

BUSINESS REVIEW - GREEN TECHNOLOGIES

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YINSON GREENTECH KEY INVESTMENT UPDATES FYE 2022



Advanced hydrofoil system for electric vessels

- Investment announced in 2020.
- Technology incorporated into Hydroglyder, a Yinson-developed fully electric harbour craft.
- Concept unveiled at Singapore Maritime Week 2021, model showcased at Nor-Shipping 2022.
- Prototype vessel currently being built; on track for full test in Q1 2023.
- Lift Ocean received second round of investment, NOK 20 million.



E-bike and swappable batteries

- Investment announced in June 2021.
- Generation 3 swappable batteries introduced in January 2022.



Autonomous systems for EVs

- Co-investment with SMRT Ventures announced in June 2021.
- Tri-party agreement signed with National University of Singapore and YGT to test and demonstrate autonomous bus technologies.



Marine energy storage solutions

- Investment and MoU for collaboration announced in October 2021.
- Awarded grant with Yinson and other partners, as part of Goal Zero consortium, from the Singapore government for electric cargo vessel project.
- PwrSwäp, swappable marine battery solutions launched in October 2021.
- Good pipeline of projects and recent collaboration with Vallianz for a fully electric tug in Singapore.



Autonomous and robotic technology

- Investment signed in November 2021.
- Team expansion for technologies development in Kuala Lumpur.



EV charging solutions

- Term sheet signed in October 2021, followed by joint venture agreement in February 2022.
- Deployment of new chargers in multiple locations.
- Collaboration with Hyundai for chargEV subscription services.

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YGT

YINSON GREENTECH GOALS AND STRATEGIES

GOALS

- Establish green technologies as a major revenue stream for Yinson.
- Develop profitable, disruptive businesses, based on clean technologies and digitalisation.
- Achieve a net zero business.

STRATEGIES

Short to medium-term (1 to 5 years)

- Identify and invest in strategic green technology companies and develop assets within the marine, mobility and energy segments.
- Relentlessly drive innovation in alignment with government incentives and industry trends.
- Build low-carbon businesses serving commercial and industrial customers, supporting their own net zero ambitions.

Long-term (6 to 10 years)

- Accelerate business growth by working with like-minded partners and attracting investment capital.
- Establish Yinson as a recognised brand within net zero technologies and businesses.
- Develop a net zero solutions platform capable of adapting and incorporating novel technologies.

MARKET OVERVIEW

The world is seeing innovations and advancements in green technologies developing at a phenomenal speed, catalysed by increasing energy demand and a global movement towards clean energy sources. In the period from 2020 to 2030, the global green technologies and sustainability market is expected to grow at more than 20% per annum. Global primary energy consumption is expected to increase by approximately 50% by 2050, with global electricity demand more than doubling over the same period.

Despite the pandemic, electric cars had a record year in 2021, with Europe overtaking China as the largest plug-in market and sales more than doubling compared with 2020 and tripling when compared with 2019. Global electric car stocks increased by 43% in 2020 compared to 2019, caused by the rising competitiveness in the EV market and national fiscal incentives. In line with this growth, the EV charging infrastructure market is expected to boom, with market size anticipated to reach almost USD120 billion by 2027 – up from only USD20 billion in 2019.

With energy storage and renewables set to play increasingly important roles in powering EVs globally, we also foresee great growth in the energy storage sector. Battery market size is expected to grow by between 10% and 15% annually between 2020 and 2027, reaching over USD300 billion by 2027. Experts believe that improved battery technology could reshape industries that contribute most to carbon emissions, especially transport and energy production.

The electrification of the marine sector is also gaining momentum worldwide, with electric technologies and energy storage emerging as alternatives to decarbonise the maritime shipping industry especially in short sea transportation. Experts agree that while much of the shipping sector is committed to decarbonising, the availability, technological development and infrastructure for alternative fuels is a major challenge that needs to be addressed for the sector to help limit global temperature rise to 1.5°C in line with the Paris Agreement.

