



PAKISTAN'S ENERGY CRISIS

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ABOUT THE REPORT

Pakistan has an acute energy problem that requires increased domestic attention to the problem and pursuit of regional solutions, both to benefit Pakistan and to prevent this problem from being a source of domestic and international conflict. This report provides an overview of some of the key problems facing Pakistan's energy sector, considers some of the solutions that the government is pursuing, and then concludes with a look at what benefits Pakistan could achieve by pursuing greater engagement in regional and bilateral energy relations.

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[How Pakistan pursues its regional energy options . . . will either increase potentially destabilizing geopolitical competition among regional actors or contribute to new collaboration, strengthening regional ties.]

Summary

- Pakistan has an acute energy crisis that it cannot resolve domestically—at least not in the near term—placing the onus on greater regional cooperation for addressing the situation.
- This crisis reflects years of underinvestment, partly implemented reforms, and bureaucratic overlap and infighting. The government has taken steps to address the problem, but a far more comprehensive package of solutions is required—one that must be enacted with greater political will than yet displayed.
- Pakistan has various regional energy options it can pursue. These are not mutually exclusive and could, for example, see Pakistan develop as both an energy hub and a corridor, taking advantage of its geographic position as a crossroads to and between so many countries.
- Unfortunately, many of the regional solutions available, while boosting the prospects for Pakistan on one hand, undermine it on the other. Thus, Pakistan is faced with difficult choices, with every avenue that appears to offer a new energy source also having a major downside.
- At present, Pakistan is not well placed to transform itself. It is in a fiscally fragile position and politically charged as it heads into an election cycle. Its security situation is poor, and social unrest in the country is unusually high. Relations with regional neighbors such as Afghanistan and India remain problematic, and its global standing is poor.
- Ultimately, Pakistan must prove it is a worthy ally to the key players in the region. As battered and bruised as it is, Pakistan needs to overcome past experiences and recreate itself as a dependable, trustworthy partner.
- Regional frameworks are in place that could be far better employed to serve Pakistan's interests. These include the South Asian Association for Regional Cooperation (SAARC) and the Economic Cooperation Organization (ECO), both of which need to be developed with a focus on energy and development.
- In the long term, mutual energy need may help dissipate traditional divisions between countries. This is certainly the best-case scenario for Pakistan, and one that curtails the gain-and-loss pattern of its current energy relationships.

Introduction

Pakistan is suffering from an acute energy crisis. The country's generating capacity falls well below demand, and its available domestic energy supplies are dwindling. As a result, Pakistan must pay increasing amounts for expensive energy imports. The energy crisis is a complex, long-running, and multifaceted problem, with several possible solutions. For the economist, it is primarily a circular debt issue.¹ For the political watcher, it is an issue of absent political will. For the aid organization specialist, it is a governance problem. For the engineer, it is a matter of resolving technical problems, improving energy conservation, and addressing issues like theft and nonpayment of electricity bills. All these viewpoints are valid, and such solutions would go some way toward addressing the problem. But adding an additional layer to an already complicated situation, Pakistan's energy crisis is in part linked to the geopolitics of its neighborhood. For some observers, pipeline politics and access to resources have the potential to have a significant impact on the tenor of a number of Pakistan's international relationships—in the case of India, quite possibly in a positive direction. For others, these geopolitical realities, when coupled with the domestically destabilizing political and socio-economic effects of the power riots to which Pakistan is prone, point to Pakistan's energy challenges as a possible source of regional conflict.

It is clear that a caucus in Pakistan fully understands the extent of the issue: various high-level committees over the years have astutely identified the problems and solutions, but there is a repeat failure to translate this into policy action. Pakistan needs to attack the problems from all angles. Some challenges require political will, while others require significant financing. Estimates of how long it will take Pakistan to tackle the major problems vary considerably. An Asian Development Bank (ADB) report, published in 2010, argued that with swift action Pakistan could be on the right energy trajectory within three years.² In the opinion of others, Pakistan needs to get through its election year before bold but unpopular decisions required to reform the power sector can be taken.³ With elections scheduled for 2013, the potential for action is delayed until months into 2013 at the earliest. For others still skeptical that any future government will focus on energy, the time horizon runs into a decade, possibly longer.

For Pakistanis facing no relief from the searing heat of summer months, nor from the damp cold of winter, and for an economy affected by a rising energy-import burden, with a drop-off in domestic industrial activity as a result of daily power outages, all of these time frames are too long. How Pakistan pursues its regional energy options to address these domestic challenges, and how the world chooses to respond to these decisions, will either increase potentially destabilizing geopolitical competition among regional actors or contribute to new collaboration, strengthening regional ties. Given this potential, energy politics are intrinsically linked to the future stability of South Asia.

This report provides an overview of some of the key problems facing the energy sector, considers some of the solutions—short-, medium-, and long-term—that the government is pursuing, and then concludes with a look at what benefits Pakistan could achieve by pursuing greater engagement in regional and bilateral energy relations. The latter is often overlooked when discussing Pakistan's energy problems, with the onus typically placed on domestic solutions.

The Problem

It is not in the scope of this report to examine the technical strands of Pakistan's energy problems. Rather, the focus is on mapping out the broad issues. First, however, some context to the energy crisis is required.

Pakistan does not produce enough energy to meet demand. As a result, it currently has an electricity shortfall of approximately 5,000 megawatts (MW) per day.⁴ Pakistan's energy shortfall reflects years of underinvestment and partly implemented reforms, resulting in a situation where power consumption has risen 80 percent, with supply failing to maintain this pace.⁵ It is likely that this situation will only deteriorate. It is often forgotten in all the talk of outages and energy shortfalls that around 30 percent of the population does not have access to grid electricity, with around one-third of the population meeting its energy needs through noncommercial sources. As more of these people seek access to grid electricity, demand will only increase.

According to the Pakistan government, power shortages are estimated to cost the economy 2 percent of its GDP each year, although some observers have suggested the figure is higher.⁶ Major shortfalls were in evidence in 2011, with even some urban areas, which typically avoid lengthy periods of load-shedding—or scheduled power outages—suffering fourteen to eighteen hours without power per day by October, with this figure rising to twenty-two hours in some other areas.⁷ The government has previously estimated that approximately \$10 billion is required to meet the country's immediate energy needs, and at least twice this is needed for its longer-term energy plans.⁸

Domestic energy supplies are dwindling. Currently, Pakistan has a gas supply shortage of approximately 20 percent.⁹ Natural gas supplies fell 33 percent in 2010 when compared with figures from 2009. This situation prompted the government in December 2011 to announce gas rationing in an attempt to counter the deficit.¹⁰ Domestic oil and gas supplies are forecast to be exhausted by 2025 and 2030 respectively.¹¹ Already Pakistan imports around 30 percent of its energy supplies (mainly from Iran).¹² The *ADB's Integrated Energy Sector Recovery Report and Plan* for Pakistan has suggested that in 2008–9 energy imports totaled more than \$10 billion, which it argued could rise to as much as \$38 billion by 2015–16 if there is a failure to take action to increase indigenous resources.¹³ It has been suggested that given the difficulties Pakistan faces in developing indigenous energy sources, its import tally may rise to more than 75 percent of the energy mix by 2025.¹⁴

Adding to the problem is the fact that Pakistan has long subsidized fuel costs to lessen the burden on the population. As energy costs have risen, this has proved to be a costly policy. In December 2011, Finance Minister Abdul Hafeez Sheikh revealed that the country had paid one trillion Pakistani rupees (PKR) in subsidies and financing to offset the losses of state-run power companies in the past four years.¹⁵

More broadly, the impact on the economy has been wide-ranging. The State Bank of Pakistan (SBP), the country's central bank, has warned that the government needs to address deteriorating business conditions. It views the country's energy problems as being the most serious of these.¹⁶ Most obviously, a lack of power has hobbled industry, particularly the energy-intensive textile sector that is the backbone of the country's exports. At the same time, an increase in power tariffs has undermined manufacturing by raising costs. The shortages also affect services. The rail industry has reduced the number of routes it offers and has even threatened to stop trains as a result of fuel shortages. Gas shortages have prompted a rise in oil imports, which in turn has both increased inflationary pressures (already rising as a result of the dismantling of fuel tariffs and the subsequent passing on of costs) and placed added strain on the budget deficit. As for employment, it is estimated that 4.1 million jobs and employment opportunities have been lost since 2008 due to the country's energy problems, roughly 7.5 percent of the workforce.¹⁷

Notably, the government's energy performance has only fallen in the face of a deteriorating situation. In July 2009, a Gallup poll found that 53 percent of the population was

Domestic oil and gas supplies are forecast to be exhausted by 2025 and 2030 respectively.

without electricity for more than eight hours daily.¹⁸ Since then, the electricity shortfall has increased countrywide by 42 percent, with power outages rising sharply.¹⁹

The Causes

Many factors have fed into the problems Pakistan faces today. They include the following.

