

Eskom Investment Support Project Questions & Answers

This Project Has Economic, Social, and Regional Benefits

Q: What is the impact of energy on South Africa's economic growth and poverty reduction?

Chronic power problems take a heavy toll on society. Without reliable energy, the basic services that people in rich countries take for granted cannot be offered. Since South Africa's electricity crisis began in December 2007, it has been obvious that without an immediate increase in its energy supply South Africa's economy will suffer, public services will become more expensive, and businesses will have to scale back. Failing to address South Africa's energy crisis will have dire consequences for the poor, for industry, and for neighboring countries.

The impact of energy on society, as described by the [World Economic Forum](#), is "Lack of access to sustainable modern energy services constrains key aspects of human development and growth. Access to clean water, maternal health, infant mortality, environmental sustainability, gender equality of opportunity and progress against income poverty are all seriously impeded without the services modern energy provides. Across the globe an estimated 3 billion people continue to lack access to sustainable and affordable modern energy. Most remain dependent on traditional fuels, often adding to stresses on natural resources and undermining the sustainability of rural livelihoods."

See: Reuters on [Energy Shortages Threaten Africa's Growth](#)

Q: Why does South Africa need public financing from the World Bank for its energy sector?

Immediately after the electricity crisis South Africa was swept into the global financial crisis. Like many countries, South Africa had trouble borrowing money from private banks. Fortunately, South Africa is coming out of the economic downturn but inadequate power supply could undermine the country's economic recovery and ability to create new jobs. A World Bank loan offers low-cost capital with long repayment periods but, more importantly, the loan offers a chance to borrow for renewable technologies.

South Africa is also encouraging private investment in renewable technology and a loan from the World Bank sends a signal to private financiers about the credibility of Eskom's Investment Program. Without support from the World Bank, both energy security and clean energy generation face considerable risk. Post-recession, energy demand is rising and energy security has again become a major issue.

Q: How much electricity produced will go directly to low-income consumers (as opposed to industrial consumers)?

In 2003 the Government of South Africa (GoSA) launched the Free Basic Electricity (FBE) policy that provides 50 kilowatt hours (KWh) of free electricity per month to poor families. For a sense of scale, 1 kWh can run a small business kiosk for a day; 50 kWh per month is enough to light 3 lamps and run a small appliance (water heater, TV, or refrigerator). Local governments decide who qualifies for free basic services under criteria set for registering households. Today Eskom provides free basic electricity to 27% of its customer households.

The FBE system is supplemented by cross-subsidies from large customers to households using less than 350 KWh/months. The tariffs for this category of customers are usually 25% lower than for customers who consume more than 350 kWh/month.

Regarding pricing of electricity, it is important to note that all OECD countries charge households more for per-unit electricity consumption than major, high-voltage industrial users. For comparison across countries and household/industrial electricity pricing, see the [Energy Information Administration](#). For example, in the U.S. households pay 10 cents per kilowatt hour whereas industrial users pay 6 cents; in the U.K., households pay 18 cents whereas industrial users pay 11 cents.

Q: How many poor consumers not currently connected to the grid will be connected as a result of this project?

Over the past 20 years, South Africa and Eskom have increased access to electricity from 34% to 81% but they have made limited investments in new large-scale power generation. While other countries have built up enormous power generation capacity, South Africa (and the neighboring countries) have scraped by with power plants built many years ago. Today the South African energy system is under enormous stress and unable to meet the demand.

South Africa requested this loan to add a significant amount of base load power to the main grid and jump-start their investments in renewable technologies -- not for making new household connections to the grid. The World Bank's due diligence for the loan examined South Africa's track record of providing electricity to households and whether/how South Africa protects the poorest households. Although the World Bank project does not directly finance new connections, the Government of South Africa has an annual budget for rural electrification and a program in place to connect the remaining 19 % of households by 2014. The majority of these households are poor. Without additional power generation capacity, Eskom will find it harder to connect the remaining households that still do not have access to electricity.

By providing power to meet the demand/supply gap, the Medupi plant will play an important part in promoting 100% access to electricity. In addition to household needs, demand is also growing from commercial and small industrial developments as well as schools and health services in rural areas.

Q: What is the regional impact of this project?

