

## China's Real Energy Crisis

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Skyrocketing Chinese energy consumption, surging world energy prices, a high-profile bid by the Chinese state oil company CNOOC to take over Unocal, and reports of catastrophic and growing environmental degradation in China – the latest involving a massive benzene spill on the Songhua River outside Harbin – are understood by many Americans as connected by a coherent logic. In that view, China, as a rising global power, is engaged in a purposeful, systematic, and centralized global quest for energy, pursued with ruthless determination and utter disregard for the ecological consequences.

In this essay we take issue with this prevailing wisdom. China has indeed emerged as a major factor in global energy and environmental matters, but not in the manner or for the reasons that many Americans believe. The real problem in China today, and the most important driver of the nation's energy and environmental footprint, is not geostrategic ambition, but rather a glaring deficit of governmental regulatory and administrative capacity. That is, the problem is not primarily one of appetite, ambition, state strategy, or active disregard, all of which are to some degree present in China, as they are in many nations. Rather, the real problem, overshadowing all the others and least recognized by outsiders, pertains to the Chinese system's inability to govern coherently.

In China, as in virtually any country, energy-related decisions – ones involving fuel choice, technology choice, infrastructure development, and environmental protection – are intensely political, involving the reconciliation of numerous and often conflicting interests and stakeholders. Over the last five years in China the number of societal actors having some say in these decisions – whether in the planning, financing, or implementation stages – has multiplied exponentially. Many of these actors embody the blurred distinctions between public and private and governmental and commercial characteristic of the Chinese system as a whole. What this means is that a host of individuals and organizations, from grassroots enterprises to central agencies, have all become players in the process – players that sometimes may be wearing a commercial “hat,” sometimes a societal “hat,” and sometimes a governmental regulatory “hat.” More often than not, the “hats” are worn simultaneously, inducing further confu-

sion, conflicts of interest, and challenges for coordination.

Yet as the number of decision makers has expanded, the relative scope and reach of ostensibly neutral, national level regulatory bodies has declined. Energy-related agencies at the central level today are severely understaffed and, for the most part, under-qualified, the bulk of their most talented personnel having moved into the more dynamic, quasi-commercial state energy corporations. Central agencies today are no longer up to the task of coordinating and sanctioning the myriad commercial, civil, and subordinate governmental actors involved in energy-related decision-making. Indeed, such agencies are generally far less well informed about the situation on the ground than the actors they are supposed to be monitoring and regulating.

Key decisions about China's physical and technological infrastructure are still being made. Unfortunately, despite their profound consequences for Chinese long-term energy development and global resource sustainability, these decisions are being made on an *ad hoc* basis primarily by grassroots actors with neither the incentive nor the ability to think about the “big picture.” What many outsiders take to be the deliberate result of Chinese national “energy strategy” is in fact better understood as an agglomeration of ad hoc decisions by local governments, local fuel and power producers, and local industrial concerns, few if any of whom have national interest in mind, and most of whom are rushing to fill a void left by the absence of national-level energy strategy. Amidst surging energy demand and frenetic local decision making, agencies and individuals in the central government are scrambling simply to keep abreast of developments on the ground.

### THE BIG PICTURE

While outsiders may misconstrue the drivers of China's energy posture, their sense of alarm is understandable. Chinese energy consumption is indeed growing rapidly, with worldwide ramifications. China is now the world's second largest consumer of petroleum products after the United States. Growth of the power sector has been even more dramatic. Total generating capacity grew by nearly one third in just the last three years. In effect,

the Chinese are adding the equivalent of nearly the entire UK power grid each year. Most of this generating capacity, both new and existing, is fueled with coal, and China's coal-fired power plants are the main cause of the rapid increase in its greenhouse gas emissions, now the world's second largest after the United States.

The extraordinary growth rates of the last few years probably aren't sustainable for much longer, but there is no doubt that even in the medium term Chinese energy demand will rise far above its current level. Private car ownership in China today stands at 10 million, or a little over 7 cars per 1000 people, far below the global average of 120 per thousand. Similarly, electricity consumption per capita in China, at about 1700 kilowatt hours per year, is only about 20% of the average per capita consumption in the advanced economies. In short, China's energy demand is certain to grow over the next few decades. Its consumption and imports of hydrocarbons will continue to increase, with major implications for the world market for oil and gas. Furthermore, its carbon dioxide emissions are fast approaching a level that, unless something is done to reduce them, will make it increasingly difficult for other countries to justify any effort to reduce theirs.

#### GOVERNANCE ON THE GROUND

*The Electric Power Sector.* Capacity expansion in China's electric power sector provides some of the clearest evidence of how energy-related decisions are actually being made. On paper, the story seems straightforward. Most power plants belong officially to one of five major state-owned national energy corporations, enterprise groups that in theory answer upward to the central government. This chain of command should mean that for a new power plant to be built, the state-owned parent must secure the necessary central government approvals and ensure that the new project meets relevant national operational standards.

