How to Exchange Scope 3 Emissions Data - Usage Guidelines

Introduction

Business Process Name	How to Exchange Scope 3 Emissions Data
Identifier	• RFI/RFPs • Purchase Order • Field Ticket • Invoice • Invoice Response • Catalog Data (Master Data)
Actors	• Operators • Suppliers • ESG Leads • IT Providers • Supply Chain Professionals
Scenario	Operators and suppliers wish to exchange Scope 3 emissions data, using actual emissions measurement and tracking (bottoms-up reporting).

Introduction

PIDX has formed the Emissions Transparency Data Exchange (ETDX) to address a growing issue in the industry today.

As more and more large operators make commitments to reduce GHG emissions, all companies participating in their supply chain are under increased pressure to produce accurate and granular emissions data. PIDX has recognized the need for an industry specific standard for capturing and communicating this data across the supply chain.

Greenhouse gas emissions in the Energy Industry are often categorized by evaluating the source of the emissions in the supply chain. Scope 1 emissions come from direct sources—organizations directly producing emissions from its own assets—while Scope 2 and 3 come from indirect sources, with Scope 2 looking at what is consumed by an organization, and Scope 3 examining all other emissions associated with the products and services an organization produces, but that come from assets that organizations do not own and operate.

PIDX recognized early on that organizations would make a key shift in how they provide emissions data, moving from estimates, or top-down reporting, to actual emissions measurement and reporting, also known as bottoms-up reporting.

Scope 3 emissions are difficult to track because they are from external sources; however, including the data fields in PIDX supply chain messages makes emissions reporting transparent when companies conduct business transactions.

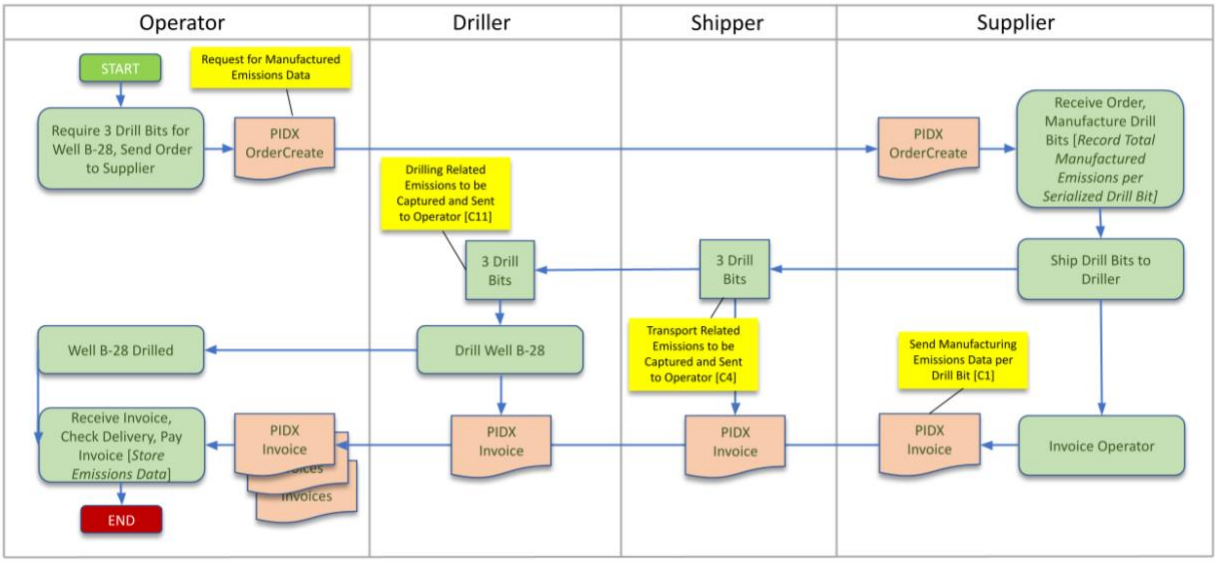
Developed by the industry, for the industry, and used globally by more than 100 Energy companies, PIDX standards address specific oil and gas data needs that are not covered by generic B2B standards. PIDX standards are technologically agnostic and free to use.

ETDX created this standard to define how an operator can request emissions data and how a supplier can transmit that data securely, using the current orchestration of different PIDX messages to do Scope 3 reporting (e.g., cradle-to-gate, service emissions for the items the buyer has purchased).

ETDX looked at field ticketing and invoices but decided upon catalog data (master data) for products and services during its proof of concept (POC), augmenting that attributed information in such a way that it has the carbon footprint of different commodities.

Business Process Data Flow

The diagram below shows the typical flow of PIDX supply chain documents between Operators (Buyers) and Suppliers in the Oil & Gas Industry.



By utilizing the attachment capabilities of existing PIDX Document Schemas, scope 3 emissions reporting data can be sent from Suppliers to Operators without the need to establish alternative data exchange mechanisms for the transfer of emissions data. Utilizing these existing relationships and data flows is secure and reliable since the data exchanged is commercially sensitive and the emissions reporting data is just as commercially sensitive.

