# A Gaming and Social Networking Platform for Evolving Energy Markets' Operation and Educating Virtual Energy Communities

H2020 ICT-731767

## Data Management Plan, Dissemination and Exploitation plans

## Deliverable D6.1

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# Glossary of Acronyms

| Acronym | Definition |
| --- | --- |
| API | Application Programming Interface |
| BMC | Business Model Canvas |
| C&I | Commercial & Industrial |
| CIS | Customer Information System |
| CRM | Customer Relationship Management |
| DMP | Data Management Plan |
| DR | Demand Response |
| DoA | Description of Action |
| DSM | Demand Side Management |
| DSO | Distribution System Operator |
| EC | Energy Community |
| ECC | Energy Consumption Curve |
| EC-RTP | Energy Community Real Time Pricing |
| EE | Energy Efficiency |
| EIDaaS | Energy Information distribution as a Service |
| EMS | Energy Management System |
| EP | Energy Program |
| ESCO | Energy Services Company |
| ESP | Energy Services Provider |
| GDPR | General Data Protection Regulation |
| GSMaaS | Gamified Social Marketing as a Service |
| GSRN | Green Social Response Network |
| InEC | Innovation & Exploitation Committee |
| IBR | Inclining Block Rates |
| ICT | Information and Communications Technology |
| IPR | Intellectual Property Rights |
| KPI | Key Performance Indicator |
| LCMS | Learning Content Management System |
| LO | Learning Object |
| M&V | Measurement & Verification |
| NGO | Non-Governmental Organization |
| ORDP | Open Research Data Pilot |
| P-RTP | Personalized Real Time Pricing |
| RAT | Research Algorithms Toolkit |
| S/W | Software |
| ToU | Time of Use |
| VEC | Virtual Energy Community |
| VPC | Value Proposition Canvas |

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# Document History

This deliverable includes an updated version of the initial SOCIALENERGY Data Management Plan. It also includes the dissemination, communication and exploitation plans of the consortium.

**Table 1: Document History Summary**

| Revision Month | File version | Summary of Changes |
| --- | --- | --- |
| 21/03/2017 | v0.1 | Draft ToC circulated to the entire consortium. |
| 04/04/2017 | v0.2 | Final ToC structure and writing job delegations have been agreed among all partners during the 2nd project's plenary meeting in Athens. |
| 25/05/2017 | v0.4 | ICCS provided its 1st round of contributions and provided writing guidelines to all partners. |
| 06/06/2017 | v0.6 | 1st round contributions by SU-NIS, NRG and INTELEN. |
| 14/06/2017 | v0.8 | 2nd round contributions by all partners based on comments from the 1st round internal review. |
| 28/06/2017 | v0.9 | Final Review by INTELEN. |
| 30/06/2017 | Final | ICCS made some required enhancements and the deliverable was submitted in ECAS portal. |

# Executive Summary

This report is the 3rd official deliverable of H2020-GA-731767-SOCIALENERGY project dealing with the market analysis and initial business modelling as well as with the derivation of the required data management, dissemination, communication and exploitation plans of the project. Based on the results from the first 6 months of the project's duration, Deliverable 6.1 (D6.1) elaborates on the architecture design, business-related use cases' analysis and technical specifications work that has already been done. SOCIALENERGY is an innovation project and its implementation is based on the upgrade of existing S/W toolkits and platforms, whose technology readiness level is quite mature, meaning that the S/W prototypes have already been pilot tested and initially demonstrated in relevant environments (i.e. TRL 5). These technology assets are transferred from various diversified sectors such as: gaming, ICT, energy, education and social sciences. As a result, the consortium already has a clear view on the innovation impact points that the SOCIALENERGY S/W platform (as a whole) can have on today's converged ICT/energy commercial sector.

As documented in D2.2 (M6), the SOCIALENERGY architecture is "modular by design" in order for all subsystems (i.e. GSRN deployed by INTELEN, GAME deployed by NRG, RAT deployed by ICCS and LCMS deployed by SU-NIS) to be potentially exploitable as stand-alone commercial products in the future. The technical APIs for the interaction between the various subsystems have been appropriately designed in a way that any possible combinations of SOCIALENERGY subsystems to be commercially exploitable in the future (e.g. GSRN with RAT as one single product, GAME with RAT as another one, GSRN-GAME as another one, GSRN-RAT-LCMS as another one, etc.). This strategic decision at the design phase provides the flexibility to the consortium to decide how to prioritize its dissemination, communication and further exploitation activities towards commercialization. Of course, the default choice and ultimate objective of the consortium is to fully integrate all 4 subsystems into one single SOCIALENERGY S/W platform in the context of WP5 work. This way, the SOCIALENERGY product and associated services are expected to be competitive enough in order to enter the liberalized ICT/energy market and be sustainable as a product from a business perspective.

D6.1 aims at providing a clear roadmap towards achieving the ultimate goal of the project, which is the best possible commercialization of SOCIALENERGY products and services after the end of project's lifetime. There are clear inter-relations between the market analysis/business modelling activities with the respective planning of data management, dissemination, communication and exploitation activities. These inter-relations are extensively described throughout this deliverable, whose scope is thus much larger than a classic ORDP-type deliverable of an EU H2020 project.

The structure of the deliverable is the following:

Chapter 1 includes an analysis of today's markets, to which SOCIALENERGY aims at offering its innovative products and services. The expected impact points of the new businesses and applications generated by SOCIALENERGY are also analysed. Furthermore, all new market and research trends that are emerging in the serious gaming, progressive electric utility, data

analytics and competence based education are described in a sententious manner. SOCIALENERGY S/W platform's 'competitors' (i.e. related commercial products and services) are also shortlisted. Finally, an initial business modelling and a long list of value propositions has taken place by using the Business Model Canvas (BMC) tool and the Value Proposition Canvas tool correspondingly.

In chapter 2, the Data Management Plan of the project is described dealing with all the concerns about the treatment of the data involved in the whole project lifecycle and has been structured in compliance with the guidelines and the template conveyed by the European Commission. The main aspects that have been considered in the Data Management Plan (DMP), for each of the data set identified in the project are the following: a) types of data generated, collected or processed, b) standards used to manage data, c) data exploitation methodology, d) accessibility to data produced by the project, e) data dissemination level, and f) data preservation and re-use.

Chapter 3 includes the SOCIALENERGY dissemination and communication activities' plan. Eight (8) main categories of related activities have been identified, namely: a) academia-oriented publications and events, b) organization and participation in major international events, c) industry-oriented communication activities, d) open access reports, data and software, e) communication of SOCIALENERGY products to interested stakeholders, f) training activities and academic dissemination, g), cooperation and mutual dissemination activities with other related EU projects, and h) other general public dissemination actions. It should be noted that general dissemination activities are separated with communication activities in the sense that the latter are closely inter-related with the exploitation activities' plan presented in chapter 4 (e.g. communication with specific customer segment and business stakeholders).

In chapter 4, the SOCIALENERGY exploitation activities' plan is presented both from "system as a whole" and "per partner" perspectives. For each one of the SOCIALENERGY's exploitable assets, four (4) subsections are provided stating the asset's: a) description, b) main functionalities, c) innovation aspects, and d) target groups. We consider that each asset can be individually exploited by the partner that develops it. However, the strategy of SOCIALENERGY is to integrate all 4 exploitable assets into one single SOCIALENERGY S/W platform in order to maximize its commercial/business impact and offer respective benefits and added value/background knowledge to all partners after the end of project's lifetime.

Finally, chapter 5 concludes the report and summarizes the major action points of the consortium for the upcoming months.

# 1 Market analysis and initial business modelling

This chapter is included in this deliverable to reflect the work that has been done in Tasks 6.1 and 6.2 regarding the SOCIALENERGY-related market analysis and initial business modelling, which started in M1. This work will be presented during the 1st review (M9).

## 1.1. Market analysis and expected impact of SOCIALENERGY's innovations

User engagement is the most challenging issue, which hinders the large-scale DR market growth and especially at the residential sector, which represents approximately 40% of the overall DR market share. Many DR programs are already in place harvesting considerable benefits in the open electricity markets, but it is obvious that DR markets will not be boosted unless users comprehend their role and potential benefits as a result of changing their everyday energy behaviour. DR concept demands from users to be transformed from passive consumers to active prosumers and from end users (enjoying the outdated electricity services) to the so called "start users" (i.e. arrange their own energy schedules, be more responsible for the energy they are consuming/producing, be aware of the best energy efficiency rules and practices at a community level, cooperate with other prosumers to achieve even more energy and cost savings, etc.).

SOCIALENERGY creates an alliance of beneficiaries with all the necessary technologies ranging from ICT (ICCS), gaming (NRG), energy efficiency (INTELEN) and educational (UNIS) sector towards the development of a social and gamified online market for DR-aware Energy Programs (EPs), which we consider that will be not only necessary, but also operate in a very competitive environment within the following decade.

Apart from the opportunities that DR markets entail, Europe needs sophisticated DR technologies to face existing challenges (i.e. security of supply and system reliability issues), too, regarding the current operation of the EU electricity grid. According to the European Network of Transmission System Operators[1], Europe could lack up to 47 GW generation capacities by 2020. This significant fact reflects the tough economic conditions faced by power plant operators. Market spreads on futures markets are often negative for baseload & mid-merit gas-fired generation units. The lack in the energy generation in Europe has high impact and more general consequences and puts on hold general investment decisions. In this perspective, market operators and authorities have recently started to examine the other side of the market: the demand. Thus, they raised the question: "What if retail consumers could also change or even reduce their consumption?" Recent pilots and market developments in the other side of Atlantic[2,3] have proved that this is feasible, but

[1] ENTSO-E report, "Demand Response: A study of its potential in Europe", December 2014, https://www.entsoe.eu/Pages/default.aspx

[2] R. Sussman and M. Chikumbo, "Behavior Change Programs: Status and Impact", American Council for an Energy-Efficient Economy (ACEEE), Report B1601, October 2016.

[3] S. Mazur-Stommen and K. Farley, ACEEE Field Guide to Utility-Run Behaviour Programs (Washington, DC: ACEEE, 2013), http://aceee.org/research-report/b132

considerable work needs to be done towards user engagement via gamification in such efforts, especially when dealing with the residential sector, in which the "human factor" is crucial. Furthermore, Europe is still lacking to engage users and integrate commercial DR programs in the real market despite the fact that many pilot testing sites have brought up promising results.
By exploiting, integrating and advancing multi-disciplinary technologies such as gaming, gamification, social networking, data analytics and education, SOCIALENERGY will fast bridge the gap between successful trials of DR programs and wide user adoption. We believe that the proposed SOCIALENERGY S/W platform is the most promising bottom-up learning and education way, which may lead to widespread user adoption.

### 1.1.1. Energy Efficiency Gamification business analysis

According to Gartner (Hype Cycle for Smart Grid Technologies, 2016, Published: 18 July 2016), a definition is: "Energy efficiency gamification applies game mechanics to drive consumer engagement in energy conservation. Typical strategies include contests and rewards for conserving energy, social media elements such as communities, and indicators of status and success, including badges and leader boards".

Gamification applies game mechanics to motivate people and change behaviour. Utilities (or else energy retailers or else Energy Service Providers - ESPs) can use gamification to improve customer engagement in energy efficiency programs. SOCIALENERGY will have an impact to Utilities' and ESCO objectives, since it will drive efficiency for the end users.

By 2015, American Council for an Energy-Efficient Economy (ACEEE) had identified 22 gamified solutions deployed by utilities. The largest energy savings are achieved by winners of utility sponsored contests (upward of 50%); however, results indicate that average savings among participants can fall in the 3% to 6% range (Gartner).

Gamification has succeeded in driving engagement in subsets of targeted populations, including difficult-to-reach populations, such as building occupants that do not pay for utility services and, therefore, receive no direct financial benefit from energy efficiency.

Nowadays, CIOs in utilities with energy efficiency mandates, or in competitive energy retailers seeking differentiated energy services are investigating energy efficiency gamification and rank it in a high position in comparison to other possible energy efficiency measures. We keep in mind that the body of evidence for energy efficiency gamification results is still evolving (Behavioural M&V), including analysis of persistence (i.e. long-term conservation) and rebound (the tendency for consumption to increase once the program is no longer in place). Gamification programs are also cross-disciplinary in nature, involving energy efficiency program managers, marketers and IT personnel in order to be successful. Since utility IT organizations are likely to have little or no experience with the design and management of games, utilities are looking to 3$^{rd}$ parties for solutions.

Regarding business impact, energy efficiency gamification can be used by demand-side management departments as a niche conservation measure that engages a subset of customers. Incorporating consumption data from meter data management systems improves programs, and integration with utility customer information systems (CIS) and/or

CRM systems can help track and manage customer participation. It can also be used by competitive energy retailers to support customer acquisition and retention efforts.

According to the concept of SOCIALENERGY, there are several advantages if the customers of utilities are small sets of users (ECs) and not single users. Towards the dynamic self-organization and management of ECs, the appropriate online tool that can host the customers of a utility will have the shape of a social network and the customers will be communities-groups of people. By considering the above, SOCIALENERGY bridges the gap between each progressive utility and its customers by providing a Gamified Social Marketing as a Service (GSMaaS) that focuses in the easy and deep communication among them towards the widespread adoption from the latter of advanced DR EPs that the utility company provides.

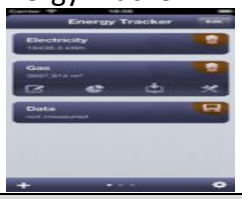
Recently marketing strategies that exploit social networks have been proven very effective and highly increased the revenues of the companies that used them. A typical example related with energy efficiency is Appliances Online[4], where a marketing strategy through Facebook increased the company's fans from 2,500 to 1M in just two years and led to 58% uplift in sales. Another example is POWERHOUSE[5] that gamifies energy savings and proposes to its users house repairs and upgrades, which will reduce the costs of the energy that they consume.

Motivated from the above, and by considering that the combination of gamification and social networks will lead to very effective marketing, SOCIALENERGY will exploit its intelligent and advanced recommendation and advertisement services in order to create new markets related with energy efficient products and services. In more detail, SOCIALENERGY will bridge the gap between the consumers of advanced DR EPs and the electric appliances and house upgrades that they need in order to fulfil the objectives that the EPs set. These new business actors will be able to have a central role in the energy efficiency sector and considerably grow their business by utilizing the innovative SOCIALENERGY web platform services.

