INCREASE

INCREASING THE PENETRATION OF RENEWABLE ENERGY SOURCES IN THE DISTRIBUTION GRID BY DEVELOPING CONTROL STRATEGIES AND USING ANCILLARY SERVICES

D7.2 Intermediate progress report 1

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Summary

This deliverable gives an overview of the progress towards the project's objectives and the significant results obtained during this 1st reporting period (1/09/2013-28/03/2014). Every task of every WP is described within this deliverable and financial overviews per WP and per partner are provided. Deviations are mentioned and solutions proposed.

1. WP1 Definition of requirements and constraints

1.1 General information

WP1 has a duration of 6 months (1/09/2013-28/02/2014) and is led by University of Ljubljana (UL).

1.2 Project objectives for the reporting period

To enable INCREASE to start in a well-founded way, the innovative concepts, their validation procedures, an updated state-of-the-art and the necessary international experiences was to be gathered and summarized into an inception report, composed of two deliverables (D1.1 Report on relevant experiences and D1.2 Report on technical aspects).

In the report, different grid constraints and requirements were further defined and updated. These are necessary for the variable distributed renewable energy sources (DRES) to be able to support the operation of the power system by the provision of ancillary services (AS). All of the investigations were focused on the development of the control strategies and the simulations, lab tests and field trials used to validate and demonstrate the proposed solutions. An overview of market mechanisms for AS provision was presented along with the corresponding constraints and opportunities, as well as the corresponding ICT requirements.

The foreseen outcome of this WP in Annex I is a two-fold report: D1.1 (Report on relevant experiences) and D1.2 (Report on technical aspects). These reports were submitted on time and as a result M1 (Two part report on the requirements and constraints necessary for the development of the control strategies) was achieved on time as well (28/02/2014).

1.3 Work progress and achievements during the period

1.3.1 Summary of progress towards objectives

1.3.1.1 Task 1.1 Definition of requirements by the different stakeholders

In this task, a set of relevant stakeholders was selected, including DSOs and TSOs. The TSOs are mainly challenged by the congestion and the balancing problem; the DSO by the congestion problem. Through the cooperation activities (a Kick-off Conference and two follow-up questionnaires) different

stakeholders (DSOs, TSOs, knowledge providers – research institutions) were brought together to provide a common starting ground for the research.

The experience and know-how from the different stakeholders from past projects was exchanged, ranging from past experiences to results of different methods (demand response, demand side management, real-time line rating etc.).

1.3.1.2 Task 1.2 Definition of case studies for distribution grid integration of DRES and framework conditions

A set of case studies was defined to demonstrate the solutions proposed in INCREASE, as outlined in chapter 8 (Test case description) of D1.2 (Report on technical aspects). Different validation steps of the proposed control strategies were outlined. First, the developed simulation platform will be used to develop and fine-tune the proposed control strategies. A first validation of these control strategies will be done by means of the simulation platform using different reference cases for the low and the medium voltage network. Solutions for the medium voltage network will only be validated by means of simulation. Secondly, the developed control strategies for the low voltage network will be validated in the laboratory environment of Lemcko (Ghent University) and TU/e respectively. Once the laboratory tests are successfully finalized, the field trials can start. Three different field trials with a different focus are conducted in Slovenia, Austria and the Netherlands.

This task also carried out an investigation of the relevant international and national standards and grid codes that govern the connection of the DRES to the distribution grid. As they are often country-specific, their investigation defined a common set of boundary conditions for the provision of ancillary services from DRES in different EU countries. Relevant experiences with policy making were investigated. The key policy documents investigated include policy frameworks and grid codes, as they regulate the conditions for connection of DRES and their operation in the distribution network. Based on the general overview of distributed generation connection and operation, the focus turned to provision of ancillary services via DRES. In some of the countries assessed the regulatory frameworks already regulate the supply of reactive power and some other services by DRES. Frontrunners in this development are the countries with a high share of DRES in their energy systems – Germany, Spain and Italy. Their experience can inform the investigations carried out within INCREASE, as outlined in in chapter 4 (Policy framework conditions and grid codes) of D1.1 (Report on relevant experiences), which was submitted on February 28th to the EC.

1.3.1.3 Task 1.3 Requirements for increased DER with ancillary services

Within this task UGENT described problems arising from the connection of distributed renewable energy units based on measurements and information provided by distribution system operators all over Europe. It was shown that the over voltages, voltage unbalance and on-off oscillations are already occurring due to the presence of distributed renewable energy units. If the penetration of these units further increases, these problems will become more pronounced. Therefore it is important that solutions for these problems are found.

In INCREASE a multi-layer control strategy for inverter-connected units is proposed. The control strategy comprises a local control strategy and a multi-agent control strategy. The local control strategy mitigates voltage unbalance, mitigates under/over voltages by means of a droop control and provides fault-ride through capabilities. The local control strategy works without communication and thus ensures a reliable distribution grid. The multi-agent control strategy provides set-points for the droop constant and the exchanged power and uses communication.

The combination of these two control strategies can result in possible conflicting situations. In order to estimate the impact/chance of those situations a risk analysis on the low and medium voltage network was performed. It was concluded that by giving the MAS control the highest priority, all possible risks were covered.

In this task, the Ancillary Services as regarded in INCREASE were defined. They are characterized in view of their provision from DRES, flexible consumers and also prosumers to the DSO, and by the aggregators and DSO to the TSO. The existing classifications of the AS were briefly outlined and the choice of the services, provided on the distribution network and on transmission network was substantiated. Following AS provision, the options for AS procurement were investigated, as they provide the main motive for the providers to offer AS and incur costs. Some requirements for benefit calculation due to DRES AS provision were outlined, and the options for market-based provision were investigated. Finally, the technical and operational aspects of AS provision by DRES were outlined, focusing on the four chosen services: voltage control, voltage unbalance mitigation, line congestion, and reserve provision. For each of the four services, provision aspects were outlined, as well as the barriers and opportunities for their provision by DRES. The outcomes of this task constitute chapter 3 (Ancillary Service Provision and Procurement) of D1.1.

1.3.1.4 Task 1.4 Definition of smart grid communication requirements for the provision of ancillary services and operational control of DRES

The objectives of this task according to Annex I are the following:

- Architectural requirements and building blocks of the CS network.
- Definition of data sources: data will be taken from all available smart meters, phasor measurement units (PMUs) and other trials.
- Functional requirements of the CS network (band width, protocol, timing interval, etc.).
- Analysis of different CS properties, including their economics, robustness and IT security.
- Analysis of the limitations of extracting useful information from external data sources. In the investigation will be included: historical weather data and weather forecast from different measurement points.
- Register of producers that will be involved in case studies. Connections and relations between these producers will also be investigated.

Within this reporting period all objectives have been successfully finished. Analyses of architectural requirements showed the need for a reliability, network latency, security, delivery of critical data,

time synchronization and multicast support in the communication system. Also different communication system architectures have been studied, namely Home, Field and Wide area networks. Within this task, functional requirements and different CS properties have been provided for each technology and in comparison to each other. A list of data sources and description of data has been defined. There were also some analyses of historical weather data with general description of spatial and communication limitations for extracting the useful information from data sources. At the end of the report (D1.2 Report on technical aspects) the list of all power plants for each field test scenario has been provided.

1.3.1.5 Task 1.5 Definition of the simulation toolset framework and architecture

AUTH overviewed extensively the dynamic behavior of the distribution system together with the MAS control system within this task as to decide the way it will be implemented in the software platform of WP3 (Development and use of integrated simulation platform).

It was concluded to use sequential power flows, since the dynamic behavior of the distribution system refers mainly to loads, voltages and current changes. The modeling approach for the various grid elements has also been defined. More specifically:

- The three-phase inverter-interfaced power sources will be modeled as controllable PQ sources with the distribution of active and reactive power per phase determined by the control systems in each calculation step.
- Parts of the network without controllable power sources will be modeled in a reduced way as described in chapter 6 (Simulation platform) of D1.2 (Report on technical aspects).
- Passive loads will be modeled using equivalent Pi RLC elements.
- The MAS system will be implemented in a separate parallel simulation layer, communicating with the core power grid module.
- The three distinct control schemes, namely local, fast and slow, have been identified both in operational principle and in the details that refer to the communication between the MAS layer and the power grid module.
- The communication network will be implemented in a separate module, based on the open-source OMNeT++ tool. This module will communicate with both the power module and the MAS layer.
- The overall structure of the simulation platform will be flexible as to the integration of other independent modules dealing with forecasting, demand side management, dynamic line rating and optimization to generate the control strategies.

Ten different open-source and commercial software platforms were investigated. Three of them, namely PSAT, MATPOWER and OpenDSS have been selected as the best candidate tools for the implementation of the power grid core module. These three open source software platforms offer the required features that are necessary for the implementation of the INCREASE features. The development environments for the MAS layer and the LAN Simulator tool have also been selected.

An overview of possible similar software developed within the frame of other EU-funded projects was made and is also documented in chapter 6 (Simulation platform) of D1.2 (Report on technical aspects). Seven such software were identified. However, almost all of them are mostly targeted towards the simulation of the electricity market operation, except for one which presents the basics for the simulation of the MAS control (the one developed in the Microgrids project).

1.3.1.6 Task 1.6 Definition of an energy architecture for the distributed control system at the MV grid

The main objectives of this task according to Annex I are the following ones: list the requirements and general specifications for the overall architecture necessary for a distributed control system, and define the specifications for the grid components.

At first, EANDIS created a general visualization of the energy architecture principle. This energy architecture concept was presented and agreed upon by the entire INCREASE consortium during the Kick-off Conference in Vilvoorde on the 2nd of December. All the partners gave constructive feedback and suggestions about the architectural image which was later integrated in the final concept.

The next steps comprised a detailed analysis of the different sections of the energy architecture, i.e. the net components and measurement devices, the communication and protocols, and the central data collection and distributed control system.

A chapter about this architecture concept was integrated in D1.2 (Report on technical aspects), which defines the direction of INCREASE.

1.3.2 Significant results within WP1

1.3.2.1 Task 1.1 Definition of requirements by the different stakeholders

The main requirements and characteristics of the relevant international and national standards and grid codes have been presented during the Kick-off Conference in Vilvoorde.

Chapter 2 (Technical problems and system requirements for distribution systems with high penetration of DRES) are included in D1.1 (Report on relevant experiences) to describe the outcomes of this task. They will provide the rest of the WPs with the unified nomenclature based on the analysis of the comprehensive set of grid codes and the definition of the framework conditions for the case studies that will be used in simulation and evaluation of the results.

1.3.2.2 Task 1.2 Definition of case studies for distribution grid integration of DRES and framework conditions

The main technical problems arising from the connection of distributed RES (DRES) units on the distribution network (MV and LV) were presented at the Kick-off Conference in Vilvoorde in December 2013.

Chapter 2 (Technical problems and system requirements for distribution systems with high penetration of DRES) and chapter 8 (Test case description) have been included in the D1.1 and D1.2

to describe technical problems arising from the connection of distributed RES (DRES) units to the distribution network (MV and LV), and define a set of case studies to demonstrate the solutions proposed in INCREASE.

1.3.2.3 Task 1.3 Requirements for increased DER with ancillary services

From the received and processed measurement data delivered from the DSOs the problem definition in LV grids was defined and the following ancillary services were determined:

- Voltage control
- Voltage unbalance mitigation
- Distribution line congestion management
- Active power reserve provision

This task is successfully finished and the different objectives are met.

Several presentations about this task were given during this reporting period:

- Presentation in Eindhoven, internal meeting between UGent and TU/e (08/11/2013)
- Presentation in Vilvoorde, INCREASE Management Meeting (01/12/2013)
- Presentation meeting UGent and UMons (10/01/2014)
- Presentation telephone conference (21/01/2014)
- Presentation telephone conference (11/02/2014)

An abstract was published and accepted concerning the work done within this task: Overview of increasing the penetration of renewable energy sources in the distribution grid by developing control strategies and using ancillary services (YRS2014).

