

## **Press Release**

### ***AES maintains a strong value and safety stance on boiler retrofits***

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When retrofitting and upgrading boilers, operational experience, technical knowledge of different boiler types, operating conditions and water treatment counts. Through operating 79 boilers, AES knows what works and what does not. This equips AES as South Africa's go-to industrial steam operations and project company to share insights and make invaluable recommendations.

#### ***Motivation for boiler retrofits***

"Retrofitting a boiler is like upgrading some components on a car rather than replacing its entire engine," Williams explains.

"New control systems improve fuel efficiency, emissions and load response without changing the boiler's original pressure rating. The right upgrades deliver meaningful performance improvements while extending the delivery of value through existing assets," he adds.

Williams points out that the main motivations for applying a retrofit / upgrade to an existing boiler could include:

- Unworkability of obsolete instrumentation and equipment, and non-availability of spare parts such as Scada, PLC, control modules and electronic components
- Incompatibility with updated technology in management systems (for example, collection of site operating data, process management and efficiency tools)
- Efficiency impacts due to obsolete design of air preheater or economiser components, combustion or burner and control system design, fuel management and air distribution system designs
- Inability to comply with emissions targets because of ageing and poorly performing emission abatement plant
- Desire to reduce carbon footprint through a fuel switch where combustion system can be changed

Additional considerations include maintenance of boiler steam output - due to changes in combustion and emission abatement systems that require changes to draught management through the boiler - as well as improved electrical efficiency through applying latest technology on electrical motors and drives, and better boiler operability (improving a boiler's ability to respond to load changes and operate with lower emissions).

“Retrofits such as boiler control systems, combustion systems, burners and flue gas upgrades, can improve boiler combustion and overall efficiency - mirroring the benefits of a new plant with its better operating efficiency yet unfortunately also high capex requirements,” Williams notes.

An example of the potential payback resulted in a 15% improvement in efficiency - with a 13.1% reduction in fuel intensity per tonne of steam generated - following the retrofit of a boiler control and steam load balancing system on a fast-moving consumer goods (FMCG) client site featuring multiple boilers.

Here, benefits included access to operating data from the boiler house for overall plant management insight and planning; and a reduction of between 40 and 50% in boiler house electrical use when applying updated control systems with variable speed drives (VSD).

### **First-hand insights**

When it comes to boiler changes, Williams says that AES has evaluated various combustion and burner systems: “Having liaised with original equipment manufacturer (OEM) suppliers, visited their sites and their client reference plants, AES has first-hand insights into pyrolysis, gasification, biofuel combustion and various other technologies which can often be retrofitted to package boilers for fuel swapping.”

AES has developed its own in-house control system which will have an impact on a boiler’s combustion and overall efficiency, load following capability and can incorporate load balancing systems: enabling the spreading of steam across multiple operational boilers. This is being reviewed, adjusted and optimised on an ongoing basis, to ensure the best possible combustion technology is applied.

Furthermore, AES installs and operates emission abatement solutions including bag filters and electrostatic precipitators (ESPs), and has first-hand experience of alternatives: “AES has access to advanced cyclone particulate emission abatement plant, which achieves particulate loading in flue gas below 120mg/Nm<sup>3</sup>. This technology is more cost-effective than bag filters and ESPs in terms of capex and opex,” Williams advises.

### **To retrofit - or not**

Williams emphasises that there is a major difference between a retrofit and legally required maintenance and repairs to pressure vessels (including welding repairs and tube replacements).

A full-blown boiler replacement only applies when an asset has limited remaining life expectancy, and there is benefit from purchasing a new one: “When addressing emissions, if a retrofit can achieve the same outcomes - and changes can be made to control systems, combustion systems and burners on an existing boiler - then that would negate almost all of the benefits of a new boiler.”

Replacement might also not be considered where an asset’s days are numbered. This applies when the wall thickness on the pressure parts of an older boiler is compromised through rusting of the outer shell, or internal pitting corrosion due to poor water treatment: “This may render boilers non-compliant in terms of their originally designated steam pressure and temperatures.

In such a case, it is possible - with the aid of professional engineering experts doing design calculations and an Approved Inspection Authority (AIA) - to repair the boiler’s affected areas or derate the operating pressure to allow the boilers to continue operating,” Williams advises.

Using a boiler originally designed to operate at 20 bars as an example, he concedes that - should there be a case for a boiler to be derated from a pressure perspective and recertified to operate at a lower maximum pressure, this steam pressure still needs to be suited to the relevant client’s requirements: “If they do not need 20 bar steam, this is still workable. If the client does, then the boiler must be replaced.”

### **Safety and legal compliance**

Another safety aspect entails ensuring that a new liquid or gas burner installed in a boiler has the correct flame shape and size to prevent impingement of the flame onto the boiler’s metal surfaces. Flame adjustment and set-up is needed to prevent localised overheating and possible failure.

Steam plant safety requirements in South Africa and boiler compliance requirements go hand-in-hand. Adjustments must be undertaken in alignment with the legal requirements such as Pressure Equipment Regulations.

Changes impacted by legal and design restrictions require signoff by approved and professional parties. Third party oversight and approvals are critical and, over the years, AES has worked closely with approved inspection authorities – as well as metallurgical and engineering design professionals - to evaluate each situation according to its merits.

Safety is one area where AES will not compromise: “If we arrive on site and find that an asset is not signed off legally to be operational, we will immediately shut it down. It is absolutely critical that clients understand legislative requirements in terms of boilers as pressure vessels, and safety around these is strictly not negotiable,” Williams concludes.

## ***Ends***

***(1 069 words)***

### **Note to Editors:**

As South Africa’s go-to industrial steam operations (O&M) and project company, AES has been an innovator and pioneer for over 25 years.

It is the ‘go-to’ company for manufacturers to optimise their energy generation and operations, diversify energy resources, improve site operations, and reduce their carbon footprints through the production of the maximum amount of energy, reduction of risk and minimisation of the total cost of production through an energy plant’s operational life.

Current long-standing contracts average at least 10 years – with client savings achieved extending from 10% to over 35%. The company has concluded more than 50 outsourcing contracts (28 currently active) and has over 75 boilers under management. Client sites benefit from AES’s significant expertise and skill, which spans operations, maintenance and mitigating the risk associated with energy and combustion vessels under pressure.

The industry sectors in which AES operates include power generation, chemical, plastics and rubber, timber, pulp and paper, textiles, food and beverage, and mining. The company not only assists with the day-to-day generation and supply of steam from coal, liquid fuels, biomass and gas, but has assisted numerous clients in converting to more sustainable fuels.

The substantial value added by AES is evident across the entire manufacturing supply chain via the mitigation of risk and the reduction of plant downtime, the cost-effective procurement of fuel and logistics management, assistance with asset maintenance over a plant’s lifetime, improvement in site operations and lead times, minimisation of wastage and a reduction in carbon footprint.

AES subscribes to the strongest ethics and operates according to high safety standards, prioritising process safety management and occupational safety so that clients know that their assets are legally compliant, cared for, safely operated and managed.

The company is also proud of its commitment to service delivery, technology advancement and the development of its people. AES upskills and promotes talented people on an equal opportunity basis into the industrial operations environment. The company believes that making a positive difference to communities and the environment is the best way to ensure that everyone benefits.

**Editorial Contact**

Kendal Hunt

Managing Director

Kendal Hunt Communications PR and Media Liaison Agency

+27 - 11 462 6188

+27 - 82 823 6533

[kendal@kendalhunt.co.za](mailto:kendal@kendalhunt.co.za)