Space for Sustainability: Why Impact Investors Should Look to Space

The effects of climate change are getting worse. Freezing in Afghanistan, floods in California, warm winters in Europe – last year offered up all the evidence needed to show that solutions to what Antonio Guterres calls 'global boiling' are badly needed. And investors can help.

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Those looking to contribute to effective climate action should look in a new direction: to space. Because space tech is playing an increasingly important role in the climate crisis.

CO2

Satellites are powerful tools for making the world run more efficiently. They optimise both private and public transport routes, for example, while optimising the use of energy. And this translates to lower emissions.

Inmarsat has found that satellites are already lowering global carbon emissions by *1.5 billion tonnes annually* – equivalent to nearly four times the UK's emissions in 2021 – while Globant has shown they could increase yearly CO2 savings to up to 5.5 billion tonnes, roughly one-sixth of the total carbon emissions needed to limit the rise in global temperature to below 1.5°C by 2030.

Current research indicates that the world is missing out on up to 4 billion

tonnes of immediate CO2 reductions by not using satellite technology fully. And that's just with the existing technology. Advances in satellite technology are happening all the time.

Methane

Space technology also has a role to play in bringing down methane – a key battleground in the climate crisis. Originating from oil and gas infrastructure, landfills, wetlands and livestock, methane is the second-largest contributor to global warming after carbon dioxide, and it has been rising since 2007. Moreover, its short-term climate impact is far greater than that of CO2. Over 20 years, methane traps 84 times more heat.

Satellite technology, which frees decision-makers from having to depend on unreliable self-reported data from companies and countries, can paint an accurate picture of methane emissions, enabling governments and international bodies to fine or tax those responsible for and thus bring down emissions rapidly. In the US, starting this year, companies producing 'excess' methane emissions will face fines of $900 per tonne, rising to $1,500 per tonne in 2026.

Rainforests

Protecting rainforests could be our most important climate action. They capture carbon, cool the planet, support the livelihoods of *1.6 billion people*, according to the Rainforest Alliance, and host 80% of the world's terrestrial biodiversity. Space technology is vital for preserving these essential ecosystems. By bouncing signals off the forest canopy, satellites can measure the height of trees, detect illegal deforestation, and gauge the progress of reforestation initiatives.

Satellite data is already building trust in carbon credit programs, which

support rainforest protection efforts in remote regions where on-site verification can be challenging. Providing high-resolution, real-time data on tree cover, height, and above-ground biomass is vastly improving our understanding of the efficacy of carbon projects in contributing to global climate action. It's thanks to satellite insights that the ultimate goal of creating a robust $50-plus billion carbon credit market to support reforestation now looks likely to be achieved.

Wildfires

According to the World Resources Institute, wildfires are getting worse. It means that it's now highly likely that growing plants and new vegetation will not be adequate to offset the emissions and aerosols that wildfires – a normal part of many ecosystems – naturally produce, as would happen in the past. The International Energy Agency (IEA) estimates that wildfires emit around 8 billion tonnes of CO2 per year, which, accounting for CO2 offsetting, equates to annual net emissions that represent 5% to 10% of all CO2 emissions globally.

Wildfires also cause enormous damage. In 2019, they caused an estimated *$4.5 billion in damage in California* and Alaska alone. In August 2020, wildfires tore across California, Oregon, and Washington, with California experiencing five of its six largest wildfires since 1932. Fires combined and grew in strong winds and dry conditions, becoming mega-fires. The cost economically *was $19 billion, $16.5 billion of which was property damage.*

As of late 2023, forest fires since May that year had released nearly 160 million tonnes of carbon, as reported by the Copernicus Atmosphere Monitoring Service (CAMS). That's equivalent to nearly 600 million tonnes of carbon dioxide. And space-enabled technology key to addressing this. By monitoring vegetation density, rainfall, wind patterns and other factors, it can analyse past wildfires, predict future ones, forecast the

likelihood of wildfires breaking out in certain areas or near to certain assets.

Space technology means more accurate modelling and forecasting and more effective responses from emergency services. It's not just of huge benefit to the environment, but potentially life-shaving in the shorter term, too.

Agriculture

Agrifood is a *$7.8 trillion global market that employs 40% of the world's workforce*. Livestock rearing and other human agricultural activities account for 96% of the mass of all the Earth's mammals, and agriculture is projected to take up *70% of our greenhouse gas emissions 'budget' by 2050*.

But not only does such a lopsided ecosystem pose a threat to the environment, agriculture fails to feed humanity. Around 2.3 billion people, 29.3% of the world's population, were moderately or severely food insecure in 2010, according to the World Health Organization. And the situation is expected to get worse, with a 56% shortfall projected between current food production and what will be needed by 2050. Meanwhile, current agricultural practices cause massive soil erosion, amounting to 24 billion tonnes (and a loss of $480 billion) a year, as well as a loss of around 60% of organic carbon from the soil.

Earth observation technology, global navigation satellite systems (GNSS), satellite communication and connectivity can address these issues by tackling waste throughout the supply chain, increasing agricultural productivity, and introducing digital agronomy technology for precision farming and natural capital management. They can enable yield estimation and optimization, improve soil sustainability, optimise the use of water and fertiliser, and enhance monitoring. Hyperspectral and optical

satellite imagery can detect pests early, which could save up to 0.8 billion tonnes of crops annually. And space tech can improve irrigation, reducing water usage by up to 50% – equivalent to saving up to 2.8 billion litres of freshwater.

And all this translates to economic benefits. Reductions in food waste could add an additional up to $175 billion in economic value for producers, the UN Food and Agriculture Organization has said. Just a 5% cost reduction would amount to $7 to $8 billion in input savings for growers. Thanks to increasing adoption of Earth Observation technology in agriculture, according to McKinsey & Company, the market for space-enabled insights in agriculture is projected to double by 2030, reaching nearly $1 billion.

Final thoughts

Space technology is changing how we do things on Earth. More and more, its value is being recognised and its use is increasing. Meanwhile, the costs of launch, satellites and ground infrastructure are coming down and the resolution at which satellite cameras can take images is going up.

Earth Observation satellites help address food waste, freshwater usage and greenhouse gas emissions; prevent wildfires, floods and growing food prices.

Bogdan Gogulan is CEO and Managing Partner at Private Equity company *NewSpace Capital*.

Article by Bogdan Gogulan