

Killer generator fumes fuel deaths, climate change as power supply worsens

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*Regular electricity has continued to be a mirage for many Nigerian homes. **JANET OGUNDEPO** writes on how alternative power supply has increased deaths and contributed to the fast-depleting climatic and environmental conditions in the country*

A few days after a businessman, Lawrence Olorungbo, his wife and three children, moved into their newly rented apartment in the Apapa area of Lagos State, the stench of their decomposing bodies greeted their neighbours.

Since the Olorungbos were new to the environment, they had yet to establish a close relationship with neighbours. When some people did not see them for days, they felt the newcomers were yet to fully move in. Until pervasive smell assaulted the area and led residents to the apartment did they discover that their yet-to-be neighbours had died.

Speaking to our correspondent, Olorungbo's relative, Joseph Olorungbo, stated that he got wind of the incident through a phone call from neighbours one morning in March 2022.

He said the neighbours told him of their intention to call the Apapa Police Station to gain entrance into the building.

Joseph said, "Preliminary investigations showed that the change-over switch was at the generator's side. The generator was a small one and was found plugged. The fuel tank was also empty. The generator was inside the house and the windows were closed, so there was no way for carbon monoxide to escape. As a layman, we concluded that they died of generator fume inhalation."

He recalled a previous experience he had with some church members who died of the same circumstance during a church service.

"They were having a vigil; the generator was turned on but placed inside the church and several persons died in the event," he added.

Olorungbo's relative stated that immediately he returned home, after settling matters with the police regarding an autopsy, "I told my neighbours to remove their generator sets far away from my space and by God's grace, they complied."

Since constant electricity supply had yet to be achieved, the incident made Joseph a crusader of "generator safety and ethics."

"To be safe, I'll advise that instead of the small generators owned by individuals, some people can contribute to buy a bigger generator that will serve many people; that way, they won't fall prey to death by generator smoke inhalation.

"People should take precautions to ensure the generators are in a ventilated area and far away from the house," he added.

Uncured epileptic power

Nigeria's electric energy is derived from hydropower or hydroelectric and thermal or fossil fuel power plants.

Hydropower is a renewable, clean, non-fossil fuel form of electricity generation from stored and regulated rivers or dams.

According to Statista, in 2020, electricity was generated more from the thermal plants, 22 terawatts hours, while production from hydropower was 6.1 terawatts hours.

According to the United Nations Framework Convention on Climate Change, about 25 million Nigerians are not connected to the power grid.

The World Bank, corroborating UNFCC's report, stated that over 80 million Nigerians, which formed 43 per cent of the population, do not have access to grid electricity.

Also, a breakdown of the reports by Climate Score Card stated that in 2018, only 56.5 per cent of Nigerians had access to electricity due to the poor public infrastructure in rural areas, among others.

Unarguably, these data reflect inadequate national power distribution and supply.

In another vein, the International Gas Union, in partnership with Hawilti Limited, in its February 2023 report, stated that the available energy in Nigeria, Cameroon and Egypt, among other African countries, was expensive, inefficient, polluting and unreliable.

Between January and September 2022, the Nigerian national grid collapsed four times.

Deadly generator fumes

Not a year goes by without reports of deaths caused by generator fumes.

In June 2019, the deadly fume cut short the lives of 10 wedding guests, who attended the traditional ceremony of their beloved in Imo State.

The PUNCH reported that the small generator set, popularly known as "I better pass my neighbour" was turned on overnight and kept in a kitchen, while the doors and windows were closed.

Instead of joyous greetings to celebrate the success of the previous day's celebration, nervous screams and shouts for the guests to open the door were heard.

After a forceful entrance into the house, 10 of the 50 guests were found dead while the others were rushed to a hospital unconscious.

The village head, Martin Ezurike, expressed shock over the incident.

"I know that it was not a case of food poisoning, but fumes from the generator killed them; this is shocking. The parents of the lady, who got married, were among those who survived. Among the dead were the bride's twin siblings," he stated.

