AgroSpectrum ASIA
Envisaging Future | Updating Present

Conservation of marine biodiversity through smart technology innovation

17 February 2025 | News

Victor Cheng, Chief Executive Officer, Delta Electronics (Thailand) PCL

Victor Cheng, Chief Executive Officer, Delta Electronics (Thailand) PCL

Singapore's National Parks Board (NParks) launched the 100k Corals Initiative in December 2024 with the aim of planting 100,000 corals in Singapore's waters over the next 10 years. NParks will create a coral culture facility on St John's Island so that corals can be cultivated and transplanted into the marine environment to restore degraded reefs or establish new coral communities. This programme will also scale up NParks' existing coral restoration efforts to improve the resilience of coral communities and reefs, making it the most extensive coral restoration effort in Singapore to date. On this mission, Delta Electronics collaborated with NParks to embark on the NParks-Delta Corals Research Programme, which helps NParks cultivate corals with the help of smart technology. As part of the two-year research programme, NParks will leverage Deltaâ??s expertise in industrial and building automation to optimise large-scale coral cultivation at the coral culture facility. As the healthy growth of corals is dependent on several parameters, including lighting, temperature, water quality and water flow, smart technology will be deployed to cultivate corals under controlled conditions in the tanks, enabling them to thrive without being subject to environmental stressors such as ocean warming and acidification. **Victor Cheng, Chief Executive Officer, Delta Electronics (Thailand) PCL** highlighted additional critical aspects of the NParks-Delta Coral Research Programme and the role of smart technology in conservation of marine biodiversity.

How do you describe the role technology innovation plays in marine biodiversity conservation, especially in coral reef restoration?

In recent years, several technologies have emerged as game-changers for large-scale coral reef restoration across Asia. AI-enabled environmental monitoring systems allow real-time tracking of water conditions, ensuring optimal growth environments

for corals. Adaptive LED lighting systems mimic natural sunlight and support coral photosynthesis, while 3D-printed reef structures provide ideal habitats for coral larvae to attach and grow.

At Delta, we have integrated these innovations into our solutions, such as customized coral culture tanks and IoT-enabled water management systems. These technologies not only enhance restoration success rates but also make the processes more energy-efficient and scalable, making them ideal for urban and high-demand environments like Singapore.

How are NParks and Delta Electronics working together to integrate smart technology into coral cultivation? Does the program offer grants to support its initiatives?

Delta is proud to partner NParks on the 100K Corals Initiative, a transformative project that will help restore and cultivate coral reefs in Singaporeâ??s waters. This project is aligned with Deltaâ??s commitment to supporting biodiversity and addressing global environmental challenges through innovation and collaboration.

Marine conservation has long been a focus for Delta. In Taiwan, Delta and the Delta Electronics Foundation worked with marine experts to develop coral nurseries and protect coastal reefs, using advanced automation systems to create controlled environments that foster coral resilience and optimal growth conditions. These efforts have significantly contributed to reef restoration in Taiwanâ??s waters.

In Singapore, Delta will support the creation of ideal growing conditions for corals in land-based aquaculture tanks through its automation and monitoring systems. The Smart Coral Aquaculture System will integrate technologies such as redundant Programmable Logic Controllers (PLCs), Human-Machine Interfaces (HMIs), sensors for water quality monitoring, and wave makers to ensure good water mixing throughout the tanks. Additionally, a chiller system trialled by NUS researchers will manage water temperature, ensuring system reliability and optimal conditions for coral growth.

To scale up restoration efforts, Delta has enhanced the new coral culture facility with a custom tank control and monitoring system, energy monitoring system, alarm systems, and surveillance trackers.

To date, this initiative has received over $2 million in support from its donors, including Delta (approximately $1.7 million) through contributions to the Garden City Fund, NParksâ?? registered charity and IPC.

What are the key parameters Delta will evaluate to optimize the coral culture facility's potential for large-scale coral cultivation?

Restoring corals in an urban setting like Singapore is a challenge. Our man-made surroundings require a unique blend of advanced technologies tailored to protect coastal and climatic conditions.

Deltaâ??s environmental sensors and adaptive lighting can help create controlled conditions to support marine habitats, complementing natural environmental factors essential for coral restoration. This helps support optimal growth conditions for coral nubbins, while minimizing energy consumption. The energy monitoring system also helps to track and manage power usage, ensuring energy efficiency throughout the facility, aligning with our commitment to efficiency.

In addition, the VTScada System, provides remote monitoring and always-on connectivity allowing for immediate alerts on any environmental changes, enabling quick responses to protect the coral. The comprehensive monitoring system ensures efficient management of water parameters for optimal operation and maintenance. Delta will conduct quarterly check-ins for the foreseeable future to ensure the equipment is well-maintained and operates at peak efficiency.

Give an overview of Delta's sustainable approach to the 100K Corals Initiative, such as the use of green materials or a low-carbon supply chain.

