DESSIN

DEMONSTRATE ECOSYSTEM SERVICES ENABLING INNOVATION IN THE WATER SECTOR

www.dessin-project.eu

MS25 First periodic report

Scientific progress and project management M1 – M18

IWW, September 2015 – revised version October 2015

The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 619039

TITLE OF THE REPORT

MS25 First periodic report
Scientific progress and project management M1 – M18

SUMMARY

DESSIN demonstrates and promotes innovative solutions for water scarcity and water quality / the implementation of the Water Framework directive (WFD) and shows the value of those solutions for the water sector and society by also demonstrating a methodology for the valuation of ecosystem services (ESS) as catalyser for innovation. By this twofold approach, DESSIN will be able to demonstrate how innovative solutions in the water cycle can increase the value of the services provided by freshwater ecosystems, enabling a more informed selection of the most promising solutions in regards to their impact on the water body and their economic implications. Scientists, public and private water management organisations and end-users, technology providers (SMEs), supporting RTD experts and relevant public authorities within DESSIN are collaborating to test, validate and demonstrate innovative solutions at five demo sites across Europe with special focus on urban areas. The solutions include technological, monitoring, modeling and management approaches for a more resource-efficient and competitive water sector in Europe, such as decentralized water treatment units, real time control of large scale systems, sewer mining and storage of freshwater in aquifers, among others. The demo sites Emscher (Germany) and Hoffselva (Norway) contribute to ecosystem services related to water quality/Water Framework Directive and the demo sites Westland (Netherlands), Athens (Greece) and Llobregat (Spain) to water scarcity. During the first 18 months, DESSIN has

- developed the overarching project features such as the ESS evaluation framework (Work Area 1),
- carried out the necessary initial RTD work (Work Area 2) as a precondition for the demonstration case studies
- started with the actual technical demonstration at the case studies (Work Area 3)
- prepare the grounds and tools for proper dissemination, exploitation and market uptake of DESSIN solutions once they are ready and fully demonstrated / validated (Work Area 4).

MILESTONE NUMBER	WORK PACKAGE
MS25	WP51, WP52
LEAD BENEFICIARY	**DELIVERABLE AUTHOR(S)**
IWW	David Schwesig, with contributions by all WA and WP leaders

QUALITY ASSURANCE

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List of Acronyms and Abbreviations

AMI	Advanced Monitoring Infrastructure
ASR	Aquifer Storage and Recovery
ASRO	Aquifer Storage and Recovery – Reverse Osmosis
BOD	Biological Oxygen Demand
CICES	Common International Classification of Ecosystem Services
CSO	Combined Sewer Overflow
DoW	Description of Work, i.e. Annex I to the Grant Agreement (GA)
DPSIR	Drivers, Pressures, State, Impact, Response
Dx.y	Deliverable number y of work package number x (x,y: variables)
EC	European Commission
EEA	European Environment Agency
ESS	Ecosystem Services
GA	Grant Agreement (No 619039 for DESSIN)
HRF	High Rate Filtration
ICT	Information and Communication Technology
MAR	Managed Aquifer Recharge
MBR	Membrane Bioreactor
MSx	Milestone X (X: variable)
Mx	Project Month X (X: variable)
PAC	Project Advisory Committee
PSB	Project Steering Board
RO	Reverse Osmosis
RTC	Real Time Control
RTD	Research and Technical Development
SME	Small and Medium-sized Enterprises
SS	Suspended Solids
Tx.y	Task number y of work package number x (x,y: variables)
US-EPA	United States Environmental Protection Agency
WA	Work Area
WAMT	Work Area Management Team
WFD	Water Framework Directive
WP	Work Package
WWTP	Waste Water Treatment Plant

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Executive summary

Project context and main objectives

What is the context and background of DESSIN?

Water scarcity and water quality are important issues in urban areas across Europe and beyond. New technology or management approaches to tackle these issues are needed. Those approaches are more likely to turn into real innovations that are actually implemented and taken up by the market if there is evidence of their benefits or added value in economic, environmental and societal terms. Therefore, a method to prove the value of new solutions is needed in addition to new technology and management approaches.

What are the main objectives of DESSIN?

DESSIN aims to demonstrate and promote innovative solutions for water scarcity and water quality / the implementation of the Water Framework directive (WFD), and to show the value of those solutions for the water sector and society by also developing and demonstrating a methodology for the valuation of ecosystem services (ESS) as catalyser for innovation. By this twofold approach, DESSIN will be able to demonstrate how innovative solutions in the water cycle can increase the value of the services provided by freshwater ecosystems, enabling a more informed selection of the most promising solutions in regards to their impact on the water body and their economic implications.

How do we do it?

Scientists, public and private water management organisations and end-users, technology providers (SMEs), supporting RTD experts and relevant public authorities within DESSIN will test, validate and demonstrate innovative solutions at five demo sites across Europe with special focus on urban areas. The solutions include technological, monitoring, modeling and management approaches for a more resource-efficient and competitive water sector in Europe, such as decentralized water treatment units, real time control of large scale systems, sewer mining and storage of freshwater in aquifers, among others. The demo sites Emscher (Germany) and Hoffselva (Norway) contribute to ecosystem services related to water quality/Water Framework Directive and the demo sites Westland (Netherlands), Athens (Greece) and Llobregat (Spain) to water scarcity.

Additionally, DESSIN develops and applies an Evaluation Framework to assess the sustainability aspects of the mentioned solutions and to valuate changes in ecosystem services (ESS) of water bodies that result from the implementation of these solutions. The ecosystem services approach is a method that enables a standardised evaluation of impacts and benefits from technology and governance innovations in multiple sectors. One of its main advantages lies in its capacity to integrate the economic, environmental and societal dimensions. That means, the ESS methodology enables a monetary valuation of the impact of water management measures based on the new solutions, which makes a direct comparison of measures possible and generates arguments for market uptake and practical implementation.

Work performed and main results achieved so far

DESSIN has made its first achievements towards the development of the DESSIN Ecosystem Services Evaluation Framework. It has gathered the necessary overview on the state of the art in the assessment and economic valuation of ESS; selected a common classification of ESS as a consistent basis for the framework; agreed on a conceptual approach upon which to build the DESSIN framework; consolidated a common terminology (DESSIN Glossary), and produced a progress report outlining all the components of the first version of the evaluation framework. Finally, the first tests of the draft concepts have been conducted at three 'mature sites' in order to have a validation and refinement of the approach at an early stage. DESSIN has also developed a governance assesment tool for analysing the performance of urban water governance and its capacity to promote innovation uptake; it has tested this tool in three case studies and highlighted enabling and hindering governance factors; It has analysed financing models and funding mechanisms for innovation uptake and also the role of specific policy instruments. It has linked best practice and constraints in governance and financing regimes with ESS valuation and innovation uptake and developed a manual for practitioners and policy makers. This will further feed into the work of the actual demonstration work in the DESSIN case studies, and also support the DESSIN SMEs and their "route to market".

Technical solutions to tackle water quality and water scarcity have been developed, in particular a new system with modular cross-flow lamella settling units for application in Combined Sewer Overflow (CSO) holding tanks; a high rate filtration (HRF) system for implementation on the overflow pipe from a CSO, and a Real Time Control (RTC) system for reducing CSO overflow volumes. Significant results achieved are 1) the use of model test results, compiled as settling efficiency versus surficial loading, for dimensioning cross-flow lamella settlers; 2) promising test results for the removal efficiency in biological oxygen demand (BOD) (50 – 80 %) and suspended solids (SS) (60 – 80%) of the HRF. Furthermore, an online monitoring system for the demonstration plants enabling remote control has been designed. Solutions for water scarcity challenges include distributed reuse technologies (both modular and mobile) with focus on sewer mining technologies and Aquifer Storage and Recovery (ASR) systems to be demonstrated as potential sources for drinking water, agricultural or industrial water. With regards to the distributed reuse technologies, the significant results achieved are 1) the set up of guidelines for the selection and optimisation of new membrane solutions and technologies as modular packaged treatment solutions; 2) the design of the hardware and software of the ICT monitoring platform. Within the proposed ASR solution for agricultural or industrial use, the reverse osmosis is integrated in the ASR pilot. Finally, in the study related to the ASR solutions for drinking water use, the evaluation of historical data of water quality allowed the selection of the sand filtered water as the most suitable input water for being injected in the demonstration phase. At all five DESSIN sites, the solutions to be demonstrated have been assembled and installed, and the actual demonstration has started.

The DESSIN dissemination tools, strategies and materials have been developed and produced (logos, templates, newsletter, website, project leaflet, annual magazine). To support the DESSIN SMEs on their route to market, DESSIN has developed e.g. a market analysis, two business environment reports, and a cooperation document for route to market support established with the individual SMEs. Furthermore, working relations with the DESSIN SMEs have been established and a series of events been carried out such as individual workshops with the SMEs to further detail the commercialization of the DESSIN products.

Expected final results and their potential impact and use

The main final results of DESSIN will be:

1. An analytical framework to evaluate and account impacts from changes in ESS suitable to the water sector, finally resulting in an evaluation framework for development of an ESS module. This will be: (i) tested, validated and refined at three sites across Europe; (ii) transformed into a software framework and module for ESS valuation

2. Concrete guidance for practitioners and policy makers linking good practice and lessons-learned for innovation-friendly governance regimes and financing options, within an ESS framework.

3. Innovative solutions for Water Quality / WFD implementation, implemented in two areas in Europe and evaluated by use of the ESS approach: (i) enhanced efficiency of decentralised treatment of combined sewer overflow by a new cross-flow lamella settlers and innovative high-rate filters, demonstrated in Germany and Norway; (ii) a fully automated real-time control system to minimize combined sewer overflow.

4. Three innovative solutions for Water Scarcity, each implemented in a European area and evaluated by use of the ESS approach: (i) a new combination of sewer mining technology with distributed ICT intelligence to enable decentralised sewer treatment for irrigation e.g. of urban green; (ii) an innovative solution for sustainable freshwater supply from brackish/saline aquifers by combining Aquifer Storage and Recovery (ASR) and desalination with an innovative well design; (iii) a flexible ASR system to increase freshwater availability in the Mediterranean coastal region by deep injection systems able to deal with variable water qualities.

5. A maximised market reach and impact of the solutions developed within DESSIN by (i) Market analyses for groups of technologies developed within DESSIN; (ii) a sample commercialisation process for involved SMEs; (iii) business environment reports for technologies to tackle water quality and water scarcity, (iv) a monitoring & evaluation system for innovation and continuous monitoring of framework conditions and outcomes.

We expect that DESSIN solutions for Water Quality Challenges / WFD implementation will have the following impact:

- Reduced pollutant load and volume from CSO overflows
- Improved water quality in water bodies receiving CSO overflows, some classified as heavily modified that require measures to improve the ecological and chemical status.
- Facilitate increased implementation of mitigation measures by incremental implementation of local treatment and upgrading the efficiency of existing infrastructures with RTC, in comparison to large scale expansion of sewer systems.
- Improved aesthetic value of urban water bodies enabling improved recreational services and functions as environmental elements in urbanized areas.
- Safeguard of a habitats and protection of aquatic species.

We expect that DESSIN solutions to tackle Water Scarcity Challenges will have the following impacts:

- Enhancement of groundwater resources in quality and quantity, contribution to the good ecological, chemical and quantitative status groundwater bodies
- Safeguarding water supply to areas with intermittent availability and peak demands.
- Reducing ecological and chemical pressures caused by high abstraction.
- Increase operators' competitiveness in the drinking water treatment process, with a substantial reduction of the cost and environmental impact of injected water.
- Provision of irrigated urban green spaces in arid/semi-arid regions.
- Increased resilience of water supply systems under extreme conditions (scarcity and drought periods, periods of imbalances between demand and available resources)
- Service sectors such as tourism, trade or leisure will break water availability constraints.
- Increase reliable fresh water resources of high quality for a sustainable urban, agricultural and industrial development.
- Enhanced potential to supply fresh water from brackish (coastal) areas to decrease the negative effects on surrounding freshwater ecosystems.

1 Project objectives for the period

The main objectives of DESSIN are

- to demonstrate and promote innovative solutions to water-related challenges with a focus on: (i) water quality issues related to the implementation of the Water Framework Directive (WFD) and (ii) water scarcity;
- to develop and demonstrate a methodology for the valuation of ecosystem services (ESS) as catalyser for innovation in water management;

To this purpose, DESSIN will launch demonstration projects of innovative solutions to challenges related to (i) the effective implementation of the Water Framework Directive (WFD) and (ii) water scarcity with a special focus on urban areas. The solutions will integrate technological, monitoring, modeling and management approaches for a more resource-efficient and competitive water sector in Europe.

As a second key feature, an Evaluation Framework to assess the sustainability aspects of the mentioned solutions and to valuate changes in ecosystem services (ESS) of water bodies that result from the implementation of these solutions will be developed and applied.

By adopting this twofold approach, we will be able to demonstrate how innovative solutions integrated in the water cycle can increase the value of the services provided by freshwater ecosystems while assuring sustainability, thus generating additional incentives and arguments for their market uptake and practical implementation. This will support innovation and competitiveness in water management by enabling a more informed selection of the most promising solutions, as regards their impact on the water body and their economic implications.

The whole project is centered around a suite of carefully selected sites across Europe, (Emscher - Germany, Hoffselva – Norway, Westland – Netherlands, Athens – Greece, Llobratag – Spain), representative of global major water challenges, where we bring together public and private water management organisations and end-users, technology providers (SMEs), supporting RTD experts and relevant public authorities to demonstrate this approach.

Main objectives for the first reporting period were to get the project started and

- to develop the overarching project features such as the ESS evaluation framework (Work Area 1),
- to carry out the necessary initial RTD work (Work Area 2) as a precondition for
- getting started with the actual technical demonstration at the case studies (Work Area 3)
- to prepare the grounds and tools for proper dissemination, exploitation and market uptake of DESSIN solutions once they are ready and fully demonstrated / validated (Work Area 4).

1.1 Objectives of Work Area 1 (WP 11-13)

WA1 is a crucial component of DESSIN in that its ultimate goal is to produce a key input for all other Work Areas: a tested and validated framework for the evaluation of changes in ESS. For this reason, the first 24 months of the DESSIN project represent the period of highest activity within WA1.

Until the end of month 18, the general objectives leading to the achievement of the ultimate goal described above were three. The first one entailed the preparation and development of a "new decision making framework" which has the ESS concept at the forefront and which builds upon the most recent developments on ESS assessment and valuation. The second aim during this period was to elaborate concrete guidelines for businesses, practitioners and policy makers in enabling change to happen: linking good practice and lessons-learnt for innovation-friendly governance regimes and financing options. And finally, the third objective was to initiate the testing and validation of the "new framework" through its practical application in three mature sites: Aarhus (DK), Emscher (DE) and Ebro (ES).

1.2 Objectives of Work Area 2 (WP 21-23)

Work Area 2 aims at developing and enabling innovative solutions to improve water quality in receiving waters and to handle water scarcity across the demonstration sites in DESSIN.

The Work Area 2 is structured based on the challenges addressed, innovation (1) for water quality / WFD implementation and (2) for water scarcity tackling plus a work package devoted to the development of a standard ESS module for DSS, not yet started:

Work Package 21 Innovations for Water Quality / WFD implementation

Work Package 22 Innovations to tackle water scarcity

Work Package 23 Software framework for ESS valuation

1.3 Objectives of Work Area 3 (WP31-35)

The objective of Work Area 3 is to demonstrate at five representative sites across Europe the potential of a range of innovative solutions

- to tackle two major water challenges (water quality and water scarcity)
- to increase the value of ecosystem services of the water bodies

Work Area 3 integrates the technology solutions developed in Work Area 2 as well as the Ecosystem valuation approach from Work Area 1.The five full scale demonstrations including their main objectives are listed in the table below.

Table 1: DESSIN demonstration sites and work packages and their specific objectives

Demonstration	Objective
WP31 Emscher (DE)	Improved water quality in strongly urbanised areas by implementing novel and cost efficient treatment and regulation solutions for existing CSO facilities that increase value of the ESS and serve as example in the reconversion process of the whole Emscher system.
WP32 Hoffselva (NO)	Improved water quality in peri-urban areas using innovative decentralised CSO treatment solutions that enable cost efficient, sustainable mitigation of an overloaded sewer system and increased value of the ESS.
WP33 Westland (NL)	Enhanced fresh water availability in brackish coastal zone through novel ASR systems.
WP34 Athens (GR)	Enhanced urban water availability through decentralised sewer mining solutions
WP35 Llobregat (ES)	Increased fresh water availability in Mediterranean coastal region using flexible ASR systems.

1.4 Objectives of Work Area 4 (WP41-42)

WA4 main objectives since day one have been to do public correspondence and dissemination materials to reach the different target audiences. The preparation of dissemination materials has been coordinated on the basis of a concise communication strategy for DESSIN outcomes, consisting of a thorough target audience analysis and an exploitation strategy. This consisted of editorial and publishing activities such as the release of an annual DESSIN Magazine, DESSIN newsletters, articles, general and specialized press releases, a suite of promotional material (leaflet, posters…), etc.

Another main point of the WP41 objectives has been the transformation of the demo-sites into showcases. This will help to establish DESSIN demo-sites as reference sites for lighthouse-solutions that can be presented to various audiences such as interested water managers from other regions with similar challenges.

As per WP42, the overall objective of this WP is to maximize the market reach and impact of the water technologies, methodologies and innovative solutions developed in WA1 and WA2 and demonstrated in WA3. WP42 will work in order to achieve market readiness of products/services developed with regard to water quality (WFD), water scarcity and ESS assessment.

1.5 Objectives of Work Area 5 (WP51-52)

The objective of this Work Area is to co-ordinate and to manage the progress of the project, in order to ensure that the objectives will be met. This includes the coordination of activities among the Work Areas and Work Packages, facilitation of the internal communication, organization of meetings, guidance of the decision-making processes, reporting to the European Commission, monitoring of progress, quality control of the project deliverables, and re-adjustment of the work if necessary.

2 Work progress and achievements during this period

2.1 Work progress and achievements, general picture

2.1.1 Work Area 1 (WP 11-13) – Evaluation Framework

The ambitious objectives set for WA1 and the great efforts of the partners involved have already yielded significant progress and a series of achievements within the first reporting period. Some of these first achievements have served to set the groundwork for the development of the DESSIN ESS Evaluation Framework. For instance, gathering the necessary overview on the state of the art in the assessment and economic valuation of ESS (Deliverable 11.1); selecting a common classification of ESS to be used as a practical and consistent basis for the framework (the CICES Typology); agreeing on a sound conceptual approach upon which to build the DESSIN framework (customised DPSIR scheme); consolidating a common terminology as a means of setting provisions to ensure effective communication within the project and facilitate the exchange of ideas across disciplines (DESSIN Glossary); and finally producing a progress report outlining all the components of the first version of the evaluation framework (Milestone 12). Regarding the analysis of governance regimes and financing options, a framework has been produced (Milestone 3) and applied in the three mature case studies (Deliverable 12.1), while financing options conducive to innovation have been explored (Deliverable 12.2). The results of these exercises have been used to elaborate two short documents (Deliverable 12.3) giving concrete and distinct guidance to businesses and water innovators on one hand, and to practitioners and policy makers on the other. Furthermore, the first version of the ESS evaluation framework including many of its elements is currently being explored in the mature sites. The exercise includes the quantification of biophysical indicators. In parallel, a database of economic valuation studies is being developed (currently holding over 140 entries). The information gathered in this database will allow establishing links between the biophysical indicators being quantified in the mature sites and economic values related to changes in human wellbeing.

All the information produced so far is being condensed into a guidance document colloquially called the DESSIN “cookbook”. This is the precursor to Deliverable 11.2, which is the final version of the DESSIN ESS Evaluation Framework.

2.1.2 Work Area 2 (WP21-23) – Development and Enabling of Innovative Solutions

In Work Area 2 all tasks are progressing according to plan.

In Work Package 21 the focus is on solving research needs of solutions for local treatment and regulation of Combined Sewer Overflow (CSO) overflows to be demonstrated in Work Area 3: a new system with modular cross-flow lamella settling units for application in CSO holding tanks, a high rate filtration (HRF) system for implementation on the overflow pipe from a CSO, and a Real Time Controln (RTC) system for reducing CSO overflow volumes. The development work for the technologies has been completed and the relevant milestones achieved. Significant results achieved

are 1) the use of model test results, compiled as settling efficiency versus dimensionless surficial loading, for dimensioning cross-flow lamella settlers; 2) promising test results for the removal efficiency in biological oxygen demand (BOD) (50 – 80 %) and suspended solids (SS) (60 – 80%) of the HRF. Furthermore, an online monitoring system for the demonstration plants enabling remote control has been designed.

Work Package 22 tackles the water scarcity challenge with innovative solutions both on the clean water and waste water side of the water cycle. The solutions proposed include distributed reuse technologies (both modular and mobile) with focus on sewer mining technologies and Aquifer Storage and Recovery (ASR) systems to be demonstrated as potential sources for drinking water, agricultural or industrial water. The activities started as planned and the progress is according to plan. No deviations or reasons for corrective actions are envisaged. Deliverables are on schedule and the milestones achieved. With regards to the distributed reuse technologies, the significant results achieved are 1) the set up of guidelines for the selection and optimisation of new membrane solutions and technologies as modular packaged treatment solutions; 2) the design of the hardware and software of the ICT monitoring platform. Within the proposed ASR solution for agricultural or industrial use, the reverse osmosis is integrated in the ASR pilot. Finally, in the study related to the ASR solutions for drinking water use, the evaluation of historical data of water quality allowed the selection of the sand filtered water as the most suitable input water for being injected in the demonstration phase. This output has been a key factor as starting point for equipment implementation and the experiments to test potential disinfection methods.