A chapter, chapter 2 (Technical problems and system requirements for distribution systems with high penetration of DRES), was included in D1.2 (Report on technical aspects). This report was submitted to the EC on February 28th.

1.3.2.4 Task 1.4 Definition of smart grid communication requirements for the provision of ancillary services and operational control of DRES

The task's results show that the most effective, from IT and cost perspective, is to use the existing CS infrastructure, where it is available. Also the list of field test power plants and data sources has been put together. This list will serve as input for field trial preparations in WP4 (Implementation and validation of the proposed control strategies).

A chapter was written for D1.2 (Report on technical aspects): chapter 5 (Definition of smart grid communication requirements). D1.2 was submitted to the EC on February 28th.

1.3.2.5 Task 1.5 Definition of the simulation toolset framework and architecture

The main requirements and characteristics of the simulation platform have been presented during the Kick-off Conference in Vilvoorde in December 2013.

A chapter, Chapter 6 (Simulation platform), was included in D1.2 (Report on technical aspects) where the outcome of this task is described in large detail. This report was submitted to the EC on February 28th.

This task is successfully finished and the objectives are met.

1.3.2.6 Task 1.6 Definition of an energy architecture for the distributed control system at the MV grid

A presentation was given during the INCREASE Kick-off Conference about the principles of the energy architecture.

A chapter, Chapter 7 (Energy architecture and the distributed control system at the MV grid), was written and integrated in D1.2 (Overview of technical aspects), submitted to the EC on February 28th.

This task is now finished and the foreseen objectives have successfully been achieved.

1.4 Deviations from Annex I during this reporting period

There are no deviations from Annex I to be reported. It was agreed with the PO to submit D1.1 and D1.2 at the same time (month 6), while it was foreseen in Annex I to submit D1.1 in month 4. It seemed more efficient and complete to write both deliverables as one and submit them together.

1.5 Use of resources

1.5.1 Person months/personnel costs

Partner	Planned PM	Actual PM	Planned personnel costs	Actual personnel costs
UGent	2	2	10.991,00	11.013,13
Elia	0,5	0,2	4.500,00	1.607,00
Eandis	2	1,40	18.667,00	18.900,00
EG	3	3,05	15.167,00	9.040,50
LIA	2	0,53	16.248,00	6.945,00
SNG	1	0,65	7.750,00	6.746,34
AUTH	2	1,92	3.428,00	4.579,96
JR	4	4,16	26.961,00	28.444,00
TU/e	2	0,80	10.968,00	9.137,13
UL	12	10,16	51.210,00	20.014,70
AL	1	0,30	8.000,00	1.028,00
KOR	2	2	9.000,00	5.683,35
MaVo	1	1	1.610,00	1.595,00

1.5.2 Budget deviations

Partner	Deviation	Explanation
UGent	Actual personnel cost (PC) > planned PC	The difference is very small. This is not a recurring problem as other WPs prove.
Elia	Actual PM < planned PM	Work within this WP was less than initially expected,

		the remaining PM will be shifted by amendment to WP5. More input from the TSO will be necessary in WP5.
Eandis	Actual PM < planned PM	Work within this WP was less than initially expected, the remaining PM will be shifted by amendment to WP3 and WP5 respectively. This way there is more time for testing and evaluating.
Eandis	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
EG	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.
LIA	Actual PM < planned PM	Work within this WP was less than initially estimated, the remaining PM will be shifted by amendment to WP4. This way there is more PM available in the validation phase.
SNG	Actual PM < planned PM	Work within this WP was less than initially expected, the remaining PM will be shifted by amendment to WP2.
AUTH	Actual PM < planned PM	Work within this WP was less than initially expected, the remaining PM will be shifted by amendment to WP3 as WP3 builds further on the conclusions of WP1.
JR	Actual PM > planned PM	The work done within WP1 was more time consuming than initially estimated. 0.16 PM will be shifted from WP2 to WP1.
TU/e	Actual PM < planned PM	Work within this WP was less than initially expected, the remaining PM will be shifted by amendment to WP5 as WP5 builds further on the conclusions of WP1.
TU/e	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
UL	Actual PM < planned PM	The remaining PM within WP1 for this partner will be transferred to WP2. It will be used to additionally define the role of intelligent market agents in their control of the consumers under the Demand Response Integration initiative, as well as the control of the producers to follow the market price signal.
UL	Actual PC < planned PC	The discrepancy in the personnel cost is only temporary. As within WP1 a lot of time was dedicated to the compilation of the policy reports, grid codes and other relevant literature more work of less senior researchers was used than initially expected.
KOR	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.

2. WP2 Grid connection control strategies

2.1 General information

WP2 has a duration of 34 months (01/09/2013-30/06/2016) and is led by Ghent University (UGENT).

2.2 Project objectives for the reporting period

The WP2 objectives for this reporting period as described in Annex I are the following ones:

- Develop a (fast, low level) control strategy which provides voltage control in low voltage network and allows fault-ride through: fast control actions.
- Develop a three-phase four wire inverter prototype equipped with the proposed control strategy.
- Develop a scalable agent-aggregator concept: addressing renewables to contribute to the control of the distribution network.
- Create a hands-on "manual" DSOs can use to connect DRES in a smart way to the medium voltage grid.
- Develop optimal coordinating strategies to harmonize multi services/objectives.

2.3 Work progress and achievements during the period

2.3.1 Summary of progress towards objectives

2.3.1.1 Task 2.1 Development of a (fast, local) control strategy for three-phase four-wire grid-connected inverters at the LV network

In task 1.3 within WP1 the challenge for the local control was defined. This formed the basis for the selection of the control strategies. A combination of two strategies was selected: the voltage-based droop control strategy and the damping control strategy.

The voltage-based droop control strategy will solve the over voltage problems and will prevent on-off oscillations in the grid voltage. The damping control strategy will mitigate the voltage unbalance and will provide fault-ride through capabilities.

2.3.1.2 Task 2.2 Development of the agent-aggregator platform and its distributed algorithms

Within task 2.2 a lot of work has been done during this reporting period by partners TU/e and UGENT.

The methodology to achieve voltage regulation has been identified: the Jacobian matrix based algorithm. Voltage regulation in the distribution grid can also be controlled by the curtailment procedure. But in the curtailment procedure producible green energy will be untapped to avoid

voltage problems. The Jacobian matrix based algorithm on the other hand ensures maximum green energy generation based on the implementation of soft curtailment.

The development of a global architecture for the different controls has been completed. A flow chart is developed which shows the connection among local, fast and slow control. A more detailed description of this flow chart is available in chapter 6 (Forecasting and agent-based control strategies) of D2.1 (Overview of forecasting techniques for production and consumption) which was submitted to the EC on February 26th.

The development of a fast control algorithm is on-going. Preliminary results have been obtained successfully. The algorithm is being tested in a test network. Nonetheless, the algorithm will be tested in a more complex and real time network later on during the project. After its successful testing, the fast control will be tested and implemented in Simulink.

A first attempt to integrate the local control and reactive power based voltage regulation in the MV grid has been conducted . It was found that reactive power based voltage control was developed in phasor simulation and local control was developed in continuous simulation. Hence, agent control and local control models need to be updated for successful integration. UGent and TU/e will update respective models such that models can be implemented in phasor simulation.

The development of the slow control algorithm is based on multi objective coordination control and will be developed within task 3.4 (Develop optimal coordinating strategies to harmonize multi services/objectives) at a later stage. Nevertheless, a basic slow control model will be developed within this task for integrating the local, fast and slow control.

2.3.1.3 Task 2.3 Optimization techniques

Within this task different partners are involved and each has done his share during this reporting period.

AUTH and UL worked together to obtain an overview of the existing techniques for Demand Side Management (DSM) and Demand Response (DR). After a careful examination of the state of the art in the methodologies of DSM and DR, it has been decided to focus mainly on the issues related to the short term real-time DR and load regulation, based on proper price driven signals, as the most appropriate techniques to be considered as part of a bundle of Ancillary Services (AS).

AUTH also examined the potential options to incorporate these techniques and the developed models in the simulation platform of WP3 and defined the required data interchange with the power grid core module and the MAS simulation layer.

EANDIS studied the possibilities of Dynamic Line Rating (DLR) for the DSO. DLR is always combined with curtailment of wind turbines and only applicable in MV grids. Based on the business case EANDIS concluded that DLR is beneficial to extend the limits of existing cables compared to new cable investments.

TU/e contributed with an agent-based DSM application with a focus from aggregator downward to device agent level. An agent model for DSM has been developed in MATLAB and Java Agent Development Framework (JADE) environment. In this model device agents send bids to the aggregator and the aggregator provides a new price to the device agents. Once the models for DSM and DR are developed by the other partners, integration or an update of the device agents and aggregator will follow.

2.3.1.4 Task 2.4 Forecasting techniques

The objectives of this task were to make an overview and analyze the existing forecasting techniques for photovoltaic solar plants forecasting, wind power plants forecasting and consumption forecasting. The goal was to identify, adapt and use the forecasting algorithms which can be used as input for the multi-agent system. Within this task the different forecasting models had to be studied for the purpose of short and long term predictions.

Within the 1st reporting period all objectives have been successfully finished. The photovoltaic solar power, wind power and consumption models, for both – short and long term – have been overviewed. Moreover, the connection of models and MAS have been provided. The conclusions have been described in D2.1(Overview of forecasting techniques for production and consumption) and this deliverable suggests which models are beneficial and can be used within INCREASE.

2.3.1.5 Task 2.5 Development of a generic distributed control system at the MV level

This task is planned to start only in month 15 (November 2014) according to Annex I. Therefore nothing has been done during this reporting period.

2.3.1.6 Task 2.6 Probalistic model to support provision of AS to TSO

A literature overview and detailed content analysis were done during this reporting period. This is a long term task, therefore it was decided to perform most of the work after the end of WP1. Task 2.6 needs to be in compliance with INCREASE and since WP1 describes the direction of the project, introduction and methodologies, it serves as input for this task.

2.3.2 Significant results within WP2

2.3.2.1 Task 2.1 Development of a (fast, local) control strategy for three-phase four-wire grid-connected inverters at the LV network

UGENT developed new MATLAB models based on the existing ones. The model for the damping control strategy is working and voltage unbalance and fault-ride through capabilities have been simulated.

The voltage-based control strategy is finished for the single-phase simulation model. The simulation model for the three-phase droop control is also finished.

Several presentations about this task were given during this reporting period:

- Presentation in Vilvoorde, INCREASE Management Meeting (01/12/2013)

- Presentation meeting UGent and UMons (10/01/2014)
- Presentation telephone conference (21/01/2014)
- Presentation telephone conference (11/02/2014)

A paper was submitted about the work done within this task: Voltage dip mitigation capabilities of three phase-damping control strategy (Transactions on Power Delivery IEEE).

2.3.2.2 Task 2.2 Development of the agent-aggregator platform and its distributed algorithms

TU/e developed a working agent based model for voltage regulation on MV grid based on reactive power control successfully.

Preliminary results show that PSAT can be an alternative for Simulink based power flow. Nevertheless the use of Simulink within INCREASE cannot be neglected.

A chapter (Forecasting and agent-based control strategies) as part of D2.1 (Overview of forecasting techniques for production and consumption) was written. D2.1 was submitted to the EC on February 26th. M2 (Optimization and forecasting techniques) was achieved on time when submitting this report.

A paper (Applying Agent-based Coordination Mechanism to mitigate voltage fluctuations) was written and accepted for the IEEE Young Researchers Symposium.

