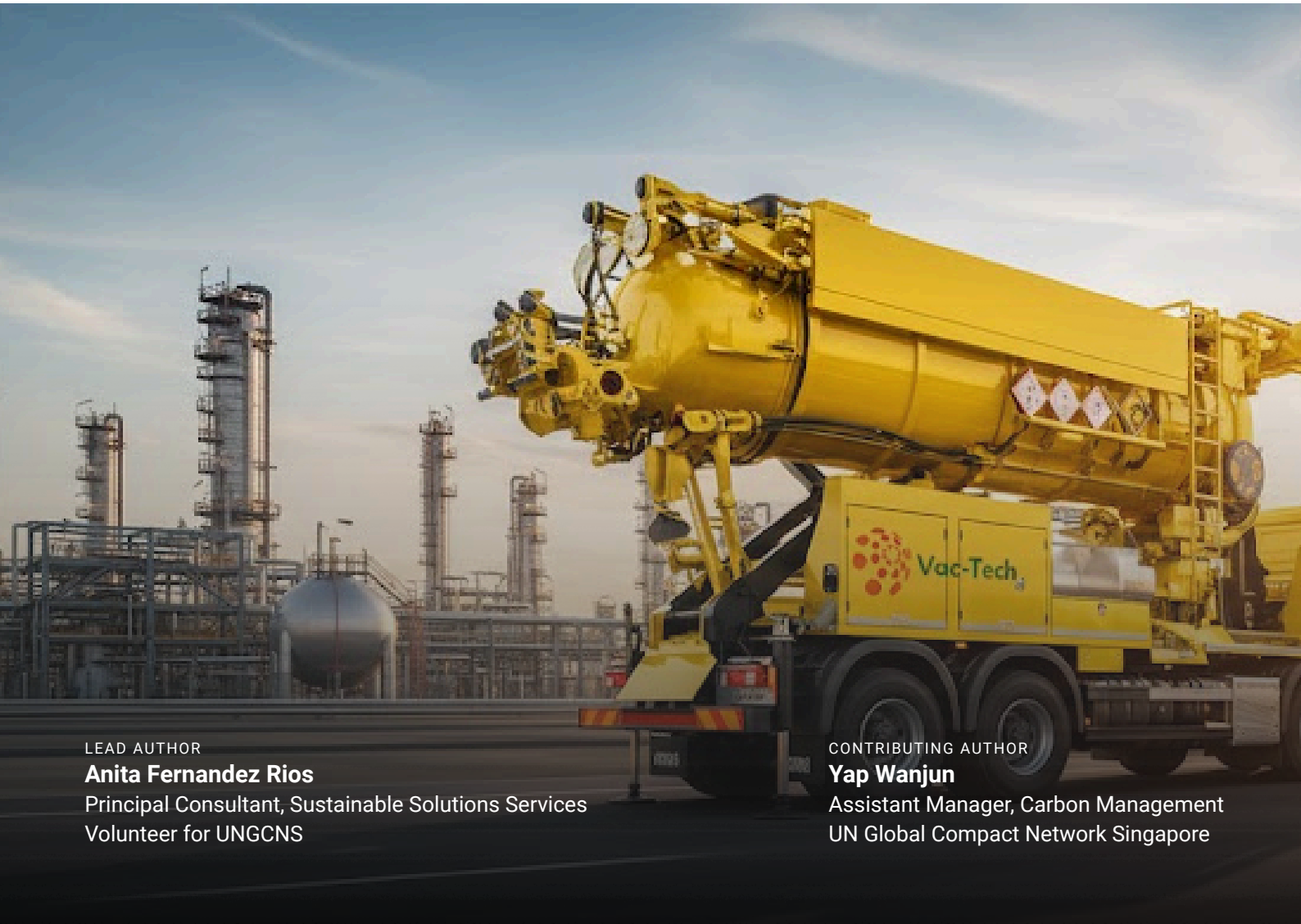
Global Compact Network Singapore

Vac-Tech

LowCarbonSG Awardees (2023 – 2025):

Leaders in Action on Decarbonisation

How Vac-Tech Engineering Delivers Measurable Decarbonisation under Real-World Constraints



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i. Introduction

Across the global business community, climate ambition has become commonplace. Targets have been announced, strategies articulated, and commitments formalised. Yet as expectations rise, so too does scrutiny — stakeholders now ask not only what companies intend to do, but how progress is being made and whether it can be verified. In this context, credibility matters.

