StateUp

STATES REGENERATE

GREENING GOVERNMENT FOR OUR PLANET, WEALTH, AND HEALTH

THE KEY IDEAS
+
THE STATES REGENERATE 50:
50 STARTUPS TO GREEN GOVERNMENT

NEBULA
by StateUp

www.stateup.co/nebula

INTRODUCTION

Climate change is rising up the agenda

Despite global efforts, the planet remains on track for a century of rising seas, expanding deserts, and flooded cities. Governments are responding by setting out ambitious plans for a 'green recovery' from the coronavirus pandemic, and setting increasingly ambitious net-zero targets. Most countries are now aiming for net zero emissions by 2050 or earlier. In some countries, huge investment packages have been rolled out to create green jobs, stimulate green industries, and cut greenhouse gas emissions.

But for governments to be a source of widescale regeneration that benefits people and planet for the long-term, it is not enough alone for them to devote attention to greening the economy. **Crucially, governments must also focus on greening their own organisations and operations - with the opportunity to shift at least £7.8 trillion annually towards green spending.**

Governments account for a substantial portion of total emissions both directly and through the companies which supply them with goods and services. They have responsibility for guiding and shaping economic activity. And they have a unique capacity to demonstrate the leadership that the climate emergency demands.

States Regenerate finds that greening government would not just speed up decarbonisation and set a good example for other sectors. **It would further catalyse entrepreneurs, inventors, and investors to help develop the innovations and technologies we need to deal with climate change, while creating healthier local places, planetary wellbeing and wealth too.**

But how should governments go about their own decarbonisation? There are many ways that governments can take the lead. In *States Regenerate*, we highlight five focus areas where there is an opportunity to bring about meaningful change.

1 Creating the leadership and accountability mechanisms to enable a green transition in government

A mission as big as government decarbonisation requires real, long-run leadership. We advocate the appointment of a Chief Decarbonisation Commissioner, with teeth and an infrastructure around the role, as critical to ensuring responsible decarbonisation. But governments are also most likely to make real progress towards decarbonising their assets and operations with collaboration from a concerned populace: prioritising citizen engagement is one especially powerful way of achieving this.

The impact it could have:

- A dedicated government body for promoting and monitoring decarbonisation can **reduce emissions by 32% in 10 years,** according to data from **Canada.**
- Precedent from France suggests that high-quality citizen engagement could **generate hundreds of new ideas** for government decarbonisation.

2 Decarbonising public procurement - which comprises some 12% of global GDP - both as an end in itself and to encourage wider decarbonisation in the economy

Public procurement offers a powerful route to improved environmental stewardship—but greening public procurement is still an evolving practice. Alongside regulatory change and upskilling, the uptake of digital technologies can facilitate this process. As a growing number of governments take green procurement seriously, lesson-sharing is critical given the newness of the task at hand.

The impact it could have:

- **GPP can reduce public sector emissions;** forecasts for China indicate cumulative GHG emissions reductions of up to 232 millions of tonnes of CO_2 by 2030.
- **GPP can also encourage green innovation in the private sector:** in the US, research demonstrates that a 1 percent increase in GPP is correlated with a 0.046 percent increase in the number of new green patents.

3 Managing and Restoring Our Shared Environmental Public Goods

Conserving environmental resources like water, air, the atmosphere, and biodiversity is fundamental not just to decarbonisation, but to enabling people and nature to thrive together for generations. Conserving environmental public goods is vital both for tackling the climate emergency and for promoting the flourishing of human beings and their communities. Ensuring that water supplies and the air are clean, and protecting green spaces, is intimately linked with human health and happiness, as well as with reducing greenhouse gas emissions and the human impact on the environment at large.

The impact it could have:

- **More cost-effectively managing water and air quality**. Using drones, Auckland Council in New Zealand has saved an estimated 30 percent in water quality management costs.
- **Preserving a key carbon sink,** which absorbs more carbon from the atmosphere than it releases. Conservation zones sequester 500 million tonnes of carbon annually. Sustaining protected area coverage can stop this rate from falling below 300 million tonnes annually by 2100.

4 Decarbonising Infrastructure and the Built Environment

To decarbonise our built environment, we must reimagine these vital resources as the increasingly complex "system of systems" that they are, and draw on advances in complexity management and the technology innovations around it to manage our built world as such. There are also interventions that governments can make into specific infrastructure systems, including decarbonising building materials, construction and use. We must also recognise the value of nature-based infrastructure, including trees, as intrinsic to human opportunity and wellbeing.

