Net Zero Innovation Handbook: Australia & New Zealand

August 2022

UK Government

GREAT
BRITAIN & NORTHERN IRELAND

Contents

"Climate change is the critical issue of our time"

The Glasgow Climate Pact at COP26 outlined how vital it is to keep 1.5 degrees alive, by acting to reduce our carbon emissions over the next decade.

Louise Cantillon

British Consul-General Sydney and Deputy Trade Commissioner, Asia Pacific – Australia & New Zealand

UK Department for International Trade

COP26 also saw business and government working together through our Race to Zero Campaign, with many organisations setting goals for reaching 'net zero' emissions and working hard to identify solutions that will accelerate their decarbonisation efforts and lead us towards a more sustainable future.

In Australia and New Zealand, the UK Government is building on this ambition through the Net Zero Innovation Mission, a collaboration between the UK Government's Asia Pacific Digital Trade Network, PwC and Tech Nation.

Throughout the Mission, we have engaged hundreds of Australian and New Zealand businesses to understand their decarbonisation plans and where the toughest parts of their journey lie. With these insights we have developed this handbook, which articulates the challenges organisations face and showcases some of the UK's innovative technology solutions. From digital carbon accounting, emissions capture and energy storage, to Scope 3 reporting and traceability of environmental, social and governance (ESG) metrics, demand for solutions is high.

The UK is leading by example by going further and faster to cut carbon emissions while growing our economy. In 2019, the UK became the first major economy to pass into law a domestic requirement for net zero emissions by 2050. Between 1990 and 2019, the UK economy has grown by 78% while our emissions have decreased by 44%. This is the fastest rate in the G7 and shows that the growth in a green economy is tenable.

The UK has innovative offerings across the clean growth economy and a strong commitment to the green revolution. Over the next six months we will build on this Mission by facilitating match making opportunities between businesses. I encourage you to speak to my team to learn more about the Net Zero Innovation Mission and how we can connect you with UK expertise.

Overview of the Net Zero Innovation Mission

During 2022, the UK Government's Digital Trade Network is leading an Innovation Mission to connect UK clean growth companies with organisations across Australia and New Zealand to accelerate decarbonisation

The Net Zero Innovation Mission aims to accelerate decarbonisation action in the region through connecting organisations in Australia and New Zealand that have a clear decarbonisation need with UK climate tech companies that have innovative technologies.

The four phase process of the Net Zero Mission identifies and engages organisations in Australia and New Zealand and climate tech companies in the UK; uses screening criteria to shortlist this cohort for the Mission; and supports matchmaking through showcase events.

Phase 1: Consultation and Opportunity Identification

Phase 2: Promotion to UK climate tech companies

Phase 3: Shortlist and Showcase

Phase 4: Match-make and Mandate
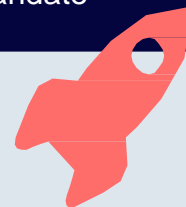
We've identified latent demand in A/NZ organisations for climate tech solutions…

Outreach

600+
Australia /
New Zealand
organisations
contacted

500+
UK climate tech
companies
reached by our
messaging

Challenge areas identified

Across Australia and New Zealand, our insights revealed the challenge areas that are most in need of UK solutions include:

- Digital carbon accounting
- Scope 3, supply chain emissions
- CO_2 monitoring / data services
- Energy storage
- Industrial process efficiency
- Reducing climate impact on customers
- Agriculture (agri-tech solutions in robotics, low GHG fertilisers, soil carbon sequestration)

# …with potential to create <mark>partnership opportunities</mark> for innovative UK climate tech companies

UK climate tech is a growing market…

- Forefront of global boom in investment
- UK climate tech start-ups saw a 210% growth in investment year-on-year in the 12 months prior to H1 2021[1]
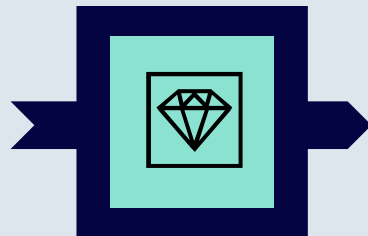
With innovation across Net Zero challenge areas…

- The UK saw more climate tech companies receive venture funding than any other European country between 2013 and H1 2021[2]
- Solutions range from mobility and transport, to financial services, to carbon capture removal and storage.
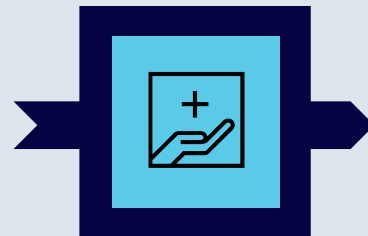
Initial outreach has highlighted key areas where UK climate tech could help…

- Solutions are required across a range of sectors including agriculture, energy and insurance.
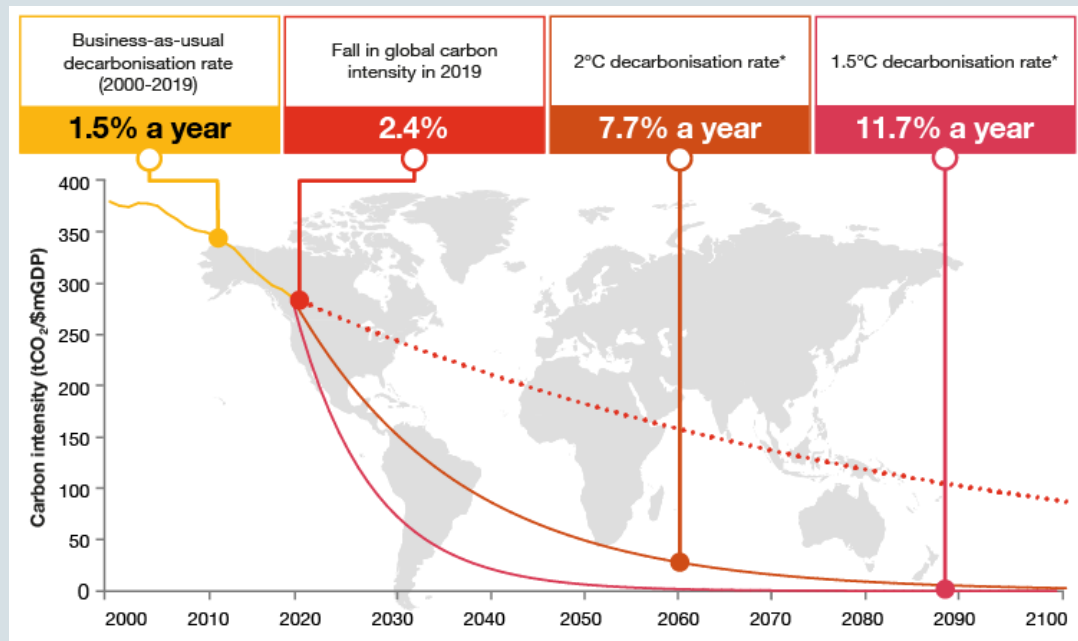- Solutions in demand are agri-tech, energy and carbon accounting, amongst others.
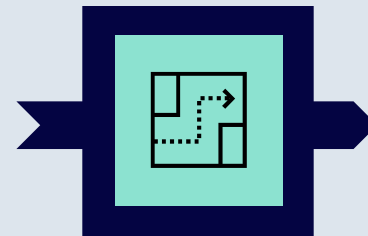
But has also suggested barriers to UK companies' overseas entry

- Understanding of A/NZ market requirements.
- Understanding of decarbonisation priorities.