Delta is committed to environmental stewardship and is working to embed sustainability into the 100K Corals Initiative. These can be seen in the:

- Energy-efficient systems: Delta leverages its expertise in smart industrial automation and utilizes intelligent automation such as Programmable Logic Controllers (PLCs), Human-Machine Interfaces (HMIs) and energy monitoring system to optimize energy consumption in the facility, ensuring systems operate only as needed while minimizing energy waste; and to reduce the overall operational carbon footprint by maintaining precise control of energy-intensive processes like lighting and temperature regulation.
- Water Conservation and Recycling: Deltaâ??s control topology helps maintain water temperature within the desired range, preventing chiller overruns and reducing energy waste.

- Smart Monitoring and Data Analytics: IoT-enabled sensors and AI-driven systems are used for real-time monitoring of environmental conditions, enabling precise control and minimizing resource wastage.

Deltaâ??s approach exemplifies how technology and sustainability can come together to address critical environmental challenges, ensuring that the 100K Corals Initiative contributes meaningfully to marine ecosystem restoration while minimizing its ecological impact.

How can the NParks-Delta Research Programme support future cross-sector collaborations and research opportunities for coral restoration?

Delta places great importance on forming international partnerships to address complex sustainability challenges like biodiversity and coral reef restoration. Collaborating with NParks on the 100K Corals Initiative showcases how public and private expertise can come together for collective action to protect biodiversity.

Committed to a smarter, greener future, Delta applies its technical expertise to drive meaningful sustainability efforts and welcomes further collaborations.

How do you define Delta's overall commitment to ecological sustainability and marine biodiversity resiliency?

At Delta, environmental conservation is deeply embedded in our ESG (Environmental, Social, and Governance) strategy because we understand the intricate connections between climate change and nature. Coral reefs, for example, are vital ecosystems that protect marine biodiversity, provide livelihoods, and safeguard coastlines, yet they are facing unprecedented threats from ocean heatwaves and acidification.

As a company committed to sustainability, Delta sees conservation not just as a responsibility but as an opportunity to apply our expertise in energy-efficient and innovative technologies. By integrating conservation into our ESG strategy, we align our business objectives with global goals like biodiversity preservation and climate change mitigation, ensuring a positive impact on the planet and our communities.

What ESG trends and opportunities would Delta Electronics advocate for in the future?

Delta is committed to advancing sustainability and addressing global challenges through innovation. We have pledged to achieve the goal of 100% renewable electricity and carbon neutrality by 2030 for all of Deltaâ??s global operation sites, and achieve net-zero greenhouse gas emissions by 2050. Using the power of technological innovation, we are committed to pursuing business growth through sustainable development.

The key ESG trends and trends Delta advocates for include:

- Transition to net-zero emissions: Delta emphasizes the urgent need for businesses to align with global carbon neutrality goals by adopting low-carbon technologies, improving energy efficiency, and integrating renewable energy into operations. Opportunities lie in advancing green buildings, energy storage, and electric vehicle infrastructure to accelerate this transition.
- Circular economy practices: Delta supports the adoption of circular economy principles by promoting sustainable product design, responsible material sourcing, and recycling initiatives to reduce waste and environmental impact. The company advocates for developing solutions that enable lifecycle management and resource optimization.
- Digitalization for sustainability: Delta recognizes the role of digital transformation in achieving sustainability, encouraging the use of IoT, AI, and smart automation to enhance resource efficiency and operational sustainability. Opportunities exist in enabling smart cities, energy-efficient data centers, and intelligent manufacturing systems.
- Climate adaptation and resilience: As climate risks grow, Delta advocates for solutions that enhance resilience, such as renewable energy systems, disaster-proof infrastructure, and sustainable water management practices.
- Investing in green innovation: Delta highlights the importance of R&D in green technologies to drive innovation across sectors, particularly in energy, transportation, and building solutions.
- Promoting sustainable supply chains: Delta emphasizes the need for transparent, low-carbon, and ethical supply chains to foster sustainable practices across industries.
- Biodiversity Conservation: Delta underscores the importance of preserving ecosystems to protect biodiversity, as reflected in its coral restoration projects and initiatives to protect natural habitats. This includes the Chaojing Bay Project, where Delta collaborated with marine institutions to restore coral reefs, cultivating and transplanting over 1,000 coral colonies by the end of 2022. Delta also became the first Taiwanese corporation to serve as an official observer at COP16, sharing its biodiversity policies and commitment to restoring 10,000 coral colonies by 2025.
- Stakeholder Engagement and Education: Delta advocates for stronger collaboration between governments, corporations, and communities to raise awareness, share knowledge, and collectively address sustainability

challenges.

Delta became an early adopter of TNFD with its first official disclosure in accordance with the TNFD v1.0. This marked an important step to safeguard nature & biodiversity in our operation. Through Deltaâ??s coral restoration scheme and the partnership with NParks, we see great opportunities to expand our impacts and contribute to nature conservation beyond our own supply chain.