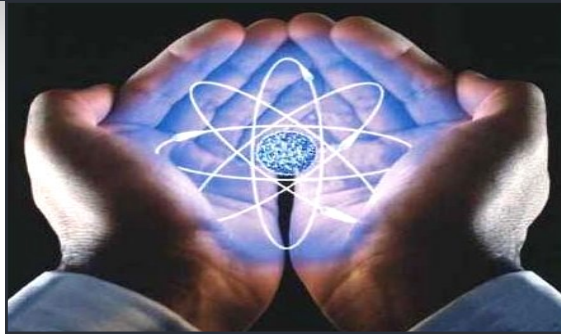


Energy Audits and Sustainable Energy Management Plans



Sustainable Solutions International Pty Ltd (SSI) is an engineering consultancy specialising in sustainable engineering and implementing energy efficiency management. Sustainable Solutions International is a Member of the Australian Green Development Forum and has a number of Green Star, Ecobiz and NABERS Accredited Professionals that are able to provide assistance in the Design, Development and Verification of sustainable developments and buildings.

Sustainable Energy Management Journey

The implementation of true sustainable energy management is not an end of cable solution where renewable energy sources replace polluting energy sources. Sustainable energy hierarchy involves seven steps to deliver the best outcome for the client and profitable operation.



Step 1: Measure (what you cannot measure you cannot manage) – Conduct a level 2 or a level 3 energy audit in compliance with AS/NZS 3598:2000;

Step 2: Avoid energy wastage – Operate lights and air conditioning only when they are needed;

Step 3: Improve energy efficiency – Replace incandescent lights with compact fluorescent lights, installing solar hot water systems and sensor based lighting systems in low occupancy locations;

Step 4: Waste energy recovery – Pinch assessments and reusing waste heat to produce hot water or to run absorption chillers;

Step 5: Energy tariff management – Operate cooling and heating systems on off peak tariffs by utilising energy storage devices such as

chilled water storage for air-conditioning and thermal sinks to store heat;

Step 6: Onsite renewable energy generation – Generate onsite renewable energy using Photo Voltaic cells or solar thermal, wind, water in the form of tide and micro hydro schemes and waste to energy systems using cogeneration or fuel cell technologies; and

Step 7: Renewable energy off-setting – Purchase green energy.



Energy Assessment Overview

An energy inventory is undertaken to determine how much energy your equipment uses. SSI conduct these assessments to identify opportunities to use energy more efficiently. Each type of equipment is identified with consumption (or power) ratings recorded. Reconciliations are undertaken to determine if power leakages are occurring or if load capacities are appropriate for your operations.

Power analysis and data logging is an important tool in the process to reduce energy inefficiencies and greenhouse gas emissions. Benchmarks and performance indicators are used to determine if a building or operation as a whole is an excessive or reasonable energy consumer. The use of in-plant meters record energy consumption rates and will lead into more detailed investigations that identify savings that can be achieved by capital investment of new energy efficient equipment.

Asset & Maintenance Management	Design Construction Management & Commissioning	Efficiency Audits & Cleaner Production	Environmental Compliance & Licensing	Master Planning	Plant Assessment & Optimisation	Sustainable Resource Management	Risk Assessments (HACCP & HAZOP)
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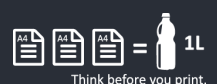
For more information please contact:
Sustainable Solutions International Pty Ltd

07 3255 0000

office@ssi-bne.com

sustainablesolutionsinternational.com

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AS/NZS 3598:2000 Energy Audit Levels

Level 1 energy audit

A Level 1 energy audit allows the overall energy consumption of a site to be assessed, to determine whether energy use is reasonable or excessive. Initial Key Performance Indicators are developed so that energy usage can be measured, recorded and evaluated. It may be in the form of a desktop study; however the information given to, or gathered by, the auditor needs to be sufficient to enable the overall level of efficiency of the site to be determined. A Level 1 audit is expected to give an overview, which provides rough orders of savings and costs. Accuracy of figures would generally be within ±40%.

Level 2 energy audit

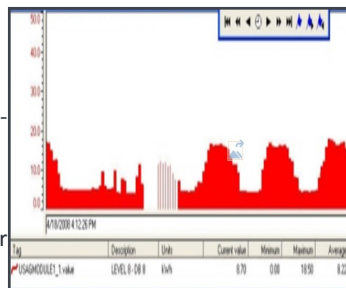
A Level 2 audit identifies the sources of energy used, the amount of energy supplied, and what the energy is used for. It also identifies areas where savings may be made, recommends measures to be taken, and provides a statement of costs and Return On Investment. A Level 2 audit is an energy use survey, which is expected to provide a preliminary assessment of costs and savings. Accuracy of figures would generally be within ±20%.

Level 3 energy audit

A Level 3 audit provides a detailed analysis of energy usage, the savings that can be made, and the cost of achieving those savings. It may cover the whole site or may concentrate on an individual item, such as a single industrial process or one of the services. The auditor may often employ a specialist to carry out specific parts of an audit or may need to install local metering and data logging. The report from a Level 3 audit often forms the justification for substantial investment by the owner or an energy performance contractor. A Level 3 audit will provide a firm estimate of savings and costs. Accuracy of figures would be within +10% for costs and up to 10% for benefits.

Analysis and monitoring of a system can provide information including:

- Off peak power wastage and unnecessary peak power usage;
- Discovering sources of power quality events;
- Identifying inherent problems with electrical installations;
- Harmonic distortion;
- Sags and swells;
- Avoid repeat interruptions of unmaintained equipment;
- Identify demand control;
- Identify base load and power factor improvement analysis;
- Supply voltage check and regulation; and
- Where to improve inefficiencies and processes.



Key areas for energy savings include:

- Installation of effective lighting control systems;
- Correctly sized pumps, fans and motors to ensure optimal efficiencies. A simple speed drop of 20% can save up to 50% in energy usage;
- Heating and cooling control systems to reduce hours of operation thereby reducing the effects of out-of-hours running, which can achieve up to 40% in energy savings;
- Improved power factor and power quality can achieve savings of up to 20%;
- With the identification and control of loads, energy waste can be reduced significantly; and
- Peak demand management within your electricity tariff.

Key Projects

Marsh Springs

Marsh Springs is one of Australia’s leading manufacturers of spring wire, and pressed product. SSI worked with the Australian Industry Group’s (AI Group) Environmental Team to conduct a level 2 energy audit at Marsh Springs as part of the QLD Government Climate Smart Business Program. The energy audit involved SSI reviewing over 220 individual pieces of manufacturing equipment ranging from industrial wire cutters to metal conditioning ovens powered by gas to hand tools.

Drake Trailers

SSI worked with the AI Group’s Environmental Team to conduct a level 2 energy audit at Drake Trailers as part of QLD Governments Climate Smart Business Program. As part of the energy audit SSI investigated electricity and natural gas consumption. The audit involved reviewing 70 different types of equipment with over 1680 individual items assessed for energy efficiency.



Hockey QLD Inc.

Hockey QLD Inc. commissioned SSI to prepare an overall Sustainability Master Plan for the Queensland State Hockey Centre, located in Colmslie. The initiatives developed in the Master Plan were aimed at reducing operating costs and the outcome was the first mainstream sporting organization embracing sustainability. SSI conducted a Level 1 energy audit of the existing facilities and developed a Sustainable Energy Management Plan for the site and its re-development.



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For more information please contact:
Sustainable Solutions International Pty Ltd

07 3255 0000 office@ssi-bne.com sustainablesolutionsinternational.com

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