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Net Zero & Climate Risk

Green Quadrant: Enterprise Carbon Management Software 2022

By Jessica Pransky and Alessandra Leggieri
With Kim Knickle

August 2022

This version of the report contains Verdantix's summary of IBM's capabilities to help prospective customers evaluate whether the vendor is a good fit for their requirements. It does not contain other vendor profiles.

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This report provides a detailed fact-based comparison of the 15 most prominent carbon management software vendors in the market. Based on the proprietary Verdantix Green Quadrant methodology, our analysis encompassed two-hour live briefings, desktop research and vendor responses to a 103-point questionnaire covering 17 capability and 10 market momentum categories. Verdantix analysis finds that although carbon management software has existed for over 15 years, the market has grown substantially over the last three years, due to increased pressure from internal and external stakeholders, resulting in numerous new use cases and functionality requirements. Among the software vendors featured in the Leaders' Quadrant, seven firms—Cority, Enablon, IBM, Intelex, Sphera, UL Solutions and VelocityEHS—demonstrated the most advanced all-round carbon management software capabilities.

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Organizations mentioned

3M, AECOM, AEG, Ahlstrom-Munksjö, Alliant Energy, Amaggi, ArcelorMittal, Ashland, Association of Issuing Bodies (AIB), ASUS, AT&T, Bagel Brands, Bain & Company, Bayer, Benchmark Digital, Blackstone, BRK Ambiental, Buckman, C3.ai, CBRE, Celestica, CDP, Chevron, Cintas, Clear Sky Analytics, Cloverly, Coatue, Commercial Buildings Energy Consumption Survey, Commonwealth Bank, Cority, Costco, cr360, Danone, Department for Environment, Food and Rural Affairs (Defra), ehsAI, Électricité de France, Emex, Emissions & Generation Resource Integrated Database (eGrid), Enablon, ENGIE Impact, Enviance, Envizi, ERM, EU, EVPassport, FigBytes, Financial Executives International, Ford Motor Company, Fortive Corporation, Franklin Templeton, French Agency for Ecological Transition (ADEME), Genstar Capital, Gerdau, GHG Protocol, International Energy Agency (IEA), Global Logistics Emissions Council, Global Reporting Initiative (GRI), Global Reserve Group, Google, Green-E, Greenhouse Gas Management Institute, GRESB, Hewlett-Packard, Hitachi Systems, HOMER Energy, Hoover, Hunter Industries, IBM, IFC, IHS Markit, Implenia, Indorama, Industrial Scientific, Insight Partners, Intelex, Intergovernmental Panel on Climate Change (IPCC), ISDI, IsoMetrix, Ista, JetBlue, JMJ Associates, Jupiter Intelligence, Kimberly-Clark, KMI, Kraft Heinz, Levi's, Lumileds, Mercedes-Benz, Metro Group, Microsoft, MillerKnoll, MSDSonline, Munich Re, National Australian Built, Environmental Rating System (NABERS), National Governance Association (NGA), Natura, Nilfisk, Normative, Obvious Ventures, Omni Logistics, OneTrust, OPEX Group, Pachama, Partnership for Carbon Accounting Financials (PCAF), Plan A, Planetly, Power Report, Prelude Ventures, Principles for Responsible Investment (PRI), ProcessMAP, Prose, Qlik Quantum Energy Partners, Quentic, Questel, Radicle, Refinitiv, Rolls-Royce, Saint-Gobain, Salesforce, SAP, Schneider Electric, Science Based Targets initiative (SBTi), Shell, Siemens Healthineers, SINAI Technologies, Sky, SL Green, Slack, SMBC, Snowflake, Society for Corporate Governance, SoftBank Vision Fund 2, Sphera, State of Minnesota, Stripe, Sustainability Accounting Standards Board (SASB), Sustainable Finance Disclosures Regulation (SFDR), Sweep, Task Force for Climate-related Financial Disclosures (TCFD), Tata Consultancy Services, TCV, Telus, The Rise Fund, Thinkstep, Thoma Bravo, Toyota, TPG, TÜV Rheinland, Uhuru, UL Solutions, UN, UN Framework Convention on Climate Change (UNFCCC), Universal Studios, Urjanet, US Environmental Protection Agency (EPA), US Securities and Exchange Commission (SEC), Valo Ventures, Value Reporting Foundation, Vector Group, VelocityEHS, Vineyard Wind, Volvo, Watershed, WeSustain, Wolters Kluwer, Workiva, World Economic Forum, Zeigo

The State Of The Carbon Management Software Market

The market landscape for carbon management software has evolved rapidly over the past three years, driven by mandatory reporting rules based on the Task Force on Climate-Related Financial Disclosures (TCFD), the need to deliver on the Science Based Targets initiative (SBTi) and other net zero pledges, and pressure from external stakeholders. These new drivers have required carbon management software applications to expand beyond calculating and modelling Scope 1, 2 and 3 emissions to incorporate a wider range of functionality – such as forecasting future emissions to deliver on net zero goals, tracking the progress of decarbonization projects, incorporating financial analysis into asset investment planning, producing investment-grade financial disclosures, and conducting physical asset risk assessments – to fit a wide range of industries and use cases (see Verdantix Best Practices: Creating an RFP For Enterprise Carbon Management Software). With the rapid evolution of regulations and the increasing integration of carbon emissions into disclosures, the carbon management software market is in an expansion phase.

Given the rapid pace of change in the market, this report provides individuals responsible for selecting, implementing and deriving value from carbon management software applications with a detailed assessment of the 15 most prominent platform solutions providers and their product offerings. The customer questions answered by this report encompass:

- What is the current state of the carbon management software market?
- Which carbon management software applications lead the market?
- Which carbon management applications will best match the requirements of my firm?
- How can I benchmark the capabilities of carbon management software applications?
- What factors indicate that a carbon management software vendor is a reliable partner for the future?

