

## Innovation in the Climate Change Industry

Climate change may be more universally regarded as the steadily mounting existential challenge of our lifetimes with each passing season, but many would regard the progress of humanity to slow or reverse anthropogenic climate change — and minimize its impacts on civilization and the natural environment — as being only one of fits and starts.

The climate change industry as defined and quantified by CCBJ continues to grow there is no doubt, but behind revenues measured in the commercial market across nine segments and over 60 subsegments, lies a foundation of research and development. This R&D is expected to sustain growth throughout the energy transition and climate change mitigation eras, and what looks to be the never-ending climate change adaptation & resilience challenge — a challenge that one could argue our species has already endured for 100,000 years.

So just where are we in continuing to build on this foundation and just how does it manifest itself in innovation in climate change industry segments? Measuring the pace of innovation across the climate change industry is challenging because of a number of factors.

First is the difference in innovation in science and technology that can create transformative breakthroughs versus innovation in engineering and implementation that lead to incremental improvements and commercialization milestones.

Second is the variation across climate change industry segments from renewable energy to energy storage to carbon capture to transportation to greening the built environment and infrastructure.

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## Innovation in the Climate Change Industry

Recent progress on clean energy and emissions reductions are notable, but more progress requires innovation: CCBJ assesses where we are in the innovation cycle. Features in this edition present Q&As with executives offering perspective on plastics recycling, EV infrastructure, carbon capture, coastal resilience, large scale wind development, and artificial intelligence applied to grid stability, resilient infrastructure, distributed energy, microgrids, and AI as a tool for productivity. AI itself comments as ChatGPT is included in the CCBJ Q&As where prompts lead a consensus opinion on innovation needed across the climate change industry 1-13

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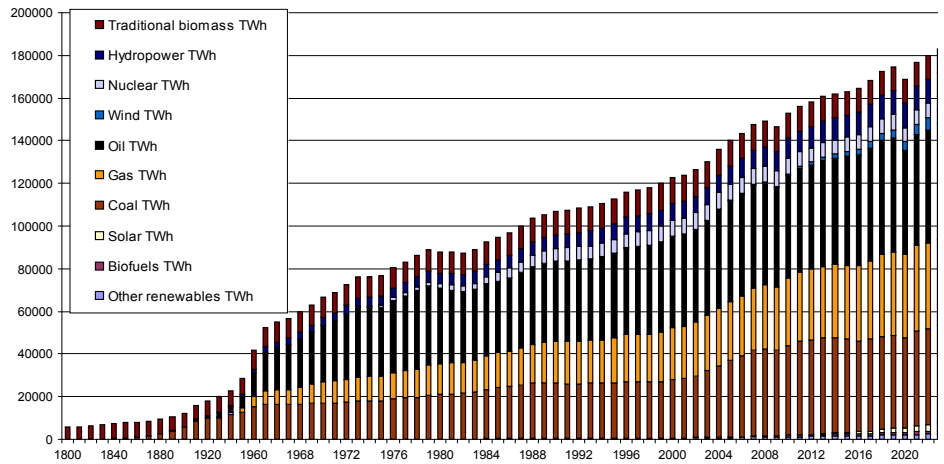
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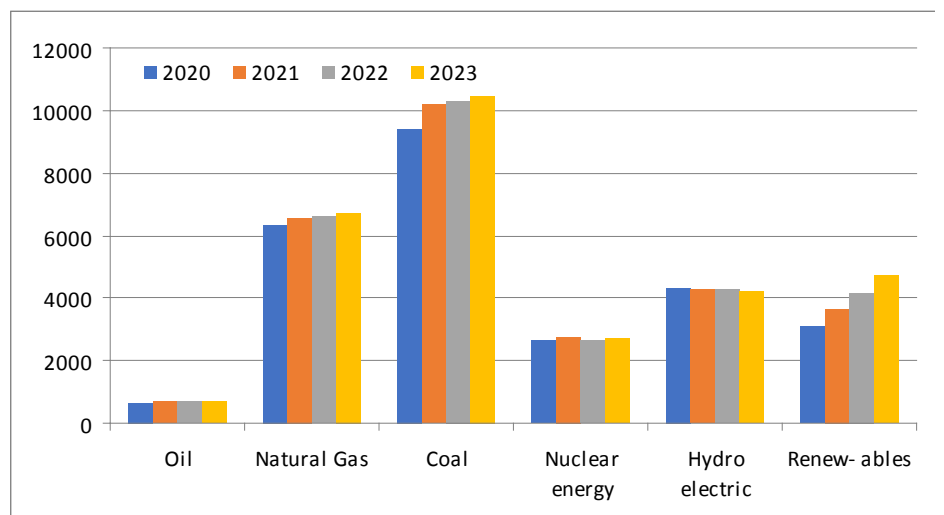
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## Global Energy Consumption by Fuel 1800-2023 in Terrawatt-hours