South Africa accounts for two-thirds of southern Africa's GDP. Studies have shown that one-percent growth in South Africa's GDP is associated with 0.4-0.9 percent growth in GDP of the rest of Sub-Saharan Africa; the stability of growth and development in South Africa is critical for the continent. South Africa generates more than 60 percent of all electricity produced in Sub-Saharan Africa and it exports substantial amounts of power to its neighbors; South Africa's electricity shortages can seriously impact the economic development of neighboring Botswana, Lesotho, Namibia, Swaziland, and Zimbabwe. These countries also depend on South Africa for significant share of their power supply. Over the medium and long term, the project's investments in solar and wind technology will demonstrate the market-readiness of renewable power in Africa.

The Bank believes this support to Eskom's Investment Program will play a role in changing the technology base of the region – addressing urgent and immediate energy constraints while accelerating South Africa's and the region's investments in renewable technologies. Technical advisory services

provided through the project will also promote improvements in regional integration of renewable energy investments and transmission infrastructure.

The World Bank Has Assessed this Project According to Its Criteria

Q: Does this loan meet the World Bank's criteria for financing fossil fuel power plants?

Yes, the Eskom Investment Support Project meets all six criteria of *Development and Climate Change: A Strategic Framework for the World Bank Group (DCCSF)*, as approved by the Board of Executive Directors and required for coal power projects. In accordance with these criteria, the Bank will only finance coal projects under exceptional circumstances and a high bar is set. The project meets the following six criteria:

1. There is a demonstrated developmental impact;
2. There is assistance to identify and prepare low carbon projects;
3. Energy sources have been optimized by considering the possibility of meeting the country's needs through energy efficiency and conservation;
4. There has been full consideration of viable alternatives to the least-cost options (including environmental externalities), and when additional financing from donors for their incremental cost is not available;
5. The project uses the best appropriate available technology, to allow for high efficiency and, therefore, lower greenhouse gas emissions intensity; and
6. There is an approach to incorporate environmental externalities in project analysis.

An Expert Panel has reviewed the project design and technology mix of coal, wind, and solar. The panel's public [report](#) confirmed that the project meets the six criteria and that, because South Africa has announced goals to lower carbon intensity and eventually emissions, the World Bank Group should assist the Government of South Africa in meeting those goals.

Q: What alternatives were considered?

The World Bank conducted a careful review of the alternatives for South Africa and the economic consequences of not pursuing this project. After full consideration it was determined that coal is still the least-cost and most viable option for meeting the base load power needs required (9600 megawatts over five years) by Africa's largest economy.

Although wind power is market-tested, it is still more expensive than coal and it cannot replace base-load needs. Concentrated solar offers a new opportunity, but this technology is still not market ready for large-scale generation and cannot replace base load generation. Despite the country's high solar radiation, each kilowatt of concentrated solar generation capacity costs three times as much as coal (\$6,000/KW vs \$2000/KW). Both wind and solar are much more expensive than coal; the African consumer should not be expected to pay the additional Research and Development costs to bring down the price of these technologies. South Africa is pursuing aggressively their renewable energy options, but it takes time and it is expensive. The country has pressing energy needs that cannot be met with renewable in the short term.

The Bank also considered domestic or regional alternatives, but they cannot meet the required base load capacity of 4800 megawatts in the same five-year time frame that the Medupi plant can. The alternative power supply options were the proposed Mmamabula coal plant in Botswana and several other regional options based on hydropower and natural gas. These projects were not at a stage where they could be

brought on line in the short term and they offered insufficient power to fill the gap in supply. In view of the serious energy crisis in the Southern Africa region, time was an important criterion when reviewing the alternatives.

Q: Could conservation and better demand management lessen the need for a new coal plant in South Africa?

Demand Side Management is an important energy conservation measure and is being pursued aggressively in South Africa and by Eskom. However, Demand-Side Management only has an impact on peaking capacity, not base load. The Bank's proposed loan is for South Africa's base-load power, improved efficiency of an existing power plant, and the development of new renewable technologies like wind and Concentrating Solar. Although the solar components will have the potential to be scaled up and used for base load operation, Demand-Side Management (DSM) cannot replace base load capacity. The supply deficit is too large for only DSM or other conservation measures to make a dent.