To answer these questions, Verdantix assessed 15 suppliers using a 103-point questionnaire, two-hour live demonstrations by vendors, and interviews with more than 25 carbon management software customers across a range of industries, such as consumer goods, retail, pharmaceuticals, tourism, manufacturing, transportation and technology. The resulting analysis is based on the proprietary Verdantix Green Quadrant methodology, which is designed to provide an evidence-based, objective assessment of vendors offering comparable products or services.

A New Wave Of Enterprise Carbon Management Software Arrives

Over the past three years, rising pressure from investors to identify climate risks, the realization that firms can achieve a competitive advantage with a lower carbon footprint, and increasing regulations have led to a surge in demand among buyers across all industries, as well as greater interest from the C-Suite. Growing demand has created a fast-evolving marketplace for carbon management software.

Carbon Management Software Has Been Available For 15 Years

The carbon management software market has been evolving since the 2000s, when this type of software was mainly used by emissions-intensive industries to ensure compliance with existing regulations. Verdantix research shows that:

- **Initial use cases for carbon management software were primarily compliance-related.**
  In the 2000s, the main purpose of carbon management software was to respond to regulations to reduce GHG emissions, such as the EU Emissions Trading System (ETS) and the GHG Reporting Program of the US

Environmental Protection Agency (EPA). To a lesser extent, some corporates used carbon management software to differentiate their products and service offerings with lower embodied carbon. Firms generally incorporated the software into their larger EHS software offerings, used by heads of EHS or Sustainability. Vendors with a history of providing EHS software, such as Cority, Enablon, Intelex, Sphera, UL Solutions and VelocityEHS, have spent years developing robust air emissions calculation engines and modelling functionality – as well as data acquisition and management capabilities – to help their customers meet GHG regulations.

- **Demand for voluntary sustainability reporting and national disclosure requirements has grown.**
  Over the last 15 years, the need for carbon management software to meet voluntary and national disclosure requirements – often incorporated into ESG disclosure requirements – emerged. Providers of carbon management software solutions have developed templates that allow customers to gather and generate data that can flow directly into a Carbon Disclosure Project (CDP) or other voluntary reporting template, such as the Sustainability Accounting Standards Board (SASB) or Global Reporting Initiative (GRI) frameworks, or into national disclosure requirements, such as the EU ETS or the National Australian Built Environmental Rating System (NABERS) requirements.

TCFD-Aligned Climate Disclosure Rules And Investor Pressure Have Reshaped Requirements

Support for the TCFD's climate-related financial disclosure recommendations, which were released in 2017, has grown rapidly over the past two years. In 2021 more than 2,600 firms pledged support for the framework (see Verdantix Strategic Focus: Mastering TCFD Disclosures). The TCFD framework initially operated at a voluntary level, but several countries – such as Brazil, Japan, New Zealand and the UK – have recently instigated mandatory TCFD disclosures. Additionally, the EU's Corporate Sustainability Reporting Directive (CSRD) will incorporate TCFD recommendations, with the first draft set of the standards to be adopted in October 2022, and the US Securities and Exchange Commission (SEC) has proposed carbon disclosure requirements that align with the TCFD framework. To meet these requirements, corporates now need their carbon management software to incorporate more forward-looking capabilities, in addition to the carbon calculations and disclosure requirements that were included in the first generations of the software. New capabilities cover:

- **Investor-grade, auditable data.**
  As carbon disclosures move from voluntary to mandatory, the pressure to prepare investor-grade data – as well as the legal risk of publishing inaccurate data – is mounting (see Verdantix Strategic Focus: Transitioning to Investor-Grade ESG Data and Decision-Making). The new wave of carbon management software incorporates tools that securely store data, associate emissions quantities with operating assets and legal entities, have data-gap-filling capabilities, and facilitate data audits and assurance of processes, including allowing auditors secure access to software for visibility into emissions calculation formulae.

- **Carbon calculation methodologies.**
  The GHG Protocol Corporate Accounting and Reporting Standard, which covers key principles and sets organizational boundaries, is widely used as a global accounting platform for carbon emissions. Most enterprise vendors have also incorporated the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard to meet increased demand to calculate Scope 3 emissions. Newer entrants to the market, such as Persefoni and Sweep, have sustainability advisory boards with deep industry knowledge and expertise, helping them to align with upcoming requirements.

- **Evaluation of physical asset climate risk.**
  The TCFD requires analysis of the impact of climate risk on the core business model of a firm. Specifically, the framework recommends describing climate-related risks and opportunities over the short, medium and long term, as well as the impact of climate-related risks and opportunities on an organization's business, strategy and financial planning. As a result, firms must conduct complex scenario analyses to quantify potential risks and opportunities, taking into account industry-specific, geographic and supply-chain-related risks. The use of geospatial data to achieve these goals is becoming increasingly important. Vendors with these capabilities tend to be specialist firms, such as machine learning (ML) specialist Pachama and climate risk analytics firm Jupiter Intelligence. Geospatial data are not consistently being integrated into enterprise-wide carbon management software (see Verdantix Strategic Focus: Growing Reliance On Geospatial Data For ESG And Sustainability). One exception is IBM, which can provide customers with access to a variety of continually updated geospatial-temporal information through its Environmental Intelligence Suite (EIS) platform.

- **Financial management functionality.**
  The TCFD recommendations include describing the impact of climate-related risks and opportunities on an organization's business, strategy and financial planning. Corporates therefore need to be able to apply an internal carbon price to business activities, purchased services and raw materials. Additionally, as the financial sector must comply with TCFD requirements, there is an increased need for banks, investors and asset managers to calculate, understand and manage financed emissions across their entire portfolios.

