

## ESGSignals® Product Capabilities

### Table of Contents

<b>ESGSignals® Product Capabilities</b>	1
<b>General Overview</b>	2
What is the ideal use case for ESGSignals®?	2
What is ESGSignals® naturally good at?	2
What are ESGSignals®'s constraints?	2
Which market segments is ESGSignals® focused on?	2
Rating Providers	2
ESG Analytics Providers	3
Index Providers	3
Asset Managers	3
Corporates	3
What sector challenges lie ahead that can be overcome with technology or behavioral change?	3
<b>Approach</b>	3
Where do we get the raw data from and is this accessible to you?	4
What history is available for our main data and output sets?	4
What normalization and adjustments do our data and outputs undergo?	4
Is our data and analysis point-in-time and does it include any forward-looking assessments?	4
<b>Distinctive Competence, Ownership, and Addressable Market</b>	5
Who are our primary competitors and what sets us apart from them?	5
What is our perceived distinctive competence and enduring edge in the industry?	6
What is our ownership structure?	6
What sectors do we see as more "hidden" today?	6
<b>Data Types</b>	6
What types of ESG and SDG indicators, gauges, and measures are available in our dataset?	6
Is our coverage regional or global in nature?	7

Sample Dataset	7
<b>Scope of Coverage</b>	8
Weather and climate modelling and predictive risk services	8
Innovation and substitution effects	8
Changes in global standards/benchmarks	8
<b>Case Study</b>	8
Alcoa vs. BHP vs. Rio Tinto	8

## General Overview

### What is the ideal use case for ESGSignals®?

ESGSignals® provides environmental impact and climate physical risk data and metrics for some of the most polluting and physical asset-intensive industries. The data and metrics are provided at the asset-level which is necessary for comparing the risk profile of assets with similar attributes and production capacities. This level of in-depth comparison is especially applicable for investing themes based on ESG integration, best-in-class, and sustainability themed investing. The ideal use case for our product would be market segments implementing ESGSignals® not only for gaining instantaneous, verifiable, and comparable ESG insights, but also for contributing to an overall shift away from outdated and inefficient ESG reporting methodologies.

### What is ESGSignals® naturally good at?

ESGSignals® is the industry-leading geospatial analytics platform for providing asset-level environmental metrics. This is accomplished through deriving insights from a combination of various structured and unstructured data points – geolocation, diverse satellite datasets, atmospheric, aqueduct, surface & groundwater and land usage datasets. These datasets are processed through the proprietary ESGSignals® PaaS (Platform as a Service) to create asset-level emissions, water stress, land usage, and physical risk metrics.

### What are ESGSignals®'s constraints?

One constraint of the product is that the current coverage is limited only to the materials, energy, and utilities sectors, but soon will be expanded to cover industrial, real estate, and consumer staples in 2021.

### Which market segments is ESGSignals® focused on?

Below are the market segments we are currently focused on:

### Rating Providers

Country, regional and company level emissions, land usage, water stress and physical risk, and economic indicators

### **ESG Analytics Providers**

Integration of asset level emissions concentration, land usage, water stress, physical and transition risk metrics

### **Index Providers**

Integration for ranked sustainable investment indices and custom benchmarks

### **Asset Managers**

Integration for fundamental, quantitative and enhanced active investment strategies

### **Corporates**

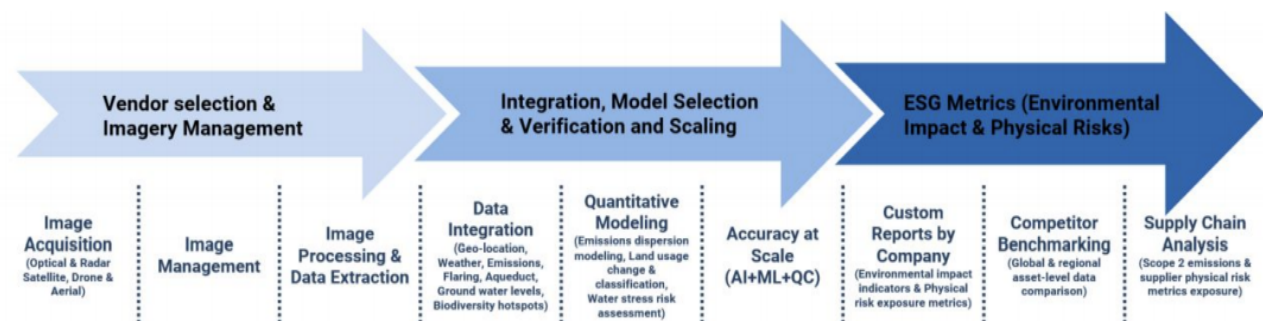
Asset-Level environmental impact and climate physical risk metrics for assessing exposure to ESG risks and opportunities, material environmental & physical risk metrics in the company's supply chain; data monitored for custom events and emerging controversies

