INDIA AND PAKISTAN'S ENERGY SECURITY

CAN AFGHANISTAN PLAY A CRITICAL ROLE?

EastWest Institute
Forging Collective Action for a Safer and Better World

Cover image by Dragan Stojanovski

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EXECUTIVE SUMMARY

India and Pakistan need to find long-term solutions to their ever-growing energy needs, triggered by their continuing demographic boom and strong economic growth. Combined, these countries make up close to one-fifth of the world's population, much of it without stable access to primary energy and electricity. A timely response is crucial considering last summer's energy shortages in India, which affected more than half-a-billion people. The shortage of energy supplies, especially for electricity generation, is already considerably slowing these two countries' economic growth. The overall annual growth rate in Pakistan is 3 to 4 percent and in India 7 to 8 percent. Without the energy shortages, each of these countries' growth rates would be 3 to 4 percent higher.

In India and especially in Pakistan, natural gas is rapidly gaining importance as a key source of energy, in particular for electricity production. Gas-based power is significantly cheaper than electricity produced by fuel oil or diesel. Gas-fired turbines are flexible and can quickly respond to peak demand. They are also cheaper to build than hydropower dams, nuclear-power stations and even coal-fired plants. In addition, gas is the most environmentally friendly fossil fuel. In principle, hydropower can play a significant role in ensuring energy security both in India and Pakistan, but planning and constructing hydroelectricity power stations is very time consuming and often carries considerable economic, political and social costs. Hydropower installations can disrupt water basin balance, remove water from the agricultural sector and complicate relations between upstream and downstream countries.

Nuclear power plants are expensive to build and create a number of safety and security risks linked to their working cycle and utilization of spent fuel.

Green electricity produced from wind and solar could theoretically be competitive if compared to diesel-based generators. However, its share in the regional energy mix to date is low. Renewable energy sources, like solar and wind, therefore will not be able to address the energy deficits in Pakistan and India anytime soon. They are also costly investments, requiring special electricity grids. Neither solar nor wind can provide a stable electricity flow, and both require back-up, power-generation capacity.

The most efficient way for India and especially Pakistan to address the energy deficit is, therefore, the construction of gas-fired power plants. In the case of Pakistan, the role of gas can be complemented by the import of a cheap surplus of hydroelectricity from Central Asia. Both countries' needs can be met by neighboring countries—Iran, Qatar and Turkmenistan—who are major providers of gas. Hydropower is also relatively abundant in neighboring Kyrgyzstan and Tajikistan.

The reality, though, is shaped by obstacles, which often outweigh the advantages that geography offers. In terms of resources and geographical location, Iran is well positioned to meet Pakistan and India's energy needs, but current international sanctions have removed Tehran from the regional energy landscape. Qatar, owner of the world's third largest reserves of natural gas, could be a major supplier as well, but the price demands are already too expensive for India and could be unaffordable for Pakistan.

The overall annual growth rate in Pakistan is 3 to 4 percent and in India 7 to 8 percent. Without the energy shortages, each of these countries' growth rates would be 3 to 4 percent higher.

Afghanistan's role as a transit country for gas from Central Asia can hardly be overestimated. Islamabad and to a lesser extent, New Delhi, have little choice but to consider using the planned Trans-Afghanistan Pipeline (TAPI) and the Central Asia South Asia Regional Electricity Trade Project (CASA 1000) to access Turkmen gas and Central Asian electricity. Both planned projects run through Afghanistan. The precarious security situation in Afghanistan is a major challenge to these options and is preventing these significant energy projects from going forward.

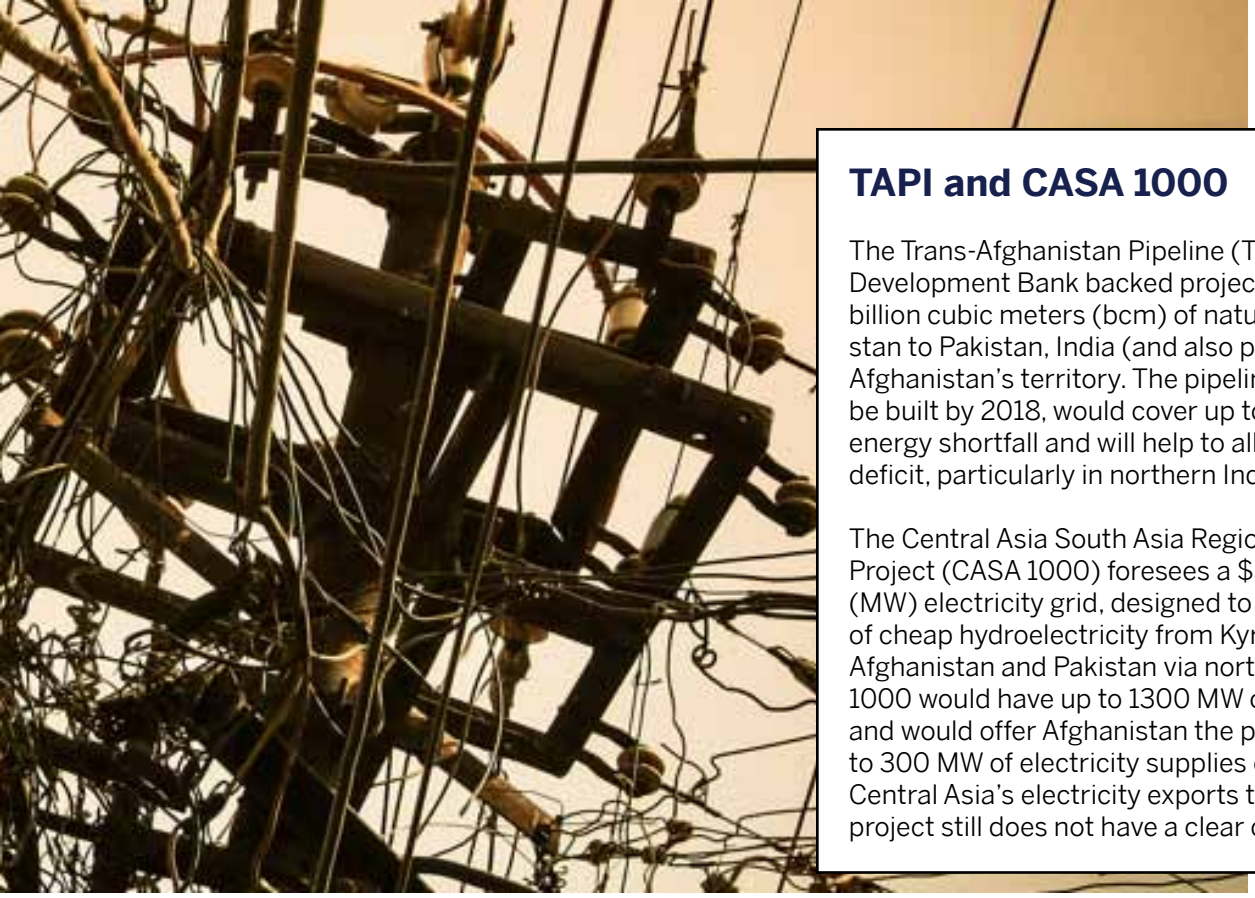
China's relationship with Turkmenistan as a major consumer of the country's gas is the second important factor affecting the regional energy landscape. China is already the largest buyer of Turkmen gas. In 2011, almost 50 percent of China's natural gas imports or 15.5 bcm came from this country.[1] Beijing also plans to boost domestic usage of natural gas and increase the imports of Turkmen natural gas to 65 bcm by 2015. Though Beijing never publicly voiced concerns regarding TAPI, one can safely assume that China is not eager to share its access to Turkmenistan's gas supplies unless China can feel confident that its own needs will be adequately met. India and Pakistan are standing at the "end of the queue" for Turkmen gas.

By December 2009, China managed to build infrastructure and secure major supply and transit agreements with Turkmenistan. The Central Asia-China strategic gas pipeline was built in 18 months, while talks on the TAPI with an envisioned 33 bcm capacity (only half of the capacity of the Turkmen–China pipeline) have been going on for the last 20 years without any tangible results. Turkmenistan's gas reserves could theoretically provide sufficient material base for exports to China, India and Pakistan. However, these plans depend upon Ashgabat's ability to respond to these demands.

Energy trade could in principle play a constructive role and become a catalyst for a more productive regional cooperation between Central and South Asian countries. Due to its major importance, energy trade might even mirror the positive spillover effect of the European Coal and Steel Community, created in 1951, which laid the foundation for the European Union and contribute to a mutually-beneficial relationship between India and Pakistan.

There seem to be encouraging signs that both India and Pakistan, despite their often difficult relationship, understand the posi-

1 This paper uses cubic meters as a measure of natural gas production and trade. In calorific value 1000 cubic meters (or 0.725 tons of liquefied natural gas) of natural gas is equal to 0.89 tons of oil equivalent or 10.54 MWh of electricity.



TAPI and CASA 1000

The Trans-Afghanistan Pipeline (TAPI) is a $7.6 billion Asian Development Bank backed project, which hopes to bring 33 billion cubic meters (bcm) of natural gas from Turkmenistan to Pakistan, India (and also possibly Afghanistan) via Afghanistan's territory. The pipeline, which is scheduled to be built by 2018, would cover up to 25 percent of Pakistan's energy shortfall and will help to alleviate the growing energy deficit, particularly in northern India.

