

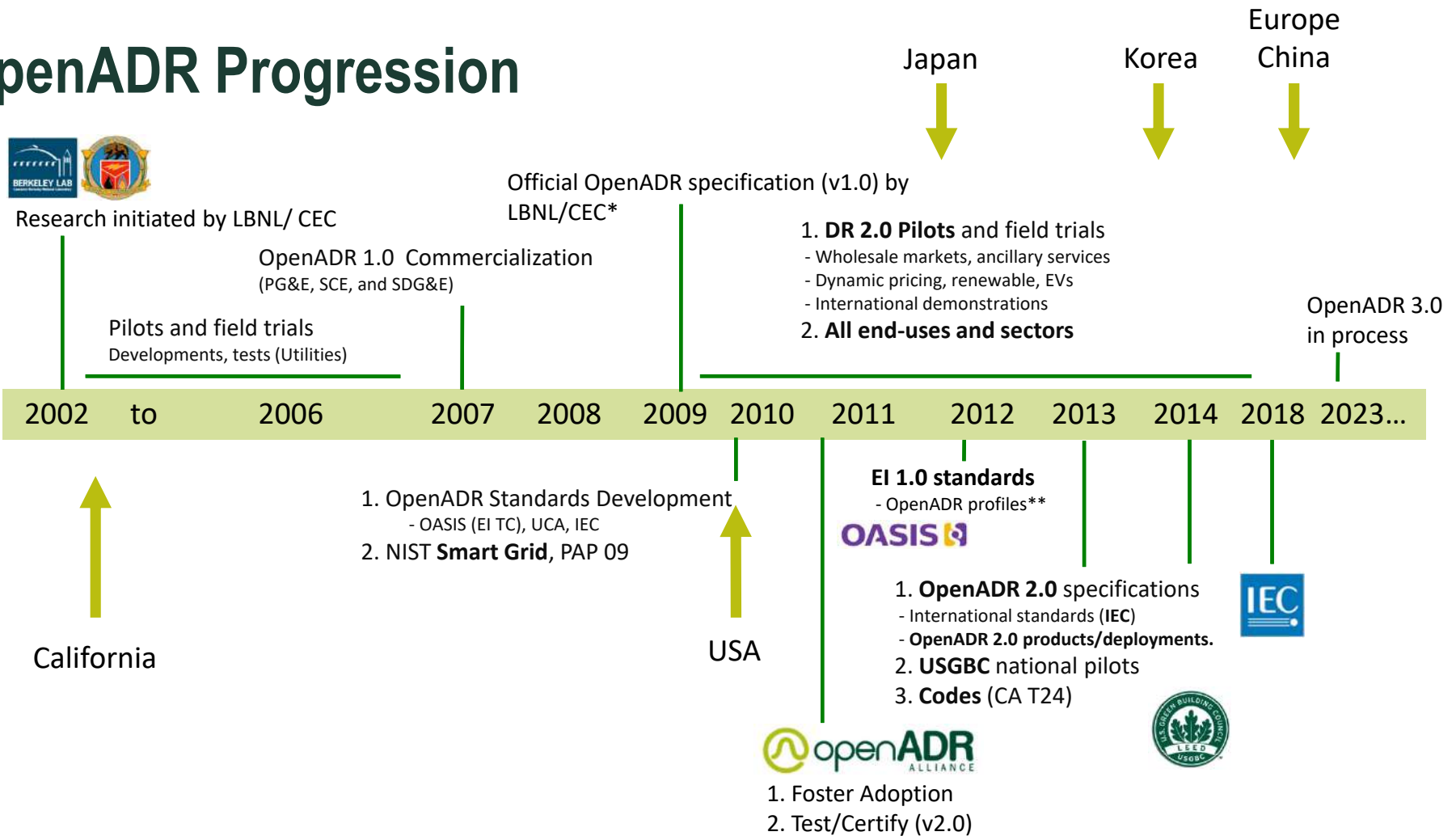


OpenADR in Europe (and other places)

