



**Second Community Workshop for Societal Challenge
Secure, Clean and Efficient energy 4th of October 2016**

Vertretung des Landes Nordrhein-Westfalen bei der Europäischen Union, Brussels

1. AGENDA

10:00 – 10:20 Welcome & Introduction

- Introducing attendees, workshop goals (BDE consortium)
- BigDataEurope: Scope and opportunities (EC, Dr. Simon Scerri IAIS, BDE consortium)

10:20 – 11:20 Smart Grids

- Policy and Legislation developments in Energy (Dr. Mark van Stiphout, EC ENER.C.2 - New energy technologies, innovation, clean coal)
- Data management in demand side, metering and retail (Dr. Maher Chebbo, ETP SmartGrids/SAP)
- Data management and analytics in smart grids, comprising distributed generation (Mr Alberto Bernardo, EFACEC)

11:20 – 11:30 Coffee break

11:30 – 11:50 BigDataEurope Platform

- Architecture and implementation (Dr. Aad Versteden, BDE consortium/TENFORCE)

11:50 – 12:15 System monitoring

- Data acquisition challenges in System monitoring (F. Mouzakis, BDE/CRES)
- BDE Pilot case in system monitoring in Energy (F. Mouzakis, BDE/CRES)

12:15 – 12:40 Light lunch break

12:40 – 14:50 Energy efficiency

- Energy Efficiency in Buildings Challenge: data related challenges and opportunities (Dr. Jens Laustsen, Concerted Action Energy Performance of Buildings Directive)
- BEMS: System design and data requirements (Mr. A. Androutsopoulos, BDE/CRES)
- Smart Data Platform: Big Data for energy efficiency projects (Dr. Tatsiana Hubina, CSI Piemonte Energy Expertise Unit, Turin)
- Data management in energy efficiency systems: A case study (Dr. Maja Skrjanc, Center for Knowledge Transfer in Information Technologies, Jozef Stefan Institute, Ljubljana, Slovenia)
- Data requirements in Energy efficiency domain
- Discussion on BDE platform application

13:20 – 13:30 Coffee break

14:50 - 15:00 Summary, Outreach & Farewell
15:00 End

2. WORKSHOP SCOPE AND STRUCTURE

The aim of the workshop, the second of a scheduled series on the domain, is the continuation of the identification of current and future challenges for data management and analysis in the energy domain; challenges to be tackled with the evolving Big Data technology. In the second workshop the discussion was focused in energy distribution (smart grids) and in energy efficiency (building sector). In the workshop real examples of the challenges and complexities of using big data in these fields were discussed.

In parallel the technical advances in BDE were presented in terms of the platform development and the pilot application in energy domain.

The workshop addressed an audience composed by organisation representatives, EC officials, service providers, researchers and IT engineers.

The outcome of the workshop will support the design and realisation of the necessary ICT infrastructure on which the deployment and use of the BigDataEurope platform will be based. Furthermore, the presentation of data related challenges in the discussed fields will facilitate the identification of next pilot cases for BDE platform.

The workshop was divided in four parts, described in the following paragraphs.

Part I: The general introduction to the BDE background, objectives and targets, as well as an overview of the tools and technologies envisaged within the project was presented by BDE coordinator (Dr. S. Scerri, Franhofer/IAIS).

Part II: Keynote presentations on data management challenges in domain fields.

Topic A: Electricity Industry

A review of the EU Commission activities and priorities in the energy domain was presented by Dr. Marc van Stiphout (EC ENER C.2).

The views of the European Smart Energy Association and ETP platform were presented by Dr. M. Chebbo (ETP SmartGrids/SAP). The presenter, being a senior executive in SAP, also presented related research projects and the commercial side of the available technological solutions.

A review of the data management challenges in distributed electricity generation and smart grids was presented by Mr. A. Bernardo (EFACEC), representing a systems and service provider for the energy generation and distribution industry.

Topic B: System Monitoring

The data acquisition challenge in System Monitoring of energy systems was presented by BDE partner (CRES).

Topic C: Energy Efficiency in Buildings

The data management challenges in the energy efficiency in buildings were presented by Dr. J. Laustsen (EPBD/2peach), the coordinator of Energy Performance on Buildings Concerted

Action. The design and data requirements for BEMS (Building Energy Management Systems) were presented by A. Androutsopoulos (CRES).

