

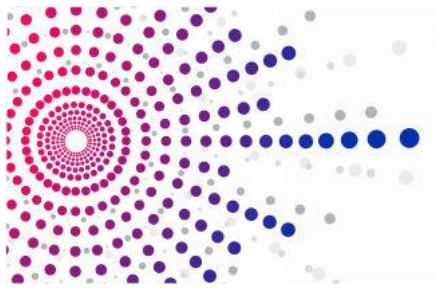
**BD⁴
NRG**

Big Data for Next
Generation Energy

Institutional Presentation

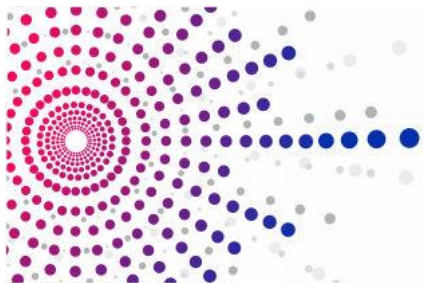
28/06/2022





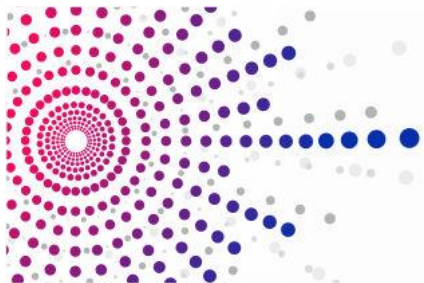
Contents

- ▣ **General Information**
- ▣ **Consortium**
- ▣ **Motivation**
- ▣ **Vision**
- ▣ **Objectives**
- ▣ **Timeline & Methodology**
- ▣ **Work Formation**
- ▣ **Large Scale Pilots**
- ▣ **Target Group & Impacts**



General Information

Title:	Big Data for Next Generation Energy
Funding:	European Union's Horizon 2020 Research and Innovation Program (H2020)
Overall Budget:	11.883.025€
Lifetime:	January 2021 – December 2023 (36 months)
Coordination:	ENGINEERING - INGEGNERIA INFORMATICA SPA
Participants:	35
Call/Grant	H2020-DT-2019-1/872613



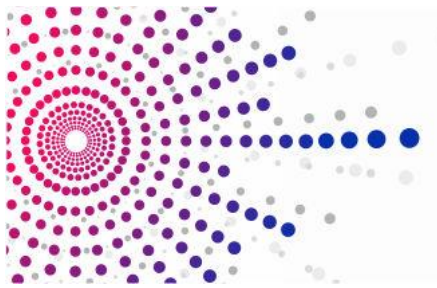
Consortium

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28/06/2022





Motivation

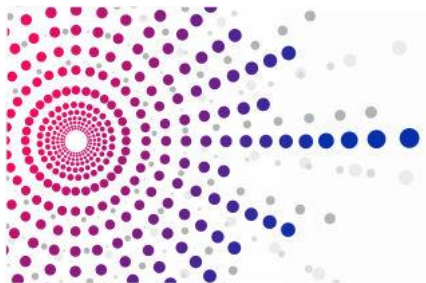
Energy System Transformation

- ❑ New energy sources installations lead to growing responsibilities
- ❑ Consumers are now active players. Energy systems are moving from a supplier centric model towards a consumer centric model.
- ❑ The pace of digitization in energy is increasing and consequently the availability of datasets
- ❑ Solutions are required to face heterogeneity, scalability and asynchronicity of the available energy data
- ❑ Energy system management requires big data approach in order to process large volume and varieties of both real and historical data



