# AI IS HELPING THERMAL POWER PLANTS REDUCE COSTS AND POLLUTION

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Despite periodic policy pronouncements to shift to cleaner fuels, coal-fired thermal power plants still account for over 70% of India's electricity. That's perhaps not surprising for a developing country where coal is the cheapest source of fuel. So, we can expect thermal power to continue to occupy the top slot for quite some time, overriding concerns over carbon emissions, pollution and climate change.

But what can mitigate the damage to our health and environment is lowering the amount of coal thermal plants consume. This requires power plants to improve their efficiency by adopting new technologies. But state-owned power plants and electricity subsidies have made it complicated to incentivize a shift to more efficient plants by investing in tech solutions. That's one reason why industrial IoT startups, which could have helped power plants with data analytics, found it hard to sell their products in India in the past, and focused on buyers in global markets.

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This has changed in the past couple of years because of a number of factors. "It's an extremely difficult market to sell into, but thermal power is a stressed industry right now," points out Rahul Raghunathan, co-founder of three-year-old Bengaluru startup ExactSpace, whose focus is on helping power plants with artificial intelligence (AI) for operational efficiency and predictive maintenance.

**Key challenges**

One of the stress points comes from the growing share of renewable energy. It means thermal power plants have to operate at partial capacity during daylight hours when solar power reaches peak level in the grid. This poses operational challenges. "When you suddenly bring the temperature down, it creates a physical stress. The plant operators don't have a mental map of what's needed to achieve an optimum level. It's a flexible operation scenario and that is one of the things we're trying to address for a power plant," explains Raghunathan.

With AI, the startup can create a "digital twin" of the entire process, take into account varying conditions and figure out the optimal configuration in a live setting. This helps improve efficiency and reduce fuel inputs, which in turn has an impact on carbon emissions.

"We have been able to improve boiler efficiency by 1%, which is quite significant. For a 500MW thermal power plant, it means a reduction of coal usage by 10,000 tonnes in a year," says Raghunathan.

The other key area of impact is the reduction of expensive downtime due to breakdowns. For example, the failure of large steam turbines could lead to the entire production coming to a halt. That, in a 500MW plant, costs 3-4 crore per day.

ExactSpace faces global rivals like GE whose Predix platform offers industrial IoT solutions. But unlike the GE platform, which was built for multiple verticals, the Indian startup focused on the special needs of thermal power.

Two of the co-founders—Raghunathan and Arun Jose—had started visiting power plants while working together at a Bengaluru IoT services company. When they decided to launch an industrial IoT startup to serve the emerging needs of the thermal power industry, they realized that they needed an insider with deep domain expertise.

So, they roped in a thermal power industry veteran, Boben Anto, as a third co-founder. Anto had conceptualized and commissioned power plants for NTPC Ltd, where he worked for 22 years. He was later with German power company Steag for 11 years, the last four of which were as executive director for India.

The startup recently outbid the likes of GE, Siemens and Schneider Electric for a contract with a power utility original equipment manufacturer in India.

"We were able to beat all these global players in a public tender, both technically and commercially. I couldn't overemphasize the importance of knowing the domain in which you're solving a problem," says Raghunathan.

**New solutions**

Validation also came from the selection of ExactSpace for Swedish-Swiss MNC ABB's Synerleap accelerator programme to build bridges between corporate innovation and startups.

"We have identified several areas where ExactSpace's AI technology helps us to speed up ABB's digitalization vision. Their technology has given us openings for completely new solutions, some of which we already have installed on customer sites," says Martin Olausson, ABB vice-president and head of business development at Synerleap.

The partnership with ABB is opening up possibilities for ExactSpace's platform to be used in other domains adjacent to thermal power, such as cement or steel. But it also wants to stay true to its original approach.

"Our value delivery to the customer remains the same. We will provide extremely domain-specific solutions with this platform. We're not going to ship out a platform and say, 'you build the value'," says Raghunathan.

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