

## Barbados Light & Power's two 9-cylinder diesel engines are successfully running with Cylmate® monitoring systems

The Barbados Light & Power Company (BL&P) in Bridgetown, Barbados, has successfully installed two Cylmate systems at their Spring Garden power station, producing efficient and environmentally friendly electricity to approximately 280,000 Barbadians.



### Introduction

The Barbados Light & Power Company (BL&P) converts fuel oil into clean, invisible electricity and delivers it to the consumer. Each link in the chain, from the power source to the consumer, is a specialized technical process. The main steps in getting electricity to the consumers are facilitated through personnel in the Generation and Distribution Departments.

The Cylmate® systems are installed on the 9K80MC-S engines in the Generation Department.

Electric power at the generating plant is produced by a rotating shaft on which a powerful electromagnet is mounted. The shaft turns inside a cylindrical iron shell called a stator. The electromagnet, acting inside a field of wire coils in the stator, produces electricity. The bigger the electromagnet and the stator field, the more the electric power that can be generated, and to turn the shaft, mechanical force is required. BL&P obtains this force from diesel engines or by burning fuel oil and natural gas to boil water. This produces steam at high pressure in the boilers, where the steam ultimately rotates a turbine, which is connected to the generator shaft. The Company's gas turbine generators use engines similar to those of aircraft to turn the generator shaft.

### Transmission & Distribution

Electricity is transmitted at 24.9 kV or 69 kV from the generating stations to substations located throughout the island. Transformers, located at each of the substations, step the voltage down to 11 kV for distribution via feeder circuits to residential and commercial areas. Pole-mounted or pad-mounted transformers then step the voltage down further for supply to customer installations.

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# Barbados Light & Power's two 9-cylinder diesel engines are optimized and monitored by ABB's Cylmate® systems – continuously

## What are the main benefits with the Cylmate® systems?

We asked Mr. Ramon Jules, Senior Generation Engineer and Mr. Philip Browne, Generation Engineer, both from BL&P's Spring Garden generating station located in St. Michael, Barbados.

### General

"The Cylmate® continuous on-line monitoring system makes a big difference in our ability to troubleshoot problems as they arise and, as such, has been a very useful tool in our daily work.

The continuous measurement feature is of tremendous help to maintenance personnel when engine balancing is required. Previously, setting up equipment to perform the cylinder pressure measurements in preparation for engine balancing took approximately two (2) hours. Now those measurements are obtained immediately with the use of the Cylmate®. As a result, we can keep the engines running efficiently at all times.

We can see engine cylinder pressure changes and we can plan maintenance with the Cylmate® monitoring system. Prior to the installation of the system, we had to rely on alarms and, when they occurred, it did not give us much time to respond.

With 2 years' experience working with the Cylmate® systems on our 9-cylinder large diesel engines, we really trust their high reliability and accuracy."



### Savings

"The longer we can keep these engines running, the more efficient is our fuel use, and saving fuel means that customers' bills are lower.

We can therefore optimize our use of Bunker 'C' and keep the fuel costs to a minimum, which is advantageous for our consumers and the environment.

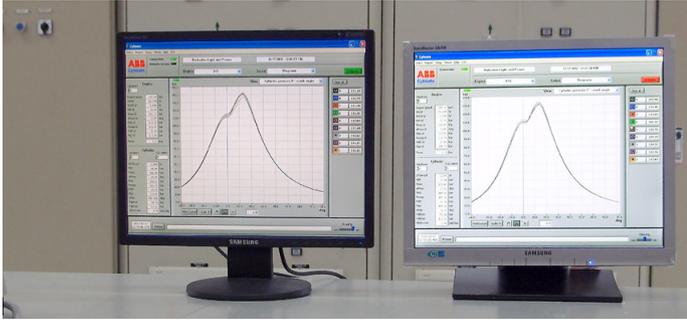
Since BL&P is the only power company in Barbados, we must ensure that we can supply the country's needs and monitoring the engine's cylinder conditions with the use of the Cylmate® system, allows us to be proactive in rectifying any fault condition that may develop and lead to an engine shutdown.

