PERIODIC PROJECT REPORT

Year 1: April 2014-March 2015

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Table of Contents

Declaration by the project coordinator

I, Andrea Emilio Rizzoli, as coordinator of this project and in line with the obligations as stated in Article II.2.3 of the Grant Agreement declare that:

- The attached periodic report represents an accurate description of the work carried out in this project for this reporting period;

- The project (tick as appropriate):
  ☑ has fully achieved its objectives and technical goals for the period;

  ☐ has achieved most of its objectives and technical goals for the period with relatively minor deviations.

  ☐ has failed to achieve critical objectives and/or is not at all on schedule.

- The public website, if applicable

☑ is up to date

☐ is not up to date

- To my best knowledge, the financial statements which are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project (section 3.4) and if applicable with the certificate on financial statement.

- All beneficiaries, in particular non-profit public bodies, secondary and higher education establishments, research organisations and SMEs, have declared to have verified their legal status. Any changes have been reported under section 3.2.3 (Project Management) in accordance with Article II.3.f of the Grant Agreement.

Name of the Project Coordinator:

Andrea Emilio Rizzoli

Date: ...../ ...../ .....

1.1 Summary description of project context and main objectives

1.1.1 The project context

The SmartH2O project aims to provide water utilities, municipalities and citizens, with an ICT-enabled platform to design, develop and implement better water management practices and policies, leading to a reduction in water consumption, without compromising the quality of life, and to an increase in resource security.

Water consumers are people whose behavior depends on a variety of motivations and social and individual drivers and triggers. For this reason, SmartH2O develops a framework able to consider **both the technical and the social sides** of the problem, which **promotes the active engagement of the consumers** with the shared objective of saving water and energy.

The solution proposed by the SmartH2O project is to develop an ICT platform based on the integrated use of **smart meters**, **social computation**, and **dynamic water pricing** that will be able to:

- **Understand and model** the consumers' current behavior on the basis of historical and real-time water usage data;
- **Predict** how the consumer behavior can be influenced by various water demand management policies, from water savings campaigns, to **social awareness campaigns**, to **dynamic water pricing** schemes;
- **Raise the awareness** of water consumers on their current water usage habits and their lifestyle implications and to stimulate them to **reduce** water use;

The SmartH2O platform is a "virtual world" that allows water utilities to experiment various combinations of water demand management policies (e.g. incentives and water pricing, social awareness campaign) and assess their potential impact on water users. The social participation application will also enable obtaining feedback from the users to calibrate and validate users' behavior models. Traditional econometric methods will also be used to model consumer behavior and experimental economics approaches will help calibrate the econometric and agent models. The SmartH2O platform will then produce simulations of the expected impacts of the proposed policies on the users' behavior, thus allowing the water utilities to select the most effective water demand management strategy.

The social participation application is then also used to **deploy policies in the real world**. The consumers will receive signals, such as incentives to save water in specific environmental conditions, or such as dynamic price information. Once the policies are deployed, the SmartH2O platform allows **continuous monitoring** of the users' aggregate behavior, i.e. their water consumption, in order to suggest other actions if the original policy loses effectiveness.

1.1.2 The project objectives

The SmartH2O general objectives are to:

1. study, understand and modify consumer behavior in order to …
2. … achieve quantifiable water savings by **raising consumer awareness** and by …
3. … the design and implementation of **dynamic pricing schemes**
4. … thus also improving the efficiency and business operations of water companies.

The general objectives listed above are translated in a set of scientific and technological objectives. The *scientific* objectives of this project are:

- the study of **social awareness incentives** to promote water conservation behaviors;

- the development of an innovative method **to learn and develop models of user behavior** integrating quantitative data, obtained by smart sensors, and qualitative data, collected through an online social participation application;
- the study of the design of **dynamic water pricing** policies;
- the development, implementation and validation of an **agent-based simulation model**, able to reproduce the behavior of whole districts of water users based on selected user profiles;
- to **publish and disseminate** our results, in particular fostering trans-disciplinary works involving both ICT and water resources researchers.

The main *technological* objectives of this project are:

- the development of a **modular and scalable ICT platform** that integrates a series of components, in order to provide water utilities an effective tool for the design and implementation of water demand management policies to promote water usage efficiency;
- to improve the resource efficiency and business operations of water utilities thanks to the use of the SmartH2O platform;
- to promote the adoption of novel ICT solutions in water management companies;

1.2 Description of work performed since beginning of project and main results

The first project period was characterised by the overall organization of the project, proper establishment of project management procedures and standards, collection of users' requirements, setup of the Validation Scenarios, specification of the SmartH2O Platform Architecture, including its components, and the Drop! digital game and its physical counterpart. A first prototype of the Platform and of the Game has been released.

The major results achieved so with respect to the objectives of each work package are described in the following paragraphs.

1.2.1 Work package 1 - Management and coordination

The objectives of this work package are to monitor progress and ensure that the project runs smoothly on track. In the first year, WP1 has delivered a document describing the management structures and processes which have been set up to help project development (D1.1 Management Processes). In particular, D1.1 explains how the internal project wiki page is to be used for reporting work progress, how periodical quarterly reports are to be conducted, and how the quality assurance procedure is applied to project deliverables

1.2.2 Work package 2 - Requirements, design and specifications

WP2 is a key work package with the aim of identifying narrative user stories, visual mockups, and formal use cases and requirements that drive the software development of the SmartH2O platform and also the research lines to be explored to achieve the overall project objectives. The narrative user stories and visual mockups of the SmartH2O platform contextualize and illustrate the envisioned application features for both end users and developers. They were formalized as use cases, which were the basis for specifying the functional and non-functional requirements of the SmartH2O platform, including success criteria. In the first year, WP2 has iteratively developed a set of user stories and interface mockups (**T2.1**) based on the user needs elicited in focus groups and interviews, evolved such user stories into formal requirements expressed as use cases (**T2.2**) and into functional and non-functional specifications (**T2.3**, work prosecuting to Y2), from which success criteria were derived. This activity produced two deliverables: D2.1 Use cases and early requirements; D2.2 Final requirements. In order to achieve these results and identify end-user needs of water consumers, two workshop sessions have been organised with local residents in Switzerland and in the UK. Furthermore, exploratory interviews and a workshop

in Reading, UK, with representatives from SES and TWUL, have been held, to elicit the requirements from the perspective of the utility personnel.

1.2.3 Work package 3 - User modelling

The objectives of this work package are to collect available data on past and present consumer behaviour, obtained from the smart meter infrastructure and standard offline meter data, analyse the consumer behaviour and classify it, develop models of the consumer elasticity to stimuli such as water prices, to incentives, awareness campaigns and social pressure. The models, built on current consumption pattern identified on the basis of the smart meter readings, allow estimating expected new behaviour, under the influence of social awareness and different pricing structures. Finally the behaviour models are used in an agent based simulation system to generate aggregate water consumption at the district level.

During the first year WP3 developed the structure of the database to store the user data (**T 3.1**), able to store both consumption related data, but also psychographic data and data related to the social relationships and the social network interactions, all elements which will be essential for the development of the user model (D3.1 Databases of user information). Another achievement of WP3 is the development of end use disaggregation algorithms (**T3.2**): these algorithms, based on the total water consumption of the user, these algorithms are able to attribute fractions of that consumption to single fixtures, such as showers, dishwashers, etc., which is instrumental to understand how the users actually use water and thus enable building the actual user models and simulations (**T3.3** and **T3.4**). Work in WP3 has produced deliverable: (D3.1 First user behaviour models).

1.2.4 Work package 4 - Saving water by social awareness

The main objectives of this work package are to understand how the awareness of consumption behaviour and the social norm can influence the water user behaviour. WP4 explores the effect of the gamification approach in increasing the awareness level and in creating connections among consumers in order to trigger the social norm effect.

In the first year the efforts have been focussed on studying the mapping of raw consumption data into a semantically understandable format for users, and on developing a visualization model of such able to stimulate users' individual and collective awareness regarding water consumption. This work (**T4.1**) has contributed to the notion of Consumer Portal, visually specified in D2.2 (Final Requirements). Secondly, T4.1 has also required a broad survey of how games have been used for improving awareness and resource usage in the past; from this study, a novel concept has emerged of a social game capable to involve users and to raise their awareness level, and in the development of the gamification approach for the SmartH2O platform. As an outcome, T4.1 has designed and implemented a board game with a digital extension, which provides the entry point to the SmartH2O concept (D4.1 First social game and implicit user information techniques). Also, a distributed cloud-enabled architecture has been design and deployed for the mass scale collection of social network data (**T4.2**), with a focus on crawling the Twitter social media site. Data collected from social networks are semantically represented in the project repository and will serve as the basis for the analysis of community roles, people influence and trust (**T4.3**). A preliminary set of metrics for the detection of influencers has been defined and applied to the dataset of users that published the tweets (**T4.3**). A minimal interface for visualising influencers, used for internal testing purposes, has also been developed (**T4.3**) and will be enriched in Y2.

1.2.5 Work package 5 - Saving water by dynamic water pricing

WP5 explores the effect of water pricing on consumer behaviour. In particular it aims to evaluate the impact of dynamic water pricing, assessing its effectiveness in periods of water scarcity. It develops econometric models of user behaviour, which will be implemented in the agent based modelling simulation platform developed by SmartH2O.

In the first year WP5 has mostly focussed in a thorough review of the state of the art and current research in the area of dynamic pricing for different type of utilities In this respect, **T5.1** has produced deliverable (D5.1 Review of pricing instruments). Activities for the

experimental economics-based tests of pricing policies have also started (**T5.2**), by exploring different solutions for data collection, including a user questionnaire to assess price elasticity. These determinants will serve as the basis for the integrated water supply-demand modelling including dynamic pricing.

1.2.6 Work package 6 - Platform implementation and integration

WP6 has the objective of establishing common software engineering practices to ensure that development is conducted according to a common standard, following a Continuous Integration approach, of managing release planning and delivery, and verifying software quality. It also manages the design, set-up, tuning, and day-to-day administration of the cloud architecture where SmartH2O is deployed. In the initial part of the first year, WP6 has defined the plan for the management of the period deliveries of the continuously updated SmartH2O platform (**T6.1**, producing D6.1 Delivery management plan and testing specification). Then, WP6 has defined the overall platform architecture and design (**T6.2**, producing D6.2 Platform architecture and design); it has also produced (in **T6.3**) the initial prototype of the SmartH2O platform, which collects live data generated from the Swiss case study smart meters, thanks to the Smart Meter Data Management Component; it has also implemented the initial prototype of the Gamified Consumer Portal, where the different gamification elements identified by WP4 have been put into action. The abovementioned software realizations are the constituents of the deliverable (D6.3 Platform integration and integration – initial prototype), which have been tested and assessed using the continuous integration approach (**T6.4**).

1.2.7 Work package 7 - SmartH2O Validation

The objectives of this work package are to demonstrate and validate the use and impact of the SmartH2O platform in the Swiss and UK case studies and provide quantifiable evidence on the impact of SmartH2O on water consumption reduction. This WP was planned to start in year 2, but some activities of **T7.2** have been anticipated in the Swiss Case study were 400 smart meters have been installed before the start of the validation tests. The WP has also produced a plan to validate the SmartH2O platform in the two case studies (D7.1 Validation methodology), produced in **T7.1**.

1.2.8 Work package 8 - Business Development

The objectives of this work package are to observe how trends in ICT usage and the market potential in the water management sector emerge, to study how market regulation instruments evolve in the EU, and to start-up the SmartH2O Business Ecosystem, including all activities for training and technology transfer to early adopters. In the first year, this WP has made an initial assessment of the exploitation possibilities, which are open to SmartH2O, by identifying a number of project assets such as: the Gamified online water bill, the Drop! board game and its digital extensions, the smart meter data management component, tools for customer behaviour analysis and demand planning, the integrated SmartH2O platform (D8.1 Early Exploitation Plan). WP8 has also set up a Water Utility, Market and Regulation watch (as part of **T8.1** and **T8.2**) to keep a broad overview on the development of a new and dynamic market and its regulation (producing deliverable D8.2 Technology watch report) and in the first year it has also produced a report on the most relevant standards for smart water systems, including open data initiatives (producing deliverable D8.3 Standards and open data report). Informal activities in the creation of the business ecosystem have also started, to prepare the ground for T8.3.

1.2.9 Work package 9 - Communication and dissemination

The objectives of WP9 are to define the communication strategy for the project, to disseminate the project outputs at local level, strengthening user participation, to disseminate at national level, increasing knowledge on ICT-supported water resource management, to disseminate at the international level, through scientific and business networks of the project partners, and to organise the major dissemination events of the project. In the first year, WP9 has set up the D&C strategy (**T9.1**), supported by a number of dissemination channels (**T9.2**), ranging from the official project website, to the Twitter feed, the LinkedIn community and it

has also provided templates and standards to provide a coherent visual identity (D9.1 Dissemination tools and materials). The communication strategy targeting both the general public and the scientific communities (D9.2 First dissemination report) has been developed and successfully implemented across the different communication channels.