Firms Are Pledging To Reach Net Zero By 2050 Or Earlier

Firms are announcing net zero emissions strategies to align with stakeholder pressure and climate change policies. Announcements on negotiations at the UN Climate Change Conference COP26 have added to the momentum behind business strategies aligned with reducing carbon emissions. To address challenges in this area, carbon management software vendors have added new functionality that moves beyond compliance to meet a broad range of customer demands, such as:

- **Net zero strategy development and programme implementation.**
  Firms that have set medium- or long-term abatement targets must disclose these targets under the TCFD framework. This requirement is in line with the SBTI's new Net-Zero Standard, which launched in October 2021 and includes a mandatory near-term abatement goal of no more than 10 years into the future, as well as with the 'Race to Zero' campaign of the UN Framework Convention on Climate Change (UNFCCC). The new wave of carbon management software needs to assist corporates in establishing data and baseline controls to accurately make emissions forecasts, as well as controls to handle the impacts on baselines and forecasts of any acquisitions or divestments, which can significantly alter a firm's carbon inventory. Firms will also need project portfolio management software to track enterprise-wide decarbonization projects, covering emissions associated with buildings, equipment, data centres and vehicle fleets, and the upstream and downstream emissions associated with their operations. To help firms get to net zero, software must be deployed across a variety of functions, such as sustainability, EHS, risk, finance, operations and the supply chain.

- **Incorporation of carbon credits and allowances.**
  Corporates may leverage carbon credits as part of their net zero transition plans (see Verdantix Market Overview: The Future of Voluntary Carbon Markets). Carbon management software can incorporate functionality that allows these firms to view the impact of offsets on their carbon footprint and demonstrate that these are being used in a manner compliant with SBTi certification. In 2021 the value of carbon credits traded on the global voluntary carbon market exceeded $1 billion for the first time. Enterprise-wide carbon management software that supports carbon trading activities, especially in emissions-intensive sectors, allows

corporates to view the impact of offsets on their overall carbon footprints. Vendors currently offer a variety of options that include carbon credits and allowances. For example, OneTrust features built-in carbon credit purchasing functionality, while Intelex maintains a partnership with carbon removal platform Cloverly to allow customers to purchase and track carbon credits.

- **Ability to track renewable energy sourcing and contracts.**
  By incorporating renewable energy source tracking, software vendors can enable their customers to collect, unify and validate data from their renewable energy sources. Customers can consolidate data from on-site renewables and off-site energy purchases in the form of Energy Attribute Certificates (EACs), Renewable Energy Certificates (RECs) and Guarantees of Origin (GOs), which can be further used to monitor Scope 2 emissions and prepare accurate reporting. Witness SINAI Technologies, which has developed an EAC tracking platform, as well as UL, which maintains a platform to help customers evaluate the financial cost and carbon emissions associated with different solutions.

Expectations Of Booming Demand Reshaped Tech Vendor Dynamics From 2019

In a 2021 Verdantix global survey of 400 senior executives in ESG and sustainability governance (see Verdantix Global Corporate Survey: ESG And Sustainability Governance, Strategies And Priorities), over a quarter of the respondents identified global GHG emissions management IT systems as their top priority. With the growing demand for carbon management software, Verdantix has witnessed the following key trends pertaining to the market:

- **Massive funding pouring into new technologies centred around carbon.**
  Over the past three years, the market has witnessed the arrival of numerous new vendors whose main focus centres around carbon management. Several of these vendors have caught the eye of investors, receiving large investments in a short period of time. For example, Persefoni, Watershed and Sweep have raised $101 million, $70 million and $100 million, respectively, since they were founded in 2019-2020. These investments signal the demand for strategic spend on carbon management software.

- **Larger vendors acquiring specialists.**
  Rather than develop in-house capabilities, large software vendors and services firms have been acquiring specialist firms to grow their reach into the carbon management space. In 2021, for example, Cority acquired enterprise sustainability software provider WeSustain, and sustainability consulting firm ERM acquired the AI specialist firm OPEX Group. Early 2022 saw two major acquisitions, with IBM acquiring the Australian-based carbon accounting and energy analytics software firm Envizi and OneTrust acquiring the German-based carbon footprint software provider Planetly.

- **New products emerging from existing software vendors.**
  To meet customer demand associated with carbon management software, existing software vendors have begun offering carbon management solutions. Several software firms best known for their EHS offerings – such as Cority, Enablon, Intelex, Sphera, UL Solutions and VelocityEHS – have strong capabilities in GHG and air emissions calculations, which form the backbone of their carbon management software solutions (see Verdantix Green Quadrant: EHS Software 2021). Similarly, ENGIE Impact, Salesforce and Schneider Electric have all leveraged their existing capabilities to develop carbon management software offerings.

- **Vendors offering varied use of services.**
  Due to the data-intensive nature of carbon emissions services, Verdantix research finds that consultancies are often needed to aid customers with data collection and software implementation. Some vendors do not offer

any consulting services – instead, maintaining partnerships to help customers manage their carbon inventories. Others, such as ENGIE Impact, have strong in-house consulting branches that assist in this respect, while FigBytes offers strong customer support services. Vendors such as Salesforce maintain a strong network of partnerships to expand their offerings to customers. For uniformity in this Green Quadrant, Verdantix assessed vendors on the capabilities of their software offerings as standalone products.

Green Quadrant For Carbon Management Software 2022

Corporates across all industries and geographies will benefit from implementing enterprise-wide carbon management software to meet the data-intensive needs associated with TCFD-based requirements, delivery on STBi pledges, and stakeholder pressure. For the purposes of this report, Verdantix defines carbon management software as:

> *"Enterprise-scale software that enables firms to capture, analyse and report carbon data, manage climate risks, and track progress towards net zero goals across all business operations."*

This definition does not include software designed to be deployed on a site-by-site basis, desktop software, applications used for regulatory content management, ESG data aggregation platforms (unless they have a specific focus on carbon) or applications with a focus on a single impact area such as supply chain management or energy management.

Verdantix research shows that the functionality of carbon management software covers data acquisition and management capabilities, the ability to calculate and model Scope 1 to 3 emissions, and data quality control. Vendors with software that does not have capabilities in these functional areas were excluded from the study. Additionally, this study focuses on the technology and usability of carbon management software and does not assess the service or consulting capabilities offered by vendors.