Work Package 23 aiming at making the ESS methodology developed in Work Area 1 available in a software system, has just started during the final month of the reporting period.

2.1.3 Work Area 3 (WP31-35) - Demonstration

In Work Area 3 activities are progressing according to plan, with only minor delays which are not critical for other project activities.

Work Package 31 demonstrates the feasibility and effect on ESS of different innovative solutions (Local treatment of CSO overflows to reduce the impact on recipient water quality, RTC of holding volumes in the sewer system to reduce overflow volumes from CSOs) developed to mitigate the negative effects on the water quality in the Emscher river system caused by CSOs. During this reporting period a pilot container with a cross-current lamella settler was designed, assembled and installed at the pilot location. In addition, for 5 CSO facilities in the Emscher sub-catchment an implementation plan for the ADESBA RTC has been completed.

Work Package 32 demonstrates the feasibility and effect on the ecosystem services of different innovative local solutions for CSOs (cross-flow lamella settlers, high rate filter, data communication) developed to improve water quality in Hoffselva. During this reporting period the high rate filter system is installed at the Hoffselva demo site, and flow and turbidity have been monitored at the VAV measurement station.

Work Package 33 demonstrates freshwater supply from brackish aquifers with a combined ASR/RO system. During this reporting period different ASR cycles are carried out and samples are taken from the infiltration water and recovery water and the water quality has been determined. Monitoring results are evaluated with a calibrated groundwater transport model. At the Westland demo site, the high-end ASR (including Freshkeeper) and RO technologies have been integrated for the first time in order to obtain an optimal, robust, and sustainable ecosystem service.

Work Package 34 integrates and validates two promising new technologies: minimal footprint packaged treatment plants and advanced monitoring infrastructure as a new solution to distributed reuse within the city. During this reporting period an optimal configuration small packaged plant for urban sewer mining has been delivered. The MBR and RO units have been constructed as individual containers (modular) that are joined together in one containerised compact system offering ease of transportation. Completed installation of AMI-SM technologies (MS24) is expected to be postponed until M20 due to delay in purchasing part of the equipment.

Work Package 35 demonstrates the potential increase of fresh water availability in the Mediterranean coastal region by deep injection systems (ASR) with variable water qualities. During this reporting period a new geological profile of the Llobregat site has been provided, the injection system has been completed, and a monitoring plan has been defined.

2.1.4 Work Area 4 (WP41-42) – Bringing Innovation to Society and Market

All the dissemination materials planned for the period from month 1 to 18 have been produced according to Annex I (logos, templates, newsletter, news and publications). Furthermore, DESSIN has produced extra materials such as an Annual Magazine and a general project leaflet, both useful to export the knowledge of the DESSIN works.

The DESSIN website (Task 41.2) (www.dessin-project.eu) has been set up and serves as an information source for the DESSIN project and as a principal outlet of informational products about or coming from DESSIN, such as deliverables or the DESSIN newsletter and magazine. The website has a news section in blog format, which is frequently updated (at least once a month, but usually at a much higher frequency) with news items about activities and achievements of DESSIN.

At the website, also an internal area has been set up for the DESSIN members to share information about work in progress, and to provide project partners with internal documents, minutes, presentations, project templates, internal documents etc. Access to this internal area can be given to EC officials or EC reviewers upon request.

The Westland demonstration side has successfully been developed into a full scale showcase, including a guided tour along the different objects of the facilities at the pilot site, a mobile banner exposition describing the different technologies applied at the site. A group of 130 visitors of the 36th world conference of the International Association for Hydro-Environmental Engineering and Research already visited the showcase, as part of a tour along water innovations in the

Netherlands. The showcase is set up so an extension with additional components (e.g. scale model) is possible. This showcase will serve as an example for the showcases to be developed at the other four DESSIN case sites.

Work package 42 (Route to Market) has delivered a couple of key documents instrumental for work in the project, such as

- a Market analysis (inside-out) as toolbox character and being tested with the SMEs
- two business environment (outside-in) reports
- the concept for a monitoring & evaluation system for innovation, indicator shortlist developed
- Cooperation document for route to market support established with the individual SMEs

Furthermore, working relations with the DESSIN SMEs have been established and a series of events been carried out:

- Networking (Business-to-Business B2B) among the SMEs achieved, initial potential partnerships identified
- Individual workshops with the SMEs in the respective countries to further detail the commercialization of the DESSIN products.

2.1.5 Work Area 5(WP51-52) – Project Management

Activities and progress of Work Area 5 are described in chapter 3 of this report (Project Management during the period).

2.2 Work progress and achievements per Work Package in detail

2.2.1 Work Package 11 – Development of an Evaluation Framework to account for impacts of changes on ecosystem services

Objectives

- Identification of current state evaluation methodologies on ecosystem services (ESS);
- Development of an analytical framework to evaluate and account impacts from changes in ESS suitable to the water sector;
- Integrating water related specific attributes into the evaluation framework.

Progress

The state of the art report on ecosystem service evaluation (D11.1) was finished during the first months of the project. The report provides a state-of-the-art review to support the conceptual and practical development of the DESSIN ESS Evaluation Framework. It briefly presents the state of affairs regarding the measurement of changes in ESS, including description of existing classification systems, analytical frameworks and economic valuation methodologies. The challenges associated with spatial and temporal variations of ESS are considered and an approach to define and measure sustainability is presented. Finally, the next steps in the work plan of Work Area 1 are outlined, which are being undertaken during the second year of the project.

The D11.1 report was followed by extensive discussions via telecommunication and at the WA1 coordination meeting in Barcelona in 2015. Topics were centered on how to shape the DESSIN ESS Evaluation Framework, including latest knowledge gained from literature and other projects. Those discussions, their results and the decisions made were condensed to form a progress report that provided a first outline of the main elements making up the evaluation methodology to be tested in the mature sites (MS 12).

Table 2: Work Package 11 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status
D11.1	State of the art report on ecosystem service evaluation	M9→M12	Submitted
MS12	First version of evaluation methodology available for testing at mature sites	M12→M16	Achieved

Significant Results

- Outlining the state of the art on the assessment and economic valuation of ecosystem services
- Elaborating the DESSIN Glossary to ensure common understanding of terminology and to facilitate the communication of ESS-related concepts throughout the project
- Developing a preliminary version of the DESSIN ESS Evaluation Framework;
    - building upon the Drivers-Pressures-State-Impact-Responses framework of the European Environment Agency (EEA) and integrating the Common International Classification of Ecosystem Services (CICES) developed by the European Union with elements of the Final Ecosystem Goods and Services-Classification System (FEGS-CS) of the US Environmental Protection Agency (USEPA),
    - facilitating a stepwise response evaluation process (evaluation of DESSIN solutions),
    - providing a scheme to differentiate between Impact I (effects on ESS) and Impact II (effects on human wellbeing),
    - providing initial guidelines for the uptake and implementation of the framework and testing them with demo site owners (WA3);
- Running first tests and exploration on the mature sites;
    - assessments focusing on the differences in the situation before and after implementation of mature site solutions, including the state of the ecosystem, the changes in ESS (Impact I) and elucidating the first links to the changes in human wellbeing (Impact II)
- Defining the requirements to integrate a sustainability assessment of DESSIN solutions.

Reasons for deviations from Annex I and impacts on resources and planning

Due to complex coordination work and intense transdisciplinary discussions on the concepts making up the DESSIN ESS Evaluation Framework, D11.1 and MS 12 were submitted / achieved with delays. However, these deviations have been overcome and no effect on subsequent tasks is expected.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

Task 11.1 Information gathering of current state and adaptations of existing ESS evaluation approaches (M1-M9)

The work covered literature research on various topics. To name a few:

- Existing frameworks for the assessment of ESS
- Application and adaptation of the DPSIR adaptive management framework;
- Methodologies and indicators for the analysis of ecosystems, their functions and their processes from the perspective of the natural sciences;
- Methodologies and indicators for the economic valuation of ecosystems and the services they provide;
- Existing frameworks for the assessment of sustainability issues.

The task benefited significantly from the close collaboration between different WP partners, contributing from different fields of science. Provisions were taken to develop a common terminology for the project (joint development of a DESSIN Glossary), allowing partners to overcome the barriers created by the multidisciplinary character of the concepts surrounding the ecosystem services approach. This provided a solid basis on which to build upon. This basis will lead to the final version of the DESSIN ESS Evaluation Framework, which will be transferred into a decision support system within WP23 and finally applied in all DESSIN demo-sites.

Task 11.2 – Development of the framework for evaluating changes in ecosystem services at the mature sites (M7-M18).

The challenge of the first 18 months was to draft a theoretically based and sound evaluation framework, incorporating different established concepts, evaluation criteria and indicators, and integrating them with new or adapted ones. Aligned with the notion of the ecosystem services approach, the idea was to develop an integrated methodology that considers social, economic and natural science aspects, and taking that beyond by acknowledging the practical needs of businesses in the water sector. This ensures the soundness of the evaluation framework while supporting the route to market of new solutions as an outcome of DESSIN. The preliminary version of the framework is currently in the testing phase (integration with the subsequent task).

Task 11.3 – Reflecting after testing – possible improvements and further research (M12-M24)

The testing and improvement of the ESS evaluation framework has started. The mature case representatives have discussed the concept and received excel-based work-forms. Additionally, some elements of the framework have been tested by the demo site owners of WA3, opening a new feedback loop. Furthermore, exchange has been established with WA3 and WA4 to define the capabilities of the DESSIN technologies in the context of ESS and to outline potential end-users in the demo sites. First results of the testing were presented at the PSB meeting in Holzwickede and

further elaborated within discussions for interdependent WPs in WA1. One discussion point open to date is to decide on the conceptual integration of the sustainability assessment. An intensive discussion on links and boundaries between the evaluation of changes in ESS achievable with DESSIN solutions and the sustainability assessment of those solutions has been held at the PSB meeting. The challenge of the next project months is to keep the sustainability assessment frame practical, covering most relevant characteristics of DESSIN solutions. This is due to the aim of D 12.2 to enable the demo sites to evaluate the effect on ESS and the sustainability of their solutions. The work to develop an "ESS module" for the overall decision support system to be drafted in WP23, also including a part for the sustainability assessment, will start in the next 18-month period.

2.2.2 Work Package 12 – Innovative and innovation-friendly modes of governance, financing and payment

Objectives

- Development of an analytical framework for the assessment of governance regimes, with particular focus on favourableness to innovation.
- Identification of good practice aspects/hindering factors for uptake of innovative measures/technologies.
- Analysis of financial models/funding mechanisms encouraging uptake of innovative and sustainable measures, with consideration of ESS valuation uptake.
- Provide concrete guidance for practitioners, linking good practice and lessons-learned in governance regimes and financing options with the ESS framework.

Progress

Work Package 12 has achieved all planned milestones and submitted all planned deliverables. A delay for submitting D12.1 occurred due to delays in obtaining meetings and interviews with stakeholders during data collection. This delay impacted the work of the lead partner on D12.2 who also contributed to D12.1 through a case-study. As a result, D12.2 was submitted in M19 (instead of M14). D12.3 relied on data from D12.2, which meant that submission of D12.3 was also delayed (M20 instead of M18). However, all deliverables have now been submitted. The remaining work on WP12 will mainly entail providing input to the development of the DESSIN ESS Evaluation Framework. Specifically, this will mean supporting the integration of particular WP12 results into the "cookbook" being developed in WP11-WP13.

Table 3: Work Package 12 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status
MS3	Analytical framework for governance regime assessments	M4	Achieved
D12.1	Report on governance regime factors conducive to innovation uptake	M14 -> M16 (April 2015)	Submitted
D12.2	Report on financing approaches conducive to water sector innovation	M14 -> M19 (July 2015)	Submitted
D12.3	Manual for practitioners and policy makers	M18 -> M20 (Aug 2015)	Submitted

Significant Results

- Development of a governance assessment tool for analyzing the performance of urban water governance and its capacity to promote innovation uptake. This is in contrast with previous theoretical frameworks which either did not focus on urban water governance or, when they do, aim to contribute to governance theory rather than supporting policy and decision-making.
- Testing of the governance assessment tool in three case-studies, and collection of empirical observation on governance factors leading to innovation uptake in urban water management. The research provides historical storylines presenting innovation uptake in the three case-studies and highlighting enabling and hindering governance factors, such as: stakeholder commitment to compromise, building political support, the role of "policy entrepreneurs" and actor coalitions, the role of discursive strategies and partnership design, and the impact of regulative, economic and communicative instruments.
- Assessment of the role of economic instruments in promoting innovation uptake in the water sector, including presenting the role of specific policy instruments such as public procurements, pricing policies and financing frameworks. The potential role of Payments for Ecosystem Services for innovation uptake in urban water management is explored. A list of financing and payment mechanisms is provided as well as templates for different policy instruments, presenting their objectives, structure, and existing examples of their application worldwide.
- Two briefs targeted to 1) innovators and businesses and 2) water managers and policy-makers synthesising the results above and examples of how to use or promote governance for pushing the uptake of technological innovations in urban water management.

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives and deliverable submission for this reporting period were met. Minor delays in finalization of deliverables don't have an impact on schedule or objectives of other Work Packages.

Corrective actions needed

No corrective actions needed.

Task 12.1 Development of an analytical framework for governance regime assessment (M1 – M4)

The task stated in M1 and was finalised in M4 as planned. The task was first focused on reviewing the literature on transformation and change in urban water management, including a focus on innovation studies. The work then focused on developing a governance assessment tool using the Interreg DROP assessment framework developed for examining drought governance. The results of the task are presented in DS3 "analytical framework for governance regime assessments". It includes the literature review, the presentation of the main dimensions of the governance

assessment tool, and how to measure them. A methodological guide was also included for application in Task 12.2. The guide consisted in a series of questions which case-study leaders in mature sites had to examine in Task 12.2.

Task 12.2 Case-Study analysis of governance regime factors conducive to innovation uptake (M6 – M14)

Task 12.2 was a truly collaborative task in which the assessment framework and guide was applied in the three mature sites of DESSIN (Aarhus, Emscher, Ebro). Because the focus of analysis was urban water management, the city of Zaragoza was chosen in the Ebro river basin. The three sites had experienced significant transformations in their urban water management systems, and thus provided excellent terrains to collect evidence on influencing governance factors. They also offered a diversity of cultural and social background as well as water management issues (quality, scarcity, morphology) and innovations (retention basin and real time monitoring, storm retention basin and separate stormwater and sewage networks, water efficient devices, district metered areas and active leakage control). Documentary analysis and interviews (with city planners, water managers, stakeholders, academics, etc) were carried out in the three mature sites. Detailed empirical evidence was collected leading to the formulation of historical storylines of innovation uptake highlighting influencing governance factors. A cross-comparative study of mature sites together with the wider literature was also made to generalise the results and develop concrete policy and business recommendations. The results fed into D12.3 in Task 12.4, and bilateral meetings were held with WP42 to inform research and compare results (in particular market analysis). Results will further feed into the "cookbook" of WA1 in order to inform the implementation of the DESSIN ESS Evaluation Framework in WA2 and WA3.

Task 12.3 Economic policy instruments to foster innovation in the water sector (M6 - M14)

Task 12.3 focused on identifying and evaluating existing financing and payment mechanisms leading to innovation uptake in urban water management. The research is based on a literature review of peer-reviewed and grey publications, including from Australia and the US as well as European projects (e.g. EPI Water, POLICYMIX, Trust, CECILIA 2050, etc) and experiences in DESSIN mature sites (Aarhus, Emscher, Ebro). Results are presented in D12.2, in the form of a core discussion together with several annexes presenting an overview of existing financing structures to facilitate market uptake as well as economic policy instrument factsheets. The results fed into D12.3 in Task 12.4, and bilateral meetings were held with WP42 to inform research and compare results (in particular analysis of regulatory environment and modes of financing for market uptake and the market analysis). Results will further feed into the "cookbook" of WA1 in order to inform the implementation of the DESSIN ESS Evaluation Framework in WA2 and WA3.

Task 12.4 Synthesis: Linking good-practice/constraint identification in governance and financing regimes with the ESS valuation and innovation uptake (M14 - M18)

Task 12.4 focused on translating the results from Task 12.2 and Task 12.3 for policy and business use. To increase impact, Deliverable 12.3 takes the form of two short briefs targeted to 1) water innovators and businesses and 2) policy-makers and practitioners synthesising recommendations and providing practical examples. They present enabling factors and best practices with regards to innovation uptake, including how to structure the policy framework, how to take most advantage of existing incentives and payment modalities, and how to create momentum and support for innovation uptake. Deliverable 12.3 has been provided to case-studies in WA2 and WA3, but will also be useful to promote the uptake and application of the DESSIN ESS Evaluation Framework (including the DSS Module to be developed within WA2 in the future) and to raise awareness of the wider audience (dissemination in WA4).

2.2.3 Work Package 13 – Testing & refining the ESS evaluation framework by using mature sites

Objectives

- Testing and refining the ESS evaluation framework (incl. the ESS valuation toolkit and sustainability assessment) developed in WP11 by using mature sites to validate the methodology
- Quantification and valuation of changes in ESS for the historic sites (changes from baseline to present status)
- Quantification and valuation of ESS for the entire case study areas for different future scenarios
- Development of a sustainability assessment in the mature sites

Progress

It was decided for a joint approach between WP11 and WP13 to increase efficiency in the development of the ESS Evaluation Framework; this was adopted in early 2015. Therefore, MS21 will be achieved together with D11.2 & D13.1 in M24, according to a decision of the Work Area Management Team (WAMT) taken in March 2015. This will allow more time for testing and refinement of the Framework. For frequent communication (biweekly telephone conferences) between WP11 and WP13, a mature sites task force was set up in March 2015, coordinated by the WP13 lead and with participation of all mature case study leaders and key WP11 partners.

In January 2015 it was furthermore decided to integrate the Llobregat mature case in replacement of the Ebro site.

Explanation:
DESSIN Work Area 1 uses so-called 'mature sites' for testing and refining the method for ESS valuation prior to its application in the actual demonstration sites (which is going to take place in Work Area 3). 'Mature sites' are sites where restoration measures or implementation of improved technology have already been carried out, and 'before vs. after' data on the status of the ecosystem are available for testing and fine-tuning the ESS valuation framework. During the development of the ESS valuation framework and the initiation of interaction with the mature sites within WA1, it became evident that the portfolio of mature sites used in DESSIN should also cover sites where restoration measures or technologies have been used that are similar to those of DESSIN WA3. Two work packages within DESSIN WA3 address artificial groundwater recharge techniques (WP33, WP35), but this was not the case for any of the 'mature sites' pre-selected during preparation of the DoW. In order to optimize the DESSIN approach with minimum changes to the contractual work plan, the Work Area Management assessed the options for another suitable mature site. As the most suitable option it turned out to shift the Spanish mature site from 'Ebro' to the Spanish Llobregat area (the same region where demonstration in WP35 is taking place).
Specifically, Llobregat mature site consists in the implementation of infiltration ponds in the right bank of the Llobregat River (Sant Vicenç dels Horts, with an annual infiltration capacity of 1 Mm^3 and Santa Coloma de Cervelló, with an annual infiltration capacity of 10 Mm^3). Sant Vicenç dels

Horts infiltration system was implemented in 2008, and several R+D projects have collected and treated data of groundwater quality and groundwater level along the aquifer. Ecosystem Services identified a priori are related to the capacity of the aquifer to store water (provision ESS), to improve groundwater quality (regulation ESS) and to host visitors and researchers (cultural ESS.
The mature site in Llobregat is focused in the evaluation of water injection for aquifer replenishment, using ASR wells Aquifer Storage and Recovery). Thus, the methodology developed for the quantification of provision ESS and regulation ESS could be directly applied in this mature site, and in the Westland mature site.
With this new approach, ESS linked to groundwater and aquifer capacities will be covered from the mature site assessment to have a practical implementation in Llobregat and Westland demonstration sites. The change from Ebro to Llobregat is also supported by local stakeholders in Llobregat, showing great interest in the assessment of the infiltration ponds from the perspective of the ESS.

This change does not affect the scope, objectives, resources or budget of this WP and its beneficiaries, and does not fully exclude the Ebro site from the DESSIN project, because the Ebro site was still used as an important mature case study in the work carried out under Work Package 12 on the innovative and innovation-friendly modes of governance, finance and payment. It also doesn't lead to a substantial change in the distribution of work between beneficiaries, because responsibility for the Llobregat mature site will be with the same Spanish beneficiaries as was planned for the Ebro site. Furthermore, this change does not introduce a completely new geographical investigation/demonstration area, because the Llobregat region has already been a regular part of DESSIN (in WP35). Hence, this is more a gradual shift in the way different sites are used in DESSIN, to ensure that the project objectives are met and results delivered.

Jointly with WP11, components and foundations of the DESSIN ESS Evaluation Framework were agreed upon, and on this basis a conceptual approach as well as a detailed "cookbook" (stepwise guide) was developed. Currently, practical recommendations stemming from the tests on the mature sites feed into fine-tuning and improving the Framework. Formal exchange with WA3 started in June 2015 (i.e. six months earlier than planned) with the aim of assuring the later applicability of the Framework in the demo sites.

Table 4: Work Package 13 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status*
MS21	Internal recommendations on the application of the ESS method	M18→→M24 (Dec 2015)	request to postpone to M24

Significant Results

- Close collaboration between WP13 and WP11 in developing the DESSIN ESS Evaluation Framework; recommendations made by WP13 by checking needs, relevance, and applicability of the Framework in the mature cases throughout the development process; resulting in:
    - scheme of the conceptual approach of the Framework
    - detailed "cookbook" (stepwise guide)
- First tests conducted at the three mature sites regarding:
    - description of Drivers-Pressures-State-Impact-Responses
    - identification of possible and relevant ESS
    - ESS classification into final and intermediate services
    - identification of beneficiaries
    - indicators suggested and described for biophysical assessment of provisioning, regulating & maintenance, and cultural ESS
    - preparing for later linking between biophysical and economic evaluation

Reasons for deviations from Annex I and impacts on resources and planning

The joint approach adopted between WP11 and WP13 resulted in an earlier involvement of the mature site owners in the development of the ESS Evaluation Framework (6 months earlier than originally planned). This resulted in an ongoing feedback loop through which mature site owners are continuously providing internal recommendations on the application of the framework. For this reason, WA 1 requests to postpone the final repository of all recommendations from WP13 to WP11 (MS21) until Month 24 (original date in Annex I was Month 18).

