

Software to measure and manage energy

Saving energy with computer power



Software to measure and manage energy

Energy management software allows organisations to monitor and report energy use and emissions, check against benchmarks and target energy efficiency. What's available, and what's best for you?

Monitoring energy use is the core of sound energy management. It can be one of the most valuable activities for an energy-intensive organisation.

It's also helpful to have benchmarks or energy use indices against which to compare performance and progress.

An energy use index is a measure of energy use for a desired output. It could be kilowatt-hours per student, patient, square metre, can of baked beans or number of guests.

Setting targets for energy savings is the next logical step. A good monitoring and targeting system is an essential tool for carrying out the recommendations of an energy audit.

As the complexity of energy systems grows, often with microprocessor-driven equipment of several different brands installed at the same site, it becomes more and more difficult to keep track of all the information. It's tempting to give it up in favour of more urgent tasks.

Busy energy managers, many of whom are given the task as only part of their job, rarely have the time to painstakingly enter data into self-designed spreadsheets.

They might have a goal of saving say 10% of consumption, or producing 10% more output for a given level of energy spending, but without accurate information it's difficult to know where to start, or how to measure progress.

Fortunately, it is not necessary to start from scratch. Other people have already developed systems for keeping track of energy use.

Several proprietary software packages are available in New Zealand. All are designed for organisations with substantial energy use, ranging from city councils to factories, wineries, shopping malls and universities.

They work best with modern time-of-use electricity meters, but some can accommodate older-style meters.

If an organisation spends more than \$250,000 a year on energy or has more than 10 energy meters, it should consider using a proprietary energy management software package. Some organisations with less energy expenditure also find them worthwhile. If the energy spend is less than \$50,000 a year, spreadsheets should be adequate.

Where an organisation is truly unique and no ready-made package fits the bill, custom-written software can be considered, but it's usually preferable to customise an existing package.

Custom-made software can be more expensive and upgrades and support could be a problem.

Benefits

Energy management packages' functions range from tracking of energy bills to enable checking against the supplier's invoice, to full-blown analysis available as graphs or tables minute by minute on a secure website. With increasing focus on greenhouse gas emissions in recent years, packages typically offer varying degrees of reporting on energy-related and other organisational emissions.

They offer user-friendly report templates that make it easy to communicate energy-use, emissions and other utility information, and are capable of advanced data analysis.

Some can receive data such as billing information from energy retailers in electronic format, eliminating the need for manual data entry.

Sophisticated systems automatically collect data such as spot market electricity prices and calculate whether it is advantageous to switch off selected equipment or reschedule operations.

They receive energy-use information from meters, and record and calculate against energy supplier tariffs, without human intervention.

Test drive

Energy management software is continually developing, with new features being added to adapt to a changing market.

The best way to find out what suits an organisation's circumstances is to visit a comparable site and experience a demonstration.

Because of the diversity of businesses and the way they use energy, fine-tuning and individual attention are often required in setting up and maintaining the software, so the relationship with the supplier is very important.

Generally, the supplier works with the organisation to customise the system and provides training and support.

Success factors

Successful implementation of an energy management system needs commitment from the top of the organisation.

It is important to have a person designated as the energy manager responsible for the system and reporting on it.

How much?

Putting a monitoring and targeting system in place typically identifies energy savings of between 5% and 25%. A reasonable budget for the system would be 5% to 10% of the annual energy spend.

Proprietary systems start at \$5,000-\$10,000 for the software package, which can be web-based or suitable for direct installation on the user's servers and/or individual PCs.

Alternatively, one New Zealand package, e-Bench, structures its cost according to the amount of energy and utilities used; users pay an annual fee of \$500 and a percentage of their annual energy and utility bill.

Some packages come in modules that allow users to add more features and only pay for what is used. Budgeting should include the cost of supplying and installing extra sub-meters if required, training, consultancy and time to set up the system. It's also useful to conduct a survey of historical energy costs to establish the usage patterns and expenditure, estimate how much energy can be saved and define energy cost centres.

Operating costs can include meter reading and data collection, software upgrades and time to operate the system, including data input and reviewing reports.

What to look for

Each system has its own strengths. People investigating buying the software should define their particular requirements.

Items to consider include:

