

Recycled LEAF EV usage

Recycled LEAF EV batteries to power Nissan Casting's EV component plant. Carole Goldsmith visits the Dandenong location.

'Reduce, Reuse & Recycle' is in action at the Nissan Casting Australia Plant (NCAP) in Melbourne's south-east. Nissan LEAF electric vehicle (EV) end of life batteries, charged by solar energy will part power the EV component's manufacturing area. This is estimated to cut NCAP's annual CO₂ emissions by 259 tons, saving the company 128 megawatts of energy and around \$30,000 each year.

Winner of the 2022 Victorian Manufacturing Hall of Fame Award - Leader in Global Supply Chain Partnerships award for its outstanding achievement in manufacturing, NCAP can soon add its Battery Project, called Nissan Node to its successful accomplishments.

This exciting future for end-of-life EV batteries, Nissan Node will include a new Battery Energy Storage System (BESS) installation made of nine repurposed Gen 1 Nissan LEAF batteries charged via a solar array as well as EV chargers for cars at NCAP. Founded in 1982, Nissan Casting Australia (NCAP) is located in Dandenong South and has been manufacturing in Victoria for 40 years. As one of Australia's only OEM, (Original Equipment Manufacturer), it has established itself as a market leader in die cast manufacturing, specifically for electric vehicle (EV) and hybrid vehicle components. NCAP's site stretches over 90,000sqm and houses both high- and low-pressure die-casting machines, with the capacity to produce 10,000 tons of cast parts and accessories per year.

NCAP has around 200 personnel comprising full-time employees and contractors. Every auto component it makes has a kangaroo stamped on it, to proudly emphasise that it was made in Australia. As the Manager of New Projects, Business Development



Angus Robinson
Manager New Projects Business Development, EHS, Manufacturing - Nissan Motor Co. Australia Pty. Ltd.

& EHS in Manufacturing at Nissan Motor Co. (Australia), Angus Robinson advises that the Nissan Node project is currently in progress. "The vehicle charging station has been installed, with the solar array and electrical connections to be completed this December," he says. "The battery energy storage system will be manufactured by Relectrify, our partner on the project, this December and Nissan will install it at NCAP in February next year."

Robinson has had a nine-year career at Nissan including roles at NCAP in Quality Control, New Products and EHS. He has also held engineering positions at Toyota and Ford in Melbourne and Geelong, soon after graduating with a Bachelor of Engineering at Queensland University of Technology. The Nissan Node project team also consists of Environment & Energy Coordinator Peter Erhardt, a mechatronics engineer, supported by Nissan Australia's National Manager, Electrification and Mobility, Ben Warren. NCAP has not directly employed extra personnel for this project, but it has generated work for a number of contractors and installation companies.

"Nissan provides the end-of-life batteries to Relectrify who has created a battery energy storage system that allows for granular control over individual battery cells or modules within a larger battery pack or system," Robinson explains.

Melbourne based Relectrify, is the developer of ground-breaking battery management and inverter technology that dramatically extends the life of batteries, reduces battery system costs, and enables the repurposing of high-quality second-life batteries from electric vehicles. Relectrify's ReVolve BESS being installed at the NCAP is a first-of-its kind product, built from end-of-life LEAF batteries.

"The solar array consists of 270 individual panels with a capacity of 99.9kW and estimated to generate 128MWh per year. The solar panels are being placed on the eastern end of NCAP's manufacturing plant's roof," advises Robinson. "We have installed two 7.2kW EV chargers at NCAP that allows staff and visitors to charge their Nissan EV vehicles on site."

When asked the annual cost savings on the project, Robinson says: "It is hard to be exact due to volatile energy market, but at an average rate of 21.4c/kWh we would save approximately \$30,000 per year."

Circular Economy project – Turning over a new LEAF.

It's a true Circular Economy project, using end-of-life batteries from the Nissan LEAF, the world's first mass-market electric vehicle and renewable energy to power part of the production of components for Nissan's global EV models. It will also help supply the new EV chargers to charge staff electric vehicles. The project is estimated to reduce Nissan Casting Australia's annual CO₂ emissions by 259 tons, while saving 128 megawatts of energy every year.

