

# SunSpec Alliance

## Mid-Year Standards Update

Latest developments across Secure SunSpec Modbus, SunSpec IEEE 2030.5 Test Procedures and Conformance Profiles, and SunSpec Europe.



### Antitrust & Intellectual Property Compliance Reminder

All SunSpec meetings are conducted in accordance with the SunSpec Antitrust Policy and IP Provisions defined in the Member Agreement. The agreement is available at [sunspec.org/sunspec-membership-agreement](https://sunspec.org/sunspec-membership-agreement).



### Key Rules

- SunSpec strictly prohibits using meetings as a forum for communications that violate antitrust laws
- Confidential or proprietary information must not be discussed in open session
- Contact SunSpec management with any questions



### Note:

This meeting is being recorded. The deck and recording will be emailed out after the webinar.



## Agenda

01

### SunSpec Modbus Work Group

Secure SunSpec Modbus, Grid-Forming Model, Poland Profile

02

### SunSpec IEEE 2030.5 Work Group

CA Rule 21 Test Procedures, V2G-AC Profile, ISO 15118 Profile

03

### SunSpec Europe

Standards adoption, policy alignment, and open collaboration across the EU



# Secure SunSpec Modbus

Approved December 10, 2025. Securing SunSpec Modbus with:



## Mutual TLS

Encrypted, authenticated communications with verifiable identity



## RBAC

Built-in roles (Viewer, Operator, Engineer, installer) aligned with IEC 62351-8



## Interoperability

Preserves existing Modbus workflows;  
RTU devices supported via certified converters



## EU CSA Alignment

CRA-aligned in design intent (authentication, encryption, RBAC)





# Secure SunSpec Modbus Test Procedures

Promoted to **TEST** status **May 13, 2026**. Public review extended to **August 1**.

Provides the conformance framework for validating TLS-secured Modbus implementations.



## TLS Conformance Testing

General device, model, curve, reversion, protocol, and exception generation tests



## Open Compliance Criteria

Documents compliance against the SunSpec Modbus standard



## Member Benefits

Practical pre-deployment verification via SunSpec Dashboard

Generate Test PKI Certificates here:

[https://github.com/sunspec/pysunspec2/blob/master/sunspec2/tests/tls\\_data/create\\_tls\\_certs.sh](https://github.com/sunspec/pysunspec2/blob/master/sunspec2/tests/tls_data/create_tls_certs.sh)



## Validate Security

Ensure TLS is configured correctly and securely.



## Ensure Interoperability

Confirm compliant devices work together seamlessly.



## Reduce Risk

Catch issues early and accelerate certification and deployment.



# SunSpec Modbus Grid-Forming Model

**Draft version.** Defines the Modbus surface for grid-forming inverter control, observability, and state — used as both config interface and telemetry readout.



## Control & Algorithms

- Mode/state machine
- droop
- VSM
- VOC
- dVOC
- matching-control
- virtual inertia
- virtual impedance



## Setpoints & Limits

- P/Q/V/Hz refs
- slew limits
- current limiting (most-contested area in GFM products)
- ROCOF & pole-slip protection



## Telemetry & Coordination

- Internal angle/voltage
- P/breakdown (inertial/droop/ref)
- sync windows
- black-start
- anti-islanding override
- leader/follower multi-unit coordination



### For Config & Control

Enables precise configuration and control of grid-forming inverter behavior.



### For Observability

Provides rich telemetry and state visibility for grid awareness.



### For Coordination

Supports multi-unit coordination for stable, reliable grid-forming operations.



### Built for Interoperability

Standardized Modbus interface ensures broad compatibility across vendors.

# SunSpec Modbus for Poland Profile



**TEST status:** Entering TEST status now. No set end date — we're seeking input from local market experts to refine requirements.



**Secure SunSpec Modbus is likely to be required:**



## Key Requirements

- ✓ Common Model (1) required points must be supported
- ✓ DERMeasureAC (701): voltage, active power, reactive power, frequency
- ✓ DERCapacity (702): nameplate and rating data
- ✓ DEREnterService (703): permit service, thresholds, delays, ramp timing
- ✓ DERCtlAC (704): power factor, reactive power, active power setpoints
- ✓ DERVoltVar (705): VRef, autonomous adjustment, response time, curve points
- ✓ DERWattVar (712): six-point curve; first three points optional (set to zero if unused)