PIDX permits any format of data to be sent in an attachment and there a number of different attachment types. Attachments cab be one of three types:

1. Embedded document content
2. URL Link to envelope attachments
3. URL Link to external source over the internet.

Header or Line Level Attachments

Most PIDX XML Schemas permit attachments at the header level of a document and at the line item level. Header level attachments tend to be used when an attachment pertains to everything in the document, for example, terms and conditions on an order may apply to every item in a PIDX OrderCreate message and so would be attached at the header level of the order.

Line item attachments tend to be relevant to just that line item in a document. An example of this type of attachment use can be illustrated using a Material Data Safety Sheet (MSDS). A order document may have twenty lines on the order, however two of the lines are for specific hazardous materials and the MSDSs for those two particular items are included as attachments for the lines on the order but not for the other eighteen line items.

The choice of header vs. line attachments is determined by the sender of the document however, it is typical that the sender and receiver agree the attachment use so that the handling of the attachments is explicit when the receiver processes the XML data in a document and any of it's attachments.

Since Scope 3 Emissions data relates to specific materials or services, it will be common for attachments containing the Scope 3 Emissions data to be handled at the line item level. There are circumstances where the Scope 3 Emissions data could be aggregated at the header level especially where the Scope 3 Emissions data can be treated as a single data object for every corresponding line in the document.

Scope 3 Emissions Data Format

Initially the ETDX team developed a new XML emissions data storage structure to use inside of the PIDX XML schemas for any document type. This data structure was used during the Proof of Concept (POC) that ETDX ran to show the viability of exchanging Scope 3 Emissions data inside existing PIDX XML transactions. However, PIDX collaborates with many standards organizations in Oil & Gas. The OpenFootprint group is standardizing storage of Emissions Data at rest for the Enterprise.

The World Business Council for Sustainable Development (WBCSD) has developed a model for reporting Scope 3 Emissions for Products and Services called PACT Pathfinder. It was decided by ETDX that PIDX would use the PACT Pathfinder data structure to represent Scope 3 Emissions reporting data since it was more mature than the ETDX developed version, plus, it is industry agnostic and so will allow PIDX documents to report Emissions Data for any industry product or service.

The WBCSD structure is defined in a JSON object, JSON objects can be encapsulated inside PIDX XML transactions as attachments as easily as any other form of data such as PDF or JPEG. Using the JSON WBCSD object to represent the Emissions data as an attachment at the header or line item level was chosen as the path forward for PIDX by ETDX.

Appendix A describes the WBCSD PACT JSON format in detail.

