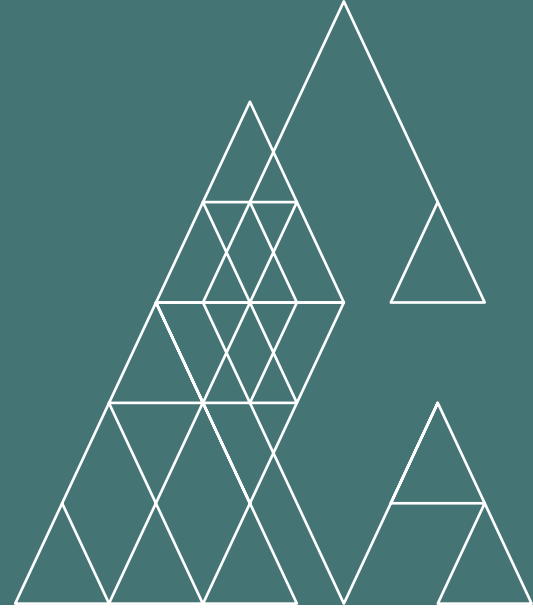


# McCain | Pulsed Electric Field Case Study

McCain has switched from coal pre-heaters to Pulsed Electric Field technology to produce the humble hot chip.



The hot chip is a Kiwi institution, and thanks to investment in cutting-edge processing technology, chances are the next hot chips you enjoy will have been produced with a fraction of the energy previously required, a massive saving in freshwater consumption, and a major reduction in carbon emissions from the potato pre-treatment process.



## Business information

<b>Company</b>	McCain Foods
<b>Industry</b>	Food manufacturing
<b>Number of employees</b>	140
<b>Site region</b>	South Canterbury
<b>Fund</b>	Technology Demonstration Fund
<b>Year of funding</b>	2020

## Project summary

- EECA's Energy Transition Accelerator (ETA) programme helped McCain Foods identify energy saving and technology opportunities
- McCain Foods invested \$1.85 million in new Pulsed Electric Field (PEF) technology, replacing coal used in the pre-heating process of chip production
- Coal consumption has been cut by seven tonnes per day and carbon emissions by approximately 3,990 tonnes per annum
- Freshwater consumption has been reduced by 82 per cent
- Cost savings of approximately \$1 million per year
- EECA support of \$250,000 through the Technology Demonstration Fund

## About the journey

McCain Foods is the world's largest producer of frozen potato products. As a global company that has operated for more than 60 years, McCain Foods has a clear sustainability strategy in which one of its four pillars is a commitment to resource-efficient operations.

Approximately nine per cent of New Zealand's greenhouse gas emissions currently come from process heat applications – the burning of coal, oil or gas to generate industrial heat for manufacturing, space / water heating and food production.

McCain Foods has flipped the old model of burning coal at its Timaru plant to produce steam and heat water for pre-cooking potatoes, instead investing \$1.85 million to revolutionise its pre-treatment process.

EECA's Energy Transition Accelerator (ETA) programme helped identify the technology options available to McCain and then bring this sustainability commitment to life at its Timaru potato processing plant.

## Project benefits

Rather than pre-cooking the potatoes in vats of hot water with the heat generated by burning coal, McCain installed [New Zealand's first Pulsed Electric Field \(PEF\) plant](#). This new technology was supported with \$250,000 in funding from EECA's Technology Demonstration Fund. The new technology arrived in New Zealand in January 2020, transforming all environmental and productivity metrics at the site.

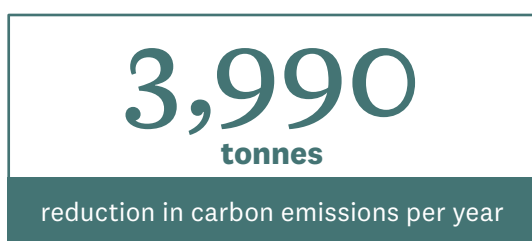
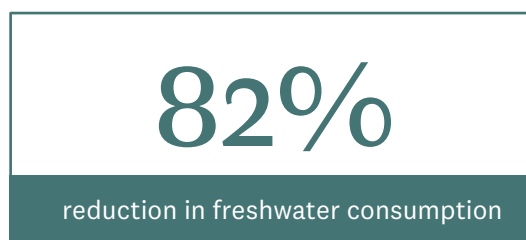
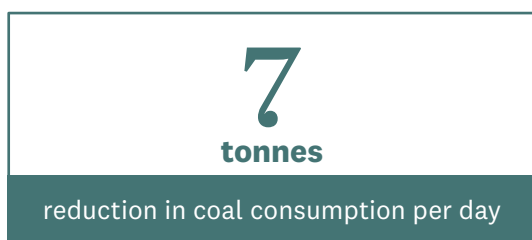
[Learn more about Pulsed Electric Field](#)

The PEF technology uses 400-volt electrical supply converted to 22,000 volts of electricity to achieve the same results with the potatoes, in just five to eight seconds. It has cut coal consumption by seven tonnes per day and carbon emissions by approximately 3,990 tonnes per year.

Fresh water is an important input into potato processing and the Pulse Electric Field has slashed freshwater consumption by 82 per cent – approximately the same volume required to fill 10 Olympic-sized swimming pools each year. At the same time, the overall cut quality of the processed chip has improved due to better pre-cooking, allowing more of the potato to be used.

As a result of quality improvements through the new processing system, McCain achieved a huge reduction in potato waste – previously generated through potatoes becoming stuck in the old pre-heaters. Even though the process has switched from coal to electricity, overall electricity consumption at the site had not increased as there is no longer the need for older electric motors in the pre-heating process.

As a result of reduced resource consumption and significant efficiency improvements, the PEF is generating annual cost savings of approximately \$1 million per year at the Timaru site. Downtime at the site is also significantly reduced as there is no longer any need to stop production to change the water in the pre-heaters, and space is saved on site as the PEF plant is significantly smaller.



## Insights and learnings

McCain's New Zealand Engineering Project Manager, Lenard Smythe, said the company is delighted with the new technology. It was installed within 16 days and within budget.

He said since committing to the Timaru installation, McCain have installed the technology at other sites across Australia.

“Our use of new technology is a win-win for everyone. It saves precious resources, eliminates carbon emissions from this process, reduces waste, and directly leads to a more productive and profitable business.”

Smythe said initially there was some employee concern around the use of high voltage electricity but with proper induction and training, the plant is considerably safer to use than relying on burning coal to generate steam for the pre-cooking process.

“We're committed to the most efficient use of natural resources as possible and to reducing carbon and waste. The use of this technology has been a game changer for our operations that highlights how investment in sustainable technology can go directly to the bottom line.”

## At a glance: McCain's switch to Pulsed Electric Field

### Performance outcomes

- Annual cost savings of approximately \$1 million
- Coal consumption has been cut by 7 tonnes per day
- Carbon emissions have been reduced by approximately 3,990 tonnes per year
- Freshwater consumption has reduced by 82 per cent
- No increase in electricity consumption at the site
- PEF technology pre-cooks potatoes in five to eight seconds
- Huge reduction in potato waste due to improved pre-cooking process
- Significant reduction in downtime at site

### Further reading:

Learn more about the Technology Demonstration Fund: <https://www.eeca.govt.nz/co-funding/technology-demonstration/>

Learn more about the GIDI Fund: <https://www.eeca.govt.nz/co-funding/industry-decarbonisation/about-the-government-investment-in-decarbonising-industry-fund/>

Find out more about fuel switching for boilers: <https://genless.govt.nz/for-business/on-site/heat-efficiently/boilers/>