Use cases, related research projects and IT applications in the field were presented by Dr. M. Skrjanc (Jozef Stefan Institute, Slovenia) and Dr. T. Hubina (CSI Piemonte).

Part II: BDE advances

The BDE platform (i.e. architecture, implementation, guidelines) was presented by the BDE technical partner A. Versteden (TENFORCE), whereas the developing pilot in the domain was presented by F. Mouzakis (CRES).

3. DOMAIN TOPIC REVIEWS (PARTII)

Topic A: Electricity Industry

Dr. M.Chebbo (Digital Energy 4.0 leader, president of ESMIG, GM Europe SAP) presented the views of the European Smart Energy Association and the ETP SmartGrids platform.

The presentation addressed the evolution of the energy market towards a “customer centric smart energy system” and the importance of the needed supporting new technology advances (Big Data, IoT, sensing etc), with the predictions being that by 2020~25 90% of the commercial and industrial and 70% of the residential consumers will be engaged in “smart energy” processes. The Smart Grids functional levels were analysed with respect to R&D (according to EEGI European Electricity and Grid Initiative and ETP SmartGrids).

Following a review of the recent technology trends (i.e. in hyperconnectivity, supercomputing, data science etc) the evolved new business models and the importance of customer data were discussed. The Digital Energy System 4.0 (by ETP SmartGrids) was presented, with reference to digital use cases at the level of power generation, transmission and distribution networks, retailers and aggregators. The cases regarded asset management, network planning and operation, customer participation, balancing and market facilitation.

In the sequel, several projects were presented (involving commercial IT provider) regarding load forecasting for a regional grid operator, benchmarking of energy efficiency of residential customers and smart city street light control. The EC funded projects FLEXICIENCY, INTEGRID and FutureFlow were also presented.

In the concluding messages the following were pointed out:

- ICT infrastructures need empowerment using digital simulation and forecasting models
- Well-guided data confidentiality accelerates the digital transformation
- Digital well designed Energy Management can successfully integrate massive renewables
- Leveraging Digital technologies will also enable a well-functioning, open and flexible market
- Digital home technologies can shift residential consumption during peak demand
- Keep investing in disruptive digital technologies while thinking first your digital use cases

Mr. A. Bernardo (representing an energy engineering systems and services provider, EFACEC) presented a review of data management and analytics in smart grids.

The following were addressed:

- Smart grid concept
- On-going development and current challenges in Smart Grids field
- Domain data content
- Advantages of smart grid applications enabled by data management and analytics

In the concluding messages the following were pointed out:

- Lack of data model has become a bottleneck for efficient data integration and application deployment (note for utility related data)
- Smart grid community will exploit related Big Data developments
- EFACEC as a stakeholder will investigate the application of BDE platform

In Appendix A.1 the link for the presentations are given for full and accurate reference.

Topic B: System Monitoring

The data acquisition challenge for high data volume and sampling rate system monitoring was presented by F. Mouzakis (BDE domain partner CRES). The presentation covered:

- Requirements in system monitoring
- Typical DAQ (data acquisition) core components
- FPGA technology
- Distributed architecture for data collection
- File formats

The presented data acquisition architecture was implemented for the support of the BDE pilot in Energy.

Topic C: Energy efficiency

Dr. J. Laustsen (coordinator of Energy Performance on Buildings Concerted Action EPBD; 2peach) presented a review of the energy efficiency in buildings domain.

In the first place the structure of the Concerted Action EPBD IV was presented, in relation to technical elements, policy implementation and compliance capacity impact. The new structure of the CA (reflecting the EPBD policies such as the nZEB: near zero energy consumption by buildings), includes data related advances specifically in data collection and management. The various data involved (in policy making level) were described.

In the concluding messages the following were pointed out as gaps to be filled in relation to data management:

- Better combination / connection between data on buildings and on energy use
- Better data on results of change – before and after
- Better connection between measured and calculated energy use
- More data on consumer influence on consumption

Mr A. Androutsopoulos (CRES) presentation focused on the design and data requirements for BEMS (Building Energy Management Systems). The objectives, structure and applications of BEMS were presented followed by the predictions for the growth of the BEMS market. In the sequel, the BEMS related services in visualization and reporting, fault detection and diagnostics, predictive maintenance, adaptation and optimization were discussed; the common ground being data acquisition, management and analytics.