Circular Debt

Circular debt is regarded as one of Pakistan's major energy policy problems.²⁰ The problem began when the government pledged to compensate energy companies with subsidies in the face of higher costs rather than allow them to increase prices, but subsidies then went unpaid. As a result, energy companies have borrowed to make their payments, with many now reaching a point where they cannot afford to borrow further. As a result, with energy companies unable to pay fuel suppliers, fuel supplies have been curtailed, or worse still, halted, which in turn means that power companies have insufficient supplies to run their plants, reducing generating capacity.²¹

A Lack of Investment

The energy sector suffers from years of underfunding. Attempts to attract private sector involvement (particularly through privatization) have met with little success in recent years, a situation that current financing constraints (resulting from the fragility of the global economy and domestic fiscal problems) only exacerbate. As a result of underfunding, existing infrastructure is in need of repair and refurbishment, while plans for new plants and equipment are either put on hold or delayed. Much effort needs to be focused on upgrading and replacing aging equipment. Transmission and distribution losses are high, and the average thermal efficiency of power plants needs to be increased.²²

Reform and Governance Issues

Pakistan has a national energy policy, but it is unresponsive, only partially implemented- implementable, and at the mercy of competing bureaucratic interests. Overall, the sector is poorly managed, exhibiting considerable institutional overlap and poor capacity, a situation that has become more evident as the energy situation has deteriorated. Six ministries and forty-two agencies are involved in Pakistan's energy policymaking and provision. Successive administrations have added task forces, created special adviser posts, and one-off commissions.²³

Earlier reform measures, particularly from the 1990s, were only partially implemented. Reforms, such as privatization, need to be reconsidered, and a more enabling environment for reform created through areas like regulatory improvement and enhanced security for investors, their personnel, and assets.

Cultural Change

Pakistan finds itself in the odd position of having low energy prices, and high levels of non-payment. It is estimated that just 1 percent of the population pay for electricity. Power theft is rampant, and unpaid bill losses are huge. The national power company, Pakistan Electric Power Company (Pepco), is reported to have seen collected revenue fall in 2010–11, losing a staggering \$1 billion in unpaid bills.²⁴ Yet the government subsidized natural gas at a cost of \$3.5 billion over the same period.²⁵

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Security Issues

Pakistan suffers from two types of security problems when it comes to energy development: the broad, big-ticket security issues, like terrorism, and localized threats emanating from very specific grievances. It is unfortunate that the country's energy resources are located in challenging locations—either in terms of the security situation or available infrastructure. Much of the country's known gas reserves are found in the restive province of Balochistan, with oil deposits located in the troubled Khyber Pakhtunkhwa (KPK) province. The Thar desert in Sindh holds great potential in terms of coal reserves, but these have yet to be exploited. The army's activities against militants in and around Pakistan's border areas with Afghanistan are well documented, and the unrest in the region acts as an obvious deterrent to all but the hardiest of investors.

In Balochistan, a long-running, low-level tribal-separatist-nationalist insurgency undermines the security outlook, complicated by a hostile reaction from the state's security apparatus. This not only undermines the security of the area where energy supplies are located but also contributes to frequent attacks on energy infrastructure. Even where the outlook should be brighter, localized threats can and have emerged. There have previously been several bomb and gun attacks as well as kidnappings of foreign workers operating in the energy industry. Chinese and French engineers working in the port area of Gwadar, as well as interior Balochistan, have been targeted, and several killed.

Federal-Provincial Tensions

The federal and state (provincial) governments need to work together on the energy issue given their overlapping remit, but there are numerous instances of tensions and deliberate impediments to policy progress from one side or another. Currently, this manifests itself most obviously in the tensions between the central government, and its policy plans, and Punjab's opposition-run administration. Indicative of this, October 2011 saw Punjab's government reveal that it would not follow federal government plans to impose two weekly holidays in a bid to conserve energy.²⁶

A longer-running and serious issue is provincial opposition to federal plans in areas like hydroelectricity development. This routinely sees Sindh and KPK in particular oppose large hydroelectric schemes on the basis of their negative effects, including displacement and drop-off or silting up of local water resources. Past assurances of compensation for losses connected to displacement have not been fully actualized, aggravating the sense of mistrust and injustice.

Tensions also exist elsewhere. The constitution gives provincial governments full authority to exploit mineral rights. Most, however, lack the resources and expertise to develop sectors like coal, but resent federal government moves to do so, often finding themselves insufficiently compensated. This, in turn, can foment further unrest, creating a cycle of problems. The dynamic has been on display for some time in Balochistan where federal-provincial tensions over energy resource distribution are most acute.²⁷

Bilateral and Regional Tensions

For Pakistan to enjoy long-term energy security, a strong foundation of trust with its regional and international partners needs to be built. Nationalist politicking at other countries' expense and foolhardy activities that unsettle relations are not going to achieve this.²⁸ Pakistan needs regional-international buy-in to its plans, given that true energy security will have to be both national and regional.

Possible Solutions

Pakistan's current government came to power in 2008 aware of the large and wide-ranging power problems but has failed to tackle the issue head-on. Although some steps have been taken, many face obstacles to implementation, and more broadly, the government is regarded as having taken too little action.

To date, it has hosted a number of high-level talks, out of which short-term energy saving measures have emerged; sought to give a swifter boost to generating capacity through the acquisition of rental power plants (RPPs); created a draft petroleum policy²⁹; and sought to address the issue of tariffs, pledging to increase them by 2 percent monthly until the cost of service has been fully recovered.³⁰ Attempts have been made to address the issue of circular debt, through which the government set up a debt-holding company, Power Holding Ltd, with the aim of transferring PKR 302 billion from energy companies' balance sheets.³¹ Finally, attention has also been directed toward implementing programs to rehabilitate and upgrade transmission and distribution systems, in an attempt to reduce commercial losses.

Short Term

Establish rental power plants. In the short term the focus is on boosting generating capacity as quickly as possible. In this respect, RPPs appear to offer a good and, importantly, swift solution to Pakistan's immediate energy needs. Whereas independent power plants take three to five years to come online, RPPs take just six to eight months with payment spread over three to five years. In August 2009, the cabinet approved installation of fourteen RPPs to generate 1,500 megawatts of power. Notably, the ADB, which the government asked to analyze the usage of RPPs, concluded that the scheme should be supported, but that just eight RPPs should be developed.

In reality, generating capacity has not come online as swiftly as had been anticipated. Some observers have argued that greater attention should be paid to upgrading existing facilities, which itself would help address a significant percentage of the generating shortfall. The SBP, in its annual report, argued that the government's interest in RPPs was misplaced, and instead, attention should have been focused on resolving the circular debt problem. Corruption has also entered the equation, with the former water and power minister accused of mishandling the award of contracts. The situation has slowed policy implementation, and the Ministry and Water and Power's actions have allegedly resulted in Pakistan receiving aged generating equipment from suppliers.

Curtail losses. Ending circular debt would undoubtedly be costly, but it would reap great benefits. Most obviously, it would increase the funds available to power generators, which in turn could then pay their fuel suppliers, ensuring that plants could operate at greater capacity. This single act would be the quickest means to increase power generation.

Dismantling fuel subsidies is another area that is receiving attention. The government spent PKR 395 billion on subsidies in the 2010–11 fiscal year, 75 percent of which went toward subsidizing power consumption.³² The government has taken some steps to take apart the subsidy structure, but concurrent price increases for the consumer means that this is a highly unpopular policy, and one that is consequently being pursued incrementally. There is external pressure on the government to move more swiftly. In January 2011, the International Monetary Fund warned the government that its energy policy was "inefficient and untargeted," pointing out that large companies and the wealthy were taking advantage of the subsidy structure, leaving poorer sections of society no better off.³³

Table 1. Transmission and distribution losses (public utilities) by year, in gigawatt hours

Year	Gigawatt Hours
2005–06	22,506
2006–07	21,912
2007–08	18,742
2008–09	19,396
2009–10	18,957

Source: Ministry of Petroleum and Natural Resources, *Pakistan Energy Yearbook 2010* (Islamabad, 2011), 95.

Furthermore, the cost of subsidies weighs heavily on the economy, and by keeping prices of fuels like gas low, it makes introducing imports into the market difficult, because they will naturally be priced higher. Low domestic prices are also creating a disincentive to exploit new resources, either domestically or from abroad, even though demand far outweighs supply. Signaling the difficulty of dismantling subsidies, the government has deferred decisions over price hikes.