- **Invoice checking** – Many systems automatically check energy invoices for errors or inconsistencies that may potentially result in a refund and ongoing saving.
- **Energy use analysis** – Checking long-term energy usage for anomalies or seasonal trends can help to highlight areas where energy is being wasted, or where equipment malfunctions or operational changes have occurred. It can also help to quantify the benefits of any energy efficiency initiatives that have been undertaken.
- **CUSUM analysis** – Useful for detecting small and sustained shifts in energy use over time.
- **Tariff analysis** – There are often a range of different energy tariff options available, and these generally differ between regions as well. Assessing which option is optimal for a site's consumption and load behaviour can sometimes offer significant cost savings.
- **Multiple regression analysis** – Useful for determining correlations between energy use and other relevant variables, particularly production output or ambient temperature. This can also identify how much of a site's energy consumption is associated with production levels or climate, and how much is "base load".
- **Emissions calculation and monitoring**
 - Allows the assessment of a site or organisation's greenhouse gas emissions or "carbon footprint". As energy consumption (including vehicle fuel use) frequently accounts for the majority of an organisation's emissions, this can significantly help toward certification under systems such as carbonZero and CEMARS (Certified Emissions Measurement and Reduction Scheme).
- **Data logging and online data recording**
 - Logging energy load data is useful for measuring short-term energy use, then identifying abnormal operation and problem areas such as poor power factor. Online access allows multiple users within an organisation to utilise the recorded data.
- **Load control** – Controlling loads can be beneficial if supply capacity is constrained or if there are "demand" charges in the site's electricity tariff. By using software to automatically shed low-priority loads at certain times of day or when total load is too high, significant cost savings can often be achieved through reduced demand charges or through delaying the need for capital expenditure in capacity upgrades.
- **Energy and cost prediction** – This can be a useful accounting tool for budgeting annual energy costs using historical consumption patterns and current energy prices.

- **Comparison to relevant performance benchmarks** – Comparing a site’s energy and resource performance against standard industry benchmarks, for example kWh per kg of production for an industrial site or kWh per square metre of floor space for a commercial building, allows a quick assessment of whether this performance is above or below average for the nature of the operation. This in turn can be used to estimate the extent of potential savings that could be made through improvements in energy and resource efficiency.
- **Manual or automatic data entry** – Some systems will automatically access and acquire energy invoice data with no intervention required, while others may only work automatically with certain energy retailers or invoice types. It is important to consider any ongoing costs in staff time when assessing the overall costs and benefits of a particular software package.
- **Modularity of features and costs** – Inevitably, there will be some aspects of any software package that are of little use or interest to certain users. In a modular system, the user will only pay for the aspects that are needed, rather than paying for the entire suite and using only some of it.
- **Account history records** – Account history records allow ready access to information on any actions, modifications or correspondence relating to the accounts. This can significantly simplify information-gathering for future queries or assessments.
- **Flexibility of data output formats** – Certain programs and tools require input data to be in a certain format in order to work. It is important to ensure that any potential software package has outputs in the formats needed for any other programs or systems that the user employs.
- **Manufacturing/productivity inputs (for Energy Use Index)** – The additional input of simple activity data, such as production output, climate or occupancy, allows the calculation of energy performance figures such as kWh/kg, kWh/degree-day or kWh/guest, which can then be used to benchmark against standard industry figures or to identify any changes in efficiency over time.

For advanced users, does it allow for climatic factors – with the input of heating degree-day data to correct energy use for the air temperature?

The system should be able to deal with the number of meters the client has on site. If you would like automatic data entry of the energy company’s invoices, you should check with the retailer that this is possible and that the format is compatible.

Here we look at several packages, to help the decision-making process.

This is a guide only, and not an endorsement of the products offered.

Building management systems

Some sites choose to use a Building Management System (BMS) or Industrial Control System (ICS) to monitor energy use.

A BMS controls building services equipment and can generate alarms when the system cannot provide the specified conditions or when equipment fails.

An ICS co-ordinates and controls industrial equipment, generates alarms and reports on trends.

If a control point for each energy meter becomes part of the BMS or ICS, it can also monitor energy use.

Most systems have good data logging and trend logging capabilities.

They might not allow the user to input data manually, but will be able to compare energy use with run hours or production quantity.

It is worthwhile to look at the cost of enhancing an existing BMS or ICS to provide the reporting function of an energy monitoring and targeting system.

Ask about features such as data analysis, reporting, and data storage.

Control system suppliers include Andover, Citect, CSI Control Systems International, Honeywell Ltd, Johnson Controls Ltd, Satchwell and Siemens Building Technologies Ltd.

More information:

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e-Bench™ is a fully-patented Software as a Service (SaaS) system that provides targeting, monitoring (consumption, cost and Carbon Emissions equivalent (CO₂e), benchmarking and simulation.

Originally developed as a purpose-built second generation Building Energy Rating (BER) tool, its simulation tools normalise for climate, utilisation and construction, and are fully supported by a graphical CAD interface for ease of data population (see example Figure 1).

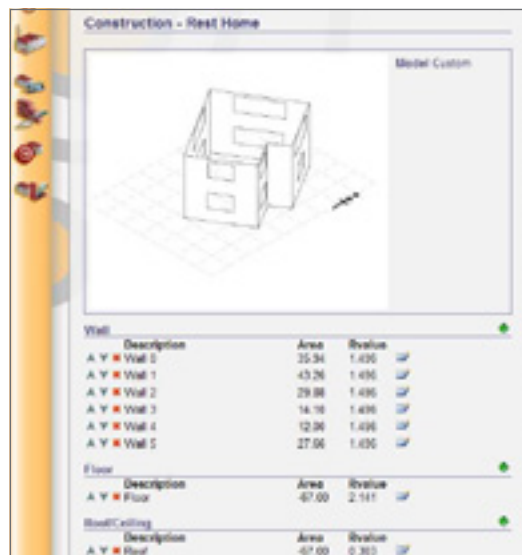


Figure 1: Benchmarking construction

These tools allow a user to undertake simulation (forward or what-if analysis) and benchmarking (historical or why-is-it analysis).