701



DERMeasureAC

702



DERCapacity

703



DEREnterService

704



DERCtlAC

705



DERVoltVar

712



DERWattVar



**Modbus TCP devices must support Secure SunSpec Modbus**



**Modbus RTU devices will need to be paired with Secure SunSpec Modbus Certified RTU-TCP converters.**



**Access the specification:**

[sunspec.org/specifications/#specifications-for-review](https://sunspec.org/specifications/#specifications-for-review)



**Submit comments:**

[sunspec.org/specification-comment-form/](https://sunspec.org/specification-comment-form/)

# SunSpec IEEE 2030.5 Test Procedures



## Purpose

Define IEEE 2030.5 test procedures for CSIP, SAE J3072, Metering, and other profiles to support CA Rule 21 and jurisdiction certification.



## Current Task

Improve conformance and interoperability with CSIP 1.3; address issues observed since the original 2018 test spec.



## Next Steps

Currently protocol tests; working on new tests for reported requests.



## Next Task: ISO 15118-20 AMD1-SAE V2G-AC Guide

Snapshot of AMD1-SAE Schema available on Teamworks. Continue using existing V2G AC Profile WG for 15118 work until further notice.



## Key Guidance

- Understand how ISO 15118-20 works in general
- Understand how AMD1-SAE Schema interacts with existing -20 schema
- Identify gaps where possible (note: SAE policy prohibits AI on work products)



### Standards-Driven

Aligned with IEEE 2030.5 and evolving utility certification needs.



### Interoperability Focused

Improving device interoperability and grid integration across multiple profiles.



### Quality & Conformance

Strengthening test coverage to ensure reliable, compliant implementations.



### Future-Ready

Building the foundation for V2G, ISO 15118, and next-generation DER communications.

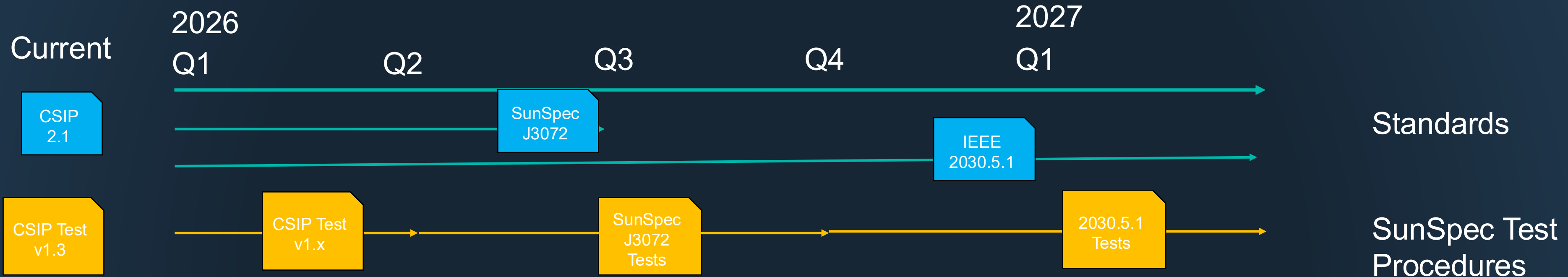


# SunSpec 2030.5 Test Procedures WG

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- **Purpose:** Continue development of IEEE 2030.5 test procedures for CSIP, SAE J3072, Metering and other profiles
- **Why:** to have baseline of functionality to meet official certification such as CA Rule 21 certification and other jurisdictional requirements
- **Current Task:** improve conformance and interoperability with existing CSIP 1.3 test specification
  - 2030.5 industry has evolved significantly since the creation of the original test spec in 2018
  - To address conformance and interoperability issues observed in the industry
  - Tests are protocol tests currently
  - Working on creating new tests for list of reported requests

# Topics for SunSpec 2030.5 Test Procedures WG



## • Improve current test spec to include updates

- Interoperability/corner case scenarios around 2030.5 mandatory rules (Steve)
- Error scenarios (Emilia)
- Ability to test clients without restarting (Kudrat)
- Verify inclusion of all 1547-2018 required functions (Kudrat)
- Include additional tests performed in the industry (PGE/Utilities)
- Ability to control server via API (Kudrat)
- Review current 1.3 test spec and identify any other resolutions needed (Steve)
- **Current list of topics that the WG is working on can be found on SunSpec Teamwork: <https://twk.pm/nrxqw7iyu7>**