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. The postponing of MS21 will imply also a necessary delay in MS26 (the testing and approval of the applicability of the evaluation methodology). However, as mentioned above, the testing is ongoing and a formal approval from the mature site owners coming in Month 24 is not expected to have any impacts on subsequent tasks.

Corrective actions needed

No corrective actions needed.

Task 13.1 – Application of ESS methodology and quantification of ESS (M12-M18)

The analytical Evaluation Frameworks developed in WP11 has been applied test wise in the mature cases. Relevant provisioning, regulating & maintenance and cultural ESS were identified for each mature site and possible indicators to measure changes in ecosystem status and ESS capacity and use have been suggested and described in terms of their data requirements. River sections that are

to be assessed have been identified and the quantification of the ESS for each of these sections is in progress. The valuation of the ESS will be the subsequent step, which is already being prepared for by i) identifying users/beneficiaries of the ESS, ii) classifying the ESS into intermediate and final services (the latter are to be valuated) and iii) by linking the biophysical ESS assessment to the economic valuation via the development of a database of economic valuation studies (in WP11).

WP13 partners are furthermore involved in the development of the sustainability assessment – also here the needs and relevance from the mature and demo cases strongly influence and direct the development of the sustainability approach.

The quantification and valuation of the ESS under different scenarios, as researched in T11.1.3, will be conducted after the first round(s) of readjustments and improvements of the ESS Framework have been completed.

Task 13.1.1 - Case study of mature site Aarhus (DHI, SINTEF)
Task 13.1.2 - Case study of mature site Emscher (EG, UDE, IWW)
Task 13.1.3 - Case study of mature site Ebro (CETaqua, ECOL)

Concerning the mature case specific subtasks T13.1.1-3, the selection of relevant ESS for Aarhus confirmed the special emphasis on water quality issues and recreational values. In the Emscher case, river sections of different restoration stages have been selected as exemplary water bodies and their results are to be transferred to comparable water bodies, allowing a prognosis for the whole catchment. In Spain the focus of the evaluation will be on the economic valuation of changes in ESS provision, as Llobregat in contrast to Emscher and Aarhus, mainly offers provisioning ESS.

Task 13.2 - Reflecting applicability of ESS methodology (M12-M18)

The application of the Framework has already been and still is being tested in the mature cases throughout the process of developing the Framework. Therefore, practical recommendations are being provided promptly, allowing improvements and further research on the development of a final version of the Framework to be conducted directly.
In June 2015, the demo sites have already been asked for feedback on their needs and requirements concerning the ESS Framework from the technological perspective, by using the mature case as examples.

2.2.4 Work Package 21 – Innovations for Water Quality / WFD implementation

Objectives

Develop innovations that improve water quality in urban water bodies and thereby facilitate and improve the implementation of the WFD in urbanised areas by:

- Enabling enhanced particle removal in CSO tanks with innovative cross-flow lamella settlers.
- Enabling local treatment of CSO overflow with an innovative high rate filter.
- Enabling integration of local CSO treatment by innovative monitoring and data communication.
- Enabling real time control of CSOs with innovative control algorithms and communication protocols.

Progress

All tasks have been started according to plan. The development work for the lamella settler solution and the high rate filter (HRF) solution has been completed and the relevant milestones achieved. The solution for monitoring and control of the HRF filter, designed to demonstrate integration of local treatment processes by remote monitoring and control has also been completed. The activity in the task on use of real time control to reduce CSO overflow volumes is still in progress, but is progressing according to schedule.

Table 5: Work Package 21 – Progress on deliverables and milestones due during this reporting period

D / MS number	Title	Delivery date (project month) according to Annex I	Status
MS4	Concept for the development and construction of the model setup of cross-current lamella settlers	M4	achieved
MS5	Design of HRF solution for pilot testing in Laboratory	M4	achieved
MS7	Concept for optimized encapsulated ADESBA modules	M6	achieved
MS14	Instrumentation and monitoring equipment Installed	M12→M17 (May 2015)	achieved
D21.1	Treatment units and instrumentation for CSO treatment solutions	M12→M18	submitted

Significant Results

- Settling efficiency versus dimensionless surficial loading from laboratory scale model tests to be used for dimensioning of cross-flow lamella settlers.
- Testing of the HRF process has shown promising results, indicating that the overall BOD removal is 50 – 80%, and the total SS removal is 60 – 80%.
- An on-line monitoring system has been designed with on-line sensors, a data acquisition manager with wireless connection enabling data transfer and remote control of the plant.

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. There were minor delays in the completion of some tasks, but without critical impact on other work in the project. Work is back on schedule.

Corrective actions needed

No corrective actions needed.

Task 21.1 Enhancing treatment efficiency in CSO holding tanks with cross-flow lamella settlers (M1-M12)

Investigation of a cross-flow lamella settler started as planned with a review of literature and design of the model system for laboratory testing. Model tests in laboratory were performed with original size of lamella structures and a model sediment (Styrofoam P 423 beads, D = 0.5 mm) with same range of settling velocity (v_s = 0.4 cm/s) as sewer sediments. The tests covered a typical flow range. Tests were performed with a steady through flow of 0 – 8 L/s by use of a pump. Salt was added to the water in order to adjust the density to achieve smaller settling velocity v_s in some tests. The results can be compiled as settling efficiency versus dimensionless surficial loading. The final report with evaluation of different parameters is available (Deliverable D21.1).

The results feed into WP31 and the demonstration of the cross-flow lamella settler.

Task 21.2 Local treatment of CSO overflow by High Rate Filtration (M1-M36)

The activity in Task 21.2 started as planned and the HRF system was discussed with involved project partners (Inrigo Water, LKI, MFT, VAV and SINTEF) at meeting in Oslo 4th March 2014. A memo with site specification/requirements and a memo with initial description of HRF demo plant design and plan for laboratory testing were prepared (MS5). Based on feedback form VAV and LKI on specifications in the memo, a HRF test plant was designed and constructed. Testing of the process has shown promising results, indicating that the overall BOD removal is 50 – 80%, and the total SS removal is 60 – 80%.

The HRF test plant was installed in a container and sent to Hoffselva in Oslo for installation in February 2015 where the demonstration will continue in WP32.

Task 21.3 Integration of local CSO treatment units by monitoring and data communication (M1-M24)

The activity in this task started as planned and has followed the progress of Task 21.2 since the monitoring and data communication was to be demonstrated with the HFR plant. An on line monitoring system has been designed with on-line sensors for flow rate, pressure, turbidity and level. The on-line data are collected by a data acquisition manager (DAQ Manager) installed on a PC with wireless internet connection using an ICE router. Data are stored on the PC and can be transferred to other users at the project partners. Remote access to the desktop of the PC also enables remote control of the plant. All the operating parameters and online water quality data are collected and stored in web server accessed by project partners.

The system will be used in WP32 during the demonstration of the HRF solution at Hoffselva.

Task 21.4 Reducing CSO overflow volumes by Real Time Control (M1-M36)

The activity started with standardization of function blocks. Specification software concepts and hardware selection and procurement have been completed. Software development is in progress and will be followed by software functional testing. ADESBA modules for use in process control systems have been specified and hardware selected. Software development is in progress. Functional testing remains until after software development. The software development for the encapsulated modules is at 50%, and will be followed by functional testing. Upgrade of the ADESBA Planner with a web-based online module and recalibrate function: preparation of specification and software concepts has been completed. Software development of ADESBA Runtime will begin after the completion RTC-Modules. Planned completion is in M30.

Task 21.4 is approximately 70% completed.

2.2.5 Work Package 22 – Innovations to tackle water scarcity

Objectives

Develop innovations to tackle (temporal) water scarcity in urban areas facilitating sustainable use of available water by:

- Enabling technologies for distributed sewer mining in large urban areas, integrating membrane treatment and ICT/AMI state-of-art for fast and efficient deployment by SMEs and/or water companies;
- Enabling a robust and sustainable freshwater supply from brackish and/or saline aquifers by combining Aquifer Storage and Recovery (ASR) an desalination with an innovative well design;
- Enabling improved aquifer water quantity and quality with flexible ASR systems to deal with different quality injection waters.

Progress

The works started as planned and the progress is according to plan. No deviations or reasons for corrective actions. The programmed deliverables are on schedule and the milestones in time achieved. Benchmark study on guidelines for packaged plant selection and optimization is the most interesting result/achievement to enable technologies for distributed sewer mining in large urban areas. Within the ASR technologies, the reverse osmosis is integrated in the ASR pilot for freshwater supply from brackish and/or saline aquifers, while a chemical characterization with potential impacts identification and a regional flow model are the achievement to be highlighted for the study related to enabling improved aquifer water quantity and quality with ASR systems flexible to different quality injection waters.

All contractual items (deliverables, milestones) due during reporting period 1 have been achieved / submitted.

Deliverable D22.4 (due next reporting period, M20) has been split into three parts. The first two parts (D22.4A and D22.4B) are already publicly available at the DESSIN website. Formal submission of D22.5 to the EC will be done upon completion of the third part D22.4C. This part is 3 month delayed and will be delivered by end of M23. This slight delay was discussed by the Work Area Management Team (WAMT) in its monthly TelCos in September and October 2015), and it was concluded that this is not critical with regard to achieving the project objectives.

The same delay and assessment is valid for deliverable D22.5 (3 months late, actual delivery expected by end of M23, no critical impact on other project activities or achievement of critical objectives).

Table 6: Work Package 22 – Progress on deliverables and milestones due during this reporting period

D / MS nunber		Title	Delivery date (project month) according to Annex I	Status
D22.1		Guidelines for packaged plant selection and optimisation (report) (NTUA)	M12->M17	submitted
MS13		System architecture design completed and described (NTUA)	M12	completed
D22.3		Assessment Reversed Osmosis membrane clogging by varying redox conditions of feedwater (KWR)	(M24)	Part 1 of 3 is MS15, completed in M12;
MS15		Evaluation completed and benefits quantified (KWR)	M12	Completed as part 1 of D22.3; available at intranet
D22.4		Evaluation of pre-potable water requirements for safe injection into the aquifer through ASR	M20	Partially delivered (see subdivisions of D22.4)
Subdivisions D22.4	D22.4 (A)	Evaluation of pre-potable water requirements for a safe injection in the aquifer through ASR. Description of the ASR system in the Llobregat Area and Water Quality Evaluation based on historical data	Internally proposed: M16	Available at website
	D22.4 (B)	Simulation of ASR operation at demonstration and full-scale: numerical modelling: Regional and local numerical modelling to simulate the flow and conservative transport in the Llobregat demo site.	Internally proposed: M14	Available at website
	D22.4 (C)	Selection of pre-potable water and additional pre-treatments needed.	M 20	Pending (not due in 1st period)
MS16		Selection of the most suitable pre-potable water and expected impacts.	M15	Achieved

Significant Results

- Proposed guidelines for packaged plant selection and optimization for distributed sewer mining: the focus has been on new membrane solutions and technologies in the form of modular packaged treatment solutions (MPTS). The treatment level required is determined by the specific quality objectives for unrestricted urban wastewater reuse, identified in the relevant national legal framework, whereas different capacities of MPTS are designed at preliminary level accompanied by technical and operational considerations. The system architecture is build to a pilot plant;
- The set up of hardware components for the sewer mining platform is designed;
- Set up of the software for distributed sewer mining is designed: it is worth noting that the developed SW has incorporated open standards defined by the Open Geospatial Consortium (OGC) that enable uniform and interoperable representation of measurement data;
- The ASR-Reversed Osmosis (ASRO) is installed to inject the rainwater surplus of 27ha of greenhouse roofs in an aquifer (23 to 37 m below ground level) to demonstrate that a sustainable and reliable freshwater supply can be obtained by combining the techniques of ASR and reversed osmosis in one system (ASRO);
- The ASR groundwater transport model is set up (SEAWAT) and injection/recovery schemes are quantified and the optimal well configuration is determined;
- The cycling of infiltration of fresh water in winter periods and recovery in summer periods is now monitored;
- Literature review of international experiences of ASR using non potable water. Compilation of threshold values and recommended water quality for injection using deep wells;
- Selection of sand filtered water as the most suitable effluent for ASR of the intermediate potabilisation process. Historical data was analyzed to determine the strength and weaknesses of sand filtered water in terms of potential impact with native groundwater;
- Numerical modeling at (1) local scale to assess the impact of the demonstration phase and (2) regional scale to assess the impact of the implementation at full scale using the full capacity of the ASR system. Local scale model has been developed using MODFLOW and regional model has been developed in VISUAL TRANSIN code.

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

Task 22.1 Distributed Reuse in large urban areas (AMI-enabled Sewer Mining)

The works started as planned and the progress is according to plan. A report with the focus on new membrane solutions and technologies in the form of modular packaged treatment solutions (MPTS) is delivered as D22.1 (T22.1.1). The treatment level required is determined by the specific quality objectives for unrestricted urban wastewater reuse, identified in the relevant national legal framework, whereas different capacities of MPTS are designed at preliminary level accompanied by technical and operational considerations. The results of the work performed within T22.1.1 set the basis for Task 34.1. Initial System Architecture (SW and HW) design is achieved with Software and Hardware components, system structure and interoperability; this also includes: design and development of interoperable sensor data layer based on Open Geospatial Consortium (OGC) suite of standards; design and development of the server-side (back–end) software application using J2EE technologies; design and development of the server-side (back–end) software application using J2EE technologies; testing of the s/w platform using "dummy" data and Updated System Architecture (T22.1.2). The development of the communication solutions (T22.1.3) has, for the reporting period, included the investigation of different communication solutions; site survey at EYDAP demonstration area (Athens) to identify a suitable communication solution of the ICT architecture and installation; deployment of the software platform (web application) on a secure web server and development of suitable interfaces that can link local events to a remote management center; integration of the developed sensor data layer with the web enabled local and remote monitoring user Interface. The most interesting result/achievement is that the communication solution and the developed software platform are enabled with local and remote management capabilities. The results of the work performed within T22.1.2 and T22.1.3 have been incorporated in task T34.3.

Task 22.2 Innovative solutions for sustainable freshwater supply from brackish/saline aquifers by combining ASR and desalination with an innovative well design

The works started as planned and the progress is according to plan. The Westland Aquifer Storage and Recovery Reversed Osmosis (ASRO) is installed to inject the rainwater surplus of 27ha of greenhouse roofs in an aquifer (23 to 37 m below ground level). The aim is to demonstrate that a sustainable and reliable freshwater supply can be obtained by combining the techniques of ASR and reversed osmosis in one system (ASRO). A Westland ASR groundwater transport model is set up (SEAWAT) and injection/recovery schemes are quantified and the optimal well configuration is determined (T22.2.1). The cycling of infiltration of fresh water in winter periods and recovery of fresh water in summer periods is now monitored (T22.2.2, on-going)

Task 22.3 Increase the flexibility and resilience of Aquifer Storage and Recovery (ASR) in strategic groundwater reservoirs

The works started as planned and progressing according to plan. Exhaustive literature review of recommendations and compilation of international experiences of ASR systems and their main operative parameters was produced and results are available in deliverable D22.4A. Historical data of the sand filtered water produced has been plotted and analysed compared to quality standards

and recommendations (T22.3.1 - finished). A regional numerical flow model is set up and used to evaluate the impact assessment of ASR in terms of groundwater volume infiltrated in the aquifer and the improvements and/or impacts in groundwater quality (conservative transport). The work has been divided in two parts: (i) MODFLOW-based numerical model to simulate the impact on injected water in the local piezometric network installed for the project (4 km^2) (ii) VISUAL TRANSIN-based numerical model to simulate the impact of ASR and ASTR at regional scale (129 km^2) (T22.3.2 - finished). The review of guidelines and recommendations reported in international literature (T22.3.1) has been also applied to the Sand filtered Water (SFW) characterisation. Data from 2010 to 2014 of SFW have been plotted and aggregated in ranges to evaluate the frequencies and mean values of the bulk chemistry. Total suspended solids, Modified Fouling Index, Turbidity, dissolved organic carbon, total organic carbon; assimilable organic carbon, E. coli and ammonium are the parameters mainly reported as clogging and pollution control in ASR injection (T22.3.3 - finished). A generic model inspired in the Llobregat aquifer is being developed to be used as an example hands-on for future operators (T22.3.4 – ongoing).

2.2.6 Work Package 23 – Software framework for ESS valuation

This work package has not yet fully started.

The scheduled start according to the DoW was at the end of this first reporting period (Month 18). However, due to the suggested changes in Work Area 1 to better interlink activities in WP11 and WP13 and to deliver the final WA1 D11.2, D13.1 and Milestone MS21 together in M24, this has an impact on WP23: Work package leader of WP23 (DHI) has been asked and agreed to support preparation of MS21 by defining their requirements and supporting the development of template/format for MS21.

As a consequence, WP23 in total will be delayed by up to 6 months which is not considered critical for the application of the software in the case studies (now starting around M34/35). Despite the late start, objective and results of WP23 will be achieved.

Interaction of DHI with the demo cases in WA3 needs to be organised in order to make it a success, and the preparation has already started (development of a concept, scope, target group, tentative date and agenda for a workshop of WP23 with the demo case partners from Work Area 3).

2.2.7 Work Package 31 – Emscher Demonstration: Improving water quality in the strongly urbanised Emscher area

Objectives

To demonstrate the feasibility and effect on ESS of different innovative solutions developed to mitigate the negative effects on the water quality in the Emscher river system caused by CSOs. The solutions are in two groups according to the main features:

- Local treatment of CSO overflows to reduce the impact on recipient water quality
- RTC of holding volumes in the sewer system to reduce overflow volumes from CSOs

Progress

Both innovative solutions to be tested in the Emscher region have been timely provided by the WA2 partners. The installation of the cross-current lamella settler pilot has been achieved in M18. During the DESSIN 18M Project Steering Board Meeting in June 2015, the project consortium had the chance to visit the pilot during an excursion.

The Real Time Control of the sewer network (ADESBA) is still in the preparation phase. The analyses of potential as well as the feasibility checks are promising for full scale implementation in the Emscher sewer network.

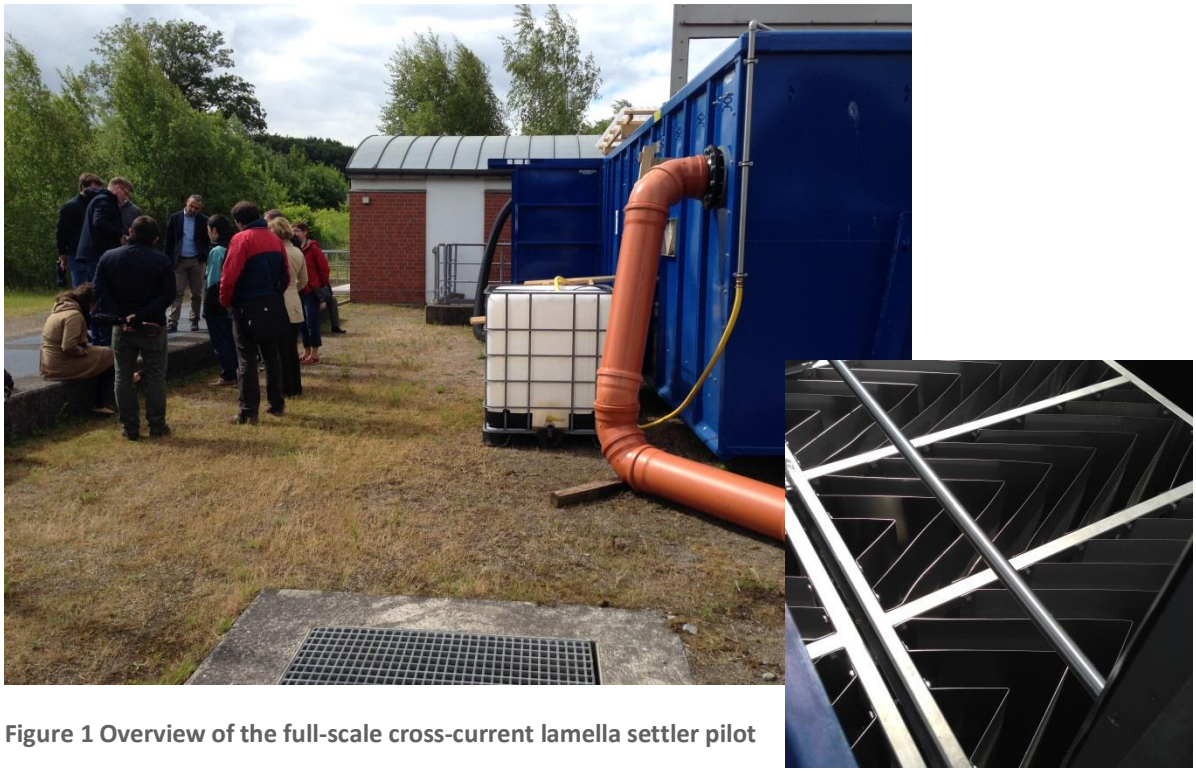


Figure 1 Overview of the full-scale cross-current lamella settler pilot

Table 7: Work Package 31 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status
MS22	Completed installation of full-scale cross-current lamella settlers	M18	achieved

Significant Results

- Cross-current lamella settler
  - an appropriate demonstration site was identified in 2014
  - numerical simulations confirm the final container design as optimal for smooth flow through
  - the pilot container was assembled by UFT and was transported to the site in May 2015
  - installation of container has been achieved in June 2015

- RTC of sewer network
  - 5 CSO facilities in the Emscher sub-catchment of Dortmund Deusen have been identified as demo sites in 2014
  - analyses of potential conducted for historical and model datasets show similar results; e.g. free storage volume in 88% of the overflow events with free storage capacity of 1 to 83% of maximum storage volume
  - feasibility checks on i) CSO tank hardware, ii) SPS software, and iii) telecommunication were conducted successfully by the EG operating department
  - implementation plan for ADESBA RTC into the 5 CSO tanks in the Emscher basin has been completed

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

Task 31.1 Decentralized water treatment (M1-M42, EG, UFT, UDE)

An appropriate demonstration site was identified in 2014: a CSO in Castrop-Rauxel (Germany). The container was assembled by UFT in the beginning of 2015, while numerical simulation by UDE confirmed the final container design as optimal for smooth flow through. The pilot container was transported to the site in May 2015. All necessary preparations on the site were accomplished by EG with the involvement of subcontractors (for details about the need to involve subcontractors see section on task 31.2). The full scale installation of the cross-current lamella settler container has been achieved in June 2015, while the experimental rigging (electrical controls for pump and data recording equipment) and the installation of sampling devices into the container has been conducted in July 2015. The pilot operation is planned for about 5 months until December 2015 with subsequent transport of the container to the Hoffselva demo site. Sampling and analysis of N, P, COD, BOD, and suspended solids will be conducted during rain events to assess sedimentation efficiency. A small prediction model for the estimation of efficiency and effect on the ecosystem will be established and calibrated when the first sampling results are available.