Integrated into e-Bench™'s modelling engine is a suite of targeting and monitoring platforms that allows a user to track the consumption of anything they want to capture and record. This includes electricity, natural gas, LPG, water, landfill waste, diesel, gasoline, coal, wood, chilled water, steam, hot water and any other resource or waste product.

It also accepts SCADA and BMS data and has up-to-date NIWA data for rainfall, temperature, degree-days, hours of darkness, and solar insolation.

It is being used for tracking and reporting on the use of a variety of assets and facilities including commercial buildings, water treatment and waste water treatment facilities, recreational and swimming pool centres, street lighting and vehicles.

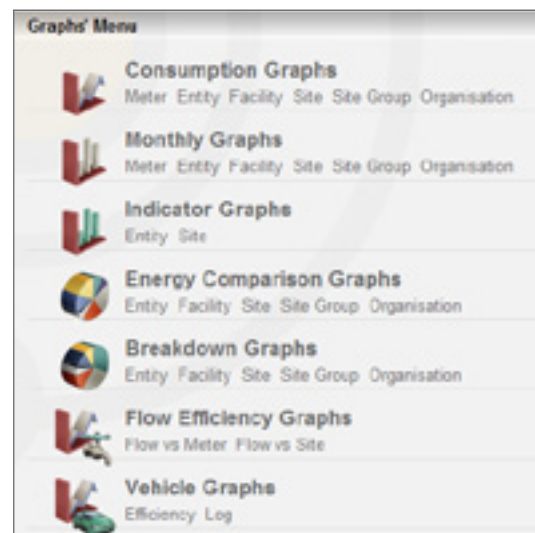


Figure 2: Graphing menu

A reporting engine (see example Figure 2) allows a user to plot virtually any type of report on the consumption and performance of utilities, facilities, assets and vehicles. Over 200 'standard' management reports are presently available, with more envisaged to be added as users' requirements become more sophisticated (see example Figure 3).

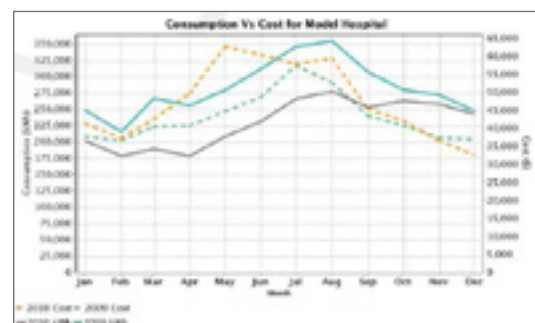


Figure 3: Standard report

Greenhouse Gas Emission reporting is undertaken in accordance with the United Nations Global Reporting Initiative and ISO 14064/1.

**e-Bench™ user:
Damon Birchfield,
Rodney District Council**

Says Damon Birchfield, Energy Management and Environment Officer for Rodney District Council: “The Rodney District Council first subscribed to e-Bench in 2008, in a bid to put some order into the organisation’s energy management process and to better understand where the Council’s annual \$2 million spend on electricity was going. Since that time, the organisation has been learning how to get the most out of the e-Bench tool, which certainly delivers with regards to providing accurate measuring and monitoring feedback.

We are now rolling out access to e-Bench to our libraries managers, our water and wastewater engineers, holiday parks, leisure centre, and traffic engineers, so that everybody in the organisation starts to develop an interest and take greater responsibility for how energy is being used, and also what saving energy means practically to their bottom line.

And the results? In the first quarter of this year RDC achieved energy savings across the organisation of 5.8% year on year. That has meant bottom line savings of just under \$30,000 in the first quarter of the year. Perhaps more importantly however, is the confidence that senior management gets from seeing these results in an easy to understand and visual way. This in turn makes it easier to get support for doing more ambitious programmes in the future.

I can thoroughly recommend e-Bench to other medium and large energy users, and Geoff and his team offer a personable and committed service experience to compliment the practical merits of the tool itself.”

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Energy Intellect – iE2 Interactive Energy Enterprise – Clariti

Clariti is an energy information service provided by Wellington-based energy technology design group Energy Intellect. Clariti is a web-accessed online solution that is used by customers via their meter data service providers, utility or energy retailer.

The Clariti service provides a range of graphical and tabular reports, but can also provide views on carbon emissions that relate to electricity use and generation types.

Clariti allows users to compare current energy usage against historical usage (see example Figure 4), monitor individual sites for operational efficiency, compare usage data across multiple sites, access the interval data (see example Figure 5) via exportable formats for in-house analysis, and monitor and evaluate the effectiveness of energy saving measures.