In COP26, more than 40 nations signed up to the Breakthrough Agenda, making a commitment to align standards and coordinate investments to speed up clean technology production to bring forward the tipping point at which green tech is more affordable and accessible. The first five breakthroughs stated within the agenda are clean electricity, EV, green steel, hydrogen and sustainable farming.

With these sectors demonstrating strong outlooks, we believe that Yinson's focus on building a green ecosystem within and between the marine, mobility and battery segments provides solid opportunities to deliver greater value to our stakeholders.

YEAR IN REVIEW

YGT was established in September 2020 with a clear minded purpose to accelerate the transition to a net zero world through investments in novel green technologies within the marine, mobility and energy segments.

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Our earliest investment was in the area of marine technology through Norwegian start-up Lift Ocean in late 2020. YGT and Lift Ocean developed the concept for Hydroglyder – a passenger harbour craft equipped with advanced hydrofoil technology, which was showcased during the Singapore Maritime Technology Conference 2021 and Nor-Shipping 2022. Work is progressing well, and the prototype will be launched early in 2023.

In September 2021, Yinson, as part of a consortium called Goal Zero, was awarded funding to develop, deploy and commercialise a fully electric cargo vessel with interoperable swappable batteries and charging infrastructure solutions by the MPA and SMI. In the consortium, YGT will spearhead Goal Zero's overall programme management and commercialisation, while Seatech Solutions is the lead of the consortium, developing vessel design and system integration. As the second busiest port in the world, attracting around 130,000 vessel calls per year, the Port of Singapore sees decarbonisation as a top priority. YGT, which is headquartered in Singapore, is excited to support the transformation of Singapore into a sustainable global hub port.

In October 2021, we became a cornerstone investor into Shift, a Canada-based energy storage solutions company working to lower or eliminate dependence on fossil fuels in marine and industrial applications. Both parties also concurrently entered into a binding MoU with the intention to form a joint venture to accelerate the large-scale rollout of Shift's solutions in Southeast Asia and beyond. The partnership leverages Yinson's strong presence in Southeast Asia to offer Shift's business solutions to marine, port and other industrial energy storage sectors, as well as to establish service and assembly hubs for energy storage and battery swap solutions.

Our investments into marine tech draw synergies from Yinson's experience in the offshore technologies and applications, and ultimately aim to contribute to a globally integrated, technologically advanced clean logistics ecosystem.

On the mobility side, we are actively participating in the development of EV infrastructure in Malaysia and Singapore. Just weeks ago, we launched our electric fleet leasing service, which provides full-fledged, affordable and reliable leasing of fleets to companies in Singapore and Malaysia. Through this Mobility as a Service offering, we aim to help businesses easily transition from traditional internal combustion engines to EVs.

Concurrently, we also formed a joint venture with GTMA to develop and operate chargEV, Malaysia's largest EV charging network. Even prior to the formalisation of the joint venture, our team has been working hard to lay the groundwork for a substantial upgrade of the chargEV infrastructure, and we have now swung into high gear to implement our plans. With the combined strengths of YGT and GTMA, EV users in Malaysia can look forward to planned improvements including the repair and upgrade of existing charging stations, improved customer service standards and the development of a new back-end system and mobile app.

Earlier in 2021, we invested in Oyika – a start-up that aims to lower the barriers to EV adoption starting with a battery swap service bundled with an electric motorbike, made available through affordable subscription plans. Oyika's solution has been successfully implemented in Indonesia and Cambodia, and with Yinson's support Oyika is now working to expand to other regions. Southeast Asia is the world's largest motorbike market, with motorbikes constituting up to 85% of vehicle population. Of these, less than 0.1% are electric. Each internal combustion engine motorbike on the road replaced by an e-motorbike saves about one tonne of CO₂ equivalent per year. Thus, a significant reduction in carbon emissions can be made through the introduction of such EV solutions.