The Central Asia South Asia Regional Electricity Trade Project (CASA 1000) foresees a $1 billion, 1000 Megawatt (MW) electricity grid, designed to bring the summer surplus of cheap hydroelectricity from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan via northern Afghanistan. CASA 1000 would have up to 1300 MW of transmission capacity and would offer Afghanistan the possibilities of taking up to 300 MW of electricity supplies or simply transiting all Central Asia's electricity exports to Pakistan. As of now, the project still does not have a clear construction schedule.

tive effects of increased energy cooperation. India has already offered to export its petroleum products (diesel, gasoline) to Pakistan, where the installed refining capacity meets only 50 percent of its domestic demand in petroleum. India, which exports 25 percent of its 185 million tons of refined products, proposed to connect via pipeline the refineries in northern Pakistan. India and Pakistan have a strong common interest in ensuring reliable gas supplies from Turkmenistan.

The construction of TAPI and CASA 1000 projects and the subsequent transit of gas and electricity via Afghanistan will require a multitude of important regulatory and investment decisions. It would be helpful to rely on already established and internationally accepted energy transit regulations and mechanisms for investment protection.

One might argue that multilateral institutions already present in the region should be used to facilitate the implementation of TAPI and CASA 1000 projects. However, the South Asia Association for Regional Cooperation (SAARC), Economic Cooperation Organization (ECO) and Regional Economic Cooperation Conference on Afghanistan (RECCA) all largely fail to sufficiently address the complicated and diverse energy landscape in the region, primarily due to the lack of accepted legally-binding instruments, relevant policy mechanisms and the limited nature of their membership. Their mandate is also not closely focused on energy issues.

This paper argues that the Energy Charter Treaty (ECT) could become an appropriate institutional "umbrella" providing for such regional "rules of the game." The ECT is the only global, multilateral framework with a significant membership having relevant institutional mechanisms and a successful record of unbiased cooperation in the area of energy transit and investment protection.[2] This would be particularly relevant for infrastructure projects in the trans-Afghan energy corridor. Potential gas and electricity suppliers such as Turkmenistan, Tajikistan and Kyrgyzstan are already full members of the ECT. Afghanistan, India and Pakistan should consider becoming full members of the ECT as well. That would put TAPI and CASA 1000 in a homogeneous legal and regulatory framework and facilitate an uninterrupted flow of energy. The importance of the ECT appears even greater in Southwest Asia than in Europe, where it was originally formed due to the regions poor record of genuine multilateral cooperation and bilateral relationships.

2 The Energy Charter Treaty has been signed or acceded to by 51 states, the European Community and Euratom. For the full list of the members, please see http://www.encharter.org/index.php?id=61.

Chapter I

Most countries in the region have been unable to efficiently exploit their natural energy resources despite often important fossil fuels deposits (mostly coal) and substantial hydropower potential.

The Energy Deficit in India and Pakistan

Lack of access to primary sources of energy, especially natural gas, insufficient power-generation capacities and poor governance of the energy sector, are key challenges for India and Pakistan, producing an increased frequency of electricity shortages. According to Indian government data, only 66.3 percent of the Indian population has access to electrical power.[3] In Pakistan less than 62.4 percent of inhabitants can regularly access electricity supplies.[4] Southwest Asia energy companies suffer tremendously from electricity shortages caused by lack of generation capacities, poor strategic planning to address energy needs and poor governance of existing energy infrastructure. Most countries in the region have been unable to efficiently exploit their natural energy resources despite often important fossil fuels deposits (mostly coal) and substantial hydropower potential.[5] At the same time, industrial development and GDP growth in the region, especially in India, are contributing to the overall energy deficit—in particular, to power shortages.

The Case of India

Even with last summer's huge power outages, caused by network failure, India has been in general more successful than Pakistan in addressing its energy deficit. This is particularly the case for electricity production, including securing sufficient access to natural gas. New Delhi took a more proactive stance in diversifying its energy/power generation mix, while equally developing both domestic production and import energy options. India also managed to make significant breakthroughs in renewable energy sources. It has a higher percentage of renewable energy in its electricity mix than Pakistan, where green energy (with the exception of hydropower) is virtually nonexistent.

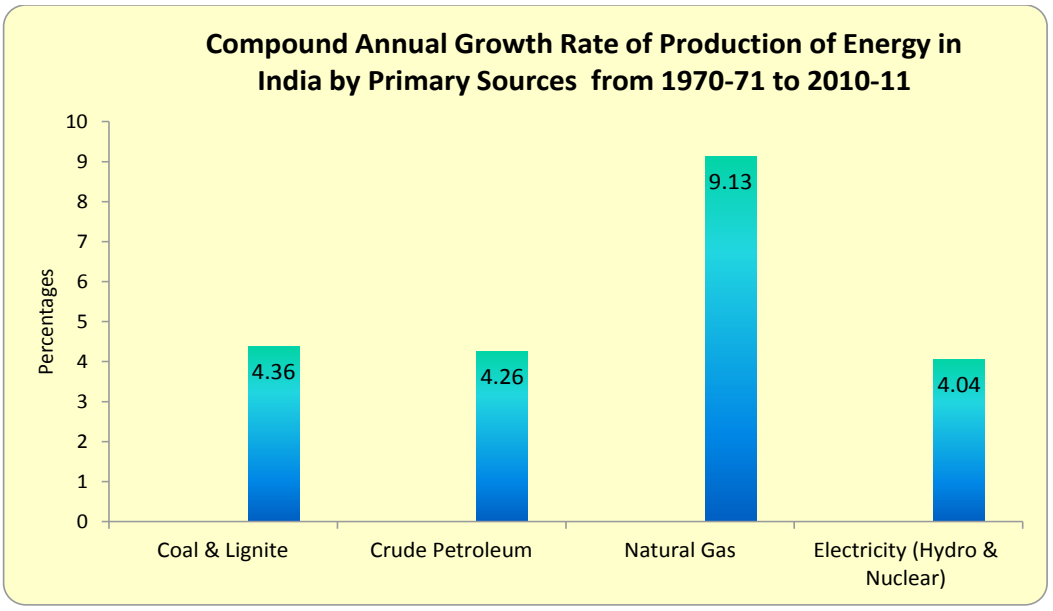
Indian energy companies such as GAIL (previously known as Gas Authority of India Limited, the country's largest gas supplier) and Oil and Natural Gas Corporation (ONGC) have strong strategic advantages when compared to their regional competitors from energy-importing countries.[6] They have substantial financial and technological resources, pro-

3 Indian Ministry of Statistics and Programme Implementation (MOSPI) data, 2011. http://mospi.nic.in.

4 Access to Electricity, World Bank, 2009. http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS/countries?display=default.

5 According to BP Statistical Review of World Energy 2012 India and Pakistan have respectively 60.6 and 2.07 billion tons of proved coal reserves. India has 800 million tons of oil reserves, while Pakistan has negligible oil deposits. In 2011, reserves of natural gas reached 1.2 trillion cubic meters (tcm) in India and 0.8 tcm in Pakistan. According to the World Bank 2009 data hydropower potential of India and Pakistan is respectively estimated at 150 Gigawatts (GW) and 30 GW of maximum level.

6 With a notable exception of Chinese energy enterprises which have been able at numerous occasions to outcompete India's oil and gas conglomerates.



Compound Annual Growth Rate of Production of Energy in India (Central Statistics Office, India)

duction assets both at home and abroad and access to energy supplies. Indian companies have been able to secure affordable supply contracts, which was not always the case for Pakistani energy firms. For example, GAIL signed two additional Liquefied Natural Gas (LNG) import contracts with Russia's Gazprom and U.S.-based Cheniere Energy in 2011.

India's electricity mix is quite diverse, but still heavily relies on the usage of fossil fuels in power generation. The thermal power stations account for 66.2 percent of electricity produced in India, while hydropower and nuclear respectively for 19.24 percent and 2.35 percent of the national electricity mix. Renewable energy sources (RES) which also include Small Hydro Projects (SHP) generate 12.07 percent of India's electricity.[7] Coal and gas account for respectively 56.54 percent and 9.18 percent of India's electricity production, with gas until recently the fastest growing component of the electricity mix.[8] In contrast to Pakistan, the share of expensive oil/petroleum imports in power generation is insignificant.

Though per capita gas consumption in India is not very high, natural gas is increasing its importance for India's economy as well. From 1970 to 2011, gas has been the fastest growing component of India's energy mix. Its compound annual growth rate reached 9.13 percent.[9] In 2009-10, gas consumption increased on average 21-22 percent per year and reached 61.9 bcm in 2010.[10]

However, India is experiencing growing difficulties in securing adequate growth of gas supplies, which starts to limit natural gas consumption, especially in the power generation sector. Overall, consumption of natural gas in India decreased in 2011 by 1.2 percent to 61.1 bcm after growing by over 20 percent in 2010.[11]

Still, India is in the same boat as Pakistan because of the growing importance of natural gas, its relative inability to cope with the rapidly growing gas demand, and its unwillingness to import excessive amounts of expensive LNG. As a result, India needs to seek to establish close relations with major regional energy exporters, including Qatar, Iran and especially Turkmenistan.