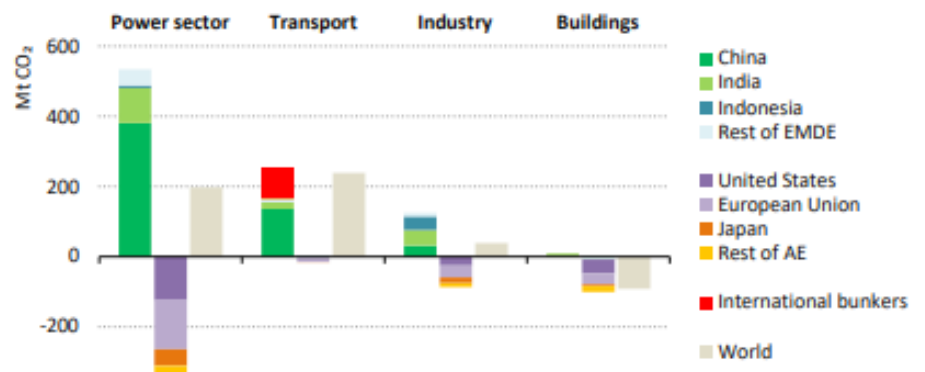


## Global Electricity Generation by Fuel in Terawatt-hours, 2020-2023



## Change in CO2 emissions by Sector and Region, 2022-2023

Figure 15: Change in CO<sub>2</sub> emissions from combustion by sector and region, 2022-2023



Source: International Energy Agency, IEA's report CO<sub>2</sub> Emissions in 2023 issued in April 2024

At the sector level, IEA's CO<sub>2</sub> Emissions in 2023 reports that transport experienced the most pronounced growth in emissions, surging by 240 Mt globally. The power sector contributed the second largest increase with the highest level of regional disparity, as emissions in advanced economies collapsed while those in emerging developing economies soared. Industrial emissions saw a slight uptick, as the combination of moderately weaker industrial output, efficiency gains, and fuel switching in advanced economies was insufficient to counterbalance the emissions increase from industrial development in emerging economies. Buildings was the only sector to see emissions fall at the global level, largely attributable to milder temperatures experienced in 2023.

## AiDash Supports Objectives in Sustainability & Climate Resiliency for Infrastructure Firms with AI & Satellite SaaS Solution

**AiDash** (San Jose, CA) is making critical infrastructure industries climate-resilient and sustainable with satellites and AI. Using our full-stack SaaS solutions, customers in electric, gas, and water utilities, transportation, and construction are transforming asset inspection and maintenance - and complying with biodiversity net gain mandates. Our customers deliver ROI in their first year of deployment with reduced costs, improved reliability, and achieved sustainability goals.

Abhishek Vinod Singh, CEO and Co-founder of AiDash. Abhishek is a serial entrepreneur with almost two decades of experience in building innovation-led products. An IIT Kanpur alumnus, he was formerly the COO, USA, and Head of Digital Transformation at Kellton Tech. He holds robust industry experience, astute domain knowledge, and innovative business and marketing strategies.

### **CCBJ: Can you briefly describe AiDash's founding vision and how it has evolved in the face of escalating climate challenges?**

Abhishek: Climate change is one of the biggest threats to our world. This summer's catastrophic wildfires are another sign underscoring the urgency for new solutions. AiDash seeks to provide some answers. The company was founded on the belief that technology is the key to mitigating and adapting to the harmful effects of climate change. By leveraging the tools at our disposal, we can create more resilient environments that benefit humanity.

