PLATOON

Digital platform and analytic tools for energy

Data Spaces: Common data models for Energy

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Horizon 2020 Programme

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 872592

About PLATOON

Call- Topic: DT-ICT-11-2019 – Big Data Solutions for Energy (IA)

Duration: 36 months, start date 01/01/2020

Participants: 20 partners from 9 European countries (Belgium, France, Germany, Italy, Poland, Serbia, Slovenia, Spain, and Switzerland)

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Global Goals

Enable reliable, fair and secure extraction of knowledge from energy sector data.

Foster new business models in the energy sector using digital technologies.

Enhance multi-party cooperation between technology providers and data owners.

Contribute to the standards of energy management systems.

Offer proper roles for inter- faces to enable innovative business processes.

Identify new **COSMAG- compliant standards** for scalable and replicable energy management solutions.

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General Objective

- PLATOON aims to develop a federated data platform for Energy focusing on 3 main pillars:
  1. Interoperability;
  2. Decentralized Trust (Privacy and Sovereignty);
  3. Data Analytics Tools and Edge Computing.

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Partners and Pilots

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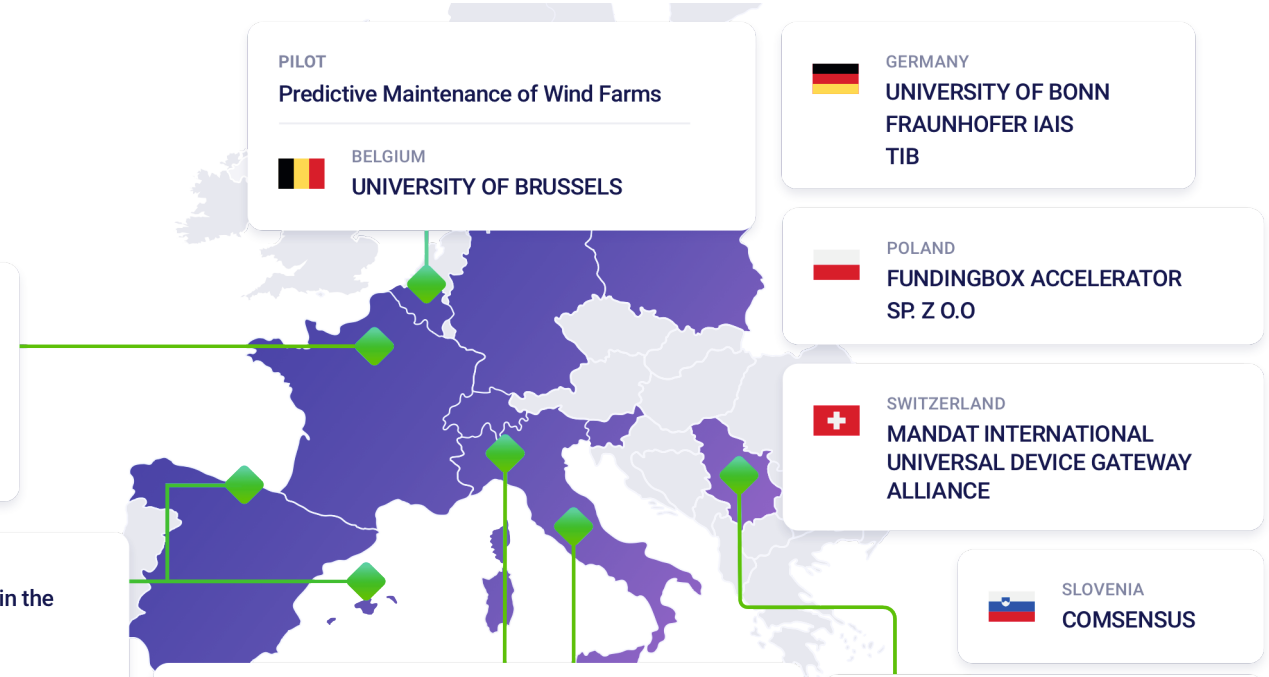
Partners and Pilots

Partners Pilots



PILOTS
Office building Operation performance with physical models and AI algorithms

FRANCE
ENGIE

PILOTS
Energy Efficiency and Predictive Maintenance in the Smart Tertiary Building Hubgrade
Electricity grid stability, connectivity and Life Extension

SPAIN
TECNALIA
GIROA VEOLIA
SISTEPLANT, S.L.
SAMPOL INGENIERIA Y OBRAS
INDRA SOLUCIONES TECNOLOGIAS DE LA INFORMACION
CLUSTER ENERGÍA – BASQUE ENERGY CLUSTER