### **What sector challenges lie ahead that can be overcome with technology or behavioral change?**

We see ESG ratings following a similar evolutionary path as credit ratings. Credit ratings were initially a black box, but as importance increased for stakeholders it drove demand for greater transparency and consistency across all vendors as well as the need for independent, objective, auditable, and real-time financial data. Broad ESG scores were initially used for portfolio construction, but now with ESG increasing in value and relevance, the stakeholders are looking for objective, verifiable, independent asset-level data which RS Metrics is providing through ESGSignals®.

### **Approach**

Below is a high-level overview of the ESGSignals® PaaS.



We offer bespoke work as part of our product suite. Please see below for all product details.

**TRAFFIC  
SIGNALS™**

(2010): Retail traffic data and signals for retail and restaurant chains

**CRE  
TRENDS™**

(2011): Trends and signals for commercial real estate properties (retail, office, industrial)

**FACTORY  
SIGNALS™**

(2012): Trends and signals for employment, materials usage, and production for global factories and DCs (e.g. TSLA, SNBR)

**METAL  
SIGNALS™**

(2017): Trends and signals for zinc, aluminum, copper, iron ore, bauxite, coal, and steel at 500+ global smelters, terminals, and storage sites

**GREAT™**

(2019): Active tracking of mines, smelters, and factories leading to intelligent management of supply chain risks combined with PAAS

**ESG  
SIGNALS™**

(2019): Objective environmental analytics, benchmarks, and insights from satellite analytics

# OUR PRODUCTS

Predictive Analytics  
Trading Signals Alerts  
End-user Indexes  
Applications

## Where do we get the raw data from and is this accessible to you?

Raw data is sourced from various specialized satellite data vendors depending on the type of imagery necessary to create metrics. Satellite data is combined with geo-location, supply chain, aqueduct, ground water, surface water, land usage, vegetation index, land cover change, and biodiversity datasets. We do not provide the raw datasets used for creating a metric or score as this is acquired through negotiating commercial agreements with multiple third-party data providers.

## What history is available for our main data and output sets?

Availability varies per metric that is covered; however, GHG Emissions coverage goes back to 2017. Land usage and water stress have more historical data.

## What normalization and adjustments do our data and outputs undergo?

ESGSignals® environmental metrics are built using a variety of data sources with different spatial and temporal resolutions that need to be normalized to extract insights at the asset-level. The metrics follow the industry standard unit of measurement and are comparable across multiple dimensions.

## Is our data and analysis point-in-time and does it include any forward-looking assessments?

ESGSignals® is a point-in-time assessment with historical data for some commodities going back to 2013. We maintain bi-temporality but we are currently not providing any forward-looking assessments, especially for environmental metrics. One of our other products we offer, MetalSignals™ provides forecast

signals for price and inventory directionality for key base metals derivative contracts using KNN (K-nearest neighbors algorithm) which has proven to be over 80% predictive of the price direction.

## Distinctive Competence, Ownership, and Addressable Market

### Who are our primary competitors and what sets us apart from them?

RS Metrics continues to be the market-leading company for satellite imagery and geospatial analytics for businesses and investors. We created this space in 2010, with proprietary and patented technology ([US Patents](#)) that leverages advanced computer vision and machine learning to extract meaningful and ready-to-use data from a variety of location-based sources. RS Metrics provides predictive analytics, alerts, and end-user applications for decision making in financial services, ESG, real estate, retail, industrials, metals, government, and academic research.