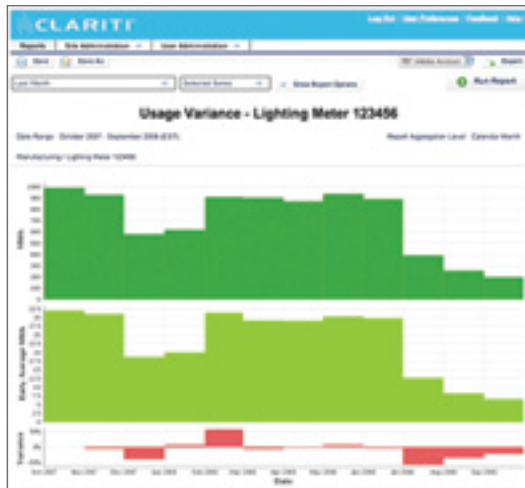


Figure 4: User variance

Clariti also has the functionality to send alerts when parameters such as kwh electricity usage or demand exceeds a preset level warning level allowing customers to take action before critical a usage level or peak demand is reached.

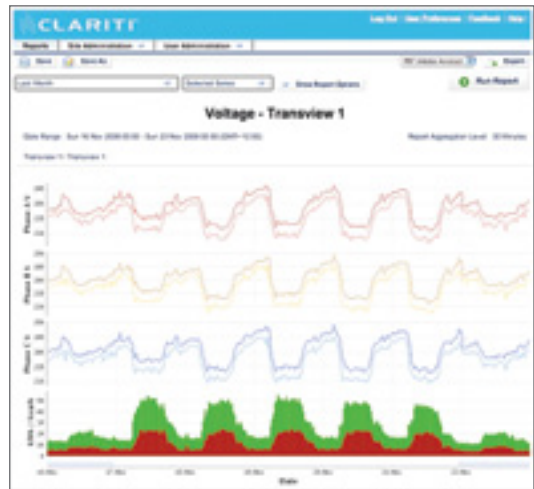


Figure 5: Voltage

The administrative functionality provides end users with access to selected meter data information on a single user metered site, or across a national chain or large industrial installation with multiple metered points.

Energy Intellect also produces and hosts an MDM (meter data management) system – called iE2 – that provides the back office and storage for all the meter data displayed by Clariti.

Clariti is the graphical visualisation module of iE2, and the energy information presented, stored and managed comes under the NZ electricity governance approved and recognised rules. Energy Intellect is industry-approved and annually audited by Telarc, while also maintaining registration for ISO 9001-2008 for all processes related to the management, storage and delivery of energy information and interval data.

Energy Intellect's iE2 provides real-time metering and energy control solutions are used globally in advanced metering and load control applications. The real-time components enable, for example, online energy management, grid support, grid security, distributed energy resource management and demand-response application services.

Clariti user:

Nathan Donnelly, Group Electrical Engineer, Alliance Group Limited

According to Alliance Group Electrical Engineer Nathan Donnelly, “the Energy Intellect meter data management service supplied via Stream Information Limited has always been excellent, enabling us to monitor and evaluate our energy saving initiatives through access to timely information.” He adds, “Clariti takes the Stream service to a different level, the range and ease of use of the reports provides an insight into essential data from our key sites.”

The Alliance Group is New Zealand’s leading producer of lamb-based meat products. Alliance has reduced green house gas emissions from energy use by 26% per unit of production since 2000.

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Ellserve

Ellserve is an online energy use monitoring and reporting tool by Energy Link Ltd, and is used to analyse both time-of-use (TOU) and non-TOU billing information. Ellserve directly processes invoices and metering data issued by the energy retailer, automatically checking this gathered information for errors and against trends.

Ellserve can be used for simple reporting purposes, including month-to-month reporting of energy use and CO₂ emissions (see example Figure 6), as well as to check whether a client is being overcharged for their energy consumption. The aim of this service is to reduce a site or organisation's energy costs by 5-10% outright, then further over time.



Figure 6: Configurable charts

All of a client's data is stored within Ellserve's database, and is fully available for download, graphical representation and analysis through the password-secured website, allowing instant access and full functionality from any location with an internet connection. This also means that no software is required to be purchased, installed or maintained in order to utilise this system.

Error-checking of invoices includes the application of tariff components such as network and ancillary charges, and totals are calculated with consideration to GST and any applicable discounts. Any invoices with possible problems are flagged for attention, while error-free invoices are authorised for payment.

Reporting features of Ellserve include the ability to arrange and display accumulated data by account, site or group, by commodity/energy source, by region and by retailer (see example Figure 7). This information on energy cost, consumption and CO₂ emissions can be shown as monthly or cumulative views.

