

As a result of international assistance, Afghanistan's electricity sector has expanded significantly. Although from a low base, Afghanistan's installed energy capacity has increased by around 139%, from approximately 430MW in 2001 to 1029MW in 2009, and the overall supply of electricity has almost tripled between 2006 and 2011. The major economic hubs of the country, including the cradle of the Taliban movement – Kandahar, Kabul and Herat enjoy a 24-hour supply of power for the first time in decades, according to the World Bank. In Kabul, 70% of households are connected, compared to 6% coverage in 2001. However, this progress has been driven by increasing dependence on electricity imports and costly diesel power which has been, thus far, procured and fully funded by donors. In 2011, electricity imports constituted almost 73% of Afghanistan's electricity supply, and electricity production from diesel power plants has almost tripled between 2009 and 2012. With donors' money scheduled to run out in 2013-2014, Afghanistan will face serious sustainability challenges in maintaining and expanding its energy sector. With the provision of electricity being at the heart of economic growth and one of the key weapons against insurgents, the inability to maintain and expand power is poised to have adverse effects not only on economic development but also on counterinsurgency strategy (COIN).

Access to electricity is at the heart of development, with economic growth and per capita electricity consumption being [correlated at 90%](#). The Afghanistan National Development Strategy (ANDS) recognizes this relationship by noting that "Energy is [Afghanistan's] top economic development priority, and [its] economy's hope," singling out electricity as "the motor that powers [Afghanistan's] growth."

Improvements in Afghanistan's electricity sector

Since the electricity sector constitutes about [77%](#) of commercial energy consumed in Afghanistan, it has been prioritized over other energy sub-sectors; the rehabilitation of electricity infrastructure, including increased power generation, power transmission capacity and upgraded electric distribution grids, is a main objective of the Afghan government and international donors. This goal has been translated into notable improvements in access, reliability and affordability of power supplies in Afghanistan. Based on the estimates of the Afghan Ministry of Energy and Water, as of 2012, around 30% of Afghans have access to electricity. This constitutes a notable improvement considering that, historically, Afghanistan never had power coverage of more than [22](#)

[%](#)
of its population.

In Afghanistan, total electricity [supply has nearly doubled](#) from 1894 million kWh in the fiscal year 2009-10 to 3579 kWh in 2011-12. Furthermore, data from the Afghan Energy Information Center (AEIC) indicates that, for instance, in 2006, 19 out of 45 power plants listed by the Center were not operational, while by 2011, only

[eight out of 45](#)
did not produce power.

Particularly in [major economic hubs](#) the supply of electricity has been marked by progress. Parts of Kabul, Herat, Mazar-e-Sharif, and Pul-e-Khumri, connected to the North East Power System (NEPS) which transmits power from Uzbekistan, have a

[24-hour power supply](#)
for the first time in decades. For instance, in Kabul, around

[70%](#)
of households are connected; while in 2001, only

[6%](#)

of Kabul city had access to electricity.

Also institutional capacity of Afghanistan's major public utility company, Da Afghanistan Breshna Sherkat (DABS) has improved. Albeit from a low base, services delivery has expanded and [metered connections](#) increased nearly three and a half times between 2003 and 2010, from 227,000 to 786,000 connections. Moreover, revenue collection of DABS-Kabul [has improved by 59%](#)

, and technical and commercial losses have decreased by 12% from 50% to 38%.

Shortcomings and sustainability challenges

Despite progress, the improvements outlined above have been unevenly distributed, while also facing serious sustainability issues. Despite the overall increase in energy supply, the figures mask considerable differences between electricity coverage in rural and urban areas. For instance, only around 9% of rural population which constitutes more than 70% of Afghans has access to electricity and instead relies on [self-supplied](#) energy sources, using wood, dung and other biomass for fuel. In contrast, the remaining less than 30% of Afghans who live in urban areas have electrification coverage estimated to be more than 70%, including electricity generated from privately owned diesel-power generators. Moreover, the coverage is heavily concentrated. For instance, the [60%](#)

of the country's connections and installed power generation capacity is concentrated in the capital, Kabul. The

[greater Kabul region](#)

also accounts for approximately 50% of the Afghanistan's overall electricity consumption.

