

Energy audits conducted through the Plastics New Zealand Best Practice energy Programme have identified **savings of between 10 - 20%** of participating company's energy spend. Many of these savings required little or no capital investment to start saving money.

# WHAT'S INVOLVED in an Energy Audit?

There are different levels of energy audit available. An in-depth, 'Level 2', energy audit through the Best Practice Energy Programme delivers you quality information on your current energy use, energy costs, and ways to minimise that use and expenditure.

An audit provides useful data to assist with your prioritising and decision-making, as well as giving practical advice on ways to reduce energy use.

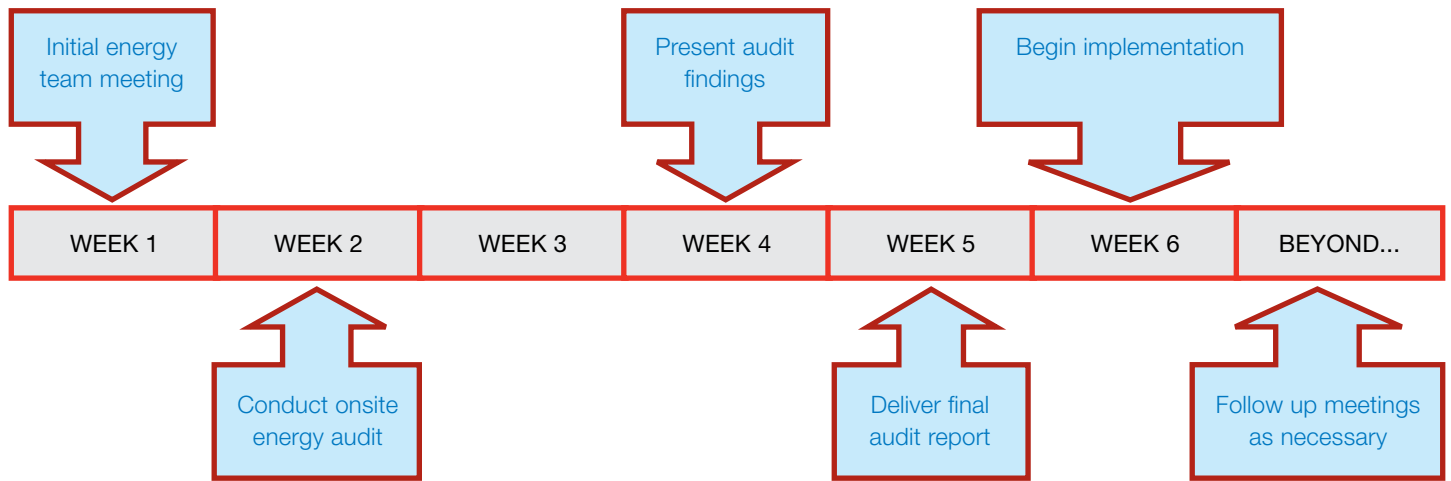
## A Director's Perspective

"The audit process was thorough and detailed giving us full confidence that the big issues had been identified with clear options on the best way forward."

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# How Long Will it Take?

The diagram below shows approximate timeframes for a typical Level 2 energy audit.



# How Much of My Time Will it Take?

Minimal work is required from your staff on site. The audit team is lead by qualified electricians who need minimal supervision.

# Where Do We Start?

The process begins by setting up an energy team within your company. This is important because people from throughout the company will need to be involved in making changes. It is even better if the most senior manager on site is involved from the start. Involving different staff helps when it comes to implementing energy saving initiatives after the audit is complete. It can also be very useful to run an EECA Energy Achiever Energy Diagnostic session to assess your current energy management practices.

After an initial site meeting the energy auditors will begin the detailed audit of your operations and equipment.



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# Reviewing Energy Bills and Tariffs



Reviewing your energy bills won't necessarily save energy - but it will often save you dollars.

An energy audit will explain to you what your energy charges are made up of. This is useful information for the future to ensure you understand your bills and can identify when mistakes are made or unusual charges arise.

