

111 Eagle Street Project,
Brisbane Australia

Exhaust Control Industries

Air and noise pollution control specialists

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www.exhaustcontrol.com.au

ECI worked with Leighton Contractors, Q Electrical and Triple M Mechanical Services to deliver outstanding design innovation, superior acoustic products and emission reduction technologies to one of Queensland's most inspiring building developments.



Premium Grade
Office Tower

Net lettable area of
64,145m²

Background

Situated in Brisbane's premier "Golden Triangle" precinct, this ambitious "Fig Tree Inspired Architecture" premium grade office tower by The GPT Group and Leighton Contractors has set new standards in building sustainability and design.

The Challenge

With ambitious building developments comes the need for proven and tailored air and noise pollution control technologies. Noise pollution around urban high rises can be a nuisance to residences and businesses alike. This disruption to daily life can lead to high blood pressure and other stress related illnesses.

NOx emissions are also of particular concern due to their contribution to ground-level ozone formation. In the lower atmosphere, NOx combines with reactive organic gases in the presence of sunlight to form ground-level ozone, which is the primary component of urban smog. Severe health effects on the respiratory system across all levels of the community due to exposure to urban smog, is well documented.

The History of SCR

SCR (Selective Catalytic Reduction) for NOx (oxides of Nitrogen) abatement was developed in Germany in the early 1950's with the first system commercialised in America in 1963. Over the past 40 years the fitting of this post combustion NOx control system on both diesel and gas fired engines and turbines, has resulted in major reductions in NOx in our urban environments.

Nitrous oxides are the precursor to smog. With the ever increasing need for efficient power generation, coupled with stringent air policy regulations, Selective Catalytic Reduction (SCR) for NOx abatement is widely used in large peak lopping power stations, process plant applications and gas fired Co/Tri generation projects around Australia and in hundreds of projects in America and Europe.

The Solution

ECI (Exhaust Control Industries) worked with Q Electrical and Triple M Mechanical Services and Leighton Contractors to achieve a 6 Star Green Star rating for the project.

ECI's tailored component design, manufacturing and installation experience provided the roof top facility with the most efficient layout for both operational performance and plant room functionality. The project includes a Continuous Emissions Monitoring system (CEMS) which reduced the total NOx exhaust emissions of the gas generator by 98%. Well below state regulation limits throughout the complete operation of the Tri-generation plant.

ECI designed and manufactured all components which included a Hybrid High Performance Super Critical Exhaust Silencer arrangement which offered a staggering 58 dbA of insertion loss, making the operating gas engine inaudible or measurable against the back ground noise of 54 dbA. A natural gas Oxidation Catalyst was fitted with a CEMS controlled SCR System for NOx abatement and the complete integrated exhaust systems for both the gas and diesel generators and hot water boilers. All components meet EPA and stringent Australian gas appliance and pressure vessel code standards.

ECI SCR System Components

The catalyst, comprising of parallel plates or honeycomb structures, was installed in the form of rectangular modules, downstream of the engine. Typically, an SCR system is comprised of a urea storage tank, vaporisation and injection equipment for the urea, a mixing duct, SCR reactor with catalyst, and instrumentation and control equipment.

ECI Oxidation Catalyst

In catalytic oxidation, a catalyst is used to oxidize carbon monoxide (CO). The addition of a catalyst to the basic thermal oxidation process accelerates the rate of oxidation by absorbing oxygen from the air stream and CO in the exhaust stream, onto the catalyst surface to react to form carbon monoxide (CO₂) and water. Reduction efficiencies achieved for this project were a staggering 92 percent.

ECI's demonstrated experience in Tri-generation and SCR projects in Australia makes them a strong business partner for life.



Pollutants Tested	Target	Result
Oxides of Nitrogen (NOx)	50 mg/Nm ³	8 mg/Nm ³ (98% Reduction)
Carbon Monoxide (CO)	67.6 mg/Nm ³	27.6 mg/Nm ³ (92% Reduction)
Ammonia Slip (NH ₃)	0-4 mg/Nm ³	0.16 mg/Nm ³
VOC (NMHC)	N/A	0.5 mg/Nm ³

PARAMETER	Average Results	Guideline Limit	Unit of Measure
Exhaust Gas Temp	260	N/A	°C
Oxygen	9.45	N/A	%v/v
Carbon Dioxide	6.48	N/A	%v/v
Carbon Monoxide	27.6	67.6	mg/Nm ³
Moisture	15.2	N/A	%v/v
Non Methane VOC's (NMHC)	<0.5	N/A	mg/Nm ³
Oxides of Nitrogen (NOx)	8	50	mg/Nm ³
Ammonia after oxidation catalyst	0.16	4	mg/Nm ³

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