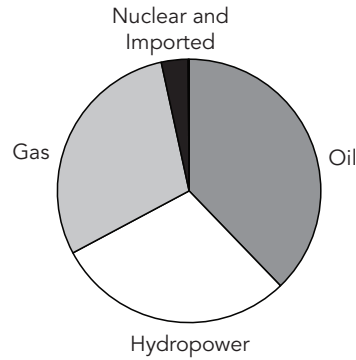
A slightly longer-term but equally effective move at countering losses is to curtail transmission and distribution losses. There has been some improvement in transmission and distribution loss figures over the past few years, but it has been slow and had variable annual results (see table 1). Further efforts require focus on the upgrade of existing equipment, and some replacement with new equipment. Attention to the energy assets Pakistan already has would be another means to boost generating capacity, but even this option falls afoul of hostile politics. This would also come at a relatively low cost, certainly smaller than building new power plants. Plus, it is relatively straightforward to source the materials and technical capacity needed to pursue this sort of program.

Associated with curtailing losses is the need to change the cultural mindset, and have consumers understand that they need to pay for electricity. In the 2010–11 fiscal year, the government paid PKR 82 billion to cover the costs of nonpayment of bills, theft, and transmission losses.³⁴ Changing attitudes is difficult for any government, but all the more so given Pakistan's high poverty levels, and the rising cost of fuels. Again, however, by improving their revenues, electricity companies would have greater funds at their disposal both to pay their suppliers and also to invest in upgrading and purchasing new equipment.

Medium Term

Effect major policy change. There is some sense that Pakistan's leaders appreciate the need for policy change, but to date, progress has been lacking. Topping the policy priorities is the need for a meaningful, well-constructed energy plan implemented in full. It should not be underestimated just how difficult this will be for Pakistan. Such a plan is, however, essential to setting the country on a path to short- and long-term energy security. Attempts to formulate a comprehensive, single plan have so far largely failed. It had been envisaged that the country's Integrated Energy Plan 2009–2022 would produce an approved energy plan that would help drive policy forward, but this has not materialized.

Instead, attempts to change policy have been piecemeal, manifesting themselves in amendments to policy in areas like coal extraction and petroleum policy. Many aspects of the policy agenda require attention. One such policy area previously neglected is

Figure 1. Electricity Generated by Source

Source: "Electricity Generation by Source," in *Pakistan Energy Yearbook 2010*, 88.

Pakistan could make swift and major energy savings by simply better conserving its energy supplies and making construction more energy efficient.

energy efficiency standards. Pakistan could make swift and major energy savings by simply better conserving its energy supplies and making construction more energy efficient. No such standards exist for new buildings, and yet this would constitute a relatively straightforward and cost-effective step toward conserving energy. In addition, the international community would support such standards, ensuring Pakistan would receive the technical expertise and required capacity to effect change.

Long Term

Pakistan's skewed energy mix has created some of the problems the energy sector now faces. There is talk about diversifying the composition of the country's energy mix, with the government focusing on gas, renewables, and, to a lesser extent, coal. Change is necessary given the fiscal toll of energy imports and dwindling domestic energy supplies,³⁵ but it is not an overnight process and there are many factors to consider. In terms of generation capacity, in 2009–10, the country generated 95,608 gigawatt hours of electricity (see figure 1).

Gas. Pakistan has exploited its gas reserves, which partially explains why gas is such a large element in its energy mix. When gas was first discovered there in the 1950s, Pakistan believed it had a virtually inexhaustible supply and directed much of its attention to developing the gas sector, with the aim of using it as a bridge while it developed other forms of energy generation, such as hydro. The government has remained keen to increase domestic gas production, regarding it as the country's fuel of choice. Underlining this has been the phenomenal growth of liquified natural gas usage in Pakistan, which now boasts the world's largest number of gas-fueled cars.³⁶ More recently, however, there have been signs that the government is looking to scale back gas usage in favor of developing renewables.

This is, in part, presaged on the fact that known domestic gas supplies are dwindling. It is estimated that by 2020 one of the country's largest gas fields, at Sui (Balochistan), will be depleted.³⁷ Although anecdotal evidence suggests that Pakistan has further potentially extensive untapped reserves,³⁸ security problems and pricing that fails to reflect market value deter the exploration required to identify and exploit further reserves. Added to this, widespread flooding in 2010 damaged parts of the gas infrastructure. The largest field at Qadirpur, Sindh, which produces around one-quarter of the country's total output, was forced to halt production. Although reports suggest that flood-damaged gas infrastructure has been repaired, the situation highlighted an unforeseen vulnerability.

For now, the focus is on developing external sources of gas from neighbors such as Iran. If, however, Pakistan worked on issues like tackling security threats and improving well-head pricing, renewed activity in the sector may prompt a raft of new gas discoveries.

Oil. Given that Pakistan's oil reserves are small and not particularly viable given issues of security and accessibility, it imports around 80 percent of the oil it uses.³⁹ Historically this has not been much of an issue, although the 1970s oil hike should have signaled the potential for problems. Friendly relations with Gulf States have supported the practice, but as prices have risen, Pakistan's import bill has spiraled. Attempts have been made to attract investment into the sector, but this has proved to be a challenging process given such diverse obstacles as complex regulation and serious security issues. Furthermore, while other fuel sources are heavily subsidized, there is little incentive for exploration. As a result, Pakistan will make little progress in developing domestic oil exploitation.

Nuclear. Pakistan's civil and military nuclear programs have been the subject of many column inches and much policy discussion in recent years. In terms of the energy mix, there is little to write about: it is minimal, contributing just over 1 percent to the energy mix.

During the 1970s Pakistan's civil nuclear ambitions were sizeable, with policymakers regarding this as the future source of much of the country's power. In context, this came during a decade of oil price turbulence, with nuclear energy seemingly offering a clean, long-term source of power generation. This ignored the massive upfront capital costs to a country that did not have the fiscal means to pursue such a program.

Since 1986, China has formally supported Pakistan's nuclear power generation program. To date, the country has three nuclear power plants, the 300MW Chashma 1 and Chashma 2, and the 125MW Kanupp. Two additional reactors are in development, with the 340MW (each) Chashma 3 and 4, the completion of which is expected in 2016–17.

Pakistan is a nonsignatory to the Nuclear Non-Proliferation Treaty, and it has faced international sanctions on the supply of nuclear materials since it tested nuclear weapons in 1998. This has stymied the sector's development, but not stopped the government from expressing its interest in increasing nuclear power generation. The government has argued the need for nuclear energy as part of a green—and growth—agenda and used the United States' civilian nuclear agreement with India to try to secure a similar deal. During 2010, speculation suggested that this was a possibility, but given the deterioration in relations between the United States and Pakistan over the course of 2011, such a deal can now be wholly discounted.

A reported increase in production in Pakistani nuclear warheads has fueled fears that nuclear supplies will be funneled away from civilian energy programs and into weaponry,⁴⁰ even though Pakistan has kept its two programs separated to date. Events at Japan's tsunami-stricken Fukushima-Daichi reactor have thrown into question both the overall safety of both aged nuclear-power-generating equipment and the use of nuclear technology in earthquake-prone regions, such as the one in which Pakistan lies. Beyond this, persistent doubts remain over the extent of threat to the program from extremist elements, especially given Pakistan's history as a major source of proliferation through the work of AQ Khan, the architect of Pakistan's nuclear program.

These problems and the continued obstacles Pakistan will face in sourcing nuclear material and supplies suggest that this sector looks set to fall far short of government goals and has limited prospects for significant growth.

Hydroelectricity. In the postindependence period, hydro accounted for much of the country's power generation. It would appear to be the energy of choice for Pakistan: the country

has considerable hydro potential—estimated at 46,000MW.⁴¹ Hydro is also a relatively cheap option once the upfront capital is taken out of the equation, offering low generating costs.

There are, however, several major downsides to hydro, and Pakistan's hydro schemes have a history of problems. Hydro requires significant investment, which ensures that Pakistan needs support from donors or partners like China. The scale of many of the projects has resulted in political controversy and corruption. On a provincial level, conflicts have repeatedly stalled projects as the provinces have quarreled over water and power resources and been faced with location-specific problems such as population displacement. Federal-provincial and interprovincial tensions require particular attention, but if political settlement can be achieved, a major domestic obstacle to hydropower development would be removed.

Construction costs are high, and generating potential is unpredictable: seasons typically affect the amount of power generated and silting in major rivers poses an ongoing problem. Inevitably, when need peaks, generating capacity is low as a result of limited rainfall. Added to this, government policy that has subsidized electricity prices has undermined the financial viability of these sorts of capital-intensive schemes.

