

# Century Yuasa

## Sustainable Manufacturing in Action

- 83% decrease in the amount of potable water used
- 23% reduction in energy usage.
- 80% reduction in chemical costs due to a reduction in sodium hydroxide required to adjust pH levels in the wastewater.
- Developed a fully recyclable cardboard/ polyethylene sheet and eliminated use of polystyrene in packaging

Century Yuasa is Australia's oldest battery manufacturer with a history of designing, manufacturing and supplying batteries in Australia since 1928.

The company is affiliated with GS Yuasa Corporation in Japan, one of the world's largest battery manufacturers. Century Yuasa has a distribution and service network throughout Australia and New Zealand and a manufacturing facility at Carole Park in Queensland.

The company's portfolio includes three main business units:

- the automotive unit which manufactures and distributes vehicle batteries;
- the motive power unit which manufactures batteries for forklift trucks and other heavy industrial equipment; and
- the standby unit which manufactures energy storage and power systems for on and off grid applications.

The company employs more than 650 people in the areas of research and development, manufacturing, sales and distribution.

Century Yuasa is committed to minimising the environmental impact associated with both the manufacture and supply of batteries and the ideals and benefits that renewable technologies provides for a safer and greener community.

## Efficient Manufacturing

The environment is one of Century Yuasa's four key priorities among safety, innovation and quality assurance. Century Yuasa has achieved SAI Global ISO14001 environmental accreditation, an international standard outlining the requirements for a structured approach to environmental protection and responsibility. It also maintains a Quality Management System that complies with Australian Standard AS/NZS ISO9001:2008

and a safety management system independently certified by the British Standards Institute.

***"We understand that for our business to remain sustainable we must ensure our impact on resources and the environment is limited."***

Century Yuasa Batteries

**Century Yuasa**



## Water Efficiency

In 2007 Century Yuasa developed a Water Efficiency Management Plan in response to South East Queensland's worst drought in 100 years. Over the course of the next eight years the company has been able to reduce their potable water consumption by 83%.

Understanding the premise that you cannot manage what you don't measure they began by sub-metering their individual processes to help identify where water savings could be made.

Initiatives included:

- Treating and reusing wastewater generated from the wash-down of equipment for battery acid dilution, instead of using mains potable water.
- Installing a fully automated injection filler to fill battery casings with acid. Previously a semi-automated machine submerged the battery casing in a vat of acid to allow gravity to fill the battery. The savings of this initiative were multiple:
  - A reduction in the water required to rinse the casing as they are no longer covered in an acid residue.
  - A reduction in wastewater charges as levels of sulphate and lead are now well below the company's tradewaste licence limits.
  - A reduction in sodium hydroxide required to adjust pH levels in the wastewater that has reduced chemical costs by around 80%.

## Energy Efficiency

The process of manufacturing batteries especially vehicle batteries is energy intensive. Century Yuasa consumes around 1MW per day costing \$1.5 million annually with \$900,000 for the charging room alone. Efficiency initiatives have reduced energy consumption by 23% over the last eight years.

### Peak demand reduction

Peak demand charges significantly add to the cost of electricity and for this reason the charging of the batteries is staged.

Century Yuasa has also installed an industrial Battery Energy Storage System (BESS) to mitigate daily load spikes and reduce peak demand tariffs. The batteries allow Century Yuasa to capture electrical energy during periods of low demand to be stored in a chemical form and then converted back into electrical form during periods of high demand. The system is composed of 216 kWh battery bank which feeds a 110kVA inverter.

The system includes a large screen LCD interface at the battery bank and web interfaces that allows Century Yuasa to log-on and view energy consumption and real-time levels of peak demand. The system has reduced the facility's peak demand from 100 kVA to 65 kVA saving approximately \$13000 annually.

## Power correction factor



Battery Energy Storage System (BESS)

Power factor is a measure of the ratio of the 'total power' (kVA) that is demanded by a business and the 'real power' (kW) that is used by the business. The ratio of the real power to the total power is power factor, a number between 0 and 10. The higher the power factor the more efficient business is at utilising the supplied power.

Low power factor may result in higher costs for the electricity supply company and these higher costs are passed on to the business.