Singapore presents a distinctive operating environment for sustainability. As a small, densely urbanised city-state with limited access to renewable energy sources, businesses here cannot rely on the geographic advantages available to larger economies. Instead, they must find low-carbon pathways within tight constraints — navigating strict regulations, high governance standards, and complex supply chains, while maintaining operational efficiency and commercial viability.

This article is part of a series profiling companies recognised under the LowCarbonSG programme, an initiative helmed by the UN Global Compact Network Singapore (UNGCNS) that honours demonstrated, measurable progress in reducing Scope 1 and Scope 2 greenhouse gas emissions over a defined period. Rather than rewarding ambition or aspiration, the programme values disciplined, evidence-based improvement — reflecting a principle that is increasingly important for corporate leaders: climate action must be verifiable, defensible, and repeatable.

The company profiled here represents one such journey. Regardless of sector or scale, what unites the LowCarbonSG awardees is not perfection, but a commitment to progress — anchored in clear boundaries, credible data, management accountability, and sustained operational effort. Their experiences offer practical lessons for organisations across Singapore and beyond that are seeking to move from commitment to delivery, and from ambition to evidence.

The following profile documents the low-carbon journey of **Vac-Tech Engineering**, a company in the waste management sector and **2023** LowCarbonSG awardee.

ii. Case Study

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Vac-Tech

2023 LowCarbonSG Awardee: Vac-Tech Engineering Pte Ltd Low-Carbon Journey

1. Company Introduction

Vac-Tech Engineering Pte Ltd is a Singapore-based industrial and environmental solutions provider established in 1995, specialising in hazardous waste management, industrial maintenance, and waste logistics for the petrochemical, energy, and manufacturing sectors. Operating across three core business units—Specialised Industrial Services, Hazardous Waste Treatment, and Hazardous Waste Transportation—the company delivers integrated solutions such as automated tank cleaning, sludge recovery and dewatering, on-site waste treatment, and hazardous waste disposal. Its operations are supported by one of Singapore's largest vacuum truck fleets and a 71,476.64 ft² facility staffed by 167 employees.

As a subsidiary of Blue Planet Environmental Solutions, Vac-Tech contributes to a global mission of circularity, resource recovery, and decarbonisation. Its vision is *"to be a leading sustainable industrial and environmental solutions provider, enabling safer operations, resource circularity, and low-carbon transformation across industries globally."* This is reinforced by a mission centred on engineering innovation, automation, digitalisation, and strong ESG governance.

The company's sustainability ethos is captured in its guiding principle: *"Recovering resources, reducing carbon, and protecting people — every project, every day."* Its leadership commitment is strong, with the General Manager, Jimmy Chooi, emphasising that sustainability must be embedded into solution design, resource management, and customer support.

Vac-Tech's commitment to sustainability is reflected in its ISO 9001, ISO 14001, and ISO 45001 certifications, and in being one of the pioneer companies to receive the LowCarbonSG logo. Its decarbonisation efforts are driven by continuous small improvements, including the digitalisation of paper-based timesheets, enhancements to fleet management, and maintaining a robust maintenance tracking system. The company also continually improves client solutions through technologies such as man-less and robotic tank cleaning systems, and other mechanical cleaning methods that enhance safety, efficiency, and environmental performance.

