Energy Digital Twins with Data Spaces and Standards – SYNERGIES project

Data Week 2023, Session «Digital Twins with Data Spaces and Standards» - 13/06/2023

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This project has received funding from the EU HORIZON Innovation Actions - Sustainable, secure and competitive energy supply CL-5-2021-D3-01

Grant Agreement: 101069839

SYNERGIES at a Glance

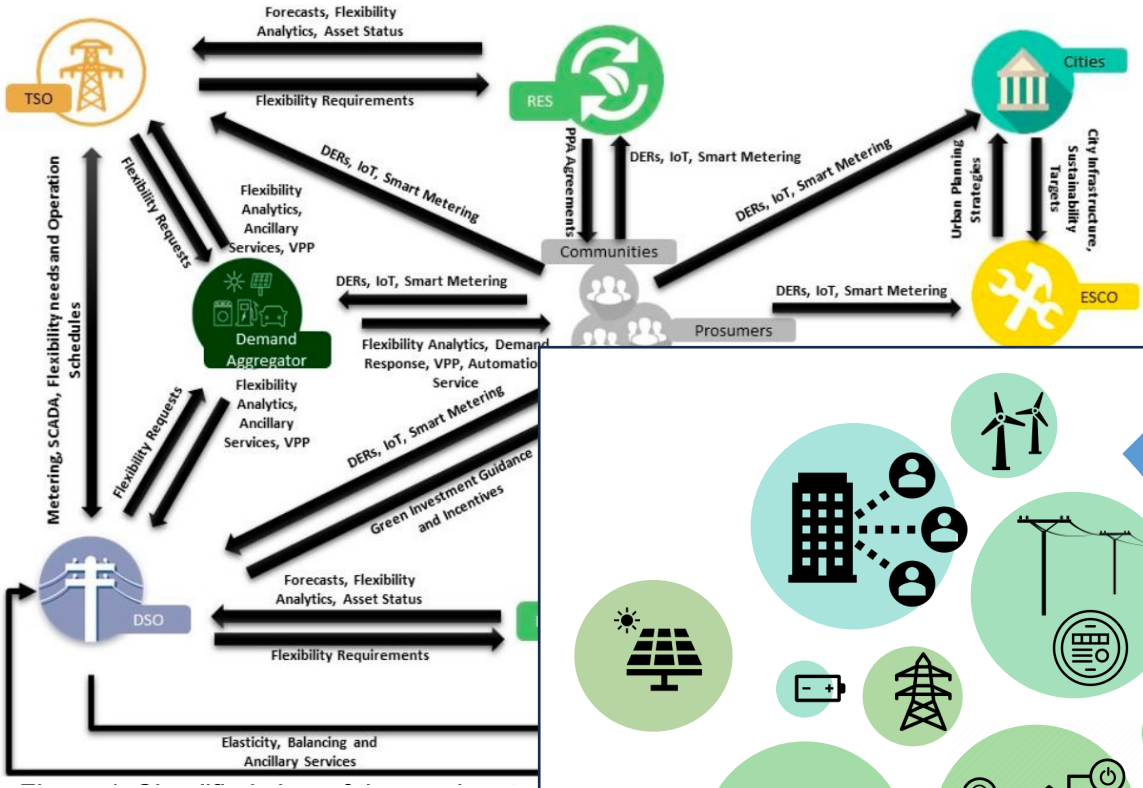
Shaping consumer-inclusive data pathwaYs towards the eNERGy transItion, through a reference Energy data Space implementation