Examples of some important energy apps from the existing markets are identified below:

| App | Description |
| --- | --- |
| Energy Management | |
| Kill-Ur-Watts  | Using a user's energy consumption data, the smartphone app Kill-Ur-Watts keeps track of energy use over time and develops strategies for energy reduction. Created for the US Department of Energy's "Apps for Energy" Challenge in 2012, KeyLogic Systems, Inc. created the app. It provides customizable graphs and lets users view their carbon footprint. The computed energy score lets users challenge family and friends. |
| Wiser EMS | Schneider Electric's energy management app, The Wiser Energy Management System (Wiser EMS), makes energy use easy to view and |

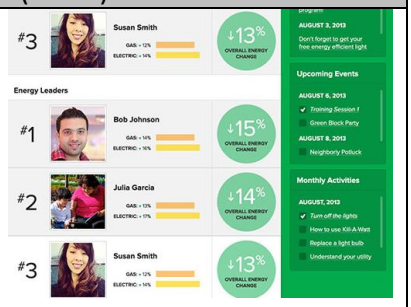
[4] https://www.appliancesonline.com.au/
[5] http://www.powerhousetv.com/Energy-EfficientLiving/

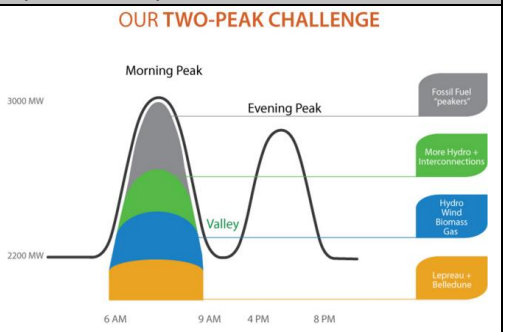
| | |
| --- | --- |
|  | understand with infographics. Families can see where they need to reduce energy consumption to maximize savings. |
| Energy Tracker  | The Energy Tracker app helps to avoid unnecessary energy expenses. On just two tabs on the smartphone screen, users see how much energy an appliance or system has used. Data gathered by the app can be exported to a computer in a CSV file. |
| Energy & Cost Calculator | |
| EcoGator  | Ecogator, developed by the EU-funded project MyEcoNavigator.eu, guides consumers on two different levels: the shopping assistance mode and the day-to-day mode. For shopping assistance, ecoGator provides functionalities designed to support a purchase decision in the shop with regard to the most energy efficient products on the market. The day-to-day mode provides the consumer with playful elements ('gamification') to motivate them to lead a more sustainable lifestyle and to use the mobile application on a regular basis. |
| Energy Cost Calculator  | The Energy Cost Calculator is a simple equation-based system that calculates energy costs. Users can Input estimated consumption per hour, how many hours of energy used per day, and the cost per Kilowatt – and will find out what it costs. |
| Thermostats | |
| Green Outlet  | Recommended by treehugger.com, ecogadget.com, and DailyTekk.com, the Green Outlet allows users to figure out what appliances in household use the most energy. After entering some personal data, the app will calculate the average monthly cost. |

Moreover, examples of some important gamified apps are identified:

| JOULEBUG | |
| --- | --- |
| Through a free app for a smartphone or laptop, the player (Joulebug) is informed about more than 100 sustainability actions. Whenever a player does an action, takes an electronic badge. Additionally it "climbs" in the leaderboard. Players not only participate in friendly competitions composed from game designers, but they are also able to create their own competitions and their own communities. Player achievements are shared through Facebook in order to attract and inspire more people. |  |

| GainesvilleGreen (GGREEN) | |
| --- | --- |
| GainesvilleGreen is based on the assumption that it can reduce energy bills by making public the energy footprints of the consumers and by giving them the tools to make useful comparisons. Google maps are exploited and the concept of neighborhood comes forward. In this way, GainesvilleGreen tries to engage consumers in discussions and bottom-up self-learning in order to understand (by themselves) the factors that lead to a more energy friendly life. Houses are not ranked only according to their raw consumption of electricity, but also from their consumption of gas, water. |  |

| Chicago Neighbourhood Energy Challenge (CNEC) | |
| --- | --- |
| CNEC is a friendly competition game, where houses in the same neighbourhood are competing on how much they reduce their energy usage (as a percentage), if it is compared with the previous months and/or the same month of the previous year. Players win monthly prizes for reducing their energy usage and compete for larger end-of-competition prizes for the individuals and buildings saving the most energy. The game uses ranks and leader boards in order to host the competition. Although social networks could be ideal for the operation and the advertisement of such a game are missing from CNEC. |  |

| Beat the Peak Energy Challenge (BEATPICK) | |
| --- | --- |
| Players sign up to be notified by email, text, or phone one day ahead of peak-demand hours (during hot summer days and cool winter days). Players that reduced their energy during the peak hours of these days receive cash prizes. Additionally, players form teams and compete with other teams. In this case, cash prizes are proportional to the team members. The game is explained to the players through a website, but there is not any other online interaction. |  |

| IKEHU | |
| --- | --- |
| The Ikehu DRIVE System is a patent-pending solution that provides incentives to residential customers to reduce power consumption during peak and critical peak times. It rewards desired consumer behavior with points or airline miles. The system includes a management console that provides electric utilities with access to a cloud-based service. This service will handle all of the details related to sending incentives, provide real time status of offer accepts, and validate points earned. | ikehu INC. |

| | |
| --- | --- |
| The DRIVE System includes the DRIVE App as a fun and creative way to reward consumers for responsibly using energy. | |

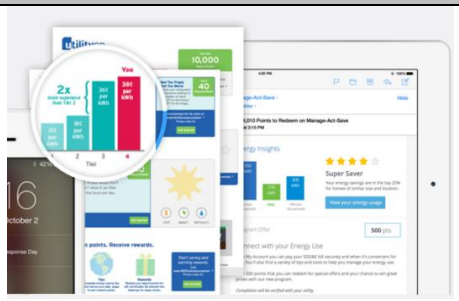
| Simple Energy (SIEN) | |
| --- | --- |
| The players monitor their energy consumption in real time using devices that were integrated with a social media platform, so that results were instantly broadcast to all players. In more detail are exploited: i) Energy Insights (Data-driven messages help customers better understand their energy use and how to conserve), ii) Energy Community (Energy-saving competitions and Leaderboards make saving energy fun), iii) Energy Rewards (Reward points drive customers to take specific actions and increase satisfaction). Finally data are turned into actionable insights. This data-in, data-out cycle delivers sustained engagement over time and helps utilities better understand their customers. |  |

Figure 1 presents a recent survey by Accenture that highlights the "digital personalization gap" that energy utility companies should fill towards building better relationship with their existing customers and trying to attract new customers and respective revenue streams. Based on these findings, SOCIALENERGY's innovations can be very targeted to current and emerging market needs.

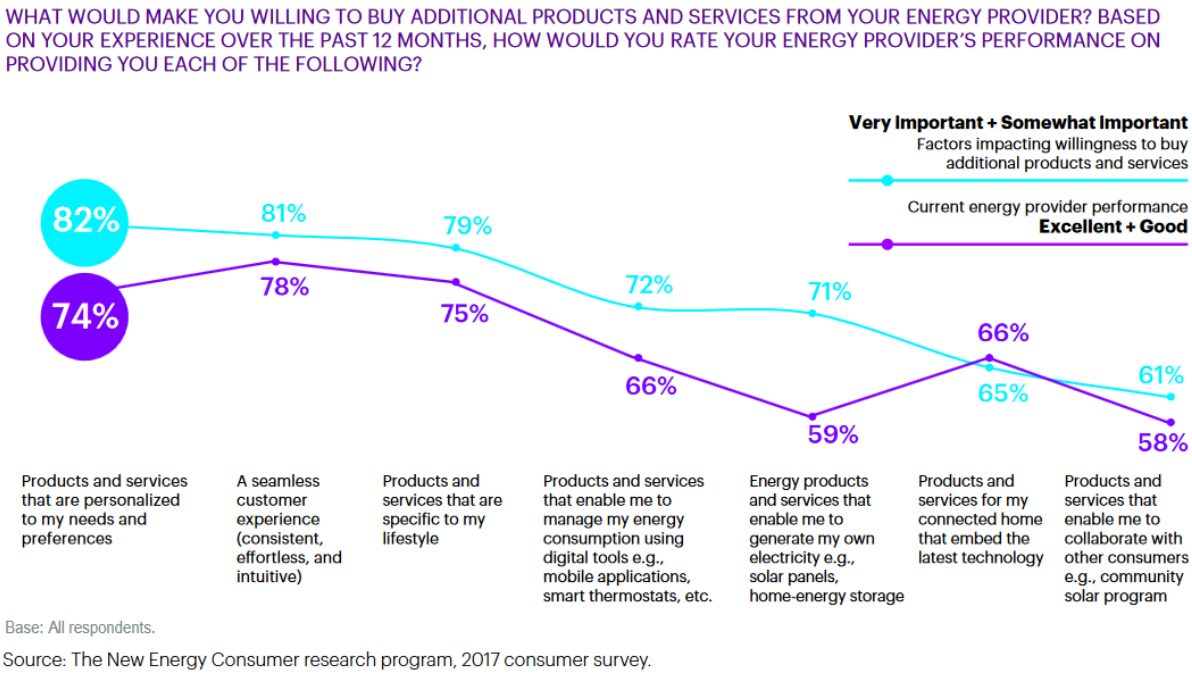



**Figure 1: Digital Personalization Gap for Utilities (innovation potential for SOCIALENERGY)[6]**

[6] ACCENTURE report, "New Energy Consumer: This time it gets personal", https://www.accenture.com/ca-en/_acnmedia/Accenture/next-gen-5/insight-new-energy-consumer-2017/Accenture-NEC2017-Gets-Personal-POV.pdf

## 1.2. Initial Business Modelling and list of value propositions

SOCIALENERGY consortium utilizes the Business Model Canvas - BMC, which is a well-known tool for business modeling. A preliminary application of Business Model Canvas for SOCIALENERGY is presented below. It should be noted that this is an initial version of BMC based on WP6 work made so far. Both qualitative and quantitative results will be presented in detail in subsequent deliverables D6.2 ("Intermediate version of business modeling" at month 15) and D6.3 ("Final version of business modeling" at month 30).

### 1.2.1. Introduction to the Business Model Canvas

The 9 building blocks of the BMC are shortly introduced below:

1. **Customer Segments:** Who are we creating value for?
2. **Customer Relationships:** e.g. Personal assistance, Automated Services, Communities, Co-creation
3. **Channels:** How do our Customer Segments want to be reached? How are we reaching them now?
4. **Value Propositions:** What value do we deliver to the customer? Which customer needs and problems are we addressing? Performance, brand/status, price, risk reduction, usability?
5. **Key Partners** and key suppliers; Key Resources from partners.
6. **Key Activities:** for our value propositions, for our channels, for our customer relationships and our revenue streams
7. **Key Resources:** Physical, Intellectual (brand patents, copyrights, data), Human, Financial.
8. **Cost Structure:** What are the most important costs inherent in our business model? Is our business more Cost Driven or Value Driven?
9. **Revenue Streams:** For what value are our customers really willing to pay? For what do they currently pay? Types: Product sale, Usage fee, Renting/Leasing, Licensing, Brokerage fees.

Figure 2 summarizes the initial business modelling work for SOCIALENERGY S/W platform as a whole. In the subsequent deliverables, detailed analysis of all building blocks with emphasis on the value propositions (mainly qualitative analysis) and the cost structure and revenue streams (mainly quantitative analysis) will take place. The current version of BMC will be used as input to the ongoing dissemination, communication and exploitation activities of the consortium.

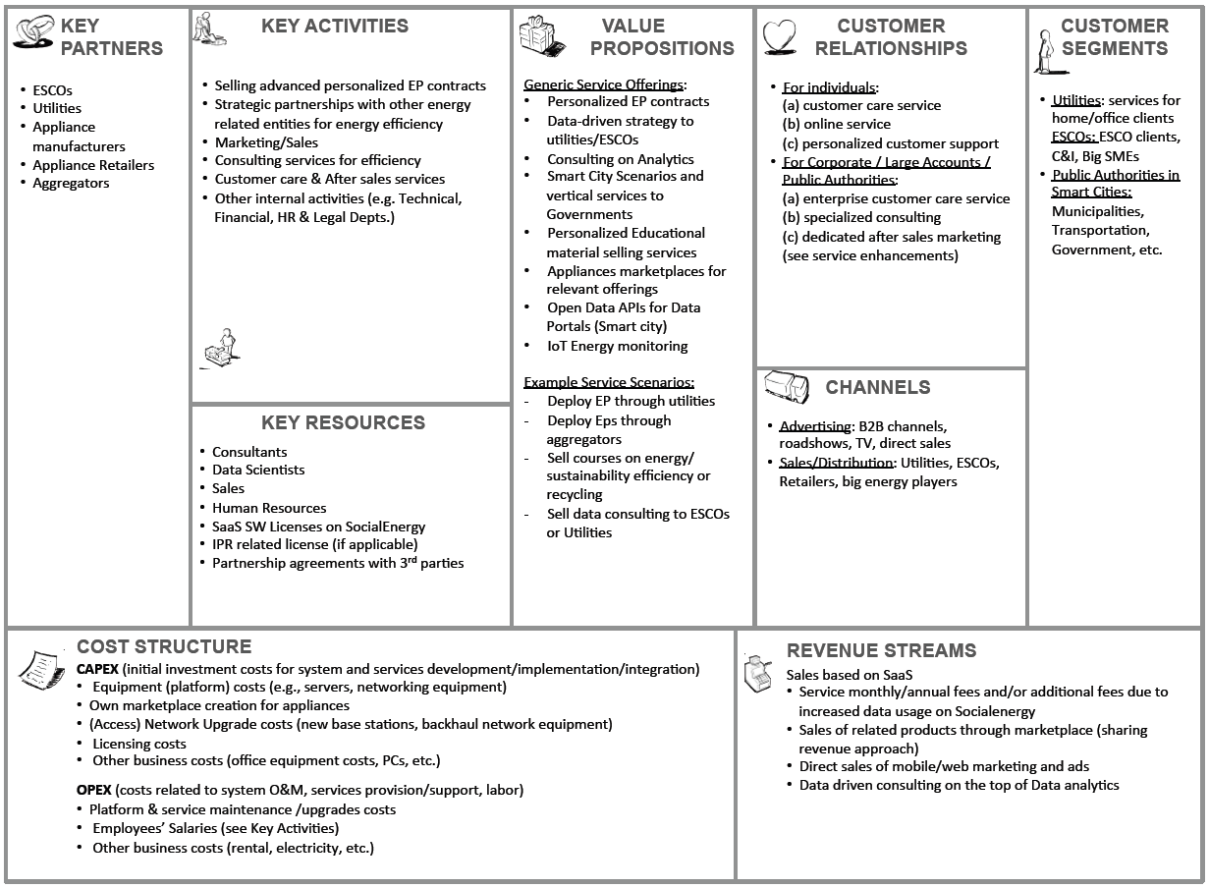



**Figure 2: An initial business model analysis of SOCIALENERGY (BMC with its 9 building blocks)**

### 1.2.2. Introduction to the Value Proposition Canvas

From the BMC introduced in the previous section, the blocks 'Value proposition' and 'Customer segment' go hand in hand and are the heartbeat of the business case. The Value Proposition Canvas (VPC) functions like a plug-in to the BMC and zooms in on the value proposition and customer segment to describe the interactions between customers and product more explicitly and in more detail. The VPC gives a 'product-market fit' by connecting the value map to the customer profile.