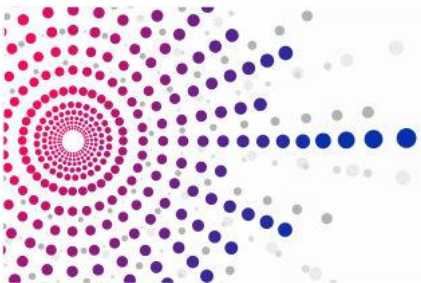
Data Driven Applications

- ❑ Increasing momentum of big data technologies and the growing trend towards a data economy
- ❑ High adoption of ICTs technologies, such as IoT, AI, 5G and big data all the way to the consumer
- ❑ Rising amount of data that are being generated, require a conceptual and technological framework facilitating and motivating energy stakeholders to share data to maximise their added value
- ❑ Data driven applications, require a standardisable interoperable architecture for big data along smart energy grids able to provide a unifying approach for technological components, platforms and interoperability with smart grid operational framework
- ❑ Artificial Intelligence (AI) and Edge/IoT Infrastructure Management Enablers are the main drivers in generating innovative services and applications

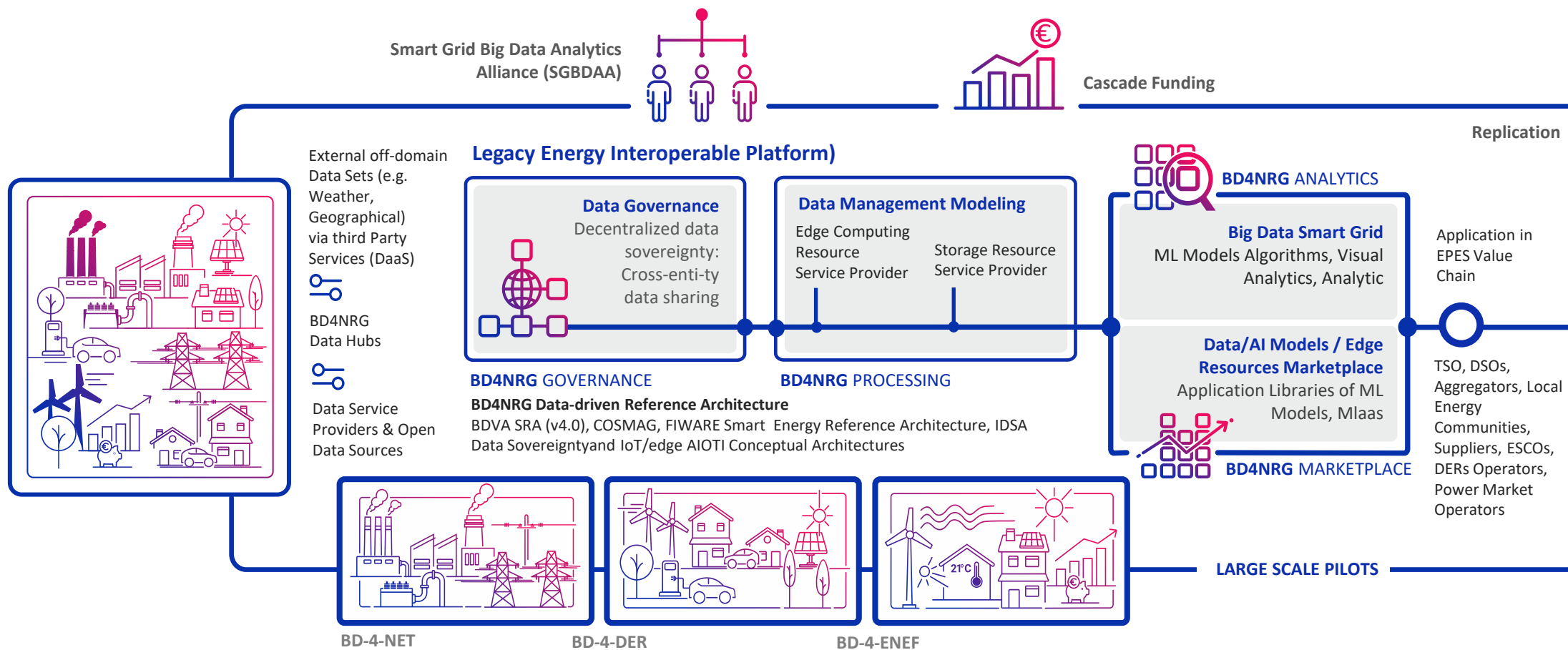


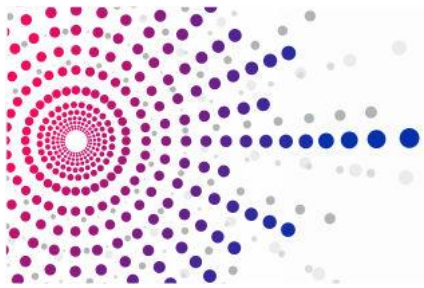
Vision(1/2)