"In the case of the Nissan Node project," Robinson advises, "the term 'Circular Economy' is used to describe the fact that end-of-in vehicle-life batteries from Nissan LEAF vehicles are being repurposed to

support the assembly of parts for new Nissan LEAF vehicles sold globally. This is essentially turning over a new LEAF," explains Robinson.

"We believe this to be an auto industry first in Australia. Nissan were early leaders in developing electric vehicles and the Nissan LEAF was the first, truly mass-market, EV to be sold globally. NCAP has been, and continues to be an important part in the LEAF journey. When asked what the EV chargers would be used for, Robinson replies, "the chargers at NCAP will solely be used for charging staff and visitor's vehicles, however with that said, the Nissan LEAF is the only full EV on the market today that has Vehicle-to-Grid (V2G) / Vehicle-to-Home (V2H) capability. Meaning, when paired with a specific bidirectional charger, you can not only charge your car, you can discharge your car and use your car's battery to power your home or support the energy grid during peak times."

"This is an incredibly exciting idea, as you can use your parked car to capture renewable energy during the day and then use it later on to power the house. This means you can help decarbonise both your transport and energy, save money on fuel (and probably power) as well as have a brilliant car to drive," Robinson says.

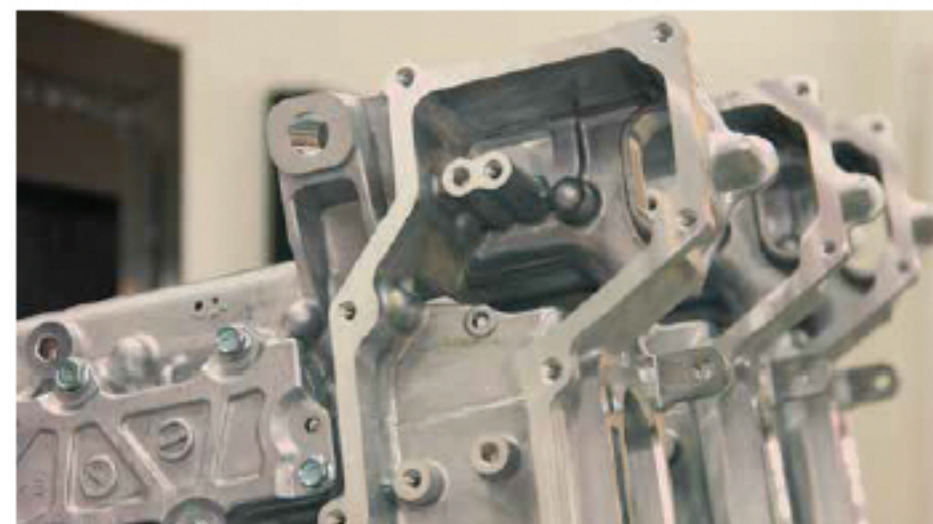
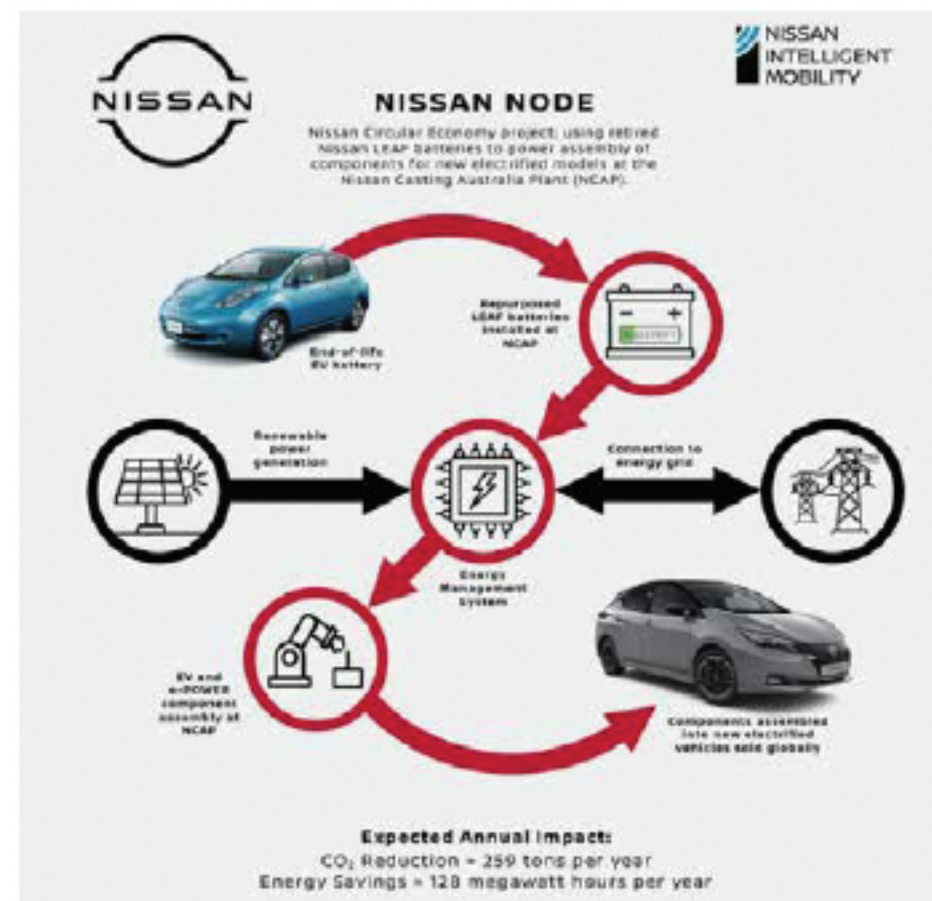
"Nissan have been at the forefront of V2G programs deployed across the world, with trials and programs running across Japan, Europe and US dating back as far as 2016. The certification process for these chargers is well underway and we are participating in trial programs already in Australia, to demonstrate the value and the opportunity for this market."