SOCIALENERGY will enhance the new trend in utilities, which is called "**Alternative Revenue model**". This approach monetizes various data streams and procedures, based on SOCIALENERGY value proposition and actors, in order to generate new revenue streams for utilities.

The table below presents a long list of SOCIALENERGY's value propositions:

**Table 2: Long list of SOCIALENERGY's value propositions (to be short-listed as the project progresses)**

| SOCIALENERGY component/ module/ service | Customer | Value proposition |
| --- | --- | --- |
| GSRN alone | Utilities<br>Smart cities, | Utilities and Smart cities can offer digital content and information on |

| | | |
| --- | --- | --- |
| | Retail companies | tariffs, energy and electrical appliance marketplace to the consumers/citizens |
| GAME alone | Utilities<br>Smart cities<br>ESCOs | Users can interact with a serious game to raise their awareness and to train themselves into various game scenarios and tasks related to energy savings |
| Combination of GSRN & GAME | Smart cities<br>Municipalities<br>Utilities | A complete platform to start engaging users for energy savings under a specific rewarding/loyalty scheme with various incentives |
| Combination of GSRN & RAT | DSOs<br>TSOs<br>Utilities<br>EV companies | A platform capable of analyzing data and to take decisions, offer services on various smart-grid topics (load forecasting, DR, virtual energy community management, etc.). |
| Combination of GSRN & GAME & RAT | Utilities<br>ESCOs<br>DSOs | A platform capable of combining personalized gaming and advanced personalization of the end users for energy efficiency and behavioural energy programs of utilities and ESCOs |
| Combination of GSRN & LCMS & RAT | Utilities<br>Smart cities | A digital content platform that can offer training courses to users and to analyze their knowledge potential. |
| Combination of GAME & RAT | Utilities<br>DR aggregators | A great tool for DR aggregation, capacity management and for behavioural DR programs by using sophisticated mathematical modeling for the GAME design |
| SOCIALENERGY system | Electric utility | A complete consumer engagement platform to drive digital engagement of utility users, to reduce churn, to raise awareness and to produce new revenue streams, by analysing and monetizing data |
| SOCIALENERGY system | ESCO | A complete platform to drive behavioural energy efficiency and to support ESCO funding, justify savings and promote various rebates (retrofit services) for appliance replacements or home upgrades |
| SOCIALENERGY system | Community Energy Scheme (CES), communities, | A great platform to drive Government policies on green citizens. Communicate to a Smart city (citizens), Government policies, |

| | | |
| --- | --- | --- |
| | public authorities in smart cities | green actions, create a “big data lake” for additional governmental services monetization and promote sustainability |

# 2 Data Management Plan

This section provides the initial version of the Data Management Plan (DMP), as defined in SOCIALENERGY WP6 during the first six months of the project. SOCIALENERGY has decided to participate to the Open Research Data Pilot (ORDP), introduced in Horizon 2020 Work Programme and aimed at improving and maximising access to and re-use of research data generated by EC-funded projects. In line with this decision, in this initial phase, SOCIALENERGY has identified a number of data sets, which will be generated within the project and shared with the research community. The main objectives of the project are to improve the exchange and dissemination of research results and, possibly, to enable and promote a wider validation of the project results and to encourage a fair comparison and evaluation of different solutions in the SOCIALENERGY's technical areas.
The Data Management Plan deals with all the concerns about the treatment of the data involved in the whole project lifecycle and has been structured in compliance with the guidelines and the template conveyed by the European Commission.
Hereafter, the main aspects that will be considered in the Data Management Plan are reported for each one of the datasets identified in the project:

- Types of data generated, collected or processed
- Standards used to manage data
- Data exploitation methodology
- Accessibility to data produced by the Project
- Data Dissemination level
- Data Preservation and re-use

Deposition of generated research data: Following a similar strategy to publications, SOCIALENERGY aims to participate in the Open Research Data Pilot (ORDP). Research data generated within SOCIALENERGY, which the consortium decides that is suitable for sharing, will be openly accessible. End-users will have the right to access, mine, exploit, reproduce and disseminate free of charge digital research data (statistics, results of experiments, measurements, etc.) under the terms and conditions set out in the Grant Agreement. The initial Data Management Plan (DMP) of SOCIALENERGY is shown in the table below (taken from DoA):

**Table 3: Initial Data Management Plan (DMP) of SOCIALENERGY (taken from DoA)**

| Data set reference & name | Data set description | Standards & metadata | Data sharing | Archiving & preservation (including storage & backup) |
| --- | --- | --- | --- | --- |
| **EC creation and dynamic adaptation studies** | Simulation data generated from clustering algorithms. The data will be useful for research groups and commercial actors such as | The dataset will be exported from simulation runs and will | The data set will be deposited in an open access repository Access will be free for all | The deposition of data is free of charge for SOCIALENERGY consortium. Links |

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| | aggregators, ESCOs as well as system operators and policy makers. | be deposited in a simple .mat or .py form. | interested parties. | in the SOCIALENERGY's website will facilitate access to the deposited data (e.g. GitHub, Zenodo tools). Research data will be available for end users for at least 10 years after their initial deposition. |
| **GSRN platform development** | Experimental data on the real-life interaction of ECs with the utility. The data will be useful for research groups and other interested actors. | Simulated results will be available and deposited in a simple .mat or .py form. | The data set will be deposited in an open access repository Access will be free for all interested parties. | |
| **Virtual world and serious game development** | Follow [RAGE] example by arranging self-contained gaming assets on a well-managed and structured repository, digital library and media archive system. The resulting material in the ecosystem, particularly the textual resources, will be semantically annotated to support searching and access. | Material will be semantically annotated to support searching and access | The data set will be deposited in an open access repository. Access will be free for all interested parties. | |
| **Experimental data from aggregated DR operations** | Experimental data from the DR events handling at the block of buildings level. The data will be useful for research groups, other communities/ neighborhoods, policy makers, etc. | The dataset will be exported from experimental runs and will be deposited in a simple txt form. | The data set will be deposited in an open access repository. Access will be free for all interested parties. | |
| **Individual Learning units** | Some individual learning units (videos, story-telling, etc) and an indicative learning plan will be available for researchers from education sector. | Material will be semantically annotated to support searching and access | The data set will be deposited in an open access repository. Access will be free for all interested parties. | |

Based on the above table, the consortium partners have elaborated on an updated version of the Data Management Plan that will be followed within SOCIALENERGY project's lifetime. In the following subsections, specifications about all the datasets that will be deposited and be available in open access mode are provided. The consortium has followed the respective H2020 template[7] regarding "Guidelines on Fair Data Management in Horizon 2020" and has appropriately adapted it to the needs of SOCIALENERGY project.

[7] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

## 2.1 Data set 01: Experimental data inputs and results from SOCIALENERGY RAT's Dynamic Pricing Algorithms Module

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| Data set ref. name | Dynamic pricing algorithms for participation in advanced energy programs |
| Description | At SOCIALENERGY Research Algorithms Toolkit (RAT) side, there is a S/W module called "Dynamic Pricing Algorithms", where various pricing algorithms (or else innovative SOCIALENERGY's energy programs) are executed. The baseline EP is based on the fixed/flat pricing policy, which is the most common/baseline way of electric utilities' charging in most of the EU countries today. The follow-up model of Inclining Block Rates (IBR) charges a higher per unit price of electricity to users with high consumption profiles. There will be different variants of IBR-based charging incorporated in this module. Time-of-Use (ToU) based EPs will also be incorporated. This type of energy program can be customized according to the utility user's needs (i.e. the price curve within a day will be customizable). Real-Time Pricing (RTP) energy programs and associated algorithms will be part of this module, too. Furthermore, several innovative research algorithms will be proposed within SOCIALENERGY context such as the personalized RTP and the Energy Community RTP (EC-RTP).<br>The data inputs and results from the execution of the above-mentioned algorithms will be available in open access mode. The purpose of data collection/generation is to make the results of our research reproducible and comparable with other researchers around the globe in the long term thus boosting the recognition of our work and the reusability of the results for future works in the long term. These results are directly related to the main objectives of SOCIALENERGY project as basic KPIs such as minimization of user's electricity cost, maximization of user comfort, fair distribution of the costs to the participating users, etc. will be automatically and dynamically calculated boosting thus the innovation capabilities of SOCIALENERGY platform as a whole. The origin of the data utilized as input to the dynamic pricing algorithms is based on real-life consumption data taken from INTELEN's customer portfolio and other types of open data that ICCS has in its own databases and has reused it successfully for other research activities in the past. Regarding the expected size of the data, ICCS aim is to provide indicative datasets at least for all the types of algorithms that will be deployed. Thorough documentation about the mathematical models and algorithms' logic will be available via the publications that ICCS aims at having in well-known international conferences and high-impact scientific journals. ICCS aim is to make a basic version of RAT fully accessible (i.e. open source code) and usable by any interested user such as an individual researcher, an ESCO user, a utility user, etc. This approach is expected to boost the exploitation strategy of ICCS and SOCIALENERGY project as a whole. Of course, access to the full version of RAT can be restricted according to the exploitation strategy of the consortium (an updated DMP version will be provided in M18 and M30 after the final S/W prototype is ready and initial commercialization activities will start taking place). |
| Standards and metadata | In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions. |

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| | The following fields will be used:<br>1. Title of dataset<br>Tentative name: Dynamic pricing algorithms for participation in advanced energy programs<br>2. Name(s) of dataset creator(s)<br>ICCS/NTUA staff<br>3. Description of data<br>Included in the README file<br>4. Source of data<br>This dataset is a primary output of SOCIALENERGY project<br>5. Creation date<br>TBD<br>6. Format<br>CSV and JPEG files where applicable<br>7. Location of Data<br>Zenodo (exact link to be provided)<br>8. Digital Object Identifier<br>DOI from Zenodo<br>9. Access status and embargo<br>Open data – no embargo period foreseen for this dataset<br>10. Funding statement<br>This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731767. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains.<br>11. Related Publications<br>Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text.<br>12. Dataset Citation<br>A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. |
| Data sharing | The research data will be deposited and maintained in Zenodo (http://www.zenodo.org), the research data repository launched by CERN and OpenAIRE. |
| Archiving and preservation | For redundancy, besides uploading the data on Zenodo, it will be also maintained on a university-owned server at ICCS/NTUA. The server offers real-time data mirroring through RAID (redundant array of independent disks) and weekly backups to external disk drives. The approximated end-volume of this dataset is less than 500 |

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| | MB. The dataset will be preserved for at least 7 years after the project end and the associated costs will be covered by ICCS/NTUA through own funds. |

## 2.2 Data set 02: Experimental data inputs and results from SOCIALENERGY RAT's EC Creation and Adaptation Algorithms Module

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| Data set ref. name | Virtual Energy Community creation and adaptation algorithms |
| Description | There are two S/W modules residing in RAT that incorporate various algorithms for the creation of ECs based on multiple parameters, that is the clustering of consumers is not only made based on their energy consumption curves (ECC)/profiles but also based on: a) their connections in social media, b) their personal habits, character and demographic data, c) their behavior regarding demand response actions (retrieved from GSRN), d) their will for participation/engagement in innovative energy programs and services offered by SOCIALENERGY, e) their learning curve, competences and skills regarding good practices in energy efficiency sector (taken from LCMS and GAME), etc. Via this multi-parametric clustering approach, the ECs that are created can achieve better results in terms of energy efficiency/savings, monetary profits and long-term engagement in good energy efficiency practices. This is achieved via the inherent social-based or else "peer pressure" that takes place among the members of an EC. Within the SOCIALENERGY context, the ESCO/utility user will be able to run various simulations to understand the social dynamics and analyse the behaviour of his/her customer portfolio. An EC user will be able to understand whether it is beneficial to add/remove more members to the EC that he/she is leading and realize indicative metrics about which EC member is over- or under-performing.<br>The initial "clusterings" or else virtual ECs can change in case a pre-defined threshold is being surpassed/violated. In particular, a multi-dimensional space is created in which all consumers are depicted via a point that has multiple coordinates. In this graph, all "distances" between all possible combinations of points are measured and thus based on a constraint that is defined by the administrator (e.g. ESCO/utility user), the "clusterings" are created. As the time goes by, the profiles of the energy consumers are continuously changing, so an EC adaptation algorithm should be run in order for the new ECs to be formed. This means that maybe some energy consumers may switch to another more beneficial EC or the administrator or EC leader may choose to add/remove some members from his/her EC. As a result, this sub-module can also be seen as a reporting and recommendation engine, whose results can be retrieved by GSRN and become very useful the SOCIALENERGY's business.<br>The data inputs and results from the execution of the above-mentioned algorithms will be available in open access mode, while complete documentation will be available via the publications that ICCS aims at having in well-known international conferences and high-impact scientific journals. The origin of the data utilized as input to the EC creation algorithms is based on real-life data taken from INTELEN's DiG platform, which is already a commercial product and other types of open data that ICCS has in its own databases and has reused it successfully for other research activities in the past. |
| Standards and | In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe |

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| metadata | basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions.<br>The following fields will be used:<br>1. Title of dataset<br>Tentative name: Virtual Energy Community creation and adaptation algorithms<br>2. Name(s) of dataset creator(s)<br>ICCS/NTUA staff<br>3. Description of data<br>Included in the README file<br>4. Source of data<br>This dataset is a primary output of SOCIALENERGY project<br>5. Creation date<br>TBD<br>6. Format<br>CSV and JPEG files where applicable<br>7. Location of Data<br>Zenodo (exact link to be provided)<br>8. Digital Object Identifier<br>DOI from Zenodo<br>9. Access status and embargo<br>Open data – no embargo period foreseen for this dataset<br>10. Funding statement<br>This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731767. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains.<br>11. Related Publications<br>Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text.<br>12. Dataset Citation<br>A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. |
| Data sharing | The research data will be deposited and maintained in Zenodo (http://www.zenodo.org), the research data repository launched by CERN and OpenAIRE. |
| Archiving and | For redundancy, besides uploading the data on Zenodo, it will be also maintained on a university-owned server at ICCS/NTUA. The server offers real-time data mirroring |