As the figures below illustrate, the improvement in overall electricity supply further conceal a skyrocketing increase in electricity imports from neighboring Central Asian countries with imports of electricity nearly tripling between 2009 and 2012. In 2011, electricity imports constituted almost [73%](#) of Afghanistan's electricity based on data from the AEIC. In comparison, imports constituted only 33.5% in 2006. In contrast, domestic production has actually been on a decrease since 2009 due to a decrease in power production from thermal sources and stalled production from hydro sources (Figure 1). For instance, in

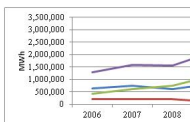
[2006](#)

domestically generated hydro and thermal power accounted for nearly 50% and 17% of power production respectively; whereas in

[2011](#)

hydro power constituted only 26% and thermal power 1.3% of the annual power production.

Figure 1. Afghanistan Annual Domestic Energy Production and Imports (2006-2011)



Source: Compiled by the Author, [Afghan Energy Information Center](#) Figure 2.
Afghanistan Electricity Imports by Country of Origin (2006 – 2011)

Source: Compiled by the Author, Afghan Energy Information Center Sustainability

Despite the improvements, an audit conducted by the Office of the Special Inspector General for Afghanistan Reconstruction (SIGAR) indicates that Afghanistan “faces several sustainability challenges in maintaining and growing its energy supply.” Along similar lines, Clare Lockhart, a former UN adviser in Afghanistan, pointed out that, “[t]here has been an enormous amount of

investment, and there has been some progress, but the outcome is far less than the input.”

Insufficient Infrastructure

Despite demand [outpacing supply](#), the existing transmission network is inadequate to handle all the available supply from neighbors like Uzbekistan and Tajikistan. Power sharing agreements between Afghanistan and its neighboring countries for instance indicate that based on the current agreements, Afghanistan could import 370 MW of 900 MW potential from these countries via NEPS. However, only 70 MW is currently being imported due to the lack of an adequate transmission network.

According to Farooq Qazizada, Afghanistan's Deputy Minister for Electricity, Kabul, for instance, is unable to import more than 300 MW despite demand being much higher. Moreover, numerous power generation units are operating at below installed capacity due to issues in fuel, water shortages, maintenance problems and rehabilitation. Specifically, Afghanistan's operational capacity, in other words the actual electricity generated, is only at 60%, or 621 MW of Afghanistan's installed capacity. Lastly, many power stations are more than 40 years old and need to be rehabilitated. The lack of sufficient infrastructure poses challenge considering that DABS chief executive officer, Abdul Razique Samadi, estimates that Afghanistan will need around [3,000 MW](#) or about five times the current supply to satisfy the country's needs by 2020. This estimate is based on the ongoing increase in a number of Afghans moving from rural and urban areas and an influx of returning refugees. Just in Kabul, the population has [tripled](#)

between 2001 and 2009, with returning refugees accounting for 80% of this growth.

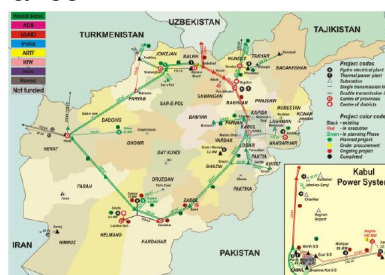
Since rehabilitation and expansion of the electricity distribution system for the key economic hubs has been a priority, Afghanistan's power system consists of several main isolated power grids clustered around areas of Kabul in the east, Mazar-e-Sharif in the north, Herat in the west, and Kandahar in the south. These grids, however, do not reach the rural areas which tend to depend, besides self-supplied biomass, on an insufficient number of micro-hydro units and financially unsustainable diesel units supplied through the National Solidarity Program.