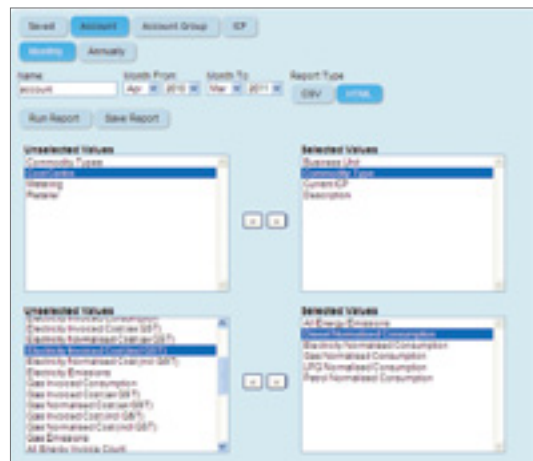


Figure 7: Flexible report generator

Ellserve user: Neville Auton, Dunedin City Council

In less than six months, the Dunedin City Council is on its way to chopping \$145,000 off its five million dollar energy bill, and Energy Manager Neville Auton believes this is just the tip of the iceberg. "Ellserve has revolutionised our business practices. We will make an immediate saving of \$145,000, and there's more to come as we feed electricity invoices into the system."

Neville needed an easier and faster way to manage and unlock vital information, "All I had to work with was 500+ paper electricity invoices arriving every month. The prospect of establishing energy baselines and identify sites with savings opportunities was a daunting task."

Neville Auton says the benefits to the DCC have been immense and are ongoing. “The list of things that Ellserve allows us to do grows everyday. We can forecast increases in energy pricing and budget for it. We can check our energy costs against budget. Managers can monitor their own group accounts and know the information is accurate. The DCC’s Energy Manager believes Ellserve is going to make his core business of improving energy efficiency so much easier.

“It’s exciting; even though we are only in the early stages, I can see a lot of other things coming out of it. Just the detailed reporting that we can achieve will be brilliant for this Council. And if Ellserve can provide this enhanced service for the Council, they can set it up for anyone.”

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Energy Wizard

Energy Wizard is a real-time energy management package that has a monitoring and targeting facility while also assisting with load shedding where required.

It is a New Zealand product developed by Intech Instruments Ltd, initially in a joint venture with former government electricity state-owned enterprise ECNZ. It is used mostly on an industrial scale and also in facilities such as wineries.

It has been designed to meet the requirements of both management and site personnel. It provides analysed data for strategic planning, energy audits and tariff negotiation and can provide real-time information to optimise plant and processes, with the flexibility to enable automatic control if required. Energy Wizard can accept raw data from industrial PLCs and signals from analogue or pulsing transducers or other sources. It makes data available online in real time, and makes predictions.

The Energy Wizard traces electricity consumption and costs from the main incomer(s), drilling down to cost centres and, if required, individual loads in cost centres (see example Figure 8). Some customers, such as shopping malls and apartment buildings, as well as industrial sites broken up to smaller areas, use it primarily to apportion power usage among their sub-metered customers (see example Figure 9). It generates an invoice based on the fixed costs and variable costs.

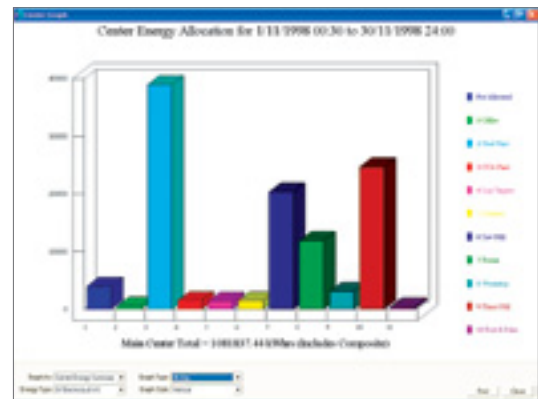
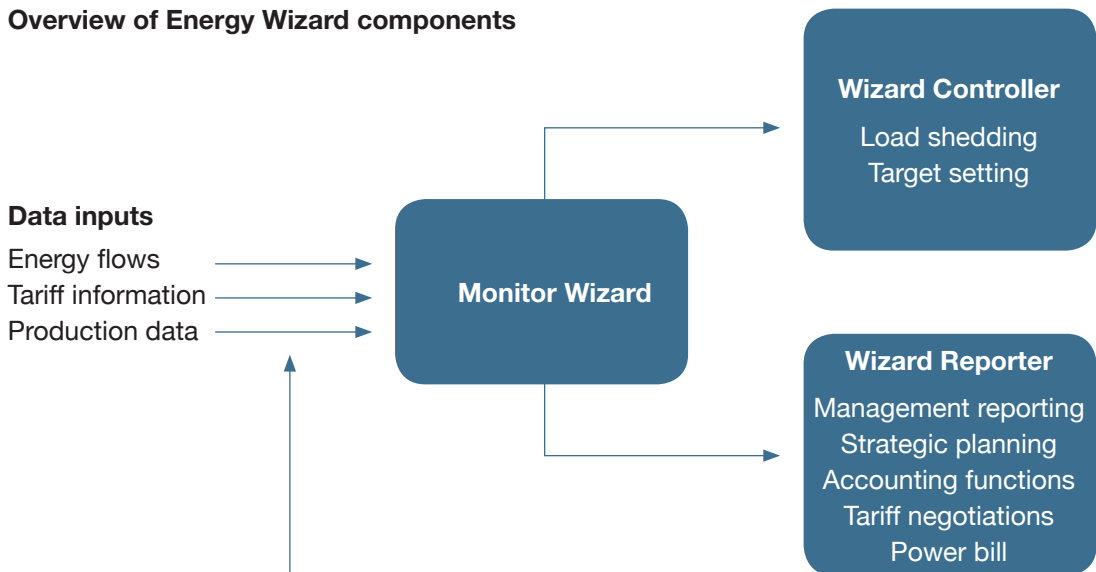


