's recent revival of coal tariff and decrease in coal consumption, as shown in chapter 8. The curse is intensified by China's climate-energy policy that accelerates declines in energy demand and worsening terms of trade, as demonstrated in chapter 9.

Second, China's direct investment in energy resources has mixed results. It supported the coal export countries of Indonesia and Kazakhstan to redirect coal export for domestic power generation, providing an option to mitigate resource curse incurred by China's shrinking coal demand. While it serves to develop electricity infrastructure to mitigate the bottleneck of economic growth, it raise coal share in power generation and increased CO_2 emission. The investment also enabled Myanmar to consume electricity generated from its developed hydropower and gas field, but at the same time brought significant loss and deforestation of land, which increases CO_2 emission, reduces income for local producers filling regional demand through soil erosion, infertility and loss of biodiversity. The investments risks renewable resources in Myanmar into non-renewable for the benefit of China, as indicated in chapter 11.

3. The Future

The findings of this volume suggest that it is not until export and FDI in the energy and power sectors do not serve as a way of achieving domestic climate and environmental targets that China will seriously take measures to overcome the conflicts of interests among major stakeholders for the purpose of advancing energy transformation to achieve a low CO_2 emission development. Meantime, it continues to seek clear energy resources and outsource coal and hydropower in a way that can benefit partner countries to some extent. Contrary to the Washington Consensus that imposes specific reform package to recipient countries, China respects the non-interference principle and seeks win-win opportunities with them (Lin and Wang 2017). However, China's FDI and resource- or infrastructure-backed loans package can easily redirect the energy development pathway of partner countries toward a high CO_2 emission, as indicated in the two case studies chapters of Indonesia and Myanmar. China's "common fate and destination" model consisting of joint venture companies with host country and engineering, procurement and construction (EPC) contracts can entrench dependency on China and institutional lock-in coal-centered energy system, incapable of moving out toward a more sustainable pathway. Partner countries will welcome China's infrastructure finance for increasing access to affordable and reliable modern energy, regardless of the type of energy for the time being.

They also indicate that resource-rich countries will suffer from resource curse and unless they diversify industrial and trade structure, and trade partner, as well as develop institution that properly manage macroeconomic impact of resource boom to prepare the future burst. These measures are also essential to mitigate a risk of increasing dependency on China. Higher dependency accelerates their export and industrial specification into resources and primary goods with lower value added, making them more vulnerable to resource boom and burst.

However, diversification of already specialized industrial and trade structure imposes a far tougher challenge to them. China induced resource boom generated both technological and policy feedback effects, changing not only political costs and options (Jordan and Matt 2014), norms, policies, regulations and prevailing institutions (Verbong and Geels 2007) but also state capacities and institutions to affect later prospects for policy implementation, and interests, identity and political participation of large group of people to mobilize support (Pierson 1993). Such trajectory is hard to be shifted without strong driving forces against them.

Besides, resource-rich countries can hardly enjoy the same positive feedback effect that China did through the emergence of renewable energies. Except of few countries such as India, small domestic market disables domestic manufacturers from enjoying economies of scale to enhance market competitiveness. Feed-in-tariff can simply can simply invite Chinese manufacturers and developers that have gained competitiveness in the world market (OECD 2017). In addition, richness in energy has often enabled them to supply energy at a subsidized price. For fear of fierce opposition from the population, the governments tend to place price reform on the last priority. This blocks renewables to be competitive with conventional energy sources, providing rationale for justifying energy development plans that center on conventional energy.

One of the possible countermeasures is increasing energy connectivity. Regional connectivity can bring about regionally collective benefits, including: more stable national energy supply through an increase in resource diversity, higher efficiency through economies of scale and scope, higher share of renewables by enabling pooling of region's renewable energy resources, and lower environmental burden (UNESCAP 2016).

This option may work in the Association of Southeast Asian Nations (ASEAN) that is active in the regional interconnection. It initiates two flagship programs and energy cooperation action plan under which lists16 projects. In contrast, Central Asia inherits the inter-connection from the Soviet period, and is supported to implement major projects by China after independence. South Asia locates in the middle. On the one hand, the South Asia Electricity Transmission and Trade Project (CASA 1000) is ongoing backed by the World Bank and Asian Development Bank supports, with the aim of transferring surplus energy from Central Asian hydropower to South Asia. On the other hand, China backs energy development—both coal and renewables— and inter-connection projects in Pakistan under the China Pakistan Economic Corridor, with the aim of creating energy connectivity with China that enables China to avoid the Malacca Dilemma and mitigate energy insecurity that associate with increasing dependence on foreign sources.

Energy transformation toward a low CO_2 emission is not limited to a technological and infrastructural challenge such as high deployment of renewable energies, transformation of the electricity transmission network and management of the variability and uncertainty associated with wind and solar power. It entails a socio-technical transition, or a non-linear shift of the current energy regime and requires changes not only in regulations, market rules, designs, and the operation of networks and systems, but also a concept of energy security (Mitchell 2008; Verbong and Loorbach 2012). Market can generate a feedback effect for transformation, but it is only after clean energies become sufficiently competitive with the conventional energies. In the process, non-market drivers are indispensible because transition provokes hard-fought inter- and intra-scalar contestations between old and new institutions, agents and technologies, posing inherent limitations on rapid change (Smith and Raven 2012). Complementary measures have to be prepared to provide clean energies at an affordable price to ensure access to reliable, sustainable and modern energy for all, including residents who can hardly afford international price of energy.

It remains a future challenge to explore effective ways to minimize contestations to accelerate the transition not only in China but also in resource-rich countries that export energy, especially coal to China[1].

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[Note]

[1] Several works such as Delina (2017) and Mori (2018) are addressing this challenge.