

## ELECTRODE BOILER FACT SHEET

Synlait commissioned New Zealand's first large-scale electrode boiler in March 2019 to provide process heat/steam in its advanced dairy liquids facility at Synlait Dunsandel.

The deliberate decision to not build another coal boiler is part of Synlait's bold sustainability strategy announced in June 2018 and leads the way to a lower emissions future for New Zealand.

This was the first significant initiative that Synlait has implemented to progress its goal of reducing off-farm greenhouse gas emissions by 50% by 2028.

### HOW DOES IT WORK?

The six-megawatt (6 MW) electrode boiler uses 11,000 volt electricity to power electrodes submerged into water. Electricity flows from the electrodes through ultra-pure boiler water inside an earthed neutral basket inside the boiler shell. The flow of current creates a high flux rate that generates steam by boiling water. The boiler produces saturated steam of 180 degrees celsius at 10 bar.

The electrode boiler conversion efficiency of electrical energy to heat energy is greater than 97%. Unlike a traditional water tube boiler only a small amount of water is heated which enables it to go from cold start to steaming at 8 tonne per hour (t/h) in less than an hour. When the boiler is in hot standby mode it can steam from zero to 8 t/h in less than 30 seconds.

Maintenance cost is low compared to a coal fired boiler and an annual maintenance turnaround would take only two days. From an operational point of view the boiler is classified as unattended and needs no input from operational staff except for water chemistry management and remote monitoring.

An electrode boiler differs from a household kettle in the sense that the flowing of current in the former boils water as opposed to an element that heats up to boil the water it is in contact with.

The process heat/steam from from the electrode boiler is used to pasteurise and sterilise milk, clean production lines and equipment, and assist in forming product packaging among other uses.

The installed electrode boiler has a 12MW design capacity. It is limited to 6MW operational capacity as per current demand. The high voltage supply capacity to site (66kV) is a limiting factor which Synlait is working on with Orion to enable future demand expansion to 12MW.



*Electrode Boiler operating at Synlait Dunsandel.*