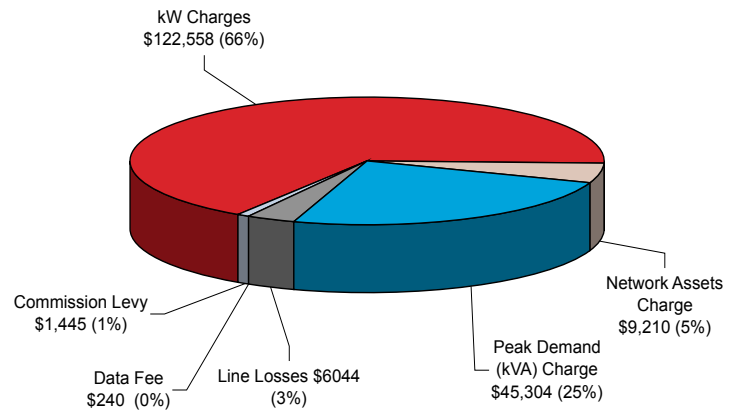
The auditor will review your energy bills for a period of up to 2 years and look for any overcharges and for opportunities to reduce your tariff. In some instances the auditor can negotiate with your energy company on your behalf.

The auditor will also look at how you might be able to make savings by switching to other fuels (e.g. changing from LPG to electricity).

## Overcharging revealed

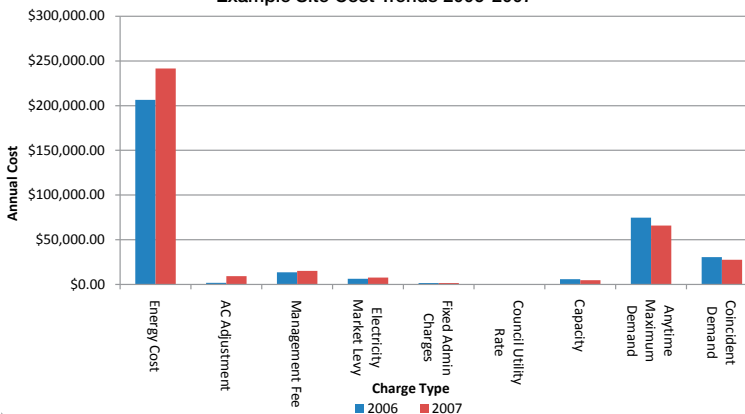
Reviewing the energy bills of an Auckland plastics manufacturer revealed an overcharge for 6 months of **\$24,000** – almost 5% of their annual energy spend.

### Example of an electricity cost analysis



# Historical Energy Use and Costs

Example Site Cost Trends 2006-2007



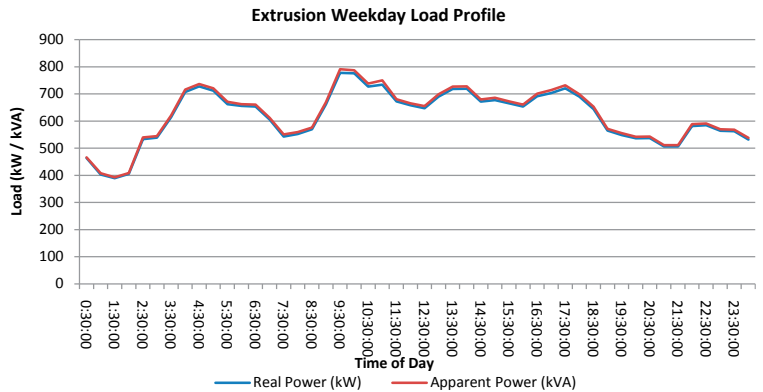
It is important to understand how energy use has changed on your site over time. An energy audit will review energy consumption and cost trends. Information on historical energy use can help you to plan for future energy costs.

Analysing your historical energy consumption can also help to identify seasonal peaks and variations. This information helps with energy planning.



Maximising the growth and success of plastics-based technology in New Zealand in an economically, socially and environmentally responsible manner.

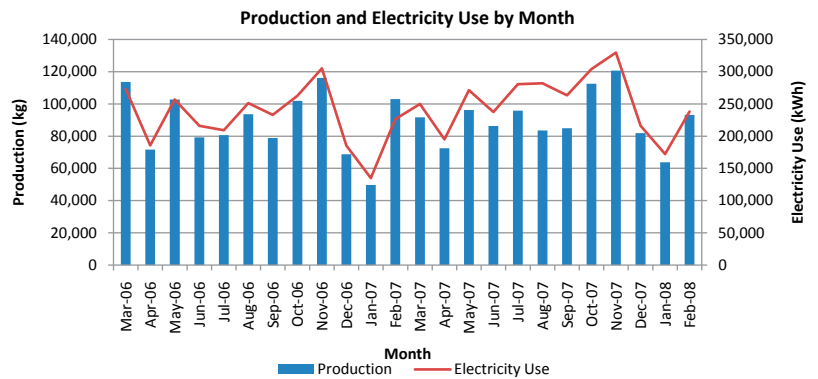
# Monitoring Current Energy Use



The energy auditor will closely monitor energy use throughout your operation over a set period of time. To do this the auditor uses state-of-the-art data logging equipment.

