

Shoalhaven City



ENERGY SAVINGS ACTION PLAN

October 2007



Environment - Growth - Community

Shoalhaven City Council

Energy Management Program Development

&

Energy Savings Action Plan

Final Report at 28th September 2007

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Executive Summary

Shoalhaven City Council is committed to fulfilling its Energy Savings Action Plan (ESAP) obligations. The generation of this report provides written record of Council's past, present and future energy saving measures.

Shoalhaven City Council is a large multi-faceted organisation spread over a large geographic area with diverse population centres and a varying population base. Due to its size, nature of operation and distance from larger centres Council has in-house electrical engineering and technical services.

Energy management has historically rested with Council's internal electrical support group rather than the asset managers. This situation has led to technical rather than operational energy saving measures and created an organisational culture that did not focus on energy management in its daily operations.

The main focus of Shoalhaven City Council's ESAP is to reverse this trend by creating a platform to build organisational change. Council has several initiatives that are identified in its ESAP that will support and build upon the plan including: Policy development and senior management commitment through staff training and energy and water resource reporting.

The plan provides:

- A history of energy management in Shoalhaven City Council
- A management review
- Baseline data for council and its 10 largest sites
- Technical reviews of Council's ten highest energy consuming sites

Council ultimately manages 990 sites consuming 136,000 Giga Joules /annum of non renewable energy (Electricity, LPG and Natural Gas). The operation of these sites generates 33,000 tonnes CO₂-e (Greenhouse gas) per annum.

Approximately 60 % of this energy is used with similar amount of greenhouse gas emitted in the operation of Council's top 10 energy consuming sites.

When the technical review energy savings initiatives are implemented, the collective reduction in energy for the 10 sites will be 24% along with a 21% reduction of greenhouse gas emissions.

Introduction

Business & Site Description

Shoalhaven City has an area of 4,660 square kilometres, a 1,000 kilometre coastline and a base population of 96,300. One of its major industries is Tourism and during holiday periods its population grows threefold to 320,000.

Shoalhaven City Council is one of the largest multipurpose Local Government operations in NSW and one of the few that has its own Water supply and Wastewater undertakings. Council manages 990 sites that consume energy in their operations

Council's "*Cityplan*" contains these vision and mission statements.

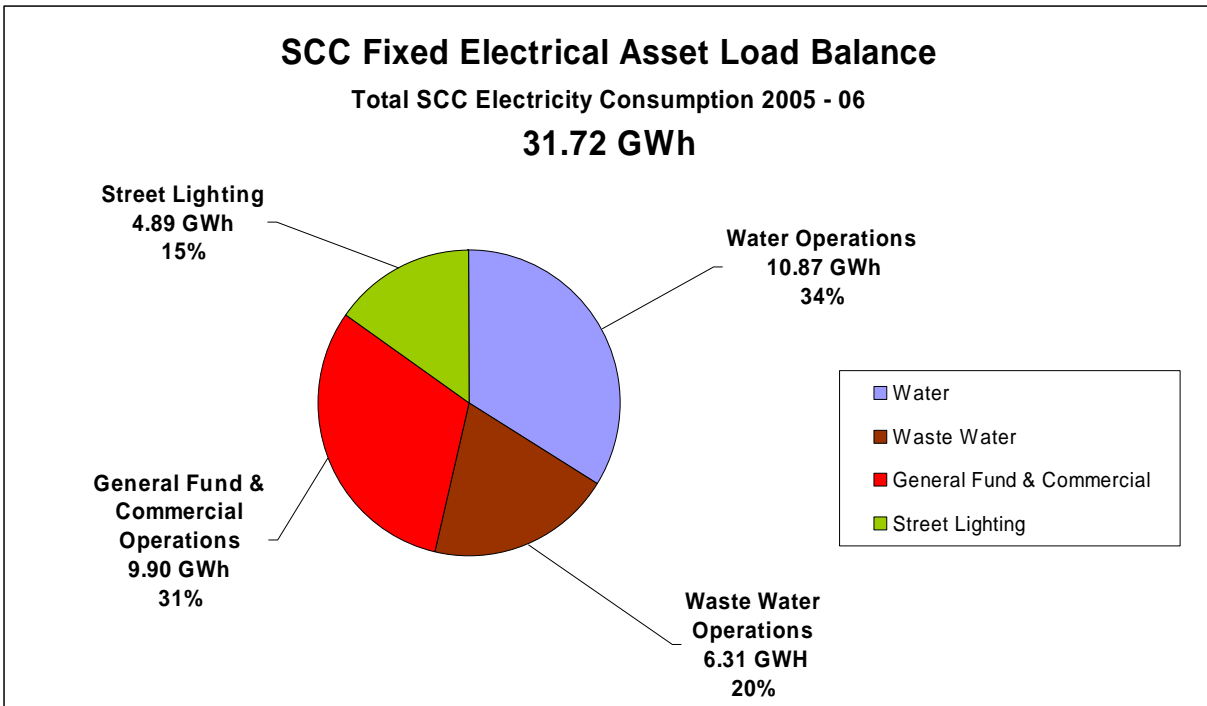
"We will work together in the Shoalhaven to foster a safe, attractive place for people to live, work, stay and play; where growth, development and environmental protection are managed to provide a unique and relaxed lifestyle."

"To enhance Shoalhaven's Community, Economy and Environment through good government involvement and innovative use of our resources."

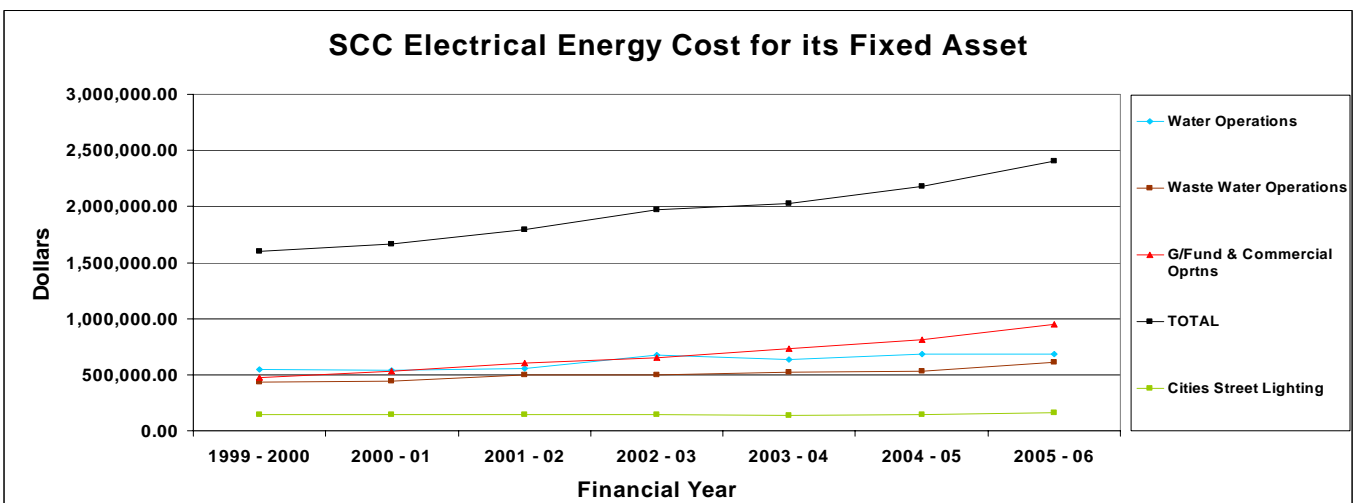
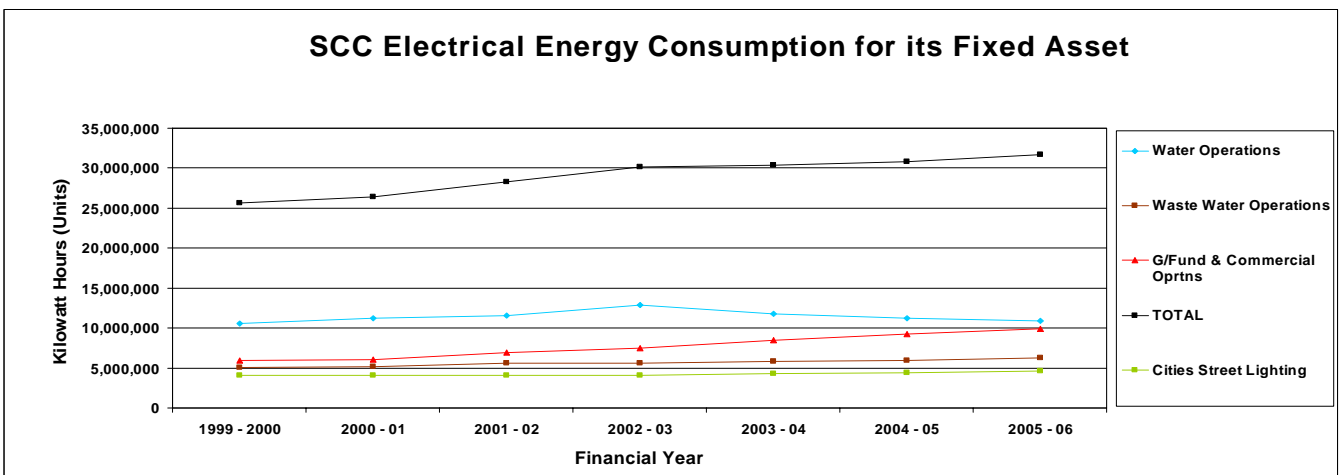
The objective of the NSW Governments Energy Savings Action Plan program aligns closely with those of City Plan. Energy management will have an increasing focus in City Plan as Council's Energy Savings Action Plan is developed, embraced and implemented. Shoalhaven City Council will appropriately and by example become a community leader in energy management and conservation.

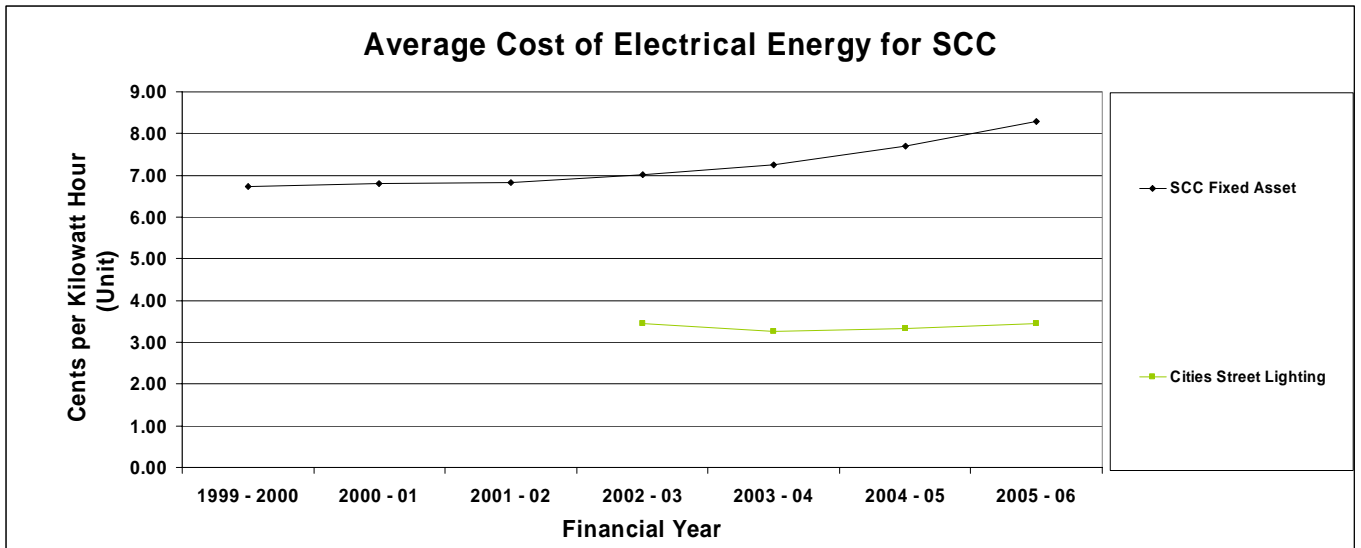
The predominant energy consumed by Council's fixed asset is electricity and none is currently generated from renewable energy sources. Council's electricity consumption for the 2005/06 financial year was 32 GWh and its electrical energy bill for the same period was \$2.5M.

Electrical Energy is used in four areas of Councils operation they being Water & Waste Water operations, General Fund & Commercial operations and in its Street & Public Lighting systems. The following chart shows the breakdown of electrical energy consumption across these operational areas.