New projects need to address all these issues. That said, hydropower enjoys government backing and renewed support from the donor community as evidenced by the backing that the 4,500MW Diamer-Bhasha dam has attracted, with the ADB as the lead financier. This is all the more appealing given the green credentials of hydro, ticking the boxes of both helping meeting Pakistan's energy needs through domestic means and better managing rising emissions.

Coal. Reflecting the emphasis on gas and oil for power generation, Pakistan has just one coal-based power plant, and yet the country has an estimated 175 billion tons of coal reserves.⁴² To put this another way, it is estimated that Pakistan's coal beds have the potential to produce 100,000MW for three hundred years. The problem has always been, and to a large extent remains, viable extraction. The reserves are located in the Thar desert in Sindh and are of low quality. Until recent years, with plentiful supplies of gas and relatively low-priced oil, there was no economic reason to pursue mining, and the coal's quality made it unsellable to foreign buyers. Increasingly, however, extracting coal makes a lot more sense for Pakistan. Doing so would provide a domestic and, therefore, relatively cheap source of fuel, and any excess coal (or, in time, excess electricity generated from the coal) could be exported to neighboring countries, most notably India.

Fiscal pressures have prompted a rethink at both the federal and provincial level toward Pakistan's Thar desert reserves. The provincial government is reportedly aiming to develop ten blocks there for the production of 20,000MW by 2030, and in July 2011 the government pledged the release of PKR 900 million for a Thar coal-gasification project.⁴³ It is envisaged that this will initially produce 100MW of electricity from the conversion of coal into gas. It currently appears that the government is more interested in this smaller-scale option than the larger, and far costlier, exploitation of Thar's coal reserves.

Given the sector's underdevelopment, a lot of work is needed related to the regulatory and legislative regime. Investment has typically been deterred as a result of basic problems, such as the lack of an up-front tariff price for coal and legislative inconsistencies. Steps are being taken to address these concerns: the Thar Coal and Energy Board constituted a committee to prepare a formula for determining a coal price based on international best practices, and the Sindh Coal Act is in draft form. More wide-ranging, encompassing action is required to instill investor confidence. For example, in 2010 the World Bank withdrew

its support for the Thar Coal and Power Technical Assistance Project (designed to produce 3,000 to 5,000MW of electricity), in part due to a lack of clarity.⁴⁴ This dealt a blow to Thar's development as a coal reserve, not least given that the international community's involvement had provided credibility as well as much-needed technical expertise.

Given that Thar coal is particularly dirty, Pakistan can also be expected to face environmental opposition to its development of this sector.⁴⁵ Admittedly, the domestic green caucus has limited impact, but on the international stage, Pakistan will face pressure. That said, pragmatism is also expected to be a factor. Given Pakistan's urgent need to reduce its energy import bill, its best option is to tap into its domestic resources. Given international pressure for coal extraction, the relative speed of construction, and the relatively lower costs involved, this looks to be one of the most viable options currently available.

Renewables. Pakistan has a good set of resources for renewable energy: long hours of sunshine make solar a viable option for approximately half of the country, and it has a natural wind corridor in Sindh. That said, it has made almost virtually no progress in developing a renewables sector, despite a professed interest in the sector for a number of years and the existence of a dedicated government body, the Alternative Energy Development Board. The country has the potential to tap into biogas or waste-to-electricity, but again, this has not been pursued, suggesting little commitment on the government's part. Yet, renewables lend themselves well to Pakistan's energy needs. They offer a decentralized generation source, often at a local level, which would be of immense use in addressing the needs of the off-grid rural population.

In 2010, the government vowed change in favor of renewables, a sentiment that has been reexpressed recently. To this end, it passed the Alternative Energy Development Board Bill 2010, designed to replace the Alternative Energy Development Board Ordinance of 2007 in the promotion of renewable energy. It has also partnered with the likes of the ADB and Germany in a bid to drive forward projects and bring on board necessary financing and know-how.

Unless Pakistan receives considerable support from other nations, renewables are unlikely to become a significant part of the energy mix. Pakistan's government lacks the vision and capacity to take this sort of program forward, and even strong growth in this sector would be coming from a very narrow base, and consequently fail to make much of an impact.

Regional Prospects

There is little doubt that Pakistan needs to boost its energy capacity. This, however, takes time and resources, both of which Pakistan has in short supply. What is increasingly evident is that Pakistan's neighbors and the wider region will come to play a part in its energy security. Some observers argue against Pakistan's building domestic energy capacity when it can become part of wider regional plans.

Like many other states in the region, Pakistan simply does not have enough natural resources for long-term energy security. Perhaps more accurately, it will face a significant shortfall in energy until it can develop its resources, such as coal and renewables, and the related infrastructure to a level capable of satisfying domestic energy needs. As a result, it needs to consider how it is going to manage its future fuel acquisition and potential sale. Regional energy partnerships make a lot of sense, in terms of both sourcing fuel and selling fuel and electricity, and allowing Pakistan to benefit from the transit fees from cross-regional projects.

Pakistan . . . needs a workable energy vision, but, for this to be effective, its regional partners would have to lend their support and seriously consider how their actions affect Pakistan's energy interests.

Perhaps the other key issue Pakistan needs to take into account is how best to get its partners to buy into its long-term energy vision. Clearly, it first needs a workable energy vision, but, for this to be effective, its regional partners would have to lend their support and seriously consider how their actions affect Pakistan's energy interests. Alongside this, Pakistan must also figure out its own position in terms of energy security. There are signs that it is building networks, most obviously with Iran—a logical step though a problematic one given Iran's growing international isolation—and Central Asia. At the same time, however, Pakistan cannot ignore its South Asian neighbors, and nor can they ignore Pakistan. The concept of energy coexistence and cooperation, involving all countries in the region, has to be promoted.

Indeed, Pakistan's prospects are tied to its geography: it sits on an important crossroads between Central and South Asia, and between the Middle East and China. This makes it a key state for any regional energy plans, and there are no shortage of these in both development and play.

Pipelines

There is the potential for a number of pipelines (oil and gas) to transit through or end in Pakistan. Given Pakistan's energy needs, it would benefit from several projects coming to fruition, but as the situation stands, the major pipeline proposals compete against one another. One of two routes is likely to be realized: either TAPI—a pipeline running from Turkmenistan (from its Dauletabad field) on to Afghanistan, Pakistan, and finally India—or IP, a pipeline taking gas from Iran to Pakistan.

TAPI enjoys the support of key players in the international community, most notably the United States, and has its funding underpinned by the ADB. Reports suggest that in December 2011 the United States offered to fund Pakistan's portion of the pipeline in return for an end to its involvement in IP.⁴⁶ TAPI would foment stronger energy ties between India and Pakistan, and between Afghanistan and both countries, although there would also be the potential for tension over transit: Pakistan could, for example, threaten to curtail supplies during times of poor relations with India. TAPI does face a number of other significant problems, notably security threats along its proposed route, difficult topography, which increases construction costs, and political issues. Indeed, peace and stability in Afghanistan is required for the pipeline to have a realistic chance of success. That said, its international backers have ensured that the pipeline has made much more progress than it would otherwise have made thus far, although reports suggest that disagreement over pricing issues is currently slowing its development.

Meanwhile, the \$7.4 billion IP pipeline is progressing despite significant and concerted opposition from the United States, India's decision in 2009 to exit the scheme, and the security threats posed by running the pipeline through Balochistan. Although IP would strengthen Pakistan's energy relations with Iran, it would come at the expense of relations with a number of other states, particularly the United States. Pakistan faces a significant predicament, with a realistic prospect of it falling into a category of anti-U.S. states. Domestic anti-American sentiment only serves to exacerbate the situation. India could also be concerned, given it has reasonably good relations with Iran, and may not welcome a close Pakistan-Iran energy relationship.

The project has been on and off since the mid-1990s but enjoyed a renaissance in 2004 on the back of improving relations between India and Pakistan. Until 2007, progress in negotiations was significant, culminating in some agreement on pricing. There was a very real

sense that this was an agreement in the offing, a deal that would have seen Pakistan enjoy not only access to Iranian gas supplies, but also potential job creation in parts of Balochistan and Sindh and significant transit revenues from India.

Debate remains as to exactly why India decided to opt out of the project: some observers argue that it was as a result of pressure from the United States, which used the India-U.S. nuclear deal as leverage, while others suggest that Chinese interest (expressed in 2008) spooked India. Officially, India announced that the decision resulted from security concerns and a pricing dispute with Pakistan. The possibility of China joining the scheme remains. This possibility was again mooted in 2010. China's involvement would add a major assurance to the pipeline's longer-term prospects.⁴⁷

With India out of the picture, Pakistan and Iran continued to negotiate the pipeline and in June 2010, a contract was signed under which Iran agreed to supply the equivalent of 29 percent of Pakistan's current consumption of natural gas.⁴⁸ Various dates for the start of gas transportation have been bandied about, and it is currently set at no later than the end of 2014. The Iranian portion of the pipeline is nearing completion, though Pakistan still has much of its section of pipeline to build.