Task 31.2 – Case Emscher – Real Time Control of sewer network (M1-M42 EG, SEGNO, UDE)

5 CSO tanks in the Emscher sub-catchment of Dortmund Deusen have been identified as appropriate demonstration facilities in 2014. The analyses of potential show free storage volume during overflow events. Also the feasibility checks on i) CSO tank hardware, ii) SPS software (with involvement of the subcontractor Janzon), and iii) telecommunication were conducted successfully by the EG and support full scale implementation of the RTC system. Retrofitting of the SPS in 1 tank and of the telecommunication in 4 tanks is completed, while telecommunication retrofitting in 1 tank is close to completion. A conceptional implementation plan for the ADESBA integration into the 5 CSO tanks has been completed by Segno. The ADESBA Planner is close to completion by Segno. A hydraulic simulation model in Simba# including the ADESBA RTC bloc is in progess by UDE and will allow the analysis of the CSO load reduction potential. Setting local rules and security modules for an automatic switch from RTC to manual mode in order to allow safe ADESBA operation is ongoing with all partners, the EG and an additional subcontractor (Liquitec) involved (but this is only relevant for reporting in the 2nd period). In parallel, the developers of the ADESBA algorithm ifak (Institut für Automation und Kommunikation) are currently being consulted concerning the safe application of ADESBA. A deterioration of the stream water quality needs to be ruled out. An analysis of the congestion frequency in the sewers using a hydrodynamic model will not be required.

Explanation on the involvement of subcontractors in WP31:

DESSIN is aiming to deliver real innovations, i.e. solutions that are demonstrated in a real operating environment. This is considered one of the hallmarks and key success factors of DESSIN. For some of the DESSIN demonstration sites, this means that new solutions have to be integrated into existing complex organisational and/or technical systems, - which may require some adaptation of existing structures to make this possible. This has already been foreseen at contract preparation stage, and is described in the DoW (GA Annex I part B chapter 2.4 p. 77):

Subcontracting

Subcontracting is a minor position of the DESSIN budget (EUR 127,579.50, i.e. about 2% of the EC contribution). In principle, the DESSIN consortium is complete and has the key expertise for carrying out the tasks of the project. However, there are some task that are either minor services (e.g. logistical support in the execution of meetings, layout/printing services) or requiring highly specialised equipment or expertise not available in the consortium because they are beyond the core activities of the beneficiaries, such as e.g. special transport services, special analytical techniques.

Subcontracting will be carried out respecting the terms of the ECGA, in particular by using tendering or selection procedures that ensure transparency, equal treatment and best value for money. As DESSIN is aiming at demonstrating technical innovations at existing sites, this demonstration in some cases includes also the need to adapt or change existing installations, models or control units at the sites. Subcontracting for some of these tasks requires very specific knowledge and familiarity with the specific local circumstances and installations of the demonstration site, which is only available to organisations that have been involved in the installation, operation or maintenance by appointment or order of the site owner or within a framework agreement with the site-owner that pre-dates the DESSIN Grant Agreement. In such cases were the foreseen subcontractor is already known, they are already named in the following breakdown. Also in these cases and in the case of framework agreements pre-dating the EC-GA, selection of subcontractors has been done respecting the terms of the ECGA, in particularly by procedures that ensure transparency, equal treatment and best value for money.

At the time the DoW was finalised, the need, nature and extent of the work as well as the foreseen subcontractor were already known for some of the demonstration sites (and therefore specified in the DoW), but not for the Emscher demonstration case in WP31. Here, the RTD work in WP21 and preparation of DEM work in WP31 were crucial for identifying what sort of modification and adaptation work was needed and to decide whether this could be carried out by the beneficiary or needed to be subcontracted.

Selection and contracting procedures for the subcontractors were in full compliance with the German national regulation for public procurement, in this case VOL/A §3 Section 5c and 5g.

This subcontracting does not change at all the scope, objectives or overall budget of the project, nor does it imply any substantial change in the distribution of work between beneficiaries. In financial terms, it is only a re-distribution of financial resources within the DESSIN budget of beneficiary EG (by shifting from ‘other direct cost’ to ‘subcontracting’ within the DEM activity).

In fact, this subcontracting is considered to be essential for WP31 to enable a successful implementation & demonstration and to achieve the objectives of this Work Package.

In particular, the following task was subcontracted for the following reasons:

- Company R. Janzon, who had originally programmed the PLC (Programmable Logic Controller; German: “SPS”) programs of the Combined Sewer Overflows (CSO) by the time the CSOs were built, had to check these programs for compatibility with the Real-Time Control (RTC) that is going to be demonstrated. This work is necessary to ensure save RTC operation and could not be done by EG itself, as they did not originally do the SPS programming of the CSOs. The costs for this "Analysis of SPS programs of CSOs" are claimed in the M18 report. The CSO structures need to be operate reliably during the demonstration in order to avoid any unnecessary overflow event. Due to the complex structure of the CSO facilities and the urgency for successful project processing, the tasks had to be accomplished by a company that is familiar with the CSO facilities.

Definition and specification of this subcontract was not possible at DoW preparation stage, but only after the actual selection of the CSOs for the demonstration had taken place and the specifications of the ADESBA RTC solution for these CSOs had been defined, guided by work done during the starting phase of WP21 and WP31. Beneficiary EG (waterboard for an area of 865 km^2) is currently operating approx. 90 CSO units of various type, age and technology in its catchment, and based on criteria developed during the early stages of WP31, 6 specific CSO facilities (1 for T31.1 and 5 for T31.2) were selected for the actual demonstration phase.

There was another organisation (ifak institute) involved in the work of WP31, but not yet as a subcontractor. Ifak is the developer of the ADESBA algorithm that is the core part of the above mentioned RTC solution. They were consultated about the ADESBA algorithm, in order to ensure save inplementation and operation of the RTC. For this reason, a first consultation seminar with ifak at their premises took place on 11.06.2015. For participation of EG key staff in this seminar, travelling costs are claimed in the M18 report, - no subcontracting cost.

Task 31.3 Evaluation of solutions (M1-M42, EG, ECOL, DHI, ADELPHI, IWW)

Assessing sustainability, governance/policy implications and novel financing mechanisms of the two technical solutions with respect to the actual implementation processes in the Emscher context will be initiated when the Evaluation Framework and the Manual for Practitioners and Policymakers developed in WA1 as well as the DSS Module developed in WP23 are available and the results from the demonstration phases are evaluated.

2.2.8 Work Package 32 – Hoffselva Demonstration: Improving water quality in the peri-urban Hoffselva area

Objectives

The main objective is to demonstrate the feasibility and effect on the ecosystem services of different innovative local solutions for CSOs developed to improve water quality in Hoffselva.

- Enable enhanced particle removal in CSO tanks with innovative cross-flow lamella settlers.
- Enable local treatment of CSO overflow with an innovative high rate filter (HRF).
- Enable integration of local CSO treatment by innovative monitoring and data communication.

Progress

All tasks have been stated according to plan. There was an initial delay in delivery of the HRF plant to the demo site, but the plant is now ready for use and the task is on schedule. The demonstration plant has CSO treatment capacity of 20 m^3/h and is fully automated. The plant is programmed for both CSO treatment mode and sewage treatment mode. The demo activities will include demonstration of the solution for monitoring and data communication.

Flow and turbidity have been monitored at the VAV measurement station from 22 October to the beginning of the ice season in 2014. Preliminary analyses indicate the occurrence of short periods with high peak concentrations of acute pollutants during storm events.

Table 8: Work Package 32 – Progress on deliverables and milestones due during this reporting period

D / MS number	Title	Delivery date (project month) according to Annex I	Status*
MS19	Completed installation of high-rate filter unit with monitoring instrumentation and data communication.	M13→M18 (June 2015)	achieved

Figure 2 Field laboratory at Hoffselva and online sensor

Significant Results

- The HRF system is installed at the Hoffselva demo site. The demonstration plant has a CSO treatment capacity of 20 m3/h, and is fully automated.
- Flow and turbidity have been monitored at the VAV measurement station from 22 October to the beginning of the ice season in 2014. Preliminary analyses indicate the occurrence of short periods with high peak concentrations of acute pollutants during storm events.

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

Task 32.1 Demonstration of cross flow lamella settling for local treatment of CSO overflow - Case Hoffselva (M21-M42, UFT, SINTEF, VAV, EG)

Work will start in 2016.

Task 32.2 Demonstration of High Rate Filtration for local treatment of CSO overflow - Case Hoffselva (M9-M42, INRIG, SINTEF, VAV)

The HRF system is installed inside two standard 20 inch containers. The demonstration plant has a CSO treatment capacity of 20 m^3/h and is fully automated. The plant is programmed for both CSO treatment mode and sewage treatment mode. The plant is under sewage mode with low filtration speed (2.5 m/h) when it is in dry period, while the plant will switch to CSO mode with high filtration) speed (42 m/h when it is raining period. This is controlled by a level sensor is installed in the intake water pit to monitor the water level. SS, COD, BOD and bacteria will be analysed to document the treatment performance of HRF system. The different filtration speed, backwash frequency, and media cleaning approach will also be investigated during the demonstration.

The objective is to develop and design a manhole type CSO treatment HRF system for Hoffselva area by demonstration results.

Task 32.3 Demonstration of monitoring and data communication for local CSO treatment units - Case Hoffselva

(M9-M42, LKI, SINTEF, UFT, INRIGO, VAV)

Instruments and equipment form monitoring, data communication and control have been installed and tested. The demonstration activities will be performed in parallel to the demonstration of the HRF solution in Task 32.1.

Task 32.4 Monitoring water quality in Hoffselva and evaluation of solutions (M12-M42, SINTEF, VAV, ECOL, DHI, ADELPHI)

The water quality in Hoffselva is poor, with a moderate to very bad ecological status according to the classification of the EU Water Framework Directive (WFD). Hoffselva is one of 14 so-called "quite zones" in Oslo, with a low level of noise and high importance for recreation, and it is planned to reach bathing water quality in Holmendammen.

The discharge of the river is monitored by VAV on their measurement station mainly for operational purposes. Weekly data is published together with the water quality data that is measured at this station. There is a need of high-resolution data for the analysis of water quality during storm events.

In September 2014, water level loggers were installed in order to record the water levels in a 5 min interval at the following locations: Skådalsbekken (eastern tributary stream) (A), Hoffselva upstream from Holmendammen (B) and Makrellbekken close to the confluence with Hoffselva (C). This allowed establishing a discharge hydrograph for the measurement period between September and November 2014. At Makrellbekken (location C), it was not possible to establish a reliable W-Q-relationship under the conditions in the measurement period. Measuring the discharge in Makrellbekken at an alternative location will be evaluated.

A turbidity sensor was installed at the VAV measurement station and recorded data from 22 October to the beginning of the ice season. Preliminary analyses indicate the occurrence of short periods with high peak concentrations of acute pollutants during storm events.

The effects of CSO-spills during storm events were documented in a series of videos and photos. The field visits also revealed a number of waste water outlets into the river which were not originating from CSO-spills, but from direct waste water outlets. Such point sources seem to play a very important role for the river water quality as well.

The results will feed in to the ESS evaluation at Hoffselva.

2.2.9 Work Package 33 – Westland demo site: Freshwater supply from brackish aquifers by combining ASR and desalinisation

Objectives

To demonstrate freshwater supply from brackish aquifers with a combined ASR/RO system.

Specific objectives are:

- To quantify freshwater recovery by an ASR well design.
- To demonstrate the added value of an ASR /RO system on freshwater recovery.
- To demonstrate the effect of enhanced subsurface iron removal on membrane clogging.
- To demonstrate the impact of freshwater supply from brackish aquifers on regional groundwater quality and Water Framework Directive goals.
- To evaluate innovative solutions to enhance freshwater supply from brackish aquifers

Progress

Aquifer storage and recovery (ASR) of freshwater surpluses in brackish or saline aquifer suffers from freshwater losses upon mixing. In combination with desalination using reverse osmosis, freshwater recovery can be boosted up to 100% of the injected freshwater. At the Westland demo site, the high-end ASR and RO technologies have been integrated for the first time in order to obtain an optimal, robust, and sustainable ecosystem service.

Bruine de Bruin compiled the fit-for-purpose RO-treatment facility, which was added to the existing ASR system. The facility is feed by rainwater mixed with saline groundwater abstracted by the (deeper) ASR wells, which are called Freshkeeper wells. As a result, more freshwater is produced via RO, but at the same time, the shallower ASR-wells are able to abstract more freshwater, since upcoming saltwater is intercepted.

In the next reporting period, KWR and Bruine de Bruin will analyse and optimize the performance of the RO-membranes upon desalination of the mixed, brackish rainwater-groundwater. It is expected that desalination of this water type may induce membrane clogging. The results of the DESSIN RO-system are compared to the current RO-treatment facility at the site, which is abstracting mixed water from the fringe of the ASR bubble.

Table 9: Work Package 33 – Progress on deliverables and milestones due during this reporting period

D / MS number	Title	Delivery date (project month) according to Annex I	Status
MS20	Completed installation of RO membranes in the demonstration site.	M16	achieved

Figure 3 The Westland setup with the Reverse Osmosis system (top) and infiltration / recovery system (below)

Significant Results

- Different ASR cycles are carried out and samples are taken from the infiltration water and recovery water and the water quality determined.
- The monitoring results are evaluated with a calibrated groundwater transport model.
- Completed installation of RO membranes at the demonstration site (ASR/RO).

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

Task 33.1 Quantification of the freshwater recovery by an innovative well design (M1- M16; KWR)

This task has been finalised. Various ASR cycles are monitored to quantify freshwater recovery. The monitoring data from the full scale demonstration setup (freshwater recovery with Multiple Partially Penetrating Wells -MPPWs- and injection/recovery schemes) were evaluated with the previously developed calibrated groundwater transport model.

Task 33.2 Demonstration of the added value of an advanced ASR/RO system (M16-M36, BdB, KWR)

This task is ongoing. The Freshkeeper including installation of RO membranes at the ASR field pilot is completed by Bruine de Bruin (SME) and KWR.

Task 33.3 Demonstration of the effect of enhanced subsurface iron removal on membrane clogging (M24-M42, KWR, BdB)

This task has not started yet.

Task 33.4 Demonstration of the impact of the Westland ASR/RO pilot on the regional groundwater quality (M1-M42, KWR)

This task is ongoing. The quality development of the brackish water target aquifer is currently monitored, and the effect of the ASR/RO system on the regional water quality is evaluated using a regional ground water quality model.

Task 33.5 Evaluation of innovative solutions to increase freshwater supply from brackish aquifers (M1-M48, KWR, ECOL, ADELPHI)

The innovative solutions developed for the Westland case (a Freshkeeper design in combination with reverse osmosis of brackish groundwater) will be evaluated when the Evaluation Framework and the Manual for Practitioners and Policymakers developed in WA1 as well as the DSS Module developed in WP23 are available.

2.2.10 Work Package 34 – Athens Demonstration: Sewer Mining for Urban Re-use enabled by Advanced Monitoring Infrastructure

Objectives

To integrate and validate two promising new technologies: minimal footprint packaged treatment plants and advanced monitoring infrastructure as a new solution to distributed reuse within the city. Specific objectives are:

• To setup an AMI-enabled packaged plant and optimise its performance.

• Implement a hardware and a software platform to record data in real time, orchestrate, process and visualize the data and provide intelligent and timely info-support for key application decisions.

• Integrate both aspects of the solution (treatment and ICT) and monitor their performance.

• Propose a quantifiable plan for the upscale of the solution to the city level and Demonstrate its impact using the Ecosystem Service tool.

Progress

An optimal configuration small packaged plant for urban sewer mining has been delivered on M18. The MBR and RO units have been constructed as individual containers (modular) that are joined together in one containerized compact system offering ease of transportation. The initial design has been improved in that the MBR and RO unit are a hybrid technological product that on the one hand employs membrane technology to treat sewage and on the other hand, in case this function fails, can operate as conventional type of WWTP. In addition this structure allows the units to be deployed either individually or in combination depending on the requirements of any potential future application. Although the construction of the system had been partially completed since M10, as demonstrated to the partners during the WA2-3 coordination meeting in Athens (3-4 November 2014), delays in purchasing part of the equipment resulted in a final delivery on M18. Completed installation of AMI-SM technologies (MS24) was postponed until M20 due to the aforementioned delay.

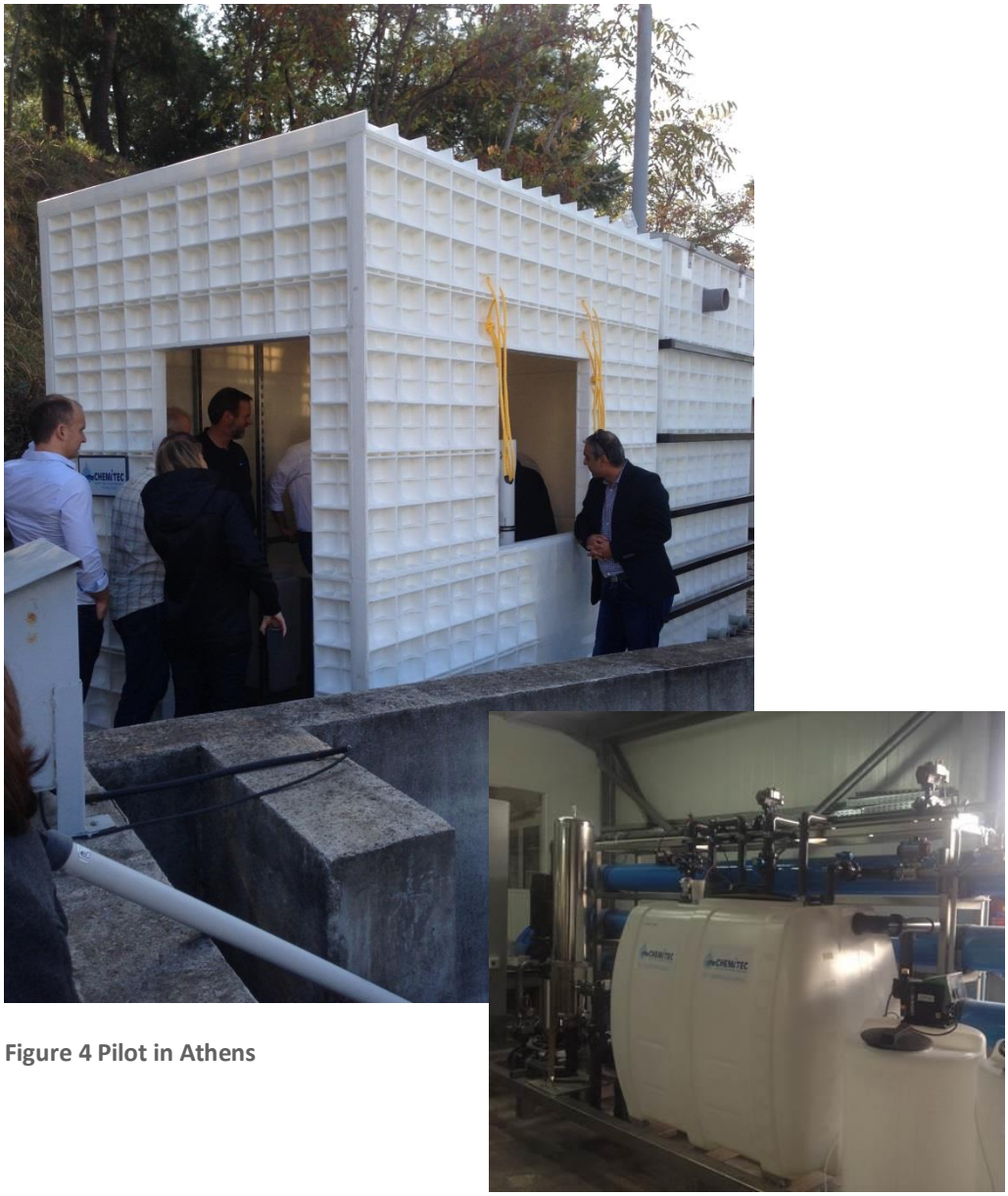


Figure 4 Pilot in Athens

Table 10: Work Package 34 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status
D34.1	An optimal configuration small packaged plant for urban sewer mining	M12→M20	submitted
MS24	Completed installation of AMI-SM technologies	M18→→M20	completion delayed, achieved in M20

Significant Results

- Delivery of robust and compact WWTP for treatment of sewage from permanently inhabited buildings with a capacity of 30-200 EP or analog capacity 6-40 m3/d installed at KEREFYT, the Sanitary Engineering Research and Development Center of EYDAP.
- The MBR and the RO unit, are - module wise - constructed as individual containers that are joined together in one containerized compact system offering ease of transportation, and that second, the MBR unit is a hybrid technological product that on the one hand employs membrane technology to treat sewage and on the other hand, in case this function fails, can operate as conventional type of WWTP.
- The monitoring and supervisory system is dynamic, allows real-time measurement display, supports alerting functionality and historical data display (user can select desired time-range). Furthermore, the developed monitoring solution can be easily adapted and integrated by the other systems implemented at the DESSIN demo sites.
- UWOT has already been applied at a small scale application, the pilot location, to simulate the water and the energy flows. The energy flow includes the energy consumed by the sewer mining unit, but also the insolation (incoming solar radiation) and the latent heat (evaporative cooling). Initial results show the daily environmental energy flow on the studied area during the dry season and the daily volume of potable water required to irrigate the KEREFYT park with and without sewer mining.