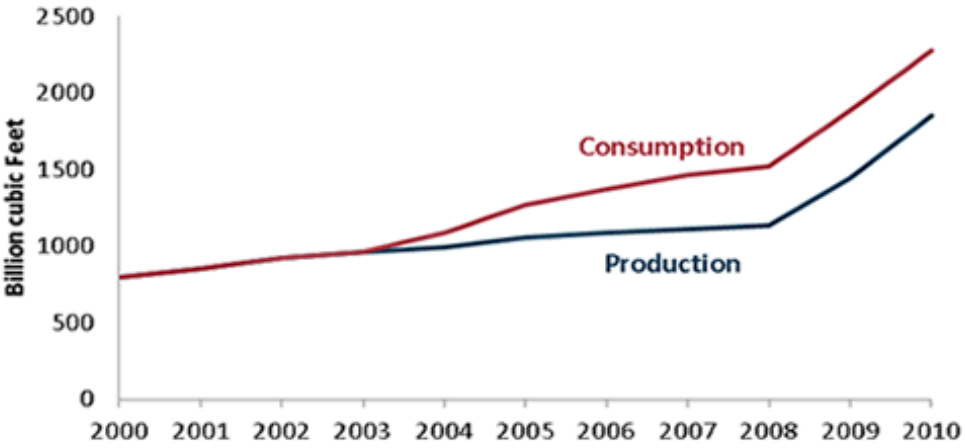
7 "Power Sector at a Glance "ALL INDIA" (as of March 31, 2012), India's Ministry of Power Statistics. http://www.powermin.nic.in/indian_electricity_scenario/introduction.htm.

8 Ibid.

9 "Energy Statistics 2012",Central Statistics Office of the Indian Ministry of Statistics and Programme Implementation, 2012, 26. http://mospi.nic.in/mospi_new/upload/Energy_Statistics_2012_28mar.pdf.

10 BP Statistical Review of the World Energy 2012, 23. www.bp.com/statisticalreview.

11 Ibid.



India's natural Gas Production and Consumption (U.S. Energy Information Administration, 2012)

The case of Pakistan

Estimates of the Planning Commission of Pakistan suggest that losses arising from electricity and natural gas shortages held down GDP growth by 3 to 4 percent in 2011-12.[12] These numbers are particularly important, considering the fact that overall GDP growth in Pakistan is forecast to reach only 3.6 percent in 2012 and 4 percent in 2013.[13] The shortage of electricity generation capacity at peak levels reached 5000 megawatts (MW) in 2011, the equivalent of more than 20 percent of Pakistan's power generation capacity (23,412 MW).[14]

Islamabad faces a series of energy-related challenges such as a mismatch between growing energy demands and stagnating domestic production. Poor governance has prevented Pakistan from a timely exploitation of its own considerable national energy resources, such as coal, hydropower and con ventional and unconventional natural gas. If current severe deficiencies of planning, administration and overall governance persist, the country's energy shortfall will reach a remarkable 50 million Tons of Oil Equivalent (TOE) or 56 bcm in gas equivalent by 2025-26 and will depress Pakistan's average GDP growth rate by 3 to 4 percent over the next 15 years![15] This is a dramatic perspective for both the country and the daily life of its citizens.

Natural gas is playing a key role in the country's energy balance. Until recently, consumption of natural gas has been growing rapidly in all sectors of the national economy, driven by cheap domestically produced gas sold under regulated prices.[16] The role of natural gas is particularly important in electricity generation: it accounts for 45.08 percent of Pakistan's thermal electricity production (of which oil is the largest thermal source with 54.57 percent).[17]

Potential investors find Pakistan's regulated pricing policy unattractive, leading to significant underinvestment in its gas sector. Insufficient exploration and a lack of conventional gas resources led to stagnation of domestic

12 "Asian Development Outlook 2012: Confronting Rising Inequality in Asia", Asian Development Bank, 2012, 180. http://www.adb.org/sites/default/files/pub/2012/ado2012.pdf.

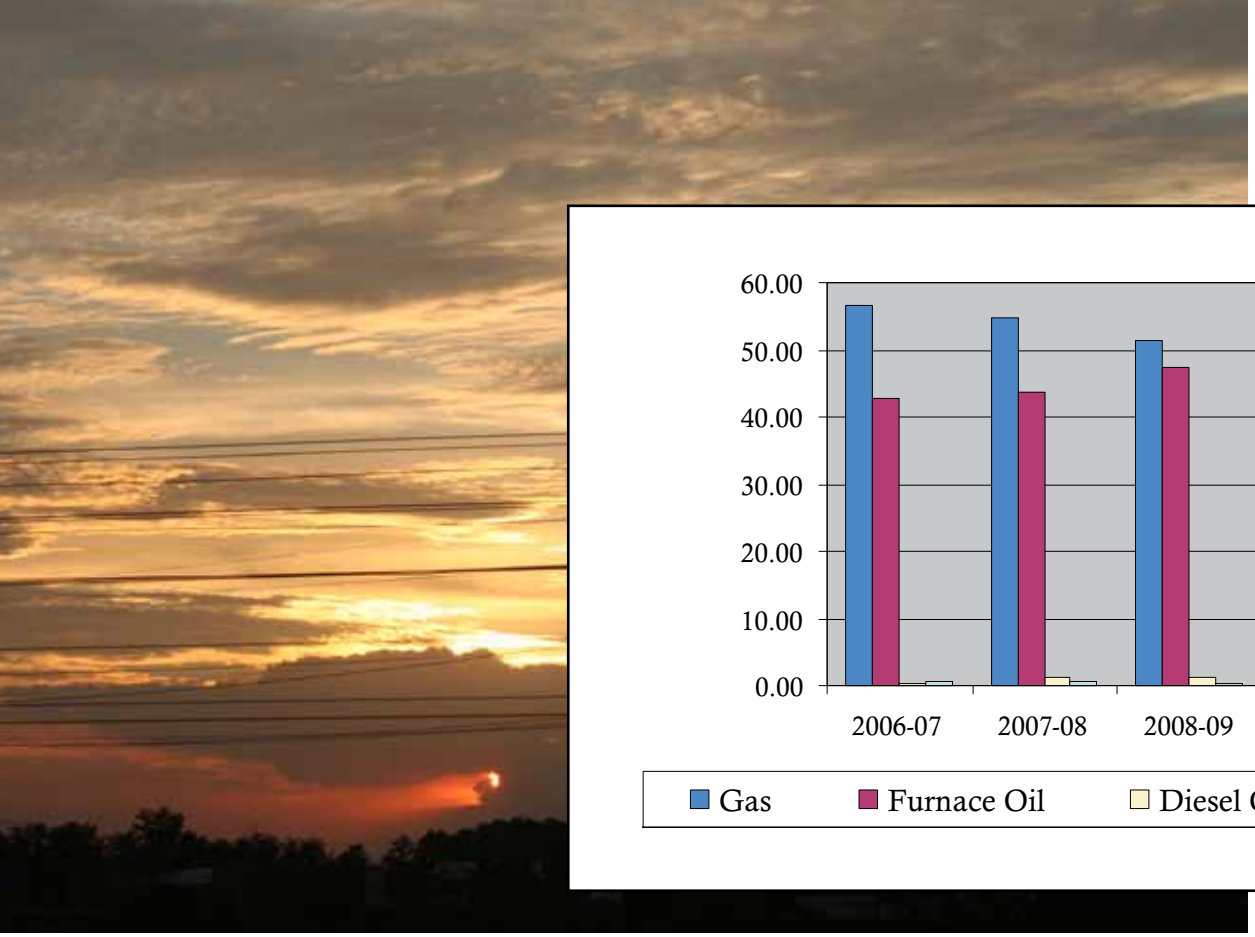
13 Ibid., p. 179.

14 "State of Industry Report 2011", National Electric Power Regulatory Authority (NEPRA) of Pakistan., p. 3. http://www.nepra.org.pk/Publications/State%20of%20Industry%20Reports/State%20of%20Industry%20Report%202011.pdf.

15 "Pakistan Energy Outlook (2010-11 to 2025-26)" Petroleum Institute of Pakistan, 2011, 2. http://www.pip.org.pk/.

16 Especially when compared to oil and petroleum products.

17 As of June 30, 2011 Pakistan had 23,412 MW of installed power generation capacity of which 16,070 MW (68.64 percent) was thermal, 6,555 MW (28.00 percent) was hydroelectric and 787 MW (3.36 percent) was nuclear.



Fuel Consumption for Thermal Power Generation (in percent) (State of Industry Report, National Electric Power Regulatory Authority of Pakistan)

gas production and consumption.[18]

Natural gas has traditionally dominated Pakistan's thermal power generation. However, stagnation of domestic production and increased competition for gas from the country's transport sector and producers of fertilizer has led to a considerable decline of the share of gas in the country's electricity production.[19] This, in turn, increased Pakistan's reliance on fuel oil for electricity generation.