Figure 8: Center energy allocation graph

Overview of Energy Wizard components



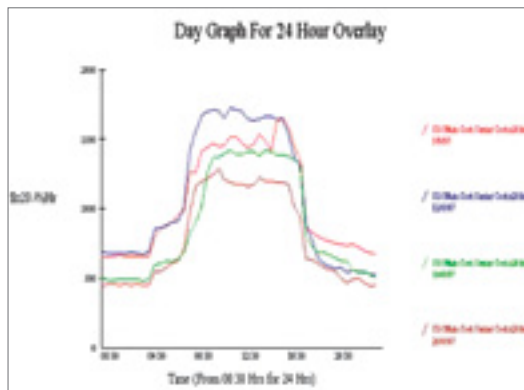


Figure 9: Day graph for 24 hour overlay

In industrial sites it can also be used for load-shedding for the purposes of managing available supply capacity and reducing demand charges.

Wizard Reporter (Monitoring) Features:

- Monitors up to 200 configurable input/output tags
- Power bill feature, splitting main electricity bill into appropriate cost centres according to characteristics of tariff
- Cost allocation feature proportions cost centres onto pie graph presentation
- Tariff Analysis feature to provide direct energy comparison of monthly load profiles between different supplier tariffs
- Outage search feature for data validation
- Peak demand search feature for relevant peaks with respect to supplier tariff
- Energy Composite comparison feature for data loss recovery

- File doctor feature for repairing damaged store files
- Energy logs viewable on the Master Grid
- Half-hour average demand graphically displayed
- Export tariff energy and costs to spreadsheet
- Monthly files include tariff and configuration data embedded in file structure for ease and portability
- Password protection in three levels for systems integrity
- Tag maths for complex energy splits between cost centres

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EnergyPro® Virtual Energy Manager

EnergyPro® Virtual Energy Manager provides practical, reliable and sustainable measurement, management, communication and reduction of energy utilities and carbon emissions. It was developed in 1992 in accordance with GHG protocols and ISO14064-1 standards.

By centralising all energy utilities and carbon emission information, EnergyPro provides streamlined data collection, integration and retention. It automatically processes, audits, analyses and reports.

EnergyPro® is a scalable software package designed to support energy utilities and carbon management.

EnergyPro complements metering software, suiting organisations that spend more than \$100,000 a year on total energy costs, whether at single sites, multiple sites or private or public organisations.

In many organisations, EnergyPro has paid for itself by identifying billing errors, but it can also target abnormal energy usage or waste (see example Figure 10), identify savings opportunities, help set priorities and track electricity, gas and water use for budget control and reporting.

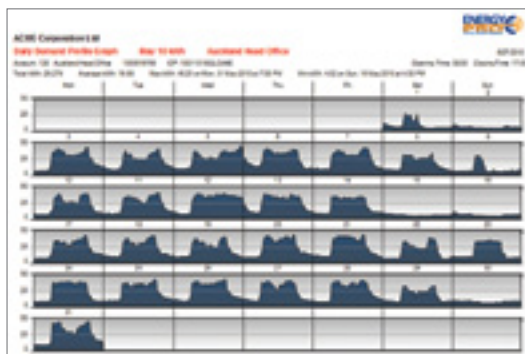


Figure 10: TOU manager output

Energy and related data from metering, billing or BMS systems can be input manually or electronically, depending on the supplier. EnergyPro automatically audits all energy data to reveal what's actually happening and to highlight any anomalies. EnergyPro automates clerical tasks and integrates and presents results based on the organisation's management structure. This ensures that the energy manager, engineers and consultants use their expertise to maximum advantage.

Major features of EnergyPro include emissions inventory and carbon reporting, TOU/advanced meter interval data management, sub-meter data management, benchmarking, monitoring and reporting, bill verification and processing, targets, initiatives and quantification of savings, budgeting, accruals and accounts integration, vehicles management, and waste and recycling management (see example Figure 11).



Figure 11: EnergyPro web dashboard

Beginning with an assessment to understand each organisation's specific energy management needs, options include turnkey solutions, outsourced services or shared implementation with maintenance and support. Post-implementation reviews, email and phone-based technical support and software upgrades are included in the support agreement. The system is modular and adaptable, with clients only paying for the elements they actually use (see example Figure 12), and EnergyPro can be either installed in-house, as client server or as a web-based solution.