- Delivering an innovative energy-specific open analytics modular framework
- Enabling and realising an incremental decentralized energy data-driven ecosystem
- Integrating State-of-The-art technological advancements to operate the data-driven ecosystem
- Unlock and exploit the economic potential of big data in the energy sector
- Enabling AI-based cross-sector analytics for optimised smart energy grid management



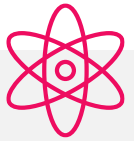
Vision(2/2)





Objectives

BD4NRG's vision is summarized in 8 clear, measurable, realistic, and achievable objectives:



Scientific

Development of a **data-driven Reference Architecture** for AI-based big data management & analytics in smart energy grids

Development of a **semantic and business interoperability framework** for cross domain analytics applications and cross-context learning



Technical

Implementation of a **decentralised energy data governance technological enabler**, to facilitate secure data sharing allowing data sovereignty and control.

Integration of the **technological enablers** near-real-time with graphical environments and deployment of the **BD4NRG Open modular Energy Analytics Toolbox**.

Adaptation, evolution, upscaling, and deployment of **technology enabler for advanced edge AI-based big data management, learning and analytics**.

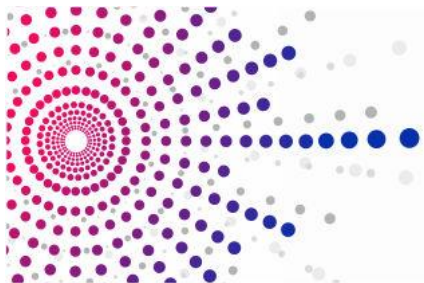
Provision of a **flexible, adaptable and configurable marketplace**, on top of the technological framework, to enable reusable AI-based models, third-party services and cross-sector data usage.



