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Energy Efficiency Auditing

Traps and tips

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Programs and Legislation - industry

- Greenhouse Challenge Program
- Energy Efficiency Opportunities Act
- National Greenhouse and Energy Reporting Act
- Ecobiz
- Generator Efficiency Standards
- Carbon Pollution Reduction Scheme

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Programs and Legislation - Offices

- Energy Efficiency in Government Operations (EEGO) Policy
- National Australian Built Environment Rating System (NABERS)
- Government Energy Management Strategies GEMS (Qld government)

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Table 1: Existing programmes with greenhouse and/or energy reporting requirements.

Greenhouse or Energy Reporting Programme	Year Established	Voluntary or Mandatory?	Report greenhouse gas or energy emission reductions, offsets or abatement actions?
ABARE Fuel and Electricity Survey (ABARE FES)	1973	V	No
Ozone Protection and Synthetic Greenhouse Gas Management Act	1989	M	No
National Greenhouse Gas Inventory (NGGI)	1990	V	No
Greenhouse Challenge	1995	V	Yes
Australian Petroleum Statistics	1996	V	No
National Pollutant Inventory (NPI)	1998	M	No
NSW Load Based Licensing	1999	M	No
Mandatory Renewable Energy Target (MRET)	2001	M	Yes
Protocol for Environmental Management; Greenhouse Emissions and Energy Efficiency in Industry (EPA Victoria Industry Greenhouse Programme)	2001	M	Yes
NSW/ACT Greenhouse Gas Abatement Scheme[1]	2003	M&V	Yes
Greenhouse Challenge Plus[2]	2004	M&V	Yes
Queensland EcoBiz	2004	V	Yes
NSW Energy Savings Plans and Fund[3]	2005	M	Yes
Queensland 13% Gas Scheme	2005	V	Yes
Energy Efficiency Opportunities (EEO)[4]	2006	M	Yes

From the NGER Act Explanatory memo.

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Business drivers

- Improve the efficiency of energy use
- Corporate social responsibility
- Market expectations (Green star)
- Rising energy prices / risk management
- Responding to government policy (for Government Owned Corporations)

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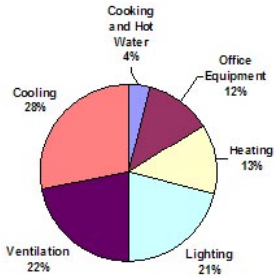
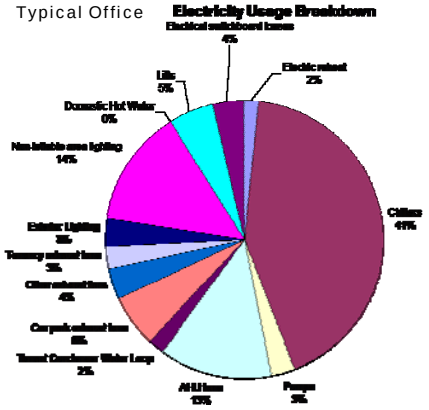
Energy use – commercial buildings



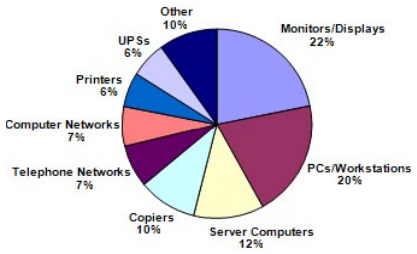
Commercial building greenhouse gas emissions by end-use
Source: EMET Consultants and Solarch Group, 1999

Typical Office Electricity Usage Breakdown



Typical breakdown of "central" services energy use – Modelled data

Office Equipment

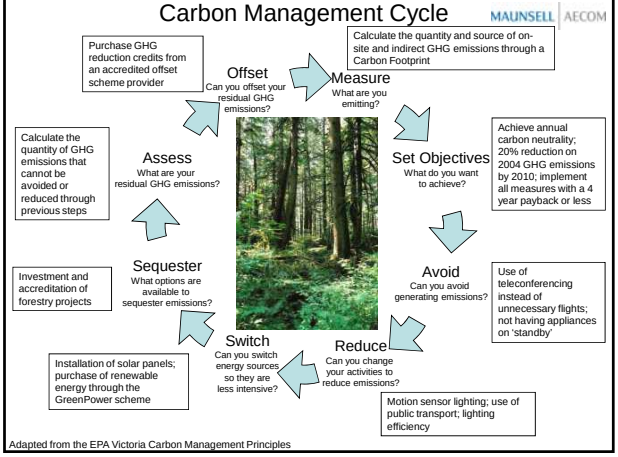


Typical office equipment energy use
Source: Sustainable Solutions, 2003

Benchmarks and environmental performance standards

- Office space – kWh per sqm per annum
- Fleet – average litres/100km, vehicle CO2e grams per kilometre
- Lighting – lumens per watt
- Star ratings for offices (GBCA and NABERS)
- Star ratings for appliances and office equipment See http://www.energyrating.gov.au/man1.html)

Carbon Management Cycle



Adapted from the EPA Victoria Carbon Management Principles

Roles of agencies and experts

- QEPA – Ecobiz and other energy efficiency programs
- EIANZ – accredited professionals (CEnvP)
- DME – Policy settings for Government
- Consultants – Stay up to date and provide a readily accessed skill base.