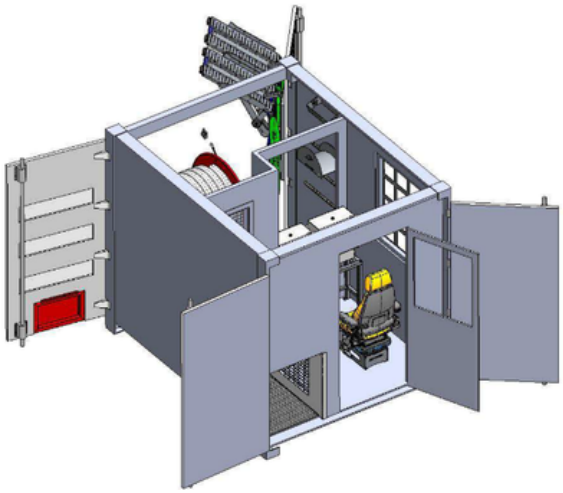
2. Low-Carbon Initiatives

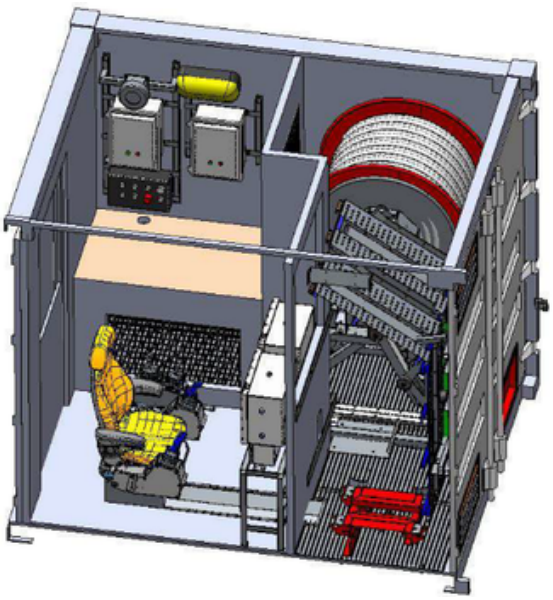
Vac-Tech's decarbonisation strategy integrates use of renewable energy source, operational efficiency, digitalisation, resource circularity, and organisational transformation. These initiatives align with the broader ESG strategy of Blue Planet Environmental Solutions and are reinforced by the company's internal sustainability roadmap.

2.1 Key Low-Carbon Initiatives

Resource Recovery & Circularity
Deployment of centrifuge oil recovery systems and closed-loop cleaning technologies enables hydrocarbon recovery from sludge, reducing waste volumes and emissions.

Automation & Robotics
Mechanised and robotic tank cleaning systems reduce manpower hours in confined hazardous environment, and shorten project durations.





On-Site Waste Treatment

Installation of dewatering and treatment systems at client sites reduces transportation distances, fuel consumption, and Scope 1 emissions.

