



The Open Footprint Landscape

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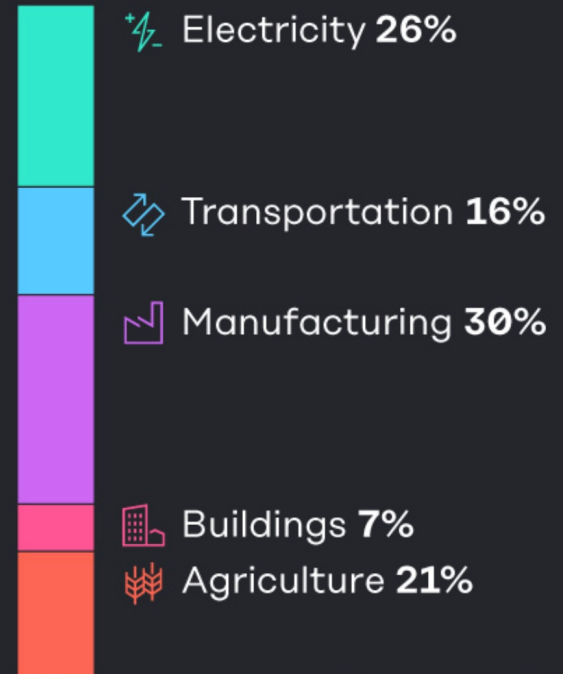




- Discuss why open standards for carbon footprint measurement matter
- Overview of the Open Footprint Forum
- Level set for today's workshop

GRAND CHALLENGES

Five main sources are responsible for the majority of global greenhouse gas emissions.



Multiple Stakeholder Groups are Activating Around ESG and Carbon Management



Customers

Demand low carbon inputs and define required ESG information / approved vendors



Internal operations

Successful net zero delivery will drive enterprise-wide transformation. From procurement to operations to distribution.



Inorganic Opportunities

Business and customer segments will disrupt significantly by 2030 - customer behaviours and demands are changing and net zero will create winners and losers

Carbon Operating System



*Trusted,
actionable
emissions
ledger*



Investors

Investors are increasingly factoring ESG into their decisions, seeking to shift portfolios and understand systemic risks



Lenders

Banks are scrutinizing exposures to carbon-intensive assets; many restricting or ceasing financing of new projects



Regulators

Major regulatory changes to promote low carbon will affect companies across geographies - including market-based (dis)incentives and disclosures (C&I, carbon pricing and taxes)

