AES, energy efficiency and the food and beverage sector

Associated Energy Services (AES), South Africa's leading operations and maintenance service provider to the steam and boiler sector, believes that it can help food and beverage sector manufacturers deal with their many challenges.

Cooker vessels in a food production facility will often use thermal energy such as steam as a key input in the beneficiation process.

South Africa's food and beverage sector plays an important rolea key role in maintaining food security. But this energy-intensive industry is under considerable pressure – from retailers and consumers – to absorb ever-growing input costs and help curb rapidly increasing food price inflation.

AES Commercial Director Dennis Williams sums up the sector's key production-related performance challenges in three words: efficiency, quality, and reliability. Consequently – and as one of the country's largest users of thermal energy – Williams says the food and beverage industry needs an energy management ally.

"One of the idiosyncrasies of the food and beverage sector is that not only is thermal energy a key input in the beneficiation process, but this usually exceeds electricity requirements, by two or three times. Electrical energy is dense and easy to use and – except during load shedding – is there whenever one needs it. But thermal energy has tomust be converted into a usable format on site. That is where AES comes in," he explains.

The complexities do not end there. The applications for energy in the food and beverage production sector are vast, and can include everything from spray drying coffee creamers to the heating of raw materials ahead of processing, as happens during beer production. One manufacturer may use steam for cooking and canning vegetables; while another such as a dairy producer uses it for pasteurising. Temperature control of work spacesworkspaces and clean-in-place (CIP) processes, which include cleaning and sanitation to meet stringent health and safety standards, are also important. This means reticulating steam throughout a food and beverage processing and production facility to all operational areas.

To add to this, different manufacturers and product categories come with their own specific requirements, which means creating bespoke solutions for individual clients.

At food processing and production facilities, AES is typically responsible for the whole chain of control, starting with selection and availability of the right fuel and continuing on to the actual generation of steam and its delivery to the processing plant. Strong and longstanding relationships that depend on effective communication and education – and include an on-the-ground understanding of exactly how a particular plant and business operates – are paramount in this process.

Williams says that proper design and planning of reticulation systems is crucial: "In older plants, AES often finds that, because of space and time constraints, processes are not ideally situated when it comes to energy supply. This may even include thermally active pipelines, which are actually just dead-ends due to haphazard expansions over the years, which reduces efficiencies," he advises.

Addressing such design and operational footprint inefficiencies and limitations needs to be done in partnership with the client. "We can generate the thermal carrier, but if the client wastes it or uses it poorly in their production process, then they negate our efforts at the front-end. They will need more steam than necessary, and we will need to burn more fuel to provide it. That is why partnerships between AES and our clients is so pivotal, and why we strive always to build a mutually beneficial understanding and synergy at all times," he explains.

Success stories

Williams says that AES has a several success stories in the food and beverage sector: "AES took over operations at a large FMCG (fast-moving consumer goods) client's pilot facility, which was struggling with overall energy efficiency due to a lack of technical expertise and resulting challenges with the plant and equipment on site.

"We guaranteed an improvement in the operating efficiency in the boiler house and a reduction in the use of heavy furnace oil. We put one of our own boilers on the site to bolster their capacity, installed further capacity to support their production, took over management of training their staff, and implemented AES's operating practices and management systems," he recalls. These combined efforts reduced fuel consumption and carbon footprint at the facility by an impressive 21%.

AES went on to operate a second and larger site for the same company where the situation was even more dire in terms of skills shortages. "There, we delivered a 35% reduction in the cost of fuel and the carbon footprint. Over the years, that has enabled us to expand our footprint within the company to five sites."

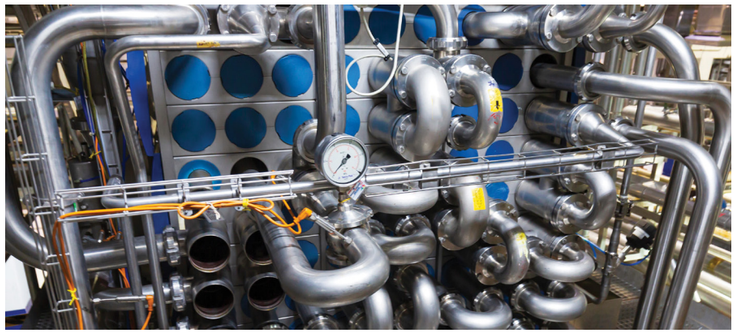
During this time, AES has reconfigured steam generation facilities, introduced changes to fuel and ash handling systems, addressed health and safety issues and improved the general reliability of the plants.