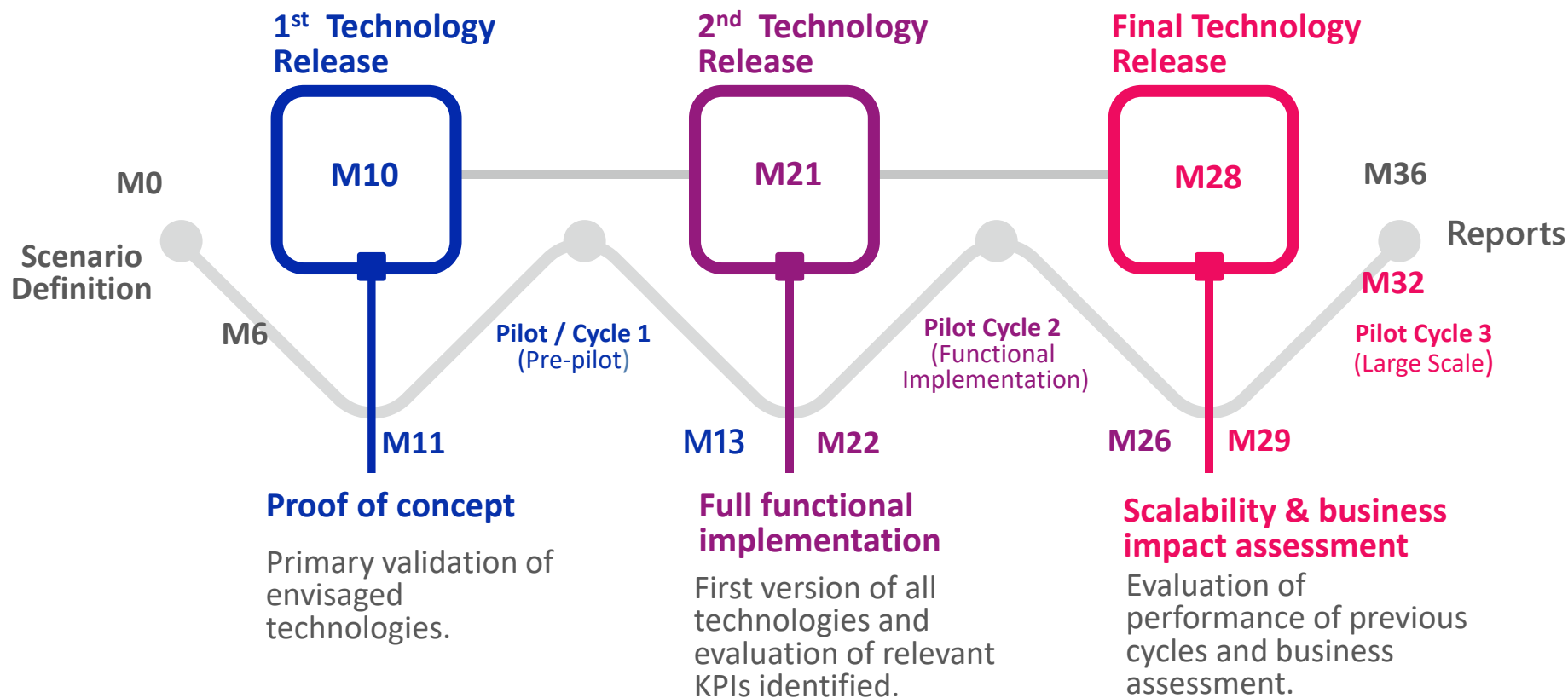
Business

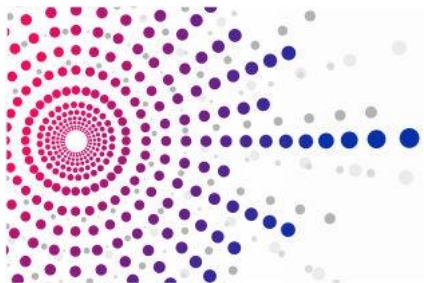
Development of **AI-based analytics** along several large-scale pilots and cross-domain applications, to validate the BD4NRG Toolbox.

Laying the foundation for a pan European **smart grid ecosystem** and boosting **EU-scale data economy**.

