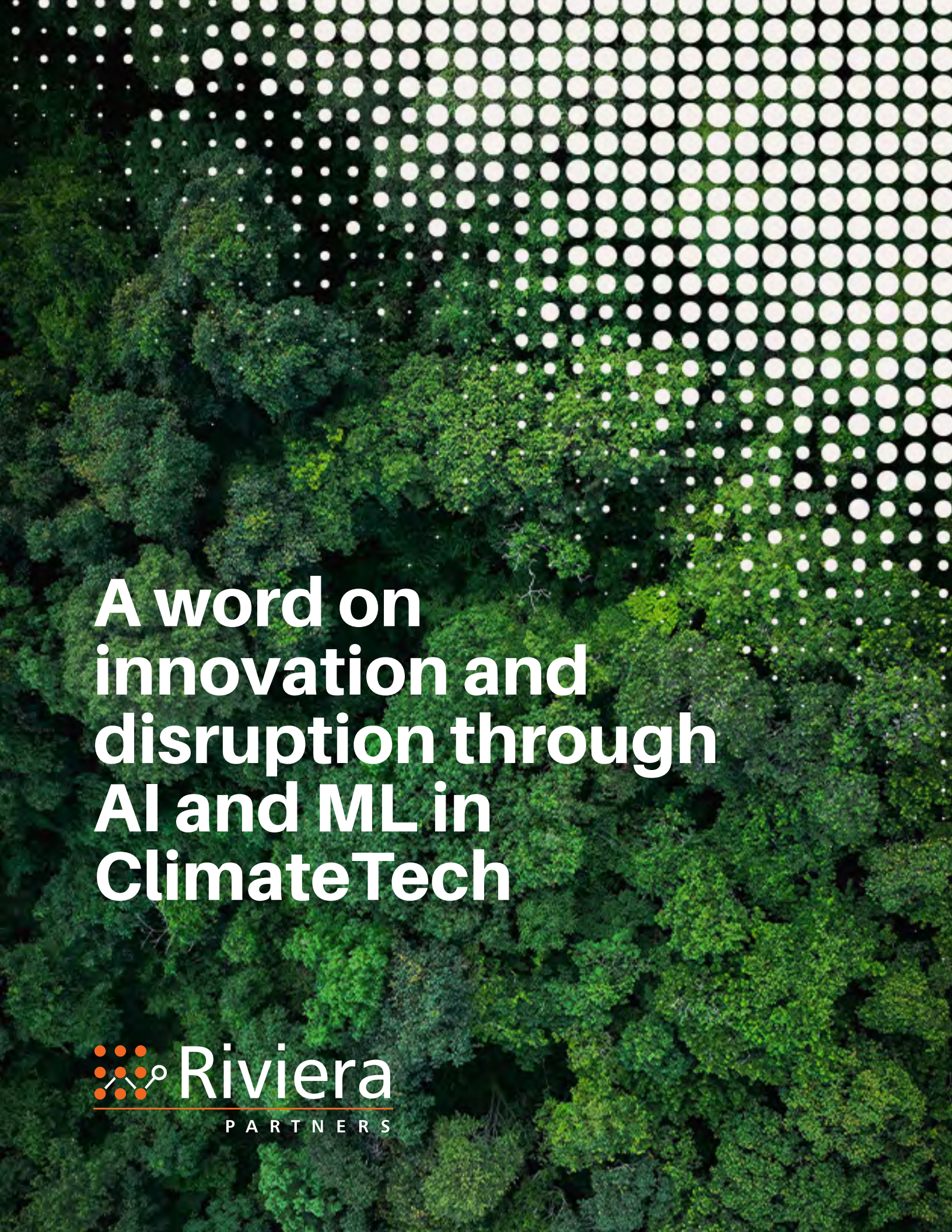

A word on innovation and disruption through AI and ML in ClimateTech

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AI and ML have emerged as a powerful tools in the fight against climate change, enabling innovative solutions across various domains.

