DRAFT

Orange Button Taxonomy Guide

April 2018

SUNSPEC ALLIANCE

xBRL US

Table of Contents

Orange Button Taxonomy Guide

1 Goal

The goal of the Orange Button Taxonomy Guide is to provide sufficient information for document and data preparers, intermediaries and data users to work with the Orange Button Taxonomy - https://xbrl.us/solar-taxonomy. This Guide has been written with the business user in mind. Readers of this Guide should develop an understanding of how to create, process, extract, and analyze solar financing data in structured format.

Readers may already have experience in solar financing and/or in the XBRL standard. Section 4 covers the basics of the XBRL specification. It is important for readers with little or no knowledge to read this section carefully as a basic understanding of XBRL is necessary to successfully use this Guide and the Taxonomy. More technical information about the XBRL technical standard can be found at http://xbrl.us and at http://xbrl.org.

2 Scope

Orange Button is designed to capture data needed to represent the broad use cases of Project Origination, Portfolio Management, Insurance and Surety, and Construction Finance. Given the broad scope of the taxonomy, the focus of the content is on the data necessary to the financing of the solar project, rather than on the details of building or operating the system, unless data used in building or operating is also important to financing. For example, Monthly Operating Reports are used in the ongoing monitoring of the financial health of the project - therefore, this level of detail is included in the Taxonomy. Second by second performance data, while important for engineers and developers, is of less importance to making financial decisions. Therefore, this type of detail is not included in the Taxonomy.

In future releases of the Taxonomy, additional concepts may be added to represent these other non-finance specific use cases.

3 Key Features

3.1 Based on XBRL

The Orange Button Taxonomy is defined using the XBRL standard. XBRL is the international standard for the electronic representation of business reports. XBRL allows the definition, preparation and exchange of reporting information across organizational boundaries. It does so in a manner that can be validated at every point in the process which is made possible through a number of interrelated technical specifications collectively referred to as the XBRL International Specification [XS]. These specifications set out how to create and test the "metadata" parts of XBRL: taxonomies, concepts, and dimensions (tables), as well as the "data" components: instances and facts. The XBRL specification can be used with multiple formats including XML, JSON and CSV.

The Orange Button Taxonomy is a stand-alone taxonomy although it leverages some concepts drawn from the US GAAP Financial Reporting Taxonomy, which is used by all US public companies today to report their financial data to the Securities and Exchange Commission.

Most Orange Button concepts are unique to solar financing, and are not in the US GAAP Taxonomy, therefore they were defined specifically for Orange Button. The Orange Button Taxonomy follows the conventions used in the US GAAP Taxonomy and the XBRL US Style Guide [XUS SG]. As a result, the Taxonomy can easily accommodate new or revised elements from the US GAAP Taxonomy as reporting requirements for US GAAP, and/or for Orange Button reporting change. Maintaining a style and structure consistent with other XBRL taxonomies ensures that the Taxonomy can be used with any software applications that are XBRL-compliant.

3.2 Open Source

The Orange Button Taxonomy is jointly owned by SunSpec Alliance and XBRL US, and is an open standard, with no associated licensing fees. The XBRL standard is an open source specification, managed and maintained by XBRL International, a global non-profit standards organization.

3.3 Integrates with other standards

Solar-specific concepts in Orange Button were developed by integrating existing solar standards from organizations such as IECRE[1] and Sunspec[2], as well as solar-finance terms generally

[1] IECRE Renewal Energy: http://iecre.org/
[2] SunSpec Alliance: https://sunspec.org/

used in the industry for project finance, portfolio management, construction finance, and insurance. The diagram below shows how these differing standards can be leveraged to build a robust solar financing standard.

3.4 Extensibility

XBRL taxonomies can be extended to allow preparers of data to create new custom concepts to represent data that is unique to that preparer's reporting need. The ability to create extensions can be helpful in certain situations, but it can also introduce inconsistency and reduce the comparability of reported data.

The Orange Button Taxonomy is designed to avoid the need to create extension concepts for specific reporting requirements. The Taxonomy is intended to be comprehensive and allows terms to be re-used for multiple contexts without the need to define additional metadata outside of the Taxonomy. This enables data to be shared with a minimum of customization. The Taxonomy can be extended if necessary, for custom requirements but this should be minimal and should only be used on a unilateral basis.

4 XBRL Specification

This section provides an overview of the fundamentals of the XBRL technical specification. To effectively use this Guide and work with the Orange Button Taxonomy requires an understanding of the fundamentals of eXtensible Business Reporting Language (XBRL). This is not intended as a comprehensive review of the XBRL specification.

The technical specification is maintained and supported by XBRL International, a non-profit standards setter. XBRL US is the US jurisdiction of XBRL International[3] and as such, is responsible for developing standards for use in US markets. Only the features that are relevant to the Orange Button Taxonomy are covered in this Guide.

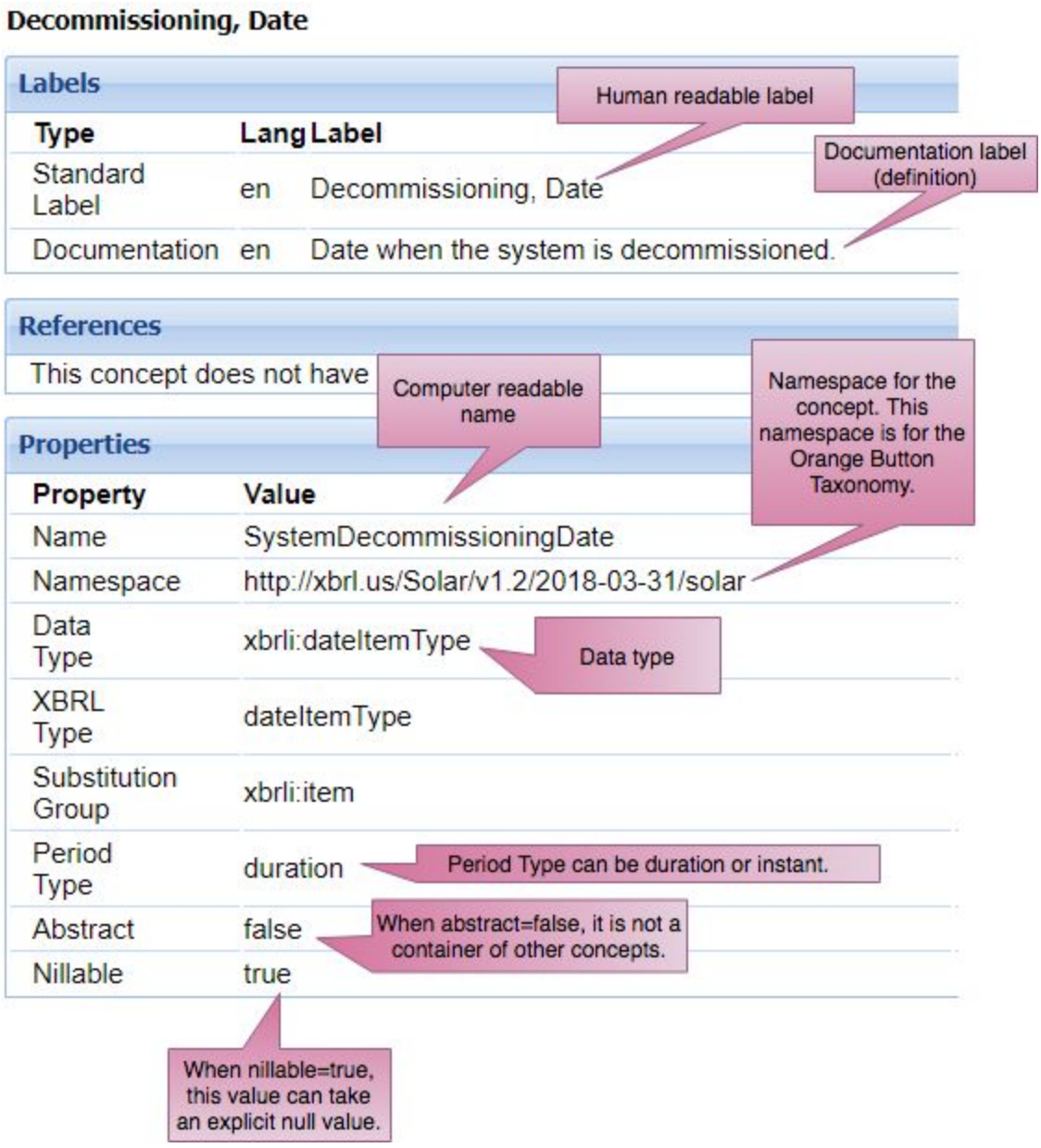
Software developers and technologists can learn more about the specification by visiting this link on the XBRL International web site: https://www.xbrl.org/the-standard/what/specifications. A glossary is included in the appendix to the Guide containing XBRL terms that may also be helpful to the Reader.

[3] http://xbrl.org

4.1 Taxonomies and Instance Documents

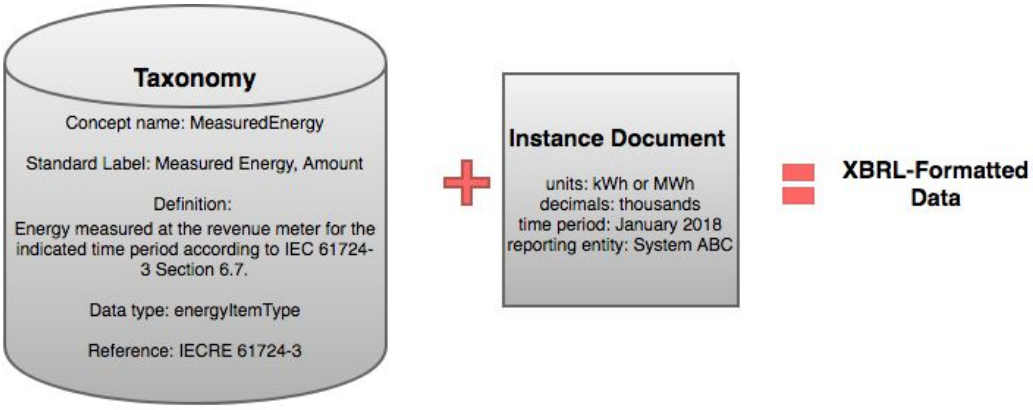
An XBRL taxonomy is a digital collection of terms called concepts or elements, which can be used to represent facts, or groups of other concepts. An XBRL instance document contains information about a specific reporting situation, such as the Income Statement for ABC Company, for the period 9/30/2017. Both taxonomy and instance document are required to convey all the metadata associated with a specific reported fact.

Content contained in the taxonomy includes metadata about the concept including computer-readable name, human-readable label, documentation label (definition), data type, and other information as noted in the diagram below which shows the concept *Decommissioning, Date*.



Content included by the preparer in the instance document conveys the other metadata needed to complete the data picture, including reporting entity, time period, dimensional qualifications, and decimalization. Preparing an instance document is referred to as “tagging” - connecting the appropriate taxonomy concept to a reported value or fact. For example, the concept Revenues may be used to tag the fact value 100,000, thus indicating that 100,000 represents a revenue data point.

The diagram below illustrates what is contained in the instance document, and what is contained in the taxonomy.



This idea can be further illustrated by the diagram below which shows a

Concepts (Elements)

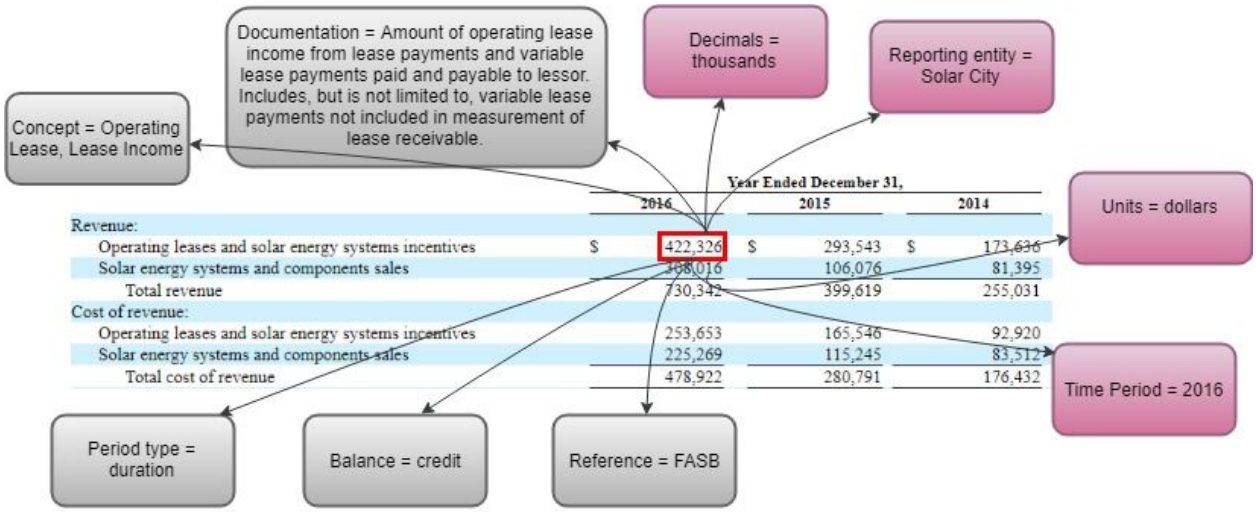
The terms “concept” and “element” can be used interchangeably. Both are used throughout this Guide. Concepts provide meaning to, or “tag” individual reported facts, such as the value 422,326 highlighted in red on the financial table, which was extracted from Solar City’s 10-K for the period ending 12/31/2016.

	Year Ended December 31,		
	2016	2015	2014
Revenue:			
Operating leases and solar energy systems incentives	$ 422,326	$ 293,543	$ 173,636
Solar energy systems and components sales	308,016	106,076	81,395
Total revenue	730,342	399,619	255,031
Cost of revenue:			
Operating leases and solar energy systems incentives	253,653	165,546	92,920
Solar energy systems and components sales	225,269	115,245	83,512
Total cost of revenue	478,922	280,791	176,432

Concepts are also used to collect logical groupings of other concepts which are called Abstracts. These are used to help preparers and users of data find concepts they need more easily in the taxonomy. For example, the abstract *Site Climate Classification [Abstract]* contains concepts representing different types of classification including Koppen and ANSI classifications.

To accurately and unambiguously describe a reported value such as “422,326” shown on the financial statement above requires conveying to the user of the data, information including label, definition, time period, balance type, and reporting period. Information associated with the datapoint 422,326 is depicted on the diagram below in gray and purple boxes.

Without all these pieces of information, the user of the data will not have a clear picture of what the reported value represents. The metadata in gray boxes is contained in the XBRL Taxonomy; the metadata in purple is drawn from the XBRL instance document.

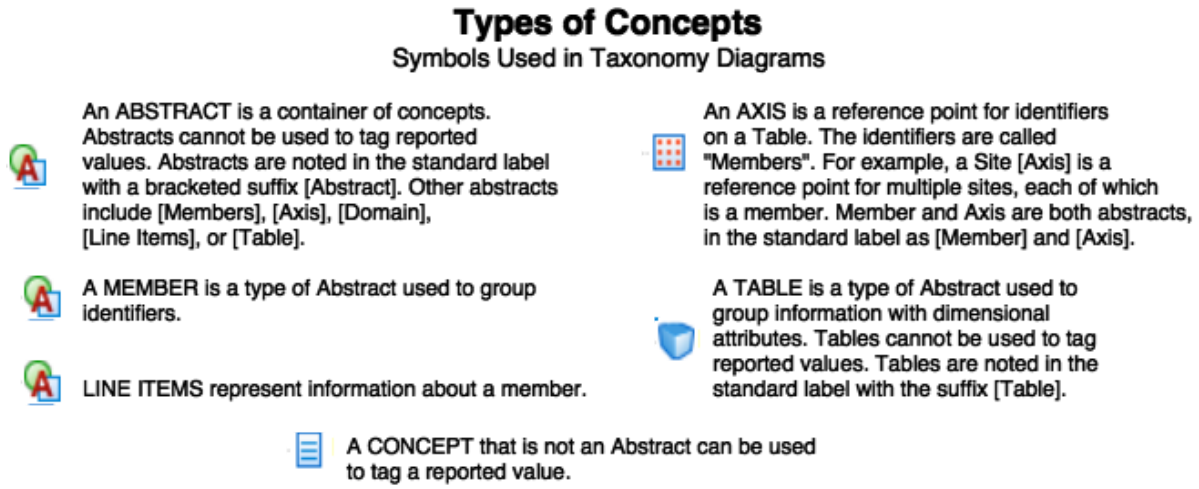


	Year Ended December 31,		
	2016	2015	2014
Revenue:			
Operating leases and solar energy systems incentives	$ 422,326	$ 293,543	$ 173,636
Solar energy systems and components sales	308,016	106,076	81,395
Total revenue	730,342	399,619	255,031
Cost of revenue:			
Operating leases and solar energy systems incentives	253,653	165,546	92,920
Solar energy systems and components sales	225,269	115,245	83,512
Total cost of revenue	478,922	280,791	176,432

To convey this information, the preparer would need to use the XBRL concept Operating Lease, Lease Income,

To embed this metadata into the value requires the preparer to choose the appropriate concept which is Operating Lease, Lease Income.

Other types of abstracts that are used throughout taxonomies include axes, line items, members, and tables. These abstracts are described in the diagram below which also shows the symbols used to represent these concepts in the taxonomy diagrams that will be used throughout this Guide. Further detail on tables, axes, members and line items will be covered in the section below on dimensions.



4.2 Data Types and Units

Reporting domains must often represent many different types of data. XBRL was created to handle the unique features of financial data, but can also accommodate other types of data including energy, mass, power, string (text), and area, among others. XBRL International maintains a Data Type Registry[4] and a Units Registry[5] which are centralized lists of data types and units that can be used with concepts in XBRL taxonomies. While new unit types can be created, preparers should always reference the Units Registry to see if the unit type already exists.

Each concept in a taxonomy has an associated data type, and each data type can be represented by one or more units. For example, *Property, Plant And Equipment, Salvage Value*, has a data type of monetary, and can be reported in units of US dollars, euros, or other currencies. A data type of temperature can have units of Celsius or Fahrenheit. A data type of power can have associated units of watts, kilowatts, or megawatts.

The unit associated with a value is metadata provided by the preparer when the value is reported in the XBRL instance document. The unit is not included in a taxonomy. The data type is directly associated with the concept, and therefore it is included in a taxonomy.

4.2.1 Percent, Per Unit, and Pure data types

The data type pureItemType is used for concepts that are dimensionless numbers such as percentage change, growth rates, and other ratios where the numerator and denominator have the same units, for example, a loan-to-value ratio, or an exchange rate. The perUnitItemtype is

[4] https://specifications.xbrl.org/work-product-index-registries-dtr-1.0.html
[5] http://www.xbrl.org/utr/utr.xml

used for concepts such as Currency per watts. The percentItemType is used to represent data such as percent of kilowatts lost due to shading.

4.2.2 Duration data type

Concepts used to represent facts that describe a specific and known duration of time will have a data type of durationItemType. When tagging a fact using a concept with a durationItemType, such as *Asset Management Contract Term*, the value should be entered using the ISO8601 format of PnYnMnDTnHnMnS. For example, a 5-year term would be represented as P5Y, a 3-month term as P3M, and a 4-year, 6-month and 10-day term would be represented as P4Y6M10D.

AssetManagementContractTerm

Labels

Type	Lang	Label
Standard Label	en	Asset Management Contract, Term
Documentation	en	Term of the Asset Management Contract. The value should be entered using the ISO8601 format of PnYnMnDTnHnMnS. For example, a 5-year term would be represented as P5Y, a 3-month term as P3M, and a 4-year, 6-month and 10-day term would be represented as P4Y6M10D.

References

This concept does not have any references.

Properties

Property	Value
Name	AssetManagementContractTerm
Namespace	http://xbrl.us/Solar/v1.2/2018-03-31/solar
Data Type	xbrli:durationItemType
XBRL Type	durationItemType
Substitution Group	xbrli:item
Period Type	duration
Abstract	false
Nillable	true

4.2.3 Enumerated Data Types

XBRL can also accommodate enumerated data types which limit the reported value to one of the options on the enumerated list. For example, to report the type of roof slope a custom data type was created as *roofSlopeItemType*, with options of Flat, Sloped, or Steep. The benefit of using enumerated lists is that it requires the preparer to select from a set list which ensures consistency of data reported from preparer to preparer. While a concept like *Roof Slope Type* could have been created as a string concept with the preparer required to describe the slope of the roof, data reported would have been inconsistent.

4.2.4 Boolean Data Types

Facts that should be tagged as “true” or “false” use the booleanItemType. Standard labels for boolean elements in the Taxonomy contain the term “Flag”.

4.3 Time Periods and Period Type

Every reported fact must include metadata for the reporting time period, which is handled by the preparer when creating the instance document.

Data may be reported at a point in time, for example, for the month of January; or over a period of time, for example, the sum of energy produced from January 1 through January 31. The latter has a Period Type of **duration**; the former, a Period Type of **instant**. An element such as *System Capacity, kW Peak DC, Power*, defined as “Capacity of the site in kWp (kilowatt peak - the DC capacity)” is an instant. An element such as *System Estimated Energy Lost*, which is defined as “Estimated energy lost in kWh which could be associated with a specific event or downtime” is a duration.

Reported data may be “**period-independent**”, for example, monthly rental expense, or average insolation for the month of January for a specific system. The reported data represents “all months” or “all Januaries” and is not related to a specific time span. It has a duration of forever, with no start or end date.

In the Orange Button Taxonomy, data can also be associated with a specific time period that is not the time period of the instance document. For example, average energy reported in the month of January. The reported value is representative of “all januaries”. To handle this situation, a special *Period [Axis]* was created and is discussed later in this Guide.

4.4 Tables (dimensions)

The XBRL Dimensions specification[6] enables the creation of multi-dimensional facts.

Dimensions are ways of categorizing facts, and allows for the re-use of concepts, as depicted in the table below. The *Site Identifier [Axis]* represents the primary key for the table. Sites A, B, and C are identified on the axis in XBRL as Members.

Multiple sites are represented on the table with various associated line items - *System Operational Status, Site Parcel Identifier*, and *System DER Type* - which are dimensional qualifications (dimensions) for the members in this example. Site A has a system which is a photovoltaic (PV) system only, has a status of operational, and has a site parcel number of 4839385939.

[6] https://specifications.xbrl.org/work-product-index-group-dimensions-dimensions.html

Site Identifier [Axis]	System Operational Status	Site Parcel Identifier	System Der Type
A	operational	4839385939	PV system only
B	under maintenance	A7788CF	storage only
C	decommissioned	777HHH4939	PV system only

Some tables may contain more than one axis because there is a “many to many” relationship as shown in the table below. In this example the *Financing Event [Axis]* is the primary key and the *Project Identifier [Axis]* is the secondary key. Two axes are needed because a project may have more than one financing event; and a single financing event could apply to more than one project. Project 8890483a is associated with both an origination and closing financing event.

Financing Event [Axis]	Project Identifier [Axis]	Financing Event Status	Financing Event Type
1	3493JJ8d	In process	Binding commitment
2	8890483a	Finalized	origination
3	8890483a	In process	closing

The value “Binding commitment” must be reported as the intersection of three concepts as shown on the diagram below. By using all three concepts to represent the value “Binding commitment”, the end user has a complete and unambiguous understanding of the meaning of the value.

4.4.1 Default axes and members

When a taxonomy is created, an explicit dimension can have default members specified by the taxonomy author. If no member is specified by the creator of the XBRL instance document, the default member is then assumed to have been chosen.

In Orange Button, there are certain cases where an axis is specified as having no default member. This is denoted by the suffix [No Default]. For tables that contain this kind of axis, the preparer must always include that axis when tagging a value on that table.

4.4.2 Typed and Explicit dimensions

The examples shown above are Typed Dimensions - used when there are no Members specified in the Taxonomy. With typed dimensions, there can be an unlimited number of members which are defined by the preparer. This makes sense for these situations because there can be an infinite number of sites, and there can be an infinite number of financing events.

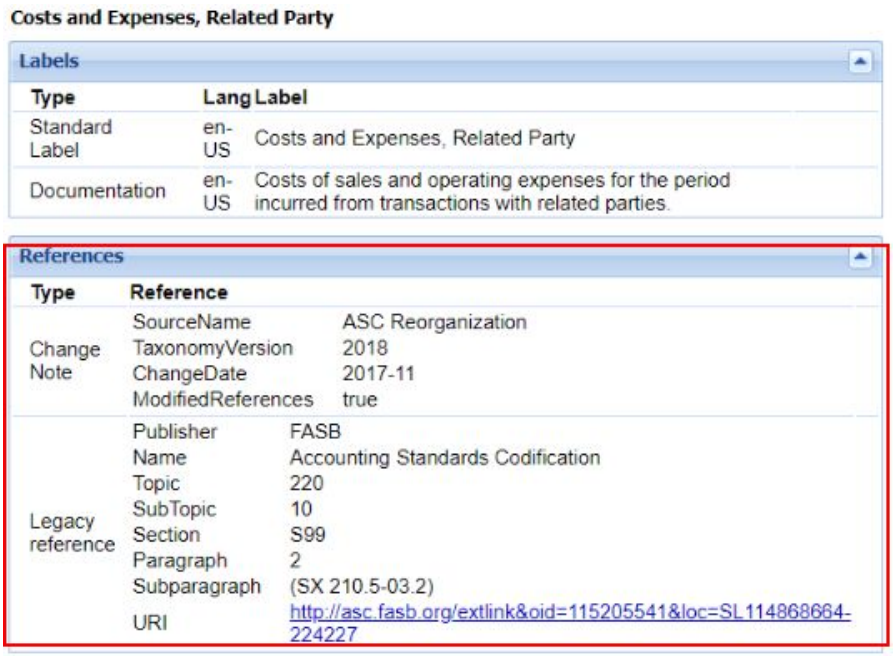
Some tables have explicit dimensions - a known, finite number of members. An example of an explicit dimension is the *Equipment Type [Axis]* in the Orange Button Taxonomy that has members representing types of equipment used in a solar system, for example, modules, inverters, combiners, transformers. It is a known and finite list.

4.5 Identifiers

Numerous identifiers are used throughout the Orange Button Taxonomy to represent various sites, systems, funds, asset managers, developers, and documents. An identifier should be a unique, random string which can be a combination of numbers and/or letters.

4.6 References

References provide authoritative sources for individual concepts and should be used to help identify the appropriate concept. References will include the name of the source, for example the Financial Accounting Standards Board (FASB) Codification[7], or the IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications (IECRE)[8], and may also include the reference standard document number, and the reference standard concept name. The diagram below shows a concept reference for the FASB Codification.



Costs and Expenses, Related Party

Labels

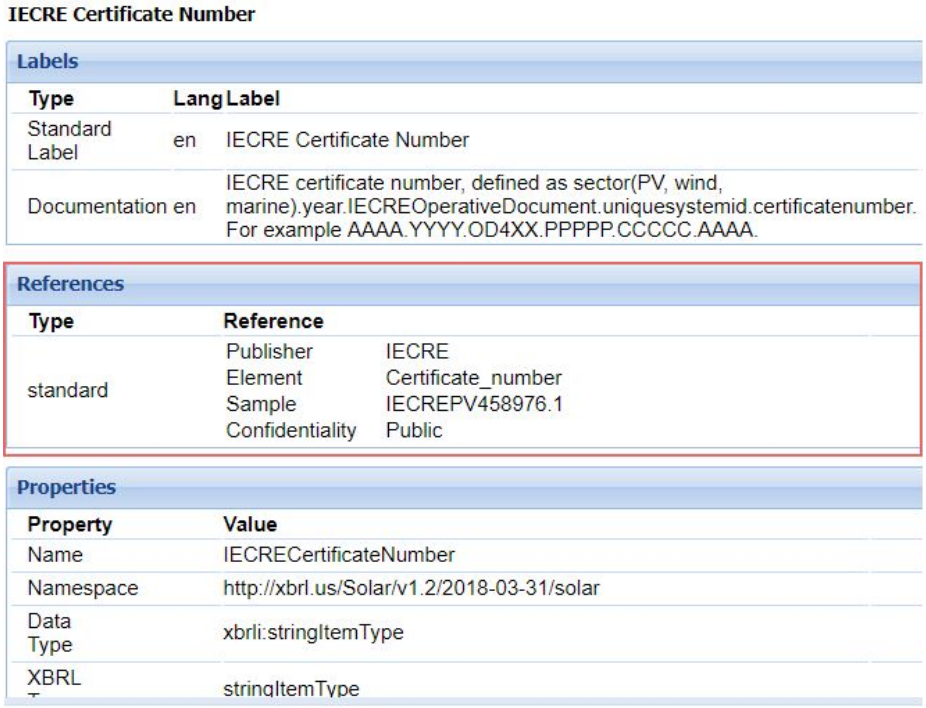
Type	Lang	Label
Standard Label	en-US	Costs and Expenses, Related Party
Documentation	en-US	Costs of sales and operating expenses for the period incurred from transactions with related parties.

References

Type	Reference	
Change Note	SourceName	ASC Reorganization
	TaxonomyVersion	2018
	ChangeDate	2017-11
	ModifiedReferences	true
Legacy reference	Publisher	FASB
	Name	Accounting Standards Codification
	Topic	220
	SubTopic	10
	Section	S99
	Paragraph	2
	Subparagraph	(SX 210.5-03.2)
	URI	http://asc.fasb.org/extlink&oid=115205541&loc=SL114868664-224227

[7] https://asc.fasb.org/
[8] http://iecre.org/

Below is an example of a commonly used reference that can found for many concepts in Orange Button - the IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications. Each reference in the Taxonomy may include the name of the publisher, the publisher document that contains information about that standard, the name of the element designated by that publisher, a sample element, and the level of confidentiality of this element. Note that this level of detail may not be available for every reference. For example, some references may only include the fact that an IECRE standard exists for this element and the IECRE document where the standard is sourced. The level of detail is based on what was available at the time the Taxonomy release was finalized.



IECRE Certificate Number

Labels

Type	Lang	Label
Standard Label	en	IECRE Certificate Number
Documentation	en	IECRE certificate number, defined as sector(PV, wind, marine).year.IECREOperativeDocument.uniquesystemid.certificatenumber. For example AAAA.YYYY.OD4XX.PPPPP.CCCCC.AAAA.

References

Type	Reference	
standard	Publisher	IECRE
	Element	Certificate_number
	Sample	IECREPV458976.1
	Confidentiality	Public

Properties

Property	Value
Name	IECRECertificateNumber
Namespace	http://xbrl.us/Solar/v1.2/2018-03-31/solar
Data Type	xbrli:stringItemType
XBRL	stringItemType

4.7 Validation

XBRL allows for the creation and implementation of validation rules which can be used at the point where the data is prepared, and/or at the point where the data consumer is extracting the data. Because of the highly structured nature of XBRL-formatted data, rules can be used to check the accuracy of the data and to ensure that it conforms to reporting requirements and to the design of the taxonomy.

Validation rules can be created using open source languages such as XBRL Formula, which is part of the XBRL standard; or XBRL Rules (Xule), which is an open source XBRL processor created by XBRL US. Below are examples of validation rules that can be created to confirm that:

- A reported value is always positive or always negative

- The value reported for one concept always has the same relationship to another concept, e.g., one date is always earlier than another, one value reported is always greater than, or less than, another concept
- A value reported always falls within certain boundaries
- Axes in the taxonomy are used appropriately

4.8 The Semantic data model

Concepts in a taxonomy are grouped to provide structure that should capture the semantic (business) model of the data, to ensure that all supply chain participants can easily find concepts of interest, and to ease the loading of the taxonomy into software applications.

A semantic data model defines the meaning of data within the context of its interrelationships with other data. It is an abstraction that defines how the stored symbols of the data model relate to the real world business that the model is designed to represent. It is also called the conceptual model of the data.

The semantic model can vary depending on the reporting domain represented by the taxonomy. The US GAAP Taxonomy, for example, relies on the financial statements in US GAAP such as the Statement of Income, Statement of Cash Flows, and Statement of Financial Position, to provide structure. The Corporate Actions Taxonomy relies on individual actions, such as a dividend announcement or an acquisition, to provide the Taxonomy structure. Some taxonomies rely on a hybrid approach, depending on the complexity of the data represented, and how it is used.

The structure of the XBRL taxonomy supports the semantic data model by using entry points and groups to collect data into consumable sets of content.

4.8.1 Presentation hierarchy

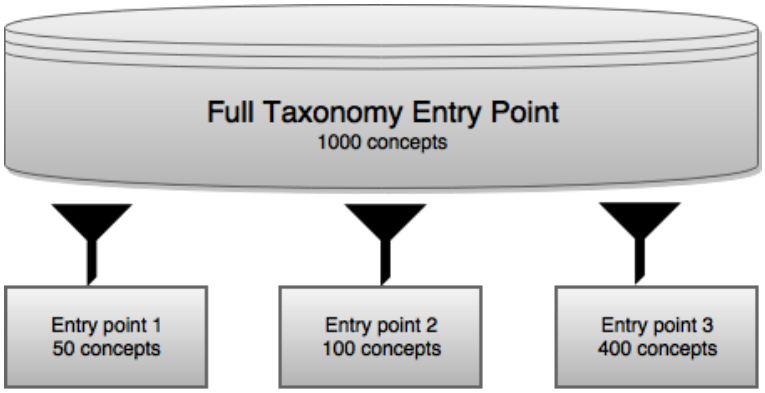
XBRL elements in a taxonomy are hierarchically structured.

4.8.2 Entry points

Entry points provide a filter on the taxonomy as shown in the diagram below. The filter organizes parts of the taxonomy in a manner that makes sense to a specific user. The taxonomy defines concepts, and the relationships between the concepts. An entry point shows the concepts and relationships that may be relevant for a specific purpose, user, use case, or report.

For example, on the diagram below, Entry point 1 may contain all the concepts needed to define a financial report. Entry point 2 may contain concepts needed to define a type of contract. The

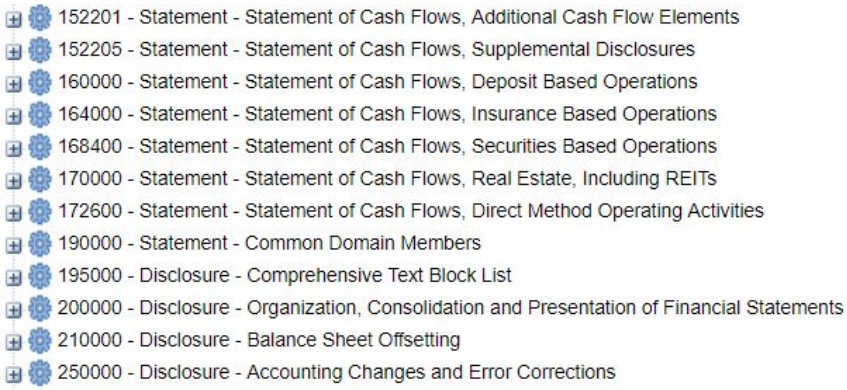
number of entry points that can be created to provide a “window” into a taxonomy is unlimited, and users of the taxonomy can define their own entry points for their own use if they wish.



Entry points are essentially methods to access all or some portion of the Taxonomy. They can eliminate the need for data creators and users to scan through the entire taxonomy, improving the ability to search. Accessing smaller entry points enables quicker taxonomy download to improve the user experience for software applications. Entry points are for reference, and do not preclude preparers from selecting additional elements from the taxonomy as needed. For example, the entry point for a manufacturer specification or cut sheet contains approximately 200 data fields; the System entry point over 600, therefore loading the cut sheet entry point is more efficient than loading the System entry point.

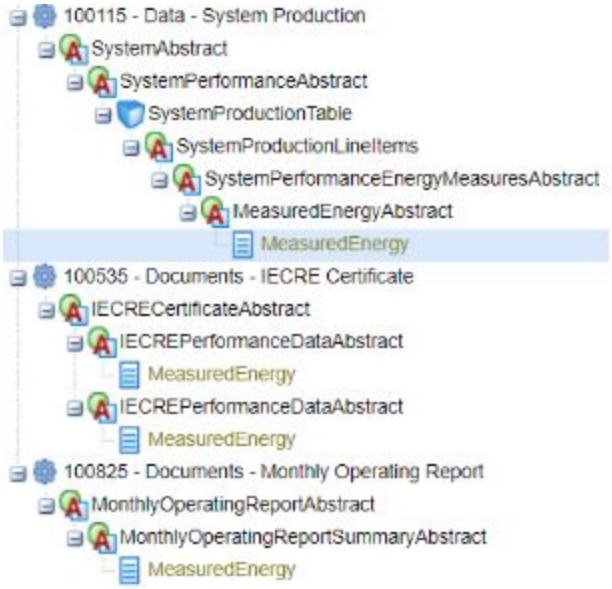
4.8.3 Groups

Groups are also collections of content that are relevant to one or more users. Entry points can contain one or more groups. Groups can also serve as entry points. Each group is assigned a number which establishes the logical ordering of the taxonomy. For example, in the US GAAP Financial Reporting Taxonomy, groups are split into “Statements”, “Disclosure”, and “Documents”. Statements groups are numbered from 104000 to 190000; disclosures are numbered from 195000 to 994200. A portion of the groups can be seen in the diagram below. The number itself has no meaning except to establish the ordering of the content.