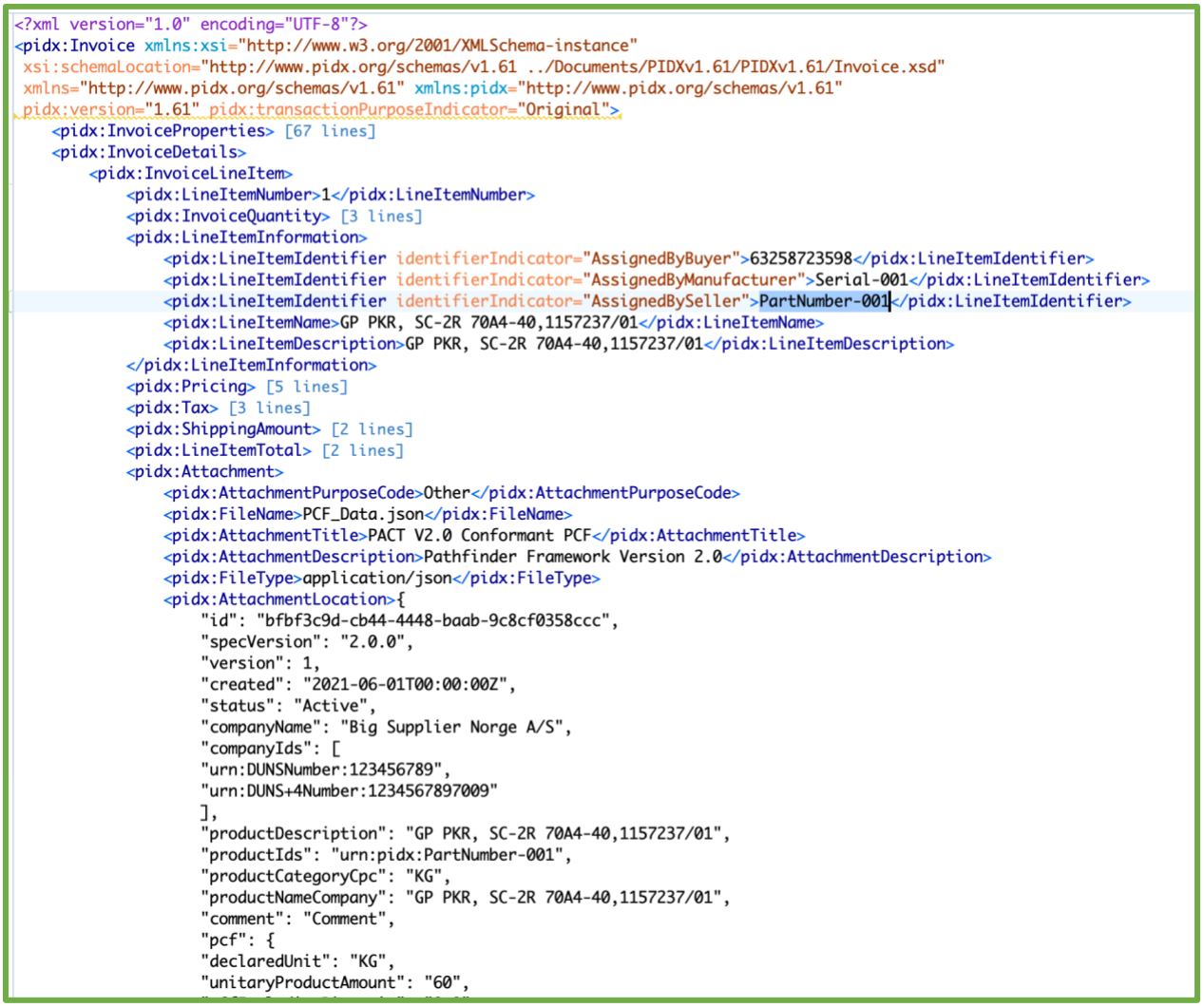
Business Messages - Transport Mechanism

The PIDX transport mechanism for JSON properties (WBCSD's format) is to embed it as an object (binary file within the XML). This has many advantages:

- Using existing secure and trusted data transport
- Industry partner IDs already defined
- Using an industry agnostic format
- Supported by more industry companies
- Users can test conformance to WBCSD format
- Can be used in all versions of PIDX XML Standards

As outlined above, PIDX defines three formats of attachment:

- Inline embedded data: in which the message is embedded in the messaging itself in the line item.



```
<?xml version="1.0" encoding="UTF-8"?>
<pidx:Invoice xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xsi:schemaLocation="http://www.pidx.org/schemas/v1.61 ../Documents/PIDXv1.61/PIDXv1.61/Invoice.xsd"
 xmlns="http://www.pidx.org/schemas/v1.61" xmlns:pidx="http://www.pidx.org/schemas/v1.61"
 pidx:version="1.61" pidx:transactionPurposeIndicator="Original">
    <pidx:InvoiceProperties> [67 lines]
    <pidx:InvoiceDetails>
        <pidx:InvoiceLineItem>
            <pidx:LineItemNumber>1</pidx:LineItemNumber>
            <pidx:InvoiceQuantity> [3 lines]
            <pidx:LineItemInformation>
                <pidx:LineItemIdentifier identifierIndicator="AssignedByBuyer">63258723598</pidx:LineItemIdentifier>
                <pidx:LineItemIdentifier identifierIndicator="AssignedByManufacturer">Serial-001</pidx:LineItemIdentifier>
                <pidx:LineItemIdentifier identifierIndicator="AssignedBySeller">PartNumber-001</pidx:LineItemIdentifier>
                <pidx:LineItemName>GP PKR, SC-2R 70A4-40,1157237/01</pidx:LineItemName>
                <pidx:LineItemDescription>GP PKR, SC-2R 70A4-40,1157237/01</pidx:LineItemDescription>
            </pidx:LineItemInformation>
            <pidx:Pricing> [5 lines]
            <pidx:Tax> [3 lines]
            <pidx:ShippingAmount> [2 lines]
            <pidx:LineItemTotal> [2 lines]
            <pidx:Attachment>
                <pidx:AttachmentPurposeCode>Other</pidx:AttachmentPurposeCode>
                <pidx:FileName>PCF_Data.json</pidx:FileName>
                <pidx:AttachmentTitle>PACT V2.0 Conformant PCF</pidx:AttachmentTitle>
                <pidx:AttachmentDescription>Pathfinder Framework Version 2.0</pidx:AttachmentDescription>
                <pidx:FileType>application/json</pidx:FileType>
                <pidx:AttachmentLocation>{
                    "id": "bfbf3c9d-cb44-4448-baab-9c8cf0358ccc",
                    "specVersion": "2.0.0",
                    "version": 1,
                    "created": "2021-06-01T00:00:00Z",
                    "status": "Active",
                    "companyName": "Big Supplier Norge A/S",
                    "companyIds": [
                    "urn:DUNSNumber:123456789",
                    "urn:DUNS+4Number:1234567897009"
                    ],
                    "productDescription": "GP PKR, SC-2R 70A4-40,1157237/01",
                    "productIds": "urn:pidx:PartNumber-001",
                    "productCategoryCpc": "KG",
                    "productNameCompany": "GP PKR, SC-2R 70A4-40,1157237/01",
                    "comment": "Comment",
                    "pcf": {
                    "declaredUnit": "KG",
                    "unitaryProductAmount": "60",
```

- Link to URN/URI: send the link of where to find it; invoke a RESTful web service to pull the carbon footprint for that item.