A lot of bilateral meetings with UGENT and communication took place in order to be able to work together in an optimal way to achieve the goals of INCREASE.

2.3.2.3 Task 2.3 Optimization techniques

There are no results to be reported yet. The work within this task is on-going, a lot of progress has been made. The involved partners are working on D2.2 (Recommendations on real-time line rating and demand-side management). This deliverable is planned to be submitted by April 30th.

2.3.2.4 Task 2.4 Forecasting techniques

This task's results suggest which forecasting model can be used within INCREASE. Each model has its own advantages and disadvantages, which have to be considered when implementing the model in the MAS control system.

D2.1 Overview of forecasting techniques for production and consumption was compiled and submitted to the EC according to the Annex I timing on February 26th. M2 (Optimization and forecasting techniques) was achieved on time when submitting this report.

2.3.2.5 Task 2.5 Development of a generic distributed control system at the MV level

Nothing to report so far.

2.3.2.6 Task 2.6 Probalistic model to support provision of AS to TSO

There are no results yet.

2.4 Deviations from Annex I during this reporting period

Nothing to report.

2.5 Use of resources

2.5.1 Person months/personnel costs

Partner	Planned PM	Actual PM	Planned personnel costs	Actual personnel costs
UGent	2	2,70	10.990,92	13.671,97
Eandis	2	1,42	22.960,06	19.224,00
EG	0,24	1,21	1.213,32	2.741,84
LIA	0,12	0,00	975	0,00
SNG	0,06	0,00	465	0,00
AUTH	12	1,71	20.572	3.988,88
JR	0,18	0,00	1.213,38	0,00
TU/e	4	3,40	24.183,56	33.106,16
UL	5	2,00	21.337	3.432,77
AL	0,12	0,12	960	411,20
KOR	4	6,1	19.035	20.831,06

2.5.2 Budget deviations

Partner	Deviation	Explanation
UGent	Actual PM > planned PM	More work has already been performed by this partner within WP2, personnel costs are higher accordingly.
Eandis	Actual PM < planned PM	Most work will be done by this partner in a later phase.
EG	Actual PM > planned PM	The partner already performed a lot of work within this WP. There is no need to increase PM.
EG	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.
LIA	Actual PM < planned PM	Work within this WP has not started yet for this partner.
SNG	Actual PM < planned PM	Work within this WP has not started yet for this partner.
AUTH	Actual PM < planned PM	AUTH is a very important partner within this WP, the initial work in task 2.3 is done, but they are still involved in tasks 2.1, 2.2 and 2.5.
JR	Actual PM < planned PM	Work within this WP has not started yet for this partner.
TU/e	Actual PM < planned PM	Most work will be done by this partner in a later phase.

TU/e	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
UL	Actual PM < planned PM	Most work will be done by this partner in a later phase.
UL	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.
AL	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.
KOR	Actual PM > planned PM	A lot of work within this WP has already been performed.
KOR	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.

3. WP3 Development and use of an integrated simulation platform

3.1 General information

WP3 has a duration of 31 months (1/11/2013-30/06/2016) and is led by the University of Thessaloniki (AUTH).

3.2 Project objectives for the reporting period

The project objectives of WP3 for this reporting period according to Annex I are the following ones:

- Development of a simulation platform to be used for the first step in the validation process of the proposed control strategies for the integrated smart distribution network. Additionally, the simulation platform is meant to be used by the DSOs and the TSOs for the investigation of the influence of various control strategies in the optimization of DRES operation and performance in distribution networks.
- The simulation toolset should be capable to jointly analyze the performance of the various system components: the electrical power grid, the proposed multi-agent coordination algorithms, the communication network, and the overall system performance coordination.

3.3 Work progress and achievements during the period

3.3.1 Summary of progress towards objectives

3.3.1.1 Task 3.1 Development of the principle modeling units for the integrated platform

Based on the type, the functionalities and the requirements of the simulation platform as discussed and concluded in WP1, the controlled DRESs will be simulated as controlled PQ sources with different active and reactive power output or input per phase. The mathematical expressions that describe the dynamic behavior for the mitigation of voltage unbalance are already available. These expressions

refer to the control of the injected currents by the DER at the Point of Common Coupling (PCC) with the grid. The equivalent transformation of the injected currents into injected active and reactive power and the validation of this transformation with commercially available software like NEPLAN or PSS-SINCAL or EMTP-RV, is already in progress. Preliminary results show that the selected model can be finalized without problems in the next months.

Other modeling units such as power distribution lines, both overhead and underground, loads, transformers, and the corresponding control devices and interfaces were investigated. Reduced models for parts of the distribution system have also been investigated. Two cases were identified: parts of the network consisting of passive loads and parts consisting of passive loads and distributed generators other than the ones investigated in INCREASE. The methodology for deriving these reduced models is described in detail in chapter 6 (Simulation platform) of D1.2 (Report on technical aspects).

3.3.1.2 Task 3.2 Integration of the MAS based control system in the network simulation platform

Although the actual work of this task begins in month 10, following the discussions about the MAS simulation platform within WP1 and the individual model development within task 3.1, some initial investigations have already been done to ensure the compatibility with the power grid core module.

3.3.1.3 Task 3.3 Development of a toolset capable to access jointly the power and the communication in the integrated platform

For the implementation of the communication toolset, three open source software tools have been investigated, namely OMNeT++, OPNet and MS3. From the comparisons of the corresponding properties and features it was concluded that the OMNeT++ tool can be used for the LAN simulation in the integrated platform. The most critical technical issues of the communication module in the integrated platform are met using OMNeT++ (e.g. transmitting data over multiple media, collecting and analyzing massive amounts of data rapidly, etc.). OMNeT++ can be extended to include custom modules and additional frameworks on top of Eclipse, whereas for large-scale simulations typically scripts are used for running the simulation and analyzing the results. Initial investigations using different communication network technologies have been performed (e.g. transport layer: TCP, UPD; network layer: IPv4, IPv6; link layer: Ethernet, WiFi, PPP) using the framework INET on top op OMNeT++ with overall satisfying results.

Although OMNeT++ is a discrete event simulator of communication networks, it can also cooperate with other simulation systems. Therefore, a power system simulator module was implemented incorporating the OMNeT++ into the MATLAB and NEPLAN environment. Simulations were also carried out, in order to evaluate the network performance using the IEC 61850, IEEE 1646, IEEE 1547 and IEE 1379 standards.

3.3.1.4 Task 3.4 Develop optimal coordinating strategies to harmonize multi services/objectives

Although the activities within this task are planned to start in month 7 (March 2014), some work has been done by TU/e.

A literature study was conducted and details of different modules that will be integrated in INCREASE were collected. The objectives for slow control were set: electricity market, technical regulation, maximum possible exploitation of renewable energy, and coordinated control of inverters in the network.

3.3.2 Significant results within WP3

3.3.2.1 Task 3.1 Development of the principle modeling units for the integrated simulation platform

Although no task outcomes (such as deliverables or milestones) are foreseen for the 1st reporting period in Annex I, the main features, requirements and functionalities of the power grid core module models have been presented and discussed during the Kick-off Conference in Vilvoorde in December.

3.3.2.2 Task 3.2 Integration of the MAS based control system in the network simulation platform

Nothing to report so far.

3.3.2.3 Task 3.3 Development of a toolset capable to access jointly the power and the communication in the integrated platform

Although no task outcomes are foreseen for the 1st reporting period in Annex I, the main features, requirements and functionalities of the LAN simulator module have been presented and discussed during the Kick-off Conference in Vilvoorde in December.

3.3.2.4 Task 3.4 Develop optimal coordinating strategies to harmonize multi services/objectives

Nothing to report so far.

3.4 Deviations from Annex I during this reporting period

There are no deviations for this WP. Everything is progressing according to the plan.

3.5 Use of resources

3.5.1 Person months/personnel costs

Partner	Planned PM	Actual PM	Planned personnel costs	Actual personnel costs
UGent	1	1,55	5.495	7.390,40
Eandis	1	0,00	9.333	0,00
EG	2	0,00	10.111	0,00
LIA	1	0,00	8.125	0,00

SNG	0,5	0,00	3.875	0,00
AUTH	4	4,2	6.857	6.662,08
TU/e	1	0,50	5.483,50	4.644,03
UL	0,9	0,00	3.840,70	0,00

3.5.2 Budget deviations

Partner	Deviation	Explanation
UGent	Actual PM > planned PM	More work has already been performed by this partner within WP3, personnel costs are higher accordingly.
Eandis	Actual PM < planned PM	Work within this WP has not started yet for this partner.
EG	Actual PM < planned PM	Work within this WP has not started yet for this partner.
LIA	Actual PM < planned PM	Work within this WP has not started yet for this partner.
SNG	Actual PM < planned PM	Work within this WP has not started yet for this partner.
TU/e	Actual PM < planned PM	Most work will be done by this partner in a later phase.
TU/e	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
UL	Actual PM < planned PM	Work within this WP has not started yet for this partner.

4. WP4 Implementation and validation of the proposed control strategies

4.1 General information

WP4 has a duration of 35 months (1/12/2013-30/11/2016) and is led by KORONA.

4.2 Project objectives for the reporting period

As only task 4.1 has already started during this reporting period, the objective according to Annex I is limited to the development of a prototype of a three-phase four-wire inverter with the necessary protection algorithms by ALENCO which can be used in the Lemcko laboratory (UGENT) to test the developed control strategies.

The work progress and results are therefore only described of task 4.1 in this report. Important to mention however is that input was provided for chapter 8 (Laboratory test cases) of D1.2 (Report on

technical aspects) about the tests in the simulation platform (task 4.3), the lab tests (task 4.4) and the field trials (task 4.5).

4.3 Work progress and achievements during the period

4.3.1 Summary of progress towards objectives

4.3.1.1 Task 4.1 Development of a three-phase four-wire inverter system equipped with the proposed control strategy

In order to be able to develop a prototype of a three-phase four-wire inverter which will be tested in the Lemcko laboratory of UGENT a close cooperation between both partners is very important (Alenco and UGENT).

In this task the proposed control strategy of WP2 is implemented in a micro-CHP system, this will be described more thoroughly in D4.1 (Report on the feasibility of using the hot water boiler to provide electrical flexibility) due in month 14 (October 2014). ALENCO started with the calculations for this implementation: thermodynamic calculations and calculations in Mathcad for the thermal buffer have been done.

Process parameters have also been determined and first ideas for the control strategy were discussed.

4.3.2 Significant results within WP4

4.3.2.1 Task 4.1 Development of a three-phase four-wire inverter system equipped with the proposed control strategy

Two-weekly bilateral meetings between ALENCO and UGENT (WP leader of WP2) took place to ensure the successful development of the prototype of a three-phase four-wire inverter.

Preparations are going on for D4.1 (Report on the feasibility of using the hot water boiler to provide electrical flexibility).

4.4 Deviations from Annex I during this reporting period

Nothing to report so far.

4.5 Use of resources

4.5.1 Person months/personnel costs

Partner	Planned PM	Actual PM	Planned personnel costs	Actual personnel costs
UL	0,3	0,00	1.455,30	0.00
AL	1,4	0,96	9.625	3.726,92

4.5.2 Budget deviations

Partner	Deviation	Explanation

UL	Actual PM < planned PM	Work within this WP has not started yet for this partner.
AL	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.

5. WP5 Market mechanisms and regulatory framework for ancillary services

5.1 General information

WP5 has a duration of 27 months (01/03/2014-30/06/2016) and is led by University of Ljubljana (UL).

5.2 Project objectives for the reporting period

As this entire work package only started in month 7 (March 2014), there is nothing to report for the 1st reporting period.

