

At the centre of this shift is bagasse, the dry fibrous residue left after sugarcane is crushed.

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For decades, sugarcane has been synonymous with sweeteners on dining tables and raw material for the food and beverage industries. But across Uganda's sugar belt, the crop is quietly powering a different kind of transformation—turning waste into electricity that lights homes and drives industrial growth.

At the heart of this shift is bagasse, the dry, fibrous residue left after sugarcane is crushed to extract juice. Once considered a by-product of little value, bagasse is now emerging as a key player in renewable energy generation.

At Kakira Sugar Works Limited in Jinja, the process is already in full swing. Mr Julius Akiziman, a mechanical engineering cane yard supervisor, says sugar production and power generation seamlessly integrated.

Once the cane is crushed, the bagasse is fed into boilers where it is burned to produce high-pressure steam," he explains.

"This steam is then directed to turbines. As it expands, it spins turbine blades, which drive generators to produce electricity," he adds.

The system does not stop there. After powering the turbines, the steam is condensed and recycled back into the system, improving efficiency and reducing waste.

The electricity generated is not only used within but is also synchronised with the national grid, allowing surplus power to be distributed to surrounding communities and industries.

Advantage.

This form of power is vital for economic growth and community development. It is clean, cost-effective, and readily available where sugarcane is grown,

and
sugarcane is grown,
— Michael Mugabira, a sugar technologist and grower affiliated with Kinyara Sugar Limited.

Industry experts say this model—known as cogeneration—is not new, but its growing scale is reshaping Uganda's energy landscape.

Mr David Kafuku, a retired sugar technologist, notes that sugar factories have historically been self-reliant in power production.

"Factories have long generated their own electricity to run operations. They only import power in times of shortage, but most of the time, they are self-sufficient," he says.

What is changing, however, is the extent to which this power is now shared beyond factory gates.

"Today, electricity generated from sugarcane waste is increasingly fed into the national grid. In many countries, this has become an important renewable energy source supported by government policy," Mr Kafuku adds.

The trend is also evident at Sugar and Allied Industries Limited, commonly known as Kaliro Sugar. The company's manager, Mr Deep Dhola, describes the process as a practical example of turning waste into wealth.

"From bagasse, we generate steam by burning it. The steam runs turbines,



The equipment used to convert bagasse into electricity at Kakira Sugar Ltd factory in Jinja. The electricity generated is not only used within but is also synchronised with the national grid, allowing surplus power to be distributed to surrounding communities and industries. PHOTO/DENIS EDEMA.

How sugarcane waste is driving clean energy shift

and the turbines produce electricity. So we are converting waste into a useful product," he says.

Beyond efficiency, proponents highlight the environmental benefits of this approach. Unlike fossil fuel-based power generation, bagasse-based electricity significantly reduces greenhouse gas emissions.

"We are using waste, so there is minimal pollution. Compared to coal-powered plants, this is clean and green energy," Mr Dhola adds.

Mr Michael Mugabira, a sugar technologist and grower affiliated with Kinyara Sugar Limited, says bagasse has become indispensable in modern sugar processing.

"When sugarcane is crushed, what remains is bagasse, and this is not wasted. It is used as fuel to generate electricity," he explains.

He adds that cogeneration allows factories to simultaneously produce heat for sugar processing and electricity, making it one of the most efficient uses of agricultural resources.

Experts argue that this dual production model is critical as Uganda seeks to diversify its energy mix and reduce reliance on hydropower and fossil fuels.

Boosting power supply

Electricity generated from sugarcane waste is increasingly supporting not just factory operations but also the national grid, especially in sugar-producing regions such as Busoga and Bunyoro.

This has helped expand access to power for households and small businesses, while also supporting industrial growth.

Mr Mugabira notes that converting agricultural waste into electricity offers a practical solution to Uganda's rising energy demand.

"This form of power is vital for economic growth and community development. It is clean, cost-effective, and readily available where sugarcane is grown," he says.

Beyond energy, sugarcane continues to drive a wide range of industries. Processed sugar feeds confectionery and beverage production, molasses is used to make ethanol and animal feed, while by-products like filter mud enrich soils as organic fertiliser.

Bagasse itself is also used in the manufacture of paper, packaging materials, and fibre boards, further expanding its economic value.

The processed sugar is used to make confectionery such as sweets, biscuits, and soft drinks, while molasses is used in the production of ethanol, alcohol, and animal feeds.

Modern Power, which is part of the diversified Modern Group, generates

2000MW, comprising power plants in various locations in Africa. In Uganda, Modern Power is one of the leading brands in the power sector, generating a total of 52MW.

Mr Ashish Monpara, the chairperson of the Modern Group of Industries that runs a chain of sugar factories in Uganda (Kaliro Sugar, Modern Sugar, and Kassanda Sugar), explains how the sugar power generation, or bagasse cogeneration, is made.

"We plan to generate a total of 100MW as part of our commitment to complement government efforts in addressing power gaps in the country," Mr Ashish says.

He adds: "We believe in fostering a sustainable ecosystem of growth by creating employment opportunities, investing in skills development, and reducing the cost of power while prioritising responsible business practices."

Sugar factories such as Modern Group's Kaliro Sugar have invested in advanced technologies to convert 30–40 percent of by-products into renewable bioenergy, biodegradable packaging, and advanced chemical materials.

Kaliro Sugar Factory currently produces sugar and cogenerates electricity from sugarcane bagasse. The plant produces 12MW of power (5MW for internal use, 7.9MW for the national grid).

As demand for sustainable energy grows, experts believe scaling up cogeneration within the sugar industry could significantly boost Uganda's electricity supply.

What was once discarded as waste is now lighting homes, powering factories, and redefining the role of agriculture in the country's energy future.

According to the Ministry of Energy, the government plans a 120MW boost from sugarcane power.

Dr Patricia Litho, the assistant commissioner for Communications and Information Management in the ministry, says the government is planning to increase electricity generation from sugarcane waste by up to 120 megawatts in the medium term, as part of efforts to expand renewable energy sources.

Government plan

"Our expansion plan focuses on scaling existing mills, bringing new sugar projects on board, and maximising export of excess power to the national grid. Uganda has over

100 megawatts of potential within the sugar industry, with companies such as Kakira Sugar Limited generating about 52MW and Kinyara Sugar Limited expanding to up to 40MW," Dr Litho observes.

She adds that the government is targeting significant growth in the sector in the coming years.

"In the medium term, Uganda expects additional capacity of approximately 60 to 120 megawatts from sugar-based cogeneration, depending on factory expansions and grid integration timelines," she says.

To support this, Dr Litho says the government has put in place a range of incentives aimed at attracting investment into biomass energy.

"We have established mechanisms such as the Renewable Energy Feed-in Tariff to guarantee predictable pricing, alongside programmes like GET FIT to improve project bankability," she explains.

SUGARCANE POWER AT A GLANCE

• Over 100MW potential from Uganda's sugar industry

• Kakira Sugar generates about 52MW

• Kinyara Sugar expanding to about 40MW

• Kaliro Sugar produces about 12MW

• Government targets 60–120MW additional capacity

• Cogeneration produces both heat and electricity.

100MW
POTENTIAL