PILOT
Predictive Maintenance of Wind Farms

BELGIUM
UNIVERSITY OF BRUSSELS

GERMANY
UNIVERSITY OF BONN
FRAUNHOFER IAIS
TIB

POLAND
FUNDINGBOX ACCELERATOR SP. Z O.O

SWITZERLAND
MANDAT INTERNATIONAL
UNIVERSAL DEVICE GATEWAY ALLIANCE

SLOVENIA
COMSENSUS

PILOTS
Advanced Energy Management System and Spatial Predictive Models in the Smart City Energy Management of Microgrids

ITALIA
POLITECNICO DI MILANO
ENGINEERING INGEGNERIA INFORMATICA SPA
ROMA CAPITALE
POSTE ITALIANE SPA

PILOT
Electricity Balance and Predictive Maintenance

SERBIA
INSTITUT MIHAJLO PUPIN

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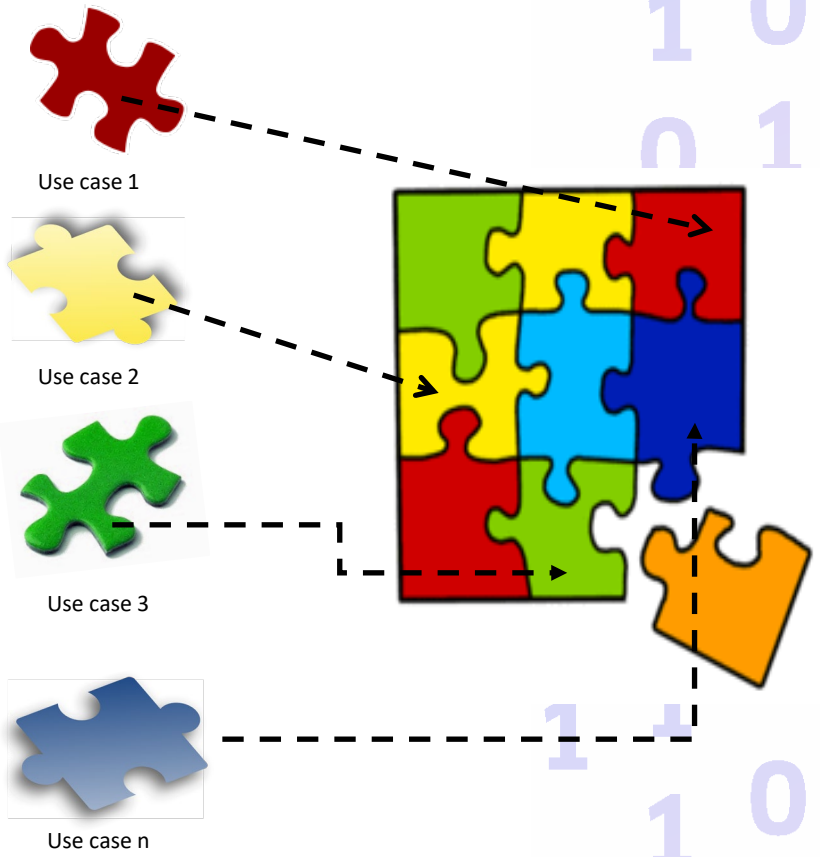
Common Data Models for Energy

- Complex systems that :
  - deal with heterogeneous data (data structures, semantics and protocols);
  - deal with different infrastructures (software and hardware);
  - Deal with different rules, policies (business, internal, national, international).
- Several interlinked domains in Energy sector: Smart Grid, Building, City, Renewables (Wind, Solar, …).

Need to define of a set of **Open & Shared Common Semantic Data Models** to enable interoperability in the energy domain considering the whole value chain (generation, transport/distribution and end use of energy) and the different use cases (O&M, flexibility, LEC…).



PLATOON Common Data Model: Methodology

PLATOON pilot Desciption

Use Case -
Context Evaluation

Core semantic
Data model

KRR
Ont. Req. Spec → **KRR**
Ont. Analysis → **KRR**
Ont. Modules → **KRR**
UC Exp. Interaction → **KRR**
Ont. Formalization

Reuse/Extend of Existing – Not reinvent the Wheel.