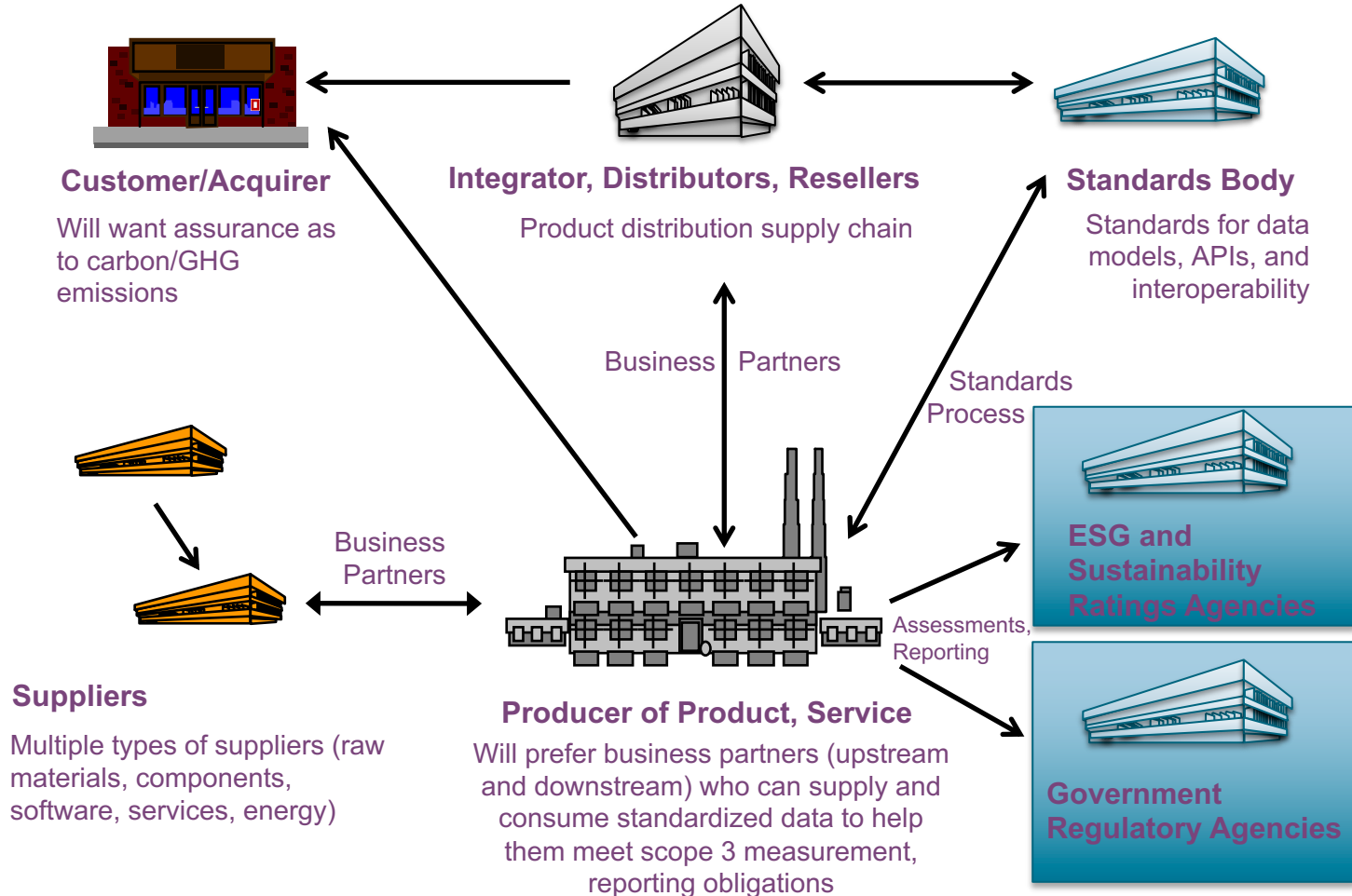
Key Metrics

- Scope 1 Emissions
- Scope 2 Emissions
- Scope 3 Emissions by Category
- Life Cycle Analysis / Product Footprint / Carbon Intensity
- Scope 4 / Avoided Emissions
- GHG Emissions generated from renewable energy or low-carbon products
- % Methane Emissions

What Do Companies Care About?

- Customers care, and social license and social capital will increasingly accrue from ESG and carbon emissions actions
- Investors and regulators increasingly care
- More than 90% of S&P 500 now publish Environment, Social, Governance (ESG) reports in some form
- Companies have upstream supply chains, and downstream product delivery chains, all interconnected, and they need help in particular with scope 3 measurement, reporting
- Companies also care about the “how” of carbon footprint reporting, and about the cost of doing so

Calculating Carbon and GHG Emissions: An Ecosystem Perspective



THE SUSTAINABILITY CHECKLIST

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25 Steps at a Glance

LAYING THE FOUNDATION

- Write a green mission statement
- Create a Green Team
- Engage the right employees
- Create a sustainability plan

LAUNCHING THE PROGRAM

- Complete an EcoAssessment
 - Use a tool that produces an EcoScore
- Launch and communicate the goals and plan to all employees
 - Make a big deal with a company wide launch meeting

EMBRACING ACCOUNTABILITY

- Use a framework to track progress and milestones
- Publish an EcoScorecard
- Calculate your carbon and GHG emissions

CELEBRATING SUCCESS

- Recognize people and program achievements
- Make sustainability part of your quarterly company updates

<https://greenbusinessbureau.com/blog/the-sustainability-checklist-25-things-to-do-when-launching-and-managing-a-sustainability-program/>

Outside-in vs. Internal Measurement

- **Outside-in Measurement**
 - Ratings agencies are developing ESG scores for companies, for use by investors
 - Useful in obtaining some understanding of a company's ESG, sustainability position
 - Insufficient for companies to manage and take action against
- **Internal Measurement**
 - Provides a more accurate measure of carbon impacts
 - Enables accurate data sharing among business partners
 - Informs and allows for active management against goals