What is the decarbonisation challenge in Australia and New Zealand?

The world needs to decarbonize 5x faster to meet 1.5°C aligned climate goals. Organisations in all sectors are under pressure to record, report, and reduce emissions

Business-as-usual decarbonisation rate (2000-2019)	Fall in global carbon intensity in 2019	2°C decarbonisation rate*	1.5°C decarbonisation rate*
1.5% a year	**2.4%**	**7.7% a year**	**11.7% a year**

- The world needs to **halve emissions by 2030**, just under two business cycles

- This requires **rapid transformation of every sector** of the economy

- **Businesses are facing ramping up pressure** to cut emissions faster and robustly report progress, all while the net zero playbook is still being written

Climate change has emerged as a critical issue for business leaders across the globe

In response, Australian and New Zealand governments have committed to carbon neutrality by 2050.

The pressure to decarbonise

In Australia, net zero commitments are predominantly market driven.

Businesses generally do not face substantial pressure through regulatory obligations (except for some heavy polluters such as energy generators and mining companies). However, recent policy signals from a new government indicates this may change in the near future.

In New Zealand, the government is mainly driving regulation and net zero demand.

For example in 2020, the government launched a NZD 70 million industry decarbonisation fund and also became the first country to mandate climate risk reporting in line with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations.

However…

- Recently announced **global reporting standards** from the International Sustainability Standards Board will put requirements on organisations to disclose sustainability action, particularly around Scope 3 emissions.

- Additionally, the rise in **sustainability linked loans** is facilitating significant growth in environmental reporting and investment.

- With more scrutiny from financial institutions and investors, and increasing regulation, organisations in A/NZ are facing growing pressure to decarbonise.

The pressure to decarbonise has <mark>created an opportunity</mark> for knowledge sharing and collaboration on net zero

The opportunity created

There is still significant action required to meet the goals of the Paris Agreement and limit global warming to 1.5°C:

- In Australia only 36% of the ASX200 disclose a net zero target[1].
- In New Zealand, larger companies are only now starting to develop net zero strategies.

This lack of progress, coupled with the need to reach "net zero" emissions by mid-century, and with new regulations looming, means businesses are under pressure to rapidly identify solutions and take action.

The opportunity?	To share knowledge and generate trade between the UK and A/NZ.
Can the demand be met locally?	The demand for innovative climate tech solutions can be partially met by A/NZ's growing landscape of climate tech companies. However UK climate tech companies offer unique solutions and have the ability and capacity to provide further support.
Why the UK?	The UK is looked to by many organisations as a leader in net zero decarbonisation - it is the top country in Europe for climate tech investment and among the top three globally, alongside China and the USA from 2013 to H1 2021[2].

[1] Source: PwC, ESG Reporting improves among the ASX200, October 2021
[2] Source: PwC, State of Climate Tech, 2021

Decarbonising at this pace and scale creates challenges for organisations from all sectors.

We interviewed a number of organisations in Australia and New Zealand committed to Net Zero, and through that identified initial priority sectors and common Net Zero challenges.

Australia

Financial services

Retail & Consumer

Real Estate

Agriculture

New Zealand

Agriculture

Energy

Public sector / local government

Education

➔ Emissions capture across the value chain
➔ Overall complexity of scope 3 reporting
➔ Measurement and traceability of ESG KPIs
➔ Recording and reporting against historical change
➔ Agriculture specific: Measurement of soil carbon change to stand up to audit scrutiny to participate in carbon credit generation schemes (generation of ACCUs in Australia)

The interviews highlight the mix of challenges faced by Australian and New Zealand organisations depending on the stage of the net zero journey they are on. The measurement, accounting and reporting of scope 3 emissions upstream and downstream is definitely difficult, especially for those with international suppliers or in the energy sector. Interviews reveal that a key challenge is capturing data efficiently to allow annual analysis.

❝ The bigger priority will be getting a better sense of scope 3 footprint over time. The first look will be heavily estimated. ❞

❝ Accounting piece is also a major area to provide analysis. e.g. to aid in decision making model to understand one input over another based on emissions profile. ❞

Similarities and differences in the journey to Net Zero

Key insights and challenges identified throughout the interview process:

Australia

Financial services	Retail & Consumer	Real Estate	Agriculture

New Zealand
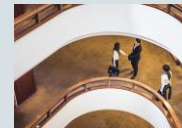
Agriculture	Energy	Public sector / local government	Education

➔ Not promoted by regulatory environment

The lack of legislative mandates for ESG related disclosures has led to organisations having to take the leading role and identify quality solutions to drive net zero campaigns. As a result, digital solutions aimed at simplification of data recording, analysis and reporting are key drivers for Australian organisations' net zero commitments.

➔ 'Best in class' industry leaders

Some organisations are setting a high bar for net zero targets and ESG disclosures to demonstrate strong commitment and a future-focused mindset to their customers and stakeholders, and encourage competitors to act accordingly. They will need digital solutions to help them deliver.

➔ Limited by technological capacity

Most organisations are simply challenged by the lack of technology and in-house capacity to drive significant emission reductions at the scale and pace they desire. Integration of datasets and multi-source material for decision-making is a notable challenge for almost all the New Zealand organisations interviewed.

➔ Use of partnerships to collaborate information

Public sector/local government institutions are less focused on bottom line/regulatory commitments and instead champion the use of multi-stakeholder collaborative partnerships to create long-term solutions to decarbonise.

The UK is uniquely placed to meet decarbonisation priorities

Australia and New Zealand have some capabilities but there are clear gaps that could be complemented by UK solutions

	AUSTRALIA	NEW ZEALAND
Current coverage	• **Agri tech** and **water tech** - good capabilities here due to drought challenges over the years. • **Energy** - South Australia and Victoria both have strong renewable policies. Victoria has a A$1.6bn dollar fund focusing on decarbonisation and often looks for inward investment.	• **Emissions measurement** is available but simplistic.
Gaps in the market	• "Climate tech" hasn't got traction yet as a specific sector and instead is combined with AI, Fintech, Energy Tech. • **Energy -** despite the funding focus, there are still opportunities for UK companies. • Growth opportunities around; **CCS, Transport and Logistics,** and **green buildings.** • **Digital carbon accounting and reporting**.	• **Digital dashboarding** - there are no 'ready for market' solutions. Energy companies interviewed are looking for this. • Emissions measurement is available, but the **view of the supply chain**, and how to manage the **supply chain emissions** is not well progressed. There is a desire to combine the two - **emissions data collection with real time progress to reduction.**

Climate tech companies offer unique impact through potential digital solutions

The potential impact of digital solutions

70% of the UN's Sustainable **Development Goals (SDGs) targets** can be directly supported by technology innovation

Deployment of digital technologies will

accelerate progress toward the SDGs by
↑ **22%**

mitigate downward trends by
↑ **23%**

Green AI could be deployed to reduce global emissions by 4% by 2030, an amount equivalent to the annual emissions of Australia, Canada and Japan combined

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An example of a climate tech solution area seeing market traction is Digital Carbon Accounting

As companies pledge to reduce their greenhouse gas emissions and disclose emissions in line with new regulations, they require:

- solutions to more robustly collect, aggregate and validate data (i.e. carbon measurement and reporting); and

- flexible outputs that respond to evolving standards, commitments and policy.