South Africa's Integrated Resource Plan (IRP) includes more than 5,000 megawatts of demand-side management, but this will only reduce their reliance on more expensive plants during peak periods (by reducing the need to quickly fire up expensive liquid-fueled plants during peak use). Given the fact that South Africa has not built a major power plant in almost twenty years and the fact that better demand management will only help South Africa avoid additional *peaking* capacity, a new base load plant is still needed to support South Africa's over-burdened power system.

Q: What is the value added by World Bank engagement?

One of the reasons the Government of South Africa came to the Bank with this loan request is its long-term commitment to low-carbon energy and its understanding that the Bank's energy projects include significant investment in renewable energies, energy efficiency, capacity building, and research and development. The World Bank Group energy portfolio is increasingly oriented toward renewable energies and energy efficiency (RE/EE); total World Bank Group energy financing in FY09 was \$8.23 billion, of which 76% was for non-fossil fuels. In FY09, renewable and energy efficiency financing was at a record high of \$3.3 billion.

The Bank's loan will help solve an urgent energy crisis with the cheapest financing available, but the extended engagement with the World Bank Energy Department will also provide a down payment on the cleaner energy future South Africa has planned. The proposed loan includes \$260 million for wind and solar power projects and \$485 million for energy efficiency improvements and reduced greenhouse gas emissions from coal transport. These investments are a first step in South Africa's long-term plan to mainstream renewable energy and encourage regional energy integration in the Southern African countries.

To put the solar and wind projects in context: the 100 megawatt solar power project will be the biggest grid-connected solar thermal power project in any developing country, the biggest ever solar thermal project with storage, and the biggest ever central receiver-type solar power project.

South Africa Has Long-term Plans for a Cleaner Energy Sector

Q: Is South Africa committed to carbon emissions reduction?

Yes, South Africa has taken an early and strong position on reducing its carbon emissions and has demonstrated determination to scale up on renewable investments. The Government of South Africa ratified the UNFCCC, signed the Kyoto Protocol, adopted a National Climate Change Response Strategy, issued Electricity Regulations for Energy Efficiency, issued pending regulatory standards for ambient air quality and emissions of specified air pollutants from coal-fired power plants, co-drafted and signed the Copenhagen Accord, and [confirmed ambitious emission reduction targets](#) of 34% by 2020 and 42% by 2025.

This ambitious commitment includes meeting urgent generation expansion while committing to an aggressive program to enhance energy efficiency measures and introduce renewable energy and demand side management. In 2008, South Africa's Cabinet endorsed Long Term Mitigation Scenarios (LTMS) to reduce carbon emissions and the proposed World Bank loan supports those plans. The intention is to ensure that carbon emissions peak during 2020-2025, plateau for a decade, and then begin declining thereafter. The Eskom Investment Support Project, as well as the longer term partnership established between the Government of South Africa and the World Bank, will support South Africa's efforts to meet its low-carbon targets.

The Medupi power plant is the first in Africa to use the cleaner coal "supercritical" technology, the same technology used in most high-income countries for new coal power generation (although some of their coal plants are still being constructed using the less clean sub-critical technology). The railway line associated with this loan will substantially reduce the greenhouse gas emissions from moving coal in trucks.

Q: Will this project help South Africa reduce its carbon emissions over the long term?

It is true that South Africa has a carbon-intensive economy today. It is also true that South Africa is taking important steps to change reduce its carbon emissions. If they are to make progress on their long-term low-carbon plans they need to invest in a mix of technologies and efficiency improvements – which is what the proposed Eskom loan would facilitate. If the loan is approved, South Africa will be able to invest \$260 in wind and solar power and \$485 in energy efficiency improvements, while at the same time keeping their economy moving with the new power plant.

In 2004, the world produced about 49,000 Megatons CO₂-equivalent, mainly from energy generation and deforestation. In comparison, South Africa produced about 440 Megatons or about 1% of the global amount. Although South Africa's emissions are miniscule on a global scale, their carbon output is large relative to its population and economy. South Africa's emissions intensity (i.e. emissions per GDP) is high compared to other countries and developing countries. Their emissions per capita are higher than China and India, which are also coal-based energy economies, and higher than Brazil – until we add Brazil's emissions due to changes in land use, notably deforestation.