Complexity of Scope 1/2/3 Emissions

- **Scope 1: Direct GHG emissions.** Includes fuel combustion, company vehicles and fugitive emissions. These are direct GHG emissions that happen from sources owned or controlled by an organization including fuel combustion in boilers, furnaces, vehicles.
- **Scope 2: Indirect GHG emissions.** From consumption of purchased electricity, heat, cooling or steam. These emissions are a result of a company's activities but often occur outside a company's physical facility (e.g. at an electricity utility plant).
- **Scope 3: Other indirect GHG emissions.** Covers other indirect emissions, inc. extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transmission and distribution (T&D) losses. ***Scope 3 emission sources include emissions both upstream and downstream of the organization's activities (e.g. suppliers, product use, and transportation of goods).***

S&P Scope 3 GHG Emissions Assessment

Source	Explanation for relevance	Metric tons CO2e	Emissions calculation methodology	Coverage	Percentage of emissions calculated using data obtained from suppliers or value chain partners:
<p>1. Drop-down menu:</p> <ul style="list-style-type: none"> - Purchased Goods and Services (upstream) - Capital Goods (upstream) - Fuel- and Energy-Related Activities (not Included in Scope 1 or Scope 2) - Upstream Transportation and Distribution - Waste generated in operations (composting, incinerating) - Business Travel - Employee Commuting - Upstream Leased Assets - Downstream Transportation and Distribution - Processing of Sold Products (downstream) - Use of Sold Products - End-of-Life Treatment of Sold Products - Downstream Leased Assets - Franchises - Investments - Other upstream - Other downstream 					<p>Please specify unit: _____</p>

For all of these emissions source categories, data definition standards are needed

Open standard enable these

Calculating Carbon and GHG Emissions

Standards requirements:

- Standard data models (data definitions for data to be measured, captured, calculated, shared, managed)
- Interoperability standards
- Standard APIs
- Implementation guidance
- Reference open source software

Core Challenges to Tracking Carbon

Lack of clarity around carbon data

- Understanding the basis and the underlying details used for calculating & reporting emissions (e.g., determining the emission factor or activity)
- Regulatory and reporting frameworks vary with respect to measuring and reporting, which may require multiple sets of books
- “Accounting” rules are still being defined on how to handle emissions

Sharing of data is required but needs trust

- Documenting and communicating the basis for assurance of the data being provided
- Level of detail that needs to be shared beyond emissions to allow comprehension and comparison
- Differences in data disclosed externally to meet different stakeholder needs (e.g., Scope 3 vs. carbon intensity)

Cross-industry problem but resourced in silos

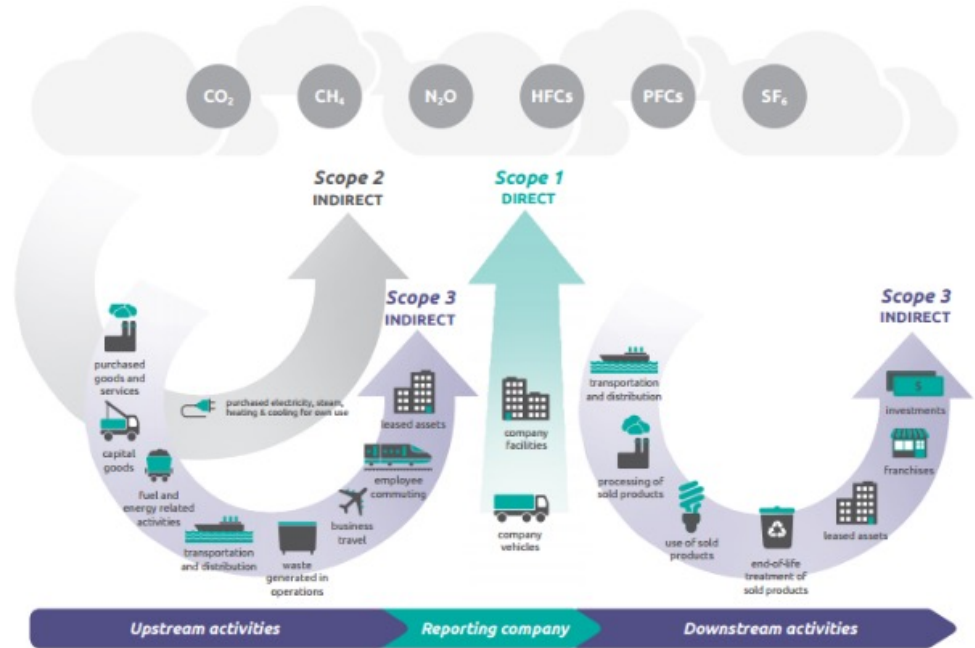
- Individual companies are approaching carbon data through individual efforts
- Collaborative efforts are aplenty but not well aligned
- Cross-industry efforts are often resourced on top of existing job duties
- Differences in terms of competition vs collaboration