How to?

Before the audit day:

- Agree on scope of work, select a protocol and agree on a level of detail
  - AS 3598
    - Level 1,2 or 3?
  - ecoBiz (Queensland only)
  - NABERS (energy, water, indoor environment, waste)
- Research (activities undertaken at the site)
- Examine energy monitoring data and initial analysis

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APPENDIX C
SUMMARY OF TYPICAL ENERGY AUDIT DELIVERABLES
(Informative)

Deliverables	Level 1	Level 2	Level 3
Useful report	Yes	Yes	Yes
Abbreviated report	Yes	No	No
Full analysis and report	No	Yes	Yes
Metering	No	Desirable	Yes
Formal presentation to senior managers	No	If requested	Yes
Provision of an itemized and prioritized list of recommendations to reduce energy consumption	Short list of high priority actions	Yes	Detailed evaluations
Level of detail of recommendations for implementation	Recommendations for further action, if relevant	Recommendations with brief descriptions of necessary works	Detailed recommendations that will allow design and documentation to proceed
Analysis of 24 months' bills and comparison with benchmark	Yes	Yes	Yes
Preparation of monthly or seasonal energy consumption profiles	Yes	Yes	Yes
Preparation of energy consumption targets and indicators	No	Yes	Yes
Site visit and commenting on major wastes	No	Yes	Yes
Tariff analysis	Yes	Yes	Yes
Listing of major uses	No	If relevant to audit	Yes
Model of energy use	No	If requested	Yes
Daily load curves for site	No	Yes	Yes
Daily load curves for major plant	No	If requested	Yes
Measurement of light levels	No	Yes	Yes (if relevant)
Monitoring of temperature and other key parameter	No	No	Yes
Detailing key aspects of building fabric	No	Yes	Yes (if relevant)
Implementation specifications	No	If requested (post audit activity)	If requested (post audit activity)
Tariff negotiations with utilities	No	If requested (post audit activity)	If requested (post audit activity)
Bill monitoring for 18 months after report handover	No	If requested (post audit activity)	If requested (post audit activity)

Extract from AS 3598 – comparison of levels of Audit

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How to?

On the day of the audit:

- Use an audit checklist
- Conduct a pre audit meeting with facility manager, including an explanation of the checklist
- Use a camera, notebook and/or laptop.
- Don't forget to confirm metering arrangements (by inspection and by confirmation of schematics)
- Review your photos before leaving site

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Challenging Issues

- Coming up with new ideas in an industry where there are few new ideas
- Access to good data – no sub metering
- Level 3 audits are sometimes seen as "up-selling" unnecessarily
- Some good initiatives have long payback times – conflicting with low "hurdle" rates
- Misinterpreting the McKinsey curve

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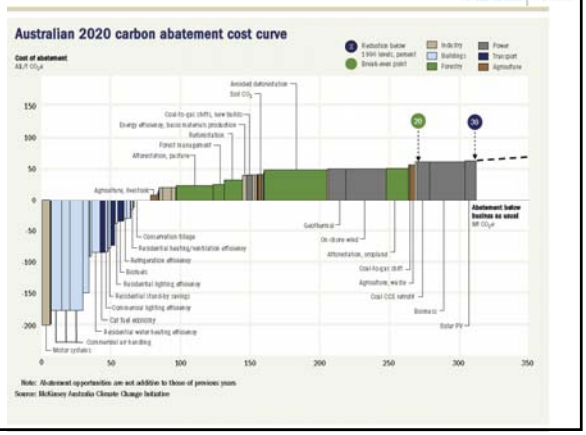

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Top tips

- Schedule time to sit and interview the facilities manager – explain how things will go and what your needs are.
- Gain a clear understanding of all activities on site prior to commencing (operating hours, call centres etc..)
- Schedule time to review your photos on site
- Careful matching of HVAC operating hours with staff/building users is a potential low cost win.
- IT groups have an increasing share of the energy budget, need to make sure they are "on board".
- Lighting controls may be missing or misused. Signage helps
- Proper investigation of HVAC performance is very specialised
- Sub-metering is cheap – about $500 per meter (for existing BMS). Can meter water, gas and electricity.