



# Wide-Area Monitoring Of A Refinery For Renewables In Singapore

**Country**  
Singapore

**Industry**  
Construction

**Project Type**  
Refinery for renewables

**Main Products**



BEAM-VW-S8



BEAM-GW

# Challenge

The Neste Singapore Expansion project is a €1.5 billion investment by renewable solutions provider Neste to increase its production capacity for renewable products. The construction phase of this project, which began in early 2019, is expected to take four years. Once completed, it will facilitate an additional one million tonne capacity for the Neste Singapore refinery to produce sustainable aviation fuel and renewable raw materials for polymers and chemicals.

The main challenge was to help fulfil the safety requirements of the site by installing an efficient data acquisition system to monitor a network of strain gauges placed strategically across an area of approximately 1,800m<sup>2</sup>. These strain gauges monitor the loads from struts installed in the excavation site, alerting site personnel to potential high-risk singularities.

# Solution

The deployment of strain gauges at the site was designed by geotechnical engineering solutions provider Kimaro. To safely monitor these strain gauges, Kimaro, with support and training from geotechnical instrumentation service provider CEP, installed the Ackcio Beam wireless data acquisition solution on site.

This Ackcio Beam system, which has been functioning since November 2020, comprises 10 Ackcio Vibrating Wire Nodes (BEAM-VW-S8), monitoring 80 strain gauges at a required frequency of once every hour.

Once installed and commissioned, the Ackcio Gateways (BEAM-GW) and Vibrating Wire Nodes became interconnected within an Ackcio Mesh network, adding a number of crucial benefits to the monitoring process.



## Benefits

- Long-range transmission
- Easy to scale with multiple hops
- Reliable communication in dynamic environments
- Automated data recovery, retransmitting missing data in the event of power loss to the Gateway
- Reliable downlink, adjusting sensor frequency in near real-time
- Low power consumption allowing nodes to last for years on the same batteries

# Results



Increased reliability



Up to 40% saving in labour costs



Easy to scale



Remote access to data in real-time

Ackcio's patented Ackcio Mesh technology is self healing which significantly reduces the likelihood of any blackspots or communication failures on site, resulting in increased reliability of the sensor data transfer and ultimately a safer work site.

As construction of this site progresses, more sensors including strain gauges will be added that require monitoring. To that end, the Ackcio Beam system is easily scalable and able to connect with and transmit data from new sensors as they are installed.

The wireless connectivity of the Ackcio Beam system eliminates any need to monitor the strain gauges using cables, which would have to be extensive for this site and significantly more expensive to deploy and maintain, particularly as the network of sensors continues to expand. This has resulted in significantly increased operational efficiency of the site, reducing its monitoring labour costs by 40%, resulting in savings of over S\$500,000 for the duration of the project.

Most importantly, the real-time monitoring capabilities of Ackcio Beam have significantly improved the site's productivity and overall efficiency, ensuring it remains live and running whilst optimising safety for all site workers.

Kimaro and CEP share their experience with the performance of Ackcio Beam at this site.

**Terence Teo from CEP said,**  
"We're glad we recommended Ackcio for this project. Given the vastness of the deployment area, the challenging site conditions, and our requirement to reliably acquire data at short intervals, this solution really ticked all the boxes."

**Elson Kong from Kimaro said,**  
"By using Ackcio Beam, we managed to save a significant amount of time, man hours, and labour costs, and comfortably fulfilled all of our monitoring requirements. It certainly made our work easier when monitoring the vast network of strain gauges we had deployed across the site."





## About CEP

Established in 1978, CEP has been a pioneer of instrumentation works in Singapore and has provided field installation and monitoring services for the last 30 years.

With over four decades of experience in instrumentation works, they provide a wealth of specialised services for manufacturing, distribution, installation, commissioning, monitoring, and rental of instruments, applications consultancy, and maintenance and calibration services for projects in South Asia, Asia Pacific, and Australia.

Some of their most recent projects include MRT Circle Line, Downtown Line, Kallang Paya Lebar Expressway, Marina Bay Business Financial Centre, Sands Resorts, Gardens by the Bay, and Resorts World Sentosa.

## About Kimaro

Kimaro is a specialised solutions provider in the field of soil investigation, instrumentation, and monitoring. As such their applications perform key roles in numerous engineering disciplines including military, mining, petroleum, and construction.

With a dynamic team of Singapore-registered professional engineers and the latest industry technology, Kimaro services clients by providing engineering technical expertise and solutions for monitoring critical focus areas of a site, such as the foundations, ground improvements, tunnelling, deep excavation, slope stability, reclamation designs and analyses, and more.



Ackcio builds reliable wireless data acquisition systems for industrial monitoring applications. The company automates monitoring processes and provides remote, intelligent data to enable increased safety and efficient risk management in mission-critical industries including construction, infrastructure, mining, and rail. Ackcio's flagship solution, Ackcio Beam, is an industrial data acquisition platform that uses a patented long-range wireless mesh network to monitor sensors accurately and reliably in both above ground and underground environments. Ackcio is headquartered in Singapore and supports clients across the world. In 2021, the company was included in Forbes Asia's inaugural '100 to Watch', a list comprising of small companies and startups on the rise across the Asia Pacific.

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