4.8.4 Cross-use of Taxonomy Concepts

Concepts that reside in one group or entry point, may also reside in a separate group or entry point, if the concept is needed in multiple areas. The diagram below shows the concept *Measured Energy* which is available in multiple entry points. The ability to cross reference concepts minimizes the size of the taxonomy and ensures consistency in reported data. Concepts with the same name that appear in multiple locations, have identical attributes, for example, standard label, documentation label, references, and all other properties.



5 Orange Button Taxonomy

5.1 Representing the Semantic Data Model

The Taxonomy has been organized to represent the semantic data model of the Orange Button use cases, with an aim to making it easy for all participants to the various solar reporting supply chains to find and easily understand how to work with the concepts.

5.1.1 Solar Terminology

Solar and project finance participants often have different approaches to terminology to define aspects of a solar project. Throughout this Guide and in the Taxonomy, we have sought to establish standard methods to define these terms.

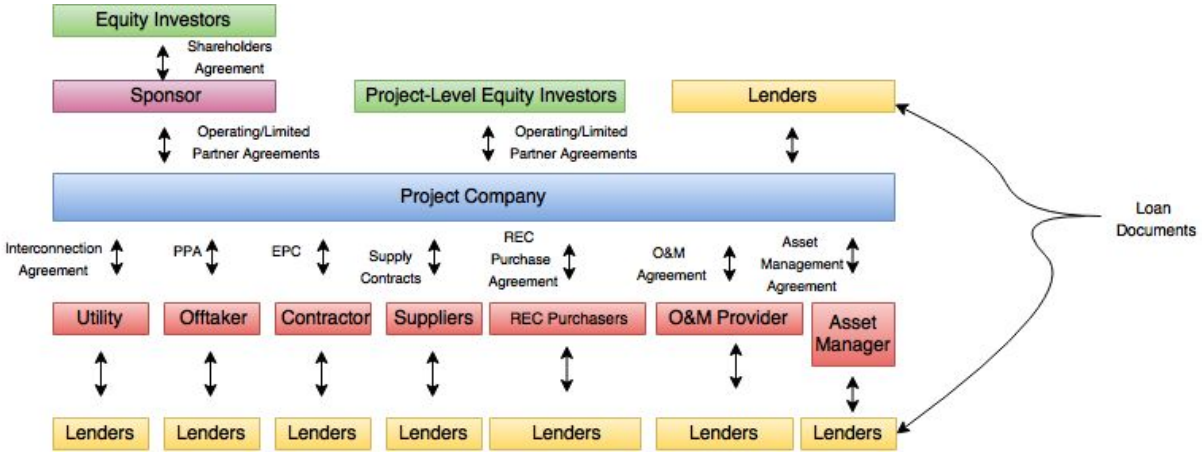
For example, the term **System** is used to denote the physical setup of the plant. **Site** refers to the physical location of the system. **Project** refers to program established to manage the legal and financial activities of the system or systems. **Fund** refers to the investment vehicle

established to finance a project. A site can contain multiple systems. A fund can contain multiple projects. A project can contain multiple sites and/or systems.

Documentation labels in the Taxonomy contain descriptions of these terms and many others that are needed in the process of solar financing.

5.1.2 Representing Use Cases

Project finance is the primary use case covered in the Taxonomy. Data management in project finance today requires collecting and manually entering information from hundreds of separate documents, which are prepared and delivered by multiple organizations, throughout the evaluation, build and operations of a project. The diagram below provides a high-level picture of the information flow in a project finance program for a solar installation.



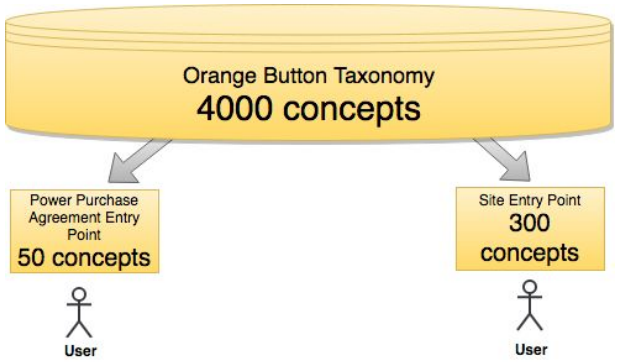
Documents are prepared by attorneys and other parties, and typically contain data collected from developers and others. Documents are posted into a data room which is accessed by all participants in the project. Investors, and other participants, access the documents. They may manually extract 100% of the data contained in the document; a subset of the data; or they may simply need to record the fact that the document is available, or is in final form. The documents are typically in PDF or Microsoft Word format.

To help preparers capture the data needed in the numerous contracts, reports, and documents, in the form in which they are traditionally collected, the Taxonomy relies on three organizational approaches.

First, it contains a set of over 140 document entry points, ranging from Interconnection Agreement to Power Purchase Agreement (PPA). If a preparer needs to create an Orange Button-compliant PPA, they can select the PPA entry point, and need only view the elements necessary for the PPA. If they decide they need other elements that are not contained in the

PPA entry point, they can still access all other elements in the Taxonomy and use those to tag the document as well.

The diagram below depicts two different users, accessing the Taxonomy for different purposes - one uses the Taxonomy to prepare an Orange Button PPA, the other uses the Taxonomy to obtain concepts for a database of information about a Site.



Some document entry points only contain the minimum data that is traditionally required to be reported. These concepts are not used to tag a full document but only to record information about the document, such as: the document is available; it's in final form; the effective date, and; the names of counterparties to the document. For example, document groups such as Certificate of Completion, contain only the concepts depicted in the diagram below, which are the only reported values that are needed during the financing of the project.

The investor records facts indicating that the certificate is available, whether or not it is final, if there are any exceptions to the certificate, names of counterparties, dates of the certificate, and

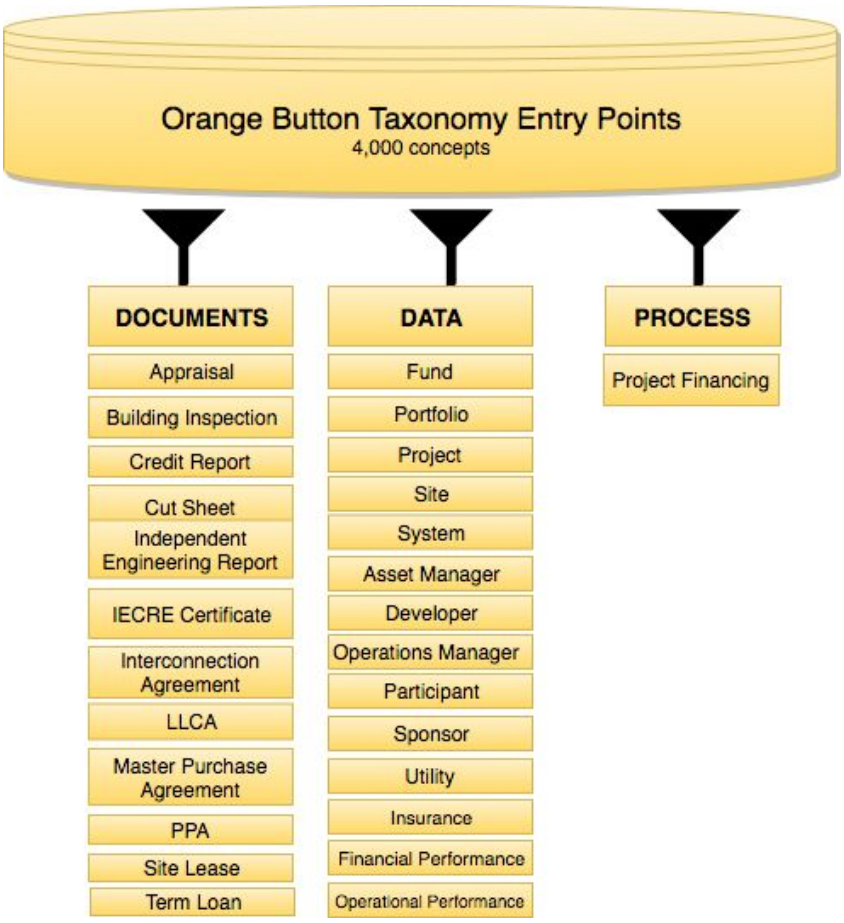
may include a link to a complete copy of the certificate. Therefore, these are the only concepts available in the Taxonomy pertaining to the Certificate of Completion.

Second, the Taxonomy contains a process entry point for Project Financing. Data collected from the various documents is used to record details about the financial models and the physical structure of the system. Data is reported using these concepts while onboarding parties to the project, and while monitoring, reporting, and operating, the project and system. The Process-Project Financing entry point is comprised of numerous tables to capture data about projects, funds, portfolios, participants to the program, such as developers and operations managers, financing events, regulations and permits, as well as site-specific data pertinent to the system.

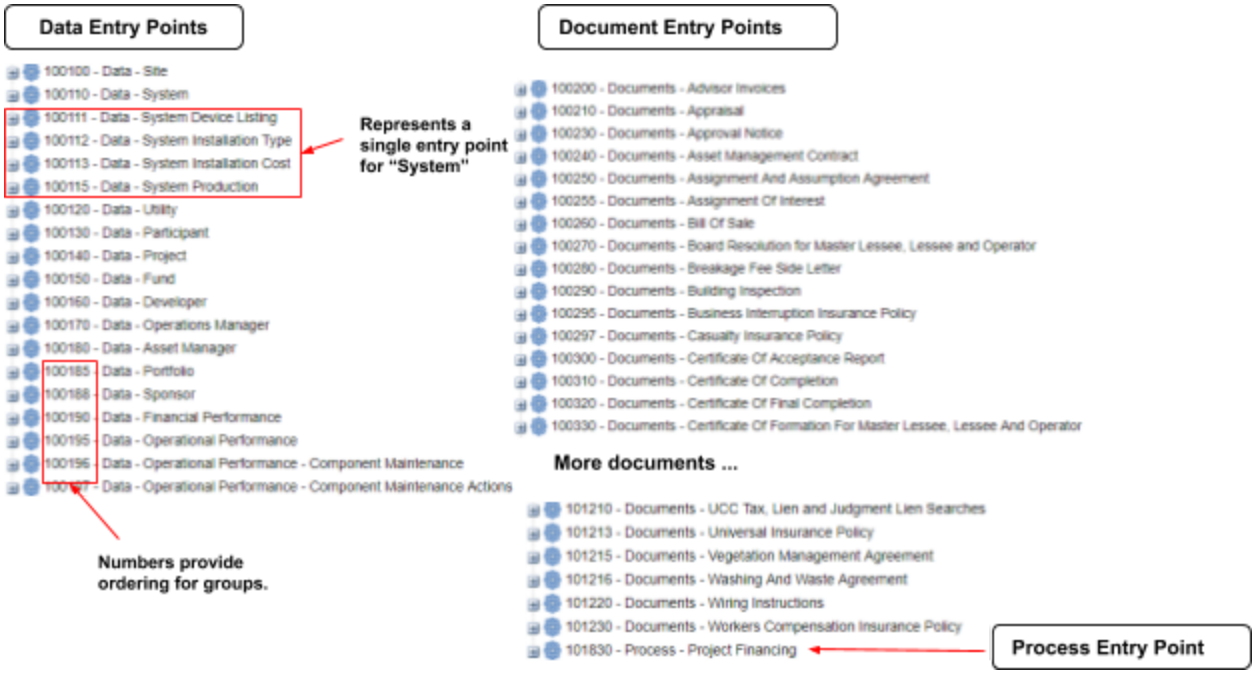
During the project finance process, data is extracted from the various documents in a data room and manually entered into an investors internal system. Concepts representing this data may be dispersed throughout the various document entry points but they are also aggregated into the Process-Project Financing entry point to make it easier for Taxonomy users with different requirements.

Third, the Taxonomy contains entry points for discrete topical areas such as site, project, or system. This provides users with an easy way to identify content that can be used in databases for multiple systems, sites, projects, or funds. The site entry point, for example, contains all the concepts in the Taxonomy related to a site; and as such, serves as a good starting point for building a database of sites. These entry points are named Data entry points, for example, Data-System, Data-Site, Data-Project.

The diagram below shows the entry points for Orange Button (Note that given the number of document entry points, all are not depicted on the diagram).



The organization of the Taxonomy can also be seen in the diagram below pictured in the Taxonomy Viewer. Each row represents a group which contains concepts pertaining to the group topic. As noted earlier, each group is assigned a number which establishes the ordering of the groups. Note that for some entry points, there is more than one group, for example Data-System is comprised of the groups, System, System Device Listing, System Installation Type, System Installation Cost, and System Production. This is necessary because of the structure of certain groups that may contain multiple dimensional concepts.



With subsequent releases of Orange Button, new entry points can be created as new uses for the Taxonomy are established. The Taxonomy files have been broken up to allow the maximum flexibility to add and remove various components using a custom entry point.

5.2 Data Types Used

The Orange Button Taxonomy must capture many different data types ranging from monetary, which can be used to represent units such as USD (US dollars), euros, or any other currency; to power, representing units such as watts, kilowatts, or megawatts. To consistently handle the many data types, traditional XBRL data types have been augmented with energy- and solar-specific data types. The table below outlines the data types used in Orange Button.

Data Type	Description	Units: Examples
areaItemType	Area	acre, square feet, square meters, square miles; Array, Total Module Area
booleanItemType	Binary variable representing TRUE or FALSE	Component Failure Indication, Flag; Availability Of Equipment Warranties, Flag
dateItemType	date	January 31, 2018; Environmental Site Assessment I, Effective Date
decimalItemType	decimal	1.1; Power Factor, Module Design Factor
domainItemType	Predefined set of types (members)	Equipment Type [Domain] with members Inverter, Module, Combiner; Period [Domain] with members January, February, etc.

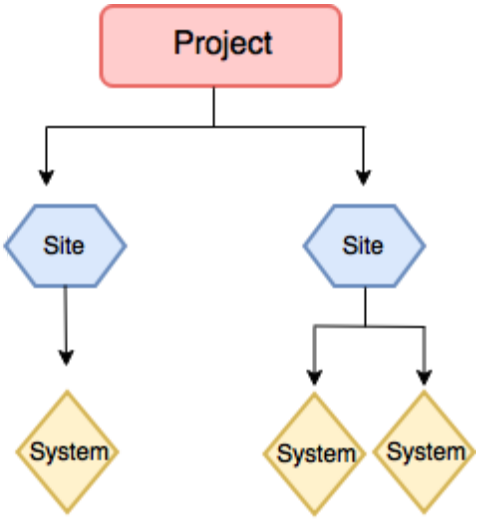
durationItemType	Period of time such as a year of 365 days.	Year, month, day; Length of Employment
electricCurrentItemType	Amperes	Amps; Inverter Input, Maximum Operating Current DC
energyItemType	Kilowatt hours of energy	kWh, mWh; Predicted Energy At The Revenue Meter
frequencyItemType	Frequency or number of cycles per second, herz	Hz; System Grid Frequency; Inverter Output, Rated Frequency
insolationItemType	kWh per square meter	Measured Insolation
irradianceItemType	Watts per square meter	Reference Cell Irradiance
integerItemType	Integer, whole number	Number of Modules Per String; Number Of Expected Daylight Hours
lengthItemType	Length	Feet, inches, meters, yards; Inverter Width
massItemType	Weight	Pounds, ounces; Module Weight
monetaryItemType	Monetary units	US dollars, euros; Zoning Permit Upfront Fee, Amount
percentItemType	Percent	System Availability, Inception To Date, Percent
perUnitItemType	Amount per unit	Power Purchase Agreement, Price Per kWh
planeAngleItemType	Degree	Rack Tilt Measurement, Degrees
powerItemType	Watts, Megawatts	W, mW; Revenue Meter, kW Output
pressureItemType	SI	System Barometric Pressure
pureItemType	Dimensionless pure number	Loan to Value Ratio, Percent
speedItemType	Miles per hour, kilometers per hour	Mph, kph; Test Condition Wind Speed
stringItemType	Text	Project Description
temperatureItemType	Degrees celsius	Inverter Operating Temperature Range Maximum
voltageItemType	Volts	Inverter Input, Rated Voltage DC, Amount; Module, Rated Voltage
volumeItemType	Gallons	Washing Water Quantity, Amount

In addition to these data types, Orange Button contains approximately 90 enumerated data types, which are documented throughout the Taxonomy. For example, when a preparer is reporting using the concept *System Type,* the associated data type is solar-types:solarSystemCharacterItemType*,* which represents the enumerated options, Residential, Community Solar, Commercial, Industrial, Agricultural, Utility. These specialized data types are designed to put restrictions around what can be reported for certain concepts to maximize the consistency and comparability of data produced.

The next sections of the Taxonomy Guide will provide a detailed discussion of each entry point, individual groups within the entry points, and will cover how the concepts and dimensions within each entry point can be used.

6 Data-Site Entry Point

The site is the physical location of the plant or system. One site can contain more than one system. One project can contain more than one site.



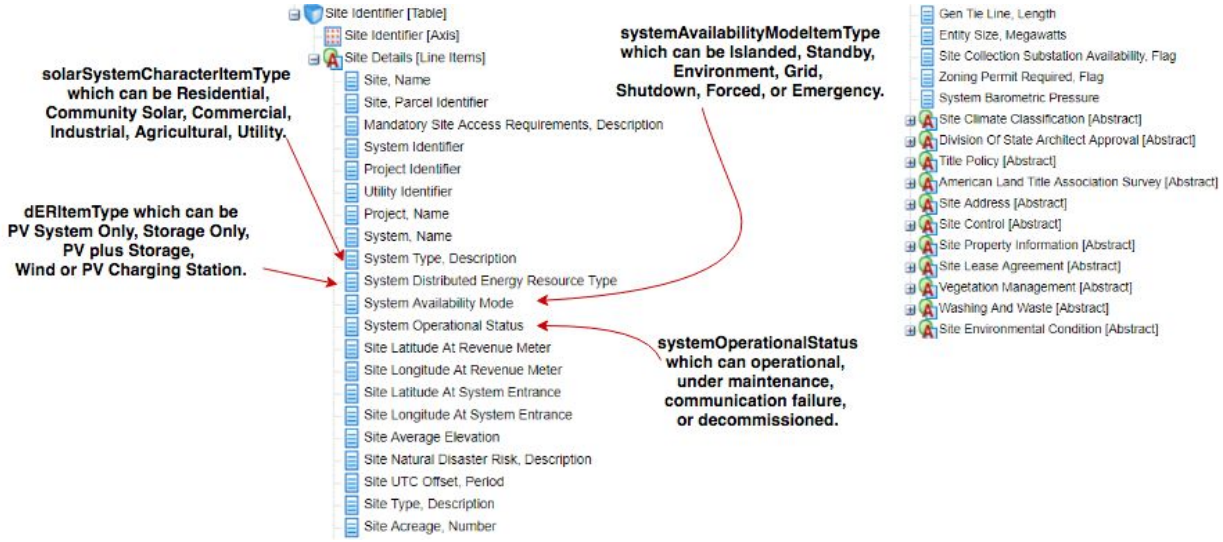
6.1 Site Identifier [Table]

This table can be used to collect information when onboarding a new project, reporting general information about a site, such as location and type, or when building a database of sites. It can be modified by Project Name or *System Identifier* so that data can be reported by site, by project associated with a site, or by system within a site.

The *Site Identifier [Axis]* uses a typed dimension as there can be an infinite number of sites. The system and project identifiers are available on this table to allow preparers to connect the site to the corresponding system and/or project.

The abstracts highlighted on the right side column in the diagram below can be further disaggregated to show concepts about Division of State Architecture Approval, Title Policy, ALTA Survey, Site Control, and other topical areas related to a site. The Vegetation Management, and Washing and Waste Management abstracts contain information about activities and costs related to these areas.

Some concepts are represented by special solar data types that contain enumerated lists which are described on the left side column of the diagram below.

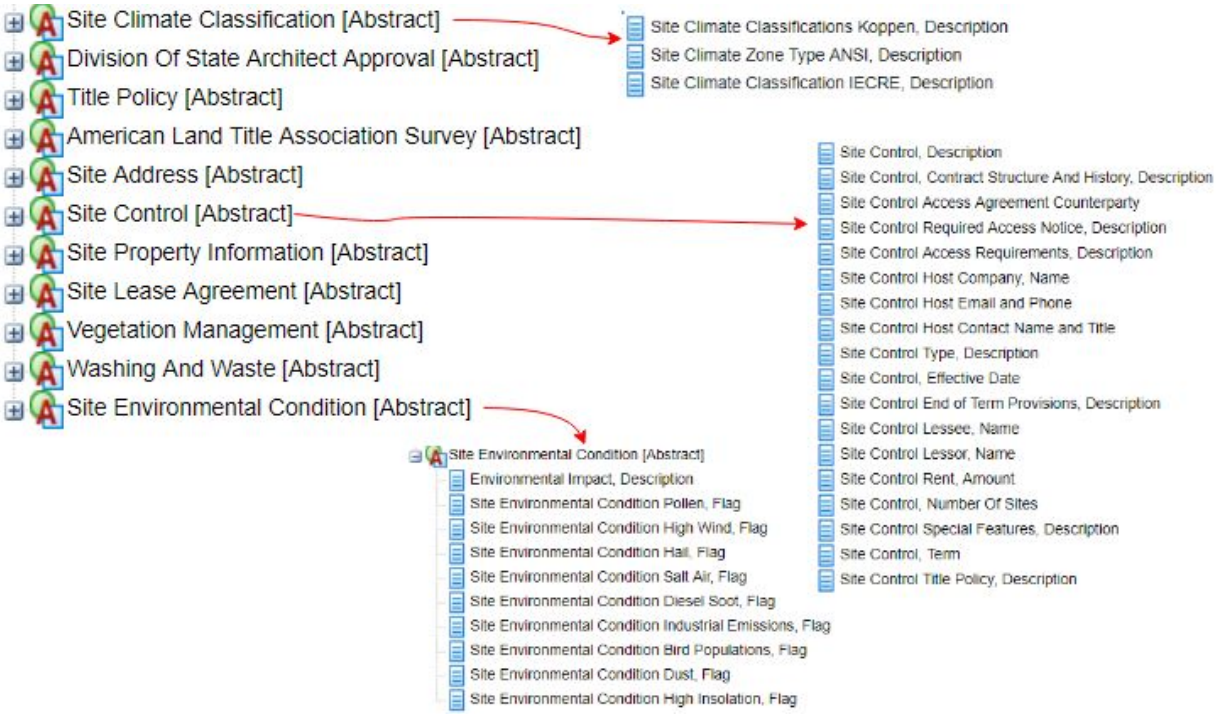


The *Site Identifier [Table]* can be used to tag data such as that depicted in the table below. Project blue contains Site a and Site b. Site a has one system: ZZ. Site b has two systems: AA and UU. Each site has associated attributes describing the status and DER type of the system, as well as the parcel identification number.

Site Identifier [Axis]	Project Identifier	System Identifier	System Operational Status	Site Parcel Identifier	System Der Type
a	blue	ZZ	operational	4839385939	PV system only
b	blue	AA	under maintenance	A7788CF	storage only
b	blue	UU	decommissioned	777HHH4939	PV system only

Abstracts under Site Details in the Site Identifier table contain additional line items for preparers to provide further metadata about sites. For example,three different climate classifications are included in the Taxonomy - these are grouped under the abstract *Site Climate Classification* as seen on the diagram below. *Site Climate Zone Type ANSI, Description* is a classification from ANSI/ASHRAE/IESNA Standard 90.1-2007, and has categories ranging from Very Hot - Humid, to Subarctic. Preparers can also opt to use *Site Climate Classification Koppen, Description* which is the Koppen-Geiger climate classification system, with an enumerated selection ranging from Tropical/megathermal climates, to Polar climates. Or preparers can use the *Site Climate Classification IECRE, Description* which is a string element referencing IECRE 60721 where preparers can tag a climate description drawn from the IECRE standard.

The *Site Control [Abstract]* contains items to tag data about the organization controlling the site. *Site Environmental Condition [Abstract]* contains boolean elements to indicate if certain conditions such as the presence of pollen, hail, or high wind, exist on the site.



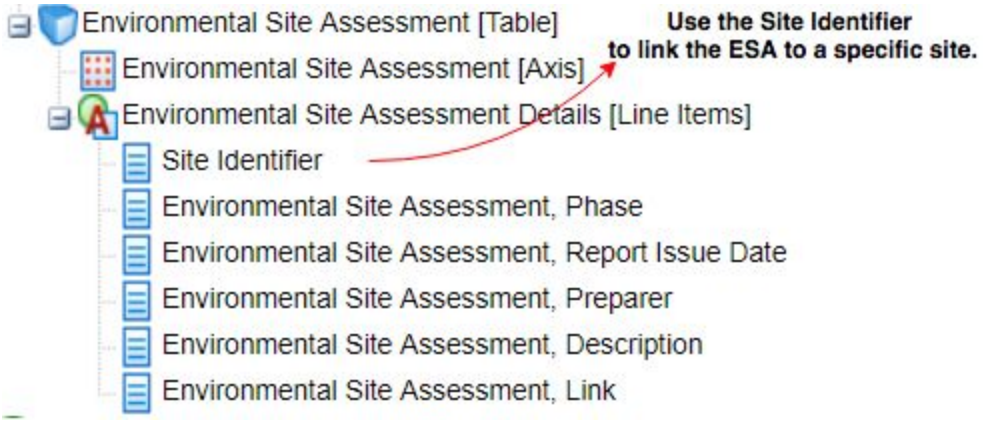
The table below shows a sample database structure depicting data about three different sites with the *Site Identifier [Axis]* as the primary key.

Site Identifier [Axis]	Site Name	Site Type	Site Parcel Identifier	Size Megawatts	Site Climate Zone Type ANSI	Acreage
1	ABC Site	Campus	123-45-123	10	Very Hot - Dry (1B)	500
2	Store54	Store	145-0000	1	Mixed - Marine (4C)	750
3	Site 1-2-3	Factory	A233377	4	Cool - Dry (5B)	880

The *Site [Table]* is located in both the Data - Site and Process - Project Financing groups.

6.2 Environmental Site Assessment [Table]

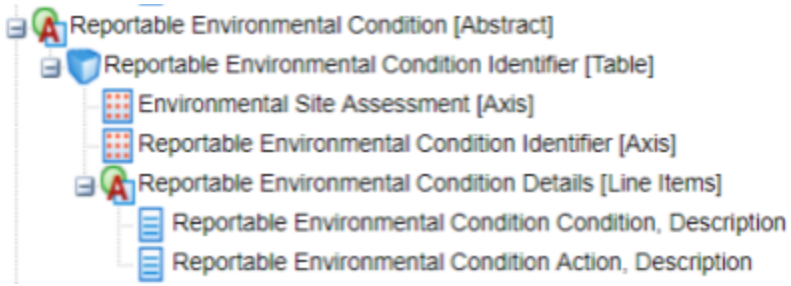
This table represents information about one or more Environmental Site Assessments (ESA) conducted about a site. There may be multiple ESAs related to a single site conducted by different organizations or individuals which can be represented using the *Environmental Site Assessment [Axis]* as the primary key for the table. The *Site Identifier c*oncept should be used to link the ESA report to the associated site. This table is found in the Data - Site and Process - Project Financing groups.



6.3 Reportable Environmental Condition [Table]

Examples of Reportable Environmental Conditions (REC) can include hazardous substances or petroleum products, found at, or near a site. These are typically reported about in an ESA report, so this table, which relies on the *Reportable Environmental Condition [Axis]*, is generally used in conjunction with the *Environmental Site Assessment [Axis]*. There may be multiple ESAs and multiple RECs related to a site. A single REC, such as the presence of petroleum products, may be reported in more than one ESA; conversely a single ESA may contain information about more than one REC.

The *Reportable Environmental Condition [Axis]* is a typed dimension accommodating an infinite number of RECs. Data reported on RECs include description of the condition and actions to be taken to remedy the situation, therefore they are all string elements. This table is also found in the Data - Site and Process - Project Financing groups.



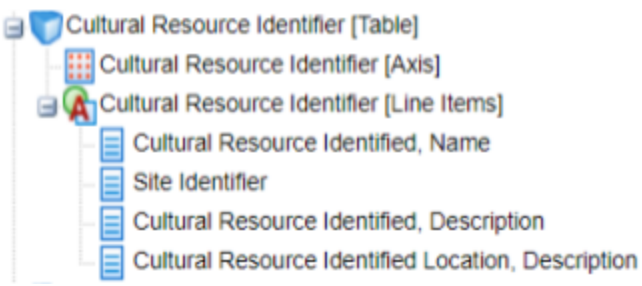
6.4 Cultural Resource and Natural Resource Tables

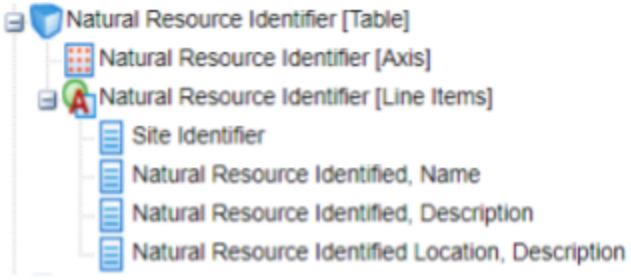
Cultural resources are defined as landscapes, objects, or structures of significance to a group of people, for example, tribal burial grounds, or an historic preservation site. Natural resources are defined as materials or substances that exist in nature, such as the presence of water, minerals, or hazardous materials. Cultural and natural resources must be considered when selecting a

site, and in constructing a solar system. Data related to these resources is captured in several tables which are similarly structured in the Taxonomy. These tables are found in the Data - Site and Process - Project Financing groups.

6.4.1 Cultural Resource Identifier [Table] and Natural Resource Identifier [Table]

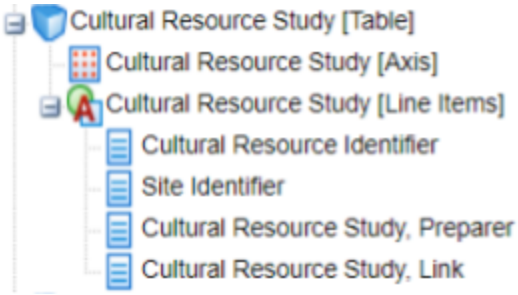
These two tables, shown in the diagram below, represent identifiers for the resources with axes, *Cultural Resource Identifier [Axis]* and *Natural Resource Identifier [Axis]*. These are typed dimensions as there can be any number or type of cultural or natural resource. Line items associated with this table are string elements including name, location and description. These tables should be used with the *Site Identifier* concept, which is included on both tables, to link one or more resources to a particular site.

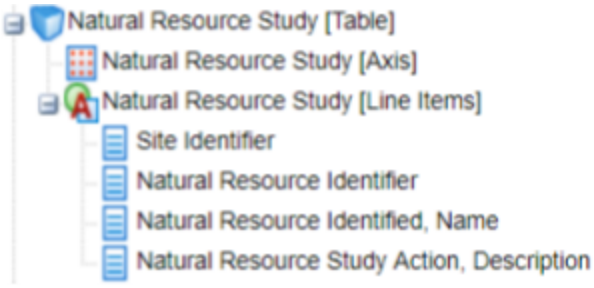




6.4.2 Cultural Resource Study [Table] and Natural Resource Study [Table]

These two tables represent information about studies conducted about the resource, using axes *Cultural Resource Study [Axis]* and *Natural Resource Study [Axis]*. These are also typed dimensions as there can be many different studies conducted. Each study should be linked to a particular resource which requires the use of the *Cultural Resource Identifier* or *Natural Resource Identifier* line items. Other line items associated with this table are string elements including name of the study, preparer of the study, and link to the study. The *Site Identifier* is also available to link the study to the site.





Below is an example table showing two natural resources on the ABC Site, each identified with two associated studies that could be tagged using the *Natural Resource Study [Table]*. On this table, the *Natural Resource Study [Axis]* is the primary key.

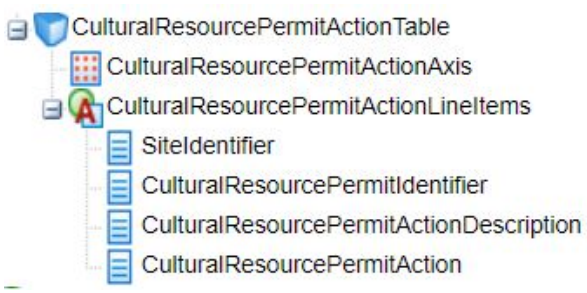
Natural Resource Study [Axis]	Natural Resource Identifier	Natural Resource Identified, Name	Natural Resource Study Action, Description
1	A	Hazardous waste site	Conduct cleanup study.
2	B	Mineral deposits	Geological study.
3	A	Hazardous waste site	Engage environmental team to assess options.

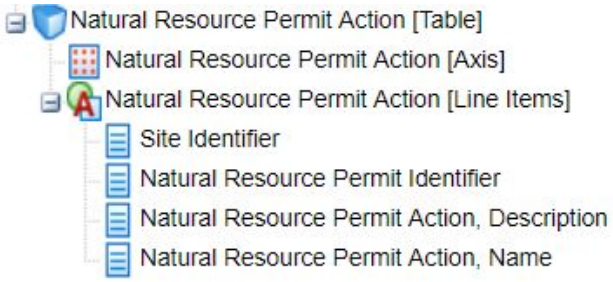
6.4.3 Cultural Resource Permit [Table] and Natural Resource Permit [Table]

These tables, depicted in the diagram below, capture data about permits that a developer may need to obtain related to a cultural or natural resource. Preparers use the *Cultural Resource Permit [Axis]* or *Natural Resource Permit [Axis]* to identify the permits. These are typed dimensions. They can be used in conjunction with the Site Identifier concept to connect them to a specific site, and to the *Natural Resource Identifier* or *Cultural Resource Identifier* to link them to a specific resource. Data that may be reported about a permit include the authority issuing the permit, link to the permit, and issue date.

6.4.4 Cultural Resource Permit [Table] and Natural Resource Permit [Table]

Permits may require specific actions taken, such as the payment of fees, or the performance of covenants. Data about actions taken can be depicted using these tables in conjunction with the related concepts *Cultural Resource Permit Identifier* or *Natural Resource Permit Identifier*, to associate the action taken with a specific permit. Again, these are typed dimensions as there can be any number of actions.





6.5 Zoning Permits

6.5.1 Zoning Permit [Table]

This table, depicted below, is used to represent information about various types of zoning permits which may be needed for a site or system. Zoning permits may be used for different aspects of a system, such as the plant, the gen tie line, or the substation. A data type can be used to describe this called zoningPermitPropertyItemType. Another data type is available to represent the status of zoning permit fees, and is also shown on the diagram below.

The *Zoning Permit Identifier [Axis]*, on the *Zoning Permit [Table]* is a typed dimension, to accommodate multiple permits. This axis can be used in conjunction with the *Site Identifier* to connect the permits to a specific site. Many concepts are string elements, for example *Zoning Permit Authority*. Boolean elements are identified with the term “Flag” in the standard label.

Boolean elements, such as *Zoning Permit Renewable, Flag* should be reported as TRUE if the condition is available, e.g., the zoning permit can be renewed.

6.5.2 Zoning Permit Documents [Table]

The table below contains the *Zoning Permit Documents [Axis]*, which is a typed dimension that accommodates multiple documents associated with a specific permit using the *Zoning Permit Identifier*; and can also be associated with a specific site, by using the *Site Identifier*.

6.5.3 Zoning Covenants [Table]

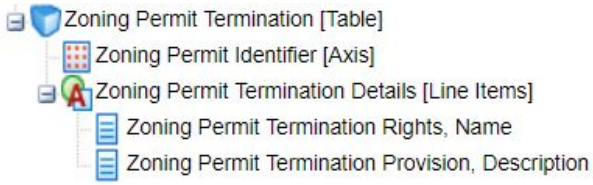
This table contains two axes to accommodate multiple covenants and permits. The *Zoning Covenants [Axis]* is the primary key to the table; the *Zoning Permit Identifier [Axis]* is the secondary key.

The table below shows how the *Site Identifier [Axis]* and *Zoning Permit [Axis]* can be used on a table to identify pertinent information.

Zoning Permit Identifier [Axis]	Site Identifier	Zoning Permit Type	Zoning Permit Property	Zoning Permit Renewable	Zoning Permit Issue Date
1	A	Special use	substation	TRUE	Feb 8, 2017
2	A	Conditional Use	Gen tie	TRUE	March 15, 2017
3	B	Special use	plant	FALSE	January 12, 2005

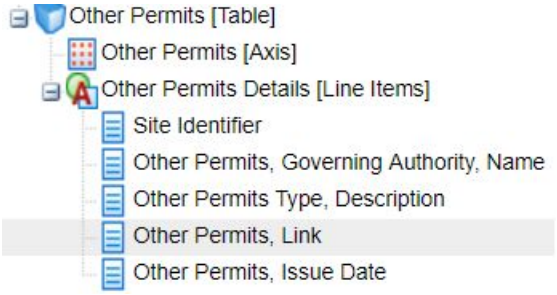
6.5.4 Zoning Permit Termination [Table]

This table contains only a *Zoning Permit Identifier [Axis]* as there may be many zoning permits, but only one termination per permit.