# Work Items Status

1	Issues Identified	Test Category	Possible Resolution	Volunteer	Status	
2	Ability to run tests w/o client restarts	Interoperability	Add conditions into test case for server to cancel all events and remove DefaultDERControls. Add precondition that server/client be in clean steady state (nothing being processed)	Kudrat	Test Setup section proposed and added	Done
3	Review 1547.1-2020 tests and identify any gaps	Interoperability	Develop tests for any missing tests, ex. DeviceInformation	Kudrat	WattVar, ConstantVAR, EnterService tests added	Done
4	Review Phase 1/3 tests in CSIP and expand setpoints	Interoperability	Tests that use phase 1/3 functions have specific setpoints, ex. Curve points and immediate control values. Review them to see further expansion is needed.	Similar as 1547	Gaps identified and proposed	Done
5	Review endpoint locations being used and update tests to use other locations	Negative Tests	In CSIP tests, locations that are commonly used in 2030.5 and CSIP specs are used, ex. /dcap, /edev, etc. Change/update tests to use other locations	Steve	New core24 test case added	Done
6	Collect common interoperability issues observed in the industry and add new tests	Interoperability	Collect interop issues from users of 2030.5/CSIP systems in the US, Australia and other countries and add new tests.	PGE, Steve, other utilities		
7	Create negative tests for all CSIP test cases	Negative Tests	Error scenarios to improve robustness of clients and servers	Steve		
8	Test full range of adjustability for polling rates	Corner Cases	PollRate test exists currently. Adjustment needed?	Steve		
9	Test for backward/forward compatibility between 2030.5-2018 and 2030.5-2023					
10	Test that include optional elements and/or extended standard, ex. csip- aus parts	Optional Extensions	add a test that includes optional or extensions to verify client/server's ability to ignore them.	Steve	New core25 test case added.	Done
11	Long events, ex. x hours, x days, etc.	Corner Cases	mimic deployment models used in industry	Steve		
12	Use of large lists	Corner Cases	2030.5 list ranges from 0 item to 4+billion items, ex. DERProgramList, DERControlList, MUPList	Steve	Core-26 test case added.	Done
13	MUP metering rules verification	2030.5 Mandatory Rules	Servers and clients do not support all mandatory rules as explained in section 10.11.3 which may lead to interoperability issues	Steve	New Basic030 test case added. CSIP profile may subset rules in the future.	Done
14	Subscription rules verification	2030.5 Mandatory Rules	Servers and clients do not support all mandatory rules as explained in section 8.7.3.4 which may lead to interoperability issues	Steve		
15	Event rules verification	2030.5 Mandatory Rules	Servers and clients do not support all mandatory rules as explained in section 10.2.3 which may lead to interoperability issues	Steve		
16	Response rules verification	2030.5 Mandatory Rules	Servers and clients do not support all mandatory rules as explained in Table 27 which may lead to interoperability issues	Steve		

# New Test Examples

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- **Ongoing v1.4 draft on teamwork is being kept with latest additions for wg members to review**
- **Following tests have been added**
  - Method to handle running tests without client restarting
  - IEEE 1547.1-2020 updates/phase 1 and 3 tests gaps
  - Servers using different resource locations other than defaults
  - Using optional or extended functions that are not part of CSIP
  - Long events that last for x hours, days, etc.
  - Use of large lists
  - MUP metering rules
- **To review each of the new tests, they are available on Sunspec's Teamwork site**

# Next Sub Work Group Meeting

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- **Biweekly meetings for sub work group**
- **Next sub work group meeting will be June 18<sup>th</sup>**
  - July 2<sup>nd</sup> sub work group meeting cancelled due to July 4<sup>th</sup> holidays
  - July 16<sup>th</sup> will be following sub work group meeting after June 18<sup>th</sup>
- **Interested in participating as contributor or reviewer? Please contact Steve Kang ([skang@qualitylogic.com](mailto:skang@qualitylogic.com)) or Kudrat ([Kudrat@sunspec.org](mailto:Kudrat@sunspec.org))**

# IEEE 2030.5 V2G Work Group

1

**Sept 15, 2025**

SunSpec IEEE 2030.5 V2G AC Profile for SAE J3072 V1.0 Approved

2

**June 18, 2026**

SunSpec IEEE 2030.5 V2G AC Profile for SAE J3072 V2.0 Promoted to TEST Status

3

**Aug 15, 2026**

Public Review Period Ends

4

**Aug–Sep 2026**

ISO 15118–20 AMD1 Expected Publication



#### Next Task: ISO 15118–20 AMD1–SAE V2G–AC Guide

Snapshot of AMD1–SAE Schema available on Teamwork. Continue using existing V2G AC Profile WG for 15118 work until further notice.