From optimizing energy systems to enhancing carbon capture and trading, AI and ML are revolutionising the way we approach environmental challenges. In this piece, we explore how scale-ups and start-ups in the European ClimateTech ecosystem are leveraging AI and ML for climate action across various sectors.

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Energy

The energy sector is a key area in addressing climate change, and ML contributes to optimizing energy systems and sustainable practices. **Octopus Kraken**, a platform developed by UK based **Octopus Energy** have utilized ML to automate much of the energy supply chain, enabling the creation of dynamic, smart tariffs tailored to customer needs and renewable energy sources. It employs data science and ML models to analyse vast amounts of smart meter data, allowing Octopus Energy to understand energy consumption patterns down to the household level and predict demand across its network to optimize energy procurement from the wholesale market. Ankur Bhatia, Head of Engineering at Kraken Technologies, highlights several key applications. He shares that smart metering is driving a data revolution, with readings now collected every 30 minutes instead of quarterly. This high-frequency data enables dynamic pricing based on real-time supply and demand. As Bhatia explains, "you can now start doing variable pricing - when there's suddenly a big surge of wind, the energy company can make it free for you to use electricity." This data-driven approach allows energy companies to optimize purchasing decisions and influence consumer behaviour towards renewable energy usage. Additionally, Bhatia shares that in the water sector, ML models can analyse consumption patterns from smart meters to detect leaks, addressing significant water waste that was previously difficult to identify, in turn reducing waste and improving efficiency.

Carbon Capture, Utilization & Storage (CCUS)

CCUS technologies are essential for mitigating the impact of greenhouse gas emissions, and advanced data analytics and ML are enhancing their efficiency and effectiveness. **Climeworks**, a pioneering company in direct air capture technology, is exploring the use of data analytics and ML to support their operations. The company has developed a digital plant solution for real-time monitoring, anomaly detection, and optimization of their Direct Air Capture facilities. By analyzing operational data and key performance indicators, Climeworks aims to fine-tune its processes and improve the efficiency of their carbon removal systems.

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Carbon Markets and Trading

ML and AI are revolutionising carbon markets and trading by enabling more accurate pricing, risk assessment, and forecasting. **Sylvera**, a London-based start-up, leverages ML and satellite data to monitor and verify carbon offset projects. Their platform provides transparency and accountability in the carbon credit market, ensuring that offset projects deliver genuine environmental benefits. This helps businesses and individuals make informed decisions when investing in carbon offsets.

The platform uses computer vision, remote sensing, and ML-based tools designed to track the performance of carbon offsets. The company remotely monitors the performance these projects at up to weekly intervals, then reviews the data and integrates it into internal and external reporting frameworks.

Nature Based Solutions

While carbon credits focus specifically on greenhouse gas emissions, Nature Based Solutions address multiple environmental and social challenges simultaneously, including biodiversity conservation, water security, and climate resilience. Edinburgh based Space Intelligence, focuses on supporting developers of Nature Based Solutions in project development and monitoring. They specialize in providing high-quality data on land cover, habitat analysis, and above-ground carbon storage across the world. Using AI and ML applied to satellite imagery, **Space Intelligence** offers tools like Habitat Mapper and Carbon Mapper to assist in landscape analysis and carbon storage estimation.

"AI, ML, and Big Data are critical enablers of the development and expansion of the climate tech space. Our business is predicted on the availability and analysis of huge volumes of data from EO satellites using efficient and scalable technologies in the cloud. This is a far cry from when we started out in this field; downloading, processing and analysing individual satellite scenes on local machines."

