# OpenADR, EcoPort, and Energy Star OpenADR webinar with Codibly

codibly

June 2024

# Agenda

1. Housekeeping
2. Intro of the panelists
3. Overview of OpenADR, EcoPort and Demand Response
4. Energy Star - key facts
5. Implementation of standards in common appliances
6. Specific states and regions - recent updates and standards already in place
7. Energy Star and it's "Connected" status - how to achieve it?
8. Selected case studies
9. Q&A session

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# Housekeeping

- The webinar is being recorded
- Slides and Recording will be made available on https://www.openadr.org/webinar-series
- All attendees are in listen only mode
- To ask questions, please enter them in the Questions tab of the Webinar Tool
  - We will field as many questions as possible at the end of the presentations

# Today's panelists

**Rolf Bienert**
Technical Director
of the OpenADR Alliance

Rolf Bienert is the Managing and Technical Director of the OpenADR Alliance. In this capacity, he oversees all aspects of the non-profit organization, including strategy, technical developments, and certification programs. Rolf has been an active member of many industry organizations since over 20 years, driving the development of new technologies with a specific focus on standardization, certification, and interoperability. Rolf holds a master's degree in EE.

**Spencer Borison**
Head of US
Codibly

Spencer Borison is the US Lead for Codibly, a global IT services firm that has been supporting clients across the Renewable Energy and eMobility industries for over 13 years. Many of his projects focus on Demand Response, Grid Communication, Standards and Interoperability, and Smart Home Energy Management Systems (EMS). Codibly is a Contributing Member of the OpenADR Alliance and has relationships with many of the leading DR Aggregators.

# Codibly - expert in e-Mobility & Renewable Energy

Codibly is passionate about driving positive change in transportation and energy. The company brings together expertise in software development with an in-depth understanding of e-Mobility and Renewable Energy to offer innovative solutions that empower businesses and individuals to embrace eco-friendly practices.

**13+**
years of experience

**130+**
satisfied Clients

**150+**
delivered projects

openADR ALLIANCE
Contributing Member

SoDA
Founding Member

**ENERGY & ELECTROMOBILITY**
Practices

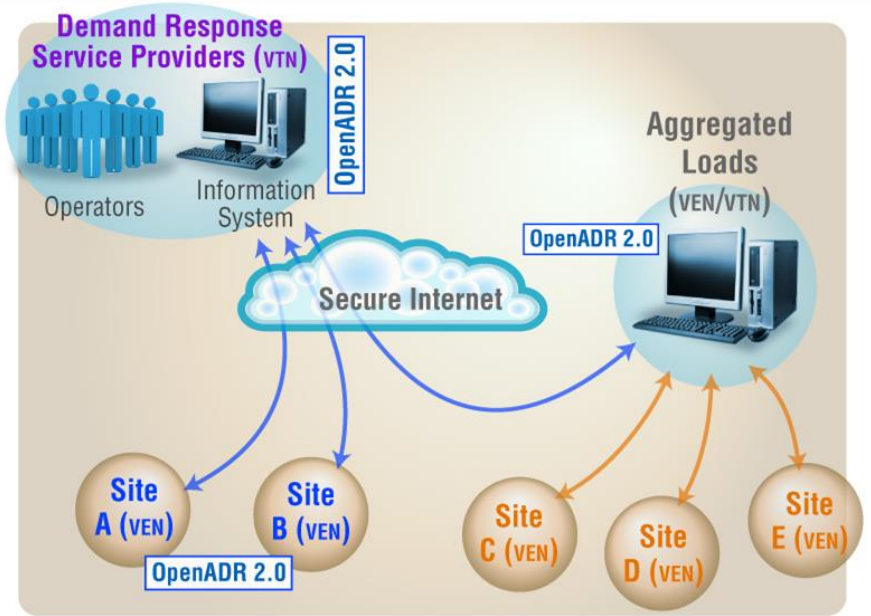

Energy Industry / Sustainability Expertise


Global Presence and Client List


Broad Software and Technical Dev Capabilities

# OpenADR in a nutshell

OpenADR (also IEC 62746-10-1) provides a non-proprietary, open standardized Demand Response (DR) & Distributed Energy Resources (DER) interface that allows DR service providers to communicate DR, DER, and TE (Transactive Energy) signals directly to existing customers using a common language and existing communications such as the Internet.