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| preservation | through RAID (redundant array of independent disks) and weekly backups to external disk drives. The approximated end-volume of this dataset is less than 100 MB. The dataset will be preserved for at least 7 years after the project end and the associated costs will be covered by ICCS/NTUA through own funds. |

## 2.3 Data set 03: Experimental data inputs and results from SOCIALENERGY's real world (i.e. GSRN platform)

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| Data set ref. name | GSRN platform data |
| Description | For each specific target group of GSRN (ESCO, Utility, Smart city, 3rd party), several parameters will be identified by each vertical pilot. The data to be received by external sources will fill in these parameters. The small-scale pilots have identified some identical parameters, however some differ. There are seven basic types of parameters, which will be used and analysed by GSRN as follows:<br>▪ Demographics: Data concerning the demographics of the users<br>▪ Building Data: Data describing the buildings' characteristics<br>▪ Psychographics: Data concerning the personality of the users<br>▪ Digital Interactions: interactions of users with the GSRN platform<br>▪ Appliances Data: Data on specific user home appliances<br>▪ Marketplace data: data coming from 3rd party marketplaces<br>▪ Energy Data: Data coming from smart meters<br>Data sources are over APIs from the various GSRN components and SOCIALENERGY modules.<br>ISO/TR 16344:2012 (revised by ISO 52000-1:2017) will be followed to provide a coherent set of terms, definitions and symbols for concepts and physical quantities related to the overall energy performance of buildings and their components, including definitions of system boundaries, to be used in all standards elaborated within ISO on energy performance of buildings.<br>These terms and definitions are applicable to energy calculations in accordance with the Technical Report and standards on the overall energy performance of buildings and their components, to provide input to the Technical Report or using output from the Technical Report. They are based on existing terms and definitions from standards and other documents referenced in the bibliography.<br>ISO 16346:2013 (revised by ISO 52000-1:2017) defines the energy services to be taken into account for setting energy performance ratings for planned and existing buildings and provides: (1) a method to compute the standard calculated energy rating, a standard energy use that does not depend on occupant behaviour, actual weather, and other actual (environment or indoor) conditions, (2) a method to |

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| | assess the measured energy rating, based on the delivered and exported energy, (3) a method to improve confidence in the building calculation model by comparison with actual energy use, and (4) a method to assess the energy effectiveness of possible improvements. ISO 16346:2013 is applicable to a part of a building (e.g. flat), a whole building, or several buildings.<br><br>Data access and sharing plan include several aspects that have to be identified regarding the data resulted from the project. Bellow the issues regarding the data access for GSRN and sharing plan are presented in a more detailed manner.<br><br>**IPRs and Privacy Issues**<br><br>Data access and sharing activities will be implemented in compliance with the privacy and data collection rules and regulations, as they are applied nationally and in the EU, as well as with the H2020 rules. Due to the nature of the data involved, some of the results that will be generated by each project phase will be restricted to authorized users, while other results will be publicly available. Data access and sharing activities will be rigorously implemented in compliance with the privacy and data collection rules and regulations, as they are applied nationally and in the EU, as well as with the H2020 rules. One possibility would be to ask users to pre-register for the purpose of using the system and will then need to authenticate them against a user database. If successful, the users will have roles associated with them. These roles will determine the level of access that a user will be given and what they will be permitted to do.<br><br>**Methods for Data Sharing**<br><br>As the raw data included in the data sources, will be gathered from sensor nodes and information management systems, those could be seen as highly commercially-sensitive. Therefore, access to raw data can only take place between the specific end users and the partners involved in the analysis of the data. For the models to function correctly, the data will have to be included into the SOCIAENERGY's repository. The results of the data analytics in the orient phase are set to be anonymised and made available to the subsequent layers of the framework, which will then allow the possibility for external industry stakeholders to use the results of the project for their own purposes. Publications will be released and disseminated through the project dissemination and exploitation channels to make these parties aware of the project as well as appropriate access to the data. |
| Standards and metadata | See details about the standards to be followed by SOCIALENERGY above. In the absence of a well-defined metadata standard for a given type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions.<br>The following fields will be used:<br><br>1. Title of dataset<br>Tentative name: GSRN data<br><br>2. Name(s) of dataset creator(s)<br><br>INTELEN |

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| | 3. Description of data<br>4. Source of data<br>This dataset is a primary output of SOCIALENERGY project<br>5. Creation date<br>TBD<br>6. Format<br>CSV and JPEG files where applicable<br>7. Location of Data<br>Zenodo (exact link to be provided)<br>8. Digital Object Identifier<br>DOI from Zenodo<br>9. Access status and embargo<br>Open data – no embargo period foreseen for this dataset<br>10. Funding statement<br>This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731767. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains.<br>11. Related Publications<br>Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text.<br>12. Dataset Citation<br>A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. |
| Data sharing | The research data will be deposited and maintained in Zenodo (http://www.zenodo.org), the research data repository launched by CERN and OpenAIRE. |
| Archiving and preservation | For redundancy, besides uploading the data on Zenodo, it will be also maintained on an INTELEN-owned server at INTELEN's premises. |

## 2.4 Data set 04: Experimental data inputs and results from SOCIALENERGY's virtual world (i.e. GAME)

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| Data set ref. name | SOCIALENERGY Game Data |
| Description | The use of the game in the overall SOCIALENERGY platform is to apply the knowledge acquired within the virtual environment to ensure risk-free testing environment (i.e. the purpose of serious games) as well as to test different scenarios |

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| | of energy consumption in a funny and engaging environment to maintain a good level of adherence to the tasks and progress in the game. The data will include the usage data and interactions of the user within the game for analytics and reward purposes. The data will be originated by the user, while playing the game and will be sent to the RAT for evaluation, and the GSRN platform will contain the data generated to provide the user an overview on their progress within the game. The game data as it is mostly used for by the RAT for the adaptation and dynamic pricing as well as by GSRN for progress visualization. The game also consumes the data from these two components (e.g. user data from the GSRN). The game does not store any data (temporary cache data) and does not share it with third parties. However, for the dissemination/communication purposes of the project, indicative SOCIALENERGY game datasets incurred by respective gameplays of certain real users will be available in open access mode. These datasets will be very useful for the electric utilities and ESCOs to understand the commercial impact that an applied/serious game on energy efficiency like the SOCIALENERGY game, may have in their business in order to increase their revenues by realizing new revenue streams. |
| Standards and metadata | In the absence of a well-defined metadata standard for this type of data, a simple README file will be used. This will be generated in raw text format and will describe basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed. Documentation will also include details on the methodology used as well as file and folder naming conventions.<br>The following fields will be used:<br>1. Title of dataset<br>Tentative name: SOCIALENERGY GAME data<br>2. Name(s) of dataset creator(s)<br>NRG staff<br>3. Description of data<br>Included in the README file<br>4. Source of data<br>This dataset is a primary output of SOCIALENERGY project<br>5. Creation date<br>TBD<br>6. Format<br>CSV and JPEG files where applicable<br>7. Location of Data<br>Zenodo (exact link to be provided)<br>8. Digital Object Identifier<br>DOI from Zenodo<br>9. Access status and embargo<br>Open data – no embargo period foreseen for this dataset<br>10. Funding statement |

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| | This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731767. The results of this dataset reflect only the creator's view and the Commission is not responsible for any use that may be made of the information it contains.<br>11. Related Publications<br>Bibliographical details of publications based on the dataset will be listed, with links to abstracts and, where possible, full text.<br>12. Dataset Citation<br>A 'ready-to-use' citation reference for the dataset will be provided – incorporating the core descriptive elements. |
| Data sharing | The research data will be deposited and maintained in Zenodo (http://www.zenodo.org), the research data repository launched by CERN and OpenAIRE. |
| Archiving and preservation | For redundancy, besides uploading the data on Zenodo it will be also maintained on a university-owned server at ICCS/NTUA. The server offers real-time data mirroring through RAID (redundant array of independent disks) and weekly backups to external disk drives. The approximated end-volume of this dataset is less than 100 MB. The dataset will be preserved for at least 7 years after the project end and the associated costs will be covered by ICCS/NTUA through own funds. |

## 2.5. Data privacy & data security

According to the SOCIALENERGY DoA, the objective is to design and deploy an innovative platform ecosystem for motivating end-users' behavioural changes towards the adoption of energy efficient lifestyles, building upon the evolvements in the online marketplaces, data modeling, analysis and recommendation and gaming/gamification eras.

This requires the collection of data based on sensors and user feedback, exploiting the power of the collection of data from a critical mass of interested people and the application of proper communication networking schemes with regards to data collection. Advanced data modeling and analysis techniques are applied for the modelling of the collected data – both from sensor networks as well as directly from end users - and the extraction of advanced knowledge by exploiting the power of data analytics techniques.

Focus is given on the development of personalized applications and games targeted at providing energy related information to end users, triggering interaction with relevant users in social communities (e.g. users in a specific area within a city), increasing their awareness with regards to ways to achieve energy consumption savings in their daily activities and adopt energy efficient lifestyles based on a set of recommendations and motives targeted to their culture. The engagement and direct inclusion of end users within the diverse components of the provided IT ecosystem is going to be strongly supported.

### 2.5.1. Potential data protection issues identified in SOCIALENERGY

In short, the main potential ethical issues of the project are related to personal data protection.

The SOCIALENERGY DoA describes some of the personal data treatments required in the research:

- Personal data collection will be realized through participatory sensing based on active involvement of users combined with opportunistic sensing. Towards this direction, data feeds from social networks and data feeds from social media applications will be exploited. The target is to involve citizens that both participate and use the mobile/web applications. The provided information will be correlated with geo-location characteristics, facilitating the development of applications targeted at people in the same district or city.
- From the data quality perspective, the project aims to use semantic models to model human behaviour, which "will include –among others- parameters and concepts relevant to:
    - daily activities/behaviour of residents (average time spent in the building, average stare/end times, usage pattern of electrical appliances, usage of heating and ventilation system, showering and bathing frequency)
    - household characteristics (number of occupants, occupancy variance, average age of occupants, presence of children, educational level)
    - usage policies and organizational culture (common occupant activities)
    - type of actions (environmental friendly activities, positive/negative behaviour, tips and assistance, e.g. set your thermostat wisely, let the sun in for warmth, use less energy consuming lights)

Regarding the RAT's analytic framework, the project will support the task of recommendation (dynamic pricing, clustering, etc) aiming at behavioral change of users towards an environmental friendly, energy efficient attitude. In particular, this will include:

- data processing facility based on existing semantic repository / linked data solutions, which will serve as a basis for storing and processing the data at a distributed manner,
- use of results of the analysis –especially with regards to human dynamics- for further processing of the identified behaviours,
- reasoning mechanisms upon the defined semantic models for analysing and aggregating citizens interests, behaviour and relevant data from various sources, in particular mobile crowd sensing mechanisms and various sensors (e.g. smart meters, plugs and social media),
- analysis framework targeted to smart home and energy sector, considering user behaviour, energy consumption readings and social media. The analysis facility will include ontology-based techniques to access, query, reason over the data,
- recommendation representation facility, which will enable users to receive and be present with the recommendations via a multitude of channels, especially social media channels.

### 2.5.2. Measures followed to mitigate the potential ethical issues included in SOCIALENERGY

To address the potential ethical issues, the SOCIALENERGY DoA declares that the project "will undertake research involving adult healthy volunteers, from whom it will collect and process behavioural and lifestyle related data".

It does not however intend by any means to collect and or process any other sensitive personal data (medical history, tracking of people, etc). For this reason, the protection of personal data will be dealt with cautiousness, respecting all national and European guidelines.

The project consortium confirms that it will assure that if the items mentioned hereunder are applicable to the project they will be conformed to:

- Directive 95/46/EC (Protection of personal data)
- Opinion 23/05/2000 of the European Group on Ethics in Science and New Technologies concerning 'Citizens Rights and New Technologies: A European Challenge' and specifically those relating to:
    - ICT (Protection of privacy and protection against personal intrusion)
    - Ethics of responsibility (Right to information security)
    - Article 15 (Freedom of expression and research and data protection)

The project will ensure that the consortium agreement (or addendums thereof) is constructed to enable such assurances to be formally made and adhered to by consortium partners.

In addition, with respect to Directive 95/46/EC (Protection of personal of data), individual work packages will be specifically requested to ensure that any models, specifications, procedures or products also enable the project end users to be compliant with this directive.

The project has correctly identified the applicable law at the initiation of the project, but the ethical assessment will also consider the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation o GDPR).

### 2.5.3. Data protection recommendations that SOCIALENERGY will follow

Given the type of personal data to be treated, the type and extension of the personal data treatments and the potential impact of the new technologies object of the research, the project will fulfil the following recommendations:

- Rec01. All personal data subject to treatment will be clearly identified.
- Rec02. Personal data flows and treatments will be sufficiently documented.
- Rec03. Pseudonymization of personal data techniques
- Rec04. Technical security measures
- Rec05. Informed consent must be properly collected and managed
- Rec06. Data protection rights of the data subjects

- Rec07. The organizations executing the pilots must comply with their local data protection laws formal and documentation requirements.

## 2.6. Conclusions about the DMP

This document has provided the first version of the Data Management Plan defined by the SOCIALENERGY consortium in the first six months of the project. The DMP has identified a number of datasets, which will be generated within the project and, for each of them, has defined the strategy for the documentation, open access sharing and maintenance of the associated data, according to the guidelines provided by the EC in the Horizon 2020 programme.

Data privacy, data security and ethical issues are of utmost importance for the SOCIALENERGY consortium. As a result, a clear related plan has been incorporated in the respective DMP. It should be noted that more detailed and technical descriptions of all the related measures taken into consideration will be documented in subsequent WP5 deliverables related with the S/W integration and pilot-testing activities.

This document will be progressively updated during the project's lifespan, in order to reflect any possible change and addition in the data sets, as well as any refinement in the strategy to maximize the sharing and re-use of the project outcomes. These updates will be mainly based on the consortium's decisions according to the progress that has been made towards commercialization of SOCIALENERGY's innovative products and services. In particular, at least two updated versions of the DMP will be released (if needed): the first at M18 and the final one by the end of the project at M30.

# 3. Dissemination Plan

## 3.1. Dissemination strategy

SOCIALENERGY project introduces a number of innovation activities that present strong exploitation potential and could significantly impact the on-going research and most importantly commercial activities in related domains. In order to find an optimal trade-off between safeguarding the generated IP and maximizing the dissemination activities and knowledge exchange with the related research and industrial community, SOCIALENERGY consortium has agreed on the dissemination plan described in this section. This plan, overseen by the Innovation and Exploitation Committee (InEC) will be updated every six months (if needed), taking account any new internal and external factor that could affect SOCIALENERGY's exploitation path. For every innovation result generated within SOCIALENERGY, its consortium members, under the recommendation of the InEC, will decide whether this is suitable for protection or it can be disseminated to increase the project's impact.