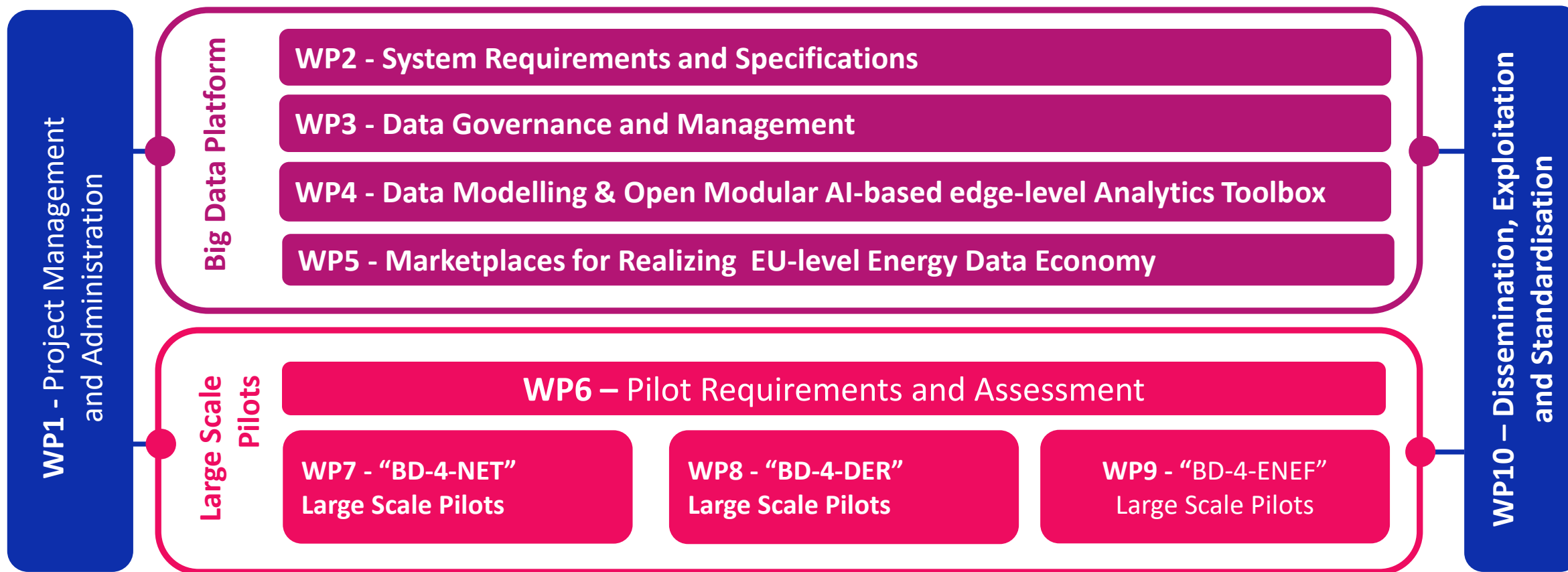


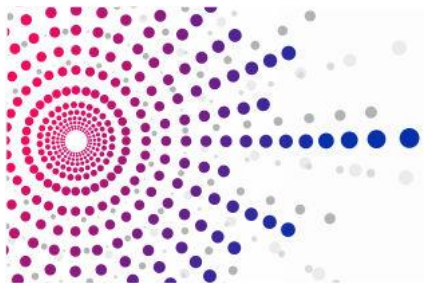
Timeline & Methodology



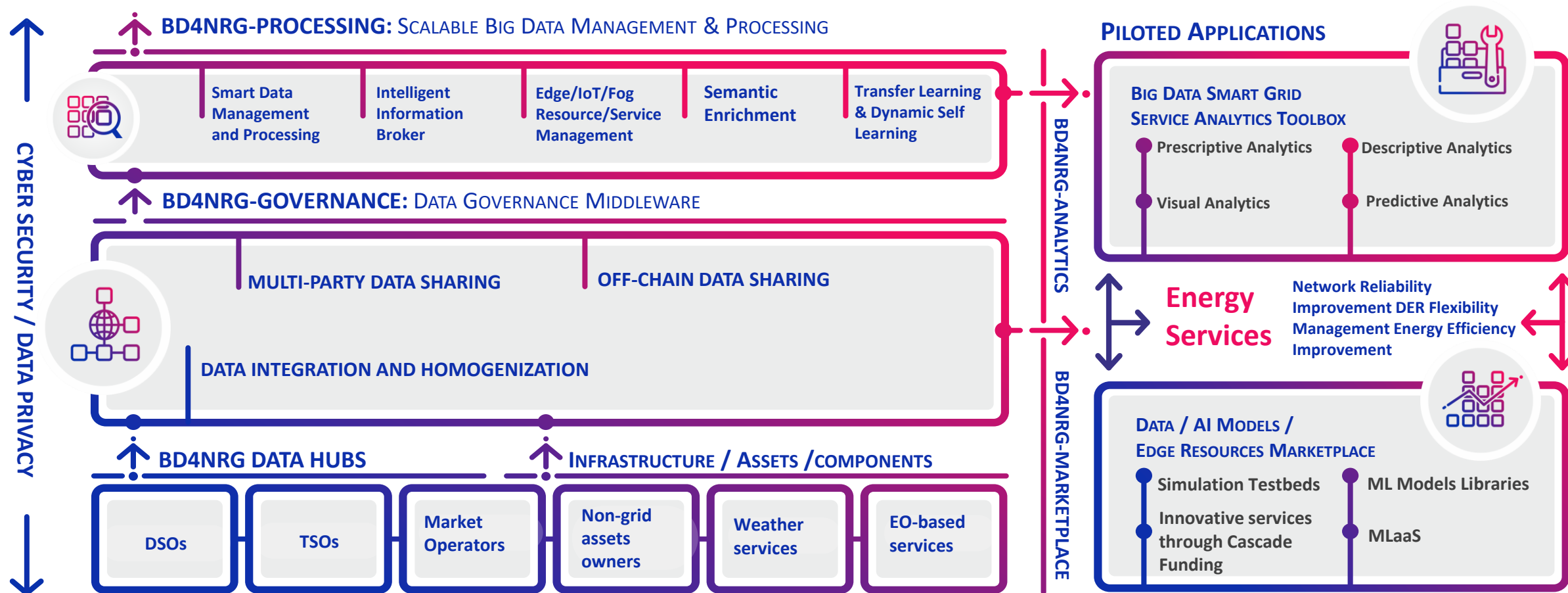


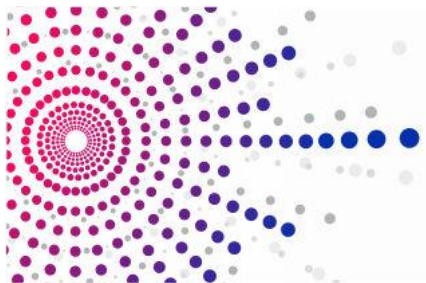
Work Formation(1/2)



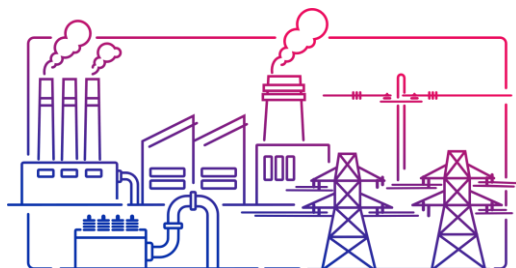


Work Formation(2/2)



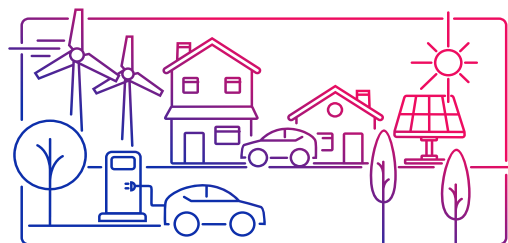


Large Scale Pilots (1/3)



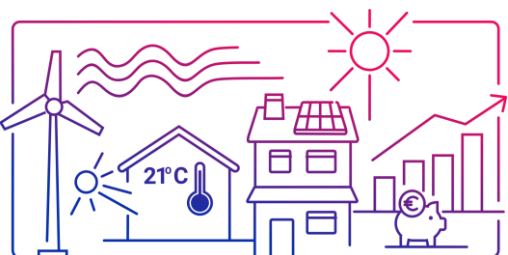
BD-4-NET

Predictive Analytics that can forecast and increasing the efficiency and reliability of the electricity network



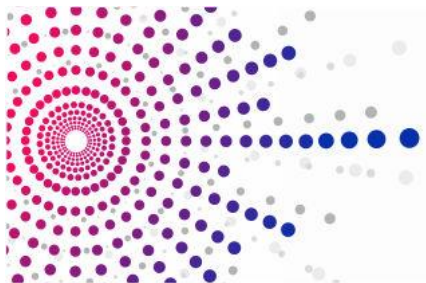
BD-4-DER

Optimizing the management of assets (Distributed Energy Resources – DER) connected to the grid



BD-4- ENEF

Increasing the efficiency and comfort of buildings, and de-risking investments in energy efficiency, as both are interlinked



BD-4-NET Large Scale Pilots



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BD-4-NET

LSP 1: Integrating off-grid data with Condition based Monitoring for Enhanced Predictive Asset Maintenance

