Your Core Business and the Benchmarking of Energy & Utilities

Energy Management 2003

Why are we here?

- Forestry Industry is energy intensive;
- Expecting 30% to 40% increases in energy prices for gas and electricity;
- $6 GJ for gas at Taranaki vs. $1.80 and 8c vs. 3c kWh in 1999;
- Increasing government and consumer focus on sustainability.
What do we want to know?

- Are we efficient in the way we consume energy and utilities?
- If we are inefficient, where are the inefficiencies and by how much?
- How do I improve my efficiencies and what is involved in achieving this?
- How does all of this relate to my core business?
- What are others doing in the industry?

How do we obtain this information?

- Collect and store consumption information – preferably as accurately and easily as possible, e.g. using smart metering;
- Relate consumption to what you do – cubic tonnes of output, time of production, etc.;
- Analyse and determine the links between consumption and your core business;
- Benchmark internally and if possible against others in the industry and best practice.
What is benchmarking?

- A valid and meaningful comparison between a process, product, or an entity;
- Requires identification of benchmarking partners, data types, definitions, sources & data collection;
- Ranking participants in terms of performance;
- Identification of gaps & the potential for improvements;
- Monitoring & reviewing progress and adjusting targets.

Energy & Environmental Benchmarking

- Large range & type of data;
- Many interrelations between data sets;
- Requires information about a facility or processes’ physical attributes;
- Requires consumption and power quality data;
- Must correct for climate, utilisation, exposure, construction, etc.;
Typical Benchmarking Process

- Paper based, spreadsheet or simple database process;
- Often discrepancies in the data or field definitions;
- Often not comparing apples with apples;
- High level of manual data entry & therefore potential for errors;
- Difficult to correct for many factors;
- Historical record – often months old.

Recent Developments

- Growth in Social Awareness of Climate Change – changes in weather patterns;
- Recognition of this by Policy Change at UN and Govt. level – Global Reporting Initiative and Kyoto Protocol;
- Advances in Technology – Communications such as the Internet, smart metering & faster processing.
Recent Developments (Tech)

- The Internet – number of users continuing to increase;
- Massive increase in bandwidth for data transfer, e.g. in Wellington – 1GB available;
- Other means of communication – wireless, electricity lines, as well as the landline;
- Smart metering (time of use, pulse output) – possible remote reading every 5 minutes;
- Faster computer processors & database engines, larger storage capacity.

Benchmarking: New Approach

- Internet-Enabled Benchmarking (IEB);
- Supplemented by the ability to build a benchmarking database that can feature:
  - Real-time benchmarking with automatic upload of consumption data;
  - Desktop performance comparison of facilities & processes within own organisation and against others in the same database;
  - Seamless & fast corrections for climate, shape, occupancy, orientation, construction.
What does this allow?

- Compare apples with apples & recognition of energy efficiency & best practice;
- An interpretative tool, so that the performance can be understood by all users (CEO or FM);
- Underpins & prioritises investment & business case decisions;
- Saves money through reduced consumption of energy and utilities;
- Identifies when assets, plant or facilities need remedial work or improvements.

Example

- Only example we know of that meets the new genre for benchmarking;

**e-Bench™**
What is e-Bench™?

- Utility Management tool (by default an energy management plan and L1 E-Audit);
- Asset and Process Management tool (model of the core business);
- Organisational tool (triple bottom line reporting);

Background

- Scarcity of good energy efficiency information and benchmarks in NZ. Claim by IEA of the worst in OECD;
- Extensive research in NZ and overseas to determine existing applications – nothing else like e-Bench™;
- International Intellectual PCT Application filed for benchmarking evaluation process & virtual audit.
Background (cont.)

- Under development since October 2000. Successfully trialed by Massey University from February 2002;
- Web based so no software needed by users (auto updated & supported by ETS);
- Stored centrally on secure servers, allowing constant updating of benchmarks, as well prompt customisation to users request.

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e-Bench™ Benchmarking Basis

- Based around Chartered Institute of Building Services Engineers UK (CIBSE) process;
- Top-down rather than bottom-up approach. Allows macro overview and desk top analysis;
- Built using thin client architecture.
**Features**

- Accepts all forms of utility – biomass, solar, gas, gasoline, diesel, electricity, LPG, coal, water, waste, medical gases etc.;
- Automatic batch update of consumption data (info from retailers – eliminate manual entry);
- Monitoring and Targeting;
- Measuring Efficiency / Benchmarking;
- Property & Process Management;

**Features (cont.)**

- Prioritise Efficiency Improvements;
- Identify International & National Best Practice;
- Invoice reconciliation & verification;
- Feeder for triple-bottom-line accounting;
- Monitoring Performance Contracting/New Buildings, e.g. Capital & Coast Hospital.
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[Image of two charts displaying energy consumption data]
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Energy Management 2003
Energy Management 2003
Energy Management 2003

![Image](image1.png)

![Image](image2.png)
Corrections

- Climate (Cooling Degree Days/Heating Degree Days) for 25 regions in NZ;
- Process or Facility Physical Attributes;
- Orientation (north, south facing);
- Exposure (wind, sun);
- Utilisation (hours of use, loading, head pressures, etc.).
**Exclusions**

- No correction for aspects that can be managed (e.g. control systems, insulation, lighting, chillers, etc.);
- Improvements in these aspects will show up as a better efficiency indicator.

**Benchmarking Outputs**

- B1: Raw uncorrected benchmark: (total energy use / square metres);
- B2: Adjusted for climate (degree days) and thermal values of its construction;
- B3: Further adjusted for utilisation factors;
- Lets us determine whether the inefficiencies are in the fabric, engineering services or operational equipment, e.g. type of PCs.
e-Bench™ Summary

- World’s most advanced & unique energy efficiency benchmarking database – patent applications;
- Will never be redundant;
- User friendly interpretative system;
- A one stop shop to meet ALL energy and utility efficiency requirements;
- Provides continuous L1 Energy Audit - allows targeted L2 Audits.

Benchmarking – Future Developments

- Extremely positive outlook;
- Interfacing Internet-enabled benchmarking (IEB) with Asset / Maintenance Systems;
- Interfacing IEB with equipment or product manufacturers & suppliers;
- Allow energy efficiency to be actively incorporated into maintenance & asset replacement decisions;
Benchmarking - Summary

- Energy & Environmental Benchmarking has entered a new phase in response to:
- Changes in social & policy attitudes towards the environment (and energy use);
- Technological advances in metering, communications & processing speed;
- It is now possible to have benchmarking based on real-time data & a basis for day-to-day decision making – continuous improvements.

Summary (cont’d)

- Need to monitor progress of CO₂ mitigation projects by company, sector & by nation;
- IEB offers an ideal way of transparently delivering on this monitoring – (NGAs?)
- Desktop analysis of assets to quantify & prioritise improvement projects;
- IEB fully supports business plans for these projects.
Summary (cont’d)

- IEB seamlessly captures improvement project data and updates the database;
- IEB will deliver greater value both in $$$ and kWh than traditional benchmarking;
- Many further developments from integration with FMMS and manufacturers product data;
- The energy audit becomes a precise tool for investigating a specific asset and devising an effective, acceptable solution.

How we can benefit

- Reduced financial expenditure through lower consumption in energy and utilities;
- Reduced financial expenditure through improved load management and maximum demand charges;
- Corporate identity linked with sustainability and responsible working practices;
- Improving staff and investors perception of the organisation – improved productivity and staff retention.
The End

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