MAPPING OUT A SUSTAINABLE FUTURE

AS THE COP26 CLIMATE CHANGE SUMMIT GETS UNDERWAY IN GLASGOW, **NIC HAMILTON** REVIEWS HOW THE NATION'S MAPPING AGENCY IS HELPING ITSELF AND ITS CUSTOMERS PREPARE FOR A SUSTAINABLE FUTURE

The biggest impact we can have on advancing environmental solutions, is to support our customers achieve their sustainability goals. By providing geospatial expertise, authoritative data and technology solutions, we can help governments and businesses make better decisions to achieve net-zero and robust environmental stewardship.

More severe and frequent floods, droughts and tropical storms, dangerous heatwaves and rising sea levels are already severely threatening lives and livelihoods globally. We need to reduce greenhouse gas emissions by 45% before 2030 and reach net zero emissions by 2050. To achieve these ambitious targets, we need urgent action to set a different path.

Where government leads, sustainability follows

Our customers in government are turning to geospatial expertise and data to safeguard the environment alongside promoting biodiversity, protecting people and places from flooding, and planning greener public transport. OS is supporting all areas of the UK Government to achieve this by giving easier access to OS data which has been made possible via the Geospatial Commission's Public Sector Geospatial agreement (PGSA). Our new APIs are available to the public sector for free, providing valuable location data to support a range of services including reaching net-zero. Across the public sector we are seeing geospatial becoming a key tool in helping to deliver sustainability projects of all sizes.

Property developers must now demonstrate that new homes provide protection for wildlife habitats, as well as people. Building proposals covering waterways and wetlands in Hampshire must now be 'nitrate neutral', [See Protecting Hampshire's nature case study[1] and the interactive Protecting Hampshire's environment Storymap for a deeper dive].[2]

England's Environment Agency (EA) manages and mitigates flood risk. Up-to-date location data underpins the EA's ability to know who and where throughout England is at risk from flooding, and to respond in emergencies – to protect both people and the environment. [Explore Richer data protecting people and the environment from flooding for more information].[3]

Transport for London (TfL) is trialling an electric scooter rental scheme to explore whether e-scooters have a part to play in the move to greener modes of transport. The government's Emergency Active Travel Fund (EATF) has encouraged organisations such as OS Partner, Road Safety Analysis, alongside the Agilysis team, to innovate an Active Streets tool for local authorities to assess their active travel network – to highlight safer spaces for walking and cycling. [Tour the tool[4] for further insight]. In addition, the Department for Transport[5] is using location data and aerial imagery to support infrastructure planning for electric vehicle charge points.

What we're doing for our customers

The most important action we're taking to help UK customers is to make our data easier to access, use and share. We're doing this because the UK recognises that by opening up geospatial data to more users across the public and private sectors, the conditions for innovation are enhanced, and the government can better join up information across different sectors for more powerful insights and improved decisions. This is particularly true in areas such as utilities and energy.

The utilities industry has huge transformation challenges ahead. Delivering quickly on these challenges requires much greater collaboration. Which is why we're combining our expert teams with the strengths of other organisations such as 1Spatial[6] to deliver innovative solutions for net-zero outcomes.

A key energy project for us is the mapping of the UK's entire energy network[7] to understand where renewable energy can plug into the grid and decide where electric car charging points can be implemented, to drive decarbonisation in the energy system.

With energy being a major contributor to carbon emissions, location is providing

Opened in 2010, Ordnance Survey's headquarters in Southampton (pictured below) was subsequently named one of the most sustainable buildings in the whole country. Its super-efficient design has cut the organisation's carbon footprint by 60 per cent and its temperature is strictly controlled by a finely-tuned electronic system that opens and closes windows and activates heating and ventilation. A ground source heat pump provides the building with warmth; food waste is composted, and even the toilets are flushed with harvested rainwater. Image: Ordnance Survey

Aerial imagery is being used by The Department for Transport to support infrastructure planning for electric vehicle charge points

insight into land use. In Scotland, our greenspace data helped to reveal that 60 per cent of Edinburgh and Aberdeen are made up of green space. Scotland's parks and greenspace charity, Greenspace Scotland, says this green space is a vital source of clean energy, which can be harvested using ground source heat pumps (GSHP), and used to heat our homes. [Greenspaces for green energy provides more information[8]].

Working with international customers

In Dubai, OS and Deimos Space UK worked with the Mohammed Bin Rashid Space Centre (MBRSC) to automate the production of geospatial information and identify climate change with Satellite Earth Observation (EO) data and artificial intelligence. This enabled automatic production of geospatial information with equivalent or greater accuracy than manual processes, as well as efficiency savings and more frequent data updates, for better measurement and monitoring.

The rapid growth of Dubai has had a big impact on the natural environment, natural resources and native habitats. EO data has long been an important source of information for measuring and monitoring how the environment is changing. However, producing geospatial information for large areas from EO data is time consuming and costly.

As palm trees and mangroves have cultural and economic value in Dubai, OS and Deimos Space UK developed a prototype palm tree and mangrove feature for EO data using state-of-the-art deep learning techniques. This supported the development of an interoperable data model to easily share data with other government departments and help inform decisions. Read Monitoring UAE natural environments with Earth Observation data[9] to learn more.

