

Data Is the Candy



In that order. The other orders don't get you far.

Jan Rippingale

President, Orange Button Alliance

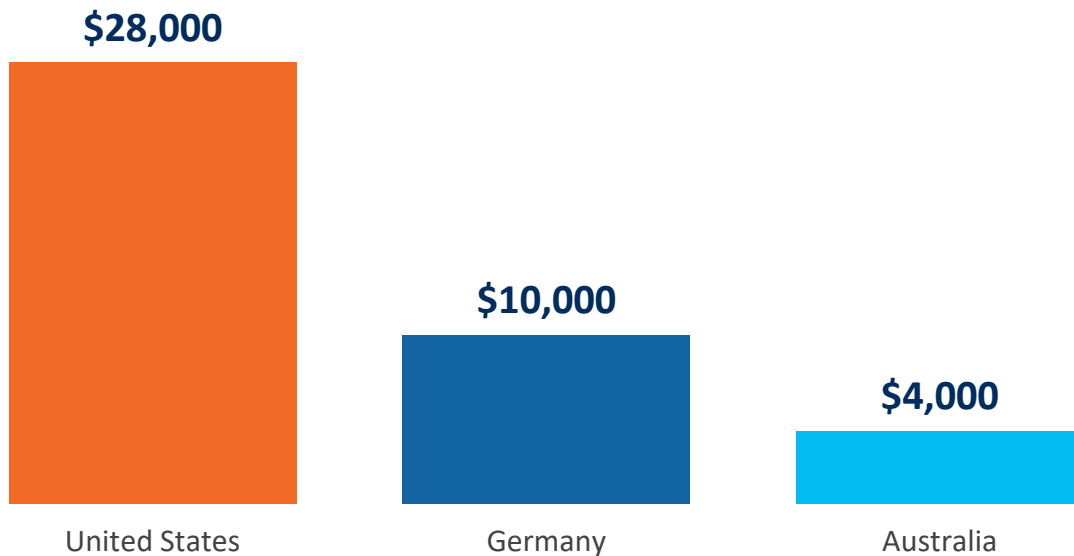
Founder & CEO, Blu Banyan — software for solar installers and asset managers

Co-chair, Orange Button Working Group — with Dr. Cliff Hansen, Sandia National Laboratories

Sandia National Laboratories · Albuquerque, NM · August 4, 2026

It's not the panels. It's the paperwork.

Same hardware, wildly different price



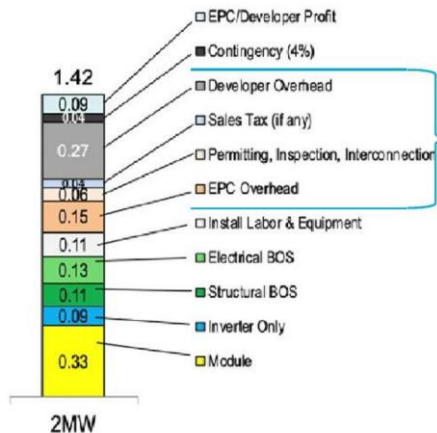
7x

the cost of the same equipment, on the same kind of roof.

Typical residential system, all-in. Sources: NREL cost benchmarks; international market comparisons.

Data friction is 36% of a solar project's cost

Clifford Hansen, Sandia National Laboratories — and it has held up



- Data friction: the cost of collecting, reporting, and communicating project data.
- Harmonizing it opens two doors: automated risk assessment, which lowers the cost of capital, and business-process scalability.
- Every soft-cost line in that stack is somebody re-keying a number that already existed somewhere else.

Fig. 6 from U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks: Q1 2021, NREL/TP-7A40-80694, November 2021

Fig. 6, U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks: Q1 2021, NREL/TP-7A40-80694. Reused from Hansen, Rippingale, Transue — 50th IEEE PVSC, 2023.

Data attracts. Terms enable. Tools interoperate.

The order matters, because each stage buys the right to the next one

1. COMMON DATA

The attractor

Nobody shows up for a vocabulary.
They show up for a dataset they don't
want to build or maintain themselves.



2. COMMON TERMS

The enabler

Once you're using the dataset, you're
already speaking its vocabulary.
Adoption becomes a side effect.



3. COMMON TOOLS

The payoff

Tools that share a vocabulary
compose. Integration stops being a
project and becomes a schema.

Standards are broccoli: healthy, necessary, seldom sought after.

Data is the cheese. Get enough of it on there and people eat the broccoli without noticing.