Digital carbon accounting solutions can automatically ingest data from ERP systems and other sources, enabling companies to move from proxy data to primary data, reducing the cost of compliance and meeting enhanced regulatory requirements.

" Sustainability research firm, Verdantix, estimates that the changes could result in $6.7bn (£5bn) of spending over the next three years on consulting, legal, assurance and digital solutions. "

" An area we have identified as a key component that digitech could support is how to get a better understanding of scope 1,2,3 emissions of the supply chain. "

What have we learned about UK climate tech companies?

The UK remains at the forefront of the global boom in climate tech investment

Climate technologies are technologies that are explicitly focused on reducing green house gas (GHG) emissions, or addressing the impacts of global warming. These are technologies that mitigate, help us adapt to, or enhance our understanding of climate change.

Regional leader
The UK is top for climate tech investment in Europe and third globally, behind only China and the USA

High VC funding
The UK saw investment levels in excess of US $2.7bn between H1 2021 - H2 2022

Leading innovation
More UK climate tech companies than any other country in Europe in 2013 - H1 2021.

As a result, the UK is uniquely positioned to support ambitions to adopt climate tech around the globe.

North America US$56.6bn

Europe US$18.3bn

China US$9bn

Most active investment hubs (H2 2020–H1 2021)

1	San Francisco Bay Area	4	New York, NY, US
2	**London, UK**	5	Boston, MA., US
3	Berlin, Germany		
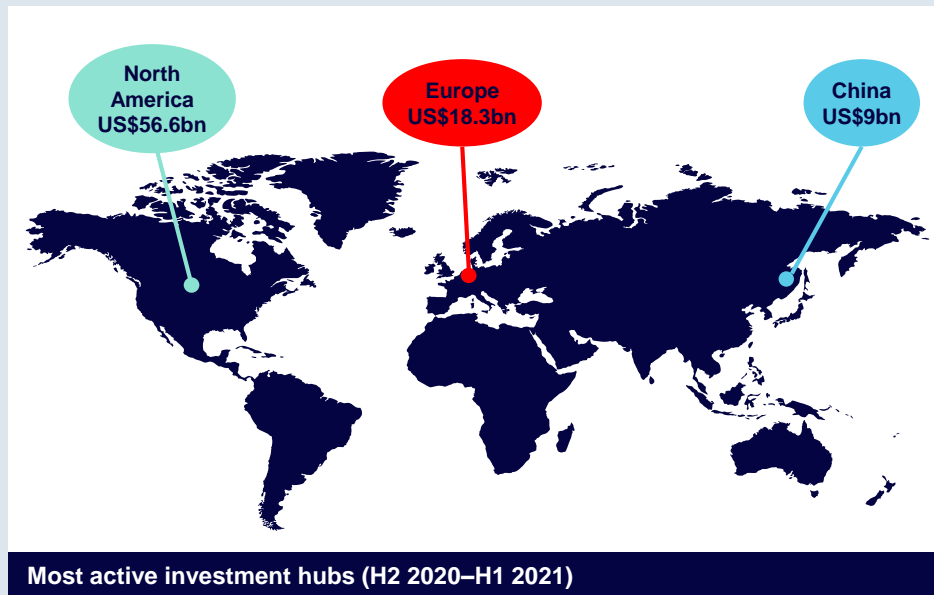
UK climate tech innovations are emerging across varied Net Zero challenge areas and sectors

For instance, PwC's Future50 report identified a selection of emerging technologies according to eight challenge areas. These are relevant to many of the gaps identified in the A/NZ market.

Energy
Gaps in A/NZ market

OXFORD PV™ · Highview Power® · equiwatt · enertechnos · H₂GO POWER · MARINE POWER SYSTEMS · BRAMBLE · Standard Gas · HABITAT ENERGY · Lake Parime · Gommyr Power Networks

#Microgrids, #Blockchain, #SolarGlass, #OceanEnergy, #Hydrogen, #Fusion

Mobility
Gaps in A/NZ market

RIDING SUNBEAMS · VELOCYS · petalite · ZEROAVIA · smart green shipping · signol

#IoT, #Hydrogen, #Hyperloop, #Microbility, #Mobility-as-a-service, #AutomousVehicles, #SustainableFuels

Food, land and agriculture

BETTER ORIGIN · vertical future · Desolenator · Small Robot Co · BeadaMoss Sustainable Sphagnum · ARC Marine ACCELERATING REEF CREATION

#PrecisionAgriculture, #SyntheticBiology, #GIS, #Robotics, #VerticalFarming, #IoT, #PrecisionFermentation

Industry, manufacturing and resources

Carbon8 · NOTPLA · Hummingbird Technologies · ECONIC · greyparrot · Lithion · MIRICO · PLASTIC ENERGY

#Nanomaterials, #smartmaterials, #Blockchain, #Spectroscopy, #GIS, #AI

Built environment
Gaps in A/NZ market

wondrwall® · Adaptavate · MACREBUR · Telensa · INFOGRID · KATRICK TECHNOLOGIES · PAVEGEN · 247 living · welink HOMES

#IoT, #Nanomaterials, #VehicleToGrid, #SolarGlass, #CircularEconomy, #ModularConstruction

Financial services

abundance. · EARTHLY

#Blockchain, #CryptoForGood, #GIS

GHG management
Gaps in A/NZ market

Deep Branch® · carbon clean

#MicroCarbon, #SoilCarbon, #DirectAirCapture, #GIS

Climate change management
Gaps in A/NZ market

Rezatec · yayzy · Emitwise©

#MachineLearning, #CloudComputing, #DataMapping, #AI

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Case studies of UK climate tech innovation

Summary of companies

Emissions measurement and reporting

<u>Net0</u> - *AI based carbon accounting platform to measure, monitor, reduce and offset carbon emissions.*
<u>Yayzy</u> - *Calculate carbon footprint from consumer data and provide personal customer footprints.*
<u>Ditch carbon</u> - *Measure emissions of supplied goods and services, with the data available via an API.*
<u>Supercritical</u> - *Measure and report Scope 1-3 emissions and help to scale carbon removals.*
<u>Spherics</u> - *Scope 3 carbon accounting in the supply chain.*

Supply chain transparency

<u>Circulor</u> - *Supply chain traceability, e.g. of high-risk and impact materials in manufacturing and recycling.*
<u>Manufacture 2030</u> - *Supplier carbon emission measurement, management and reporting.*

Data and ESG risk evaluation

<u>Quantenergy</u> - *Data-led insights to optimise cleantech investment decisions.*
<u>Skenario Labs</u> - *Analytics, risk and portfolio value assessment platform.*

Energy use optimisation

<u>SoftIron</u> - *Computer, network and data centre storage solutions that are efficient and scalable.*
<u>Surple</u> - *Energy usage and engagement platform for utilities and their customers.*
<u>Measurable Energy</u> - *Reduce energy wastage with machine learning-powered plug sockets.*
<u>QLM Tech</u> - *Detecting greenhouse gas leaks through infrared sensors.*

Summary of companies (cont.)