Partners Involved: REN & RDN



LSP 2: Cross-functional Integration of Grid Operation with Predictive Asset Management

Partners Involved: ELES



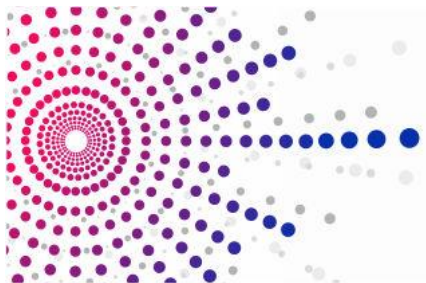
LSP 3: Cross-Domain functional Integration of Predictive Asset Management and Grid Operation while coordinating with EVs smart charging **Partners involved:** ASM



LSP 4: Cross-functional Predictive Asset Management for MV Grid Planning

Partners Involved: OEDAS





BD-4-DER Large Scale Pilots



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BD-4-DER

LSP 5: Cross-stakeholder Transfer Learning for Flexibility Assets Forecasting

Partners Involved: CENTRICA

centrica
Business Solutions

LSP 6: Coordinating grid-owned and behind-the-meter assets management prediction for improved grid operation and near real time power market operation settlement

Partners Involved: EKL, BORZEN, CS



Borzen

COMSENSUS

LSP 7: Predictive Analytics Forecasting of storage optimized operation for improved market reserve participation

Partners involved: ENELX

enel x

LSP 8: Predictive Demand and Generation Forecasting for Optimized Local Energy Community Management

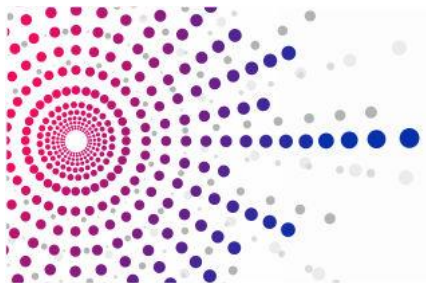
Partners Involved: UNIWA



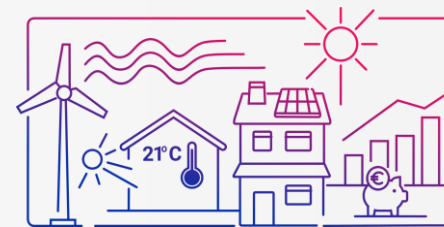
LSP 9: Predictive Demand and Generation Forecasting for Optimized Local Energy Community Management

Partners Involved: UNIWA





BD-4-ENEF Large Scale Pilots



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BD-4-ENEF

LSP 10: Predictive and Prescriptive Analytics for improved Energy Performance Certificates Reliability

Partners Involved: CARTIF & VEOLIA

[TECHNOLOGY
CENTRE]

CARTIF



LSP11: Weather-enhanced building thermal comfort prediction to enable energy efficiency reliable forecasting

Partners Involved: AJSCV & VEOLIA



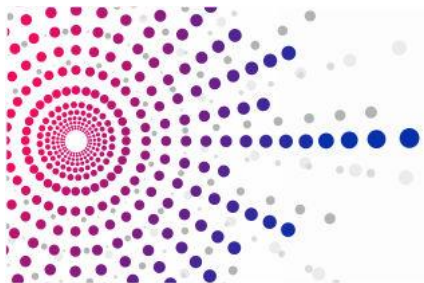
AJUNTAMENT DE
SantCugat



LSP12: Predictive Analytics for Energy Efficiency Investments de-risking

Partners involved: LEIF





Target Groups & Impacts

EPES value chain stakeholders

Generators, suppliers, TSOs, DSOs, aggregators, consumers (municipalities, building operators, local energy communities, etc.), suppliers, ESCOs

IT Industry Players & SMEs

IT companies, web entrepreneurs, software engineers of solutions for big data and energy domains

Equipment Manufacturer

Industrial Manufacturers of smart energy grid devices (e.g., smart meters, transformers, breakers, automation devices)