1.3 Expected final results and potential impact and use

The expected final result of the SmartH2O project an **ICT platform** able to:

- **Understand** and model the consumers' current behaviour, based on historical and real-time water usage data
- **Predict** how the consumer behaviour can be influenced by various water demand management policies: water savings campaigns, social awareness campaigns, to dynamic water pricing schemes
- **Raise the awareness** of water consumers on their current water usage habits and their lifestyle implications and to stimulate them to reduce water use

The SmartH2O ICT infrastructure will enable water managers to close the loop between actual water consumption levels and desired targets, using information about how the consumers adapt their behavior to new situations: new regulations, new water prices, appeals to water savings. This feedback will allow to aptly revise the water demand management policies, enabling to maximise the water and energy saving goals.

1.4 Project public website

The project public website is available at http://www.smarth2o-fp7.eu

1.5 The project consortium

The SmartH2O project consortium is composed by:

Research and Academia

Name	Cty	Background / expertise / skills	Role
SUPSI	CH	The Dalle Molle istitute for artificial intelligence studies is a world leading research institution, making advances in the fields of machine learning, data mining, modelling and simulation	Project Coordinator, lead of WP1 and WP3. IDSIA will also be involved in other WPs.
Politecnico di Milano	IT	Politecnico di Milano brings expertise in Water Resources Management and hydroinformatics. ICT research in the fields of Systems and Control, Computer Science and Engineering. Water Economics	Scientific Coordinator, lead of WP4. POLIMI will also be involved in other WPs.
University of Manchester	UK	The University of Manchester has a strong research track on water resources and spatial economics.	Lead WP5. Active contribution in most work packages.

Utilities

Name	Cty	Background / expertise / skills	Role
Thames Water Limited	UK	The largest UK water company	Lead WP8. Major activities in validation, requirements, and business development
Società Elettrica Sopracenerina	CH	A Swiss multiutility	Lead WP7. Major activities in validation, requirements, and business development

Organisations representing users

Name	Cty	Background / expertise / skills	Role
EIPCM	DE	The European Institute for Participatory Media is an organization dedicated to the promotion, research and development of next-generation media ecosystems enabling organizations, industry and society at large to take advantage of new participatory forms of content and media creation, delivery and utilization.	Lead WP2. Major involvement in WP4. Active contribution in most work packages.

SMEs dedicated to innovation

Name	Cty	Background / expertise / skills	Role
SMOB	RO	SMOB is specialized in real time solutions for business based on office and system integration. Its strength resides in its knowledge base regarding mobile technologies, cloud computing and processing, as well as in its Research and Development team.	Lead WP6. Actively Involved in WP 4 and 5.
MSM	UK	MoonSubmarine is a newco started up in 2012 to capitalize on the 20+ years' experience of its founders in mobile application development and game design. The company has the aggressive objective of becoming a strategic innovation partner for companies wishing to target mobile users, in the B2B and B2B2C markets.	Lead T4.2 Data Harvesting, involved in WP2, WP11, WP12 and WP13

2. Project objectives for the period

The project objectives, as defined in Annex I of the contract, are reported in the following sections. In Section 2.10 we also report the recommendations from the reviewers which were issued after the pre-review, which could evaluate only partially the status of the project after the first year.

2.1 Work package 1 - Management and coordination

The objectives of WP1 in the first year of the project were:

- To monitor progress and ensure that the project objectives are achieved
- To manage financial and administrative issues
- To monitor and manage the project and ensure it is delivered on time and to budget
- To report to the European Commission

2.2 Work package 2 - Requirements, design and specifications

The objectives of WP2 in the first year of the project were:

- Analyse and structure a number of user stories and use cases that will be used to drive the development of the platform.
- Analyse the requirements of the SmartH2O platform, from the social awareness application to the policy design and evaluation applications

2.3 Work package 3 - User modelling

The objectives of WP3 in the first year of the project were:

- Collect available data on past and present consumer behaviour, obtained from the smart meter infrastructure and standard offline meter data
- Obtain water end-use patterns
- Analyse the consumer behaviour and to classify it

2.4 Work package 4 - Saving water by social awareness

The objectives of WP4 in the first year of the project were:

- Investigate the design of human tasks that involve explicit human computation for smart water management issues
- Apply the paradigm of social games to the definition of individual or collective games for pursuing smart water management objectives.
- Analyse traces of human activity (e.g., Twitter data) to extract behavioural information applicable in urban water demand management.

2.5 Work package 5 - Saving water by dynamic water pricing

The objectives of WP5 in the first year of the project were:

- Identify and evaluate water pricing instruments being applied or considered in EU states, including an in depth analysis of water pricing in the UK

2.6 Work package 6 - Platform implementation and integration

The objectives of WP6 in the first year of the project were:

- Establish common software engineering practices needed to ensure that development activities are conducted according to a common standard; the work in this WP will do so by identifying a suitable integration model following a Continuous Integration approach, managing release planning and delivery, and verifying the quality of produced software.
- Implement, set-up, tune and day-to-day administration of the cloud architecture where SmartH2O will be deployed. A hybrid cloud-storage infrastructure will be set-up. The WP will also manage the provisioning and verification of the platform infrastructure needed for distribution and scaling of SmartH2O data and services.
- Test and monitor the reliability and performance of the implementation. Take adequate countermeasures if needed in order to guarantee the expected level of service.

2.7 Work package 7 - SmartH2O Validation

The overall objectives of WP7 are:

- Provide quantifiable evidence on the impact of SmartH2O on water consumption reduction

According to the work plan, in Year 1WP7 had to deliver the Validation Methodology contained in D7.1.

2.8 Work package 8 - Business Development

The objectives of this work package are:

- Set up an observatory of trends in ICT usage and the market potential in the water management sector
- Set up an observatory of how market regulation instruments evolve in the EU

2.9 Work package 9 - Communication and dissemination

The objectives of this work package are:

- Design and implement an effective communication strategy for the project.
- Disseminate the project outputs at local level, including strengthening user participation, expanding to other local and regional water authorities and businesses.
- Disseminate at national level, including increasing of knowledge on ICT-supported water resource management.
- Disseminate at the international level, exploiting the various scientific and business networks of the project partners.

2.10 Recommendations from the pre-review

The first reporting period of the SmartH2O project spans the 1st of April 2014 until the 31st of March 2015. On the 19th of March 2015 a preliminary review was held in Brussels, which was based only on partial results of the project, as D2.2, D5.1, D6.3, D7.1, D8.2, D8.3, D9.2, and the first year report were not yet available, because they were due on month 12.

The reviewers have nevertheless managed to issue a preliminary consensus report which provides useful suggestions for the project management and its continuation. The project consortium has produced a detailed answer which cannot fit into this report, but it is added as an Appendix. Here we summarise the major remarks and our responses.

2.10.1 From the executive summary

"The most important deviations lie in: validation plans and business development of the expected results. Both of these plans seem to be still in the conceptual phase. As a result a clear action that would lead to the achievement the objectives of the project were not proposed."

The reviewers had access to a draft version of the validation plan (D7.1). Its final version has been revised in order to incorporate the reviewers' suggestions. In particular, a detailed time plan of the tests and of the necessary activities leading to their execution has been produced. The objectives have been put in relation to existing benchmarks. A detailed risk plan explaining our strategy to maintain the validation test on track has been added.

The business development plan has been initially described in D8.1 "Early exploitation plan", where we report our asset-based strategy to exploitation, in the status in which it can be appraised at the very inception of the project (at month 6). The adopted strategy, which will be better described in the introduction of the revised version of D8.1, is based on clear milestones and goals for the intermediate and final exploitation plans, which will ensure maximal exploitation of the project results.

2.10.2 Recommendations concerning the period under review

"Rejected deliverables have to be resubmitted: D3.1, D3.2, D6.2 and D8.1. A clarification of the "data accessibility" problem has to be seriously treated. Broad explanations were delivered and presented during the review meeting in Brussels. Solutions should be presented in further deliverables."

The availability problem of water consumption data has been resolved by accessing a data set provided by a research organization in New Zealand, which will be used to validate the disaggregation algorithms at various temporal resolutions. Furthermore, two new partners will be involved starting from the next reporting period: EMIVASA, the Water Utility of Valencia (Spain), and Valencia Polytechnic University (UPV). EMIVASA, has already a smart metering system up and running and will provide SmartH2O with hourly meter readings for 2'500 households.

2.10.3 Recommendations concerning future work

"The consortium has to put more effort in developing an exploitation plan (see 2c under D8.1)"

The early exploitation plan provided at M6 was only meant at sizing up the potential markets and at identifying the marketable assets of the project. It has been revised with the plan of activities that will lead to the release of the intermediate and final exploitation plans, where the approach to market of SmartH2O will be fully developed. We underline that many informal and preliminary, but very concrete, business talks have been already conducted with potential partners and adopters, which are preparing the ground for the definition of the next version of the exploitation plan. These business talks have been instrumental to the identification of the most valuable and exploitable assets of the project, described in D8.1.

"The expected impact might require an accurate assessment by means of specific techniques as benchmarks, evaluation procedures, even citations."

The impact of the water demand management techniques put in place by the project will be assessed quantitatively during the last two years of lifecycle of the project, as planned in the DoW, and according to the assessment procedures and methodologies delineated in D7.1.

"The scientific component should be improved in some deliverables."

We underline that the scientific innovation of the project is not in the integration work done to assemble the platform, but in the novelty of the social awareness methods for change behavior and in the holistic user modeling for delivering demand prediction and targeted recommendations. The effort devoted to these research challenges will be greatly increased

after the deployment of the first prototype, and the consortium will document and disseminate the scientific results achieve in the most detailed and methodologically sound manner.

“More technical and scientific information have to be provided for the next deliverables.”

More technical detail will be already provided I the revised version of D6.2 (Platform architecture and design)

3. Work progress and achievements during the period

3.1 Overview

The SmartH2O project is organised in 8 work packages, plus the management WP. The work package organisation is shown in Figure 1, which describes the PERT diagram highlighting the dependencies across work packages. In general, we have Research and Development work packages (WP2 Requirements, WP3 User Modelling, WP4 Saving water by social awareness, WP5 Saving water by dynamic water pricing), Integration and Validation work packages (WP6 Platform integration, WP7 Validation) and Impact and dissemination WPs (WP8 Business development, WP9 Communication and Dissemination).

During the first reporting period, the SmartH2O project has started working on all work packages as shown in Figure 2. It can be noted that while on average all WPs have performed approximately one third of their work, WP2 has already made 2/3 of its work, while WP3 is approximately half way. This is in line with the project plan as reported in the tables from Table 1 to Table 8.

The detailed achievement and the work performed in each individual work package are described in the sections from 3.2 to 3.9, while here we anticipate in a compact way the major outcomes.

In WP2 we completed the analysis of the requirements of the SmartH2O platform and we produced a set of narrative user stories, visual mock-ups and formal use cases which are being used to drive the development of the SmartH2O platform. The application requirements have been elicited in interviews and workshops with end users (water consumers and suppliers) to elicit user needs as well as with technical partners to push technical innovations.

In WP3 we developed and implemented a classification model of user behaviour, which is able to identify the main drivers of water consumption and return an estimate of consumption based on those features. At the same time we developed disaggregation algorithms which, on the basis of medium to high frequency data, attribute consumption to the different fixtures.

In WP4 a first prototype of a board game with a digital extension has been realised. The Drop! game enables the involvement of young players raising their awareness of the topic of water conservation. Its digital extension provides an entry point to the SmartH2O platform, and it integrates with the Gamified Customer Portal, allowing the user to get extra points by playing the game, thus creating an extrinsic motivation to engagement in the SmartH2O platform.

In WP5 a review of various water pricing schemes has been produced.

In WP6 the development environment has been set up, the platform architecture has been designed, and an initial prototype of the SmartH2O platform and consumer portal has been realised. The prototype uses live data obtained from the Swiss case study by means of the Smart Meter Data Management Component. The prototype also contains a fully working version of the Gamified Customer Portal.

In WP7 the validation methodology has been laid out. Moreover, the Swiss case study required the installation of 400 smart water meters, which were installed in the district of Tegna, in the municipality of Terre di Pedemonte, in Canton Ticino.

WP8 delivered an early exploitation plan that identified the main assets which will be subject of the first exploitation plan to be delivered in Year 2. Also, a technology watch has been set up and a report on standards and open data has been completed.

WP9 organised the communication strategy of the project and dissemination activities on various fronts, from scientific publications and conference participations, to interviews with the media.

