New research identifies an action agenda for Africa's electricity sector

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To meet the development needs of a growing population, Africa's electricity sector requires a major transformation.

Despite important changes over the past decade, efforts to expand and modernize the sector need to be redoubled. Indeed, current electrification rates, generation-capacity levels, and security-of-supply indicators underscore that much is yet to be accomplished.

New research, published today in *Science*, identifies five sets of complementary actions to put Africa's electricity sector on track to sharply increase electrification rates and secure long-term access to affordable and cleaner energy.

"Africa's development needs are as diverse as the countries in the continent. Yet, none of those needs will be met unless a reliable supply of affordable electricity, generated through clean fuels, is available to all. In this article, we describe five no-regrets actions to transform Africa's electricity sector" says lead-author Daniel Puig, who works for the Technical University of Denmark's Department of Technology, Management and Economics. He is a senior advisor at UNEP DTU Partnership.

These are the five recommendations made in the article:

- Introduction of a combination of supply-side incentives and demand-side subsidies, to help expand electricity markets
- Digitalization of energy sector planning and management tools, to help deliver energy at the right time, in the right place, at the lowest cost
- Integration of local-content requirements in renewable-energy policies, to capture employment benefits and ensure that state-of-the-art technologies are fully adopted by African countries
- Strengthening and expansion of regional power pools through African-led international partnerships, to expand electricity access and reduce electricity bills
- Expansion of investments in off-grid and interconnected clean-energy mini-grids, to account for the different socio-economic realities across urban, peri-urban and rural areas

"All countries struggle to meet three goals: Security of reliable and affordable energy supplies, universal access to modern forms of energy, and reduction of polluting emissions. Africa's development challenges magnify the task of achieving these goals. What's important to remember, for African and all other countries alike, is that these three goals cannot be achieved in isolation from one another," says Magda Moner-Girona, of the European Commission Joint Research Centre, one of the co-authors of the article.

An essential Sustainable Development Goal

Achieving universal access to clean and affordable

energy, as outlined in Sustainable Development Goal (SDG) 7, is a pre-condition for reaching most of the other 16 SDGs. Access to energy positively affects everything from health to the fight against poverty and pollution to opportunities for education and climate action.

"Investment in, and integration of, clean energy across Africa can enable the full suite of SDGs and make the energy future of the continent one that facilitates equity and climate justice. But there is a need for international support and partnerships to ensure funding and investment in the information systems required to make this happen," says Daniel M. Kammen, James and Katherine Lau Distinguished Professor of Sustainability, and Chair of the Energy and Resources Group at the University of California, Berkeley, one of the eight authors of the article.

Even though rural electrification has seen significant progress, at least 250 million people in Africa still live without electricity. Because of the COVID-19 global health pandemic, an additional 80 million people on the continent have fallen into extreme poverty.

"Africa's electricity sector has to undergo a profound transformation, with the twin objective of addressing electricity access and security of supply in ways that are compatible with a healthy climate. In this paper, we offer some concrete suggestions for policies that can get us there," says co-author Yacob Mulugetta, professor of Energy and Development Policy at University College London, who co-authored the article.

An independent champion

The article notes the difficulties associated with achieving an endeavor of such magnitude. Power, agency and politics play out in ways that are not necessarily conducive to meeting key societal goals related to environmental quality, employment, and equity. Specifically, the article lists incumbents in the energy sector resisting change, information asymmetries among different stakeholders invariably punishing prospective new entrants in the energy sector, and priorities and procedures on the part of bilateral and multilateral lenders that are unduly rigid.

The authors conclude that an independent entity is needed to champion a transformative expansion and modernization process for the Africa electricity sector—a process that is not captured by short-term agendas or the interests of any stakeholder group. An international partnership such as the Sustainable Energy for All Initiative is well placed to be that champion.

"The time is right. Earlier this year, the African Single Electricity Market was launched. We need to capitalize on the opportunities it offers to leapfrog to an electricity sector for the future. Africa has the energy endowment to do so, and the technologies are there. Therefore, as we write in the article, leadership has to be up to the mark," says Dr. Yohannes Hailu, a United Nations Economic Commission for Africa's Energy Policy Expert and Economic Affairs Officer, and one of the co-authors of the manuscript.

The stakes are high, because electricity has spillover effects on the entire economy—from a macro-economic point of view, but also, and especially, from the point of view of the livelihoods of the poorest communities in the continent.

"Energy, and especially electricity, is central to human development. The tragic COVID-19 global health pandemic, which is pushing many in Africa into extreme poverty, is magnifying the impact that electricity access has on livelihoods. The paper puts forward an urgent action agenda for Africa's electricity sector, to accelerate access to electricity using cleaner fuels," says Professor Nebojša Naki?enovi?, who co-authored the article. Professor Naki?enovi? is a former Deputy Director General of the International Institute for Applied Systems Analysis, and a former Professor of Energy Economics at the Technical University of Vienna. Currently, he acts as Director of the "The World in 2050" initiative.

More information: An action agenda for Africa's electricity sector, *Science* (2021). DOI: 10.1126/science.abh1975 , science.sciencemag.org/content/373/6555/616

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