The essence of AiDash lies in combining our unwavering commitment to serving the planet through our technology with a sharp

### **AiDash's Recent Growth Milestones & Footprint**

- Maintained a 100% annual growth rate for the 4th year running.
- Reached more than 150 customers globally, and our technology is in use in 48 of 50 US states and across five continents
- Released Intelligent Vegetation Management System, v 2.0. With exceptional capabilities — including SatelliteVision, multisource data fusion, VegetationAI, and AiDash IVMS Field App — which help utilities implement end-to-end vegetation management workflows with real-time insights and automate operations.
- A patent for Intelligent Sustainability Management System (ISMS) was granted.
- Launched the BNGAI platform to answer UK biodiversity net gain (BNG) challenges in February 2024, gaining over 75 of the top developers as customers in just a few months.
- Closed an oversubscribed Series C funding round at \$58.5 million.
- Were named to both Forbes' America's Best Startup Employers 2024 List and TIME's America's Top GreenTech Companies 2024 List.

and intelligent focus on the commercial opportunities. Our vision is to deliver maximum value to our customers and investors while contributing to a greener, cleaner, and safer world from the vantage point of space.

Specifically, AiDash seeks to create this greener, cleaner, safer planet by using satellites and AI systems. We provide full-stack software-as-a-service (SaaS) solutions that support sustainability and climate resiliency for electric, gas, and water utility, transportation, and construction organizations.

So why did we take this approach? Existing software systems and traditional solutions have been limited in their ability to transform operations, maintenance, and sustainability for critical core industries. By contrast, our solutions monitor and analyze distributed assets at scale. This allows us to help by:

- Strengthening resilience, reliability, and recovery.
- Expanding and deepening data and analysis for vegetation, storms, wildfires, resources, and workforces.
- Increasing understanding of how climate affects their distributed assets.

- Transforming sustainability initiatives with accurate results and metrics.

Our product suite continues to evolve based on industry needs. For example, our initial biodiversity-focused product allowed any organization with large landholdings to measure, enhance, track, report, and offset sustainability metrics on land, air, and water. But when the UK's Environment Act 2021 set 10% biodiversity net gain (BNG) requirement for new developments, we knew we could take it up another level.

We honed our capabilities into a platform and process for achieving BNG compliance, as such a product would also be meaningful to companies all over the world, not just those dealing with the Environment Act 2021. We evolved an existing offering into a breakthrough solution, which was renamed Biodiversity Net Gain Management System™ (BNGAI).

### **CCBJ: In which ways are you using satellite technology and AI innovatively?**

Abhishek: AiDash is leveraging the best of satellite technology and pairing it with the latest in AI to deliver a level of actionable insights that has been impossible for

critical infrastructure companies to attain previously. Such data is vital to combating climate-related disasters, which intensify year after year.

Critical infrastructure is at the center of our human lives; it dictates how we function and move about the world around us. Yet, it is aging, and repairs are often put off. Additionally, things like railroads and power grids cover so much territory that it is very hard to ensure everything works all the way down the line. Scheduled inspections and routine maintenance no longer cut it. Organizations must have eyes on the assets and alerts at the first sign of an issue.

By providing organizations with the technology they need to not only keep facilities up and running but also to proactively head off issues before dangerous situations occur, we have the capacity to dramatically improve operational efficiency, as well as environmental safety and the lives of the people around us.

**CCBJ: What sets AiDash's technology apart from other solutions currently available in the market?**

Abhishek: One of the biggest differences is our approach. AiDash is satellite-first, meaning satellite imagery underlies everything we do. We believe that not only are satellites future-proof, but they deliver more accurate insights and better monitoring capabilities at much greater scale and value than other technologies like drones, which many competitors rely on. Drones serve a particular purpose— but satellites are increasingly better for a wider set of use cases. They provide rich, real-time data in even the most remote or difficult to access areas.