# The 'Entities' of OpenADR

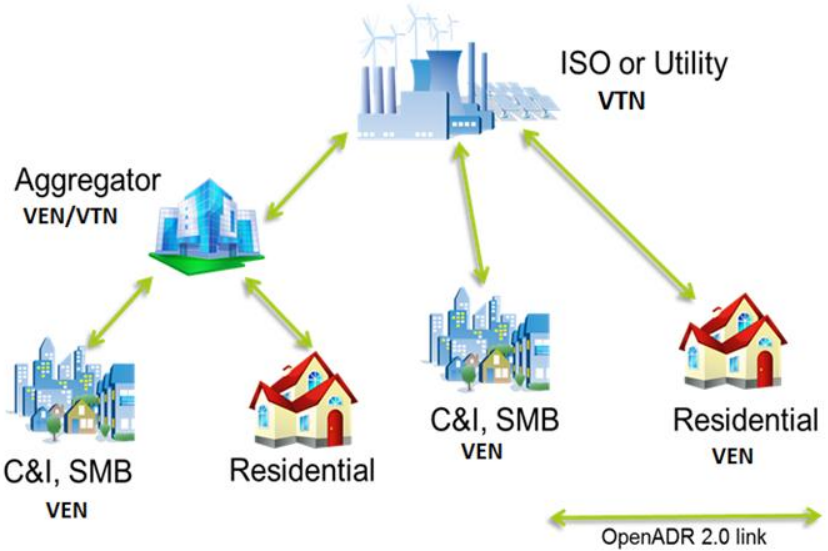
OpenADR is a message exchange protocol with two primary actors, aka 'entities'

**Virtual Top Nodes** (VTN)

- Manages Resources
- Creates/Transmit events
- Request Reports

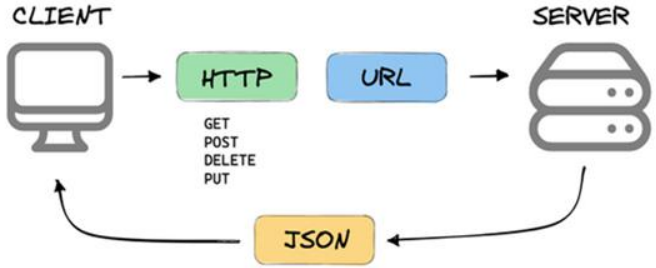
**Virtual End Nodes** (VEN)

- Receive events and respond to them
- Generate reports
- Control demand side resources



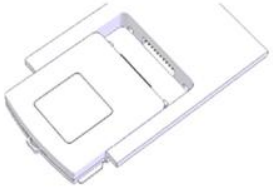
# A new addition – OpenADR 3.0

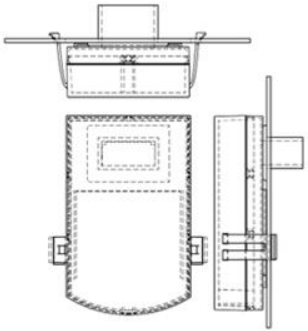
- Created in addition, instead of changing the existing 2.0 standards
  - Maintain interop, 2.0 remains in place
- REST API for simpler implementation
- JSON
- Maintains concepts of OpenADR (inform & motivate) but simplifies and increases flexibility
  - E.g., could be resource server in building gateway



# EcoPort™ in a Nutshell

- CTA-2045 modular communications standard approved 2021.
- EcoPort is the brand name for devices that passed testing to CTA-2045-B requirements
- First certified products – October 2021
- EcoPort Site: for information and certified products list: openadr.org/ecoport



# Product Listing – some select listings
## ecoport.openadr.org

ECOPORT

CERTIFIED PRODUCTS

UNIVERSAL COMMUNICATION MODULES

**Steffes – Ethernet EcoPort UCM**

The Steffes Universal Communications Module (UCM) connects to consumer smart home assets like water heaters, heat pumps, and electric thermal storage heaters. The UCM connects EcoPort Smart Grid Devices (SGDs) to a powerful device management head end with best-in-class cybersecurity. Steffes UCMs enable rapid deployment of load-up and load-down programs to maximize customer participation in the latest Time-of-Use, DR+, and price-based load control strategies.