Ambiguities in data concerning even just the size of China's electric power sector, however, suggest a more complex reality. As central government officials acknowledge, of the 440 gigawatts of generating capacity in place at the beginning of 2005, there were about 110 gigawatts of 'illegal' power plants, plants that never received construction approval by the responsible central government agency. These plants were obviously all financed, built,

and put into service, but nobody at the center can be sure under what terms or according to what standards.

The key to understanding how this could happen lies in the role of local government. In China today, localities in high growth industrialized regions like Zhejiang and Guangdong desperately need electricity in order to sustain economic growth, the primary metric upon which local governmental officials will be judged. Officials in these regions, long accustomed to operating in a bureaucratic system that for all its confusion has consistently emphasized the maximization of economic growth and consistently tolerated 'entrepreneurial' ways of achieving that goal, have stepped in to play key roles in power plant construction and operation. In general in China, the bulk of financing for new power projects comes from two channels: loans from state banks, and equity investments from municipal or provincial energy development corporations. Local officials effectively control both channels. In the case of bank loans, the funds are extended by branch-level banking officials whose



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job tenure and career trajectory depend far more on local governmental support than on compliance with orders from the bank headquarters. In the case of energy development corporations, local officials directly control these quasi-commercial agencies, and frequently fund them through various fees and informal taxes levied at the local level.

Thus, regardless of formal ownership ties running up to the center, power plants built for the urgent purpose of meeting local demand are often built with locally controlled financing. It should not be surprising, then, to find municipal governments providing construction approval to get the plants online as quickly as possible, while simultaneously shielding them from the need for further approvals from the center that might well require stricter technical, environmental, or fuel standards. The fact that 110 gigawatts of installed capacity is "illegal" means neither that the plants are hidden in a closet nor that they lack any governmental oversight. What it does mean is that they are not part of a coherent national policy, that they frequently operate outside national standards, and that they often evade control even by their ostensible owner at the national corporate level.

*Environmental Regulation.* This pattern of de facto local control also characterizes the administration of environmental regulation, particularly with respect to implementation and enforcement. Environmental policy at the national level is primarily, though by no means exclusively, the responsibility of the State Environmental Protection Agency (SEPA), a relatively weak organization, though one that has been gaining authority recently (that said, its director was forced to resign in the wake of the recent benzene spill on Heilongjiang's Songhua River). But implementation and enforcement come under the authority of provincial and municipal-level arms of SEPA, local agencies whose personnel and budgetary affairs are for the most part thoroughly divorced from the central ministry. If the locality's main goal is to achieve economic growth, and cheap electric power is needed to fuel that growth, then environmental enforcement will play a secondary role, a situation undoubtedly related to the initial Songhua River chemical spill and the subsequent effort to cover up that spill. Local environmental officials who take a different view are likely to run into career difficulties. Moreover, budget allocations for local environmental bureaus are exceedingly tight. To keep up staffing levels and ensure that their employees are paid, they must rely either on the collection of local pollution emission fees or on handouts from the local government. In practice, this translates into incentives for local environmental regulators either to allow emitters to pollute (as long as they compensate the local SEPA office with the payment of emission fees) or to accept payment from the local government in return for ignoring emissions entirely.

*"Self Help" by Major Energy Consumers.* In the fastest-growing and most power hungry areas of China, major commercial consumers of energy, namely industrial plants and other manufacturing concerns, frequently solve their problems by becoming energy producers themselves. In provinces like Guangdong and Zhejiang, major industrial cities have grown up out of what only recently were still small towns or villages. As infrastructure expansion has lagged the accelerating pace of commercial activity, large numbers of manufacturers have been installing their own diesel-fired generators. The diesel fuel may be expensive, and the electricity often more costly than from a large coal-fired power plant, but the factories have little choice. Many are tightly integrated into global production networks and are scrambling to meet overseas demand for their products. They simply cannot afford to shut down for lack of power. China is now the world's largest market for industrial diesel generators, and the country's consumption of diesel fuel, much of it produced from imported crude, has climbed substantially. Generator manufacturers estimate that ten percent of China's total electric power consumption is supplied by these "within-the-fence" units. Local officials have generally tolerated and in some cases have actively supported such solutions, and

environmental regulation of these diesel generators has lagged behind that of central station power plants.

#### **THE PATH FORWARD: A COAL FUTURE OR AN OIL AND GAS FUTURE?**

The complicated, fragmented governance of China's energy sector is today having – and will continue to have – major bearing on one of the most important aspects of its future development: the relative roles of coal, on the one hand, and oil and natural gas, on the other. In China, as in the world as a whole, fossil fuels will dominate the supply side for the foreseeable future. (China's ambitious plans for nuclear power underscore this point. If these plans come to fruition, more nuclear plants will be built in China over the next two decades than in all other countries combined. But even then, nuclear energy will still only provide about 4% of China's electricity; fossil-fired plants will account for much of the rest.) The question of what type of fossil fuel, however, is an exceedingly important one, involving complicated trade-offs between issues as varied as global climate change, energy security, and global resource competition.