Before I show you anything — here's your version of this problem

Global horizontal irradiance, as published by real irradiance APIs

- $G(h)$
- ghi (interval-beginning timestamp, unit of W/m^2)
- ghi (interval-end timestamp, unit of Wh/m^2)
- GHI
- GHI (interval-beginning except at 1-minute resolution, then interval-ending)

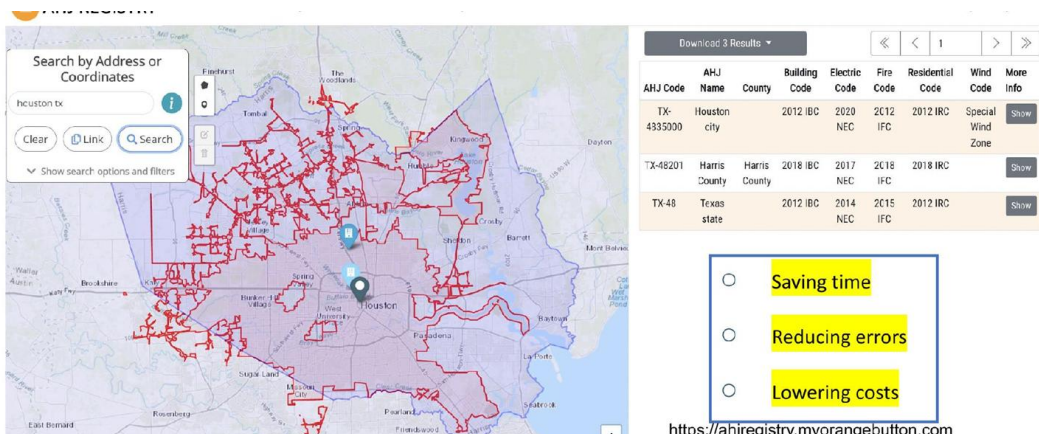
Different names, different units, different timestamp conventions

Different names. Different units. Different timestamp conventions. Plausible, silently wrong answers.

Reused from Hansen, Rippingale, Transue, "Orange Button: Accelerating the Digital Transformation of Distributed Energy," 50th IEEE PVSC, June 2023. SAND2023-05161 C.

Common Data, worked example #1: the AHJ Registry

Watch the pattern, not the dataset — this one isn't for you



The screenshot displays the AHJ Registry interface. On the left, a map of Houston, Texas, is shown with red lines indicating the boundaries of various jurisdictions. A search bar at the top left allows users to search by address or coordinates, with a dropdown menu showing 'Houston, TX'. On the right, a table titled 'Download 3 Results' lists three AHJ entries. The table has columns for AHJ Code, Name, County, Building Code, Electric Code, Fire Code, Residential Code, Wind Code, and More Info. The first entry is 'TX-4335000' for 'Houston city' with a '2012 IBC' building code and '2020 NEC' electric code. The second entry is 'TX-48201' for 'Harris County' with a '2018 IBC' building code and '2017 NEC' electric code. The third entry is 'TX-48' for 'Texas state' with a '2012 IBC' building code and '2014 NEC' electric code. Below the table, a box highlights three benefits: 'Saving time', 'Reducing errors', and 'Lowering costs'.

AHJ Code	AHJ Name	County	Building Code	Electric Code	Fire Code	Residential Code	Wind Code	More Info
TX-4335000	Houston city		2012 IBC	2020 NEC	2012 IBC	2012 IBC	Special Wind Zone	Show
TX-48201	Harris County	Harris County	2018 IBC	2017 NEC	2018 IBC	2018 IBC		Show
TX-48	Texas state		2012 IBC	2014 NEC	2015 IBC	2012 IBC		Show

<https://ahjregistry.mvorangebutton.com>

17,540

residential projects tested against it

98.5%

matched the human-assigned jurisdiction

669

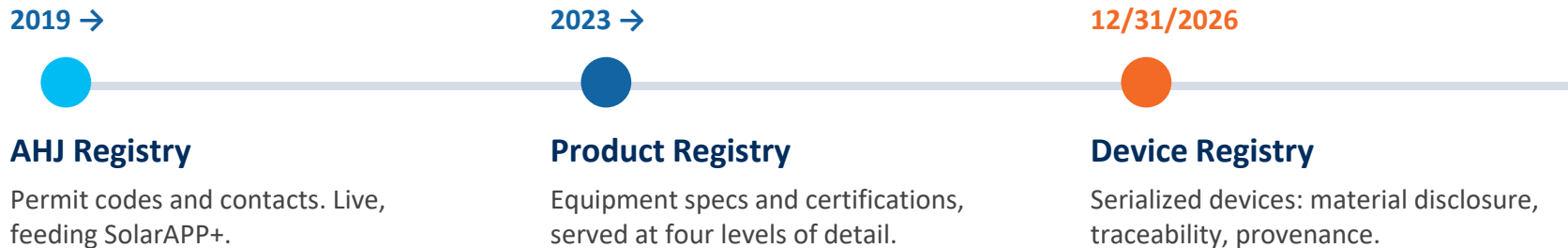
AHJs across 8 states in that test

Built the dataset first. The vocabulary came along with it.

ahjregistry.mvorangebutton.com. Accuracy study reused from SolarAPP+ webinar series, July 2023.