**e-Radio USA Inc. – P2DFMLTEM2045AC**

e-Radio's AC form factor UCM offers privacy-preserving and zero-congestion FM radio broadcast technology to receive real-time low-latency advisory information combined with long-range low-cost LTE-M cellular and Wi-Fi/Bluetooth for two-way connectivity as needed. The hybrid network system can minimize LTE data usage and the FM radio also can also provide automatic two-factor authentication of the LTE path for the industry-leading cybersecurity. The UCM has power-outage-safe local storage for future and repeating schedules and implements local intelligence to respond to FM signals or local Wi-Fi and Bluetooth networks with minimal or no cloud access. e-Radio's cloud services provide a convenient DR event scheduling web portal or API access for third party integration and there are existing integrations to Virtual Peaker, CEC's MIDAS, WattTime GHG and TeMix RATES for transactive energy. OpenADR 2.0b support is planned.

**SkyCentrics – P2DFMLTEM2045AC**

SkyCentrics' AC form factor Cellular CTA-2045 EcoPort UCM is an industry leading long-range low-cost LTE-M cellular UCM with advanced cybersecurity. The Cellular UCM has local storage for buffering of data during power outages and for future and repeating schedules.

SkyCentrics' cloud services provide access through our DR event scheduling web portal (DREAM), our REST API and our certified OpenADR 2.0b VEN. Existing integrations include OADR VTN's from OATI, Itron, AutoGrid, Honeywell, and SmarterGrid Solutions; CEC's MIDAS, and WattTime GHG. Additional integrations will be added in the future.

SkyCentrics provides a variety of services for easy customer sign-on, customer management, and fleet management and optimization so that utilities and aggregators can get the most benefit while customers can easily save money and time.

The UCM comes pre-provisioned. Simply install the UCM as per the appliance manufacturers instructions. The UCM will automatically connect and is ready to communicate to the grid.

Information about the EcoPortCM technology and the certification program can be found at http://www.openadr.org/EcoPort

Full list of certified products at https://ecoport.openadr.org

The EcoPort™ logo may only be used on, or in association with, tested and certified products. The certification process is detailed at: https://www.openadr.org/ecoport-cert-brand

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SMART GRID DEVICES

Rheem

The new degree of comfort™

ARISTON

The home of sustainable comfort

**Intellihot – Electron Series iE1**

Intellihot offers a unique electric heat pump water heating system that is healthy and sustainable.

Our Electron series is the world's first electric tankless heat pump water heater that heats water on-demand by using energy stored in a thermal battery. It produces clean, healthy, and efficient hot water without storage while providing the utmost reliability. No compromise between health or efficiency unlike others. The iE1 is EcoPort (CTA-2045) compliant.

**Rheem – ProTerra**

Rheem® has expanded the ProTerra® family of heat pump water heaters, the most efficient and most advanced solutions available, with new 120-volt plug-in models. ProTerra Plug-ins are a sustainable, smart and easy replacement with uncompromising performance.

**American Standard – Hybrid Heat Pump Water Heater**

The American Standard Water Heaters Hybrid is modern heat pump water heater that delivers maximum energy savings, quality you can trust, intelligence and connectivity, and maximum ease of installation. Product is built to respond to Demand Response commands through the CTA-2045 protocol and it is ready to optimize energy consumption based on Time of Use Rates. The heat pump also features WiFi'app remote control, scheduling, energy reports and diagnosis. The Hybrid was designed for quick install, universal replacement, rapid set-up, and app connection. The following models include EcoPort:

ASHPWH-50 ASHPWH-50-JA13
ASHPWH-65 ASHPWH-65-JA13
ASHPWH-80 ASHPWH-80-JA13

**HTP Water Heaters**

HTP water heaters that are EcoPort (CTA-2045) enabled.

*Water heaters applicable:*
EVR040C2X045NDR
EVR052C2X045NDR
ELVI55C2X045NDR

**Ariston Water Heaters**

Ariston water heaters that are EcoPort (CTA-2045) enabled.

*Water heaters applicable:*
ARIER040C2X045NDR
ARIER052C2X045NDR
SUPR?????????

INNOVATIVE PRODUCTS

**SkyCentrics – SkyBox EcoPort to Modbus AC SGD Adaptor**

SkyCentrics' AC form factor SkyBox EcoPort to Modbus AC SGD Adaptor (MA01-EP) is an industry innovation enabling OEMs to rapidly go to market with a certified grid-interactive EcoPort CTA-2045 solution. We work with the following products and OEMs to enable their certified EcoPort CTA-2045 solution. The SkyBox EcoPort will accept and function with any EcoPort certified AC UCM. When using the SkyCentrics UCM, the products below are also certified OpenADR 2.0b compliant through the SkyCentrics OpenADR 2.0b certified VEN cloud.