The impact it could have:

- **Reducing carbon emissions from public buildings by up to 15%**[1]
- Reducing waste and increasing the resilience of vital infrastructure
- Forming a considerable carbon sink of up to half a trillion new trees could **remove two-thirds of all anthropogenic CO_2 emissions**[2]

5 Bolstering Data and Innovation

Data is key to decarbonisation. Much innovation which could enable decarbonisation of infrastructure and government operations entails improving visibility or coordination of data, for example about energy use, emissions, efficiency, costs, or other key metrics. Equally, much innovation which can aid in decarbonising key operations or infrastructure would benefit from using real data in the innovation process. As a result, making data available in a thoughtful, useful way, can help innovators develop new technologies and bring them to market.

The impact it could have:

- **Estimates for the value of open government data as a percentage of GDP have ranged from 0.08% to 7.19%.** A recent OECD report cites a range of 1% to 2.5% of GDP. From this, the European Union identifies **geospatial, earth observation and environmental data as among the most valuable.**[3]

Read the full States Regenerate report, featuring expert comment from greentech and climate policy experts, here.

1 Digital Buildings (research based on UK data
2 Protected areas' role in climate-change mitigation
3 The Value of Data Summary Report 2020, Bennett Institute for Public Policy, University of Cambridge

Digital Innovation and Government Decarbonisation

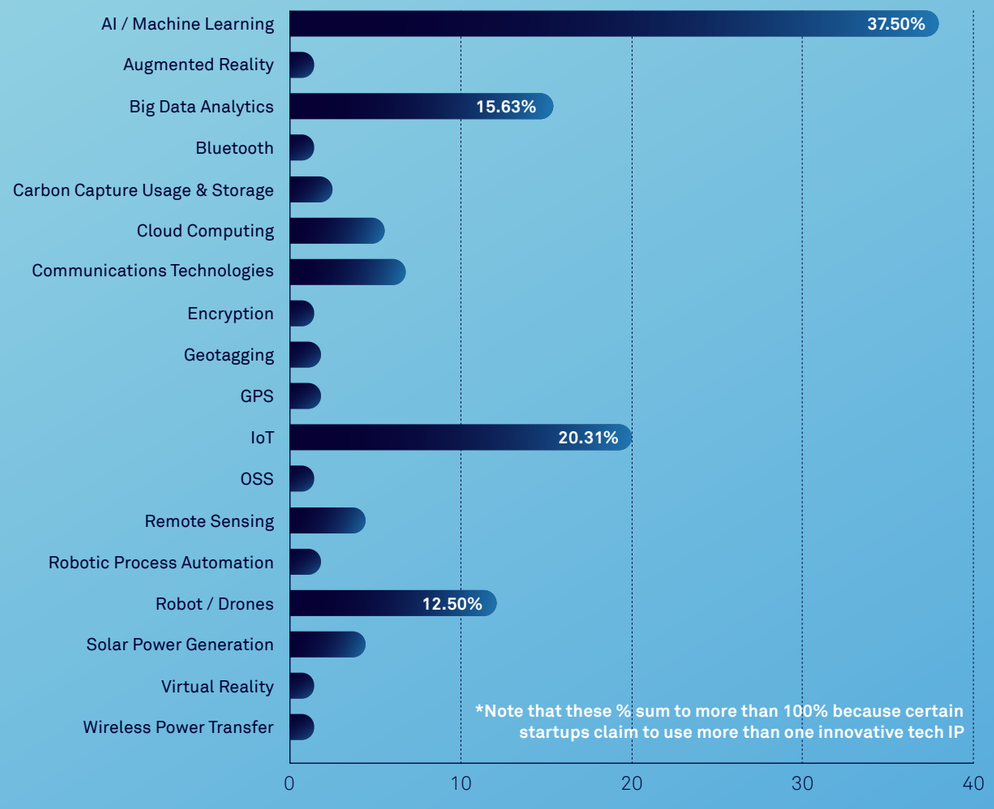
Taken together, these approaches could have profound impact. For many of these efforts to become reality, governments around the world will need to engage digital and emerging technologies, working with the innovation sector to decarbonise how they work. *States Regenerate* highlights what some of these technologies are and do, and how they can be engaged to achieve positive and enduring outcomes.

At StateUp, as one component of the Nebula Public-Purpose Technology Intelligence Platform, we have compiled a curated, quality-controlled database of leading public-purpose technology startups globally—including those focused on government decarbonisation. These startups are developing a diverse range of technologies and addressing many dimensions of government operations, from sensors to monitor air quality to drones to decarbonise delivery. We showcase many of them throughout *States Regenerate*, and list 50 Startups to Green Government on p. 55.

