



Policy Brief

Fossil Fuels in Africa in a Carbon Constrained Future

Africa has substantial reserves of fossil fuel resources. These include about 9.5% of the total global proven reserves of crude oil, 8% of natural gas reserves, and 4% of coal reserves. Much of the fossil fuel in Africa is either exported or has not yet been developed for use within Africa. Despite its huge energy resources, Africa is still faced with enormous energy challenges, including low access by many to modern energy, insufficient energy infrastructure, low efficiency, and lack of institutional and technical capacity to make use of its huge resources. Most African countries are net energy importers, as currently exploited oil reserves are concentrated in only a few countries. As a consequence, the continent has 38 net oil-importing countries, demonstrating the high dependence of most African economies on imported fossil fuels. This exposes them to volatile world oil prices and jeopardises their balance of payments positions. For most oil-importing countries in Africa, sharp increases in the cost of imported energy, coupled with increasingly scarce traditional energy resources (e.g. fuelwood), have created what has been termed a double energy squeeze. The squeeze has eroded some of the economic gains that have been made in recent years and has exerted strong pressure on macroeconomic stability and economic growth.

The heavy reliance on fossil fuels to generate energy has also contributed to a number of environmental and social problems at the local, regional, and global levels. These include depletion of non-renewable resources, depletion of ozone, ocean acidification, and global warming. The contribution of energy generation to global warming is particularly worrisome due to the emission of carbon dioxide and other greenhouse gases during the combustion of fossil fuels.

Key messages

- Africa has considerable fossil fuel resources and must use them to improve energy access and increase economic growth.
- Use of cleaner fossil fuel technologies must be emphasised if greenhouse gas emissions are to be kept to a minimum.
- Tradable permits and other policy instruments could be used in Africa to mitigate greenhouse gas emissions.

Challenges and opportunities

Africa has twin energy challenges. The first is to use its huge fossil fuel resources to improve energy access and increase economic growth, both vital to sustainable development. The second challenge is to mitigate emissions from the consumption of these resources. In future, Africa's fossil fuels will have to be used in a way that minimises greenhouse gas emissions. Despite the challenges, substantial fossil fuel reserves provide Africa with important opportunities to improve access to energy, accelerate economic growth and reduce poverty.

The imperative to improve energy access and alleviate poverty in Africa means that expansion of fossil fuel supplies will be necessary in the short- to medium-term. But such expansion should be balanced with measures to develop cleaner energy solutions for the future. Therefore, focusing on technologies that improve energy efficiency and energy conservation is the best strategy to reduce greenhouse gas emissions during the combustion of fossil fuels.

Shifting to new renewable energy technologies is appropriate in the longer-term. But such a shift will take time, and some challenging barriers, such as high initial costs, lack of technical expertise and institutional constraints, will need to be overcome. It makes good financial sense to seek maximum efficiency gains as the first step, as these are likely to reduce the supply base and thus create an attractive investment environment for renewables. Given that fossil fuels will continue to dominate energy supply in the short- to medium-term, attention needs to be given to cleaner fossil fuel technologies if greenhouse gas emissions are to be reduced. Clean coal technologies, including coal-upgrading technologies, improvements in existing power plants, use of advanced technologies, and near-zero emission technologies offer opportunities to reduce greenhouse gases and other pollutants during coal combustion.

Policy instruments for mitigating greenhouse gases

A number of policy instruments could be used to mitigate greenhouse gas emissions in the production and use of fossil fuels. These include emission taxes, targeted subsidies or their removal as appropriate, product charges, regulation, emissions trading, and provision of information. Policies intended to reduce greenhouse gas emissions should also consider the trade-off between efficiency and equity. For example, removal of subsidies or the imposition of taxes on fossil fuel use would stimulate more efficient use of fossil fuels. The equity of such policies would depend on the nature of the

subsidies or taxes and/or whether they are progressive or regressive. Recent studies have found that taxes on transport fuels in some African countries are progressive, indicating that the burden of these taxes falls more heavily on rich households. However, this is less so for fossil fuels such as kerosene that are used for cooking. The various policy instruments cited above have different cost implications for society at large. Reducing greenhouse gas emissions is not the only goal, but if Africa is to assist in reducing global greenhouse gas emissions, it will need support, including financial assistance, human capacity building, and technology transfer.

Policy implications and recommendations

Africa must use its considerable fossil fuel resources to improve energy access and increase economic growth. However, this must be done wisely, as greater use of fossil fuels will necessarily lead to more local, regional and global environmental impacts. Although per capita emissions in Africa are still low compared to those in the rest of the world, emissions from all fuel sources have grown in Africa over time.

It is becoming increasingly clear that abandoning traditional fossil fuel energy sources is not a viable option. Therefore, cleaner fossil fuel technologies must be emphasised. Although a number of these technologies exist in developed countries, most African countries are faced with many challenges in the use of state-of-the-art fossil fuel technologies. The use of such advanced technologies in Africa is limited by economic and institutional barriers, including high capital and operating costs. Lack of finance, lack of expertise, and policy constraints, such as subsidies for traditional technologies, also contribute to the problem. Institutional barriers, such as problems related to monitoring and enforcement, environmental regulations, information shortages, and cultural and social issues impede the diffusion and commercialisation of such technologies. Moreover, in a part of the world where the focus is of necessity on transition to the use of

modern fuel sources, the adoption of cleaner fossil fuel technologies may not be the priority of governments. There is also a need to cooperate with developed nations as the associated environmental problems are global, as well as local, in nature. Moreover, clean energy technology deployment requires concerted public and private commitments and partnership.

Policy instruments such as tradable permits are becoming increasingly common in developed countries and could be used in Africa to mitigate greenhouse gas emissions. Policies designed to facilitate the development of renewable energy can also help reduce consumption of fossil fuels and thereby reduce emissions.

Africa lacks sufficient research and development (R&D) capacity to support decision-making on energy. The funds are simply not available in Africa for detailed studies of greenhouse gas mitigation measures. Moreover, the absence of skilled professionals and of commitments from government limits R&D on fossil fuel technologies in Africa. Increasing public investment in innovative technologies and large-scale demonstration projects is necessary. We recommend that African countries

participate in the International Energy Agency's Networks of Expertise in Energy Technology initiative, which seeks to expand the participation of major energy consuming nations in the IEA energy technology collaborative network. This would enable Africa to gain expertise and experience in clean and advanced technologies.

Finally, further research on fossil fuels may help Africa reduce greenhouse gas emissions and enable the design of appropriate policies and strategies for deploying fossil fuel technologies in Africa. For example, a need exists to investigate the role of different tax systems in the consumption of fossil fuels in Africa. There is also need to examine barriers to the adoption of different fossil fuel technologies at country level, given that the problems are country-specific. Strategies to embrace clean technologies should be based on research on consumption, production and barriers to their adoption.

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