Orange Button: Accelerating PV Capabilities by Facilitating Data Exchange

Clifford Hansen (Sandia National Laboratories), Jan Rippingale (BluBanyan)

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Data “friction” adds to PV system costs

Although difficult to quantify, data friction (cost associated with collecting, reporting and communicating project data) contributes to 36% of total solar project cost, making data exchange costs comparable with some hardware costs.

Anecdotal evidence suggests data friction costs are substantial.

Harmonizing data would break additional barriers:
- Increases access to capital by enabling automated risk assessment
- Data clarity translates directly to business process scalability
Names for GHI used by APIs offering irradiance data

- G(h)
- ghi (interval-beginning timestamp, unit of W/m²)
- ghi (interval-end timestamp, unit of Wh/m²)
- GHI
- GHI (interval-beginning except at 1-minute resolution, then interval-ending)
The OB Working Group (chaired by BluBanyan, Sunspec Alliance, Sandia) seeks to create an **open data exchange standard** for the distributed solar PV industry.

A data exchange standard comprises:
- A taxonomy
- Tools to access reference data sets
- A compliance test suite (future work)

Vision: Harmonize solar data across the system life-cycle, from sales through operations
What is a taxonomy?

- “A taxonomy is... a semantic architecture - it is about naming things and making decisions about how to map different concepts and terms to a consistent structure.”¹
  - More than a dictionary or variable list because a taxonomy can provide hierarchical structure and can attach metadata to values

- A taxonomy provides
  - **Consistency** (agreement on terms)
  - **Connections** (related terms can be grouped together into information objects), and
  - removes **Ambiguity** (terms can possess primitive data such as a timestamp and a unit) (credit to [1]).

The (OpenAPI) Orange Button taxonomy

- Open-source, public, free-to-use
  - JSON compliant with the OpenAPI 3.0 specification
  - Javascript style conventions
- Editor at https://openobeditor.sunspec.org
- Documentation at www.orangebutton.io (dated)
The OB taxonomy provides common, reusable terms
Examples of instance documents

```
{
   "EnergyAC": {
      "Decimals": "1",
      "EndTime": "2020-02-08 09:59:59+07:00",
      "StartTime": "2020-02-08 09:00:00+07:00",
      "Unit": "kWh",
      "Value": 50.1
   }
}
```

```
{
   "EnergyACArray": [
      {
         "Decimals": "1",
         "EndTime": "2020-02-08 09:00:00+07:00",
         "StartTime": "2020-02-08 09:59:59+07:00",
         "Unit": "kWh",
         "Value": 50.1
      },
      {
         "Decimals": "1",
         "EndTime": "2020-02-08 10:00:00+07:00",
         "StartTime": "2020-02-08 10:59:59+07:00",
         "Unit": "kWh",
         "Value": 50.1
      }
   ]
}
```
Editor demonstration – PVSystem object
Demo of AHJRegistry
https://ahjregistry.sunspec.org/

Kimpton Monaco
15 W 200 S, Salt Lake City, UT 84101

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OB is enabling scalability

**SolarSuccess**™ – integrates with application providers to deliver a cohesive solar applications' ecosystem that **helps reduce solar project costs, grow the addressable market, and scale deployment.**
Conclusion

Browse the taxonomy

- [https://github.com/Open-Orange-Button/Orange-Button-Taxonomy.git](https://github.com/Open-Orange-Button/Orange-Button-Taxonomy.git)
  Download and save Master-OB-OpenAPI.json for latest version
- [https://obeditor.sunspec.org/](https://obeditor.sunspec.org/)
  Open the file you downloaded

Development follows use cases, and we welcome your participation

Contact

Cliff Hansen, cwhanse@sandia.gov
Jan Rippingale, jrippingale@blubanyan.com