June 27, 2023
Rolf Bienert



OpenADR Progression



* OpenADR v1.0: <http://openadr.lbl.gov/>

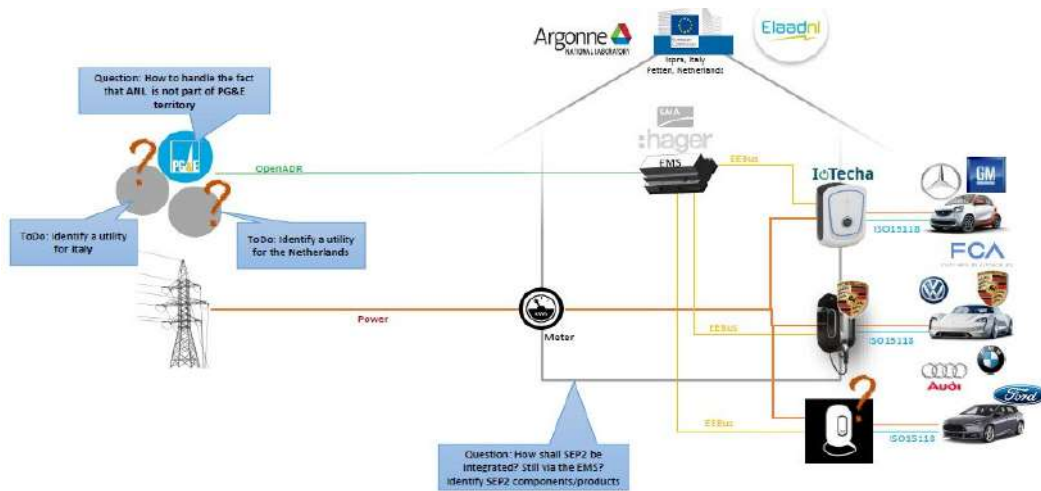
** OASIS EI 1.0 standards: <http://www.oasis-open.org/committees/download.php/45425/energyinterop-v1.0-cs01.zip>

*** Publication: http://drrc.lbl.gov/sites/drrc.lbl.gov/files/LBNL_5273E.pdf

European Market in general

- Largely unbundled, as per EU regulation
 - Generation
 - Transmission System Operators
 - Distribution Network Operators
 - Retailers
 - Independent Aggregators
- Uneven access of DR to market mechanisms
 - Varies by country, much as it does by RTO in the US
 - Technical requirements are often still aligned with traditional generators
 - Stronger focus on aggregation for TSO markets