6.6 Other Permits [Table]

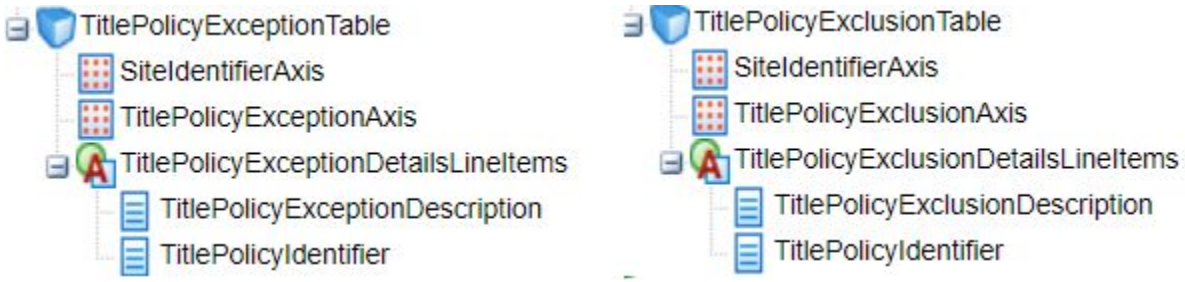
This table contains other types of permits, such as electrical or construction permits necessary for the system or site. To capture this information the *Other Permits [Axis]* can be used in conjunction with the concept *Site Identifier*. This table uses a typed dimension and is found in the Data - Site and Process - Project Financing groups.



6.7 Title Policy Exception [Table] and Title Policy Exclusion [Table]

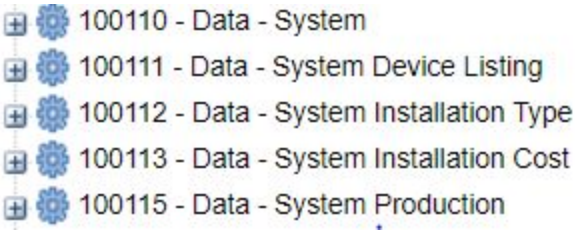
A title is a bundle of rights in a piece of property in which a party may own either a legal interest or equitable interest. These tables, which are shown below, are used to describe liens, encroachments, easements, or other exceptions or exclusions to a title policy.

The *Title Policy Exception [Axis]* and *Title Policy Exclusion [Axis]* are used in conjunction with the Title Policy Identifier concept to link the exclusion or exception to the title. The *Site Identifier [Axis]* can be used to link multiple title policies with multiple sites. These are typed dimensions and are also found in the Process - Project Financing group.



7 Data-System Entry Point

The Data - System entry point is designed to represent all concepts related to a system (plant), and can be used to create a data collection infrastructure. This entry point contains descriptive information about the system, including production, cost, important dates, design and modeling, installation, and equipment-related data. Because of the complexity of the various elements used to describe a system, the Data - System entry point is broken into five groups as seen in the diagram below.



Components of a system are represented in the Taxonomy at three levels:

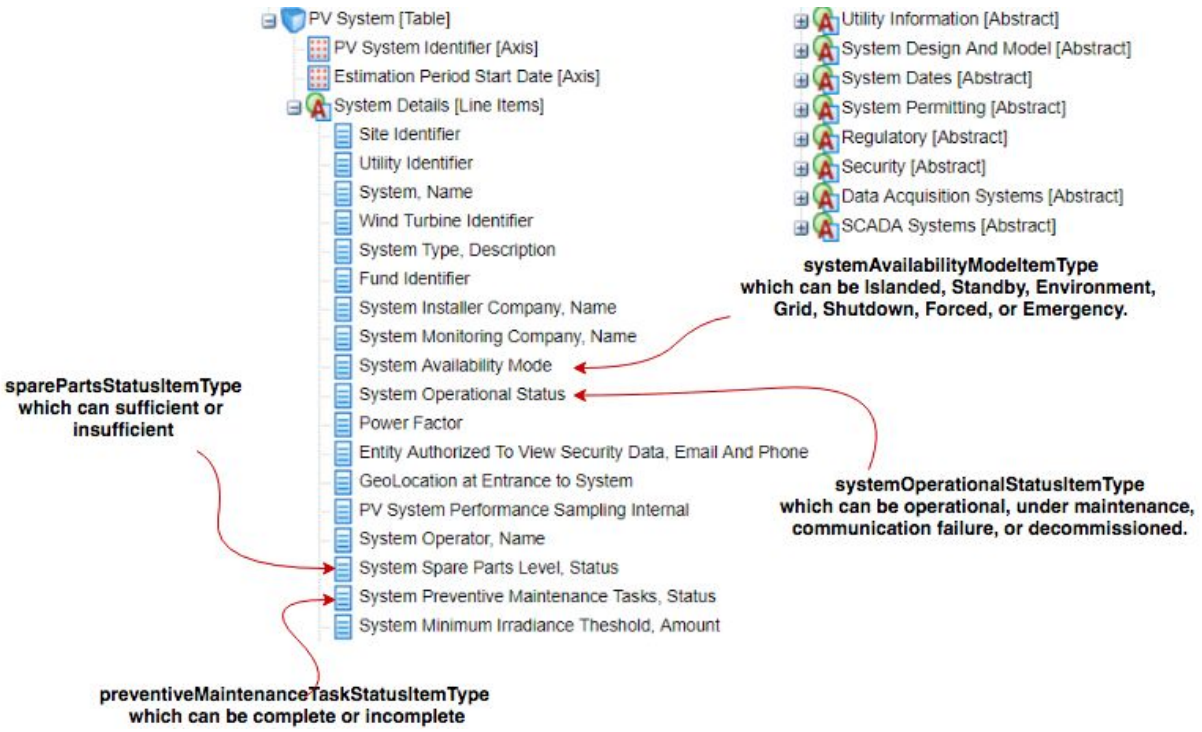
Level	Description	Examples
Equipment	Categories of equipment such as inverters, modules, combiners or transformers. A category such as “inverter” can apply to any combination of inverter products or models.	Inverter, Module, Combiner, Transformer
Product	Specific products	Sunny Boy Inverters, Enphase Microinverters
Device	Specific device or component that may be used in a system	Sunny Boy Inverter Model Number 3.0-US 208, serial number 123456789.

Each of these levels is important and will be referenced throughout this Guide. This next section describes the various tables available in the Data - System group.

7.1 PV System [Table]

All concepts in the Data - System group can be used with the *PV System [Axis]* as shown in the diagram below, to identify individual systems. The *PV System [Axis]* is the primary key to this table and is a typed dimension, as there can be an infinite number of systems or plants represented on the *PV System [Axis].* The *Site Identifier* concept can be used with the *PV System [Axis]* to connect the system to a specific site. Concepts with enumerated lists for system operational status and system mode are noted on the diagram. This table is also found in the Data - Operational Performance and the Process - Project Financing entry points as well.

The abstracts noted on the right side of the diagram below are described in greater detail below the diagram.



PV System Identifier [Axis]	Site Identifier	System Operational Status	System Availability Mode
1	A	operational	Grid
2	B	operational	Standby
3	C	decommissioned	Islanded
4	D	operational	Standby

7.1.1 Utility Information [Abstract]

This abstract contains basic information about the utility related to the system. Additional utility-specific information can be found in the Data - Utility entry point.

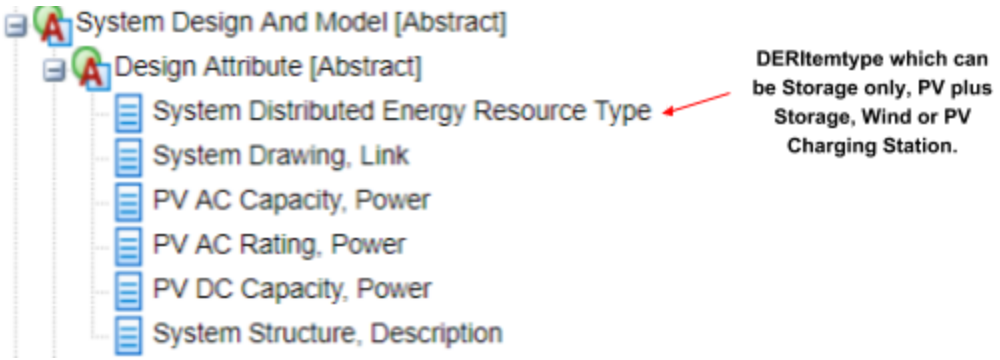
7.1.2 System Design and Modeling Information [Abstract]

The *System Design and Model [Abstract]* is used to report information about the design of the plant and contains two sub-abstracts which are described below. These elements can be used when reporting on the design model and assumptions made about the system. They are also useful when conducting testing, and when preparing information needed for a system-level certificate such as IECRE.

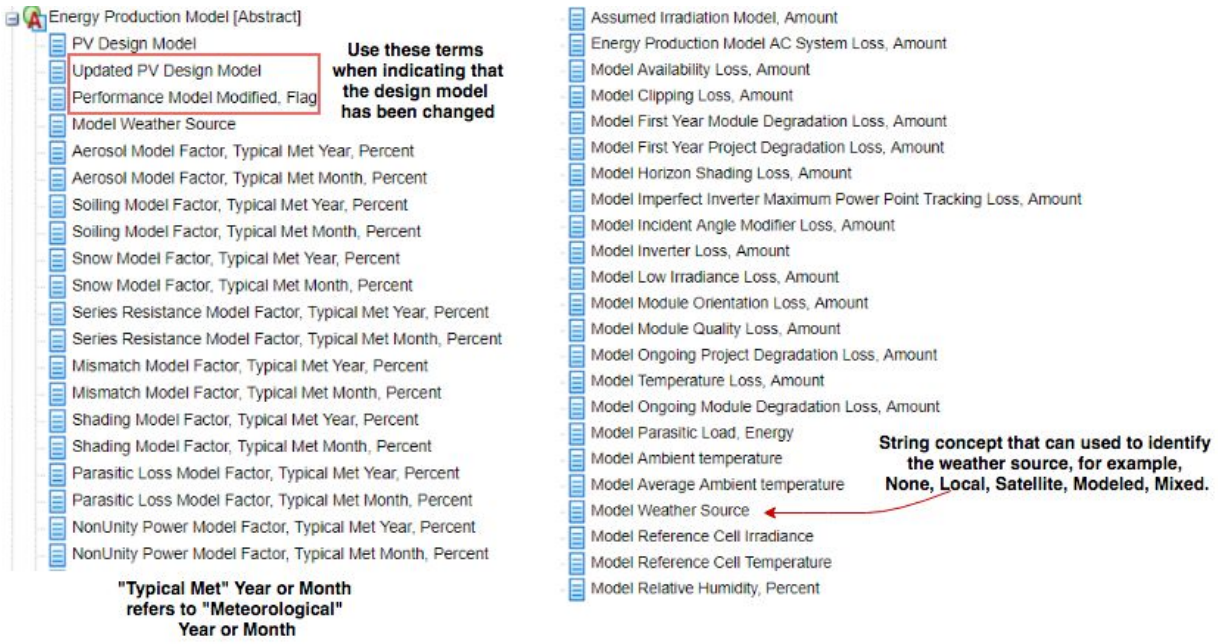
The *Design Attribute [Abstract]* contains elements to represent the design of the solar installation. *System Distributed Energy Resource Type* is an enumerated list.

System Structure is a string element which can be used to characterize the system, for example the system is a carport, ground mount, or rooftop. This element should be used when characterizing a single system, and where detailed installation information is not needed. The *Installation Type [Table]*, which is described later in this document, provides another means to report installation data about more than one system, with more detail around the roof and mounting types.

Other elements provide concepts to capture capacity data based on the design of the system.



The *Energy Production Model [Abstract]* below, contains information about the system design model selected. The concept PV Design Model is a string element that can be used to report the type of design such as PVSyst, PVWatts, Sam or some other design model. In the event that the design model has changed, preparers should use *Updated PV Design Model*, to indicate the revised design model being used. Preparers should also use the boolean element *Performance Model Modified, Flag* and tag the value as TRUE. These elements are shown in the red highlights box below.



Other concepts included in this abstract are various energy production loss factors, for soiling, snow, mismatch, module degradation, low irradiance, and shading, driven by the design model chosen. Some concepts, like *Snow Model Factor, Percent*, are used to tag the *percent* of kWh lost due to a specific loss factor, and should be reported for a typical meteorological year or month. A typical meteorological year (TMY) or month (TMM) represents a selected range of weather data for a specific location with values for solar radiation and meteorological elements over that time period. Percent model loss factors are shown in the red box in the first column of the diagram below. For each loss factor, there are two elements, for example, *Soiling Model Factor, Typical Met Year, Percent*, and *Soiling Model Factor, Typical Met Month, Percent.*

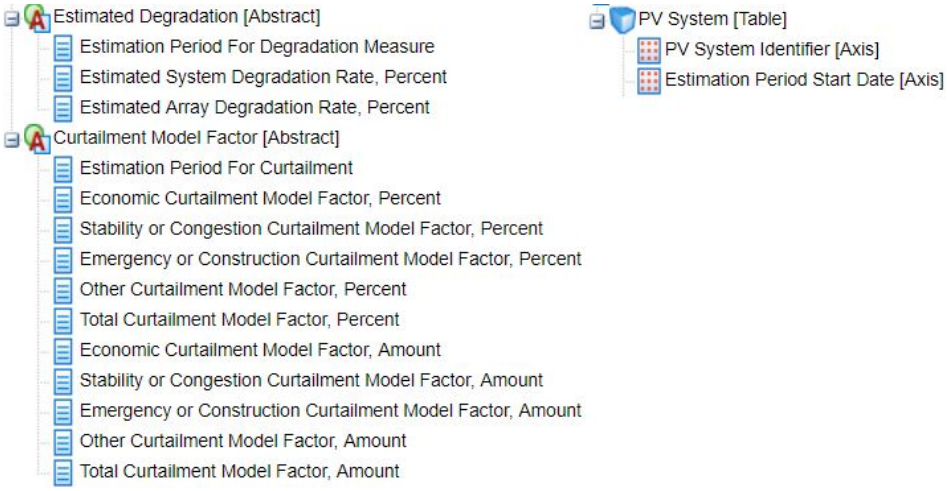
A second set of loss measures, shown in the right side column of the diagram above, are used to report the amount of energy loss, such as *Model Horizon Shading Loss, Amount.* These values must be reported using units of kWh or MWh.

Additional concepts are shown in the right side column that can be used to tag temperature, humidity and irradiance values.

7.1.3 Reported Estimated Curtailment and Degradation Over Time

Curtailment and degradation rates can vary over time and therefore are not reported for typical meteorological years or months. Rates need to be estimated for future dates with values that can vary over time. To handle this situation, use the *Estimation Period Start Date [Axis]* shown

on the diagram on the right, in conjunction *Estimation Period for Degradation Measure* or the *Estimation Period for Curtailment* concepts.

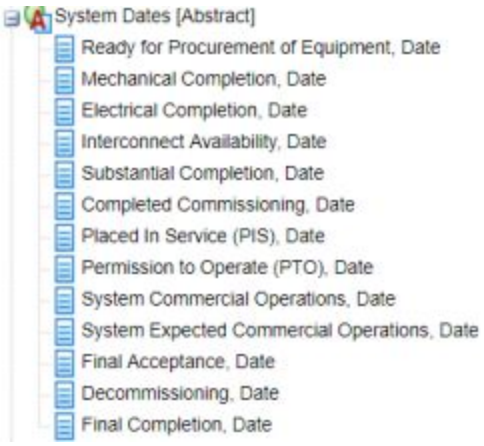


The axis identifier should be the starting date for the period of estimation and the end point defined by the length of the estimation period. For example, if the *Estimation Period Start Date [Axis]* = 2020-01-01, and the *Estimation Period for Curtailment* = P1M, to represent one month, then the value would be reported over the period from January 1 to January 31, 2020.

PV System Identifier [Axis]	Estimation Period Start Date [Axis]	Estimation Period For Curtailment	Economic Curtailment Model Factor, Percent	Stability or Congestion Curtailment Model Factor, Percent
AA	2019-01-01	P1M	2%	1%
AA	2020-01-01	P1M	5%	3%
BB	2019-01-01	P1M	0.5%	4%

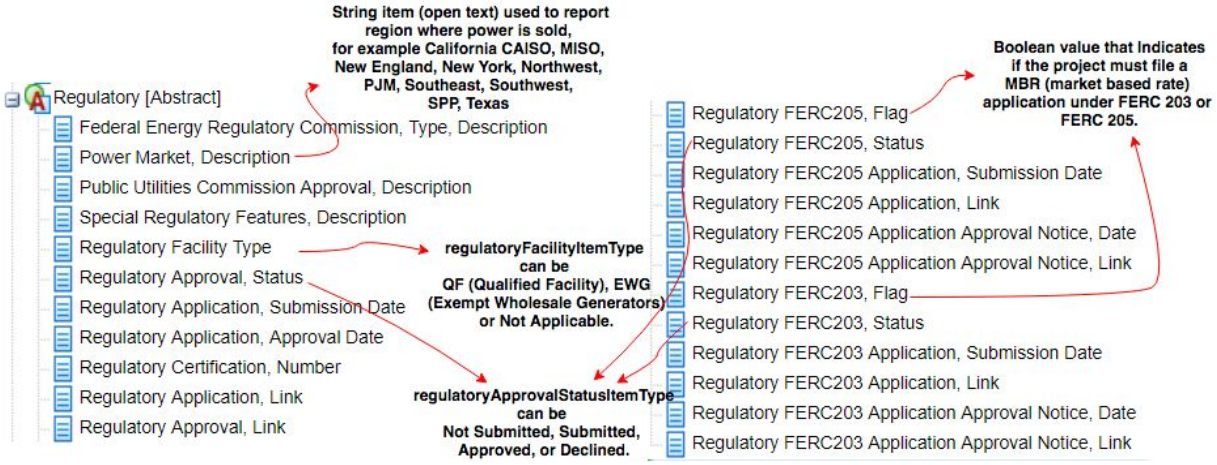
7.1.4 System Dates [Abstract]

The *PV System [Table]* also allows for the reporting of important dates during the construction process such as *Mechanical Completion Date*, and *Placed In Service (PIS), Date.* These can be seen on the diagram below *System Dates [Abstract]*. Important dates can be linked to the system by using the *PV System Identifier [Axis]*.



7.1.5 Regulatory Information [Abstract]

The *Regulatory [Abstract]* shown in the diagram below, contains concepts that can be used to tag data about FERC regulatory requirements including FERC 205, which concerns public utility filing of rates, terms, and conditions for interstate electricity transmission and wholesale electricity sales; and FERC 203, regarding the transfer of equity interests that effect a change in control of a US power plant that is used to sell power in to the wholesale electricity market. Data reported about regulatory information can be linked to the relevant solar system by using the *PV System Identifier [Axis]*.



7.1.6 Security [Abstract]

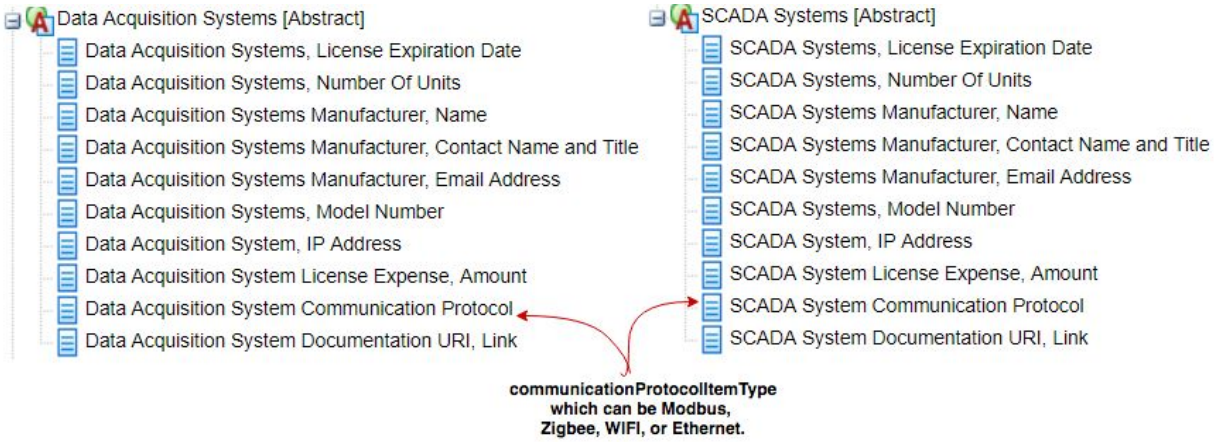
The *Security [Abstract]* contains concepts for data about the security company engaged for the system, such as security company contact information and various associated costs. The *Data Acquisition System [Abstract]* contains concepts to tag data about the DAS manufacturer and

equipment. Data reported about the security company can be linked to the relevant solar system by using the *PV System Identifier [Axis]*.

7.1.7 Data Acquisition [Abstract] and SCADA Systems Information [Abstract]

These two abstracts are also on the *PV Systems [Table]* and are used to represent values reported about a Data Acquisition System, which is an application that collects data about the plant's physical and electrical characteristics, as well as environmental conditions; and a SCADA system, which is a monitoring and data collection application. Some solar energy systems may have both a DAS and a SCADA system.

DAS and SCADA are not considered part of the system itself, therefore they are not included on the *Equipment Type [Axis]*, along with equipment such as inverters, modules, optimizers, etc. Data reported about a DAS or SCADA system can be linked to the relevant solar system by using the *PV System Identifier [Axis]*.



7.2 Product Identifier [Table]

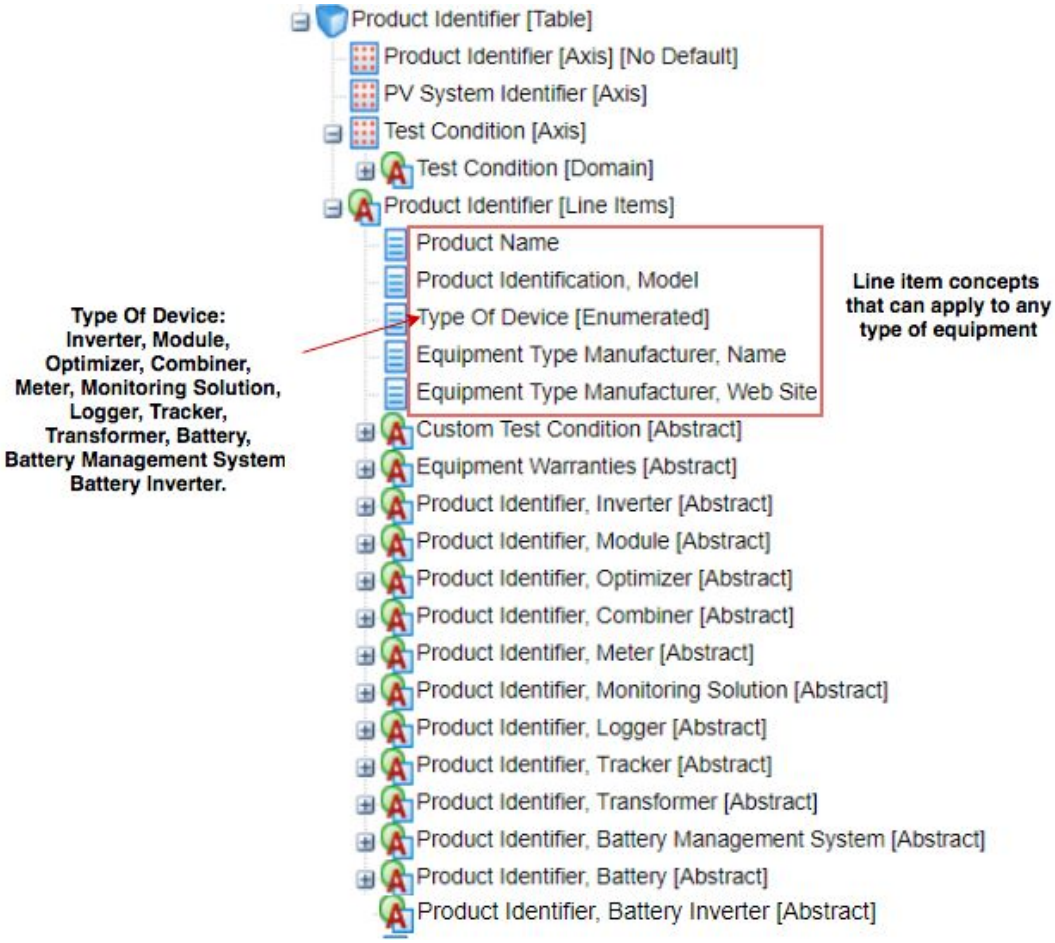
This table uses a typed dimension on the *Product Identifier [Axis]* as the primary key to represent individual products used in the system, for example Sunny Boy Inverters, or Enphase Microinverters. The *PV System [Axis]* is available to relate a product to a specific system as the

secondary key. The *Test Condition [Axis]* can be used to associate a value with a particular type of testing condition which will be covered in greater detail later in this section.

The *Product Identifier [Table]* can be used to tag information about individual products used in one or more systems, or a manufacturer cut sheet. A separate Cut Sheet Entry Point to the Taxonomy is also available. Line item concepts on this table represent general information which can be reported about any type of equipment, such as product name, model, and equipment manufacturer, as shown on the diagram below.

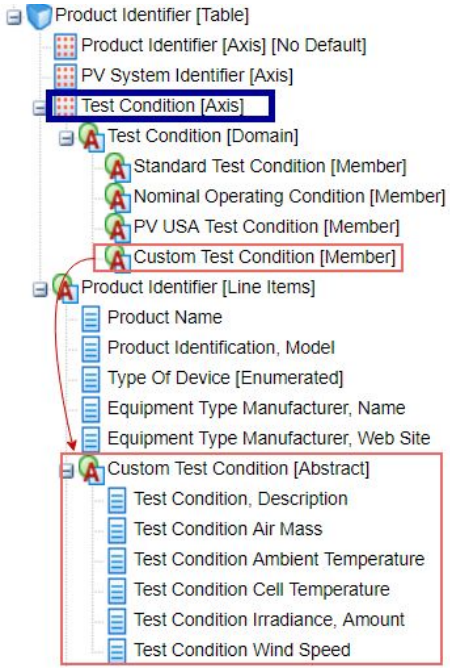
The concept *Type Of Device*, is an enumerated listing that contains a finite set of equipment types which are drawn from the *Equipment Type [Axis]*. This axis uses an explicit dimension because there is a finite set of equipment types comprise the system, such as inverter, transformer, optimizer, and module. These equipment types are members on that axis and are shown on the diagram.

The Product Identifier abstracts shown further down on this table, such as *Product Identifier, Inverter [Abstract]* and *Product Identifier, Module [Abstract]* contain additional concepts that are specific to that type of equipment. These sections will be covered later in the Guide.



7.2.1 Using Test Conditions

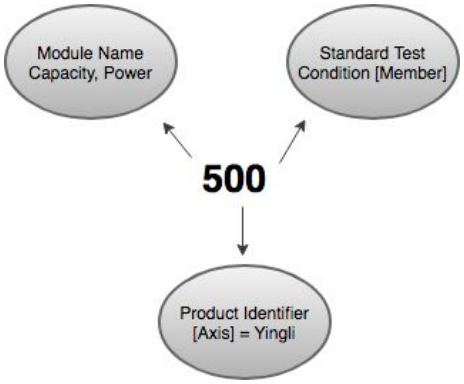
The *Test Condition [Axis]*, highlighted in blue on the diagram below, allows preparers to indicate if test conditions were in place when a value was reported. Test condition members included on the axis are *Standard Test Condition [Member]*, *Nominal Operating Condition [Member]*, or *PV USA Test Condition [Member]*.



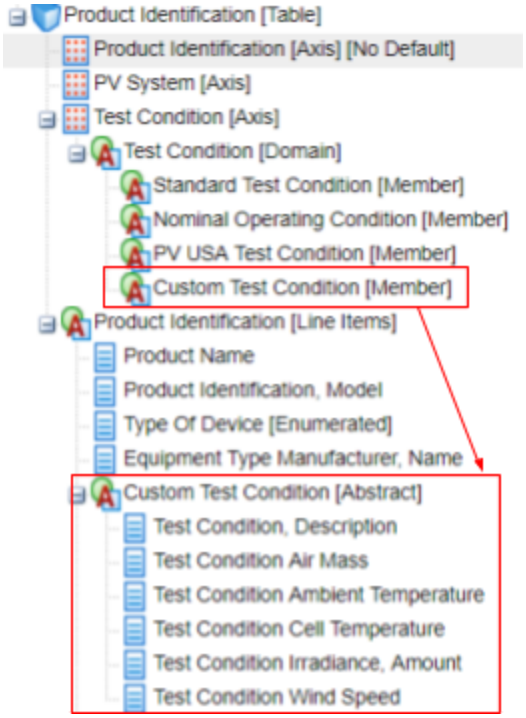
For example, a preparer may wish to report a value using the concept *Module Nameplate Capacity, Power* under STC (Standard Test Condition). To do so, they should use the concept *Module Name Capacity, Power,* along with the *Standard Test Condition [Member]* (which is on the *Test Condition [Axis]*), with the *Product Identifier [Axis]*. The intersection of these three concepts embed metadata into the reported value that properly conveys its meaning, as shown in the table below which shows sample data that could be reported using this table.

Product Identification [Axis]	PV System Identifier [Axis]	Test Condition [Axis]	Module Name Capacity, Power
Module	AA	Standard Test Condition	50
Module	BB	PV USA Test Condition	100

The combination of the three concepts ensures that the end user has a clear and unambiguous understand of the meaning of the value 500.



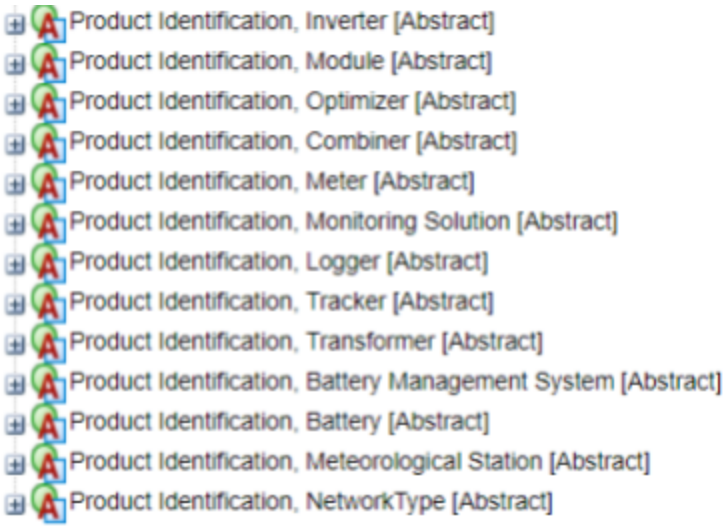
If one of the three traditional test conditions available do not apply, the preparer can create a Custom Test Condition by selecting the *Custom Test Condition [Member],* and tagging values used during the test for air mass, cell temperature, ambient temperature, irradiance, and wind speed with the appropriate concept as shown on the diagram below.



While product name, model and manufacturer name are consistent across all types of equipment, additional data may need to be reported that is specific to the type of equipment. For example, inverter manufacturers can obtain different kinds of certifications; and an inverter can have features such as built-in metering, or ground fault monitoring. These features are not applicable to other types of equipment like modules or combiners.

Modules (solar panels), on the other hand, have features which may include fire rating, front material, or junction box rating. These features do not apply to other types of equipment like inverters. Equipment-specific line items are contained in the Product Identification abstracts for each equipment type such as *Product Identification, Inverter [Abstract]* and *Product Identification, Module [Abstract]*.

The image below shows Product Identification abstracts that can be disaggregated to display additional concepts specific to a type of equipment. This section covers some of the more significant equipment categories.

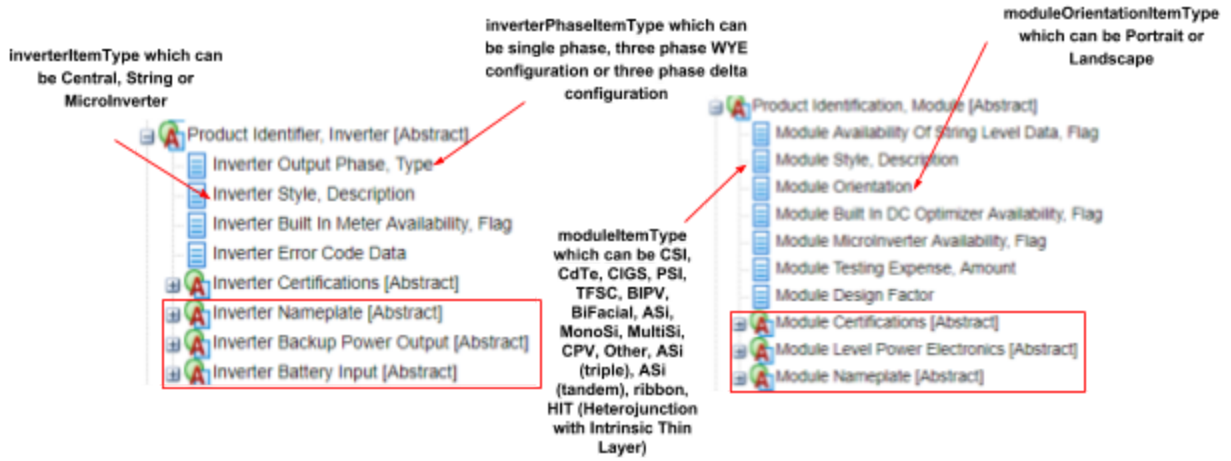


7.2.2 Inverter [Abstract] and Module [Abstract]

The inverter and module abstracts as shown on the diagram below contain concepts that are specific to these equipment types. Both have abstracts containing content related to certifications, nameplate characteristics, and other topical areas (in red highlight boxes on the diagram below).

Concepts to describe the technical “style” of inverters and modules are available as enumerated lists. *Module Orientation* and *Inverter Output Phase, Type* are also enumerated concepts.

Boolean concepts are also used to represent inverter- and module-specific features and are identified in the standard labels used as “Flag”.



7.2.2.1 Certifications

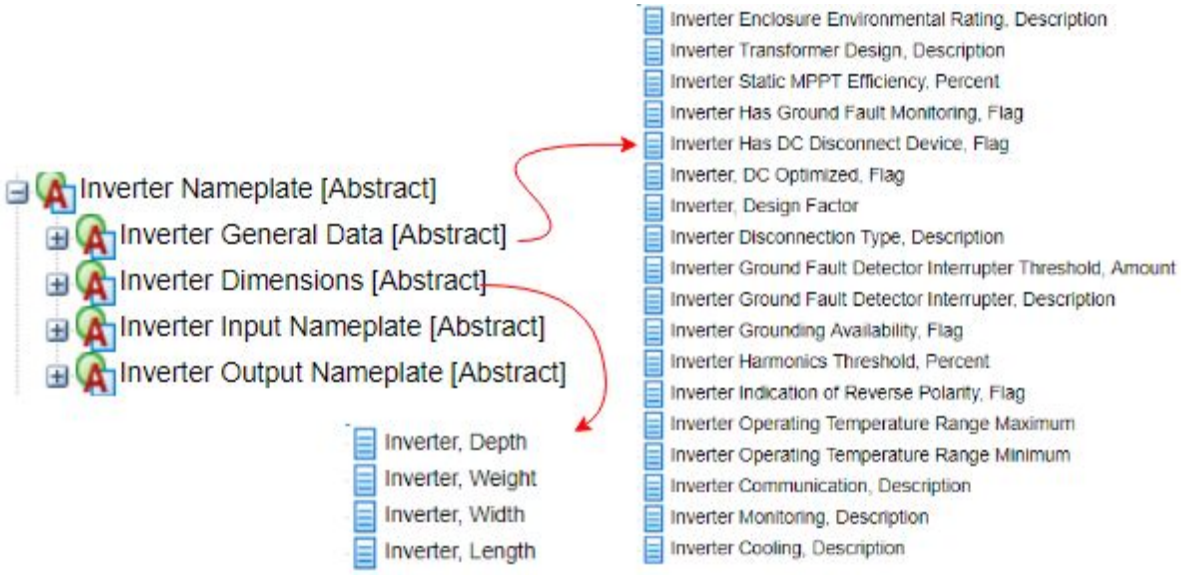
Inverter and module equipment manufacturers can obtain various certifications which may be reported on a cut sheet. These are boolean elements such that values reported for these concepts are TRUE if the certification is available, and FALSE if it is not. The certifications covered may not be exhaustive (there may be additional certifications that were not identified at the date of Taxonomy release). In the event that a preparer needs to report a different certification, two additional concepts, *Module Has Certification Other, Description* and *Inverter Has Certification Other, Description*, are included as string concepts, to allow preparers to list additional certifications beyond those available in the Taxonomy.

In some situations, a preparer may need to report a listing of all certifications available for a module or inverter. To handle such a situation, *Module Certification Listing, Description*, and *Inverter Certification Listing, Description*, are available to allow preparers to tag a listing of certifications as a string element.

7.2.2.2 Nameplates

Modules and inverters have a number of nameplate-specific data fields which can be used for cut sheets and other applications.