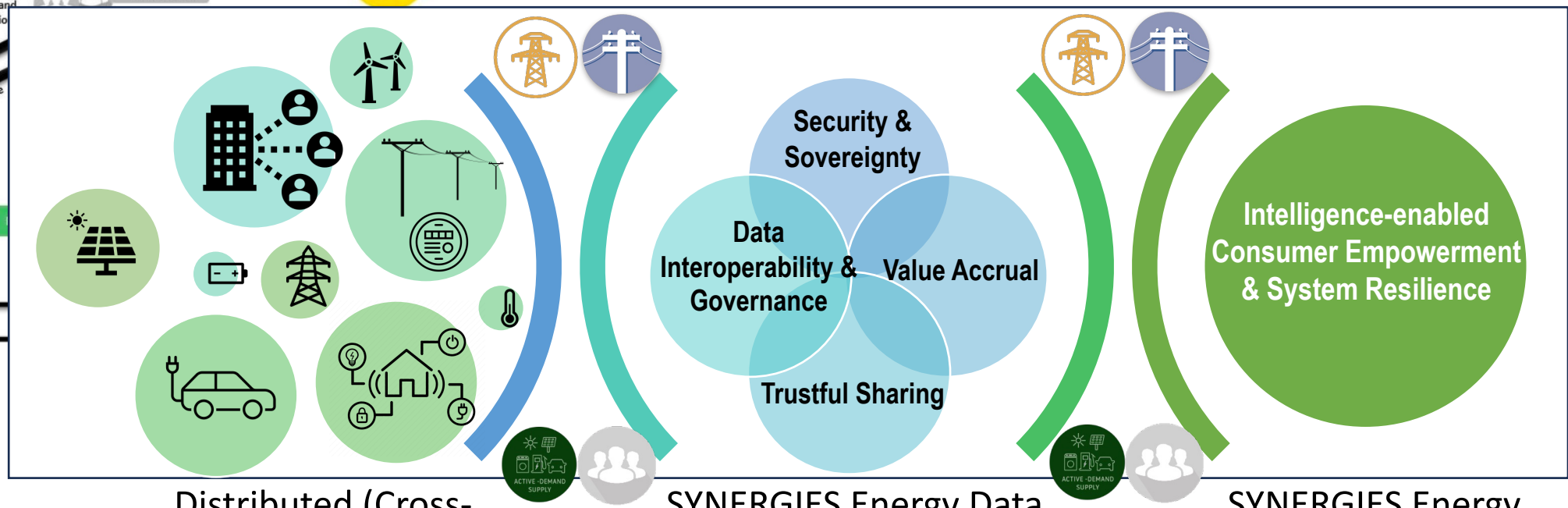
Start Date 01/09/2022	22 Partners
42 Months	10 Countries
Innovation Action	3 Demonstration Sites in Europe (Greece, Spain, Denmark)