For a sense of comparison, it is useful to consider a country like Australia that has the same make-up in terms of industry and mining. Australia's per capita emissions are 16.5 metric tonnes; South Africa's are less than half that at about 7.8 metric tonnes. South Africa ranks 10th among the G20 countries in terms of per capita emissions and ranks 12th in terms of total emissions. The nine countries with higher per capita emissions are the U.S., Australia, Canada, Saudi Arabia, Russia, Japan, South Korea, Germany, and U.K. (in that order).

By initiating this partnership with the World Bank on a long-term clean energy future, South Africa is demonstrating its commitment to the Long Term Mitigation Scenario and to moving away from business as usual.

Q: How serious are the wind and solar components to this project?

This project includes a 100 MW-capacity Concentrated Solar Power (CSP) plant and a 100 MW wind energy facility. South Africa's investments in 100 megawatts of solar and 100 megawatts of wind should be commended, particularly by environmentalists, considering the largest comparable solar plant capable of supporting base load supply operating in the world is only 20 megawatts. As mentioned, the solar power project associated with this loan would be the biggest grid-connected solar thermal power project in any developing country, the biggest ever solar thermal project with storage, and the biggest ever central receiver-type solar power project.

The solar project should be understood in the context of today's concentrated solar power industry. South Africa's plans for going from 0 to 100 megawatts in the nascent solar industry will require a big leap. It would be too much to expect a developing country to enhance this risk by attempting anything larger in an industry that is still evolving in terms of technology and costs.

The Government has in place an energy framework and a well defined program for lowering greenhouse gas emissions. Eskom has the institutional infrastructure and the technology to translate these plans into energy security and scalable prototypes on wind and solar. No other country in Africa has the frameworks in place to implement a project large enough to support accelerated design and development for changing the energy mix in Africa. The Upington solar plant associated with this project will be a flagship activity, the largest facility in the world using central receiver technology. This will help establish cost and performance benchmarks for the broader deployment of Concentrated Solar technology. If the project is not approved, it may be many years before an investment of this kind is possible.

South Africa's intentions with the wind power are to use this as a demonstration and facilitation project to attract private sector investment into this more mature form of renewable technology. The wind project is intended to capture lessons and make these available as public goods and to build up supportive infrastructure and systems integration elements such as transmission infrastructure for future wind capacity. Because the Government is on track to establish an independent system operator to purchase power from private sector companies (using feed in tariffs), investing more public financing into the wind power plant is not optimal.

This project could jumpstart a renewable market in other parts of Southern Africa. By serving as a demonstration project, especially for the solar technology, and promoting significant investment in renewable technology, this project serves as a down payment on a greener future.

Eskom Meets the World Bank's Environmental, Transparency, and Procurement Standards

Q: Were the environmental safeguards handled according to international standards?

A careful review of the environmental and social safeguards for the project showed that the South Africa processes meet the Bank's requirements. South Africa's legal, regulatory, and institutional framework is equivalent to the World Bank's safeguard policies for Environmental Assessment, Natural Habitats and Physical Cultural Resources. South Africa's policies are aligned with their commitments to international environmental agreements with respect to these safeguards. With respect to Involuntary Resettlement, the

Bank's Safeguards Diagnostic Review (SDR) identified one key gap, relating to the form of documentation, and Eskom has already taken actions to bridge that gap during project preparation. As such, this project will use country systems for the applicable environmental and social safeguards.

The review of safeguards also showed that Eskom and South Africa's environmental regulatory agencies have the institutional capacity, procedures and track record to meet the Bank's criteria for the safeguards. A summary of the South African Emission Standards can be found in the [SDR](#) (Annex 4).

Q: Is the Medupi project consistent with World Bank Environmental Health and Safety Guidelines for Thermal Power Plants?

Medupi was subject to the Environmental Impact Assessment process in 2006 under South African laws, was approved, and construction began in 2007. This predates the proposal and adoption on April 1, 2010, by South Africa of new emissions regulations, and adoption by the World Bank Group of a new Environmental Health and Safety Guidelines (EHSG) for Thermal Power Plants in December 2008, and therefore falls under these respective regulations and guidelines for existing power plants. This is standard practice since changes in regulations and guidelines apply prospectively.