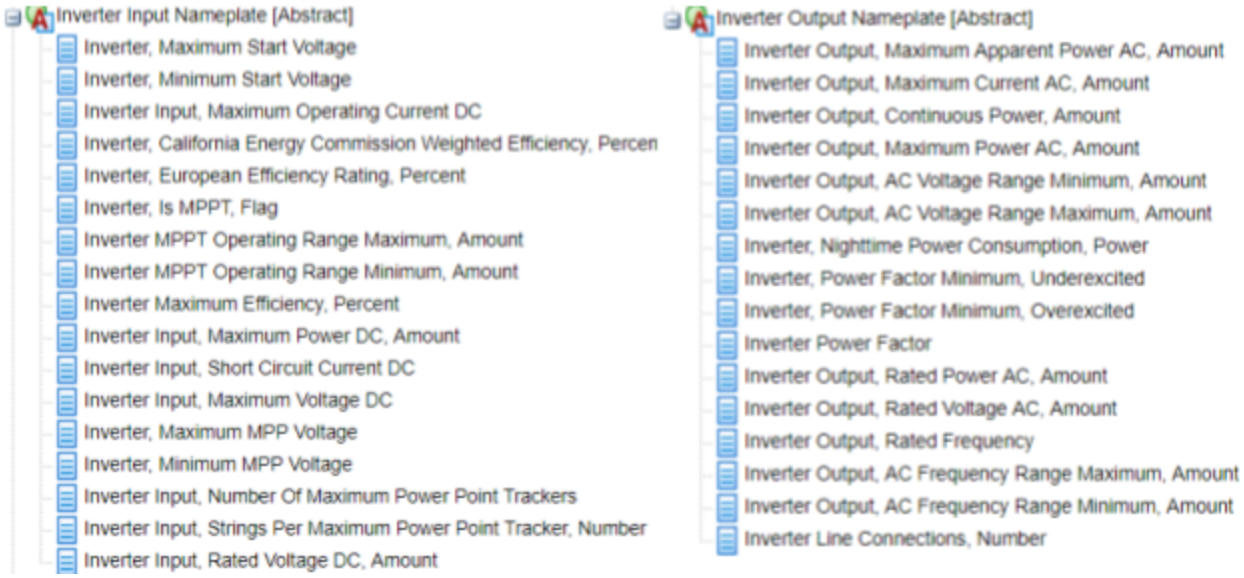
The *Inverter Nameplate [Abstract]* has further sub-abstracts as shown on the Taxonomy diagram below.



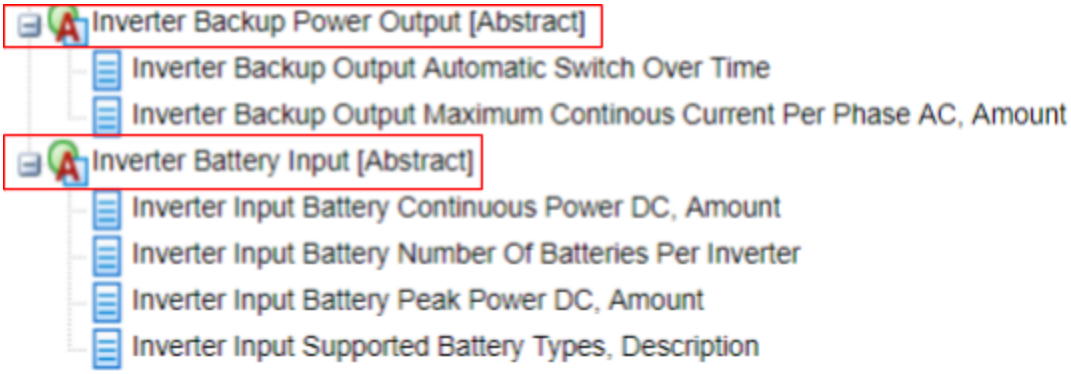
Many of the concepts in the *Inverter General Data [Abstract]* are boolean such as *Inverter Has Ground Fault Monitoring, Flag*, which should be used with a value of TRUE or FALSE. The *Dimension [Abstract]* contains concepts for depth, height, length and width - items commonly found on manufacturer cut sheets.

Input and Output Nameplate characteristics for inverters are split into these two topical areas for ease of identification. The *Inverter Input Nameplate [Abstract]*, as shown on the left side of the diagram below, contains concepts to represent data reported about DC current and voltage coming into the inverter. It also includes various efficiency ratings and boolean elements to indicate if the inverter is at MPPT (Maximum Power Point Tracking) and other MPPT-related concepts. The *Inverter Output Nameplate [Abstract]* on the right side of the diagram below contains concepts to represent current and voltage in AC produced by the inverter. The *Inverter Output Nameplate [Abstract]* also includes concepts such as nighttime power consumption, power factor and frequency.

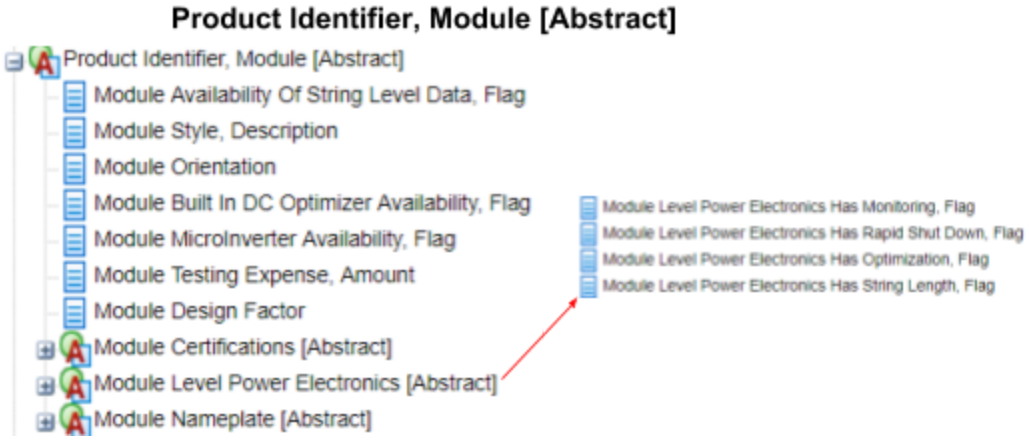
Inverter Input and Output Abstracts



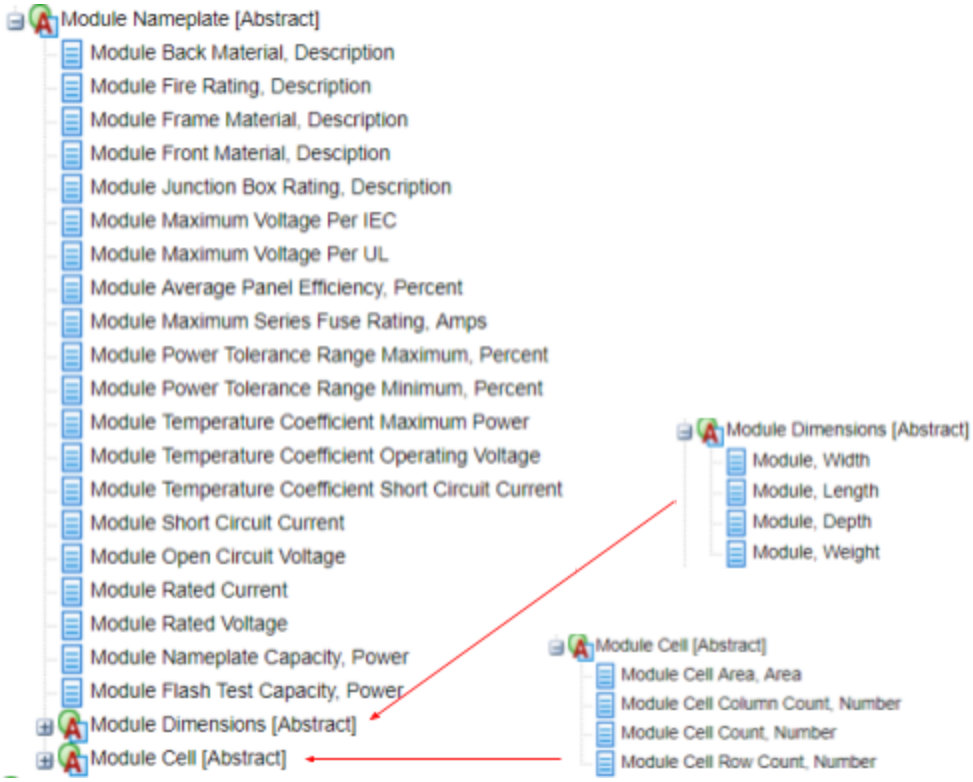
The *Inverter Nameplate [Abstract]* also contains sub-abstracts to represent information about battery output power, and battery input. These abstracts contain elements as shown in the diagram below.



The *Product Identifier Module [Abstract]*, depicted below, contains concepts that are typically found on a module manufacturer's cut sheet. In addition to the certifications abstract, there is an abstract for Module Level Power Electronics (MLPE) which contains boolean elements indicating if the MLPE has monitoring, rapid shutdown, optimization, or string length.

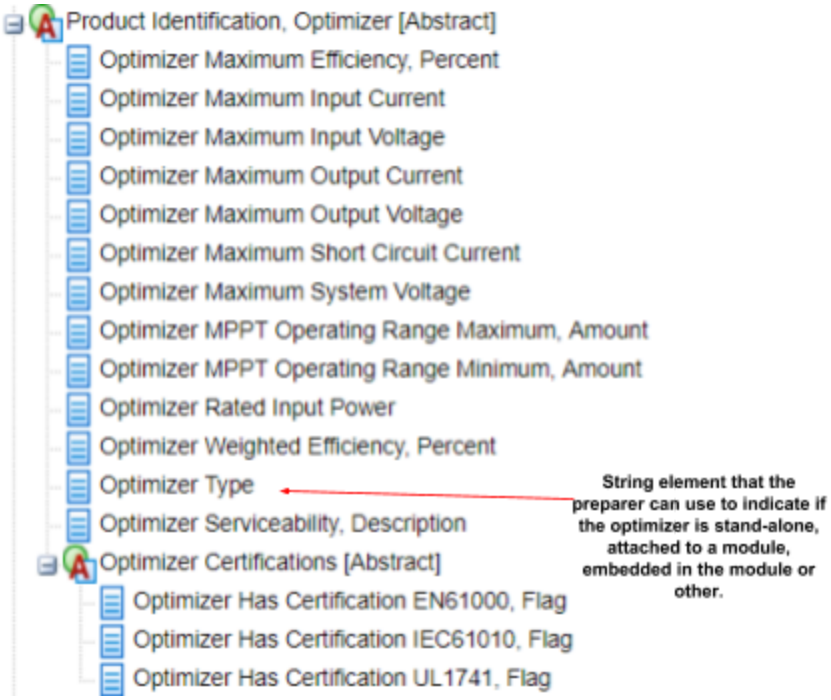


Module Nameplate characteristics contains descriptive information about the materials used in the module, various ratings, tolerance, and temperature data. There are also concepts to capture data about the dimensions of the module, and data about the physical structure of the cells such as area and count, that comprise the module.



7.2.3 Optimizers

DC optimizers also have many product-specific characteristics which may be used in a manufacturer cut sheets as shown below. Optimizer certifications are also boolean elements which should be tagged as TRUE if the optimizer has the certification, FALSE if the optimizer does not. The concept *Optimizer Serviceability, Description* is a string element used to indicate the level of difficulty in servicing the optimizer, for example, a stand-alone unit can be easily replaced, a unit attached to a module may be replaced in the field, and an embedded device cannot be serviced separate from the module.



7.2.4 Other Equipment Types

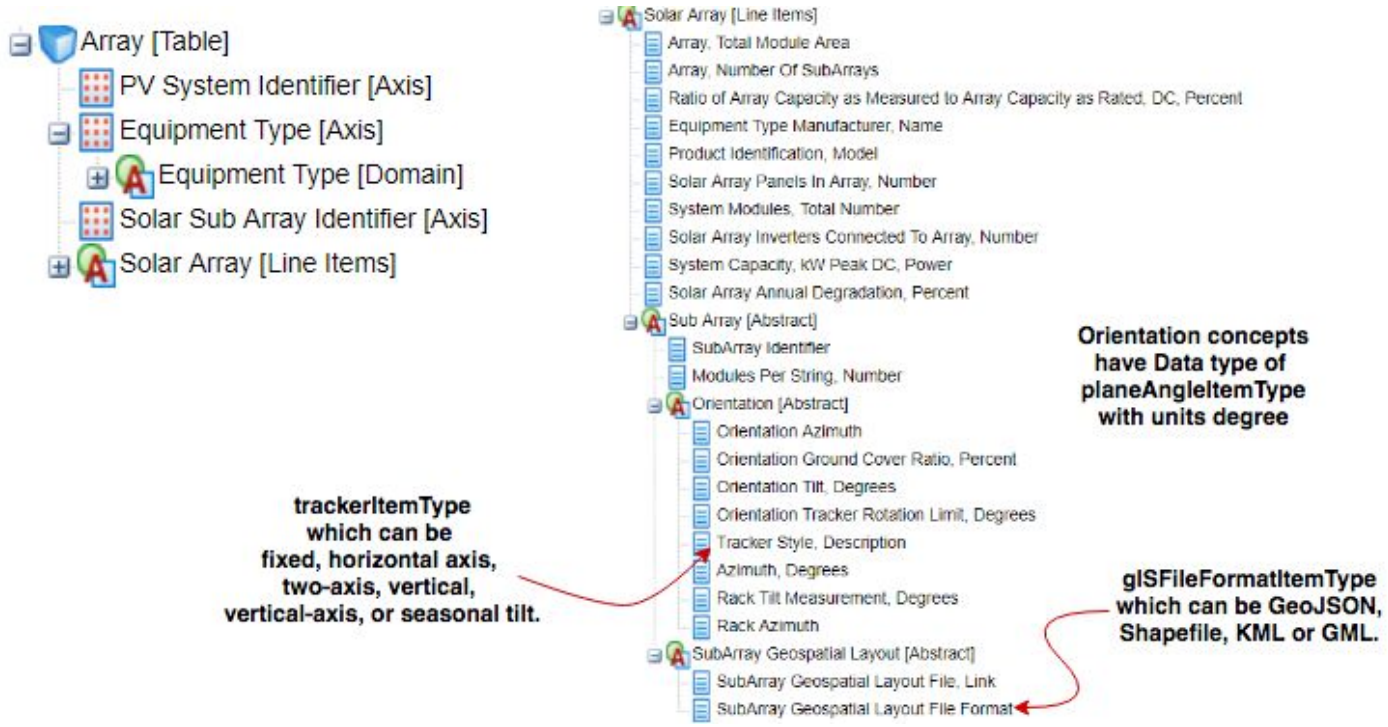
Equipment-specific concepts are also available for other pieces of equipment including combiners, transformers, meter, monitoring solution, logger, tracker, meteorological station, network type, battery, and battery management system. The coverage is less detailed than that for inverters, modules, and optimizers.

7.3 Array [Table]

This table represents information about the array and the sub-arrays that comprise the array. It can be used to build a database connecting the array to the system and the components of the array. A solar array is the totality of solar cells, modules, and panels. A PV system is the totality of every component in the system, including balance-of-system components, which are what safely converts DC power to AC power. Sub-arrays are PV surface units made up of the same type of modules mounted together at the same angle and orientation.

The *Array [Table]* uses two typed dimensions, which can be used to represent systems (*PV System Identifier [Axis]*), and sub-arrays (*Solar Sub Array Identifier [Axis]*). It also has one explicit dimension (*Equipment Type [Axis]*) to represent equipment types such as inverters, modules, and mounting equipment that are part of the array. The availability of these axes allow preparers to create database structures linking an array to the PV system and to one or many sub-components including inverters, modules, and mounting.

The line items captured on this table are broken into those associated with an array and those associated with a sub-array, as shown in the diagram below. Concepts about sub-arrays are further grouped by orientation and by geospatial layout.



Here are some examples of how this table can be used to tag specific values that need to be reported:

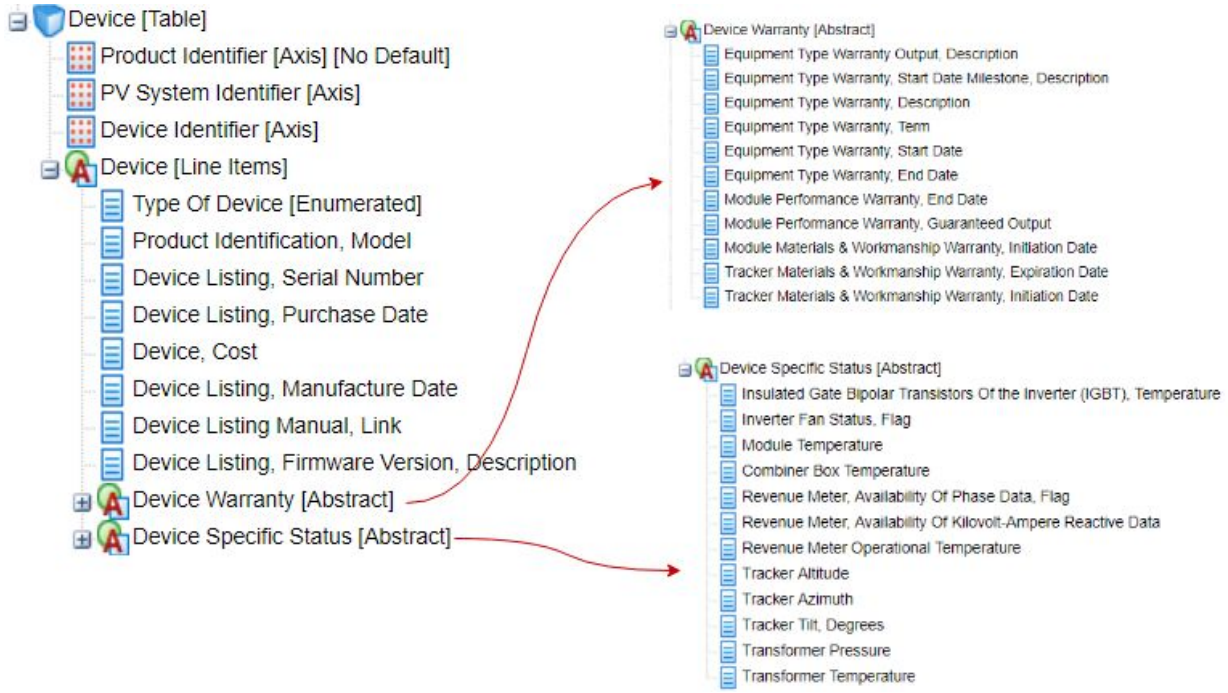
Reported Value	Orange Button concepts
Total number of modules in an array within a specific system	System Modules, Total Number PV System Identifier [Axis]
Name of the manufacturer of the modules within a specific system	Equipment Type Manufacturer, Name Equipment Type [Axis] = ModuleMember PV System Identifier [Axis]
Geospatial layout of a specific sub-array with a specific system	SubArray Geospatial Layout File Format Solar SubArray Identifier [Axis] PV System Identifier [Axis]

7.4 Device Listing [Table]

Note that this table is contained in a separate group - *100111-Data-System Device Listing*, although it is considered part of the *Data-System* entry point.

As noted earlier, the term “device” is used to indicate a specific piece of equipment or component in a system, for example, a Sunny Boy brand inverter with serial number 12345. This table should be used to report information related to individual components. The *Device [Axis]* is the primary key for this table. Given that there can be an infinite number of individual components, it uses a typed dimension. The *Product Identifier [Axis]* should be used to identify the product, for example, Sunny Boy Inverter. The *PV System Identifier [Axis]* is also available to connect multiple devices to multiple systems.

The diagram below shows the elements available on this table. *Type Of Device* is an enumerated list of equipment types (for example, module, inverter, transformer, etc.), drawn from the *System Equipment [Axis]*. Values that can be tagged using this table are all component-specific, such as serial number, purchase date, and manufacture date. There are also elements to capture data related to the warranty for individual devices in the *Device Warranty [Abstract]*. The *Device Specific Status [Abstract]* contains elements about attributes of individual equipment components, such as temperature.

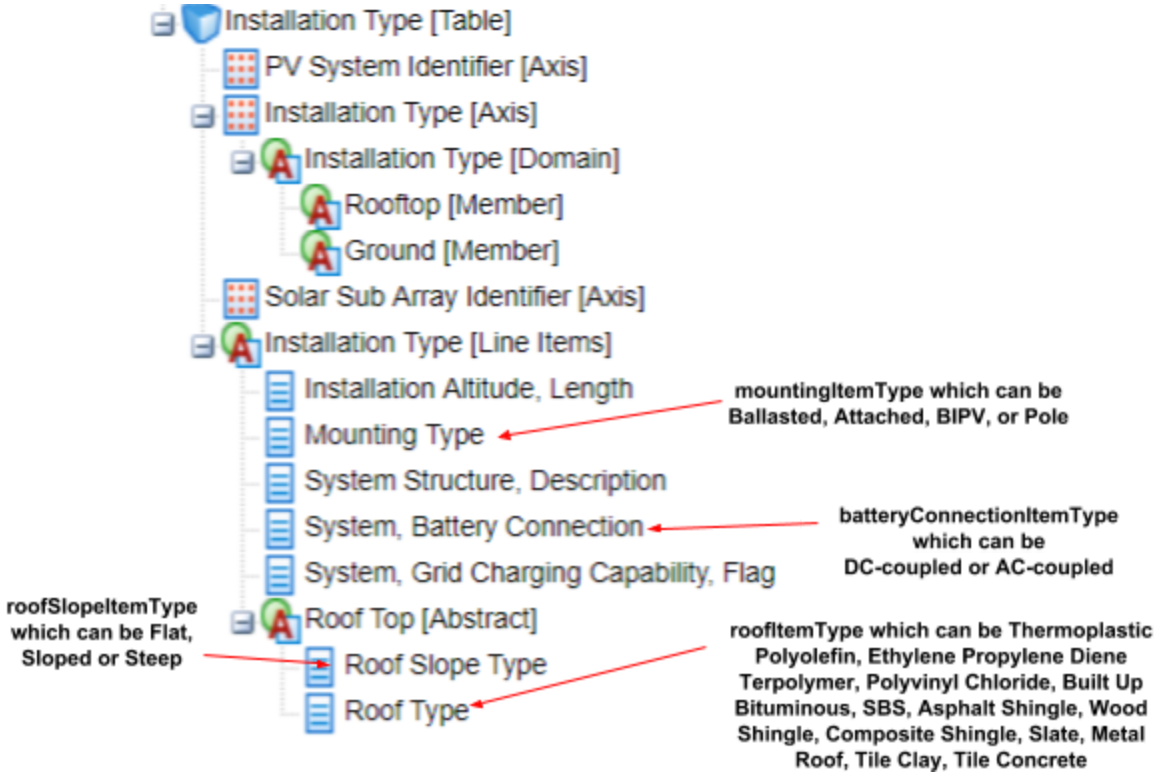


7.5 Installation Type [Table]

Note that this table is contained in a separate group - *100113-Data-System Installation Cost*, although it is considered part of the *Data-System* entry point.

This table is used to describe the type of installation of the system. It relies on the *Installation Type [Axis]* which is an explicit dimension with member options of Rooftop or Ground. The table also contains the *PV System Identifier [Axis]* so that multiple systems can be depicted on the table, matched up against each system's installation type.

The line items on this table include several enumerated values, along with other descriptive elements, as seen in the diagram below.



7.6 System Equipment [Table] in Data-System Installation Cost

Note that this table is contained in a separate group, *100113 Data-System Installation Cost* although it is considered part of the Data-System entry point.

The *System Equipment [Table]* used in this group, allows for the collection of installation costs for equipment used in the system. Note that this table re-uses the *System Equipment [Axis]* which is also used in many other areas in the Taxonomy. As noted earlier, the term “equipment” applies to categories such as “all inverters” or “all transformers”. It does not apply to individual devices or components, or to individual products. Therefore, this table is used to describe, generally, the aggregated costs for the inverters, modules, or other categories of equipment used in a system.

The *Equipment Type [Axis]* is an explicit dimension with members as shown above on the right side of the diagram. It can be used in conjunction with the *PV System Identifier [Axis]* to link multiple equipment types to a particular system.

Most of the line items have monetary data types to capture the value of the equipment installed, or integer data types to report the number of pieces of equipment used in a system, for example, the number of modules or the number of inverters. This table can be used to capture the total cost of devices in a system, or the cost by equipment type. The *Device Cost* Line item used with the *PV System Identifier [Axis]* is the total cost for all devices in the system at a point in time.

All the cost items in this table are values at a point in time, the aggregate of which will be the total asset value of the system, assuming that all costs are capitalized.

7.7 System Production [Table]

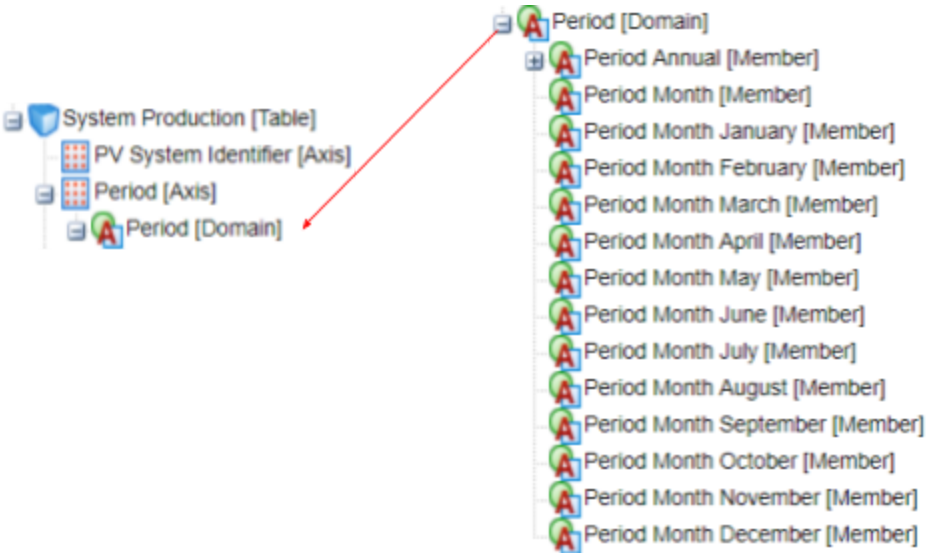
Note that this table is contained in a separate group - *100115-Data-System Production*, although it is considered part of the *Data-System* entry point.

This table captures information about power, energy, insolation, seasonal model factors, and nameplate data related to one or more systems. Production-related data can be reported annually, quarterly, monthly, or at higher levels of frequency. Orange Button covers most periodicity, however it does not handle minute by minute performance data. The *System Production [Table]* uses a typed dimension which can be used to represent multiple systems (on the *PV System [Axis]*); and it uses an explicit (pre-defined) dimension for period (on the *Period [Axis]*). Production data can also be reported as actual, predicted, or expected. Understanding how time periods are handled in the Taxonomy is critical to reporting values correctly and ensuring that creators and users have a consistent grasp on the meaning of the data reported. This next section handles that topical area.

7.7.1 Time Periods and Predictions

7.7.1.1 Period-independent Data

The *Period [Axis]*, shown on the diagram below, should be used to tag period-independent data which needs to be reported on an annual or monthly basis. A value tagged using the *Period [Axis],* has an associated date on which the value was reported, but the value itself is not related to that date.



For example, monthly kWh expected to be produced by the array in a typical January or typical February, can be reported by using the concept *Expected DC Energy At Array, Amount*, as shown below, in conjunction with the *Period [Axis]*. To report a fact that represents typical DC energy for any January, regardless of year, use *Expected DC Energy At Array, Amount* and *Period Month January [Member].* To connect the fact to a specific solar system, use *PV System Identifier [Axis].*

Expected DC Energy At Array, Amount

Labels

Type	Lang	Label
Standard Label	en	Expected DC Energy At Array, Amount
Documentation	en	Expected energy in DC kWh produced at the array. This element should be used with the PeriodAxis to indicate the period of measurement.

Another example of an element that can be used with the *Period [Axis]* is *Measured Average Insolation For Period*, which is shown below. For this concept, the use of the phrase "*For Period*" indicates to the Taxonomy user that the *Period [Axis]* may be appropriate. The definition specifies that "*To record the average insolation for Q1 for example this element would be used with the PeriodFirstQuarterMember on the Period Axis. If the period axis is not used this represents the insolation over the entire life of the project from activation date up to the contextual date*."

Measured Average Insolation For Period

Labels

Type	Lang	Label
Standard Label	en	Measured Average Insolation For Period
Documentation	en	Computed average insolation, for the period defined on the PeriodAxis over all years of operation since activation date in kWh/square meter. To record the average insolation for Q1 for example this element would be used with the PeriodFirstQuarterMember on the Period Axis. If the period axis is not used this represents the insolation over the entire life of the project from activation date up to the contextual date.

There are, however, situations in which a fact is period-independent, but does not need to be used with the *Period [Axis]*. Some concepts in the Taxonomy are, by default, period-independent, for example, string concepts such as model number, serial number, and product name. Concepts such as *PV AC Capacity, Power*, as shown below, are also period-independent, as this is used to tag the expected capacity of the system. The values reported for these concepts are, be default, not associated with a specified time period, therefore, the *Period [Axis]* should not be used.

PV AC Capacity, Power

Labels		
Type	**Lang**	**Label**
Standard Label	en	PV AC Capacity, Power
Documentation	en	Total AC Capacity of the system based on the design of the system and the manufacturer's expected capacity (calculated as DC X (1-derate factor)).

7.7.1.2 System Lifetime Measures

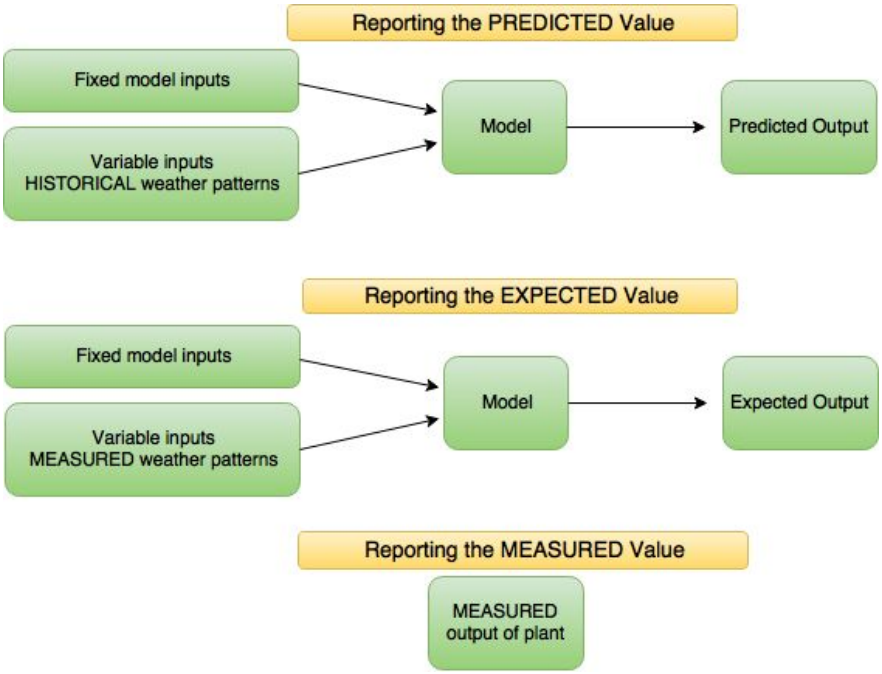
Often solar participants are required to report data over the **lifetime** of the system. The "lifetime" time period is depicted in the Taxonomy with the descriptor inception-to-date, such as *Measured Insolation To Weather Adjusted Insolation, Inception To Date, Percent,* as shown in the diagram below.

Expected Energy At Revenue Meter, Inception To Date, Amount

Labels		
Type	**Lang**	**Label**
Standard Label	en	Expected Energy At Revenue Meter, Inception To Date, Amount
Documentation	en	Expected Active Electrical Production at the revenue meter for indicated time period in kWh per IEC 61724-3 using measured weather data during times of availability and including adjustments for parasitic losses. See Section 6.6.6 of IEC 61724-3. Measured from inception to date.

7.7.1.3 Actual, Predicted, and Expected Production Data

Production data like energy and insolation can be reported as actual, predicted, or expected. The term "predicted" in the Orange Button Taxonomy, is defined as predicted performance based on historical weather patterns and system design; "expected" is defined as expected performance based on measured weather patterns and system design; and, "measured" indicates actual. These terms are used extensively in the *System Production [Table]*.



7.7.2 Insolation Measures

The *System Performance Insolation Measures [Abstract]* is used to report production of insolation, defined as the amount of solar radiation reaching a given area. The amount of insolation is measured using the *insolationItemType* which is reported using the units - kWh per square meter.

Insolation can be reported as period-independent, for example, “the insolation in March is usually …” by using the concept *Measured Average Insolation For Period*, along with the *Period [Axis]*. Actual insolation can be reported over any time period by using the concept *Measured Insolation*. Expected system lifetime insolation should be reported using the concept *Expected P50 Insolation, Inception To Date*, where P50 is defined such that 50% of estimates exceed the P50 estimate (and by definition, 50% of estimates are less than the P50 estimate).

As noted earlier, IECRE standards are used in Orange Button, including the concepts *One Year In Plane Assumed Irradiation*, and *One Year In Plane Measured Irradiation*. The latter is shown below with the reference in the red highlight box.

One Year In Plane Measured Irradiation

Labels

Type	Lang	Label
Standard Label	en	One Year In Plane Measured Irradiation
Documentation	en	One-year in-plane measured irradiation, Hi, as described in IEC 61724-1 Ed. 2, in kWh/m2.

References

Type	Reference	
standard	Publisher	IECRE
	Document	IEC 61724-1 Ed. 2 in Table 10, Section 9.3 and Table 3, section 7 and as tabulated under the guidance of IEC 61724-3.
	Element	One-year_in-plane_measured_irradiation
	Sample	1000

Properties

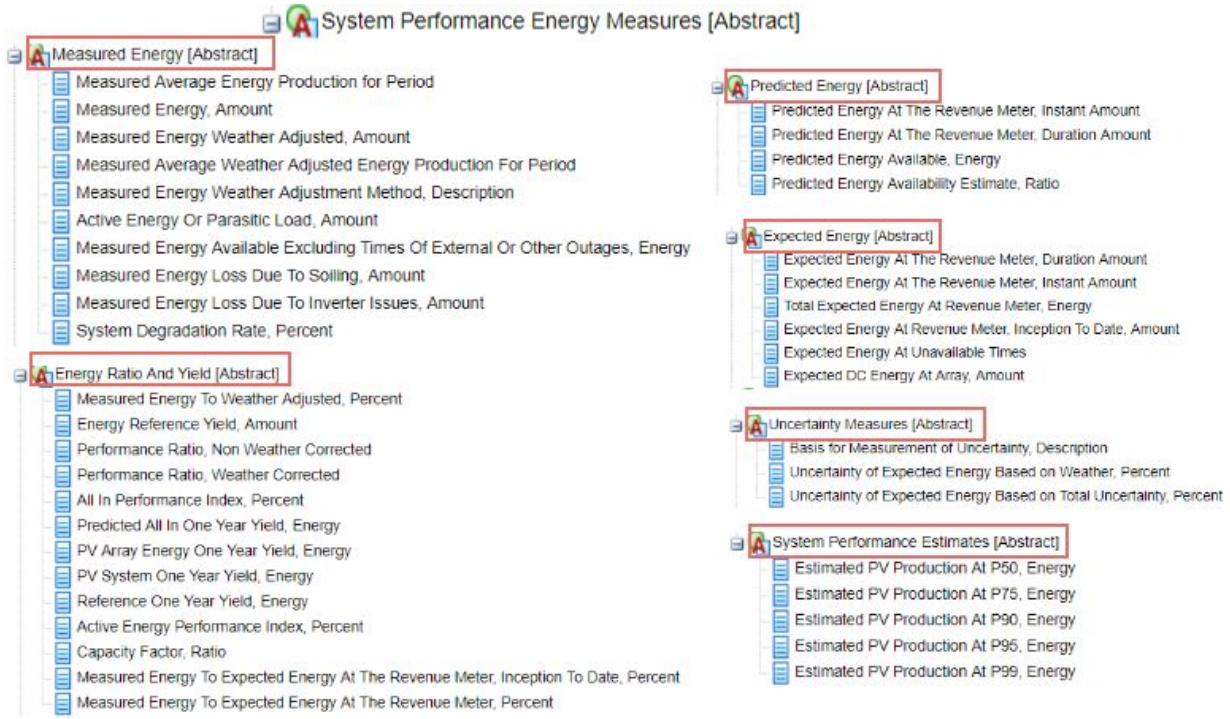
Property	Value
Name	OneYearInPlaneMeasuredIrradiation
Namespace	http://xbrl.us/Solar/v1.2/2018-03-31/solar
Data Type	num-us:irradianceItemType
XBRL Type	decimalItemType
Substitution Group	xbrli:item
Period Type	duration
Abstract	false
Nillable	true

References that are included throughout the Taxonomy, indicate the name of the publisher, the document where the reference is published, the element name of the concept for that publisher and a sample, where that information is available. For this concept therefore, the IECRE standard name for this insolation measure is “One-year_in-plane_measured_irradiation”. An example of a reported value would be “1000”.

The concept *Irradiation Weather Adjustment Factor* is the ratio of the two. The concept *Irradiance for Power Target Cap Measurement* is defined as “Irradiance used for the targeted conditions for the capacity measurement using IEC 61724-2.”