Although cost constraints remain a priority, Williams says that sustainability – especially for multinationals operating in South Africa – is becoming a big focus. The reduction of emissions and waste, the choice of environmentally friendly or 'green' fuels such as biomass or natural gas and water-saving have become priorities.

Citing an example, he says AES recently assisted with an evaluation to convert to natural gas by an internationally owned frozen foods manufacturer, which had made commitments to reduce the carbon footprint of its South African facilities. "Our involvement extended from specification of a suitable boiler for the gas burner systems, site location, reticulation of the gas pipeline and engaging with gas vendors regarding price and availability of fuel," Williams says.

An ongoing project at a much larger sister plant began with identifying a sustainable and cost-effective biomass route. The AES team has travelled to Europe and South America, reviewing between 12 and 17 fuel and technology options in detail. Risk and fuel supply assessments culminated in a preliminary roll-out plan. When it comes to saving water, Williams says that managing condensate, an inevitable by-product of the process, is "the low hanging fruit".

"Even in instances where it has a much lower temperature, that condensate still has value. We can include this with any make-up water that goes back into the boilers and reduce water, fuel, and chemical consumption for treatment purposes," he notes.



Heat exchangers in the food industry can be used to recirculate the heat from the process stream – pasteurised milk for example – for use in preheating the incoming product, such as untreated milk. This reduces the total energy needed to process the product.

Future-proofed energy and food processing

Change in the food and beverage processing and production industry requires ongoing and constant engagement with clients, Williams maintains. "We walk through the reticulation process.

We do thermal imaging and talk to clients about whether or not steam traps are functioning correctly, make recommendations about things such as reticulation, dead-ends and where they can be isolated. Strategic input includes conducting a high-level energy audit, which offers substantial cost benefits," he says.

Then comes the innovation component, as demonstrated during a recent project: "We operate a biomass boiler with an economiser (or heat exchanger). Hot flue gas coming out of the boiler passes through this before it goes up the stack. We then circulate the water going into the boiler through that heat exchanger to preheat it, which reduces fuel usage." Williams believes that most food and beverage manufacturers are aware of the need to maximise efficiency and ensure that operations are sustainable. Although there are many high-tech operations in South Africa's food and beverage sector, there are even more that must continue to do the best they can with what they have.

However, small changes can have a significant impact.

"AES's role is to help optimise expansions and improvements to existing food and beverage production processes. It is very much a supportive, synergistic partnership. Together, we can make these companies more competitive in marketplaces, both locally and internationally," Williams concludes.

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ROMPCO promotes natural gas for Africa's industrialisation

At Africa Industrialisation Day last year, the challenge in the availability of reliable and affordable energy sources was in focus. "A key solution is the abundant, clean resource provided by natural gas," says Siphephelo Kunene, Senior Officer of Communications & Stakeholder Management at the Republic of Mozambique Pipeline Investments Company (ROMPCO).

"Large quantities of natural gas are available to meet the supply and demand of alternative energy sources for industrial development in Africa.

This is a game-changer for the continent," notes Kunene. Gas supply can fuel economic growth, create employment opportunities, and empower local communities.

"It brings economic, social, and environmental benefits as we work toward a low-carbon future," adds Kunene.

ROMPCO's efforts have been instrumental in advancing industrialisation, not only in South Africa but also in Mozambique. The company has entered into cross-border agreements to supply energy to markets in these countries.

Its gas pipeline network has the capacity to serve both Mozambique and South Africa, catalysing industrial growth.

"We have made tremendous contributions to increased industrialisation in both Mozambique and South Africa. Our collaboration and cross-border agreements have been pivotal in fostering industrial growth, creating jobs, and driving economic progress," he says.

Expanding the gas supply network into other African countries presents challenges, notably geopolitical tensions that can deter potential investors. However, the opportunities are equally promising.

The demand for natural gas as an alternative energy source is high, while the revenue generated from expanding the network can significantly drive economic growth and structural transformation.

Kunene stresses that the company understands the importance of stakeholder engagement and relationship management in promoting industrialisation. "Effective engagement fosters support for both short-term and long-term goals, creating a collaborative environment for industrial growth," he adds.

As the need for natural gas supply continues to rise, ROMPCO's mission aligns with the continent's aspirations. The company aims to grow, expand, and remain sustainable. "Therefore, it would be a good opportunity to expand our gas pipeline to other African countries," says Kunene.

"Our mission is to be the leading Southern Africa gas transmission and infrastructure company, transforming the communities in which we operate and developing the energy industry through the provision of sustainable gas supply and innovative solutions to our markets," he concludes.

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