Clean energy and EV infrastructure

<u>Lake Parime</u> - *Offering flexible demand for energy operators, and computing power for the tech sector.*
<u>Petalite</u> - *Innovating a range of rapid charging EV technology.*

Agritech

<u>Small Robot Company</u> - *Regenerative and sustainable farming using robotics and AI.*
<u>Spotta</u> - *Pest control via smart insect monitoring using internet activated traps and real time alerts.*
<u>Lixea</u> - *Converts agricultural by-products and waste wood to produce a greener crude oil alternative.*
<u>Carbogenics</u> - *Convert paper based product waste to biochar to optimise agricultural yields.*

Waste management

<u>Topolytics</u> - *Data analytics to make waste visible, verifiable and valuable.*

Net0

Net0 - AI based carbon accounting platform to measure, monitor, reduce and offset carbon emissions.

SUMMARY

Net0 is a carbon accounting software platform that empowers businesses to measure, monitor, reduce and offset carbon emissions. The cloud-based solution automatically calculates emissions (Scopes 1-3), replacing manual calculations with Artificial Intelligence (AI). Companies use Net0 software to measure their carbon footprint, plan, execute steps to reduce emissions, and share results with investor-grade reporting. Net0 also provides third party certification of carbon neutrality. It is a tech first company - the founders are from tech and AI backgrounds.

IMPACT

Net0 calculates a company's carbon footprint using an activity-based approach which allows businesses to precisely measure their carbon emissions and execute plans to reduce those emissions to achieve carbon neutral status. Stakeholders from vendors to customers can view your carbon footprint in real-time which enables businesses to accelerate the transition to the green economy.

USE CASES / CLIENT EXAMPLES

Net0's solution is created for executives, operations and sustainability managers. Net0 are versatile as to who they can work with so are open to conversations with anyone. They have worked with organisations with complex emissions even for scope 1 and 2 such as cities. They have helped to calculate the emissions footprint of Pune, which has set a target to be India's most sustainable city. They also deal with governments and have an exclusive partnership with the Swiss government and are an official partner of Monaco to help their businesses. Being tech based, they work globally and are certified across jurisdictions.

USP

Net0 say they have a unique ability to automate the emissions calculations across all three scopes, based on their use of AI which for example can be used to automate reading invoices. As the data Net0 uses is direct from source (i.e. invoices), processes can be audited and verified by third parties, enabling investor grade reporting. They are conscious of staying on top of changing accounting regulations and carbon taxes and constantly develop the platform to reflect these. With their approach to Scope 3, Net0 offer vendor outreach to save customers time on surveys and data gathering; they reach out to vendors to get the data required to calculate emissions by vendor.

yayzy

Yayzy - Calculate carbon footprint from consumer data and provide personal customer footprints.

SUMMARY

Yayzy helps organisations and consumers to track, reduce and offset their emissions. Yayzy have three areas of key focus:

- B2B APIs: These APIs allow banks and fintechs to enable their customers to track and offset the carbon footprint of their purchases in real-time, from within the mobile banking app.
- Consumer App: Allows consumers to track their carbon footprint, by connecting via APIs their bank or credit card to see the impact of their purchases in real-time.
- Business: Impact monitoring software for SMEs through a carbon footprint calculator - an easy to use tool which can be used by anyone without domain knowledge.

IMPACT

Yayzy can automatically calculate the carbon footprint of each purchase in real-time. It's proprietary algorithm granularly and reliably categorises each transaction, providing a relevant carbon footprint. Yayzy then enables users to offset their purchases, transaction by transaction or as a monthly Subscription. Its been built with a leading scientist on life cycle calculation using data used by Fortune 100 companies.

USE CASES / CLIENT EXAMPLES

Yayzy have localised data for 150 different countries. It has extensive experience of working within Green banking, Transportation and eCommerce sectors. It's APIs are grounded in 25+ years of academic research, based on the GHG protocol and built with advisory from Dr. Sangwon Suh, a leading scientist on Life Cycle Assessment and Chief Scientist at Vitalmetrics, which has clients such as Google and Disney.

USP

The Yayzy products are interconnected and share data to enrich each other. For instance, the B2B APIs benefit from rapid user feedback and short iteration cycles of the Yayzy app, allowing Yayzy to provide the most granular and advanced carbon footprint calculation. Additional impact data, such as the retailer's carbon neutrality or B Corp status, for each transaction, is also provided.

Ditch ~~carbon~~

Ditch carbon - Measure emissions of supplied goods and services, with the data available via an API.

SUMMARY

Ditch carbon focus on measuring the emissions of supplied goods and services which make up most of Scope 3 for many enterprises. Unlike common spend based methods their methodologies use the individual emissions of each of your suppliers to calculate the emissions. This gives accurate data so you can focus your efforts elsewhere.

IMPACT

Ditch carbon help companies by providing data to support purchasing decisions so buyers optimise for carbon not just price and speed. "Real climate action only happens when we optimise for carbon, by providing our calculations via API your teams can consider carbon for every decision they make."

USE CASES / CLIENT EXAMPLES

- Enterprise wants to measure its carbon footprint:
    - Using our proprietary GHG protocol aligned models we can quickly measure the emissions within your supply chain.
- Enterprise wants to reduce scope 3 emissions:
    - We provide benchmarking for suppliers so you can identify where the big reductions can be made fast, we constantly update our database with the latest company disclosures so when suppliers make progress this is reflected in your emissions numbers.
- Procurement platforms:
    - We integrate with procurement platforms meaning the software you use can work with you towards your net zero objectives.

USP

Ditch carbon's database of emissions data means they can provide an up to date picture of your supply chain footprint. This data is made available via APIs, meaning you can integrate it into everyday decision making at pace.

Supercritical - Measure and report Scope 1-3 emissions and help to scale carbon removals.

SUMMARY

Supercritical assess a company's carbon impact, create an emissions reduction plan and recommend a portfolio of carbon removal offsets. Their passion lies in helping to scale carbon removals. They see removal offsets as the only legitimate route to net zero, as conventional offsets 'pay someone else not to emit', whereas carbon removal technologies actually remove carbon from the atmosphere.

IMPACT

Supercritical only sells carbon removal offsets like direct air capture, biochar and bio-oil sequestration. Research into these carbon removal technologies is costly, and many are still in the early stages of development. Supercritical's platform is a market-maker for these emerging carbon removal solutions, aggregating demand and helping them scale and innovate much faster than otherwise possible.

USE CASES / CLIENT EXAMPLES

Supercritical's customers include Tide, what3words and Faculty. It is also a member of the Tech Zero taskforce – a group of innovative UK tech companies working together to fight the climate crisis and accelerate progress to net zero.