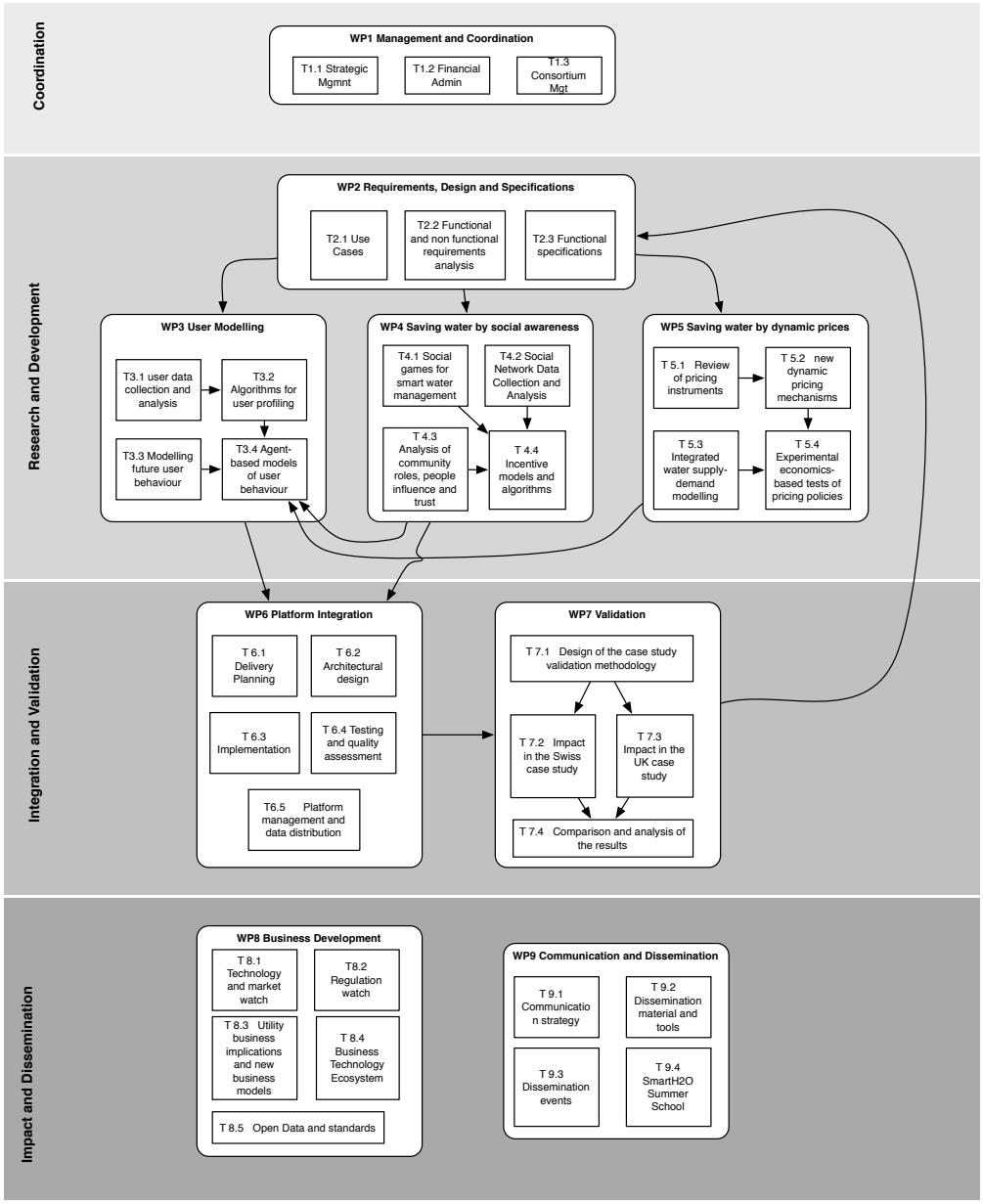

Figure 1. The PERT diagram of the SmartH2O workpackages.

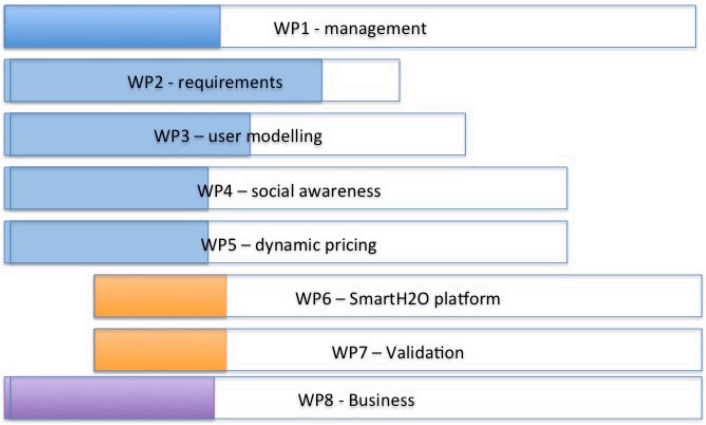

Figure 2. Visual progress status after 1st year.

Table 1. WP2 plan.

WP2	Requirements, design and specifications	1	2	3	4	5	6	7	8	9	10	11	12
T 2.1	Use case descriptions	1	1	1	1	1	1	1	1	1	1	1	1
T 2.3	Functional and non functional requirements analysis			1	1	1	1	1	1	1	1	1	1
T 2.3	Functional specification of the SmartH2O platform				1	1	1	1	1	1	1	1	1
D2.1	Use cases and early requirements (m8)								X				
D2.2	Final requirements (m12)												X
MS5	[EIPCM] Requirements available and accepted (m12)												M

Table 2. WP3 Plan.

WP3	User modelling	1	2	3	4	5	6	7	8	9	10	11	12
T 3.1	User data collection and analysis	1	1	1	1	1	1	1	1	1	1	1	1
T 3.2	Algorithms for user profiling					1	1	1	1	1	1	1	1
T 3.3	Modelling future user behaviour							1	1	1	1	1	1
T 3.4	Agent-based models of user behaviour									1	1	1	1
D3.1	Databases of user information (m6)						X						
D3.2	First user behaviour models (m9)									X			
MS3	[SUPSI] Initial techniques and algorithms for user profiling accepted (m9)									M			

Table 3. WP4 Plan

WP4	Saving water by social awareness	1	2	3	4	5	6	7	8	9	10	11	12
T 4.1	Social games for water management	1	1	1	1	1	1	1	1	1	1	1	1
T 4.2	Social Network Data Collection and Analysis			1	1	1	1	1	1	1	1	1	1
T 4.3	Analysis of community roles and trust and people search			1	1	1	1	1	1	1	1	1	1
T 4.4	Design of Incentive models and algorithms												1
D4.1	First social game and implicit user information techniques (m9)									X			
MS6	[POLMI] Initial techniques and algorithms for social interaction accepted (m12)												M

Table 4. WP5 Plan

WP5	Saving water by dynamic water pricing	1	2	3	4	5	6	7	8	9	10	11	12
T 5.1	Review of pricing instruments	1	1	1	1	1	1	1	1	1	1	1	1
T 5.2	Developing new dynamic pricing mechanisms							1	1	1	1	1	1
T 5.3	Integraqted water supply-demand modelling including dynamic pricing												1
T 5.4	Experimental economics-based tests of pricing policies												
D5.1	Literature review (m12)												X

Table 5. WP6 Plan

WP6	Platform Implementation and Integration	1	2	3	4	5	6	7	8	9	10	11	12
T 6.1	Delivery management plan and testing specification				1	1	1	1	1	1	1	1	1
T 6.2	Architectural design of the SmartH2O platform						1	1	1	1	1	1	1
T 6.3	Implementation of the SmartH2O platform									1	1	1	1
T 6.4	Testing and quality assessment									1	1	1	1
T 6.5	Platform management and data distribution				1	1	1	1	1	1	1	1	1
D6.1	Delivery management plan and testing specification (m6)						X						
D6.2	Platform architecture and design (m9)									X			
D6.3	Platform Implementation and Integration - initial prototype (m12)												X
MS7	[SETMOB] R1 initial release of the platform (m12)												M

Table 6. WP7 Plan

WP7	SmartH2O Validation	1	2	3	4	5	6	7	8	9	10	11	12
T 7.1	Design of the case study validation methodology				1	1	1	1	1	1	1	1	1
T 7.2	Impact in the Swiss case study												1
T 7.3	Impact in the UK case study												1
D7.1	Validation methodologyy (m12)												X

Table 7. WP8 Plan

WP8	Business Development	1	2	3	4	5	6	7	8	9	10	11	12
T 8.1	Technology and market watch	1	1	1	1	1	1	1	1	1	1	1	1
T 8.2	Regulation watch	1	1	1	1	1	1	1	1	1	1	1	1
D8.1	Early exploitation plan (m6)						X						
D8.2	Technology watch report (m12)												X
D8.3	Standards and Open Data report (m12)												X
MS8	[SUPSI] Standards and open data report available (m12)												M

Table 8. WP9 Plan.

WP9	Communication and Dissemination	1	2	3	4	5	6	7	8	9	10	11	12
T 9.1	Communication strategy and planning	1	1	1	1	1	1	1	1	1	1	1	1
T 9.2	Dissemination material and tools	1	1	1	1	1	1	1	1	1	1	1	1
T 9.3	Dissemination events	1	1	1	1	1	1	1	1	1	1	1	1
T 9.4	SmartH2O Summer School												1
D9.1	Dissemination tools and materials (m4)				X								

D9.2	First year dissemination report (m12)												X
MS2	[SUPSI] Project start info released to the media (m3)			M									
MS9	[POLIMI] SmartH20 social awareness app launched (m12)												M

3.2 WP2 Requirements, design and specifications

The main objectives for Year 1 were:

- Identifying the user roles for the SmatH2O platform and awareness applications.
- Defining, together with representatives of the user roles, the stories that describe the usage of the platform.
- Expressing the user stories formally as use cases.
- Defining the mock-ups of the user interfaces supporting the identified use cases.
- Setting user acceptance criteria for validation, in cooperation with WP7.

3.2.1 Progress towards objectives

Task 2.1 Use cases descriptions

In this task the methodology and roadmap for the requirements elicitation process have been defined and performed to analyse and structure a number of user stories and use cases that will be used to drive the development of the SmartH2O platform. Following the user-centred methodology, an initial exploratory analysis of user needs based on existing studies of water consumption in Switzerland and UK and exploratory requirements interviews with water/energy supplier representatives (TWUL, SES) have been performed. Accordingly, initial drafts of user stories, target groups and accompanying visual mockups have been developed and verified in two end-user workshops with the target groups (Tegna, Manchester).

Consecutively, the user stories were broken down into a list of user-centred use cases. Adhering to the developed methodology combining user-pull and technology push the user stories have also been verified in a workshop with technical partners to elicit the technology-driven needs and potentials. Based on the received feedback and input from these workshops the user stories and the related visual mockups and use cases have been refined.

As a result, the SmartH2O platform has been structured in several main application elements comprising the basic customer portal (visual water meter), the advanced customer portal (gamified and social water meter), the business dashboard, the agent-based customer consumption simulator and the games platform (Drop! mobile game app and board game).

The individual use cases relating to the different application elements have been described accordingly and an initial user model and early software integration requirements from T2.3 have been integrated into the first deliverable D2.1 (Use cases and early requirements). Subsequently, for each of the application elements and main use cases, corresponding visual mockups have been developed and/or revised. These have been used to perform a final validation of the developed user stories and use cases. This has been done from the business requirements perspective with the water utility staff in Reading, UK (TWUL) and from the end-user and water research perspective in a moderated online discussion on LinkedIn (SmartH2O Innovation Community). Based on the feedback received, the user stories, use cases and visual mockups have been refined and adapted accordingly. For an additional verification, a literature analysis of lessons learned from energy gamification applications and of natural resource consumption visualization models has been performed and used to inform the final designs.

Finally, conclusive feedback from technical partners has been obtained in a joint one week working session in Berlin. All of the achieved results from this process have been documented in D2.1 (Use cases and early requirements) and D2.2 (Final requirements).

Task 2.2 Functional and non functional requirements analysis

In this task, the part of the methodology for eliciting and formalizing specific requirements from end-users and technical partners based on user stories and use cases developed in T2.1 has been defined and performed. Initial requirements have been extracted, defined and

formalized at application level and at use case level, based on the results of exploratory interviews with water utilities (TWUL, SES), existing studies of water consumption and workshops with water consumers in Switzerland and the UK (performed in T2.1). In this way, a more detailed description of the user stories and use cases defined in T2.1 has been developed in form of a systematic, formalized requirements specification for the SmartH2O platform.

The results achieved at the requirements level have been documented in D2.1 (Use cases and early requirements). This included early high-level functional and non-functional requirements at the application level, an early user model as well as a set of main use cases with corresponding functional descriptions and early specifications of use-case specific functional requirements, adhering to the widely accepted formalization model from (Cockburn, 2000).

Subsequently, the requirements were refined, finalized and further extended to include success criteria according to additional feedback from a water utility business workshop (with TWUL), from the online discussion with target users and stakeholders (LinkedIn SmartH2O Innovation Community) and from the workshops with technical partners (performed in T2.1).

As a result D2.2 (Final requirements) was produced, containing a detailed, systematic specification of high-level application requirements and use case specific functional requirements, as well as non-functional requirements operationalized in form of success criteria. In addition, it included the final user model and final software-integration requirements for the development of the SmartH2O platform (input from T2.3). This includes both the social awareness applications (the basic and gamified social customer portal, the games platform) and the policy design and evaluation modules (i.e. the business dashboard and the agent-based consumption simulator).

Task 2.3 Functional specification of the SmartH2O platform

The functional specification of the SmartH2O platform depends on the requirements defined in T2.1 and T2.3, i.e. published in D2.1 (m8) and D2.3 (m12), respectively. As a first step toward the functional specification of the SmartH2O platform, the elicitation of early software integration requirements was anticipated and contributed as part of D2.1, in order to inform the development of main SmartH2O technical infrastructure early on. This includes early requirements on critical issues of the integration/communication of the SmartH2O system with the water companies existing infrastructure (e.g. smart meter data acqusition and data integration, services integration etc.).