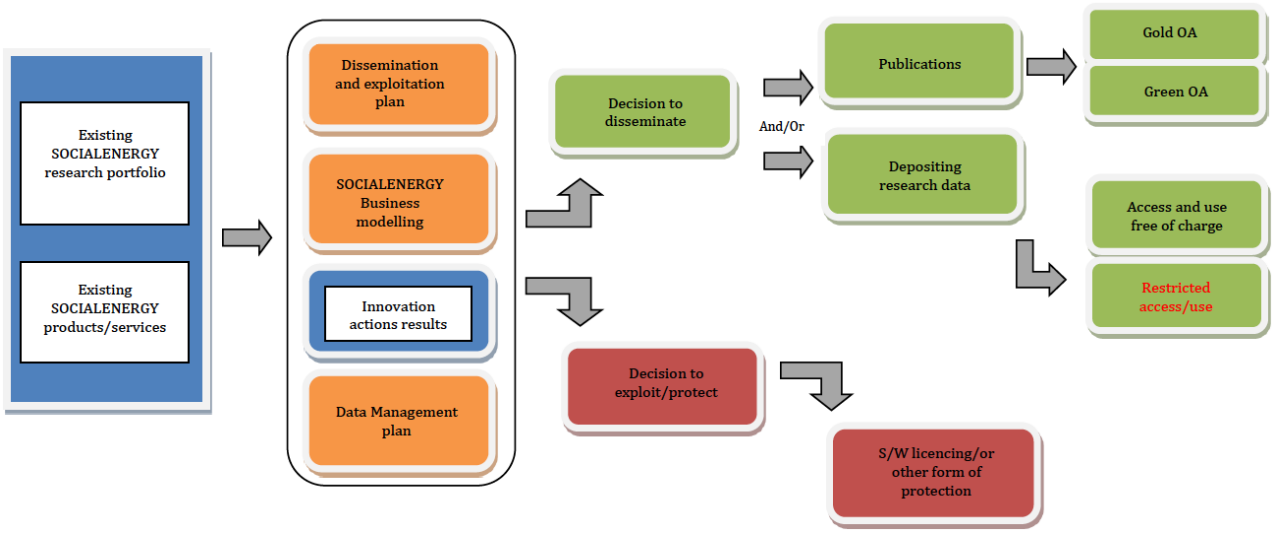


**Figure 3: Dissemination strategy of SOCIALENERGY w.r.t. exploitation activities**

As shown in the above figure, SOCIALENERGY consortium has started building its innovation activities by exploiting its existing research portfolio offered by academic partners (i.e. ICCS and SU-NIS) and its existing products/services being commercialized by its commercial partners (i.e. background knowledge). Based on the ongoing SOCIALENERGY's innovation results, business modelling and dissemination/exploitation/data management plans, the consortium decides either to disseminate or exploit and protect foreground knowledge. In the former case, publications and depositing of research data, which will be publicly available is provisioned according to Data Management Plan (DMP) presented in chapter 2. In the latter case, S/W licencing and other forms of protection measures will take place towards commercialization of the new businesses and applications generated by SOCIALENERGY after the end of the project's lifetime.

SOCIALENERGY follows an open access dissemination strategy, providing on-line access to the appropriate scientific information and innovation actions generated in the project free of charge to the end-users. In more detail, the Innovation and Exploitation Committee (InEC)

identifies dissemination target groups and proposes the appropriate means of communication in order to maximize impact. Two main dissemination actions have been identified in SOCIALENERGY: a) publications, and b) the dissemination of research-generated data:

**- Publications:** All SOCIALENERGY publications will be deposited to repositories enlisted in Open AIRE (Open Access Infrastructure for Research in Europe) in a machine-readable electronic copy at the latest upon publication. To ensure open access to the deposited publication, SOCIALENERGY consortium partners will then be free to choose between self-archiving and open access publishing ("gold" OA). In the case of self-archiving ("green" OA), SOCIALENERGY partners will deposit the final peer-reviewed manuscript in a repository of their choice ensuring open access to the publication within a maximum of six months. Alternatively, publications in open access journals will be pursued or in journals that also offer the possibility of making individual articles openly accessible.

**- Deposition of generated research data:** Following a similar strategy to publications, SOCIALENERGY will participate in the Open Research Data Pilot (ORDP). Research data generated within SOCIALENERGY, which the consortium decides that is suitable for sharing, will be openly accessible. End-users will have the right to access, mine, exploit, reproduce and disseminate free of charge digital research data (statistics, results of experiments, measurements, etc.) under the terms and conditions set out in the Grant Agreement. More details about the DMP are provided in chapter 2 above.

## 3.2. Communication strategy

SOCIALENERGY partners are mainly commercial companies (INTELEN & NRG) leading the implementation of novel products and consulting services in the emerging energy/ICT sector. Moreover, the consortium is complemented by two top-tier research organizations (ICCS & SU-NIS), with a significant track record and extensive experience in EU and national projects. As a result, SOCIALENERGY partners are very active in promotion and dissemination actions and are already realizing a cooperative approach for converged industry and academia pathways. Communication activities in SOCIALENERGY are coordinated under WP6 (i.e. T6.4) and aim at promoting SOCIALENERGY and its innovation activities' results to a very diverse range of recipients. To maximize impact, SOCIALENERGY's communication strategy will be guided by the following rules:

- Clearly identify different types of target audience and define respective communication strategy for each one.
- Define the objectives for each communication action with respect to the target audience.
- Define timelines for the project's promotion plan and ensure continuity of communication actions.
- Involve professionals, taking advantage of the in-house capacity available at large institutes within the SOCIALENERGY consortium.
- Quantify the results (e.g. number of papers, citations, visits on website, views on video clips, etc.) and provide feedback to dissemination and communication planning.
- Involve dissemination partners to multiply (press echoing) and amplify the message using their well-established communication paths. Exploit freely accessible EC tools like Cordis wire.

- Define and agree within the consortium upon a simple procedure for checking the soundness and confidentiality level of information before disseminating (e.g. create ―dissemination kits‖ with approved information; distribute new material and await confirmation by all partners within 7 days).

The SOCIALENERGY promotion plan will be updated regularly to provide concrete communication activities for each target group, ensuring that the consortium agreement provisions regarding confidentiality and publication of information are followed.

## 3.3. Categorization of SOCIALENERGY dissemination and communication activities

SOCIALENERGY dissemination and communication activities are presented in eight (8) main categories, namely:

- Academia-oriented publications and events
- Organization and participation at major international events
- Industry-oriented communication activities
- Open access SOCIALENERGY reports, data and software
- Communication activities of SOCIALENERGY products to interested stakeholders
- Training activities and academic dissemination
- Cooperation and mutual dissemination activities with other related EU projects
- Other general public dissemination actions

### 3.3.1. Academia-oriented publications and events

Regarding academia-oriented publications and events, there are three main sub-categories, namely: a) international conference papers, b) international journal papers, and c) organization of scientific SOCIALENERGY special sessions and/or workshops at international conferences.

Regarding (a), the consortium (especially academic partners) aims at disseminating SOCIALENERGY concept, architecture, research algorithms and findings from pilot tests via scientific papers in international conferences. Due to the wide range of project's scope encompassing ICTs for energy efficiency (ICCS is the main responsible partner), gamification for energy efficiency (INTELEN is the main responsible partner), gaming technologies (NRG is the main responsible partner), education/learning and social sciences (SU-NIS is the main responsible partner), the consortium will seek for the best possible and related venues to disseminate project's results. The same rationale applies for the international journal papers. It is expected that a total number of at least 10 conference papers and 4 journal papers will be published within SOCIALENERGY's context.

Regarding (c), consortium partners are continuously seeking for related conference venues in order to organize a few scientific special sessions and/or workshops in cooperation with other related EU projects (such as the ones presented in subsection 3.3.7 below). All consortium partners aim at exploiting their participation and liaisons with other related projects in order to co-organize this type of scientific events within the project's lifetime.

### 3.3.2. Organization and Participation in major international events

The SOCIALENERGY consortium plans to promote the project and its findings by displaying S/W prototypes and live/off-line demonstrations in international exhibitions "through the boots" and other promoting activities of its consortium members. Target exhibitions are collocated with the biggest and most prestigious conferences in the converged energy/ICT field in Europe and the United States, and address scientific, technical and business audiences (for example):

- Gamification World Congress
- European Utility Week
- ACEEE
- Energy Efficiency and Renewable Energy Forum and Exhibition for Europe
- Energy Efficiency Global Forum
- ESCO Europe forum
- Distribution technology and innovation summit

SOCIALENERGY commercial partners (i.e. INTELEN & NRG) will be mainly responsible to undertake these dissemination/communication activities (as part of their own business) as they all participating via sponsorships in several worldwide exhibitions. Co-organization of hub sessions (e.g. European Utility Week) and/or industry/business-oriented workshops with other related projects (such as the ones presented in subsection 3.3.7 below) is also an aim of the consortium.

Another dissemination path is through public events where the outputs of the project are presented to EU Officers, to experts and professionals, as well as to the general public. SOCIALENERGY's consortium plans to participate in the annual ICT concertation meetings and/or similar events. This way, the consortium will exchange information with other similar projects funded by EC so as to increase interoperability and get new ideas on how the project should proceed. Furthermore, SOCIALENERGY aims at organizing special sessions/workshops in major international conferences collecting scientific contributions from many related projects. As a result, effective communication paths with other Project Coordinators will be established towards adopting the best possible practices of excellence and implementation of SOCIALENERGY innovation activities.

### 3.3.3. Industry-oriented communication activities

SOCIALENERGY SMEs (particularly INTELEN by exploiting its business portfolio with utilities from many EU countries) will be mainly responsible to undertake these communication activities as they have a very active participation in standardization activities and also a large customers portfolio consisting of big players in the liberalized electricity market. NRG will have several B2B and B2C meetings with the customer segment, which is mainly interested in the SOCIALENERGY GAME. NRG will exploit its experience from the commercialization of several other related serious games towards having them available in well-known e-commerce stores such as i-tunes and google store. Within the project's lifetime, two (2) industrial workshops or else DEMO days will be organized by SOCIALENERGY consortium towards interacting with the related business actors and disseminate project's results and potential innovation impact (indicatively the first event will be held after 1$^{st}$ integration and validation activities and the second one within M25-M30 period).

The main aim of the consortium is to identify potential real customers of SOCIALENERGY products and agree on real business relationship with them before the end of project's lifetime. INTELEN has already discussed with several utilities and respective "Letters of Intent" (LoIs) have been agreed. The next step is to agree on Memorandum of Understanding (MoU), which can take place after the first S/W integration activities and related DEMOs that are expected to take place at M20. Then, the final step will be to bring the integrated SOCIALENERGY S/W platform as close to the market as possible (TRL 8 and TRL 9) at the end of the project's lifetime (M30).

It should be noted that an International Advisory Board consisting of potential customers (i.e. mainly electric utilities) is being formed in order to help the consortium to focus its S/W development activities in targeted functionalities and services that are really useful for the market.

### 3.3.4. Open Access SOCIALENERGY reports, data and software

Regarding the open access SOCIALENERGY reports, data and software, there are three main sub-categories, namely: a) public SOCIALENERGY reports and deliverables, b) open access datasets, and c) open access SOCIALENERGY software and user manuals.

Regarding (a), all SOCIALENERGY deliverables (together with all other dissemination material like the ones presented in subsection 3.3.8 below) are made public in the project's website (see the "Downloads" tab[8]), so as everyone may have access and download the respective material. Publishable summaries for the 3 reporting periods will also be publicly available in the same web portal. Moreover, internal consortium reports, mainly of confidential nature will be made available via "SOCIALENERGY Members' area" to SOCIALENERGY Advisory Board members (mainly electric utilities coming from INTELEN's and NRG's business portfolio).

Regarding (b), each SOCIALENERGY subsystem will provide open datasets to be used mainly for research purposes. For more details about the structure and contents of these datasets, please see section 2 about the Data Management Plan – DMP above.

Finally, regarding (c), the consortium's strategy is to have a basic version of S/W prototypes fully accessible to anyone interested in understanding the basics about the whole system's operation and experiment with its innovative functionalities. In particular, a comprehensive user manual will be available for every subsystem and the system as a whole in order for everyone to be able to start experimenting with the platform's functionalities. This is done in order to further disseminate the project's results (i.e. SOCIALENERGY foreground knowledge). However, the final version of S/W prototypes (especially regarding the GSRN and GAME components) will be kept in "closed/restricted access" in order to boost the commercial exploitation activities of the two companies and protect the respective IPR.

[8] http://socialenergy-project.eu/index.php/downloads

### 3.3.5. Communication Activities of SOCIALENERGY products to interested stakeholders

For each one of the identified SOCIALENERGY innovative products and services, targeted communication activities will take place with targeted customer segments towards bringing these products as close to the market as possible at the end of the project's lifetime. These communication activities are closely inter-related with the activities described in subsection 3.3.3 above. According to the consortium's strategy, a long list of value propositions has been created at the beginning of the project (see section 1.2.2) in order to identify all possible customer segments, which may be interested in purchasing SOCIALENERGY products and services (apart from those companies with which the consortium's commercial partners are already making discussions). This list will become considerably shorter as the project progresses, in order for the S/W development activities to be focused on the needs of the customer segments that have practically shown interest in purchasing our products and services (i.e. via LoIs, MoUs, business contracts, etc.). This short list of value propositions will be provided in D6.2 (M15) and D6.3 (M30).

In the following, we provide a list of customer segments and indicative communication activities that will take place:

- **Webinars:** Special focus will be given to the organization of webinars through which utilities, ESCOs, energy consumers, public authorities' representatives grassroots community organizations and facility managers with focus on energy efficiency of their buildings will be invited to become aware of SOCIALENERGY's platform novelties. This action is closely inter-related with exploitation activities, as these webinars will be the basis upon which the consortium will build its clientele in the long term.
- **Investor DEMO Days**: the project outputs will be presented in various VC/Investor Demo Days in Europe and in several cleantech and gamification investment events (RockStar Cleantech Accelerator, StartupBootcampXL, Eco-Innovation Berlin, CeBIT Cleantech, etc.).
- **Utilities:** At its final phase and after the duration of the SOCIALENERGY project, it will try to attract as many utilities as possible in order to use and exploit its platform. By having INTELEN that guarantees from the first day of the project a sustainable platform that will be highly extended during project's lifetime, we envisage that: i) the customers of these utilities, ii) the interaction of the platform with Facebook will trigger the wide dissemination of the platform to end users. This will be the critical mass of users that will allow SOCIALENERGY platform to grow.
- **Online markets for energy efficiency:** The SOCIALENERGY platform is able to be exploited from online markets in electrical appliances and house upgrades, building renovation and construction companies, etc. in order to provide energy efficiency to the customers of the utilities that participate in SOCIALENERGY. At the final stage of the project, SOCIALENERGY will try to attract the stakeholders in these markets in order to educate them on the features of the platform and persuade them to participate and extend their business through it.
- **Public authorities:** Many public authorities (e.g. municipalities, ministries, etc.) own a lot of buildings (e.g. schools, hospitals, government) and influence many targeted communities of people. SOCIALENERGY will try to establish relationships with such communities in order to allow them to: i) set the requirements that they desire during the design of the platform, ii) act as the pioneering examples that will prove

the necessity of SOCIALENERGY and trigger the widespread use of SOCIALENERGY from such communities.