Moreover, many of the diesel generators in rural areas are not utilized due to the [lack of funding](#)

for

operational costs including fuel and maintenance.

Figure 3. Afghanistan's Power System



Source: Abdul Rahman Ashraf, Office of Senior Adviser for Afghan Ministry of Mining & Energy, 2009

Diesel-generated power

Due to frequent energy shortages caused by insufficient and dilapidated infrastructure, many Afghans have to rely on electricity produced by costly, privately-owned diesel generators that can be used only a few hours a day. Private generator owners charge Afghans by the [light bulb](#)

, about \$2.60 a month for each bulb. This translates into \$11 a month to power a television, despite the fact the average income in Afghanistan is around a dollar a day. Moreover, with increasing oil prices on the global market, diesel-generated electricity is becoming increasingly

expensive, with a liter of diesel and petrol at fuel stations having risen [more than 30%](#) since 2010.

Beside the widespread use of privately owned diesel generators in Afghan by households and businesses, costly diesel is also used for grid-based electricity production as opposed to lower cost options such as imported power or power generated from natural gas, hydro, solar and wind energy. The Afghanistan Statistical Yearbook 2011-2012 indicates that electricity production from diesel power plants [has almost tripled](#) from 48 million kWh in 2009-2010 to 128 million kWh in 2011-2012, with Kandahar and Kabul provinces accounting for the vast majority of this consumption. The increasing dependence on diesel-generated power may pose a problem, considering that Afghanistan does not have an operating refinery and has to import all its petroleum products. Based on the Afghanistan Statistical Yearbook, in 2011-12, Afghanistan consumed approximately 1,300,000 tons of state-supplied last year including diesel, petrol and other fuels. The [fuel is imported](#)

into Afghanistan from Central Asia, Iran, Russia, Pakistan, Saudi Arabia and the United Arab Emirates with Russia and Turkmenistan being the leading exporters to Afghanistan in 2011-12, followed by Uzbekistan and Iran.

The cost of power generated from diesel is prohibitively high compared to other available sources. Imports of diesel fuel across long and dangerous distance translates into an operating [cost of 40 cents](#)

per one kilowatt-hour generated from diesel. This is almost seven times higher than the price of a kilowatt-hour imported via transmission lines from neighboring Central Asian countries or in comparison to electricity generating costs from domestic sources, including hydro, gas and coal. Due to high costs, powering generators through subsidized imports of petrol and diesel does not seem to be a sustainable option in the long-term. Furthermore, with energy being a politically charged commodity that is often more a question of foreign policy rather than business, a complete dependence on imports of diesel may pose a challenge in a future. The implications of Afghanistan's fuel dependence were already demonstrated in December 2010, when the Iranian government imposed an embargo on oil and gas shipments to Afghanistan for political reasons with the ensuing shortage driving diesel fuel cost up almost 30% in the first week of 2011 alone.

Institutional challenges

Despite the expansion of Afghanistan's electricity sector, the SIGAR audit concludes that DABS "lacks the capability to collect revenues to fund fuel costs and operations and maintenance expenses," and the ability to recruit let alone retain qualified staff. This will constitute a significant threat to the sustainability of the current power supply, considering that in 2013, DABS is expected to assume responsibility for all operational and maintenance costs related to power systems as well as for fuel procurement. Without assistance, it is questionable how DABS will be able to operate let alone expand the electricity supply. In 2013, the military is scheduled to transfer diesel plants to DABS with funding for diesel fuel and maintenance projected to run out by January 2014, with "[no current plans](#) to fund the plants afterward." For fiscal year 2013, fuel and maintenance costs just for the Kandahar diesel plants are projected to account \$100 million compared to \$48 million in 2011. DABS cannot afford fuel procurement, since the amount constitutes around 60% of its current nationwide revenue or more than 400% of Kandahar DABS' current revenue. Afghan Finance Minister, Omar Zakhilwal, confirmed this

reality by stating that “[diesel fueled generators] are not easy for us – we cannot maintain, and we cannot operate them either.” The diesel power plant in Kandahar was supposed to be a temporary solution, the so-called “Kandahar bridging solution,” until the city was connected to the NEPS that transmits imported power. However, the completion date for the NEPS project has been delayed until July 2014 or even September 2015, with other alternative sustainable sources being projected to replace Kandahar Bridging sometimes “well [beyond 2014](#)