The cost of one KWh produced from fuel oil increased by 40 percent, while the cost of one KWh produced from gas for the same period rose only by 8.86 percent.[20] Not surprisingly, the lack of natural gas supplies led to the increase in the overall cost of electricity production in Pakistan. The access to natural gas both at home and abroad is clearly becoming a crucial challenge for the country. Islamabad can get access to gas either by developing its indigenous resources or importing gas. Due to the geological, operational and financial constraints, the fast development of domestic gas reserves in Pakistan is not feasible. Pakistan's State of Industry Report 2011 rightfully stresses that Islamabad should seriously consider LNG maritime deliveries as well as (land-based) "pipeline gas imports from other regional countries including Iran and Turkmenistan."[21]

18 Understanding these challenges, the government of Pakistan reduced the fiscal burden in the framework of the new Petroleum Policy 2012. New policy has been approved by the Council of Common Interests and announced by the Federal Minister for Petroleum and Natural Resources on August 27, 2012. On October 3, 2012, Dr. Asim Hussain, Prime Minister's Special Advisor for Ministry of Petroleum and Natural Resources also rather unexpectedly revealed Pakistan's plans to start importing 2 bcm per year of LNG within next 12 – 18 months. On October 4, 2012, the Pakistan Tribune announced that the Economic Coordination Committee of Pakistan has approved a plan to import 10 bcm per year of LNG supplies. Even though these plans could partly alleviate energy deficit in the south of Pakistan, it is highly unlikely that those supplies would be able to fully cover Pakistan's growing demands of natural gas.

19 The amount of electricity generated by natural gas fell from 17400 GWh in 2005-06 to about 10000 GWh in 2009-10, followed by increased in oil-based electricity generation. See "State of Industry Report 2011", National Electric Power Regulatory Authority (NEPRA) of Pakistan., p. 11. http://www.nepra.org.pk/Publications/State%20of%20Industry%20Reports/State%20of%20Industry%20Report%202011.pdf.

20 Ibid.

21 Ibid. p. 11.

NATURAL GAS AS A "GAME CHANGER" IN SOUTHWEST ASIA

Gas is the best source of energy to secure flexible generation and back-up capacity for national power generation and apt to address chronic energy shortages in Southwest Asian countries.

The International Energy Agency (IEA) stressed that gas is a "particularly attractive fuel for countries and regions, such as China, India and the Middle East, which are rapidly urbanizing and need to satisfy their increased energy demand."[22] The majority of power generation facilities in these regions are environmentally unfriendly coal-fired power plants, which is the cheapest option for countries with developed coal potential such as China and India.[23] Regional electricity production is also based on oil, considered to be the most expensive fossil fuel used in electricity production.[24]

From a power generation perspective, gas is the best source of energy to secure flexible generation and back-up capacity for national power generation and apt to address chronic energy shortages in Southwest Asian countries. On an industrial scale, combined cycle, gas-fired turbines are the most efficient way of producing electricity. These installations adapt quickly to shifts between low and high demands. This is not the case for other sources of power generation. Moreover, gas turbines have low construction costs—a relevant point for many countries experiencing difficulties in attracting investors to their energy sector.[25]

Hydropower is, in principle, a good alternative to gas to satisfy at least part of the increasing demand for energy and could provide relatively cheap electricity for countries in this region. However, the construction of dams to establish necessary reservoirs is extremely expensive. Hydropower facilities can also disrupt regional water balance, create water deficits and complicate already sensitive relations between upstream and downstream countries. EWI's paper "Making Most of Afghanistan's River Basins" illuminates these issues for the Amu Darya Basin area.[26] The analysis found there is relevant for other trans-boundary river basins of the region.

Nuclear energy has very high investment costs and a number of serious challenges linked with security and safety of nuclear power plants in densely populated areas. Treatment and disposal of spent nuclear fuel is also an important issue, negatively impacting public perception of nuclear power plants. Green electricity produced from wind and solar could theoretically be competitive if compared to diesel-based generators. However, its share in the regional energy mix to date is low. Renewable energy sources, like solar and wind, would not be able to address the energy deficits in Pakistan and India anytime soon. Green electricity also requires costly investments, including special electricity grids. Neither solar nor wind can provide a stable electricity flow and they both require back-up power generation capacity.

All of this means that natural gas is the best choice for addressing the increased energy needs of Pakistan and India. These countries are located geographically close to the region's biggest gas reserves holders—Iran, Qatar and Turkmenistan. BP Statistical Review of World Energy 2012 estimates that Iran has 33.1 trillion cubic meters (tcm), Qatar has 25 tcm and Turkmenistan up to 24.3 tcm of natural gas reserves. The deposits of Turkmenistan and Iran could theoretically provide enough gas to feed the energy-hungry economies of Pakistan, India and possibly even China for decades to come.

22 "Are We Entering a Golden Age for Gas? A Special Report", IEA, 2011, 7. http://www.iea.org/publications/freepublications/publication/WEO2011_GoldenAgeofGasReport.pdf.

23 This is for instance the case of India, where coal and lignite account for 52 percent of overall electricity production. China's electricity sector is also dominated by coal. Pakistan, despite its sizable coal potential (Thar coal deposits) was until present unable to develop a full scale industrial extraction of Thar coal.

24 Pakistan's electricity sector is heavily dependent on expensive fuel oil. Oil and petroleum products generated 34.5 percent of Pakistan's electricity production in the fiscal year 2010-2011.

25 The cost of gas-fired power generation facilities is generally less than 0.8 million euro per MW of installed capacity.

26 See http://www.ewi.info/making-most-afghanistans-river-basins.

Chapter II

Major centers of energy consumption in Pakistan and India are in close proximity to the major producers of gas (Iran, Qatar and Turkmenistan) and hydroelectricity (Kyrgyzstan and Tajikistan).

A Promising Neighborhood: The Role of Central Asian Countries, Qatar and Iran in Providing Energy Security for India and Pakistan

There is no shortage of energy resources in the Southwest Asia-Central Asia region. Natural gas is abundantly available in this part of the world. Major centers of energy consumption in Pakistan and India are in close proximity to the major producers of gas (Iran, Qatar and Turkmenistan) and hydroelectricity (Kyrgyzstan and Tajikistan).

Iranian gas can be delivered directly to Pakistan and then on to India via pipeline, while gas supplies from Turkmenistan have to be transported via Afghanistan. Qatar LNG is already exported to India.[27] Hydroelectricity installations in Kyrgyzstan and Tajikistan are close (500–600 km) to Pakistan's major power consumption area in Peshawar and could respond to energy shortages in that country.[28] But several obstacles outweigh the advantages that geography offers.

The case of natural gas: Iran, Qatar and Turkmenistan as major supply sources

Iran

Iran sits on the world's second largest proven gas reserves and has enough natural gas to easily satisfy Pakistan and India's growing energy needs.[29] Tehran is also ready to offer attractive prices for natural gas exports.[30] However, international sanctions have de facto removed Tehran from the regional energy landscape.

Even if sanctions against Iran were lifted, it would take at least 5 to 10 years to substantially increase its gas exports. For too many years, there has been an absence of sufficient investment in the Iranian national gas sector. In 2011, Iran had to import 10.6 bcm of natural gas and exported only 9.1 bcm. It is ironic that the country with the world's second largest gas reserves of 33.1 tcm (allowing for 220 years of production at the current rate) is for the time being a net gas importer.

The gap between natural gas consumption and production in Iran appears even to be growing. Production of natural gas in Iran grew in 2011 by 3.9 percent to 151.8 bcm, while consumption increased by 6.1 percent to 153.3 bcm. There are also significant regional imbalances inside Iran between the country's energy-rich south and its energy-poor, yet densely-populated north. This imbalance is aggravated by an insufficient interconnection of regional gas grids. Northern Iran is even experiencing serious seasonal energy deficits, forcing this part of the country to look for external sources of natural gas supplies. In 2011, Iran requested from Turkmenistan 20 bcm for its northern provinces, but man-

27 India annually buys up to 13 bcm in LNG from Qatar.

28 Electricity that flows from the Central Asian states will also have to transit via Northern Afghanistan.

29 According to the estimates published by BP Strategic Review of World Energy 2012, Iran's proven natural gas reserves amounted to 33.1 tcm or 15.9 percent of the world's total gas stocks.

30 For example, Iran is ready to supply gas for $380 per 1000 cubic meters (cm) or even cheaper, while Turkmenistan gas will cost $450 – $460 per 1000 cm and Qatari liquefied natural gas supplies could reach $525 - $630 per 1000 cm.

aged to purchase only 10.2 bcm. These issues are likely to heavily affect the ability to export sufficient amounts of natural gas even after sanctions end.

Qatar

Qatar has the world's third largest reserves of natural gas. Its growing export capacity is, in principle, a potential alternative to Iran's gas resources. Qatar has 25 tcm of gas reserves and can export up to 77 million tons (over 102.6 bcm) of LNG and 19.2 bcm of pipeline gas. Over 90 percent of Qatari gas exports go to the United Arab Emirates, while LNG is primarily sold to the UK (21.9 bcm), Japan (15.8 bcm), India (13 bcm) and South Korea (11.1 bcm).[31] New Delhi is eager to further increase LNG supplies from this Gulf state.

Qatar decided to seal its production capacity at the level of 115–120 bcm per year, at least until 2015. Doha might be willing to sell more gas to New Delhi but at a prohibitively high price. India will have to compete with Japan and South Korea, who are accustomed to very high prices for their LNG imports. These steep prices make Qatar a secondary source of gas supplies for India. India could have access to the "second wave" of LNG supplies from Australia, "third wave" from West Africa and eventually from the U.S. shale gas supplies. However, these are unlikely to fully satisfy natural gas demand in northwest India—a perfect market for TAPI supplies from Turkmenistan.