USP

Supercritical exclusively focuses on carbon removal offsets as these are the only type of offset that actively remove carbon. This focus on carbon removal rather than offsets sets them apart from others in the market.

Spherics

Spherics - Scope 3 carbon accounting in the supply chain.

SUMMARY

Spherics offers carbon accounting software which gives an automated, consolidated view of an organisation's operational carbon impact through the value chain. Spherics calculation methodology is science-based and auditable, using machine learning to continuously improve the algorithms and output accuracy; starting with conversion factor averages, and progressing to supersede stated calculated metrics with accurate live data, aligned with continuous improvement product development.

IMPACT

Spherics' impact lies in monitoring scope 3 emissions which starts with a need to understand the environmental impact of day-to-day operations. Spherics does this through procurement data and business activity data. These insights enable businesses to conduct decarbonising projects whilst remaining low impact/neutral in doing so. Spherics' data-enabled approach makes the solutions easy, automated and scalable.

USE CASES / CLIENT EXAMPLES

Spherics are particularly well suited to banking, finance and financial services companies. They are currently working with companies in the UK across construction and finance (under NDA) and will next be working with the Telecoms industry. They work with academic institutions and public sector organisations. Spherics are one of Tech Nation's Net Zero Group.

USP

Spherics are building a unified way of companies, large and small, measuring and reducing carbon emissions and other environmental externalities through a secure B2B compliance framework. All companies globally are connected through their value-chain and Spherics are creating the network to enable carbon accountability and collaboration on decarbonisation strategy at a global scale. Spherics say their USP is the accuracy of their data.

Circulor - Supply chain
traceability, e.g. of high-risk
and impact materials in
manufacturing and recycling.

SUMMARY

Circulor support organisations with a solution to industrial, complex supply chain traceability. Based on AI and Blockchain technology, they use a suite of technologies to track materials, emissions, and compliance, to overcome real-world complexities along supply chains.

The technology has been designed for ease of integration with existing enterprise platforms; data can be fed seamlessly to the blockchain via system integration using APIs with security and authentication protocols. The user-friendly desktop application can also be used for fast manual upload, and the mobile application ensures an inclusive low barrier to entry for participants.

IMPACT

The Circulor System enables suppliers and buyers to follow raw materials through the production process. Materials like cobalt, tantalum and mica are associated with issues such as child labour, slavery, theft of natural resources, environmental damage and human rights abuses, which are common but often not seen by consumers and manufacturers. This level of traceability allows clients to promote sustainable and ethical practices in its supply chain, and provide better transparency for consumers. It also helps with the recycling of complex and/or valuable metals, at a time when competitiveness over these products has never been greater.

USE CASES / CLIENT EXAMPLES

The product has multiple industry applications - across electric vehicles, extractive industries, plastics and recycling and construction. Circulor are working with Vulcan Energy Resources to establish the first lithium traceability and dynamic CO_2 measurement solution for Zero Carbon Lithium TM across the European Lithium-ion battery and Electric Vehicle (EV) supply chain, in a world-first for the lithium sector.

USP

Circulor are a global business with growing teams based in EMEA, NA, and APAC. They have worked with companies like Jaguar Land Rover, Oracle, Sky, Boeing, Mercedes, TotalEnergies, Volvo and BHP. They have won awards multiple awards in the cleantech space and from companies like Bloomberg, and the Future Unicorn Awards.

MANUFACTURE 2030

SUMMARY

Manufacture 2030 provides global corporations with the visibility needed to hit their Scope 3 emissions reduction targets. The cloud-based platform measures, manages and improves the performance of each individual site in a manufacturing supply chain.The platform makes it cost-effective and straightforward for companies to work with thousands of suppliers. Dashboards are intuitive and aligned to the GHG protocols, serving-up reports in a range of tailored and recognized formats.

IMPACT

It goes beyond historical, company-level data and measures in detail each supplier's environmental impacts, including Scope 1, 2 & 3 carbon, energy, water & waste. It also supports plans for reducing emissions in line with reduction targets by giving suppliers access to best practice advice, expert insights and action planning software. Manufacture 2030 doesn't just help suppliers to close in on their targets, but also creates real opportunities for developing supplier relationships, reducing operational overheads, and driving carbon reduction at scale. Unlike other platforms, users can see more than just a view of the supply chain footprint, but see if individual sites are tracking against target, what the gap to target is, and how to close that gap.

USE CASES / CLIENT EXAMPLES

Manufacture 2030 has experience helping buyers from several sectors unlock access to their supply chain. Historically it has specialised in supporting blue chip organisations from Retail and Consumer, Pharmaceutical / Chemical companies, and Automotive (e.g. Toyota) businesses. It is however, open to, and actively pursuing opportunities outside of these key sectors where Manufacture 2030's platform and services align with the company's needs.

USP

Manufacture 2030 focus on closing the gap between supplier and buyer targets via the M2030 Climate Action Program – as well as support from M2030's Climate Action Team, the M2030 Platform provides over 550 best practice actions, which have been developed with 20+ knowledge partners (including The University of Cambridge and WRAP). In addition, this infrastructure is supported by its machine learning features that provide recommendations and targeted actions. M2030 also has various offers to support suppliers such as green finance, discounted partners and PPAs.

SUMMARY

Quantenergy delivers data-led insights to fast track cleantech investment decisions, and drives net zero targets and bottom-line savings for the built environment. Aimed at organisations with extensive building portfolios, the QuantCo2 Platform consumes data from multiple sources into an algorithm to optimise and aggregate clean technology investments, and provide insights on their net zero potential.

The SaaS model uses proprietary algorithms and consultancy services to combine data from numerous sources, to expedite complex calculations, and model granular simulations for: solar PV, battery, heat pumps, and electric vehicle charging. This produces a feasibility report detailing the net zero potential, financial risk analysis and vendor landscape for their portfolio, supporting clients with visibility of long term investment decisions.

IMPACT

Quantenergy brings together regulatory, financial and technical data to demonstrate: risk mitigation options, investment analysis and net zero potential. This granular, quantitative, analysis (at sub-hourly levels) is conducted in a matter of days, rather than months, and at a fraction of the cost of traditional consulting methods.

USE CASES / CLIENT EXAMPLES

Working across real estate (both industrial and commercial) and public and private sectors. Clients of Quantenergy include: Bulb, NG Bailey, Sodexo, central government and local authorities - Greater London Authority, Southend on Sea City council and the London Borough of Merton. Quantenergy was the Project Delivery lead working in collaboration with Energy Unlocked and Eigen Ventures to run an acceleration process to facilitate the creation of a flexible energy marketplace for the Mayor of London.

USP

 The QuantCo2 Platform is currently running a number a projects, where detailed outputs include: optimal technology selection and sizing; vendor selection - using database of 1000+ cleantech products (and growing); investment and payments; and feasibility assessments for evaluating net zero potential property portfolios.

SUMMARY

SkenarioLabs use data and AI to predict the future of sustainable real estate. They support property owners, portfolio managers, banks and insurance companies with objective and transparent risk and value assessments of their portfolio.