Murray Collins
CEO of Space Intelligence

Agriculture & Forestry

Data Science, ML and AI are transforming the agriculture and forestry sectors, enabling precision farming, optimised resource management, and sustainable practices. In the forestry domain, **Overstory**, a UK-based company, uses AI, ML and remote sensing data to monitor and manage forests. Their platform provides insights into forest health, carbon sequestration, and biodiversity, helping prevent wildfires and power outages as well as enabling smarter infrastructure management and safer communities. In agriculture, **Ecorobotix**, a Swiss-based company, leverages AI and advanced robotics to revolutionize sustainable agriculture and precision farming. Their flagship product, the ARA smart spraying system, employs sophisticated computer vision and AI algorithms to detect, identify, and classify individual plants in real-time as it moves across fields. This technology enables the system to distinguish between crops and weeds with remarkable accuracy, targeting only unwanted plants for treatment.

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Built Environment & Transportation

The built environment and transportation sectors are significant contributors to greenhouse gas emissions, and ML is playing a crucial role in reducing their environmental impact. 011h is a Spain-based construction technology company that uses AI and ML to optimise the building process and reduce carbon emissions in the construction of residential buildings. By leveraging AI and ML to optimize building design, material usage, logistics, and the construction workflow, **011h** can construct energy-efficient homes much faster than traditional methods while minimizing waste and environmental impact. In the transportation sector, **Optibus**, a UK-based company, leverages AI and ML to optimize public transportation planning and scheduling, using advanced algorithms to analyze data and generate efficient routes, timetables, and crew schedules. The company's platform enables transit agencies to predict on-time performance, automatically generate running times, and quickly evaluate complex scheduling scenarios, improving service quality and operational efficiency.

Conclusion

As you can see, even from just the examples above, AI & ML has the potential to touch and disrupt so many of our working practices and how we approach solutioning for needs across sectors. It is already prevalent in the ClimateTech and is revolutionising the way we approach environmental challenges. European start-ups and scale-ups are at the forefront of leveraging data, AI & ML to drive sustainability and environmental stewardship across various sectors, including energy, carbon capture, carbon markets, agriculture, forestry, built environment, and transportation. As the appetite and demand for ClimateTech solutions continues to grow, so will the optimisation and industry value offered by the utilisation of AI/ML technologies. Companies and initiatives in this space will progress from disruptors, innovators, and product-defining pioneers, to table-stakes and category leaders. The competition for talent and the relevantly skilled professionals who can drive the innovation and accelerate the development or application of these cutting-edge technologies will be critical, as a deep understanding of AI and ML tech's potential for impact needs to be married with an acute appreciation for industry requirements.

Companies to Watch

Plan A is a Berlin-based SaaS company specialising in corporate carbon accounting, decarbonisation, and ESG reporting, with an additional office in London. Founded in 2017, Plan A has raised $43 million in funding from investors including SoftBank, Demeter, and Coparion. The company leverages AI and ML to provide data-driven insights and solutions, helping businesses measure and reduce their carbon emissions effectively.

Sweep is a sustainability data management platform headquartered in Paris, France, that helps organisations track, disclose, and act on their carbon and ESG data. The company has raised a total of $100 million from investors including Balderton Capital, Coatue and La Famiglia. Sweep leverages AI and ML to provide insights, automate data reporting, and enhance compliance with regulatory requirements, enabling businesses to make data-driven decisions to reduce their environmental impact.

H2GO Power is a UK-based company specialising in hydrogen energy storage technology, headquartered in Central London. The company has raised nearly $13.6 million from private investors and public funding institutions, with additional £4.3 million from the British Government for specific projects. H2GO Power utilises AI and ML through its proprietary HyAI platform to optimize hydrogen storage and energy management, ensuring cost-efficient and real-time operational decisions.

Checktobuild is a construction technology startup headquartered in Spain that specialises in automating quality control and progress monitoring through AI and ML. The company has raised Seed funding, with investors including the Swedish family office Kulldorff, Fides Capital, Brain VC, Capacity VC, and Beresford Ventures. Their platform leverages BIM and reality capture technologies to provide real-time, AI-driven insights, enhancing decision-making and efficiency in construction projects.

Vaiva Uryzaj
Director, Riviera Partners
rivierapartners.com

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