Worked examples #2 and #3 — and the compounding

Each dataset made the next one easier to fund



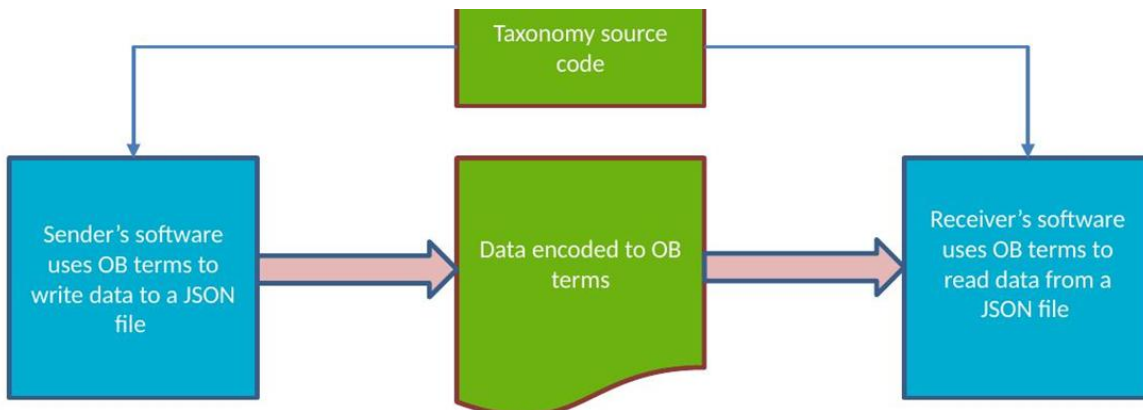
Device Registry funding: \$100K DOE subcontract via the PV Tech Adoption Center. Taos Transue technical lead. MVP Sept–Dec 2026.

Common data isn't a dataset you build. It's a position you keep extending.

productregistry.myorangebutton.com; California Energy Commission Solar Equipment Lists.

Common Terms: how the handoff actually works

One taxonomy, two independent codebases, no bespoke integration



Calendar versioning — YYYY.mm.pp. Major releases every ~6 months and not backward compatible. Renaming a term is major; adding one is minor. The change-type table is published.

Diagram reused from Hansen, Rippingale, Transue — 50th IEEE PVSC, June 2023. Versioning policy: github.com/Open-Orange-Button/Orange-Button-Taxonomy.

Common Tools: 27 days to 72 minutes

Proof the mechanism works — in a domain none of you work in

Before

27 days

median residential permit

After

72 minutes

same permit, via SolarAPP+ on OB data formats

- SolarAPP+ reads the AHJ Registry and the Product Registry — three tools, three teams, one vocabulary
- Blu Banyan built SolarSuccess on these terms, from the foundation up, not as a compliance layer
- That's why I can tell you it holds commercially. If it didn't, I'd have found out the expensive way.

SolarAPP+ / NREL jurisdiction adoption statistics. Blu Banyan disclosed as the speaker's commercial interest.

So I did the mapping for you

pvlib's data model against the Orange Button taxonomy

SAME THING, SAME NAME

wind_speed
→ WindSpeed

poa_global
→ IrradPlaneOfArray

You're closer than you think.

SAME THING, MY NAME

temp_air
→ TempAmb

temp_cell
→ TempRefCell ?

The second one I'm not sure about — I think yours is operating temperature and mine is a reference cell. You tell me.

NOT IN ORANGE BUTTON

dni, dhi
→ —

aoi, airmass
→ —

No equivalent I could find.

Every OB weather term I found lives inside an ASTM E2848 capacity-test record. Orange Button was built for measurement campaigns. pvlib is built for modeling. That's where the gaps come from.

Draft extract — full mapping in the handout. OB term names verified against Master-OB-OpenAPI.json; definitions not yet confirmed. pvlib names per pvlib variable conventions.

One ask: correct my homework

Not membership. Not a rewrite. Not even the mapping — I already did that.

Take the mapping. Tell me where I got you wrong.

Then tell me which of those gaps matters most — because that's what we build next.

Costs you a coffee, not a morning

I already spent the morning. Reading a diff is not the same as building one.

You're the expert here, not me

Eight years inside a taxonomy makes me the worst judge of whether it describes your work honestly.

Your gaps become the roadmap

Missing terms in your domain are what the standard needs next, in priority order.

github.com/Open-Orange-Button · openobeditor.sunspec.org · **OB Technical Group meets weekly**

"We'll open source it" is not a plan. It's a range.

The TODO Group's OSPO maturity model — a shared language for pricing open-source commitments

0	Ad hoc	Developers grab what works. No policy, no inventory.
1	Legal driven	Compliance, license inventory, developer education.
2	Community driven	Contributing upstream in earnest; launching projects.
3	Engagement driven	Hosting and staffing projects; nurturing communities.
4	Leadership driven	Open source shapes technology strategy.

For funders

Make a proposal, name its target stage, then price it.

Stage 1 is cheap, and should be. Stage 3 means funding maintenance, security response, and governance for years.

Pretending otherwise is how we get abandoned repos that shipped on time.

Source: TODO Group / Linux Foundation Research, "The Evolution of the Open Source Program Office" (2022).

Common Data. Common Terms. Common Tools.



In that order. The other orders don't get you far.

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github.com/Open-Orange-Button · oballiance.org

So — what does your corner of this need that Orange Button doesn't have yet?