Switching to renewable energy could save thousands of lives in Africa

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Lethabo Power Station is one of the largest coal-fired power plants in South Africa. Credit: WikiCommons

With economies and populations surging, an industrial revolution is inevitable on the African continent. The question is, what's going to

power it? With renewable energy cheaper and more efficient than ever, countries in Africa have the unique opportunity to harness abundant renewable sources like wind, solar and geothermal to leapfrog the dependence on fossil fuels that has poisoned the air and environment in Europe, the U.S., India and China.

But will they?

New research from Harvard University and the University of Leicester finds that if Africa chooses a future powered by fossil fuels, nearly 50,000 people could die prematurely each year from fossil fuel emissions by 2030, mostly in South Africa, Nigeria and Malawi.

The research is published in *Environmental Science and Technology*.

"Our work shows the substantial health benefit of shifting to clean energy sources in Africa, which we hope can help incentivize the transition towards renewable energy over fossil fuels," said Eloise Marais, a former graduate student of the Department of Earth and Planetary Sciences and postdoctoral fellow at the Harvard John A. Paulson School of Engineering and Applied Science (SEAS) and senior author of the paper.

Marais is now an Associate Professor at the University of Leicester.

The researchers focused on air pollution from power plants and transportation, as many African countries are currently working to increase fossil-fuel power plants and vehicle infrastructure. South Africa, for example, is commissioning the largest dry-cooled coal-fired power plant in the world. Namibia, Ghana and Mozambique are all turning to offshore power plants—known as powerships—that run on the dirty residue from crude oil refining.

The researchers calculated emissions from all the current power plants on the continent as well as the projected emissions of all power plants proposed as of November 2017. They calculated vehicle emissions based on increases in population that they showed is strongly tied to vehicle usage. They then plugged all the data into the GEOS-Chem global transport model, the open source pollution model developed and housed at Harvard.

The researchers found that continent-wide, 13,000 people would die prematurely each year from exposure to vehicle emissions and 39,000 people would die from exposure to pollutants from power plants. Most of those deaths are in southern Africa, where most of the new power plants are being planned.

Interestingly, some countries without any planned power plants also show high rates of mortality. Pollution from power plants in South Africa and Botswana, for example, travels as far as northern Angola because of winds and air circulation.

"This research shows that if we can cut emissions in southern Africa, and South Africa specifically, it can have a far-reaching impact on health," said Marais.

"Africa has the opportunity to avoid the mistakes that much of the rest of the world has made in electricity generation and transportation," said Joel Schwartz, Professor of Environmental Epidemiology at the Harvard T.H. Chan School of Public Health and co-author of the study. "The technology to avoid these mistakes already exists. Making these choices for clean energy will greatly benefit the health of Africans."

"Our work suggests that the countries of Africa can show the way toward cleaner energy, with benefits for both the earth's climate and the air that millions breathe," said Loretta Mickley, Senior Research Fellow at

SEAS and co-author of the study.

More information: Eloise A. Marais et al. Air Quality and Health Impact of Future Fossil Fuel Use for Electricity Generation and Transport in Africa, *Environmental Science & Technology* (2019). DOI: 10.1021/acs.est.9b04958

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