Financing is a major obstacle. Currently, Pakistan is struggling to finance its segment of the pipeline, with possible investors deterred by the threat of possible retaliatory action as a result of sanctions against Iran.⁴⁹ Pakistan has recently reiterated its resolve to pursue IP, despite the hurdles, and is reportedly exploring a range of financing avenues from export credit agencies to development banks, Islamic investment funds, and Chinese banks, but appears to be making little progress. As the problems mount, it is easy to lose sight of why Pakistan continues to focus so heavily on this scheme. Certainly, the fact that an agreement has been made and timeframe set make it a lot more "real" than its main contender, TAPI, which is still being negotiated. Proximity is another factor—Iran has finished its section of the pipeline, placing the onus on Pakistan to follow through—as is the fact that IP is now a bilateral engagement, rather than an inherently more complicated multilateral project involving countries with which Pakistan has more uncertain relationships.

Pakistan is integral to both projects, with any pipeline needing to cross Pakistani territory, using either its existing energy infrastructure in Karachi or a new terminal at either Karachi or Gwadar, Pakistan's two port cities expected to act as an end point for supplies to the country.

Electricity Transmission

Pakistan's involvement with a Central Asian scheme, such as the Central Asia South Asia Electricity Transmission and Trade Project (CASA 1000), which involves Kyrgyzstan, Tajikistan, Afghanistan, and Pakistan, would potentially improve its political relations with the region following a period where events in Afghanistan, and Pakistan's conduct toward its northern neighbor, have unsettled the Central Asian republics. Pakistan has historically been an ally of many Central Asian states—particularly through its founding membership of the Economic Cooperation Organization (ECO)—providing easy access for goods to move between the region and the Persian Gulf. As relations with its Western allies have soured, Pakistan has increasingly looked to the wider region for energy and trading tie-ups, although regional tensions over Afghanistan have complicated the outlook for them. A further strengthening of relations with Central Asia, particularly if Pakistan continues to court Iran, would widen the gulf in its relations with both the United States and South Asia.

In August 2011, Tajikistan's ambassador to Pakistan, Zubaydullo N. Zubaydov, announced that Pakistan could end its power shortages if it acquired 2,000MW of electricity from the CASA 1000 project.⁵⁰ This sounds ideal (despite the fact Pakistan needs more than 2,000MW to address its shortages) but is currently unrealistic: the project, which was signed in 2008, has yet to be completed, and is expected to transfer just 1,000MW of electricity from Tajikistan to Pakistan via Kyrgyzstan and Afghanistan. The main downside is the timeline: observers suggest that realistically Pakistan might receive energy from it in ten to fifteen years, making it not the answer to Pakistan's energy needs, but one of several possible future sources.

Gwadar Port

Pakistan routinely seeks to sell itself as a hub, its territory offering a corridor through which energy and other supplies can flow. It has offered these services to Central Asia, arguing that its own development as an energy and trade hub would boost the prospects of all Central Asian republics, and it has repeated the offer to China. Given its proximity to the Gulf states, Pakistan offers an ideal land route through which to transport energy products into China's remote and energy poor province of Xinjiang. Looking East, Pakistan offers an obvious transit route into India and countries beyond. Additionally, it provides some access from Afghanistan (and its hydropower resources) with the end client again likely to be China.

At the center of Pakistan's potential to be a hub is its megaport of Gwadar, which sits on the southern coast, approximately seventy miles east of the border with Iran. Construction began in the early 2000s, and Gwadar finally became operational in December 2008. To date it has failed to live up to expectations. These ranged from the fanciful—descriptions of it as a South Asian Las Vegas—to the more interesting, a possible rival to Dubai. Its location, however, remains ideal. Gwadar is close to the Straits of Hormuz, through which around 40 percent of the world's oil cargo is shipped. Couple this with plans to develop the facility beyond a container port into a petrochemical and refining unit, and then use the facility to serve as the meeting point of as many as five regional oil and gas pipelines, and you have what on the face of it appears to be a winning proposition.

It seems that at one stage China bought into this too. China was believed to be responsible for approximately 80 percent of the widely quoted \$200 million funding for the first phase, and was instrumental in providing the materials, workers, and technological know-how to the project's construction. There has been much discussion about China's true intentions regarding Gwadar. It is not the remit of this paper to question whether China is developing a listening post, a "string of pearls" naval capacity in the Indian Ocean, or indeed posit any other theory about China's intentions. The fact remains that owing to its location, Gwadar does potentially offer the basis for an energy hub, should China at some point wish to use it as such. There are signs that China may be considering this as a long-term strategy. Indeed, there are few other reasons why it would continue to work on plans to lay a trans-Himalayan oil pipeline from Gwadar to Xinjiang, which would ultimately allow it to reduce its dependence on oil imports shipped through the Straits of Malacca.

Energy Trading

The real potential market for regional energy set-ups should not be underestimated. India is setting up electricity sharing agreements with the likes of Bangladesh, Bhutan, Nepal, and Sri Lanka, where it is investing in the transportation infrastructure as well as in-country gen-

eration schemes in the hope that once other South Asian nations develop excess generating capacity India will be best placed to absorb it.⁵¹ From a pure energy standpoint there is no reason why India and Pakistan should not pursue similar linkages. As this report has already highlighted, Pakistan has large coal reserves in close proximity to a large-scale industrial base in India's state of Gujarat. At the same time, India could sell electricity to Pakistan when it has excess capacity, offsetting some of Pakistan's immediate shortfall.

Although relations between India and Pakistan remain troubled, energy cooperation should not be ruled out in the longer term. Pakistan is a major transit state, and India has good relations with countries like Iran and Afghanistan. The need for power may well be a major determining factor in boosting the India-Pakistan bilateral relationship to the level where both states can benefit.

The classic example of pragmatic cooperation is the Indus Waters Treaty, which saw the two countries agree on water sharing of their cross-border resources in the 1960. Notably it has never been revoked, even during times of warfare between the two states, but it was agreed a long time ago in a very different political and economic climate. Possible signs of the start of an energy relationship came in early 2012, when it emerged that India and Pakistan had agreed (pending agreement by respective defense ministries) to trade energy across the border between Lahore (Pakistan) and Amritsar (India). This amounted to 500MW, with a tariff linked to market rates, and was described as a move to strengthen business relations. Talks were also scheduled to discuss the use of a 200-kilometer pipeline, located in India, which would transport surplus diesel to Pakistan.⁵²

Key Partners

What is striking from the literature on Pakistan's energy dialogue with its partners is the amount of talk, but very little delivery. There are lots of discussions, some of which are followed with memorandums of understanding. Deals are agreed, but less than the amount of dialogue would suggest. Often the impression emerges of a country that is so desperate for help that any lifeline another state can offer is quickly grabbed. Support generally falls into one of two camps: some states are comfortable as facilitators, organizing funding, and others will offer broader support, working on specific projects in Pakistan.

China

Pakistan enjoys a strong relationship with China, and China has been active in Pakistan's energy sector for years, reflecting the countries' historic diplomatic ties. China is the partner that offers up the big deals, both in terms of project size and numbers of firms involved in Pakistan's energy sector. It is difficult to source any reliable figure identifying the overall size of this, but both governments have made reference to billions of dollars. Complicating the situation, the Pakistani government is keen to publicize the strength of relations, giving positive publicity to the country's relationship with China and highlighting the partnership's value in rhetoric though not necessarily in substance. This contrasts sharply with more recent coverage of relations with the United States, which have increasingly come to be portrayed in a negative light.

China has played a pivotal role in Pakistan's nuclear energy sector, constructing nuclear reactors, and allowing these to continue functioning in the face of international sanctions and restrictions. Attention has also been focused on hydropower, with China expressing an interest in working with the Water and Power Development Authority (WAPDA) to help

develop a number of large-scale hydropower projects.⁵³ Renewable energy is getting increasing amounts of attention, with China helping to develop three wind farms and also several solar projects in Pakistan. More recently, the two countries set up the Joint Energy Working Group (JEWG), which held its inaugural meeting in August 2011 on the back of which a number of agreements were made.

This all looks very impressive, but there is a nagging doubt as to whether China is working in Pakistan's best interests. The JEWG is an interesting case study. At the inaugural August meeting, a number of agreements were signed covering a range of energy projects. Whether these will all be followed through is another matter. The JEWG may prove to be an effective tool that has a significant impact: it has the potential to help deliver more effectively in other areas, particularly increasing attention on projects to improve the existing infrastructure. For some observers, however, the group is unlikely to have much substance and is instead designed as a deliberate snub to the United States and its continuing energy dialogue with Pakistan.