Reasons for deviations from Annex I and impacts on resources and planning

The delay in delivering the plant (D34.1) was due to unexpected delays in purchasing part of the plant equipment and, in particular the sensing elements. To acquire the field sensors, a competition had been set up on an early stage. However, given that only a few vendors existed that could provide this technology, and the rigorous procedures involved in the competition process, the competition failed to complete and had to been set up for a second time, causing this delay in plant delivery (D34.1). This delay has resulted in subsequent delay in starting Task34.2 by 6 months.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. D34.1 has been delivered successfully after several months delay. This is not expected to affect achievement of upcoming critical objectives.

Corrective actions needed

It is suggested that Task 34.2, which starts on M18 as a result of the delay in plant delivery, is extended until M36, because the operation of the plant will need to be monitored and optimized for a period of 24 months. This is not expected to affect other tasks.

Task 34.1. Installation of small footprint packaged treatment plant (M6-M12, EYDAP, Chemitec)

The work in T34.1 started as planned, delayed for a six month period and delivered on M18. The work performed in the reporting period is summarized below:

- Purchase of appropriate membrane solutions and technologies following NTUA's benchmark study developed within Task 22.1.1
- Set up of competition for purchase of field sensors
- Subcontractor appointment to implement the required engineering work prior to plant and ICT installations
    - Implementation of a system of pipes, pump and tank to connect the treatment plant with the sewage network.
    - Set up of internet connection
    - Construction of office building in close proximity to the plant to serve as meeting room and computer room where the monitoring web-platform of the developed solution will be demonstrated.
- Configuration of modular packaged treatment solution
- Installation of modular packaged treatment solution consisting of an advanced Membrane Bioreactor (MBR) coupled with reverse osmosis (RO) membranes
- Installation of field sensors
- Connection of treatment plant with the sewage network
- Delivery of optimally configured small packaged plant

Delays in successfully completing the competition for part of the equipment (field sensors) was the reason for the postponed delivery of the plant.

The most interesting result/achievement is the robust and compact WWTP for treatment of sewage from permanently inhabited buildings with a capacity of 30-200 EP or analog capacity 6-40 m3/d that was installed at KEREFYT, the Sanitary Engineering Research and Development Center of EYDAP. Also, it is worth noting that first the two units, the MBR and the RO unit, are - module wise - constructed as individual containers that are joined together in one containerized compact system offering ease of transportation, and second, the MBR unit is a hybrid technological product that on

the one hand employs membrane technology to treat sewage and on the other hand, in case this function fails, can operate as conventional type of WWTP.

The results of the work performed within this task in combination with the results of T22.1.1 have been incorporated in task T34.2.

Task 34.2. Optimize the operation of the membrane wastewater treatment system (M8-M18, NTUA, EYDAP, Chemitec)

The work in T34.2 started with a six month delay as a result of the equal delay in the delivery of the membrane wastewater treatment plant. Having said this, it appears that there was actually a discrepancy between the 24month monitoring requirement in the description of the task and the start-end date of the task, even without the delay in plant delivery. It is therefore suggested that this task is extended until M36 because the operation of the plant will need to be monitored and optimized for a period of 24 months (as stated in the task description). The work performed in the reporting period is summarized below:

- Identification of performance indicators that will be employed to optimize plant operation

It is worth mentioning that the plant's location in the Sanitary Engineering Research and Development Center of EYDAP allows easy proximity to where constant quality tests can be performed for continuous monitoring of the system.

Task 34.3. Implement the monitoring and supervisory system (M12-M24, TELINT, NTUA)

The work in T34.1 started as planned and is progressing according to plan. The work performed in the reporting period is summarized below:

- Implementation of sensor data layer (OGC SOS/SES clients) on a small sized single-board computer (low-cost solution)
- Establish communication SOS/SES clients with the web enabled monitoring user interface platform
- Integration of real field sensor data (e.g. type of measurements, min/max values of measurements – measurement ranges, sampling period) with the S/W platform, produced by a test application.
- Adaptation of the monitoring user interface to incorporate site specific attributes such as location of sensors at the waste water treatment unit
- Adaptation of monitoring user interface according to sensor specific attributes such as range of measured data, sampling rate etc.

The most interesting result/achievement is that the monitoring and supervisory system is dynamic, allows real-time measurement display, supports alerting functionality and historical data display

(user can select desired time-range). Furthermore, the developed monitoring solution can be easily adapted and integrated by the other systems implemented at the DESSIN demo sites.

Task 34.4.Demonstrate the impact of the solution at the city-as-a-catchment scale and identify opportunities/barriers (M12-M48, NTUA, ECOL, DHI, Adelphi)

The work in T34.4 started as planned and is progressing according to plan. The work performed in the reporting period is summarized below:

- Schematic representation of the pilot components to serve as an input to UWOT model, an existing urban water cycle model
- Application of UWOT in KEREFYT (the pilot site) to investigate the impact of irrigation through sewer mining at a small scale
- Initial discussions on policy implications regarding broad application of sewer mining systems

The most interesting result/achievement is that UWOT has already been applied at a small scale application, the pilot location, to simulate the water and the energy flows. The energy flow includes the energy consumed by the sewer mining unit, but also the insolation (incoming solar radiation) and the latent heat (evaporative cooling). Initial results show the daily environmental energy flow on the studied area during the dry season and the daily volume of potable water required to irrigate the Kerefyt park with and without sewer mining.

2.2.11 Work Package 35 – Llobregat Demonstration: Flexible ASR system to recharge different water qualities

Objectives

To demonstrate increase of fresh water availability in the Mediterranean coastal region by deep injection systems (ASR) with variable water qualities. Specific objectives are:

- Validate the pre-treatment and selected pre-potable water suitability at full-scale using the existing facilities of the drinking water operator (AB) in the Llobregat basin.
- Assess the beneficial effect of this Managed Aquifer Recharge (MAR) technique in terms of ESS enhancement and economic approach to include these services in a regulated payment system.
- Adapt the methodology of flexible ASR systems to be applicable to other European sites to provide ASR facilities with a most versatile operation to cope with global change in water scarcity regions.

Progress

The implementation of the Llobregat demonstration site has started successfully. The key for the successful achievement of Milestone MS29 has been the participation of Aigües de Barcelona in the selection of the injection well (P18), the equipment installation and the preparation of the monitoring plan. CATALANA DE PERFORACIONS and ALFAELECTRIC companies have been the big suppliers of piezometers and pumping system respectively. Both companies are usually providers of Aigües de Barcelona, which helped to a fluent implementation works in the DWTP of Sant Joan Despí.

The installation of new observation wells allowed the improvement of hydrogeological knowledge at local level. This information was collected and presented in a partial deliverable (D35.1A) that is currently published in the website as an initial description of the hydrogeological system as a basin for the hydrogeological conceptual model. The injection system is ready to start in July 2015, before the starting date scheduled in the proposal (M26). Sampling campaigns in the piezometers have already started to have a complete characterisation of the native groundwater and the groundwater impacted by the conventional ASR system with potable water.

Figure 5 Llobregat pilot site in Barcelona, injection system (left) and drilling works (top)

Table 11: Work Package 35 – Progress on deliverables and milestones due during this reporting period

D / MS number		Title	Delivery date (project month) according to Annex I	Status
D35.1		Evaluation of the results and impacts on ESS of a flexible ASR system in Barcelona (ES) demo site. Guidelines and recommendations for transfer this innovative solution.	M48	Partially delivered (see List of partial deliverables)
Subdivisions D35.1	D35.1(A)	Conditioning of existing network of observation wells: Hydrogeological information acquired during field works in Sant Joan Despí.	Internally proposed: M14	Available at website (Draft version)
	D35.1(B)	Numerical Model of flow and conservative transport: Evaluation of the impact of the injection and extraction regime in the ASR system in the aquifer of Lower Valley and Llobregat River Delta.	Internally proposed: M 25	Pending (not due in period 1)
	D35.1(C)	Hydrogeochemical impact of ASR using pre-potable water in Barcelona.	Internally proposed: M 25	Pending (not due in period 1)
	D35.1(D)	Guidelines and recommendations for ASR implementation using pre-potable water.	Internally proposed: M 42	Pending (not due in period 1)
MS29		Completed installation of ASR pipelines and potential pre-treatment pilot plant.	M15	Achieved

Significant Results

- Hydrogeological characterization and new instrumentation of installed boreholes: A new geological profile has been provided, including all the disperse information of Aigües de Barcelona historical wells.
- Full implementation of the injection system: The pumping injection and piping connecting the sand filtered channel and the injection well has been completed on time. The system is able to inject 50L/s of sand filtered water independently from the rest of the existing ASR system.
- Definition of the monitoring plan: hydrogeochemical parameters and priority and emerging compounds have been selected. Sampling campaigns have been scheduled and agreed with the local stakeholders: ACA and ASPC, Water Catalan Agency and Health Authority respectively.

Reasons for deviations from Annex I and impacts on resources and planning

There were no deviations from Annex I.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

Task 35.1 Selection and design of additional pre-treatments to comply with WFD and specific European operators' requests (M10-20, CETaqua).

Four disinfection methods have been tested at laboratory scale: Chlorination (Cl_2), dioxichlorination (ClO_2), ozonation (O_3) and UV radiation. Tests have been performed in the experimental platform of Cetaqua located in the facilities of the DWTP of Sant Joan Despí, using sand filtered water as raw water. The following microbiological indicators have been monitored in the experimental plan to assess the effectiveness of each disinfection method at different dose: E. coli, total coliforms, colony account (at 22ºC), Clostridium perfringens, aeromonas and pseudomonas. Moreover, undesired effects are also monitored, as bromide formation, residual chlorine and trihalomethanes formation.

Disinfection has been discarded by Aigües de Barcelona to be implemented at demonstration scale. Preliminary results indicate that the undesired effects can have a negative impact in groundwater. Moreover, it is expected and additional microbiological removal promoted by the passage of the injected water in the aquifer. Analytical results will be compiled and discussed in a technical report (M20)

Task 35.2 Conditioning of existing network of observation wells and implementation of additional piping and selected pre-treatment (M18 – M26, CETaqua).

Well P18 was selected by Aigües de Barcelona as the injection point for the demonstration phase. An existing piezometer of the official network of groundwater control of ACA (Catalan Water Administration) is placed 10 meters away of P18. In July 2014 two additional boreholes were drilled at 2 meters and 5 meters of distance aligned with the existing one. The purpose was to complement the network of observation wells around the injection well (P18), located in the facility of the DWTP in Sant Joan Despí. The PVC boreholes were drilled by CATALANA DE PERFORACIONS.

Total thickness is 50 meters, and the screen is located from 30 to 50 m depth. Piezometer #1 is 2", while Piezometer #2 is 3". Both were equipped with a submerged TCD DIVER.

In June 2015, the piping connection and pumping equipment has been installed. ALFELECTRIC Company provided the pump, flowmeter and valves and complementary equipment for the autonomous pilot for the continuous injection of filtered water in the DWTP of Sant Joan Despí. Nowadays the injection system installation has been completed and the injection is intended to start in early July 2015.

Task 35.3 Evaluation of the impact of the injection with pre-potable water by groundwater and recharge water monitoring (M26-M40, CETaqua)

This task started in M16 with the evaluation of the quality of native groundwater before injection, and continued in May with an injection period of two weeks to assess the response of the aquifer to potable water. Injection of sand filtered water is intended to start in July (M19), before the scheduled in the proposal. This advance is due to the interest of Aigües de Barcelona to test the demonstration pilot as long as possible along the project duration.

Task 35.4 Advanced hydrogeochemical modelling: application to the case study and calibration with real data (M20-M44, CETaqua)

Not started. Will start in M20 as planned.

Task 35.5 Valuation of the changes in ESS resulting from a full-scale injection of pre-potable water in the Sant Joan Despí and Cornellà area using the DSS Module developed in WP23. (M36-M48, CETaqua, A21).

Not started. Will start in M36 as planned.

Task 35.6 Development of a methodological approach for economic analysis and payment regulation of the identified ecosystem services in the Barcelona demo site (M36-M48, A21).

Not started. Will start in M36 as planned.

2.2.12 Work Package 41 – Dissemination of DESSIN and development of its demo sites as showcases

Objectives

The objectives of WP 41 for the reporting period were as follows

- Ensuring a successful run-time and final dissemination of project results to all relevant stakeholders.
- Facilitating the market deployment and exploitation of the technologies through the organization of different events at the participating utilities and tailored workshops.
- To achieve these goals, the methodology followed within WP41 consists of:
- Project Branding: A strong and recognizable brand is essential for a European research project. Recognition value and a consistent appearance remarkably help to transport the important results and outcomes of the project.
- Setting up and maintaining the website and its contents: These days the internet is one of the most powerful communication vehicles and one of the main sources for information. The project will have its own project-specific website domain.
- Public project correspondence and dissemination material: In order to ensure a widespread uptake of project results by relevant end-user groups and in order to reach the different target audiences, there is a need to translate scientific understanding and knowledge into convincing messages that are specifically tailored for the respective target audience. The preparation of dissemination materials will be coordinated on the basis of a concise communication strategy for DESSIN outcomes, consisting of a thorough target audience analysis and an exploitation strategy. This consists of editorial and publishing activities such as the release of an annual DESSIN Magazine, articles, general and specialized press releases, a suite of promotional material, etc.
- Establishing demo-sites as showcases: This will help to establish DESSIN demo-sites as reference sites for lighthouse-solutions that can be presented to various audiences such as interested water managers from other regions with similar challenges.

Progress

During the first 18 months of work WA4, the dissemination materials have been the main focus. Using the website as platform for dissemination, all the major progress has been announced with full detailed news and reports. In addition, both the three Newsletters and the first Annual Magazine are also a platform to generate key information of the DESSIN project, with detailed information about the partner's progress and materials made. As part of additional material not included in the DoW, the WA4 produced a leaflet of the project, which explains the main points of the project. The leaflet was delivered to all the 21 partners at the Emscher June meeting. They all received 50 copies.

The DESSIN website (Task 41.2) (www.dessin-project.eu) has been set up and serves as an information source for the DESSIN project and as a principal outlet of informational products about or coming from DESSIN, such as deliverables or the DESSIN newsletter and magazine.

An internal area has been set up for the DESSIN members to allow them to share their work in progress, and to be able to receive minutes, presentations, project templates, internal documents, among other things. The continuously updated blog on the DESSIN website (at least once a month) has the purpose to update and inform DESSIN members and interested readers about the progress of the project and serves as a comprehensive source of information and motivation.

Progress of T41.4 is according to plan. The Westland demonstration side has been developed into a full scale showcase, including a guided tour along the different objects of the facilities at the pilot site, a mobile banner exposition describing the different technologies applied at the site. The showcase is set up so an extension with additional components (e.g. scale model) is possible. For the other four demonstration sites initial ideas to create a meeting place, in order to realize a lasting exploitation of showcases and innovative technologies, have been developed and discussed with responsible partners. The actual showcases will be developed in the next reporting period. The planning of the setup of these showcases depends on the demonstration activities in WA3.

Figure 6 Visit held by the Westland Demo Site early July 2015

Table 12: Work Package 41 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status
D41.1	Project branding (logo and templates)	M3	delivered
D41.2	Official website launch	M3	delivered
MS2	A book of style is shared to all partners; logo and templates are used in all materials produced	M3	achieved with D41.1
MS6	Blog and social networks are set up and first content is provided	M4	achieved
MS8	Target audience and exploitation strategy	M6	1st version available at intranet, to be continuously updated
MS10	First newsletter published	M6	Achieved. Newsletter #2 and #3 also published

Significant results:

All the dissemination materials planned for the period from month 1 to 18 have been produced according to the DoW (logos, templates, newsletter, news and publications). In addition, from the Communication team we found appropriate to produce extra materials such as the Annual Magazine and the Leaflet, both useful to export the knowledge of the DESSIN works.

The public website of DESSIN (www.dessin-project.eu) is continuously updated. The main site of the website is organized in a newsblog format. Until the end of the reporting period, 28 news items about the project have been posted, - at the date of this report (end of September 2015) this has increased to a number of 39. Furthermore, there are already 27 public downloads (reports, deliverables, publications) available, and a much higher number of downloadable items in the internal area (accessible to project partners after registration). Upon request (and following a simple registration procedure), access to this internal area can also be given to the EC project officer and project reviewers working for the EC.

A suite of posters on the five demonstration sites has been presented at the IWA international conference Cities of the Future (28-30 April 2015, Mülheim an der Ruhr, Germany).

During the first reporting period a showcase has been developed at the Westland demonstration site in the Netherlands. The pilot at Prominent has been redesigned into a permanent showcase for subsurface water solutions. The showcase also includes information on other subsurface water pilots in the Netherlands, and is a co-production of DESSIN and the Dutch Valorization Programme Delta Technology with support of the Water Buffer Foundation and site owner Prominent. A group of 130 visitors of the 36th world conference of the International Association for Hydro-Environmental Engineering and Research already visited the showcase, as part of a tour along water innovations in the Netherlands.

Reasons for deviations from Annex I and impacts on resources and planning

No deviation from Annex I, hence no impact on resources and planning.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is on schedule.

Corrective actions needed

No corrective actions needed.

2.2.13 Work Package 42 – Route to Market

Objectives:

The overall objective of this WP is to maximize the market reach and impact of the water technologies, methodologies and innovative solutions developed in WA1 and WA2 and demonstrated in WA3. WP41 will work in order to achieve market readiness of products/services developed with regard to water quality (WFD), water scarcity and ESS assessment.

Due to resource constraints and for lack of capacity, SMEs are particularly challenged by this step. Assistance in the area has long been proven to be necessary and effective (e.g., German technology support fund), by promoting an approach of prototyping, testing and verifying solutions in the water technology field, SMEs' capacities to develop marketable products and services can be built. DESSIN further seeks to identify entry points to the market and pave the road to market (by addressing and overcoming typical market barriers and proactively promoting the uptake of these solutions among potential clients).

On the other hand, decision-making support will be made available to the demand side which demonstrates the long-term superiority of ESS based approaches. To this end, the ESS valuation methodology itself needs to be promoted, establishing a new standard in water management decisions. This step will also create positive innovation dynamics by the supply side, demanding further solutions in the field. This in turn further incentivizes SMEs to innovate.

In detail, objectives of WP42 are:

- To support supply side push for water technologies by developing sample development approaches.
- To assure international (European and beyond Europe) market uptake of water technologies, by addressing and overcoming market barriers and promoting solutions.
- To create demand side dynamics to further stimulate water technology innovation.
- The identified key innovations actors in DESSIN are classified in 3 groups (Figure 4 in B 1.3). Description of
- WP42 tasks will cover the needs for drive them to market using appropriate actions in each case:
- Technology developers and marketers for innovative solutions.
- Suppliers for innovative solutions using a combination of existing technologies or applying them for an innovative use.
- Providers of innovative services linked to water ESS assessment.

Table 13: Work Package 42 – Progress on deliverables and milestones due during this reporting period

D / MS nunber	Title	Delivery date (project month) according to Annex I	Status
D42.1	Market analysis (inside-out) for ESS software and solution packages	M12 → M15	**delivered**
D42.3	Two business environment (outside-in) reports a) Scarcity b) Quality / WFD	M10 → M12	**delivered**
D42.5	M+E system for innovation and continuous monitoring of framework conditions and outcomes (Demonstrator)	M12 →→ M48 (Dec 2017)	**Completion delayed** due to demonstrator nature; **request to postpone to M48**
MS9	Individual meeting with each SME and technology developer of DESSIN	M6 (→M18)	**Achieved** (survey with all SMES and follow-up interviews with selected SMEs in the initial 6 months; second questionnaire in Nov. 2014 – indiv. SME coop developed based on that; in the course of RP1 meetings / workshops were held with SMEs)
MS17	Formal presentation of DESSIN to the ESS European Roundtables and Platforms	M12	**Achieved** (EIP presentation was held in Nov 2014 through partner CETaqua; input into the action plan of the EIP working group on ESS (through IWW); generally more a focus of year 3 & 4)
MS18	Indicator system developed	M12 → M13	**Achieved** Report on M&E approach and initial indicator system available

Significant Results

- Market analysis (inside-out) completed as toolbox character and being tested with the SMEs
- Two business environment (outside-in) reports completed based on Emscher and Llobregat case; further detailing in form of market specific analyses and country benchmarking for selected SMEs
- M&E system for innovation, indicator shortlist developed
- Networking (B2B) among the SMEs achieved, initial potential partnerships identified
- Cooperation document for route to market support established with the individual SMEs
- Individual workshops carried out with the SMEs in the respective countries to further detail the commercialization of the DESSIN products.
- Good collaboration and information exchange achieved with Work Area 1 on the operationalization of the ESA and, vice versa, market relevant input to the ESA.
- Several blog entries were written for the DESSIN webpage and input into the DESSIN newsletter has been provided.

