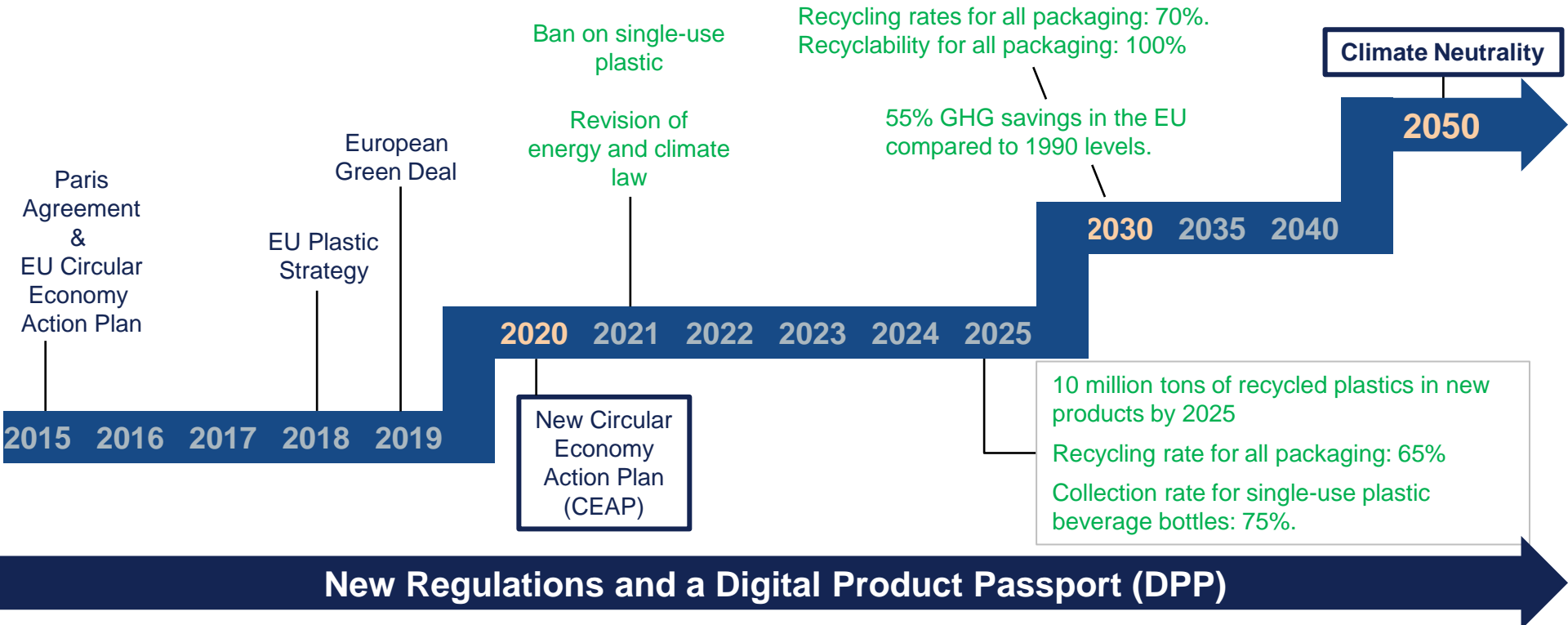


ZVEI-Show-Case PCF@Control Cabinet

Dr. Stefan Schork

Roadmap of the European Green Deal

Increasing Requirements to Document Product Information



The Digital Product Passport under ESPR

Key Information



Tracking of **raw materials extraction/production**, supporting due diligence efforts



Enable **manufacturers** to create products **digital twins**, embedding all the information required



Tracking the life story of a product, enabling services related to its **remanufacturing, reparability, re-use/re-sale/second-life, recyclability**, new business models



Benefit **market surveillance authorities and customs authorities**, by making available information they would need to carry out their tasks



Make available to **public authorities and policy makers** reliable information. Enable to link **incentives to sustainability performance**



Allow **citizens** to have access to **relevant and verified information** related to the characteristics of the products they own or are considering to buy/rent (e.g. using apps able to read the identifier)

The Digital Product Passport

DPP-System and -Data

DPP-system



(to be developed before DPP deployment)

- All **standards** and **protocols** related to the IT architecture, like standards on:
 - Data carriers and unique identifiers
 - Access rights management
 - Interoperability (technical, semantic, organisation), including data exchange protocols and formats
 - Data storage
 - Data processing (introduction, modification, update)
 - Data authentication, reliability, and integrity
 - Data security and privacy
- The DPP registry



Digital Product Passport



DPP-data

(to be identified when developing product-group specific secondary legislation)

Possible Track & Trace identifiers

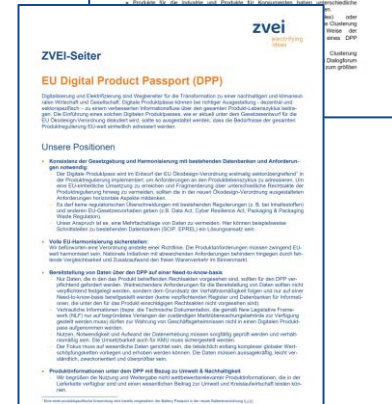
- Economic operator's name, registered trade name
- Global Trade Identification Number or equivalent
- TARIC code or equivalent
- Global location number or equivalent
- Authorised representative
- ...

Example of potential attributes

- Description of the material, component, or product
- Recycled content
- Substances of concern
- Environmental footprint profile
- Classes of performance
- Technical parameters
- ...