One possibility for the future would entail China's remaining heavily dependent on coal for electric power, industrial heat, chemical feedstocks, and increasingly, transportation fuels. Doing so would afford China greater energy autonomy, given the nation's extensive coal resources, while also reducing Chinese pressure on world oil and gas markets – something that Americans might find appealing. The heavy coal use scenario, though, would also involve substantially elevated local and global environmental costs, something that neither Chinese nor outsiders find appealing. It would certainly be bad news for anybody concerned about carbon dioxide emissions and global climate change.

An alternative possibility would entail China's following along the well-trod path of every country that has preceded it up the economic development ladder, rapidly shifting from reliance on solid fuels towards oil and gas, with gas playing an increasingly important role in electric power generation, in industrial and residential heating, and potentially also in transportation. This would undoubtedly have environmental merits. A modern gas-fired electric power plant is not only cleaner than its coal-fired counterpart; it emits 70% less carbon dioxide per unit of electrical output. A petroleum-based transportation system emits only about half as much carbon dioxide per barrel as it would if the liquid fuels were produced from coal. Yet, the high oil and gas scenario would also force China, with few resources of its own, to compete ever more aggressively for access to them around the world.

Much is riding on which of these scenarios China will choose. Outsiders, of course, in ruling China's growing contribution to global climate change while simulta-

neously condemning China's commercial entities for sourcing cleaner liquid fuels from abroad, suffer their own inconsistencies of logic. The outside world has come to no clear consensus as to how China should proceed; some rue the rapidly growing contribution of China's coal industry to global climate change, while others express alarm over the efforts of China's commercial entities to source cleaner liquid fuels from abroad. More important, China itself has come to no clear consensus, and indeed lacks the governmental capacity needed to achieve such consensus. Instead, individual actors, organizations, and regions are rushing forward with their own solutions, pushing the nation down a variety of paths for which nobody can discern the ultimate outcome.

Many municipalities are simply building conventional coal-fired power plants as fast as they can, often with sub-par environmental controls. While they are willing to import coal from the poorer inland provinces, they are not willing to invest in the large-scale infrastructure that would make them dependent on electricity generated in those interior regions. They are certainly not willing to invest in more environmentally sustainable, large-scale "clean coal" projects that would locate the business of power generation – and all the concomitant commercial returns – beyond their own geographic jurisdiction. It is commonly observed that in China everybody wants to generate power, and nobody wants to rely on others for it.

Meanwhile, more developed provinces like Zhejiang and Guangdong, or provincial-level municipalities like Shanghai, struggling to provide adequate power supplies but also facing growing demands by an increasingly sophisticated public for a better environment, recognize the need for more sustainable approaches. However, these wealthier regions are investing not in clean coal, but rather in a burgeoning natural gas infrastructure, based mainly on liquefied natural gas (LNG) imports. In this, their interests coincide with those of the state petroleum companies, which have become significant investors in – and builders of – the infrastructure of port facilities, terminals, LNG regasification plants, pipelines and power plants, frequently partnering in these projects with the energy development arms of the municipalities and provinces. Since the viability of these investments depends on the availability of natural gas, the state petroleum companies have recently been focusing their overseas acquisition activities at least as much on gas as on oil. In effect, commercial and quasi-commercial interests at the local and national levels – almost always in cooperation with international investors – are moving China's coastal regions, if not China as a whole, down a natural gas-intensive path.

## CONCLUSIONS

In light of this fragmented system of governance, what can outsiders expect of China in those aspects of its energy development that matter most to us?

First, we should recognize that the Chinese government's capacity to achieve targets for reducing hydrocarbon consumption or pollutant releases, or Kyoto-like limits on greenhouse gas emissions, is in practice quite limited. China's national leadership may eventually be prepared to enter into such agreements, but if so those undertakings should be understood primarily as aspirational. China's system of energy-related governance makes the fulfillment of international commitments

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problematic. Nevertheless, those commitments – in a fashion akin to WTO accession on the commercial and trade side – can be important sources of domestic leverage for leaders seeking to strengthen internal governance in the long run.

Second, the authoritarian nature of the Chinese state does not mean that the state itself is internally coherent or effectively coordinated. This is all the more true with regard to energy. As a practical matter, the number of actors exercising de facto decision-making power over energy outcomes in China is large, and they are not exclusively confined within China's borders. We should not reflexively invest the actions of even state-owned Chinese energy entities with geostrategic intent. Nor should we assume that China's energy posture at any given time reflects a rationale plan or coherent thinking on the part of political leaders.

Finally, while the developmental trajectory that China is following has many unique aspects, we should not delude ourselves into thinking that somehow China has escaped the dilemmas that we ourselves face in the energy arena. Energy-related decision-making in China – whether pertaining to environmental regulation, fuel pricing, technology standards, or infrastructure development – is intensely political, just as it is in most other nations. Such decisions in China, as elsewhere, involve many stakeholders, and often put commercial interests in close proximity to governmental ones. Energy-related decision-making in China – regardless of its impact on issues as portentous as global climate change, international resource competition, and national security – frequently proceeds through decidedly non-rational processes. In essence, we must recognize that China's energy system is in its own way at least as politically complex, fractured and unwieldy as our own.

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