Green Quadrant Methodology

The Verdantix Green Quadrant methodology provides buyers of specific products or services with a structured assessment of comparable offerings at a certain point in time. The methodology supports investment decisions by identifying potential software vendors, structuring relevant purchase criteria through discussions with buyers and providing an evidence-based assessment of the products or services in the market. To ensure objectivity in the study results, the research process is guided by:

- **Transparent inclusion criteria.**
  We worked to analyse all providers that would qualify for inclusion in this research. Due to the relatively nascent market and limited amount of publicly available information on specific capabilities of vendors, we excluded firms that did not provide sufficient information or which were unwilling to cooperate fully on the 103-point questionnaire and two-hour product demonstration from this study.

- **Analysis from the buyer's perspective.**
  The buyer personas for carbon management software are expanding, and research into this market is ongoing. As part of this Green Quadrant, we interviewed reference customers and individuals who have bought or are planning to buy the product or service analysed. We used their answers to define relevant buying criteria and to weight the evaluation criteria in the model that drives the Green Quadrant graphic.

- **Reliance on professional integrity.**
  As it is not feasible to check all data and claims made by vendors, we emphasize the need for professional integrity. Assertions made by software vendors are put in the public domain via this Verdantix report and can be checked by competitors and existing customers.

- **Scores founded on evidence.**
  To assess the expertise, resources, business results and strategies of individual providers, we collected evidence from public sources and conducted interviews with multiple representatives of the actively participating software firms, as well as industry experts. When providers claimed to be 'best-in-class', we collated relevant evidence.

- **Comparison based on relative capabilities.**
  We construct measurement scales ranging from 'worst in class' to 'best in class' performance at a certain point in time. A provider's position in the market can change over time, depending on how its offering and success evolves relative to its competitors. A vendor's Quadrant positioning may not necessarily improve — even if it adds new capabilities, makes a strategic acquisition or receives investment — as the assessment is relative to what other vendors are offering. The Green Quadrant analysis is typically repeated every one-and-a-half to two years.

Evaluated Firms And Selection Criteria

Verdantix defined vendor inclusion criteria to ensure that the Green Quadrant analysis only compared firms providing similar services. We believe that all of the firms in this report provide significant value in the enterprise carbon management software market. The 15 providers included in this study were selected because they have:

- **Minimum coverage of over half the Green Quadrant solution categories.**
  We focused the study on vendors with the human, financial and technological resources to meet the needs of diverse customers for the foreseeable future. To qualify for this benchmark study, participants needed to maintain capabilities in at least two of the following categories: climate risk, carbon financials, carbon operations, and emissions inventories.

- **At least 50 employees and/or $20 million in funding.**
  This Green Quadrant is intended to assess the most prominent vendors offering enterprise carbon management software solutions. Due to the evolving landscape of the carbon software market, we established this hurdle to screen out small software providers and start-ups that have only recently entered the market. Although smaller firms may offer capabilities similar to those of their larger counterparts, without stronger organizational or financial resources, our research finds that they cannot truly offer an enterprise-wide solution. The vendors included in this Green Quadrant study have at least 50 full-time employees to support their solution, or at least $20 million in funding, indicating that they are capable of hiring additional staff to support their solution and to meet the needs of diverse customers for the foreseeable future.

- **A global presence.**
  To qualify for this benchmark study, at a minimum, the vendors must operate in at least two countries across at least two continents.

Based on the inclusion criteria above, this report evaluated 15 carbon management software solutions, from the following providers: Cority, Enablon, ENGIE Impact, FigBytes, IBM, Intelex, OneTrust, Persefoni, Salesforce, Schneider Electric, SINAI Technologies, Sphera, Sweep, UL Solutions and VelocityEHS. All the carbon enterprise software

providers in this study actively participated in an interview, digital tool demonstrations, and responses to a 103-point questionnaire.

Verdantix also invited Benchmark Digital, C3.AI, Emex, IsoMetrix, Normative, Plan A, ProcessMAP, Quentic, Radicle, SAP, ServiceNow, Watershed and Workiva to participate, but these firms declined. The main reasons given for declining were organizational constraints (for example, not having enough staff to prepare responses to the questionnaire or participate in briefings), having existing partnerships with other vendors in the study, or because their carbon management software offerings were still under development. This reflects the large volume of new entrants to the market and the rapidly evolving needs of customers.

Evaluation Criteria

Verdantix defined the evaluation criteria for the Green Quadrant carbon management software study using a combination of interviews with corporate managers, desk research, discussions with multiple customers and staff expertise. In full, this year's Green Quadrant analysis compares offerings from 15 software firms using a 103-point questionnaire covering 17 categories of capabilities and 10 categories of market momentum. Individual metrics were classified as:

- **Capabilities metrics.**
  The capabilities dimension, plotted on the vertical axis of the Green Quadrant graphic, measures each software vendor on the breadth and depth of its service approach, its differentiators against other providers, and its proven experience in each area. Verdantix assessed 17 capabilities across four layers of functionality: climate risk (covering TCFD reporting, portfolio modelling and voluntary reporting); carbon financial management (encompassing internal carbon price modelling, integration with financial software, and carbon financial performance analysis); carbon operational management (such as carbon reduction project portfolio management, science-based scenario models, and emissions baselines); and emissions inventories (for example, emissions factors and calculation engines, GHG data audit tools, and physical asset databases). The Verdantix Green Quadrant considers the evolution of the market and customer requirements to ensure that the weighting of all high-level criteria mirrors the importance of all software components to users globally.

- **Momentum metrics.**
  The momentum dimension of the analysis, as captured on the horizontal axis of the Green Quadrant graphic, measures each software firm based on their brand perception, revenue size, customer base, partnerships and vision. Evidence was either provided by software firms or through desktop research and was assessed using a quantitative model that started with the sub-criteria scores. We weighted each sub-criterion to generate the overall score for each capability area. To assess performance along this dimension, we collected data on 35 criteria in nine areas: 1) vision and strategy; 2) market focus; 3) partnerships; 4) customer size; 5) customer success; 6) user adoption; 7) brand preference; 8) organization resources; and 9) financial resources.