The past 6 years annual Energy consumption and average Kilowatt hour (Unit) charges for the above operational areas are shown in the following graphs.





To date Council has not kept cumulative LPG, natural gas and oil - based fuel consumption records. It is not practical to collate this energy consumption and cost data from invoices for the same 6 year period. Overall Council's fixed asset LPG and natural gas bill for the 2005/06 financial year was approximately \$350,000 with the majority of this being LPG.

With the current average cost of LPG for the year being approximately 45c/Litre it is estimated that (allowing for a small component of energy provided by natural gas and oil based fuels) Council's fixed asset consumed approximately 800,000 litres equivalent of LPG. Using the Council's supplier, ELGAS' conversion of 1,961 Litres of LPG to the Tonne, Council's fixed Asset consumed 408 Tonnes of LPG 2005/06 financial year.

Using the Baseline Template, Council's total electricity and LPG consumption for its fixed asset for the 2005/06 Financial Year was 136,000 Giga Joules and the corresponding energy bill was in the order of \$2.85M.

Fig 1 shows the proportions of Electricity and LPG energy used by all Council's fixed asset during 2005/06. Green House Gas emission from fixed asset for the 2005/06 period was 32,872 tonnes CO₂-e and the proportions generated by Electricity and LPG are shown in Fig 2

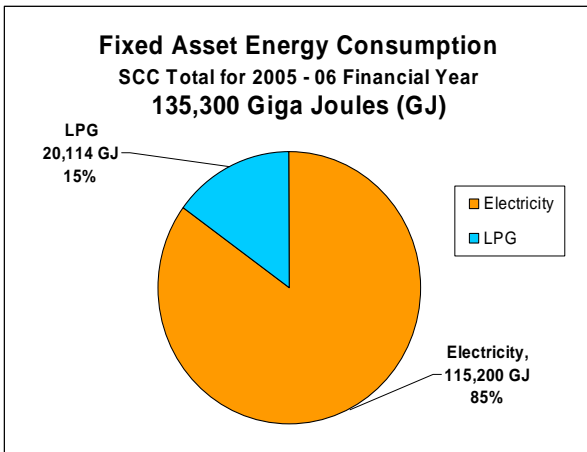


Fig 1

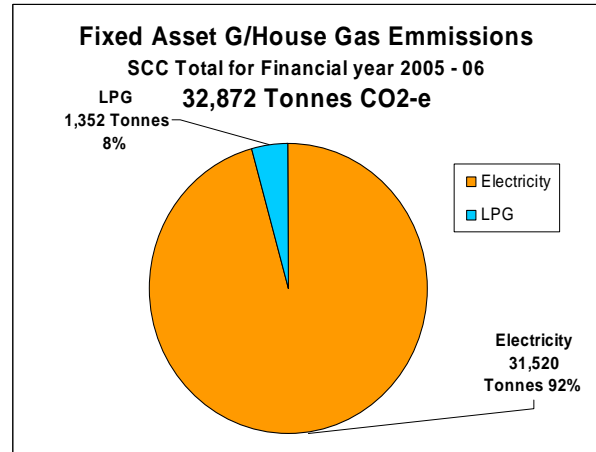


Fig 2

As there were no significant abnormal operational factors for this period these annual energy consumption and Green house gas emission figures will be used as the baseline for future reporting purposes. More accurate LPG and natural gas consumption data will be available in the future once a new all-energy tracking and reporting system is commissioned in the near future.

Energy Management History

Up to 1980 Council was its own Electricity supplier and as a consequence electrical energy remains the predominant energy source used in its operation. After the loss of Council's electrical supply role Council became more focused on improving energy efficiency to offset the increase in electrical energy costs. Council also maintained its electrical engineering and trade services due to the heavy reliance on electrical assets in water supply and wastewater operations. As a consequence some energy efficient technologies have automatically been introduced in this in-house electrical installation and maintenance work.

Asset managers within Council have become reliant on electrical engineering staff to develop energy savings initiatives. This situation has led to a bottom-up approach to energy savings initiatives as asset managers have remained somewhat divorced from the process.

The list of Electrical Energy Savings initiatives taken by Council since 1980 are shown in the Appendix 17, however, actual savings are difficult to establish as no specific records were kept.

A committee was established in the late nineties to consider Council's options in the new contestable energy market place. As a result of the work of this committee Council became the first local government body in NSW to take up the State Government Electricity Contract 777. Council has reviewed its options at the end of each contract period and has elected for lowest cost/risk reasons to stay with the State Contract which now includes Small Sites and Street lighting.

Council's Sustainable Planning and Asset Management Committees will provide senior management guidance to the newly appointed role of Energy Manager for energy and water resource management. This top down approach is seen as the best model to drive organisational cultural change.

ESAP Preparation

In 2003 Council established its Sustainable Planning Committee (SPC) to provide a corporate forum for strategic planning and policy development for the city. The SPC also ensures that input to strategic planning is provided by the relevant groups of Council. On a broader level, the SPC would consider Council's participation in the "Cities for Climate Protection" program.

At the same time ESAP legislation was gazetted Council was undergoing corporate restructure. And the Electrical Technology Services Manager, responsible for corporate electrical energy procurement, retired from Council. These situations led to a delayed uptake to the ESAP process, which started in the 2nd quarter of 2006. At this time the former Electrical Manager was appointed to a role of facilitating Council's ESAP preparation.

An Energy Working Party was then formed to take ownership of the ESAP development. The Energy Working Party comprises senior management and energy conservation champions from each asset management group within Council. The ESAP facilitator reported directly to the chairman of the Working Party until the ESAP progress report was submitted to DEUS in March 2007.

Following an ESAP presentation to the Energy Working Party by Penny Kalaremas, the DEUS specialist, in May 2006 it became apparent that Council's electrical staff had informally provided energy savings initiatives over the years. However Council did not have a formal corporate energy management program or strategy in place. As a consequence Council's asset managers were generally lagging in respect to their energy

management focus and culture. It was decided that a corporate energy management strategy was therefore critical to the on-going success of the ESAP.

At this time not all Management Review actions necessary to give Council a "Minimum Sustainable Platform" have been completed. However, a Management Action schedule has been developed and included in the ESAP Template 3 (Management Action).

To submit the ESAP in an acceptable time frame it has been necessary to complete the "Baseline" and "Technical Review" elements with minimal input from asset managers and operations staff. However, Council has developed several cultural change initiatives which should result in a more proactive implementation of current initiatives and development of Council's ongoing ESAP program.

Energy Savings Action Plan

Management Review

As each of Councils 10 largest energy consuming sites have similar technical review requirements it was decided to carry out one organisational management review as apposed to management reviews for each site. This corporate wide process also serves as the vehicle to establish a Minimum Sustainable corporate energy management cultural platform to launch its initial and ongoing ESAPs.

Council carried out its own internal review with senior managers to start the process of cultural change. A series of meetings were held to develop the actions that would bring Council to the Minimum Sustainable level in all areas outlined in the DEUS Management Review template.

From this point the mechanisms will be progressively put into place to raise Council to Industry Leader and Best Practice levels to meet its City Plan target.

The senior management review team consisted of the eight most senior officers of Council and included:

Mr. Russ Pigg	General Manager
Mr. John Gould	Assistant General Manager
Mr. Peter Dunn	Director - Finance & Corporate Services
Mr. Tim Fletcher	Director - Development & Environmental Services
Mr. Ernie Royston	Director - Strategic Planning
Mr. John Wells	Director - City Services & Operations
Mr. Bill Tomkinson	Acting Director - Shoalhaven Water
Mr. John Lenehan	Information Technology Manager
Mr. Stephen Crerar	Human Resources Manager

At the first review meeting managers were briefed on Council's Energy Management History, ESAP obligations, in relation to Councils top 10 electrical energy consuming sites. Each participant completed a DEUS management review matrix in consultation with their work teams to obtain perceptions of Council's current energy management culture.

At further meetings the progress of the baseline exercise was discussed in relation to the top 10 energy consuming sites and the order adjusted following addition of LPG consumption. Also the results of the Senior

Management Review Survey (Appendix 1) were discussed. The shaded areas are the agreed senior management ranking for each of the 10 elements. .

Actions were determined that would move all 10 elements of the Management Review to "Minimum Sustainable". One of the Actions was to include an Energy Management item on all future meetings of Council's Sustainable Planning and Asset Management meetings. In time all Senior Managers and Council's Energy Manager/Coordinator will contribute to this agenda item. Through this process senior management are now proactive in the energy management debate.

A draft Energy and Water Policy (Appendix 2) and a Sustainable Buildings Policy (Appendix 3) have been developed as the main drivers to the cultural change needed for adoption of Council's ESAP. This was considered necessary to gain ownership of each element by all staff from senior management to operational worker. The policies are expected to be adopted by Council during October 2007.

A significant action since the submission of the Progress Report is the secondment of an Energy Coordinator. This person has the responsibilities outlined in the Operational Energy and Water Management policy of lifting the progress rate of the agreed Management Review Actions. Also since the submission of the Progress Report Council is now integrating sustainability clauses into its corporate Purchasing Policy. For example:

Shoalhaven City Council is committed to the principles of sustainable procurement to help achieve triple bottom line objectives - delivering better environmental, social and economic outcomes. Employees should always give consideration to goods and services that broadly;

- *improve efficiency and reduce waste*
- *save money*
- *stimulate markets for material collected through council's kerbside recycling collection*
- *demonstrate leadership to the community and stakeholders*
- *support local communities and businesses*
- *help achieve long term social and environmental objectives.*

Specific consideration should be given to goods and services that:

- *contain recycled content*
- *are reused or recycled at end of life*
- *reduce greenhouse gas emissions*
- *save water and/or energy*
- *are non toxic*
- *help protect biodiversity and habitat*
- *minimise unnecessary purchasing*
- *support local jobs*
- *provide long term value for money.*

After receipt of its 3rd Annual Water and Energy Management Survey from the Local Government and Shires Association in November 2006 the questionnaire was converted to an email format and distributed to senior managers to ensure input from all senior staff. The responses were collated to provide a more accurate corporate response to the LGSA. The state average results were overlaid on the questionnaire results and returned to senior managers for their information. The results of the survey are at Appendix 4.

Senior managers will be kept informed through energy consumption and trend reports for Council properties and proactive in Council's Energy Management Program by their involvement in the Annual LGSA Energy and Water Management Survey for NSW Local Governments.

Other significant actions since the submission of the Progress Report have been the selection of:-

- a comprehensive Energy Recording and Tracking System.
- an Energy Performance Reporting System that has been customised to meet local government ESAP & sustainability reporting needs.
- a training package to provide Council's asset managers and technical staff with comprehensive energy awareness training.

Energy Performance Reporting and training will be implemented during October 2007 to facilitate improvement in Council's corporate energy management culture.

Baseline Review

Council has an established electrical consumption and demand data-base drawn from electrical account data over the past 20 years. This consumption and demand data is available for over 900 separately metered sites. As a result formatting the electrical data for its top ten sites into the DECC Baseline template has been a relatively straight forward process. The baseline data submitted in the Progress Report has now been updated to the same data gathered for the respective site technical reviews. Gas consumption records have not been kept in the same manner as electrical records resulting in a more time consuming process. Gas data is drawn from invoices which have been collated into the baseline template.

Table 1 provides base line data for Councils total energy consumption and green house gas emission equivalent (CO₂-e) as well as information on its top 10 sites.

Time Period	1 st July 05 to 30 th June 06
Total Energy Consumed by Council	136,000 Giga Joules
Energy consumed by top ten sites	83,000 Giga Joules
Approximate percentage of energy consumed by top 10 sites to Council's total energy consumption	60%
Total green house gas emission equivalent (CO ₂ -e) for Council	33,000 tonnes
CO ₂ -e gas emission equivalent for the top 10 sites	20,000
Approximate percentage of CO ₂ -e emissions for Council's top 10 sites.	60%

Table 1: Energy and greenhouse gas emissions for Shoalhaven City Council.

More accurate data for future ESAP'S will be more readily available after the Energy Recording and Tracking system is installed during 2007/08,

There were no abnormal operation of these ten sites during the sample period and as a consequence no adjustment of the annual energy consumption figures was required.

Technical Reviews

Selected Sites

Council has 990 sites consuming non renewable energy, primarily electricity. Council's ten selected sites are listed from highest energy consuming site to the 10th highest based on combined Electricity and Gas energy consumption.