.” Corruption and red tape poses yet another issue with 25 signatures needed to get connected to electric grid in Kabul through the official way as opposed to no signatures needed through personal connections and bribes, according to the World Bank.

Insecurity

Insecurity is another challenge that may endanger the sustainability of Afghanistan’s power supplies. This is because Afghanistan is among the countries with the highest concentration of energy infrastructure attacks with insecurity preventing contractors from building new transmission lines while also inflating costs not only for imported fuel but also the costs related to any rehabilitation and expansion of the power sector. For instance, security costs related to the rehabilitation of the Kajaki hydropower plant are estimated to account for nearly 30% of the plant’s total cost.

Energy-development-security nexus

Poor access to electricity has been identified by the World Bank’s Investment Climate Survey as [the number one obstacle](#) to investment and business development in Afghanistan, with the situation in Kandahar - one of the main urban economic hubs in Afghanistan - epitomizing possible economic implications resulting from Afghanistan’s inability to sustain, let alone expand, its current level of power supplies. With access to reliable electricity produced by military-run generators powered by fuel procured and donated by USAID, Kandahar has experienced an economic boom, with over 100 new factories being opened in its industrial park – Shurandam. With donor’s money scheduled to run out in 2013-14, with DABS inability to take over, and with alternative and more sustainable sources of power being delayed well beyond 2014, the sustainability of this economic boom becomes questionable.

For instance, the necessity of electricity for economic development and security was expressed by an owner of a factory in Kandahar’s industrial park, “Day and night, I worry about the future, [...], Once there will be no electricity, [there will be no industry here](#), and no security.” Others believe that many new factories will be forced to close down shortly after the donors’ fuel procurement ceases. Without electricity provided by the military run diesel plants, many factories will have to again resort to their privately owned diesel generators, spending the majority of their income to pay for diesel or run the factory only a few days a week as they used to do. Moreover, this sustainability challenge directly endangering Afghanistan’s fragile economic development is not limited only to Kandahar. According to Afghanistan’s Deputy Minister for electricity, “Most of [Afghanistan’s] industrial parks in the seven major cities are just receiving [a limited percentage of electricity](#)

” – while donors still procure diesel fuel and DABS is not yet responsible for operation, maintenance and expansion of the power system.

Security implications

Sustainability of energy supplies in Afghanistan or the lack thereof has security implications because without access to affordable, reliable and sufficient energy supplies, there will hardly be sustainable development – one of the core elements of the counterinsurgency strategy (COIN). Since COIN strategy depends on winning hearts and minds of the local population, there have been concerns that the inability to deliver or sustain power supplies may create an expectation's gap, and therefore become counterproductive to the COIN strategy. The SIGAR directly cautions that the lack of funding and delays to energy-related infrastructure projects “[may result in adverse COIN effects](#).”

” An illustration of a possible adverse effect was expressed by one Afghan factory owner, noting that “the Taliban was able to restore reliable power to Kandahar in just eight months after taking over in 1994, despite international sanctions.” Precisely in Kandahar, Afghanistan's second largest city, a home of the Taliban movement, and a focus of the COIN strategy, power plants have been seen “[as a key weapon against the insurgents](#).”