The technical aspects of BEMS were described, focusing in system configuration, communication protocols, physical communication media and sensor networks. A use case of an operating BEMS system was presented.

In the concluding remarks the following were pointed out:

- Customer interest for energy efficiency and EU Directives drive the demand for installation of BEMS
- Data management and real time monitoring are the key elements for the efficient use of BEMS
- A high growth in BEMS applications is predicted, along with IT supportive services
- BDE platform capabilities will be assessed for BEMS cases

Dr. T. Hubina (CSI Piemonte) presented various use cases in the field of energy efficiency that used for demonstration of smart data platforms (developed for EU projects NRG4CAST, DIMMER). The use cases are descriptive of the energy efficiency domain and include:

- Electric car smart charging
- Street lighting management
- Thermal energy production and tele-heating
- BEMS systems
- Smart city scenario

Various descriptive dashboards and system workflows were presented.

In the sequel the CSI SmartDataNet project was presented along with reference to its available platforms.

Dr. M. Skrijanc (Jozef Stefan Institute, Slovenia) presented the Big Data challenges form Energy Efficiency case studies.

A brief introduction in the challenges in energy conservation, the environment monitoring and the sustainable energy management systems was followed by the presentation of two EU research projects (NRG4CAST for energy efficiency and SUNSEED for grid management).

The presentations focused on the technical implementation of the IT solutions namely:

- System architecture
- Data flows
- Multimodal stream data analytics
- Textual pipelines
- Forecasting pipelines

The challenges in the development of the IT solutions were discussed (grid monitoring):

- Various communication protocols
- H/W development and cost, communication cost
- Minimal set of measurement nodes at locations to maintain whole grid observability
- Integration of different security levels

In the concluding remarks the following were pointed out:

- Domain knowledge is the key (also in solving tech challenges)
- Input from business perspective necessary to push and drive product development
- Cyclic technical development (one prototype each year) turned out to be winning combination
- Intensive dissemination activities are necessary

In Appendix A.1 the link for the presentation is given for full and accurate reference.

4. TECHNICAL TOPICS REVIEWS (PART III)

Dr.A.Vesteden and Dr. E. Pauwels (BDE technical partners, TENFORCE) presented the technical overview of BDE platform.

In the first place the BDE platform main design aspects were presented to the community; design aspects serving specific goals related to the low cost of ownership, low starting learning rate, simplicity of integration with custom components, applicability and capability of adopting new technologies.

In the sequel the following were presented in detail:

- Platform architecture
- Semantic Big Data
- Support layer
- Platform installation and deployment
- Pipeline demonstration

The attending community members were given the basic information for investigating the content of the platform and acquiring the technical details for its installation and possible use.

Contacts were made between the technical attendants and BDE partners.

In the concluding remarks the following were pointed out:

- The platform is being used in practice
- It is easy to get started for application development
- It is under improvement cycles
- Support is available within the framework of BDE

Mr. F. Mouzakis (CRES) presented the BDE pilot case in the field of system monitoring in Energy. A brief introduction for the monitoring use case problem definition and scenario was followed by the pilot technical aspect presentation.

The pilot addresses the case of system monitoring with high volume and sampling rate data streams. The following were presented:

- Description of the monitored system (wind turbine)
- The sensor network
- The distributed data acquisition system
- Data description (type, format, volume etc)
- Base analytics
- Pilot concept and structure

The specific aspects of the pilot, namely the volume of the data, the analysis requirements and the need of incorporating third party analytics modules were presented.

The current status of the pilot development was presented, announcing the presentation of the operating instance in the forthcoming webinars and thematic workshop.