- 1 - Burrier Water Pumping Station (29,200 GJ - Electricity)
- 2 - Cities Street and Public Lighting Systems (16,500 GJ - Electricity)
- 3 - Bay and Basin Leisure Centre (10,600 GJ - LPG & Electricity)
- 4 - SCC Main Administration Centre (6,800 GJ - Electricity & Natural Gas)
- 5 - Ulladulla Leisure Centre (6,700 GJ - Electricity & LPG)
- 6 - St. Georges Basin Sewerage Treatment Plant (2,900 GJ - Electricity)
- 7 - Vincentia Sewerage Treatment Plant (2,900 GJ - Electricity)
- 8 - Bomaderry Aquatic Centre (2,900 GJ - Electricity)
- 9 - Bamarang Dam Water Pumping Station (2,500 GJ - Electricity)
- 10 - Lake Tabourie Tourist Park (1,700 GJ - Electricity & LPG)

The collective energy electrical energy consumed by these ten sites is approximately 83,000 Giga Joules and represents around 58% of Councils total fixed asset electrical energy consumption.

The baseline data and proposed energy savings actions for each of the ten ESAP sites are summarised under the Technical Review Section of this report with more detail in respective Technical Reviews attached.

General Review Strategy

Council manages and operates Water Supply and Wastewater Services with the subsequent need for electrical engineering and trades staff to support electrical asset.

Use of electrical engineering staff to develop energy audit expertise allows ongoing routine technical reviews and energy audits of electrical asset to meet ESAP guidelines and Council's own Energy Management Program.

Council will supplement this approach through the use of external energy auditors when specialist services are required or where it is considered that there may be innovative energy savings initiatives beyond the capabilities of Council staff.

Council may also consider Energy Performance Contracts (EPC's) if it can be firmly established that an EPC would produce a better outcome than Council could obtain by using its own electrical staff and resources.

Council's electrical engineers and some asset managers have been proactive in energy management activity when opportunities have arisen. For this reason Council's senior management feels that its facilities, for the most part, are operating reasonably energy efficient at this time.

It was initially considered that by using the ESAP Technical Review Checklist developed by Penny Kalaremas, that Council's electrical engineering and operations staff could carry out the technical reviews as part of their Service Level Agreements with internal clients. However, to ensure that electrical engineers and operations staff were able to make objective decisions it was decided to format the checklist to ensure that energy consumption and demand data was known by the time operations staff became involved in the technical review process.

The above strategy protracted the technical review process requiring Council to request a three months extension beyond the 30 September 2006 deadline.

Following the initial 3 month extension it was realised that due to a heavy pre- Christmas works program and lack of resources to carry out the Technical Reviews to the standard required by DEUS the three months

extension would not be adequate. Whilst realising this, senior management also saw the need to maintain pressure to complete the reviews so did not apply for a longer extension period. Instead, Council adjusted its ESAP strategy to engage an external auditor to carry out a Level Three audit at its more complicated electricity, LPG & solar powered Bay and Basin Leisure Centre.

This gave Council additional resource but more importantly gave its electrical engineers the opportunity to closely monitor auditing processes. This assisted their auditing expertise development and enabled them to expedite the Technical Reviews for the other sites.

Council sought auditors recommended by other Councils who had carried out audits at similar facilities. The company EP&T was engaged to carry out this work. Following the success of the work carried out by EP&T, Council decided to engage an external auditor to carry out a Level Three audit of its Vincentia sewerage treatment plant (STP). This was also done to broaden Council's exposure to a wide range of audits. Enman P/L was engaged to carry out this work given their experience in auditing other Water and Waste Water plants. Both EP&T and Enman were engaged on the basis of their willingness to work closely with Council electrical engineers and share knowledge.

Summary of individual site Energy Audits / Technical Reviews

A summary of the combined actions, Energy savings for the ten sites is at Appendix 5.

Technical Review summaries of Council's top ten energy consuming sites are found at Appendix 6 to 17.

Detailed Technical Reviews of each site are provided as attachments to this report.

Note:

All relevant information contained in this report is replicated in the ESAP Templates.

Energy Savings Action Plan - Senior Management Review

Review Area	Low	Moderate	Minimum Sustainable	Industry Leader	Best Practice
A Senior management commitment	No Activity / Absent	Informal Management Practices 6	Executive-level management policy (including targets) is in place for improving energy efficiency and/or reducing energy costs. This policy is reported on Council's website, in its annual reports and communicated to all employees. Sub targets are established for large sites, and regularly updated. 1	In addition to sustainable, Council's business practices are routinely audited and publicly reported	In addition to industry leader, Council can demonstrate that energy management is ingrained into corporate culture
B Understanding of energy savings potential	No Activity / Absent	Informal Management Practices 6	Energy efficiency opportunities are based on a comprehensive review of energy use at all Council sites, and of savings opportunities at each large site covering operating procedures, maintenance procedures, and capital works.	Cost-effective measures are routinely implemented, energy operating and maintenance procedures for intensive plant, and documented internal communications strategy implemented. 1	In addition to industry leader, all innovation measures implemented
C Energy Targets and key performance indicators	No Activity / Absent 1	Informal Management Practices 5	KPI's established and tracked monthly for Council's large sites, and grouped to allow for internal benchmarking of similar facilities where applicable. Sites have routine visibility of data, and reviewed thoroughly where they show large variance from target.	In addition to minimum sustainable, KPI's are included in select Council job descriptions. 1	In addition to industry leader, KPI's are benchmarked against world best practice performance and sites in top quartile
D Energy metering and monitoring	No Activity / Absent 1	Informal Management Practices 2	Council maintains a baseline database for all sites, and basic plant monitoring enables access to interval metering data for major energy streams. 3	In addition to minimum sustainable, sub-metering installed throughout large sites and results reported and tracked at regular management meetings. 1	Energy consumption metered as per industry leader, regular reporting of consumption at board level.
E Energy management reporting	No Activity / Absent 2	Informal Management Practices 5	Council report savings opportunities with extended payback periods (>5 years) and whether they plan to implement these measures and over what time-frame.	In addition to minimum sustainable, Council's business practices are routinely audited, and publicly reported.	In addition to industry leader, Council can demonstrate that energy management is ingrained into corporate culture.
F Energy supply management	No Activity / Absent	Informal Management Practices 3	Council has formal processes for energy procurement, and assess opportunities for alternative energy supply options based on capital and operating costs. 4	In addition to minimum sustainable, product life cycles studies are carried out.	In addition to industry leader, Council acts on product life cycle measures to reduce cradle to grave impacts.
G Operating and Maintenance Procedures	No Activity / Absent	Informal Management Practices 4	Opportunities assessment includes potential improvements to operating and maintenance procedures, and planned projects to improve energy efficiency incorporate formal operating procedures & training to ensure sustainability. 3	In addition to minimum sustainable, product life cycles studies carried out.	In addition to industry leader, Council acts on product lifecycle measures to reduce cradle to grave impacts.
H Accountabilities for Energy Management	No Activity / Absent 4	Informal Management Practices 3	Council has an executive – level manager who is accountable for energy management, together with at least one person at each site and an energy management group that coordinates energy management activities at large sites	In addition to minimum sustainable, KPI's are included in Energy Managers job description	In addition to industry leader, KPI's are benchmarked against world best practice performance and sites in top quartile
I Training and awareness procedures	No Activity / Absent 1	Informal Management Practices 6	Basic energy-awareness activities are in place at each large Council site, and energy management training is provided to operations and maintenance teams in energy intensive areas.	In addition to minimum sustainable, business practices are routinely audited, and publicly reported.	In addition to industry leader, Council can demonstrate that energy management is ingrained into corporate culture.
J Compliance with legal and other regulatory requirements	Regularly fails compliance Requirements	Occasionally fails compliance Requirements	Limited compliance failures 6	Compliance within allowable limits.	Consistently above compliance requirements. 1



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For more information contact the Finance & Corporate Services Group

APPENDIX 2

Organisational Energy and Water Management Policy

Policy Number: POL06/147 • Adopted: [Click here to enter date] • Minute Number: [Click here to enter Minute number] • File:34317 • Produced By: General Managers Group • Review Date:

Based on implementing Cityplan target

1. PURPOSE

To facilitate the development of an Energy and Water Management Program and help guide Council's efforts in the efficient and effective use of its energy and water resources.

2. STATEMENT

2.1 Scope

This policy applies to: Managers of Council's fixed and mobile assets, Council staff, Councillors and all other users of electricity, gas, other sources of energy and water in Council facilities.

2.2 Background

- The State Government through the Department of Environment and Climate Change (DECC) has legislated that all Councils with a population of greater than 50,000 residents is required to meet the requirements of the Energy Savings Action Plans (ESAP).
- To meet the Cityplan target of "Shoalhaven becoming known nationally for its excellence in energy efficiency" Council needs to lead by example and develop internal strategies that demonstrate to the Shoalhaven community its commitment to energy and water saving initiatives.

2.3. Applicable Legislation and Standards

- Energy and Utilities Administration Act 1987 No 103 Part 6A
- **AS 3595-1990**
Energy management programs - Guidelines for financial evaluation of a project
- **AS 3596-1992**
Energy management programs - Guidelines for definition and analysis of energy and cost savings
- **AS/NZS 3598:2000**
Energy audits

3. PROVISIONS

This policy provides a framework for the improvement of council's performance in the following areas:

Cultural Change

- Secure commitment for energy and water conservation from Councillors, senior management, supervisors and staff.
- Provide training to staff to help identify opportunities for energy and water savings.

Systems Development

- Provide access to a central energy and water consumption data bases for all fuel types and water.
- Provide standard reporting systems for energy and water consumption, demand and KPI's

Fuel Use and Selection

- Source fuels at lowest cost from quality assured suppliers.
- Wherever possible, reduce Council's dependence on fossil fuels, through the use of renewable energy;
- Develop central recording systems to monitor Council's energy consumption (all fuels).

Water Use

- Where possible, reduce Council's use of water
- Develop a system of reporting Council's operational water use
- Promote sustainable water use across all of Council's operations

Asset Management

- Ensure energy efficient technologies used in installation, upgrade and retrofit work
- Install sub metering and monitoring systems on major plant items to better measure energy performance.
- All new development and extensions to buildings constructed, maintained and or owned by Council to comply with the "**Sustainable Building Design for Council's Buildings Policy**".
- All equipment purchased to comply with the sustainable purchasing guidelines in of Council's Purchasing Policy.

Emissions Reduction

- Reduce CO2 emissions
- Reduce methane emissions at waste depots

4. IMPLEMENTATION

To ensure the effective implementation of Council's Energy and Water Management Program and the objectives of this policy are realised, Council will develop, implement and maintain a four year rolling "Energy Savings Action Plan" in accordance with NSW legislation and the Department of Environment and Climate Change.

4.1 Resources

The level of resources required by Council's Energy Management program and projects will be determined by legislation, Council requirement and, or the potential savings to be made.

4.2 Responsibilities

a. **Asset Management Committee and Sustainable Planning Committee** - To facilitate best practice outcomes for SCC and to accommodate external agency programs such as the ongoing mandatory NSW State Government "Energy Savings Action Plans" (ESAP) program.

Specific Responsibilities:-

- Develop and maintain Councils Organisational Energy and Water Management Policy and Energy and Water Management Program
- Authorise resources and priorities for energy and water management activities
- Recommend policies on purchase and use of energy consuming equipment
- Champion organisational awareness and innovation relating to energy and water conservation.

b. **Council's Energy Manager/Coordinator** – To coordinate energy management activities throughout Council's operations in consultation with Asset Managers or their nominated representative and the Asset Management Committee.

Specific Responsibilities:-

- Coordinate the implementation of Council's Energy and Water Management Program
- Carry out energy and water audits
- Develop Energy Management Proposals in conjunction with Asset Managers
- Assist HR in the development of staff training programs
- Maintain integrity of Councils energy recording systems & collate energy data
- Monitor and report on energy use
- Prepare and evaluate cost reduction proposals
- Calculate energy performance parameters (KPI's)
- Establish budgets for energy procurement, audits and cost reduction proposals
- Liaise with appropriate state and federal government departments
- Establish working groups investigate particular energy use areas
- Prepare energy forecasts

c. **Asset Managers** – Are to maintain efficient and effective control over energy and water consumption and expenditure of sites under their control.

Specific Responsibilities

- Monitor Energy consumption for the sites and assets under their control
- Include and report on energy performance in their management reporting
- Liaise with the Energy Manager /Coordinator regarding energy consumption or cost exceptions/excesses and potential improvement opportunities they wish to investigate.
- Resource energy savings initiatives.
- Review operating procedures
- Review energy aspects of capital works and major projects
- Monitor energy consumption
- Support training in energy and water conservation principals for their staff.
- Promote a culture of energy and water resource awareness with staff under their control.