6. WP6 Dissemination and deployment of results

6.1 General information

WP6 has a duration of 40 months (1/09/2013-31/12/2016) and is led by Joanneum Research (JR).

6.2 Project objectives for the reporting period

The objectives of WP6 for this reporting period according to Annex I are the following ones:

- To maximize the international visibility of the project through the development of a dissemination strategy focused towards different pre-defined target groups.
- To set up the INCREASE dissemination platform.
- To disseminate EU wide the project results.
- To prepare the exploitation of project results, i.e. preparing for deployment.

6.3 Work progress and achievements during the period

6.3.1 Summary of progress towards objectives

6.3.1.1 Task 6.1 Setting up INCREASE's strategic dissemination plan

First the INCREASE dissemination coordinator was assigned. Partner JR will take this responsibility (D6.1 Assignment of dissemination and exploitation coordinator).

A dissemination plan for the project has been set up during this reporting period and has thoroughly been described in D6.3 (Plan of action/communication strategy for dissemination of knowledge with annual updates and adjustments). It shows a strategic plan for disseminating the activities of the project. After a clear definition of target groups and different relevant activity levels, the report provides a plan of dissemination action lines, partner responsibilities, but also an overview of planned specific dissemination activities among partners. It further describes the selection process of the project logo, provides a detailed overview of the project website structure and features and gives also a first overview of possible internal and external communication strategies such as mailing lists, planned workshops and conferences, but also summer and winter school options etc. A separate table provides an overview of all the dissemination activities planned so far. One chapter deals with the organization and design of the project newsletter, leaflet, poster and brochure. The plan serves as an active and flexible tool to optimize all the dissemination activities of all the partners within INCREASE and is permanently updated.

6.3.1.2 Task 6.2 Designing, setting up and maintaining INCREASE's interactive dissemination platform

A project website has been set up including all features and information contents described in Annex I. In addition, D6.2 (First accessible version of the INCREASE website to allow promotion for the TSO/DSO stakeholder kick-off meeting in m3) has also been generated explaining the content of the INCREASE website development and its structure. As a written text the document just reflects on additional and accompanying information of the website and its features itself. The document explains the main structure of the website, some technical basics and the progress of how the website was developed, filled with contents and finally also will be maintained.

During this reporting period the visual identity of the project was also established. A logo, templates for presentations, newsletters, etc. have been developed and are described in D6.4 (INCREASE visual identity: logo, templates for presentations, newsletters, etc.).

6.3.1.3 Task 6.3 Setting up 1 large scale conference, summer schools and organize exchange workshops

Within this task a first conference was organized by UGENT for the other projects (DREAM, evolvDSO and IDE4L) involved in the same FP7 - ENERGY - 2013 -7 call, energy topic 2013.7.1.1.

The Kick-off Conference was organized on December 3rd in Vilvoorde, Belgium. More details about this conference are described in chapter 7 (WP7 Project Management) of this deliverable and in D6.5 (Organization of kick-off event where DREAM, evolvDSO and IDE4L will take part).

The INCREASE project coordination is in continuous contact with the project coordinators of the other projects to ensure close cooperation and the organization of more joint events.

6.3.1.4 Task 6.4 Deployment of project results

The following activities for further stimulation and support for project dissemination and exploitation apart from the website have been carried out so far:

- Project leaflet
- Newsletter
- Poster

6.3.2 Significant results within WP6

6.3.2.1 Task 6.1 Setting up INCREASE's strategic dissemination plan

The dissemination plan was set up by JR during this first reporting period and provides information about planned action and communication strategies of all the partners for the dissemination of knowledge with annual updates and adjustments. The dissemination of the project results is essential in general to ensure the international visibility of the project. The European dimension of the project, especially due to the fact that the electricity network does not account for borders, does demand a European collaboration and asks for a well determined European dissemination strategy throughout the overall project duration. The dissemination activities started with the project's kick-off meeting and dissemination work is on-going until the end of the project and even when the project is finished. Thus, dissemination and communication is a horizontal activity of the project, taking place throughout the project duration and it is one of the main tasks of the proposed action.

The aim of the dissemination strategy is to ensure maximum use of the project results by addressing a broad audience not only in research institutes and companies, but also to involve (research) policy makers, media and the public at large.

Figure 1 depicts an overview of the planned internal project meetings following the project proposal and decisions taken during the Kick-off Meeting. A detailed description of this is given in D6.3 (Plan of action/communication strategy for dissemination of knowledge with annual updates and adjustments), which was submitted to the EC on October 31st as foreseen in Annex I.

In addition to the events and meetings and to disseminate the results of the project to their full extent, the organization of an international summer school for postgraduate students and young professionals is foreseen to be held in the middle of 2014 (June).

In September 2013 the Austrian newspaper "Kleine Zeitung" released an article about the project.

The other deliverable planned within this task was also successfully achieved and submitted to the EC on October 2nd 2013 (D6.1 Assignment of dissemination and exploitation coordinator).

6.3.2.2 Task 6.2 Designing, setting up and maintaining INCREASE's interactive dissemination platform

The project website has been structured according to the needs of the target audiences. The initial website's architecture is structured along the following domains:

- **Home** (see **Error! Reference source not found.**)
- **INCREASE in Brief**

- Objectives and Aims
- Expected Results
- Press Releases

- **Who We Are (Partner logos and links to partner websites)**
- **News**
- **Events**
- **Results (Downloads)**
- **Links**
- **Contact**
- **Forum**

The webpage provides regular updates regarding smart grid news and related events (News, Events and Results).

The purpose of the project website is to provide access to project results at two levels: one public and one private (i.e. password – protected) for project partners (Partner Area) respectively. Visitors of the INCREASE project website can view all the site material excluding the one hosted in the Partners Area accessible only via the Login window with "username" and "password" for each partner of the consortium. More information about the website is available in D6.2 (First accessible version of the INCREASE website to allow promotion for the TSO/DSO stakeholder kick-off meeting in m3). The link to the website is the following one: www.project-increase.eu.

In addition to the existing forum of the website, the project consortium also agreed to use a communication platform provided by UGENT to share data and information on a central platform. Project partners are able to create their specific access using the following link https://zephyr.ugent.be/secure/index.php.

JR also developed in close collaboration with UGENT an internal and external mailing list for project information exchange and dissemination activities.

The project logo was also designed and templates for presentations, reports and newsletters were developed. This is described in D6.4 (INCREASE visual identity: logo, template for presentations, newsletters, etc.) which was submitted to the EC on November 6th 2013.

6.3.2.3 Task 6.3 Setting up 1 large scale conference, summer schools and organize exchange workshops

The 1st joint conference with the consortia of DREAM, evolvDSO and IDE4L was organized in Vilvoorde on December 3rd. The conference organization and outcome is described in D6.5 (Organization of kick-off event where DREAM, evolvDSO and IDE4L will take part).

6.3.2.4 Task 6.4 Deployment of project results

An important action in order to establish the project's identity and to support "brand recognition" was the design of a project logo to be associated and included in all documentation (paper or electronic) and publicity material relating to the project.

Within the reporting period a first newsletter, a project leaflet and a project poster have been developed and spread.

6.4 Deviations from Annex I during this reporting period

There are no deviations to report.

6.5 Use of resources

6.5.1 Person months/personnel costs

Partner	Planned PM	Actual PM	Planned personnel costs	Actual personnel costs
UGent	1,8	1,43	9.000	7.195,94
AUTH	0,9	0,15	1.575	366,68
JR	1,8	3,68	12.915,75	28.825,00
TU/e	0,9	0,4	3.658,50	4.235,57
UL	0,9	0,0	2.853,90	0,0
KOR	0,8	0,8	3.600	4.337,72

6.5.2 Other costs

Partner	OTH	Description
UGENT	3.535,24	Organization kick-off meeting 22-24/09/2013 Oostende
UGENT	4.101,95	Organization kick-off conference 2-3/12/2013 Vilvoorde
UGENT	83,01	Dissemination material
UGENT	155,36	Transport costs to meetings other projects
AUTH	1.680,74	Attending INCREASE Kick-off Conference
JR	1.353,17	Dissemination material
SNG	550,78	Attending INCREASE Kick-off Conference
UL	836,37	Attending INCREASE Kick-off Conference

6.5.3 Budget deviations

Partner	Deviation	Explanation
AUTH	Actual PM < planned PM	Work within this WP has not started yet for this partner.
JR	Actual PM > planned PM	As JR is the dissemination and exploitation manager it

		is normal that more work is performed in the beginning of the project: designing promotion materials and the project's image.
TU/e	Actual PM < planned PM	Most work will be done by this partner in a later phase.
TU/e	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
UL	Actual PM < planned PM	Work within this WP has not started yet for this partner.

7. WP7 Project Management

7.1 General information

WP7 has a duration of 40 months (1/09/2013-31/12/2016) and is led by UGENT.

7.2 Project objectives for the reporting period

The ultimate goal of this work package is to perform a close follow-up of the project objectives in a qualitative way and to meet the project schedule and deadlines (technical coordination) and to perform the financial and administrative tasks of the project (administrative and financial coordination).

The specific objectives are:

- Provide a secure management structure for the decisions to be taken.
- Contacts with European Commission (EC).
- Prepare contracts.
- Establish reports.
- Conduct the overall legal, administrative and financial management.
- Follow-up of project activities, solve problems, revision or updates of plans if necessary.
- Handle financial issues (collect reports, approve costs, transfer payments).
- Achieve the knowledge management (including its protection), also when disseminating the project results beyond the consortium.
- Organize and prepare management meetings and contacts.
- Follow-up gender issues.

7.3 Work progress and achievements during the period

7.3.1 Summary of progress towards objectives

7.3.1.1 Project Management

D7.1 Project Handbook

As described in the DoW the 1st main task for the project coordinator apart from the day-to-day management activities was the setting up of a project handbook (D7.1 Project Handbook). This deliverable was due in month 2 (31/10/2013) and was submitted to the EC on the 22nd of October 2013.

D7.1 Project Handbook has the following structure:

1. Introduction
   - 1.1 Purpose of this document
   - 1.2 Scope of this document
   - 1.3 Acronyms and abbreviations
2. Project Management
   - 2.1 Project Management Structure
     - 2.1.1 Work Packages
   - 2.2 Project Organization
     - 2.2.1 Overall Management Team
     - 2.2.2 Project Coordinator
     - 2.2.3 Management Committee
     - 2.2.4 Technical Committee
     - 2.2.5 Work Package Leaders
     - 2.2.6 Scientific Advisory Board
   - 2.3 Decision making process
   - 2.4 Meetings
     - 2.4.1 Voting rules and quorum
     - 2.4.2 Veto
3. Project Dissemination
   - 3.1 Dissemination Strategy
   - 3.2 Publications
   - 3.3 Management of Intellectual Property Rights
4. Reporting
   - 4.1 Overview of the different types of reports
     - 4.1.1 Intermediate Progress Report
     - 4.1.2 Project Periodic Report
     - 4.1.3 Project Final Report

The main purpose of the Project Handbook is to provide an overview of the management and administrative procedures of INCREASE in order to ensure a successful execution with positive results. The document provides the project partners with information necessary to facilitate the management, the monitoring of the overall progress and the communication. It can be adjusted and reviewed whenever considered necessary.