Following the release of early requirements in D2.1 the analysis and identification of data and software components required for supporting the implementation of the identified early user stories, use cases and functional requirements has been initiated. This included the critical decision-making regarding the software architecture and data integration methods as a result of understanding the established rules for data exchange and the privacy policy of the data originators (TWUL and SES).

Main components of the SmartH2O platform and the functional composition of the platform releases have been defined, feeding into D6.1 and D6.2. First technical use-cases specifying the Smart Meter Data Management component have been defined and anticipated in D6.2 for the purpose of coordination with the architecture and implementation development process.

The UML design of the functional specification of the Portal Data Exchange has been initiated, the technical use cases and the API documentation for the Gamification Engine and the Consumer Portal integration to the SmartH2O platform Enterprise Service Bus have been formalized (and also anticipated in D6.2 to coordinate on-going technical infrastructure development). The framing and organization of main system functions has been drafted and the specification of physical format of the system interface initiated. The definition of the system quality level has been performed, the software integration requirements refined (contributed to D2.2) and the preparation of the D2.3 (Functional specification of the SmartH2O platform) started.

3.2.2 Main achievements

All objectives for the reporting period have been met: 1) a number of user stories and use cases that will drive the development of the SmartH2O platform have been defined and described, and 2) based on these user stories and use cases the specific requirements of the SmartH2O platform have been analyzed, systematically described and formalized. This has been achieved for both the social awareness application and for the policy design and evaluation modules (business dashboard and the agent-based consumption simulator).

In particular, specific target groups and user needs have been identified and described, including a typology of users for different application elements and classes of functionalities (e.g. gamified vs. non-gamified). The use cases and requirements have been described in narrative form of user stories and through visual mockups (supporting early communication to and feedback from target user groups and stakeholders) as well as formalized in a way supporting effective technical implementation. The defined requirements include high-level functional and non-functional application requirements, use case specific functional requirements and non-functional requirements in form of success criteria for main application elements of the SmartH2O platform (basic customer portal, advanced customer portal, business dashboard, games platform and agent-based consumption simulator). Finally, the corresponding user model and the software integration requirements have been specified. Thereby the user-centred requirements elicitation methodology has been successfully performed, effectively involving representatives of target user groups and stakeholders in the process, through several workshops and a moderated online discussion.

All of these results have been documented in two deliverables D2.1 Use cases and early requirements (m8) and D2.2 Final requirements (m12) that have been produced and delivered according to the planned schedule. Deliverable D2.1 has been accepted.

A draft version of D2.2 has been anticipated and delivered for the anticipated review one month in advance. The final version has been delivered at end of m12. The milestone MS5 Requirements available (m12) has been successfully reached.

The following deliverables were completed:

- D2.1 Use cases and early requirements (m8): **accepted**
- D2.2 Final requirements (m12): **delivered**

And milestone 5 has been successfully achieved as the final requirements have been made available to all partners.

- MS5: Requirements available (m12): **achieved**

3.2.3 Use of resources

WP2	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D2.1	Requirements early version (m8)	3.09	6.73	1.05	12.00	1.13
D2.2	Requirements final (m12)	0.75	0.50	6.00	10.00	2.75

Spending is lower than expectations. In order to accommodate for the new case study (Valencia), the spending has been adjusted to save some resources that will be needed to perform an additional requirements analysis part for this case study following its inclusion (see Change of beneficiaries).

3.3 WP3 User modelling

The main objectives for Year 1 of this WP were:

1. The collection of available data on past and present consumer behaviour, obtained from the smart meter infrastructure and standard offline meter data
2. Obtain water end-use patterns
3. Analyze the consumer behavior and to classify it.
4. Develop models of the consumer elasticity to water prices, to incentives, to awareness campaigns and to social pressure
5. Implement the consumer models in an agent-based modelling platform and validate the model

3.3.1 Progress towards objectives

Task 3.1: User data collection and analysis

This task targets objectives 1 and 2 and it was mainly articulated in the following activities

- Review of the state-of-the-art case studies and of available data sources for data harvesting;
- Design of a software repository for containing the harvested data;
- Data collection.

Review of the state-of-the-art case studies concerned an analysis of the literature in order to: (i) understand the structure of the databases, applications and case studies previously used in the literature focussing on the nature of water end use data employed; (ii) identify the potential determinants of water end-use consumption; (iii) understand the effectiveness of water demand management programs and policies.

Regarding the design of the software repository, work has been organized first in the specification of the context data and then in the development of Entity-Relationship models. The specification of the context data was based on the review of the case studies similar to the SmartH2O project, a list of user data, which have been considered to be important for user modeling, has been identified. Different priorities have been assigned to the data.

The Entity-relationship model was based on the identified context data, an entity-relationship diagram describing the structure of the database has been prepared. An SQL-based database has been implemented. The database stores initial users features which will be updated with the data gathered from the social game developed in WP4. Moreover, the database is equipped with interfaces to the water utilities data systems for reading the water consumption smart metered data.

Data collection has been more problematic. We negotiated a price with Bill DeOreo to purchase data extracted from the Aquacraft database for 7,000 USD. Aquacraft is a world leader in the acquisition and processing of high resolution water consumption data. Unfortunately Aquacraft, during the negotiation phase, assessed that the development of the SmartH2O project would pose a threat to their commercial leadership and therefore decided not to sell the data.

In the meantime the SmartH2O project tried to access data produced by the tests sites operated by Thames Water, a partner in the project. Unfortunately, due to unforeseen circumstances, the maintenance of the test sites has been discontinued for reasons independent of Thames Water will. The contractor who was maintaining the sites was not awarded a larger contract for the provision of 8’000’000 smart meters in the next 15 years. For this reason, they terminated the contract with Thames Water and the data was not accessible any longer.

Thanks to our extensive literature review e identified the WEEP project as a potential source of water consumption data. Contacts were taken with Branz Co, the company who run the

project and with Dr Lee Bint. After a long negotiation and discussion data were eventually supplied, but they were made available to the project partners only in early March 2015, well after the delivery of D3.2.

Professor Martin Anda, of Murdoch University, Australia made available a sample dataset of billed data with the associated psychographic features of the users (obtained from M. Anda's project).

Task 3.2: Algorithms for user profiling

This task targets objective 3 (analyse the consumer behaviour) and it was structured in the following sub tasks:

- Development of algorithms for end use disaggregation of water consumption
- Models of water consumption based on user profiles

Regarding the disaggregation of water consumption data, first a review of the literature on the methodologies applied for water consumption disaggregation, data-driven user profiling and water demand forecast was performed. This review has been submitted to Environmental Modelling & Software for publication.

An extensive review on the algorithms used for energy disaggregation has been performed and three of the reviewed algorithms (i.e., FHMM, integer-programming optimization and sparse coding) have been tested against an existing database (AMPds) on energy consumption. We then proposed a new algorithm for energy disaggregation based on sparse optimization and an extension of the FHMM with sequential dynamic time warping (DTW) as well as an improvement of the optimization-based method. The results on energy disaggregation have been submitted to the IEEE Transactions on Control System Technology.

The implemented disaggregation algorithms will be tested for water consumption disaggregation as soon as data on water end-use consumption will be available. We also explored the use of the developed FHMM + DTW algorithm in the case the ground truth is not available (or only an approximation is known), meaning without requiring prior knowledge of the appliances signatures. Preliminary tests on the same energy consumption dataset are running.

Regarding the development of models of water consumption, we applied feature extraction algorithms to identify water consumption drivers and to characterize user profiles. Different algorithms have been tested on the *H2ome smart* dataset (26 users' features, low-resolution billed data, more than 3,000 households in nine towns of the Pilbara and Kimberley Regions of Western Australia). A collaboration has been started with Professor Anda in order to develop a comparative analysis among cities characterized by different socio-economic contexts. In addition, the proposed methodology has the potential to be later applied to the rollout of smart metering infrastructure in Western Australia with the Water Corporation and Western Power and Horizon Power.

Task 3.3: Modelling future user behaviour

This task is focusing on objective 4 (model the consumer behaviour). The main activities in this task have been related to the development of a a synthetic generator of residential water end use demand. Thanks to this simulator we will be able to generate use patterns in the agent based simulation model, and, at the same time, to generate sequences of water consumption to calibrate the end use disaggregation algorithms, which can then be validated on real world data.

In the first months of 2015 we have also started to investigate how to correlate the response of users to water saving stimuli, including both awareness stimuli, social network influences, and to changes in water prices. Work is also in progress on a meta-analysis of price elasticity, i.e. water consumption decrease in response to price increase, a component which can be used as an input for modeling future user behavior.

Task 3.3: Agent-based models of user behavior

This task started in 2015 and it is in charge of objective 5, that is to implement in an ABM platform the consumer models developed by WP4 and WP5 and in Task 3.3. A review of previous work in the area of agent based simulation of water and energy consumption is underway and a comparison of various simulation platform has been made, where we identified AnyLogic as the simulation platform of choice for this task.

3.3.2 Main achievements

The following deliverables were produced. They were submitted for the early review and the reviewers rejected them with comments for their improvement. The deliverables are being now resubmitted after the necessary changes have been made.

- D3.1 Databases of user information (m6) **rejected**
- D3.2 First user behavior models (m9) **rejected**

Milestone 5 has been reached at the end of Month 9, as all partners agreed to the proposed techniques for user profiling that will be used in the implementation of the SmartH2O platform.

- MS5: Initial techniques and algorithms for user profiling accepted (m9) **achieved**

Besides the contractual achievements, WP3 has been rather active on the scientific research and dissemination side. In total, during the first year, we published 2 conference papers and we have 2 journal papers under review.

3.3.3 Deviation from plan

The work package is in line with its plan, but water data has been difficult to retrieve and therefore the validation of the disaggregation algorithms has been performed with energy data. The water data have been made available early March 2015 and the first results of the application of our algorithms to the new data are promising and encouraging. The revised version of D3.2 contains an update on the validation of the models with water consumption data. Moreover, more than 300 water meters are providing hourly fresh data from the Swiss Case study and the new Valencia case study will be delivering 2'500 hourly meter readings staring from July 2015.

3.3.4 Use of resources

WP3	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D3.1	Databases of user information (m6)	4.68	7.23	0.50	13.00	0.59
D3.2	First user behaviour models (m9)	3.00	2.65	4.75	12.00	1.60

Spending of man months has been in line with plan. A moderate underspending can be observed in relation to D3.2, as the scarcity of data requested a shift of some planned activities related to model validation. This validation task has been performed in the first months of Year 2 and it is not reported here.

3.4 WP4 Saving water by social awareness

The main objectives for Year 1 of this WP were:

- To investigate the design of human tasks that involve explicit human computation for smart water management issues
- To apply the paradigm of social games to the definition of individual or collective games for pursuing smart water management objectives.
- To exploit social network analysis for optimizing crowd sourced tasks
- To integrate computational capacities of humans in order to improve the quality of water usage.

3.4.1 Progress towards objectives

Task 4.1: Social games for water demand management

An initial visualization model, based on a multiple granularity timeline, mapping abstract water metering information into a form understandable for private water consumers has been developed in T4.1. A first draft has been presented in form of visual mockups in two user workshops and subsequently adapted to include user feedback. Secondly, a literature analysis of existing studies on the design and use of games and gaming techniques for raising social awareness for water saving has been performed. This analysis has led to the SmartH2= original game concept, which addresses the creation of consumer awareness in two distinct yet coordinated ways: by gamifying the Consumer Portal web application of an utility, adding to it elements typical of a game, such as recording of user's actions, achievements, goals, and rewards for achievements. By creating a set of games (the so called Drop! games), which consists of a real game (a card game for the family and kids) and a number of digital games that can be activated by mobile QR code scanning. This integration reinforces the persuasive and education value of the game approach and permits a continuous evolution of the gaming platform with the addition of other digital extensions of the Drop! game, so to keep the curiosity and engagement of consumers alive.

Task 4.2 Social Network Data Collection and Analysis

A first analysis of existing techniques and models for social network analysis supporting the identification of relationships between users that can be applied to identify relevant users and communities has been performed. In parallel, a technical architecture for acquiring content from social media has been developed. Such architecture consists of a set of processes, realized in Java and MongoDB, which are easily parallelizable and deployed on a cloud architecture for scalability. The focus of data acquisition has concentrated on the Twitter social media platform, which has a more liberal policy for content acquisition. Its terms and usage limitations have been studied and respected in the construction of the data acquisition processes. Several test processes have been implemented, each starting from a set of "seed" queries, which permit one to retrieve an initial set of posts related to a given topic. Such posts are then filtered for relevance by means of a classifier, which has been trained using the contribution of the crowd. To this end, an ad hoc crowdsourcing application has been constructed to let crowd members vote for the relevance of a post and then aggregate votes and create the ground truth for training the classifier. After the initial set of relevant posts is created, the users who posted such content are identified and rated according to their potential influence, based on a preliminary set of metrics. Influential users are then considered, in order to find more relevant users in their social neighbourhood and thus more relevant content, in an iterative manner.