Their analytics platform models property based on asset value, ongoing costs, and its energy and carbon performance. With this model, SkenarioLabs can apply different scenarios, for example changing components such as windows, roofs or energy systems, to help companies visualise how to optimise or reduce energy intensity. In addition, they can also calculate the cost of replacing the component, and the impact on the value of the property. This can be done at a portfolio level of hundreds or thousands of buildings.

IMPACT

They help real estate professionals to understand and manage the connections between property values, performance, market and ESG risks with property-unit accuracy at a portfolio level. By analysing all property asset classes, including commercial and industrial buildings, Skenario Labs offer accurate, transparent and objective load origination, monitoring and ESG risk evaluation.

USE CASES / CLIENT EXAMPLES

Operating in 5 countries with 126 clients, SkenarioLabs have supported clients ranging from real estate, banks, local and central governments, such as Colliers, Arup and Nordea. In Slovenia, they are working with a large bank who offers pension funds and is an investor of property portfolios, to review climate stress testing for reporting requirements around carbon intensity. With local authorities, SkenarioLabs can support local area energy planning, and provided data and insights for city planning.

USP

SkenarioLabs' technology has numerous advantages over traditional approaches to portfolio analysis. For example, the platform hosts extensive pre-programmed datasets, which means they can create models for a portfolio without the need for client data. In its use of artificial intelligence and machine learning, the platform creates dynamic models which are flexible and adaptable to new legislation and guidelines. This also allows them to easily calculate RoI for proposed interventions.

SoftIron - Computer, network and data center storage solutions that are efficient and scalable.
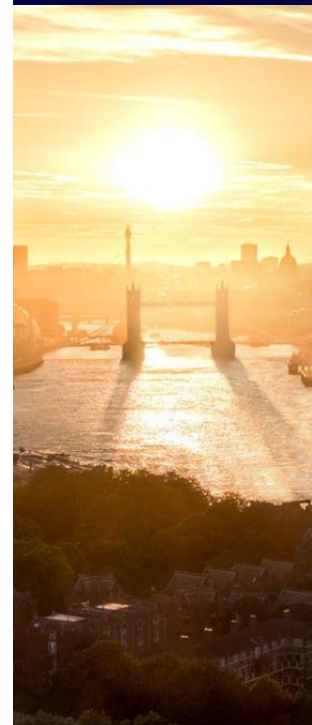
SUMMARY

SoftIron manufacture data centre hardware - computer, network and storage boxes in racks. They sell storage which is designed to be super efficient and high performing, using a fraction of the energy normally consumed.

Their HQ are UK based, and they have operating subsidiaries in six countries, including New Zealand, Australia and Singapore. They have a manufacturing facility in California, and have a second facility opening in Sydney in July 2022. Every factory can build the same products, and providing locally-built products to customers is part of the sustainability strategy.

IMPACT

The main impact SoftIron offer is the emissions saved by using their product. For every 34TB of storage run on SoftIron's HyperDrive compared to comparable alternatives, an estimated 1 tonne of CO_2 is saved by reduced energy consumption alone over its lifespan. SoftIron's hardware has massively lowered power requirements, as it requires a lot less cooling. Distribution, manufacturing and supply chain decisions also support the sustainable provenance of SoftIron's product, resulting in overall emissions of the product being far below industry standards.

USE CASES / CLIENT EXAMPLES

SoftIron received a grant of AU$1.54M to set up the sovereign manufacturing capability in Australia. Existing clients in Australia include the NCI (National Computational Infrastructure). In New Zealand, Vocas NZ have a managed service agreement using the SoftIron product, and servers Australia. Globally, they also work with the US Air Force, and in the financial services, and media sector.

USP

There is no outsourcing of the design and manufacture of SoftIron hardware - they have full control over everything designed, built and shipped. In addition to the environmental benefits of localised manufacturing, they are also able to upskill and 'level-up' the local workforce in the areas in which they operate.

SUMMARY

Surple aims to make energy efficiency easy for businesses. Working with utilities, property managers and energy service companies Surple provides an analytics and data insights platform to their business customers/tenants. The platform helps to reduce energy consumption by helping businesses to understand their consumption/generation, automatically identify waste and invest in energy efficiency solutions.

The Surple platform, is a SaaS white-label product that can be applied across organisations of all sizes and has three user interfaces; one for energy managers, one for facility managers and a third for business owners/operators who are less energy literate, making it easy for businesses to improve energy efficiency without having to become sector experts.

IMPACT

Surple's three step process of Check, Detect, Improve, allows businesses to save energy, reduce costs and decrease emissions. Where utility companies roll this out with their business customers, benefits can also include: improved customer satisfaction, better engagement and communication with customers, and greater brand loyalty. All of this leads to greater partnerships and commitments between the utility company and their business customers.

USE CASES / CLIENT EXAMPLES

During the COVID-19 pandemic, Surple worked with a hotel resort whose main focus was cost reduction. The chain closed all sites, but wanted to ensure that energy usage did not creep back up from the skeleton staff accidentally leaving appliances on, or due to faulty equipment. Surple were able to monitor daily energy consumption, which led to cost reductions of over £75k. On the international scene they have a pilot currently underway with a Canadian utility.

USP

Surple have embedded behaviour change principles that can be measured and verified within their software tool. This unique IP was developed in collaboration with EnCO, a globally recognized accreditation for 'energy conscious organizations' that's supported by the Energy Institute and ESTA. Surple expects to see a minimum of 3x return on investment and can exceed 20x return on investment.

measurable·energy

Energy efficiency.

Measurable Energy - Eliminating energy wastage with machine learning-powered plug sockets.

SUMMARY

measurable.energy (m.e) have combined hardware and software to combat energy wastage. Their power socket features edge-based machine learning which connects to a secure cloud-based infrastructure to identify waste energy, device anomalies, and provide unique energy insights. This feeds into a dashboard that has analytics, automated carbona & energy reports, goal setting and hot spot analysis to identify electricity waste, behaviours, power problems or faulty devices.

They offer different form factor plug sockets, and have more in development for early 2023. The range includes floor box, wall mount and desk mount sockets.

IMPACT

The m.e Platform helps to prevent unnecessary energy use, cuts emissions, and can save money by avoiding peak time energy costs. This can result in reduced electricity bills of up to 20%. Customers can see money returned to them through Demand Side Response 'balancing' services and the intelligent use of energy, returning savings to the Platform owner. There is a direct payback potential of the platform targeted at 2-3 years on average.

USE CASES / CLIENT EXAMPLES

measurable.energy work with a number of organisations including CBRE, Stantec, Octopus Energy and University of Reading. They're working with construction company Kier Group to cut job on-site temporary building energy use and carbon emissions by 60%.

USP

m.e's Power Socket offers unique benefits over plug-in power monitors and other 'smart sockets', which pose challenges for data capture, scale, security and quality. Most 'smart socket' devices available today are loaded with features suited for residential rather than commercial needs. They are not refined, often using more energy than they can save, and are not cost-effective for large-scale networked building installations. The m.e Power Socket has been built from scratch to run Machine Learning and be energy efficient and affordable.