Industry Associations & Technology Clusters

European initiatives and clusters, research communities, associations, federations

Policy Makers & Standardisation Organisation (SDO)s

Policy-makers at any level like EC Directorates and Units, Ministries and Governments, Regulatory Agencies, Standardisation Organisations

Researchers and Academia

Individuals engaged in research initiatives and/or working in research and academic institutes

TECHNICAL ADVANCEMENTS

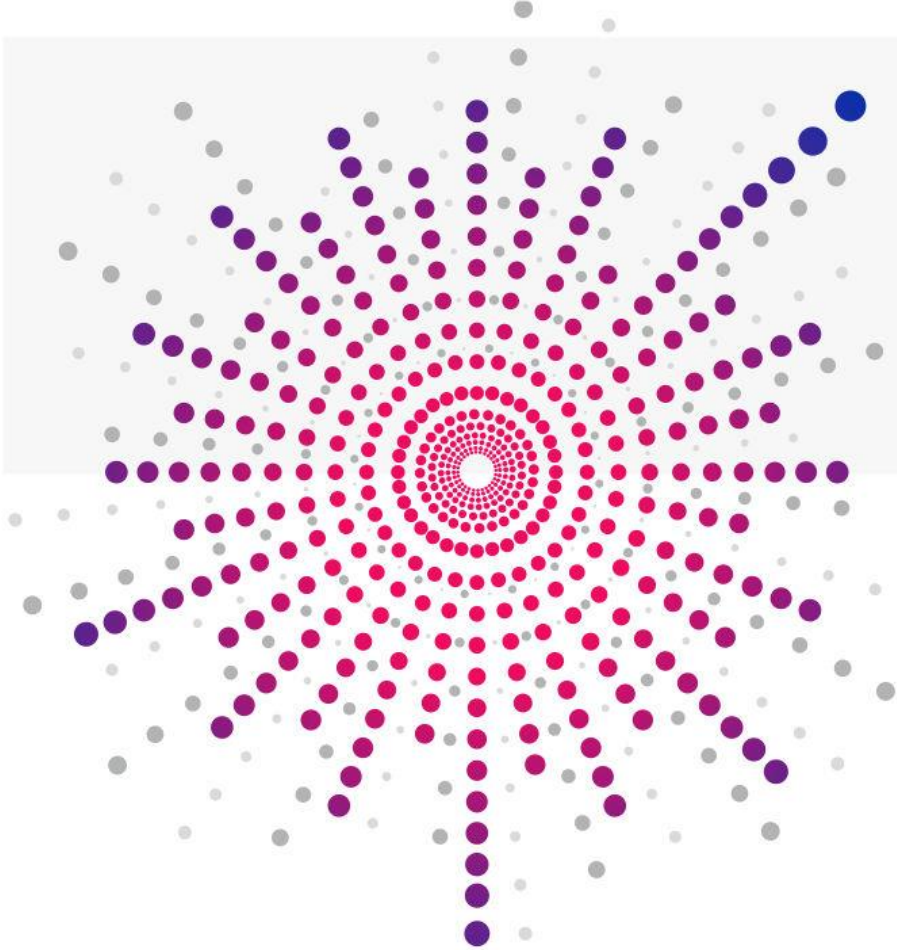
- Standardisation of an interoperable architecture
- Interoperability with Data Hubs
- SoTA Big Data Analytics in the energy sector

BUSINESS GENERATION

- Integration of digital technologies in the energy sector
- Data-driven business models and energy services
- Optimized energy asset management
- Paradigms for complex energy management. systems.
- Availability of big data for research, simulation and test purposes

STAKEHOLDERS' COMMUNITY ENGAGEMENT

- Digital industrial platforms
- Synergies with relevant EU programmes and initiatives
- Contribution to standards or pre-normative activities
- Demonstration of platforms, applications, business processes and innovative business models
- Sustainable ecosystems around big data platforms



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Thank you!

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 info@bd4nrg.eu

 www.bd4nrg.eu

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