Reasons for deviations from Annex I and impacts on resources and planning

1. The milestones and deliverables for task T42.6 are practically not in the best order to logically reflect the development and implementation process of the M&E system for innovation.
2. After a careful analysis of the actual needs of the DESSIN SMEs (including a phone assessment, a survey and face-to-face meetings with SME management) it was decided to suggest a slight amemdnemt of tasks to better address the needs of the SMEs.

(See "Corrective actions needed" below for more details.)

There is no impact on project objectives and budget.

Reasons for failing to achieve critical objectives and impacts or for not being on schedule

All critical objectives for this reporting period were met. Work is now on schedule.

Corrective actions needed

1. For Task T42.6 the milestone (MS18) and deliverable (D42.5) for the development and set-up of an M&E system have turned out to be in the wrong practical order. The development of the Monitoring & Evaluation (M&E) System for innovation has three stages. This is explained in table WT4 (List of Milestones) of Annex I part A, under Milestone MS18: it shall be achieved in a first version in month 12, reviewed by month 25, and finalized by month 48. Deliverable D42.5 also refers to the output of the same task, and its nature is defined as a 'demonstrator'. Hence, this should be the final output of this task in month 48. However, the DoW indicates that D42.5 shall be delivered at M12, - but at this stage, it cannot be delivered as a 'demonstrator', because in line with MS18 it is just available as a first, initial

version at this time. Deliverable D42.5 should be the final output of this task in month 48 as a "demonstrator" deliverable type, whereas the earlier versions should be considered as parts of milestone MS18.

2. The uptake and involvement of the DESSIN SMEs in the activities of WP42, the route to market, had been very slow for most of the part of 2014.

It was therefore decided jointly with the participating SMEs and partners during the Athens WA2/WA3 event in November 2014 to send out a short questionnaire to the technology SMEs asking them for the support services that they now require from the DESSIN project. The short questionnaire was based on the tasks for WP 42 and the potential activities presented to the project partners earlier in 2014.

Seven out of eight technology SMEs replied to the questionnaire. The evaluation of the answers revealed that there was a strong interest in most tasks, except for capacity building. Also, some tasks that were already under development in a more general manner were requested to be implemented with the individual SMEs. This includes the individual implementation of inside-out market analysis reports and outside-in market analysis reports that were developed in a more general manner as part of Task T42.1 and Task T42.3. There was also a strong interest in an M&E system for innovation.

→The following task amendments are therefore suggested:

- T42.2: Include the further implementation of inside-out and outside-in market analysis reports for individual SMEs in Task T42.2 (sample commercialization process);
- T42.2: Amend the capacity building activities to feature individual support and peer learning ("business-to-business" workshops) for the SMEs;
- T42.6: Implement the web platform for M&E instead of capacity building (this implies moving the web platform from T42.2 and T42.5 to T42.5);
- T42.6: Adjust the logical sequence of deliverable D42.5 and milestone MS18 for this task.

→The following deliverables and milestones amendments then are (changes marked in red):

D/M					Months	Effect on scope or budget of the project
D42.5	M+E system for innovation and continuous monitoring of framework conditions and outcomes	WP42	D	PU	M48 (instead of M12)	No change to original scope or budget of the project
MS18		Indicator system developed	WP 42	M12, reviewed at 25, finalized and implemented at 30-48	M12: first list of indicators validated, outline M&E system developed; M25: updated list of	No change to original scope or budget of the project

					indicators; M48: Definitive list of indicators for M+E applied in DESSIN	
MS 27		Implementation of web platform for M&E	WP 42	M25	The website is online and it has initial content	No change to original scope or budget of the project

The responsible EC project officer has been informed about these corrective measures suggested, and has been asked for advice whether the suggested changes to the work plan are acceptable and whether they require a formal amendment of Annex I of the Grant Agreement (E-mails by coordinator to project officer Rossella Riggio on 13 Feb 2015 and 06 March 2015; Phone conversation with project officer Rossella Riggio on 20 Feb 2015; E-mail by coordinator to project officer Wojciech Klimek on 19 March 2015). Feedback/decision is pending.

Annex A to this report contains a proposal for a modified Work Package description of WP42 that reflects the changes suggested above. This had been included in the above mentioned e-mail correspondence, together with comprehensive background information and justification.

The project consortium asks for guidance whether the corrective measures as outlined above can be accepted and approved by the EC without further formal procedures, or whether a formal amendment of the Grant Agreement (Annex I) is needed, based on the changes indicated in Annex A to this report.

These changes do not affect the original scope and objective of the project, and have no effect on the budget of the project. There is no change in the distribution of work between beneficiaries. In fact, the suggested changes in the task description intend to ensure that objectives of WP42 are met even more effectively, based on what the WP lead has learned during the starting phase of DESSIN about the SMEs and their specific needs.

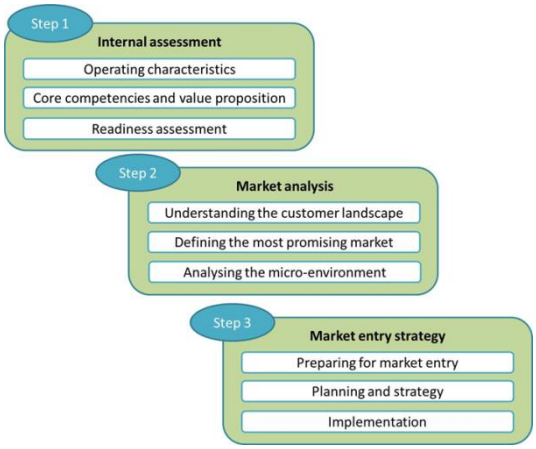
As explained in the E-mails referred to above, the suggested changes in the tasks as described in Annex A to this report will:

1. **Make the timing and sequence of milestone MS18 and deliverable D42.5 more logical (without changing the content);**
2. **Extend the use that is going to be made of D42.1;**
3. **Clarify in a better way that D42.1 and D42.3 are providing a step-by-step approach and guidance for the market entry; shift the focus of T42.2 from general to more tailored / individual support of the SMEs involved in DESSIN;**
4. **Draw a clearer line between the development of the general approach and material on the one hand (in T42.1 and T42.3) and the actual and more individual application together with the SMEs on the other hand (in T42.2);**
5. **Shift the balance between 'capacity building' activities (not so much in demand by the SMEs) and the establishing of a 'Monitoring + Evaluation M+E' system for innovation (needed/wanted by the SMEs) by changing the scope of the web platform from capacity building (as mentioned in T42.2 and T42.5) to a web platform for the M+E system (suggested as new element under T42.6)**

with no effect on allocated budgets. The DESSIN consortium therefore hopes that the decision will be in favor of these suggested changes, which are aimed to better reflect the SMEs' requirements and improve the overall effectiveness of task implementation within WP42.

Activities have taken place in all six tasks of work package 42:

Task 42.1 Development of sample approach market analysis reports for ESS solution packages demonstrated in DESSIN (inside-out) (M4-M12)



As part of this task a "Sample approach market analysis report for ESS solution packages demonstrated in DESSIN (inside-out)" has been developed. The report contains three key steps for market analysis: (1) an internal assessment of the respective SME, (2) a market analysis part, (3) a market entry strategy part. The report is based on the experiences of various DESSIN SMEs and contains tools for further application in the DESSIN project. The graphic on the right shows the structure of the report. Elements of the analysis have been and are being tested with the DESSIN SMEs and the report will be updated at the end of the project to include the actual experiences made in terms of commercialization related to the ESS aspects. The report has been made available through the DESSIN internal webpage.

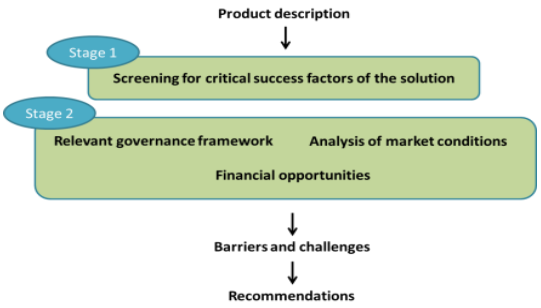
Task 42.2 Develop sample commercialization process maturity models and capacity building strategies for SMEs (M6-M48)

Within this task most of the work with the SMEs is taking place at the moment. Early in the project, an initial survey was sent to the SMEs to get their input on commercialization aspects, this was followed by telephone interviews. A modular "solution package" for DESSIN was developed and proposed at the DESSIN WA2/WA3 meeting in Athens in November 2014. A second, short questionnaire was then sent to the SMEs to get feedback on services they would like to receive from WA42. Based on the responses, a rough outline plan was developed and an initial cooperation was set up with each SME. This was followed by telephone calls with the SMEs and from spring 2015 onwards with SME workshops in the respective countries. Workshop results include key drivers & pressures for the sites; a value proposition in view of the ESS solution; opportunities & barriers for further commercialization of the solution; environmental benefits of the solution for ESS matching; customer landscape and potential business partners; narrowing down promising markets; potential networks and fora for further lobbying and ultimately, defining the next steps of the market entry strategy. In case of the Athens demo site, a joint workshop was carried out with all partners together (see below pictures). Individual SME cooperation documents have been developed to outline the next steps.

Information exchange has been established with WA1 on the operationalization of the ESA with the SMEs. Meetings were held with Ecologic on this matter and information collected from the SME workshops was shared with WA1.

An SME peer learning workshop took place with the DESSIN SMEs collectively in June 2015 (B2B peer learning format). During this workshop, the DESSIN SMEs had the opportunity to network, learn about market characteristics of the other DESSIN countries, identify room for collaboration and to exchange their views on SME-specific market challenges.

Task 42.3 Two challenge-specific business environment (outside-in) reports on (a) Scarcity and (b) Quality / WFD (Financial and regulatory environment towards commercialization) (M3-M10)



As part of this task, two outside-in business environment reports were developed. One report focused on water scarcity issues with the Llobregat case being exemplarily discussed, the other report concentrated on water quality /WFD issues with the Emscher case being the underlying example. Cooperation was achieved with the DEMEAU project for the water scarcity case (ASR technologies). The graphic on the right shows the structure and flow of these reports. A WssTP/ERRIN RIS3 Event in Brussels was visited for networking and to explore regional funding opportunities. Both reports have been made available through the DESSIN internal webpage.

Task 42.4 Support ESS lobbying for efficient modes of governance and finance (M 12-48)

Generally the focus of this task will be during years 3 and 4 once more results with respect to the ESA are available.

An initial context analysis research was conducted for T42.4 and T42.5 (e.g. other projects, innovation networks, events).

Connections with the EIP working groups were established through the project partners. I.e. IWW (at project start) and CETaqua (In Dec 2014) presented the project to the EIP working group / conference. Input from WA42 into the action plan of the EIP working group on ESS has been recommended to IWW who are an established partner of the working group.

A WssTP/ERRIN RIS3 Event in Brussels was visited for networking.

Task 42.5 Create demand side dynamics by promoting standardised ESS-based assessment framework for new technology and management (M 8-48)

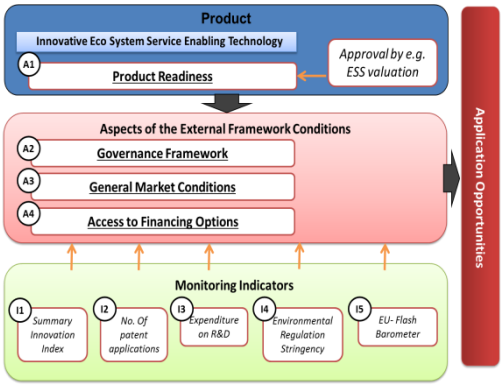
Generally the focus of this task will be during years 3 and 4 once more results with respect to the ESA are available.

An initial context analysis research was conducted for T42.4 and T42.5 (e.g. other projects, innovation networks, events, conferences/trade fairs).

The trade fair “Water Berlin International” was visited to initially approach potential SME partners and clients.

Task 42.6 Establish a monitoring & evaluation (M+E) system for innovation and continuous monitoring of framework conditions and outcomes (M 5-48)

The aim of task 42.6 is to set up an indicator system to keep track both on progress and impediments of conditions for marketization of the innovative products and services demonstrated within DESSIN. This system should document the respective framework conditions as well as outcomes. In order to achieve that, an effective indicator set for a monitoring and evaluation (M&E) system is developed that can be used by the SMEs developing and demonstrating innovative solutions within DESSIN. The M&E system supports the entrepreneurs in identifying application opportunities for their solutions during the course of the project and also after the project ends. As the first part of milestone MS18, a report has been written that outlines the initial approach and a potential set of indicators that could be used. The graphic on the right outlines the initial M&E approach and indicator categories. The indicator system will be reviewed by month 25 and finalized by month 48. A complementary website will be set up for the M&E system to have it readily available for the entrepreneurs.



3 Project Management during the period

Management activities in DESSIN serve to co-ordinate, monitor and guide the progress of the project, in order to ensure that the objectives are met. To achieve these aims, a simple and efficient management structure has been used, with clearly defined roles and responsibilities, a transparent decision making process, clear reporting lines and strong progress monitoring. DESSIN has the following main internal management structures:

- Project Steering Board with representatives of all project partners.
- Project management with the Project Coordinator and the Project Management Team.
- Work Area Management Team (WAMT) with leaders of the 5 Work Areas
- Work Package Management with 9 Work Package leaders for 14 Work Packages (some partners lead more than one Work Package).

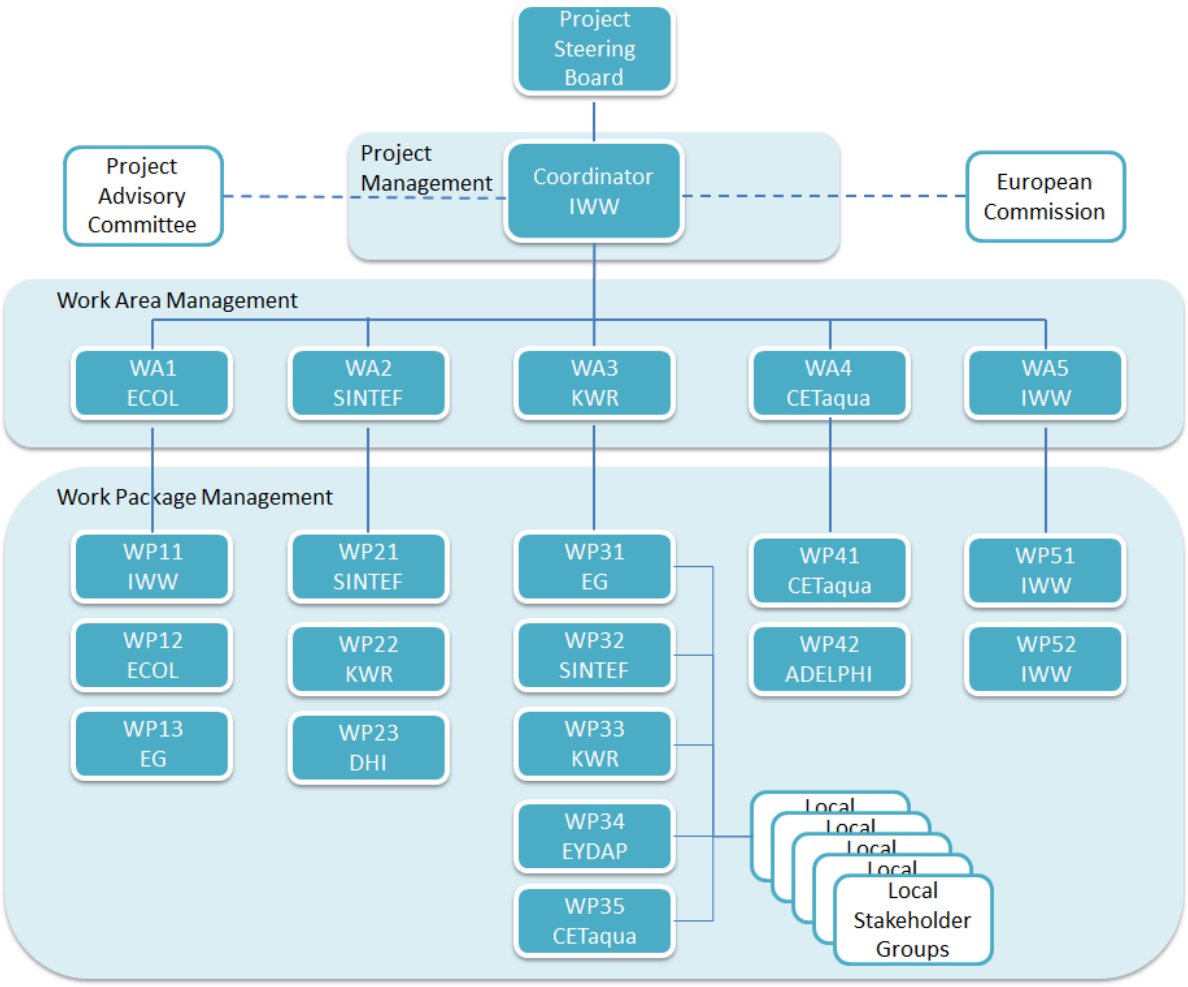


Figure 7 Project management structures of DESSIN

The Project Steering Board (PSB, chaired by the coordinator) is a representative body of all partner organizations in DESSIN, and is the ultimate decision-making and arbitration body. Each beneficiary has one official representative with voting rights in the PSB. It discusses and makes decisions on issues related to the general progress of the project, e.g.: Project implementation and the evaluation of the project milestones and deliverables; overall course of the project and any strategic changes if required (contingency plan); Review, if necessary, of the initial work plan and reallocation of resources and tasks; Publications, exploitation and dissemination of results; Administrative, legal, contract ual and financial status and development of the project; Matters of Intellectual Property Right (IPR) that go beyond regulations laid down in the consortium agreement; Approval of the periodic and final reports before submission to the EC services.

The Project Coordinator (David Schwesig, IWW) is responsible for the day-to-day coordination of the project and is the main interface between the Consortium and the European Commission. He ensures that work progress is in accordance with the timetable, and carries out the following tasks:

- Coordination of all project activities.
- Monitoring of progress and collection / compilation of scientific and financial reports.
- Communication with the EU Commission.
- Information management and facilitation of internal communication.
- External communication.
- Organisation (and chairing) of PSB meetings and WAMT meetings.

The Project Coordinator is supported by a Project Management Team composed by other members of the Project Coordinator's organisation, for support in administrative, financial, contractual and organisational matters.

The Work Area Management Team (WAMT) consists of Work Area (WA) leaders, most of whom are also leaders of at least one Work Package (WP) in their WA. They have an overview of the WP activities and maintain close communication with the WP leaders. In particular, the WA leaders carry out the following tasks:

- Synchronisation between the WP leaders in the same WA.
- Supporting the Coordinator in co-ordination of all horizontal activities among the WAs.
- Providing input to the Coordinator for the contractual reports to the EC.

Together, the WA leaders form the Work Area Management Team (WAMT). They have monthly meetings (usually as phone conferences chaired by the Project Coordinator) to discuss progress within the WAs and the need for any corrective measures. Two meetings per year are face-to-face meetings, preferably back-to-back with other DESSIN events. The WAMT discuss progress, budget and arising issues in more detail than can be done by the PSB, e.g. down to the WP and task level. They discuss and propose solutions in case of:

- Foreseeable difficulties in a WA / WP to achieve the planned deliverables.
- Need for harmonisation of activities between and across WAs.
- Obstacles and barriers causing delays in progress, in particular if this is likely to affect other WPs / WAs that need the output of another WP / WA as a starting point.
- Need for reallocation of tasks within or among the WPs / WAs if needed.
- Weak performance or malfunctioning of a partner.

WA and WP leaders are the first source of intervention when there is a lack of progress in a WA or WP. Together with the Project Coordinator, the WAMT decides whether an issue can be tackled internally or will have to be communicated to and decided by the PSB.

In matters where a decision by the PSB is required such as a reallocation of budget and tasks or the request for an amendment of the Description of Work (DoW), the WA leaders support the Project Coordinator in developing a proposal that can be made to the PSB for decision.

For the sake of maximum transparency of project management and decision-making, minutes of WAMT meetings are made accessible to all partners at the internal members area of the project website (www.dessin-project.eu).

3.1 Consortium management tasks and achievements

During the reporting period, the following achievements were made with regard to the project management and consortium management tasks:

3.1.1 Organization of meetings

The first milestone of the management activities in DESSIN (Milestone MS1) was the organization of the kick-of meeting which took place at Brussels in month M1 of the project on 28-29 January 2014. This was held back-to-back with the first meeting of the WAMT and the Project Advisory Committee PAC. The objective of this meeting was to facilitate team building, get every project partner tuned in on the overall objectives, work flow and work mode of DESSIN, and to pave the way for a successful starting phase of the project. At the meeting, the responsible project officer of the EC was present as well as the members of the Project Advisory Committee, who also gave a first set of recommendations for the first project period.

Another large meeting co-organized by the WAMT and the Project Coordinator was the meeting of nearly all Work Packages and Work Areas at Athens on 3 and 4 November 2014. Originally intended as a WA2 and WA3 coordination meeting, the need became evident to involve also WA1 and WA4 because the development of the evaluation framework (within WA1) and the dissemination / route to market activities of WA 4 are inextricably linked to the work in the case studies. This meeting was also held back to back with a WAMT meeting to review the first 10 months of DESSIN.