Digitaler Produktpass – ZVEI-Positionen

- **Technologieneutralität und Interoperabilität über NLF-Ansatz sicherstellen (Nutzung harmonisierter europäischer Normen)**
- **Dezentraler Ansatz, Sektorspezifika berücksichtigen**
- **Konsistenz der Gesetzgebung und Schnittstellen mit bestehenden Datenbanken**
- **Bereitstellung der Daten auf Need-to-know-Basis**
- **Digitalisierung voranbringen – Redundanzen digital/analog vermeiden**
- **Industrievorschläge berücksichtigen, siehe DPP 4.0**



Hauptmerkmale DPP in der ESPR

- **Dezentraler Ansatz** der Erstellung und Datenspeicherung, aber **zentrales Register für Zugänge**
- DPP muss **eindeutig mit einem Produkt verknüpft** sein
- **Data Carrier** muss auf dem Produkt, der Verpackung oder begleitender Dokumentation sein
- **unterschiedliche Zugangsrechte** zu Informationen im DPP
- **unterschiedliche „Schreib“-Berechtigungen**, um Informationen in einen DPP einzufügen, upzudaten oder einen neuen DPP zu erstellen
- **3 Granularitätsebenen** möglich:
 - Modell
 - Charge
 - Artikel
- **4 eindeutige Identifikatoren** sind immer erforderlich:
 - Unique product identifier
 - Unique operator identifier
 - Unique facility identifier
 - Unique registration identifier

Hauptmerkmale DPP in der ESPR

- **Interoperabilität** mit anderen Produktpässen
- Der **eindeutige Produktidentifikator** und der **DPP-Inhalt** müssen **dauerhaft** sein, mindestens so lange wie die **erwartete Lebensdauer des betreffenden Produkts**. (Stichwort: “broken links”)
- Um sicherzustellen, dass der Zugang zu den Informationen des Produktpasses auch nach einer Insolvenz, einer Liquidation oder der Einstellung der Tätigkeit in der Union erhalten bleibt, muss der Wirtschaftsakteur beim Inverkehrbringen des Produkts auch eine **Sicherungskopie** des Produktpasses über einen “certified **independent third-party product passport service provider**” zur Verfügung stellen

**Digital
Product
Passport 4.0**



**DPP4.0 will be enabling any
Producer / Manufacturer worldwide**

(1) to fulfill ESPR/DPP-requirements

(2) to deliver Digital Services

to any Stakeholder in the Market

ZVEI-Concept „DPP4.0“ based on two IEC-standards

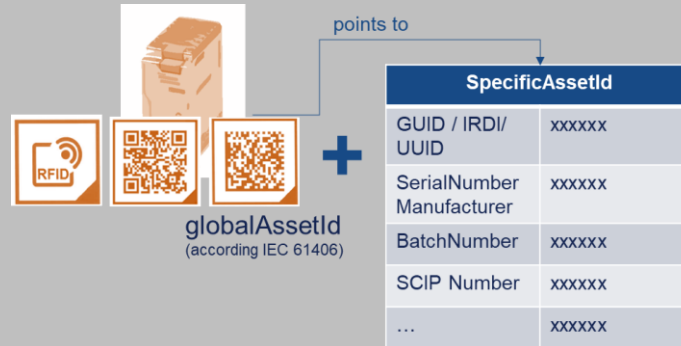
DPP4.0

**Digital
Product
Passport 4.0**



DNP4.0

Digital Nameplate 4.0
(according IEC61406-1)



AAS

Asset Administration Shell
(according IEC63278)

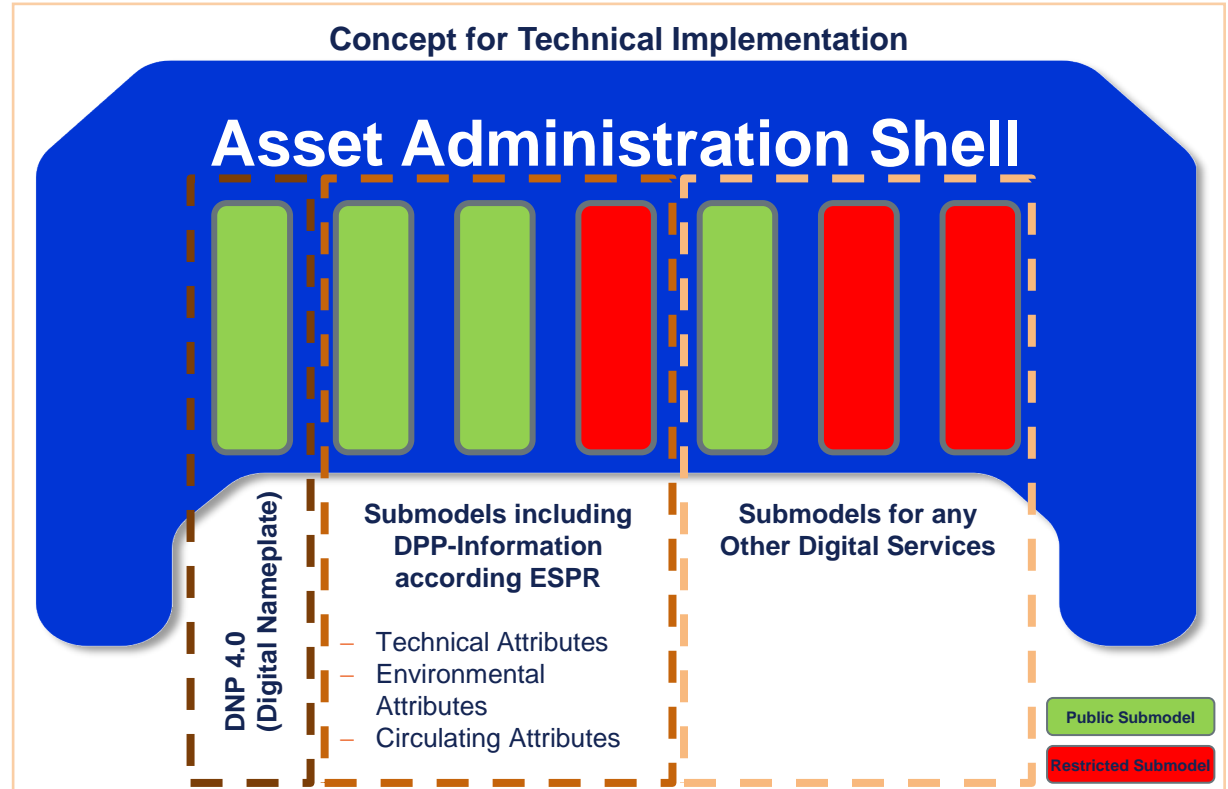
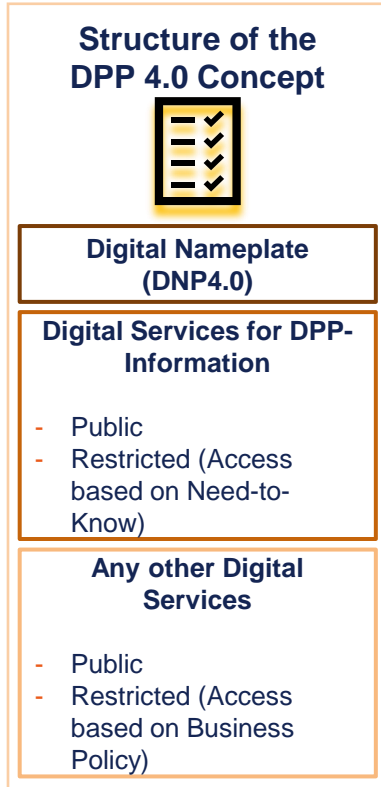