Consortium

- Project Coordinator
- Technical Coordinator

Addressing the needs: A Bird-eye view of the SYNERGIES approach





Distributed (Cross-Sector) Data Sources

SYNERGIES Energy Data Space

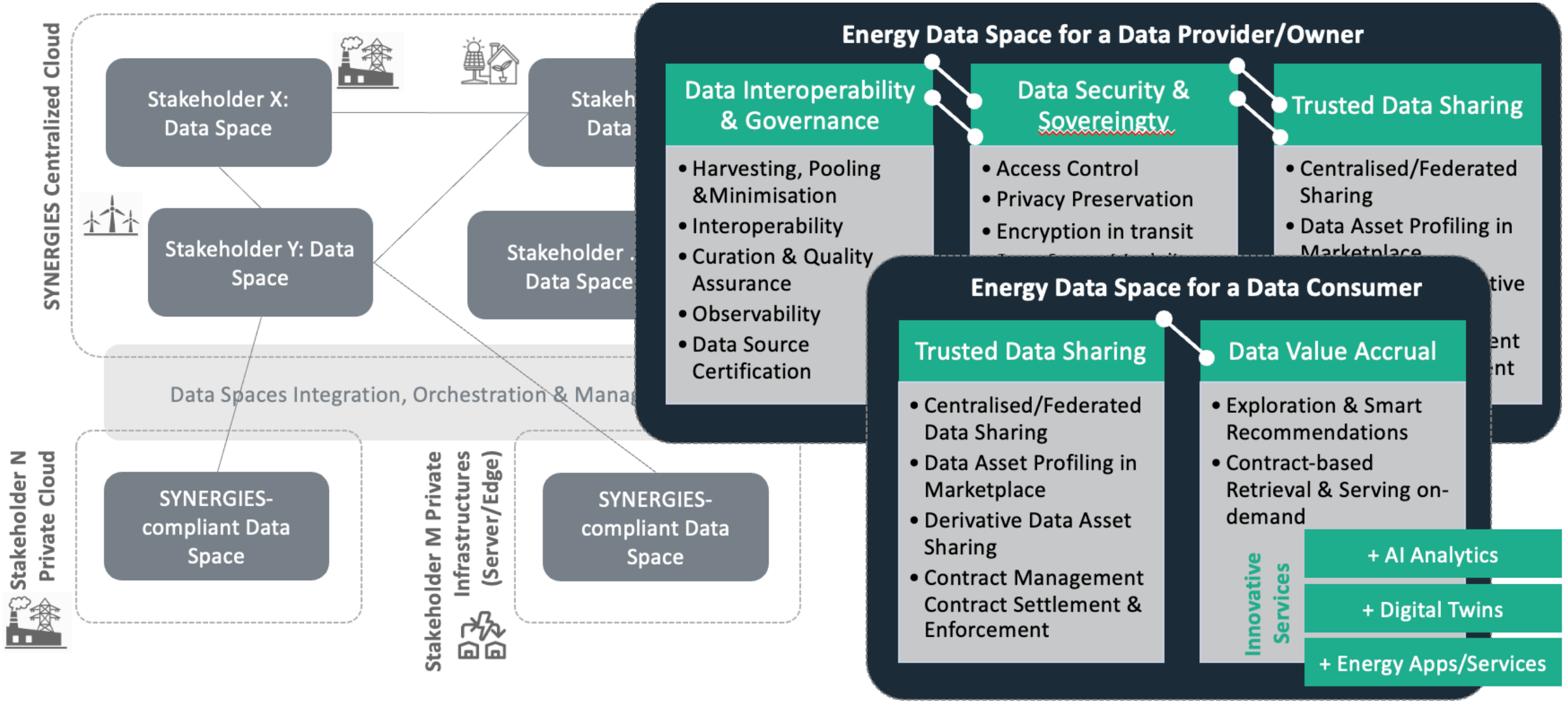
SYNERGIES Energy Service Marketplace

SYNERGIES Vision

SYNERGIES brings forward a **reference Energy Data Space Implementation** that will attempt to **unleash the data-driven innovation and sharing potential** across the **energy data value chain** by leveraging on data and intelligence coming from diverse energy actors (prioritizing on consumers, but also introducing the stakeholders of the whole value chain as **data owners and/ or providers**), as well, from **interrelated and coupled sectors (buildings and mobility)** and effectively making them **reachable and accessible** by all interested actors.

An **Energy Data Space** is a **secure and isolated data sandbox** that is provided to or is available by each stakeholder (from the energy data value chain and its interrelated, coupled sectors) to **collect, monitor, control, analyse and share their data in their own terms** and to **obtain, access and use external data (from other data spaces)** through a reliable, interoperable and sovereignty preserving approach, effectively enhancing their data-driven intelligence and increasing their data outreach

SYNERGIES from a Data Space Perspective



Digital Twins in SYNERGIES

- **Fusing simulation functions (physical models) with derivative data intelligence insights (AI models)**, to improve their observability and internal optimization functions
- Leveraging the **increased availability of real-time data of high quality** (from the Energy Data Space of each stakeholder) and **advanced hybrid (physical-AI) data (intelligence)-driven prediction** features.
- **Offered as- a-service** through the SYNERGIES Service Marketplace

Digital Twin for Real-time Network Congestion and Voltage Violations Identification and Management

Digital Twin for Short-to-mid-term Network Operation Planning (T&D), Asset Management and Long-term Asset Sizing

