04 55 Currie Street / THE RETROFIT THAT REACHED THE STARS.
06 19 Grenfell Street / AIRAH AWARD WINNING.
08 99 Gawler Place / BETTER AIRFLOW.
10 30 Wakefield Street / EASIER BREATHING.
12 IMVS PC3 Laboratory / A STATE FIRST FOR TRAPPING BUGS.
14 SSE People / IN FOCUS.
55 Currie Street was barely touching three stars. That is until System Solutions Engineering dramatically decreased its energy consumption. Electricity down by 45%, gas by 35% and much greater comfort levels, means neither the occupants, nor the building’s owner will sweat the extreme Adelaide conditions. NABERS think SSE’s efforts are pretty cool too, increasing the building’s rating from 2.96 to 4.72 stars in just two and a half years.

The building’s initial NABERS rating was below 3.0 (approximately 2.96) prior to the upgrade works taking place. As soon as the new plant was commissioned, the reduction in electrical energy was apparent. As the building’s data was collected and analysed by System Solutions Engineering, tuning strategies were introduced, continually analysed and refined over a period of two years, until the building comfort levels were optimised and the consumption of electricity and gas was honed to its optimal levels.

To see how your building can perform like this contact SSE on 8333 1855 or email mail@syssoleng.com.au

System Solutions Engineering designed and project-managed the refurbishment of the mechanical and thermal plant including a BMS upgrade between July 2011 and January 2012.
Originally a NABERS 2 star building, 19 Grenfell Street consumed approximately 1,700,000 kWh of electricity per annum. Through the installation of a new chilled water plant, variable speed drives on the main fans and pumps, induction VAV boxes, control upgrades and installation of the Shaw Method of Air Conditioning, electrical energy consumption was reduced to approximately 750,000 kWh of electricity per annum, achieving a predicted NABERS 4.5 star rating and saving approximately 400 tonnes of carbon dioxide per annum. An effort that hasn’t gone unnoticed... nationally.

System Solutions Engineering is heavily involved in building energy efficiency upgrades, and was awarded by The Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH), the 2011 Best Sustainable Retrofit for 19 Grenfell Street. The target is to achieve 5 star energy rating once the project is finally completed.

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19 Grenfell Street

AIRAH
AWARD WINNING.
System Solutions Engineering doesn’t simply reduce a building’s running costs... we do so with the comfort of its occupants in mind at all times. 99 Gawler Place had a few blockage issues – with air that is. Additional airflow pathways fixed these problems, previously unresolved since the building’s construction. Impressively, this retrofit achieved a 54% reduction in energy usage. Or 530,000 kWh each year.

But while energy savings have resulted, the greatest gains have been with internal conditions – which have been significantly improved through modifications to the existing mechanical plant and the installation of new automatic controls, providing more stable conditions within the tenancy spaces.
Wakefield House Adelaide is now breathing a little easier with improved airflow and an energy reduction of 194,000 kWh per annum. That’s 132 tonnes of CO₂ removed each year from its lungs… and yours. For commercial office buildings, up to 70% of the total energy use is attributed to the heating, ventilation, and air conditioning (HVAC) systems. Fans are typically the most significant consumers of energy. Approximately 50% can be saved by replacing the existing AC belt-driven backward-curved fans throughout a building to EC plug fans.

The original fan and air handling unit (AHU) for level 14 of the government-owned Wakefield House in Adelaide – which is typical throughout all floors of the building – comprised a coil face bypass system, with air distributed via a belt-driven, backward-curved centrifugal fan arrangement. The existing fan was replaced with an ebm-papst EC Plug fan. Minor works to the damper were also performed.

The main issues with the above arrangement and system relate to performance and the ability to adequately distribute the air to the floor. Due to the system type and the fan’s proximity to the cooling coil, cooling capacity of the Air Handling Unit is reduced, as only part of the coil face is utilised. Air from the fan is only imposed on part of the cooling coil, which results in insufficient capacity being delivered to the floor.

The new ebm-papst EC Plug fan was installed away from the cooling coil, and the damper was rearranged above the cooling coil in the bypass ductwork. The new damper was installed to provide an equivalent pressure drop to the cooling coil, which provides more stable distribution and controllability of supply air. The EC Plug fan pressurises the plenum chamber and rather than delivering an uneven air profile as per a centrifugal fan it provides uniform air pressure and therefore volume across the whole cooling coil, achieving greater capacity from the coil.

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When building the only PC3 microbiological containment lab in the State with standards fit for the World Health Organisation, System Solutions Engineering used its mechanical, electrical, hydraulic and fire protection ingenuity to keep the microscopic prisoners in check. The lab performs microscopy, culture, drug susceptibility testing, molecular species identification and diagnostic nucleic acid amplification tests for tuberculosis (TB) for all public hospital patients in South Australia. The lab also provides testing of specimens for BT agents.

Features of the services design include stable operation, monitoring and alarming of pressure differentials for the air lock and laboratory, flexible decontamination infrastructure allowing the client to select various compartments for decontamination. Successful coordination of services with the architectural and building detail ensured the required leakage rate of less than 2 L/s at 200 Pa pressure differential was achieved.

As part of a successful and integrated team System Solutions Engineering provided the design of the mechanical, electrical, hydraulic and fire protection services. This specialist facility included the refurbishment of existing laboratory space adjacent to an operational suite of PC2 laboratories.

Project Lead: Ben James
Engineering Disciplines: Mechanical, Electrical, Hydraulic, Fire Protection
Tony joined System Solutions Engineering with 42 years industry experience and industry training including 19 years of experience as a contractor in the Air Conditioning and Mechanical Services Industry specialising in all types of design and construction work. Tony offers practical and cost effective solutions for a wide range of commercial and industrial applications. He is actively involved across most industry sectors but specialises in the refurbishment of older or aging facilities using the latest technology and engineering know-how to improve the performance of plant and achieve improved building energy efficiency.

Special Fields of Competence:
- Specialist Chiller Applications Design and Application knowledge.