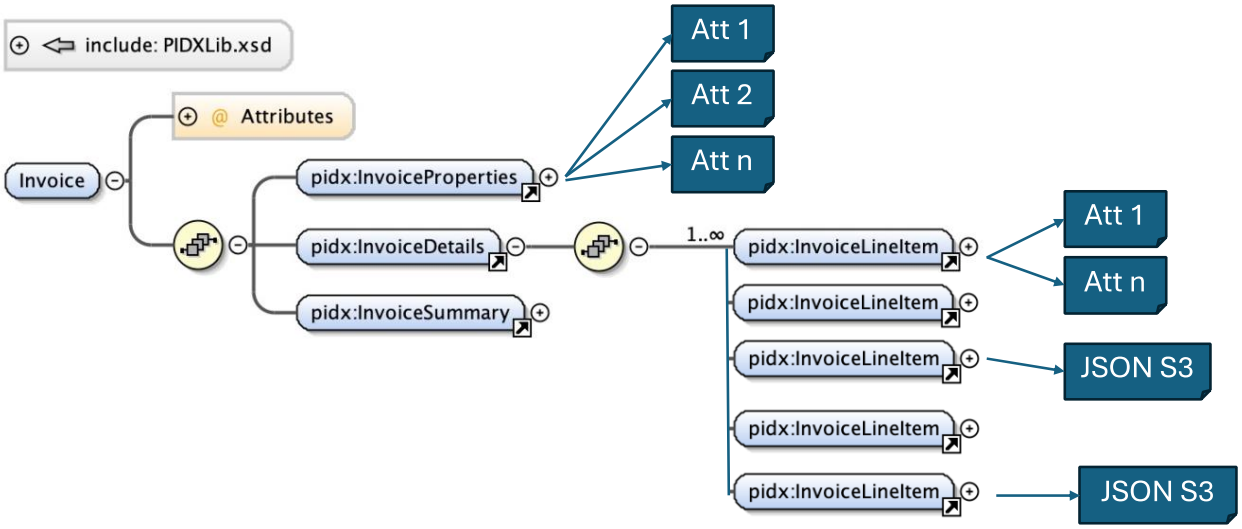
- Link to envelope attachment: Send as an attachment in the envelope in RosettaNet or AS2 for secure transactions.

Packaged RosettaNet Business Message with Attachment Containing JSON Object

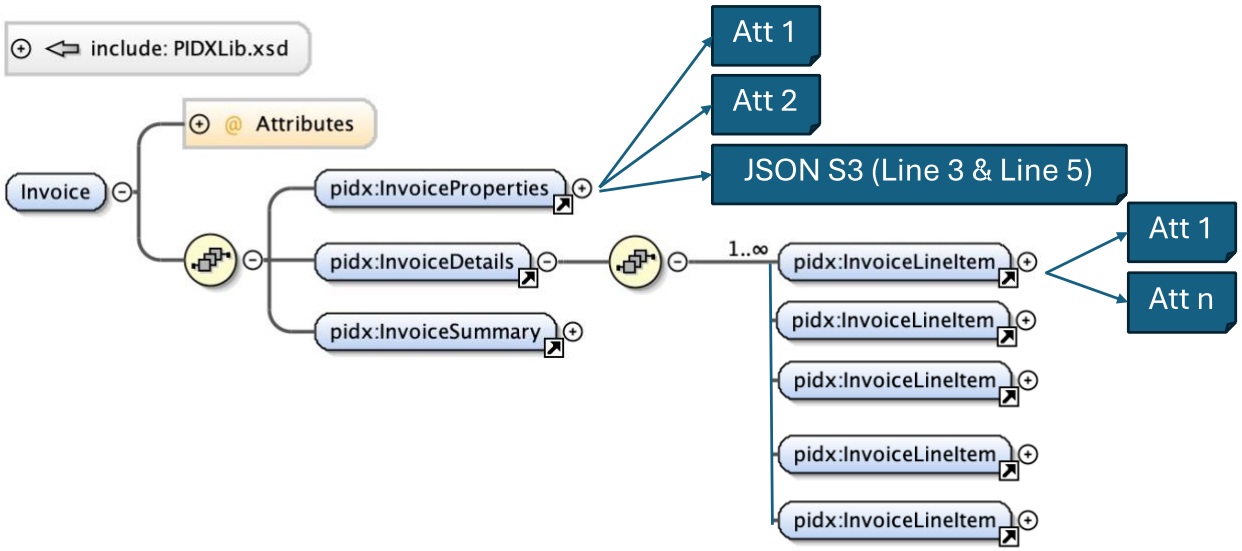
```
Content-Type: multipart/related; boundary="RN-Outer-Boundary";
              type="application/xml"
Content-Description: This is a Generic RosettaNet Business Message

--RN-Outer-Boundary
Content-Type: Application/XML
Content-Location: RN-Preamble
Content-ID: <content-ID-for-Preamble>
[Preamble goes here]

--RN-Outer-Boundary
Content-Type: Application/XML
Content-Location: RN-Delivery-Header
Content-ID: <content-ID-for-Delivery-Header>
[Delivery Header goes here]

--RN-Outer-Boundary
Content-Type: Application/XML
Content-Location: RN-Service-Header
Content-Description: RosettaNet-Service-Header
Content-ID: <content-ID-for-Service-Header>
[Service Header goes here]

--RN-Outer-Boundary
Content-Type: Application/XML
Content-Description: RosettaNet-Service-Content
Content-Location: RN-Service-Content
Content-ID: <content-ID-for-Service-Content>
[Service Content goes here PIDX XML Document]

--RN-Outer-Boundary
Content-Type: application/json
Content-Description: Scope 3 Emissions WBCSD Format
Content-ID: diag-123-16776789.ghfg.efg-xcabc.071400
[Attachment 1 goes here JSON Object]

--RN-Outer-Boundary
Content-Type: Image/tiff
Content-ID: diag-123456789.ghfg.efg-xcabc.08233
[Attachment 2 goes here]

--RN-Outer-Boundary--
```