Open Footprint Forum: Goals

» OFP to become the predominant Data Standard / Platform for **verifiable emissions**:

- **GHG Scope 1** (direct emissions)
- **GHG Scope 2** (indirect emissions from energy)
- **GHG Scope 3** (indirect emissions from suppliers & customers)
- Future focus areas may include: **water quality, circular economy**

» OFP Data Model needs to be **ready and flexible** to adapt to the evolving world of ESG and sustainability data, for all industries

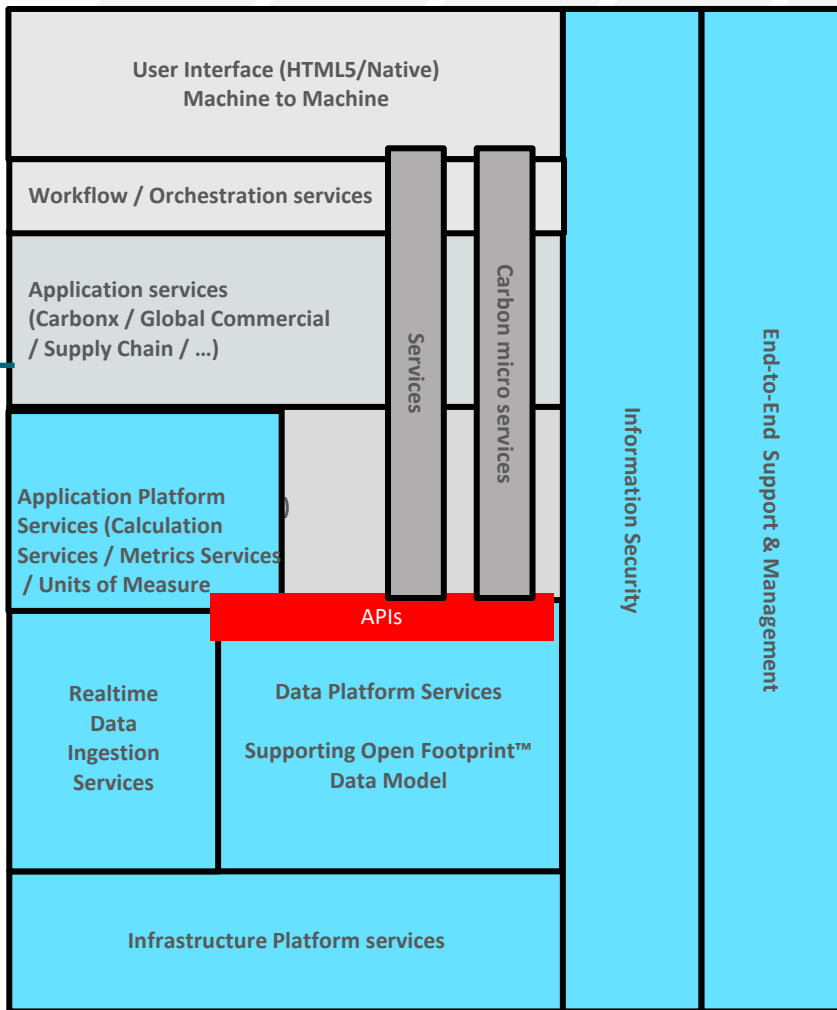


Forum Deliverables

- A standard data model with supporting APIs that can be embedded within companies and commercial products, clearly documented to provide common understanding of GHGs
- Open Footprint reference implementation:
 - 100% Open Source based and downloadable from Open Group Gitlab
 - Available for GCP, AWS and MS Azure
 - Downloadable for anyone
 - Not meant for production runs
 - To act as the reference implementation for any OFP query
 - APIs (backward compatible)
 - Based upon the Open Group OSDU data platform, course data models, etc. have been adapted