It is also notable that China will not transfer technology to Pakistan. Media reports suggest that Pakistan has previously asked for help from China to develop a renewables manufacturing industry.⁵⁴ Pakistan has a history of manufacturing medical equipment, so moving into an area like parts for renewable technology appears viable. To date, China has refused this request, and as such, any ambitions Pakistan has in this area remain stalled due to a lack of technology and funding.

In one more questionable move, according to energy industry sources, China uses Pakistan as a means to advance the competitiveness of its own designs. This is certainly the case in the nuclear sector, where it effectively highlights to other nations its tried and tested capacity in this field of reactor development through the work it contributes to Pakistan's civil nuclear program.

Doubts aside, the fact remains that China offers unparalleled support to Pakistan, at least in the view and discourse of the Pakistani government. In reality, it may be something of a "passive best friend," providing this support when it suits its own circumstances rather than those of Pakistan. As Pakistan sees it, however, China remains a constant and far more reliable ally than any other country.

United States

The U.S. government, through its aid arm, the USAID, has supported Pakistan's energy sector as a part of wider programming for decades. Notably, the energy sector has received an increasing share of this overall funding as the country's power shortfalls have intensified. Unfortunately, this comes at a time when deteriorating relations between the two countries, and a financial squeeze on the United States' budget, means that financing levels are falling.

In August, the USAID's Pakistan head of mission, Andrew B. Sisson, revealed that the energy sector now topped his organization's work in the country, with \$254 million allocated to the sector alone, up from \$86.5 million in 2010.⁵⁵ This however, is a very small amount when considering the argument that Pakistan reportedly needs at least \$10 billion to make its energy sector viable, and also when compared with the billions in U.S. military aid that have gone to Pakistan since 2001.⁵⁶

Like the projects China supports, the U.S.-supported projects are spread across a range of requirements, with focus falling on supporting the completion of the Gomal and Satpara dams, the upgrade of the Tarbela dam, and consideration of financing for the Diamir-Bhasha dam; improving thermal power plans, with a focus on Guddu and Muzaffargarh;

and supporting projects that increase greater fuel efficiency in agricultural irrigation, which it is hoped will save 1,000MW of power.⁵⁷

The fact that Pakistan enjoys close relations with China and Iran is a problem, essentially placing Pakistan in the “wrong club” for the United States. Relations between the two countries have been steadily deteriorating, markedly so since 2011, but this does not mean that wider energy relations should become a casualty. Both sides need to work out a long-term vision for their energy partnership. Providing tangible benefits in terms of radically enhanced energy supply could go some measure to repairing relations, and potentially set them on a sounder and more strategic course for coming decades. For this to be achieved, however, energy must be regarded as part of the United States’ strategic relationship with Pakistan.

If the United States chooses to regard energy as such, it needs to seriously consider the overall impact of two policy directions. First, is it going to try to use energy assistance to seek to influence Pakistan’s domestic policy? Second, is the United States willing to support the energy needs of Pakistan and the wider region through its own diplomatic activity? Given the United States’ concerns vis-à-vis China and Iran, it would appear that wider geopolitics will continue to trump energy diplomacy. That said, confidence and trust are required. The United States can potentially give Pakistan a lot of support, not just as a bilateral partner, but also by lobbying other governments and international organizations on Pakistan’s behalf. Both sides need to shed the mixed messages and speculation that prevail at present. If relations improve, so this support is likely to increase, but should relations sour further, incentives and funding are likely to be minimized.

Iran

As Pakistan’s energy problems have increased, it has increasingly looked to Iran, which routinely provides it with electricity to offset major shortfalls. Underpinning this relationship is, of course, the IP pipeline. A clear upswing in the number of official Pakistani visits to Tehran and meetings between key Pakistani and Iranian groups and officials underlines the increasing importance that Pakistan is placing on this relationship, at a time when internationally Iran remains isolated.

As this report has highlighted, Iran’s isolation is creating problems for Pakistan. News reports suggest that it is seeking to borrow \$300 million from local banks to fund its section of the IP pipeline.⁵⁸ Domestic funding is necessary because sanctions on Iran are likely to block multilateral and Western funding.

Russia

Russia may be India’s historic ally, but given Russia’s heavyweight presence in the global gas market, it is unsurprising that Russia sporadically expresses interest in the likes of the IP pipeline. It has been previously suggested that Gazprom may stump up funding for the IP pipeline,⁵⁹ while in May 2011, during a state visit with Russia as host, a memorandum of understanding was signed in support of energy cooperation.⁶⁰ The memorandum encourages the development of Pakistan’s oil and gas fields, as well as related gas endeavours, such as developing storage capacity.

Saudi Arabia

Saudi Arabia is more of a fund manager than active partner in Pakistan’s energy affairs. That said, it is a big fund manager. In April 2011, it announced it would both contribute to and seek out funding from other Arab states for the Diamir-Bhasha dam. That said, and despite

the strength of a fifty-year relationship behind them, relations tend to be fickle, with Saudi Arabia offering and withdrawing funding depending on how it perceives the political climate.⁶¹ Diplomatic cables released through Wikileaks and reported on in November 2010 highlight the personal dislike that Saudi Arabia's King Abdullah has for Pakistan's president Asif Ali Zardari. Abdullah is quoted as saying that Zardari is the "greatest obstacle" to Pakistan's progress, adding, "When the head is rotten, it affects the whole body."⁶² Saudi Arabia has also railed against Pakistan fomenting stronger relations with Iran.⁶³

Turkey

Turkey and Pakistan have a lengthy bilateral relationship. It should come as little surprise that energy relations have become an increasing talking point between them, alongside the more traditional trading negotiations. In August 2011, Turkey offered to support Punjab's government in its attempts to develop coal, hydro, and wind power-generation projects.⁶⁴ In a more recent move, the country dispatched an electricity generating ship, with a capacity of 230MW, to Pakistan's port of Karachi, in a bid to alleviate some of the city's power problems.⁶⁵ At this stage, Turkey tends to offer expertise in preparing feasibility studies, but Pakistan's broader aim will surely be to cultivate deeper energy relations.

India

India figures large in the region's future energy security and must be included in Pakistan's long-term plans. The two countries need to establish a workable energy relationship. Indeed, there is real potential for an energy relationship between India and Pakistan, and not just one that sees India supplying the energy. The location of Pakistan's massive coal reserves so close to the border with India—an area not prone to the type of violence witnessed elsewhere in Pakistan—would make supply routes short and easy once the requisite infrastructure is in place. Given that coal is a dominant fuel in India's energy mix, it would be shortsighted not to consider Pakistan as a future supplier. They do not have to like each other, but they do need to cooperate on something as crucial as this, or the region's economic development falls into question. The onus is on both countries to show the type of pragmatism and initiative that was in evidence during the Indus Water Treaty and even the IPI pipeline negotiations to some extent. This provided a glimpse of what was possible, and it can only be hoped that both states have much more to offer.

Conclusions and Recommendations

There are different lines of argument on the direction the region's energy partnerships and relationships will take. Some observers argue that as a result of broad energy needs, wider regional cooperation will develop. Others, however, see a continuation in the historic divisions, viewing stronger Sino-Pakistani energy relations as curtailing Pakistan's energy relations with India—and by extension with South Asia as a whole. A continuation of this historical trajectory cuts Pakistan off not only from possible energy supplies from India, but also from longer-term regional projects focused on hydropower development and gas from countries such as Bangladesh and Myanmar.

Ultimately, Pakistan must prove it is a worthy ally to the key players in the region. This is going to require a lot of work, and also confidence on Pakistan's part. The term *unreliable allies* could be the tagline for Pakistan's history; so often allies have pledged assistance, only

to pull the plug at a later date. The reasons for this are myriad, ranging from geopolitics and the domestic politics of a particular country to Pakistan's own problems and political landscape. Some outcomes have been fully justified, others highly questionable. The fact remains, however, that Pakistan has few real allies. And as battered and bruised as it is, Pakistan needs to overcome past experiences, and recreate itself as a dependable, trustworthy partner. This is going to be difficult for Pakistan in relation to its allies, let alone its enemies.

Currently, Pakistan is not well placed to transform itself. It is in a fiscally fragile position and politically charged as it heads into an election cycle. Its security situation is poor, and social unrest is unusually high, in part fueled by energy shortages and unemployment. Its fortunes on the world stage, which peaked around 2005–06 through its cooperation with the United States in the so-called war on terror have plummeted. Regionally, relations with India are low level, though they have picked up in recent months, and diplomatic lines with Afghanistan have become increasingly complex and difficult as a result of cross-border security issues and hedging strategies for the post-International Security Assistance Force era. Globally, relations with the United States are in their worst place in years, reinforcing the long-held domestic view in Pakistan that the United States courts the country when the need arises and later drops it once its usefulness has expired. The international community's preoccupation with Iran has complicated the regional energy set-up, contributed to delays in this important scheme for Pakistan, and raised concerns about Iran's capacity to fulfil supply pledges.