Organization Kick-off Management Committee Meeting

22-24 September 2013: INCREASE Kick-off Management Committee Meeting was organized by UGENT in Oostende, Belgium. The main objective of this meeting was for all the partners to meet each other and discuss the outlines of the different WPs and in particular the contents and restraints of WP1. A date was also set for the INCREASE kick-off conference in cooperation with the related projects DREAM, evolvDSO and IDE4L. (see annex 1: agenda kick-off meeting)

Organization kick-off conference

2-3 December 2013: INCREASE kick-off conference was organized by UGENT in Vilvoorde, Belgium. The conference was organized in cooperation with Smart Grids Flanders, a Flemish organization hosting the International Smart Grids Conference on the 2nd of December at the same location. The INCREASE partners joined this conference. The 3rd of December was dedicated to the exchange of know-how, experiences and ideas between the different projects part of the FP7-ENERGY.2013-7.1.1 call: DREAM, evolvDSO, IDE4L and INCREASE. (see annex 2: agenda kick-off conference)

Regular technical meetings

The Flemish and Dutch partners meet each other regularly in person to discuss technical issues concerning WP2 and WP3. From these meetings minutes are uploaded on the Zephyr platform or emailed between the respective partners.

Overview of the meetings:

Date	***Meeting***
9/09/13	Bilateral meeting Eandis – UGent
8/11/13	Bilateral meeting UGent - TU/e

29/11/13	Bilateral meeting UGent – Alenco
4/12/13	Wrap-up INCREASE kick-off conference WP1 and WP2, UGent - TU/e
30/01/14	Bilateral meeting UGent – Eandis
11/02/14	Bilateral meeting follow-up WP2 UGent - TU/e
19/02/14	Bilateral meeting involvement Alliander UGent – LIA

2-weekly bilateral meetings between the person responsible within UGent and within Alenco for the development of the 3-phase 4-wire inverter have been organized since the beginning of the project as their cooperation is paramount for the success of INCREASE.

The different Slovenian and Austrian partners also have been meeting regularly to discuss the progress of the project.

Conference calls

Once a month there is a 2-hour conference call between the project coordinator and the different WP leaders to discuss the progress within each WP, drivers and challenges, reporting, etc. Apart from that there are a lot of conference calls between certain partners or between the coordinator and a WP leader in order to discuss specific issues that need to be solved soon. This appears to be a very successful way of communicating. The minutes from these conference calls are uploaded on the Zephyr platform and emailed to the WP leaders.

Overview of conference calls:

Date	***Meeting***
10/10/13	Conference call WP6 UGent – JR
22/10/13	Conference call WP2 WP leaders
25/11/13	Conference call WP1 UGent – UL
10/01/14	Conference call D1.1 and D1.2 UGent – UL
21/01/14	Conference call WP leaders
29/01/14	Conference call D1.1 and D1.2 UGent - UL – JR
20/02/14	Conference call WP leaders

Organization Management Meeting and 1st Advisory Board Meeting

18-19 March 2014: Management Meeting and Advisory Board Meeting, Eindhoven, the Netherlands. The preparations for this meeting were done during this reporting period. (see annex 3: agenda and invitation advisory board meeting)

Reporting

A project flow to ensure the quality of all the reports was established in D7.1 Project Handbook and is set up as follows:

t = contractual delivery date of the deliverable

t-60 PC reminds lead partner
t-50 deliverable structure issued
t-40 PC identifies two reviewers
t-30 complete deliverable to reviewers
t-20 reviewers comment
t-13 revised deliverable completed
t-10 reviewers confirm OK
t-5 acceptance by PC and deliverable uploaded to the EC system (participants portal)

The preparation of the deliverables due during this reporting period was done according to the above explained flow and were submitted to the EC on time.

The deliverables due during this reporting period were the following ones:

Deliverable n°	***Title***	***Delivery date***
1.1	Report on relevant experiences	31/12/2013
1.2	Report on technical aspects	28/02/2014
2.1	Overview of existing forecasting techniques for production (PV, wind) and consumption	28/02/2014
6.1	Assignment of dissemination and exploitation coordinator	30/09/2013
6.2	First accessible version of the INCREASE website to allow promotion for the TSO/DSO stakeholder kick-off meeting in M3	31/10/2013
6.3	Plan of action/communication strategy for dissemination of knowledge with annual updates and adjustments	31/10/2013
6.4	INCREASE visual identity: logo, templates for presentations, newsletters, etc.	31/10/2013
6.5	Organization of kick-off event where DREAM, evolvDSO and IDE4L will take part	30/11/2013
7.1	Project handbook	31/10/2013
7.2	Intermediate progress report 1	28/02/2014

Apart from deliverables there has been a lot of reporting between the different project partners during meetings, telephone conferences and through email. All the distributed documents are always uploaded to the Zephyr platform where they are available to all the project partners for downloading.

Zephyr is a Ghent University online platform (https://zephyr.ugent.be). People have to subscribe for a specific course (in this case INCREASE) and then they get access with a log-in and password to the shared space where all the documents (deliverables, preparation documents, meeting information, meeting minutes, financial overviews, timesheets, etc.) are available. Everybody can upload

documents themselves as well. A weekly overview (on Friday) of all the uploaded documents is emailed to all the partners by the Project Coordinator.

Dissemination follow-up

For the INCREASE project it is partner Joanneum Research (JR) who is responsible for the dissemination and exploitation of the project results. Nevertheless there is a very close cooperation between the Dissemination Manager (JR) and the Project Coordinator (PC). During this reporting period the website was launched, the communication strategy was set out and a lot of visual material was developed. More information about this can be found in the WP6 chapter.

Also during this reporting period 1st steps were taken in preparing the 2014 INCREASE summer school and a 1st dedicated workshop.

Administrative follow-up

The PC is also responsible for the administrative follow-up of the project.

During the Kick-Off Management Committee Meeting in September 2013 in Oostende part of the agenda was dedicated to the administrative and financial follow-up of the project and the partners' role in this. This was explained by Mrs. Irene Bonvissuto (INCREASE EC Project Officer) and by Mrs. Saskia Vanden Broeck (UGent European projects expert).

Once the pre financing budget was received by UGent, the money was transferred to all the project partners according to their share in the total requested EC contribution.

The communication between the INCREASE project and the EC is the responsibility of the PC. UGent therefore has been in touch with the PO several times concerning different issues:

- Delay in the delivery of D1.1
- Official name change of partner SNG in the course of 2014
- Request for reallocation subcontracting budget to other costs budget by partner JR.

There is not yet anything to report concerning risk management or contingency action plans. So far there are no delays in work packages and tasks.

7.3.1.2 Task 7.1 DREAM, evolvDSO, IDE4L and INCREASE collaboration framework

The DoW states the following: *DREAM partners are committed to seek for best collaboration opportunities with the projects selected for funding within the energy topic 2013.7.1.1 in the SMARTCITIES-2013 call, in order to allow for enhancing individual results on the basis of proper exploitation of synergies.*

The first step for this collaboration was taken by the INCREASE consortium when organizing a joint kick-off conference with the other projects (DREAM, evolvDSO and IDE4L) in Vilvoorde, Belgium, on

the 2nd and 3rd of December 2013. Each project was presented and some pending issues addressed and decided upon.

In the course of March 2014 all 4 projects have organized their 1st Advisory Board Meetings and every project will be present at every meeting.

04/03/2014: IDE4L Advisory Board Meeting in Stockholm, Sweden, INCREASE is represented by Dr. Ir. Tine Vandoorn

06/03/2014: evolvDSO Advisory Board Meeting in Rome, Italy, INCREASE is represented by Prof. Dr. Ir. Lieven Vandevelde

19/03/2014: INCREASE Advisory Board Meeting in Eindhoven, the Netherlands.

21/03/2014: DREAM Advisory Board Meeting in Milan, Italy, INCREASE is represented by Prof. Dr. Ir. Lieven Vandevelde.

Preparations have been done to hand in a proposal for this year's IEEE SmartGridComm Conference for a joint presentation on all 4 projects.

More contacts were established between INCREASE and similar projects or organizations with similar goals. UGent had a meeting with Heidi Lenaerts from Smart Grids Flanders in October (22/10/2013) concerning the organization of a joint event (International Smart Grids Conference). UGent also met the Project Coordinator of City-Zen (29/11/2013) where synergies are possible, as both projects have similar interests.

7.3.2 Significant results within WP7

7.3.2.1 Project Management

Below is an overview of the deliverables that were due during this reporting period and their date of submission. Almost all of them were delivered on time, which reflects the indicator of success within WP7.

Deliverable n°	***Title***	***Delivery date***	***Submission date***
1.1	Report on relevant experiences	31/12/2013	28/02/2014
1.2	Report on technical aspects	28/02/2014	28/02/2014
2.1	Overview of existing forecasting techniques for production (PV, wind) and consumption	28/02/2014	26/02/2014
6.1	Assignment of dissemination and exploitation coordinator	30/09/2013	02/10/2013
6.2	First accessible version of the INCREASE website to allow promotion for the TSO/DSO stakeholder kick-off meeting in M3	31/10/2013	31/10/2013

6.3	Plan of action/communication strategy for dissemination of knowledge with annual updates and adjustments	31/10/2013	31/10/2013
6.4	INCREASE visual identity: logo, templates for presentations, newsletters, etc.	31/10/2013	06/11/2013
6.5	Organization of kick-off event where DREAM, evolvDSO and IDE4L will take part	30/11/2013	17/12/2013
7.1	Project handbook	31/10/2013	22/10/2013
7.2	Intermediate progress report 1	28/02/2014	26/03/2014

7.3.2.2 Task 7.1 DREAM, evolvDSO, IDE4L and INCREASE collaboration framework

The joint kick-off conference organized by the INCREASE consortium on December 3rd 2013 in Vilvoorde, Belgium, was a success. In total 37 people attended the conference: 21 people involved in INCREASE, 5 partners from evolvDSO, 4 from IDE4L, 3 from DREAM and 3 external people.

Each project was presented and followed by a discussion about the proposed solutions/approaches. This led to very interesting ideas from different points of view. Apart from that, first contacts were made and the course was set for the remaining project duration. More joint conferences, dedicated workshops and summer schools will be organized.

For more details about this conference see D6.5 (Organization of kick-off event where DREAM, evolvDSO and IDE4L will take part), submitted to the EC on 17/12/2013 .

7.4 Deviations from Annex I during this reporting period

Two deliverables were submitted later than stated in the Annex I:

- D1.1 Report on technical requirements and constraints (due 31/12/2013; submitted 28/02/2014): as this report is very closely related to D1.2 all research for these 2 deliverables was done simultaneously, therefore both were submitted at the same time. This has no effect on other timings within INCREASE, and was agreed upon with the EC.
- D7.2 Intermediate Progress Report No 1 (due 28/02/2014; submitted 26/03/2014): as this deliverable includes financial information from the 1st 6 project months (September 2013-February 2014), it could not be submitted in February as the data from that month would not yet be available. This has no influence on other timings within INCREASE, and was agreed upon with the EC.

7.5 Use of resources

7.5.1 Person months/personnel costs

Partner	Planned PM	Actual PM	Planned personnel costs	Actual personnel costs
UGent	0,9	0,6	7.499,97	4.198,73
Eandis	0,15	0,18	1.650,00	2.430,00

EG	0,15	0,00	825,00	0,00
LIA	0,15	0,00	1.218,75	0,00
SNG	0,15	0,18	1.050,00	1.836,16
AUTH	0,15	0,445	450,00	1.139,99
JR	0,15	0,66	1.076,40	3.803,75
TU/e	0,15	0,20	1.181,55	3.076,27
UL	0,15	0,00	796,95	0,00
AL	0,15	0,38	1.200,00	1.310,70
KOR	0,30	0,30	1.350,00	1.318,52
MaVo	0,15	0,15	483,00	463,00

7.5.2 Other costs

Partner	MGT costs	Description
UGent	185,10	Meeting with TU/e in Eindhoven and Alliander in Arnhem 21/02/2014
Eandis	213,00	Attendance kick-off meeting and conference
EG	3.249,18	Attendance kick-off meeting and conference
SNG	493,61	Attendance kick-off meeting and conference
AUTH	2.411,28	Attendance kick-off meeting
TU/e	1.575,00	Attendance kick-off meeting and conference
UL	1.932,05	Attendance kick-off meeting
AL	340,63	Attendance kick-off meeting and conference
KOR	1.108,05	Attendance kick-off meeting and conference

7.5.3 Budget deviations

Partner	Deviation	Explanation
EG	Actual PM < planned PM	Work within this WP has not started yet for this partner.
LIA	Actual PM < planned PM	Work within this WP has not started yet for this partner.
SNG	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
AUTH	Actual PM > planned PM	More hours were spent within this WP because of management meetings.
JR	Actual PM > planned PM	More hours were spent within this WP because of management meetings.
TU/e	Actual PM > planned PM	More hours were spent within this WP because of management meetings.
TU/e	Actual PC > planned PC	The partner is aware of this difference, but will perform all the foreseen PMs within the project and not claim extra personnel costs.
UL	Actual PM < planned PM	Work within this WP has not started yet for this partner.
AL	Actual PM > planned PM	More hours were spent within this WP because of

		management meetings.
AL	Actual PC < planned PC	The personnel cost was initially estimated too high. This will be adjusted in the 1st amendment.