SkyCentrics will assist any OEM interested in making their product Grid-Interactive using the open standards OpenADR 2.0b, OpenADR 3.0, and CTA-2045 EcoPort.

**Harvest Thermal, Inc. – Harvest Pod**

The Harvest Pod leverages software and thermal energy storage to make heat pumps smarter. Harvest Pod operates the heat pump at times when when electricity is abundant, cheap, and clean, stores that clean energy in a hot water tank, and delivers it as heating and hot water whenever needed, without running the heat pump at times when grid electricity is more expensive and dirtier. Harvest Pod optimizes your energy bills per your time-of-use rate and can respond to grid events or hourly price signals via the EcoPort (CTA-2045) communication port and protocol.

www.openadr.org/EcoPort

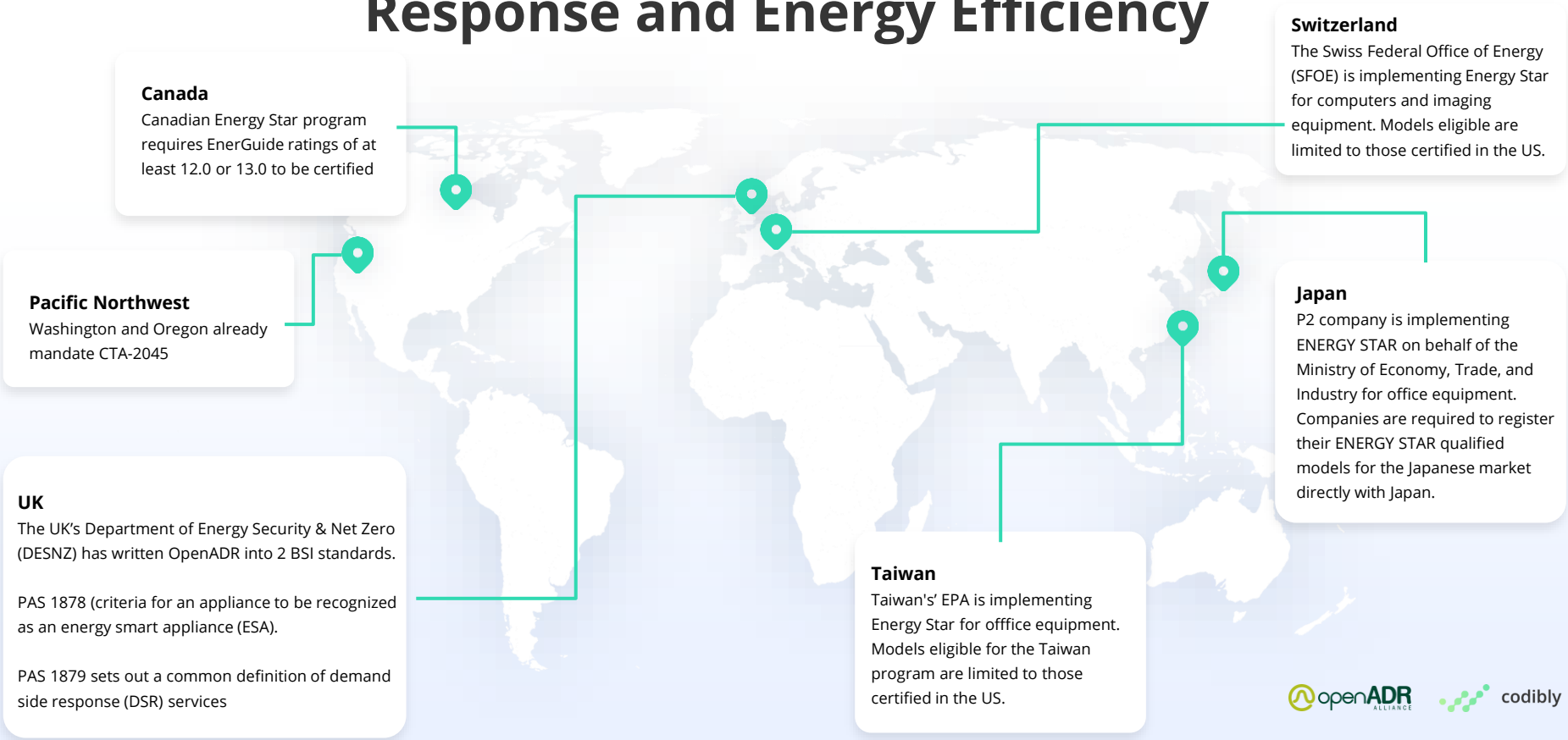
ECOPORT

# Energy Star - key facts

**Energy Star certification:**

- Government-backed program: Launched in **1992** by the U.S. **Environmental Protection Agency (EPA),**
- Voluntary labeling program that **identifies and promotes energy-efficient products.**
- By choosing Energy Star certified products, **consumers are able to save** significant amounts on their utility bills by reducing their consumption.
- **Wide range of products:** The program covers over 75 different product categories, including major appliances (refrigerators, dishwashers, washing machines, etc.), electronics (TVs, computers, monitors), lighting, heating and cooling equipment, and even new homes and buildings.

# Current Standards that Matter for Demand Response and Energy Efficiency



**Canada**
Canadian Energy Star program requires EnerGuide ratings of at least 12.0 or 13.0 to be certified