A literature analysis of techniques and approaches to online game player behavioural analysis has been performed. This survey set the foundation for an outlier detection technique, which can be used to identify behaviours that deviate from the norm and are potential signal of spamming.

Task 4.3 Analysis of community roles and trust and people search

An initial model of community roles based on user role schemes and typologies in Twitter has been defined alongside with a preliminary set of indicators and metrics to measure certain aspects (like information spreading, influence etc.) of social activity. The metrics consider their social graph of users (followers and following users) and their activity level. These metrics permit to discover users that have an important status in the online community, due to a balanced mix of the intensity of their activity and of the reach of the content they produce.

3.4.2 Main achievements

- An initial visualization model for mapping abstract metering information that can facilitate and stimulate users' individual and collective awareness regarding water consumption
- The original SmartH20 game concept based on both gamification of consumption data in the Customer Portal and on the use of awareness games
- The Drop! Card game and its digital extensions
- The connection between the game platform and the gamified customer portal, to create a unique coherent engagement experience for the water consumer.
- Initial overview and design of social network analysis techniques for community detection
- Definition of the initial community roles model, based on user's activity level and social reach.

The following deliverables were completed:

- D4.1 First social game and implicit user information techniques (m9): **accepted**

The following milestone was achieved, as also demonstrated at the pre-review meeting.

- MS6 Initial techniques and algorithms for social interaction (m12): **achieved**

3.4.3 Use of resources

WP4	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D4.1	First social game and implicit user information techniques (m9)	1.83	3.93	3.09	10.00	1.15

The limited underspending in deliverable D4.1 is attributable to a reduction in the contribution from SETMOB, which has been diverted to developments in Year 2.

3.5 WP5 Saving water by dynamic water pricing

The main objectives for Year 1 of this WP were:

1. The identification of water pricing instruments that have been applied or are being considered in EU states
2. Use of econometric modelling and analysis of water price response to dynamic water supply or environmental conditions
3. Consideration of scarcity indicators within the analysed dynamic water pricing policy
4. Assessment of the supply-demand water system to evaluate impacts of dynamic pricing
5. Validation of the econometric and agent-based behavioural modelling through an experimental economic workshop

3.5.1 Progress towards objectives

The outcome of Point 1 above was formalized in deliverable **D5.1 Review of pricing instruments and their effectiveness (M12)**. Point 2 and 3 will be included in deliverable **D5.2 Developing new dynamic pricing mechanisms (M16)**, while the planned activities for point 4 and 5 above will be reflected respectively in report **D5.3 Integrated water supply-demand modelling including dynamic pricing** and **D5.4 Experimental economics-based tests of pricing policies**. The sections below summarize the activities undertaken over the first year of the project for work package WP5.

Task 5.1: Review of pricing instruments and their effectiveness

Task 5.1 has the objective to review the EU regulatory frameworks as well as the current and past pricing instruments adopted in EU and their effectiveness; review future pricing models that could be envisaged given smart metering and interactive media; development of micro-econometric model of water demand, for the case studies. The outcome of this task was formalized in deliverable **D5.1 Review of pricing instruments and their effectiveness (M12).** Specifically the D5.1 deliverable includes the following steps:

- Review of the EU water policy
- Review of the regulatory framework of the water sector in UK and Switzerland and in other EU Member states
- Review of the traditional pricing schemes for water conservation adopted in UK and Switzerland and in other EU Member states
- Review of the state of the art studies on household water demand
- Development of a water demand baseline for the UK and Switzerland case study
- Introduction of the econometric model and how this will be implemented through the use of the meta-analysis
- Overview of innovative pricing schemes, with particular emphasis on dynamic pricing:
    - Analysis of smart metering market, stage of deployment around the world, future challenges and opportunities
    - Summary and analysis of innovative pricing mechanisms for water conservation and customers response
    - Sketch of online communities and applications in the water conservation

Task 5.2: Developing new dynamic pricing schemes

Task 5.2 has the objective to develop new dynamic pricing schemes that also take account of short and long-term water scarcity as determinants in the pricing structures. This task also presents the analysis and evaluation of the most effective ways to publish pricing schemes and integrate them into the communication with consumers. We report below the activities conducted for T5.2 over the first year of the project. Specifically these include:

- Use of meta-analysis to obtain the statistics of price elasticity, and how it varies based on:

- Exogenous variables (e.g. geography, weather)
- Pricing regulation (e.g. increasing or decreasing block rates, uniform pricing, dynamic pricing, etc.)
- The econometric methodology adopted in the study
- Environmental awareness/concerns
- Regulatory framework and other institutional factors
- Level of water scarcity

Task 5.3: Integrated water supply/demand modelling including dynamic pricing

Task not active in Year 1.

Task 5.4: Experimental economics-based tests of pricing policies

This task consists mainly in the experiment that will be conducted to test pricing policies with water consumers. The outcome from Task 5.4 will be reflected in deliverable **D5.4 Experimental economics-based tests of pricing policies**. For this task, the performed activities include:

- Preparation of an online survey to explore customers' responses to rewards and prices. The main idea behind the survey is based on asking water users if and how they are willing to undertake specific water saving actions under a range of diverse incentives (economic reward/voucher or penalties, symbolic reward/badge). The survey's expected outputs include:
  - Users' statements about their preferences and users' reactions to the incentive schemes
  - Changes in user reactions based on the user characteristics, environmental attitude, type of incentive adopted
- Questionnaire pre-test: different versions of the questionnaire have been submitted to project partners and colleagues at POLIMI, in order to:
  - Estimate time needed to fill out the questionnaire
  - Collect comments and suggestions on clarity and reasonability of the questions
- Questionnaire updated based on results from the pre-test analysis. Specifically, the following changes were made:
  - The question on household income was replaced by a question on professional category of the principal income earner in the household
  - One question was added within the 'Water Use' section
  - Two questions added for the 'Prices' and 'Rewards' sections
- Questionnaire translated in Italian and German

3.5.2 Main achievements

The main achievements include:

- Review of the water pricing instruments applied or being considered in the EU states as well as review of the innovative pricing schemes, with particular emphasis on dynamic pricing
- Review on the art studies on household water demand
- Definition of a demand baseline for the two case studies.
- Start of the Meta-analysis to obtain the statistics of price elasticity. An econometric model is being developed to analyse the water price response to dynamic water supply, regulatory and environmental conditions (e.g. the level of water scarcity).
- Preparation of an online survey (English, Italian and German) to explore customers' responses to rewards and prices

The following deliverables were produced:

- D5.1 Review of pricing instruments: **delivered**

Milestones:

- No milestones due in the period.

3.5.3 Use of resources

WP5	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D5.1	Review of pricing instruments (m12)	2.42	2.09	4.06	8.00	-0.57

The use of resources is in line with the planning.

3.6 WP6 Platform implementation and integration

The objectives of this WP for Year 1 were:

- Establishing a common software engineering practices for ensuring that development activities are conducted according to a common standard.
- Delivering a detailed architecture design of the SmartH2O platform describing all platform modules (components, services, applications), communication protocols and underlying information and data models.
- Developing the first prototype implementation of the SmartH2O platform. This included:
    - creating the central database;
    - developing the Smart Meter Data Management component for provisioning the daily smart meter readings to the central database;
    - implementing the Enterprise Service Bus (ESB), developing the basic layer of integration services and registering the services into the ESB;
    - developing the Basic Customer Portal for the non-gamified users;
    - developing the Advanced Customer Portal for gamified users;
    - developing the first version of the gaming platform (including the off-line game).

3.6.1 Progress towards objectives

Task 6.1 Delivery planning

Task 6.1 had the objective to set up the software development process to be adopted in order to produce the SmartH2O platform. The outcome of this task was formalized in D6.1 Delivery management plan and testing specification. The following steps have been achieved:

- The management plan and testing specification has been written.
- The initial requirements for the SmartH2O platform architecture and design have been defined.
- Data integration scenario has been defined.
- The development server has been installed and configured.
- The continuous integration (CI) environment has been installed and configured. It includes a Jenkins installation that receives by automated token the new code that was committed to the Bitbucket repository. Jenkins then tests, packages and submits the code to Sonar automatic code reviewer and to a snapshot/release local repository on Nexus. The results are reported via e-mail.

Task 6.2 Architectural design of the SmartH2O platform

This task is dedicated to deliver the architectural design that is at the base of the software developments. Starting from the requirement specification, the components of the SmartH2O platform has been identified and detailed by:

- Designing the overview of the SmartH2O platform architecture.
- Defining the layers and main modules of the SmartH2O platform architecture, which comprise: the water utility customer portal, the gamification engine, the games platform enterprise service bus (ESB), the smart meter data manager, the portal data exchange manager, the water utility admin portal , the authentication gateway the pricing engine, and the agent based modelling and models of user behaviour.
- Describing the abovementioned components in terms of interfaces and technical use cases.
- Defining the component integration standards.
- Defining the data governance policy.
- Defining data security standards.

Ultimately, the designed SmartH20 platform consists of a multi-tier architecture:

- The data tier comprises the database hosting the water consumption data and the user data.
- The business tier host the components implementing the business logic of the SmartH20 main modules, such as the gamification engine rewarding policies, the smart meter data manager data import and validation procedures, etc.
- The service layer wraps the business logic and the data in the form of Restful web services, according to a Service Oriented Architecture design. It is realized in the form of a pluggable, open enterprise service bus, form maximum openness and expandability by third parties.
- The presentation layer consists of a Web container (implemented using Java servlet), which executes server-side page templates, implemented in JSP, comprising the interface elements that pull data content from the service layer calling Rest Web services.
- The Web client tier consists of HTML and JavaScript, which permit the the implementation of advanced client-side interfaces, as requested for the gamified Water Utility Consumer Portal.

Task 6.3 Implementation of the SmartH2O platform

This task has been in charge of the development of the first version of the SmartH2O platform – the initial prototype. For achieving its outcome, the following activities have been performed:

- The implementation technologies, frameworks and languages have been selected, installed and integrated. These comprise:
    - Languages and libraries: Java, C#, Pig, SQL, Groovy, JavaScript, IFML
    - Frameworks and tools: ex. J2EE, Eclipse, WebRatio, Apache Camel Route, Apache Hadoop, Unity, JQuery, AnyLogic Simulation Platform.
    - Application Servers: ex. Apache JBoss, JBoss Fuse, Apache Hadoop.
    - Database Servers: ex. MySQL.
    - Communication Servers: ex. FTP, SMTP.
    - Management and Administration components. ex. MySQLWorkbench.
- The environment for parallel processing of big data has been installed and configured: Apache Hadoop and Ambari as a single entry point for Hadoop management;
- The central database has been created according to the model provided by POLIMI.
- The data model has been updated according to the continuous model specification.
- The Smart Meter Data Management Component (SMDM) workflow has been adapted to accomplish data aggregation at house and device level.
- The original gaming engine prototype, developed in the Cubrik Project and transferred with an agreement to SmartH20, has been acquired and adapted to the water scenario and has been deployed in a testing environment, as a backend of the Gamified Customer Portal.
- The specific web services for exposing data from the platform database to the Customer Portal have been implemented. Eg. getConsumptionData(), getNeighbourhood(), getAlerts(), getTips(), getBill(), getVideos(), validateUser().
- JBoss Fuse - the open source ESB has been implemented.
- The specific web services for the Customer Portal have been bundled in JBoss Fuse ESB.
- The Gamification Engine specific web service signatures have been bundled in JBoss Fuse ESB.
- The specific web services for exposing data from the Gamification Engine to the other components have been implemented. Eg. AssignActionsToUsers(), GetActions(), GetUserCredits(), GetUserRewards(), RedeemUserReward(), UserRegistration(),UserUpdate()

- The Web Service interfaces of Customer Portal for displaying data of the platform database exposed by ESB services (visualization of consumption data, alerts, neighbourhood map, water saving tips and videos) has been implemented;

Task 6.4 Testing and quality assessment

The main objective of this task is to ensure that the developed software is compliant to the quality requirements. The processes involved by this task are continuous for all the time of the development. In the first year of the project, the following activities regarding this topic of interest have been accomplished:

- The unit testing procedures have been defined.
- SONAR - the open platform to manage code quality has been integrated in the Continuous Integration environment.

Task 6.5 Platform management and data distribution

This task is responsible for selecting and implementing the infrastructure able to support large-scale content storage and processes required by the SmartH2O platform. In the first year of the project, an extensive research in the matter has been accomplished resulting in selecting the cloud environments for being deployed at the later stages of the platform development : OpenStack for the management of virtual machines and CloudFoundry as a tool chain for release engineering, deployment and lifecycle management of the SmartH2O applications and components.

3.6.2 Main achievements

The main achievement is the successful delivery of the first prototype of the SmartH20 platform, games and awareness applications, as demonstrated in the pre-review meeting.