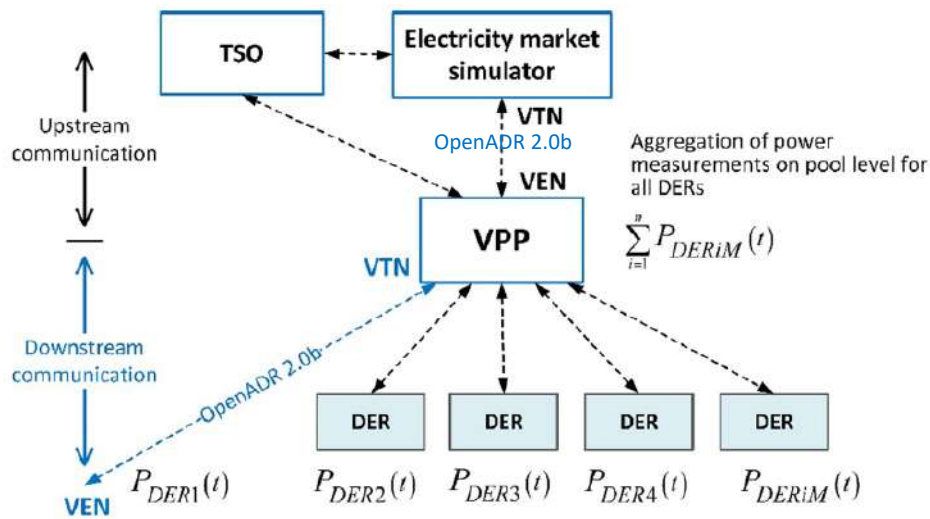
A long long time ago – Pre COVID



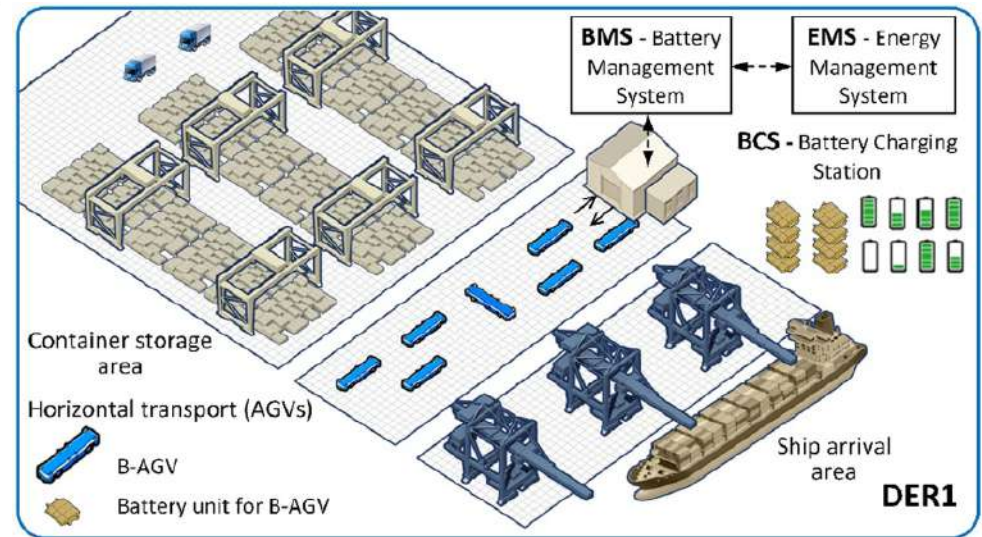
- Global Grid Integration Project
- How can we achieve an optimum in Smart Charging?
- Good initial tests and proof of concept
- No final report – COVID?



Europe - Slovenia & Germany



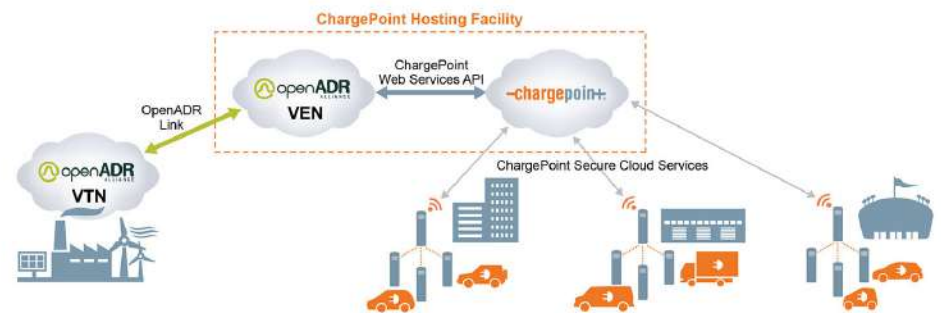
Virtual Power Plant (VPP)



<https://www.sciencedirect.com/science/article/pii/S0142061517311560?via%3Dihub>

PROJECT ELBE - Hamburg Energie, Stromnetz Hamburg, Vattenfall and ChargePoint

- Lab testing with 6 Charging Point Operators (CPOs) in 2019
- Field testing began in 2020 with more than 100 connected ports. Field tests included information exchange with all customers for daily load reductions of 30 minutes with 50% participation. The number of charging points has since increased to 389



<https://www.openadr.org/assets/OpenADR%20Case%20Study%20Stromnetz%20ChargePoint.pdf>

Intertrust – E.ON - DigiKoo

- Load balancing for efficient EV charging management
- Utility needed an efficient way to balance load spikes caused by mass EV charging
- Ability to consolidate and intelligently control the supply and demand for performance and flexibility from e-mobility charging processes

<https://www.intertrust.com/products/energy-data-ops/>

<https://www.openadr.org/assets/Intertrust%20Platform-Case-Study-EV-Charging-Load-Management.pdf>



The United Kingdom

- PAS 1878 and 1879 standards (2021) and the Interoperable Demand Side Response (IDSR) program – Department for Energy Security & Net Zero
 - Energy Smart Appliances Standards for Demand Side Response
- Objectives were –
 - Standardization helps to lower costs and promote innovation in technologies, while accelerating the uptake of secure and interoperable smart products and services
 - Develop technical specifications which could be referenced and required by future regulations and would enable certification
 - Demonstrate UK leadership on the international stage, by promoting published standards for international adoption
- The IDSR programme is part of the up to £65m [Flexibility Innovation Programme](#) within the Department for Energy Security and Net Zero's £1 billion [Net Zero Innovation Portfolio](#)

The United Kingdom (2)

- Alignment with existing international standards (e.g. OpenADR)

| Policy Principles | |
|----------------------------|--|
| 1. Interoperability | the ability of an ESA to work seamlessly across any DSR service operated by any system player. |
| 2. Data privacy | the secure storing of data on the device or with any controlling party. |
| 3. Grid-stability | the prevention of outages on the grid caused by erroneous operation of ESAs. |
| 4. Cyber-security | the prevention of unauthorized access to an ESA by third-parties. |



The United Kingdom (3) - Definitions

DSR Service Provider (DSRSP)