OFP Data Platform Technical Scope and Architecture

- Can be deployed as **Private, Community /Shared or Public** (Default data sharing is NONE)
- Can be deployed using **ANY TECHNOLOGY** to suit use case as long as compliant with standards
- Can be deployed by **ANY VENDOR**

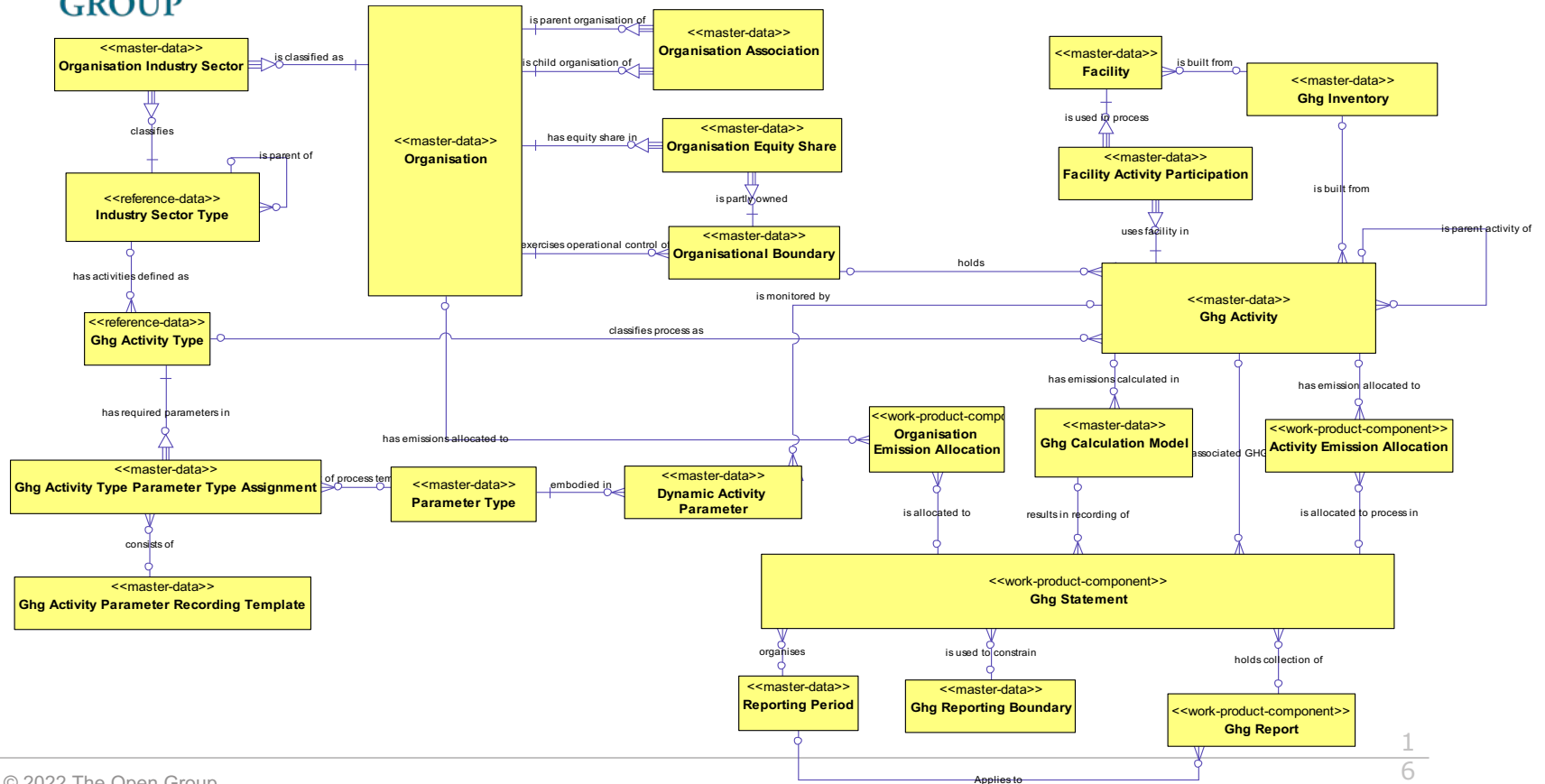


1. We do not compete in this space but all work together. Focus on Infrastructure, Data Platform and some Common Apps services.
2. We do compete in this space: We all will be developing / selecting our own applications.
3. (Commercial) Business services (examples)