Our largest competitors fall under the NIH (not-invented-here) syndrome of companies with a tendency to using solutions that they did not create themselves. Internal stakeholders then mistakenly believe that they can buy some imagery and create meaningful enterprise analytics products without having the needed expertise and operational understanding to do it on a comparable level.

Please refer to the competitive matrix below which is based on both PaaS and financial product providers (Orbital Insight and Ursa).

Competitor Analysis			
CATEGORY – OBJECTIVE (99% accuracy) SCALE (# of Industries covered) ACCURACY (10 yrs)	RS METRICS	COMP 1	COMP 2
<b>Vendor Relationship &amp; PAAS Platform</b>			
Imagery and data access and expertise for ALL global satellite providers and tech (Optical, SAR, Hyperspectral, other)	☑	☑	☑
Drone & Aerial (Airplane) expertise	☑	☒	☒
Automated imagery analysis & workflow for data accuracy at scale (Human QC)	☑	☑	☒
<b>Product Scope &amp; Coverage</b>			
ESG – Global Methane & Flaring Tracker by Oil & Gas Basin	☑	☑	☒
ESG – Asset-level GHG Emissions (CH4, NO2, SO2, CO & Aerosol) Tracker & emissions concentration measurement	☑	☒	☒
ESG – Asset-level land usage & land cover type change measurement & exposure to bio-diversity hotspots	☑	☒	☒
ESG – Asset-level physical risk assessment (fire, flood & sea-level rise) & Stranded Asset Tracking (changes in operational activity)	☑	☑	☑
ESG – Asset-level water stress risk score based on basin level activity & industry specific water intensity	☑	☒	☒
Products and Analysis – Energy	☑	☒	☒
Products and Analysis – Metals & Mining	☑	☒	☒
Data and Signal Products for Retail Traffic, <a href="#">CRE</a> , Industrials, Metals, Energy, <a href="#">ESG</a>	☑	☒	☒
<b>Vertical Applications &amp; Distribution Partnerships</b>			
Expertise in Building Vertical Applications for Multiple Industry Sectors and Asset Classes (Indices, ETFs)	☑	☒	☒
Fundamental Satellite Imagery and Geospatial Data Patents	☑	☒	☒
Data distribution agreements through platforms (Bloomberg, FactSet), exchanges (CME, SGX) and price reporting agencies (SMM)	☑	☒	☒

**What is our perceived distinctive competence and enduring edge in the industry?**

- o First to market with geo-spatial applications since 2010 and current market leader in analytics
- o Accuracy at scale
- o Continuous reinforcement and proprietary security for our tech through patents, designs, copyrights, trademarks, and brands.
- o Coverage of a broad spectrum of sectors and environment impact and climate physical risk metrics for ESG
- o High-level and diversified GHG emissions tracking (Scope 1 - CO, NO2, SO2, CH4 and HCHO emissions in CO2 equivalent) at the asset-level
- o Near real-time insights
- o Academic affiliations – Columbia University, Harvard Medical School

**What is our ownership structure?**

RS Metrics is backed by the industry leading AI / Fin-Tech investors, including Thynk Ventures, Nate Gantcher (ex-Chairman and CEO of Oppenheimer), Jim Stern (Founder and Chairman of Cypress Group), and Jim Brown (Long Ridge / Thomas Lee). We have over 150 Enterprise customers globally, including some of the world's largest hedge funds, asset managers, retailers, universities, metal traders, and REITs.

We are privately held. The key leadership team is listed [here](#).

**What sectors do we see as more “hidden” today?**

Companies operating in extractive industries depending on the geographic location of their assets are less exposed to the carbon pricing regime and not as accountable for negative environmental externalities. This is mainly the case for Asia and the Americas regions where there is lack of transparency. Steady and evolving, regulatory advancement and shareholder activism will result in driving greater interest in ESG investment products on the back of increasingly reliable and standardized ESG datasets.