We kicked off our investments into autonomous vehicle technologies through a co-investment with Singapore's SMRT Ventures into MooVita in June 2021. The co-investment aims to accelerate the development, commercialisation and international expansion of comfortable driverless solutions for public transportation and the urban environment, leveraging on Yinson's experience in logistics and energy; as well as SMRT Ventures' experience in Singapore's transport ecosystem. We subsequently acquired a controlling stake in eMoovit, MooVita's operating arm in Malaysia, in December 2021.

These investments into autonomous solutions opened the doors for us to enter into a tri-party research collaboration agreement with the National University of Singapore and MooVita, to develop a Level 4 autonomous bus shuttle to operate within the university campus.

We have made significant strides in 2021 within all three segments, and we are beginning to see our investments contribute to the strengthening of a green ecosystem that acts as an enabler for the energy transition.

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EXTERNAL VARIABLES, RISKS & OPPORTUNITIES

EXTERNAL ENVIRONMENT

- Demand for sustainable development has increased as the push towards net zero becomes a global goal.
- Governments across the world are putting significant incentives into green technologies, propelling the growth of the market.
- Green technology segments that are seen as most promising are getting increasingly saturated with early investors and start-ups.
- The growth in the market is bringing about many novel innovations, with investors hoping they have backed the new unicorn.
- Product and commercialisation costs for novel green technologies are immense, making green tech innovations harder to be commercialised for the industry.
- Development of robust regulations to govern green technologies applications are struggling to keep pace with the rapid growth in the green technologies market.
- Regulatory changes needed for the deployment of novel technologies are slower in the approval process with limited sandboxing permits.

RISKS

- New and novel green technologies can be challenging to commercialise, caused in part by high product costs.
- A lack of cost effective and reliable research institutions could delay the development of green technologies.
- Corporations that do not adapt their business models to align with green consumer choices risk the longer-term viability of their business.
- Investors and companies risk backing a novel technology that fails, causing monetary loss.
- Green tech businesses that are not prepared for or familiar with the evolving regulatory frameworks may risk non-adherence to those regulations.

OPPORTUNITIES

- Investors and businesses that get involved in green technologies that take off commercially have the opportunity to increase profitability and be leaders in the green tech segment.
- Businesses that establish research partnerships with reliable research institutions have a competitive advantage when developing new technologies.
- Companies whose business models integrate green consumer choices may be more resilient as global trends evolve to favour a greener way of life.
- Businesses that are able to keep their business practices up with evolving regulatory frameworks insulate their business from regulatory risk, boosting investor confidence.

STRATEGIC RESPONSE TO OUR RISKS & OPPORTUNITIES

Building a green ecosystem of energy supply

As how all novel technologies start out, green technologies are currently relatively expensive compared to their fossil fuel-based predecessors, putting them out of reach to most. YGT aims to bring new business models that make these technologies affordable by balancing the capital and operational expenditure gains for the markets we are addressing. The lower these technologies are priced, the more accessible it can be for everyone, and this goes in a cycle until these cleaner options are business as usual. We believe that reaching this critical mass everywhere is key to meeting the ambitious climate targets set by the Paris Agreement.

We aim to increase the accessibility and affordability of green technologies by building low carbon businesses, serving commercial and industrial customers who wish to achieve their own net zero investments. Working together with businesses and partners who have this common goal ultimately contributes to a robust ecosystem that runs on clean technologies. A strong clean energy infrastructure creates an environment that encourages even more innovation, as the market matures alongside rising investor confidence in the viability of the segment.

We believe that our experience in energy infrastructure and technologies, especially in the marine, mobility and energy segments, allows us to take a leadership position to drive this change. In line with the Group's overall net zero plans, such an ecosystem is a key enabler for our renewables business to thrive, as well as for the decarbonisation of our offshore production business.