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The then Imo State Commissioner of Police, Rabiun Ladodo, said, "The generator was on in the kitchen till dawn, while the doors and windows of the rooms the guests slept in were locked."

A few weeks ago in Ondo State, a couple and their baby were found unconscious in their room after neighbours barged in to confirm their availability.

Further investigation revealed that the baby and wife died on the spot, while the man was unconscious and taken to hospital.

Preliminary checks hinted at suffocation from generator fumes, although the police stated that the cause of death was being investigated.

Carbon monoxide is a harmful gas formed as a result of the incomplete burning of fuel.

According to DieselNet Technology Guide, diesel exhaust gas contains increased concentrations of water vapour, carbon dioxide and decreased oxygen.

Consequently, since humans breathe in oxygen and breathe out carbon dioxide, persons staying in an environment saturated with generators tend to breathe in increased concentrations of carbon dioxide and decreased oxygen.

The American Centers for Disease Control and Prevention states that CO₂ produced from generator fumes is poisonous.

It advises to “use generators outside, more than 20 feet away from your home, doors and windows.”

The American Red Cross warns, “Never use a generator inside a home, basement, garage, crawlspace or any partially enclosed area.”

It further states that generators should be placed outside in well-ventilated areas.

Abundant oil, inadequate power

In Nigeria, petrol and diesel generators are common sights.

Findings reveal that low-income earners mostly use the small 5kva generators (I better pass my neighbour), while companies, churches, hospitals and middle-income families use the big diesel generators.

In Lagos State, known as the business capital of Nigeria, generators (diesel and petrol) are known to supply half of the state’s energy needs.

Also, residents of some areas in oil-rich states in the South-South, still depend on generators for electricity supply.

A make-up artist based in Agbaru, Delta State, Mercy Amrasawore, said she depended on her petrol generator for electricity to do her job, which compromised her health due to the fumes and constant noise.

Amrasawore stated that she spent more money every week to power and service her generator.

She said, “We have electricity but it is not regular. I use a generator when there is no light and I spend up to N1,000 every day whenever there is no light. I spend between N5,000 and N10,000 to maintain the generator.

“The noise disturbs and the fumes from the generators have caused me discomfort. I had to visit the hospital because my nostrils were blocked. The doctor then asked me a series of questions and I told him that I inhaled smoke from the generator. After some tests, the doctor then said that the smoke affected my chest and placed me on treatment.”

But since her job was electricity dependent and power supply was unstable, the make-up artist stated that she had to bear with the noise “but try to be cautious and avoid inhaling the smoke.”

Erekosuma Tamunoko is a cassava miller based in Port Harcourt, Rivers State.

He stated that although his area could boast of “a good supply of electricity” the power outages were upsetting.

“The processing machine is heavy duty and whenever I use the generator to power it, the noise and fumes from it are much. It is quite saddening that even an oil-producing state like Rivers still faces the inefficiency of poor electricity supply. At a point, we had to resort to using solar inverters or generators. It is saddening and I feel very bad but what do we do? We can only hope and be optimistic for the best,” Tamunoko noted.

Michelle Akpevwoghene, another make-up artist from Delta State, said she had learned to ignore the noise and fumes while running her business with “little to no electricity in my area and I have to make use of a generator to get a power supply.”

Polluted, unhealthy cities

An air quality report group, IQAir.com, stated that as of 2021, the air quality in Lagos State was poor and classified as unhealthy according to the World Health Organisation standard.

It noted that the major source of air pollution was vehicle emissions, industry and domestic energy use.

The group added that generators supplied half of Lagos total energy needs and were another source of air pollution. The poor combustion of the gasoline and oil used to power the generators pollutes the air and could cause huge health damage.

In 2022, it ranked Nigeria 18 out of 131 countries with the worst air quality globally.