Because of the low power factor of the battery chargers at Century Yuasa's the site's power factor had fallen below 90%. This not only means physically larger cables and higher rated switch boards for the company but significant cost penalties from electricity providers. In 2016 power factor correction capacitors were installed lifting the plant's power factor to 96%. The payback period has been less than 12 months





## Reducing Waste Generation

Efficient robot technology is used to safely pack and store (lift) up to four 20kg batteries at any one time.

Packaging is an extremely important aspect of battery distribution as they can be a source of dangerous heat, sparks or fire if they are improperly packaged for transport. This means strong outer packaging is required and careful protection of the battery terminals to prevent sparking or short circuiting. Within these constraints Century Yuasa has designed more sustainable packaging, increasing recycling rates and is an active signatory of the Australian Packaging Covenant (APC).

Century Yuasa aims to reuse and recycle where possible:

- Wooden and plastic crates
- Wooden boxes
- Cardboard
- Stretch wrap and strap
- Office paper and co-mingling
- Masonite sheets reuse (returned after batteries are delivered to the manufacturing site).

The use of polystyrene sheets posed a number of problems for the company. As with Masonite sheet, polystyrene sheets were returned to the manufacturing site. The sheets however tended to break up in warehouses and were proving expensive for the agents to manage.

After twelve months of Research and Development, the company has developed a structurally sound alternative using recycled and recyclable honeycombed cardboard with a thin coating (20 microns) of polyethylene. While

shipping the cardboard from an overseas supplier is expensive the new packaging alternative has removed polystyrene from the supply chain and proven more cost effective than the polystyrene sheeting return process. The overseas supplier is now seeking to commence



Honeycomb packaging alternative

manufacturing in Australia.

Century Yuasa have also now introduced a lead recovery system where dross (solid impurities on the top of molten metal) from the lead pots is recovered and processed to recover the metallic lead from the dross. This is saving in the order of \$200k per annum on lead. All other metallic lead waste is sent to an Australian recycler for refining and returned back into the battery manufacturing process.

To reduce waste, Century Yuasa has also introduced the workplace organisation method 5S by Organising its work space for efficiency and effectiveness. Managers audit workspaces each month to ensure systems to "sort", "set in order", "shine", "standardize", and "sustain" are maintained.

## Product Stewardship

Century Yuasa are committed to ensuring their lead acid batteries are recycled and disposed of responsibly at the end of their

useful life. The company launched a nationwide recycling program in 2008 which enables customers to return old lead acid batteries free of charge at over 1100 Battery Recycling Centres. The used batteries are sent to a recycling plant in NSW where 98% of a lead acid battery can be reclaimed through various processes including:

- Conversion of the acid to sodium sulphate which is used for manufacturing laundry detergents, fertilisers and textiles.
- Recovery of lead battery plates, inter cell connectors and posts. The lead is heated within smelting furnaces and the molten metal poured into ingot moulds.
- Recovery of polypropylene which is chipped and sent to a plastic recycler where it is melted and extruded to produce small plastic pellets. The pellets are used to produce new products such as rubbish bins, pot plants, guide posts and cabling.

## Innovation and Partnerships

Century Yuasa's core strength and competitive advantage lies in their design, manufacturing and technical expertise. The company works closely with vehicle manufacturers, the Energy Storage Council and the Australian Energy Storage Alliance to bring new innovative energy storage ideas in both a technical and national policy capability.



Revolutionary technology includes:

- SmartDrive™ technology which reduces fuel consumption and vehicle emissions in vehicles fitted with Regulated Charge Control (RCC) by up to 2%.
- Design of maintenance free forklift batteries using tubular plate technology which eliminates potential for acid spills in the workplace, are now also available.
- SmartCharge™ technology for forklift chargers that incorporate leading-edge high-frequency electronics to minimising power consumption, reduce operating temperatures by up to 10°C and maximising battery service life.

## The Future

Century Yuasa recognise Renewable energy, as being a big part of successful sustainability on a global scale, in particular storage methods and efficiencies.

It is their intention to be at the fore front of such technologies.

This case study has been prepared by The Ecoefficiency Group Pty Ltd for the Queensland Department of State Development in 2017.