For example, we can now detect conditions that could lead to a worn cylinder liner and correct that situation before it is too late. This would be a big saving for us, given that the cost of a new liner is in the range of US\$30,000."

### HMI-screens

"The screen shots from the Cylmate® give a clear overview of the various engine parameters, making it easy to navigate. The diagrams are excellent and they show which cylinders are performing well. Also, the Cylmate® 'Charts/Diagrams' screen make it easy to see if the engine is balanced. The main monitoring parameters that are frequently used are  $P_{diff}$ , MIP,  $P_{comp}$  and  $P_{max}$  which are all monitored using the 'Deviations' screen. In addition, the pressure curves are utilized sometimes in our troubleshooting."





### Fault Tracing

"In January, 2013, a fault occurred on one of our engine cylinders shortly after we installed the Cylmate® system. We confirmed that a piston ring had broken as a result of a high pressure difference ( $P_{diff}$ ) between  $P_{comp}$  and  $P_{max}$ . Running the engine for too long with a high  $P_{diff}$  can ultimately lead to piston ring breakage. With the Cylmate® trend files, we were able to look back and see when the piston ring had actually broken."



### Conclusions

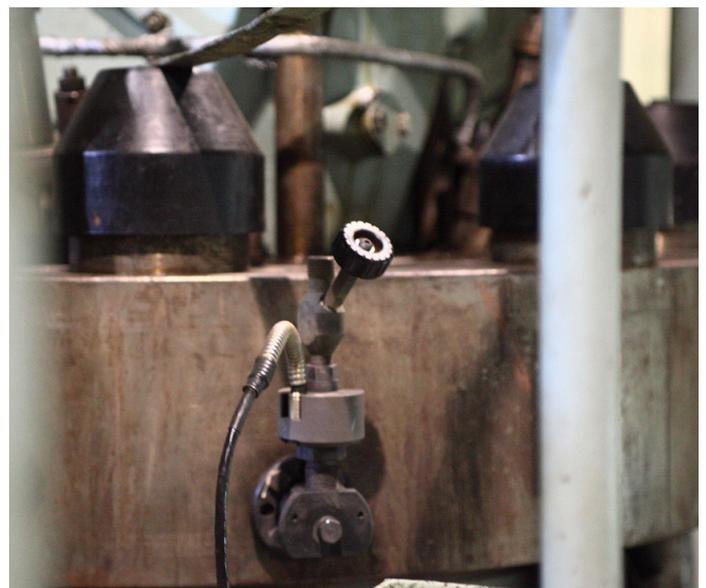
"Cylmate® is a valuable tool and it has been very beneficial. We have learned from the experience and feel more secure in our ability to better troubleshoot problems and keep the engines 'balanced' for optimum performance."

### Commissioning

"We prepared all the cabling, installation et cetera prior to the arrival of the ABB representative. Once he was on site, he proceeded with the commissioning process, which went smoothly."

### Training

"We've had excellent Cylmate® training with the ABB representative. However, we keep practicing on our own in order to get more from the system and ensure that we are utilizing all of its functionalities. We will set up alarms to better assist us in keeping these engines operating in peak condition."



# Company profile

## Facts on The Barbados Light & Power Company, Barbados

Two large diesel engines at Spring Garden generating station	Engine D15: MAN 9K80MC-S Engine D14: MAN 9K80MC-S
Installed generation capacity	About 239.1 MW meeting a peak load of about 158 MW
Total number of customers	124,094
Number of domestic customers	105,755
Number of commercial customers	18,339
Total electricity sales	918,049 MWh

For more information, visit the website [www.blpc.com.bb](http://www.blpc.com.bb)



3BSE073977R0001\_2013-05

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