Commissioned to optimize operations, power plant solutions provider, BWSC involved ABB in upgrading the turbochargers on two MAN two-stroke engines. As a result of the joint approach, the project was a success with significantly increased efficiency of the power plant, higher turbocharger efficiency and strongly reduced exhaust gas temperatures. ABB and BWSC now plan to collaborate on future upgrade projects.

Jamaica Private Power Company (JPPC) in Kingston, Jamaica contracted BWSC with the objective to improve the overall efficiency of the power plant. As BWSC is a global provider of tailor-made turnkey power plant solutions with expertise in engineering, construction, operation, maintenance, overhaul, repair and upgrades for power plants and diesel engines, the target was to optimize operations and improve overall efficiency with some existing challenges to overcome.

Mr Jes Møller, Department Manager Service Projects at BWSC said, “We chose to work with ABB Turbocharging for this project because of the specific experience and expertise in upgrading turbochargers, being complementary to the role of BWSC in optimizing the entire plant. With our strong business relationship, working together on this project has resulted in the best possible outcome for JPPC in terms of efficiency and optimization for long-term performance of the plant.” JPPC selected BWSC specifically for the ability to provide a package that included upgrade of the turbocharger, an offering where ABB has significant experience across other projects for power and marine installations.

In optimizing power plant operations, the aim of the turbocharger upgrade was to reduce exhaust gas temperatures for better reliability and increased efficiency, thereby reducing fuel consumption on the two 20 year old MAN B&W two-stroke 9K80MC-S engines.

**Challenges of optimization**

The age of the engine was one of the more difficult parts of this project as it was not in optimal condition. In addition, there was a power turbine installed, but no longer in use and the existing ABB VTR turbocharger had been re-specified to accommodate this modification. As that project was carried out as a ‘quick fix’ the resulting status was sub-optimal performance, a critical issue for JPPC.

The dormant power turbine and all other aspects of the engine were taken into account in an extensive program of simulation studies – not only to determine the best turbocharger upgrade solution for improved performance, but also to understand the previous performance of the setup including component age, wear and tear.

**Simulating performance improvement**

JPPC was highly pleased with the advanced insights of the expected improved performance of the power plant demonstrated by the simulations which showed an approximate 10% turbocharger efficiency increase. Especially valuable, were the figures for possible efficiency improvements, which were able to support the company’s investment decision-making process.
Because of the existence of the current engine turbocharger connections, the positioning of a new turbocharger is always a compromise that needs special attention and optimization. ABB was able to bring their expertise to identify the best configuration. ABB also supported BWSC in the design of the air and exhaust gas flows as well as in the design of the lubrication oil connections. Furthermore, ABB took care of the requirements for safety, mechanical integrity, vibration and thermodynamic effects as these are all important aspects of a turbocharger upgrade.

**Project implementation**

BWSC worked for four weeks on site to implement the upgrade of the power plant engines. In the final week, ABB started the commissioning of the turbocharger upgrade together with BWSC implementing the newer TPL-B type turbocharger, replacing the VTR.

**Successful long-term outcome**

After the four weeks, the engine was back in operation. The exhaust gas temperatures measured approximately 35°C lower than before, enhancing reliability and lowering engine maintenance cost.

The TPL-B turbocharger maintenance costs have proven significantly lower than the VTR, and it brings the expected benefits of a newer generation product operating on the engine. Importantly, the overhauled engine and turbocharger setup is now optimized to operate without the power turbine.

JPPC was highly satisfied with the outcome. Mr Nerio Cabrera, JPPC said, “Optimization of this plant is important for us in enabling our business to become even more competitive. With the increased efficiency achieved and the reduced exhaust gas temperatures lowering our maintenance costs, we are confident that the plant is now operating at its optimal level of performance.” Based on the successful collaboration between BWSC and ABB on the first engine, the project continued with implementation of a turbocharger upgrade in the same way on the second engine. ABB and BWSC now have plans to work together on several future projects, which are under discussion.

To find out more about how an upgrade project can improve asset performance and increase business value, please contact the local country representative for BWSC or ABB.