Industrial
Digital
Twin
Association



The Digital Product Passport 4.0 (DPP4.0)

Structure of the DPP4.0-Concept and its Technical Implementation



Increasing Requirements on Accountability for PCF

High Amount is in the Supply Chain and not Transparent

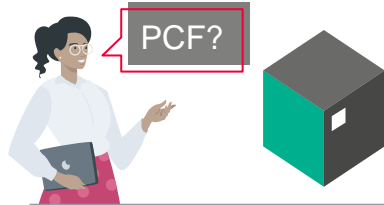
Responsibility

Public pressure

CO₂ Tax

Comp.
Advantage

Customer Request



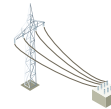
- Requirements for PCF declaration
- Lost projects due to missing PCF info
- Increased willingness to pay for PCF transparency

Product Carbon Footprint (Cradle to Gate)

Direct Emissions
(Scope 1)



Energy
(Scope 2)



9%

Supply Chain
(Scope 3)

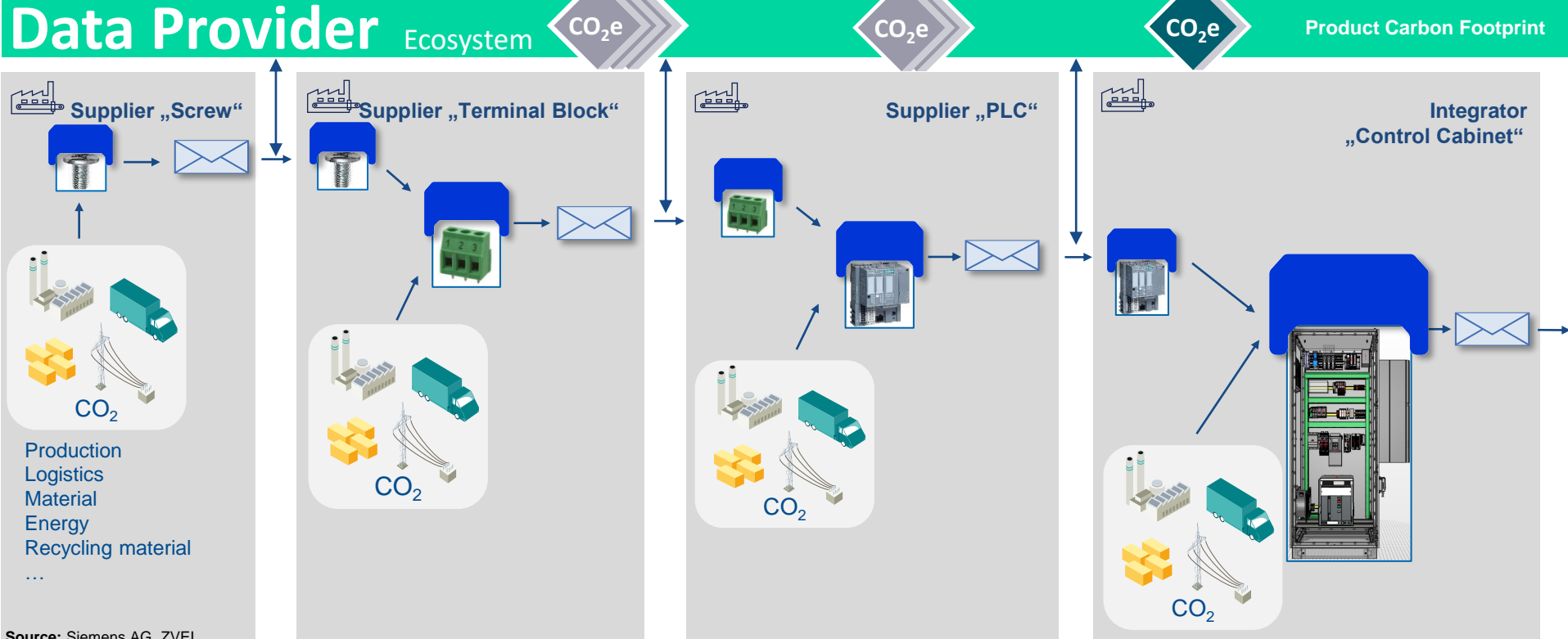


91% intransparent¹

© Siemens 2021

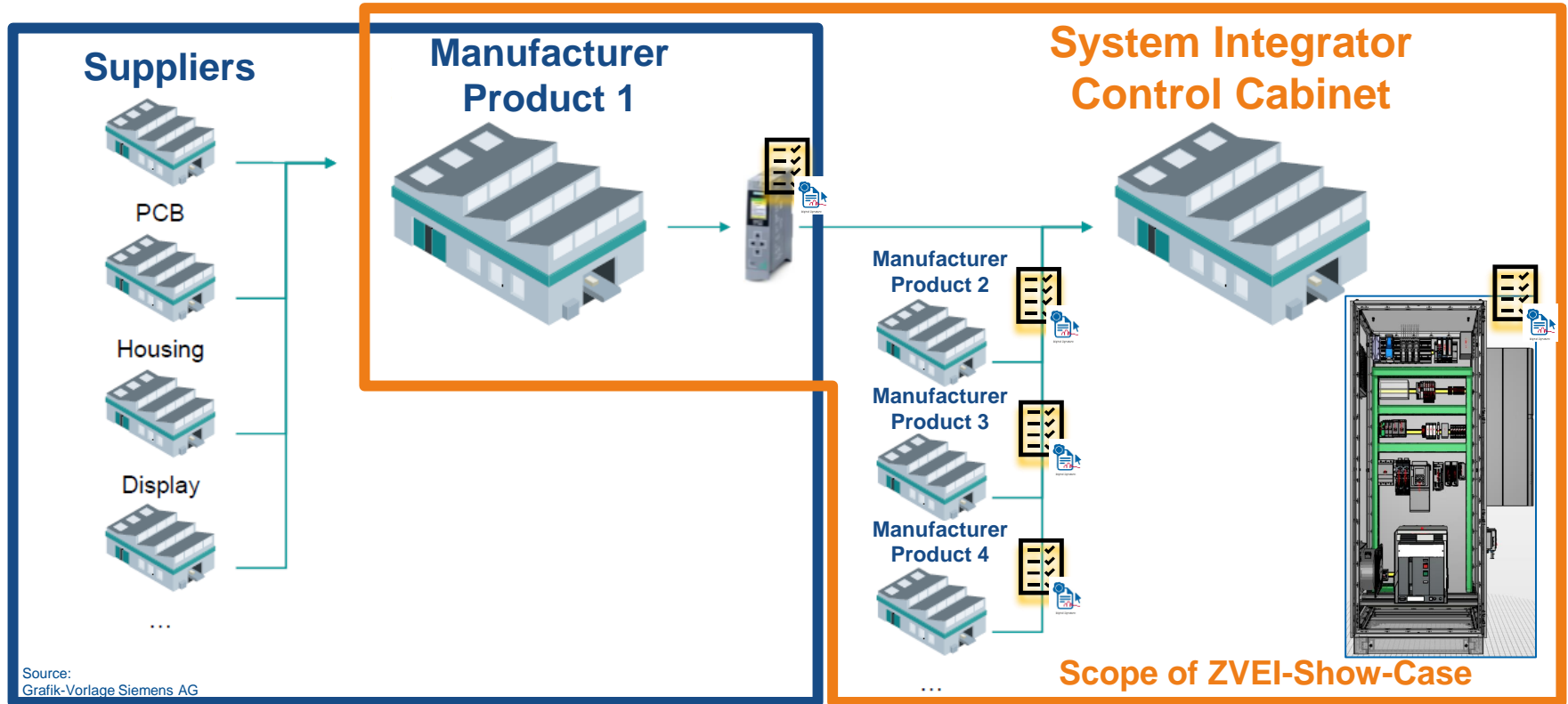
ZVEI-Show-Case “PCF@Control Cabinet”