#### Key Guidance

Understand how ISO 15118–20 works in general  
Understand how AMD1–SAE Schema interacts with existing -20 schema  
Identify gaps where possible (note: SAE policy prohibits AI on work products)



#### Standards Progress

Driving approval and testing of SAE J3072 and alignment with ISO 15118 standards.



#### Interoperability Focused

Ensuring seamless V2G communication and compatibility across vehicles, chargers, and grid systems.



#### Industry Collaboration

Working together to advance open, secure, and reliable V2G solutions.



#### Future-Ready

Preparing for global adoption of ISO 15118–20 AMD1 and next-generation V2G applications.



# SUNSPEC

EUROPE

## Advancing Interoperability Across Europe

1

### Growing European Adoption

Expanding SunSpec standards and certification to meet regional needs.

2

### Supporting Key Regulations

Aligning with EU requirements including NIS2, CRA, RED III, and Cyber Resilience Act.

3

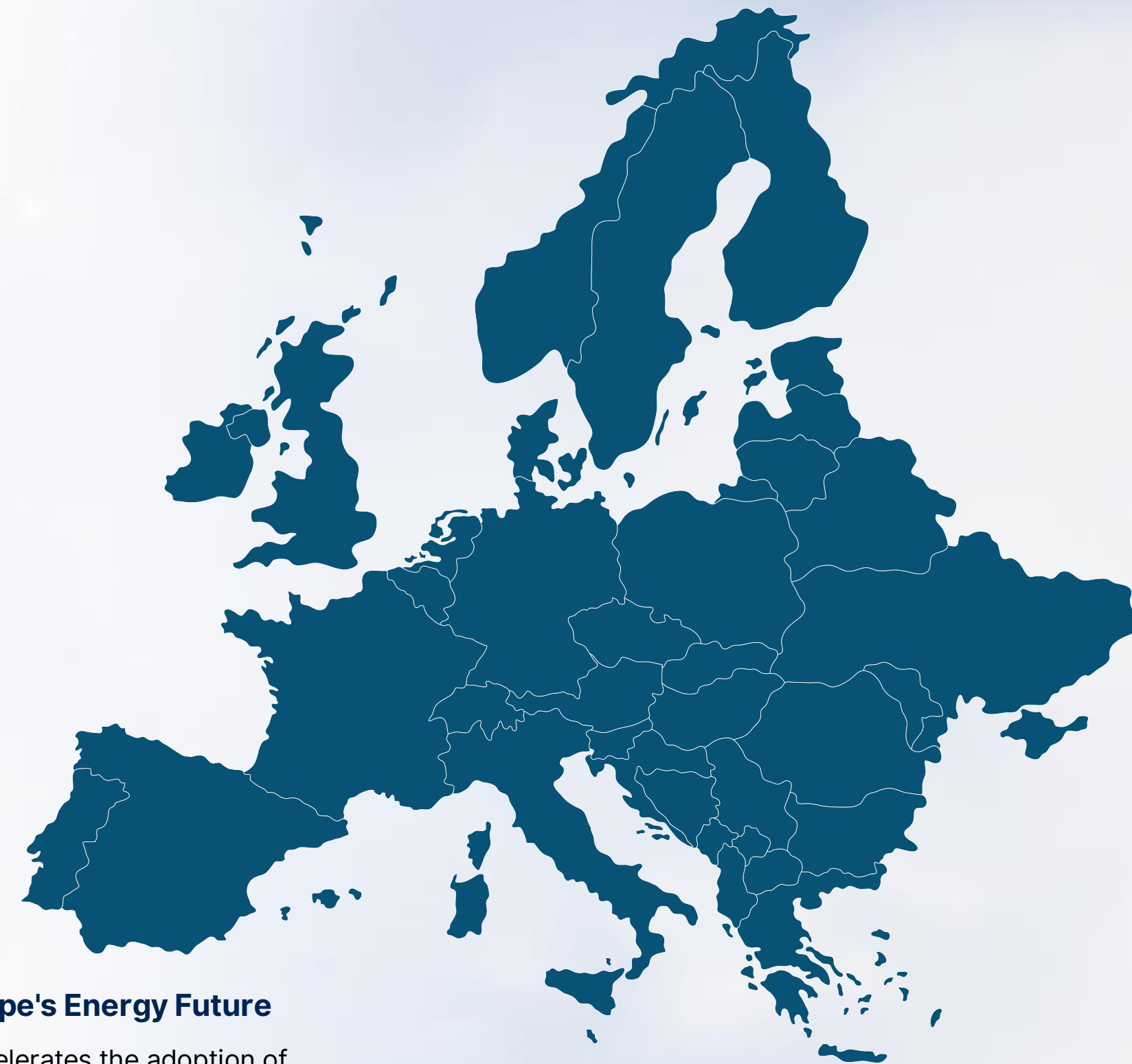
### Collaborative Ecosystem

Working with utilities, manufacturers, labs, and policymakers to drive secure, interoperable DER solutions.