We scored all sub-criteria at zero, one, two or three, with zero reflecting 'no capability' and three being 'best in class'. Each sub-criterion has a percentage weighting that dictates how much of a contribution it makes to the high-level capabilities or momentum scores. The combination of high-level criteria scores in the capabilities and momentum sections generates the Green Quadrant graphic and rankings. (See **Figure 1** and **Figure 2** for details of the study criteria, and **Figure 3** and **Figure 4** for the scoring for all participants against the criteria. For the Green Quadrant graphic summarizing the positioning of all carbon management software vendors in this benchmark study, see **Figure 5**).

Figure 1

Capabilities Criteria For Carbon Management Software

Capabilities	Questions
Data Acquisition (4%)	What functionality is available to facilitate data acquisition internally? What functionality is available to facilitate data acquisition externally? How does the software integrate with common sources of GHG emissions data?
Data Management (4%)	How do you store primary data prior to calculating CO_2 emissions? What data privacy and security credentials and controls do you have? How does the software control permissions for different user groups?
Data Modelling — Scope 1 (3%)	What functionality is available to aggregate Scope 1 data? What pre-built data models do you offer for different types of Scope 1 primary data? Do you offer any data modelling tools specific to Scope 1 activities?
Data Modelling — Scope 2 (3%)	What functionality is available to aggregate Scope 2 data? What pre-built data models do you offer for different types of Scope 2 primary data? Do you offer any data modelling tools specific to Scope 2 activities?
Data Modelling — Scope 3 upstream (2%)	What functionality is available to aggregate Scope 3 upstream data? What pre-built data models do you offer for different types of Scope 3 upstream primary data? Do you offer any data modelling tools specific to Scope 3 upstream activities?
Data Modelling — Scope 3 downstream (2%)	What functionality is available to aggregate Scope 3 downstream data? What pre-built data models do you offer for different types of Scope 3 downstream primary data? Do you offer any data modelling tools specific to Scope 3 downstream activities?
Data Quality Control (6%)	How does your software facilitate identification of missing input data? How does the software enable estimation where primary data is not available? How does the software enable auditors to test data sources and calculations? What AI capabilities enable data quality enhancement? What functionality is available for manual data quality enhancement?
Carbon Accounting Methodologies (12%)	How is the GHG Protocol Corporate Standard embedded in the software? How is the GHG Protocol Value Chain (Scope 3) Standard embedded in the software? How is the PCAF framework embedded in the software? Are any other innovative methodologies included in the software?
Carbon Emissions Calculation Engine (12%)	How are emissions factors stored? Where do you source your emissions factors from and what is your commitment to keep them up to date? Which greenhouse gases do you cover in your emissions factors library? For which power grids do you provide emissions factors? How do you create and update emissions factor calculations? What data volumes can the calculation engine process? What tools do you provide to design new emissions calculators?

Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.

Figure 1

Capabilities Criteria For Carbon Management Software

Capabilities	Questions
Carbon Financial Management (6%)	How does the software apply an internal price on carbon and integrate with finance and IT systems? How does the software incorporate carbon fee chargebacks? What functionality is available to perform financial analysis on carbon data such as carbon/revenue intensity metrics? How does the software enable asset managers to assess financed emissions of equity portfolios? How does the software enable fund managers to assess financed emissions of equity and loan portfolios? How does the software enable lenders to assess financed emissions of loan portfolios? How can the user allocate carbon emissions costs to different divisions? How can users track cost savings from carbon reduction projects? How does the software integrate with core financial applications?
Carbon Credits & Allowances Management (3%)	What functionality is available to manage trading in regulated emissions allowances? What functionality is available to manage trading in voluntary carbon credits? How does the software integrate with carbon credits registries?
Renewable Energy Sourcing & Contracts (3%)	What functionality is available to manage sourcing of renewable energy supplies? What functionality is available to manage sourcing of RECs? What functionality is available to store data on renewable energy supply contracts?
Net Zero Strategy Development (8%)	How does the software store different science-based scenarios? How does the software create and track CO_2 reduction pathways? How does the software enable users to set interim and final targets for net zero? How does the software store baseline data and enable updates subsequent to disposals and acquisitions? How does the software facilitate peer group benchmarks? How does the software facilitate internal benchmarks?
Net Zero Programme Implementation (8%)	What net zero performance metrics are available to analyze progress? How does the software support forecasted calculations for emissions/operations scenario planning? What capabilities are available to create, link and monitor decarbonization projects? How can project performance be tracked? How does the software help identify carbon abatement opportunities across diverse product portfolios? How does the software store, share and utilize best practices content? What functionality is available to optimize net zero programme certification? What functionality is available to create carbon management apps on the platform? How do you ensure full adoption of the software by all targeted user groups? What functionality is provided to engage suppliers to reduce carbon intensity and support net zero goals? Which languages are automatically supported in forms and workflows?

Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.

Figure 1

Capabilities Criteria For Carbon Management Software

Capabilities	Questions
Carbon Disclosure Management (10%)	What functionality is available to manage the approval process for regulated carbon disclosures? How does the software support TCFD-aligned carbon and climate risk/ opportunity reporting? Which frameworks and standards does your software support with predefined configurations? What functionality is available to allow users to produce voluntary carbon disclosures? Which regulated carbon disclosure templates are pre-loaded?
Physical Climate Risk (8%)	How does the software provide insight into asset-level climate risks? Does the software have any geo-spatial climate risk mapping capabilities?
Organizational Data Management (6%)	How does your software link physical asset data to legal entities and jurisdiction-level reporting requirements? How does the software store data on part-owned subsidiaries and joint ventures? How does the software facilitate organizational changes such as acquisitions, divestments and reorgs? How are operating assets such as vehicles, plants and buildings stored in the system? How is information on CO_2 emissions associated with reporting entities in different jurisdictions?
Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.	