Simple Supply Chain including OEM, 1st Tier and 2nd Tier Suppliers



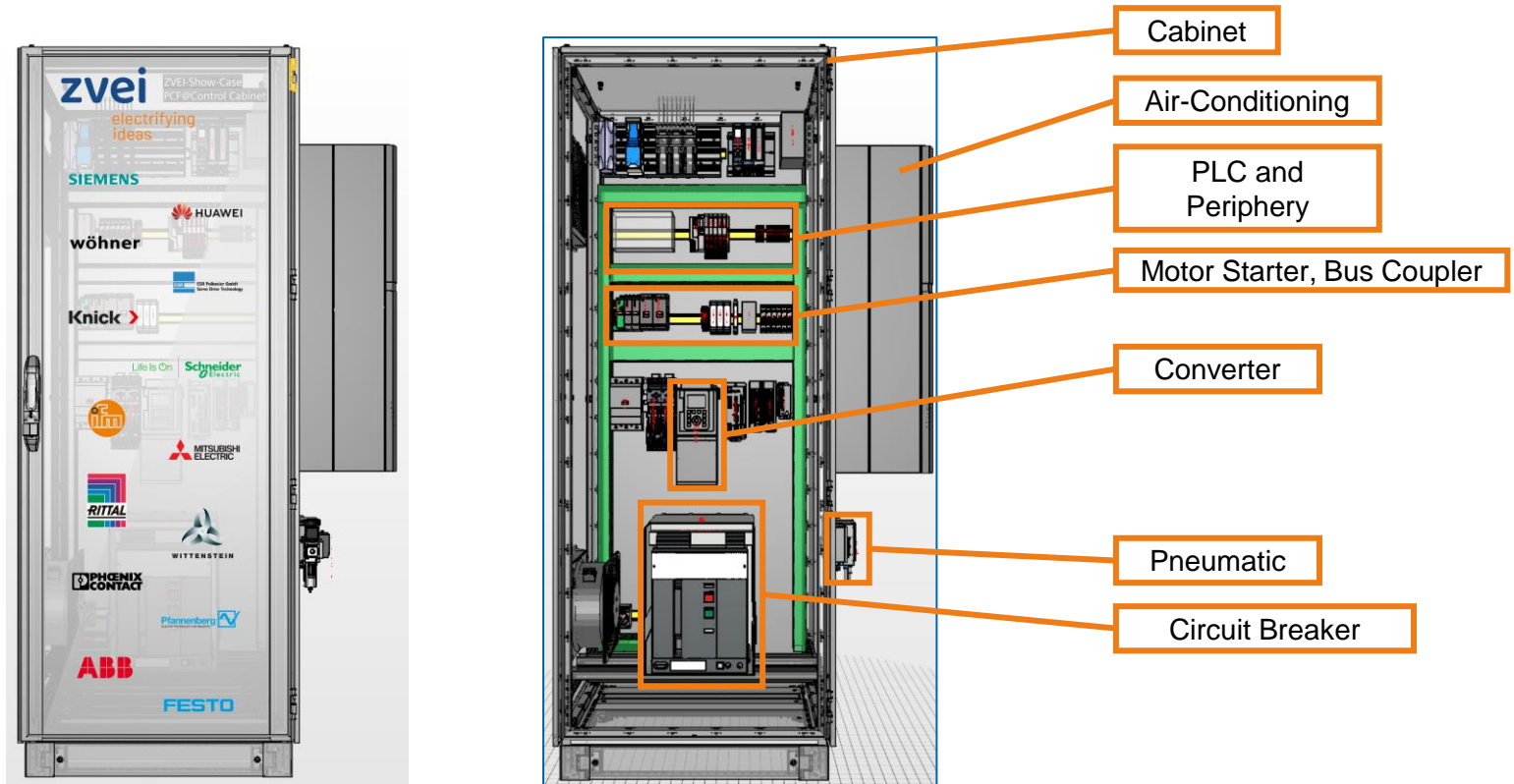
ZVEI-Show-Case “PCF @Control Cabinet”

Scope of the Show-Case: From Manufacturer to System Integrator



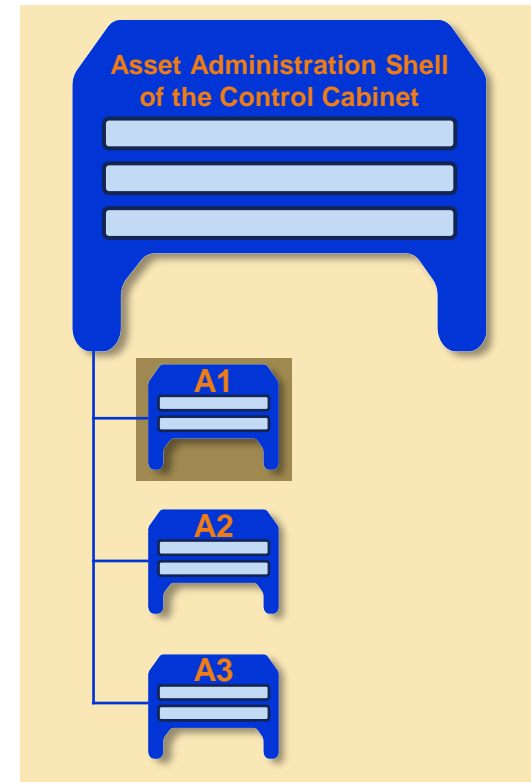
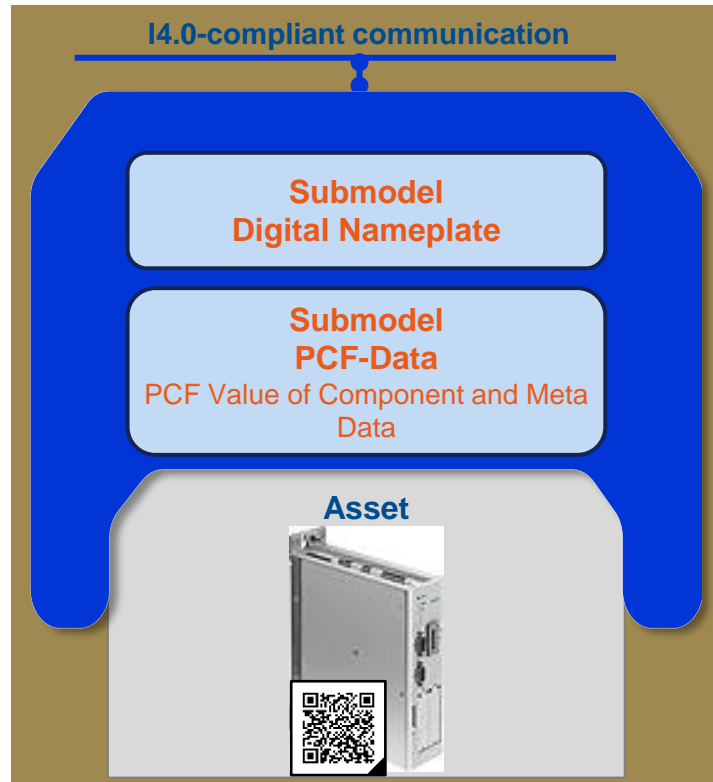
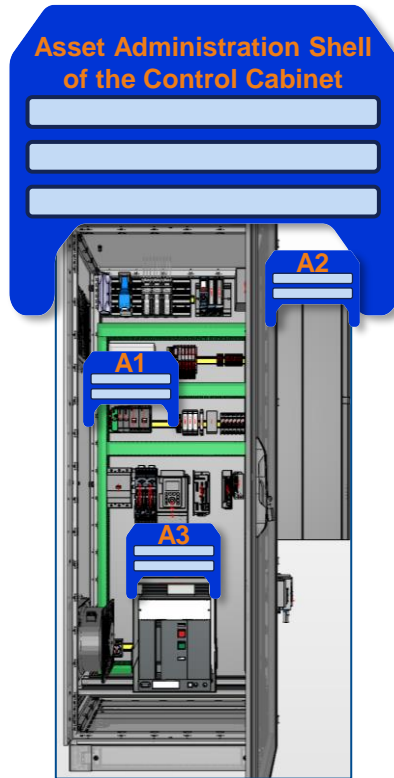
ZVEI-Show-Case “PCF @Control Cabinet”