The Lagos State Environmental Protection Agency announced in August 2022 that air pollution was responsible for over 30,000 premature deaths in 2021.

Of the figure, children accounted for 75 per cent of the victims.

A study further revealed that the worst type of pollutant, the microscopic particulate matter, which can easily penetrate the lungs due to its small size, was found over seven times in the WHO's target of 10 $\mu\text{g}/\text{m}^3$ to 68 $\mu\text{g}/\text{m}^3$.

Generators: A beloved malady

Generators in Lagos and other parts of the country are reportedly the provider of 50 per cent of energy. But it is, according to the World Bank, a major producer (79 per cent) of carbon monoxide, 27 per cent of nitrogen gas and 22 per cent of sulphur.

The dependence on generators is caused by the irregular power supply bedevilling the country.

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With many power-generating plants connected to the national grid and a generous promise by the companies of generating 30,000 megawatts of electricity by 2030, in 2023, they still grapple with producing 5,000MW.

In January, data from the Nigerian Electricity Regulatory Commission, from January 2019 to December 2022, revealed that the capacities of 26 power plants out of 29 dropped by 26 per cent, adding that three were shut down and generated no megawatt.

The data stated that the expected power generation of the 26 plants was 5,859MW but dropped to 4,522MW in December 2022.

The PUNCH reported that the three plants were AES, Dadinkowa and Asco.

In the reviewed year, of the four hydropower plants under the Power Purchase Agreement, three generated below expectations while one did not generate power.

But in August 2022, *The PUNCH* reported that nine out of the 26 power plants connected to the power grid produced 71 per cent of the electricity generated in the country.

The NERC then stated that the overreliance on the nine plants “posed a risk to the industry.”

Data from the NERC and reported by *The PUNCH* revealed that October 30, 2020, was when the industry recorded the highest daily peak generation.

The NERC Chairman, Sanusi Garba, in January 2023 further promised the supply of 5000MW to electricity consumers.

But metering experts had told *The PUNCH* that Nigeria had passed the stage to be battling to solve power generation, adding that Nigeria had previously produced 6000MW.

Poor maintenance and shortage of gas were the reasons the Minister of Power, Abubakar Aliyu, gave as the causes of the national grid collapse.

Low water levels in the dry season, poor utility performance, weather conditions, insufficient funding to upgrade to an intelligent grid and lack of monitoring and accountability, are the reasons for inadequate power generation, according to Energy Central, a global power industry professional group.

Despite these challenges, the Central Bank of Nigeria stated that it generated N29.95bn from electricity export in 2021.

The World Bank stated that the lack of reliable electricity supply further resulted in an annual economic loss estimated at \$26bn.

Recently, a coalition of the climate change network, Society for Planet and Prosperity, GCA Capital Partners and Climate Advisers Network reported that about 75 per cent of electricity in Nigeria was from diesel and petrol-powered generators.

They further affirmed that the national grid supplied less than 5000MW, implying that about 25,000MW used in the country was from alternative sources.