Table 1. Deliverables

Del. no.	Deliverable name	WP no.	*Nature*	Lead beneficiary	Dis level[1]	Delivery date from Annex I (proj month)	Forecast delivery date dd/mm/yyyy	Status: Not submitted/ Submitted	Actual delivery date dd/mm/yyyy	Comments
1.1	Report on relevant experiences	1	Report	UL	PU	4	31/12/2013	Submitted	28/02/2014	It was agreed with the PO to delay the submission of this deliverable with 2 months, as this report was written simultaneously with D1.2, and both deliverables have been submitted as one integrated report. This delay had no effect on the submission of other deliverables or any financial consequences
1.2	Report on technical aspects	1	Report	UGent	PP	6	28/02/2014	Submitted	28/02/2014	The deliverable was submitted as a joint report with D1.1.

[1] **PU** = Public
PP = Restricted to other program participants (including the Commission Services).
RE = Restricted to a group specified by the consortium (including the Commission Services).
CO = Confidential, only for members of the consortium (including the Commission Services).
Make sure that you are using the correct following label when your project has classified deliverables.
EU restricted = Classified with the mention of the classification level restricted "EU Restricted"
EU confidential = Classified with the mention of the classification level confidential " EU Confidential "
EU secret = Classified with the mention of the classification level secret "EU Secret "

2.1	Overview of existing forecasting techniques for production (PV, wind) and consumption	2	Report	Korona	PP	6	28/02/2014	Submitted	26/02/2014	
2.2	Recommendations on real-time line rating and demand-side management	2	Report	Eandis	PU	8	30/04/2014	Not submitted		
2.3	Evaluation of potential of the combined exploitation of selected optimization techniques	2	Report	TU/e	PU	12	31/08/2014	Not submitted		
2.4	Fast control strategy for three-phase four wire inverter for DRES	2	Prototype	UGent	PP	14	31/10/2014	Not submitted		
2.5	Agent-aggregator platform and its distributed algorithms	2	prototype	TU/e	PP	14	31/10/2014	Not submitted		
2.6	Probalistic models to support DSOs for the provision of AS	2	Prototype	Korona	PP	34	30/06/2016	Not submitted		
3.1	Dynamic equivalent models for the simulation of controlled DRES	3	Prototype	AUTH	PP	16	31/12/2014	Not submitted		
3.2	Integrated simulation platform which models	3	Prototype	UGent	PP	19	31/03/2015	Not submitted		

	the key components and control strategies									
3.3	Report on simulation results and evaluation of the integrated simulation platform	3	Report	AUTH	PU	24	31/08/2015	Not submitted		
3.4	Optimal coordinating strategies to harmonize multi services/objectives	3	Prototype	TU/e	PP	26	31/10/2015	Not submitted		
4.1	Report chapter on the feasibility of using the hot water boiler to provide electrical flexibility	4	Report	Alenco	PP	12	31/08/2014	Not submitted		
4.2	Prototype of three-phase four-wire inverter with the necessary protection algorithms	4	Prototype	Alenco	PP	19	31/03/2015	Not submitted		
4.3	Specifications for network and labo-like field trials	4	Report	Korona	PP	25	30/09/2015	Not submitted		
4.4	Report on the laboratory experiments at the Power Quality lab of TU/e and UGent	4	Report	TU/e	PP	28	31/12/2015	Not submitted		
4.5	Report on the field tests in the Dutch,	4	Report	UGent	PP	39	30/11/2016	Not submitted		

	Slovenian and Austrian grid									
5.1	Report on common definition of AS in the Transmission system and in the Distribution system	5	Report	UL	PU	26	31/10/2015	Not submitted		
5.2	Report on short-term market mechanisms for AS provision	5	Report	UL	PU	26	31/10/2015	Not submitted		
5.3	Report on necessary adjustments to the regulatory framework	5	Report	JR	PU	34	30/06/2016	Not submitted		
6.1	Assignment of dissemination and exploitation coordinator	6	Other	UGent	PP	1	30/09/2013	Submitted	02/10/2013	
6.2	First accessible version of the INCREASE website to allow promotion for the TSO/DSO stakeholder kick-off meeting in m3	6	Other	UGent	PU	2	31/10/2013	Submitted	31/10/2013	
6.3	Plan of communication action/strategy for dissemination of knowledge with annual updates and adjustments	6	Other	JR	PP	2	31/10/2013	Submitted	31/10/2013	
6.4	INCREASE visual	6	Other	JR	PU	2	31/10/2013	Submitted	06/11/2013	

	identity: logo, templates for presentations, newsletters, etc.									
6.5	Organization of kick-off event where DREAM, evolvDSO and IDE4L will take part	6	Other	UGent	PU	3	30/11/2013	Submitted	17/12/2013	This deliverable was submitted with a small delay as the kick-off event took place on the 2nd and 3rd of December 2013. This delay however has no financial consequences, nor for the submission of other deliverables.
6.6	INCREASE workshops to be organized, one of the workshops concerning multi-agent based technique will be organized in cooperation with the DREAM consortium	6	Other	UGent	PU	18	28/02/2015	Not submitted		
6.7	Plan for exploitation of results and further collaboration of partners after the project has ended	6	Report	JR	PP	40	31/12/2016	Not submitted		
7.1	Project handbook	7	Report	UGent	PP	2	31/10/2013	Submitted	22/10/2013	
7.2	Intermediate progress report No. 1	7	Report	UGent	PP	6	28/02/2014	Submitted	26/03/2014	The delay was agreed upon with the PO. As D7.2 integrates the financial and content data of the complete 1st 6 project months (1/09/13-

										28/02/14), the report was compiled during the month of March to be able to integrate all the data of February 2014.
7.3	Intermediate progress report No. 2	7	Report	UGent	PP	12	31/08/2014	Not submitted		
7.4	Intermediate progress report No. 3	7	Report	UGent	PP	24	31/08/2015	Not submitted		
7.5	Intermediate progress report No. 4	7	Report	UGent	PP	34	30/06/2016	Not submitted		

Table 2. Milestones

Milestone no.	Milestone name	Work package no	Lead beneficiary	Delivery date from Annex I dd/mm/yyyy	Achieved Yes/No	Actual / Forecast achievement date dd/mm/yyyy	Comments
1	Two part report on the requirements and constraints necessary for the development of the control strategy	1	UL	28/02/2014	Yes	28/02/2014	
2	Optimisation and forecasting techniques	2	Eandis	28/02/2014	Yes	28/02/2014	

3	Definition of the specifications of the multi-agent aggregator control strategy	2	TU/e	31/05/2014	No		
4	Local control strategy for three-phase four-wire inverters	2	UGent	31/10/2014	No		
5	Multi-agent aggregator control strategy	2	TU/e	31/10/2014	No		
6	Development of the simulation model of the proposed solutions	3	AUTH	31/03/2015	No		
7	Integration of MAS-based control system in the network simulation platform	3	AUTH	31/03/2015	No		
8	Toolset capable to join the power and communication aspects in the integrated platform	3	UGent	31/03/2015	No		
9	Prototype of a single-phase and a three-phase four-wire inverter equipped with the proposed control	4	Alenco	31/03/2015	No		
10	Data capture process	4	Korona	31/03/2015	No		
11	Validation by means of the integrated simulation platform	4	AUTH	30/06/2015	No		
12	Single-phase and three-phase prototypes which will be used in the lab tests and the field tests	4	Mastervolt	30/09/2015	No		
13	Generic distributed control system	2	TU/e	31/10/2015	No		
14	Report on common definitions of AS in DS and TS	5	UL	31/10/2015	No		
15	Report short-term market mechanisms for AS provision	5	UL	31/10/2015	No		
16	Validation by means of lab tests	4	UGent	31/12/2015	No		

17	Report on necessary adjustments to the regulatory framework	5	JR	30/06/2016	No		
18	Validation by means of field trials	4	TU/e	30/11/2016	No		

8. Financial overview per partner and activity type

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
UGent	**RTD**	**241.800,00**	**32.075,50**	**13,27%**	**44,00**	**6,25**	**14,20%**	**19.900,00**	**1.147,63**	**5,77%**
	WP1	10.991,00	11.013,13	100,20%	2,00	2,00	100,00%			
	WP2	131.891,00	13.671,97	10,37%	24,00	2,70	11,25%			
	WP3	82.432,00	7.390,40	8,97%	15,00	1,55	10,33%			
	WP5	16.486,00	0,00	0,00%	3,00	0,00	0,00%			
	DEMO	**61.800,00**	**0,00**	**0,00%**	**12,00**	**0,00**	**0,00%**	**6.000,00**	**0,00**	**0,00%**
	WP4	61.800,00	0,00	0,00%	12,00	0,00	0,00%			
	OTH	**60.000,00**	**7.195,94**	**11,99%**	**12,00**	**1,43**	**11,92%**	**30.500,00**	**7.875,56**	**25,82%**
	WP6	60.000,00	7.195,94	11,99%	12,00	1,43	11,92%			
	MGT	**50.000,00**	**4.198,73**	**8,40%**	**6,00**	**0,60**	**10,00%**	**8.000,00**	**185,10**	**2,31%**
	WP7	50.000,00	4.198,73	8,40%	6,00	0,60	10,00%			
	Total	***413.600,00***	***43.470,17***	***10,51%***	***74,00***	***8,28***	***11,19%***	***64.400,00***	***9.208,29***	***14,30%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
ELIA	**RTD**	**13.500,00**	**1.607,00**	**11,90%**	**1,50**	**0,20**	**13,33%**	**1.000,00**	**0,00**	**0,00%**
	WP1	4.500,00	1.607,00	35,71%	0,50	0,20	40,00%			
	WP5	9.000,00	0,00	0,00%	1,00	0,00	0,00%			
	OTH	**0,00**			**0,00**			**2.000,00**	**0,00**	**0,00%**
	WP6	0,00			0,00					
	Total	***13.500,00***	***1.607,00***	***11,90%***	***1,50***	***0,20***	***13,33%***	***3.000,00***	***0,00***	***0,00%***
Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
Eandis	**RTD**	**168.000,00**	**38.142,00**	**22,69%**	**18,00**	**2,82**	**15,67%**	**2.000,00**	**0,00**	**0,00%**
	WP1	18.667,00	18.900,00	101,25%	2,00	1,40	70,00%			
	WP2	130.667,00	19.224,00	14,71%	14,00	1,42	10,14%			
	WP3	9.333,00	0,00	0,00%	1,00	0,00	0,00%			
	WP5	9.333,00	0,00	0,00%	1,00	0,00	0,00%			
	DEMO	**27.000,00**	**0,00**	**0,00%**	**3,00**	**0,00**	**0,00%**	**6.000,00**	**0,00**	**0,00%**
	WP4	27.000,00	0,00	0,00%	3,00	0,00	0,00%			
	OTH	**0,00**			**0,00**			**4.000,00**	**0,00**	**0,00%**
	WP6	0,00			0,00					
	MGT	**11.000,00**	**2.430,00**	**22,09%**	**1,00**	**0,18**	**18,00%**	**6.000,00**	**231,00**	**3,55%**
	WP7	11.000,00	2.430,00	22,09%	1,00	0,18	18,00%			
	Total	***206.000,00***	***40.554,00***	***19,69%***	***22,00***	***3,00***	***13,64%***	***18.000,00***	***213,00***	***1,18%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
EG	**RTD**	**45.500,00**	**11.782,34**	**25,90%**	**9,00**	**4,26**	**47,33%**	**12.000,00**	**0,00**	**0,00%**
	WP1	15.167,00	9.040,50	56,91%	3,00	3,05	101,67%			
	WP2	10.111,00	2.741,84	27,12%	2,00	1,21	60,50%			
	WP3	10.111,00	0,00	0,00%	2,00	0,00	0,00%			
	WP5	10.111,00	0,00	0,00%	2,00	0,00	0,00%			
	DEMO	**99.500,00**	**0,00**	**0,00%**	**22,00**	**0,00**	**0,00%**	**38.150,00**	**0,00**	**0,00%**
	WP4	99.500,00	0,00	0,00%	22,00	0,00	0,00%			
	OTH	**0,00**			**0,00**			**5.000,00**	**0,00**	**0,00%**
	WP6	0,00			0,00					
	MGT	**5.500,00**	**0,00**	**0,00%**	**1,00**	**0,00**	**0,00%**	**6.000,00**	**3.249,18**	**54,15%**
	WP7	5.500,00	0,00	0,00%	1,00	0,00	0,00%			
	Total	***150.500,00***	***11.782,34***	***7,83%***	***32,00***	***4,26***	***13,319%***	***61.150,00***	***3.249,18***	***5,31%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
LIA	**RTD**	**40.623,00**	**6.945,00**	**17,10%**	**5,00**	**0,53**	**10,60%**	**2.000,00**	**0,00**	**0,00%**
	WP1	16.248,00	6.945,00	42,75%	2,00	0,53	26,50%			
	WP2	8.125,00	0,00	0,00%	1,00	0,00	0,00%			
	WP3	8.125,00	0,00	0,00%	1,00	0,00	0,00%			
	WP5	8.125,00	0,00	0,00%	1,00	0,00	0,00%			