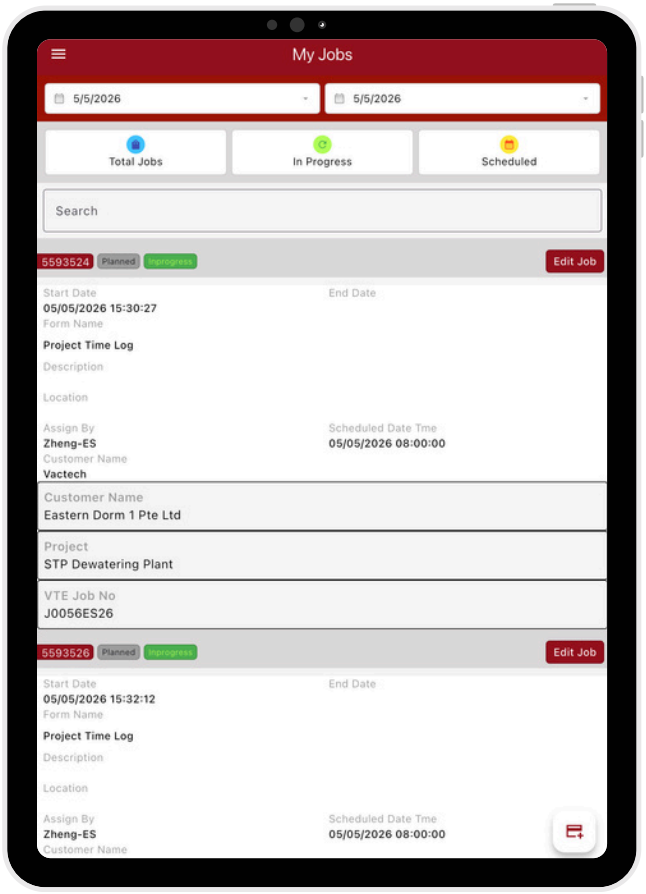




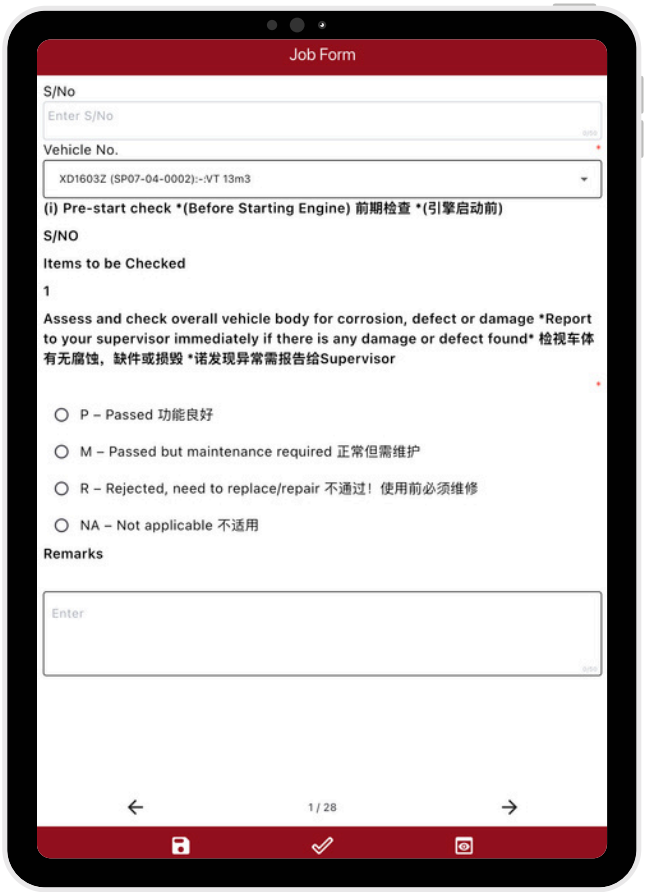
Digital Fleet Optimisation

The system has been upgraded to the new V3 fleet management platform, which tracks both fleet vehicles and containment assets. The system provides real-time GPS tracking, route optimisation, idling monitoring, driver-behaviour analytics, geofencing, and PTO switch sensors. The platform also integrates digital vehicle checklist with automated preventive maintenance scheduling, reducing reliance on manual scheduling and helping minimise overall fleet downtime. In addition, digital timesheets enable faster operational data transfer for reporting and billing while reducing paper usage.





Job List - Timesheets



Digitalised Vehicle Checklist

Energy Efficiency Measures
Transition from desktops to laptops, LED lighting upgrades, motion sensors, and standardised air-conditioning temperatures (25°C) have reduced electricity consumption. These measures collectively reduced electricity demand and contributed to measurable Scope 2 emissions reductions.

Water Efficiency Improvements
Lowering water pressure and promoting mindful use have reduced water consumption and associated indirect emissions.

Carbon Measurement & Governance
Implementation of the Updapt sustainability data platform enables monitoring of Scope 1, 2, and selected Scope 3 emissions, supporting standardised ESG reporting and contributing to the annual sustainability report of its parent company, Blue Planet Environmental Solutions.

Organisational Transformation
A sustainability team, annual reduction targets, baseline assessments, and employee engagement programmes embed sustainability into daily operations. The company's leadership "actively champions sustainability and ESG values," reinforcing a top-down culture of environmental responsibility.

3. Reduction in GHG and Other Resources

Vac-Tech has achieved measurable reductions in emissions and resource use through its integrated initiatives. These reductions reflect both operational improvements and behavioural change across the organisation.

Fuel Consumption Intensity has been reduced through digital fleet optimisation and improved driver behaviour.

Reduction in Waste Sent for Disposal through oil recovery, sludge dewatering, and circular resource recovery.

Manpower Hours per Project. Thirty five percent (35%) reduction through automation and robotics.