Figure 2

Momentum Criteria For Carbon Management Software

Momentum	Questions
Vision & Strategy (5%)	What is your vision for the development of the carbon management software market? What is your strategy to grow the business? What is your product strategy for the next 18 months?
Market Focus (5%)	What % of your revenues are generated by carbon management software?
Partnerships (10%)	With which consulting firms do you have a formal alliance pertaining to carbon management software? With which hardware firms do you have a formal alliance? With which software firms do you have a formal alliance? Which industry associations have you partnered with? Which climate and carbon organizations are you member of?
Customer Base (25%)	How many firms with revenue above $10bn have deployed your software? How many firms with revenue above $1bn but less than $10bn have deployed your software? How many firms with revenue below $1bn have deployed your software?
Customer Success (5%)	What implementation services do you offer? How do you measure customer satisfaction? What is your Net Promoter Score or similar? What training services do you offer to your customers? What was your customer retention rate in 2021?
User Adoption (10%)	On average how many users are there with each of your customers? What is the total number of users of your carbon management software? In which business functions do you have users? On average, what is the % of users of your CMS across business functions?
Brand Preference (5%)	How many followers does your firm have on social medial? What were your customers' feedback regarding your carbon management software capabilities?
Organizational Resources (15%)	How many employees does your firm have? How many employees are dedicated to your carbon management software product? In how many countries do you have an office?
Financial Resources (20%)	What were your firm's total revenues in the last financial year? What were your firm's carbon management software revenues? How much external funding has your firm secured in the last 2 years? What was your firm's earnings before interest and tax (EBIT) in the last financial year?

Figures in brackets represent the weighting given to each criterion in the flexible multi-criteria model that generates the Green Quadrant graphical analysis.

Figure 3

Vendor Criteria Scores

Capabilities

	Cority	Enablon	ENGIE Impact	FigBytes	IBM	Intelex	OneTrust	Persefoni	Salesforce
Data Acquisition	2.0	2.0	1.7	1.7	2.7	2.0	2.0	2.0	2.0
Data Management	2.0	2.3	2.0	1.7	2.0	2.0	2.0	2.0	2.0
Data Modelling — Scope 1	2.3	2.3	2.0	2.0	2.3	2.3	1.7	2.0	1.7
Data Modelling — Scope 2	2.0	2.3	2.7	2.0	2.3	2.0	1.7	2.3	1.7
Data Modelling — Scope 3 Upstream	2.0	2.0	2.7	1.7	2.0	2.0	2.0	2.0	1.3
Data Modelling — Scope 3 Downstream	2.0	1.7	2.0	1.7	1.7	2.0	1.7	1.3	1.3
Data Quality Control	2.2	2.0	1.8	1.6	2.6	1.6	1.8	1.8	2.0
Carbon Accounting Methodologies	1.7	1.8	0.7	1.6	2.0	1.2	2.4	2.6	1.0
Carbon Emissions Calculation Engine	2.6	2.6	1.9	2.0	2.3	2.3	1.7	2.1	1.7
Carbon Financial Management	1.6	1.5	0.0	0.7	1.2	1.1	1.7	2.0	1.2
Carbon Credits & Allowances Management	0.7	1.0	0.0	1.0	1.0	1.3	2.0	0.3	0.0
Renewable Energy Sourcing & Contracts	2.0	1.3	2.3	0.7	2.7	2.0	1.0	0.7	1.0
Net Zero Strategy Development	2.0	2.0	1.2	1.7	2.2	1.5	1.0	2.2	1.8
Net Zero Programme Implementation	2.2	2.4	0.6	1.1	1.5	1.5	1.6	1.9	1.5
Carbon Disclosure Management	2.0	1.8	0.6	2.0	1.8	1.4	1.8	1.6	1.0
Physical Climate Risk	1.0	1.0	0.0	1.0	2.5	0.5	0.5	0.0	1.0
Organizational Data Management	1.8	2.2	0.6	1.8	2.4	1.8	1.8	2.4	1.8

Scoring Framework

3 Vendor provides evidence of market-leading functionality, supported by a broad set of references to customer examples

2 Vendor provides evidence of strong functionality, supported by a broad set of references to customer examples

1 Vendor provides evidence of moderate functionality, with limited references to customer examples

0 No response provided or available publicly, or supplier has a weak offering

Source: Verdantix analysis

Figure 3

Vendor Criteria Scores

Capabilities

	Schneider Electric	SINAI Technologies	Sphera	Sweep	UL Solutions	VelocityEHS
Data Acquisition	2.3	1.7	2.3	2.0	2.0	2.0
Data Management	1.7	2.0	2.3	2.0	2.3	2.3
Data Modelling — Scope 1	2.0	2.0	2.3	2.0	2.0	2.3
Data Modelling — Scope 2	2.0	2.0	2.0	2.3	2.3	2.3
Data Modelling — Scope 3 Upstream	2.0	1.7	2.7	2.3	2.3	2.0
Data Modelling — Scope 3 Downstream	1.3	0.7	2.7	1.0	2.0	1.7
Data Quality Control	1.8	1.4	1.8	1.8	1.8	2.0
Carbon Accounting Methodologies	1.4	1.8	1.8	2.3	1.7	1.8
Carbon Emissions Calculation Engine	1.6	1.9	2.7	2.3	2.3	2.3
Carbon Financial Management	0.2	1.8	2.0	1.9	1.8	1.3
Carbon Credits & Allowances Management	0.3	0.3	1.0	3.0	0.0	1.0
Renewable Energy Sourcing & Contracts	2.3	2.3	1.7	1.7	2.3	1.7
Net Zero Strategy Development	1.2	2.3	2.3	2.2	1.7	1.3
Net Zero Programme Implementation	1.6	2.4	2.0	2.0	1.8	1.4
Carbon Disclosure Management	0.6	1.4	2.2	1.6	2.0	1.2
Physical Climate Risk	0.0	0.5	1.0	0.0	1.0	1.0
Organizational Data Management	1.6	2.2	2.4	2.2	1.8	1.8