- d. **Staff** - Are to participate in the conservation of energy and water within the scope of their job rolls.

Specific Responsibilities

- Report any energy or water waste or savings initiatives beyond his/her control to the Asset Manager or the Energy Manager / Coordinator if it is outside their area of operation.
- Participate in energy and water saving measures through training, identification and implementation of energy and water saving initiatives.
- Where cost effective and safe to do so switch off any energy or water consuming equipment not being used.

4.3 Lines of Communication

Formal communications on matters relating to the control of energy and water consumption and demand by end users or Asset Managers will be directed through the Energy Manager who will bring it to the attention of the appropriate senior manager and or the relevant Committee dependent on the extent of the actions to be taken.

5. REVIEW

This policy and all energy management activities evolving from it will be subject to annual review by the relevant Committee.

6. APPLICATION OF ECONOMIC SUSTAINABLE DEVELOPMENT (ESD) PRINCIPLES

This policy is consistent with objectives and targets of the Council's ESD guidelines adopted in 2003. The ESD guideline document is accessible to staff for on-line viewing on Council's Intranet website. The tasks set out in the guidelines feed into the State of Environment Indicator reporting system.



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APPENDIX 3

Draft Policy for Sustainable Building Design for Council Buildings Policy

Policy Number: • *Adopted:* [Click here to enter date] • *Minute Number:* [Click here to enter Minute number] • *File:* • *Produced By:* ??? Group • *Review Date:* / /2007 Related policies – Energy Policy

5. PURPOSE

The objectives of this policy are to:

1. provide a framework for energy efficient building design, to improve comfort levels to occupants, and improve and reduce energy and water consumption performance, thus leading to long term savings.
2. ensure Council buildings are designed to use less potable water and be responsible for fewer greenhouse gas emissions by setting energy and water reduction targets.
3. assist Council buildings to meet the requirements of the Building Code of Australia and its targets under Council's Energy Policy and its Energy Savings Action Plan by guiding the development of new buildings and retrofitting of existing buildings.
4. assist Council to lead by example by ensuring that any works or fit-outs to council buildings are as environmentally sound as possible.

2. STATEMENT

2.1 Scope

This Policy shall apply to all new development and extensions to existing buildings constructed, maintained and/or owned by Council.

It is acknowledged that circumstances may exist that limit the application of this policy, including the requirements of other Council policies, specifically:

- building and construction legislation (e.g. Building Code of Australia), which takes precedence over this policy – in areas such as light, ventilation and construction materials and setbacks,

- consideration of equitable access for mobility impaired persons, in accordance with the Disability Discrimination Act.
- lot orientation, streetscape and urban design considerations, particularly within established streets
- cultural heritage considerations (ie. Restrictions on design/materials having regard to the impact this may have on the heritage significance of a building or place)
- impact on the amenity of neighbours
- site topography restrictions

It is noted that public buildings require special design consideration as they are often subjected to heavy use by the general public and a high level of vandalism. In these cases, or where other considerations may conflict with some of the requirements of this policy, each proposal shall be assessed on its individual merit.

2.2. Background

Water and energy efficient building design reduces the consumption of resources. Buildings constructed with these principles in mind provide the benefit of: reduced energy costs, reduction in water use, provide greater natural comfort and amenity and reduced emissions of carbon dioxide and other greenhouse gases.

The Australian Government, in agreement with the building sector, has resolved to eliminate worst energy performance practices through a national standard approach to minimum performance requirements for buildings.

The Building Code of Australia (BCA) now includes minimum energy requirements for new buildings and major refurbishments. Energy efficiency measures were introduced in January 2003, and the BCA was amended in 2006 to include energy efficiency measures for all building classifications.

The inclusion of energy efficiency measures in the BCA is part of a comprehensive strategy being undertaken by the Australian, State and Territory Governments to reduce greenhouse gas emissions.

This policy is consistent with the BCA and will assist Council to meet its ESD requirements under the Local Government Act and its the energy efficiency targets under the Energy Savings Action Plan.

6. PROVISIONS

The checklist at **Attachment A** is to be including in building design briefs. It lists the following sustainability components: energy, solar design, insulation, hot water, lighting, ventilation systems, water, landscaping, construction materials, waste and noise.

Each of these components must be addressed by the design consultant. Many of these components will be met under the BCA requirements.

7. IMPLEMENTATION

To be attached to building design and alteration briefs.

5. REVIEW

This policy and all energy management activities evolving from it will be subject to annual review by Councils internal Asset Management and Sustainable Planning Committees.

6. APPLICATION OF ESD PRINCIPLES AND RELATED POLICIES

This policy is consistent with numerous objectives specified in the ESD guidelines. It is also an active response to the Energy Policy : *POL06/147*.

This document will be accessible for on-line viewing on Council's Intranet website.

List of design requirements

Goal: To ensure that where possible the building is designed and fitted out to minimise the consumption of energy.

1. Energy efficiency

1.1 Install renewable energy sources where viable (i.e. photovoltaic)

1.2 Provide as a minimum 4 STAR WELS appliances where relevant (e.g. refrigerator)

2 Solar Design

The building design should:

2.1 Maximise heat gain from the sun in winter and minimise heat gain from the sun in summer.

2.2 Use materials with high thermal mass such as concrete floors, masonry walls, stone, ceramic surfaces etc to assist with the overall thermal efficiency of the building.

2.3 Consider outdoor areas with wind protection, winter solar access and summer shade.

3. Insulation

3.1 Provide roof and ceiling insulation with a minimum “R” rating of 2.5 or as defined by the BCA.

3.2 Provide wall insulation with a minimum “R” rating of 1.5 or as defined by the BCA.

3.3 Provide door and window seals to minimise high wind entry.

3.4 Consider floor insulation for suspended timber floors.

3.5 Consider specialised glazing and window treatments to control heat loss and heat gain (eg double glazing, louvres etc).

3.6 Enclose subfloor (where applicable).

4. Hot Water

4.1 Provide hot water systems having a minimum 5-Star rating and incorporating solar heating where practical, with a performance rating of 41 RECs or more.

4.2 Locate hot water storage systems as close as possible to “wet areas” (i.e. bathrooms, kitchens, laundries).

4.3 Cluster wet areas to minimise pipe runs.

4.4 Insulate hot water pipes in accordance with AS3500.

4.5 Where beneficial, explore alternative systems for hot water generation (e.g. geothermal)

4.6 Provide systems with advanced modulation principles and control delivery systems.

5. **Lighting**

5.1 Ensure maximum natural light access without creating major heat gain or heat loss pathways.

5.2 Consider skylights in appropriate areas.

5.3 Design lighting fixtures to suit the purpose of specific areas (eg bright lighting may be required in kitchens or work stations, while task or effect lighting may be appropriate for leisure areas).

5.4 Provide separate switches for special purpose lights.

5.5 Incorporate energy efficient lamps and dedicated fittings (eg fluorescent and LED lighting).

5.6 Locate switches at exits to rooms/lobbies etc to encourage switching off.

5.7 Incorporate dimmers, motion detectors and automatic turnoff switches where appropriate.

5.8 Install control systems for timers where appropriate.

6. **Ventilation**

6.1 Consider the use of natural ventilation systems through:

- a) location of external openings for intake and exhaust;
- b) use of windows which are lockable in a partly open position;
- c) minimisation of internal obtrusions;
- d) use of convection air flows;
- e) use of external vegetation to cool incoming air.

6.2 Exhaust systems to be interlocked to light where applicable

6.3 Provide ventilation to the roof space.

7. **Heating and Cooling**

7.1 Where air conditioning is proposed, for heating a minimum 5 star rating is required (EER >4.0) Where air conditioning is proposed for cooling a minimum 5 star rating is required (EER >4.0 for 3 phase).

7.2 Ensure design incorporates zoning (or the ability to close off certain areas), so that only those areas which need to be, are heated or cooled.

7.3 Ensure ducting is insulated to at least R1.5 and that any refrigerant lines are insulated with at least 20 mm of foam insulation (or as required by the BCA).

7.4 Ensure there is no likelihood of airborne odour or pollutants being transmitted between specific work or recreation areas.

7.5 Use ceiling fans where appropriate.

7.6 Consider utilising solar energy to supply heat delivery to air handling packaged unit (heating coils)

7.7 Consider the use of in floor heating systems (hydraulic) to provide efficient heating solutions.

8. Water

Goal: To ensure that the development maximises water conservation.

8.1 Provide a rain water tank to harvest roof runoff for re-use. The tank must be fitted with a first flush diversion and overflow connected to the stormwater system.

8.2 Where appropriate use tank water for irrigation, toilet flushing and washing. Incorporate a mains top up facility.

8.3 Provide a minimum 3 STAR - WELS rating water efficient taps and shower fittings.

8.4 Specify a minimum 3 STAR - WELS rating for any washing machines or dishwashers.

8.5 Provide a minimum 4 STAR WELS dual-flush toilets.

8.6 Consider the reuse of sewage or grey water in accordance with Council guidelines.

9. Landscaping

9.1 Goal: Landscaping should enhance the operation and use of the building, while promoting biodiversity and providing habitat for native species.

9.2 Plant species should:

a) be tolerant of local climate, natural water availability and soil type.

b) not create unwanted shadows as they mature, particularly in respect to windows and any solar panels (deciduous trees can provide shade in summer and allow sun in winter).

- c) not require pesticide or fertilizer application.
- d) provide food and habitat for native wildlife.
- e) include groundcovers and mulching to conserve soil moisture.
- f) be species which do not adversely effect the structure of the building.
- g) require low water – e.g. low growing native spreading plants, pavers with tufted grass or decorative mulch to all water percolation.

9.3. Plant species with similar water requirements should be grouped together (hydrozoning).

9.4 Where possible topsoil removed during construction should be reused on-site.

9.5 Design landscaping to screen against cold winter winds, channel summer breezes and provide summer shading.

9.6 Minimise impervious surfaces by selecting porous paving materials and minimising the extent of paved areas.

9.7 Impervious areas should be graded towards pervious areas &/or separated with turf, gravel or vegetation to increase infiltration.

10 Construction Materials

Goal: To ensure the development promotes the sustainable and efficient use of resources.

10.1 Consider the use of recycled materials from demolition sites where this does not compromise the appearance of the building.

10.2 Building materials should be low-maintenance. Where possible, select building materials that will require little maintenance (painting, retreatment, waterproofing etc), or whose maintenance will have minimal environmental effects.

10.3 Design and select materials for ease of deconstruction, reuse and recycling, either upon major refit or demolition.

10.4 All timber used during construction and fit out should be from plantation or sustainably managed re-growth forests.

10.5 Select materials and finishes with a low environmental impact during manufacture, application and use.

10.6 Non chemical based termite treatments must be incorporated in the building design.

11. Waste

Goal: To ensure that the development's design, construction and operation maximise the use of recycled materials and minimise waste generation.

11.1 Ensure that the development complies with the provisions of Council's Waste Minimisation and Management Development Control Plan (no. 93).

11.2 Provide composting and mulching facilities to enable the reuse of all green garden waste on site.

9. Noise

Goal: To ensure that the acoustic design of the building is appropriate for all intended uses.

12.1 All proposed uses of the building (and their acoustic impact) should be considered during the design phase.

12.2 Where appropriate, acoustic enclosures may be required around any external equipment.

12.3 If the building may be used for noisy activities increased attenuation of openings, ceilings, walls and other architectural components must be included in the building design.

Covering Brief

The built environment has a profound impact on the natural environment, the economy, and human health and productivity. For instance, in the United States, buildings account for 36% of total annual energy use, 30% of greenhouse gas emissions, 30% of raw materials use, and 12% of potable water consumption. Employing sustainable building practices can reduce the environmental impacts of buildings by conserving natural resources, reducing solid waste, and improving air quality; provide economic benefits by reducing energy costs and water bills; and provide health and community benefits by improving productivity, enhancing comfort and health, and reducing strain on local infrastructure.

The famed Council House 2 building on Little Collins St in Melbourne expended \$11.3 million for sustainability features including a portion of the building cost of purge windows, light harvesting devices, precast ceilings, timber shutters, precast exhaust ducts, solar hot water collectors, photovoltaic cells, chilled water cooling system, shading screens, co-generation plant, air conditioning and beams and slabs. (884\$/m² or 22.1 per cent of cost).