Extending the life of EV batteries is not a new idea at Nissan

Nissan has an impressive range of other sustainability projects around the world such as the EV36ZERO, a significant project at Nissan UK vehicle plant in Sunderland, where the Nissan Leaf, Qashqai and Juke are produced. This involves investment in onsite solar, wind, second life EV batteries as well as battery manufacturing and an EV plant expansion project.

Several months before the very first Leaf came to market in December 2010, Nissan Motor Corporation in Japan partnered with Sumitomo Corp. to set up 4R Energy Corp. This partnership continues today developing further the technology and infrastructure to refurbish, recycle, resell and reuse the batteries in Nissan EVs, not for their scrap value, but to power other things.

East Japan Railway Company (JR East), one of Japan's leading rail providers, is trialling repurposed Nissan Leaf EV batteries for emergency power supply units at rail crossings, instead of using



lead acid batteries. From January last year, Nissan Leaf batteries are being used at the Atago railroad crossing on the Jōban Line, which runs through Minamisoma City in Fukushima Prefecture. Metal casting plants traditionally burn a high amount of energy, but will the Nissan Node project, provide enough energy to power the entire NCAP assembly area? "This project is not designed to power the entire plant's production," Robinson responds. "NCAP is a high energy user due to the nature of the casting process, that operates 24 hours a day. As such, a significant increase would be needed to cover the entire plant's electrical requirements. This project was piloted to generate the energy required to power the area that assembles the EV components at NCAP."

"This is the first pilot for us, naturally if things go the way we expect, ideally, we would see this initiative get expanded over time. This first stage only contributes a very small amount in terms of the overall plants' power requirements. In terms of how we landed on the system size for the pilot, we studied the energy consumption from the EV assembly cell, which is a dedicated 'clean room' within the plant where the final machining and assembly of the EV parts take place. Then we scaled the system based on that section of the plant to form the Nissan Node pilot."

This is certainly a leading sustainability project for Nissan. It's a winner on all fronts for the company and its employees, with its predicted greatly reduced annual emissions, power usage and costs. Well done, Nissan! **AMT** nissan.com.au