The second contractual PSB meeting was organized at Emscherquellhof (Holzwickede, Germany) on 22 and 23 June 2015 during month M18 of the project. The main objective of this meeting was to present and discuss the overall progress of DESSIN and to plan the finalization and approval procedures for the first periodic report to be sent to the Commission's Services.

A number of additional meetings have been held during the first reporting period of the project, either at the level of Tasks, Work Packages, Work Areas of even combinations of several WPs or Was. Meetings involving more than one Work Area were usually co-organized by the coordinator, else they were organized by the responsible unit (leader of task, WP or WA). Meetings were held as phone conferences or web-based conferences wherever feasible, in order to minimize both the

travel expenses and the carbon footprint of project activities. For a detailed overview on meetings see table in section 3.4.

3.1.2 Coordination of activities across the Work Areas and Work Packages and progress monitoring

This was mainly taken care of by the Work Area Management Team (WAMT) during its monthly phone conferences and the 2 face-to-face meetings per year. The monthly meetings were usually carried out as 60-90 minutes meetings, prepared by the Project Coordinator. They were following a standardized agenda. As a main tool, a simple Excel-spreadsheet (Project Management File) was used to keep track of a) all tasks agreed at the WAMT, b) all decisions taken by the WAMT, c) progress, status, delivery date, QA/QC measures and corrective measures with regard to all contractual items (deliverables and milestones) and d) project events and dissemination activities. Minutes of the meeting and an updated version of the (Project Management File) were prepared by the coordinator and circulated for approval within 10 working days. After approval, file and minutes were uploaded to the internal area of the project website, accessible to all project partners.

3.1.3 Facilitation of internal communication

DESSIN is a large and complex project with 20 beneficiary institutions, and currently nearly 100 people directly involved in the project work. So there is a clear need for structured and facilitated communication in order to ensure a smooth collaboration. Several measures have been taken in order to facilitate internal communication among the project partners.

As the most important measure, general communication in the project is organised in a hierarchical way according to the project management structure. Decisions at the level of the Work Area Management Team are communicated by the Work Area Leaders to the Work Package Leaders, and from there to the leaders or teams that are responsible for Deliverables, Milestones or Tasks. Information that is of general interest to all partners (e.g. reporting tasks for the first periodic report, invitation to general meetings, information about general agreements) are distributed on a case-to-case basis by the Project Coordinator directly to all partners. Furthermore, the monthly WAMT teleconferences both allow the coordinator to maintain a watching brief on unscheduled bilateral initiatives between partners, and provides a forum for the discussion of immediate challenges which WA Managers face, providing opportunities for collaborative problem solving.

The project uses an Excel-based contact list that is continuously updated by the coordinator and available at the DESSIN intranet part of the project website. This contact list contains names and contact details (e-mail, phone and fax number) of all project participants, and each person is linked to the items (Work Areas, Work Packages) which he/she is leading or participating in. For any given item, the responsible team can therefore be easily identified and contacted.

Furthermore, the website's internal area also contains sections for downloads, results, events etc., where additional material can be provided (e.g. minutes and slides of meetings, announcements of events, internal guidance documents on project rules or common definitions, publications, project templates according to the DESSIN brand and style guideline, contractual documents and reports).

A regular e-mail newsletter summarizing new uploads, events, results and developments etc has been set up and is regularly sent to all project partners (unless they unsubscribe) and other interested external contacts.

3.1.4 Reporting to the European Commission

Reporting to the European Commission is carried out via the Project Coordinator. In addition to the preparation of this official first periodic report, the co-ordinator has been in contact on a less formal basis to the first three of four sequentially responsible project officers (Lieve van Camp, Severina Markova, Rossella Riggio) via e-mail and phone contacts. The EC project officer has been invited to attend both the kick-off and M18 PSB meetings. At the kick-off meeting in Brussels, project officer Severina Markova has been present and gave a short welcome note and some guiding remarks.

3.1.5 Quality control of project deliverables

Two measures for quality control were implemented during the reporting period. First, the WAMT agreed on clear rules for the scientific review of deliverables prior to their submission. Each deliverable is reviewed by two independent reviewers. They can both be from the same Work Area that produces the deliverable, but one needs to be from another organization than the one responsible for the deliverable. Neither of the reviewers are an author or co-author of the deliverable. For milestone documents, it was decided by the WAMT that the responsible Work Area leader can decide on a case by case basis about the adequate quality control measures. For each document, the reviewers involved in the quality control are named in the document.

A second implemented quality control measure is the assignment of a Project Advisory Committee (PAC). The PAC consists of independent experts representing different categories of stakeholders.

The PAC provides independent external advice on the project operation and outputs, instigates or facilitates links to other initiatives and reviews the outcomes of the project. The Project Coordinator organised for the attendance of PAC members at the project kick-off meeting and also at a separate meeting of the PAC members during the kick-off.

The PAC also met adjacent to the M18 PSB meeting. PAC members received the presentations of the DESSIN Work Packages for the PSB meeting one week in advance in order to prepare for the meeting. After each plenary WA presentation there was a discussion with a dedicated slot of 5 minutes for questions / recommendations from PAC members only. Based on the material provided before the meeting, the PAC gave a feedback during a dedicated presentation slot on the 2nd day of the M18 PSB meeting.

The costs of PAC member attendance at these meetings (travel and accommodation, no honorary) were reimbursed from the WP51 (scientific coordination) budget of DESSIN and reported under 'RTD/Innovation other direct cost' by the WP lead (3rd party linked to coordinator under GA Article 7 special clause 10). . At the kick-off meeting in Brussels (January 2014), four PAC members participated, but only one of them (Prof. Javier Uche) claimed reimbursement of travel cost,

because the others are either residents of Brussels or covered their travel expenses from other sources.

At the PSB18 meeting in June 2015, only one PAC member could attend. As he claimed his travel cost after the end of the first reporting period (invoice dated in month 19), these costs will be part of the M36 report.

For assessment of the situation with regard to late deliverables D22.4 and D22.5, we refer to chapter 2.2.5 (section 'Progress').

3.1.6 Re-adjustment of the work and amendments of the contract

The Project Coordinator is responsible for organizing the re-adjustment of tasks, re-allocation of budget, amendment of the contract with the EC and maintenance of the consortium agreement resulting from any problems like the ones described in more detail in section 3.2 (if any).

3.2 Problems and how they were solved or envisaged solutions

Up to now, DESSIN has faced only few and minor problems. These were of simple technical or organizational nature and could be solved at task level or work package level.

DESSIN has seen some uncritical delays that were monitored by the WAMT, but not requiring intervention so far. These minor delays were analyzed against a list of critical points that had been developed at the start of the project, and none of the delays so far has been classified as critical with regard to DESSIN achieving its planned objectives.

The following (non-critical) problems were discussed (and solved) at the level of the Work Area Management Team (WAMT):

Aligning WP11 and WP13 and shifting the start of WP23

As explained in the chapter on work package WP13, it was decided to better align WP11 and WP13 and follow a joint approach with a stronger involvement of the owners of the 'mature sites'. This means that milestone MS21 will be achieved together with D11.2 & D13.1 in M24, which is six months later than the original planning for MS21. MS21 was also an important starting point for Work Package WP23. As a consequence, WP23 will be delayed by up to 6 months which is not considered critical for the application of the software in the case studies (now starting around M34/35). Leader of work package WP23 (DHI) has been asked and agreed to support preparation of MS21 by defining their requirements and supporting the development of template/format for MS21, - this will facilitate a smoother start of WP23 and partly compensate for the delayed start. This shifting start of WP 23 is considered uncritical because it doesn't change or affect the overall objectives and outputs of the project, nor does it have any impact on the use of resources.

Modifications in Work Package 42

As explained in the chapter on work package WP42, there is a need to modify the timing and sequence of one deliverable (D42.5) and one milestone (MS 18), and to adjust the scope of some supportive activities for the SMEs according to the actual needs of the SMEs. A proposal how to tackle these problems was worked out by the WP leader together with the coordinator and presented to / discussed with the responsible EC project officer. This was done in particular in Feb/March2015 with Mrs. Rossella Riggio, who was supportive to the suggested changes but planned to ask for internal advice within the EC services whether these changes require more formal steps (amendment of the Grant Agreement). As a final feedback from the EC side on this is pending since then, it was decided to start working according to the suggested chances, in order to ensure that progress can be made and overall objectives of the project be met.

3.3 Changes in the consortium

3.3.1 Addition of a Third party under special clause 10

Beneficiary 19 (Stiftelsen SINTEF) was requesting to have SINTEF Energi AS (PIC: 999513221) added to the Grant Agreement (Article 7) as its 3rd party under special clause 10 by effective date of 1st January 2014. The connection between Stiftelsen SINTEF and SINTEF Energy AS (hereinafter referred to as SINTEF-E) is as follows. The connection between SINTEF and SINTEF-E has a formal external recognition, in the framework of the legal SINTEF Group structure as mother and daughter companies, within the SINTEF Group. The relationship by nature is broad and not limited to the ECGA nor specifically created for the work in the EC-GA, and its duration goes beyond the duration of the DESSIN project and actually pre-dates and outlasts the DESSIN EC-GA. SINTEF-E has broad experience and excellent expertise within the tasks it will carry out in the project. The work of SINTEF-E (requested EC contribution of EUR 39 415) is corresponding to about 2.5 person months within the following work packages: WP 11 "Development of ESS Valuation Framework" and WP 32 "Hoffselva (NO) Demonstration".

Accordingly, the following changes were made to the EC-GA including Annex I:

- The new entity SINTEF Energi AS (PIC 999513221) was added as 3rd party linked to beneficiary no. 19 (effective date of 1 January 2014), contact data completed.
- Part of the budget of beneficiary 19 was transferred to its 3rd party SINTEF Energi AS.
- Annex I part B (Description of Work) chapter 2.3 table 6 was updated and in the subsequent text section on third parties, the relation between beneficiary 19 and its 3rd party (and distribution of tasks) was described in more detail. Furthermore, a detailed breakdown of the budget distribution between beneficiary 19 and its 3rd party was added to this chapter (table 9).

The EC Services (DG Research & Innovation) agreed to this request for change by letter Ares(2014)1453759 dated 06 May 2014.

3.4 List of project meetings, dates and venues

Table 14: Project meetings, dates and venues

Meeting	Date [yyyy-mm-dd]	Location
WAMT	2014-01-28	Brussels, BE
PSB kick-off	2014-01-28 - 2014-01-29	Brussels, BE
WA3	2014-02-27	Teleconference
WP21/32 kick-off meeting	2014-03-04	Oslo, NO
WAMT	2014-03-5	Phone conference
WA1 Telco	2014-03-18	Phone conference
WA3	2014-03-27	Teleconference
WAMT	2014-04-02	Phone conference
WP21/32 Meeting with demo site owner, Oslo VAV	2014-04-09	Oslo, NO
WAMT	2014-05-13	Phone conference
WA1 coordination meeting I	2014-05-20- 2014-05-21	Berlin, DE
WA3	2014-05-22	Teleconference
WAMT	2014-06-04	Phone conference
WA3	2014-06-19	Teleconference
WA1 Telco	2014-07-14	Phone conference
WAMT	2014-09-10	Phone conference
Vietnam delegation (viseminister agriculture) visit demonstrations site	2014-9-17	Westland (NL)
Conference Deltas in times (presentation, organiser work shop on ASR)	2014-9-24/26	Rotterdam (NL)
WA3	2014-09-25	Teleconference
WAMT	2014-10-01	Phone conference
WA1 Telco	2014-10-23	Phone conference

WP12 project work - survey	2014-10-27	Århus, DK
WAMT	2014-11-03	Athens, GR
WA2 & WA3 coordination meeting, involving WA1, WA4 and WA5	2014-11-03 - 2014-11-04	Athens, GR
WP12 data acquisition via survey	2014-11-10	Dortmund, DE
WP21/32 Safety and vulnerability evaluation for Hoffselva site	2014-11-14	Oslo, NO
WAMT	2014-12-03	Phone conference
WA1 Telco	2015-01-15	Phone conference
Sustainability Assessment Telco	2015-01-29	Phone conference
WA3	2015-01-30	Teleconference
WAMT	2015-02-04	Phone conference
WP21/32 Project work at Hoffselva	2015-02-05	Oslo, NO
WA1 coordination meeting II	2015-03-4- 2015-03-5	Barcelona, ES
WP21/32 site inspection and meeting with stakeholders in Hoffselva	2015-03-04	Oslo, NO
WAMT	2015-03-11	Phone conference
WA3	2015-03-15	Teleconference
Informative workshop on EYDAP R&D activities	2015-03-19	EYDAP pilot syte KEREFYT (Athens, GR)
Conference National Climate Adaptation strategy (showcase one of most promising innovation!)	2015-3-24	The Haque (NL)
WAMT	2015-04-01	Phone conference
WA1-WP42 exchange meeting	2015-04-09	Berlin, DE
WP11&WP13 Task Force Telco	2015-04-09	Phone conference
Essener Tagung	2015-04-15 - 2015-04-17	Aachen, DE
4. Leipziger Gespräche zur	2015-04-20 -	Leipzig, DE

Wasserrahmenrichtlinie (Workshop on Water Framework Directive)	2015-04-21	
WA3	2015-04-23	Teleconference
IWA Cities of the Future Conference – Transitions to the Urban Water Services of Tomorrow	2015-04-28 - 2015-04-29	Mülheim, DE
WP11&WP13 Task Force Telco	2015-04-30	Phone conference
WA3	2015-05-15	Teleconference
WAMT	2015-05-20	Phone conference
WP11&WP13 Task Force Telco	2015-05-21	Phone conference
Sustainability Task Force Telco	2015-05-21	Phone conference
WP42 route to market joint workshop	2015-05-21 (2d)	EYDAP pilot site-KEREFYT (Athens, GR)
WP32 project work at demo site	2015-05-26	Oslo, NO
Sustainability Task Force Telco	2015-05-28	Phone conference
Visit demonstration site by conference membersannual meeting IAHR (130 people)	2015-6-1	Westland (NL)
Sustainability Task Force Telco	2015-06-03	Phone conference
WP11&WP13 Task Force Telco	2015-06-09	Phone conference
Aquaconsoil conference (presentation, theme organiser)	2015-6-9/12	Copenhagen (DK)
IFAK Seminar on ADESBA RTC	2015-06-10 - 2015-06-11	Magdeburg, DE
WAMT	2015-06-17	Phone conference
5th Ecological Colloquium of the BfG & PIANC-Seminar	2015-05-05 - 2015-06-17	Koblenz, DE
3 Deutscher Kanalnetzbewirtschaftungstag	2015-06-17	Gelsenkirchen, DE
PSB M18 meeting, also WAMT and PAC meeting	2015-06-22 - 2015-06-23	Holzwickede, DE
WP42 meeting with SMEs	2015-06-23	Holzwickede, DE
WA1 meeting	2015-06-23 -	Holzwickede, DE

	2015-06-24	
WP11&WP13 Task Force Telco	2015-07-09	Phone conference
Sustainability Task Force Telco	2015-07-15	Phone conference

3.5 Project planning and status

Project planning is facilitated by use of a simple project management spreadsheet containing all WAMT tasks and decisions, a detailed schedule for each contractual item (deliverables and milestones) with information about responsibility, expected delivery date, QA planning and status, corrective measures required etc. This is checked and updated during the monthly WAMT phone conferences and available to all project partners via the internal area of the project website. Short-term planning is mainly done during the monthly WAMT meetings.

At the date of this report, DESSIN has

- Delivered 11 of 12 deliverables due during the first reporting period. For the late one (D42.5), see detailed explanations about WP42 and the suggested changes.
- Achieved 23 of 24 milestones planned for the first reporting period. For the late one (MS21) see explanations on WP13.

Hence, the project planning and status seem to be well on track. Late contractual items will be delivered or achieved without critical impact on the overall project or its expected objectives and impact. Detailed information on the status of specific work packages and deliverables as well as information on their timeliness or any delays are given in the WA descriptions in sections above.

3.6 Impact of deviations from planned milestones and deliverables

See the following two sections above

- “Problems and how they were solved or envisaged solutions”
- “Project planning and status”.

3.7 Changes to the legal status of beneficiaries

None during this reporting period.

3.8 Development of the project website

Detailed information on the development of the project website (www.dessin-project.eu) is given in chapter 2.2 section on Work Package WP41.

3.9 Possible co-operation with other projects and initiatives

DESSIN is currently cooperating in particular with the two following projects and initiatives:

- MARSOL (http://www.marsol.eu) is another European WATER-INNO-DEMO research project that aims to demonstrate Managed Aquifer Recharge (MAR) as a sound, safe and sustainable solution to water scarcity and drought. The basic idea is simple: Collect water when there is too much of it and store it for dry times in aquifers. MARSOL shallow well

devices and monitoring shall be applied at DESSIN Athens pilot site and DESSIN decentralized treatment technologies for sewer mining will serve as an alternative source of water to use for recharge. The small footprint treatment approach used within DESSIN, when coupled with the MAR approach, can result in an energy-saving solution.

- Action Group “Ecosystem Services for Europe” of the European Innovation Partnership (EIP) on Water: Practical exchange with this” EIP Action Group kicked off in February 2014 with the discussion of existing methodologies for the economic valuation of ecosystem services. During a conference call where members of the two consortia participated, different perspectives on the challenges, barriers and potential solutions regarding the economic valuation of ecosystem services were discussed. In addition, policy recommendations were formulated on the basis of this first exchange. A background document prepared by Ecologic Institute informed the discussion. Collaboration resumed towards the end of 2014 and early 2015 when members of the ESE AG were invited to review Deliverable D11.1 of DESSIN (Internal state of the art report on ecosystem services evaluation). The feedback gathered has informed the ongoing work on the development of the DESSIN ESS Evaluation Framework during the second year of the project. Lastly, the expanded network has resulted in new opportunities for members of DESSIN and the ESE AG to pursue new European research and innovation projects."

4 Explanation on the use of resources: Deviations

The explanation on the use of resources was removed from the scientific periodic reports and has now to be entered in the cost statement forms in FORCE instead (for each beneficiary).

However, some aggregated information on the use of resources aggregated at the level of Work Areas will be given in this section, because the FORCE templates do not easily allow an aggregated view across several beneficiaries on Work Packages or Work Areas.

4.1 Overall use of resources at the project level

The expected EC contribution for the first reporting period (M1-M18) had been estimated in the Grant Preparation Forms (form A5) based on a monthly breakdown of the personnel cost for each work package (taking into account the start and end date and the partners with their monthly staff rates involved), and then summing up the monthly "slices" of all Work Packages that fall within the first reporting period. We have then added about 48% for the travel budget for the whole project, and for partners with equipment cost, we have added the full equipment cost to period 1, in order to enable a smooth start of the work with the equipment.

Applying these principles, we had estimated an EC contribution of EUR 3,010,362 for the first period in the Grant Preparation Form A5.

The actual requested EC contribution of all beneficiaries after months 18 sums up to EUR 2,332,185 (rounded to full EUR), which is about 77% of the estimated value for the first period. This well reflects the overall status of the project that in general, the project is on track and most objectives for the current period have been achieved and results delivered, but minor (non-critical) delays in some areas and work packages have a knock-on effect also on the timing of resource usage.

4.2 Deviation tables on use of Person Months per Work Package

In the following table, the planned and actual reported Person Months (PM) per partner and Work Package are listed, and according to the reporting guideline a deviation (%) is calculated.

The figures in the column 'planned PM' were calculated based on the assumption that during the active phase of a given work package, all partners of this Work Package have a linear use of personal resources. This is a simplification, but the best approximation that can be done with reasonable effort at this stage.

The figures in column "Actual PM" are based on the PM figures as reported by the individual beneficiaries in their C-forms.

4.2.1 Work Area 1 (WPs 11 to 13)

M1 to M18	WP11 (18 of 24 months in period 1)			WP12 18 of 18 months in period 1			WP13 7 of 13 months in period 1		
Benef.	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %
IWW	8,25	12,63	+53%	2,00	0	-100%	1,08	0,00	-100%
KWR	1,5	0,26	-83%	6,00	5,57	-7%	-	-	-
CETaqua	1,5	4,18	+179%	6,50	8,99	+38%	1,88	3,86	+105%
DHI	2,25	2,83	+26%	2,00	1,47	-27%	2,69	1,40	-48%
EG	3,00	2,95	-2%	2,00	2,4	+20%	8,08	5,8	-28%
Ecologic	11,25	17,07	+52%	18,00	11,8	-34%	1,08	0,00	-100%
SINTEF	4,5	3,25	-28%	3,00	2,25	-25%	1,62	0,15	-91%
UDE	3,00	3,11	+4%	-	-	-	1,62	4,83	+199%
Sum	**35,25**	**46,28**	**+31%**	**39,50**	**32,48**	**-18%**	**18,04**	**16,04**	**-11%**

Sum across all three Work Packages of WA 1 and all beneficiaries:

Planned: 92,8 PM actual: 94,8 PM deviation +2%.

Explanation:

In particular WP11 and WP13 show deviation between planned and actual PM; - WP13 with regard to the overall sum of PM spent in this WP so far, whereas in WP13 we observe some partners that haven't used any of their PM resources yet. This is due to the following factors:

- As explained in the progress report of these two Work Packages, the interlinkage of these 2 Work Packages has started earlier than initially planned; instead of a strict sequential separation of WP11 and WP13 (which seemed to be a bit artificial), these two WPs now follow a joint approach and schedule, and involvement with the partners of the 'mature sites' (Germany: EG/UDE, Spain: CETaqua, Denmark: DHI) has started earlier in order to increase efficiency in the development of the ESS framework. As a result, PM resources in particular of the partners involved in the interaction with the mature sites have been used earlier than originally planned.
- In the starting phase of WP13, efforts have focused on the partners directly involved in the mature case studies, and partners more involved in conceptual work (e.g. IWW, Ecologic) will increase their involvement towards the later stage. This explains that as compared to the plan, partners such as UDE and CETaqua have used more resources than one would expect from a linear planning, whereas partners with a later start in this WP (such as IWW and Ecologic) have not yet used any PM resources in this WP. Based on current knowledge and estimates, this will level off towards the end of the active phase of this WP.
- Although WP12 is formally completely within reporting period 1 and has delivered all contractual items by the date of this report (September 2015), some of the work has been carried out after the end of month 18, and hence is not yet included into the reported PM figures. Therefore, the overall use of PM in this WP is 18% below the planned amount.
- If all three Work Packages of Work Area 1 are taken together, there is only a very minor deviation of 2% as compared to the linear estimate (94,8 actual PM compared to 92,8 planned PM).