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Strategic green technology investments

Selecting the right strategic green technology investments are a key way we manage the risks and seize opportunities arising from the external environment. This is also our edge in this market. Our investment decisions are guided by our clear-minded purpose of building an interconnected, integrated green ecosystem, which take geographical and Group synergies into account.

Geographical synergies

We prioritise our strategic investments to geographical areas where Yinson already has an established operating presence and where the governments have a strong direction for decarbonisation. This allows us to leverage on factors such as manpower and resources, connections to local stakeholders, strong reputation, our established position in the supply chain and local knowledge; which are key to maximising operational efficiencies.

For example, we established YGT's headquarters in Singapore, which is home to Yinson Production's projects office and part of our Global Corporate Advisory Office. Our long history and good industry standing in Singapore paved the way for our participation in the Goal Zero consortium, which won the harbour craft electrification grant from MPA and SMI. Such a track record has helped to build confidence in our ability to take on energy infrastructure projects in Singapore, such as our collaboration with SMRT Ventures.

In Malaysia where we have our global headquarters and are currently listed, we have a strong reputation as a Malaysian company that has successfully globalised. We have been contributing economically and socially to Malaysia for many years, backed by a stellar governance and compliance track record. Plus, we have been part of the Malaysian supply chain since our founding as a logistics company in 1983, and more recently through FPSO Helang. Our investment into chargEV is a good example of how our good standing in the country opened up new opportunities, with the Government and other stakeholders placing their trust in us to ramp up the adoption of EVs in the country.

Marine, mobility & energy focus

There are many areas of green technologies with great potential. However, we are selective to prioritise technology areas which most strategically align with our current position, and our plans for growth. Thus, we have narrowed our focus on the three areas where we already have existing expertise, knowledge and resources within the Group – marine, mobility and energy.

We believe that the collective knowledge and experience that we already have in these segments as a Group helps us to make wiser investment and operational decisions.

EXAMPLES OF SYNERGIES WITH YINSON'S DIVISIONS

Marine	Mobility	Energy
<ul style="list-style-type: none"> → Marine technologies such as 3D printing → Marine experts, such as naval architects → Floating microgrids 	<ul style="list-style-type: none"> → Origins in logistics and transport → Governance and regulatory experience in energy and infrastructure 	<ul style="list-style-type: none"> → Energy supply chain → Battery, microgrid, wind turbine technology

Our investments also take into account the kind of experience and resources that we have at Group-level, such as project management, corporate functions, our financing and investor base and our existing supply chain.

Driving innovation in line with government incentives & industry trends

We aim to relentlessly drive innovation in line with government incentives, including grants, subsidies and tax breaks; as well as global industry trends. Aligning our innovation efforts this way lowers the cost of implementation and commercialisation and provides a ready supportive market for commercialisation of the product. We believe this is a good way to significantly lower the risk of our ventures.

For example, MPA and SMI in Singapore have made a commitment to overcome the serious challenge of pollution caused by harbour crafts, devoting sizeable funding for research and development of new technologies. Importantly, this shows a strong intent from the authorities to electrify the harbour craft industry, aligning with Yinson's goals for decarbonisation.

The Malaysian Government's Low Carbon Mobility Blueprint envisions a holistic EV ecosystem that builds up EV penetration rates and a well-planned infrastructure framework to support growth in the segment. Our investment into chargEV ties in strategically to the blueprint, providing assurance of government support for our plans to develop chargEV's infrastructure across the nation.

CLOSING REMARKS

Having now made several investments into various businesses that we believe are foundational to the ecosystem that we hope to build, our focus is now to learn from them in order to integrate, synergise and grow.

We are on an exciting journey as a company, embarking into areas which are new, not only to us, but to the world as a whole. Leaning on our strong business fundamentals and with the support of like-minded stakeholder groups that are aligned towards our vision of a low carbon future, we are confident that our efforts will contribute to a cleaner, more sustainable future for everyone.