- **Grassroots community organizations:** In our days, a vast number of grassroots are focusing in the environment and it is well known that lack of energy historically led even to the beginning of wars. SOCIALENERGY will try to facilitate the objectives of such communities (e.g. energy friendly products, EP design, etc.) and try to find a set of them that will act again as pioneering examples and facilitate the widespread use of SOCIALENERGY.

### 3.3.6. Training activities and academic dissemination

SOCIALENERGY's training and knowledge dissemination activities will be mostly focused on young researchers, students, communities and industry professionals. These activities will include the preparation of educational material for technical schools and universities, detailed presentations and guidebooks for professionals and on-line project presentations on SOCIALENERGY-related scientific topics publicly available through the project's website. The main responsible partners for these activities are ICCS and SU-UNIS.

Additionally, SOCIALENERGY consortium partners have done deep research and have already mature technologies that SOCIALENERGY will exploit and experiment with them during pilots. More specifically, they will use SOCIALENERGY results as the basis of further research beyond the scope and lifetime of the project, strengthening their research work and achieving publications to international conferences, workshops and scientific publications. The academic partners plan to use architectures, algorithms, methodologies and other public results of the project for advanced, specialized courses given to graduate students and for new Ph.D. theses. It is also expected that the experimental platforms developed by the project will be used for "training days/sessions" to support teaching/academic/training activities and further participation to future research and experimentation projects. Finally, it is possible that the knowledge and experience acquired through involvement in the project, will help in the formation of a spin-off company for commercial exploitation of specific technologies that will be integrated in the context of SOCIALENERGY (e.g. see ICCS exploitation plan in section 4).

### 3.3.7. Cooperation and mutual dissemination activities with other related EU projects

SOCIALENERGY consortium is aiming at having mutual dissemination activities, collaboration and knowledge/ideas' exchange with several H2020-ICT-24 "sister" projects[9] like INLIFE, GOAL, e-confidence and SMARTLIFE in which ICCS and NRG are also participating. ICCS will also try to get in contact with other project coordinators coming from Athens, Greece, such as GATES, FOCUSLOCUS and ENVISAGE. Of course, the coordinator will also seek for communication with all other project coordinators from H2020-ICT-24, which are GAMECAR, GAPARS, REVEAL and GABLE. In the following table, the cooperation and potential mutual dissemination activities with other related EU projects are presented:

[9] http://cordis.europa.eu/search/result_en?q=%28relatedProgramme%2Fprogramme%2Fcode%3D%27ICT-24-2016*%27+OR+relatedSubProgramme%2Fprogramme%2Fcode%3D%27ICT-24-2016*%27%29+AND+contenttype%3D%27project%27&srt=contentUpdateDate%3Adecreasing&num=20

**Table 4: Cooperation and dissemination activities' potential with other related EU projects**

| Project Name and objectives | SOCIALENERGY interaction |
| --- | --- |
| **[RAGE][10]** is a H2020 project that aims to develop, transform and enrich advanced technologies from the leisure games industry into self-contained gaming assets that support game studios at developing applied games easier, faster and more cost-effectively. These assets will be available along with a large volume of high-quality knowledge resources through a self-sustainable Ecosystem, which is a social space that connects research, gaming industries, intermediaries, education providers, policy makers and end-users. | SOCIALENERGY will closely follow-up RAGE project activities as the latter is closely related to serious games development and is EU project flagship in this field. **SOCIALENERGY will exploit NRG and SU-UNIS participation in RAGE for foreground knowledge dissemination and interaction between the two consortia. NRG will follow the good practices and libraries for the efficient development of SOCIALENERGY GAME.** |
| **[VIMSEN][11]** is a finished FP7 EU project that researches on ICT technologies that allow the creation of Virtual Micro-Grids (VMGs) under a highly dynamic and distributed framework. Virtual Micro-Grids are dynamic associations of multiple micro-grids operating under a common information and communication framework that allows efficient energy management and control. | SOCIALENERGY will exploit ICCS background knowledge on research algorithms, which will be used as input for the project. **The VIMSEN DSS platform (TRL 5) will be used for testing the various functionalities of SOCIALENERGY and as a good basis for the development of RAT.** |
| **[SINGULAR][12]** (DR 2.0 in Microgrids over DSI in real-time) is a finished FP7 project, which investigates the effects of large-scale integration of renewables and demand-side management on the planning and operation of insular (non-interconnected) electricity grids, proposing efficient measures, solutions and tools towards the development of a sustainable and smart grid. Different network operation procedures and tools, based on innovative approaches of predictive electricity network operation are developed. | SOCIALENERGY will exploit foreground knowledge of [SINGULAR] for pilot test and experimentation plans as well as real-life pilot tests. **INTELEN has made extensive experimentations in a population of 80 residential consumers during 2015 and has realized significant conclusions, which will be fed as input to SOCIALENERGY GSRN work.** |
| **[ENTROPY][13]** is a EU H2020 innovation project aiming to design and deploy an innovative IT ecosystem targeting at improving energy efficiency through consumers understanding, engagement and behavioural changes. The focus is given on the collection of energy-related information from heterogeneous data sources, the proper analysis of the available data and the provision of interactive services, applications and serious games to end users for stimulating their interest for energy efficient activities, recommending actions for adopting more energy efficient lifestyles and increasing their overall energy consumption awareness. | SOCIALENERGY will exploit INTELEN's foreground knowledge in gamification and user engagement. **Our project will closely follow-up [ENTROPY] results and the ways that pilot tests are set up including the appropriate key performance indicators that will be used for the real-life trials. INTELEN will also use related background knowledge and liaisons for the development of GSRN platform.** |

[10] http://rageproject.eu/
[11] http://ict-vimsen.eu/
[12] http://www.singular-fp7.eu/home/
[13] http://entropy-project.eu/

| | |
| --- | --- |
| **[STEER]** developed and experimented with the background technologies that needed towards stable, efficient and scalable online communities with common interests. It developed the foundations towards audiovisual collaborative interaction. | SOCIALENERGY will **exploit ICCS background experience in social network technologies from [STEER] that were initially built for social media and real time events in order to host applications and services such as the GSRN and the EC creation and dynamic adaptation functionalities deployed in RAT.** |
| **[MATHISIS][14]** is a H2020 project that develops technologies for better human learning and teaching. The ability of such a system to adapt to different learning requirements and make use of the shared knowledge among its different components, will enable new ways of learning methodologies to emerge and foster a new era in learning that goes beyond simple social skill acquisition and targets more workplace-oriented activities. | SOCIALENERGY will follow-up [MATHISIS] good practices for the **development of the educational platform and the respective modular learning units. NRG (being a MATHISIS partner) will transfer knowledge to SOCIALENERGY and cooperate with SU-NIS regarding the development of LCMS.** |
| **[INLIFE][15]** is a H2020 project that provides an innovative gamification framework targeting both typical as well as special education and social inclusion activities based on Serious Games. INLIFE's core concept leverages on the potential of the Internet-of-Things (IoT) paradigm to directly link actions, decisions and events happening in real-life with in-game educational progress and modern gaming technologies. This bridge strengthens the infusion of gamification into non-leisure contexts, boosting at the same time the creation of new educational methodologies as well as new business opportunities. | SOCIALENERGY will get in contact with INLIFE's project coordinator, which is an ICCS team other than the one working on SOCIALENERGY. **Both teams will exchange ideas on ways to efficiently develop the educational, gaming and social modules of both systems.** |
| **[SMARTLIFE][16], [e-confidence][17] and [GOAL][18]** are 3 "sister" projects of SOCIALENERGY dealing with gaming and gamification concepts. NRG is a partner in all 3 projects. | **NRG will exchange ideas among the various consortia and try to co-organize events, workshops, special sessions, etc. in order to realize added-value and win-win situations for SOCIALENERGY and the other projects.** |
| **[GATES][19], [FocusLocus][20] and [ENVISAGE][21]** are 3 "sister" projects of SOCIALENERGY, whose project coordinators are affiliated with Greek research institutes. | **ICCS will try to get in contact with these 3 project coordinators and try to co-organize events, workshops, special sessions, etc. in order to realize added-value and win-win situations for SOCIALENERGY and the other projects.** |

[14] http://www.mathisis-project.eu/en
[15] http://www.inlife-h2020.eu/
[16] http://www.smartlifeproject.eu/
[17] http://www.econfidence.eu/about
[18] http://www.goal-h2020.eu/
[19] http://www.gates-game.eu/en
[20] http://cordis.europa.eu/project/rcn/206188_en.html
[21] http://www.envisage-h2020.eu/

### 3.3.8. Other general public dissemination actions

- **Web portal:** A web site has been developed in order to provide a portal through which continuous updates about the project progress and its results are presented. The website has a public area, targeting users external to the consortium, and an internal, password protected area. The public area includes information about the project objectives, latest achievements, public deliverables, white papers and vision papers, as well as information on the consortium beneficiaries, their background and contribution inside SOCIALENERGY. This part of the website aims to raise the image of the project and improve dissemination to specialists, potential users of SOCIALENERGY technology, policy makers and public authorities, as well as the general public. The internal area will include all the necessary data to provide efficient cooperation among beneficiaries, such as private deliverables and internal reports as well as exchange of internal documents and reports with advisory board members (both technical and ethical committees). The website will be maintained and updated regularly and will be active for at least 3 years after the end of the project.
- **Press:** Press releases and newsletters will be published for relevant European and national trade newspapers, as well as publication of corresponding papers, journals and articles. At least three press releases are already foreseen in SOCIALENERGY's promotion strategy and will be provided by the industrial consortium members at the beginning and at the end of the project, and after the first demonstration of SOCIALENERGY's platform.
- **Social Media:** Taking advantage of the popularity of social media, especially in the under-30s target group, SOCIALENERGY will create project accounts on the most popular social media services such as Facebook, Twitter and also a youtube channel to upload DEMO videos after the first demonstration of SOCIALENERGY's platform.

# 4. Exploitation plans

## 4.1. Exploitation plan as a whole

In this section, the exploitation plan of SOCIALENERGY S/W platform as a whole is presented together with the draft business plan and the strategy that is followed by the consortium towards achieving the project's ultimate goal, which is the commercial exploitation of the proposed S/W platform's results in a real market context.

### 4.1.1. Exploitation strategy

The SOCIALENERGY architecture is "modular by design" in order for all subsystems (i.e. GSRN deployed by INTELEN, GAME deployed by NRG, RAT deployed by ICCS and LCMS deployed by SU-NIS) to be potentially exploitable as standalone commercial products in the future. The technical APIs for the interaction between the various subsystems have been appropriately designed in a way that any possible combinations of SOCIALENERGY subsystems to be commercially exploitable in the future (e.g. GSRN with RAT as one single product, GAME with RAT as another one, GSRN-GAME as another one, GSRN-RAT-LCMS as another one, etc.). This strategic decision at the design phase provides the flexibility to the consortium to decide how to prioritize its dissemination, communication and further exploitation activities towards commercialization. Of course, the default choice and ultimate objective of the consortium is to fully integrate all 4 subsystems into one single SOCIALENERGY S/W platform. This way, the SOCIALENERGY product and associated services is expected to be competitive enough in order to enter the liberalized ICT/energy market and be sustainable as a product from a business perspective.

The "modular by design" approach provides flexibility to our system to be commercialized taking into consideration the diversified needs of all our potential customer segments. In the following, there are some examples of possible combinations of SOCIALENERGY subsystems:

- GSRN-RAT combination can provide considerably more "intelligence" to the SOCIALENERGY product compared with the case that GSRN is commercialized as a stand-alone platform. Moreover, diversified business modelling can be done according to the needs of the customer meaning that there can be a basic version with a basic set of algorithms and a premium version incorporating additional automated functionalities based on sophisticated algorithms' execution.
- GSRN-GAME combination can considerably strengthen the competitiveness of both GSRN and GAME. In other words, the customer is expected to be more willing to play the SOCIALENERGY game, if this is combined with a GSRN platform where the user can also realize real energy/money savings in his/her home.
- GSRN-GAME-LCMS combination can be considerably more appealing for schools and public sector buildings as the students will be able to learn about good energy efficiency practices and behaviours, while playing an enjoying game and having access to their building's real-time and historical energy consumption.

Conclusively, it is apparent that this flexibility choice of selecting any combination of SOCIALENERGY subsystems to match specific customer segment's needs provides enormous boost to the exploitation activities of all partners of SOCIALENERGY consortium.

### 4.1.2. Draft business plan and exploitation of SOCIALENERGY platform as a whole

This subsection provides a draft business plan for SOCIALENERGY platform exploitation as a whole. The consortium's projections are realistic and quite conservative. The estimations are made taking into consideration commercial partners' experience from the gaming industry and energy efficiency market. The main goal of the consortium is to make SOCIALENERGY product and services self-sustainable after the EU funding has ended. SOCIALENERGY aims at engaging end-users from utilities and ESCOs, and services will be offered as a Freemium SaaS service, which provides for free value-added offerings. The consortium's business strategy is summarized below:

#### *4.1.2.1. Revenue Streams*

The revenue models for SOCIALENERGY can be analyzed as indicated in the table below. SOCIALENERGY will be offered as a Software as a Service (SaaS) to the users and in the future can be also offered as a SaaS B2B served to ESCOs and utilities, through Web and mobile interfaces and apps. The basic model will be "License a SaaS price to utilities or 3rd party providers and get paid also by the DR savings as a portion from the utility and based on efficiency and objectives (MW managed, objective % reached, etc)". Indirect sales channel and partnerships with utilities or ESCO companies that contract big utilities or DSOs are also provisioned. Direct sales could be an option but may be not quite impressive for scaling up the product. The platform usage license fee for the platform is proportional to the number of end users registered in the platform. The fee decreases as the customer base using the SOCIALENERGY platform increases. Table 6 presents an indicative estimation of the fees on per year and per user volume scale.