The following deliverables were produced to reach this goal:

- D6.1 Delivery management plan and testing specification: **accepted**
- D6.2 Platform architecture and design: **rejected**
- D6.3 Platform implementation and integration – initial prototype: **delivered and demonstrated at the pre-review**

The following milestones were achieved:

- MS7: initial release of the platform (m12): **achieved**

3.6.3 Use of resources

WP6	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D6.1	Delivery management plan and testing specification (m6)	2.50	1.50	0.00	4.00	0.00
D6.2	Platform architecture and design (m9)	2.75	2.15	3.12	11.00	2.98
D6.3	Platform Implementation and Integration - initial prototype (m12)	0.85	1.63	7.05	12.00	2.47

Underspending is justified by the delay in the completion of the technical design of the consumption data connectors to the smart meters of the UK test case. This will be easily recovered in Y2, by a generalization of the smart meter data manager component, so to be able of incorporating the data flows from both TWUL and the new partner utility Aguas de Valencia.

3.7 WP7 SmartH2O Validation

The objectives for Year 1 of this WP were:

- Definition, in cooperation with WP2, of the validation methodology, setting the socio-technical criteria for the assessment of the level of achievement of the project objectives in the two use cases.
- Preliminary activities for the validation of the impact of the SmartH2O platform in the two planned test cases, in Switzerland and in the United Kingdom.
- NOTE: The work plan of WP7 was originally designed for the start of both test cases in Y2. In order to allow this, the Swiss test case had to start the deployment and installation of 400 smart meters. Part of this activity has been attributed to Task 7.1, in the context of the design of the case study validation methodology.

3.7.1 Progress towards objectives

Task 7.1 Design of the case study validation methodology

This task first identified the set of key performance indicators (KPI) to measure the impact of the introduction of the SmartH2O Platform on the reduction of consumption of water due to increased awareness, and the reduction in the consumption of water due to the effect of innovative pricing strategies.

The core part of the task was the definition of the methodology adopted to assess the effective impact on the proposed KPIs. This included the data collection strategy, the method to select the users in the case studies and how to dimension d the control groups.

Technology acceptance criteria and user-based performance indicators have been defined as a basis for the user-centred validation methodology (and reported in detail as part of the requirements deliverable in D2.2). Technical success criteria for the validation have been defined (and reported in detail as part of the requirements deliverable D2.2). A user-centred evaluation methodology has been defined and planned.

Besides investigating and proposing a methodology for validating the SmartH2O impact, Task 7.1 also outlined a validation plan that describes the sequence of steps that will be performed to deploy the SmartH2O platform in the case studies, to involve a set of alpha testers, to revise and correct potential software problems, and to test the pre- release of the platform (beta testing).

Task 7.2 Impact in the Swiss case study

This task was planned to start in Year 2, but preliminary work had to be carried out by SES related to the installation of the Smart Meters in the test site in Tegna, Terre di Pedemonte, Canton Ticino, Switzerland.

- final selection of the smart meter brand and model (Aquametro Topas ES KR DN20);
- final design of the data communication architecture (gsm communication from concentrator to main DB server at SES, powerline communication from the power meter to the concentrator, and wireless communication from smart water meter to smart power meter)
- procurement and installation of 300 smart meters, including the link from smart water meters to smart power meters.
- test data transfer of meter readings through the Smart Meter Data Management Component of the SmartH2O platform.

Task 7.3 Impact in the UK case study

This task starts in Year 2.

3.7.2 Deviations from work plan

With respect to the Annex I part of the work related to the Swiss test case was anticipated, in order to be able to start the validation in Year 2, as planned.

3.7.3 Main achievements

Definition of success criteria: key performance indicators (D7.1), technology acceptance criteria, user-based performance indicators and technical success criteria (see also D2.2)

- Identification of the KPI to measure the SmartH2O impact.
- Definition of the user-centred evaluation methodology.
- Definition of the validation methodology, including the sample sizes, the trials to be run and the data collection infrastructure.
- Layout of the validation plan, explaining how the trials will be performed over time.

The following deliverable has been produced:

- D7.1 Validation methodology (m12): delivered

Milestones:

- No milestones in the period

3.7.4 Use of resources

WP7	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D7.1	Validation methodology (m12)	0.22	0.43	5.74	8.00	1.61

The underspending is mostly attributable to SETMOB not being involved in the formalisation of the validation methodology, as no software development was required, and at the same time the rescheduling of the UK test case saw a time shift in the allocation of resources for TWUL. At the same time it has to be remarked that SES has anticipated work originally planned in Year 2 for the installation of smart meters in the Swiss case study, which will be anyway attributed to D7.2 (Validation report, due at month 24)

3.8 WP8 Business Development

The objectives for Year 1 of this WP were:

- Surveying the evolution of the technologies, markets and regulations affecting the water utility sector.
- Analysing the markets of the SmartH20 solutions and defining the assets delivered by the project that could have the highest exploitation potential in such markets.

3.8.1 Progress towards objectives

Task 8.1 Technology and market watch

Task 8.1 has the objective to set up an observatory on current trends in the water sector as a whole with a particular focus on technological developments regarding the use of ICT in water management and on the market application of such progresses. The outcome of this task was formalized in deliverables **D8.1 EARLY EXPLOITATION PLAN – Bringing SH2O to the market** and **D8.2 TECHNOLOGY WATCH REPORT - Exploring the market dimensions**. The sections relative to this task in the two deliverables build upon an in-depth analysis of the global water market and include the following achievements:

- Overview of the water utility industry as a reference market
- Utilities taxonomy as a methodological tool to analyze the reference market
- Water utilities and water market watch:
    - Overview of current status: market concentration of water sector, planned investments and tariff structure
    - Overview of smart metering market: investment assessment and estimates
    - Overview of multiservice smart metering in Italy
- Industrial challenges and exploitation potential:
    - Overview of market forecasts
    - Overview of smart metering in EU countries and reporting on cost-benefit analyses from a panel of selected European countries in order to assess the economic sustainability of smart metering system deployment
    - Overview of organization of smart metering activities in network industries

In view of the exploitation of the results, contacts with technological partners have been taken in order to:

- Create an initial nucleus of the SmartH20 ecosystem, in collaboration with WP9, by contacting actors of different types interested in the project results.
- Identify components from past projects that could be reused and adapted to SmartH20 requirements.
- Understanding future options for exploitation by direct talks with potential adopters and partners
- Broadening the view of exploitation potential beyond water utilities, to other utilities and the game industry.

Following is a list of the activities that were conducted:

- Contact with water utilities:
    - Contact with PROACTIVE water utility partners (Metropolitana Milanese, Milan and TEA spa, Mantova) to show them the SmartH20 concept and plan a possible test with their customers.
    - Contact with the Salt Lake City Utility contacted, as this utility relied on Aquacraft for consumption data disaggregation and end uses characterization.
    - Contact with Studio Fantozzi, a professional water services firm with many connection in Italy and Europe in the water sector.

- Contacts with other projects
    - Contact with the CUbRIK project, for the reuse/exchange of results/methods experience in serious gaming
    - Invitation of WebRatio (CUbRIK partner) to the kick-off meeting for a demo of their gamification framework, which was judged useful as a starting point for the gamification of the Water Utility Consumer Portal.
    - Signing of a MoU with CUbRIK and WebRatio for the reuse of the CUbRIK gamification engine in SmartH20 and for the customization of the gamification framework to show its potential in the water saving domain.
    - Contacts with the COBHAM ERC (Massimo Tavoni and Giovanna Dadda) research grant (https://sites.google.com/site/massimotavoni/Home/awards-honors) to agree on the exchange results and methodologies for the validation of the awareness techniques in the utility sector.
    - Contact with the Proactive Project to understand potential for integration of SmartH20 results in their People Watch demonstrator.
- Contacts with other utilities:
    - Visit to British Gas in Reading (UK), to understand their interest in the SmartH20 gaming concept for energy utilities.
    - Contacts with the service business unit off WebRatio to understand the link they can provide to other utilities and multi-utilities (e.g., Trentino Servizi, A2A).
- Contacts with game industry players:
    - Contact with an Italian board game producer to understand the options for distributing the SmartH20 games in Italy, to support the utilities in advertising their approach on sustainable water usage
    - Review of several mobile/web game development frameworks and libraries (including Play!) as part of a preliminary competition analysis
    - Test of Titanium Framework (http://www.appcelerator.com/titanium/) with the Platino plugin specifically designed for game development. (http://lanica.co/products/platino/engine/), as a potential community to engage in the ecosystem.
    - Exploration of Unity 3D and its community as an alternative for multi platform 3D game engine.
- Contacts with technological players:
    - Contact established with Bill De Oreo from Aquacraft, to explore the possibility to try/purchase the TraceWizard software for water consumption disaggregation. This software has been used by many water utilities for data disaggregation and end uses characterization: it is therefore considered the benchmark software for water consumption data disaggregation.

T8.2 Regulation watch

Task 8.2 has the objective to analyse the European and national regulatory frameworks and provide information concerning the European countries according to their openness / adaptability towards smart water saving policies. The outcome of this task was formalized in deliverables **D8.1 EARLY EXPLOITATION PLAN – Bringing SH2O to the market** and **D8.2 TECHNOLOGY WATCH REPORT - Exploring the market dimensions**. The sections relative to this task in the two deliverables build upon the summary of the institutional water policy frameworks and pricing policies in UK, Switzerland, and Italy and include the following achievements:

- Summary of regulatory frameworks in UK, Switzerland, Italy, and a panel of selected European countries
- Summary of institutional settings and pricing policies in UK, Switzerland, Italy, and a panel of selected European countries

- Identification of regulations and policy studies on smart water metering and meter management in the European Union
- Overview of regulations and policy-industry initiatives in the smart water domain for a panel of selected European countries
- Identification of Italian regulatory activities in smart water metering (the multiservice smart metering project in Italy)
- Overview of regulatory and industrial challenges for the organization of smart metering activities:
    - Impact of EU law and sector-specific regulation on the behavior of market actors and regulation of smart metering implementation
    - Overview of smart metering mandatory roll-out and chances of legal monopoly granting
    - Overview of privacy and data protection regulation in the smart metering activities

T 8.3 Utility business implications and new business models

Not active in Year 1.

T 8.4 Business Technology Ecosystem

Not active in Year 1.

T 8.5 Open Data and standards

Task 8.5 (Open data and standards), which has as main objectives the use of appropriate standards in the design of the SmartH2O platform and also the publication of data generated by the project as Open Data sets. This task delivered D8.3 at the end of year 1, but it remains still active in order to be able to monitor the evolution of relevant standards in the ICT for water sector.

During the first year the interaction with the members of the ICT4Water cluster have been particularly useful to identify the most relevant standards. Also, first hand access to OGC working groups (in particular OGC Hydro DWG and OGC Energy & Utilities DWG)

At the beginning of the task a survey of the various standards adopted in different sectors was performed, from smart metering to geospatial information, from social data to water management, which are relevant to the SmartH2O project.

In parallel a survey of the Open Data initiatives in the area of water management was conducted, as Open Data are highly relevant for publishing the data sets collected during the experimental activity of the project to the international water management research community. Existing approaches and available repositories of Open Data for urban water management have been identified. Specific recommendations for the Open Data approach of the SmartH2O project have been generated

- Review of existing standards for data representation and communication
- Exploration of Open Data solutions for the publication of data sets produced as output of SmartH2O

3.8.2 Main achievements

The main achievements in the period were the identification and analysis of the markets and the consequent definition of the exploitable project assets. Also, the WP has delivered an in depth study of the technologies for the water sector and of the awareness techniques of gamification and serious games; it has also delivered the procedures and standards for granting the interoperability and the general exploitability of the SmartH2O results, with a special focus on the publication of the data sets produced in the project as open data.

The following deliverables have been produced:

- D8.1 Early exploitation plan (m6): **rejected**
- D8.2 Technology watch report (m12): **delivered**
- D8.3 Standards and open data report (m12): **delivered**

The following milestones have been achieved

- MS8 Standards and open data report available (m12): **achieved**

3.8.3 Use of resources

WP8	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D8.1	Early exploitation plan (m6)	1.01	2.48	0.07	5.00	1.44
D8.2	Technology watch report (m12)	0.50	1.51	3.55	11.00	5.64
D8.3	Standards and Open Data report (m12)	0.33	0.55	4.85	10.00	4.27

In this workpackage underspending has been more marked, mostly due to the reduction of the contribution by Thames Water, as a consequence of the shift of their case study, and the diversion of focus of SETMOB, who had to concentrate their resources in the development of the initial prototype, thus reducing their available contribution to D8.2 and D8.3. It has to be remarked that D8.3 (Standards and Open Data Report) is closely related to Task 8.5 (Open data and standards) which is planned to starts in Y2. The work in T8.5 will therefore be based on D8.3, but at the same time, as stated in the Annex I, it will enhance and enrich the deliverable, in particular by making available open data produced by the SmartH2O project.

3.9 WP9 Communication and dissemination

The objectives for Year 1 of this WP were:

- To design and implement an effective communication strategy for the SmartH2O project.
- To disseminate the project outputs at local level, including strengthening end user participation, expanding to other local and regional water authorities and businesses.
- To disseminate the project results at national level, increasing the knowledge on ICT-supported water resource management.
- To disseminate the project results at the international level, exploiting the various scientific and business networks of the project partners.