Scoring Framework

3 Vendor provides evidence of market-leading functionality, supported by a broad set of references to customer examples

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Source: Verdantix analysis

Figure 4

Vendor Criteria Scores

Momentum

	Cority	Enablon	ENGIE Impact	FigBytes	IBM	Intelex	OneTrust	Persefoni
Vision & Strategy	2.0	2.0	2.0	2.0	2.3	2.0	2.3	2.7
Market Focus	2.0	2.0	1.0	3.0	1.0	2.0	1.0	3.0
Partnerships	1.0	1.4	1.2	1.0	1.2	0.8	1.0	1.4
Customer Base	2.0	2.0	1.2	1.0	2.4	2.0	1.2	1.0
Customer Success	2.0	1.6	2.2	1.2	1.6	1.8	1.8	1.6
User Adoption	2.0	2.1	1.1	2.0	1.2	1.1	1.2	1.0
Brand Preference	1.0	2.0	1.5	1.5	2.5	1.5	1.5	1.5
Organizational Resources	1.3	2.3	1.7	1.0	2.3	1.7	2.0	1.7
Financial Resources	2.0	2.0	2.3	1.0	2.3	1.7	1.7	1.3

	Salesforce	Schneider Electric	SINAI Technologies	Sphera	Sweep	UL Solutions	VelocityEHS
Vision & Strategy	2.0	2.0	2.0	2.0	2.7	2.0	2.0
Market Focus	1.0	1.0	3.0	2.0	3.0	2.0	2.0
Partnerships	1.2	0.8	1.0	1.2	0.4	1.0	1.2
Customer Base	1.4	2.0	1.0	1.8	1.0	2.2	2.0
Customer Success	1.8	1.6	2.6	1.8	1.8	2.0	1.6
User Adoption	1.1	2.0	2.0	2.0	2.0	2.0	1.1
Brand Preference	2.5	1.5	1.0	2.0	1.5	2.5	1.5
Organizational Resources	2.3	2.7	1.0	1.7	1.0	2.3	1.3
Financial Resources	2.3	2.3	1.0	2.0	1.3	2.0	1.7

Scoring Framework

3 Vendor provides evidence of market-leading functionality, supported by a broad set of references to customer examples

2 Vendor provides evidence of strong functionality, supported by a broad set of references to customer examples

1 Vendor provides evidence of moderate functionality, with limited references to customer examples

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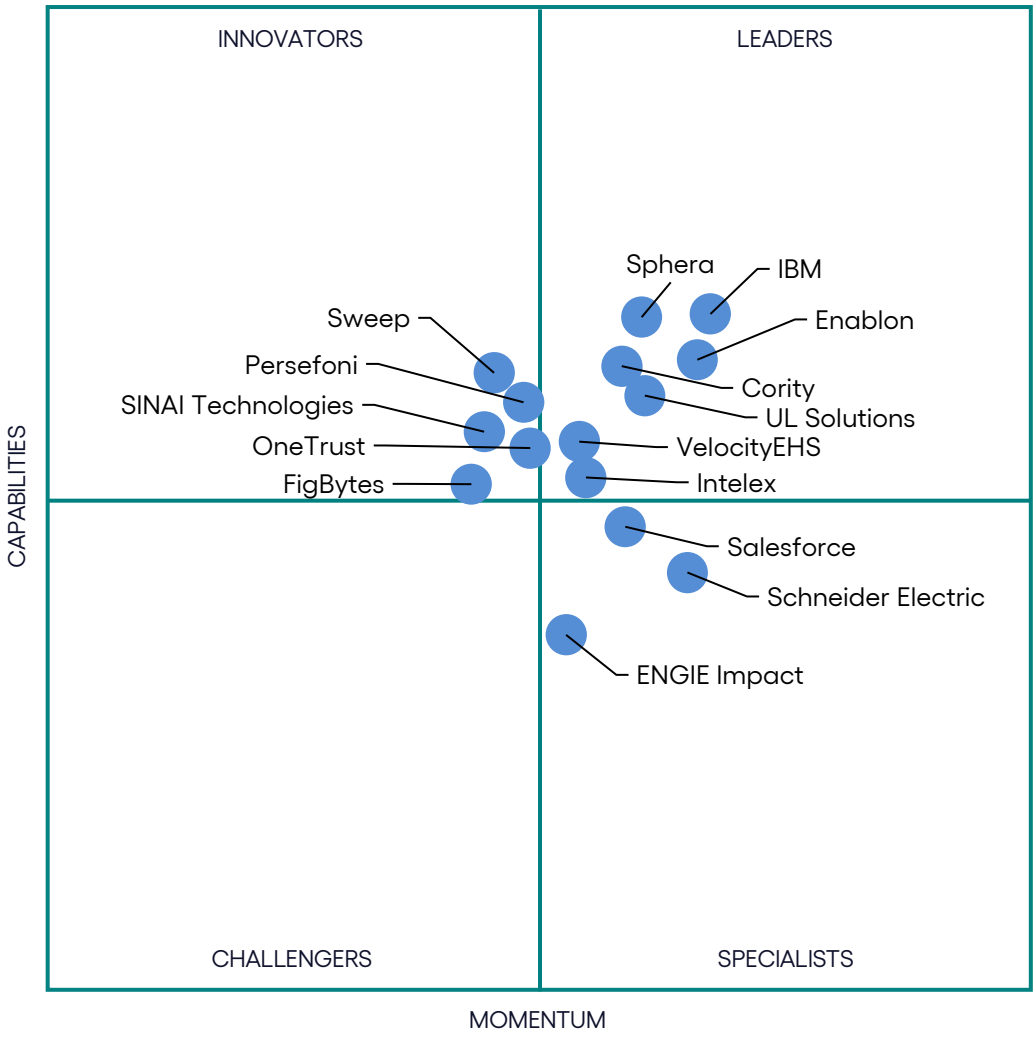
Source: Verdantix analysis

Figure 5

Green Quadrant For Carbon Management Software 2022



Capabilities	This dimension measures each software supplier on the breadth and depth of its software functionality across 17 capability areas, as outlined in Figure 1.