From the South African standpoint - regulations for emissions from thermal power plants establish a process by which existing plants are expected within a specified period of time to upgrade performance to comply with the standards for new plants.

From the Bank's standpoint - The Bank's 1998 and 2008 guidelines for thermal power plants have a similar requirement for a process to assess the need to upgrade the performance of existing plants within a reasonable timeframe.

Installing the Flue Gas Desulphurization (FGD) at Medupi as soon as water becomes available and units are shut down for routine operation and maintenance reflects good practice as recommended in the Pollution Prevention and Abatement Handbook, and will allow the plant to operate thereafter at a level consistent with what one would expect of a new plant under both the Bank's (2008 EHSG) and the South African new 2010 guidelines.

The water supply availability is the main cause for delay in the installation of the FGD. The Phase 2 of the Department of Water Affairs Mokolo Crocodile Water Augmentation Project (MCWAP) would provide more than enough water to users in the Waterberg area to easily meet Medupi's requirement to install and operate FGD. Moreover, air quality modeling for Medupi without FGD installed and using conservative (worst case) scenario shows that, with the incremental emissions of SO₂ from Medupi, the airshed remains in compliance with applicable ambient air quality standards and human health risk remains low. It is to be noted also that the six units of Medupi will be commissioned sequentially, starting in 2012 and going up to 2015. Therefore FGD installation commences as the first commissioned power block is taken off line after six years of operation for routine overhaul and maintenance.

Q: Does the Environmental Impact Report for the Medupi project take into consideration cumulative impacts?

Yes. Within its legislative framework, cumulative impacts are addressed by South African authorities at both the project and at strategic levels. Air quality modeling for the Medupi project takes into consideration the cumulative effect of Medupi's emissions on existing ambient air quality. South African ambient air quality regulations include threshold levels for pollutants and limit how frequently those thresholds can be exceeded. The modeling of cumulative effects showed that air quality could

intermittently worsen slightly, especially downwind, but that such the instances will remain infrequent and within the frequency allowed by South African regulations.

The Department of Environment Affairs (DEA) has recognized that ambient air quality in the area could deteriorate in the future if additional investments are made in the industrial, mining, or power sector. Future development is expected to result in population growth. DEA will recommend to the Minister that the nearby area, Waterberg District Municipality, be declared as a National Priority Area for air quality studies and monitoring. The DEA is in the process of installing an air quality monitoring network and developing an Environmental Management Framework for the Waterberg region, which is a long-term planning strategy for water and air quality management, biodiversity protection, mining development, and agricultural development. The South African government, the Government of Botswana, and Eskom are collaborating with the World Bank in developing a transboundary air quality monitoring and management plan that includes the Waterberg area.

Regarding transmission lines, cumulative impacts are taken into consideration by Eskom's Transmission Division in carrying out feasibility and siting studies for new high-voltage transmission lines. One of the key issues considered in both system planning and the EIA process is whether new transmission lines should be installed as part of a utility corridor with adjacent rights-of-way, or kept distant from existing transmission line rights-of-way, depending on the assessed cumulative impacts of the two strategies. A utility corridor approach is rarely taken, however, in areas where the risk of large-scale brush fires is considered significant and could place high voltage transmission lines at risk. For this reason regulatory restrictions have been established to maintain safety and security of the national power grid that would then prevent consideration of a corridor-approach to locating transmission lines in certain areas of the country.

Q: What kind of consultations did the World Bank conduct with South African civil society groups?

During the Safeguards Diagnostic Review (SDR) the Bank examined the legislative framework for consultations in South Africa and the extensive records of the public consultation process carried out by Eskom as part of the EIA process on the Project components. The findings of the draft SDR were disclosed by the Bank and Eskom. Consultations on the draft SDR were held with representatives of government agencies; private sector; academic institutions; professional societies; non-governmental organizations; and people living in the Medupi project area, including farmers' associations. The SDR and a matrix of the questions and answers have been disclosed to the public on the Bank's South Africa country [website](#).

Q: Was procurement handled according to international standards?

Yes, Eskom's and GoSA's procurement procedures and due diligence processes were followed for each of the eligible contracts.