Addressing India's need for efficient power generation

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India needs a plan that focuses on making the entire power infrastructure more efficient, and not just optimizing specific assets.

According to Trading Economics, India's average quarterly GDP Growth has averaged about 7.45 per cent between 2000 and 2011. Economy Watch further stipulated that this growth is expected to continue to hover around 8 per cent through 2015. Sustaining this growth requires a significant investment in India's power industry, including investments in the areas of power generation, transmission and distribution.

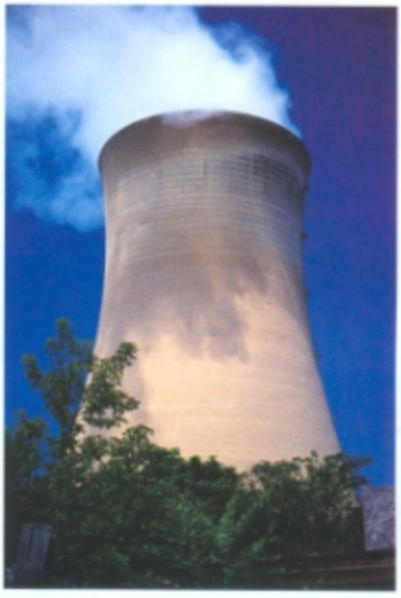
Enter the Ministry of Power and its strategic initiative, "Mission 2012: Power for All." This initiative provides a blueprint to generate sufficient power to achieve the GDP growth rate of 8 per cent. The objectives of this strategy are clear - generate reliable, quality power that is efficient and optimized. Done correctly it is expected that state-run power generation can become commercially viable. Needless to say this is a very large and ambitious undertaking, but is certainly possible. When looking at the status of power generation in India, there is quite a dichotomy of assets. There are many assets that are old and are usually running thermal coal and the new assets are more efficient forms of power generation using different energy sources (hydro, nuclear, gas).

To be successful, India needs to focus on looking at optimizing all power generation assets holistically. Rather than focus on optimizing specific assets, the plan needs to focus on making the entire infrastructure more efficient. This requires an understanding of how to optimize multiple assets, utilizing them in the best possible combination. Finding the optimal equipment setup to achieve the lowest operating cost requires a system that takes into account equipment performance as a function of load, equipment interactions, system constraints and energy contracts. This requires solutions that enable an energy management plan.

An effective energy management plan must also be holistic, addressing both sides of the energy equation effectively. It should have the capability to monitor and optimize both the supply and demand side simultaneously. The system needs to be designed to sustain the gains as the plant evolves over time, as equipment ages and is modified, as product mix and loading changes, and adding in new power generation assets as they come on line. The most effective programs should include at their core a rigorous model of the utility system as well as continuous improvement capabilities. Simple data visualization is not enough, compared to dashboard display of information synthesized via operating models from real-time data. Energy management must be proactive and become part of the entire operation.

By implementing an energy management program with elements focusing on both supply and demand, organizations can achieve significant returns-with gains in efficiency, sometimes over 15 per cent of their annual energy costs with very attractive payback on the capital invested. To achieve these efficiency gains, AspenTech recommends a three-part focus on optimum design, operations and control, and fleet management and optimization:

Optimum Design: Nearly every top EPC company uses AspenTech's engineering software suite to design the most advanced power plants, from coal gasification to carbon capture and sequestration (CCS) systems. Many owner/operators are



acquiring these tools to further provide their engineering teams with the same advanced technologies. Utilizing industry-leading engineering solutions allows for new plants to be designed with efficiency in mind, and these tools can also be applied to help optimize and increase efficiencies of older power generation assets, extending asset life and reducing costs.

Operations and Control: AspenTech's Aspen InfoPlus.21® is one of the leading data historians for monitoring power plants, as well as other process plants such as refineries, chemical plants, and steel mills. Data historians collect millions of pieces of information in real time that engineers and operations can use for a host of purposes-from condition and output monitoring, central control and dispatch, and advance equipment trouble shooting, to predictive maintenance and event diagnosis. Centralizing this process through fleet monitoring centers offers operators a way to quickly capture and disseminate best practices and resolve disturbances and events faster, reducing emissions and increasing power generation efficiency.

Another tool, Advanced Process Control (APC), is a "must have" in many industries today. While this technology is proven and certainly considered mature, in the power industry it is an emerging trend. With today's advanced coal-fired power plants and emissions systems increasingly complex, attempting to control them without APC limits opportunities to gain additional efficiencies. APC has further advantages of providing a plant with "auto pilot" functionality, often dramatically reducing operator set point changes since it handles disturbances automatically long before any trip condition can manifest.

Fleet Management and Optimization: Today's power generation fleets are more complex than they were just 20 years ago. Not just in the variety of generating types, but also in their management and optimization. As the fleet in India expands-with different constraints like start up and cycling fuel costs and now emissions regulations and permit constraints-fleet optimization is at a level of complexity never seen before. With the exponential increase in the number of variables to consider, traditional optimization techniques deliver sub-optimal results, and limited simulation and "what-if" modeling. Starting up a unit too early will result in wasted fuel and generate more emissions; starting up the unit too late and you not only lose revenue, but could drive a negative reserve and penalties.

Many of India's power generation facilities are quite mature and today's technology and solutions just did not exist when those units were constructed. Adding today's optimization technology to those plants, assuming they have or will acquire some basic digital instrumentation and control, can often be accomplished with little or no interruption in service, providing immediate and very tangible benefits. These older plants are also now operating outside their initial design envelopes, given today's grid demands and complexities. Whether the unit is newly online or mature, today's advanced optimization solutions typically will add a new level of flexibility, reliability and performance that was previously unattainable, often extending the service life of the unit.

Companies such as AspenTech are leading the way in making it easier for organizations to achieve their energy management and optimization goals. AspenTech's power industry customers use advanced optimization solutions to optimize fleets of as much as 230+ units, generating 45,000 mw of power.

In summary, the greater complexity, the more likely you are running below optimal performance. Those that can seize the opportunities will be the ones to drive the greatest returns and reduce their emissions in the process.

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