SUMMARY

Quantum Light Metrology (QLM) has developed a new type of laser imaging, detection, and ranging camera based on quantum technology that can see and accurately quantify greenhouse gas emissions. The gas imager enables customers to monitor, detect and accurately locate and quantify Greenhouse Gas (GHG) emission sources for rapid repair. The sensors use infrared single-photon detection, which allows gas detection to appear in an imaging system, depicted in the image below. This offers natural gas producers, distributors and service providers, a fast, accurate and low-cost gas leak identification system.

IMPACT

A key benefit of using QLM sensors is that users can respond to gas leaks much more quickly and effectively. This allows for greater insight into emissions being released, and ultimately better compliance with reporting and regulations. It helps users to save money both in terms of waste product being released, and can help to avoid any commercial or reputational penalties.
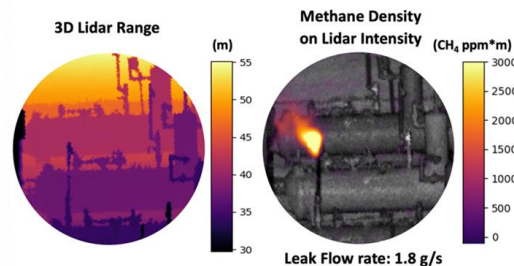
For industrial and utility companies, the technology can be used to understand the extent of methane or carbon dioxide being produced, allowing users to track changes in emissions under different conditions, and spot emissions hotspots and dilute plumes. This enables intelligent GHG production mitigation.

USE CASES / CLIENT EXAMPLES

QLM already has an international presence, with interested client discussions in the US, UK, Middle East, Europe and Australasia. The product is most applicable for oil and gas, industrial, biogas and agricultural emissions monitoring, and has been used by National Grid, Total Energies, Severn Trent, and SLB amongst others.

USP

Accurate quantification and localization of emission. They are developing an interesting proposition around their data offering, with a move towards cloud-based data processing. All the existing technology is approved and they have legal protection around the IP of the product.

3D Lidar Range (m)

Methane Density on Lidar Intensity (CH_4 ppm*m)

Leak Flow rate: 1.8 g/s

Lake Parime

Clean energy.

Lake Parime - Offering flexible demand for energy operators, and sustainable computing power for the technology sector.

SUMMARY

Lake Parime works with some of the largest utility companies in the world, helping them transform low-value or otherwise wasted clean energy into high-revenue computing power. By targeting computing segments that demand significant energy for data processing, the company's proprietary technology bridges the energy requirements between the computing industry and energy sector, unlocking enormous value for both. Headquartered in London, Lake Parime has a team of 40+ and operations in US, UK, Canada and New Zealand.

Their principle product, Powerbox, is a modular data centre solution designed to be compatible with the intermittent nature of renewable energy. Undervalued or curtailed power is diverted to Powerbox, which houses energy efficient computing hardware at the site of generation, to be used for power-intensive computing workloads, or data processing.

IMPACT

Their technology impacts two megatrends we see in the market: the race to net zero and exploding demand for computing power. Serving as a flexible energy sink, Powerbox monetises stranded power to improve the financial profile of clean energy operators, incentivising further investment in renewables. Undervalued power is used to run energy intensive workloads for groups that require large amounts of data processing, allowing the company to offer low-cost, low-carbon computing power as demand for computation continues to explode.

USE CASES / CLIENT EXAMPLES

Lake Parime provide sustainable computing power to billion dollar funds and publicly listed companies in energy-intensive industries such as Marathon Digital Holdings, and works with large-scale renewable generators around the world such as ScottishPower and Foresight Group. For example, in partnership with Contact Energy – the second largest utility company in New Zealand – Lake Parime's deployment offers flexible demand to the energy operator, utilizing stranded hydroelectric power for low-carbon computing.

USP

Lake Parime's novel solutions turn the traditional operating model of a data centre on its head. By offering flexible demand for clean energy – Powerbox can be ramped up or down depending on the amount of stranded energy available – they are able to access clean energy at low-cost, yielding benefits for energy operators (i.e. greater return on investment for renewable projects) and for industries demanding computing power (i.e. low cost, low carbon compute).

![petalite logo]

SUMMARY

Founded in 2014, Petalite offer highly reliable electric vehicles (EV) chargers for energy companies, fleets, local authorities, eVTOL, commercial businesses and EV drivers. They have 19 patents for their proprietary SDC technology, which uses innovative PowerCore technology. This means the EV chargers are equipped with a 'multilayer-adaptive redundancy system', which allows the charger to compensate any interruption to power that may occur during an EV charge session. This means a more continuous charge is provided for EV drivers.

IMPACT

By using Petalite EV chargers, partners can expect reduced EV charger installation costs and less disruption to their revenue stream. The impact of their highly reliable, regularly maintained and serviced EV chargers includes: EV charge up-time of 99%, and up to 400% ROI based on a 6% utilisation over a 15 year typical operational period. The SDC charging technology can last three times longer compared to standard public DC charger.

USE CASES / CLIENT EXAMPLES

The company's focus is on: charge point operators, big commercial fleets, energy companies and local authorities. In the UK, they have had successful case studies with Innovate UK and UKRI. They are in discussions with partners in Norway and Switzerland. Petalite are prepared to recertify for international territories.

USP

Petalite also provide consultancy services, which means their business relationships take a partnership approach. They recognise the economics around electric vehicle charging could be a concern for businesses and investors, so they provide the right business model for long term ROI and strong customer relationships.

SUMMARY

Small Robot Company are working to support the transition to the 4th Agricultural Revolution. They use robotics and AI across arable farming, to gather intelligence on individual plants, allowing for tailored remediative action on each plant. They work with farmers on a profitable future that maximises food production, and is ecologically harmonious - protecting soil health, water quality and biodiversity.

Each robot, (named Wilma, Tom, Dick and Harry), facilitates different operations. They can: track weed density and plant count, map and monitor crops, precision spray, complete non-chemical weeding and pest detection, and ultimately support net zero targets.

IMPACT

Guided by AI, the robots can monitor, treat and plant crops autonomously, based on requirements for optimal performance. The benefits include exponentially cutting chemicals, emissions and improving biodiversity. This has great benefits for farmers, saving up to 66% of their operating costs whilst making up to 40% more food. It also reduces chemical costs, with savings starting at up to 97% for post emergent herbicide costs, 80% glyphosate costs and 15% fertiliser costs, and simultaneously increasing ecological benefits.

USE CASES / CLIENT EXAMPLES

Small Robot Co are operational in the UK and have international partnerships in North and South America. With 160 EoIs signed, they are rolling out Britain's first fully autonomous crop-scanning service (Tom and Wilma) from this autumn to about 50 farms over the 2022-2023 growing season. Small Robot Company is also providing detailed monitoring for research institutes and Ag Corporates.

USP

The AI platform also allows farmers to aggregate multiple layers of farm data and management information. It generates insights on produce, reducing herbicide usage and improving the timing of fertilizer applications. Starting with wheat, they have plans to broaden their focus to oats, barley, peas, soya, rice and maize.