Demonstrator: Control Cabinet



ZVEI-Show-Case “PCF@Control Cabinet”

Digital Twin of the Control Cabinet



ZVEI-Show-Case “PCF@Control Cabinet”

Demonstration Hannover Fair 2022

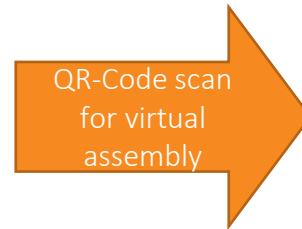


zvei Product Carbon Footprint Showcase

1642.5 kg CO₂e

zvei Combination - Control Cabinet PCF Demo

- zvei Control Cabinet PCF Demo
- Knick > Knick_P42000_2357282
- cyber® simco® drive 2
- DEPHINX CONTACT ATP-ST 4
- DEPHINX CONTACT US-EMLP (15X5)
- ABB** Combination - SACE Emax 2
- ABB** SACE Emax 2
- ABB** SACE Emax 2 Fixed Part
- SIEMENS S7-1500, DQ 32x24VDC/0.5A HF



zvei Product Carbon Footprint Showcase

1761.7 kg CO₂e

zvei Combination - Control Cabinet PCF Demo

- zvei Control Cabinet PCF Demo
- Wall-mounted cooling unit Blue e+**
- Knick > Knick_P42000_2357282
- cyber® simco® drive 2
- DEPHINX CONTACT ATP-ST 4
- DEPHINX CONTACT US-EMLP (15X5)
- ABB** Combination - SACE Emax 2
- ABB** SACE Emax 2
- ABB** SACE Emax 2 Fixed Part

ZVEI-Show-Case “PCF@Control Cabinet”

Demonstration Hannover Fair 2023



ZVEI-Show-Case “CO2@Control Cabinet”

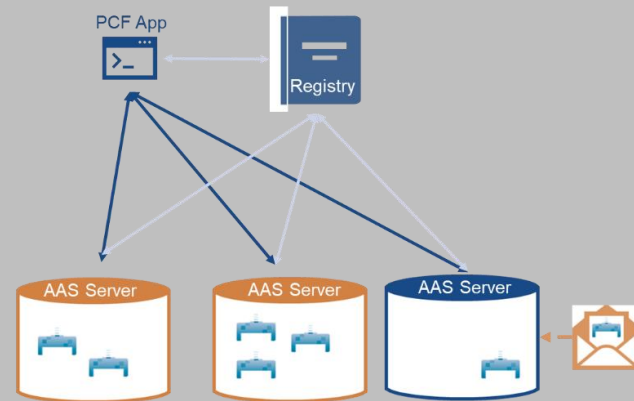
Digital Twin Level 2 (HMI2023 + SPS 2023)



Implementation View

Data sovereignty

- Central registry into which identifying information is transferred
- Distributed data storage for product and sustainability data



ZVEI-Show-Case “CO2@Control Cabinet”

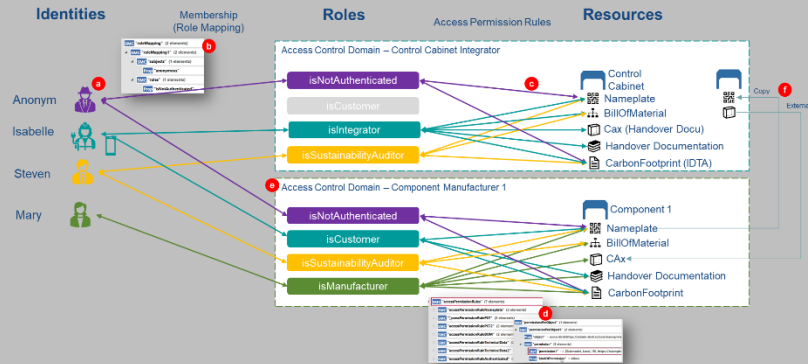
Digital Twin Level 2 (HMI2023 + SPS 2023)



Implementation View

Access rights

- Roles and permissions are maintained by the vendor
- Selective access rights with reusable rule sets
- Public access to publicly available information required by the DPP



ZVEI-Show-Case “PCF@Control Cabinet”

Demonstration Hannover Fair 2023

Full Access Rights

zvei Product Carbon Footprint Showcase

Loaded 459 submodels in 8s Role: Albert Authenticate Disclaimer: displayed PCF values are for demo purposes only


2079.2 kg CO₂e as-built
2079.2 kg CO₂e as-is

Submodels: Host: abb.com Show All Collapse All JSON: AAS Submodel

Nameplate CarbonFootprint Documentation TechnicalData **Distributed Data Storage**

ManufacturerName	ABB
ManufacturerProductDesignation	SACE Emax 2
ManufacturerProductFamily	E2.2H 2500 Ekip Dip LSIIG 3p WMP
SerialNumber	CC21187335
YearOfConstruction	2023
Address	
Markings	
AssetSpecificProperties	

Further Information Impressum



Disclaimer: The PCF calculations of the control cabinet are intended as examples for the technical proof of concept with no claim for accuracy / correctness since there is no comparability of the product-specific product carbon footprints now. As for now, the total PCF value is calculated by simply adding up PCF values calculated with different PCF calculation methods.