	DEMO	**48.748,00**	**0,00**	**0,00%**	**6,00**	**0,00**	**0,00%**	**6.000,00**	**0,00**	**0,00%**
	WP4	48.748,00	0,00	0,00%	6,00	0,00	0,00%			
	OTH	**0,00**			**0,00**			**5.000,00**	**0,00**	**0,00%**
	WP6	0,00			0,00					
	MGT	**8.125,00**	**0,00**	**0,00%**	**1,00**	**0,00**	**0,00%**	**6.000,00**	**0,00**	**0,00%**
	WP7	8.125,00	0,00	0,00%	1,00	0,00	0,00%			
	Total	***97.496,00***	***6.945,00***	***7,12%***	***12,00***	***0,53***	***4,42%***	***19.000,00***	***0,00***	***0,00%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
SNG	**RTD**	**15.500,00**	**6.746,34**	**43,52%**	**2,00**	**0,65**	**32,50%**	**5.000,00**	**461,45**	**9.23%**
	WP1	7.750,00	6.746,34	87,05%	1,00	0,65	65,00%			
	WP2	3.875,00	0,00	0,00%	0,50	0,00	0,00%			
	WP3	3.875,00	0,00	0,00%	0,50	0,00	0,00%			
	DEMO	**29.500,00**	**1.100,32**	**3,73%**	**4,00**	**0,11**	**2,75%**	**2.000,00**	**0,00**	**0,00%**
	WP4	29.500,00	1.100,32	3,73%	4,00	0,11	2,75%			
	OTH	**0,00**			**0,00**			**25.500,00**	**550,78**	**2,16%**
	WP6	0,00			0,00					
	MGT	**7.000,00**	**1.836,16**	**26,23%**	**1,00**	**0,18**	**18,00%**	**6.000,00**	**493,61**	**8,23%**
	WP7	7.000,00	1836,16	26,23%	1,00	0,18	18,00%			
	Total	***52.000,00***	***9.682,82***	***18,62%***	***7,00***	***0,94***	***13,43%***	***38.500,00***	***1.505,84***	***3,91%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
AUTH	**RTD**	**96.000,00**	**15.230,92**	**15,87%**	**56,00**	**7,83**	**13,98%**	**5.000,00**	**0,00**	**0,00%**
	WP1	3.428,00	4.579,96	133,60%	2,00	1,92	96,00%			
	WP2	20.572,00	3.988,88	19,39%	12,00	1,71	14,25%			
	WP3	72.000,00	6.662,08	9,25%	42,00	4,20	10,00%			
	DEMO	**9.000,00**	**0,00**	**0,00%**	**6,00**	**0,00**	**0,00%**	**6.000,00**	**0,00**	**0,00%**
	WP4	9.000,00	0,00	0,00%	6,00	0,00	0,00%			
	OTH	**10.500,00**	**366,68**	**3,49%**	**6,00**	**0,15**	**2,50%**	**18.500,00**	**1.680,74**	**9,09%**
	WP6	10.500,00	366,68	3,49%	6,00	0,15	2,50%			
	MGT	**3.000,00**	**3.000,00**	**38,00%**	**1,00**	**0,45**	**44,50%**	**6.000,00**	**2.411,28**	**40,19%**
	WP7	3.000,00	1.139,99	38,00%	1,00	0,45	44,50%			
	Total	***118.500,00***	***16.737,59***	***14,21%***	***69,00***	***8,43***	***12,21%***	***35.500,00***	***4.092,02***	***11,53%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
JR	**RTD**	**111.219,00**	**28.444,00**	**25,57%**	**16,50**	**4,16**	**25,21%**	**5.000,00**	**2.904,00**	**58,08%**
	WP1	26.961,00	28.444,00	105,50%	4,00	4,16	104,00%			
	WP2	10.112,00	0,00	0,00%	1,50	0,00	0,00%			
	WP3	6.741,00	0,00	0,00%	1,00	0,00	0,00%			
	WP5	67.405,00	0,00	0,00%	10,00	0,00	0,00%			
	DEMO	**28.702,00**	**0,00**	**0,00%**	**3,00**	**0,00**	**0,00%**	**2.000,00**	**0,00**	**0,00%**

	WP4	28.702,00	0,00	0,00%	3,00	0,00	0,00%			
	OTH	**86.105,00**	**28.825,00**	**33,48%**	**12,00**	**3,68**	**30,67%**	**185.000,00**	**1.353,17**	**0,73%**
	WP6	86.105,00	28.825,00	33,48%	12,00	3,68	30,67%			
	MGT	**7.176,00**	**3.803,75**	**53,01%**	**1,00**	**0,66**	**66,40%**	**6.000,00**	**0,00**	**0,00%**
	WP7	7.176,00	3.803,75	53,01%	1,00	0,66	66,40%			
	Total	***233.202,00***	***61.072,75***	***26,19%***	***32,50***	***8,50***	***26,17%***	***198.000,00***	***4.257,17***	***2,15%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
TU/e	**RTD**	**197.415,00**	**48.908,00**	**24,77%**	**36,00**	**4,70**	**13,06%**	**12.500,00**	**0,00**	**0,00%**
	WP1	10.968,00	9.137,13	83,31%	2,00	0,80	40,00%			
	WP2	137.096,00	33.106,16	24,15%	25,00	3,40	13,60%			
	WP3	32.901,00	4.644,03	14,12%	6,00	0,50	8,33%			
	WP5	16.451,00	0,00	0,00%	3,00	0,00	0,00%			
	DEMO	**71.652,00**	**0,00**	**0,00%**	**12,00**	**0,00**	**0,00%**	**8.000,00**	**0,00**	**0,00%**
	WP4	71.652,00	0,00	0,00%	12,00	0,00	0,00%			
	OTH	**24.390,00**	**4.235,57**	**17,37%**	**6,00**	**0,40**	**6,67%**	**18.500,00**	**0,00**	**0,00%**
	WP6	24.390,00	4.237,57	17,37%	6,00	0,40	11,92%			
	MGT	**7.877,00**	**3.076,27**	**39,05%**	**1,00**	**0,20**	**20,00%**	**8.000,00**	**1.575,00**	**19,69%**
	WP7	7.877,00	3.076,27	39,05%	1,00	0,20	20,00%			
	Total	***301.334,00***	***56.219,84***	***18,66%***	***55,00***	***5,30***	***9,64%***	***47.000,00***	***1.575,00***	***3,35%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
UL	**RTD**	**200.571,00**	**23.447,47**	**11,69%**	**47,00**	**12,16**	**25,87%**	**5.000,00**	**0,00**	**0,00%**
	WP1	51.210,00	20.014,70	39,08%	12,00	10,16	84,67%			
	WP2	21.337,00	3.432,77	16,09%	5,00	2,00	40,00%			
	WP3	38.407,00	0,00	0,00%	9,00	0,00	0,00%			
	WP5	89.617,00	0,00	0,00%	21,00	0,00	0,00%			
	DEMO	**24.255,00**	**0,00**	**0,00%**	**5,00**	**0,00**	**0,00%**	**2.000,00**	**0,00**	**0,00%**
	WP4	24.255,00	0,00	0,00%	5,00	0,00	0,00%			
	OTH	**19.026,00**	**0,00**	**0,00%**	**6,00**	**0,00**	**0,00%**	**25.500,00**	**836,37**	**3,28%**
	WP6	19.026,00	0,00	0,00%	6,00	0,00	0,00%			
	MGT	**5.313,00**	**0,00**	**8,40%**	**1,00**	**0,00**	**0,00%**	**6.000,00**	**1.932,05**	**32,20%**
	WP7	5.313,00	0,00	8,40%	1,00	0,00	0,00%			
	Total	***249.165,00***	***23.447,47***	***9,41%***	***59,00***	***12,16***	***20,61%***	***38.500,00***	***2.768,42***	***7,19%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
Alenco	**RTD**	**16.000,00**	**1.439,20**	**9,00%**	**2,00**	**0,42**	**21,00%**	**8.000,00**		**0,00%**
	WP1	8.000,00	1.028,00	12,85%	1,00	0,30	30,00%			
	WP2	8.000,00	411,20	5,14%	1,00	0,12	12,00%			
	DEMO	**165.000,00**	**3.726,92**	**2,26%**	**24,00**	**0,96**	**4,00%**	**66.000,00**		**0,00%**
	WP4	165.000,00	3.726,92	2,26%	24,00	0,96	4,00%			