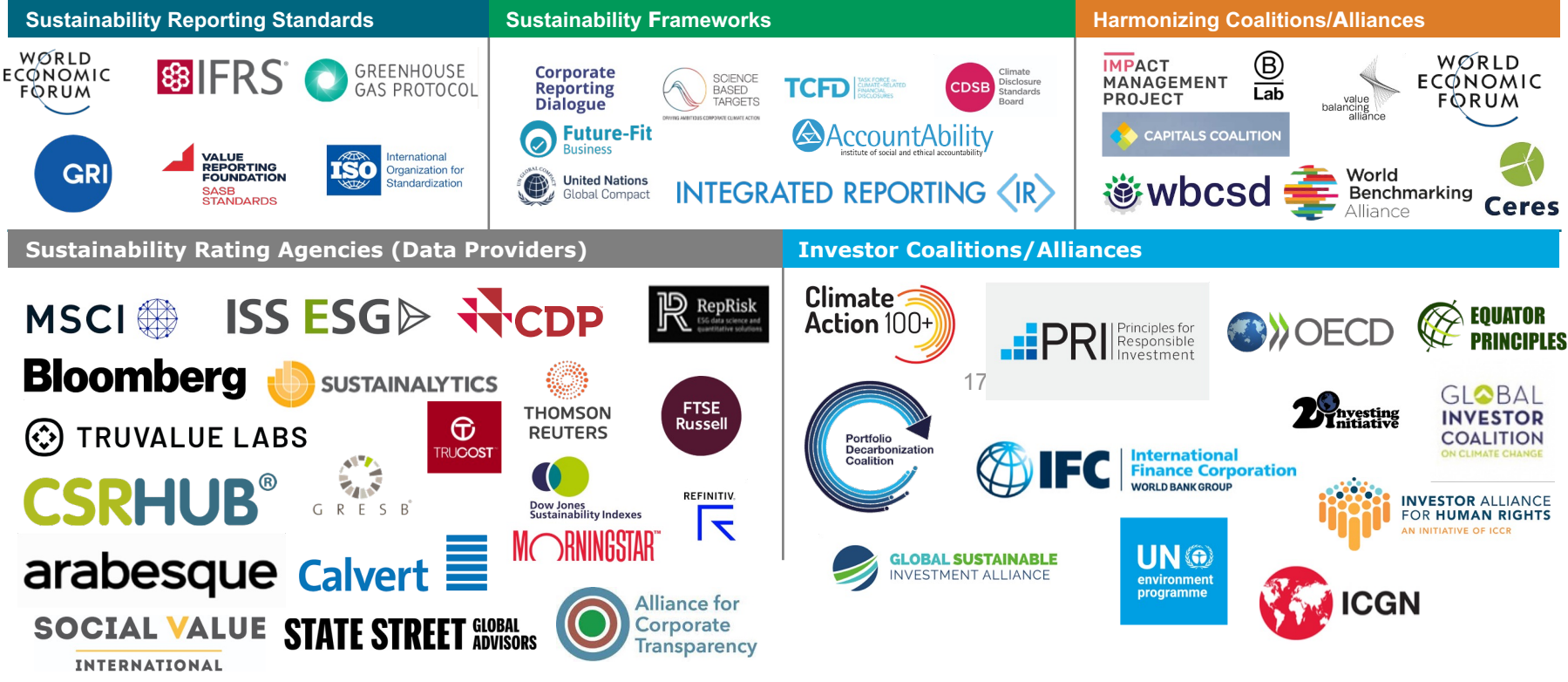
Open Footprint™ main characteristics:

1. Data access using public APIs.
2. (Near) Realtime focus.
3. Large user numbers connecting using own apps → OpenID Connect based.
4. Machine to machine focus.
5. Micro Services based.
6. Orchestration services focus.
7. Third party apps via Marketplace.
8. Open Source Driven