Pakistan has also considered LNG supplies from Qatar. Since 2009, Islamabad had been in talks with Doha regarding deliveries of Qatari LNG. According to a Memorandum of Understanding signed in February 2012, Pakistan was planning to import up to 5.1 bcm per year of Qatari natural gas. However, several media sources announced in May 2012 that Pakistan is likely to cancel the deal due to Qatar's high price ($630 per mcm).[32]

Another reason behind the eventual cancellation of the deal may be Pakistan's inability to proceed with the timely construction of an import infrastructure. Several attempts to build an LNG import facility have been marred by setbacks and problems, including political favoritism. In November 2011, Interfax reported that Pakistan's government initially awarded GDF Suez, a French energy company, a contract in February 2010 to supply up to 5.2 bcm per year to the planned LNG terminal at Port Qasim in Karachi. But the Supreme Court of Pakistan annulled the agreement in April of the same year, claiming that the Ministry of Petroleum & Natural Resources had bypassed a lower bid by Fauji Foundation, an investment group run by former Pakistani military officers and Vitol, an energy trading company.[33] This development deterred foreign investors and may also explain Qatar's decision to charge excessively high prices for its LNG deliveries to Pakistan.

In the absence of Iran and Qatar, Pakistan and India have few other options but to consider imports of natural gas from Turkmenistan and hydroelectricity from Kyrgyzstan and Tajikistan to satisfy their energy needs.

Turkmenistan

Turkmenistan is one of the most resource-rich, yet sparsely populated (5.1 million) countries in the world. It has an abundance of natural gas. According to new estimates recently released by BP Statistical Review of the World Energy 2012, Turkmenistan's gas deposits, the world's fourth largest, reach 24.3 trillion cubic meters.[34]

Courted by numerous clients, Turkmenistan has a vast choice of export options and is already selling its gas to Russia, Iran and China. In 2011, Turkmen gas exports to Russia reached 10.1 bcm, 10.2 bcm to Iran, and 15.5 bcm to China.[35]

Natural gas production in Turkmenistan reached 59.5 bcm in 2011, a solid 40.6 percent growth compared to 2010.[36] Nevertheless, this is far from the record number of 66.1 bcm produced in 2008. The decline in the post-2008 period is explained by Gazprom's

31 BP Statistical Review of the World Energy 2012, 28-29. www.bp.com/statisticalreview. Compiled data, Interfax Global Energy Services.

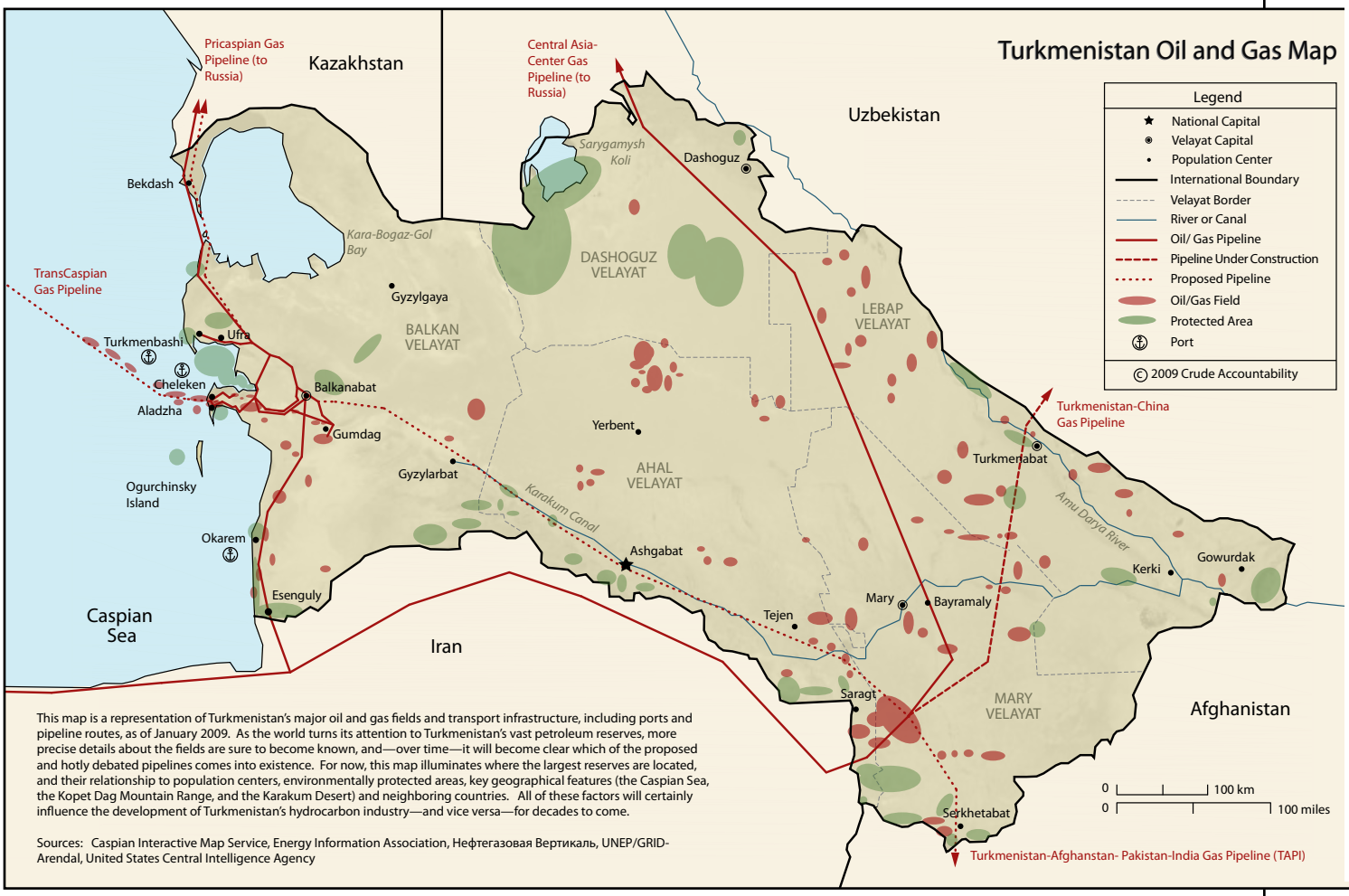
32 Ahmad Ahmadani, "Pakistan close to scrapping Qatari LNG import plans," *The Nation*, May 10, 2012. www.nation.com.pk/.

33 Sara Stefanini, "Claims of Favoritism Dog Pakistan LNG", *Interfax Natural Gas Daily*, November 3, 2011. www.interfaxenergy.com.

34 Natural gas reserve estimates are available in BP Statistical Review of World Energy 2012, 20-21. www.bp.com/statisticalreview. The numbers on Turkmenistan however are still not universally accepted by the specialists.

35 BP Statistical Review of the World Energy 2012, 28-29. www.bp.com/statisticalreview. Compiled data, Interfax Global Energy Services. www.interfaxenergy.com.

36 BP Statistical Review of the World Energy 2012, 22. www.bp.com/statisticalreview.



Turkmenistan Oil and Gas Map (Crude Accountability, 2011)

unwillingness to buy large quantities of Turkmen gas during the period of decreased energy demand from Europe.[37] China is now importing the gas that was previously contracted by Russia.

In theory, Turkmenistan has enough gas to offer it to all of its existing and potential clients, including India and Pakistan. Even back in the late 1980s, Turkmenistan was already producing up to 90 bcm, exploiting a significantly smaller natural gas resource base. However, Turkmenistan's additional export capability is dependent on whether it can rapidly increase its production capacity above the ceiling of 110 bcm per year by 2015 through 2018.[38]

The case of hydropower: Kyrgyzstan and Tajikistan as additional sources of energy