While startups are not the only vehicle of sustainable innovation, we place particular focus on them here because of the speed with which they are working and the sheer range of solutions that they are developing. The range of innovation tech IP being developed by startups working to green the public sector across the world include artificial intelligence, big data analytics, and increasingly, drones and robots (see Visualisation 1).

Visualisation 1

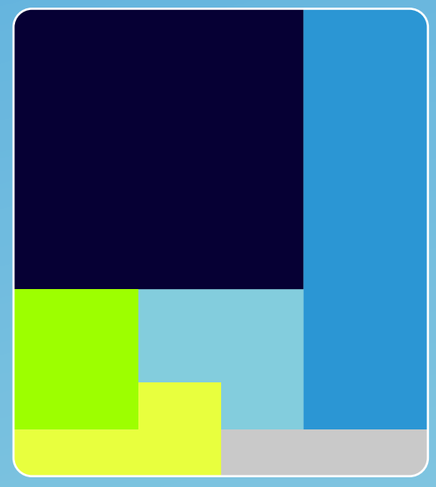
Innovative tech IP used by startups focused on government decarbonisation



While more innovation focused on government sustainability is needed everywhere, there are clear regional discrepancies. In terms of geographic location, Europe is in lead position, generating 41% of the highest quality startups contributing to greening government, followed by North America (25%). Despite governmental commitments in the region to green procurement, with only 5% of high-quality sustainable innovation for government emerging from the region, Latin America lags, falling behind the Middle East (11%), Asia (9%), and Africa (8%).

Visualisation 2

Leading Green Tech for Government Startups by Region



Regions

Europe	**41.38%**
US & Canada	**25.86%**
Middle East	**10.34%**
Asia & Oceania	**9.48%**
Africa	**7.76%**
Latin America & Caribbean	**5.17%**

Source: Nebula Intelligence Platform

Beyond "Solutionism"

Digital innovation is important. However, there is a common trap when discussing how technology can help governments decarbonise: solutionism–the assumption that technology alone will solve global problems such as climate change. Some solutionist responses to the climate crisis read like works of techno-futurism, trumpeting the next big breakthrough that will solve the climate crisis at a stroke.

In reality, significant policy and institutional change is needed too. Table 1 shows some of the national policies and strategies for cutting public sector emissions that are currently in place–but there is still a long way to go in terms of both policy design and implementation. **No one country can yet be considered a runaway success.** With this in mind, *States Regenerate* shows how digital innovation can make a substantive contribution to government decarbonisation, and explores policy options and activities to make the most of it.

The technologies described here will not end the crisis tomorrow. Some of the technologies we describe are breakthrough. Others are quiet and reliable, often already in use to some degree, and sometimes on a considerable scale, such as sensors, mapping softwares, and predictive models. But if applied strategically and comprehensively, they will be an invaluable tool in making governments carbon-neutral over the coming decades.

Green technology is still a young space, and there are few singular "right" solutions that can be rolled out the world over, regardless of context, to the same ends. We encourage lesson learning and contextual understanding rather than universalising, 'cookie-cutter' approaches.

States Regenerate:
Future Topics in the Research Collection

Beyond the topics covered here, there are many other areas of government decarbonisation that the States Regenerate research collection, of which this report is the first output, will cover. Access to the full collection will be available here.

Governments can make the future of mobility into a local and national mission. In some cases, that means building or upgrading networks. In others, it means setting an unambiguous objective of making public transport networks more attractive and affordable than private transport, and empowering entrepreneurs with the network data to develop mobility as a service applications. They can also switch government car fleets to green vehicles and build and promote charging stations for green vehicles.

Governments can also take the lead in installing carbon capture and storage (CCS) technology for carbon-producing industrial sites, including power plants. They can encourage companies to move away from carbon offsets and towards carbon capture.

They can also decarbonise energy supply. They should encourage the development of technology associated with energy storage technology, and batteries in particular. They can also promote common standards for measuring, defining, comparing and reporting energy efficiency.

A World Seeking Leadership

Ultimately, governmental decarbonisation is about leadership. The Paris climate goals will be difficult to reach, but by cutting their own emissions, governments will demonstrate the urgency of the task.

Governments that invest in their own organisations and operations will reap numerous benefits. They will have a headstart in terms of meeting and exceeding climate goals, will derive health and wellbeing benefits from cleaner air and more liveable buildings and places, and economic benefits in terms of new jobs, new companies, and new skills.