4.2.2 Work Area 2 (WPs 21 to 23)

M1 to M18	WP21 (18 of 36 months in period 1)			WP22 18 of 24 months in period 1			WP23 1 of 13 months in period 1		
Beneficiary	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %
IWW	-	-	-	-	-	-	0,04	0,00	-100%
A21	-	-	-	21,00	16,81	-20%	-	-	-
BDB	-	-	-	13,50	18,00	+33%	-	-	-
CHEMTEC	-	-	-	11,63	8,33	-28%	-	-	-
Ecologic	-	-	-	-	-	-	0,15	0,00	-100%
INRIGO	2,25	5	+122%	-	-	-	-	-	-
LKI	0,60	1,0	+67%	-	-	-	-	-	-
SEGNO	21,50	34,1	+59%	-	-	-	-	-	-
TELINT	-	-	-	7,13	7,22	+1%	-	-	-
UFT	1,38	3,38	+146%	-	-	-	-	-	-
EG	1,50	0,26	-83%	-	-	-	0,04	0,04	-
EYDAP	-	-	-	1,50	2,52	+68%	-	-	-
CETaqua	-	-	-	15,38	16,34	+6%	0,04	0,00	-100%
DHI	-	-	-	-	-	-	0,46	0,50	+15%
KWR	-	-	-	3,00	3,46	+15%	0,04	0,00	-100%
NTUA	-	-	-	17,63	13,16	-25%	0,04	0,00	-100%
SINTEF	6,00	3,45	-43%	-	-	-	0,15	0,03	-81%
UDE	4,00	8,72	+118%	-	-	-	-	-	-
Sum	**37,23**	**55,91**	**+64%**	**90,75**	**85,84**	**-5%**	**0,96**	**0,57**	**-41%**

Sum across all three Work Packages of WA 2 and all beneficiaries:

Planned: 128,9 PM actual: 142,3 PM deviation: +10%.

Explanation:

By month 18, after 50% of its duration of 36 months, WP 21 has used more resources in terms of person months than expected from a linear estimate, at least in case of the technology providers (Inrigo, LKI, Segno, UFT). This is mostly due to the fact that by end of M18, most of the research and development activities necessary to start the installation at the demonstration sites had to be completed. Hence, the first 18 months of the WP duration were more intense in terms of staff resources. It is expected that during the 2nd reporting period, less resources than during the first period will be needed. In case of the site owner of one of the demo sites in WP21 (EG) the situation was inverse: during the RTD work (mainly carried out by the technology providers) staff efforts of

the site owner were less than expected from a linear extrapolation, but it will increase during the 2nd half of activities in this WP, as now the technology is installed and tested at a site owned by this beneficiary.

Situation in Work Package 22 is different. The sum across all beneficiaries indicates that the use of resources in this WP is very close to the original plan (deviation of -5%). Although in general one would expect that also in this WP, use of resources was non-linear (higher during the first 18 months), this was only observed for some partners (e.g. the ones involved in the Dutch case study, BDB and KWR).

Overall, we do not see grave discrepancies between the expected and reported use of resources in WPs 21 and 22.

WP23 has barely started (only 1 of 13 active months was during the reporting period), and even this first month did not see full activity of WP12. This is due to the knock-on effect from joining activities of WP11 and WP13, as explained in the progress report of WP13 and WP23 (WP23 will be delayed by approx. 6 months). Hence, only the WP leader (DHI) and very few partners involved in this WP have reported small amounts of PM under this WP.

If all three Work Packages of Work Area 2 are taken together, there is only a small deviation of +10% (142,3 actual PM compared to 128,9 planned PM).

4.2.3 Work Area 3 (WPs 31 to 35)

M1 to M18	WP31 18 of 42 M in period 1			WP32 10 of 31 M in period 1			WP33 18 of 48 M in period 1			WP34 13 of 43 M in period 1			WP35 9 of 39 M in period 1		
Beneficiary	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %
IWW	0,43	0,03	-93%	-	-	-	-	-	-	-	-	-	-	-	-
A21	-	-	-	-	-	-	-	-	-	-	-	-	7,85	8,11	+3%
ADELPHI	0,43	0,00	-100%	0,32	0,00	-100%	0,38	0,00	-100%	0,30	0,00	-100%	0,23	0,00	-100%
BDB	-	-	-	-	-	-	12,00	0,00	-100%	-	-	-	-	-	-
CHEMiTEC	-	-	-	-	-	-	-	-	-	7,26	12,33	+70%	-	-	-
Ecologic	0,21	0,00	-100%	0,16	0,00	-100%	0,19	0,00	-100%	0,15	0,00	-100%	0,12	0,00	-100%
INRIGO	-	-	-	1,29	0,8	-38%	-	-	-	-	-	-	-	-	-
LKI	-	-	-	0,32	0,30	-7%	-	-	-	-	-	-	-	-	-
SEGNO	11,57	10,9	-6%	-	-	-	-	-	-	-	-	-	-	-	-
TELINT	-	-	-	-	-	-	-	-	-	3,63	1,13	-69%			
UFT	1,50	2,47	+65%	0,16	0,00	-100%	-	-	-	-	-	-	-	-	-
EG	11,14	5,75	-48%	0,16	0,01	-94%	-	-	-	-	-	-	-	-	-
EYDAP	-	-	-	-	-	-	-	-	-	8,47	11,72	+38%	-	-	-
VAV	-	-	-	0,65	0,27	-59%	-	-	-	-	-	-	-	-	-
CETaqua	-	-	-	-	-	-	-	-	-	-	-	-	8,77	4,16	-53%
DHI	0,21	0,00	-100%	0,16	0,00	-100%	0,19	0,00	-100%	0,15	0,00	-100%	0,12	0,00	-100%
KWR	-	-	-	-	-	-	10,50	7,94	-24%	-	-	-	-	-	-
NTUA	-	-	-	-	-	-	-	-	-	7,71	1,76	-77%	-	-	-
SINTEF	-	-	-	5,32	2,16	-59%	-	-	-	-	-	-	-	-	-
UDE	11,14	8,8	-21%	-	-	-	-	-	-	-	-	-	-	-	-
Sum	**36,64**	**27,95**	**-24%**	**8,55**	**3,53**	**-59%**	**23,25**	**7,94**	**-66%**	**27,66**	**26,94**	**-3%**	**17,08**	**12,27**	**-28%**

Sum across all five Work Packages of WA 3 and all beneficiaries:

Planned: 113,2 PM actual: 78,6 PM deviation: -31%.

Explanation

With regard to Work Area 3, the limitations of the linear extrapolation to calculate the planned use of resources become obvious.

Although formally most Work Packages in Work Area 3 started very early in the project, activities were lower in the beginning and only started to gain more momentum the more progress was being made in the RTD work packages of Work Area 2. The early start of the Demonstration Work Packages in Work Area 3 was planned on purpose, to enable an efficient collaboration with the RTD Work Packages in Work Area 2. However, it is clear that this logical sequence in the workflow WA 2 -> WA 3 together with a deliberate very early start of Work Area 3 leads to a non-linear use of resources that is not easy to plan exactly.

Considering these facts, the project management team feels confident that the overall deviation of approx. -31 % with regard to an assumed linear use of resources is not an indicator of any issue with the work plan or resource budget. As explained in the preceding chapters on the scientific progress, all milestones of Work Area 3 have been achieved and work is on track and on schedule, with only minor delays in one of the five work packages due to procurement difficulties with some specific items (solved), and work in the actual demonstration cases will increase significantly during the second reporting period of DESSIN.

In case of WP34, front loaded activities related to the pilot setup have cause that partners ChemiTec (technology provider) and EYDAP (site owner) have spent more effort than originally planned, whereas NTUA (research partner) has spent less. However, the total effort spent within this WP so far is very close to what was originally planned and it's only the distribution of effort between partners that has been affected by the realities in the field during the starting phase.

Furthermore, there are some partners with a deviation in the use of resources of -100%, which may need to be explained in detail: WA3 involves three partners with conceptual and cross cutting tasks in all work packages of WA 3:

- Adelphi (WP leader of WP42) to provide support to the SMEs involved in WA3 on their route to market (to ensure smooth interaction between WA 3 and WP42)
- Ecologic (WA leader of WA1) to provide support to the demonstration case studies in WA3 with the application of the conceptual framework and cookbook for ESS valuation (developed in WA1).
- DHI (WP leader of WP23) to provide support with the application of the software solution for ESS valuation developed within WP23.

Tasks of these three beneficiaries within Work Area 3 can only start at a later stage of Work Area 3, after the ESS valuation framework and the accompanying software module are available (well into

the second reporting period). Hence, these partners did not use and report any resources during the first reporting period, but will use their whole resources budgeted within Work Area 3 during the second and third reporting period.

4.2.4 Work Area 4 (WPs 41 and 42)

M1 to M18	WP41 (18 of 48 months in period 1)			WP42 16 of 46 months in period 1		
Benef.	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %
IWW	2,25	1,86	-17%	-	-	-
Adelphi	-	-	-	13,91	16,61	+19%
CETaqua	6,00	7,35	+23%	-	-	-
KWR	3,00	1,5	-50%	-	-	-
Sum	**11,25**	**10,7**	**-5%**	**13,91**	**16,61**	**+19%**

Sum across all two Work Packages of WA 4 and all beneficiaries:

Planned: 25,16 PM actual: 27,32 PM deviation: +9%.

With regard to WP 41 and WP42, we do not consider any of the deviations between planned and actual use of resources significant or in need of detailed explanations. Within WP41, deviations of single partners level off in the overall sum of resources used for this WP during the first reporting period. In WP23, the slight deviation of +19% of WP leader Adelphi is due to the fact that the initiation of interactions with the SMEs (including a series of bilateral meetings and workshops) required a higher level of activities during the starting phase of this WP than expected for the later stages of DESSIN.

4.2.5 Work Area 5 (WPs 51 and 52)

M1 to M18	WP51 (18 of 48 months in period 1)			WP52 18 of 48 months in period 1		
Benef.	Planned PM	Actual PM	Deviation %	Planned PM	Actual PM	Deviation %
IWW	1,88	2,21	+18%	5,63	3,87	-31%
Ecologic	0,19	0,00	-100%	0,19	0,17	-9%
CETaqua	0,19	0,41	+119%	0,19	0,35	+87%
KWR	0,19	0,00	-100%	0,19	0,00	-100%
SINTEF	0,19	0,23	+23%	0,19	0,14	-25%
Sum	**2,63**	**2,85**	**+9%**	**6,38**	**4,53**	**-29%**

Sum across all two Work Packages of WA 5 and all beneficiaries:

Planned: 9,00 PM actual: 7,38 PM deviation: -18%.

The overall resources used for Work Area 5 (Project Coordination and Management) are slightly lower than projected, because a significant effort in these work packages is related to the preparation of the periodic and financial report for the first reporting period. A significant part of this work can only start immediately after the end of month 18 and is hence not included in the cost statements for the first 18 months.

ANNEX A: Additional information

Proposed modification to activities and deliverables/milestones in Work Package WP42 (extract from Annex I, changes identified by red font).

Work package number	WP42	**Start date or starting event:**				M 3	
Work package title	Route to market						
Activity Type	Other						
Participant number	**3**						
Participant short name	**Adelphi**						
Person-months per participant:	**40**						

Objectives

The overall objective of this WP is to maximise the market reach and impact of the water technologies, methodologies and innovative solutions developed in WA1 and WA2 and demonstrated in WA3. WP41 will work in order to achieve market readiness of products/services developed with regard to water quality (WFD), water scarcity and ESS assessment.

Due to resource constraints and for lack of capacity, SMEs are particularly challenged by this step. Assistance in the area has long been proven to be necessary and effective (e.g., German technology support fund), by promoting an approach of prototyping, testing and verifying solutions in the water technology field, SMEs' capacities to develop marketable products and services can be built. DESSIN further seeks to identify entry points to the market and pave the road to market (by addressing and overcoming typical market barriers and proactively promoting the uptake of these solutions among potential clients).

On the other hand, decision-making support will be made available to the demand side which demonstrates the long-term superiority of ESS based approaches. To this end, the ESS valuation methodology itself needs to be promoted, establishing a new standard in water management decisions. This step will also create positive innovation dynamics by the supply side, demanding further solutions in the field. This in turn further incentivises SMEs to innovate. In detail, objectives of WP42 are:

- To support supply side push for water technologies by developing sample development approaches.
- To assure international (European and beyond Europe) market uptake of water technologies, by addressing and overcoming market barriers and promoting solutions.
- To create demand side dynamics to further stimulate water technology innovation.

The identified key innovations actors in DESSIN are classified in 3 groups (Figure 4 in B 1.3). Description of WP42 tasks will cover the needs for drive them to market using appropriate actions in each case:

- Technology developers and marketers for innovative solutions.
- Suppliers for innovative solutions using a combination of existing technologies or applying them for an innovative use.
- Providers of innovative services linked to water ESS assessment.

The conceptual scheme in Figure 4 (chapter B 1.3) shows the actions that will be developed within WA4 framework to route them to market. The methodology will act as a driver for the technology / service push into the market, not acting directly in specific SME's or private developers.

Description of work

Task 42.1 – Development of sample approach market analysis report~~s~~ for ESS solution packages demonstrated in DESSIN (inside-out) (M4 –12, ADELPHI)

This task seeks to develop a sample approach that can be taken up by SME and other technology developers and be adapted to their specific product and market situation. The approach will include a detailed description of the following paragraphs: Identification of Users, Needs Assessment through Focus Groups, Business Modeling including Costing and Pricing Models, Operating Characteristics of the Innovative Technology Business Models, Industry Landscape, Industry and Company Characteristics, Regions and Sectors, Capital Requirements, Intellectual Property, Distribution and Supply Networks. To illustrate the approach, ~~there will be identified~~ the technologies from the five ESS solution packages demonstrated in WP31 – WP35 are exemplarily included in the report ~~and market analysis reports will be developed accordingly~~. The~~se reports will be part of a more general market study, which~~ approach also outlines how to assess~~es~~ the attractiveness and demand for ESS valuation software solutions and gives recommendations on the characteristics of the products, price range, the distribution channels and ways to promote. To assure that data and facts are based in reality, close cooperation with water technology developers is sought during the writing process. Integral part of the reports is the use of a standardized assessment of technology by way of the ESS Valuation Methodology as developed under DESSIN once available. The sample approach will be tested and implemented with several SMEs (as part of WP42.2).

Task 42.2 – Develop Sample Commercialization Process Maturity Models and capacity building on strategies for SMEs (M 6-48, ADELPHI)

Another challenge is the commercialization process; T~~P~~42.2 seeks to develop a sample approach in this regard, defining key steps for the Commercialization Process and Risk Profiling as well as the Intellectual Property Rights Process (including protection, valuation and exploitation); this is further complemented by the sample definition of potential Partner identification and Network building process for SMEs. This model is piloted on the sample sites with its partners and with additional suitable SMEs to validate and demonstrate its effectiveness. As part of this task, the inside-out approach from T42.1. and the outside-in approach from T42.3 are also practically implemented and tested with interested SMEs. To implement ~~both~~ the sample market analysis report, outside-in report findings as well as the commercialization process maturity model, T42.3 offers capacity building measures through individual coaching and peer-learning. ~~by way of online trainings and weekend seminars for SME representatives~~. During the course of the programme which offers multiple entry points to SME, the focus first lies on the specific development of the market analysis and the commercialization process and then shifts to implementation of marketing strategy. All learning materials are in parallel published on the internet and remote support on specific questions is made available. ~~While no i~~Individual support is offered to companies through individual meetings and discussions~~, this joing learning experience enables them to more effectively and efficiently pursue their commercial goals~~. Peer learning and network building are

integral parts of the programme, e.g. through "business-to-business" workshops.

Task 42.3 Financial and regulatory environment towards commercialisation (M 3-10, ADELPHI)

Two challenge-specific business environment (outside-in) reports on (a) Scarcity and (b) Quality / WFD document the specific barriers and challenges that water technology SMEs face both in the field of water scarcity and water quality. The reports further identify efficient modes of governance and finance that are innovative and innovation-friendly. Particular attention is paid to access to finance (Private Equity, Public Innovation Funds, Venture Capital), the government regulatory environment and European and international market characteristics. Recommendations are given in order to improve the innovativeness of European SMEs in the sector. Complementarity with other EU funding mechanisms is sought through a resource mobilization strategy. Funding opportunities are explored, including the new European Structural and Investment Funds (ESIF), in particular regarding the protection and promotion of environmental resource management, sustainable development and territorial structuring. European incentives for implementing RIS3 (Research and Innovation Strategies for Smart Specialisation) as an ex-ante conditionality for ESIF in the different regions for the period 2014-2020 are considered. Implementation and further detailing of the reports for individual SMEs will be carried out as part of task T42.2. This task is also linked to task T42.5 and includes that we commit to meet with the Regional Authorities in charge of the Structural Funds in the DESSIN demonstration areas early in the process for the 2014-2020 programmes, as regions and cities will be finalising preparations for the 2014-2020 cohesion policy and rural development programmes. Via members of the project advisory committee (PAC) first exploratory meetings have already started (for NRW in Germany). Furthermore, at least one of the annual events "OPEN DAYS - European Week of Regions and Cities" will be attended as these events offers EU institutions, managing authorities and final beneficiaries a chance to exchange and network on new approaches for the operational programmes (OPs).

Task 42.4 Support ESS lobbying for efficient modes of governance and finance (M 12-48, ADELPHI)
To put the recommendations formulated under T42.3 to use, T42.4 facilitates the association of water technology SMEs that can act as accelerator to create a business environment conducive to innovation in the water sector. Active participation at European platforms and European ESS roundtables will be carried out. This task will highlight the successes developed and demonstrated in DESSIN using existing channels for dialogue in the area of water management: EIP action groups, WssTp (http://www.wsstp.eu/site/online/home) and ERRIN (http://errinnetwork.eu/), taking advantage of its existing forums on ESS.

Task 42.5 – Create demand side dynamics by promoting standardised ESS-based assessment framework for new technology and management (M 8-48, ADELPHI)
The development of an assessment framework based on ESS valuation methodology is an integral part of the project, as this assessment demonstrates the superiority of ESS based approaches. Thus it is of high importance to promote its use among decision-makers to demonstrate the benefits of ESS based water technologies. While this is important at the European level, the global market place offers relevant opportunities and a pull-effect as well. This is also where European technologies, also developed under this project, need to compete and succeed. Thus, this task engages with potential clients to build their capacity on and to promote the conduct of quantitative assessments of the impact of potential technologies and solutions on ecosystem functions and services. By doing so, demand is created and strengthened from potential clients for those solutions that take ESS into account. This capacity building approach is implemented ~~through a web platform as well as~~ by action conferences and road shows amongst others to promote the ESS based technology among the target group of the innovative water

management technologies. ~~The web platform will be specialized in offering ESS valuation solutions, while it will be linked to the most active actors working in the same line, to have a synergic impact.~~ Key information will be made available through the DESSIN website. Links and synergies are established with related major water investment and implementation projects at local, regional or national level, to help leverage the demand side for the demonstrated water solutions, e.g. by attending one of the annual "OPEN DAYS" events described under Task 42.3 which allow regions and cities to present the results of their EU-funded programmes and projects, showcasing the impact these have on regional development, smart, sustainable and inclusive growth. Opportunities are considered in integrated territorial investment, joint action plans, governance issues and financial instruments.

Task 42.6 – Establish a monitoring & evaluation (M+E) system for innovation and continuous monitoring of framework conditions and outcomes (M 5-48, ADELPHI)
An indicator system is key to keep track both on progress and impediments for marketization of innovative products and services. T42.7 seeks to establish system that both documents framework conditions as well as outcomes and to this end develops both, an effective indicator set as well as a monitoring and evaluation (M+E) reporting system that can be used also after the project ends. For that the M+E system will be made available through an online platform. Individual coaching on its use will be made available to the interested SMEs.

Deliverables (brief description and month of delivery)

D42.1 – Market analysis (inside-out) for ESS software and solution packages (M 12, ADELPHI).

D42.2 – Sample Commercialization Process Maturity Models and capacity building on strategies for SMEs (M 48, ADELPHI).

D42.3 – Two business environment (outside-in) reports a) Scarcity b) Quality / WFD (M 10, ADELPHI).

D42.4 – Recommendations from the open ESS channels: European platforms, Roundtables, Conferences and Web platform (M30 intermediate, M 48 final, ADELPHI).

D42.5 – M+E system for innovation and continuous monitoring of framework conditions and outcomes (M~~12~~48, ADELPHI).

Milestones

MS9 – Individual meeting with each SME and technology developer of DESSIN to identify potential intern networking and specific market needs (M6).

MS17 – Formal presentation of DESSIN to the ESS European Roundtables and Platforms and establishment of action plans for fruitful interaction (M 12, ADELPHI).

MS27 – Implementation of web platform for M+E (M~~24~~25, ADELPHI).

MS18 –Indicator system developed (first version in M12, reviewed by M25, finalized by M48, ADELPHI).

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