

GipNet



ATMOSPHERIC RESEARCH IN THE LATROBE VALLEY

From late 2017 to the end of 2019, researchers from the Universities of Melbourne and Wollongong will be undertaking atmospheric research in the Latrobe Valley. This research is focused on measuring greenhouse gases in the air.

Why is this research being undertaken in the Latrobe Valley?

This research is being conducted as part of the GipNet research initiative that has been established to provide support to a potential carbon capture and storage (CCS) project in the Latrobe Valley named CarbonNet.

The GipNet research initiative will test and validate equipment and technologies that will help CarbonNet monitor and, if necessary, respond to changes in the environment.

The atmospheric instruments are being tested to prove that they are reliable and durable for the coastal and marine environment, and return accurate and precise measurements.

What is Carbonnet?

The CarbonNet Project is investigating the potential for establishing a commercial-scale CCS network in the Latrobe Valley. CarbonNet aims to capture carbon dioxide (CO₂) released by industrial processes in the Latrobe Valley, compress and transport it to an injection site offshore, then store it deep under the seabed in suitable secure geological formations – similar to the way oil and gas has been stored underground for millions of years.

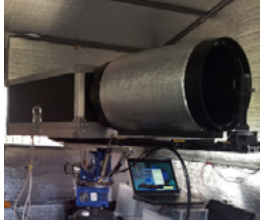
The CarbonNet project offers significant opportunities for new industries in Gippsland and for new jobs and investment, particularly in hydrogen and fertiliser production. At the same time, the project could make a substantial contribution to reducing Victoria's and Australia's greenhouse gas emissions. CarbonNet is working with Australia's leading science and research organisations, including CO₂CRC, CSIRO and a range of universities, to make sure the project is safe, effective, and able to make a significant contribution to the global effort to combat climate change.



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What equipment will be used?

Three types of measurement instruments will be used: Open-Path Fourier Transform Infrared Spectrometer (FTIR), Spectronus and Picarro. Each is designed to measure the greenhouse gases in the atmosphere, and the variability of these gases. Deploying a network of instruments will allow for the spatial variability to be determined. The instruments are:



Open-Path FTIR

The Open-Path FTIR measures across several kilometres, between the instrument at one end of the 'path' and a set of mirrors at the other end. Power and telecommunications are only required at the instrument; the

mirrors are passive and require only a solid structure on which to be mounted. The instrument measures the total amount of greenhouse gases in its line-of-sight, meaning that any variability within that path can be captured.

The instrument requires shelter, power and telecommunications, and a clear view to the mirror array. It uses a telescope to transmit infrared light (not visible to humans, and completely harmless) to the mirror array and collects the returning light. The gases in the atmosphere absorb the infrared light, so the amounts of these gases can be determined from the reduction of the infrared signal. Most instrument maintenance and operations can be done remotely with internet connectivity. In case of power or internet failure, power cycling or computer reboot might be needed. Occasional cleaning of the mirrors is also necessary, but would be performed by trained technicians.



Spectronus

The Spectronus measures atmospheric gases at a fixed location, pulling a constant flow of air through a sampling inlet. Infrared light is passed through the air in much the same way as the Open-Path FTIR. The resulting light spectrum is analysed for the quantities of gases contained.

The Spectronus was developed at the Centre for Atmospheric Chemistry at the University of Wollongong, and is manufactured at Ecotech Pty Ltd – a family firm based in Victoria that specialises in environmental monitoring solutions.



Picarro

The Picarro is a smaller but similar instrument to the Spectronus. Like the Spectronus, the Picarro also pulls a constant flow of air and delivers this to a gas cell, where light is reflected

through the cell and the reduction in signal time is measured to infer the quantity of the gases present. Four Picarras will be deployed as part of GipNet.

Operations and maintenance

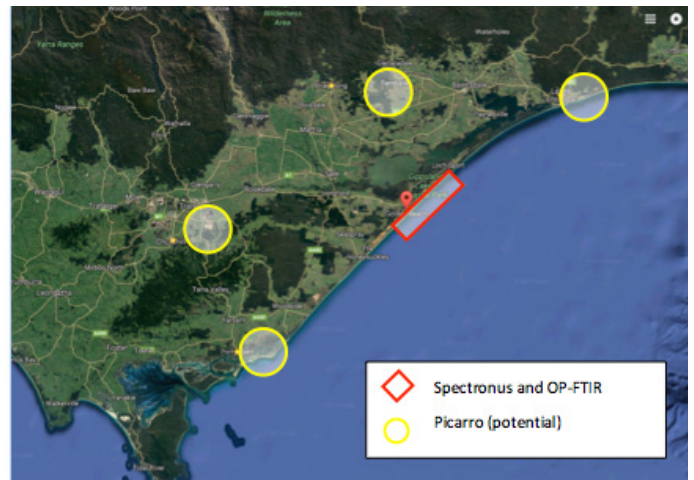
The Spectronus and Picarro have similar operational and maintenance requirements. The accuracy of their measurements relies on calibration of gases within a pressurised cylinder, which must be done regularly (weekly to monthly) to ensure that the instruments provide stable readings.

To ensure that the air they sample and measure is representative of the area, the Spectronus and Picarro instruments need to sample from above any structure that would disturb airflow, such as trees and buildings. They therefore ideally from a sample mast or from an aerial above a house roof. Only the sampling inlet, a thin length of tubing, needs to be at this elevated location. This location should be clear of local pollution sources such as engines.

Both instruments require access to mains power – the Picarro and Spectronus each use approximately 200W for standard operation.

Where will the equipment be located?

The atmospheric monitoring network will be focused on the Golden Beach area, where it is planned to locate the Spectronus instrument and the Open-Path FTIR. Additional instruments will be deployed within the wider Gippsland region to cover a broad region, with sites expected to the west (Churchill), north, north-east and south-west, up to 100km from of Golden Beach. The map below illustrates indicative locations for the instruments.



More Information

All data collected for this project is freely available to the public and can be accessed by contacting the research organisations involved: Any questions or requests can be directed to the research leaders listed below:

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