A daily load profile shows total energy consumption over a 24-hour period. This shows you when energy is being used and identifies any peaks that might be of concern. A load profile will also be taken on a non-manufacturing day (where possible), and this will help to identify any unnecessary energy consumption when you are not manufacturing.

Energy use is charted against your production data. By calculating energy used against tonnes of resin processed, you can benchmark your performance over time and against other plastic manufacturers.

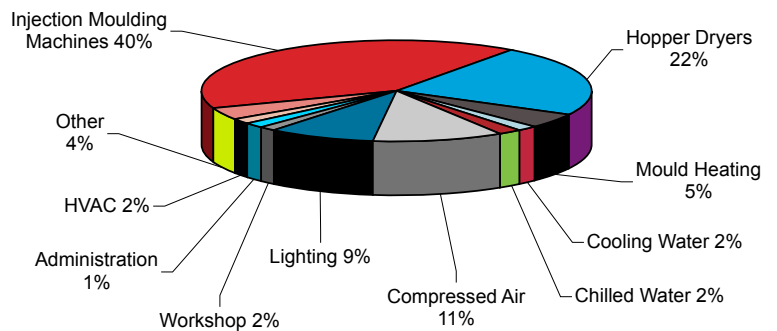


# Energy Footprint

One of the most useful outputs of the audit is an energy footprint of your entire operation. This footprint gives you a clear picture of the energy being consumed in the different parts of your site. The footprint is very useful for prioritising areas for equipment upgrades or targeting efficiency initiatives.

Monitoring is also frequently done at machine level to help the auditor to identify the real energy saving potential.

**Energy Footprint - Plastics Injection Moulding Plant**



# Identifying Real and Practical Opportunities

At the end of the audit you will be presented with a list of practical energy savings opportunities that the auditor has identified. These will range from simple, zero-cost changes, to more complex initiatives that might require significant investment in equipment. Longer term initiatives can sometimes be suitable for further EECA funding.

All energy saving initiatives will be clearly presented to you

- with:
- estimated energy savings
  - dollar savings
  - estimated capital costs
  - payback on capital investment
  - an internal rate of return on investment



| Description   | Energy Reduction kWh | Demand Reduction kW | Total Cost Savings \$ | Total Project Cost \$ | Estimated Life | Internal Rate of Return IRR | Payback (years) |
|---|----------------------|---------------------|-----------------------|-----------------------|----------------|-----------------------------|-----------------|
| T1 6.2: Reduce the gain setting on the cooling water circulation pump   | 15,180               | 2.3                 | \$1,792               | \$0                   | N/A            | N/A                         | N/A             |
| T1 6.4.1: Increase the temperature setpoint of the cooling tower water to 25°C  | 5,280                | N/A                 | \$624                 | \$0                   | N/A            | N/A                         | N/A             |
| T1 4.2.1: Contact Genesis Energy and remove old gas account   | N/A                  | N/A                 | \$563                 | \$0                   | N/A            | N/A                         | N/A             |
| T1 6.7.1: Replace all 100W incandescent lamps with 18W compact fluorescents   | 14,760               | 8.8                 | \$2,192               | \$270                 | 5 years        | 812%                        | 1.5 months      |
| T2 6.1.1: Investigate major air leaks with ultrasonic flow meters and repair  | 88,120               | 16                  | \$10,100              | \$6,300               | N/A            | N/A                         | 7 months        |
| T2 6.5: Fit an electronic timer on the hydraulic pump motor control circuit for each hydraulic injection moulding machine | 33,000               | 5                   | \$3,888               | \$3,250               | 5 years        | 117%                        | 10 months       |
| T2 6.3: Install a manual duty selection switch on the cooling water pump VSD unit   | 6,120                | N/A                 | \$654                 | \$600                 | 8 years        | 107%                        | 11 months       |

Examples of some of the actual energy saving opportunities from a Plastics New Zealand energy audit.



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## Best Practice Energy Programme

Plastics New Zealand is a national trade organisation representing over 200 member companies.

It is estimated that the New Zealand plastics industry consumes more than 1.7 petajoules of energy per annum.

The Plastics NZ Best Practice energy Programme helps plastic companies to minimise their energy footprint through energy audits and practical actions.

## Implementation

After the findings of the energy audit have been presented to you and discussed, the important work begins. Your company needs to prioritise and begin investing in the opportunities found. The sooner the changes are made, the sooner you start saving money.

## Confidentiality

The findings of the energy audit remain confidential. A copy of the audit report is submitted to the Energy Efficiency and Conservation Authority (EECA) for their records but is not distributed or made publicly available.

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