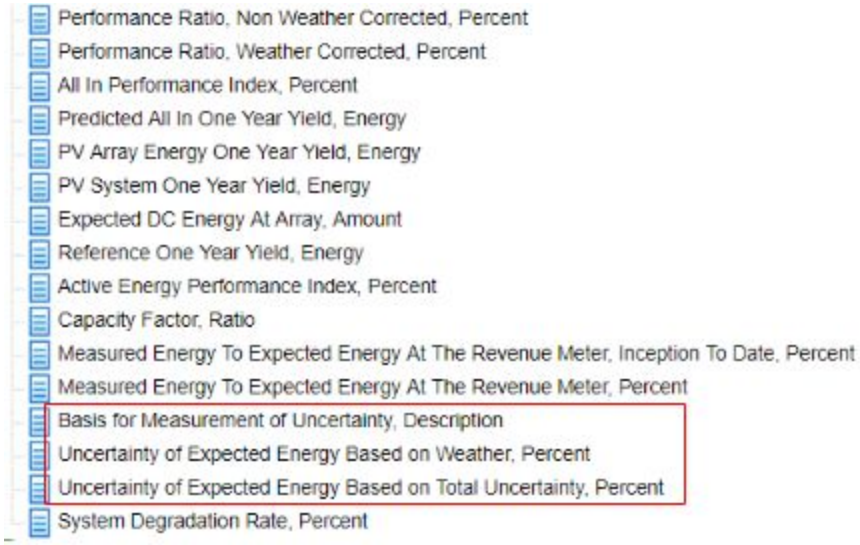
7.7.3 Energy Measures

The *System Performance Energy Measures [Abstract]* contains elements to tag energy production, grouped into abstracts which are highlighted on the diagram below. The energyItemType is used for most of these concepts except for the *Energy Ratios And Yields [Abstract]* which primarily uses the percentItemType, decimalItemType, or integerItemType, depending on the concept. When the energyItemType is used, preparers can designate units of kWh, or MWh in the instance document. Many of these concepts are based on the IECRE standard which is noted in the references for these elements.



The diagram below shows other energy concepts available in the Taxonomy. This section provides numerous performance-related indices used in the solar industry, such as IECRE performance ratios, both weather-corrected, and non-weather-corrected.

This section also includes (highlighted in red box) uncertainty factors including percent uncertainty of expected energy based on all factors or based solely on weather.



The energy measures abstract contains two elements that can be used to report system energy lost, as either percent, or amount, of kWh lost, as shown in the diagram below.

System Estimated Energy Lost, Energy

Labels

Type	Lang	Label
Standard Label	en	System Estimated Energy Lost, Energy
Documentation	en	Estimated energy lost in kWh which could be associated with a specific event or downtime.

References

This concept does not have any references.

Properties

Property	Value
Name	SystemPerformanceEstimatedEnergyLost
Namespace	http://xbrl.us/Solar/v1.1/2018-02-09/solar
Data Type	num:energyItemType
XBRL Type	decimalItemType
Substitution Group	xbrli:item
Period Type	duration
Abstract	false
Nillable	true

System Degradation Rate, Percent

Labels

Type	Lang	Label
Standard Label	en	System Degradation Rate, Percent
Documentation	en	Actual degradation rate of the system, in percent of kWh lost.

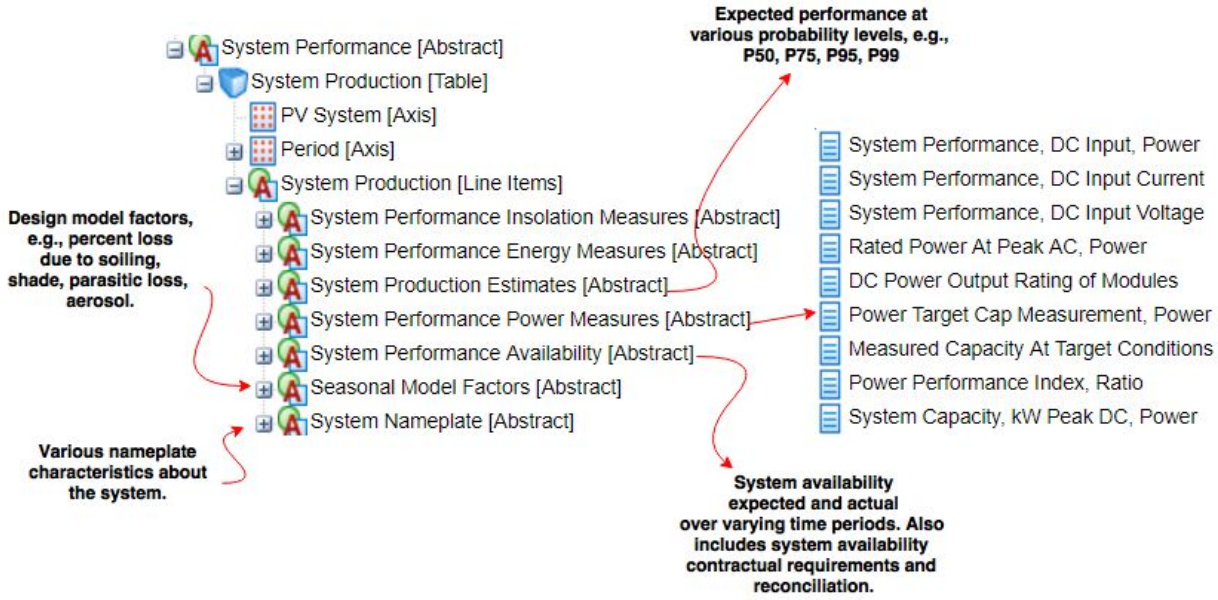
References

This concept does not have any references.

Properties

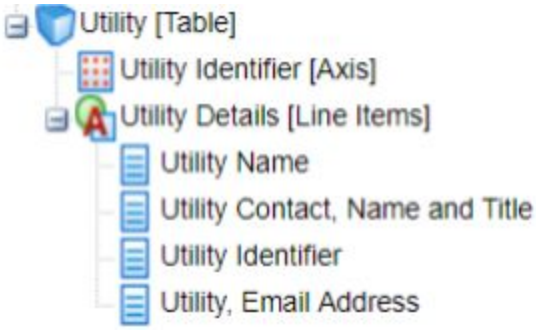
Property	Value
Name	SystemDegradationRate
Namespace	http://xbrl.us/Solar/v1.1/2018-02-09/solar
Data Type	num:percentItemType
XBRL Type	pureItemType
Substitution Group	xbrli:item
Period Type	duration
Abstract	false
Nillable	true

The remainder of the *System Production [Line Items]* contain concepts that can be used to report various production estimates, availability factors, seasonal model factors, and nameplate attributes of the system, as shown on the diagram below.



8 Data-Utility Entry Point

The Data-Utility group contains the *Utility [Table]* with line item concepts to report information such as utility company name, contact, and email. The *Utility Identifier [Axis]* is the primary key and uses a typed dimension.



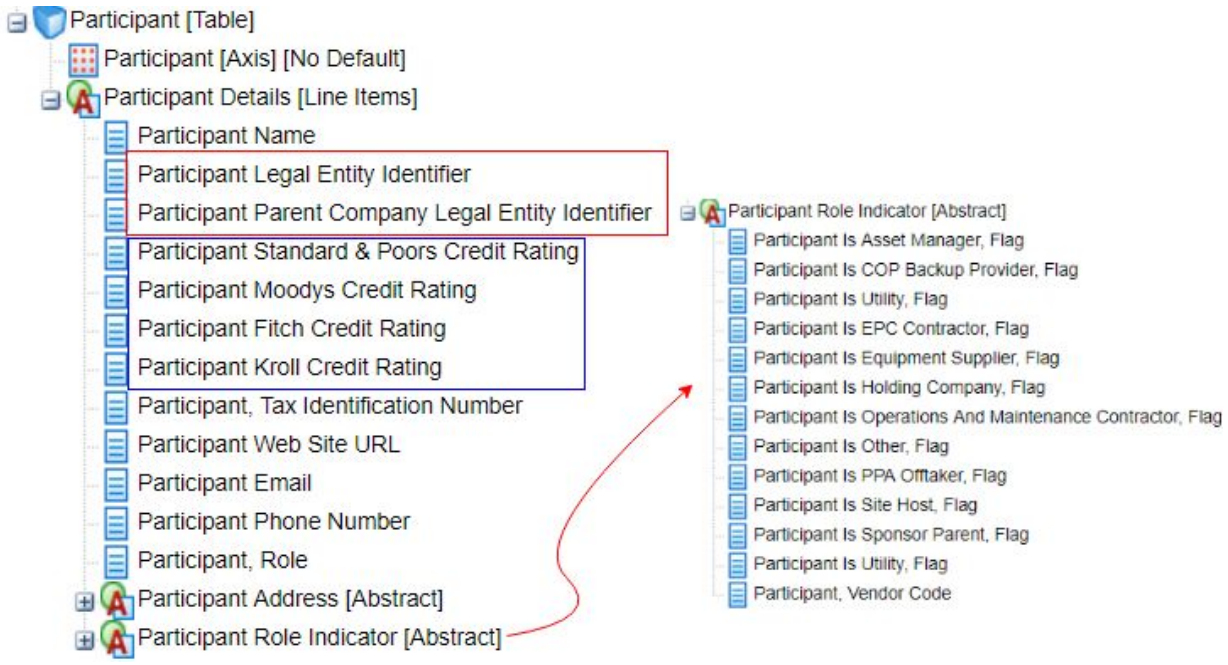
9 Data-Participant Entry Point

Participants involved in a solar implementation may be attorneys, utilities, developers, asset managers, environmental consultants, equipment factory auditors, independent engineers, or

one of many types of participants. To access a core set of content for all participants, use the *Participant [Table]* which contains concepts to report address, credit ratings (in blue box on diagram below), *Legal Entity Identifier* (in red box), and other contact information.

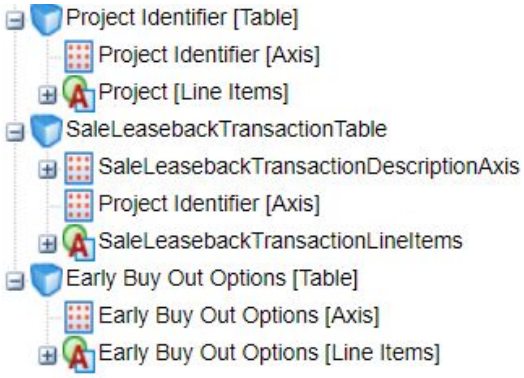
To tag “check boxes” of various roles which may useful in developing a database that includes participants, use the *Participant Role Indicator [Abstract]* which is shown on the right side of the diagram. These are boolean elements with reported values of TRUE or FALSE. The Data *Participant [Table]* is a separate entry point in Data-Participant, and it can also be found in the Process-Project Financing entry point.

The *Participant Address [Abstract]* allows preparers to tag addresses for any entity participating in a solar financing program. The only entities that have concepts for address that are specific to that entity are site and project which are contained, respectively, in the *Site Address [Abstract]* and the *Project Address [Abstract],* given the importance of these two entities in the Taxonomy. For all other entities, use the *Participant Address [Abstract].*

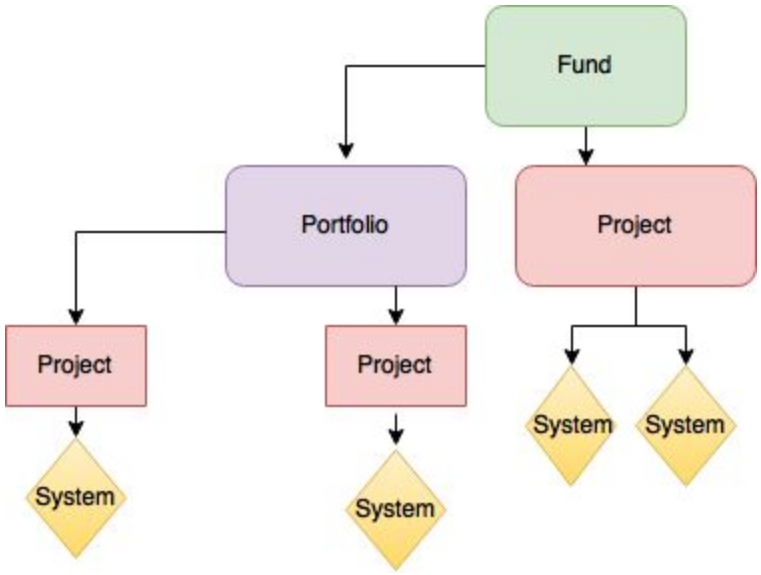


10 Data-Project Entry Point

To capture information about projects that may be used to build a multi-project database or to report data about one or more projects, use this entry point. It contains three tables as shown on the diagram below.

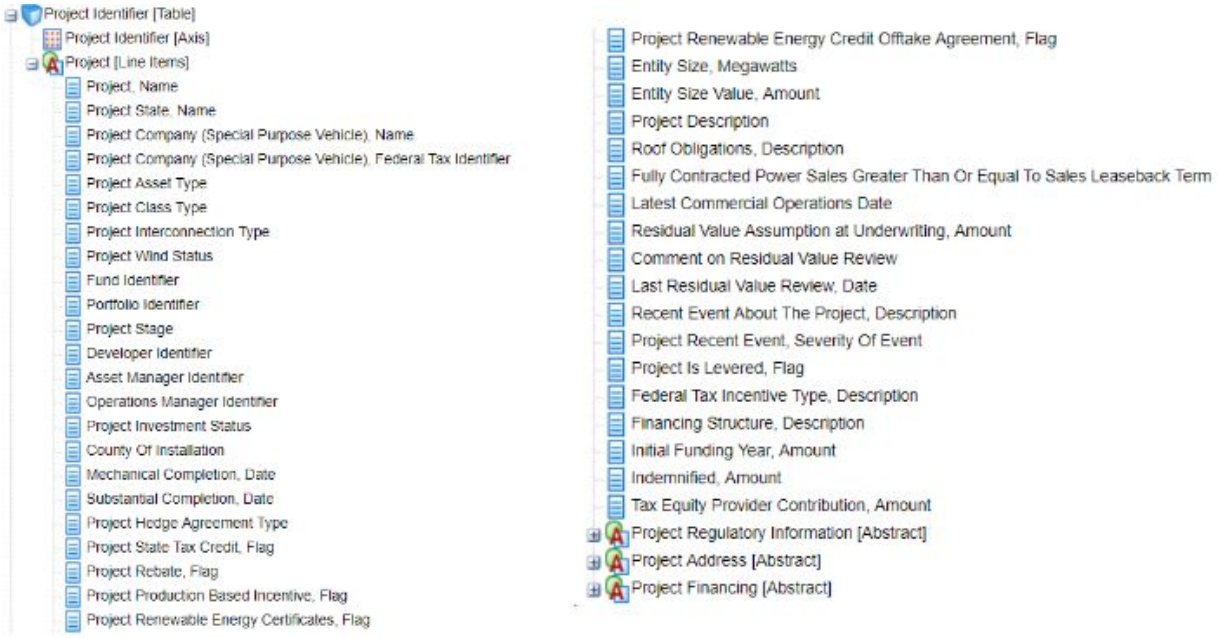


A solar project is typically associated with a single fund; it may or may not, reside within a portfolio of projects. One fund may contain several projects and/or portfolios. A single project can have one or more systems (plants). Throughout this Guide and in the Taxonomy, the relation between “fund”, “project”, “portfolio” and “system” is important. The diagram below depicts the various possible relationships between these entities.



10.1 Project Identifier [Table]

This is the primary table in this entry point and it uses a typed dimension as there can be an infinite number of projects. It is also found in the Process-Project Financing entry point and the Data-Financial Performance entry point. Numerous line items are available to capture project-specific data such as name of the project, name of the project company address, and contact, in addition to several concepts that provide enumerated list options to describe attributes of the project. In addition to general project-related terms, there are separate abstracts for regulatory information and for project financing concepts.



Concepts that contain enumerated lists in the primary abstract are noted on the table below. The three abstracts for regulatory information, address, and project financing are described further later.

Concept Name	Data Type	Enumerated List Options
Project Asset Type	projectAssetTypeItemType	Wind, solar, solar plus storage
Project Class Type	projectClassItemType	Utility Scale, Distributed Generation, Residential, Community Solar, Other
Project Interconnection Type	projectInterconnectionItemType	Behind the meter, virtual net meter, in front of the meter
Project Investment Status	investmentStatusItemType	Awarded, committed, partially funded, fully funded
Project Stage	projectStageItemType	Under development, in construction, in operations
Project Hedge Agreement Type	hedgeItemType	Swap, Revenue Put, CfD (Contracts for Difference), none, Other
Project Recent Event, Severity Of Event	eventSeverityItemType	Low, Moderate, High

Additional elements are boolean, using the term “Flag” to indicate that they should be reported with a value of TRUE or FALSE. These elements, shown below, can be read as “the project has a state tax credit”, “the project has a rebate”, etc.

The *Project Identifier [Table]* also contains identifiers for fund (*Fund Identifier)*, portfolio (*Portfolio Identifier*), asset manager (*Asset Manager Identifier*), developer (*Developer Identifier*), and operations manager (*Operations Manager Identifier*), so that these entities can be linked to a specific project. Line items also include concepts that represent the entity size of the project in monetary amounts (*Entity Size Value, Amount*), or megawatts (*Entity Size, Megawatts*).

10.1.1 Project address

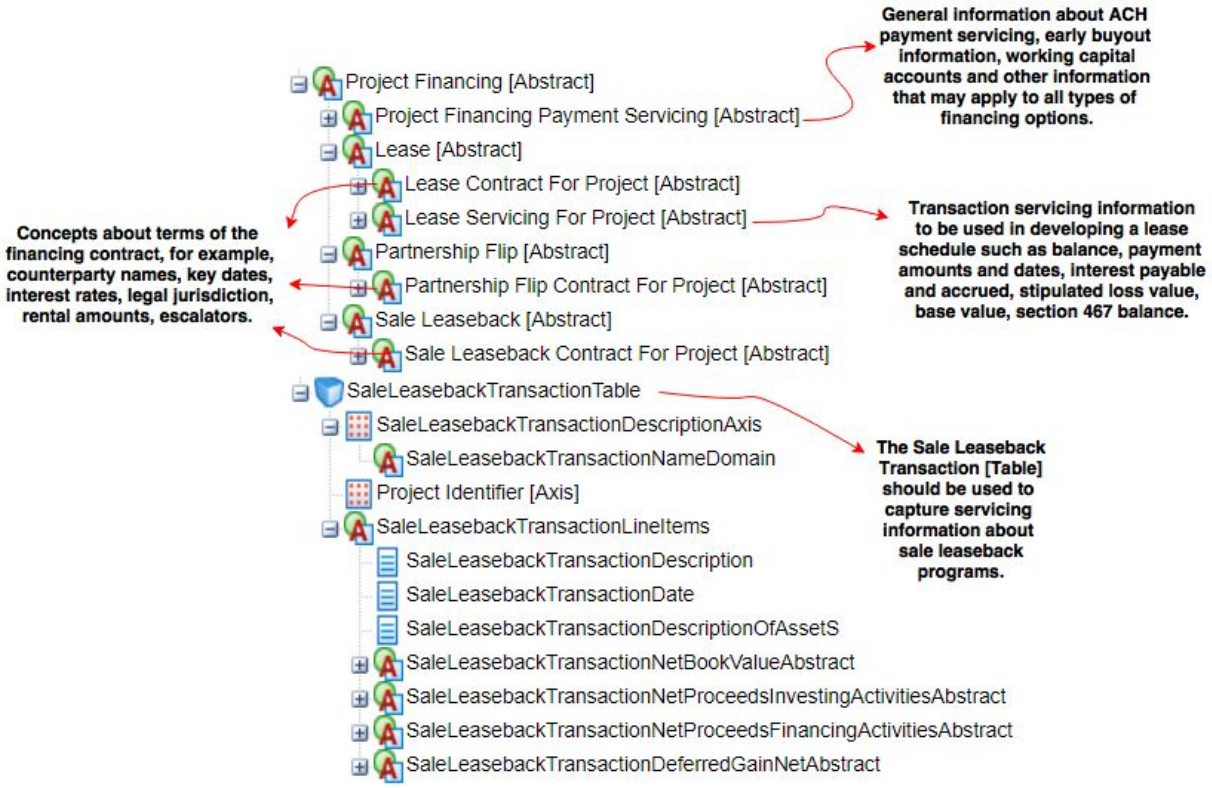
The *Project Address [Abstract]* provides project-specific concepts for the project address.

10.1.2 Regulatory data

The regulatory abstract contains information that is also included in the Process-Project Financing and in the Data-System entry points. Details on how to use these concepts was addressed earlier in section 8.1.4.

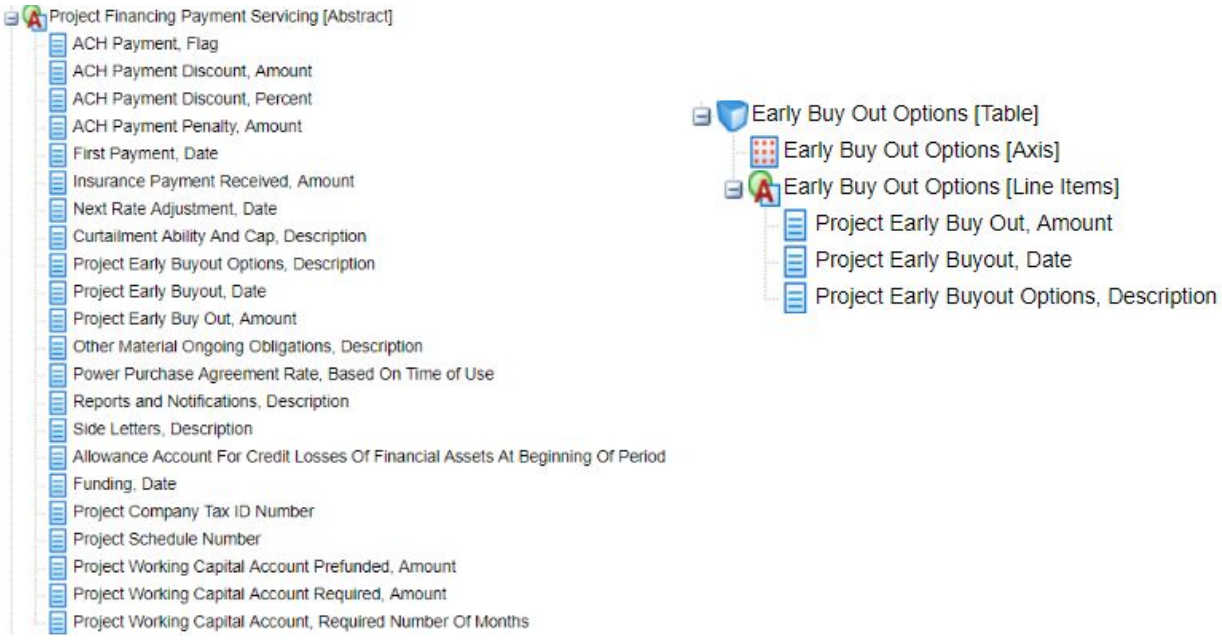
10.1.3 Data on project financing

The *Project Financing [Abstract]* depicted below, is broken into lease, partnership flip, and sale leaseback. These are the most common methods to finance a solar implementation. Preparers should use these sections of the Taxonomy to tag financing contracts, and to develop servicing tables and schedules. A separate table is available for sale leaseback programs. These areas are also found in the Process - Project Financing entry point.



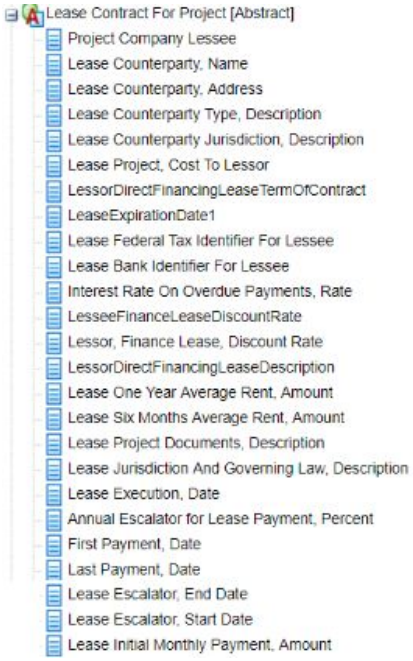
10.1.4 Project Financing Payment Servicing and Early Buy Out Options [Table]

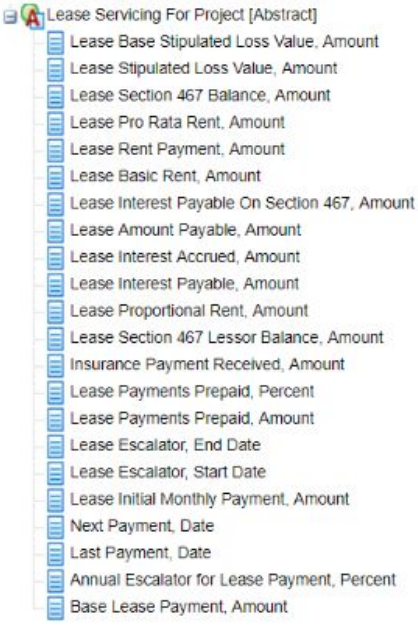
Payment servicing information that may apply to any type of project financing, e.g., lease, sale leaseback, partnership flip, is found in the *Project Financing Payment Servicing [Abstract]* and the *Early Buy Out Options [Table]* which are shown on the diagram below. The table for early buy out options should be used in the event that there is more than one early buy out option in a single project. Preparers should use the *Early Buy Out Options [Axis]* which is a typed dimension to capture information about any number of early buy out alternatives.



10.1.5 Lease

With solar leasing or a power purchase agreement, a third-party solar financing company, buys and takes care of the solar panels. The owner of the site pays a fixed rate for the solar electricity the system generates.The *Lease [Abstract]* is split into concepts that can be used to tag data in a lease contract, and concepts that can be used to tag data about the servicing of a lease which are shown in the diagram below. To tag a Power Purchase Agreement, preparers may wish to review the concepts available in the Document - Power Purchase Agreement entry point which providers greater detail.

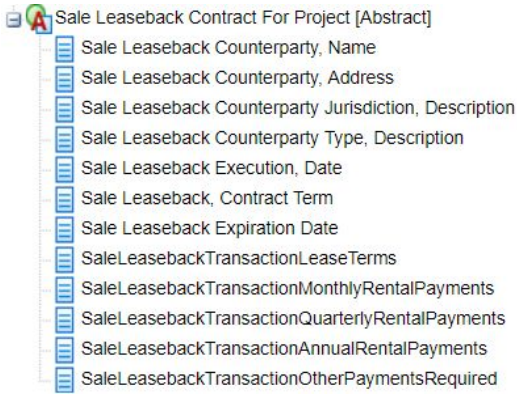


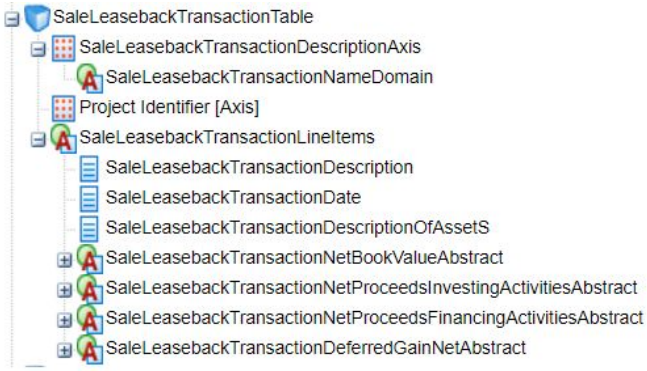


10.1.6 Sale Leaseback

In a sale leaseback transaction, the developer installs, operates and maintains the project and an offtaker (customer) agrees to purchase power from the project under a long-term PPA. The developer then sells the project to an investor who leases the project back to the developer for a lease term that approximates the time of the long-term PPA. The investor is the owner of the project for tax purposes.

For concepts used to tag a sale leaseback, the *Sale Leaseback for Contract [Abstract]* contains information used in a sale leaseback contract; and the *Sale Leaseback Transaction [Table]* contains servicing concepts. This table is sourced from the US GAAP Financial Reporting Taxonomy. It contains a typed dimension, the *Sales Leaseback Transcription Description [Axis]* to capture financial information about multiple transactions to a sale leaseback.

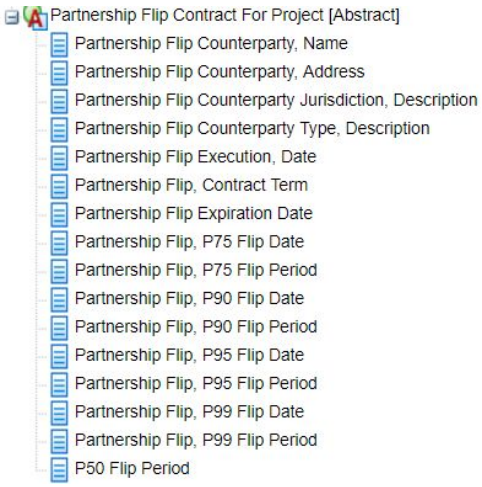




10.1.7 Partnership Flip

In a partnership flip transaction, an investor forms a partnership with a developer in which the investor receives an allocation of tax benefits and cash distributions from the partnership until the investor reaches an agreed-upon after-tax return. The investor can take its investment over time, which allows the investor to fund its investment through reductions in future tax liability. In the early stage of the project, the investor receives a larger allocation of partnership income and tax credits. When the investor target return is reached, the allocation "flips" to the developer. Typically the developer has an option to purchase the investor interest in the partnership.

Concepts that can be used to tag a partnership flip contract are contained in the *Partnership Flip Contract for Project [Abstract]* which is shown below.



11 Data-Fund Entry Point

There are three tables in the Data-Fund entry point: the *Fund [Table]*, the *Reserve [Table]*, and the *Offtaker [Table]*.

11.1 Fund [Table]

The *Fund Identifier [Axis]* on the *Fund [Table]* uses a typed dimension to accommodate multiple funds. The line items that can be used on this table are grouped into topical abstracts as seen on the diagram and described below.

The ***Pricing Model [Abstract]*** contains concepts that should be used as inputs to the pricing model, including internal rate of return, investment tax credit amounts, and payback periods.

The ***Pro Forma [Abstract]*** holds several concepts that can be used to tag pro forma data.

The ***Funds Flow [Abstract]*** covers concepts of payment-specific information such as ABA routing number, bank name and account number, and amount of payment.

The ***Renewable Energy Credit [Abstract]*** is broken into three sections. The first section contains concepts that can be used to tag a REC agreement, such as initiation and expiration date, term, volume cap, and REC percentage based portion of units of site eligible for REC. These contract-specific concepts are also included in the Document-Renewable Energy Credit Offtake Agreement entry point. The Document entry point contains additional document information concepts such as boolean elements for availability of REC agreement, and link to the REC agreement.

The second section, *Renewable Energy Credit Amount [Abstract]*, contains concepts that can be used to tag REC amounts such as REC revenue expected and actual, the ratio of actual to expected revenue from RECs, etc. The third section, *Renewable Energy Credit Performance Guarantee [Abstract]* covers concepts that can be used to tag a performance guarantee for RECs.

The ***Underwriting [Abstract]*** contains concepts that represent the basic underwriting structure of a project such as reserve structure, revenue sources, termination value, and present value of the project. Additional terms related to underwriting can be found in entry points such as Process-Project Financing, and in some of the many document entry points, such as Documents-Letter Of Credit, and Documents-Limited Liability Company Agreement. Individuals

seeking to identify other concepts are encouraged to review the other entry points to identify additional terms that may be needed.

The ***Fund Description [Abstract]*** includes concepts about the fund, for example, size of the fund in megawatts or monetary units such as dollars, fund closing date, associated site identifier, name of holding company, and sponsor company.

The ***Fund Composition and Financing Structure [Abstract]*** contains primarily boolean elements that can be used to flag whether the fund has wind or solar assets, storage projects, construction financing, or debt financing.

The ***Fund Tax Equity Details [Abstract]*** is used to describe the tax equity partners including names and percent of class equity and total equity.

The ***Collateral Agent [Abstract]*** provides concepts about the project working capital account and the agent bank. The ***Post Closing [Abstract]*** is used to tag information about punch lists and other post closing items.

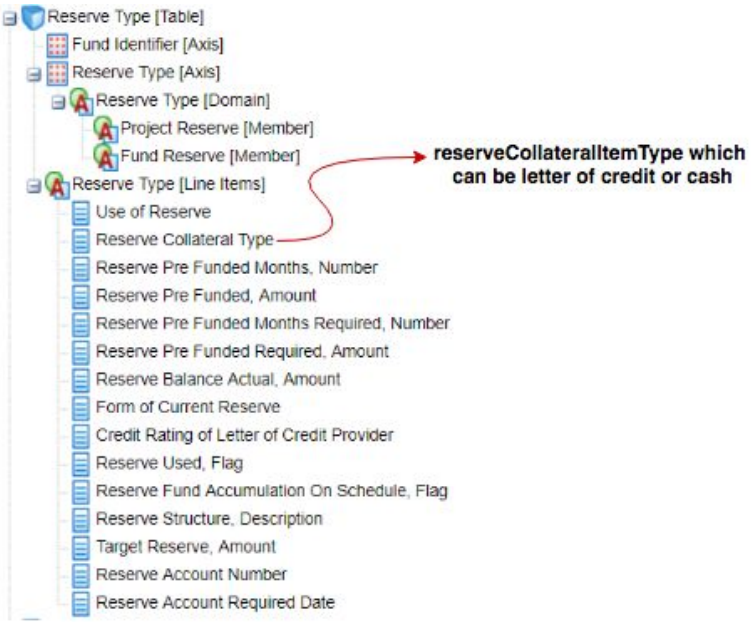
The ***Financing Overview [Abstract]*** holds high-level concepts describing important contracts such as the PPA, O&M, Interconnection agreement, and EPC agreements.

The ***Incentives [Abstract]*** can be used to tag information related to performance based incentives, such as guarantee amounts and rates; rebates and state tax credit programs; and tax indemnity agreements.

The ***Fund Insurance [Abstract]*** contains concepts about insurance related to the fund. Additional insurance-related concepts can be found in the Data-Insurance entry point, for insurance concepts specific to a project, and in various document entry points that can be used to tag various insurance policies.

11.2 Reserve [Table]

Reserves used in solar financing can be established for the project or for the fund. This table uses an explicit dimension on the *Reserve [Axis]*, with a *Project [Member]* and *Fund [Member].* The table also uses the *Fund [Axis]* with a typed dimension to represent more than one fund as shown in the diagram below.

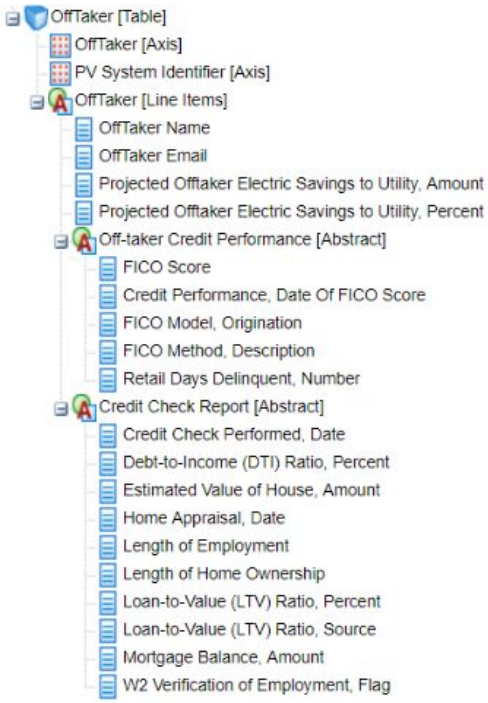


The *Reserve [Table]* can be used to prepare data such as that shown on the table below.

Reserve Type [Axis]	Fund Identifier [Axis]	Reserve Collateral Type	Use Of Reserves
Project	1	Cash	Rent
Project	2	Letter of credit	Maintenance
Fund	2	Cash	Unexpected repairs

11.3 Offtaker [Table]

This table is used to collect information about various offtakers (buyers of electricity) of a system. The diagram below shows the concepts available.



There may be situations where there are multiple offtakers for a single system; or a single offtaker may buy electricity from multiple systems. To capture these scenarios, the table includes the *Offtaker [Axis]* and the *PV System [Axis].* Both use typed dimensions as there can be an infinite number of systems or buyers. The tables below depict the two potential scenarios where this table can be used.

Multiple Offtakers - One System

Offtaker [Axis]	PV System [Axis]	FICO Score	Credit Performance, Date of FICO Score
1	AA	700	January 25, 2018
2	AA	740	February 5, 2018
3	AA	750	February 18, 2018

Multiple Systems - One Offtaker

Offtaker [Axis	PV System [Axis]	Projected Offtaker Savings To Utility
1	AA	10%
1	BB	5%

12 Data-Developer Entry Point

12.1 Developer [Table]

This table is designed to capture information about the experience and background of the developer, for example, past funds in which they have been involved, experience in construction, development, and community engagement, number of projects they have developed, number of megawatts under construction, and experience in using subcontractors.

It is also used to collect information about the current state of the developer organization, such as executive biographies, staffing and communications plans, and organizational structure. This data can be used to create a database of more than one system developer, or to gather information used during the onboarding process of a single project.

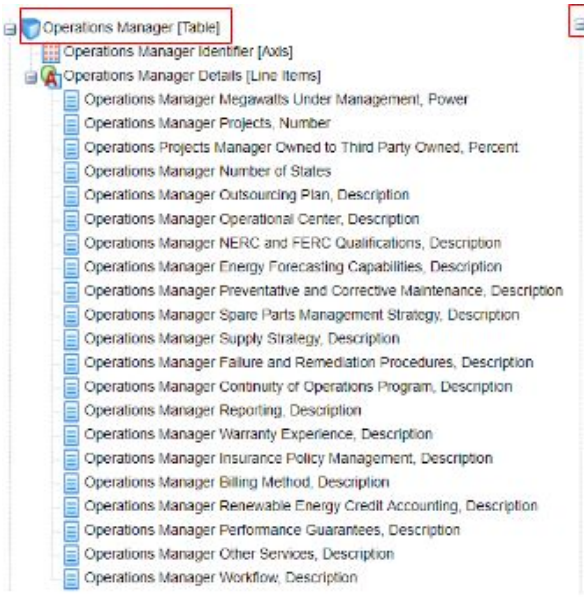
The majority of the information is descriptive in nature and therefore most concepts are string elements. Only those items highlighted on the diagram below are not string elements. The *Developer Identifier [Axis]* is the primary key for the table and uses a typed dimension.