More positively, regional frameworks are in place that could be far better employed. Most obviously these are the South Asian Association for Regional Cooperation (SAARC) and the Economic Cooperation Organization, both of which need to be developed with a focus on energy and development. Added to this is the fact that both India and Pakistan have reasonably good relations with Iran. This should be a bonus, allowing them to work together towards wider regional energy goals, helping them to move beyond mutual, underlying suspicions that currently color the proceedings. That China plays a part in this too does not have to be the impediment that is often suggested. The rivalry and mistrust between India and China is clear: the task is not to foment it. India and China do not have quite the combative relationship that many reports like to paint them as having. This does not mean that relations are warm, but China, in particular, noted for its often pragmatic stance on economic matters, may opt to support regional energy set-ups should it judge a project's benefits (to itself) to outweigh the costs. Longer-term moves by key players like the United States (particularly if it settles on a distinctly pro-India, anti-China stance in South Asia) will not help. What the region and its less fortunate players like Pakistan need is support. It does not need to be unqualified, but it will need to be pragmatic. Without this, a region and a country with a lot of potential will simply find the potential wasted.

Moving forward Pakistan has some key decisions to make, but, as highlighted, the geopolitics of the region are difficult and fraught with pitfalls. It may be that classic alignments continue to dictate the situation, including energy relations. So Pakistan and India will remain at odds, Pakistan will retain its close ties with China, and if U.S. interests in the region take a more obvious pro-India stance, Pakistan will find itself outside the U.S. "club." Pakistan will still enjoy some support from China, and will seek to maintain relations with other allies, but these relationships may be problematic. Of these, Iran remains the most difficult for the foreseeable future, and Pakistan needs to tread cautiously to avoid undermining its international standing.

Frequently, Pakistan is faced with difficult choices, with every avenue that appears to offer a new energy source also having a major downside. It may increase its energy imports, and so offset domestic energy problems, but concurrently undermine its fiscal position. It may embark on stronger energy relations with India, but this may trouble its ties with China. Similarly, within SAARC, it may approach Bangladesh for a gas tie-up, but in doing so, imperil relations with India. In this respect, there appears to be no single win-win situation for Pakistan.

What would be more positive for Pakistan would be the development of a more multi-polar system. Mutual energy need may help dissipate traditional divisions between countries. This is certainly the best-case scenario for Pakistan, and one that curtails the gain-and-loss pattern of its current energy relationships. To that end, the following recommendations for Pakistan are made:

- Pakistan needs a new and workable national energy policy. Its current policy document is unresponsive, only partially implemented-implementable, and at the mercy of competing bureaucratic interests. Attempts to formulate a comprehensive, single plan have so far largely failed. As such, it should not be underestimated how difficult this task will be for Pakistan.
- Alongside this, Pakistan needs far better management of the energy sector, which can only be achieved by streamlining the responsibilities and number of ministries and other government departments involved in policymaking and implementation. Tensions between the federal and provincial governments also require attention.
- Domestically, Pakistan needs to address key issues like eliminating circular debt, dismantling the fuel subsidy structure, tackling transmission and distribution losses, addressing cultural change to counter theft and nonpayment, and introducing new legislation, particularly energy efficiency standards and regulation.
- Poor security in energy locations is a major problem, acting as a deterrent to both improvements to existing infrastructure and to development of new exploration and extraction. The civilian leadership needs to pay particular attention to this and will have to work with the country's security apparatus to create a more comprehensive policy addressing the underlying factors to poor security in the energy-rich areas.
- Pakistan needs to make a realistic assessment of its energy mix and seek advice on how best to develop this. Some changes will be relatively straightforward—such as providing a well-head price for gas, which producers would greatly welcome—others far more difficult, like improving security in areas like Balochistan and KPK.
- As part of these moves, Pakistan needs to reconsider its use of oil and nuclear power. Its own oil supplies are difficult to extract, and the international price of oil will only increase, placing extra burden on the current account through inflated energy imports. Pakistan also faces many financial and political obstacles to developing its nuclear power sector. Nuclear power will remain as a part of the energy mix, but it must realize that the sector will not deliver to the degree that it envisages.
- Instead, Pakistan should place greater attention on the domestic extraction of coal and, to offset the emissions aspect of this, concentrate on the growth of greener energy options, ranging from hydropower to renewables.
- Regionally, Pakistan must cultivate stronger energy relations with its neighbors. There are a number of options, from simple cross-border energy trading to wider cross-regional gas pipelines and electricity transmission networks. In a bid to pursue regional aspirations, Pakistan should seek to make greater use of forums like SAARC, and in turn, try

to elevate the issue of energy security on each group's agenda. Given Pakistan's desire to fashion itself as an energy corridor and hub, improving regional coordination is key.

- Internationally, Pakistan needs to foster better relations with key countries, particularly the United States. This is going to be difficult, not least given domestic anti-American sentiment coupled with Pakistan's interests in furthering relations with Iran. Still, it should not forget that the United States can, should it choose, give Pakistan a lot of support both as a partner and a lobbying force within the international community.

Notes

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1. Circular debt refers to a structural problem in Pakistan's energy market. It arises when one party, in this case, the government, withholds payments. This affects others in the supply chain, notably the power-generating companies, with each, in turn, withholding payments. This results in operational problems for the sector's service providers, ensuring that power availability drops. According to the *Pakistan Energy Yearbook 2010*, five of twenty-two of the country's independent power producers failed to produce electricity in 2009, and the rest operated at a capacity of just 60 percent. It is likely that circular debt issues were at least partly responsible for this situation. See Ministry of Petroleum and Natural Resources, Hydrocarbon Development Institute of Pakistan, *Pakistan Energy Yearbook 2010* (Islamabad, April 2011).
2. Energy Sector Task Force (ESTF), Integrated Energy Sector Recovery Report and Plan (Asian Development Bank [ADB], October 2010), www.adb.org/publications/integrated-energy-sector-recovery-report-and-plan.
3. In conversations the author had with observers during the research of this report, it was suggested that the main opposition, Pakistan Muslim League-Nawaz (PML-N), would place a greater priority on addressing the country's energy problems than the current government. This is due to the party's probusiness focus and moves it has made in Punjab to alleviate power shortages.
4. Ahmad Fraz Khan, "Power Shortfall Increases to Over 5,000MW," *Dawn*, April 22, 2011.
5. Mehreen Khan, "Energy Subsidies Cripple Pakistan Economy, Says Study," *Financial Times Blog*, July 27, 2011.
6. An article in the *Economist* suggested the amount was nearer to 3 to 4 percent. See "Lights Out: Pakistan's Energy Shortage," *Economist*, October 8, 2011.
7. "Unscheduled Loadshedding Irks People in Punjab," *Nation*, October 2, 2011. News reports suggest that some parts of the country, for example, North Waziristan, suffer with power outages of twenty-two hours per day.
8. Anwar Iqbal, "Pakistan Seeks Outside Help to End Energy Shortfall," *Dawn*, April 23, 2010.
9. Javed Mirza, "Energy Crisis to Weigh Heavy on Economic Growth Prospects," *News*, January 1, 2012.
10. "Pakistan Goes All-In for Energy Security," *UPI.com*, December 28, 2011.
11. Ibid.
12. ADB, *Integrated Energy Sector Report and Plan*, 5.
13. Ibid., 2.
14. Zeeshan Javaid, "Energy Crisis Affecting Social, Economic Uplift," *Daily Times*, September 7, 2011.
15. "Inefficiency Causes Loss of One Trillion Rupees," *Pakistan Observer*, December 6, 2011.
16. Mirza, "Energy Crisis."
17. "Ex-Minister to Defend RPP Contracts in SC," *Dawn*, October 29, 2011.
18. Nadir Hassan, "Give Pakistan a Nuclear Deal," *Foreign Policy*, March 26, 2010.
19. Ahmad Fraz Khan, "Power Shortfall Increases to Over 5,000MW," *Dawn*, April 22, 2011.
20. A number of well-argued and thought-provoking articles have focused on Pakistan's circular debt crisis, including Shahid Kardar, "Circular Debt Solution," *Dawn*, September 14, 2011, and Salman Khalid and Kamal Munir, "Is the Circular Debt Real," *Dawn*, October 10, 2011.
21. "For Appearances' Sake PM Forms Committee to Deal with Power Crisis," *Express Tribune*, August 8, 2011.
22. It is difficult to get up-to-date figures for the extent of transmission losses. In September 2011, however, a report gave unattributed figures suggesting that four of the country's power producers were running ten power plants at an average efficiency of just 18 percent. Usha Ganesh, "Privatization of Pakistan's Power," *Searchlight*, September 20, 2011.
23. Wikileaks has revealed that the U.S. government conducted a three-part study of Pakistan's policymaking infrastructure in mid-2008. *Dawn* reported the cables in full in July 2011, which revealed the U.S. view that the country's power problems were the result of "the haphazard mix of horizontally and vertically placed institutions, which comprise the energy policy making sector of Pakistan." Further to this, the cables referred to "the complex maze of GOP [government of Pakistan] policy makers who cannot co-ordinate Pakistan's energy policy due to overlapping and contradictory authorities." A lack of a distinct policy line, and confusion over decision making, means that basic issues like raising well-head prices (the price the producer charges for gas or petroleum) to encourage exploration and extraction are not pursued or are pursued painstakingly slowly.
24. Mehreen Khan, "Energy Subsidies Dilemma Expose Failings of Pakistan State," *Financial Times Blogs*, August 5, 2011.