Appendix A

A.1 Slides & Presentations

1. [Workshop Agenda](#)
2. [BDE: Empowering Communities with Data Technologies](#) (BDE coordinator, Franhofer IAIS)
3. [Big Data and Future Energy](#) (M. Chebbo, ETP Smartgrids/SAP)
4. [Data Management and Analytics in Smart Grids comprising distributed generation](#) (A. Bernardo, EFACEC)
5. [BDE Platform: Technical overview](#) (A. Versteden, TENFORCE)
6. [System monitoring: Data acquisition challenge](#) (F.Mouzakis, CRES)
7. [Pilot case in System Monitoring in Energy](#) (F. Mouzakis, CRES)
8. [Energy Efficiency in Buildings. Data related challenges and opportunities](#) (J. Laustsen, EPBD)
9. [Building Energy Management Systems: System design and data requirements](#) (A. Androutsopoulos, CRES)
10. [Smart Data Platform: Big Data for Energy Efficiency projects](#) (T. Hubina, CSI Piemonte)
11. [Energy efficiency: Big Data challenges from case studies](#) (M. Skrjanc, Jozef Stefan Institute, Slovenia)

A.2 Photos

Link to the [Photos](#) slideset on the public BDE Flickr account.

A.3 Workshop Invitation

BigDataEurope 2nd Workshop coming up!

[View this email in your browser](#)



BIG DATA EUROPE
Empowering Communities with Data Technologies

Big Data in the H2020 Societal Challenge Secure, Clean and Efficient Energy

2nd Thematic Workshop

4th of October 2016, Tuesday 10h00-15h00 CEST

Big Data Europe consortium schedules the second workshop on big data in the energy sector on the 4th of October, 2016 in Brussels. This workshop will provide a key opportunity for stakeholders in the energy sector to be updated on the latest developments related to BigDataEurope platform and pilot cases, influence its design and propose application cases for the benefit of the energy community.

The aim of this workshop is the discussion of current and future challenges for data management and analysis in the fields of energy efficiency, smart grids and system monitoring. In addition the BDE platform will be presented focusing on its application potential in the specific domain along with the first pilot case for system monitoring.

The workshop addresses a wide audience including data users, researchers, developers, IT service providers and institutions in the energy domain.

The workshop outcome will support the final design and implementation of the necessary ICT infrastructure on which the deployment and use of the BigDataEurope platform is based. The platform targets the facilitation of big data usage in real world examples and will consist of the architecture, components, guidelines and best practices, all tailored according to the community requirements.

The workshop is scheduled a day after EC Info Day on Horizon 2020 "Smart Grids and Storage".
[Event page and agenda.](#)

Click on the button below to join free!

Register

A.4 Attendees & Registrations

| # | Last Name | First Name | Organisation | Reg. |
|----|----------------|---------------|--|------|
| 1 | Androutopoulos | Andreas | CRES | sp |
| 2 | Laustsen | Jens | EPBD (Energy Performance Directive CA) | sp |
| 3 | Bernardo | Alberto | EFACEC, Portugal | sp |
| 4 | Mouzakis | Fragiskos | CRES | sp |
| 5 | Bollinne | Denis | OPINUM | att |
| 6 | Boelman | Eliza | EC JRC | att |
| 7 | Bornas Cayuela | Damian | EC - Smartcities | att |
| 8 | Pauwels | Erika | TENFORCE | att |
| 9 | Chebbo | Maher | Smartgrids ETP/SAP | sp |
| 10 | Scerri | Simon | Franhauffer IAIS | sp |
| 11 | Van Stiphout | Marc | EC ENER C.2 | sp |
| 12 | Skrjanc | Maja | Jožef Stefan Institute, Slovenia | sp |
| 13 | Foursa | Maxim | PDS | att |
| 14 | Van Hove | Patrick | EC DG-RTD | att |
| 15 | Stantcheva | Mariana | EC INEA | att |
| 16 | Versteden | Aad | TENFORCE | sp |
| 17 | Pinault | Margot | EC ENER C.3 | att |
| 18 | Wuropulos | Katharina | RECP/EVEI PDI | att |
| 19 | Hubina | Tatsiana | CSI Piemonte | sp |
| 20 | Serra | Fabrizio | | att |
| 21 | Folkmanis | Janis | EC DG RTD D.1 | att |
| 22 | Nolf | Marie-Therese | | att |
| 23 | Clement | Nadine | | att |
| 24 | Hubeau | Jonathan | OPINUM | att |
| 25 | Ferreira | Diana | dcafms@hotmail.com | reg |
| 26 | Hickel | Tanja | LP Brussels | reg |
| 27 | Ferreira | Diana | | reg |
| 28 | Maksi | Matyas | EC | reg |

Report by CRES workshop organization team:

F. Mouzakis, A. Androutopoulos