The States Regenerate 50
50 Startups to Green Government

Company	*Country*	*Description*	*Category*
ICEYE	Finland	Helps governments make better decisions by providing access to satellite imagery. Example use cases: agriculture monitoring, dark vessel detection, oil spill detection, reducing avalanche risks, infrastructure integrity monitoring, new construction detection.	Decarbonising Infrastructure and the Built Environment
GREENbimlabs	Germany	Offers software for architects, building owners and material producers to optimize safety, sustainability and cost control in all life cycle phases of BIM-based building and smart city projects.	Decarbonising Infrastructure and the Built Environment
Spacept	Sweden	Infrastructure inspection software that helps prevent wildfires and their CO_2 emissions	Decarbonising Infrastructure and the Built Environment
Carbon Craft Design	India	Takes black carbon extracted from polluted air and upcycles it to make green products such as building tiles and pollution capturing chimneys.	Decarbonising Infrastructure and the Built Environment
Infogrid	UK	IoT sensors that make any building a smart building, e.g. door and window monitoring, people counting. IoT enabled analytics also help to minimise building emissions.	Decarbonising Infrastructure and the Built Environment
EpicCleanTec	USA	System that decentralises wastewater treatment and reuse into individual buildings or groups of buildings.	Decarbonising Infrastructure and the Built Environment
AquaRobur	Sweden	Helps water agencies reduce the amount of water they waste through leakages using an IoT device.	Decarbonising Infrastructure and the Built Environment
AMP Robotics	USA	Robotic systems that sort recyclable material effectively, safely and cost-efficiently.	Decarbonising Infrastructure and the Built Environment
Leakmited	France	Locates water leaking pipes using AI and Satellite Images.	Decarbonising Infrastructure and the Built Environment
Green City Solutions	Germany	Addresses air pollution by combining an installed moss culture with IoT technology.	Decarbonising Infrastructure and the Built Environment
RanMarine	The Netherlands	Cleans polluted waterways using an autonomous drone. Collects data, monitors cleanliness of public bodies of water.	Decarbonising Infrastructure and the Built Environment
gridComm	Singapore	Creates a network across a city's existing power lines and uses this network to connect street lights and sensors. Reduces electricity costs and carbon emissions.	Decarbonising Infrastructure and the Built Environment

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50 Startups to Green Government

Company	*Country*	*Description*	*Category*
Ecodrone	Italy	Designs wind and solar powered autonomous marine drones to monitor ocean coasts and collect data.	Environmental Management and Restoration
AstroSat	UK	Data analysis and visualization specializing in geospatial, satellite and space data analysis for environmental purposes.	Environmental Management and Restoration
Flash Forest	Canada	A reforestation company that uses aerial mapping software, drone technology, pneumatics, automation, and ecological science to rapidly reforest post-harvest and post-wildfire areas.	Environmental Management and Restoration
DroneSeed	USA	Reforestation company that combines heavy-lift drone swarms, artificial intelligence and biological engineering to reforest post-harvest and post-wildfire areas.	Environmental Management and Restoration
AirSeed	Australia	Reforestation company utilizing drones which combine artificial intelligence and GPS technology to disperse seed to reforest post-harvest and post-wildfire areas.	Environmental Management and Restoration
Dendra Systems	UK	Provides an end-to-end solution for ecosystem restoration using drones as a data collection and primary tree-planting tool.	Environmental Management and Restoration
Carbon Engineering	Canada	Develops and commercialises carbon removal technology that captures CO_2 from the air at megaton-scale.	Environmental Management and Restoration
Airly	Poland	Hardware/software products provide hyper-local data about air quality, helping communities tackle air pollution.	Environmental Management and Restoration
Aclima	USA	Hyperlocal air quality data and insights to improve human and planetary health. Lets users view air pollution on a block by block level.	Environmental Management and Restoration
SeeTree	Israel	Provides visibility into the health records and productivity of any individual tree at any time, and over time. Helps identify issues with their trees such as inefficient irrigation and over-spraying and fertilization.	Environmental Management and Restoration
Desolenator	UK	Solar water purification system, enabling clean water provisioning	Environmental Management and Restoration

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50 Startups to Green Government