” The increase in business activity reportedly weakened the insurgency, leading to a dramatic decline in insurgent attacks within the city. Mohammed Omer, Kandahar's mayor, stated “Electricity has brought security, as it provided jobs to people who could otherwise be drawn into the insurgency.” The aforementioned Shurandam industrial park was supposed to have, in the words of US Ambassador Karl Eikenberry, “demonstrated that the government of Kandahar is providing better services to its people.” Furthermore, the July 2012 SIGAR audit points out that the aforementioned NEPS power system project, “Supports COIN by demonstrating the Afghan Government's ability to build and sustain energy availability for the people of Afghanistan, reinforcing the Afghan Government's legitimacy with its populace by meeting the needs of the local population thus increasing security and stability. In addition, the project will promote and support economic development.”

Potential and opportunities Afghanistan is endowed with a vast potential for renewable energy, including hydro, solar and wind power that could significantly contribute to the expansion and the sustainability of its power supplies. Specifically, it has a potential to produce 23,000 MW of hydropower, with only 260 MW having been developed so far. It also has significant solar resources since it enjoys approximately 300 days of sunshine a year. A number of rural parts of Afghanistan benefit from micro-hydro power units installed over the last decade. However, despite the relatively low cost – about \$3,500 per village, so far only a fraction of the rural population has access to renewables which would offer a suitable solution to rural, remote, mountainous and insecure areas that are difficult and expensive to connect to a power grid. The 2007 Afghanistan National Development Strategy recognizes the benefit of decentralized power based on renewables and views it as the best option for these areas where population currently cannot afford to pay for power from electric grids which includes not only generation but also transmission and distribution costs. Drawing on the lessons from other countries, the strategy warns against a tendency to assume that grid connected electricity offers the best form of energy for rural populations, and aptly points out that “[t]oo often donors and Government officials have blindly followed a policy of rural electrification,” only to discover that the cost of energy delivered was too high for people in rural areas to afford.

Besides the vast potential in renewable sources of energy, Afghanistan has also substantial hydrocarbon resources that may bolster Afghanistan's energy security and, in turn, economic growth. The December 2011 study by the US Geological Survey (USGS) estimated that

Afghanistan is endowed with potentially [exploitable reserves](#) of 1.596 billion barrels of oil and 36.462 trillion cubic feet of natural gas, with the Amu Darya Basin and the Afghan-Tajik Basin holding “18 times the oil and triple the natural gas resources previously thought.” Afghanistan could, for instance, utilize its domestic gas supplies for electricity generation to lower its import dependence on gas-generated electricity from Uzbekistan and Turkmenistan and use its own domestic oil supplies to lower its dependence on imported diesel fuel. To harness its potential, Afghanistan’s energy sector requires investment. Investment, however, requires security which is as scarce as access to electricity in Afghanistan.

Conclusion

Energy security is one of the fundamental conditions for economic development. If energy security means access to reliable, affordable, and sustainable energy supplies, then Afghanistan’s prospects for economic development are rather bleak. As this analysis illustrates, the majority of the Afghan population still does not have access to modern forms and supplies of energy. At the same time, energy supplies that do reach Afghan cities may be problematic to sustain in the future. The sustainability challenges in urban areas present, however, only part of the problem. Without addressing the lack of access to electricity in rural areas where more than 70% of the Afghans live, Afghanistan’s economic development and, in turn, stabilization efforts, will continue to be constrained. As donors’ money dries up, the effective allocation of scarce resources will become even more critical. Therefore, from demographic, geographic, and security standpoints, rural electrification by means of grid extension dictated by macro energy policy may not be currently a suitable and economically feasible option. Drawing on lessons from other developing countries, micro energy policy that focuses on decentralization while considering a full menu of renewable energy options suitable for micro-electric power technologies should instead be considered in meeting the particular needs of rural residents. And as in other developing countries, facilitating participatory ownership of these power generation assets within village communities could serve as a critical step towards securing and sustaining these assets. *Contributor Katerina Oskarsson is a Doctoral student in the Graduate Program, Department of International Studies at Old Dominion University in the United States*