It is estimated that in 10 years time the sustainability features will have paid for themselves. Further benefits that could reduce this figure include:

- healthier staff – less time lost to colds, flu and other illnesses;
- increased workplace effectiveness;
- less costs for public domain and infrastructure; and
- the value of building as a guiding light in sustainable building.

Annual LGSA Energy and Water Management Survey for NSW Local Governments – Completed January 2007

Council is required to complete an annual survey for the Local Government & Shires Association to advise them of the status of Council’s Energy and Water Management Culture.

To ensure that a more accurate corporate response to the survey is submitted the survey has been transformed into a simple internal email survey to be completed by Group Directors or their representatives.

Your responses will be collated with the information being transferred to the official LGSA Survey form.

Would you please take a few minutes to complete the survey and return it to the sender?

If you are uncertain of or do not have a perception of any answer just simply bypass it.

Survey Completed by - John Gould, Peter Dun, Tim Fletcher, Ernie Royston, John Wells, Bill Tomkinson, John Lenehan, Steve Crear on behalf of their Groups (8 respondents)

SECTION 1 – ENERGY MANAGEMENT IN SCC

1. Rate the importance of the following energy management issues facing SCC today
(8 responses)

Please **bold** your response in each row

Reduced greenhouse gas emissions	Extremely important	Very important	Fairly important	Not very important	Not at all important
SCC Managers responses	2	2	4		
% response from 95 NSW Councils	29	39	25	7	0

Reduced energy bills	Extremely important	Very important	Fairly important	Not very important	Not at all important
SCC Managers responses	4	4			
% response from 95 NSW Councils	38	46	16	0	0

Reduced energy usage	Extremely important	Very important	Fairly important	Not very important	Not at all important
SCC Managers responses	3	5			
% response from 95 NSW Councils	30	58	12	0	0

Reduced water bills	Extremely important	Very important	Fairly important	Not very important	Not at all important
SCC Managers responses	2	5	1		
% response from 95 NSW Councils	28	46	25	1	0

Reduced water usage	Extremely important	Very important	Fairly important	Not very important	Not at all important
SCC Managers responses	2	5	1		
% response from 95 NSW Councils	54	32	14	0	0

Reduced risk eg. fire protection	Extremely important	Very important	Fairly important	Not very important	Not at all important
SCC Managers responses	5	3			
% response from 95 NSW Councils	28	43	21	7	

2. To what degree is energy management integrated into your groups activities?
(7 responses)

Please **bold** one answer Snr Mngmnt ESAP Review Criteria SCC NSW %

Extremely integrated	<i>Best Practice</i>		1
Very integrated	<i>Industry Leader</i>		5
Fairly integrated	<i>Minimum Sustainable</i>	5	43
Not very integrated	<i>Moderate</i>	2	45
Not at all integrated	<i>Low</i>		5

3. In the future, do you envisage energy management becoming more, the same, or less important in your groups activities?
(8 responses)

Please **bold** one answer SCC NSW %

More important	8	91
Of the same importance		9
Less important		

4. a) Does your group have an energy management plan?
(8 responses)

Please **bold** one answer SCC NSW %

Yes	2	20
No, but considering it	5	55
No and not considering it	1	25

4. b) Does your group or SCC have an Energy Savings Action Plan (ESAP)?
(8 responses)

Please **bold** one answer SCC NSW %

Yes	4	28
No, but considering it	4	45
No and not considering it		27

5. Does your group have a water management plan?
(7 responses)

Please **bold** one answer SCC NSW %

Yes	1	60
No, but considering it	2	30
No and not considering it	4	10

6. Has your group set energy and water management targets?
(7 responses)

Please **bold** one answer

	SCC	NSW %
Yes, energy & water management goals	1	28
Energy management goals only	2	7
Water management goals only	1	22
No goals set for either (Comment - Other than to downsize them both (1))	3	43

7. a) Does your group regularly monitor energy and water use?
(8 responses)

Please **bold** one answer

	SCC	NSW %
Yes, energy & water	3	52
Energy only	3	7
Water only		25
Neither	2	16

7. b) If you answered yes to Q7a, please indicate the type of monitoring undertaken
(6 responses)

Bold ALL relevant responses

	SCC	NSW %
Energy accounts	6	69
Water accounts	3	64
Consumption data from energy supplier	3	61
Consumption data from water supplier	1	57
Meter data	3	45
Manual monitoring	2	18
Internal energy audits/consultant	2	17
External energy audits	1	13
Other (please detail)		3

SECTION 2 – ENERGY AND WATER EFFICIENCY

8. a) How much money would you estimate that your group has saved through energy management over the past two years?
(8 responses)

Please **bold** one answer

	SCC	NSW %
Nothing		23
1-5%	5	60
6-10%	3	11
11-20%		3
21% or more		1

8. b) What additional savings do you consider achievable for your group over the next two years?

(8 responses)

Please **bold** one answer SCC NSW %

Nothing		3
1-5%	2	37
6-10%	1	49
11-20%	5	9
21% or more		1

8. c) How much money would you estimate that your group has saved through water management over the past two years?

(8 responses)

Please **bold** one answer SCC NSW %

Nothing	2	22
1-5%	5	49
6-10%	1	17
11-20%		1
21% or more		7

8. d) What additional savings do you consider achievable for your group over the next two years?

(8 responses)

Please **bold** one answer SCC NSW %

Nothing	1	3
1-5%	4	43
6-10%	1	32
11-20%	2	18
21% or more		1

9. a) Does your group receive requests from the community for information regarding energy and water efficiency in homes and businesses?

(8 responses)

Please **bold** one answer SCC NSW %

All the time	2	17
Sometimes	2	58
Rarely	1	16
Never (Go to Q10a)	3	8

9. b) What type of property do these efficiency requests relate to?

(5 responses)

Please **bold** one answer SCC NSW %

Mostly new developments	1	65
Mostly existing properties	3	23
A mix of both	1	12

10. a) Are you aware of, or have you taken advantage of, government funding programs to promote energy and water efficiency measures in the community?
(8 responses)

Please bold one answer	SCC	NSW %
Aware, but never used (go to Q11a)	2	15
Aware and have taken advantage of	3	57
No (go to Q11a)	3	28

10. b) If you answered yes to Q10a, please detail which specific programs you have taken advantage of
(1 response)

Energy Savings Fund – (State Government) **1**

Other responses from 95 NSW Councils	NSW %
SEDA/DEUS nfi / funding/rebates	37
Federal government community water grants / Aust water fund	27
AGO / CCP / ICLEI	23
EPA / DEC	8
It's a living thing	8
Environment Trust / Blue Sky project	6
Shower Heads /water saving devices	6
NECO Program	4
Sydney Water	4
Water Wise	2
Energy Australia	2
Green Power	2
Local Catchment Management Authority	2
NGAC	2
NSW Greenhouse Office	2
Other	15

SECTION 3 – INTERNAL STRATEGIES

11. a) Has SCC publicised an energy and water management policy internally?
(8 responses)

Please bold one answer	SCC	NSW %
Yes, have publicised our energy management policy	4	32
Yes, have publicised our water management policy	2	25
Yes, publicised both energy and water management policies		15
Have not publicised either	2	20
Do not have an energy and water management policy		7

11. b) Do you encourage employees in your group to share energy saving ideas?
(7 responses)

Please bold one answer	SCC	NSW %
Yes	7	54
No		46

11. c) How do you encourage employees in your group to share energy saving ideas?
 Please provide an example
(4 responses)

Team Briefs / General Discussions **2**

Aquatics – New technology **1**

Project Delivery – Design & energy savings features **1**

Through ESD Guidelines & DCP preparation building design for Council projects **1**

Car pooling when going to conferences **1**

Think about using more efficient motor vehicles **1**

Other responses from 95 NSW Councils

NSW %

Internal communication / email / newsletter	18
Workshops / forums / seminars	18
Meetings of dedicated environmental / energy teams	14
Internal competitions	10
Induction training / coaching	8
Liaise with other divisions / cross organisation meetings	8
Project planning / design / BASIX	8
Staff / toolbox / team meetings	8
General housekeeping / turn off lights/taps	4
Special events - walk to work	4
Suggestion boxes	4
Water / energy savings by council	4
Audits of council facilities	2
Conversions / discuss with supervisor	2
Council gives feedback / consumption info	2
Management meetings / engage managers	2
Membership of external gps eg NRGE	2
Shower / globe giveaways	2
Other	6

11. d) Do you encourage employees in your group to share water saving ideas?

(8 responses)

Please **bold** one answer SCC NSW %

Yes	6	65
No	2	33

11. e) How do you encourage employees in your group to share water saving ideas?

Please provide an example

(2 responses)

Team Briefs **1**

Through ESD Guidelines & DCP preparation building design for Council projects **1**

Other responses from 95 NSW Councils

NSW %

Internal communication/email/newsletter	17
Meetings of dedicated environmental/energy teams	15
Workshops/forums/seminars	12
Liaise with other divisions/cross organisation meetings	10
Project planning/design/BASIX	10
Water/energy savings by council	10
Internal competitions	8
Staff/toolbox/team meetings	8
Induction training/coaching	7
Shower/globe giveaways	5
Suggestion boxes	5
Waterwise program	5
Staff trial saving ideas/input on restrictions	3
Council gives feedback/consumption info	3

Audits of council facilities	2
Conversations/discuss with supervisor	2
Management meetings/engage managers	2
Special events - walk to work	2
Other	10

12. Which, if any, of the following initiatives are being considered or are already in place in SCC or your group?

(8 responses)

Please **bold** one answer

Employment of council staff specifically focused on energy management	Considering	Already in place	Neither
SCC Managers responses	1	4	3
% response from 95 NSW Councils	10	11	74

Appointment of external energy management consultant/s	Considering	Already in place	Neither
SCC Managers responses	1	6 Comment - On a project by project basis only (1)	1
% response from 95 NSW Councils	24	29	43

13. How interested are you in knowing more about the following?

(7 responses)

Please **bold** one answer for each row

		SCC	NSW%	SCC	NSW%	SCC			
Thermal imaging (reduce risk of electrical fire)	Very Interested	2	5	Interested	4	51	Not Interested	1	38
Power factor correction (increase efficiency)	Very Interested	4	36	Interested	3	48	Not Interested		14
Energy audits	Very Interested	6	30	Interested	1	57	Not Interested	1	11
Water audits	Very Interested	5	29	Interested	1	58	Not Interested	1	12
Financing of energy and water saving equip.	Very Interested	3	49	Interested	4	42	Not Interested		8
Energy efficient hot water systems	Very Interested	4	26	Interested	1	58	Not Interested	2	14
Sub surface irrigation systems	Very Interested	3	33	Interested	2	52	Not Interested	2	13
Environmental tradeable commodities Eg. NGACs, RECs	Very Interested	2	23	Interested	5	48	Not Interested		27
Aust. Building Greenhouse Ratings (ABGR)	Very Interested	2	17	Interested	5	52	Not Interested		28
Reducing greenhouse gas emissions	Very Interested	2	41	Interested	5	45	Not Interested		12
UPS and standby generation	Very Interested	3	14	Interested	4	57	Not Interested		25
Demand side management (load curtailment)	Very Interested	4	30	Interested	3	45	Not Interested		21

14. a) In the past two years has your group implemented any of the energy or water saving projects listed below?

Please **bold** the response in the first (Shaded) column. **You may bold as many as appropriate**

14. b) For all those implemented in the past two years, how successful would you say each has been?