Company	*Country*	*Description*	*Category*
Overstory	The Netherlands	Develops drones that carry air quality sensors and measurement modules, to support air quality monitoring programmes.	Environmental Management and Restoration
Coral Vita	The Bahamas	Uses 3D printing and robotics to protect threatened ecosystems by growing diverse and resilient corals and planting them into degraded reefs.	Environmental Management and Restoration
Rentadrone	Chile	Using drone-powered thermal aerial imagery, detects, classifies, and organizes errors and damaged modules in solar power panels, and automatically detects diseases on crops.	Environmental Management and Restoration
AgroApps	Greece	Spin-off from Draxis, a long-established environmental ICT consultancy and platform developer. AgroApps focuses on agritech applications, including for increased yield and by extension less resource footprint.	Environmental Management and Restoration
CarbFix	Iceland	Develops proprietary technology to turn CO_2 into stone and store it underground within two years.	Environmental Management and Restoration
CommonPlace	UK	Online engagement platform used to promote better informed, more inclusive planning decisions within the context of the built environment.	Community Engagement
The Future Fox	UK	Provides a digital participation platform that helps planners engage with communities on housing, transport and infrastructure schemes.	Community Engagement
Kodiak Rating	Sweden	Supplier management dashboard to enable sustainable global trade. Streamlines communication throughout the procurement supply chain.	Green Public Procurement
IntegrityNext	Germany	Sustainability and compliance platform for procurement. Manages supplier self-assessments and monitors social media to ensure CSR and sustainability requirements.	Green Public Procurement
ProductBio	USA	Helps municipalities make environmentally conscious procurement decisions by providing tools to analyse products for sustainability.	Green Public Procurement
Circulor	UK	Uses blockchain and AI to cut the cost of traceability and due diligence in raw materials supply chains.	Green Public Procurement

The States Regenerate 50

50 Startups to Green Government

Company	*Country*	*Description*	*Category*
Ekotrek	Germany	Platform for sustainability credentials and sustainable supplier management. Enables public procurement officials to vet suppliers for sustainability and to monitor the impact of their supply chain.	Green Public Procurement
BBOXX	UK	Designs, manufactures, and distributes plug and play solar systems in developing countries.	Clean Energy Solutions and Support
Nuru	Dem. Rep. of Congo	Deploys solar-based mini-grids.	Clean Energy Solutions and Support
Moxion Power	USA	Manufactures zero-emission, mobile energy storage systems, including for construction, government agencies, and utilities	Clean Energy Solutions and Support
Raygen	Australia	Developers of a solar-plus-storage system to provide renewable electricity on demand at utility scale.	Clean Energy Solutions and Support
Swift Solar	USA	Develops lightweight perovskite solar panels that are more efficient and more affordable than conventional panels. Uses technology initially developed at Stanford and MIT.	Clean Energy Solutions and Support
Moixa	UK	Smart battery company. Develops smart battery hardware and software to facilitate smart energy storage and sharing.	Clean Energy Solutions and Support
Ignite.Solar	Rwanda	Develops national-level infrastructure projects using solar power and technology across Africa.	Clean Energy Solutions and Support
Percepto	Israel	Develops autonomous drone technology for surveillance and inspections. Applications across thermal energy, solar energy, oil & gas, mining, industrial sites, ports & terminals.	Clean Energy Solutions and Support
UrbanFootprint	USA	Creates software that helps inform land use and mobility planning decisions with actionable data around the built and natural environment, community resilience, and climate and hazard risks.	Environmental Intelligence & Data-driven Decision-making
Latitudo 40	Italy	Platform turns satellite imagery into geospatial information to support decisionmaking in the smart cities and agritech sectors. Applications include heat island identification	Environmental Intelligence & Data-driven Decision-making

The States Regenerate 50

50 Startups to Green Government

Company	*Country*	*Description*	*Category*
Green Urban Data	Spain	Software that helps local municipalities prioritise and make decisions that fight climate change. Products map pollution levels, track temperatures, and plan eco-friendly routes through cities.	Environmental Intelligence & Data-driven Decision-making
Farad.ai	UK	Uses AI to predict the electricity grid's regional peak load, assisting network operators in their decision-making process to optimise distribution.	Environmental Intelligence & Data-driven Decision-making
Jupiter Intelligence	USA	Helps quantify the risks associated with climate change. Uses proprietary algorithms to predict and model catastrophic risk scenarios.	Environmental Intelligence & Data-driven Decision-making
Cervest	UK	Develops climate intelligence tools to help quantify climate risk to physical assets. EarthScan product assesses how extreme weather impacts assets, enabling climate-smart buildings and infrastructure.	Environmental Intelligence & Data-driven Decision-making
OroraTech	Germany	Integrates AI and satellite data to monitor wildfire risk. Builds AI-enabled satellites equipped with custom infrared cameras.	Environmental Intelligence & Data-driven Decision-making

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