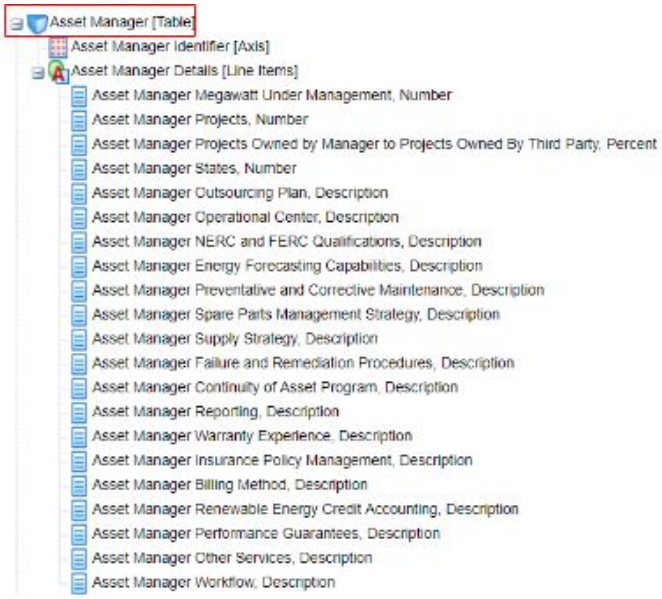
13 Data-Operations Manager and Data-Asset Manager Entry Points

These entry points each contain two tables which are similarly structured, and used to collect information to be used during the project onboarding process, and/or to develop databases of information about asset managers and operations managers. Both entry points will be addressed in this section.

13.1 Operations Manager [Table] and Asset Manager [Table]

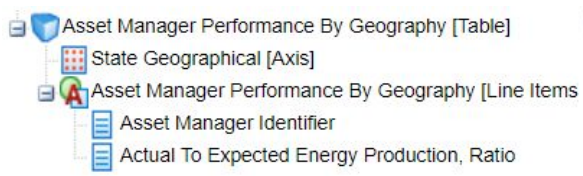
These tables are similar to the *Developer [Table]* discussed earlier in the Guide, and are designed to collect information about past experience and current state, for operations and asset management companies. Each relies on an identifier axis, *Operations Manager [Axis]*, and *Asset Manager [Axis],* which are typed dimensions, and serve as the primary key for the table. The majority of the data that can be reported is descriptive in nature, and therefore uses a string data type.

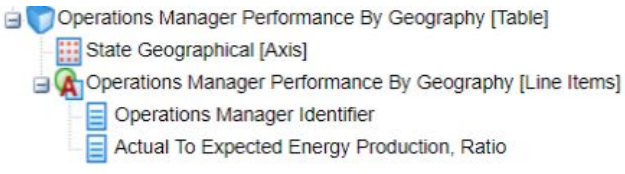




13.2 Performance By Geography Tables

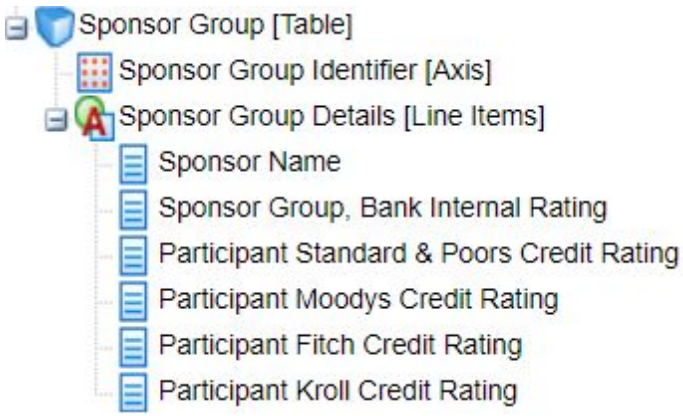
These two tables are used to collect data on the performance of asset managers and operations managers on a state by state basis. The *State Geographical [Axis]* is the primary key for the table and is a string element which should be used to report the two-letter state abbreviation. The concept *Actual to Expected Energy Production, Ratio* is used to report the ratio of actual to expected energy production of projects for that asset manager or operations manager in a particular state.





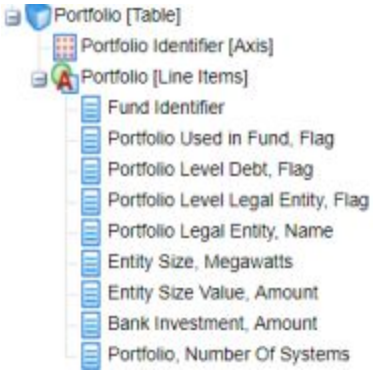
14 Data-Sponsor Entry Point

The *Sponsor Group [Table]* is found in this entry point and it allows for the reporting of information about the sponsor such as credit ratings, bank internal rating, and name of the sponsor. The *Sponsor Group Identifier [Axis]* is a typed dimension.



15 Data-Portfolio

The Data Portfolio [Table] in this entry point captures information about one or more portfolios and uses a typed dimension.



16 Data-Financial Performance Entry Point

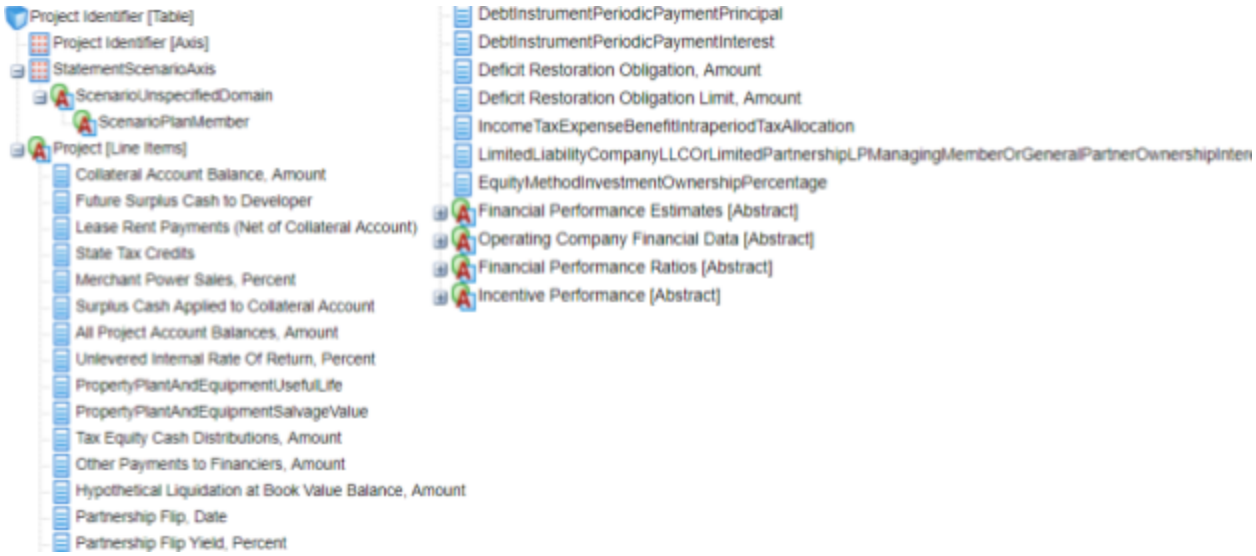
This entry point contains the *Project Identifier [Table]* which is also found in the entry points for Data-Project, and Process-Project Financing. In this entry point, the table is used to represent financial performance data specific to the project. This entry point also includes the *Financial*

Summary By System [Table] which is used to collect actual and projected financial summary data about individual plants.

16.1 Project Identifier [Table]

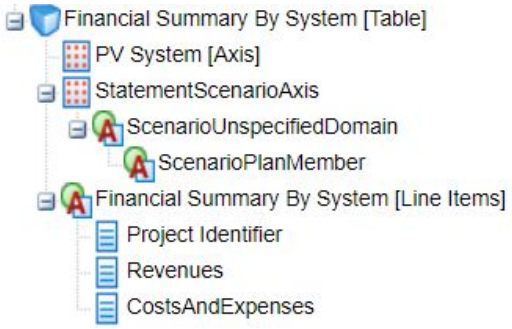
This table uses a typed dimension on the *Project Identifier [Axis]* and contains concepts describing the financial performance of the project such as interest rates, payment amounts, actual and estimated, as well as incentive data and performance ratios. The concepts are broken up into various topic-specific abstracts which are shown on the diagram below.

The *Statement Scenario [Axis]* is an explicit dimension with one member, the *Scenario Plan [Member]* which can be used to tag a reported value that is a forecast. It is sourced from the US GAAP Taxonomy. To report forecast data, for example, to report projected state tax credits for a particular project, preparers should use the concept State Tax Credits, with the *Scenario Plan [Member]* and the *Project Identifier [Axis].* To report actual data - not a forecast - simply do not use the *Statement Scenario [Axis].*



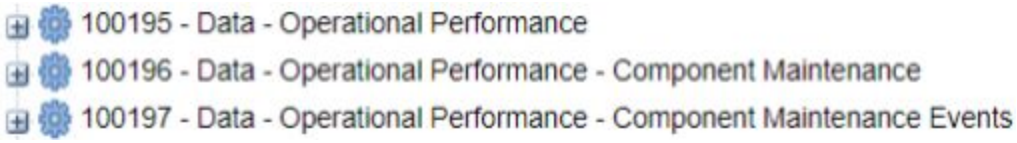
16.2 Financial Summary By System [Table]

This table, shown below, also uses the *Statement Scenario [Axis]* to allow preparers to report forecast data. This axis is an explicit dimension with one member, the *Scenario Plan [Member]*. This member should be used with forecast values for revenues and costs. To report actual values for revenues and costs, do not use a member. These line items are also sourced from the US GAAP Taxonomy. The *Project Identifier* concept links the financial summary data to a specific project.



17 Data-Operational Performance Entry Point

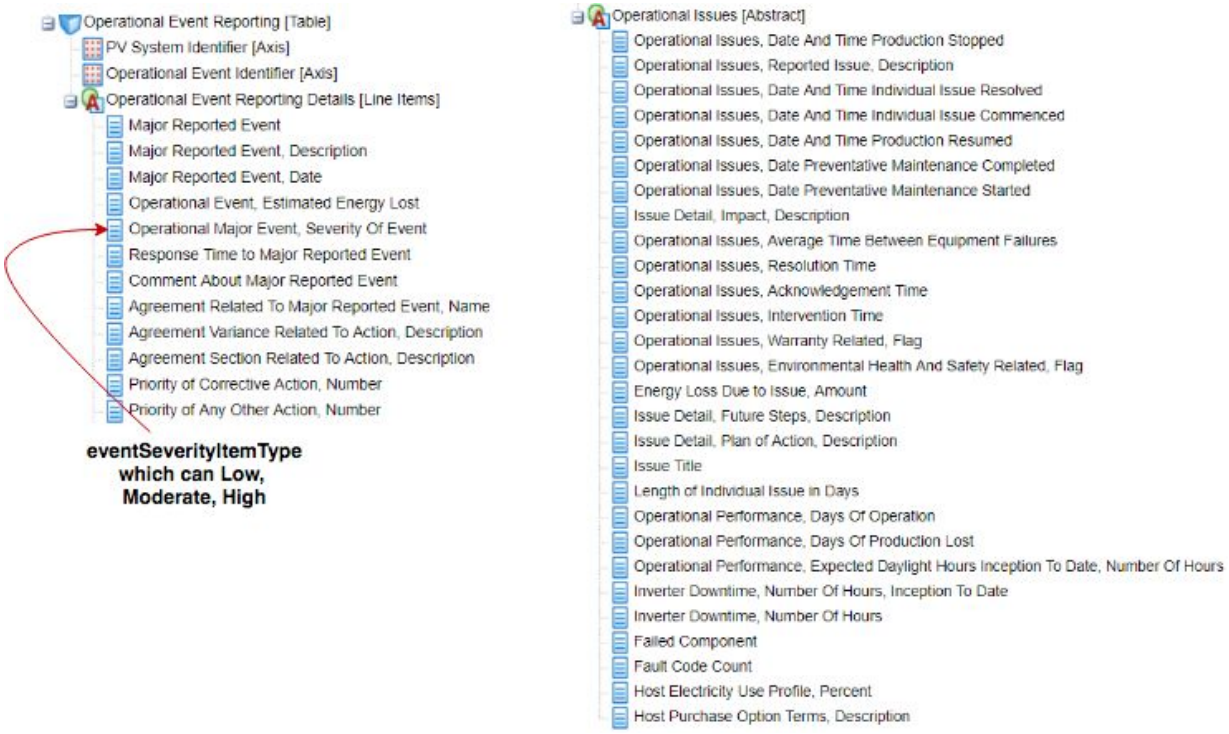
This entry point is contained in three groups: Data-Operational Performance, Data-Operational Event Component Maintenance, and Data-Operational Component Maintenance Events as shown in the diagram below.



17.1 PV System [Table] and Operational Event [Table]

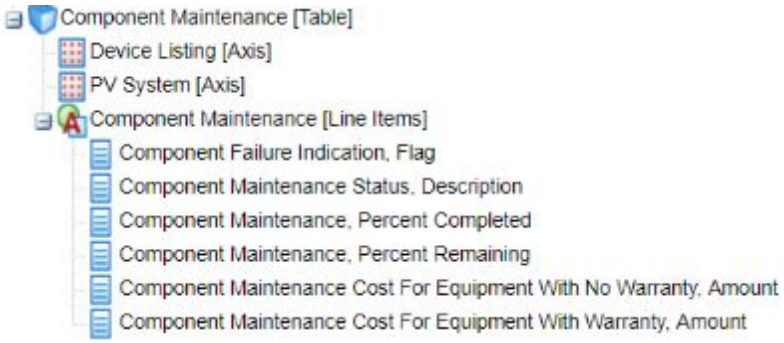
The first group, Data - Operational Performance, contains two tables. The **PV System [Table]**, which is also contained in the Data-System and Process-Project Financing entry points relies on the *PV System [Axis]* to tag information about the operations of one or more systems. The line items on this table cover system-specific facts about the operations, such as insurance and reporting requirements for the developer, operational status and commercial operations date.

The ***Operational Event [Table]***, which is depicted in the diagram below, relies on the the *Operational Event [Axis]* to identify various events and issues related to the operations of the plant. An **event** is defined as *something that happens in the system, related to, or triggered by a contract*, such as the Asset Management Agreement or the Engineering Procurement & Construction Agreement. An **issue** is an *occurrence that requires resolution* such as a breakdown in a component.



17.2 Component Maintenance [Table]

This table is contained in the Data-Operational Performance Components Maintenance group, and is used to represent information about components used in the system that are undergoing maintenance work. It is shown on the diagram below. This table uses the *Device Listing [Axis]* as the primary key to the table, with the *PV System [Axis]* as the secondary key. Both are typed dimensions. See *Device Listing [Axis]* in Section 7.2, as it is also used in the Data-System entry point on the *Device Listing [Table].*



The table below shows the kind of data that can be reported using the *Component Maintenance [Table]*.

Device Listing [Axis]	PV System [Axis]	Component Failure Indication, Flag	Component Status, Percent Completed
Sunnyboy Inverter, Serial No. 8904484	1	TRUE	50%
Itek Energy Module, Serial No. F88903	2	TRUE	75%

17.3 Component Maintenance Event [Table]

This table, shown on the diagram below, contains three axes, and is used to capture information about maintenance-related events such as repairing or replacing a piece of equipment. The *Component Maintenance Events [Axis]* is the primary key to the table and is used to identify the maintenance-related event. The *Device Listing [Axis]* is used to capture the individual device. The *PV System [Axis]* is used to identify the related system.

Use this table to capture information like the data below.

Component Maintenance Events [Axis]	Device Listing [Axis]	PV System [Axis]	Reason for Maintenance Ticket, Description	Number of Components Affected By Maintenance
1	Sunnyboy Inverter, Serial No. 8904484	AA	Repair needed	5
2	Itek Energy Module, Serial No. F88903	ZZ	Replacement needed	10

18 Document Entry Points

Numerous contracts, reports, and other types of documents are necessary to finance a solar project. The Taxonomy contains individual groups labeled “Documents” to represent concepts needed to prepare or convey information about these documents. Preparers who need to create Orange Button-compliant documents, should refer to the Document groups to tag the appropriate corresponding contract or report.

In some situations, the concepts provided in a document entry point represent all items needed to tag a report, for example, the Monthly Operating Report (MOR), covered at length below. In addition to concepts covering the facts contained in the document, the Taxonomy includes a common set of elements ***about*** each document, including whether the document is available, if it is in final form, expiration date, names of the counterparties or preparers of the document, etc.

For many reports, investors may ***only*** need to know this common set of data about the document. For example, a Shared Facility Agreement is used for entities sharing a building or a piece of equipment. Investors only need to capture information about the availability of the Shared Facility Agreement, expiration date, etc. To accommodate the many documents that fall into this category, some document entry points only contain the following minimal set of elements:

- Availability Of document, Flag - boolean element set to TRUE if the document is available
- Availability Of Final document, Flag - boolean element set to TRUE if the final document is available
- Availability Of Exceptions to the document, Flag - boolean element set to TRUE if there are exceptions to the document
- Document Exceptions, Description - string element
- Counterparties To The document, Names - string element
- Document, Effective Date - date
- Document, Expiration Date - date
- Document, Link - string
- Document Preparer Of document, Name - string
- Document Identifier, document - string element that is a unique identifier for the document

This next section of the Taxonomy Guide will cover a sample of the larger documents and contracts in the Orange Button Taxonomy documents entry points.

19 Monthly Operating Report Entry Point

The project's Monthly Operating Report (MOR) contains statistics on insolation, energy, availability, and performance, and is typically prepared by the operator for the investor. The project's MOR information in Orange Button is split into five sections: Summary, Balance Sheet, Income Statement, Accounts Receivable Aging, and Cash Distribution.

19.1 MOR Summary

Summary data includes energy statistics as well as descriptive information about the project. Examples of these two types of reports are included below.

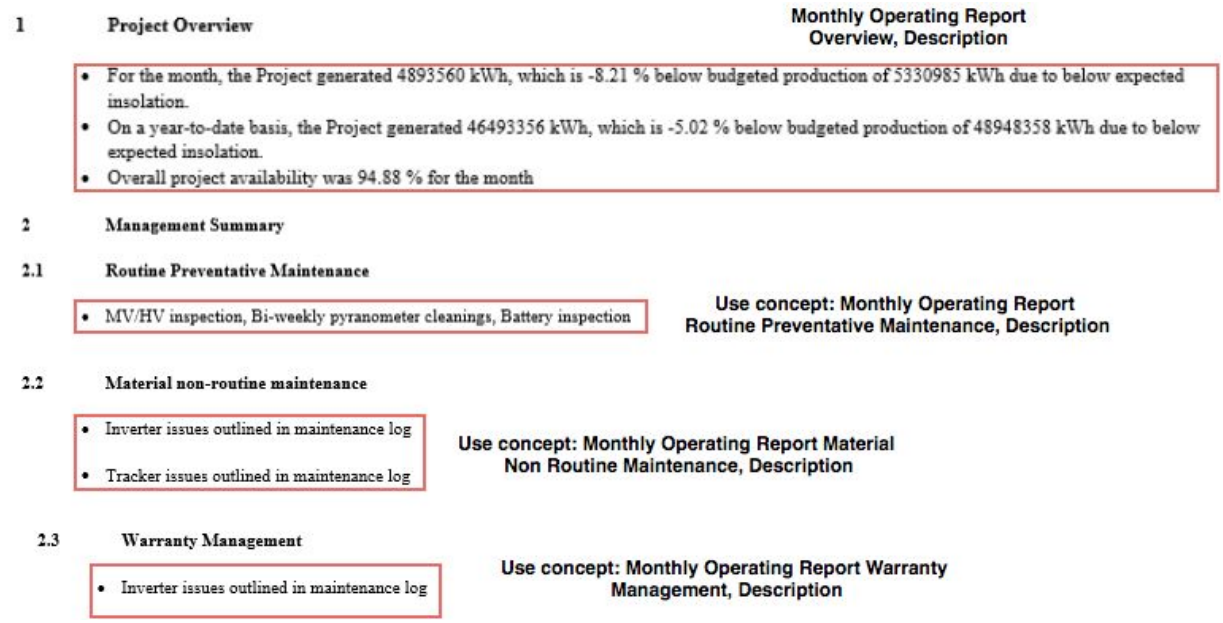
The first report, directly below, shows statistical summary data. While some MOR reports require the use of a dimension (XBRL table), this data does not have dimensional attributes and all the concepts needed can be found in the *Monthly Operating Report Summary [Abstract]*.

Exhibit H-2 Monthly Summary Report

Project Name 1 LLC
Project Name
Year 2016
Prepared by Sponsor Name

Row Labels	Ins. p(50) [kWh/m2]	Ins. Actual [kWh/m2]	Actual/ p(50) [%]	Gen. p(50) [MWh]	Weather Adj. [MWh]	Gen. Actual [MWh]	Actual/ p(50) [%]	Actual/ Weather Adj. [%]	Curtailment [MWh]	Project Availability [%]	Performance ratio [%]
Jan	134	115.88	86%	3011	2570	2582.59	86%	100%	-	96.76%	84.21%
Feb	146	135.36	93%	3151	3017	2858.02	91%	95%	-	98.06%	85.58%
Mar	231	230.29	100%	4925	4935	4924.91	100%	100%	-	97.85%	79.99%
Apr	282	279.65	99%	5437	5496	5626.31	103%	102%	-	95.12%	77.89%
May	330	307.90	93%	5868	6318	6307.19	107%	100%	-	97.51%	74.36%
Jun	344	332.02	97%	6102	6763	6678.33	109%	99%	-	96.10%	74.51%
Jul	316	317.49	101%	6222	6289	5944.76	96%	95%	-	94.95%	74.27%
Aug	310	273.88	88%	6076	5593	5321.40	88%	95%	-	95.64%	74.64%
Sep	267	249.97	94%	4892	4744	4529.98	93%	95%	-	93.21%	71.34%
Oct	213	232.71	109%	4372	4823	4287.78	98%	89%	-	97.56%	78.28%
Nov	162	151.92	94%	3402	3249	3164.80	93%	97%	-	96.23%	80.58%
Dec	0	0.00	0.0	0	0	0.00	0%	0.0	-		
Grand	2735	2627	96%	53457	53797	52226	98%	97%	-	96.27%	74.50%

Descriptive information in red highlighted boxes in the text summary report below can also be tagged.

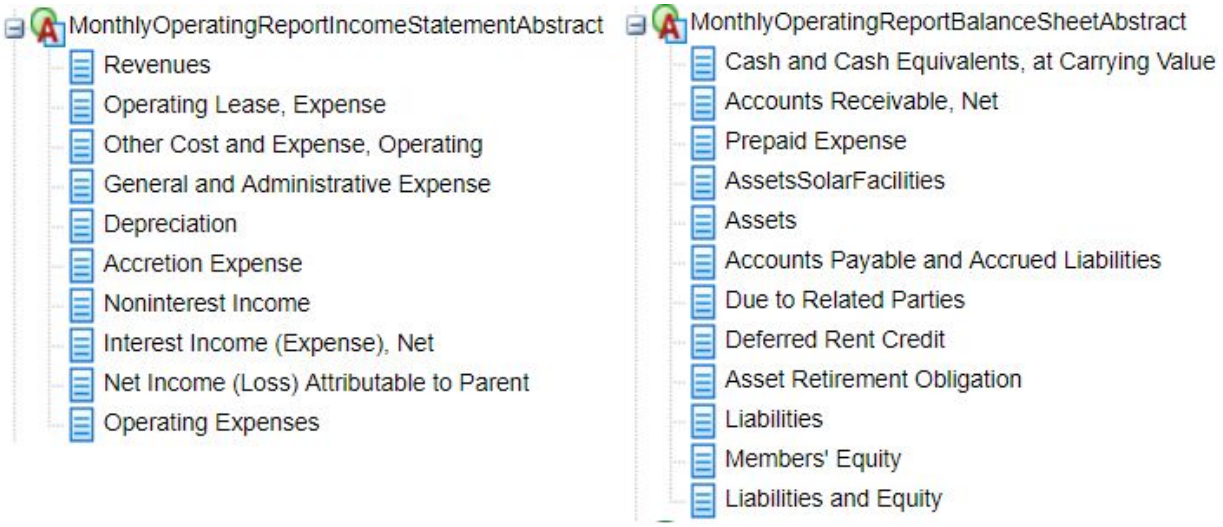


The facts for both the statistical and text reports above can be tagged with the concepts as shown in the Taxonomy diagram below from the *Monthly Operating Report Summary [Abstract].* The majority of the concepts are used in the statistical summary. The concepts that can be used for the descriptive text summary are highlighted in red below.

19.2 MOR Balance Sheet and Income Statement Abstracts

The *Monthly Operating Report Balance Sheet [Abstract]* and *Monthly Operating Report Income Statement [Abstract]*, shown below, contain basic elements needed to tag simple financial

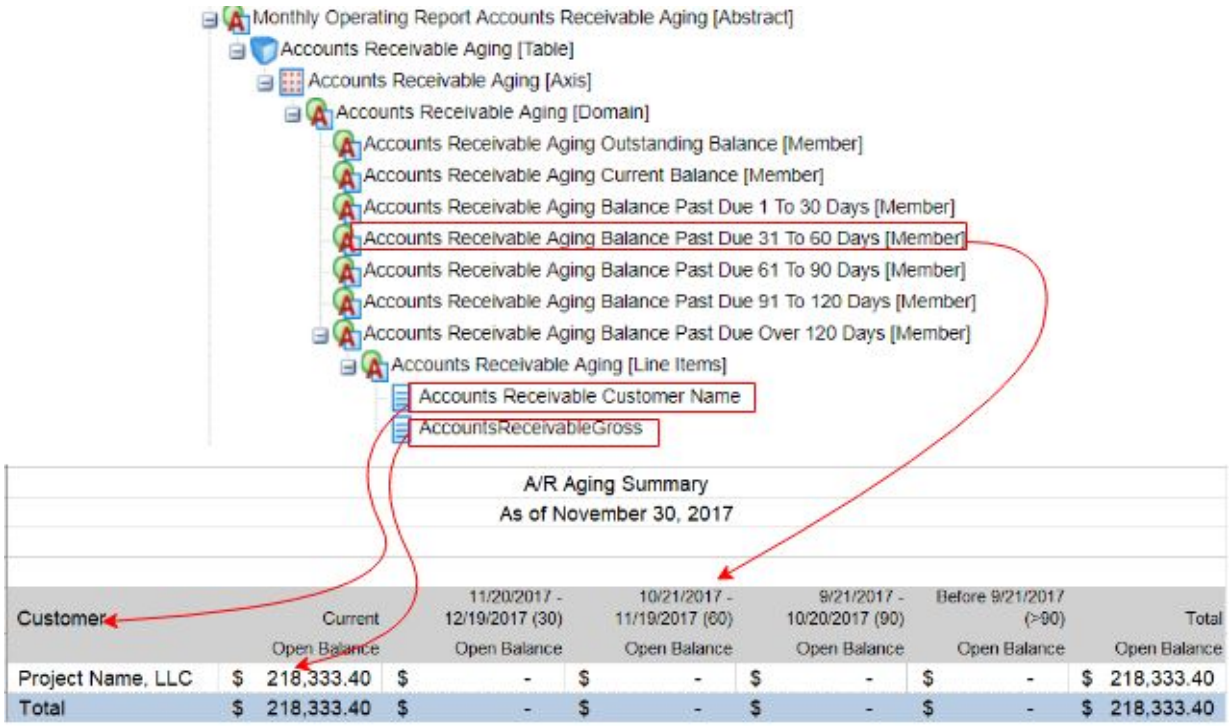
statements. Most of the concepts included are sourced from the US GAAP Financial Reporting Taxonomy.



19.3 Monthly Operating Report Accounts Receivables Aging [Table]

This table uses an explicit dimension with members to reflect the number of days aging for the amount of receivables. Below is an example of an Accounts Receivable Aging report from a MOR and a corresponding Taxonomy excerpt. This table uses the *Accounts Receivable Aging [Axis]* to capture A/R balance due customer accounts at various aging periods, for example 1 to 30 days past due, 31 to 60 days past due which are described as Members of the Axis.

To correctly tag the value 218,333.40 the concept Accounts Receivable Gross should be used with the *Accounts Receivable Aging Current Balance [Member]* on the *Accounts Receivables Aging [Axis]*. To tag the reported value for “Customer”, the concept Accounts Receivable Customer Name should be used with no member, as there is no dimensional attribute to this value.



19.4 Monthly Operating Report Cash Distribution [Table]

This table is used to report various cash distributions made to different classes of investors. The table uses three typed dimensions to allow preparers to associate the report with a project (*Project Identifier [Axis]*), a type of cash distribution such as “Preferred” as noted in the example below (*Cash Distribution [Axis]*), and a type of investor such as Class A investor or Class B investor (*Investor Class [Axis]*).

The concept *Period Of Applicable Distribution* relates to the period for which the cash distribution is made, for example the cash distribution is a payment for services rendered in the month of January, or for the second quarter.

Cash distribution values reported on this table can all be tagged using the US GAAP Taxonomy concept *Partners Capital Account Return Of Capital* which is defined as “Total change in each class of partners' capital accounts during the year due to the return of partner's capital. That is, excess distributions over earnings to partners. All partners include general, limited and preferred partners.”

The axes available should be used to refine the definition. For example, the value highlighted on the diagram of 256,198.18 should be reported using preparer-defined members of Class A Investor, Project 1, and Preferred Cash.

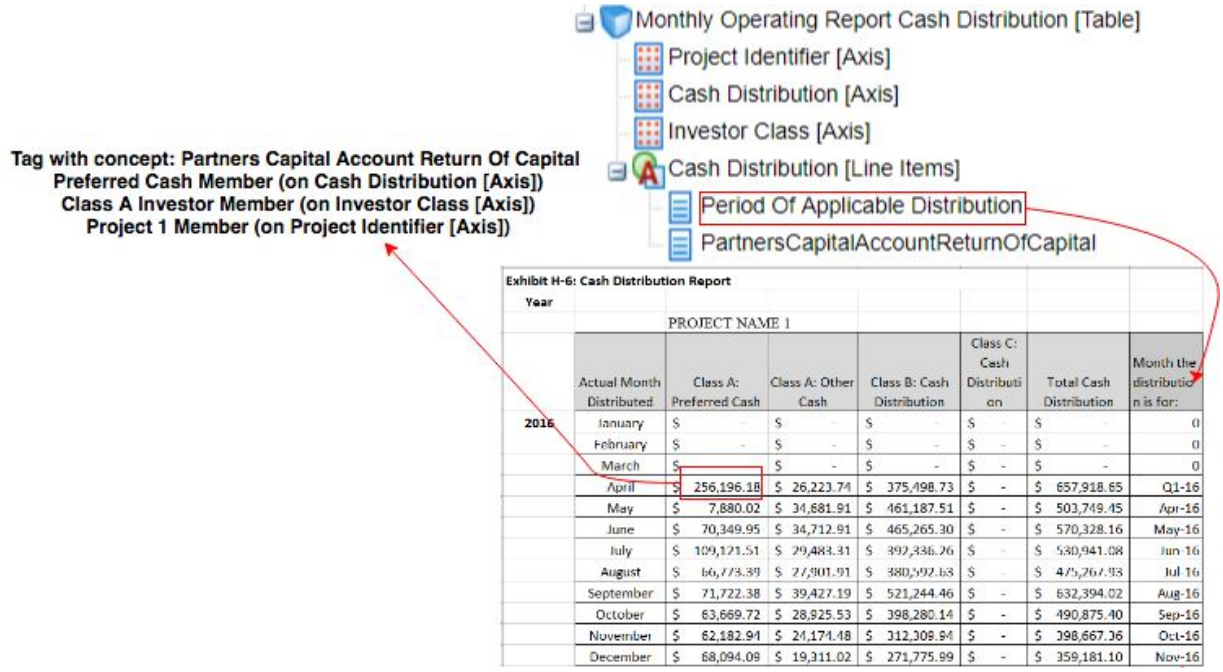


Exhibit H-6: Cash Distribution Report

Year

PROJECT NAME 1

	Actual Month Distributed	Class A: Preferred Cash	Class A: Other Cash	Class B: Cash Distribution	Class C: Cash Distribution	Total Cash Distribution	Month the distribution is for:
2016	January	$ -	$ -	$ -	$ -	$ -	0
	February	$ -	$ -	$ -	$ -	$ -	0
	March	$ -	$ -	$ -	$ -	$ -	0
	April	$ 256,196.18	$ 26,223.74	$ 375,498.73	$ -	$ 657,918.65	Q1-16
	May	$ 7,880.02	$ 34,681.91	$ 461,187.51	$ -	$ 503,749.45	Apr-16
	June	$ 70,349.95	$ 34,712.91	$ 465,265.30	$ -	$ 570,328.16	May-16
	July	$ 109,121.51	$ 29,483.31	$ 392,336.26	$ -	$ 530,941.08	Jun-16
	August	$ 66,773.39	$ 27,901.91	$ 380,592.63	$ -	$ 475,267.93	Jul-16
	September	$ 71,722.38	$ 39,427.19	$ 521,244.46	$ -	$ 632,394.02	Aug-16
	October	$ 63,669.72	$ 28,925.53	$ 398,280.14	$ -	$ 490,875.40	Sep-16
	November	$ 62,182.91	$ 24,171.48	$ 312,309.84	$ -	$ 398,667.36	Oct-16
	December	$ 68,094.09	$ 19,311.02	$ 271,775.99	$ -	$ 359,181.10	Nov-16

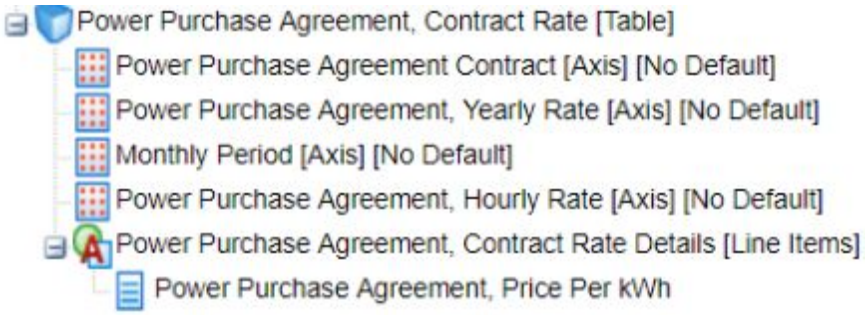
20 Power Purchase Agreement Entry Point

20.1 Power Purchase Agreement Contract [Table]

This is one of two tables that reside in the PPA entry point. A portion of this table is depicted on the diagram below. This table is designed to represent multiple PPA contracts. It relies on the *Power Purchase Agreement Contract [Axis]* which is a typed dimension. There are over 70 line item concepts to report values ranging from invoicing information to performance guarantees.

20.2 Power Purchase Agreement, Contract Rate [Table]

This table, shown below, is designed to capture rate information that changes over time. It uses four axes, all typed dimensions, which allow preparers of PPA rate data to identify the PPA contract, and to present rates that occur at yearly, monthly, or hourly frequencies.



Below is an example of a partial exhibit that may be included in a PPA with annual rates. To report the value $0.25, use the concept Power Purchase Agreement, Price Per kWh, with the *Power Purchase Agreement, Yearly Rate [Axis] [No Default],* and the *Power Purchase Agreement Contract [Axis]* to identify the specific PPA.

Other values on this table that can be tagged include the date, January 25, 2017, using the concept *System Commercial Operations, Date*. The value 20 years, can be tagged with the concept *Power Purchase Agreement, Term*. They are tagged using line items from the *Power Purchase Agreement Contract [Table]* and as such, should be associated with the identifier for the PPA by using the *Power Purchase Agreement Contract [Axis]*, which is a “no default” axis.