As described above, attachments can be sent at the header level or the line item level. With the WBCSD PACT format, there is also a choice of single entry or aggregated entry of data.

With single entry, each attachment contains just one product or service Scope 3 Emission report. This is suitable for line item level reporting especially when only some of the lines of a transaction are to be reported against. The diagram below shows the representation of an invoice with 5 line items. Items 3 and 5 have Scope 3 Emissions Data to report (JSON S3), the others do not. The JSON S3 object for each item will contain a single PCF record relevant to that product or service reported in the invoice.



The WBCSD PACT format also supports multiple reports in a single JSON object. The above invoice could also be represented using a single WBCSD PACT report at the header level where the reports for line 3 and 5 are contained in the multiple instance JSON object which is a single object at the header level. The diagram below shows this representation:



Duplicate Data Between the PIDX XML Transaction and the WBCSD PACT JSON Object

The WBCSD PACT format is in JSON and has some constraints for data content. The PIDX transaction data is in XML format. Data required in the JSON object is also present in the existing PIDX XML. Mapping of the PIDX XML elements from a transaction has been shown in Appendix A.

Example mappings to illustrate that data is duplicated are shown below:

<*pidx:InvoiceDate*> - this is the date of an invoice transaction

created – this is the date of the Scope 3 Emissions data report

The WBCSD ***created*** can equal the <pidx:InvoiceDate> to ensure that the report of the scope 3 emissions coincides with the report of the business transaction (invoice).

<*pidx:PartnerName*> - the name of a company (the supplier)

companyName - The name of the company that is the ProductFootprint Data Owner

The WBCSD ***companyName*** is equal the <pidx:PartnerName> of the supplier that produces the goods or services.

Appendix A shows a sample analysis of the WBCSD PACT JSON format and associated mappings between PIDX XML elements and the corresponding WBCSD PACT JSON data element. This table is not complete and only shows a representative set of how to proceed with JSON mapping from the PIDX XML data fields. It is expected that the PCF data reported in the WBCSD PACT JSON object needs to be complete for each product or service it references in any PIDX XML transaction.

Links to the explanation of the WBCSD data fields is included in the table for reference.

Appendix A

World Business Council for Sustainable Development (WBCSD) PACT Pathfinder Data Exchange Model Properties

The following tables compare the relationship between the ETDX data exchange model with WBCSD PACT Pathfinder data exchange model properties.

4.1 Product Footprint

Property	Type	Req	Specification (Version 2.0.1-20230314)	OFP Data Points	Notes/References	Mapping to PIDX
id : PfId	String	M	The product footprint identifier, See § 4.29 Data Type: PfId for details.		A PfId MUST be a UUID v4. Each PfId MUST be encoded as a JSON String. Example JSON string value: "f4b1225a-bd44-4c8e-861d-079e4e1dfd69"	it needs to be defined
specVersion	String	M	The version of the ProductFootprint data specification with value 2.0.1-20230314. Subsequent revisions will update this value according to Semantic Versioning 2.0.0.			Should be a default value: "2.0.1-20230314"
precedingPfIds: PfId	Array of Strings	O	If defined, MUST be non-empty set of preceding product footprint identifiers without duplicates. See § 4.29 Data Type: PfId and § 5.2 Change Definition and Classification for details.			