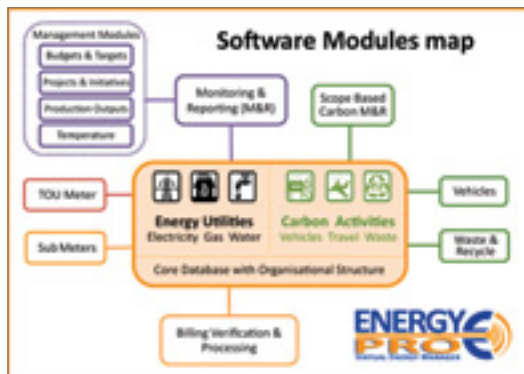


Figure 12: EnergyPro web dashboard

**EnergyPro user:
University of Auckland**

Prior to coming on board with EnergyPro in 2002, the University of Auckland relied on a manual process of combining spreadsheet data from a range of different sources for monitoring of energy consumption and cost. Over four campuses and 261 separate utility accounts, in addition to the installation of 870 check meters throughout the various buildings, EnergyPro has vastly improved the ability of University staff like Energy Manager Denis Agate and Environmental Coordinator Leslie Stone to identify and quantify when and where the energy is being used.

“The saying that you can only manage what you can measure is not just a catchphrase, it is absolutely true,” Stone says. “Monitoring and attention to detail by measuring your energy use is absolutely essential if you’re going to identify problems and put solutions in place. Monitoring also gives you the data you need to assess and communicate their effectiveness.”

EnergyPro’s centralised system for monitoring energy use throughout a wide area but at a localised level has made it possible to identify opportunities for energy savings, then quantify the achieved savings through post-implementation monitoring. An example of this is when the University trialled shutting down the 600 student computers in the library and information commons building overnight, where subsequent monitoring showed savings of 206,359kWh (\$25,724) over a six-month period – much higher than anticipated. This out-of-hours shutdown has since been extended to a range of other departments.

Says Stone: “We’re getting more and more targeted, giving more detailed breakdowns to every group. It makes such a difference when you walk into a room with a graph and you can show people exactly where and when the energy is being used.”

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FoundationFootprint™

FoundationFootprint™ is a web-based, real-time carbon footprint and energy management system, built to meet the requirements of the GHG Protocol Corporate Standard and ISO 14064. The system integrates with both a company's internal systems and their utilities and suppliers' IT systems to track energy, fuel, water, waste and supply chain emissions. FoundationFootprint™ has been developed to manage the complexity of large organisational structures such as multi-national organisations and local, regional and central government as well as maintaining simplicity for small and medium enterprises.

FoundationFootprint™ consists of four key modules: the Carbon Management Module, the Energy Management Module, the Universal Bill Manager and the Return on Investment (ROI) Manager.



Figure 13: Benchmark summary report

The Carbon Management Module measures and tracks an organisation's carbon footprint (see example Figure 13). It tracks and manages resources such as electricity, gas, fuel, water, waste, raw materials, supply chain emissions and staff business travel. Full audit trails are provided for internal and third party verification and the full requirements are met for leading global carbon footprint standards including the GHG Protocol Corporate Standard and ISO 14064.



Figure 14: Approving invoices

The Energy Management Module analyses current and historical electricity data (see example Figure 14), with invoices being transferred electronically from suppliers to FoundationFootprint™ along with kWh usage from Time of Use and smart meters. Real-time business intelligence shows trends and ratios such as seasonal change, energy costs and kWh per day as well as benchmarking of intensity ratios defined by the organisation's output.

The Universal Bill Manager is a fast, accurate and efficient way of approving hundreds of invoices electronically every month. Suppliers and tariffs are set up in the system and invoices are automatically checked for tariff errors, energy use variations and billing anomalies. Anomalies are flagged for querying, while approved invoices can be automatically transferred to the customer's payment facilities.

Significant refunds can be realised through the highlighting of invoicing errors, corrections on previously unchallenged accounts and tariffs, unusual usage levels and concentrating on reducing resource usage beginning with the highest users first. Considerable time savings can also be realised through the automation of checking and transferring invoices through a web-based approvals process and integration with the customer's financial systems.

The Return on Investment (ROI) Manager allows conclusive tracking of the return on investment of "cleantech" or energy efficiency initiatives, for example changing to LED street lighting or more fuel efficient technologies in vehicles.

**Revolution ID user:
Michael Field, Sustainability Manager,
North Shore City Council**

North Shore City Council saved \$291,440 in the first nine months of using FoundationFootprint™, having signed up in September 2008 and entered 3 years of historical information.

This includes a total of \$221,166 of refunds obtained from errors in invoices, with a further \$16,624 from identifying inactive sites. Identifying unusually high usage levels at Takapuna Aquatic Centre saved a potential \$28,000, and an estimated 675 hours per year of staff time (at a value of \$25,650) has been saved through reduced time to check, approve and manage the hundreds of invoices received each month. Says Michael Field, Sustainability Manager for North Shore City Council:

"FoundationFootprint™ is an excellent product. At the click of a button I can see the energy usage and carbon footprint of any single set of traffic lights, bus station, library or even a whole business unit. And I have information for as far back as we have data for, more than four years in some cases. We currently track energy, gas, fuel and some of our suppliers' emissions and are in the process of putting in our water and waste.