(4 responses)

Please **bold** response for each project implemented in past two 2 years

Thermal Imaging	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses						
% response from 95 NSW Councils			43	14	43	
Power Factor Studies	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses			1			
% response from 95 NSW Councils		22	48	13	9	4
Energy Audit Studies	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses			1			
% response from 95 NSW Councils		10	34	49	5	2
Analysis of consumption data	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses			1	3		
% response from 95 NSW Councils		3	48	40	6	2
Encourage Solar Power Programs	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses				1		
% response from 95 NSW Councils		7	21	29	36	7
Programs to reduce peak energy loads	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses			1	1		
% response from 95 NSW Councils			19	63	6	13
Empowered staff to better manage usage	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses						
% response from 95 NSW Councils			14	67	14	5
Encouraged residents to better manage resources	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses		1				
% response from 95 NSW Councils			23	60	9	9
Encouraged retro fitting eg low flow shower roses	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses			3		1	
% response from 95 NSW Councils		6	38	47	8	2
Water management programs	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses		1	2			
% response from 95 NSW Councils		14	32	42	8	4
Energy Savings Action Plans	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses				1		
% response from 95 NSW Councils		4	29	50	8	4
None of the above	Implemented in past 2 yrs	Extremely Successful	Very Successful	Fairly Successful	Not Very Successful	Not Successful At all
SCC Managers responses						
% response from 95 NSW Councils						

Please check that you have answered question 14.b)

SECTION 4 – GREEN ENERGY

15. a) Do you know the quantity of greenhouse gases emitted as a result of SCC's energy consumption?
(6 responses)

Please **bold** one answer SCC NSW %

Yes		48
No	6	51

15. b) Does SCC purchase green energy?
(6 responses)

Please **bold** one answer SCC NSW %

Yes	1	32
No	5	66

15. c) How valuable would you rate the provision of residential green energy customer numbers for the SCC Local Government Area?
(4 responses)

Please **bold** one answer SCC NSW %

Very valuable		29
Valuable	4	46
Not valuable		24

SECTION 5 – OTHER ENERGY MANAGEMENT ISSUES

16. State whether you agree or disagree with the following statements
(6 responses)

Please **bold** one answer for each row

We have a good understanding of energy wastage issues SCC Managers responses	Strongly agree	Agree 6	Neither agree nor disagree 1	Disagree	Strongly disagree
% response from 95 NSW Councils	3	43	28	20	3

We could do more to reduce our energy wastage SCC Managers responses	Strongly agree 1	Agree 6	Neither agree nor disagree	Disagree	Strongly disagree
% response from 95 NSW Councils	29	66	1	0	0

We are a leader in environmental strategies and implementation SCC Managers responses	Strongly agree	Agree 3	Neither agree nor disagree 3	Disagree 1	Strongly disagree
% response from 95 NSW Councils	2	21	45	21	10

We consider ourselves to be a very energy efficient Local Council ISCC Managers responses	Strongly agree	Agree 1	Neither agree nor disagree 5	Disagree 1	Strongly disagree
% response from 95 NSW Councils	2	9	54	29	3

We consider ourselves to be a very water efficient Local Council SCC Managers responses	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
		2	4	1	
% response from 95 NSW Councils	8	33	41	15	1

We are interested in external advice regarding energy efficiency projects and opportunities SCC Managers responses	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
		1	5	1	
% response from 95 NSW Councils	17	60	17	3	0

We are a leader in energy management SCC Managers responses	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
		2	4	1	
% response from 95 NSW Councils	2	2	39	46	9

We are a leader in water management SCC Managers responses	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
	2	4	1		
% response from 95 NSW Councils	4	25	42	23	3

We recognise where we may be wasting energy SCC Managers responses	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
		6	1		
% response from 95 NSW Councils	4	60	22	10	2

We are interested in learning about measures to promote energy & water efficiency in our local community SCC Managers responses	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
	2	5			
% response from 95 NSW Councils	26	60	9	3	0

Comments

- The average scores above were, for the most part, slightly higher than those submitted to LGEA before Christmas. As a consequence the survey Council submits next year should reflect continuous improvement in most responses.
- The responses in this corporate survey were varied and this can be attributed to each group having different levels energy/water usage and priority for energy/water management activity plus, Council not having a corporate policy, targets and KPI'S for Energy Management. Responses next time will not be as wide ranging.
- When a corporate policy, ownership of policy elements, group KPI'S and Targets are established survey respondents should only be ask to consider questions relative to their activity. This will remove most perception responses.

Mick Ludlow
ESAP Facilitator

Appendix 5

Site	Cost - Effective Opportunities				Potential Cost - Effective Opportunities			
	Energy / Demand Savings Initiative	Implementation	Energy / Demand	Payback	Energy / Demand Savings Initiative	Implementation	Energy / Demand Savings	Pay Back
			Savings \$				\$	
Cost \$	Cost \$	Period	Cost \$	Period				
Burrier	Adjust Pump Station Operation	0	37,500	Nil				
	Sub Total	0	37,500	0.0				
St Georges Basin	Replace select lighting	4,500	1,532	2.9				
Leisure Centre	Recover heat loss from Change Room exhaust systems.	30,000	8,000	3.8				
	Recover heat loss from 25m and Leisure pool exhaust systems	170,000	48,680	3.5	973,200			
	Reduce pool water temperature	0	1,069	Nil				
	Install VSD's on Circulation Pumps	40,000	8,000	5.0				
	Spa heating using Rotex system	15,000	6,713	2.2				
	Replace current gas boilers with Rotex / Rinnai gas package for main Leisure pools heating	120,000	48,846	2.5				
	Integrate Zane Solar System into BMS	10,000	4,000	2.5				
	Sub Total	389,500	126,840	3.1				
Cities Street & Public Lighting Systems	Change out of remaining MV Streetlights on Main Roads for more efficient HPS Streetlights	0	3,125	Nil	Install T5 & CF & lamps instead of MV fittings and lamps.			
	Progressive replacement of MV Streetlights on Secondary Roads with more efficient CF Streetlights	0	34,003	Nil	Convert Public Lighting 4 systems to one of the other			
	Replace MV Sphere lights in Graham St- Nowra with more efficient CF fittings and lamps	0	368	Nil	Complete inventories of Public Lighting Systems 2, 3 & 4 and initiate similar energy savings actions.			
	Progressively Replace MV Sphere Fittings in Junction St - Nowra with more efficient CF fittings and lamps	0	1,774	Nil	Fully optimise the dual lighting circuits in Junction St. to switch of non-essential lighting when not required. Develop and implement comprehensive Scheduled Maint. program for System 1 Public Lighting systems Replace remaining Time switch controls on system 1 Public Lighting systems with PE Cell controls Identify the location of all HPS Floodlights on Integrals inventory to confirm that they are Council's			

Appendix 5

Site	Cost - Effective Opportunities				Potential Cost - Effective Opportunities			
	Energy / Demand Savings Initiative	Implementation	Energy / Demand	Payback	Energy / Demand Savings Initiative	Implementation	Energy / Demand	Pay Back
					Develop and implement procedures to confirm that individual street lights and subdivision lighting has been			
					Carry out periodic energy consumption reconciliation exercises to compare inventory load with billed load.			
					Stipulate the installation of low maintenance (no painting) S/L columns in all new subdivisions			
	Sub Total	0.0	39,270	0.0				
Main Admin Building	Install Movement Sensors on lighting circuits	8,000	5,000	1.6				
	Install Time Switches on Boiling Water Units	3,000	1,200	2.5				
	Install ECO Save Syst. on remainder of Light Circuits	12,000	3,500	3.4				
	Change Start Finish times of Main Air Conditioner	0	4,500	Nil				
	Adjust Gas Boiler operation	0	1,000	Nil				
	Sub Total	23,000	15,200	1.5				
St Georges Basin W T P	Install Power Factor Equipment to raise PF from a .78 average to .98	11,600	4,110	2.8	Install Variable Speed Drives on each of the Aerators.	29,000	2,939	9.9
					Install a single Variable Speed Drive with a change over switch mech to operate both Effluent Pumps.	82,000	11,773	7.0
	Sub Total	34,600	24,810	1.4	Sub Total	111,000	14,712	7.5
Lake Tabourie Tourist Park	Install Metered Power Heads on storage Van Sites	135,000	20,000	6.8	Install "Key Tag Energy Management Isolation Switches" in cabins			
					Install LPG submetering on Ammenities Blocks			
Bomaderry Aquatic Centre	Install VSD in Outdoor Circulation Pump							
	Isolate one of the two Indoor Circulation Pumps outside normal hours							
	Sub Total	135,000	20,000	6.8				
Vincentia S T W	Alter the control system to increase the aeration delay time	15,000	6,359	2.4	Introduce Energy Awareness & Monitoring Program to motivate staff to become proactive in energy efficiency initiatives.	15,000	1,307	11.5
	Change operation of Blowers so that both Blowers operate on full VSD control	10,000	2,200	4.5	Introduce Motor System Efficiency Programme to raise maintenance standard to Best Practice.	37,000	3,228	11.5

Appendix 5

Site	Cost - Effective Opportunities				Potential Cost - Effective Opportunities			
	Energy / Demand Savings Initiative	Implementation	Energy / Demand	Payback	Energy / Demand Savings Initiative	Implementation	Energy / Demand	Pay Back
	Install Demand Monitoring & Management System	19,000	3,775	5.0	Installation of a compressor control system to shut down the second compressor when not required.	10,300	458	22.5
	Upgrade Power factor Correction Equipment	6,100	1,355	4.5				
	Sub Total	179,000	32,334	5.5	Sub Total	62,300	4,993	12.5
<hr/>								
Ulladulla Leisure Centre	Install Power Factor Equipment	8,000	1,800	4.4				
	Install Variable Speed Drives on O/Door Crcltn Pump	10,000	3,200	3.1				
	Sub Total	212,100	39,264	5.4				
<hr/>								
Bamarang WPS	No Savings Initiatives							
	Total	973,200	335,218	2.9		173,300	19,705	8.8

Burrier Water Pumping Station
(Energy Consumption Approximately 29GJ/Annum)

The 6.6 KV High Voltage Burrier Water Pumping Station is Council’s largest Energy Consuming site using approximately eight (8) GWh of electrical energy / annum. The site has no gas or oil based fuel consuming equipment and because 98.5% of its electrical energy is consumed by one of its two Main pumps (only one pump is operating at any given time) it was decided to carry out an internal Technical Review as apposed to an external Level 3 Audit.

Another reason the internal review was chosen is that the pumping station installation & operating parameters of the pumps have not changed, other than extending the hours of operation, since it was efficiently designed and installed by PWD in 1981. The most significant savings initiative identified is to develop a Water Supply Risk Management Plan that eliminates or minimises the need for the duty pump to operate in the demand penalty period.

The following summary of energy savings initiatives, implementation costs, savings & project time frames on is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Burrier Water Pumping Station Baseline Data – From 1/4/05 to 31/3/06	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI
	GJ	t CO2e	W - KVA	S - KVA	M/ Litres	GJ / ML
	29,189	7,986	2,100	2,100	14,535	2.01

Energy Savings Initiatives		Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
				Energy	GHG	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years												
1	Adjust operation of Pumping Station to Maximise Demand savings from new tariff	Electrical Engineer	Nil			2,100	2,100	52,500			1/7/06	30/6/07
Total Previous Actions over Past 5 Years						2,100	2,100	52,500				
Cost Effective Opportunities												
1	Review Risk Management Pump Operation Plan to avoid pumping in Demand penalty period in any month.	Director S / Water	Nil			2,100	2,100	37,500			1/7/07	31/9/07
Total Cost-Effective Opportunities						2,100	2,100	37,500				
% change resulting from all measures												
Potential Cost Effective Opportunities												
Total Potential Cost-Effective Opportunities												
Summary of Site												
Total Energy Consumption Savings						2,100	2,100	37,500	Does not include Savings achieved from previous actions			

Technical Review Summary
Cities Street & Public Lighting Systems
 (Energy Consumption Approximately 17GJ/Annum)

With Integral Energy constructing and maintaining the city's Street Lighting Network under a Service Level Agreement Council's Energy savings initiatives in this area are limited. However, this Technical Review has served to better acquaint Council staff with the Asset that Council pays for in rental charges and has shown them where to keep the pressure on the network provider to expedite the introduction of more efficient Street lighting technology.

Council is responsible and in control of its Streetscape and Public Area Lighting and the review has grouped this lighting into four distinct categories enabling its engineering staff to identify and program the energy savings initiatives detailed in the Technical Review.