version	Number	M	The version of the ProductFootprint with value an integer in the inclusive range of 0..2^31-1.			it needs to be defined
created : DateTime	String	M	A ProductFootprint MUST include the property created with value the timestamp of the creation of the ProductFootprint.			<pidx:InvoiceDate>
updated : DateTime	String	O	A ProductFootprint SHOULD include the property updated with value the timestamp of the ProductFootprint update. A ProductFootprint MUST NOT include this property if an update has never been performed. The timestamp MUST be in UTC.			
status	String	M	If defined, the value must be one of the following values: Active - The default status of a product footprint is Active. A product footprint with status Active can be used by a data recipients, e.g. for product footprint calculations. Deprecated - The product footprint is deprecated and should not be used for e.g. product footprint calculations by data recipients. See § 5 Product Footprint Lifecycle for details.			"Active" or "Deprecated"
statusComment	String	O	If defined, the value should be a message explaining the reason for the current status. See § 5 Product			

			Footprint Lifecycle for details.			
validityPeriodStart : DateTime	String	O	If defined, the start of the validity period of the ProductFootprint. The ***validity period*** is the time interval during which the ProductFootprint is declared as valid for use by a receiving data recipient. The validity period is defined by the properties validityPeriodStart (including) and validityPeriodEnd (excluding). The validity period is optional. If no validity period is specified, the ProductFootprint is valid for 3 years starting with referencePeriodEnd. If a validity period is to be specified, then 1. the value of validityPeriodStart MUST be defined with value greater than or equal to the value of referencePeriodEnd. 2. the value of validityPeriodEnd MUST be defined with value 1. strictly greater than validityPeriodStart, and 2. less than or equal to referencePeriodEnd + 3 years.			
validityPeriodEnd : DateTime	String	O	The end (excluding) of the valid period of the ProductFootprint. See validityPeriodStart for further details.			
companyName	String	M	The name of the company that is the ProductFootprint Data		This would be the name of the seller.	<pidx:PartnerName>

			Owner, with value a non-empty String.			
companyIds : CompanyIdSet	Array	M	The non-empty set of Uniform Resource Names (URN). Each value of this set is supposed to uniquely identify the ProductFootprint Data Owner. See CompanyIdSet for details.		DUNS #	<pidx:PartnerIdentifier partnerIdentifierIndicator="DUNSNumber"> <pidx:PartnerIdentifier partnerIdentifierIndicator="DUNS+4Number"> Example: "companyIds": ["urn:DUNSNumber:123456789", "urn:DUNS+4Number:123456789700 9"],
productDescription	String	M	The free-form description of the product plus other information related to it such as production technology or packaging.		From seller, or buyer, or either?!	<pidx:LineItemDescription>
roductIds : pProductIdSet	Array	M	The non-empty set of ProductIds. Each of the values in the set is supposed to uniquely identify the product. What constitutes a suitable product identifier depends on the product, the conventions, contracts, and agreements between the Data Owner and a Data Recipient and is out of the scope of this specification.		From buyer/seller/ Manufacturer?	<pidx:LineItemIdentifier identifierIndicator="AssignedByBuyer"> <pidx:LineItemIdentifier identifierIndicator="AssignedByManufacturer"> <pidx:LineItemIdentifier identifierIndicator="AssignedBySeller">
productCategoryCpc : CpcCode	String	M	A UN Product Classification Code (CPC) that the given product belongs to.			it needs to be defined

productNameCompany	String	M	The non-empty trade name of the product.		This would be the name of the product, the trade name. In PIDX the trade name isn't a separate attribute. Question for WBCSD - does this need to be mandatory, or can it be optional?	<pidx:LineItemName>
comment	String	M	The additional information related to the product footprint. Whereas the property productDescription contains product-level information, comment SHOULD be used for information and instructions related to the calculation of the footprint, or other information which informs the ability to interpret, to audit or to verify the Product Footprint.			<pidx:Comment>
pcf : CarbonFootprint	Object	M	The carbon footprint of the given product with value conforming to the data type CarbonFootprint.		Upon purchase of the product, this attribute is expected to become part of the purchasing company's upstream scope 3 emissions.	TBD

extensions : DataModelExtension[]	Array	O	If defined, 1 or more data model extensions associated with the ProductFootprint.extensions MUST be encoded as a non-empty JSON Array of DataModelExtension JSON objects. See DataModelExtension for details.			