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Standard Ontologies considered in PLATOON

Domain	Format	Link	Semantic Data Models	Renewable Generation	Smart grids		End Use of Energy			Generation, Distribution and End Use of Energy
				Predictive Maintenance of Wind Farms	Electricity Balance and Predictive Maintenance	Electricity grid stability, connectivity and Life Extension	Office building: Operation performance thanks to physical models and IA algorithms	Advanced Energy Management System and Spatial (multi-scale) Predictive Models in the Smart City	Advanced Energy Management System and Energy Efficiency and Predictive Maintenance in the Smart Tertiary Building Hubgrade	Energy Management in microgrids
Home appliances	TTL	https://forge.etsi.org/	Saref*	✓	✓	✓	✓	✓	✓	✓
Energy	TTL	https://ontology.tno.	Saref4Ener*	✓	✓	✓	✓	✓	✓	✓
Environment	Ntriple, RDF/XML, TTL	https://w3id.org/def/	Saref4Envi*	✓						
Building	Ntriple, RDF/XML, TTL	https://w3id.org/def/	saref4Bldg*				✓	✓	✓	
Smart city	Ntriple, RDF/XML, TTL, JSON-LD	https://w3id.org/def/	Saref4City*			✓		✓		
Industry	Ntriple, RDF/XML, TTL, JSON-LD	https://w3id.org/def/	Saref4INMA*							
Agriculture	Ntriple, RDF/XML, TTL, JSON-LD	https://w3id.org/def/	Saref4Agri*							
Building, device,	JSON-LD	https://fiware-datame	FIREWARE*	✓			✓	✓	✓	
IOT	JSON-LD	https://www.gsma.co	GSMA*	✓	✓	✓	✓	✓	✓	✓
Electricity	UML, RDF	https://ontology.tno.	CIM*		✓	✓				✓
Sensor device Iot	TTL	http://www.w3.org/r	SSN	✓	✓	✓	✓	✓	✓	✓
SSN and spatial data	TTL	http://www.w3.org/r	SOSA	✓	✓	✓	✓	✓	✓	✓
Energy system	TTL	https://w3id.org/seas	SEAS	✓	✓	✓	✓	✓	✓	✓
Energy heating	TTL, TAG	https://brickschema.o	Brick schema				✓	✓	✓	
Building topology	TTL	http://www.w3id.org	BOT				✓	✓	✓	
Energy efficiency in Future Smart Homes	OWL	https://www.auto.tu	ThinkHome				✓	✓	✓	
Prosumer-Oriented Smart Grid	OWL, TTL	http://data-satin.tele	ProSGV3							✓
OEMA (Ontology for Energy Management Applications); Infrastructure, Energy, Equipment, Geographical data, Smart Grid Stakeholders, Units of Measure	RDF/XML, Ntriples, TTL	https://innoweb.mon	OEMA (reutilise ThinkHome, Saref, Energyuse, ProSGV3)	✓	✓	✓	✓	✓	✓	✓
Energy flexibility for a specific device	TTL	https://sites.google.c	Mirabel	✓	✓	✓	✓	✓	✓	✓
Smart city	RDF	http://wlode.disit.org	KM4city					✓		
Energy domain: Building energy consumption	OWL	http://semanco-tools	SEMANCO				✓	✓	✓	
LCC (Leeds City Council): Energy Consumption	TTL	http://smartcity.linke	LCC	✓	✓	✓	✓	✓	✓	✓
Smart Building	OWL	http://lpis.csd.auth.g	BOnSAI				✓	✓	✓	
Intelligent Domotic Environments	JSON LD, RDF/XML, Ntriples, TTL	http://iot-ontologies.	DogOnt	✓	✓	✓	✓	✓	✓	✓
Wind farms/turbines	OWL	https://raw.githubus	OntoWind	✓						

Conclusions and Next Steps

- Need of common data models (*shared abstraction and concept formalization with semantic relationships*) to enable semantic interoperability in the Energy domain considering the whole value chain (generation, transport/distribution and end use of energy) and the different use cases (O&M, flexibility, LEC…).

- There is no single ontology (and it probably won't exist) that can cover the whole energy value chain and use cases.

- PLATOON defined a methodology to build core modules that represent open and shared common data models using a bottom-up approach from use cases reusing and extending existing standard ontologies.

- The defined methodology and defined data models are explained in upcoming public deliverable “D2.3-PLATOON-Common Data Models for Energy” that will be made available through Cordis (currently under revision by the European Commission).

- The defined common data models will be extended with new use cases (flexibility, LEC, EV…) in upcoming projects from the new call Establish the grounds for a common European energy data space (HORIZON-CL5-2021-D3-01-01)

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THANK YOU FOR YOUR ATTENTION!

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https://platoon-project.eu/