3.9.1 Progress towards objectives

T 9.1 Communication strategy and planning

A clear and structured communication and dissemination strategy for the project has been developed. It differentiates between specific target groups with corresponding key dissemination messages, primary dissemination channels and the core project value for the given target group (see D9.1). The strategy also describes the specific approaches to the use of the different communication and dissemination channels (publications, project newsletter, website, social media). As a concrete operationalization of the strategy a dissemination plan has been developed and defined in detail for each dissemination channel, including specific targets (KPIs) against which the effectiveness of the implementation of the communication strategy and the dissemination plan will be regularly measured and monitored (see D9.1). The plan has been defined in alignment with T8.2 (Business Ecosystem). As part of this plan, the implementation of a specific focus on selected social media of primary relevance for the project has also been defined.

This includes the definition of an editorial publishing plan for Twitter and of the establishment of the Social Community on LinkedIn, as a community of interest grouped around the project. Related editorial approaches for these channels have been defined. Accordingly, a communication team consisting of the partner representatives has been formed and charged with the implementation of the defined communication strategy and the related operational dissemination plan (incl. the production of related dissemination materials and their dissemination through specific tools; T9.2). Within the communication team specific responsibilities have been assigned and coordinated (e.g. POLIMI leading and coordinating the communication on traditional channels and the Website, EIPCM leading and coordinating the communication on social media). The main communication channels have been setup and initiated. In this way, a systematic and orchestrated approach to the project communication and dissemination has been put in place.

As part of the communication strategy, and in collaboration with WP8, specific liaisons with related initiatives and EU projects have been defined and established to further promote the SmartH2O project through their activities: e.g. affiliation of SmartH2O with the ICT4water cluster, ensuring connection with 10 projects on ICT and Water Management and liaisons with EU projects CUbRIK, iWidget and Proactive. These links will contribute to the establishment of a florid business and technical ecosystem, one of the objectives of the project.

T 9.2 Dissemination material and tools

Task T9.2 aims at producing promotional material for the project dissemination by delivering a progressively enriched information pack reflecting the brand and objectives and expected results.

The first activity of this task was building the SmartH2O project brand to promote the project visibility with a common and distinctive visual identity in all the dissemination events, such as project presentations, press-releases, newsletters.

The SmartH2O website is online since April 2014 and has been constantly maintained and updated to communicate the project progress. The website indeed provides a summary of the SmartH2O Project in terms of concept, objectives, technical architectures and use cases, a description of the Consortium, the project results (i.e., deliverables, publications, software, datasets), a list of the main events organized/attended as well as a collection of media and project presentations. The website is being instrumental for multiple objectives, such as disseminating a "brand identity" of the SmartH2O Project, informing about the main project objectives and research questions, sharing the project outcomes, involving and engaging the stakeholders, broadcasting and sharing news through social networks.

Besides the SmartH2O website, the engagement of external stakeholders have been obtained through the activation of social media channels, including (1) the SmartH2O twitter account to facilitate a direct, easy, immediate communication about the main project activities and results, as well as to share news or initiatives related to the general sH2O mission, (2) the SmartH2O SlideShare account linked to the media section of the SmartH2O website, to share the presentation produced during the project lifetime, and (3) the LinkedIn SmartH2O Innovation Community to provide a means to involve individuals and research communities from outside the project, who are invited to collaboratively build on the current project vision and to give their feedback on the project's concept, application mockups and outcomes, ultimately building synergies for existing and future projects. To facilitate and enhance the engagement of different kinds of stakeholders in the SmartH2O Innovation Community a special visual discussion space provided by EIPCM has been setup and integrated with LinkedIn.

The creation of content for the different channels has been performed in concert with the progress of work in different workpackages, and in this reporting period especially with WP2 (Requirements and specifications). Thereby, based on the available project results, content has been produced in a targeted way, adapted to the specific requirement of the different communication channels. Adhering to the communication strategy, communication of project-based content has been expanded and enriched with related content from relevant sources in order to create a broader reach and higher value for the audience (e.g. news on selected topical areas from online sources and from social media, publications of water research institutes, journals, other newsletters, conferences etc.).

Finally, this task promoted the project visibility through the publication of the SmartH2O newsletter and through contributions to the ICT4Water Cluster newsletter, which have been spread through a number of channels, including, among others, mailing lists, the project website, the Twitter and LinkedIn accounts of the SmartH2O project, and the professional networks of individual project partners.

T 9.3 Dissemination events

Task T9.3 is in charge of organizing and managing the Dissemination Events, which will be organized during the project lifetime. Although the major dissemination event is planned to take place in London during the World Water Day 2016, other dissemination events have been organized during the first year. The extensive participation of SmartH2O to scientific dissemination events and conferences started supporting the aggregation and the building of a sense of community around the project.

During the first year, members of the SmartH2O consortium promoted the project by participating to 9 international events conferences or workshops, by submitting two journal papers currently under review, by participating to a number of other dissemination events at the national and the international level, including, among others, press releases and radio interviews, visits and project presentations in schools, and project presentation to national NGO.

T 9.4 SmartH2O Summer School

The SmartH2O Summer School "Smart Systems For Urban Water Demand Management " is being organized at the Congress Centre Stefano Franscini in Ascona, Switzerland, for one week from August 21-26, 2016. The school is cofounded by ETH Zurich with a grant of € 25,000 based on 80 expected participants. Besides, the SmartH2O project members, the program include lectures by several water experts from industry and academia in Europe and US. The school will also host a public event in the form of a demo of the SmartH2O platform.

3.9.2 Main achievements

The WP has set the foundations for an effective dissemination and visibility of the project results, achieving the following main results:

- Communication strategy and dissemination plan developed.
- Targets for communication and dissemination monitoring defined.
- Dissemination channels set-up and initiated (web, print, social media).
- Successful launch of SmartH2O Twitter and of the LinkedIn SmartH2O Innovation Community engaging a core community of researchers, users and stakeholders.
- Production and successful distribution of the 1st SmartH2O Newsletter.
- Presentation of first project results at 9 scientific conferences and workshops.
- Orchestration with the ICT4Water Cluster and dissemination of first project results in two ICT4Water Newsletters.
- All dissemination targets reached (see D9.2 for further details):

Newsletter	Reached **> 2000** recipients	
Conferences	**6** presentations	
Publications	**2** conference papers published, **3** conference papers accepted, **2** journal papers under review	
Twitter	**297** tweets **122** followers	Y1 target: 80 followers✔
LinkedIn	**100** members	Y1 target: 30 members✔
Slideshare	**6** presentations **2149** views	Y1 target: 5 presentations✔

The following deliverables have been produced:

- D9.1 Dissemination tools and materials (m5): **accepted**
- D9.2 First dissemination report (m12): **submitted**

The following milestones have been achieved

- MS2 Project start info released to the media (m3): **achieved**
- MS9 SmartH2O social awareness app launched (m12): **achieved** for the technical completion, still to be launched, to synchronise the launch event with the beginning of the use case work in the CH site.

3.9.3 Use of resources

WP9	Deliverable	m1-m4	m5-m8	m9-m12	Allocated	Remaining
D9.1	Dissemination tools and materials (m5)	5.06	2.90	0.05	12.00	3.99
D9.2	First dissemination report (m12)	0.10	0.54	6.85	7.00	-0.49

Deliverable D9.1 sees an underspending mostly due to EIPCM resources for promoting SmartH2O on social media that were initially over-allocated to Y1. In alignment with the developed communication strategy the effort needed to be more equally distributed over the entire project horizon. Accordingly, the EIPCM spending for Y1 has been adjusted to ensure that the required resources are available for an equally successful dissemination on social channels in Y2 and Y3.

4. Project management during the period

4.1 Consortium management

The setup of a separate bank account has been established. The received pre-payment has been distributed without any delay to the beneficiaries.

The Project Fact sheet was created and made available.

The official kick-off of the project has taken place on the 22nd and 23rd of May in Manno,(CH) and in Como (I).

Deliverable D1.1 (management processes) has been released and it defines the rules and the standards for joint work. Its use during the first year of the project has proven successful.

A Dropbox folder to share documents under development has been set up. This experience has been so far positive, but the size of the shared folder will require a re-organisation of the workflow during the next two years.

A Project Wiki (http://smarth2o.idsia.ch) was setup to provide a unique site for periodic project reporting and to provide access to finalised documents.

For project communication different mailing list have been created, e.g. for each Workpackage, for General discussion, etc.

For weekly discussions the Skype application is used

4.2 Problems and solutions

No major problem with respect to the plan have been identified, but during the course of the project the following issues have been identified:

1. the availability of water related data to train the disaggregation algorithms developed in the first year by WP3;
2. the availability of smart meter data produced by the UK case study.

4.2.1 Problem 1: Availability of water related data

We have now resolved this problem, of which we are aware, as we closely interacted with the other projects in the ICT4WATER cluster, which had similar experiences

- As of February 2015 a synthetic data generator has been made available by the iWidget project (http://waterville.hrwallingford.com/waterville/)
- As of March 2015 we are receiving live data from the Swiss case study in Tegna;
- As of March 2015 we have acquired a high quality data set from Branz Co in New Zealand, which is the outcome of the WEEP project in which 12 households have been monitored producing high resolution water data consumption, including the end use disaggregation at the single fixture level. This data set will allow us to validate our disaggregation algorithms at various temporal resolutions.
- Based on the above data sets we are also developing an own synthetic generator of end use water consumption.

We are now set to use both synthetically generated and real world data to train and validate the SmartH2O algorithms developed in WP3

4.2.2 Problem 2: the availability of smart meter data produced by the UK case study

According to the time plan in the next reporting period (Year 2) the case studies will start deploying the SmartH2O platform in the two case studies. While everything is progressing according to plan in the Swiss case study, in the UK case study there were some unexpected events. At the time of the proposal writing Thames Water Limited, our partner in charge of the UK case study, had two tests sites in Reading and Swindon which were providing live data from 2'500 smart meters. Thames Water was also using those test sites as a trial for a later massive deployment of 8 million smart meters over the next 15 years. For this Thames Water, after a bidding process, entered a negotiation with a specific contractor to provide such deployment for a total amount of 300'000'000 UK Pounds. Unfortunately the two test sites were run by a contractor who was excluded during the bidding process and the maintenance contract had consequently expired. In conclusion the SmartH2O project could not count on those 2'500 meters and at the same time the new contractor had not yet signed the new contract.

As a consequence the timing of the UK case study had to be revised: in Fall 2015 only 50 houses will be connected to the SmartH2O platform, in order to test data transfer. In the meantime a set of 2'500 houses will be set up in Reading to make an extensive test in 2016.

In order to provide the SmartH2O project the necessary amount of data to validate its approach, the project management is preparing a contract amendment to expand the consortium and include the Water Utility of Valencia (Spain), **Emivasa**, assisted by the technical and scientific contribution of the Polytechnic of Valencia (**Universitat Politecnica de Valencia**). Emivasa has already a smart metering system up and running and will provide SmartH20 with hourly meter readings for 2'500 households.

Emivasa is the core company of the Grupo Aguas de Valencia. It manages water supply services in the city of Valencia and the metropolitan area. Emivasa has 1.800 direct employees. Its activities span all the phases of the Integrated Water Cycle Management: it runs 8 Drinking Water Treatment Plants supplying more than 2 million people. Emivasa manages a water distribution network of more than 12'000 Km, and it operates 360 Wastewater Treatment Plants, 12 Denitrification plants and 3 Desalination plants. **Emivasa will deploy 650.000 smart meters by the end of 2015**. Presently, Valencia is the first big city fully equipped by smart meters with around **490'000 devices installed**.

The Spanish case study characteristics:

- It will be held in the city of Valencia, where Emivasa will be providing anonymised hourly data from 2.500 consumers to the SmartH2O platform at least once a day. There are various District Metered Areas (DMA) where the cast study could take place and the location will be selected according to the type of households and their expected psycographic characteristics.
- Some details about smart metering management: all devices are connected in a fixed network (AMI - advanced metering infrastructure). Emivasa has developed a solution, the W=mtM platform, which permits integration and management of data from at least 6 different vendors: Contazara, Sappel, Itron, SAM, Ikor, Sensus and Elster.

4.3 Changes in the consortium

No changes occurred in the consortium during this reporting period, but in the next Year two new partners will join the consortium: Emivasa and Universitat Politecnica de Valencia, as described in 4.2.2.

4.4 Project meetings

A general meeting is a meeting where all partners attend, with at least one representative. A technical meeting is a meeting where a subset of partners meet to discuss task specific issue or cross-issues, involving tasks from different workpackages. Finally two workshop type meetings were held.

The minutes of all meetings are archived on the project wiki.