A Spatial Data Infrastructure Strategy for MBRSC was also created, to ensure data aligns with the latest developments in the Dubai Spatial Data Infrastructure, and the wider Dubai geospatial sector. The project was supported by the UK Space Agency and UK Department for Business, Energy and Industrial Strategy (BEIS), as part of the Gulf Science, Innovation and Knowledge Economy Programme.

Environment Agency – Abu Dhabi (EAD) is a government agency committed to protecting and enhancing the environment, as well as maintaining and promoting the biodiversity of the desert and marine ecosystem. One of its key aims is establishing Abu Dhabi as one of the top five environmentally sustainable nations in the world, through the Abu Dhabi 2030 Environmental Vision. To do this, it needed to raise environmental awareness, facilitate sustainable development and keep environmental issues at the top of the national agenda for the ultimate benefit of its citizens.

OS worked with EAD to develop a GIS Roadmap, containing information on all GI-related activities needed for the EAD to meet wider objectives. The Roadmap provides EAD with a detailed, structured plan to help the Agency capture, maintain and analyse environmental information to support the 2030 Vision.

A total of 52 initiatives were agreed, which when delivered, will establish EAD as a visionary and cutting-edge organisation within the global environmental community. [Geospatial policy safeguarding Abu Dhabi's environment[10] gives more details].

Sustainable urban expansion in Zambia is another way we, alongside the International Growth Centre (IGC) and the Commonwealth Association of Architects (CAA) are responding to the challenges of creating well-planned and managed cities, by piloting an automated base map. We used our experience in advanced automated process to generate a new base map using artificial intelligence across 420km^2 of Lusaka. This new geospatial dataset is being used to tackle the capitals urbanisations challenges but will also support other areas

OS Greenspace shows the area of green space in Edinburgh. Ordnance Survey data also supported town planners in Milton Keynes to plan a similar project. Also in Scotland, in Moray, OS MasterMap data has helped authorities position wind turbines to provide renewable energy.

OS used AI to generate a new base map of Lusaka

including land management, environment, and transport projects in the future.

Using AI to map African cities to improve infrastructure at low cost[11] tells more.

Geospatial leadership to drive change

Over the next few months, the opportunity to showcase geospatial is ramping up. We are looking at the use of geospatial data and how this can be used as we move towards sustainable alternatives across multiple market sectors, starting with an OS Hackathon[12] in October for developers and data scientists to help accelerate viable solutions, with a particular focus on green transport and electric vehicles.

OS is also shaping conversations around how national mapping and geospatial agencies can support their governments in achieving their climate goals, with geospatial leaders from around the world coming together at the Cambridge Conference,[13] a virtual event in September 2021, and then the conference itself in Spring 2022 to discuss climate challenge commitments.

In November at COP26, the UN's annual climate summit, all eyes will be on the four goals to inspire countries around the world to make commitments and help save our planet are:

1. Secure global net zero by mid-century and keep 1.5 degrees within reach
2. Adapt to protect communities and natural habitats
3. Mobilise finance
4. Working together to deliver

Fresh thinking and innovation

OS is also supporting startups through Geovation,[14] an accelerator programme and community of location-data and proptech collaborators, all with the same goal of making positive change happen.

A sustainability success story includes Refill,[15] which connects people looking for water with refill stations. You might have seen a Refill sticker in a café, bar or museum near you, highlighting that they're part of the scheme to help you reduce waste, allowing you to fill your reusable water bottle for free. Planet Patrol[16] is another success story – on a mission to clean

Refill's vision is of a world where everyone can choose to reuse wherever they eat, drink and shop. Its free app taps into a global network of 274,000 places to reduce, reuse and refill. With more than 300,000 downloads and 100 million pieces of plastic avoided to date, Refill has proven its power to create a wave of change and stop plastic pollution at source.

up our planet, one piece of plastic at a time, made accessible and fun to everyone through activities such as paddleboarding and kayaking.

Geospatial information is playing an important role in helping to address the key global, regional and local issues that affect people and the planet as a result of climate change. Now is a great opportunity for the geospatial sector to step up and show the world how we can make real progress on climate change, protecting natural habitats and improving quality of life by working together on one common goal – environmental action.

How we are delivering on our commitment at OS

At Ordnance Survey, it's our people who are shaping innovative solutions based on what customers tell us is their highest priority. Our engineers, data scientists and consultants listen to customers talk about their sustainable goals and provide solutions to help reach them. There is no other subject that ignites as much passion at OS than the environment…well maybe trig pillars[17], but that's another matter.

OS is based in the south of England, where the climate is relatively mild and temperate. However, we're noticing changes; higher temperatures, more rain and more sunshine. Great for the wine industry which is investing heavily in our part of the world, but not so great for wildlife, farmers and fauna which are having to adapt.

Much of the rain that falls on our head office is harvested for use in toilet facilities and irrigating the garden. We use ground source heat pumps to heat and cool the building. We recently committed to making our fleet of company vehicles fully electric by 2024 and we're providing electric car charging for our

Leading by example. Photo: Ordnance Survey

surveyors across Britain, as well as a new facility for those who cycle to work.

There's much more we can do to reduce waste, water and energy consumption, and by getting our house in order, we're leading by example and making a committed effort to reduce our carbon footprint as an organisation.

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