The following summary of energy savings initiatives, implementation costs, savings & project time frames is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Cities Street & Public Lighting Systems Baseline Data – From 1/4/05 to 31/3/06	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI-GJ / Patron
	GJ	t CO2e	W - KVA	S - KVA	Patrons	days
	16,547	4,527				

Energy Savings Initiatives	Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
			Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Cost Effective Opportunities											
Initiative 9 - Replace 17 X 80W MV Sphere lights in Graham St- Nowra with more efficient fittings and 42W (max) Compact Fluorescent lamps	Director CS & Operations	10,000	13	4			368	27.2		1/7/08	30/6/09
Initiative 8 -Replace 81 X 80W MV Sphere Fittings in Junction St - Nowra with more efficient fittings and 42W (max) Compact Fluorescent lamps	Director CS & Operations	40,000	61	17			1,774	22.5		1/7/08	30/6/09
Initiative 3 - Complete the change out of 250W & 400W MV & 310 HPS S/L fittings and lamps for 150W & 250W HPS S/L fittings & lamps	Director CS & Operations	IPART to Determine	338	93			3,125			Ongoing	
Initiative 2 -Progressively replace existing 50W & 80W MV S/L fittings and lamps with T5 & Compact Fluorescent S/L fittings and lamps.	Director CS & Operations	IPART to Determine	3,690	1,010			34,003			Ongoing	
Total Cost-Effective Opportunities		50,000	4,102	1,122			39,270				
% change resulting from all measures			24.3%	24.3%							

Technical Review Summary

APPENDIX 7

Energy Savings Initiatives	Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
			Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Potential Cost Effective Opportunities											
Initiative 14 - Convert Public Lighting 4 systems to one of the other	Director CS & Operations									1/10/07	31/12/08
Initiative 13 - Complete inventories of Public Lighting Systems 2, 3 & 4 and undertake similar energy savings actions similar Energy Savings actions.	Director CS & Operations									1/10/07	31/12/08
Initiative 12 - Fully optimise the dual lighting circuits in Junction St. to switch of non-essential Streetscape lighting when only pedestrian traffic	Director CS & Operations									1/7/08	30/6/09
Initiative 11 - Develop and implement comprehensive Scheduled Maint. program for System 1 Public Lighting systems	Director CS & Operations									1/10/07	31/12/08
Initiative 10 - Replace remaining Time switch controls on system I Public Lighting systems with PE Cell controls	Director CS & Operations									1/10/07	30/6/07
Initiative 7 - Identify the location of all HPS Floodlights on Integrals inventory to confirm that they are Councils and not private property owners	Director CS & Operations									1/10/07	30/6/07
Initiative 6 - Develop and implement procedures to confirm that individual street lights and subdivision lighting has been	Director CS & Operations									1/10/07	30/6/07
Initiative 5 - Carry out periodic energy consumption reconciliation exercises to compare inventory load with billed load.	Director CS & Operations									Ongoing	
Initiative 4 - Stipulate the installation of low maintenance (no painting) S/L columns in all new subdivisions	Director CS & Operations									Ongoing	
Initiative 1 - Install T5 & Compact Fluorescent fittings and lamps instead of 50W & 80W MV fittings and lamps.	Director CS & Operations									Ongoing	
Total Potential Cost Effective Savings											
Summary of Site											
Total Energy Consumption Savings		50,000	4,102	1,122				39,270		Does not include Savings achieved from previous actions	

Bay and Basin Leisure Centre
(Energy Consumption Approximately 10. 6 GJ/Annum)

This is the largest of Council's four Leisure and Aquatic Centres. The energy sources used in this centres operation are Solar, LPG and Electricity. In theory the Centre is designed to maximise its use of Solar (Renewable) energy, before its Heat Pumps operate and then use LPG to raise water temperature as and when required in particular for Spa operation. In practice however it is considered by the Centre Management that this priority energy use system has not been working effectively since the centre was commissioned. The main focus of this review was to introduce initiatives ensure priority energy source selection in each of the facilities in the complex and improve the efficiency of the heating systems by recycling heat that was being exhausted from the building.

During the Technical review it was recognised that most of the inefficient aspects of the buildings operation were linked and it is planned to address all identified energy savings initiatives in the one project time frame in the first 6 months of 2008. A DEUS Energy Savings grant was applied for the "Rotex/Rinnai system however, Council's application was unsuccessful.

The following summary of energy savings initiatives, implementation costs, savings & project time frames is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Technical Review Summary

APPENDIX 8

Bay & Basin Leisure Centre Baseline Data – From 1/9/05 to 31/8/06	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI-GJ / Patron
	GJ	t CO2e	S - KVA	W - KVA	Patrons	days
	10,663	1,506	206	183	136,822	0.08

Energy Savings Initiatives		Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
				Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years												
	Install sensor operated lights in the Plant & Control rooms											
Total Previous Actions Over Past 5 Years												
Cost Effective Opportunities												
1	Replace 400W Mercury Vapour lamps with more efficient 250W HPI PLUS Metal Halide lamps	CS&0 Director	4,500	69	19			1,532		2.9	1/1/08	30/6/08
2	Recover heat loss from male C/room exhaust system.	CS&0 Director	15,000	427	19			4,000		3.8	1/1/08	30/6/08
3	Recover heat loss from female c/room exhaust system	CS&0 Director	15,000	427	29			4,000		3.8	1/1/08	30/6/08
4	Recover heat loss from 25m pool exhaust system	CS&0 Director	85,000	2,667	179			24,340		3.5	1/1/08	30/6/08
5	Recover heat loss from Leisure Pool Exhaust System	CS&0 Director	85,000	2,667	179			24,340		3.5	1/1/08	30/6/08
6	Reduce pool water temperature	CS&0 Director	0	48	13			1,069		0	1/10/07	31/10/07
7	Install VSD's on Circulation	CS&0 Director	40,000	363	99			8,000		5.0	1/1/08	30/6/08
8	Spa heating using Rotex system	CS&0 Director	15,000	735	49			6,713		2.2	1/1/08	30/6/08
9	Replace current gas boilers with Rotex / Rinnai gas package for main Leisure pools heating	CS&0 Director	120,000	5,124	344			48,846		2.5	1/1/08	30/6/08
10	Integrate Zane Solar System into BMS	CS&0 Director	10,000	180	49			4,000		2.5	1/1/08	30/6/08
Total Cost-Effective Opportunities			389,500	12,707	990			126,840				
% Change resulting from all measures				119%	66%							
Potential Cost Effective Opportunities												
Nil												
Total Potential Cost Effective Opportunities												
Summary of Site Total Energy Consumption Savings			389,500	12,707	990			126,840		Does not include Savings achieved from previous actions		

SCC Main Administration Centre (Nowra)
(Energy Consumption Approximately 6.6 GJ/Annum)

Council has two Administration Centres one in the South of the City at Ulladulla and its Main Administration Centre in the North of the city at Nowra. The Nowra Administration building is the largest and the hub of Council's operation. The building was commissioned in 1980 when Sustainable Building design was in its infancy and not a focus point. Like many buildings of that era some initiatives like solar screening and louvers on external windows were sacrificed to keep project costs within budget. This and other energy savings initiatives have subsequently been installed in conjunction with building extension and upgrade work.

The following summary of energy savings initiatives, implementation costs, savings & project time frames is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Technical Review Summary

APPENDIX 9

SCC Main Administration Centre (Nowra) Baseline Data – From 1 st Feb 06 to 31 st Jan 07	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI-GJ / Sq Mtr
	GJ	t CO2e	S - KVA	W - KVA	NLA Sq Mtrs	(Net Lettable Area)
	6,853	1,720	615	385	6,151	1.11

Energy Savings Initiatives		Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
				Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years												
1	Compact Fluorescent lamps installed in 80% of foyer and corridor light fittings in 2002											
2	ECO Save system installed on level 3 of building in 2003											
Total Previous Actions Over Past 5 Years												
Cost Effective Opportunities												
1	Reduce operation time of Gas Boiler	Director C& F Services		63	4			1,000		0	1/10/07	31/12/07
2	Adjust Start Finish times of Main Air Conditioner	Director C& F Services		162	44			4,500		0	1/10/07	31/12/07
3	Install ECO Save System on remainder of Lighting Circuits	Director C& F Services	12,000	126	34			3,500		3.4	1/12/07	28/2/08
4	Install Time Switches on Boiling Water Units	Director C& F Services	3,000	43	12			1,200		2.5	1/12/07	30/6/07
5	Install Movement Sensors on lighting circuits	Director C& F Services	8,000	180	49			5,000		1.6	1/12/07	30/6/07
Total Cost-Effective Opportunities				574	144							
% change resulting from all measures			23,000	8.4	8.4			15,200				
Potential Cost Effective Opportunities												
Total Potential Cost-Effective Opportunities												
Summary of Site Total Energy Consumption Savings			23,000	8.4	8.4			15,200		Does not include Savings achieved from previous actions		

Ulladulla Leisure Centre
(Energy Consumption Approximately 6.7 GJ/Annum)

The Ulladulla leisure centre was commissioned in 1999. The complex houses 2 indoor heated pools (1 X 25m and one children’s pool), 1 Spa & 1 50m outdoor pool. Other facilities provided at the centre include a crèche, and small café.

The following summary of energy savings initiatives, implementation costs, savings & project time frames, is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Ulladulla Leisure Centre Baseline Data – From 1ST Feb 06 to 31st Jan 08	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI-GJ / Patron
	GJ	t CO2e	S - KVA	W - KVA	Patrons	days
	6,682	856	107	98	124,260	0.05

Energy Savings Initiatives		Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
				Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years												
Total Previous Actions Over Past 5 Years												
Cost Effective Opportunities												
1	Install VSD in outdoor Circulation Pump	Director CS & Operations	10,000	144	39			3,200		3.1	1/1/08	30/6/08
2	Install Power Factor Correction unit to improve PF from .85 to greater than .95	Director CS & Operations	8,000			21	21		1,800	4.4	1/1/08	30/6/08
Total Cost-Effective Opportunities			18,000	144	39			3,200	1,800			
% change resulting from all measures				2.2	4.6	19.4	21.2					
Potential Cost Effective Opportunities												
Total Potential Cost-Effective Opportunities												
Summary of Site Total Energy Consumption Savings										Does not include Savings achieved from previous actions		

Technical Review Summary
St Georges Basin Sewage Treatment Works
 (Energy Consumption Approximately 2.9 GJ/Annum)

The St Georges basin Sewerage Treatment Works was commissioned in 1991. It is the treatment plant to service the townships of St Georges Basin, Sanctuary Point, Basin View, Old Erowal Bay, Bream Beach, Wrights Beach and their environs and is the largest energy consuming Sewerage Treatment Works of the cities ten treatment Plants. Electricity is the sole energy source for the operation of this plant. The effluent is treated to a secondary stage at this plant and then pumped to Vincentia STW for tertiary treatment and from there to the REMS storage and distribution system.

The following summary of energy savings initiatives, implementation costs, savings & project time frames, is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

St. Georges Basin Sewerage Treatment Plant Baseline Data - From 1/7/06 to 30/6/07	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI
	GJ	t CO2e	S - KVA	W - KVA	M L	GJ / ML
	2,912	789	218	205	1,006	2.9

Energy Savings Initiatives	Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
			Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Nil											
Previous Actions Over Past 5 Years											
Total Previous Actions Over Past 5 Years											
Cost Effective Opportunities											
1 Install Power Factor Equipment to raise PF from a .78 average to .98	Director S Water	11,600	9	3	49	49		4,110	2.82	1/1/08	31/3/08
Total Cost-Effective Opportunities		11,600	9	3	49	49		4,110	2.82		
% change resulting from all measures			.03%	.03%	22%	22%					
Potential Cost Effective Opportunities											
2 Install Variable Speed Drives on each of the six 37KW Aerators.	Director S Water	29,000	152	42	7	7	2,352	587	9.9		
3 Install a single Variable Speed Drive with a change over switch mechanism to operate both 60KW Effluent Pumps.	Director S Water	82,000	630	172	25	25	9,776	2,097	6.9		
Total Potential Cost-Effective Opportunities		111,000	782	214	32	32	12,128	2,684			
Summary of Site											
Total Energy Consumption Savings		122,600	791	217	81	81	12,128	6,794	Does not include Savings achieved from previous actions		

Vincentia Sewerage Treatment Works

(Energy Consumption – Approximately 2.7 GJ/Annum)

The Vincentia Sewage Treatment plant services the townships of Huskisson, Vincentia, Woollamia and their environs. The plant was commissioned in 1975, upgraded in 1985 and again in 2000 to accommodate the rapid growth in this coastal region. With each upgrade energy savings initiatives have been introduced.

Whilst not the highest energy consuming treatment plant the Vincentia plant is the most complex of Council's nine Sewage Treatment plants as it combines Pasveer Channel and Diffused Aeration technologies whilst also acting as a tertiary treatment point for the St Georges Basin Treatment Plant before the effluent is pumped into the REM's distribution and storage system.