Overview of accessible submodels

ZVEI-Show-Case “PCF@Control Cabinet”

Demonstration Hannover Fair 2023

Limited Access Rights

The screenshot displays the ZVEI Product Carbon Footprint Showcase interface. At the top, it shows the user's role as 'Steven' and an 'Authenticate' button. A disclaimer states: 'Disclaimer: displayed PCF values are for demo purposes only'. The main content area is divided into two panels. The left panel, titled '2079.2 kg CO₂e as-built', lists several submodels with their respective carbon footprint values and icons for Nameplate, BOM, PCF, DOC, and TECH. The right panel, titled 'Distributed Data Storage', shows detailed information for the selected submodel, including ManufacturerName (ABB), ManufacturerProductDesignation (SACE Emax 2), ManufacturerProductFamily (E2.2H 2500 Ekip Dip LSIG 3p WMP), SerialNumber (CC21187335), and YearOfConstruction (2023). Below this, there are sections for Address, Markings, and AssetSpecificProperties, all of which are currently empty. At the bottom of the right panel, there are links for 'Further Information' and 'Impressum', along with a QR code. A large blue bracket on the left side of the image encompasses the submodel list and is labeled 'Overview of accessible submodels'.

2079.2 kg CO₂e as-built

2079.2 kg CO₂e as-is

Combination - Control Cabinet PCF Demo

Control Cabinet PCF Demo

Hybrid motor starter

Ground modular terminal block

Relay Module

SACE Emax 2

SACE Emax 2 Fixed Part

S7-1500, DQ 32x24VDC/0.5A HF

ET 200SP, AI 4xUII 2-Wire ST, PU 1

Submodels:

Host: abb.com Show All Collapse All JSON: AAS Submodel

Nameplate CarbonFootprint Documentation TechnicalData

Distributed Data Storage

ManufacturerName	ABB
ManufacturerProductDesignation	SACE Emax 2
ManufacturerProductFamily	E2.2H 2500 Ekip Dip LSIG 3p WMP
SerialNumber	CC21187335
YearOfConstruction	2023