Another difference is that our AI has been trained on data and imaging collected from far more geographies than other solutions, including a wide range of terrain and climates across 48 of the 50 states as well as internationally. This enables it to achieve a higher level of granularity, analyzing a greater number of factors that can influence decisions and outcomes. Acquiring such

## AiDash Series C Funding Round at \$58.5 Million

In April 2024, AiDash closed of its Series C funding round at \$58.5 million, adding private equity firm Lightsmith Group, and Japanese conglomerate, Marubeni Corp. to the Series C round, initially at \$50 million, and bringing total funding raised to \$91.5 million. The Series C was led by impact investor Lightrock and included a new utility investor, Duke Energy, plus previous strategic North American utility investors National Grid and Edison International. With Marubeni it also included new strategic investor Sabanci Ventures from Turkey. All other investors from prior rounds also participated, including SE Ventures, G2 Venture Partners, Benhamou Global Ventures, and Shell Ventures.

data, and making it smarter through machine learning, plays into the robustness of our proprietary software.

On top of this, our culture is a differentiator. We know what is at stake, and we are never satisfied with the status quo. We are always looking for new ways to solve critical industry issues. For example, after launching IVMS, we determined more could be done. As such, we added:

- Faster scanning and processing of satellite data with patent-pending SatelliteVision™ in IVMS, which supports scanning and processing of large T&D networks with over 100,000 miles of overhead lines in a matter of weeks.
- The ability to ingest and analyze data from multiple sources, with multisource data fusion in IVMS, which can ingest and process remote sensing data at scale from satellites, aerial imagery from drones, helicopters, fixed-wing planes, and LiDAR data from aerial or vehicle-mounted sensors.

- Assurance that vegetation risk prediction is accurate, with VegetationAI™, delivering AI analysis for climate and storm risk, biodiversity and carbon, as well as remote inspection and monitoring.

- Better communication with and feedback from the field, with our mobile app.

To build on these breakthroughs and raise the bar even further, we continue to persistently collaborate with and learn from customers like Avista, National Grid, and

Entergy. We know that to mitigate the negative effects of climate change, we can't do it alone. These complex issues will only be solved by technology-forward companies, critical infrastructure organizations, and policymakers working together.

**CCBJ: What's next for AiDash in terms of new technology developments or enhancements to existing solutions?**

Abhishek: We are constantly trying to push the envelope in terms of what is possible with satellites and AI, and there are lots of ways to combat climate change, so our R&D team is hard at work. At the same time, we must never be satisfied with our existing offerings. We are always looking to enhance them and grow our existing lines of business. New features and capabilities are generally based on collaboration with our customers, who share ideas all the time. We do our best to make them happen— and we've got some pretty exciting things coming, so stay tuned.

**CCBJ: How does your technology contribute to building climate resilience in the communities you serve?**

Abhishek: By giving organizations eyes on their assets, by monitoring their ability to function properly, by ensuring trees and vegetation are not going to fall on power lines in the event of a storm or a fire, we help protect communities. They become resilient because they have the real time data to guard against and quickly react or adapt to whatever changes may come their way.

## CCBJ: From your perspective, what are the most pressing challenges facing the climate tech industry today?

Abhishek: Keeping pace with the level of destruction that's occurring due to climate change. Tech moves fast but Mother Nature moves faster and often without reason.

Wildfires and flooding in particular have wreaked havoc over the past year, and hurricane season is really just starting to pick up. We are doing our best to ensure that organizations are ready, habitats are preserved, outages are minimized, and citizens remain safe. The goal is to help organizations better manage their assets so that they can adapt immediately to changes and mitigate damage.

## CCBJ: What are AiDash's long-term goals in terms of climate tech innovation and market expansion?

Abhishek: We ultimately want every geography across every country to have access to the insights we provide and to know what sort of actions should be taken based on sound, real time data; the issues we currently face are too big for any one company to solve.

In terms of market expansion, there remains a lot of room to grow in the U.S., but we're seeing tremendous traction in the UK and across Europe, as well as in Australia and New Zealand. 🌟

## AiDash Product Mix

Abhishek says there are so many areas in which satellites and AI are proving to be useful in adapting to climate-related issues. AiDash has chosen to focus on critical infrastructure as a starting point, believing some of society's most important assets face the gravest risks. As such, AiDash currently offers five products that provide substantial benefits to our customers and the citizens they serve. These are:

### IVMS: Intelligent Vegetation Management System

With satellite data, ground truth and historical data, coupled with pre-trained AI models, IVMS helps organizations plan, optimize, and execute their vegetation management so that things like tree branches don't interfere with power lines, causing unnecessary outages. With IVMS, companies can:

- Find vegetation risks in real time – before they damage the grid.
- Optimize vegetation management programs years in advance.
- Increase efficiency of pre- and post-trim inspections.
- Identify, predict, and monitor ROWs for accurate bid packets.
- Calculate the natural prune cycle at circuit and subcircuit levels.
- Plan with all utility constraints, such as budget and effort.
- Detect and forecast sideline and floor growth.
- Track herbicide efficacy, hazard trees, and encroachments.
- Automate audits and regulatory reporting.
- Identify threats inside and outside the ROW.
- Detect and monitor tree health.
- Classify wildfire risk areas.

### CRIS: Climate Risk Intelligence System

With CRIS, companies can forecast storm and wildfire outages and damages quickly, restore safely, communicate accurately, and build climate resilience. Organizations rapidly and seamlessly perform the tasks that have the greatest impact, such as:

- Leveraging satellite imagery (even through darkness and clouds), real-time weather data, and span-level vegetation data in a single platform to bolster preparedness and mitigate risks before, during, and after a storm or wildfire to minimize customer interruptions.
- Relying on advanced weather tracking of wind speeds, rainfall, pressures, and temperatures.
- Forecasting fire weather, wildfire risk, outages, and resource needs for 72 hours.
- Predicting storm and wildfire impacts at feeder, segment, and span levels.
- Estimating resources to prepare the field, engineering, and operations.
- Assessing and accessing damage remotely to prioritize safe responses.
- Identifying critical hotspots: measuring flood extent, mapping inaccessible areas, assessing wildfire burn severity and damages.
- Recording field assessments and observations with a mobile application for notes, photos, and comments.
- Simulating restoration based on resources, cost, and time with automatic, prioritized work assignments.
- Comparing changes from season to season, and year over year.

## BNGAI: Biodiversity Net Gain Management System

This is an end-to-end BNG management platform that uses satellite and AI to deliver accurate results, while saving time and money. Additionally, it has never been faster, easier, or more cost effective to deliver a biodiversity net gain plan. AiDash's BNGAI offers ecologist-validated plans ready for submission to local planning authorities, covering habitat surveys to post-intervention biodiversity net gain. Other benefits include:

- Unparalleled precision in habitat assessments using satellite imagery and AI.
- A comprehensive end-to-end platform that covers condition assessments, planning, management, and reporting.
- Efficient project portfolio management and collaboration that drives business growth while delivering superior biodiversity outcomes.

## AIMS: Asset Inspection and Monitoring System

An innovative solution that enables organizations to manage their assets faster and more effectively with highly accurate, precise geospatial datasets. In fact, AIMS provides a 70% reduction in digital twin creation timelines and expedites network survey time by 5x. Now organizations can:

- Overlay asset GIS data with aerial, ground, and satellite imagery.
- Create highly accurate and precise geospatial datasets.
- Maintain accurate and high-quality network data.
- Manage full asset life cycle — maintain repair and improvement history, prioritize health, adopt condition-based maintenance.

- Spot defective assets — leaning or cross-arm poles, nonfunctioning lights.
- Minimize difference between as-designed and as-built networks.
- Identify unhealthy assets and safety concerns.
- Direct field crews to exact asset locations requiring maintenance or repair.
- Support accurate network connectivity for grids to improve reliability.

## IEMS: Integrity and Encroachment Management System

Enables organizations to conduct satellite-based patrolling to identify and prioritize system risks and facilitate operational improvements. Users gain a comprehensive picture of pipeline systems with pinpoint accuracy and now use detailed scores and metrics to prioritize work and inspections. Then, with advanced automation, they can resolve integrity threats quickly and accurately. With such capabilities, organizations can do things like:

- Detect gas leaks and pipeline damage with aerial pipeline surveys.
- Identify various encroachment types automatically, per specifications.
- See full attributes, like distance from centerline, size, and more.
- Set criteria for criticality ranking to prioritize inspections and compliance.
- Coordinate among field and operations teams more efficiently.
- Use prioritized, digital workflows to respond more quickly and efficiently.
- Deliver full site history and context to field teams to report and investigate. ⚙️



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