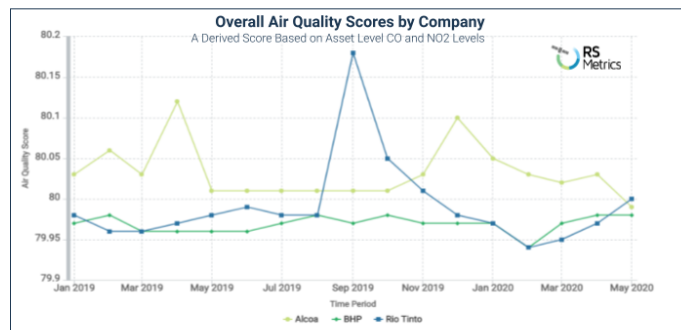
**Data Types****What types of ESG and SDG indicators, gauges, and measures are available in our dataset?**

ESGSignals® covers environmental impact and climate physical risk metrics that are linked to ESG and SDG indicators. Please refer to the [data description](#) document for a complete list of metrics we cover and our environmental metrics for [SFDR reporting](#).

- o **Scope 1 GHG emissions are measured and reported in CO2 equivalent**
  - Carbon Monoxide (CO)
  - Nitrogen Dioxide (NO2)
  - Sulfur Dioxide (SO2)
  - Methane (CH4)
  - Aerosol Index
- o **Land usage and proximity measured in square meters**

- Land Usage
  - Land cover type classification
  - Asset proximity to IUCN areas
  - Asset proximity to biodiversity hotspots
- o **Water stress**
    - Water stress score based on meteorological variables, aqueduct and surface water datasets
    - Basin water risk
    - Proximity to the nearest water stress location if applicable

## Asset-Level GHG Emissions Metrics



### Multiple Data Providers

- Includes ESA's Sentinel-5P TROPOMI
- Monitors atmospheric composition in the troposphere
- Daily monitoring with 16 day repeat orbit

### Spectral Fingerprint

- Identification of gases
- CO, HCHO, CH4, NO2, O3, and SO2

### Retrieval Algorithms

- Infer physical quantities such as number density, partial pressure, and column amount

### Methane Monitoring

- Partnerships with GHGSat, Bluefield, MethaneSAT and other NGOs including UN GLSD, EAS, ISA etc.

\* GHG – Greenhouse Gas

Asset-Level GHG Emissions Metrics, Source: RS Metrics ESGSignals® Overview Deck, 2021

### Is our coverage regional or global in nature?

Global coverage across multiple sectors and environmental themes (emissions, water stress, land usage, physical, and transition risks). Biodiversity monitoring includes proximity and operations in world heritage sites, protected areas, rivers, wetlands, endangered species, indigenous area, and proximity to power lines based on geo-location. Water stress indicators derived from geo-location data are based on meteorological variables, surface water levels, and the physical characteristics of the basin.

### Sample Dataset

You can explore a sample ESGSignals® Dataset [here](#).

## **Scope of Coverage**

### **Weather and climate modelling and predictive risk services**

Atmospheric data (temperature, pressure, wind direction, precipitation and cloudiness) is incorporated into emissions and water stress risk modelling. Dispersion modeling necessary for measuring emissions at the asset-level incorporates weather data along with the satellite imagery.

### **Innovation and substitution effects**

RS Metrics continues to be the market-leading company for satellite imagery and geospatial analytics for businesses and investors. This is achieved through continuous innovations at the product level and bringing diverse products to markets. ESGSignals® is another example of the organization being able to innovate quickly based on the market needs and leveraging our extensive partnership network to bring the best asset-level environmental impact assessment product to market.

### **Changes in global standards/benchmarks**

The metrics covered are aligned with the SASB materiality matrix. We are constantly engaging with standard setters such as SASB, ICMM, The Spatial Finance Initiative, and other leading research organizations on using geospatial datasets to identify risks and incorporate that into our product suite.

## **Case Study**

### **Alcoa vs. BHP vs. Rio Tinto**

You can explore this detailed [Metals & Mining ESGSignals® case study](#) which compares three major global miners (Alcoa Corporation, BHP Group Ltd., and Rio Tinto PLC) using our methodology.