Exhibit- Basic Terms and Conditions	
Commercial Operations Date: January 25, 2017	**Term: 20 years, beginning on Commercial Operations Date**
Contract Price:	
Year	**$/kWh**
1	$0.25
2	$0.23
3	$0.20
4	$0.20
5	$0.18
6	$0.16

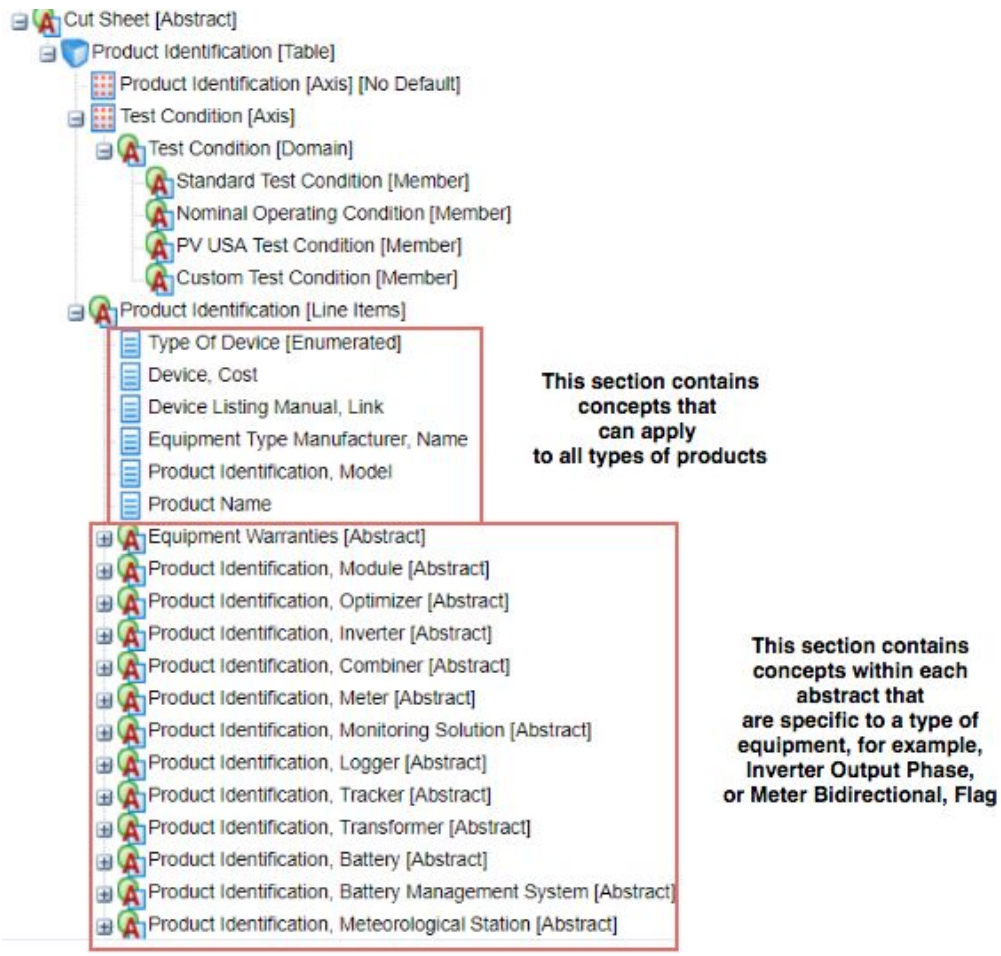
When tagging rates that are monthly or hourly, use the associated axis, *Monthly Period [Axis]* or *Energy Contract, Hourly Rate [Axis]*, and you must also use the *Power Purchase Agreement, Yearly Rate [Axis] [No Default]*. Because this axis is “no default”, it must always be used when tagging data using this table.

21 Cut Sheet Entry Point

Cut sheets are manufacturer equipment specification sheets, designed to convey nameplate and physical information about a product. This document entry point contains concepts to standardize a cut sheet for various pieces of equipment that may be used in a system. Below is an example of an inverter cut sheet that features manufacturer information about three different inverter models.

Technical data	Product Name 3.0		Product Name 3.8		Product Name 5.0	
	208 V	240 V	208 V	240 V	208 V	240 V
Input (DC)						
Max. usable DC power	3100 W	3100 W	3450 W	4000 W	5150 W	5150 W
Max. DC voltage	600 V					
Rated MPP voltage range	155 - 480 V		195 - 480 V		220 - 480 V	
MPPT operating voltage range	100 - 550 V					
Min. DC voltage / start voltage	100 V / 125 V					
Max. operating input current per MPPT	10 A					
Max. short circuit current per MPPT	18 A					
Number of MPPT tracker / string per MPPT tracker	2/1				3 / 1	
Output (AC)						
AC nominal power	3000 W	3000 W	3330 W	3800 W	5000 W	5000 W
Max. AC apparent power	3000 VA	3000 VA	3330 VA	3800 VA	5000 VA	5000 VA
Nominal voltage / adjustable	208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●
AC voltage range	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V	183 - 229 V	211 - 264 V
AC grid frequency	60 Hz / 50 Hz					
Max. output current	14.5 A	12.5 A	16.0 A	16.0 A	24.0 A	24.0 A
Power factor (cos φ)	1					
Output phases / line connections	1 / 2					
Harmonics	< 4 %					
E ciency						
Max. e ciency	97.2 %	97.6 %	97.2 %	97.5 %	97.2 %	97.5 %
CEC e ciency	96 %	96.5 %	96.5 %	96.5 %	96.5 %	97 %
Protection devices						
DC disconnect device	●					
DC reverse polarity protection	●					
Ground fault monitoring / Grid monitoring	●					
AC short circuit protection	●					
All-pole sensitive residual current monitoring unit (RCMU)	●					
Arc fault circuit interrupter (AFCI)	●					
Protection class / overvoltage category	I / IV					
General data						
Dimensions (W / H / D) in mm (in)	535 x 730 x 198 (21.1 x 28.5 x 7.8)					
Packaging Dimensions (W / H / D) in mm (in)	600 x 800 x 300 (23.6 x 31.5 x 11.8)					
Weight	26 kg (57 lb)					
Packaging weight	30 kg (66 lb)					
Operating temperature range	- 25°C ...+60°C					
Noise emission (typical)	39 dB(A)					
Internal power consumption at night	< 5 W					
Topology	Transformerless					
Cooling concept	Convection					
Features						
Secure Power Supply	●					
Display (2 x 16 characters)	●					

The *Product Identification [Table]* - shown below and included in this entry point, was initially covered in section 8.2 and should be used to tag a cut sheet.



Numerous concepts are available as highlighted on the diagram that can be used for manufacturer cut sheet values.

The *Test Condition [Axis]* - an explicit dimension - allows for the reporting of various nameplate values measured using *Standard Test Condition, Nominal Operating Condition*, or *PV USA Test Condition.*

If needed, a custom test condition can be created and the preparer can provide their own testing values for irradiance, wind speed, cell temperature, ambient temperature, and air mass. It is unlikely that custom test conditions will be used in a cut sheet; therefore the concepts needed to tag these alternative measures are not provided in the cut sheet entry point. In the event that a manufacturer does specify their own custom test condition, these concepts can be found in the Data-System section of the Taxonomy.

Below are examples of how reported values, highlighted on the cut sheet above, should be tagged using the *Product Identification [Table]*:

Reported Value	Concepts Needed
3000 Watts	Product Identification [Axis] with member "Product 3.0" Concept "Inverter Output, Rated Power AC, Amount"
535 width	Product Identification [Axis] with member "Product 5.0" Concept "Inverter, Width"

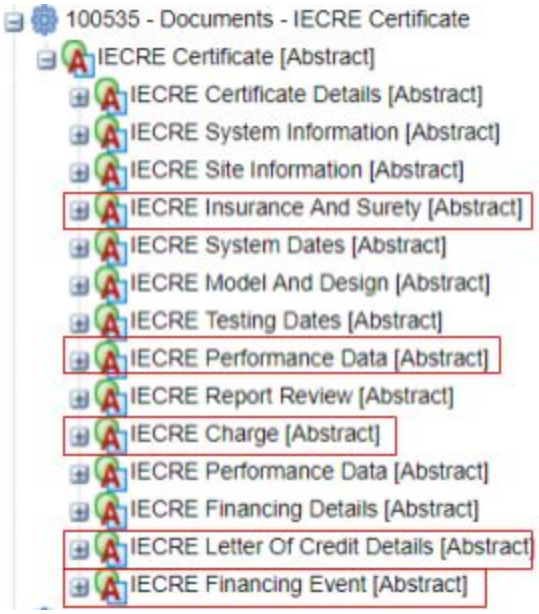
22 IECRE Certificate Entry Point

The IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications (IECRE)[9] is a set of global certification standards. Orange Button is designed to capture data needed for certifications which include the following IECRE certificate types:

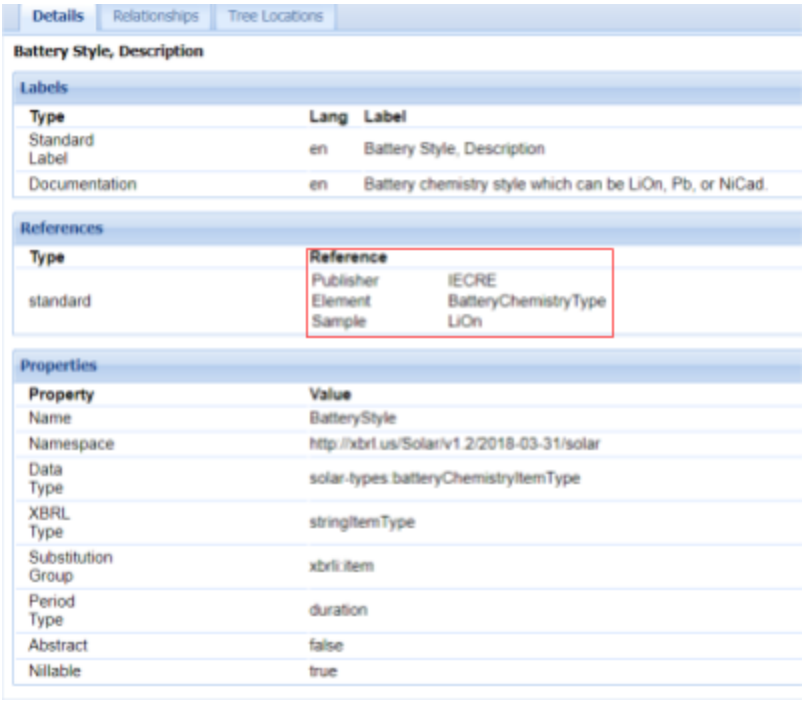
Certificate	Description
OD-403-1	PV system Design Qualification Certificate, Part 1 PV Site Qualification
OD-403-2	PV system Design Qualification Certificate, Part 2 PV Power Block Design Qualification
OD-403	PV system Design Qualification Certificate
OD401-1	PV Conditional PV system Certificate: Part 1 PV Construction Completion
OD-401	Conditional PV Project Certificate
OD-402	Annual PV system Performance Certificate
OD-404	PV Asset Transfer Certificate
OD-409	PV system Decommissioning Certificate

This entry point contains five separate tables to capture various dimensional data that may need to be collected to prepare an IECRE certificate. The diagram below shows the abstracts of content - the ones that contain tables are highlighted in red.

[9] IECRE: www.iecre.org/documents/refdocs/



Many of the concepts in this entry point include references to the appropriate IECRE document, with the corresponding IECRE concept reported as well. Where available, examples of a reported value are also included. For example, on the diagram below that shows the Orange Button concept *Battery Style, Description*, the corresponding IECRE name is *BatteryChemistryType*. An example of a reported fact for this concept is “LiOn”.



Details | Relationships | Tree Locations

Battery Style, Description

Labels

Type	Lang	Label
Standard Label	en	Battery Style, Description
Documentation	en	Battery chemistry style which can be LiOn, Pb, or NiCad.

References

Type	Reference	
standard	Publisher	IECRE
	Element	BatteryChemistryType
	Sample	LiOn

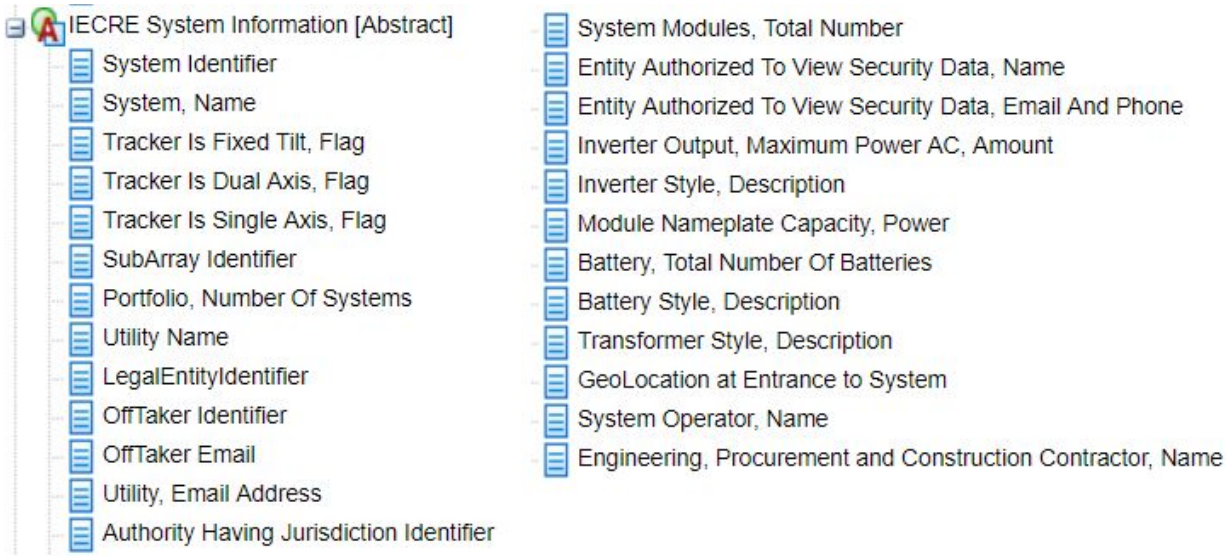
Properties

Property	Value
Name	BatteryStyle
Namespace	http://xbrl.us/Solar/v1.2/2018-03-31/solar
Data Type	solar-types:batteryChemistryItemType
XBRL Type	stringItemType
Substitution Group	xbrli:item
Period Type	duration
Abstract	false
Nillable	true

22.1 Concepts Representing Data in IECRE Certificates

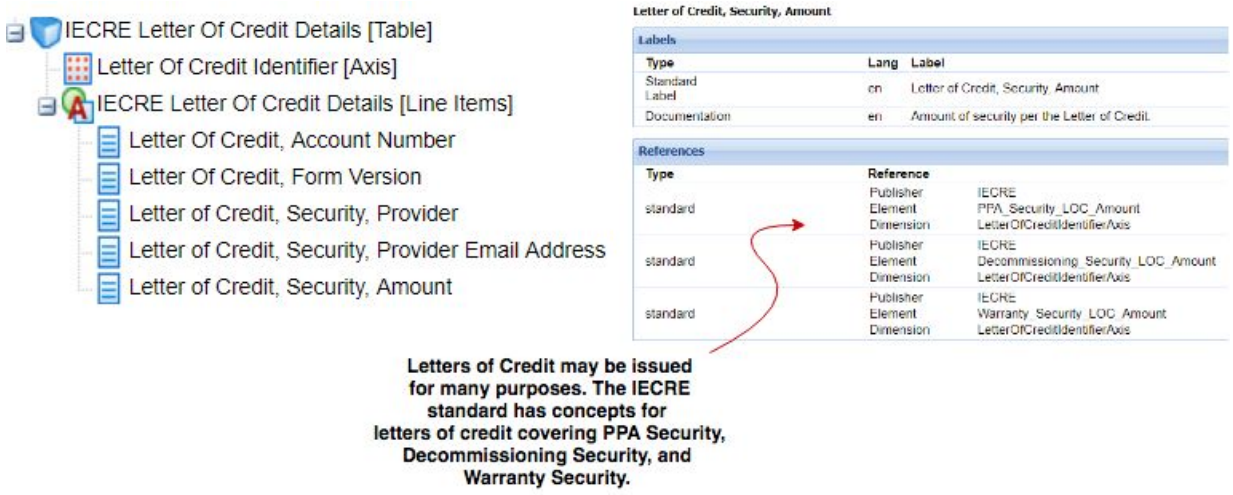
A significant amount of information is needed to prepare an IECRE certificate including data about the system, and the site . Concepts representing data about the certificate itself such as the certificate number, type, certifying body, and inspection body, are contained in the *IECRE Certificate Details [Abstract]* shown below. The *IECRE Testing Dates [Abstract]* provides concepts that can be used to tag the dates of the testing performed.

Concepts that can be used to tag data about the system is found in the *IECRE System Details [Abstract]* as shown below. Many of these elements are also available in other parts of the Taxonomy.



22.5 IECRE Letter Of Credit Details [Table]

A letter of credit is a letter from a bank guaranteeing that a buyer's payment to a seller will be received on time and for the correct amount. In the event that the buyer is unable to make payment on the purchase, the bank will be required to cover the full or remaining amount of the purchase. In the solar financing process, letters of credit can be prepared for many purposes.



This table provides the *Letter Of Credit Identifier [Axis]* which is a typed dimension to represent any number of letters of credit issued for various purposes. This is the same axis that is used in the *Letter Of Credit [Table]* found in the Document-Letter Of Credit entry point. The *IECRE Letter Of Credit [Table]* has only those line items that are needed for the preparation and awarding of an IECRE certificate. Many more line items can be found in the Document-Letter Of Credit entry point.

For the purposes of preparing an IECRE certificate, preparers may need to capture information about letters of credit for PPA security, decommissioning security, and warranty security. These are noted in the references for each of the line items on this table and are shown on the diagram above.

23 Engineering Services Checklist Entry Point

23.1 Independent Engineering Services Checklist [Table]

Hundreds of documents may be gathered over the course of a renewables project, each providing data that helps in monitoring project progress. This table is used to capture data collected from the reports, documents, and reviews prepared and conducted. The data collected

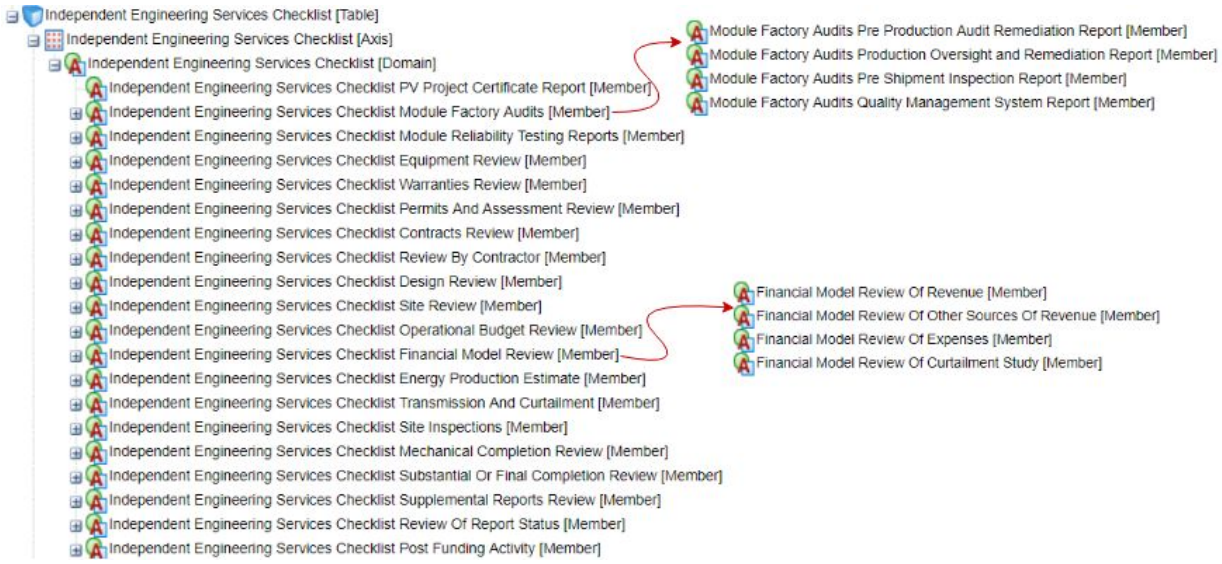
includes the standards followed for certain certificates and reports, the phase during which the document is needed, the preparer and advisor commenting on the document, as well as advisor opinions and notes. An example of a portion of a report that may be used to monitor these activities is shown below.

DG Portfolio	Utility Scale	Engineering Services (if applicable)	Standard or source of publicly available procedure	Ideally Pre-Construction, or Early Construction	Periodic Throughout Construction	Initial Funding (upon Mechanical Completion)	Final Funding (upon Substantial or Final Completion)	Post-Funding
x	x	***PV Project Certificate - report***	IECRE OD-401	x		x		
x	x	***Module Factory Audits - all below are reports***	OD-405-1 to 3					
x	x	Pre-production audit and remediation as needed -		x				
x	x	Production oversight and remediation as needed (20% of assembly time) - separate report		x				
x	x	Pre-shipment inspection (visual, EL, flash test of		x				
x	x	QMS (quality management system) data review		x				
x	x	***Module Reliability Testing (if needed based on audit)*** -						
x	x	Module Pre-Qualification Tests (IEC and Extended	See Module ALT	x				
x	x	Statistical Module Batch Tests (each BOM/Factory	See Module ALT	x				
x	x	Degradation Rate Characterization Tests	See Module ALT	x				
x	x	***Equipment Review - used in independent engineer report, operational history, description, view on***						
x	x	PV modules		x				
x	x	Inverters		x				
x	x	Racking, Tracker or Parking Structure		x				
x	x	Medium Voltage Transformers		x				
	x	Generation Step-up Transformers		x				
x	x	Data Acquisition System/Meters		x				
	x	SCADA System/Meters		x				
x	x	Communication Infrastructure		x				
x	x	Meteorological Station		x				
x	x	Other material equipment if any		x				

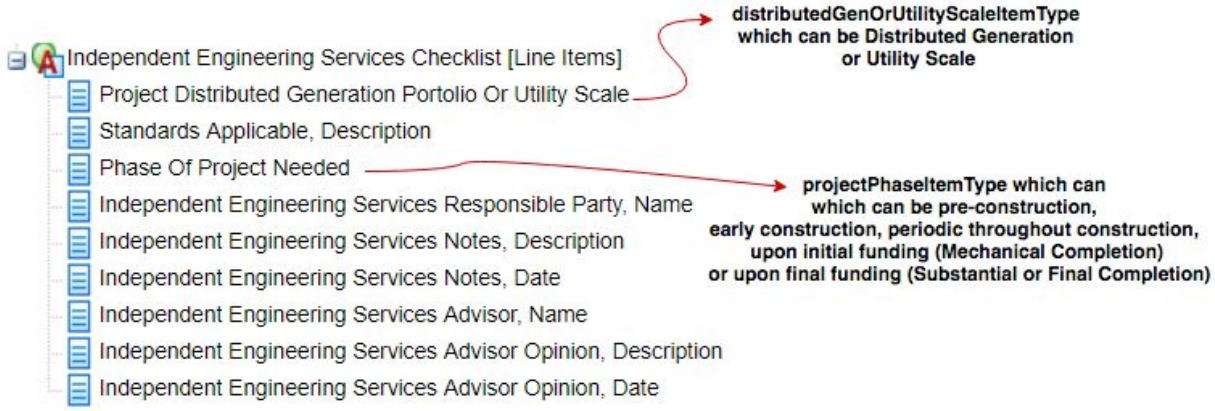
10

The axis Independent *Engineering Services Checklist [Axis]* is an explicit dimension with members to designate documents, as well as groups of documents. The member Independent *Engineering Services Checklist Module Factory Audits [Member]*, for example, can be disaggregated into documents, Pre-Production Audit Remediation Report, Production Oversight and Remediation Report, Pre-Shipment Inspection Report, and Quality Management System Report. Similarly, the *Finance Model Review [Member]*, also highlighted on the diagram below, can be disaggregated into other documents that may need to be monitored and tracked.

[10] Contributed by Wells Fargo.



The line items shown below allow the preparer to tag values associated with each document. There are two custom enumerated concepts as shown on the diagram that require the preparer to select from a set of options.



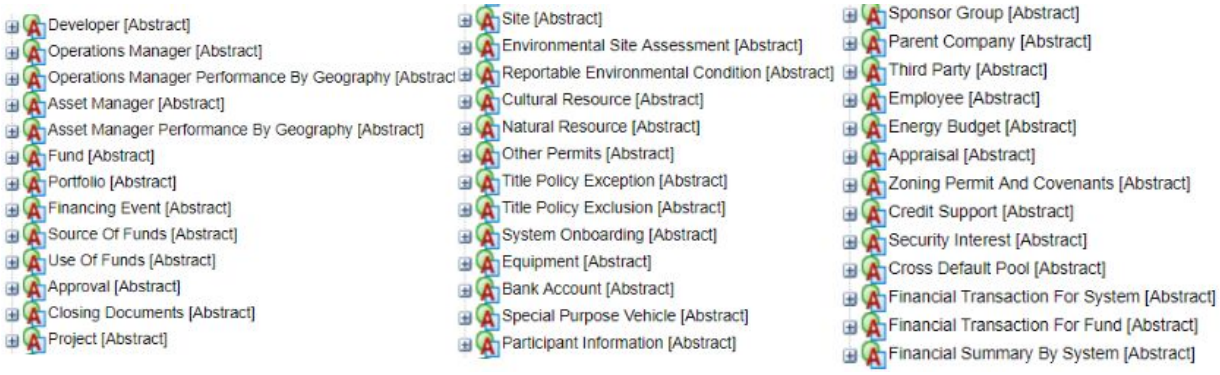
24 Process Entry Point for Project Financing

Project finance is the leading method to finance large infrastructure projects such as solar plants. This entry point contains numerous tables, abstracts, and concepts to capture the large amount of documentation needed during the onboarding process, and for ongoing monitoring of long-term renewable project financing.

The diagram below shows the content available in this entry point. Some of the content can also be found in other sections of the Taxonomy, and as such, may have already been covered in other parts of this Guide, and therefore will not be addressed again in this section. For example, *Developer [Abstract], Asset Manager [Abstract]*, and *Operations Manager [Abstract]* are also

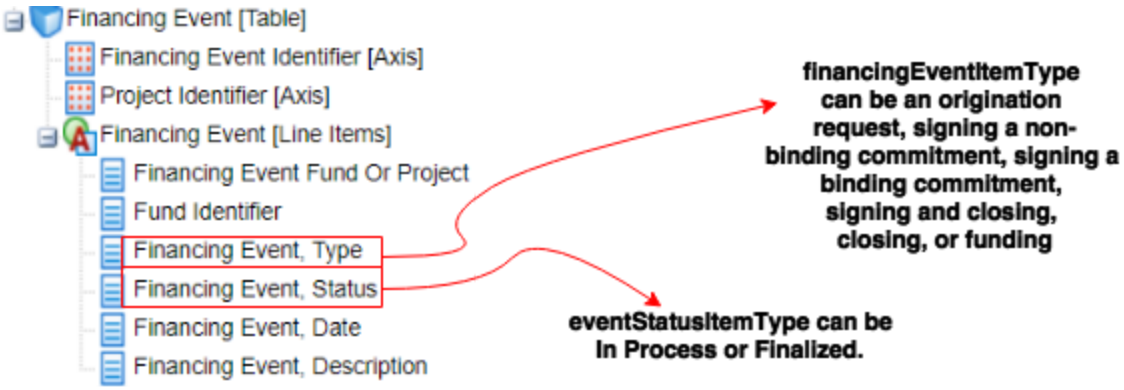
contained, respectively, in the Data-Developer, Data-Asset Manager, and Data-Operations Manager entry points and have been addressed in previous sections.

Duplication of elements is designed to make it easier to find appropriate elements. Other content, such as *Appraisal [Abstract]* and *Financial Transaction For System [Abstract]* is only found in the Process-Project Financing entry point.



24.1 Financing Event [Table]

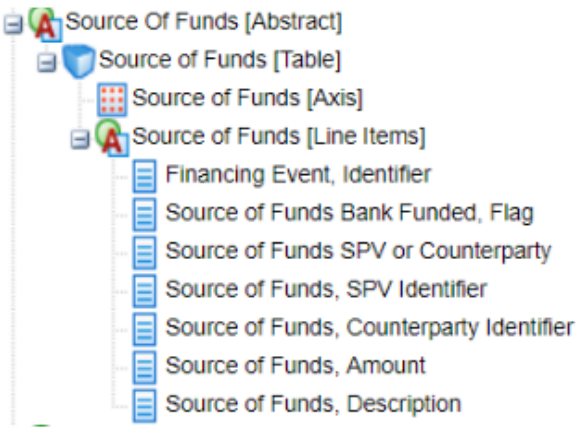
Data about financing events in project finance are captured in this table. A financing event could be an origination request, the signing of a non-binding commitment, or other category as noted in the diagram below. This table uses a typed dimension, as there can be any number of such events. It can be used in conjunction with the *Project Identifier [Axis]* so that multiple financing events can be linked to multiple projects. A second enumerated list concept, Financing Event, Status, is also available to help preparers identify whether the event has been finalized or is still in process as shown below.

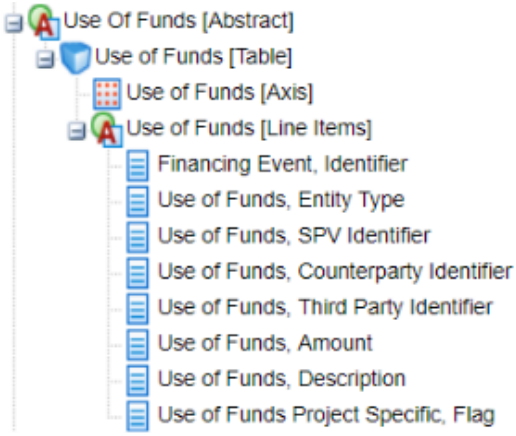


The table below depicts the kind of data that can be represented using this table.

Financing Event Identifier [Axis]	Project Identifier [Axis]	Fund Identifier	Financing Event, Type	Financing Event, Status
1	red	A	Closing	In Process
2	green	A	Funding	Finalized
3	yellow	A	Binding commitment	Finalized

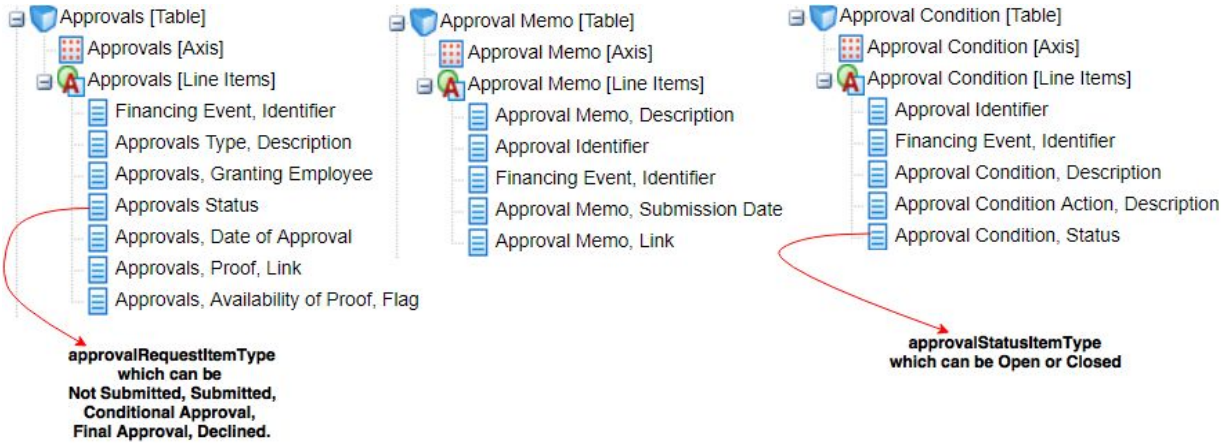
Financing events will have associated sources and uses of funds to finance the event. These sections are shown in the diagram below.





24.2 Approvals Tables

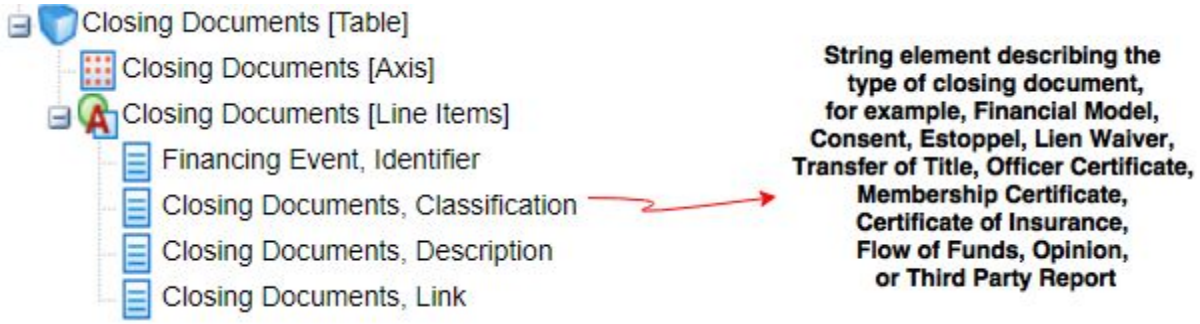
Financing events may require approvals. Data about approvals are captured in three tables. An approval can be for various types of financing events such as approvals for the Solar Project Finance, Line of Business, Credit, or for the Special Purpose Entity. The *Approvals [Table]*, shown in the left side column on the diagram below, uses a typed dimension with an *Approvals [Axis]* to accommodate multiple approvals which may be associated with a single financing event (which the preparer identifies by using the *Financing Event, Identifier)*. The *Approval Memo [Table]* in the center column, is used to tag information about memos related to approvals. The *Approval Condition [Table]* in the right side column is used to tag information about the status and actions needed for various approvals.



The *Approval Memo [Table]* and the *Approval Condition [Table]* both include the Approval Identifier concept, which is used by the preparer to link the approval to the memo about the approval, and to the condition of the approval.

24.3 Closing Documents [Table]

Various types of closing documents, such as Financial Model, Consent, Estoppel, Lien Waiver, Transfer of Title, Officer Certificate, Membership Certificate, Certificate of Insurance, Flow of Funds, Opinion, or Third Party Report, may be generated related to a financing event. This table, which uses a typed dimension, is used to capture this information. The Financing Event Identifier concept is used to link the financing event to the closing documents.

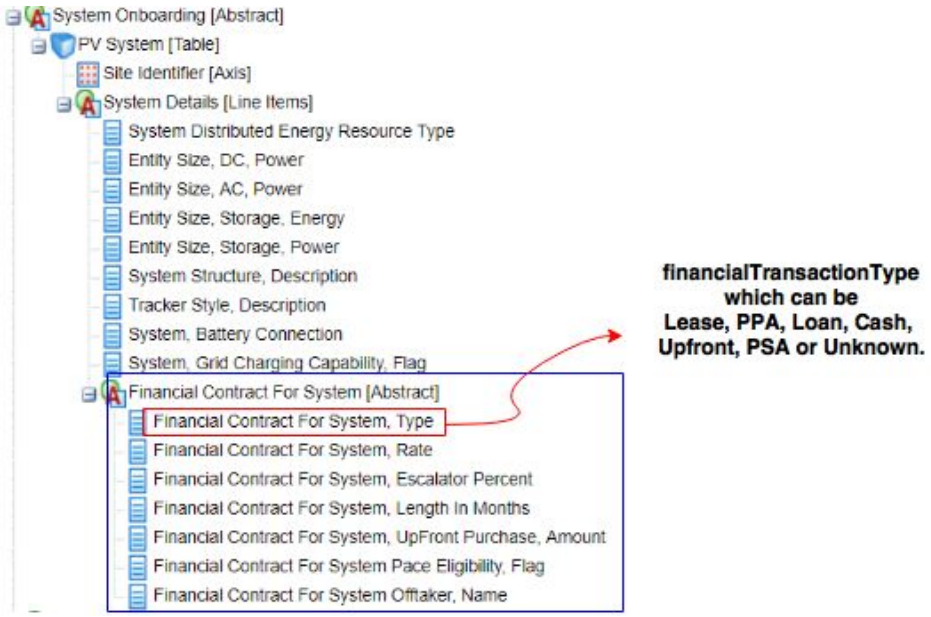


24.4 System Onboarding [Table]

This tables relies on the *PV System [Axis]* to report information about the system used during the onboarding process. Preparers can also use the *Site Identifier [Axis]* to indicate the site or sites used in connection with the system.

In addition to general information such as DER type and entity size, this table includes a set of data, highlighted in the blue box on the diagram below, about financial contracts between a

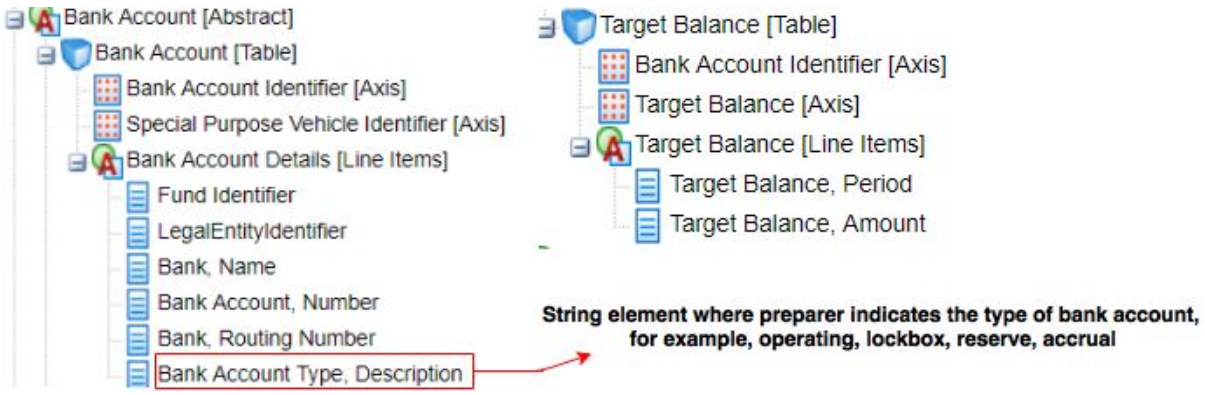
homeowner and a residential solar company, or between a commercial building owner and a C&I solar company, that are related to the system.



24.5 Bank Account Tables

Two tables are used to represent information about bank accounts used in project financing: the *Bank Account [Table]* which represents information related to a bank account such as account number, routing number, type of bank account, identifier for the special purpose vehicle to which the account is associated, and name of bank; and the *Target Balance [Table]* which represents information related to the target balance in a Bank Account which is used for a system implementation. Information about the target balance can include bank account identification number, period during which the target balance applies, and target balance amount.