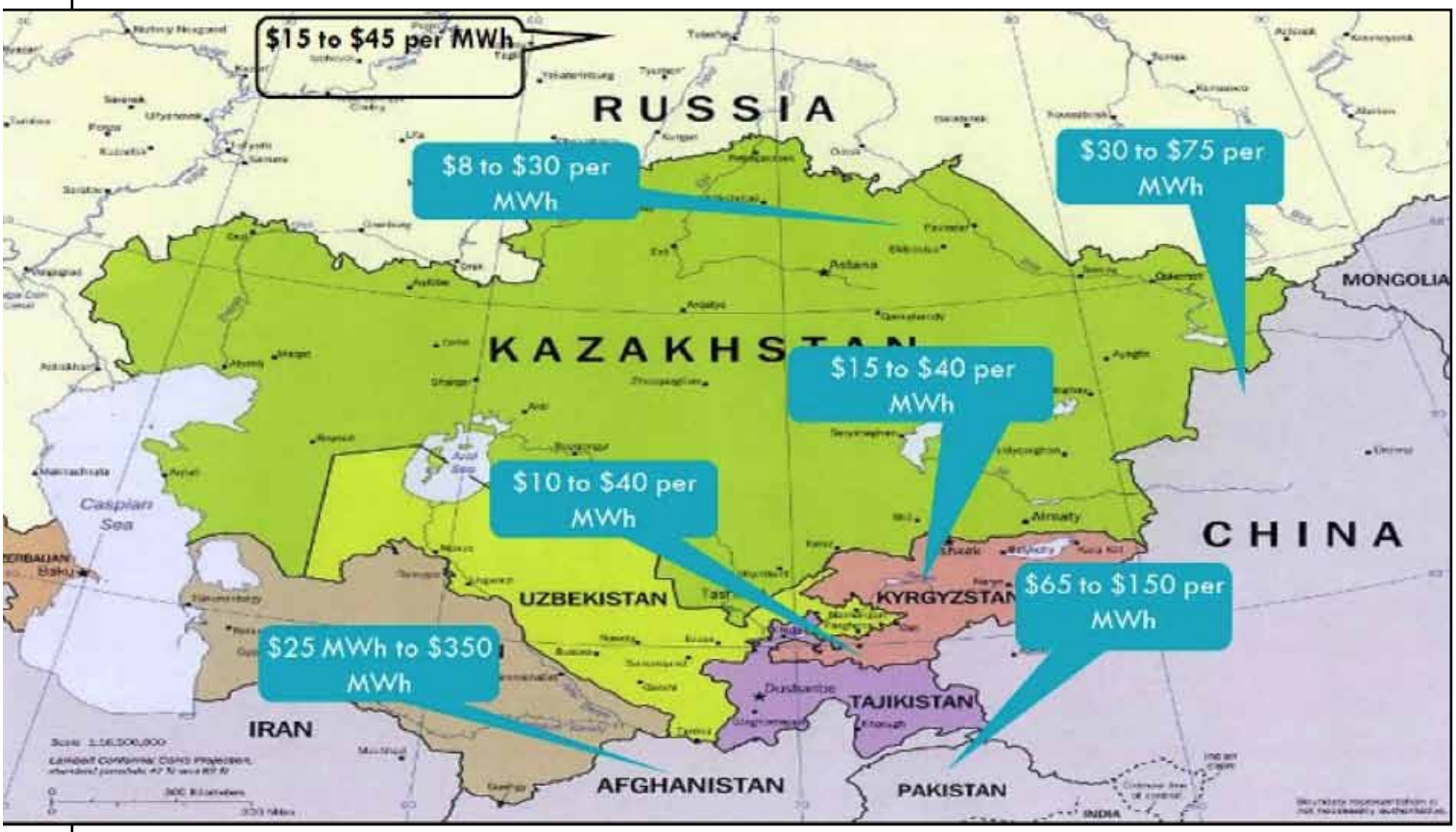
Hydropower supplies from Central Asia can only play a supplementary role when compared to natural gas supplies from Turkmenistan. The amount of energy which can be supplied via CASA 1000 is much less significant than gas delivered via TAPI. Furthermore, it is too early to say how much progress Kyrgyzstan and Tajikistan will make with the development of their hydropower potential.

Despite the pivotal role played by gas and challenges faced by hydropower, Kyrgyzstan and Tajikistan could serve as an additional source of seasonal peak-load supplies of hydroelectricity to Pakistan. For India, however, Central Asia electricity is too far away and would cost too much to be a viable option.

Tajikistan alone could produce 527 billion KWh per year of electricity from its natural hy-

37 According to the contract with national gas company Turkmengaz, Gazprom is re-selling Turkmen gas to Europe for a small commission.

38 Estimates of natural gas production growth were provided in a presentation on "The Gas Supply Options from Turkmenistan" delivered by Jim Gillet from Gaffney, Cline & Associates at the CIS Oil & Gas Summit in Paris on May 15, 2012. http://core.theenergyexchange.co.uk/s326/.



dropower potential, which is still significantly underutilized. It is expected that Tajikistan's hydroelectricity production will only reach 26.4 billion KWh in 2015. Even this "modest" output will allow Dushanbe to export up to 5 billion KWh per year by 2015.[39] Tajikistan has already started discussions with Afghanistan regarding the seasonal export of its hydroelectricity surplus. Tajikistan, as a major hydroelectricity actor, should become one of the key electricity providers for CASA 1000.

Kyrgyzstan has the third largest hydropower potential (142 billion KWh) of the former Soviet Republics after Russia and Tajikistan. Hydropower largely dominates the electricity mix in this country and provides numerous opportunities for export.[40] Electricity exports are expected to rise from 1.47 billion KWh in 2010 to 6.9 billion KWh in 2020, and some of the electricity surplus can be shipped via CASA 1000 to Afghanistan and Pakistan.

Natural gas clearly plays the role of a "game changer" for better energy security in India and Pakistan due to its abundance and geographic proximity to consumer markets. Hydroelectricity can play an important complementary role, in particular for Pakistan, due to the substantive price differential between cheap hydroelectricity in Central Asia and expensive petroleum-based power generation in Pakistan.

The adjoining map illustrates this. Thanks to its developed nuclear and hydropower sectors, Kazakhstan produces electricity at $8 to $15 per MWh. In Kyrgyzstan and Tajikistan, where electricity is predominately produced via hydropower, the cost of electricity production varies from $10/$15 to $40 per MWh, with the lower range reflecting the cost of hydropower and the higher range the cost of coal-fired thermal electricity. In Afghanistan and Pakistan, the cost of electricity production ranges respectively from $25 to $350 per MWh and $65 to $150 per MWh. The lower range reflects the production costs of hydropower and the higher range the cost of electricity produced from oil and diesel. Since electricity generation based on oil and diesel

39 "Elektroenergetika Tajikistana – Nastoyashee I Budushee (Tajikistan's Power Sector: Current and Future Trends)," a presentation by Rustam Rakhimov, Head of Investor and International Relations at Barki Tochik, Tajik Sate Energy Company at 7th Meeting of the ECT Task Force on Regional Energy Cooperation in Central and Southern Asia, Bishkek, June 23, 2011. http://www.encharter.org/fileadmin/user_upload/Conferences/2011_June/Rustam_Rakhimov.pdf.

40 Hydropower accounts for 3070 MW out of 3786 MW of Kyrgyzstan's installed power generation capacity.

COUNTRY	COST OF ELECTRICITY GENERATION
AFGANISTAN	$25 - $350 per MWh
KYRGYZSTAN	$15 - $40 per MWh
PAKISTAN	$ 65 - $150 per MWh
TAJIKISTAN	$ 10 - $ 40 per MWh

Power Generation in the Central Asia and Southwest Asia
(casa-1000.com)

dominates the energy sector in Afghanistan and is responsible for over 35 percent of electricity production in Pakistan, an important share of electricity in these countries is generated at a high cost of $150 to $350 per MWh, illustrating the need to have more access to cost effective hydropower.

Central Asian electricity sold to Islamabad at a significant discount, as compared to the electricity produced by oil-fired power plants, would allow Pakistan to gain access to considerably cheaper electricity. These considerations underline the relevance for the CASA 1000 project, particularly for Pakistan. Electricity flows through CASA 1000 from Tajikistan and Kyrgyzstan will also reduce the demand for new power stations in Pakistan. The country can save on construction costs. In addition, if Islamabad can increase its gas imports, it will have more leverage in price negotiations with Tajikistan and Kyrgyzstan for electricity supplies generated by hydropower. Turkmen gas used in Pakistan's power sector would bring electricity prices down, thus forcing Central Asia hydropower producers to keep their electricity export prices relatively low.

U.S. AND CHINA'S VISIONS OF THE NEW "SILK ROAD"

The "New Silk Road Strategy" promotes Afghanistan as a regional trade and transit hub. This strategy argues that the development of new transport and energy corridors will strengthen economic, political and social ties between Central Asia and South Asia and contribute to the economic and social development of Afghanistan. The concept of the "New Silk Road Strategy" in its present version was unveiled by Secretary of State Hillary Clinton in her speech "India and the United States: A Vision for the 21st Century," presented in Chennai, India, on July 20, 2011.[41] In that address she gave explicit U.S. backing to TAPI as a part of this strategy.[42]

The "New Silk Road Strategy" was formally launched as a policy initiative at the Ministerial Meeting in New York on September 23, 2011.[43] China could see this as a latent challenge to its energy interests in Central Asia—Beijing's "strategic backyard," which provides energy and resources to a fast growing national economy. China also has a set of coherent policy imperatives, which could be labeled as its unofficial "Silk Road strategy." The two most important components of China's "Silk Road strategy" are:

> Access to Central Asia's oil and gas deposits with an ultimate goal of connecting Iran's hydrocarbon resources to the China-oriented pipeline network in Central Asia.
>
> A transport corridor giving China direct access to the Indian Ocean and the energy resources of the Middle East and Central Asia China. Beijing sees the main passages for energy shipments, the Malacca Strait and the Strait of Hormuz, as prone to security risks. The use of this alternative transport corridor would mitigate those risks.

The different approaches to a "Silk Road" concept by the U.S. and China are clearly illustrated by the two different geographic axes of the concepts (in the case of China: Iran-Central Asia-China; in the case of the U.S.: Central Asia-Afghanistan-Pakistan-India), shaping the strategic directions for transportation of goods and energy/natural resources.

41 Remarks on "India and the United States: A Vision for the 21st Century" by Secretary Hillary Rodham Clinton, Chennai, India, July 20, 2011, U.S. State Department. http://www.state.gov/secretary/rm/2011/07/168840.htm.

42 Ibid.

43 The Ministerial Meeting on the New Silk Road held in New Yor on September 22, 2011, German Federal Foreign Office. http://www.auswaertiges-amt.de/cae/servlet/contentblob/596552/publicationFile/158538/110922-NewSilkRoad-Erklaerung.pdf;jsessionid=0072C2BAC6F13377F7472529D567C7A7.

The income from transit of electricity and natural gas could contribute to the internal stability of Afghanistan.

The trans-Afghan Energy Corridor

Natural gas and electricity supplies from Central Asia have to pass via Afghanistan to reach Pakistan and India.[44] The trans-Afghan transit corridor consists of the planned TAPI gas pipeline and the CASA 1000 electricity network. In the absence of Iranian gas supplies, it is the shortest route between resource rich Central Asia and major energy consumption centers in India and Pakistan.