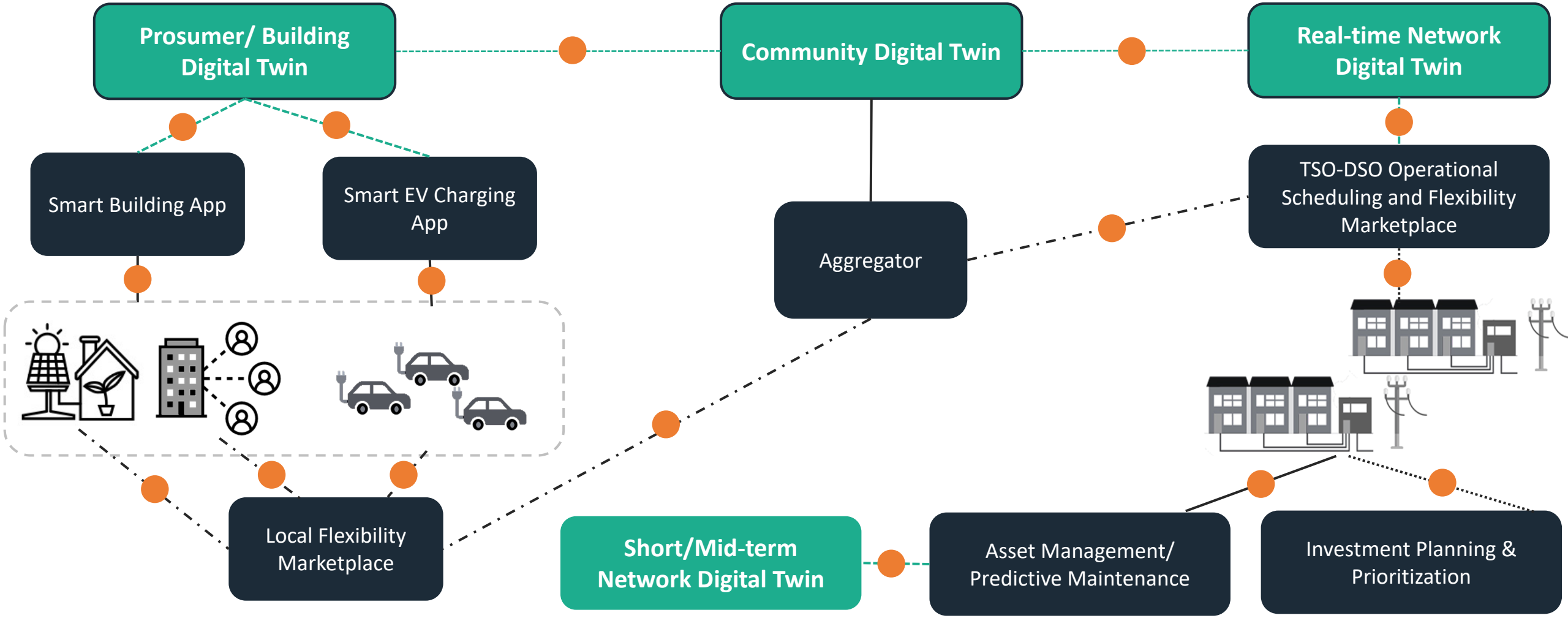
Community Digital Twin for Local Energy and Flexibility Management Optimization

Prosumer Digital Twin for Optimized Management and Control of Individual Assets

SYNERGIES from an Energy Ecosystem Service Integration Perspective

SYNERGIES

Stakeholders' Data Spaces



Future Impact/Use of Standards in the Energy Data Space

SYNERGIES

Design the **Draft Network of Sectorial Data Models**

- IEC CIM 62325/61970/61968/61850, OpenADR2.0b, USEF, SAREF, SAREF4ENER for energy/ concepts
- ETSI SmartM2M (a service capability layer on top of connectivity layers) for IoT connectivity
- SSN/SOSA for sensors/edge devices
- SAREF4BLDG, COBie for building concepts
- obXML for occupants' behavior
- OCPP for interaction CPO <> EVSE
- OSCP for interaction CPO <> DSO
- IEC/ISO 15118 & IEC 61851-1 for interaction EV <> EVSE

Design/adopt open standards-based connectors (IDS, IoT, OPC-UA, Modbus) for **facilitating data ingestion** from legacy systems and individual devices that utilize widely adopted data and communication protocols

Standards-based interoperable data exchange with existing data platforms/ data hubs, open data portals and data platforms developed in the frame of energy data-relevant EU-funded projects (Data Formats, Protocols, API Specs)

ISO 20547-3 "Big Data Reference Architecture", ISO 23053 "Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)", + ISO DIS 5338 "AI system life cycle processes", ISO FDIS 8183 "Data life cycle framework", ISO DIS 5259 "Data quality for analytics and machine learning (ML)"

Thank your for your attention!

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