	OTH	**0,00**			**0,00**			**4.000,00**		**0,00%**
	WP6	0,00			0,00					
	MGT	**8.000,00**	**1.310,70**	**16,38%**	**1,00**	**0,38**	**38,00%**	**6.000,00**	**340,63**	**5,68%**
	WP7	8.000,00	1.310,70	16,38%	1,00	0,38	38,00%			
	Total	***189.000,00***	***6.476,85***	***3,43%***	***27,00***	***1,76***	***6,52%***	***84.000,00***	***340,63***	***0,41%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
Korona	**RTD**	**130.500,00**	**26.514,41**	**20,32%**	**29,00**	**8,10**	**27,93%**	**5.000,00**	**0,00**	**0,00%**
	WP1	9.000,00	5.683,35	63,15%	2,00	2,00	100,00%			
	WP2	108.000,00	20.831,06	19,29%	24,00	6,10	25,42%			
	WP3	13.500,00	0,00	0,00%	3,00	0,00	0,00%			
	DEMO	**54.000,00**	**0,00**	**0,00%**	**12,00**	**0,00**	**0,00%**	**40.000,00**	**0,00**	**0,00%**
	WP4	54.000,00	0,00	0,00%	12,00	0,00	0,00%			
	OTH	**24.750,00**	**4.337,72**	**17,53%**	**5,50**	**0,80**	**14,55%**	**6.250,00**	**0,00**	**0,00%**
	WP6	24.750,00	4.337,72	17,53%	5,50	0,80	14,55%			
	MGT	**9.000,00**	**1.318,52**	**14,65%**	**2,00**	**0,30**	**15,00%**	**6.000,00**	**1.108,05**	**18,47%**
	WP7	9.000,00	1.318,52	14,65%	2,00	0,30	15,00%			
	Total	***218.250,00***	***32.170,65***	***14,74%***	***48,50***	***9,20***	***18,97%***	***57.250,00***	***1.108,05***	***1,94%***

Partner	*Activity type*	*Planned PC*	*Spent PC*		*Planned PM*	*Spent PM*		*Planned other costs*	*Spent other costs*	
MaVo	**RTD**	**3.220,00**	**1.595,00**	**49,53%**	**2,00**	**1,00**	**50,00%**	**8.000,00**	**0,00**	**0,00%**
	WP1	1.610,00	1.595,00	99,07%	1,00	1,00	100,00%			
	WP3	1.610,00	0,00	0,00%	1,00	0,00	0,00%			
	DEMO	**28.980,00**	**0,00**	**0,00%**	**9,00**	**0,00**	**0,00%**	**66.000,00**	**0,00**	**0,00%**
	WP4	28.980,00	0,00	0,00%	9,00	0,00	0,00%			
	OTH	**0,00**			**0,00**			**5.000,00**	**0,00**	**0,00%**
	WP6	0,00			0,00					
	MGT	**3.220,00**	**463,00**	**14,38%**	**1,00**	**0,15**	**15,00%**	**6.000,00**	**0,00**	**0,00%**
	WP7	3.220,00	463,00	14,38%	1,00	0,15	15,00%			
	Total	***35.420,00***	***2.058,00***	***5,81%***	***12,00***	***1,15***	***9,58%***	***85.000,00***	***0,00***	***0,00%***

9. Figures

9.1 Dissemination time plan

Meetings	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Management Commitee Meetings	MC1 Kick Off						MC2						MC3						MC4						MC5						MC6				MC7					MC8
Stakeholder Meetings		SM KickOff																																						
Conference Calls			CC①							CC①						CC①						CC①						CC①				CC①				CC①		
Technical Committee Meetings	TC1						TC2						TC3						TC4						TC5						TC6				TC7					TC8
Large Scale Event (Mid Term Conference Meeting)																			MCM																					
Large Scale Event (Final Conference Meeting)																																						FCM		
Conferences organized by one of the INCREASE partners			Still to be determined												Still to be determined										Still to be determined										Still to be determined					
Conferences with INCREASE Input			Still to be determined												Still to be determined										Still to be determined										Still to be determined					
Sommer School Events								SS1*)															SS2*)												SS3*)					
Winter School Events																		WS1*)																					
Dissemination Tools																																								
Brochure/Leaflet			X																																				
Poster			X																																				
Website online		X																																					
Newsletter			X							X							X							X						X							X		
Factsheet			X													X											X													X
Month	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Year	2013	2013	2013	2013	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016

9.2 Website's homepage

10. Annexes

10.1 Annex 1: Agenda Kick-off Meeting

Date + Venue	Time	Subject	Responsible
22-09-2013			
Acces Hotel Oostende, Van Iseghemlaan 21-25, 8400 Oostende	14h-18h	Preparation meeting for WP leaders	Dr. Ir. Bart Meersman (UGENT)
Toi, moi et la mer, Albert I Promenade 68, 8400 Oostende	*19h*	*Diner*	
23-09-2013			
Greenbridge Incubator - Plassendale I, Wetenschapspark 1, 8400 Oostende	9h-9h30	Welcome and introduction Project objectives	Prof. Dr. Ir. Lieven Vandevelde (UGENT)
	9h30-10h30	Administrative rules and regulations FP7 projects	Mrs. Irene Bonvissuto (EC), Mrs. Saskia Vanden Broeck (UGENT)
	10h30-11h	*Coffee break*	
	11h-11h15	Publications in Open Access	Gwen Franck (UGENT)
	11h15-12h30	Partner presentations	All
	12h30-13h45	*Lunch*	
	13h45-15h30	Project implementation and WPs	WPLs
	15h30-16h	*Coffee Break*	
	16h-17h	Detailed time and content plan 1st project year	All
	17h-17h15	Plenary discussion	All
	17h15-17h30	Conclusions 1st day	Dr. Ir. Bart Meersman (UGENT)
	18h-20h	*Guided tour Oostende*	
Hotel Acces	*20h*	*Diner*	

24-09-2013			
Greenbridge Incubator - Plassendale I, Wetenschapspark 1, 8400 Oostende	9h-10h	Discussion/preparation on kick-off event hosted by INCREASE	All
	10h-10h30	Advisory board set-up and dates next meetings	Dr. Ir. Bart Meersman (UGENT)
	10h30-11h	*Coffee break*	
	11h-11h45	Reporting requirements	Dr. Ir. Bart Meersman (UGENT)
	11h45-12h30	Quality assurance process	Dr. Ir. Bart Meersman (UGENT)
	12h30-14h	*Lunch*	
	14h-15h	D7.1 Project Handbook	Dr. Ir. Bart Meersman (UGENT)
	15h-16h	Dissemination: - Choice of logo - Agreements concerning project website - Communication platform: Zephyr	Dr. Reinhard Padinger (JR), Mr. Andreas Tuerk (JR) - Dr. Ir. Bart Meersman (UGENT)
	16h-16h30	Final conclusions kick-off meeting	Dr. Ir. Bart Meersman (UGENT)
	16h30	*End of meeting*	

10.2 Annex 2: Agenda Kick-off Conference

Date + Venue	Time	Subject	Responsible
02-12-2013			
Living Tomorrow, Indringingsweg 1, 1800 Vilvoorde	10.00h-10.15h	Welcome	Joachim De Vos (Living Tomorrow)
	10.15h-11.15h	Smart energy: The cutting edge of breakthrough capitalism	John Elkington (Volans, SustainAbility)
	11.15h-12.15h	Behavior change in demand-side management: From theory to practice A view on tomorrow's energy landscape The impact of smart grids on smart	Ruth Mourik (Dune Works, IEA) André Jurres (NPG Energy) Kris Van Daele

		buildings in 2030	(President Smart Grids Flanders)
	12.30h-13.15h	*Lunch*	
	13.15h-13.45h	WP1: progress, challenges and next steps	Prof. Andrej Gubina (UL)
	13.45h-14.15h	WP2: progress, challenges and next steps	Dr. Ir. Bart Meersman (UGent)
	14.15h-14.45h	WP3: progress, challenges and next steps	Prof. Grigoris Papagiannis (AUTH)
	14.45h-15.15h	WP4: progress, challenges and next steps	Dr. Ir. Bart Meersman (UGent)
	15.15h-15.45h	*Coffee Break*	
	15.45h-16.15h	WP5: progress, challenges and next steps	Prof. Andrej Gubina (UL)
	16.15h-16.45h	WP6: progress, challenges and next steps	Andreas Tuerk (JR)
	16.45h-17.15h	Presentation of 2 cases for kick-off conference 3/12	Dr. Ir. Bart Meersman (UGent)
	17.15h-17.45h	Final conclusions, questions, next steps and meetings	Dr. Ir. Bart Meersman (UGent)
	19.30h	*Diner: De Drie Fonteinen Location: Beneluxlaan 32, 1800 Vilvoorde*	
03-12-2013			
Living Tomorrow, Indringingsweg 1, 1800 Vilvoorde	9.00h-9.10h	Welcome, introduction, tour de table	Prof. Dr. Ir. Lieven Vandevelde (UGent)
	9.10h-10.30h	Project presentation, knowledge exchange, input collection and Q&A session EvolvDSO	Carlos Francisco Costa Rausa (Enel)
	10.30h-11.00h	*Coffee break*	
	11.00h-12.00h	Project presentation, knowledge exchange, input collection and Q&A session DREAM	Raphael Caire (Grenoble INP)
	12.00h-12.30h	Conclusions and discussion	
	12.30h-13.30h	*Lunch*	
	13.30h-15.00h	Project presentation, knowledge exchange, input collection and Q&A	Sami Repo (Tampere University of

		session IDE4L	Technology)
	15.00h-16.30h	Project presentation, knowledge exchange, input collection and Q&A session INCREASE	Dr. Ir. Bart Meersman (UGent)
	16.30h-16.45h	Final conclusions of the day	Dr. Ir. Bart Meersman (UGent)

10.3 Annex 3: Invitation and agenda Advisory Board Meeting

Dear INCREASE Advisory Board Member,

It is with pleasure that I would like to formally invite you to our 1st INCREASE Advisory Board Meeting in Eindhoven, the Netherlands, on March 19th 2014. The Advisory Board is a board of stakeholders analyzing the proposed solution of INCREASE and providing feedback on our ideas and results and recommendations to ensure further success of the project.

As a result of the significant rise of distributed renewable energy sources the secure operation of the electrical grid is no longer guaranteed. The INCREASE project, a collaborative project financed within the EU FP7 program, wants to focus on how to manage renewable energy sources in LV and MV networks, and provide ancillary services towards Distribution System Operators (DSO) and Transmission System Operators (TSO), in particular voltage control (and the provision of reserve). Apart from that the different national grid codes and regulatory frameworks will be investigated and adjustments to facilitate successful provisioning of Ancillary Services will be proposed. The proposed solutions will first be validated in a simulation platform and in a later phase in labs tests and even field trials in Austria, Slovenia and the Netherlands. INCREASE runs 40 months and started in September 2013. Ghent University coordinates this project and can count on 12 other partners, including DSOs, TSOs, research institutes and universities.

By being a member of the INCREASE Advisory Board, you are invited to our Advisory Boards meetings (three meetings in the period 2014-2016) and receive by e-mail updates of the project. The first Advisory Board meeting is scheduled on March 19th in Eindhoven, the Netherlands.

Unfortunately, due to budget constraints, travel costs associated with your participation in the Advisory Board meetings are not covered by the project.

Please contact me or Sophie Gillaerts (CC) if you require more information on the project. Attached you can find a short overview of the project and the 1st INCREASE newsletter.

We would very much appreciate it if you could confirm your participation before February 15th 2014.

Looking forward to hearing from you soon,

Kind regards,

Date + Venue	Time	Subject	Responsible
19-03-2014			
	12.00h-13.00h	*Lunch@TU/e*	
	13.00h-13.15h	Welcome and introduction	Lieven Vandevelde (UGent)
	13.15h-14.15h	Presentation INCREASE Overview WP1: INCREASE's basis	Bart Meersman (UGent) Andrej Gubina (UL)
	14.15h-14.45h	Lab tour	Will Kling (TU/e)
	14.45h-15.15h	*Coffee Break*	
	15.15h-15.45h 15.45h-16.15h 16.15h-16.45h 16.45h-17.15h	WP2: INCREASE's proposed solutions WP3: How and what will we simulate? WP4: How and what will we validate? WP5: What about the market and the grid code?	Respective WP leaders
	17.15h-17.30h	Conclusions and wrap-up	Bart Meersman (UGent)
	19.00h	*Dinner: Restaurant 1910, Eindhoven*	