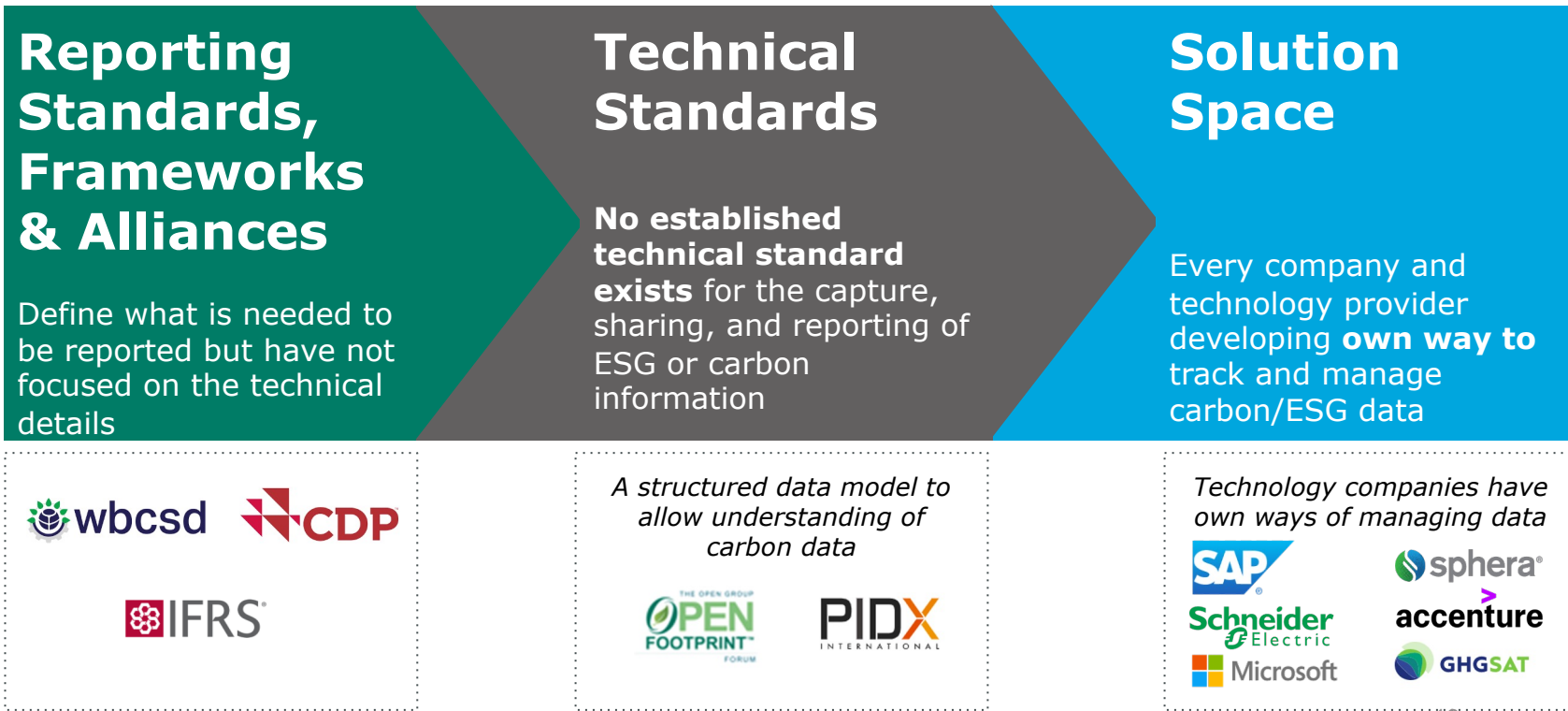
OFP Data Model Overview



The Emissions Reporting Landscape



Multiple Reporting Standards and Vendor Solutions Can Lead to Fragmentation Without a Clear Technical Standard



Open Footprint™ Forum Contributing Members



As of October, 2022

Value of Open Footprint Forum

- Technical data model standards can:
 - Ease interoperability issues upstream and downstream
 - Mitigate divergence on the solution side
- Facilitates a robust, competitive solutions space
- Open, inspectable standards and open source reference platform can enable trust in emissions data
- Shared collaborative development model brings efficiencies to customer organizations and developers

Developing Standards to Calculate Carbon and GHG Emissions

Roles involved:

- Enterprise Architects
- IT
- ESG & Sustainability managers
- Risk managers
- Supply chain professionals
- Regulators



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Thank You!