**Table 5: Revenue streams for SOCIALENERGY business plan**

| Pricing Model Type | Description |
| --- | --- |
| **Sources of Revenue** | **Public funding:** to be (partially) funded via dedicated government budgets.<br>**Usage fees:** SaaS subscription fees<br>**Advertisement:** Cross ads through the platform |
| **Pricing Model** | **Free of charge:** Basic use of the platform, data and services can be free<br>**Freemium**: Applications are free to download and use. However, some features inside the apps are unavailable until the user pays for them;<br>**Premium:** Applications have an upfront price before they can even be downloaded. However, all future upgrades to the premium apps are free once purchased.<br>**Subscriptions:** The user is charged automatically for a regular fixed fee via the Market Store for using the applications. |
| **Price Structure** | • Subscription fee<br>• On-demand fee |

**Table 6: Indicative estimation of fees for SOCIALENERGY platform use on per year and per user volume scale**

| Number of Users in SOCIALENERGY SaaS | Fee per year per user |
| --- | --- |
| 1-9,999 | 2 € |
| 10,000-49,999 | 1.8 € |
| 50,000-99,999 | 1.6 € |
| 100,000-199,999 | 1.5 € |
| 200,000-499,999 | 1.4 € |
| 500,000-999,999 | 1.3 € |

**Note:** Additional quantitative figures about the cost structure and revenue streams are also available at the beginning of the project and are accessed in restricted mode (i.e. only project beneficiaries and EC).

#### *4.1.2.2. Market Size*

SOCIALENERGY will operate under the umbrella of the overall "Smart Grid" market. This market encompasses a vast variety of technologies and solutions focused on lowering energy use. The smart grid market has grown from $69.3 billion in 2009 to $171.4 billion in 2014 globally and is expected to cumulatively surpass $400 billion worldwide by 2020, with an average compound annual growth rate of over 8%. The key trends that affect SOCIALENERGY's addressable market are: a) the environmental directives for the environment, b) the need for energy cost reduction, c) high global energy prices, d) the emerging segment of smart grids and e) new technological trends applicable on the energy domain (e.g. Nest and Google will shape new demand), e) the need of electric utilities to offer diversified, competitive and innovative services to their customers (apart from classic services related with energy delivery and billing), f) the need of energy services companies like electric appliances vendors/retailers and building construction/renovation companies to understand the needs of their customers and offer personalized marketing services.

#### *4.1.2.3. Trends in Target Market (Energy Efficiency and Utilities) and customers' preferences*

According to a global survey, more than 2/3 of utilities executives deem that the multiple benefits of smart meter deployments, such as improved customer satisfaction, will entail the emergence of new entrants in the areas of energy efficiency, demand response and other energy data related services, changing completely the competitive landscape. In 2013, a survey revealed that after a 9% decrease the previous year, just 24% of consumers indicate trust in their utility for optimal energy consumption issues. This was the lowest level of trust within the last four years, while customer satisfaction has drifted also lower globally, falling from 59% to 47%.

Across both regulated and de-regulated energy markets, customer willingness to turn to other providers remains high. Despite the fact that many utilities provide consumer-centric programs such as online additional services, 73% of consumers would leave their energy utility, if given the choice. This means that those additional services have not yet being translated into trust, satisfaction and loyalty. Another study completed in 2014, suggests that the commercial sector shows high interest in committing into energy management. Even if cost-cutting seems to be still their primary concern, companies increasingly perceive

energy management as a key choice in managing risk and enabling higher growth. Hence, more and more businesses incorporate energy management into their strategy.

Regarding the end customers' preferences, the extended use of mobile devices has led to an increasing demand for energy related mobile apps that provide personalised information. In particular, 58% of consumers stated that they would welcome the opportunity to receive notifications about their energy consumption on their mobile. Another 45% declared interested in receiving personalized advice on products and services that they could purchase to help them reduce their electricity bills. Nowadays, the introduction of social games to cooperate/compete with friends and neighbours towards decreasing energy consumption is the "hottest" trend.

#### *4.1.2.4. SWOT analysis*

Detailed information about SOCIALENERGY's competitive landscape and innovation potential is provided in chapter 1 together with a draft business modelling and a long list of value propositions (to be gradually shortened as the project progresses). The following table presents an initial SWOT analysis of SOCIALENERGY product:

**Table 7: Initial SWOT analysis**

| Positive | Negative |
| --- | --- |
| ***Strengths***<br>• Cutting edge data-driven energy management and behavioural analytics.<br>• Expertise in applying customized gamification techniques based on population traits.<br>• Allows utility/ESCO to easily run targeted campaigns with lower budget.<br>• Nudges utility's/ESCOs customers to adapt energy efficient attitude using cognition, calculus and social interaction as motivational factors.<br>• Ensures higher reliability of collected data as steps on a trust relationship with utility's/ESCOs customers.<br>• Enhances utility's/ESCOs customer engagement, satisfaction, loyalty.<br>• The cloud-based platform eliminates software installation needs, compatibility issues, updates, uptime and data savings.<br>• Utilities/ESCOs will be able to segment the market in ways they never could before. | ***Weaknesses***<br>• New entrants need a dynamic launch to gain the utility's customers trust within an environment characterized by high suspicion.<br>• Dependency on utility's/ESCOs precedent data for providing advanced consultant services.<br>• Low funding compared to direct competitors. |
| ***Opportunities***<br>• Readiness of Energy Marketplace to be disrupted.<br>• Enough room for enhancing utility's customers satisfaction or ESCOs.<br>• Many utilities/ESCOs seek partnership with companies/products that provide energy efficiency solutions and customer engagement services.<br>• Intense regulators' interest and pressure in solution that can effectively drive energy efficiency utility's/ESCOs customers expect comprehensible consumption reports | ***Threats***<br>• Direct competitors with remarkable capital funding and increasing rate of growth.<br>• Indirect competitors with high Marketing expertise.<br>• Restricted profit margins may discourage utilities from investing into customer engagement & energy efficiency solutions. |

| | |
| --- | --- |
| and bills that motivate them to manage their energy consumption.<br>• Utility/ESCOs customers are interested in savings. | • Utilities or ESCOs sticking to traditional strategies may impede the recognition of novel opportunities. |

From the above, it can be easily inferred that SOCIALENERGY consortium has a pretty clear business and exploitation plan for SOCIALENERGY system as a whole, which is realistic with current utilities' and ESCOs' business, gaming and converged ICT/energy markets. As a result, the estimated financial figures are based on real financial data according to existing client base of INTELEN. However, this is only the starting point, **SOCIALENERGY aims to constitute the platform that will not only mediate the future energy market but also will harmonize demand and production in it through its very innovative and advanced features like the game, the support of sophisticated research algorithms for dynamic energy pricing and management of virtual energy communities, and the development of LCMS, which will guarantee the long-term user engagement and continuous learning of good practices on energy efficiency**. The development of a more detailed and quantified business plan with respect to its ambitious objectives will take place in subsequent WP6 deliverables (i.e. D6.2 in M15 and D6.3 in M30).

## 4.2. SOCIALENERGY exploitable assets

For each one of the SOCIALENERGY's exploitable assets, four (4) subsections are provided stating the asset's: a) description, b) main functionalities, c) innovation aspects, and d) target groups. We consider that each asset can be individually exploited by the partner that develops it. However, the strategy of SOCIALENERGY is to integrate all 4 exploitable assets into one single SOCIALENERGY S/W platform in order to maximize its commercial/business impact and offer respective benefits and added value/background knowledge to all partners after the end of project's lifetime.

### 4.2.1. GSRN asset

#### *4.2.1.1 Asset Description*

INTELEN will deploy the GSRN platform. The GSRN is the core S/W platform of the SOCIALENERGY system, in which all types of SOCIALENERGY users (e.g. individual consumers, EC leaders/managers, electric utility/retailer user, ESCO user, etc.) are able to log in and visualize/experience many innovative functionalities. GSRN has technical interfaces with all other five (5) subsystems integrating several multi-disciplinary functionalities ranging from the scientific/research sector (cf. RAT) to the gaming/gamification sector (cf. GAME) and the educational sector (cf. LCMS). GSRN is also being fed with real-life energy consumption data from MDMS.

It also offers EIDaaS-like services to various targeted stakeholders such as building renovation companies and electric appliance vendors/retailers, who aim at indirectly exploiting SOCIALENERGY system's results towards realizing new revenue streams for their businesses.

#### *4.2.1.2 Main functionalities*

GSRN will be the main core platform of SOCIALENERGY that will connect users and user profiles/demographics/user inputs, energy data, games and gaming interactions with stand-alone connected games, learning content through e-learning objects and relevant learning interfaces, online marketplace and cross-selling services, virtual currency procedures for the rewarding schemes, will also connect to Facebook by creating social connected communities/users and finally will be using advanced analytics for recommendation engines and data monetization.

Users will create an online profile account (sign in also with facebook) and will be able to:

- Track and manage/be informed on their energy consumption and various energy metrics on DR and energy efficiency sectors.
- Manage securely personal data, demographics and feed/input information about preferences, questionnaires, behavioural data input.
- Get learning content (e-learning, training digital material, multimedia, etc.) and webinars/seminars/educational material/digital stuff based on their profiles, needs, energy performance feedback, interactions and gaming experience; This will be on a personalized approach using recommenders. Personalization will also apply to content and education, gaming, rewarding schemes and marketplace.
- Download related mobile/stand-alone games, connect (login/sign-on) to the game (virtually connected to the GSRN platform) and play, by feeding data and interactions the GSRN user account.
- Have access to personalized rewards, prizes and services through a push-pull marketplace; this will have a highly personalized approach.
- Get transparent access to many data analytics services, reports and graphs.
- Enjoy gamification elements (e.g. badges, leader-boards, coins).
- Get and use virtual currency features, in order to redeem prizes and services from the embedded market place.
- Follow friends and other users, by forming communities and monitor their individual GSRN timelines (follow, like, track, etc.) on a real-time basis over Facebook APIs.
- The user will have a unique, unified Player/User ID, that will use it to play games, buy online services from marketplaces, track the DR and energy efficiency performance, be part of on-line and off-line training and educational services and be identifiable on the data analytics procedures.
- Create a virtual character of the user, who will engage to games and to the physical experience, by connecting two worlds: the digital and the physical reality.

Connect this virtual character with a unique ID in order to exploit: educational levels, gaming level profile, preferences, specific energy and DR performance metrics and buying profile.

#### *4.2.1.3 Innovation (including comparison with SotA and existing competitors)*

The uniqueness of the system is the combination of various external components on a unified dashboard that will enable SOCIALENERGY partners to assess and measure behavioral interactions and to calculate their impact on energy savings. Behavioral impact could be due to the DR, due to the gamification or gaming components or could be due to the personalized marketplace, or a combination of all the above.

The main innovation and differentiation point of GSRN lies upon the personalized product scoring system, which combines energy efficiency related KPIs, Gaming inputs, LCMS inputs and the user's energy profile, acting as a personalized energy consultant. After the system has collected and analyzed a wealth of energy and behavioral/interaction data for each user, it ranks the products accordingly, allowing the users to make more relevant product purchase decisions. The user is exposed to a wide variety of products and is able to choose taking into account measurable and relevant metrics and not on generic KPIs, which make little sense when not combined or adjusted to his/her needs.

Furthermore, the GSRN Marketplace module is tightly integrated into the wider digital engagement framework, allowing users to experience social or gamification synergies. For example, users can be rewarded for purchasing products, inviting friends to join the platform or sharing their activity and routines with friends.

#### *4.2.1.4 Target Group*

- Utilities: services for home/office clients
- ESCOs: ESCO clients, C&I, Big SMEs
- Public Authorities in Smart Cities: Municipalities, Transportation, Government, etc.

The GSRN platform can be applied to ESCOs, Utilities and smart city governments/authorities very easily, using the SaaS business model.

### 4.2.2. GAME asset

#### *4.2.2.1 Asset Description*

Nurogames (NRG) will develop the SOCIALENERGY game in order to motivate and engage consumers and energy companies to deeply interact and educate the stakeholders with the following identified objectives:

1. Education on energy usage
2. Social inclusion towards energy efficiency
3. Enhancement of interaction between energy communities and stakeholders with similar interests
4. User engagement and profiling

To encourage people to undergo important changes towards energy saving and better use of energy in their everyday lives, we have to address the challenge of facilitating enduring new, not yet fully realized, energy habits. Introducing energy-efficient solution within smart environment will not suffice for the long-term savings. The real impact will be created when such home and lifestyle improvements are going to be accompanied with a lasting behaviour change that is going to be triggered through SOCIALENERGY game. An innovative game application is going to be introduced to ensure that there exists a motivating factor that stimulates the adaption of new behaviours, while presenting more benefits of the proposed solutions that go far beyond the financial aspect. The game will address major issues between users' knowledge, attitudes, values and intentions and their behaviour ("knowledge-action gap" and "value-action gap").

The game can be played in different scenarios to experience and learn about various aspects of energy efficiency and usage (cf. various energy programs offered in the retail electricity market). The game will be developed for browser application, where the main objective of the player is to fulfil the needs of his/her avatar.

#### *4.2.2.2 Main functionalities*

NRG will develop a virtual world within the applied game, where energy end users can experience the benefits of energy efficient behaviours without actually spending money or effort in real life. The game will allow each user to virtually design a user's actual home and add the energy consumption devices (actually the user can customize based on the settings of his/her real home). Then, the game proposes energy saving strategies based on the energy saving mechanisms (i.e. the avatar tries to fulfil the 'jobs' that are automatically created by the game). Then, users can implement these strategies and obtain the benefits by satisfying the needs of their avatar.
The main functionalities of the game will be:

1. Complete various jobs by using electric devices and functional objects in order to keep up with the avatar's satisfaction and earn game points.
2. Receive feedback, rewards or earn punishments for behavior, while interacting with electric appliances.
3. Complete iterated jobs to behave better each time.
4. Increase knowledge about energy efficiency by the use of in-game virtual laptop.
5. Unlock new jobs, upgrades by completing tasks successfully.
6. Complete side tasks such as tidying up the room, feeding the fish to gain more points and experience.
7. SOCIALENERGY GSRN platform will help use the tokens earned in the game to be used in real life.

In addition to the above-mentioned functionalities and to ensure engagement and adherence to the gameplay, certain personalization features will be added to the game. Here, an avatar editor will be proposed, so that the end-user will be able to create his/her own avatar within the virtual world. In addition to that, the end user will be able to build his/her own environment and placing the objects as s/he wishes, whether for the purpose of replicating their own apartments or creating a new one.