4.4.1 General meetings

- Kick off meeting (SUPSI, Galleria 2, Manno (CH) and Politecnico di Milano, Palazzo Natta, Como (I), 22nd and 23rd of May 2014)
- First General Meeting (Royal Berkshire Conference Centre, Madejski Stadium, Reading, 27-29 October 2014)
- Second General Meeting (Politecnico di Milano, Palazzo Natta, Como, 26-28 January 2015)
- Third General Meeting and pre-review rehearsal (SwissCore, Brussels, 17th March 2015)

4.4.2 Technical meetings

- WP5 Data and pricing policies (Thames Water Limited, Reading, 8th July 2014)
- WP5 Review of data and pricing policies (Politecnico di Milano, Como, 23 July 2014)
- WP5 Dynamic pricing models and inclusion in consumer apps (Online, 2 Sept 2014)
- WP2 User questionare (Politecnico di Milano Online, 22 Sept 2014)
- WP3 progress check meeting (Politecnico di Milano, Como, 9 Oct 2014)
- WP5 meeting with B.Storni and C.Noseda on utility attitudes (SUPSI, Manno, 20 Oct 2014)
- WP6 Platform architecture and design (Online, 6 Nov 2014)
- WP5 phone interview with C.Noseda by P. Garrone (Phone, 24 Nov 2014)
- WP5 Skype interview with B.Storni by P. Garrone and R. Marzano (Online, 28 Nov 2014)
- WP3 next steps meeting (Politecnico di Milano, Como, 28 Nov 2014)
- WP3 meeting (Politecnico di Milano, Como, 6 January 2015)
- WP3 meeting (SUPSI, Manno, 15 January 2015)
- WP5 meeting with M. Barro (Aziende Municipalizzate di Bellinzona, Giubiasco, 3 Feb 2015)
  WP2 meeting, co-located work POLIMI and EIPCM (Berlin, 02-06 Feb 2015)

4.4.3 Workshops

- WP2 Requirements workshop with technical partners (Politecnico di Milano, Como, 25 July 2014)
- WP2 Workshop with Swiss Users (Sala Comunale, Tegna, 12 Sept 2014)

4.5 Project planning and status

Overall, the Project Planning as described in the DoW was appropriate for the first period. Still there were minor issues (due to inconsistency in the DoW), that were detected during the course of project progress:

- D7.1 Validation methodology also includes the preparation work done in the Swiss case study to install and deploy the 400 smart water meters
- Milestone MS9 (SmartH2O social awareness app launched) had to be postponed in order to synchronise it with the launch of the SmartH2O platform in the Swiss and in the Spanish (see 4.2.2) case study.

4.6 Impact of possible deviations

No impact on the remainder of the work plan is expected by the deviation from MS9 and by the addition of the new Spanish partner as the timing of their involvement fits in the current time plan.

4.7 Change of beneficiaries

As described in Section 4.2.2, two new partners will join the consortium in the next Year. They are described in the following

4.7.1 Universitat Politecnica de Valencia.

The Universitat Politècnica de València (UPV) is a public, dynamic and innovative institution dedicated to researching and teaching, with strong bonds with its social environment and a strong presence abroad. The University offers modern, flexible degrees and official postgraduate program designed to meet the demands of society, attracting currently more than 36,000 students. One of the pillars of the social recognition of UPV has been and will continue to be its research capacity. With over 52 million in R&D activities, its departments (41), research centers and institutes (40) are participating in applied many research activities jointly with national and international bodies and companies, with more than 4,000 people directly involved in research. The relevance of UPV's research outputs underpins the strong international presence of the institution, which has close collaborative links with the best universities in the world. UPV is an innovative and entrepreneurial University, with effective mechanisms for the dissemination of scientific and technological results, and which excels in the training of researchers and in the creation of technology-based companies.

The research group of UPV participating in the project will consist of members of IIAMA and ITA. The Research Institute of Water and Environmental Engineering (IIAMA) is formed by around 100 employees, including more than 20 full and associate professors and several post-doc researchers, offering an ample scientific-technical baggage consolidated in the last 20 years covering most fields related to the water cycle and the environment. IIAMA participates in a significant number of national and international networks and projects of mobility and cooperation (e.g. as member in two EIP-Water Action Groups, and in many European programmes) and has a wide experience in technology transfer and cooperation with private companies and governmental agencies. The staff of the ITA research group (UPV) has been working for around thirty years on matters connected with urban hydraulics and the management and efficient use of water in the urban environment, with long trajectory on research, consultancy, training and software development in urban water engineering.

4.7.2 EMIVASA

The Empresa Mixta Valenciana de Aguas, known as EMIVASA, is the main affiliate company of the Grupo Aguas de Valencia. It was created by the Valencia City Council and Aguas de Valencia S.A. to manage the public service of water supply in the city of Valencia. It is a mixed company: Aguas de Valencia put forward 80% of the capital and the City Council the other 20%. Aguas de Valencia SA (AVSA) was set up in 1890 under the original name of Sociedad de Aguas Potables y Mejoras de Valencia, changing its name to the current one in June 1988.

The Group focuses its activity managing the Integral Cycle of Water, developing several complementary lines of business creating the suitable synergies to optimise water resources. We are dedicated to managing, exploiting and operating the services of: supplying drinking water to municipalities; sewage management and treatment of wastewater; supplying water for agricultural use; carrying out, maintaining and conserving works and constructions necessary for the completion of our services, even for third parties, whether they are public, private or for individuals.

Grupo Aguas de Valencia provides services to an overall population of 2 million end users in around 230 municipalities in Spain. EMIVASA operates, among others, two large Drinking

Water Treatment Plants in Valencia (La Presa and The Realon) taking water from rivers Júcar and Turia, with a total production capacity of 8.8 m3/s. These plants supply potable water to the whole system of the metropolitan area of Valencia.

In recent years, EMIVASA, like the whole group, has focused in developing R&D policies aiming at improving the efficiency of the different processes managed by the company and at providing a better service to customers. These activities include, among others: the adoption and development of innovative water treatment technologies; the development of tools for an efficient management of the Water Distribution Network (WDN); the deployment of smart metering in the WDNs for a better monitoring of consumption; the development of a platform capable of integrating data from different smart meter vendors; the development of a platform capable of integrating and processing the Big Data providing from the different tools monitoring the WDN.

Moreover, EMIVASA was the first company in the Valencian region to be certified by the UNE 166.002 Spanish standard for management of R&D&I, as well as being certified by ISO 9001, ISO 14001 and OHSAS 18001.

4.8 Dissemination and clustering

During the first year of the project the dissemination activities, managed in WP9, have been focussed on setting up a communication strategy based on:

- A clear visual identity, uniquely identifiable through all communication channels, internal and external.
- An approach to traditional media, based on the modulation of intensity of the press release conferences proportional to the expected impact of results. This resulted in a moderate resort to traditional media in the first year, as major results are expected in the next two years.
- The dissemination of early project results to selected conference, and the preparation of scientific papers on the early results of WP3.
- An integrated approach to new media, especially LinkedIn and Twitter, in order to create a staring base of “followers” on these social media.
- The creation of the official project website (http://smarth2o-fp7.eu) as the main reference point for the project information.

Internal communication has been organised, as described in 4.1, around:

- Mailing lists
- Skype chats
- Dropbox folders
- The project Wiki

At the same time the SmartH2O project has been involved in the development of the ICT4Water Cluster (http://www.ict4water.eu). The following meetings were attended:

- Cluster Meeting Brussels, 4 Februray 2014
- WDSA 2014 (Bari, 15 July 2014)
- Waterwise 2014 (Oxford, 16-17 September 2014)
- Waterideas 2014 (Bologna, 23 September 2014)
- ICT4Water Cluster Meeting (Brussels, 19th March 2015)

The SmartH2O project has also joined the EIP Ctrl+SWAN action group (http://www.eip-water.eu/CTRL_SWAN).

5. Deliverables and milestones tables

In the following two sections 5.1 and 5.2 we summarize the deliverables and the milestones for Year 1.

All deliverables have been submitted on time, or with a very limited delay (lesst than one week at most).

During the pre-review, the following deliverables were examined:

- D1.1 Management processes
- D2.1 Use cases and early requirements
- D3.1 Databases of user information
- D3.2 First user behaviour models
- D4.1 First social game and implicit user information techniques
- D6.1 Delivery management plan and testing specification
- D6.2 Platform architecture - initial architecture design
- D8.1 Early exploitation plan
- D9.1 Dissemination tools and materials

The reviewers, in their Consensus Report, asked for the resubmission of :

- D3.1 Databases of user information
- D3.2 First user behaviour models
- D6.2 Platform architecture - initial architecture design
- D8.1 Early exploitation plan

The above deliverables will be resubmitted by 05.06.2015, together with this report.

During the pre-review also the first three milestones (MS1,MS2, and MS3) were examined, and approved. This report describes the status of the remaining milestones (MS4-9). We deem that MS4, MS5, MS6, MS7 and MS8 have been successfully achieved. MS9, the SmartH2O social awareness app is launched, is technically achieved, as the app has been successfully completed together with the first prototype of the platform (MS67), but its launch has been delayed in order to make it coincide with the launch of the platform in the case studies.

5.1 Deliverables

Del. no.	Deliverable name	Version	WP no.	Lead beneficiary	Nature	Dissemi-nation level 1	Delivery date from Annex I	Actual delivery date	Status
D1.1	Management processes	1.0	1	SUPSI	R	PU	30.05.2014	28.05.2014	Accepted
D2.1	Use cases and early requirements	1.1	2	EIPCM	R	PU	30.11.2014	5.12.2014	Accepted
D2.2	Final requirements	2.0	2	EIPCM	R	PU	31.03.2015	31.03.2015	Accepted
D3.1	Databases of user information	1.0	3	POLIMI	R	CO	30.09.2014	26.09.2014	Rejected
D3.2	First user behaviour models	1.0	3	SUPSI	R	PU	31.12.2014	31.12.2014	Rejected
D4.1	First social game and implicit user information techniques	1.7	4	MOONSUB	R +O	PU	31.12.2014	15.12.2014	Accepted
D5.1	Review of pricing instruments	2.3	5	UoM	R	PU	31.3.2015	31.3.2015	Submitted

1 Please indicate the dissemination level using one of the following codes:
PU = Public
PP = Restricted to other programme participants (including the Commission Services).
RE = Restricted to a group specified by the consortium (including the Commission Services).
CO = Confidential, only for members of the consortium (including the Commission Services).

D6.1	Delivery management plan and testing specification	1.7	6	SETMOB	R	PU	30.09.2014	30.09.2014	Accepted
D6.2	Platform architecture - initial architecture design	2.0	6	POLIMI	R	PU	31.12.2014	30.12.2014	Rejected
D6.3	Platform Implementation and Integration - initial prototype	1.0	6	SETMOB	O	PU	31.3.2015	31.3.2015	Submitted
D7.1	Validation methodology	1.0	7	TWUL	R	PU	31.3.2015	31.3.2015	Submitted
D8.1	Early exploitation plan	8.3	8	POLIMI	R	RE	30.9.2014	29.9.2014	Rejected
D8.2	Technology watch report	1.0	8	POLIMI	R	RE	31.3.2015	31.3.2015	Submitted
D8.3	Standards and open data report	1.0	8	SUPSI	R	PU	31.3.2015	31.3.2015	Submitted
D9.1	Dissemination tools and materials	1.0	9	POLIMI	R	PU	31.8.2014	5.9.2014	Submitted
D9.3	First dissemination report	1.0	9	SUPSI	R	PU	31.3.2015	31.3.2015	Submitted

5.2 Milestones

Milestone number	Milestone name	Work package no	Lead beneficiary	Delivery date from Annex I	Achieved Yes/No	Actual /Forecasted achievement date	Comments
MS1	Kickoff meeting, planning and mobilisation	1	SUPSI	30.06.2014	Yes	22.05.2014	Meeting has taken place
MS2	Project start info released to the media	9	SUPSI	30.06.2014	Yes	22.05.2014	Various press releases have been published
MS3	Initial techniques and algorithms for user profiling accepted	3	SUPSI	31.12.2014	Yes	31.12.2014	D3.2 finalised and shared with the partners
MS4	First annual meeting	1	SUPSI	31.03.2015	Yes	27.10.2014	The general first meeting is held in Reading (UK)
MS5	Requirements available and accepted	2	EIPCM	31.03.2015	Yes	31.03.2015	D2.2 finalised and shared with the partners
MS6	Initial techniques and algorithms for social interaction accepted	4	POLIMI	31.03.2015	Yes	31.03.2015	D4.1 finalised and shared with the partners
MS7	R1 initial release of the platform	6	SETMOB	31.03.2015	Yes	18.03.2015	A first prototype, connected to live data, is shared with the partners.
MS8	Standards and open	8	SUPSI	31.03.2015	Yes	31.03.2015	D8.3

	data report available						published
MS9	SmartH2O social awareness app launched	9	POLIMI	31.03.2015	No	31.05.2015	The app is ready, its launch is postponed to the time when the test sites will be activated (May 15)

6. Explanation of the use of resources and financial statements

The financial statements have to be provided within the Forms C for each beneficiary (if Special Clause 10 applies to your Grant Agreement, a separate financial statement is provided for each third party as well) together with a summary financial report which consolidates the claimed Community contribution of all the beneficiaries in an aggregate form, based on the information provided in Form C (Annex VI of the Grant Agreement) by each beneficiary.

The "Explanation of use of resources" requested in the Grant Agreement for personnel costs, subcontracting, any major costs (ex: purchase of important equipment, travel costs, large consumable items) and indirect costs, have now to be done within the Forms (user guides are accessible within the Participant Portal)10.

When applicable, certificates on financial statements shall be submitted by the concerned beneficiaries according to Article II.4.4 of the Grant Agreement.

Besides the electronic submission, Forms C as well as certificates (if applicable), have to be signed and sent in parallel by post.