4

### Local Presence, Global Standards

SunSpec Europe bridges global standards with European market realities.



### Empowering Europe's Energy Future

SunSpec Europe accelerates the adoption of open, secure, and interoperable standards for a resilient and sustainable energy transition.



#### Market Expansion

Increasing availability of SunSpec certified products across Europe.



#### Trusted Compliance

Helping members meet EU regulations with confidence.



#### Stronger Connections

Building partnerships that drive innovation and adoption.



#### Future-Proof Solutions

Enabling a smarter, more resilient energy ecosystem.

# SunSpec Europe



## Active in EU Projects



### InterSTORE (Horizon Europe)

Use of SunSpec IEEE 2030.5 for decentralized storage and flexibility services in real energy systems.

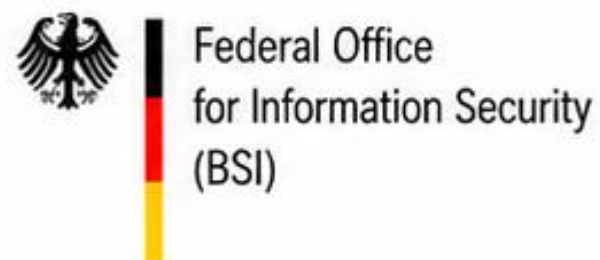


### FLEXSolar-BW (Baden-Württemberg)

Piloting dynamic export limits with IEEE 2030.5 for secure, grid-friendly PV integration.



Contributions to the open-source projects of LF Energy and EVerest.



Two of our members are responsible for CRA tests in Germany.



We write the **Heavy-Duty (Trucking Charging) Standard (SAE J3068)** used across Europe.



**FLEX CONNECT & DYNAMIC PRICING**  
Enables flexible grid integration and time-varying electricity rates in Germany.



**EU BUILDING PERFORMANCE DIRECTIVE**  
Supports energy transparency and smart building compliance.

## SunSpec creates economic value



**Faster time to market**  
Lower integration costs and shorter time-to-market



**Partnerships and industry mappings**  
Enable multi-protocol environments and seamless integration



**Open standards - no vendor lock-in**  
Strengthens competition and drives innovation



**Strategic collaboration**  
• KNX Association - Smart Buildings with grid connection (EPBD)  
• Upcoming: OCPP 2.1.0 (AFIR), EEBUS (Paragraph 14a EnWG) and more



**Lower regulatory risk**  
Supports manufacturers in meeting requirements and reducing compliance costs



Supported by the Headquarters of Fraunhofer, Europe's largest research organization!



Supported by the leading technical universities in Europe.



Prepared to apply for several European-level Research projects!



**Coming Summer 2026!**  
Contact [erin@sunspec.org](mailto:erin@sunspec.org) to get involved!



We write the **Heavy-Duty (Trucking Charging) Standard (SAE J3068)** used across Europe.