Note that the *LegalEntityIdentifier* concept on the *Bank Account [Table]* is sourced from the SEC's Document Entity Information (DEI) Taxonomy.

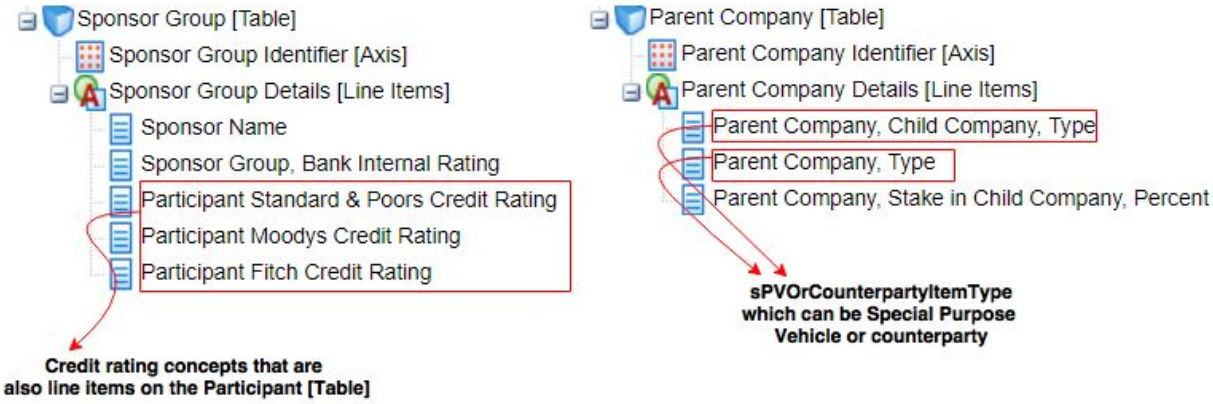


24.6 Special Purpose Vehicle [Table]

A special-purpose entity (SPE) or special-purpose vehicle (SPV) is a legal entity (usually a limited company or limited partnership) created to fulfill narrow, specific, or temporary objective, such as the creation and implementation of a solar project company or fund company. This table is used to represent any kind of legal entity including a SPV. It contains numerous boolean items (indicated as "flag" on the diagram below) which allows the preparer to indicate the availability of the legal entity articles of organization, certificate of organization, membership certificate, and operating agreement.

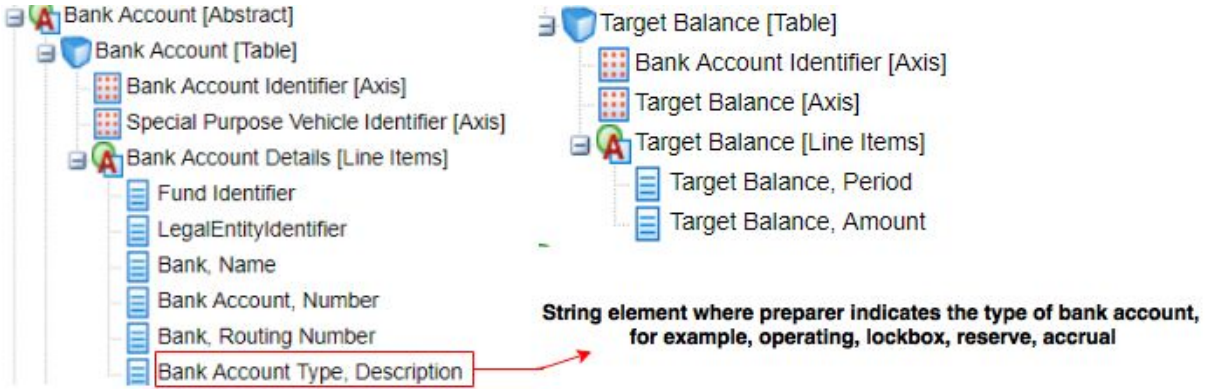
24.7 Sponsor Group [Table] and Parent Company [Table]

These two tables are designed to tag basic information about sponsors, which are the organizations that develop or sponsor the project; and parent companies, which can be a counterparty or a SPV. The *Sponsor Group [Table]* enables tagging of the credit rating of the organization. See diagram below.



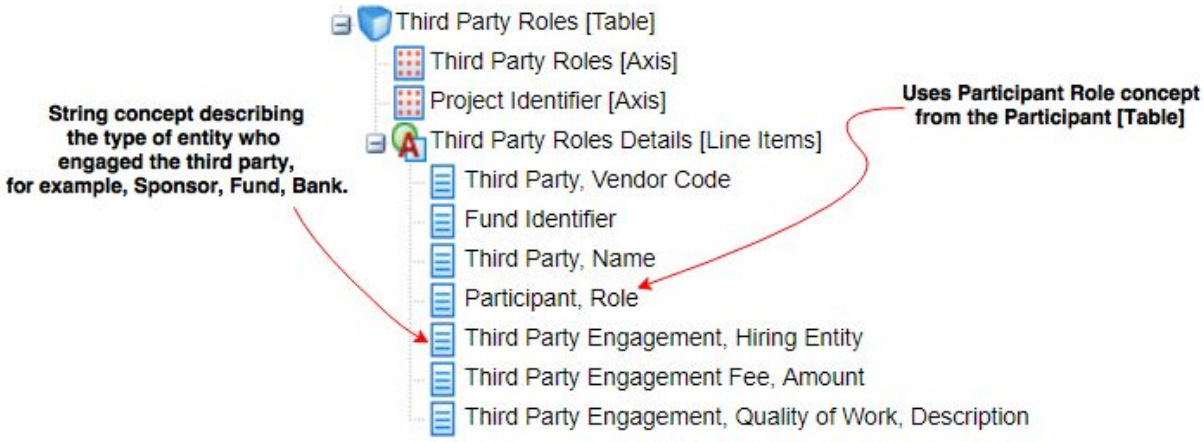
24.8 Bank Account [Table] and Target Balance [Table]

The *Bank Account [Table]* is used to report information about multiple bank accounts for various SPVs involved in a solar implementation. The table allows for multiple bank accounts on the *Bank Account Identifier [Axis]* and multiple SPVs on the *Special Purpose Vehicle Identifier [Axis]*. The *Target Balance [Table]* is used to report various target balance amounts for specified time periods, associated with the bank accounts.



24.9 Third Party Roles and Employee Tables

The *Third Party Roles [Table]* is designed to reflect information about any outside organization (third party) involved in a fund, and as such, relies on a *Third Party Roles [Axis]* as the primary key, which is a typed dimension. The table uses the Fund Identifier concept to connect the third party role to a fund. This table is shown in the diagram below. The *Employee [Table]* is used to report contact information, and role of individual employees engaged in the project.



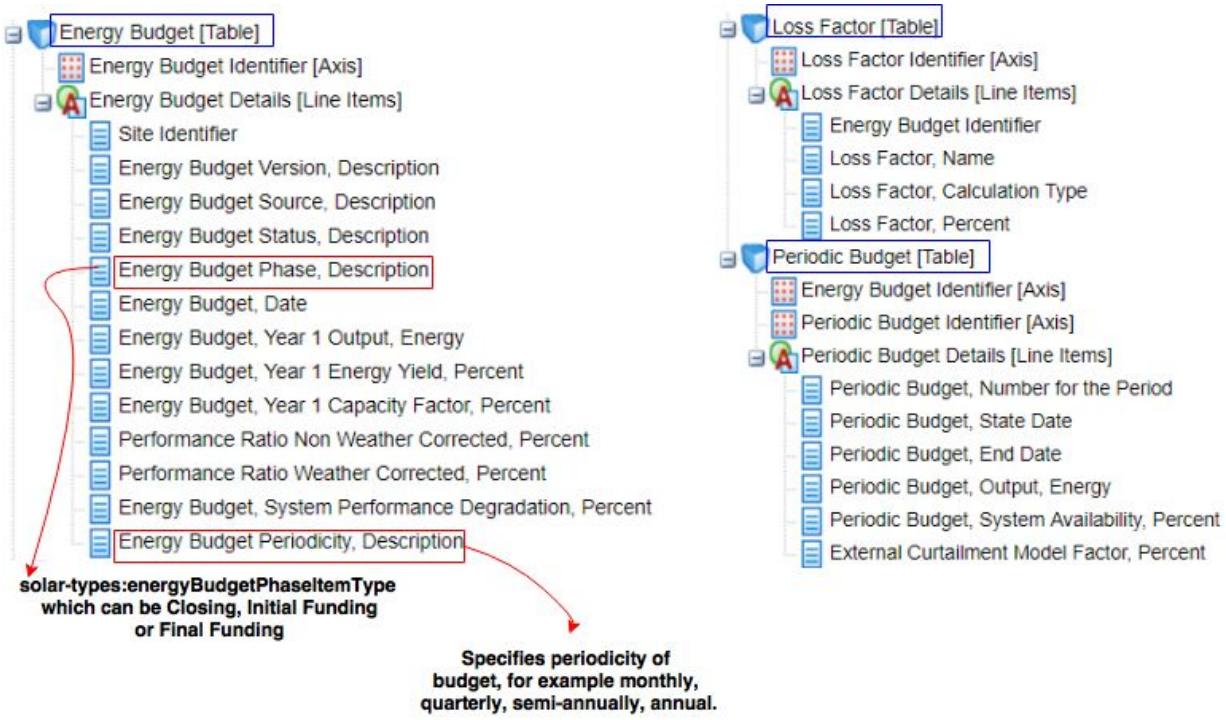
24.10 Energy Budget Tables

Multiple budgets may be prepared for a single site. For example, separate budgets may be prepared by the internal engineer, the independent (external) engineer, or the sponsor company. Different budgets may be created depending on the phase of the project, for example, at closing, initial funding, or at the final funding stage. This table is designed to capture information for the various types of budgets prepared. All tables use typed dimensions.

The *Energy Budget [Table]* describes the various energy budgets and relates them to the appropriate site with the Site Identifier. This is shown on the left side of the diagram below.

The *Loss Factor [Table]*, depicted on the right side of the diagram, should be used by preparers to capture data about factors, such as soiling or snow, that lead to a loss in energy connected to a specific energy budget. Data reported can include type, method of calculating the loss factor and percent loss. Use the *Energy Budget Identifier* to connect the loss to a specific budget.

The *Periodic Budget [Table]* is used to represent information about various periodic energy budgets and is shown on the right side of the diagram.



24.11 Appraisal Tables

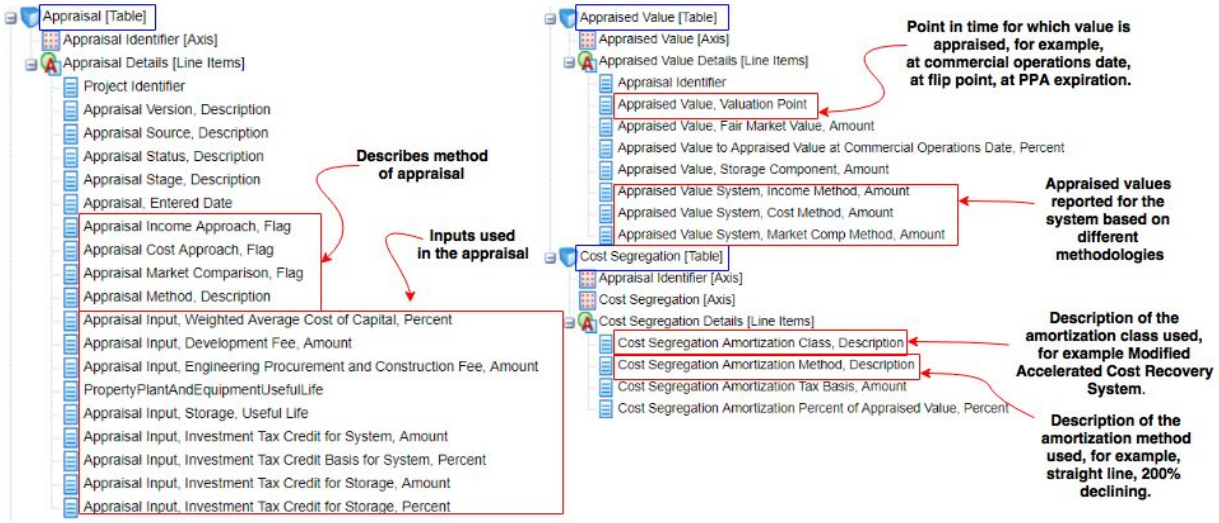
Three tables are available in the Taxonomy to represent information about appraisals for the project. Appraisals may be prepared by different organizations, for example, by an outside appraiser or by the sponsor. They may be performed at different stages in the project lifecycle, for example, at closing, initial funding, or final funding. String concepts are available to capture this type of information.

Appraisal tables use typed dimensions. The first table, shown on the left side of the diagram below, is the *Appraisal [Table]* which has an *Appraisal [Axis]* to represent multiple appraisals that may be developed. The *Appraisal [Axis]* is a typed dimension and is the primary key for the table. It can be used with the Project Identifier to associate a specific appraisal with a project.

Boolean elements are available to collect information on the methodology employed to create the appraisal, for example, does it use an income or cost approach? Does the appraisal consider market comparables? Inputs to the appraisal can also be tagged, such as development fee, EPC fee, and weighted average cost of capital.

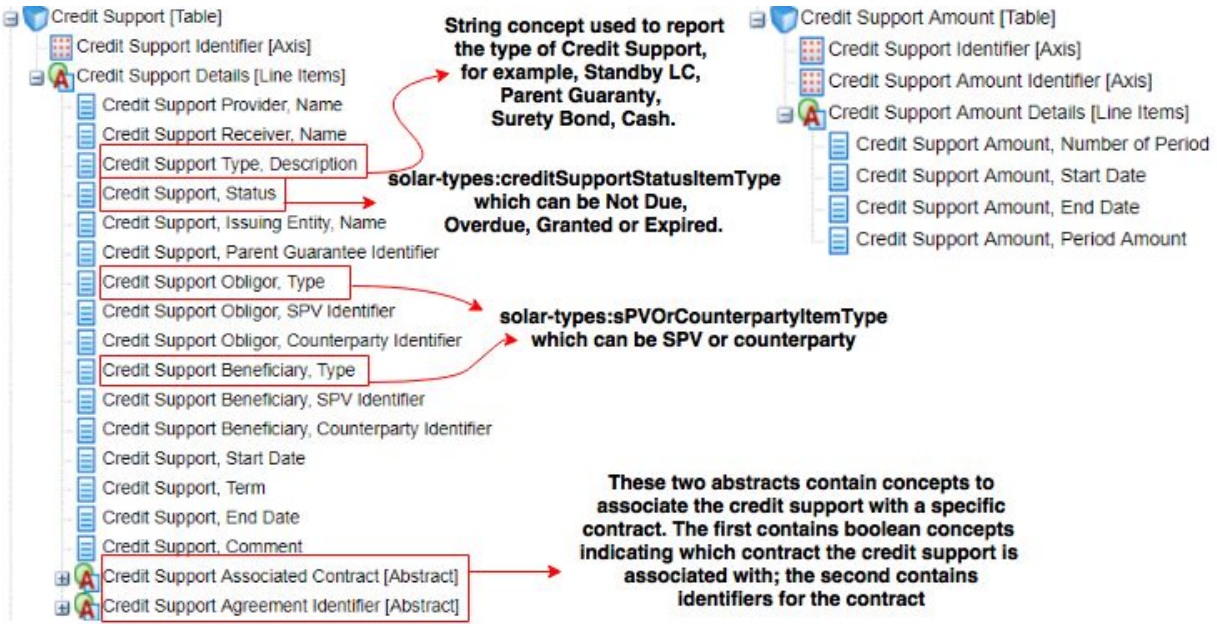
The *Appraised Values [Table]*, shown on the right side of the diagram below, represents information about the various values determined for the system using different appraisal methodologies. The *Cost Segregation [Table]* represents information about the cost segregation method used for an appraisal, which is the process of identifying personal property assets that are grouped with real property assets, and separating out personal assets for tax reporting

purposes. Information about the cost segregation method used for a specific appraisal can include descriptions of the amortization class and method, tax basis amount, and percent of appraised value. These two tables are shown on the right side of the diagram below with descriptions of certain elements and how to use them.



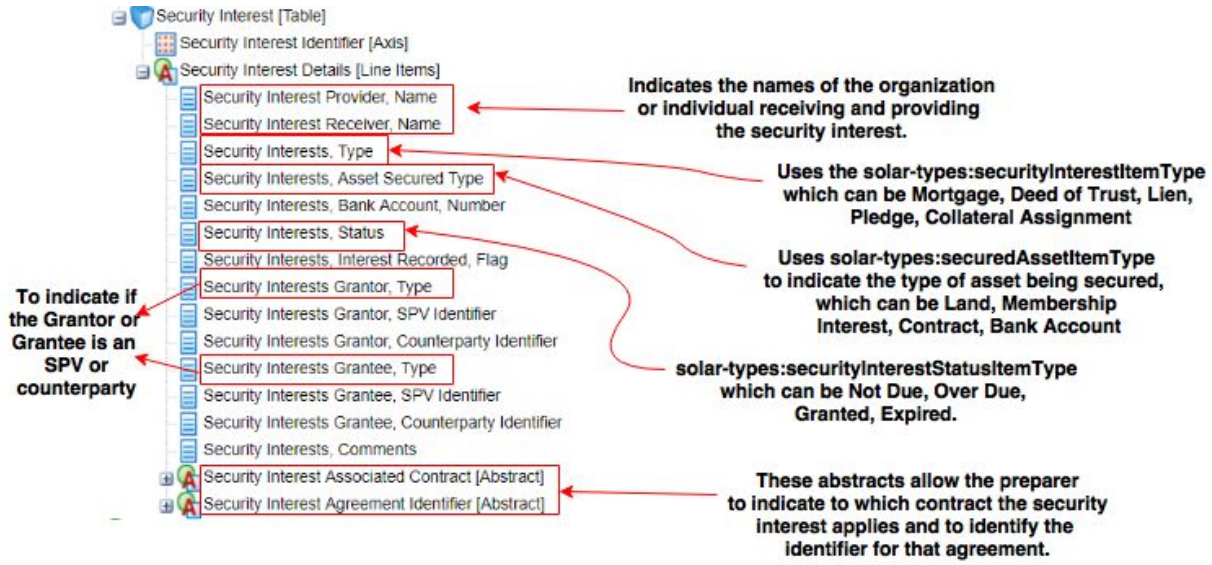
24.12 Credit Support

Credit may be provided by an entity to support a particular contract, for example for the LLCA, for a term loan, or for the hedge agreement. The *Credit Support [Table]* allows for the tagging of multiple types of credit support, and associates that support with the individual contract. This relies on a typed dimension to report any number of credit support amounts. The *Credit Support Amount [Table]* has two axes: one for the credit support amount which is the primary key for the table; and the credit support identifier which is the secondary key for the table.



24.13 Security Interest Tables

Security Interest is when the bank shares ownership, or is a joint counterparty, to something of value, such as the project itself, or to a key agreement like the asset management agreement. This table represents security interest identifier on the axis, as the primary key for the table, using a typed dimension.



24.14 Cross Default Pool [Table]

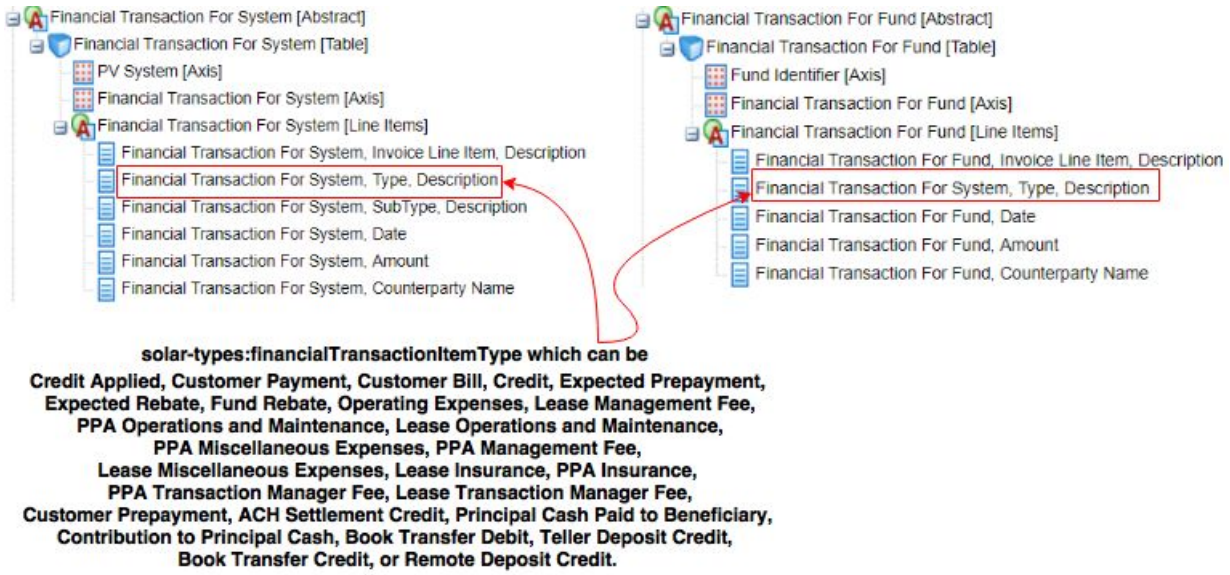
This table enables the tagging of data about default pools, which is a pool established where the revenue from one project can be used to pay the expenses and lease payment for another project that would otherwise go into default.

There are two boolean elements available. The *Cross Default Pool, Both Parties Cross, Flag*, which is used to indicate if both parties can cross the default; and the *Cross Default Pool, Monetizing of Collateral, Flag*, which indicates if, in the event of a default, the non breaching party can monetize the collateral on the other agreement. Line items for this table include abstracts containing agreement identifiers and concepts which can link the cross default pool to a specific contract associated with the project.

24.15 Financial Transaction Tables

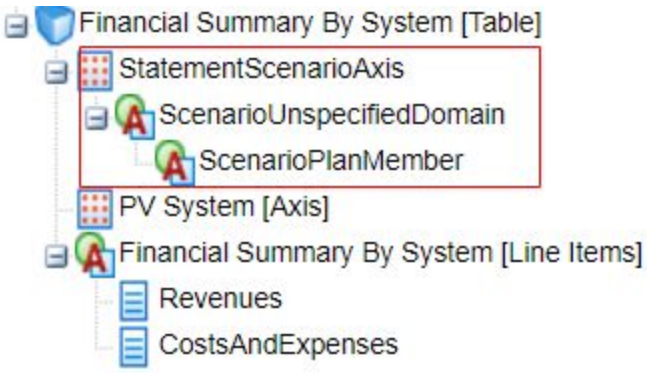
Two tables are available to report information about historical financial transactions related to a system (*Financial Transaction For System [Table]*); or transactions related to a given fund but that is not related to a specific system in the fund (*Financial Transaction For Fund [Table]*).

The diagram below depicts the two tables and highlights two enumerated concepts that have the same data type - solar-type:financialTransactionItemType.



24.16 Financial Summary [Table]

This table provides summary revenue and cost data about a system. As such, it relies on the *PV System [Axis]* which can be used to identify multiple systems. The table also relies on the *Statement Scenario [Axis]* which is an element sourced from the US GAAP Financial Reporting Taxonomy. This is an explicit dimension to report information by "scenario". Scenarios distinguish among different kinds of business reporting facts, as for example actual versus budgeted figures. The *Scenario Plan [Member]* is used on this axis to represent facts reported as plan. Data representing actual is reported by not using an axis, as actual is the default.



25 Creating and Using Orange Button Data

Orange Button data can be created, extracted, and processed by using any XBRL-enabled software or application. Orange Button content can also be created and used with the help of XBRL APIs and XBRL Orange Button-specific APIs.

The Orange Button Taxonomy is designed to work with XBRL APIs and with Orange Button XBRL APIs, all of which are open source and freely available. XBRL APIs are standardized application interfaces for software development that can be used with any XBRL content, such as an XBRL instance document, database, or taxonomy. Orange Button APIs are built on XBRL APIs but have the advantage of providing solar-specific endpoints to allow users to create or extract solar content. For example, Orange Button APIs can be used to create an Orange Button manufacturer cut sheet; or to identify all equipment categories, products and individual devices in a system. See the XBRL API documentation produced by XBRL US [XUS API] for more information.

26 Validating Orange Button Data

Validation/business rules can be written to enable checking of data at the point where the data is created by the preparer, and/or after the data is prepared and available to the user. The type of error checks that can be created could include:

- Signage requirements: checks to confirm that certain values are never negative (for example Measured Energy), or values that are never positive.
- Mandatory elements: checks that certain elements must be included when creating a type of document.
- Date timing: check that certain events occur prior to other events. For example, the Commercial Operations Date should always take place after the Permission To Operate, Date.

While these rules are not yet available, they could be created by using open source processors that are designed to create validation rules:

- **Xule** - Xule (XBRL Rules) is a proprietary open source XBRL rule processor. Like XBRL formula, required data rules can be expressed in Xule, which is only currently processed in Arelle (an open source XBRL processor).
- **XBRL formula** - XBRL formula is a rules engine for XBRL documents. Required data rules can be expressed in XBRL formula and then can be processed in most standard XBRL processors.

27 Ongoing Development and Maintenance

The Taxonomy will continue to be developed and expanded with elements necessary for reporting, and to adapt to the changing needs of the industry. Additional use cases could be added, as well. It is expected that a new release of Orange Button will be prepared and released once a year. This timing ensures needed revisions and updates are made and also that users of the Taxonomy have the needed resources and time for an easy transition. Today, over 6,000 public companies transition efficiently and smoothly to a new release of the US GAAP Financial Reporting Taxonomy every year. The 2018 US GAAP Taxonomy contains

approximately 15,000 elements, which is substantially larger than the Orange Button Taxonomy, which contains approximately 4,000 elements.

28 References

[XS] XBRL International Specification
http://specifications.xbrl.org/work-product-index-group-base-spec-base-spec.html

[XUS SG] XBRL US Style Guide
https://xbrl.us/style-guide

[XUS API] XBRL Application Programming Interface (API), Version 1
https://xbrl.us/xbrl-api

29 Glossary

abstract – An attribute of an element to indicate that the element is only used in a hierarchy to group related elements together. An abstract element cannot be used to tag data in an instance document. In the XBRL US GAAP Taxonomy, every element that has calculation children also has a corresponding abstract element.

attribute – A property of an element including its name, balance, data type, and whether the element is abstract. Attributes of XBRL US GAAP Taxonomy elements cannot be changed.

authoritative reference – Citations to specific authoritative accounting literature (pronouncements, standards, rules, and regulations) derived from various authoritative sources (SEC, FASB, and AICPA) and used to help define an element.

axis (pl. axes) – An instance document contains facts; an axis differentiates facts and each axis represents a way that the facts may be classified. For example, Revenue for a period might be reported along a business unit axis, a country axis, a product axis, and so forth.

axis-default relationship – The dimensional relationship indicating that the table axis has a default domain member. In the XBRL US GAAP Taxonomies 1.0, the default is always the domain element.

axis-domain relationship – The dimensional relationship indicating that the table axis has members drawn from a domain.

balance – An attribute of a monetary item type designated as debit, credit, or neither; a designation, if any, should be the natural or most expected balance of the element “credit” or “debit” and thus indicates how calculation relationships involving the element may be assigned a weight attribute (-1 or +1).

calculation relationships – Additive relationships between numeric items expressed as parent-child hierarchies. Each calculation child has a weight attribute (+1 or -1) based upon its natural balance of the parent and child items.

calculation relationships file – A file containing only calculation relationships. An extension taxonomy will typically have at least one calculation relationships file.

CamelCase – Method used to articulate the name of a concept with no spaces. For example, the phrase “Net Change in Assets” is transformed into “NetChangeInAssets” in camel case. When software requires preparers to provide a name containing no spaces, and changing an English phrase into the symbol makes it hard to read, use camel case. Contrasted with either lower case or upper case, camel case uses capitalization of each word in the phrase to create

visual ”humps ” Punctuation is always removed. Even an acronym occurring in a phrase also should be converted to camel case (for example, “US GAAP Report” becomes “UsGaapReport”).

context – Entity and report-specific information (reporting period, segment information, and so forth) required by XBRL that allows tagged data to be understood in relation to other information. A context can also contain dimensional qualifiers such as the contract identifier.

concept – XBRL technical term for element.

context – Entity and report-specific information (reporting period, segment information, and so forth) required by XBRL that allows tagged data to be understood in relation to other information.

decimal – Instance document fact attribute used to express the number of decimal places to which numbers have been rounded.

default – mechanism used in a dimension to describe the aggregation of values.

definition relationships file – technical term for dimensional relationships file.

dimension – XBRL technical term for axis used to define dimensional relationships between elements. The XBRL technical name for this file is a definition relationships file. Dimensions can be explicit, with a finite, defined set of members; or typed, where members can be defined by the reporting entity.

domain – An element that represents an entire set of other elements; the domain and its members are used to classify facts along the axis of a table. For example, “Arkansas” is a domain member in the domain “States,” and would be used to classify elements such as revenues and assets in Arkansas as distinct from other states. When a fact does not have any domain member specified, that means it applies to the entire domain.

domain member – An element representing one of the possibilities within a domain.

domain-member relationship – Dimensional relationship indicating that a domain contains the member.

element – XBRL components (items, domain members, dimensions, and so forth). The representation of a financial reporting concept, including line items in the face of the financial statements, important narrative disclosures, and rows and columns in tables.

element definition – A human-readable description of a reporting concept. From an XBRL technical point of view, the element definition is the label with the type “documentation ” and

there are label relationships in a label relationships file. From a user point of view, the definition is an unchangeable attribute of the element.

element names file – Part of the taxonomy that defines XBRL elements and their attributes as well as relationship groups.

entry point – XBRL file that brings together a set of relationships files. The file name ends with ".xsd" just like an element names file.

extended link – XBRL technical term for a relationship group.

extension taxonomy *or* **extension** – A taxonomy that allows users to add to a published taxonomy in order to define new elements or change element relationships and attributes (presentation, calculation, labels, and so forth) without altering the original.

face of the financial statements – Financial statements without the notes or schedules.

fact – The occurrence in an instance document of a value or other information tagged by a taxonomy element.

GAAP – Acronym for Generally Accepted Accounting Principles.

group *or* **relationship group** – Highest level of a parent-child hierarchy used to categorize item relationships at the financial statement, schedule, or industry level.

hierarchy – Trees (presentation, calculation, and so forth) used to express and navigate relationships.

hypercube – XBRL technical term for a table.

imputed value – A value that is not specifically provided but could be calculated based on other provided numbers and calculation weights.

instance *o*r **instance document** – XML file that contains business reporting information and represents a collection of financial facts and report-specific information using tags from one or more XBRL taxonomies.

integer – A data type indicating that the element is stated in whole numbers.

item – XBRL technical term for a kind of element.

label – Human-readable name for an element; each element has a standard label that corresponds to the element name, and is unique across the taxonomy.

label relationships file – Part of a taxonomy used to associate labels to elements.

label type – A distinguishing name for each distinct element indicating the circumstances in which it should be used; each is given a separate defining "role" to use in different presentation situations.

line item – Elements that conventionally appear on the vertical axis (rows) of a table.

linkbase – XBRL technical term for a relationships file.

mapping – Process of determining the elements that correspond to lines and columns in a financial statement and which elements must be created by extension.

name – Unique identifier of an element in a taxonomy.

namespace – Every element has a Universal Resource Identifier (URI) that identifies the organization that maintains the element definitions, with an indication of what the term covers. In the XBRL US WIP Taxonomy, namespaces start with "http://xbrl.us/wip/". A namespace prefix is not the namespace.

negating label – A label type that causes numeric values of an element to be displayed with their sign flipped.

nillable – An attribute that appears on all taxonomy elements, and is used (false) on elements that, if used in an instance document, must have a non-empty value. XBRL taxonomy tools normally have the default value for nillable as "true". There is no need for any extension to define an element with nillable "false".

non-GAAP – As used in this guide and the XBRL US GAAP Taxonomies v1.0, this term applies to the taxonomies of non-financial information; it does not mean "non-GAAP" in the sense of Regulation S-K Item 10(e).

parent-child hierarchy – Relationship between elements that indicates subordination of one to the other as represented in a print listing or financial statement presentation. Relationships files use parent-child hierarchies to model several different relationships, including presentation, summation of a set of facts, and membership of concepts within a domain used as the axis of a table.

period type – An attribute of an element that reflects whether it is reported as an instant or duration time period.

prefix *or* **namespace prefix** – A shorthand sequence of letters for a namespace; “us-gaap”, for example, is a common prefix for the namespace http://xbrl.us/us-gaap/2008-01-31.

presentation relationships – Relationships that arrange elements allowing them to navigate the taxonomy content in parent-child tree structures (hierarchies).

presentation relationships file – Defines the organizational relationships (order) of elements using parent-child hierarchies; it presents the taxonomy elements to users and allows them to navigate the content.

reference relationships file – Part of a taxonomy used to associate references to authoritative literature with elements.

relationship group – A set of relationships that are given a name and description and treated as a whole set.

relationship group description – A human-readable name for a relationship group, specifically used for sorting. For example, —148600 – Statement – Statement of Income is the name of a relationship group that begins with a number so that it can be sorted easily.

relationship group role or relationship group name – A unique identifier, resembling a namespace, that is shared by related calculation, presentation, and dimension relationships all used together. For example, http://xbrl.us/us-gaap/role/statement/StatementOfIncome is a relationship group role.

relationships file – Part of a taxonomy used to define specific relationships and other data about elements. There are five standard relationships file types: Presentation, Calculation, Definition (Dimensions), Label, and Reference.

render or rendering – To process an instance document into a layout that facilitates readability and understanding of its contents.

root – The top level of a tree; can appear only once in that tree.

scaling – A process that automatically scales numeric data by value, thus saving time of entering zeros during the entry or creation process. XBRL does not support the scaling of numeric values (all values must be reported in their entirety); however, it is a feature commonly found in instance document creation software.

scenario – Tag that allows for additional information to be associated with facts in an instance document; this information encompasses in particular the reporting circumstances of the fact, as for example “actual” or “forecast”. The scenario of any fact can be left unspecified.

schema – Technical term for an element declaration file.

segment – Tag that allows additional information to be included in the context of an instance document; this information captures segment information such as an entity's business units, type of debt, type of other income, and so forth.

sign value – Denotes whether a numeric fact in an instance has a positive (+) or negative (-) value.

standard label – The default label for an element. An extension may override the standard label.

suppress (a relationship) – An extension effectively can remove a parent-child relationship in a presentation, calculation, or dimension relationship. It is not actually deleted from the XBRL US GAAP Taxonomy, just made ineffectual. The technical term is "prohibiting the arc."

table – An element that organizes a set of axes and a set of line items so as to indicate that each fact of one of the line items could be further characterized along one or more of its axes. For example, if a line item is "Sales" and an axis is "Scenario" this means that an instance document could have facts that are either for an "unspecified scenario" or for a specific scenario such as "actual" or "forecast".

table-axis relationship – Dimensional relationship indicating that a table uses a particular axis. The XBRL technical name for this is the "hypercube-dimension" relationship; software tools may provide other names.

tag (noun) – Markup information that describes a unit of data in an instance document and encloses it in angle brackets ("<>" and "</>"). All facts in an instance document are enclosed by tags that identify the element of the fact.

tag (verb) – To apply markup to an instance document.

target namespace – The namespace for which an element names file defines elements. The uniqueness of the target namespace prevents element name collisions between the various element names files, assisting taxonomy users to recognize the restrictions between the original element names files and extension element names files.

taxonomy, taxonomies – Electronic dictionary of business reporting elements used to report business data. A taxonomy is composed of an element names file (.xsd) and relationships files directly referenced by that schema. The taxonomy schema files plus the relationships files define the concepts (elements) and relationships that form the basis of the taxonomy. The set of related schemas and relationships files altogether constitute a taxonomy.

tree – Common name for a display of a hierarchy, with “roots”, “branches” and “leaves.”

tuple – Tuples are not used in the WIP Taxonomy, and best practice is not to use them in any extension. Tuples may be mentioned in software applications to ensure backward compatibility with previously-created instance documents. The functionality previously addressed with tuples has been replaced with tables.

type *or* **data type** – Data types (monetary, string, share, decimal, and so forth) define the kind of data to be tagged with the element name.

unit of measure – The units in which numeric items have been measured, such as dollars, shares, Euros, or dollars per share.

validation – Process of checking that instance documents and taxonomies correctly meet the rules of the XBRL specification.

weight – Calculation relationship attribute (-1 or +1) that works in conjunction with the balance of the parent and child numeric elements to determine the arithmetic summation relationship between them. A parent with a balance credit that has two children, one with a balance type debit and the other with a balance type credit, would, in an XBRL calculation relationships file, have the parent with a weight of +1, the debit child with a weight of -1, and the credit child with a weight of +1. As can be seen, the parent’s balance drives the weight of the children addends.

XBRL – Acronym for eXtensible Business Reporting Language; an XML-based standard for electronic communication of financial and business data.

XBRL footnote – An instance document element that provides additional information for specified values by creating linkages between them and a footnote element containing this additional information.

XBRL Specification – Detailed description of XML syntax, semantics, and structures, and so forth that prescribe how XBRL is constructed. The current Specification 2.1 is used primarily by IT professionals in developing tools and software for XBRL applications.

XBRL table – A table.

XML – Acronym for eXtensible Markup Language, which is used to describe and define data by allowing users to define their own tags (in contrast to HTML where the tags are predefined). XBRL is an XML-based standard.