**Switzerland**
The Swiss Federal Office of Energy (SFOE) is implementing Energy Star for computers and imaging equipment. Models eligible are limited to those certified in the US.

**Pacific Northwest**
Washington and Oregon already mandate CTA-2045

**Japan**
P2 company is implementing ENERGY STAR on behalf of the Ministry of Economy, Trade, and Industry for office equipment. Companies are required to register their ENERGY STAR qualified models for the Japanese market directly with Japan.

**UK**
The UK's Department of Energy Security & Net Zero (DESNZ) has written OpenADR into 2 BSI standards.

PAS 1878 (criteria for an appliance to be recognized as an energy smart appliance (ESA).

PAS 1879 sets out a common definition of demand side response (DSR) services

**Taiwan**
Taiwan's' EPA is implementing Energy Star for offfice equipment. Models eligible for the Taiwan program are limited to those certified in the US.

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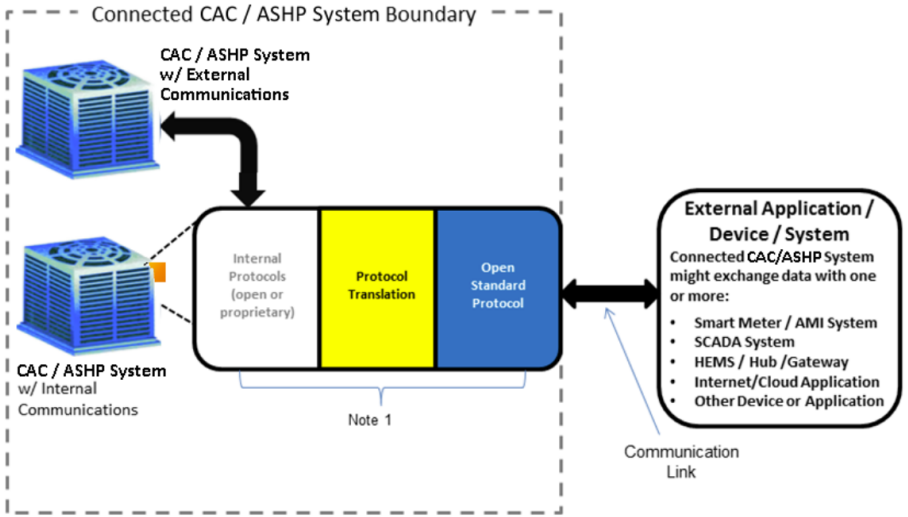
# Energy Star and it's "Connected" status

Energy Star has an optional compliance section. **If a device meets all criteria, it will be identified on the ENERGY STAR website as having 'Connected' functionality.** It must:

- Meet the communication and equipment performance standards for CTA2045-A or OpenADR 2.0b, or both, for Demand Response.
- Be able to provide consumers an easily accessible means to override demand response events. When the event is overridden, the device shall return to its previous operating mode.
- Be able to support a variety of upstream messaging to and from the device as supported by application layer protocol
- Support a range of Operational State Codes
- Be able to receive and respond to signals