Momentum	This dimension measures each software supplier on nine strategic success factors, as outlined in Figure 2.

Source: Verdantix analysis

IBM Acquires Envizi To Deliver A Comprehensive Carbon Management Software Platform

Global technology firm IBM was founded in 1911 and is headquartered in Armonk, New York. IBM has over 282,000 employees and operates approximately 600 offices in 175 countries. In January 2022 IBM acquired Australian-based carbon accounting and energy analytics software firm Envizi. Founded in 2004 Envizi's approximately 70-person team developed a carbon management solution, which is being used by approximately 150 enterprise clients – with approximately 5,000 users – across a variety of industries, such as commercial real estate, financial services, retail, government, education, healthcare and manufacturing. Notable clients of Envizi include IBM (prior to the 2022 acquisition), CBRE, Celestica, Commonwealth Bank, Microsoft and SL Green. IBM also maintains its Environmental Intelligence Suite (EIS) platform, which has the capability to apply climate risk mapping and forecasting, as well as platforms that help customers with intelligent facilities and assets, resilient IT infrastructures, and circular supply chains. Due to the recentness of the Envizi acquisition, the Envizi platform is not yet fully integrated with EIS, although this integration is expected to be completed in 2022.

Strengths And Differentiators

Based on the Green Quadrant analysis, Verdantix finds that IBM has strengths in:

- **Data quality control.**
  IBM scored a 2.6/3.0 for data quality control, which was the top score in this category. The Envizi platform provides its users with a range of reporting and audit tools to identify missing data inputs and to estimate data when primary source information is not available. These tools include various data health checks, preparation of an accounts incomplete data report, and out-of-the-box accrual methodologies. Envizi leverages IBM's DART toolkit to further assess data quality. Additionally, the Envizi platform uses artificial intelligence (AI) for several purposes, including for data accrual – account data, time-series meter data – and to incorporate seasonality and weather-related influences to improve the quality of estimated data.

- **Physical climate risk.**
  IBM scored a 2.5/3.0 for physical climate risk, which was a top score in this category. IBM's EIS platform incorporates weather, climate and environmental data to allow customers to plan for the impacts of weather and climate change. The EIS platform includes Global High-Resolution Atmospheric Forecasting (IBM GRAF), which provides a high-precision, rapidly updating global weather model using high-resolution weather data. Additionally the Geospatial Analytics component within the EIS platform allows for geospatial-temporal (such as maps, satellite, weather, drone, and IoT) queries and analytics services, providing customers access to a diverse catalogue of continually updated geospatial-temporal information.

- **Renewable energy sourcing and contracts.**
  IBM scored a 2.7/3.0 for renewable energy sourcing and contracts, which was the top score in this category. Through the Envizi platform, users can capture bundled grid and green power directly from electricity retailers, as well as renewable power generated and consumed on site. Customers can capture unbundled renewable energy certificates (RECs) at a site, group or regional level, which can then be apportioned across the organization. The Envizi platform enables customers to understand potential costs to achieve net zero for electricity. Additionally, the Envizi platform contains a Renewable Asset Management module, enabling customers to track and validate performance of photovoltaic (PV) assets.

Improvement Opportunities

Based on the Green Quadrant analysis, Verdantix finds that IBM could improve on:

- **Carbon financial management.**
  IBM scored a 1.2/3.0 for financial management capabilities. Through the Envizi platform, customers can track emission reduction initiatives as well as projected emissions savings and costs against actual emissions reductions and costs; however, Leaders in this category also have strong functionality for investment portfolio analysis.

- **Net zero programme implementation.**
  IBM scored a 1.5/3.0 for net zero programme implementation. The Envizi platform has several tools to help customers implement a net zero programme, such as forecasting emissions across several scenarios and the use of Power Report to develop custom reporting. To improve its functionality, Envizi could consider adding tools to optimize internal business processes and achieve net zero programme certification.

Selection Advice For Buyers

Considering all of the vendors' offerings in the Green Quadrant analysis, we believe that IBM should be shortlisted by:

- **Enterprise firms seeking a comprehensive and reliable carbon management platform.**
  The Envizi platform is built on a strong carbon calculation engine with over 40,000 emissions factors and incorporates Power BI-based reports to allow customers to evaluate their Scope 1 to 3 emissions. Additionally the Envizi platform allows users to configure its carbon disclosures under numerous frameworks – including the Task Force on Climate-related Financial Disclosures (TCFD), Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), Sustainable Finance Disclosures Regulation (SFDR), and the UN Sustainable Development Goals (SDGs) – and contains a target setting and tracking module that enables customers to set and track energy and emissions reductions targets. The Envizi platform uses AI to ensure high data quality, and IBM's long-term investments in AI capabilities reflect its intentions to produce more accurate data. Large, enterprise firms seeking a strong, well-rounded carbon accounting platform will benefit from IBM's global presence.

- **Asset-intensive firms looking to better understand potential climate-related risks.**
  IBM's EIS platform delivers customers insight on climate risk and geospatial analysis, advanced data modelling, and weather forecasting and event management. These capabilities allow IBM's customers to improve operational decision-making and would be best suited to firms looking to evaluate the climate risk of their assets in order to comply with climate disclosure rules, engage with stakeholder priorities, or gain a competitive advantage. The existing integration between Envizi and IBM's other operating platforms – including Maximo and TRIRIGA for intelligent facilities and assets, Turbonomic for IT infrastructure, and Sterling for circular supply chains – as well as the planned integration between Envizi and EIS will allow customers to have a 360-degree view of GHG emissions across their operations alongside integrated tools for climate risk assessment.

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