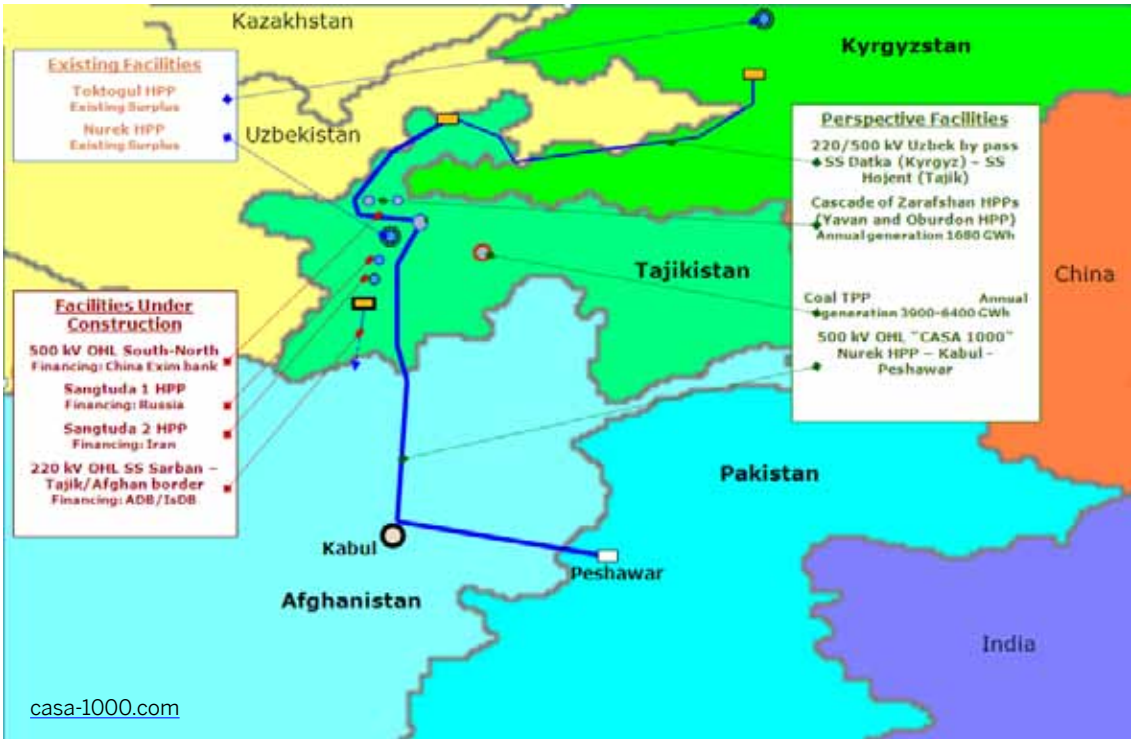
The precarious security situation in Afghanistan and the inability of the central government in Kabul to enforce its authority in the country's central and southern provinces have prevented these projects from becoming a reality. Armed conflicts have a very damaging effect on fuel transportation via pipelines and raise transit costs associated with insurance and reparation of damaged pipeline infrastructure. A case in point is the Arish-Ashkelon pipeline, which provides Egyptian gas to Israel, but for the time being is out of operation primarily due to frequent terrorist attacks.

Governance issues represent another significant political challenge. It would be very difficult for the future operators of TAPI to agree with political forces on the ground, if those forces do not come to some sort of uniform agreement on the Afghan segment of the pipeline.

Yet, despite these very real obstacles, the signing of the TAPI Agreement offers Afghanistan an opportunity to become an important transit hub for the regional energy flow. The income from transit of electricity and natural gas could contribute to the internal stability of Afghanistan. It is in the interest of Kabul to work closer with all relevant parties—not only Ashgabat, Islamabad and New Delhi, but also with Beijing —in order to proceed with a steady development of the trans-Afghan energy corridor.

Natural Gas Infrastructure and Major Fields
(World Energy Outlook 2010, OECD/IEA 2010)

44 International sanctions regime removes Iran from the list of potential transit states.



Beijing is the world's largest energy consumer and Chinese energy companies are among the top "movers and shakers" in the Central Asia region.

The competition for Turkmen gas: China's crucial role

China's relationship with Turkmenistan as a consumer of the country's gas is another important factor affecting regional energy politics. Beijing is the world's largest energy consumer and Chinese energy companies are among the top "movers and shakers" in the Central Asia region. China is already the second largest importer of Central Asian gas and will soon overtake Russia —currently the largest buyer of gas in this part of the world. [45]

Various IEA estimates show that China's gas imports will reach 109 bcm by 2017. Central Asia's supplies, predominantly from Turkmenistan, will therefore account for at least 60 pecent of China's natural gas imports by around 2017– 2018.[46] This trend will increase Ashgabat's already important role in Beijing's energy agenda.

In 2011, the China National Petroleum Corporation (CNPC) imported 15.5 bcm (or 50 percent of total Chinese imports) of gas from Turkmenistan and is expected to have increased its imports to 24.1 bcm in 2012. Since December 2009, China has already received around 30 bcm of natural gas from Turkmenistan.[47] On June 7, 2012, Interfax reported that CNPC and Turkmenistan's state gas company Turkmengaz have signed an agreement for China to receive additional supplies of up to 65 bcm per year of Turkmen gas.[48]

At present, most of Turkmen gas imported by China comes from the Bagtyyarlyk field on the right bank of the Amu Darya River, developed by CNPC under a Product Sharing Agreement. According to the CNPC data, Bagtyyarlyk will provide 13 bcm per year of gas by 2014 and its production capacity is unlikely to be substantially increased in the near future. This means that by 2015, up to 52 bcm of gas exported to China will have to come from other gas deposits in Turkmenistan.

Unless new production capacities are established, there may not be enough Turkmen gas for TAPI. Factors affecting Turkmen gas availability include: Chinese imports of 65 bcm of Turkmen gas planned for 2015; continued Russian and Iranian purchases of on average

45 Currently, China imports natural gas predominantly from Turkmenistan.

46 Author's estimates based on the IEA data compiled from "World Energy Outlook 2011", IEA, 2011. www.worldenergyoutlook.org and "Are We Entering A Golden Age of Gas?" IEA, 2011. http://www.worldenergyoutlook.org/goldenageofgas/.

47 "China's imports of Turkmen gas since 2009 totals 30 Bcm: CNPC", *Platts*, Singapore, June 4, 2012. http://www.platts.com/RSSFeedDetailedNews/RSSFeed/NaturalGas/7686814.

48 "Turkmenistan to export 65 bcm of gas to China annually", *Interfax Natural Gas Daily*, London, June 7, 2012. www.interfaxenergy.com.

It is clearly not in Beijing's interest to share Turkmenistan's gas given its rapidly growing energy needs, unless, of course, Turkmenistan is able to rapidly increase gas production.

30 bcm per year around 2014–15; the possibility of Turkmen gas supplies to Europe via the trans-Caspian pipeline[49] and the continued requirements of the domestic Turkmen market of about 20 bcm per year. Even if the South Yolotan/Galkynysh field in the southeast Turkmenistan is operational, Turkmenistan might produce only 110 bcm by 2015.[50]

It is safe to assume that this situation explains, at least partially, Beijing's reserve regarding the U.S.'s "New Silk Road Strategy." The concept puts all emphasis on the connectivity of Asian countries through Afghanistan—an idea that is bound not to please the Chinese who are wary of the potential competitors for Turkmen gas. It is clearly not in Beijing's interest to share Turkmenistan's gas given its rapidly growing energy needs, unless, of course, Turkmenistan is able to rapidly increase gas production.

Current energy planning in the region heavily depends on China's vested interests as a very major consumer of Turkmen gas. By comparison, India and Pakistan may be standing last on line for Turkmen gas if a joint consultative process with Turkmenistan, China and other consumers of Turkmen gas does not take place. This could be achieved through an international consortium designed to help Turkmenistan increase its gas production, with membership open to all relevant energy companies. This consortium should include China National Petroleum Company, Turkmengaz, Gail of India, Pakistan's Inter State gas Systems and other relevant companies.

49 The trans-Caspian pipeline if realized will transport at least 10 bcm per year of Turkmen gas to Europe via the Caspian Sea, South Caucasus and Turkey.

50 Number quoted in a presentation on "The Gas Supply Options from Turkmenistan" made by Jim Gillet, Gaffney, Cline & Associates at CIS Oil & Gas Summit on May 15, 2012. http://core.theenergyexchange.co.uk/s326/.

NATURAL GAS IN CHINA'S ENERGY MIX

Natural gas plays an increasingly important role in China's energy mix. National gas consumption grows on average 20 to 22 percent per year and by 2035 China's imports will reach 200 bcm, 6 times the volume to be transported by TAPI. Domestic demand for gas in China will grow from 110 bcm in 2010 to 500 bcm in 2035. Gas will account for up to 12 percent of China's energy mix in 2035 compared to 4 percent in 2011.[51]

The growth of gas consumption can be observed in real time. From January to November 2011 alone, China imported 28.1 bcm and produced 91.4 bcm of gas. According to the National Development and Reform Commission (NDRC), China's gas consumption reached in January-March 2012, 39 bcm, which represented a 19.7 percent year-on-year increase. Domestic production during the same period, however, rose only by 7.3 percent to 28.8 bcm.[52] There is a growing gap between China's natural gas consumption and domestic production that will have to be closed by increasing imports. Until now, China has been more successful than India and Pakistan in securing its natural gas and energy supplies. Contrary to Islamabad and New Delhi, Beijing has never had to reduce its gas consumption due to a lack of supplies.