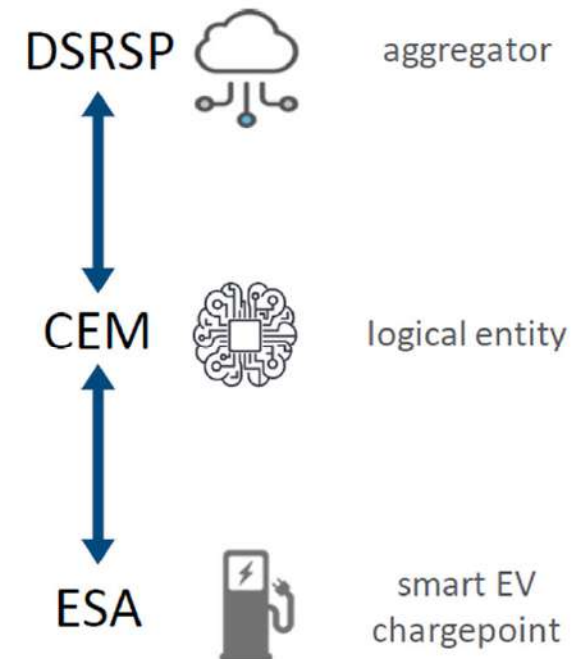
- An organization providing **demand-side** related **energy management services** to electricity system operators, electricity utilities and electricity generators

Consumer Energy Manager (CEM)

- A **logical entity**, that can be **physical or virtual**, which deals with **flexibility information** and requests
- **Translates** between the **DSRSP** and the **ESA**

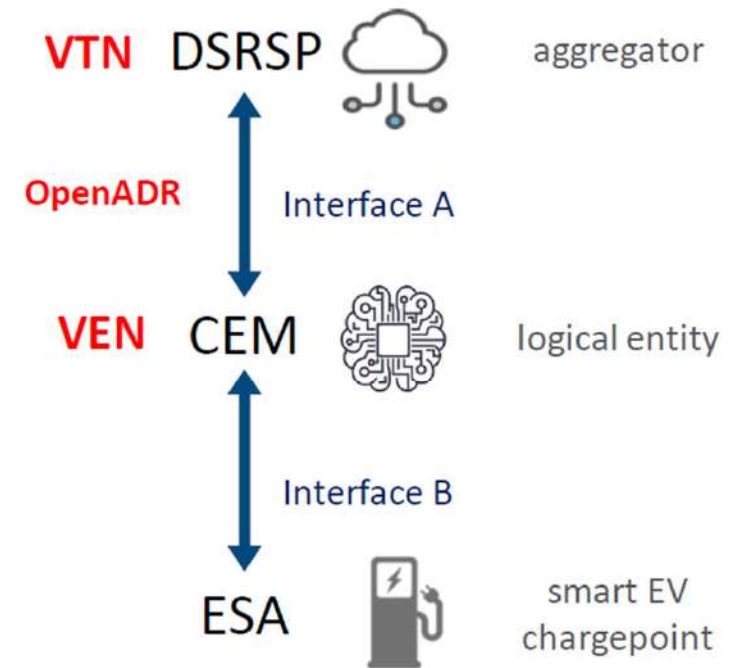
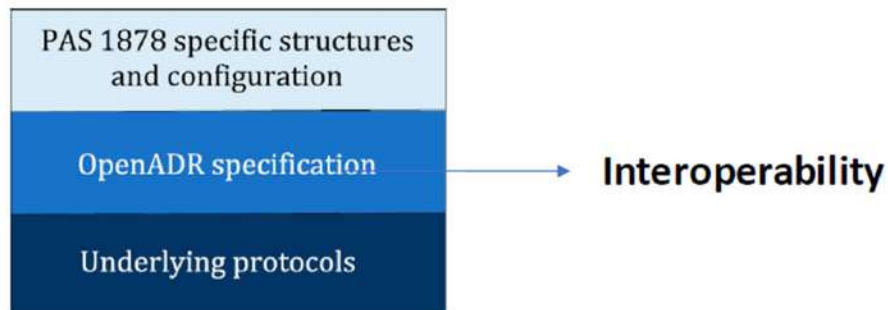
Energy Smart Appliance (ESA)

- An internet **connected** device that can **modulate or shift** its **electricity** consumption in **response** to **signals**.