Transportation Trips. Twenty percent (20%) reduction through on-site treatment solutions.

Administrative Efficiency. Ten percent (10%) improvement through digitalisation and monitoring systems.

Vac-Tech's holistic approach earned them a high score in the LowCarbonSG award on-site assessment in 2023, recognising its strong governance and comprehensive decarbonisation strategy.

4. Transferable Technologies and Practices

Vac-Tech's technologies and operational practices offer replicable models for other industrial and environmental service providers seeking to reduce emissions and improve resource efficiency.

4.1 Transferable Technologies & Practices

Use of Renewable Energy and Water Efficiency Improvements

Remote Operated ATEX Zoned Robotic Cleaning Systems
Improve productivity, reduce confined-space entry risks, and lower carbon intensity.

Closed-Loop Circulation & Oil Recovery Technologies
Enable circular resource recovery and reduce waste volumes.

On-Site Waste Treatment & Dewatering Systems
Reduce logistics emissions and improve operational efficiency.

Digital Fleet Management Systems
Optimise fuel use, reduce idling, and enhance safety.

Carbon Accounting & ESG Data Platforms (e.g., Updapt)
Support emissions monitoring, reporting, and data-driven decision-making, contributing to sustainability reporting while strengthening the company's transparency, governance, and overall corporate reputation.

Integration of Sustainability KPIs
Embed environmental performance into project planning and operational management.

ISO-Based Environmental Management Systems
Provide structured frameworks for continuous improvement.

5. Challenges, Action Taken and Conclusion

Vac-Tech's decarbonisation journey has been shaped by a set of practical, operational, and regulatory challenges that influence how quickly and effectively low-carbon measures can be adopted. One of the most significant constraints arises from the regulatory environment in which the company operates. Many of its worksites are classified as hazardous zones, where fire and explosion risks restrict the use of battery-powered or electrically driven equipment. In these settings, electric vehicles, electric forklifts, and other battery-operated machinery are not permitted unless they meet stringent explosion-proof standards—technology that is still limited and costly. As a result, diesel-powered equipment remains the compliant and reliable option, even as the company seeks to reduce Scope 1 emissions.

Alongside regulatory barriers, Vac-Tech also faces the human and organisational dimensions of change. The company has introduced digitalised timesheets to reduce paper use, streamline operations, and strengthen data accuracy. However, adoption has not been uniform. Some clients continue to prefer manual records, and parts of the workforce—particularly those long accustomed to traditional processes—require time, training, and reassurance to transition confidently to digital systems. This has made change management an ongoing effort, requiring progressive rollout, hands-on support, and close alignment with client expectations to ensure compliance and smooth implementation.

Despite these challenges, Vac-Tech has continued to make meaningful progress through targeted operational improvements. Digital fleet optimisation and on-site treatment systems have reduced fuel use by cutting idling, shortening travel distances, and minimising transportation trips. Energy-efficiency upgrades—such as LED lighting, motion sensors, laptop transitions, and standardised air-conditioning temperatures—have strengthened Scope 2 performance. The company has also embedded simple, transferable practices including preventive maintenance scheduling, water-efficiency measures, and ISO-based management systems, reinforcing a culture of continuous improvement.

In conclusion, Vac-Tech's experience shows that decarbonisation in industrial and hazardous environments requires a blend of operational efficiency, digital innovation, cultural transformation, and long-term planning. While regulatory constraints and workforce adoption present real challenges, the company's steady progress demonstrates that practical, well-chosen steps can deliver measurable reductions in emissions and resource use. Its journey offers a realistic and replicable model for organisations navigating similar constraints while striving toward a low-carbon future.

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UN Global Compact Network Singapore (UNGCNS) is the local chapter of the United Nations Global Compact. As the leading voice on corporate sustainability in Singapore, UNGCNS drives multi-stakeholder action to forge a more sustainable future, founded on the Ten Principles of the United Nations Global Compact and the Sustainable Development Goals. Through various platforms and partnerships, UNGCNS advances the stewardship of sustainable business practices and Singapore's national agenda of becoming a regional sustainable business hub.

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