4.2 Carbon Footprint

Property	Type	Req	Specification	PIDX	OFP Data Points	Notes	Mapping to PIDX
declaredUnit : DeclaredUnit	String	M	The unit of analysis of the product. See Data Type DeclaredUnit for further information.			Covered with individual ETDX attributes	<pidx:EmissionsData> <UnitOfMeasureCode>
unitaryProductAmount : Decimal	String	M	The amount of Declared Units contained within the product to which the PCF is referring to. The value MUST be strictly greater than 0.				<pidx:EmissionProductGHGQuantity> <Quantity>
pCfExcludingBiogenic : Decimal	String	M	The product carbon footprint of the product excluding biogenic emissions. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero.				TBD
pCfIncludingBio	String	O	If present, the				

genic : Decimal			product carbon footprint of the product including biogenic emissions. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal.				
fossilGhgEmissions : Decimal	String	M	The emissions from the combustion of fossil sources. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero.			Embedded in the product or in the emissions of it	<pidx:EmissionProductGHGQuantity><Quantity>
fossilCarbonContent : Decimal	String	M	The fossil carbon amount embodied in the product. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero.	ETDX #15 Operational GHG Emission		What would be the emission using the product? Another note (general): These standards are JSON based. How would PIDX handle it? Map it across to XML	TBD
biogenicCarbonContent : Decimal	String	M	The biogenic carbon amount embodied in the product. The value MUST be calculated per declared unit with				TBD

			unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero.				
dLucGhgEmissions : Decimal	String	O	If present, emissions resulting from recent (i.e., previous 20 years) carbon stock loss due to land conversion directly on the area of land under consideration. The value of this property MUST include direct land use change (dLUC) where available, otherwise statistical land use change (sLUC) can be used. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero. See Pathfinder Framework (Appendix B) for details.				
landManagementGhgEmissions : Decimal	String	O	If present, GHG emissions and removals associated with land-management-related changes, including non-CO2				

			sources. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero. NOTE: version 1 did not explictly include non-CO2 sources. This is now included in the definition.				
otherBiogenicGhgEmissions : Decimal	String	O	If present, all other biogenic GHG emissions associated with product manufacturing and transport that are not included in dLUC (dLucGhgEmissions), iLUC (iLucGhgEmissions), and land management (landManagementGhgEmissions). The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero. NOTE: version 1.0.0 incorrectly defined this is "all other GHG				

			emissions"; i.e. missing the "biogenic" qualifier.				
iLucGhgEmissions : Decimal	String	O	If present, emissions resulting from recent (i.e., previous 20 years) carbon stock loss due to land conversion on land not owned or controlled by the company or in its supply chain, induced by change in demand for products produced or sourced by the company. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero. See Pathfinder Framework (Appendix B) for details.				
biogenicCarbonWithdrawal : Decimal	String	O	If present, the Biogenic carbon content in the product converted to CO2e. The value MUST be calculated per declared unit with unit kg expressed as a decimal equal to or greater than zero.				
aircraftGhgEmissions : Decimal	String	O	If present, the GHG emissions resulting				

			from aircraft engine usage for the transport of the product. The value MUST be calculated per declared unit with unit kg of CO2 equivalent per declared unit (kgCO2e / declaredUnit), expressed as a decimal equal to or greater than zero.				
characterization Factors	String	M	The IPCC version of the GWP characterization factors used in the calculation of the PCF (see Pathfinder Framework Section 3.2.2). The value MUST be one of the following: **AR6** for the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) **AR5** for the Fifth Assessment Report of the IPCC. The set of characterization factor identifiers will likely change in future revisions. It is recommended to account for this when implementing the validation of this property.				The value MUST be one of the following: AR6/AR5

crossSectoralStandardsUsed : CrossSectoralStandardSet	Array	M	The cross-sectoral standards applied for calculating or allocating GHG emissions	ETDX #18 Emission Methodology			<EmissionVerificationValidity>
productOrSectorSpecificRules : ProductOrSectorSpecificRuleSet	Array	O	The product-specific or sector-specific rules applied for calculating or allocating GHG emissions. If no product or sector specific rules were followed, this set MUST be empty.				
biogenicAccountingMethodology	String	O	The standard followed to account for biogenic emissions and removals. If defined, the value MUST be one of the following: **PEF** for the EU Product Environmental Footprint Guide **ISO** For the ISO 14067 standard **GHGP** For the Greenhouse Gas Protocol (GHGP) Land sector and Removals Guidance **Quantis**				

			For the Quantis Accounting for Natural Climate Solutions Guidance				
boundaryProcessesDescription	String	M	The processes attributable to each lifecycle stage. Example text value: Electricity consumption included as an input in the production phase				TBD
referencePeriodStart : DateTime	String	M	The start of the time boundary for which the PCF value is considered to be representative. See the Pathfinder Framework section 6.1.2.1 for further details.				
referencePeriodEnd : DateTime	String	M	The start of the time boundary for which the PCF value is considered to be representative. See the Pathfinder Framework section 6.1.2.1 for further details.				
geographyCountrySubdivision	String		If present, a ISO 3166-2 Subdivision Code. See § 4.2.1 Scope of a CarbonFootprint for further details. Example value for the State of New York in the United States of America: US-NY Example value for the department Yonne in France FR-89				

geographyCountry : ISO3166CC	String		If present, the value MUST conform to data type ISO3166CC. See § 4.2.1 Scope of a CarbonFootprint for further details. Example value in case the geographic scope is France FR				
geographyRegionOrSubregion : RegionOrSubregion	String		If present, the value MUST conform to data type RegionOrSubregion. See § 4.2.1 Scope of a CarbonFootprint for further details. Additionally, see the Pathfinder Framework Section 6.1.2.2.				
secondaryEmissionFactorSources : EmissionFactorDSSet	Array	O	If secondary data was used to calculate the CarbonFootprint, then it MUST include the property secondaryEmissionFactorSources with value the emission factors used for the CarbonFootprint calculation. If no secondary data is used, this property MUST BE undefined.				
exemptedEmissionsPercent	Number	M	The Percentage of emissions excluded from PCF, expressed as a decimal number between 0.0 and 5 including. See				TBD