51 Data compiled from "World Energy Outlook 2011", IEA, 2011. www.worldenergyoutlook.org.

52 The data is quoted in "China's NDRC Submits 12th Five Year Plan Gas Targets to Cabinet: Official," *Platts*, Singapore, May 9, 2012. http://www.platts.com/RSSFeedDetailedNews/RSSFeed/NaturalGas/7577740.

Chapter III

Towards Multilateral Energy Cooperation for the Region: Challenges and Opportunities

Politics in Central Asia and South Asia is characterized by a lack of genuine multilateral cooperation. So far, none of the numerous regional multilateral institutions is able to successfully tackle important political and economic challenges.

Although all regional institutions recognize the importance of energy, not one has effectively addressed energy cooperation. Competing interests, institutional weakness[53] and insufficient membership render institutions such as SAARC, ECO and others unfit to balance energy needs and energy interests in the region.

China, the world's largest energy consumer, has only observer status in the SAARC. The same is true for the region's largest natural gas and electricity suppliers—Iran, Kyrgyzstan, Tajikistan and Turkmenistan. Therefore, SAARC is not relevant for the implementation of TAPI and CASA 1000.

The Central Asia Regional Economic Cooperation Program (CAREC) does have geographically relevant membership and scope of action. CAREC addresses important energy issues such as efficient use of energy resources, energy-water linkage, regulations and contractual arrangements, and has a relevant set of supporters both among governments and international organizations. However, it does not directly deal with energy governance or energy cooperation issues. Its pillar on "Regulations and Contractual Arrangements" does not fully cover Central Asia-South Asia energy infrastructure connections.

The construction of TAPI and CASA 1000 and transit of gas and electricity via Afghanistan will require a multitude of political, regulatory and investment decisions. These challenges need to be addressed by regional decision makers. It will be necessary, not least in the interest of a faster implementation of these projects, to rely on internationally accepted energy transit regulations and mechanisms for investment protection.

Consequently, India and Pakistan should rethink their approaches towards energy governance and support "energy multilateralism" for the Tran–Afghan energy corridor. Potential gas and electricity suppliers such as Turkmenistan, Tajikistan and Kyrgyzstan are already full members of the ECT. Afghanistan, India and Pakistan should become full members of the ECT as well. Such actions could put TAPI and CASA 1000 in a homogeneous legal and regulatory framework that would facilitate uninterrupted energy supplies. The ECT could become an appropriate "umbrella" providing for regional "rules of the game."

The charter already has specific legally-binding rules regulating transit and trade in energy, energy-related environmental issues and dispute settlement/investor protection mechanisms. The fundamental aim of the ECT is to strengthen the rule of law on energy issues and create a level playing field.

This paper strongly supports the idea that the ECT, with its vast membership and relevant institutional mechanisms, could become the most appropriate and efficient institutional energy cooperation framework in the region. It has all the necessary instruments and institutions to promote regional energy cooperation and facilitate completion of transit infrastructure projects such as TAPI or CASA 1000.

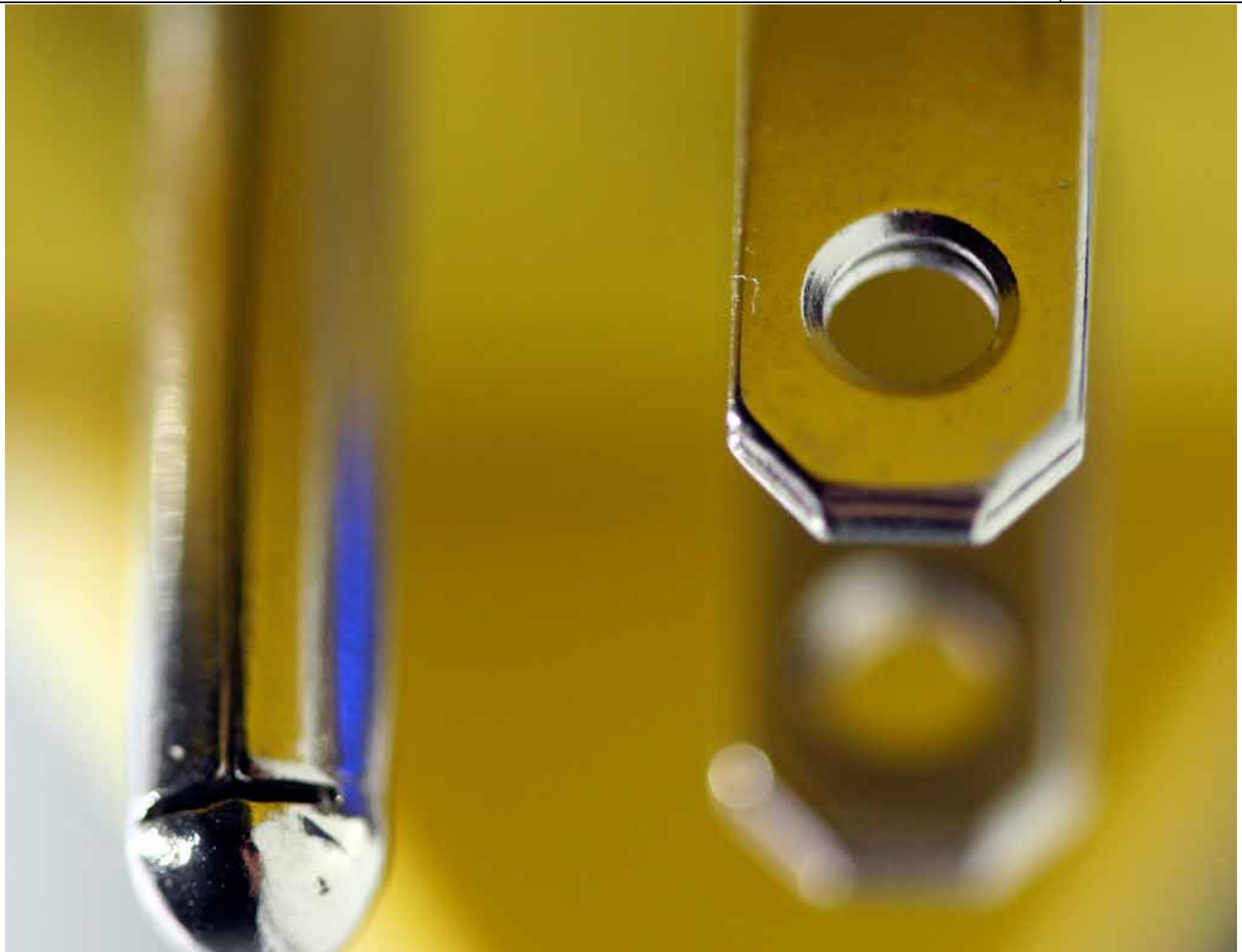
Though it was created especially for Europe and the Former Soviet Union, the ECT's provisions could become even more relevant in Southwest Asia. A stable uninterrupted flow of natural gas and electricity through Afghanistan is unachievable without a legally-binding, energy-transit regime, which could be provided via ECT Trade and Transit Group initiatives. Last but not least, the ECT investment protection mechanism could also help to re-establish international investors' confidence in the region's economic and regulatory policies.

This paper strongly supports the idea that the ECT, with its vast membership and relevant institutional mechanisms, could become the most appropriate and efficient institutional energy cooperation framework in the region.

53 The ECO could serve as an example of a multilateral framework suffering from institutional weakness.

ACRONYMNS

bcm	billion cubic meters
CAREC	Central Asia Regional Economic Cooperations
CASA-1000	Central Asia South Asia Regional Electricity Trade Project
CNPC	China National Petroleum Corporation
ECO	Economic Cooperation Organization
ECT	Energy Charter Treaty
IEA	International Energy Agency
GW (GW/h)	Gigawatt (Gigawatt/hour)
KW (KW/h)	Kilowatt (Kilowatt/hour)
LNG	liquefied natural gas
Mcm	thousand cubic meters
MOSPI	Indian Ministry of Statistics and Programme Implementation
MW (MW/h)	Megawatt (Megawatt/hour)
NDRC	National Development and Reform Commission of China
NEPRA	National Electric Power Regulatory Authority of Pakistan
ONGC	Oil and Natural Gas Corporation of India
RECCA	Regional Economic Cooperation Conference on Afghanistan
RES	renewable energy sources
SAARC	South Asian Association for Regional Cooperation
SHP	small hydropower projects
TAPI	Trans-Afghanistan Gas Pipeline
tcm	trillion cubic meters
TOE	tons of oil equivalent
WEO	World Energy Outlook



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Danila studied international relations, history and political economy in Paris, London and Nizhniy Novgorod (Russia). He has several post-graduate qualifications in international relations, including a PhD. Danila is the author of a number of academic publications and policy papers, and regularly contributes to international media and policy debates on EU, Russian and Eurasian energy, security and foreign policy. He also possesses several and professional distinctions, including being a Royal Dutch Shell and French Government scholar. Danila is a native Russian speaker and is fluent in English and French.

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