"And the Universal Bill Manager has dramatically simplified our process of approving hundreds of utility bills every month and has in itself provided the return on our investment in FoundationFootprint™. It's highlighting any invoice discrepancies from our suppliers and allows us to compare each month's usage with as much historical data as we have. With the graphs and tables of data we can gauge the trends of each of our 450 sites and take action to reduce resource usage starting with the heaviest users first."

International company Schneider Electric supplies its own brand of advanced digital power meters, and the software to interpret and make use of the information, through Christchurch-based system integrator Quasar Systems Limited.

PowerLogic ION Enterprise energy management software collects data from meters and IEDs (Intelligent Electronic Devices) and makes it available to users via their desktop web browsers across the business. Applications include revenue metering, power quality and reliability analysis, cost allocation and billing, load studies and circuit optimisation, control of peak demand and power factor, equipment monitoring and control, and preventative maintenance.

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PowerLogic ION Enterprise

PowerLogic ION Enterprise can integrate energy and demand metering of electricity, gas, water and steam, as well as weather and CO₂ emissions (see example Figure 15). It displays real-time and historical data, and analyses and reports on logged information for billing, reconciliation and performance monitoring (see example Figure 16).



Figure 15: Network vista



Figure 16: Prediction

Graphics are fully customisable for alarms, status indicators, control triggers and facility views. The alarms can be communicated by pager, email or other means.

ION Enterprise generates reports on power quality, energy and load profile, and analyses disturbances (see example Figure 17). Historical trends can be examined and displayed graphically, while customised reports can easily be generated to show only the information that is needed, and printed on demand or set for scheduled distribution via email or web (see example Figure 18).



Figure 17: Dashboard



Figure 18: Energy analysis

Its control functions include automatic load shedding, generator startup or relay control. It can carry out distributed control in response to interruptible electricity rates or real-time pricing. Scalable architecture allows the integration of organisational data on any level – from local through to international scales across any number of applications and sites (see example Figure 19).



Figure 19: Meters

PowerLogic ION Enterprise user: Porirua College

Porirua College is the first secondary school in New Zealand to introduce students to the benefits of energy monitoring and reporting as a fundamental cornerstone of energy efficiency.

The installation of a Schneider Electric PowerLogic Metering solution, integrated by Quasar Systems Limited, effectively charts new territory in the secondary school curriculum by providing teachers with an innovative and interactive teaching resource.

Utilising dedicated PowerLogic ION (Integrated Object Network) Enterprise Web-enabled energy management software, staff and students have real-time access to a wide range of energy data, power analysis and historical and projected energy use patterns throughout the school.

Electrical Engineer Mark Yeo of Norman, Disney & Young says the recent construction of three identical new buildings at the school provided additional impetus for comparative metering within each of the three new classroom facilities. “Our brief was to create an interactive energy management system to enhance student awareness of energy use. The challenge was how to present this information in a way that was both informative and interactive.

“The PowerLogic ION Metering solution specified was ideal, because it allows power use to be viewed in both real time and trended historically and is presented in an easy to interpret graphical format creating a powerful teaching resource.”

According to Porirua College Deputy Principal John Topp, having the means to monitor how and where the school uses energy, as well as record energy use change, creates a powerful driver for energy efficiency. “There is a general awareness of the need to manage energy wisely but having the means to ‘see’ what impact our decisions have on our energy use has effectively created an holistic ownership of our energy resource”.

“This wouldn’t be possible without effective metering, or the functionality of the PowerLogic ION Enterprise software that provides the facility to project ION metering screens from LAN-enabled computers in the classroom,” states Topp.

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EnergyICT® – EIServer®

Energy Solution Providers has brought the EnergyICT® Real Time data solution EIServer® to the New Zealand Market.

EIServer® is a Software as a Service (SaaS) system providing secure web based access to all of a company's utility data in real time. This enables utility wastage to be identified in a matter of minutes with real time accuracy.

EnergyICT®'s industry-leading hardware collects, stores and transmits all energy consumption data (e.g. from electricity, water, heat and gas meters) to the EIServer® management system for all data processing. This allows end customers to manage their total energy flows and optimise their energy efficiency in general.

By applying in-depth energy management and monitoring energy consumption using main, sub-meters, data concentrators and EIServer®'s extensive suite of energy management modules, New Zealand consumers have been able to achieve significant savings – of between 15 – 70%.

EnergyICT® user: Leo De Graaf, Senior Services Engineer, ASB

Says Leo De Graaf, Senior Services Engineer, ASB Bank; "With the EnergyICT® system ASB has been able to achieve an average energy reduction of 24% across all of our 165 sites nationally, this achievement simply would not have been achievable without the help of Energy Solution Providers and the real time monitoring and targeting provided by EnergyICT."

The results annual savings adjusted for production growth are in excess of 24% or \$1,175,000 dollars per annum across the sites currently monitored. This provided a payback of 1.75 years and enduring savings year on year.

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