The following summary of energy savings initiatives, implementation costs, savings & project time frames is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Technical Review Summary

APPENDIX 12

Vincentia Sewerage Treatment Plant Baseline Data 1st Jan 06 to 31st Dec 07	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI
	GJ	t CO2e	W - KVA	S - KVA	M/ Litres	GJ / ML
	2,883	789	244	212	1,338	2.15

Energy Savings Initiatives		Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
				Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years												
	Introduced off Peak Pumping into REMS											
Total Previous Actions Over Past 5 Years												
Cost Effective Opportunities												
1	Alter the control system to increase the aeration delay time	Director S Water	15,000	353	97		15	5,338	1,021	2.4	1/10/07	31/12/07
2	Change operation of Blowers so that both Blowers operate on full VSD control	Director S Water	10,000	132	36			2,200			1/1/08	31/12/08
3	Install Demand Monitoring & Management System	Director S Water	19,000			60	60		3,775	5.0	1/7/09	30/6/10
4	Upgrade Power factor Correction Equipment	Director S Water	6,100			564	564		1,355	4.5	1/10/07	31/12/07
Total Cost-Effective Opportunities			44,000	486	133	60	75	7538	6,151			
% change resulting from all measures				16.8%	16.8%	24.6%	32.5%					
Potential Cost Effective Opportunities												
5	Introduce Energy Awareness & Monitoring Program to motivate staff to become proactive in energy efficiency initiatives.	S/Water Mngmnt	15,000	86								
6	Introduce Motor System Efficiency Programme to raise maintenance standard to Best Practice.	S/Water Mngmnt	37,000	144	39	13	13	2,179	1,049	11.5		
7	Installation of a compressor control system to shut down the second compressor when not required.	S/Water Mngmnt	10,300	30	8			458		22.5		
Total Potential Cost-Effective Opportunities			62,300	261	71	13	13	3,944	1,049			
Summary of Site Total Energy Consumption Savings			106,300	746	204	73	88	11,482	5,845	Does not include Savings achieved from previous actions		

Technical Review Summary
Bomaderry Aquatic Centre
 (Energy Consumption Approximately 2.9 GJ/Annum)

The Bomaderry Aquatic centre was opened in 1970 and has evolved from an out door swimming and wading pool complex to now having an indoor 25 metre pool . The old technologies of a coal fired and gas boiler heating system for the indoor pool were replaced with more efficient heat pumps and solar heating in 2000. At the same time heat pumps were also installed to provide heating for the 50 metre outdoor pool. A dehumidification plant was also installed in 2005 to protect the building fabric & provide a more suitable environment for patrons

The following summary of energy savings initiatives, implementation costs, savings & project time frames is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Bomaderry Aquatic Centre Baseline Data – From 1/2/06 to 31/1/07	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI-GJ / Patron
	GJ	t CO2e	S - KVA	W - KVA	Patrons	days
	2,862	758	180	201	90,000	0.03

Energy Savings Initiatives		Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
				Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years												
Total Previous Actions Over Past 5 Years												
Cost Effective Opportunities												
1	Isolate one of the two indoor Circulation Pumps outside normal hours	Director CS & Operations	4,000	72	20			1,600		2.5	1/1/08	30/6/08
2	Install Variable Speed Drive on Outdoor Circulation Pump	Director CS & Operations	10,000	144	39			3,200		3.1	1/1/08	30/6/08
Total Cost-Effective Opportunities			14,000	216	59			4,800				
% change resulting from all measures				7.5	7.8							
Potential Cost Effective Opportunities												
Total Potential Cost-Effective Opportunities												
Summary of Site												
Total Energy Consumption Savings										Does not include Savings achieved from previous actions		

Bamarang Dam Water Pumping Station
 (Energy Consumption Approximately 2.5 GJ/Annum)

Following the investigations detailed in the attached Technical Review no energy savings initiatives were identified

Bamarang Dam Water Pumping Station Baseline Data – From 1/3/06 to 28/2/07	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI Mega Litres	KPI ML / GJ
	GJ	t CO2e	M/ Litres	GJ / ML		
	2,538	694	228	228	14567	0.17

Energy Savings Initiatives	Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
			Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years											
Total Previous Actions Over Past 5 Years											
Cost Effective Opportunities											
Total Cost-Effective Opportunities											
% change resulting from all measures											
Potential Cost Effective Opportunities											
Total Potential Cost-Effective Opportunities											
Summary of Site											
Total Energy Consumption Savings											Does not include Savings achieved from previous actions

Lake Tabourie Tourist Park
(Energy Consumption Approximately 1.8GJ/Annum)

Council owns and manages twelve Tourist Parks throughout the city with collectively 2,600 cabin, van and tent sites with gas and or Electricity supply points. Lake Tabourie Tourist Park is the largest of these in terms of its combined Annual Electricity and LPG Consumption. Unfortunately the initial Technical Review of this Tourist Park has been severely restricted by the lack of both Electricity and LPG sub metering at the park. This has prevented investigation staff from determining what energy is being used by the Tourist Park infrastructure and the energy being used by patrons of the park. Also hindering the review was the lack of knowledge of what electrical equipment and appliances are being used by persons with their own vans stored at the park.

This energy analysis problem will be similar in most of Council's Tourist parks at this time as the only sub metering the parks is metered power heads on the Storage Vans at four of the parks, not including Tabourie. Historically Council has been hesitant in introducing a user pay principle on electricity and gas however with the projected increases in energy costs and the inevitable increase in accommodation fees to pay for them sub metering is now essential to prevent base accommodation fees rising and the more conservative patrons paying for the excesses of others.

Whilst the savings are only an estimate of the energy reduction when patrons are paying for energy consumption the installation of metered power heads on its Storage Van sites is seen as a very cost-effective initiative given its success in other parks.

At this point there has been no investigation of the cost and savings of installing Electricity and LPG sub metering of amenities blocks, Cabins and Tent sites at the park or installing Key Tag Energy Management Switches in its cabins to reduce Air conditioning etc loads while patrons are out and about. These initiatives have been listed as Potential Savings initiatives and will be further investigated, quantified and possibly implemented in the course of this ESAP.

Solar (Gas Boosted) Hot Water systems have been installed on two of the two amenities blocks on the park in the last 5 years and it will also be installed on a new amenities block being constructed this year. The new amenities block will also be fitted with movement sensors to turn off non essential lighting when unoccupied.

The following summary of energy savings initiatives, implementation costs, savings & project time frames is a word extraction from Template 4. The project time frames are based on the assumption that Council will fully fund the initiative. If an Energy Savings Grant from DECC or funding from another source is applied for and approved, Council will adjust the implementation time frames of the subject initiatives.

Technical Review Summary

Lake Tabourie Tourist Park Baseline Data – From 1 st Feb 06 to 31 st Jan 07	Total Usage	GHG Emission	Electricity Demand		Quantity of BAI	KPI-GJ / Patron
	GJ	t CO2e	S - KVA	W - KVA	Patrons	days
	1,767	361	212	195	140,000	0.02

Energy Savings Initiatives	Responsibility	Cost to Implmnt \$	Annual Savings		Demand Savings KVA		Annual Cost Savings \$		Payback Yrs	Start Date	Cmpltn Date
			Energy GJ	GHG t CO2e	Summer	Winter	Energy	Other			
Previous Actions Over Past 5 Years											
1	Install solar hot water systems on two amenities blocks										
Total Previous Actions Over Past 5 Years											
Cost Effective Opportunities											
1	Install Metered Power Heads on all Storage Van sites	T/Parks Mngr	135,000	1,199	328			20,000		6.8	
Total Cost-Effective Opportunities			135,000	1,199	328			20,000		6.8	
% change resulting from all measures											
Potential Cost Effective Opportunities				67.8	90.9						
5	Install Electricity and LPG sub metering or wireless monitoring equipment on Amenities blocks and cabins										
6	Install Key Tag Energy Management switches in all cabins.										
Total Potential Cost-Effective Opportunities											
Summary of Site											
Total Energy Consumption Savings										Does not include Savings achieved from previous actions	

Year	Initiative	Comment
1981	Develop and implement a card System to monitor Electrical Energy consumption	Replaced existing system that provided only financial data
1981 to 2006	Numerous minor operational changes to minimise energy waste	Installation of Time switches, Photo Electric Cells, Solar panels, PLC's, Telemetry enhancements etc.
	Annual review of Tariffs and Energy Contracts and arranging changeovers	Council taking advantage of most competitive Energy rates at all times
	Electrical Engineering staff attending Energy Management Seminars and training as opportunities arose	Used knowledge gained in Energy management and conservation initiatives
1982	Replaced standard fluorescent starters with resettable, electronic ones in Admin Bldg.	Reduce energy costs, however greater savings made in lamp replacement costs
1983	Installed Power Factor (PF) equipment in Main Admin Building	Pay back period for \$12,000 capital investment was 8 months
1985	Installed P F equip. at Nowra Sewerage Treatment Plant (STW)	Installed to take full benefit of Demand Tariff and minimised PF penalty
1985	Installed Telemetry and SCADA Systems on cities Water System network	To provide improved monitoring and control of Water Treatment Plants, Pumping Stations and remote valves and as a consequence decrease collective energy consumption and demand OF SYSTEM
1986	Installed PF equip. at Bamarang WTP & WPS	Installed to take full benefit of Demand tariff
1986	Installed PF equip. at Burrier WPS	Installed to take full benefit of Demand Tariff and minimised PF penalty
1988	Development of Lotus 123 computer System to replace Energy Consumption card system	Streamlined Electricity Account processing system
1988	Installed Telemetry and SCADA Systems on cities Waste Water system network	To provide improved monitoring and control of Waste Water Treatment Plants, Pumping stations and remote valves and as a consequence decrease collective energy consumption and demand of system
1991	Installed Building Management System in Main Administration building	Considerable energy savings made (split metering to quantify savings not available at time) System also controls the Bomaderry Heated Pool and will control other Council Buildings in time
1993	Removed throttling at Bamarang WPS	Energy Consumption and cost was reduced considerably – not measured
1993 to 1996	Miscellaneous negotiations - Illawarra Electricity account anomalies and Demand control failures - NUS Initiative counterclaims	Council saved between \$30,000 & \$50,000 through negotiation on Illawarra Electricity accounts and NUS claims
1994	Energy savings initiatives included in Admin Building extensions	Building size increased by 33%. Energy consumption has increased by only 5%
1994	Changed Tourist Parks to Time of Use metering	\$42,000 savings made from Feb 94 to Feb 96 (2 years)
1994	Co-development (with consultant) of sophisticated computerised energy monitoring system "Enerlyser"	When fine tuned, "Enerlyser" will be a powerful energy management tool for Council. Initiative won Shoalhaven Water the Management Excellence Award for 1995
1994	Shoalhaven Water Supply Energy Audit – External Consultant	Savings of \$211,000/annum identified Capital outlay \$144,000 – payback period .07 years
1995	Shoalhaven Waste Water Energy Audit – External Consultant	Savings of \$98,000/annum identified Capital outlay \$33,000 – payback period .33 years
1995	Removed Electric Duct Heater from Admin Air Conditioning duct system and replaced with gas hot water boilers	Removed 80 kW of Electrical load

1996	Transfer General Fund Electricity Accounts to “Enerlyser” System	Energy consumption charts and graphs from system will be invaluable to Asset Managers when comparing the operations of similar facilities and tracking kWh/volume
1999	Remove gas hot water system supplying indoor swimming pool at Bomaderry and replace with Heat pumps and install Heat Pumps at Outdoor pool	Improve efficiency and minimise increased Electrical Energy consumption and cost
2000	Installed Heat pumps at New Bay and Basin Leisure Centre	Improve efficiency and reduce Electrical Energy Costs
2000 to 2006	Install Power factor Equipment in all New STP’s	STW’ s are on the Large site state Contract which is subject to Power factor penalties
2000 Onwards	Installed Soft Starters at SPS’s over 10kw	Reduced mechanical wear and tear and water hammer
2001 to 2006	Review operating philosophy of Aerator systems at STW’s to reduce Electricity Peak loading	Installed Touch screen and superior PLC Controls to spread energy demand and reduce consumption
2002 Onwards	Installed Man / Machine Interface systems at STW’s	To give confidence to operators that they can take energy saving initiatives without compromising their EPA responsibilities.
2004	Installed reduced voltage lighting controllers (ECO 4.8’s) in new extension of level two at the Administration Building	Reduced Energy consumption by aprox 30%
2004	Replaced Pump motor and installed variable speed controls at Nth St SPS	Minimised high speed running and matched pump output to system requirement
2004	Installed additional Solar Collectors for hot water supply to the swimming pools at the Bay and Basin Leisure Centre.	Reduced the level of energy required from the Gas and Electrical backup systems
2005	Systematically replace all fluorescent lights in Administration Building with high efficiency Tri - phosphorous lamps.	Reduced energy and maintenance costs- Improved lighting levels.
2005	Removed 72 kW of electric hot water systems at Bay and Basin Leisure Centre and replaced with solar/gas combo	Reduced Electrical Energy costs
2006	Installed Soft Starter at SPS M2, Milton	Reduced peak starting loads and pump efficiency and matched pump output to system requirement
2006	Transfer small sites to Large Site State Contract and visa versa if consumption rises above or falls below threshold for extended periods	Changes made when \$savings are identified