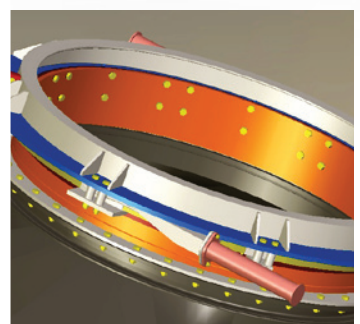
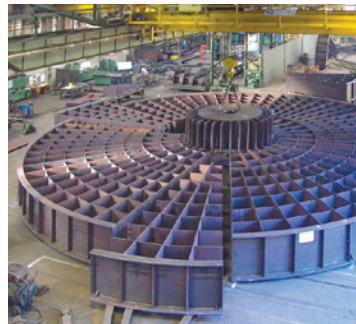
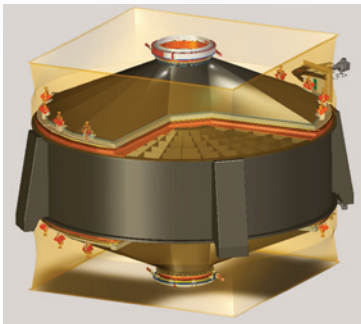


Modernization and refurbishment of San Miguel Electric Cooperative's Rothemühle® regenerative heat exchanger results in a 3 MW savings in plant auxiliary power.



Recent upgrades to the Rothemühle regenerative heat exchanger at the San Miguel Electric Cooperative power plant in Christine, Texas resulted in plant MW savings and significant fan amperage reduction. The 10.5 meter diameter Rothemühle heat exchanger, operated as the primary air preheater was put into service in 1975.

Over the past several years leakage has cost the plant several MWs of energy output. Through Siemens Energy, San Miguel Electric Cooperative turned to SPX Balcke-Dürr to upgrade and modernize the Rothemühle heat exchanger.

To minimize leakage several new and improved components were installed on the Rothemühle heat exchanger to bring its design into the 21st century.

A significant performance improvement was realized with air heater leakage and air to flue gas flow reduced by 13%.

The total fan amps were reduced by 10.5% which is the lowest total fan amps the plant has ever recorded.

The plant saved 3 MW due to the air heater upgrades alone which provides a significant savings in the long run.

For yearly generation of 7,450 hours with an 85% generating time capacity factor at an average 75% load factor at \$0.09kWh, the 3 MW of additional power to the grid **pays back the capital investment** for the Rothemühle air heater upgrade in just **4+ months** of operation.

[more](#)

*"...I want to thank you for the excellent work that you did here at San Miguel. It reminded us of how the air heaters are a precision machine and tolerances need to be held to get the expected performance. A leakage test was done and 18.6% was recorded.*

*We are very happy with this reading, remember that was only a CO<sub>2</sub> check and not an oxygen test. We know the air heater is running very good because of the ID and PA fan amps. "*

*— San Miguel's  
Production Engineer*

Items	Before Upgrades	After Upgrades	MW savings and Percent Reduction
			<b>3 MW savings for the same net MW of 397.5</b>
<b>Plant Aux. Power, MW</b>	<b>44.5</b>	<b>41.5</b>	<b>6.7%</b>
Load, MW net	397.5	398.7	-
ID Fan A – amps	748	661	11.6%
ID Fan B – amps	752	665.5	11.5%
FD Fan A – amps	239	212.2	11.2%
FD Fan B – amps	227	200.8	11.55%
PA Fan A – amps	156	149.8	3.95%
PA Fan B – amps	148	143.4	3.10%
<b>Total Fan amps</b>	<b>2270</b>	<b>203.3</b>	<b>10.45%</b>

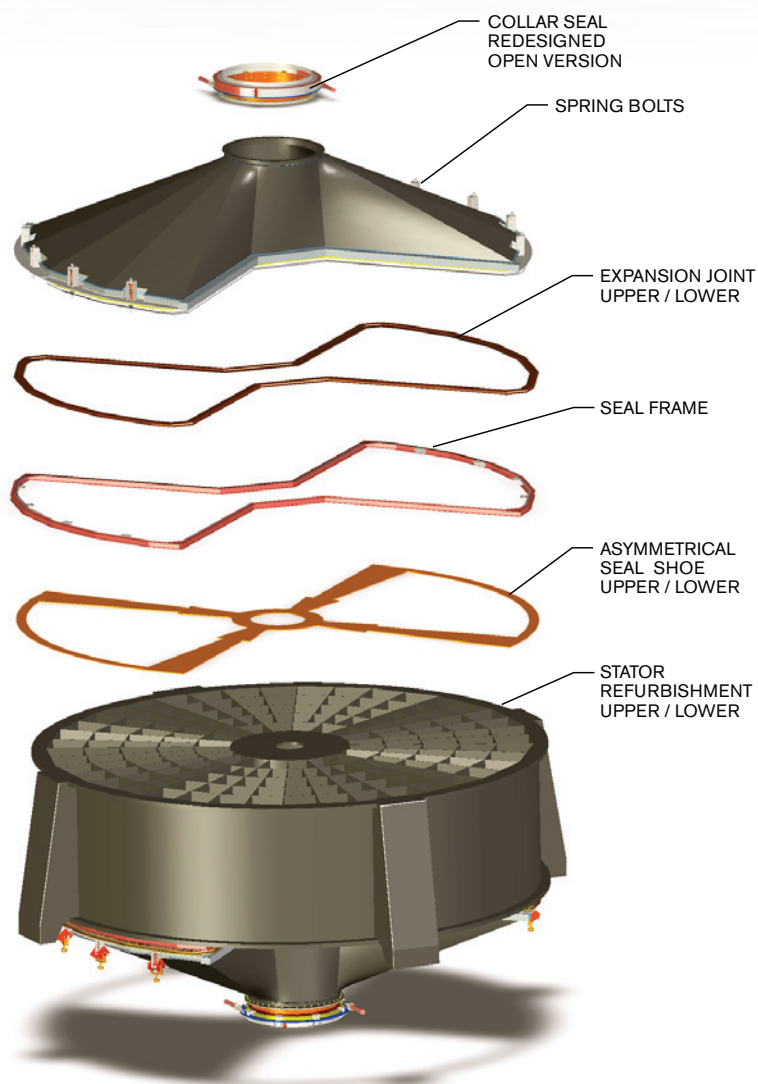
*Plant MW savings and fan amps reduction after modernization upgrades*

Modernization and refurbishment of the primary air preheater was so successful, a second project was completed one year later in which two parallel operating secondary Rothemühle air preheaters were upgraded using the latest components and design.

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In the interest of technological progress, all products are subject to design and/or material change without notice



*New and improved components installed on the Rothemühle heat exchanger*