Spotta - Preventing damage to farms and forests via smart insect detection using proprietary technology in IoT devices.

SUMMARY

Insect pests are a massive and largely unrecognised challenge, costing $0.5Tn every year. Traditional high intensity insecticide usage is expensive, damaging and ineffective.

Spotta provide 24/7 Smart Insect Monitoring as a Service. Using Spotta's services, landowners and growers are able to significantly reduce the damage caused by insects and the total cost of protecting their assets. Spotta's services are both more sustainable and cost effective than traditional methods.Spotta provides greater certainty about yield and enables better planning of resources, which improves the efficiency of field operations. Spotta's approaches will support the leading growers to meet the highest regulatory standards.

IMPACT

Using IoT Pods, Spotta attracts and then detects insect pests, sending real time alerts to farmers or land managers before widescale damage occurs. This empowers managers to deploy control measures at the right time, in the right place and using the right techniques. This can prevent loss of crops, increase production quality and grow the value of exports.

USE CASES / CLIENT EXAMPLES

The technology can be configured to monitor a wide range of insects, e.g. red palm weevil at agricultural sites, large pine weevil in forests and bed bugs in hotels. Spotta was funded by the Scottish government to develop a service to detect the early presence of large pine weevils remotely. This work was highly successful – the resulting service requires significantly less labour than today's practices, reduces pesticide use by more than 50% and is cost effective. The service has also been deployed in Ireland and Poland, with Spotta aiming to deploy across several thousands of hectares in 2023.

USP

Powered by proprietary IoT technology, Spotta is able to detect damaging insect pests earlier, cheaper and more robustly than today's methods. This capability can be applied to a large number of the world's most costly pests.

SPOTTA
WEEVIL ACTIVITY - WARSAW SITE 784D

66   93   153   58

LIXEA

Lixea - Converts agricultural by-products and waste wood to produce a greener crude oil alternative.

SUMMARY

Lixea is developing an innovative fractionation technology that converts waste biomass into novel fuels. The first product uses waste wood, agricultural by-products and sustainably grown biomass to produce a greener alternative to today's petrochemical industry, and also providing unwanted waste materials with a new purpose. This unlocks revenues from natural resources (e.g. wood / forestry residues) using an effective and sustainable process, which capitalises on the transition to a biobased economy.

IMPACT

This results in a reduced reliance on crude oil and embraces circular economy by using products normally discarded at end of life. The materials generated by the process include cellulose and lignin, which can be turned into all kinds of by-products: glues, filler for composites, and use it as fuel for energy. Lixea suggest that the market potential for bio-based chemical and materials is growing rapidly (CAGR of 26% from 2019 to 2026).

USE CASES / CLIENT EXAMPLES

The end clients are often large waste management companies and large agricultural companies, where they have an agriculture process that has an end-product that can be used in the fractionation process e.g. sugar cane to gas; or large forestry companies for pulp and paper. Lixea is currently building a pilot plant in Sweden, where the first source material is saw offcuts.

USP

Lixea offer unprecedented feedstock flexibility and are confident the process is effective on a range of biomass types, including hardwoods and softwoods as well as heavy metal contaminated mixed waste wood. Lixea are beginning to pilot their operations at a reasonable scale. The next stage would include: a roll out of more pilot plant upgrades, developing off-take agreements for cellulose and lignin, building a demo plant, and build relationships with licensees.

carbogenics

Carbogenics - Convert paper based product waste to biochar to optimise agricultural yields.

SUMMARY

Carbogenics has developed a low carbon technology to convert difficult-to-recycle and low-value paper waste such as paper sludge, cardboard, into a range of high-value bio-additives with applications in industry and agriculture. Carbogenics' products maximize biogas outputs, reduce greenhouse gas emissions and optimize agricultural yields. This supports a waste-free circular economy future.

IMPACT

Their first product, CreChar, is a functional and sustainable carbon material, known as biochar. The carbon in biochar is highly stable and can endure in soil for over a thousand years without being degraded. It also has multiple benefits including: being an adsorbent for environmental pollutants, a catalyst for chemical reactions, stabilising and increasing the output of biogas on an anaerobic digestion (AD) plant by at least 10%. This is commercially very beneficial for AD companies especially as feedstock and fossil fuel gas prices rise, and also offers great environmental value as it displaces fossil fuel gas and CreChar is created through pyrolysis and embeds a circular process to re-utilise generated syn-gas as a catalyst and waste heat for sales or drying wet feedstock.

USE CASES / CLIENT EXAMPLES

The CreChar product lends itself to agriculture, waste management companies and partners in the AD and wastewater industry, where the CreChar increases the biogas yield in the anaerobic digestion process of sewage sludge. For water utilities, this can save costs on sludge treatment, produce more renewable biogas, and improve their climate impact. The CreChar also increases the fertilizer value as it remains in part of the digestate, typically applied to land. The product thus could be used for carbon sequestration, and soil amendment.

USP

Carbogenics' patent-pending process is based on a technology known as pyrolysis and is expected to be secured in Europe this year. The Carbogenics team combines committed researchers from the UK Biochar Research Centre (UKBRC) at the University of Edinburgh as well as business professionals from major water utility companies and Anaerobic Digestion operators.

Waste and circular economy.

Topolytics - Data analytics to make waste visible, verifiable and valuable.

TOPOLYTICS™

SUMMARY

Topolytics is a data analytics business that is making waste material supply chains visible, verifiable and valuable. Its WasteMap® platform generates insights for waste producers, recyclers and government, that enable greater materials recovery, drive operational efficiencies, support investment strategies, enhance transparency and reduce carbon emissions. WasteMap is accessed through an annual subscription.

IMPACT

WasteMap® is an analytics platform that ingests data from internal systems and the waste supply chain. It cleans, normalises and analyses this data, augmented by Topolytics own reference sets and knowledge base. WasteMap® offers insights that can support circular economy policies and KPIs, drive cost and resource efficiencies, validate compliance, reduce environmental impact and improve ESG and corporate reporting.
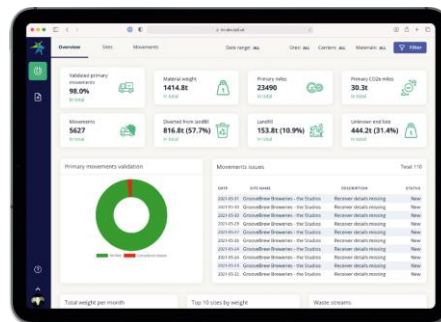
USE CASES / CLIENT EXAMPLES

DS Smith plc – processing and analysing data on the recycled content supply chain – providing a single standardised view of multiple data sets.

UK Government (DEFRA) – prototype of the UK's mandatory digital waste tracking system.
SAP – collaborating on projects with Coca-Cola Euro-Pacific Partners and smart cities.

USP

Ingesting and normalising data at scale across multiple waste producers and their recycling supply chains. Accommodating data in spreadsheets, software systems or sensors then applying modelling, machine learning and geospatial analytics to generate actionable insights that drive cost and resource efficiencies and reduce impact.

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