ABB has introduced an innovative new surface coating for its turbocharger nozzle rings to counteract the fast build-up of deposits from engines burning low-grade HFO. This allows substantially longer intervals between wet cleaning increasing overall power output through maximized uptime and reduced operating costs.

**The challenge**
The combustion of heavy fuel oil (HFO) in diesel engines contaminates the turbine blades and nozzle rings of turbochargers with deposits that require regular cleaning. The nozzle ring is a thermodynamically important part of the turbocharger, optimally guiding exhaust gas to the turbine blades. Particularly in continuously operating applications like power plants and specific marine applications, deposits on nozzle rings narrow the cross-sections which can lead to:

- Reduced turbine efficiency impacting turbocharger performance and fuel efficiency
- Elevated exhaust gas temperatures
- Higher charging and ignition pressures as turbocharger speed rises

To avoid these negative effects frequent wet cleaning injection of water during operation is required to remove deposits from the nozzle ring. Side effects of wet cleaning are:

- Reduced power output for approximately one hour due to required de-loading of the engine
- Decreased lifetime of turbine side components, through thermal shocks
- Increased costs to replace parts
- Additional maintenance effort

**Our solution**
Knowing our customers’ business ABB Turbocharging sought a solution to limit these negative effects to a minimum. A special coating for nozzle rings was developed to counter the fast build-up of deposits, enabling:

- Extended intervals between wet cleanings by four to six fold *
- Significantly increased engine availability and power output
- Sustained high turbocharger performance and fuel efficiency
- Reduced maintenance effort

This component innovation is available as a turbocharger upgrade solution, designed to fit into existing maintenance scheduling, to further maximize uptime.

* Based on current field experience.
02 EGE Haina: each engine is fitted with two TPL76-C35 ABB turbochargers

03 Significantly increased time between cleaning with coated nozzle rings

EGE Haina: A customer’s story of success

EGE Haina owner of the diesel power plant Sultana del Este with a capacity of 153 MW recently upgraded the turbochargers on nine engines with ABB coated nozzle rings.

The plant manager at the Sultana del Este power plant said: “With the upgrade to ABB’s coated nozzle rings we have been able to extend our intervals between cleaning from 50 to 300 running hours. This means we regain nearly 1,900 MWh of otherwise lost power on each engine annually with even less maintenance effort.

“The installations of the upgraded nozzle rings fitted into our regular maintenance schedule. Therefore it was remarkably convenient for us with no additional downtime.”

Annual added value per engine at Sultana del Este

<table>
<thead>
<tr>
<th>Capacity</th>
<th>17,000 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly running time</td>
<td>7,500 h</td>
</tr>
<tr>
<td>Saved time for cleaning</td>
<td>125 h</td>
</tr>
<tr>
<td>Additional energy production</td>
<td>1,870 MWh</td>
</tr>
<tr>
<td>Additional energy sales (at 0.2 USD/kWh)</td>
<td>374,000 USD</td>
</tr>
</tbody>
</table>

Make it your success

For power plant owners, every lost kWh directly transfers to their top line. Contact us to discuss how we can support you in adding value for your business. We can customize upgrade packages that suit your maintenance budget as well as your maintenance schedules. The nozzle ring upgrade ideally fits into the engine maintenance schedule ensuring downtime is kept to a minimum.