25. Ibid.
26. Abdul Manan, "Energy Crisis: Punjab Rejects Two Weekly Holidays," *Express Tribune*, October 13, 2011.
27. Under the Aghaz-e-Huqooqe Balochistan package, Balochistan is to be paid PKR 120 billion in royalties following "retrospective correction of past mistakes and underpayment of royalties." Prices paid to Balochistan per gas unit, currently at PKR 32.71, have also increased in recent years, but a discrepancy between revenue and royalties to the province remain. See "The Balochistan Cauldron-II by Akhtar Ali," *Business Recorder*, March 2, 2012.
28. One example of unsettling behavior has been Pakistan's buildup of nuclear arms, apparently in response to the development of India's civil nuclear program, as a result of its nuclear deal with the United States. Editorial, "Storing Up Trouble: Pakistan's Nuclear Bombs," *Guardian*, February 3, 2011.
29. "Pakistan Working on New Petroleum Policy," *Indo-Asian News Service*, July 10, 2011.
30. Ahmad Ahmadani and Usman Cheema, "4PC Rise in Power Tariffs on the Cards," *Nation*, October 12, 2011. For fiscal year 2010–11, the government set a target of a 15.6 percent rise in the electricity tariff, but as of October, it had risen by just 4 percent.
31. ABD, *Integrated Energy Sector Report and Plan*, iv.
32. Zaffar Bhutta, "Energy Crisis: Rather than Reduce Subsidies, Government Increases Power Outages," *Express Tribune*, July 18, 2011. The paper reported that of the PKR 395 billion, PKR 297 billion was spent on the power sector. This included PKR 120 billion that the government owed the power sector. The government also paid out PKR 82 billion to cover the costs of losses, including the nonpayment of bills, theft, and transmission losses.
33. "IMF Calls Pakistan's Fuel Subsidies Inefficient," *Reuters*, January 6, 2011.
34. Bhutta, "Energy Crisis."
35. Statistics from July–November 2011 show that oil imports rose 48.65 percent year-on-year, with crude oil imports up 19 percent to \$2.073 billion. This rise reflected oil price increases, with Pakistan's import of oil actually decreasing by 20 percent over the period. More broadly, petroleum products accounted for a bill of \$4.225 billion over the same period, reflecting a year-on-year rise of almost 70 percent. Mubarak Zeb Khan, "Oil, Food Import Bill Swells 31pc in July–November," *Dawn*, December 21, 2011.
36. As of December 2010, Pakistan topped the global list of natural gas vehicles with 2.74 million. NGV Global, International Association for Natural Gas Vehicles, "Natural Gas Vehicle Statistics: NGV Count," www.iangv.org/tools-resources/statistics.html.
37. Ashfaq Bokhari, "Coal Gasification Project Delayed," *Dawn*, April 11, 2011.
38. Charles Ebinger reports related conversations he has had with oil exploration companies, which while unsuccessfully looking for oil in Pakistan have repeatedly discovered reserves of gas. The government of Pakistan, in its Integrated Energy Plan 2009–2022, reveals the finding of what is described as a "recent study," which estimates the maximum potential at 27.5 billion barrels of oil and 145 trillion cubic feet of gas (43).
39. ADB, *Integrated Energy Sector Report and Plan*, 4. The ADB cites a figure of 83 percent for the 2008–9 fiscal year.
40. Editorial, "Storing Up Trouble: Pakistan's Nuclear Bombs," *Guardian*, February 3, 2011. The paper reported that U.S. intelligence assessments estimated that Pakistan had one hundred weapons, more than India, and twice as many as it had four years previously.
41. Charles K. Ebinger, *Energy and Security in South Asia: Co-operation or Conflict* (Washington, DC: Brookings Institution Press, 2011), 81.
42. Estimates provided by Pakistan's Geological Survey.
43. Amin Ahmed, "RS900m for Thar Coal Power Project," *Dawn*, July 22, 2011.
44. Ashfaq Bokhari, "World Bank and Thar Coal Project," *Dawn*, June 14, 2010.
45. Thar's coal has a high ash and sulphur content.
46. Zafar Bhutta, "Wielding Soft Power: US Offers to Finance TAPI Gas Pipeline," *Express Tribune*, December 19, 2011.
47. "China May Replace India in IPI Project," *Press Trust of India*, February 7, 2011.
48. Syed Fazl-e-Haider, "Floods Play Havoc with Pakistan Power Hopes," *Asia Times*, August 25, 2010.
49. Zafar Bhutta, "Strategic Retreat: NBP, OGDCL Burst the IP Gas Pipeline Bubble," *Express Tribune*, December 23, 2011. In December 2011, Bhutta reported that Pakistan's largest bank, the National Bank of Pakistan, and its largest exploration company, the Oil and Gas Development Company Ltd (OGDCL), refused to support the government's calls for financing. In the case of the bank, it feared forced overseas branch closure, while the OGDCL argued that the government already owed it considerable funds.
50. "Pakistan Can End Power Crisis through CASA 1000," *Daily Times*, August 13, 2011.
51. The issue was raised at a recent meeting of the South Asian Association for Regional Cooperation, highlighting the fact that it is becoming a regional plan (rather than just India bilaterally linking up with several of its neighbors). Serajul Quadir, "South Asian Countries to Work on Power Links," *Reuters*, September 15, 2011.

52. "India, Pak to Start Power, Petro Trade," *Times of India*, January 2, 2012.
53. William MacNamara, "China Proposes \$15bn Indus Dam Scheme," *Financial Times*, June 7, 2011.
54. "China Interested in Pak Hydrel, Renewable Energy Projects," *Daily Times*, April 6, 2011.
55. "Pakistan's Energy Sector Tops USAID Project List," *Associated Press of Pakistan*, August 29, 2011.
56. The United States provided Pakistan with \$4.5 billion in aid in 2010, more than one-half of which went to the military. Karen DeYoung, "US Withholding Military Aid to Pakistan," *Washington Post*, July 10, 2011.
57. Ibid.
58. Haris Anwar, "Pakistan Seeks Local Funds for Iran Gas Deal Opposed by US," *Bloomberg*, August 17, 2011.
59. Anna Fifield, "Gazprom in Iran Pipeline Talks," *Financial Times*, June 11, 2009.
60. Pakistan, "Russia Sign Energy MoU," *Oil and Gas Journal*, May 26, 2011.
61. Michael Kugelman, "Tilting Toward Tehran?" *Foreign Policy*, September 15, 2011. Kugelman points out that annual grant assistance from Saudi Arabia to Pakistan between 2004 and 2009 totaled nearly \$140 million.
62. Anwar Iqbal, "King Abdullah Criticised Zardari," *Dawn*, November 29, 2010.
63. Malik Ayub Sumbal, "Pakistan's Iran Overtures Test Saudi Faith," *Asia Times*, July 26, 2011.
64. "Turkey to Help Pakistan Alleviate Energy Crisis," *Daily Times*, August 12, 2011.
65. Editorial, "Pak-Turkey Friendship," *Nation*, January 3, 2012.



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Pakistan is suffering from an acute energy crisis, with an electricity shortfall of approximately 5,000 megawatts per day. This shortfall reflects years of underinvestment and partly implemented reforms. With supply failing to maintain pace with increased demand, Pakistan must pay increasing amounts for expensive energy imports. Its energy problems have domestic, regional, and, arguably, global implications. This report identifies key causes of the problem and considers how Pakistan could employ energy relationships with other countries to try to better address the situation. How Pakistan pursues its regional energy options to address its domestic energy challenges, and how the world chooses to respond to these decisions, will either increase potentially destabilizing geopolitical competition among regional actors or contribute to new collaboration, strengthening regional ties.

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