			Pathfinder Framework.				
exemptedEmissionsDescription	String	M	Rationale behind exclusion of specific PCF emissions, CAN be the empty string if no emissions were excluded.				TBD
packagingEmissionsIncluded	Boolean	M	A boolean flag indicating whether packaging emissions are included in the PCF (pCfExcludingBiogenic, pCfIncludingBiogenic).				TBD
packagingGhgEmissions : Decimal	String	O	Emissions resulting from the packaging of the product. If present, the value MUST be calculated per declared unit with unit kg of CO2 equivalent per kilogram (kgCO2e / declared unit), expressed as a decimal equal to or greater than zero. The value MUST NOT be defined if packagingEmissionsIncluded is false.				
allocationRulesDescription	String	O	If present, a description of any allocation rules applied and the rationale explaining how the selected approach aligns with Pathfinder Framework rules (see Section 3.3.1.4).				
uncertaintyAssessmentDescripti	String	O	If present, the results, key drivers,				

on			and a short qualitative description of the uncertainty assessment.				
primaryDataShare : Percent	Number	O	The share of primary data in percent. See the Pathfinder Framework Section 4.2.2. For reporting periods ending before 2025 and if this property is present, the property dqi MUST NOT be defined. For reporting periods including the beginning of year 2025 or after, this property MUST be defined.				
dqi : DataQualityIndicators	Object	O					
assurance : Assurance	Object	O		ETDX #19 Emission Verification & Validity			

4.3 Data Quality Indicators

Property	Type	Req	Specification	PIDX	OFP Data Points	Notes
coveragePercent : Percent	Number	O	Percentage of PCF included in the data quality assessment based on the >5% emissions threshold.			

technologicalDQR	Number	O	Quantitative data quality rating (DQR) based on the data quality matrix (See Pathfinder Framework Table 5), scoring the technological representativeness of the sources used for PCF calculation based on weighted average of all inputs representing >5% of PCF emissions. The value MUST be a decimal between 1 and 3 including.			
temporalDQR	Number	O	Quantitative data quality rating (DQR) based on the data quality matrix (Table 5), scoring the temporal representativeness of the sources used for PCF calculation based on weighted average of all inputs representing >5% of PCF emissions. The value MUST be a decimal between 1 and 3 including.			
geographicalDQR	Number	O	Quantitative data quality rating (DQR) based on the data quality matrix (Table 5), scoring the geographical representativeness of the sources used for PCF calculation based on weighted average of all inputs representing >5% of PCF emissions. The value MUST be a decimal between 1 and 3 including.			
completenessDQR	Number	O	Quantitative data quality rating (DQR) based on the data quality matrix (Table 5), scoring the completeness of the data collected for PCF calculation based on			

			weighted average of all inputs representing >5% of PCF emissions. The value MUST be a decimal between 1 and 3 including.			
reliabilityDQR	Number	O	Quantitative data quality rating (DQR) based on the data quality matrix (Table 5), scoring the reliability of the data collected for PCF calculation based on weighted average of all inputs representing >5% of PCF emissions. The value MUST be a decimal between 1 and 3 including.			

4.4 Assurance

Property	Type	Req	Specification	PIDX	OFP Data Points
assurance	Boolean	M	A boolean flag indicating whether the CarbonFootprint has been assured in line with Pathfinder Framework requirements (section 5).	ETDX #19 Emission Verification & Validity	
coverage	String	O	Level of granularity of the emissions data assured, with value equal to corporate level for corporate level product line for product line PCF system for PCF System product level for product level		

			This property MAY be undefined only if the kind of assurance was not performed.		
level	String	O	Level of assurance applicable to the PCF, with value equal to limited for limited assurance reasonable for reasonable assurance This property MAY be undefined only if the kind of assurance was not performed.		
boundary	String	O	Boundary of the assurance, with value equal to Gate-to-Gate for Gate-to-Gate Cradle-to-Gate for Cradle-to-Gate. This property MAY be undefined only if the kind of assurance was not performed.		
providerName	String	M	The non-empty name of the independent third party engaged to undertake the assurance.		
completedAt : DateTime	String	O	The date at which the assurance was completed. See data		

			type DateTime for details.		
standardName	String	O	Name of the standard against which the PCF was assured.		
comments	String	O	Any additional comments that will clarify the interpretation of the assurance.		