The United Kingdom (3) – Interface A

- PAS 1878 mandates that any implementation of Interface A shall support the use of **OpenADR**
- The use of OpenADR guarantees interoperability and therefore **enables consumer choice**
- PAS 1878 provides a structure that is mapped on to the OpenADR protocol

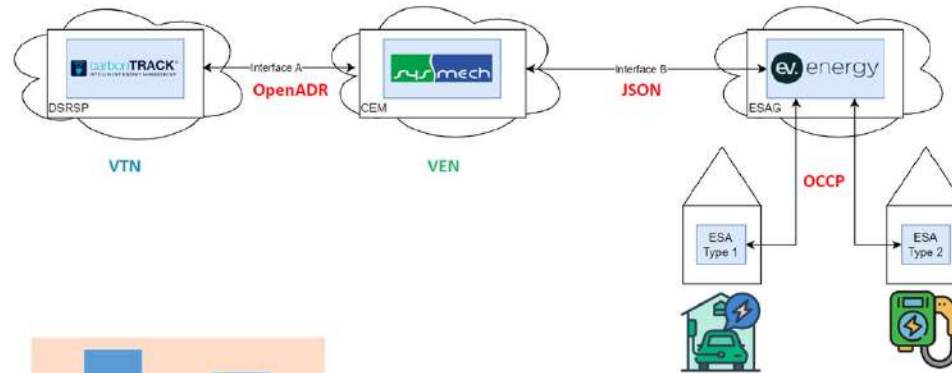


The United Kingdom (4)

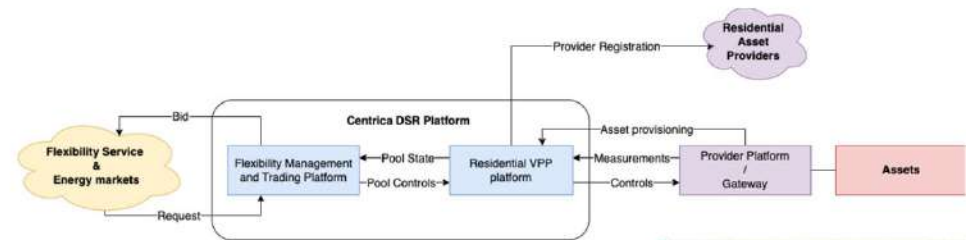
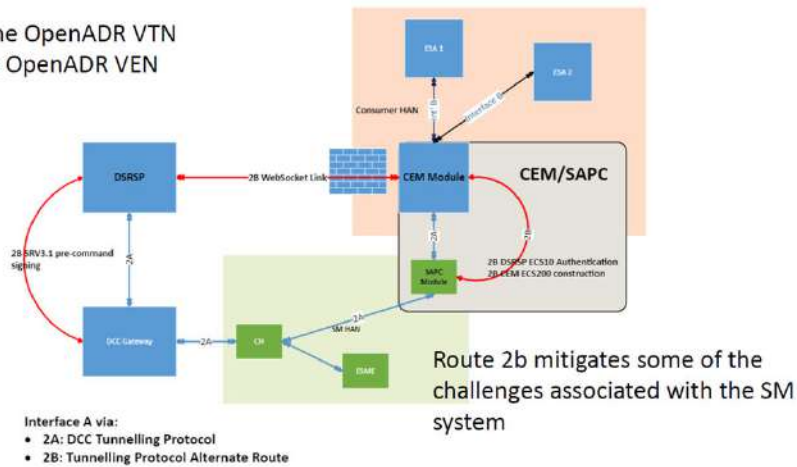
- Program use cases

| IDSR Programme Use Cases | |
|--------------------------|---|
| A | Consumer registering DSR appliance with CEM (where not integrated) |
| B | Consumer registering with the appointed DSRSP |
| C | Consumer defining DSR preferences |
| D | Routine DSR mode of operation based on preferences tariff (ToU) |
| E | Sending power profiles from ESA to CEM and to DSRSP |
| F | Response DSR mode of operation |
| G | Consumer over-ride of DSR response mode and routine mode |
| H | DSRSP maintaining DSR service delivery despite availability changes |
| I | Consumer de-registers ESA from CEM and DSRSP |
| J | Change of incentive information |
| K | Consumer changes DSRSP |

The United Kingdom (5) – Some early implementations



The DSRSP is the OpenADR VTN
The CEM is the OpenADR VEN



Other emerging efforts

- SmartGridready Switzerland – Label in preparation, evaluating OpenADR
- EU Horizon series of projects – Demand Response
- Austria evaluating Demand Response and OpenADR
- Nordic market evaluating protocols. OpenADR and general CIM



Thank you!

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