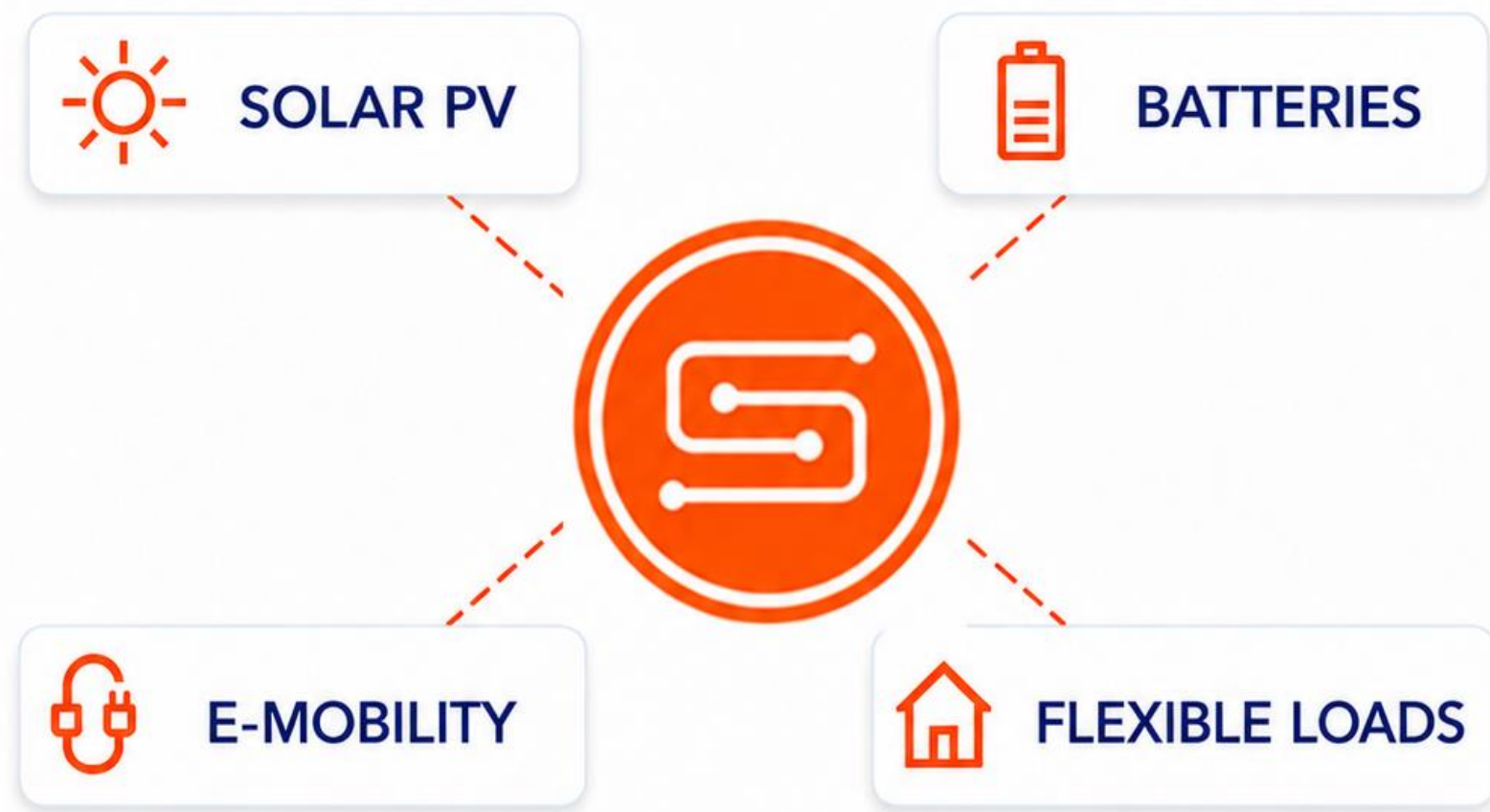
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Supports energy transparency and smart building compliance.



# Europe's decentralized energy system speaks many languages.

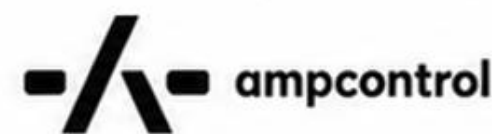


Many proprietary communication solutions increase integration costs and complexity.

SunSpec Europe connects established protocols and enables coordination, so devices, grid operators and markets can finally work together as **one system**.



## SunSpec Europe e.V. Gründungsmitglieder





# Stronger Together. Advancing Interoperability.

SunSpec Alliance brings together the best minds across the DER ecosystem to drive open, secure, and interoperable energy solutions.



### SunSpec Modbus Work Group.

Meets Wednesdays at 8 AM PST



### SunSpec 2030.5 V2G.

Meets Thursdays at 8 AM PST



### 2030.5 Test Procedures

Ad-hoc small group meetings and monthly large group meetings

## Join the SunSpec Alliance

Be part of a growing global community committed to interoperability, innovation, and a smarter energy future.

### [Learn more here](#)

All SunSpec Members are welcome to attend any work group meeting and enroll in the SunSpec member portal



#### Industry Connections

Build valuable relationships across the DER ecosystem.



#### Exclusive Resources

Access member-only content, tools, and technical resources.



#### Amplify Your Voice

Shape the future of standards and policy together.



#### Global Impact

Drive innovation and accelerate the clean energy transition.