Address

Markings

AssetSpecificProperties

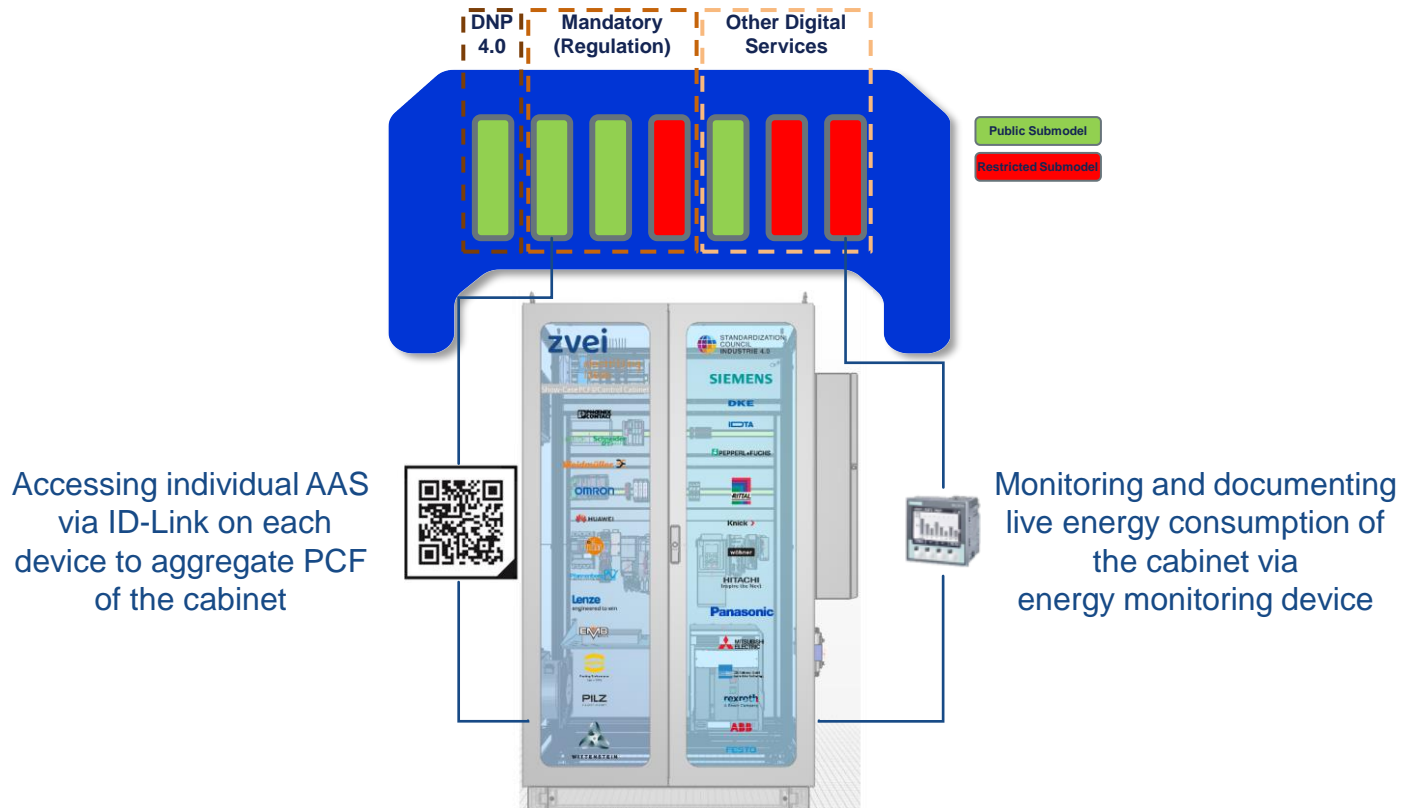
Further Information Impressum

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Overview of accessible submodels

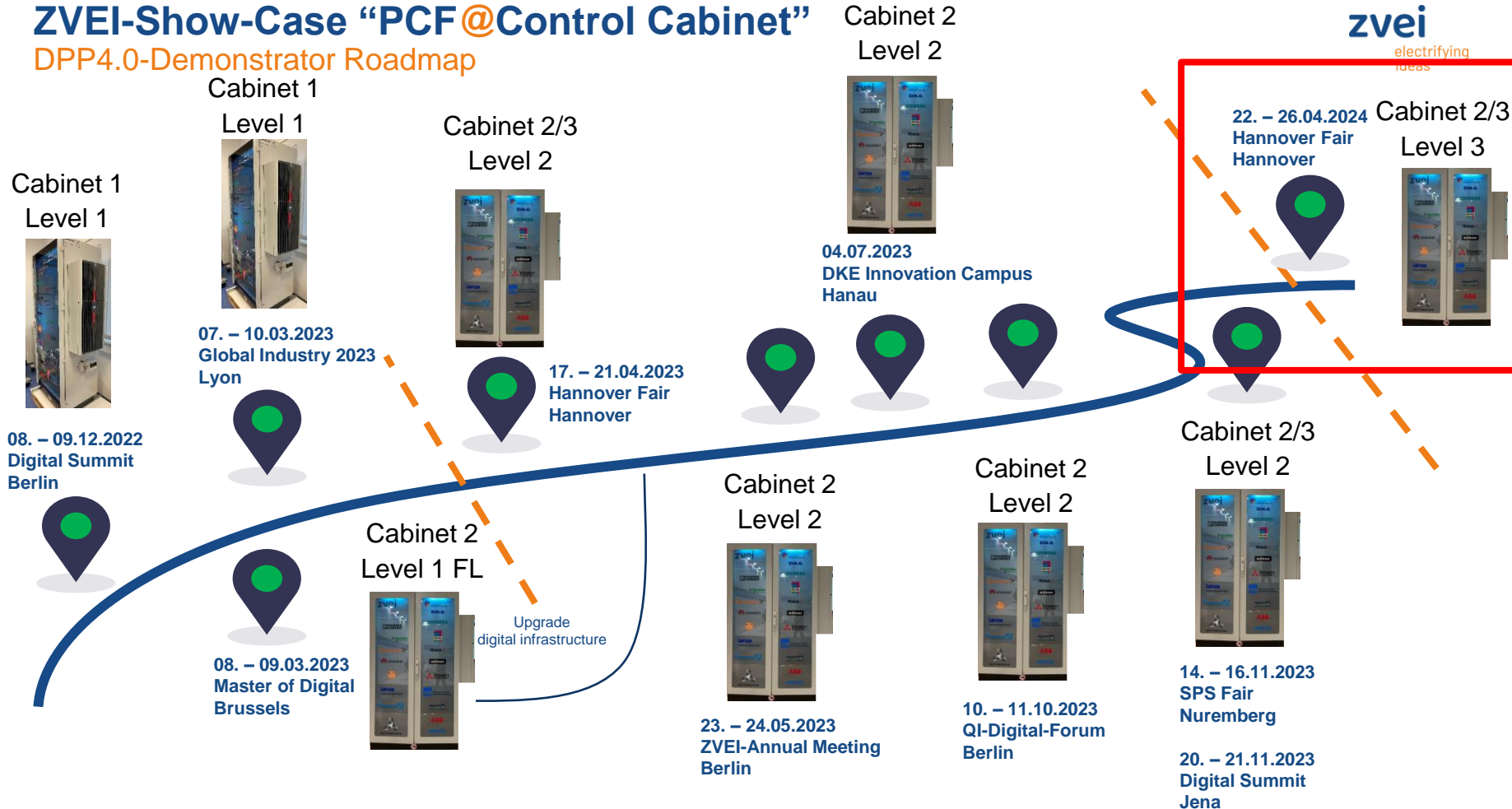
HMI-2024: DPP4.0-Example for „Digital Service“

Use-Case – Energy Monitoring Control Cabinet



ZVEI-Show-Case “PCF@Control Cabinet”

DPP4.0-Demonstrator Roadmap



ZVEI-Show-Case “PCF@Control Cabinet”

DPP4.0-Demonstrators in different sectors



Industry: Show-Case PCF@Control Cabinet

[Livestream: BMWK - Digital-Gipfel 2022: Livestream 09.12. – Forum A \(Originalton\)](#)
start 06:19:37 (length 09:03)

Dr. Stefan Schork | ZVEI Industry Division

Buildings: Show-Case DPP4.0@EIS (Electronic Installation Systems)

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Automation Division

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<http://www.zvei.org>



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electrifying
ideas