**Example of HVAC Connected Status**




More information here: LINK

# Energy Star - certification process

| | |
|---|---|
| **Published Standards** | The EPA regularly publishes and revises standards for each device category to precisely describe the regulations pertaining to that device and the requirements for different levels of certification/status. |
| **Implement Energy Efficiency** | Manufacturer (with third party industry partners if desired) must implement changes to hardware and software within the devices to comply with the standard. |
| **3rd Party Testing Lab** | The EPA requires all Energy Star products to be third-party certified. Products are only allowed to be tested in an EPA-recognized laboratory and testing and coordination with a testing lab are the responsibility of the manufacturer. |
| **3rd Party Certification** | After achieving testing lab success, the EPA requires that all results are reviewed by an EPA-recognized certification body before they can carry the label. |
| **Helpful Links** | Standards Example: **LINK**<br>Accredited Testing Labs & Certifying Bodies: **LINK** |

# Other standards to watch for

| | |
|---|---|
| **US Level** | Residential Devices (HVAC, Pool Pumps, Water Heaters, etc.) are regulated under 42 U.S.C. 6291(16), and must meet the energy conservation standards specified in the Code of Federal Regulations at CFR 430.32(c)(3). |
| **California** | CTA-2045 was proposed for inclusion in the 2022 revision of California's JA 13, now in progress. The California Energy Commission requires manufacturers to certify "that the building equipment, products, and devices listed meet the applicable requirements of Title 24, Part 6, of the Building Energy Efficiency Standards," which include JA 13. (OpenADR is already a requirement of Title 24 (2019 version.)<br>JA13 requires "all requirements of the version 7.0 of the Northwest Energy Efficiency Alliance (NEEA) Advanced Water Heater Specification Tier 3 or higher, excluding Appendix A." If it is updated to version 8.0, then CTA-2045/EcoPort would also become a JA13 requirement. |
| **New England States** | Several states in New England are considering similar mandates. |
| **California Advanced Water Heating Specification (AWHS) 8.0** | Provides guidance to manufacturers and market actors interested in developing residential, commercial, multifamily, and industrial water heating products that are able to provide high levels of consumer satisfaction and energy performance in a range of climates. Among others, this specification calls for compliance with CTA-2045. A "compliant implementation" of CTA-2045 would mean bringing a product through the EcoPort certification program. |

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# Case Study - Supporting PAS1878 in the UK


## Client Challenge:

- Our client was under pressure to meet a critical deadline set by the UK government for the development of their GridFabric product by the end of January 2024. This involved complex enhancements and integration of OpenADR standards to ensure robust, scalable energy management solutions.

## Major Areas of Work:

- Solution Design Planning and Technical Development Support
- **Key Features Implemented**
    - Development of bidirectional report functionalities (VTN->VEN and VEN->VTN).
    - Handling of reportSpecifierID for enhanced reporting and communication.
    - Integration of XML signature generation for secure message handling.

## Lessons Learned:

- **Collaborative Approach** - Early and continuous engagement with the client's technical team facilitated a deeper understanding of the project requirements and existing challenges.
- **Adaptability** - Flexibility in development was crucial due to evolving project requirements and deadlines.
- **Testing and Validation** - Rigorous testing phases were instrumental in ensuring the reliability and stability of the implemented functionalities before the final rollout.

# Case Study - Accelerating Implementation


## Client Challenge

- Our client needed comprehensive support in integrating OpenADR standards to achieve certification and be eligible for Energy Star connected status.

## Major Areas of Work

- **Consulting and Training** - We led a series of workshops to deep dive into the basics and granular details of OpenADR, Energy Star, the tools and implementation options, and the certification process and preparation needed
- **Accelerator Implementation** - We Implemented Codibly's VEN Accelerator to streamline OpenADR protocol adoption, enhancing system performance and reducing time to market by up to 75%.
- **Testing and Certification Support -** We helped client select testing lab and certification body, and then to coordinate with those third party players to ensure validation and certification was successful.

## Lessons Learned

- **Strategic Training Essential** - Training tailored to both technical and business units facilitated a deeper understanding of OpenADR impacts and compliance, proving crucial for client confidence and operational alignment.
- **Customization and Support** - Continuous technical support and the ability to customize solutions based on client needs were key to successful protocol integration and system optimization.
- **Preparation for Certification** - Early and detailed preparation for certification processes, as well as communication with testing labs early on and often, prevented potential setbacks.

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# Q&A session

# Thanks for joining!

**Rolf Bienert**
**Technical Director at OpenADR Alliance**
rolf@openadr.org

**Spencer Borison**
**Head of US at Codibly**
spencer.borison@codibly.com