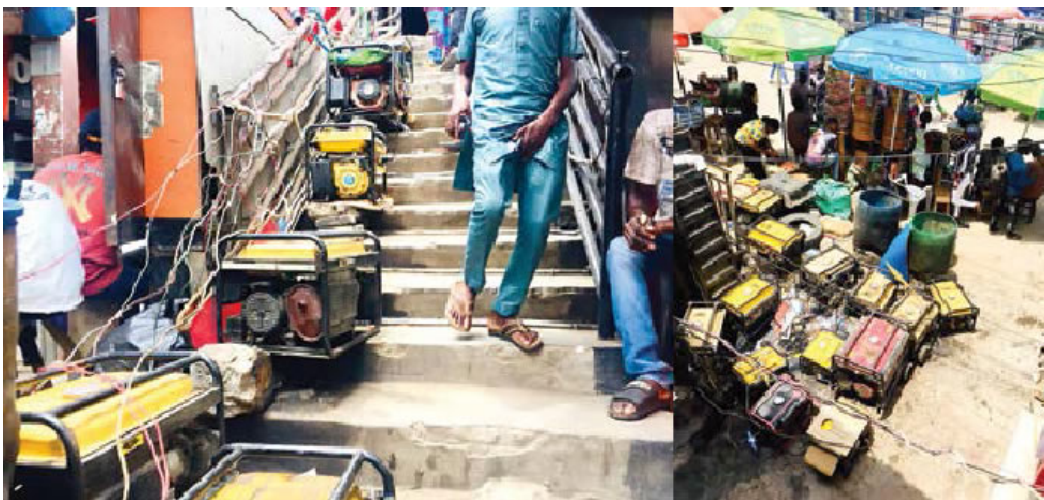
The President of the Society for Planet and Prosperity, Prof. Chukwumerije Okereke, stated that the low power generation was not at par with other developing countries and was a “major thing crippling the economy.”

Okereke said, “So, we get nearly 75 per cent of our electricity in this country through generators, which is one of the most polluting sources of electricity generation. Therefore, the elimination of diesel and petrol-powered generators is the second on the list that we have identified.”

Compromised health, weather

A climate energy consultant with Poder Green Consulting, Adedeji Adetoyi, said the changing climate was a result of the increase of greenhouse gases in the atmosphere.

According to him, methane stays longer in the atmosphere than other gases such as carbon dioxide and mono oxide, nitrogen oxide, and sulphur oxide.



He added that research findings showed that persons living in a crowded environment, a commercial or industrial area, were exposed to the impact of the urban heat island.

This, he said, caused respiratory difficulties, heat cramps, stroke and exhaustion.

Adetoyi stated, “The numerous generator operations within homes in Nigeria contribute increasingly to the household carbon release. This is coupled with other forms of activities that emit greenhouse gases.

“The amount of CO₂ we generate daily is in millions just for us to have power supply. Consequently, this has increased the number of health challenges in the country.”

He called for a transition to renewable energy for electricity generation, transportation and cooking, stating that the use of fossil fuels in all of these processes further contributed to polluting the environment.

Adetoyi confirmed that noise pollution was another side effect of constant generator use with serious health implications.

He said, “The air and noise pollution affects the health of residents in the area and the agricultural production in the area. This is because more CO₂ and nitrogen dioxide in the atmosphere will cause acid rain and this is not good for crops and human consumption.

“If we are to look at all aspects of emissions going on, it comes back to affect our health mentally, directly and indirectly. Air pollution carries lots of airborne diseases and this affects the health system of persons who have been exposed to such.”

The climate-energy consultant further stated that the effects of greenhouse gases (gases in the earth's atmosphere that trap heat) affected marine life and the mental health of humans.

Adetoyi surmised that migration was another offset of climate change effects in Nigeria.

Also, a Professor of Geology and researcher in Environmental and Petroleum Geochemistry at the University of Calabar, Calabar, Therese Nganje, noted that although petrol was a light hydrocarbon and diesel had a higher molecular hydrocarbon, burning of these fuels contributed to depleting the ozone layer.

The ozone layer covers the entire planet and protects life on earth by absorbing harmful rays from the sun.

She added that other products added to petrol, for example, gasoline, contained harmful substances that were unhealthy to the environment and human health.

Nganje said, "The more people use generators, the more harmful gases are being released into the environment in form of particles. We call them particulate matter. This affects humans when they come in contact with it, which is usually through the skin and inhalation. Noise pollution is another effect of burning these fuels. The burning of the fuel produces carbon dioxide and the hydrocarbon itself may change from one form to the other and may contain other components, which may take a long time to take away from the environment. Also, when there is a spillage, it goes into the soil and can contaminate the groundwater."

According to the geology professor, the interaction of dangerous contaminants with the atmosphere is one of the causes of acid rain, which damages zinc roofs in affected areas.

"Many countries are already talking about clean energy because fossil fuel contains some dangerous contaminants like the hydrocarbons and heavy metals like lead and sulfur, among others. That is why we are now talking about electric cars, hydro and solar-powered electricity," she stated.

Nganje decried the non-implementation of enacted environmental laws, stating that it had promoted several unsafe and non-environmental friendly practices.

The don added, "We need to sensitise the populace and work towards implementing the laws to control and mitigate the current effects.

"Nigeria needs to harness the gas to levels that are not harmful. Despite several calls about an intervention into the situation with gas flaring, nothing has been done. In our environment, it is a complex situation because other countries have talked about transitioning to clean energy.

"People cannot continue to stay in darkness, so they have no choice but to keep using diesel and petrol to power their generators. Those who do not use generators are also affected by their neighbour's use of generators."

Seeking cleaner power source

The Assistant General Manager of the sales department of a power and energy solutions industry, LionRock Corporate Nigeria Limited, Kashif Khan, stated that the improper placement of generator sets was behind carbon poisoning.

On the effects of the harmful gases generator fumes infused into the environment, Khan stated that generator users must always be safety conscious.

He said, "We need to ensure that a generator is installed in a place that has proper ventilation. If it is a diesel generator, it should have a distance of three to four feet from the house and the exhaust pipe should be placed facing the sky and not in a place that allows the smoke to get in back into the house."

He warned against the placement of generators (of various types and sizes) under staircases, basements or inside rooms.

Khan further stated, "When generators are working, they are burning fuel, either petrol or diesel, and as a result, they are emitting smoke. The smoke has carbon dioxide and mono oxide, among other gases that are dangerous to health. Humans are supposed to exhale carbon dioxide and inhale oxygen so when you inhale carbon dioxide in large quantities, there are chances that this could lead to death.

"Petrol generators are very vulnerable to this because petrol is easily combustible. It easily catches fire as against diesel. So, apart from the smoke, they can also catch fire whenever the users are not using them appropriately."

According to him, high electricity demand, which is more than the supply, and the inefficient power generation method, are reasons for the unstable power supply in the country.

Speaking on the environmental impact of generator fumes, Khan stated that no technology was available to reduce harmful emissions from generators.

He submitted that a transition to cleaner and renewable energy sources for power generation was the only way out.

“One of the solution cards is hydro and those who can afford it can go green by installing solar panels and using the energy from the sun to generate energy. The only way to reduce the carbon footprint is to go green so you can hit net zero.

“In other countries, a generator is used as standby, but in Nigeria, the generator is used as a primary source of power. The grid has to be improved and awareness of green energy should be made, though it is not easily affordable,” Khan added.

He called for the thoughtful usage of generators, stating that they “should be used when critically needed and turned off immediately after power is restored.”

In all these, Khan hoped that Nigeria would transition into a cleaner, stable and reliable energy source.

A diesel generator expert and technical director of Ligo Energy Limited, Elizabeth Ogunshina, agreed that deaths from generator fume inhalation were due to improper placement of generators.

Ogunshina said, “When the fume circulates into a room, what they are inhaling is no longer oxygen. The more they inhale carbon dioxide, the more it binds with the haemoglobin in the blood and this reduces the oxygen circulating in the system. If the person is awake, it can cause dizziness.

“When buying your generators, either diesel or petrol, make sure you do not place them close to where humans are. Position them where there is enough ventilation and circulation. Place the exhaust pipe away from facing other people’s rooms or compounds. If you place your exhaust pipe on a particular tree, after some time, the tree will die off. So, they have a long time effect on the environment and human health.”

Ogunshina noted that there was no regulation for the emission levels of generators.

She urged generator users to ensure constant servicing and proper maintenance of their generators by experts to reduce the emission rate of carbon dioxide.

The expert hoped for a transition to renewable energy while generators become used as backups.