#### *4.2.2.3 Innovation (including comparison with SotA and existing competitors)*

Regarding the SOCIALENERGY project, the proposed solution will go beyond another gamified approach. The goal of the project is not just to introduce new solutions for energy efficiency, but rather introduce an approach, in which the persuasive game will facilitate the change of user's attitudes towards more efficient energy consumption that benefits: a) the user, b) the utility, and c) the energy grid/system. SOCIALENERGY goal is not just to involve regular users in the process of engagement with innovative solutions on the energy market through motivational aspects of the game. Its focus is to introduce a non-intrusive environment, in which the users will change their behaviour towards more efficient energy consumption. Applying the expertise of the leisure market gaming, game development

partner (i.e. NRG) will ensure the long-lasting experience implementing addictive mobile game psychology features like the following:

- Positive reinforcement
- Timeout and craving build-up
- Unlimited game-play
- Social triggering through the sense of pride

SOCIALENERGY game will use the self-determination theory to address the satisfaction of basic psychological needs for relatedness, autonomy and competence. Introducing the "Player Experience of Need Satisfaction" Model in SOCIALENERGY, the game will address competence - the needs of a steady growth, improvement of abilities and skills, efficacy – through levelling of the persuasive game, autonomy – opportunities for action by giving user the possibility to decide on his/her own about the next possible action within the game, but which will have different outcomes in virtual world, and relatedness – meaningful interaction and collaborative approach.

The solutions currently available on the market for gamified energy efficiency come in a wide array of products. With a variety of entertainment channels that can reach the end user, it is nowadays possible to see gamified "energy solutions" in major point of interaction of our life, ranging from mobile phones, PCs and gaming consoles, to social networks, board games or social initiatives.

Current competitors include:
In **Cool Choices**[22], players (and their teams) can earn points by making decisions that save energy. Users are presented with a monthly set of cards that feature actions that promote sustainability. These range from smaller actions like "Turn off the lights" to bigger ones such as "Calibrate your flat panel TV's picture". The bigger the action, the more points the user gets.
**WeSpire**[23] is a customizable platform that helps users reach their goals. These can be energy related, but also related to citizenship or health. Players are encouraged to complete actions by earning points for them. Once WeSpire considers an action to have become "habitual", new actions are unlocked. Through this, players can gain additional levels. To further motivate users, WeSpire also offers teams, leaderboards, achievements as well as social-media integration. Furthermore, the platform features a "return-on-investment" calculator that shows the user the impact of their actions in real-life terms such as "water conserved" or "trees left standing".
**JouleBug**[24] is a free application that aims at promoting sustainability. Users are invited but not required to fill in their profile information to get personalized suggestions. Other than that, there are 94 achievements they can earn by "buzzing" the pin associated to each one. After a certain amount of buzzing, users are awarded the pin in question. Alternatively, users can also earn virtual trophies for their actions. The results are quantified in terms of relevant savings, which are sometimes presented in a humours way (for example: "X stressful days saved by sharing the road with bikes"). Earned pins can also be shared through Facebook or Twitter, but this is optional.

[22] https://coolchoices.com/about/
[23] http://www.wespire.com/
[24] http://joulebug.com/

**The Opower Social Energy App**[25] is a web-based application for smartphones, which was co-developed by Facebook. Users can log in with or without their Facebook. However the non-Facebook version only asks basic questions about energy usage, while the Facebook-version offers the possibility to create a home profile, connect utilities and invite friends. If the user's utility has a contract with Opower, data about energy usage is gathered automatically. Otherwise, users can enter data manually. One of the main features is the ability to compare one's home to other similar homes. Opower also offers recommendations about sustainability, but these are not linked to points.

**Ollie's Club**[26] energy saving games: The "game" educated the player regarding the energy usage of each appliance in the house and how to reduce the energy footprint to a minimum. Although informative, it cannot be categorised as a game, since no actual task is being done by the player apart from reading the suggestions and answering the quiz.

**Domino Game**[27]: The domino game works in a mixed environment, in which the players receive smart plugs to track their energy consumption on the mobile app. The players can compete their usage with other players in the community. The community actually works as a real community of several neighbours working together. The main goal is to decrease the consumption of the energy of each user. SOCIALENERGY game will trump this idea due to the decreased cost of playing the game since we will use already existing Smart devices, whereas DOMINO users have to buy plugs to start playing the game.

**Energy 2020 game**[28]: The energy 2020 game asks the advice of the user in certain scenarios to ensure that the user learns the social, environmental and economical impact of his/her decision in the scenarios. Although this game is quite informative, it does little things to educate the user about the best solution to the scenario and the reason for it apart from its impact. SOCIALENERGY game provides more realistic scenarios (of the player's own home) for the player to know the usage of each object s/he has in his/her daily lives. Education is quite explicit in the SOCIALENERGY game unlike Energy 2020 game.

Although a number of solutions are proposed on the market, its full potential is not yet realized. Thus, some of the competitor games fail to acquire a solid user base as they lack to offer proper engagement and motivation to the user (in fact some of them are gamified solutions of the learning content and not the actual games). On the other hand, others failed to be exploited commercially and were either deleted from the stores or the websites are not reachable:

[25] https://opower.com/uploads/files/US_DataSheet_Social.pdf
[26] http://www.olliesworld.com/club/gamehouse.htm
[27] https://www.dominoenergy.eu/en
[28] http://www.2020energy.eu

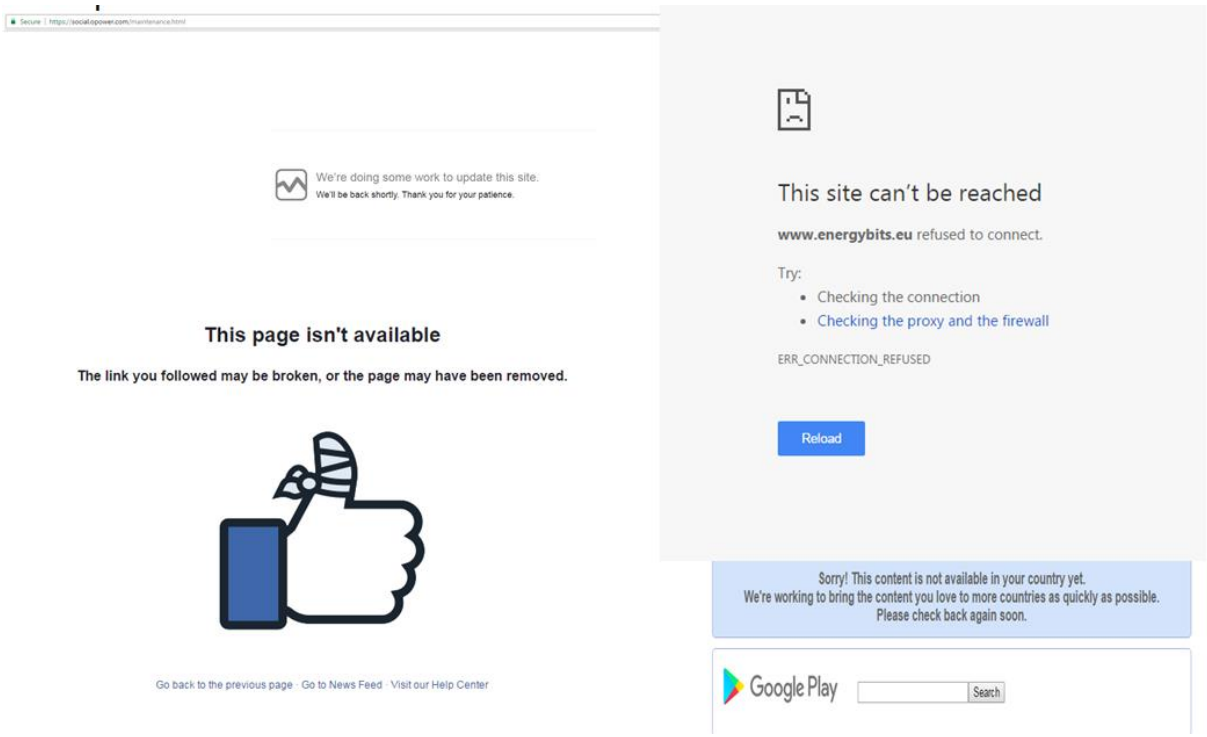


**Figure 4: Competitors' Energy Games not reachable in web and the online stores**

#### *4.2.2.4 Target Group*

The game will target various cohorts of users, specifically the players in energy efficiency market. The diversity of the scenarios will help the energy efficiency companies to help their stakeholders develop a plan based on the game actions, also individuals who intend to gain knowledge about energy usage will be targeted as the knowledge that can be disseminated using the game is huge and immersive to learn, while being engaging for the users.
Just an introduction of smart solutions and smart metric systems is not enough to drastically change energy consumption and therefore reduce CO2 emission. Even though the economical factor of consuming less energy plays a big role, the cost/benefit perception for the end-user stays yet unclear. Therefore gamification solutions, to trigger user's behavior towards considerable consumption of energy have to be introduced to realize full potential of smart grids. Indeed, the International Data Corporation (IDC) estimates that "**by 2016, 60% of progressive worldwide energy retailers will utilize at least one gamified application**"[29].

### 4.2.3. RAT asset

#### *4.2.3.1 Asset Description*

Research Algorithms' Toolkit (RAT) is one of the four SOCIALENERGY subsystems. Its main goal is to provide "intelligence" to the whole system's operation. This is done via the execution of several research algorithms and the provisioning of sophisticated mathematical models upon which the various innovative services of SOCIALENERGY are built. RAT has a technical interface (i.e. API) with the core GSRN platform. Via the GSRN-RAT interface, the RAT receives all social, demographic and personal preferences data for each user and energy

[29] https://www.idc.com/getdoc.jsp?containerId=EIRS04V

community as well as data related with the user's actions inside the core GSRN platform (e.g. number of logins, page views, number of applications used, number of achievements, etc.). Moreover, the LCMS-related score is also acquired by RAT (e.g. number of tips read, number of learning objects read, number of learning activities done, etc.). Then, the ECs' creation algorithms module is able to create and possibly adapt the structure of the ECs when needed. Regarding the RAT-GSRN interface, the GSRN gets the energy costs, energy/money savings per user according to EP involved to be used for GSRN credits' distribution policies. In other words, RAT provides data analytics services to GSRN.

Via the GAME-RAT module, the RAT is able to acquire game-related data such as the score and game status of each player (e.g. which game level has he/she reached?) as well as the player's actions within the game. This can be used as one more parameter to EC creation algorithms' module. Moreover, the RAT provides all the required data models for electric appliances (e.g. A/Cs for heating and cooling, heat pumps and water heaters for bathing, kitchen for cooking, dishwasher, washing/dryer machine for clothes' washing/drying, electric vehicles for going out for work/leisure, etc.). The mathematical equations for the dynamic pricing mechanisms and the user's utility function (i.e. USER SATISFACTION minus COST) is also given by RAT to the GAME in order for the GAME score to be automatically calculated throughout the whole gameplay's duration and lifecycle. These RAT functionalities aim at boosting the GAME's operation towards being commercially sustainable and competitive in the long term. Finally, via the MDM-RAT interface, the RAT can get any type of energy consumption and DR flexibility curves at various time granularities and timeframes based on data from real energy consumers that belong to an electric utility's customer portfolio.

#### *4.2.3.2 Main functionalities*

In a nutshell, the RAT's functionalities are provided like data analytics as a service to the other two main subsystems of SOCIALENERGY, namely the core GSRN platform and the GAME. Especially for the GAME, RAT provides the mathematical equations that derive the game's structure and operation. Some main functionalities that RAT offers to its users are the following:

- Run research algorithms and compare them with state-of-the-art (mainly applicable to the system administrator users and potentially researchers that will use RAT for their experimentations).
- Run simulations to identify/define various business strategies from the utility's/ESCO's perspective.
- Provide data analytics services to utilities/ESCOs such as reporting, recommendations, profiling, virtual energy communities' management, dynamic pricing and calculation of various key performance indicator's related with the online execution of various energy programs.
- Provide sophisticated mathematical modelling to support the operation of serious games related with energy efficiency.

#### *4.2.3.3 Innovation*

The innovative features of RAT are closely inter-related with the novelty of the integrated research algorithms, namely: a) dynamic pricing algorithms, b) EC creation algorithms, c) EC adaptation algorithms, and d) profiling and advanced searching algorithms.

As of (a), various pricing algorithms (or else innovative SOCIALENERGY's energy programs) are running at RAT's side. Apart from several variants of well-known Inclining/Declining Block Rates, Time-of-Use and Real-Time Pricing (RTP) algorithms, a set of novel algorithms will be integrated in RAT, namely personalized RTP and EC-RTP algorithms. Of course, there will also be several hybrid energy programs (EPs) combining features from two or more energy programs. The portfolio of the deployed EPs will also be populated with innovative EPs based on real electric utilities' business needs, which will emerge during SOCIALENERGY's communication activities.

Regarding (b), various EC creation algorithms will be integrated in RAT, that is clustering algorithms that cluster consumers in virtual energy communities. The novelty of this type of clustering is that it is not only made based on consumers' energy consumption curves (ECC)/profiles but also based on: a) their connections in social media, b) their personal habits, character and demographic data, c) their behavior regarding demand response actions (retrieved from GSRN), d) their will for participation/engagement in innovative energy programs and services offered by SOCIALENERGY, e) their learning curve, competences and skills regarding good practices in energy efficiency sector (taken from LCMS and GAME), etc. Via this multi-parametric clustering approach, the ECs that are created can achieve better results in terms of energy efficiency/savings, monetary profits and long-term engagement in good energy efficiency practices. This is achieved via the inherent social-based or else "peer pressure" that takes place among the members of an EC. From an electric utility's business perspective, this could be interpreted to the creation of community EPs targeting several members of a family, a company, an organization, or generally a group of people, who want to share the benefits of community EP.

Regarding (c), the initial "clusterings" from the above-mentioned algorithms or else ECs, can change in case a pre-defined threshold is being surpassed/violated. In particular, a multi-dimensional space is created in which all consumers are depicted via a point that has multiple coordinates. In this graph, all "distances" between all possible combinations of points are measured and thus based on a constraint that is defined by the administrator (e.g. ESCO/utility user), the "clusterings" are created. As the time goes by, the profiles of the energy consumers are continuously changing, so an EC adaptation algorithm should be run in order for the new ECs to be formed. This means that maybe some energy consumers may switch to another more beneficial EC or the administrator or EC leader may choose to add/remove some members from his/her EC. As a result, this sub-module can also be seen as a reporting and recommendation engine, whose results can be retrieved by GSRN and become very useful for the SOCIALENERGY's business objectives.

Finally, regarding (d), profiling algorithms run at RAT's Profiling and Searching Module (PSM). PSM can be seen as a "business analytics" module, which can be very useful for an ESCO user from a managerial point of view. Clustering algorithms based on both static and dynamic information taken from the other SOCIALENERGY subsystems will be integrated in PSM.

#### *4.2.3.4 Target Group*

RAT is designed in a way that can be commercially exploitable as a standalone S/W toolkit, which can be integrated as S/W "plug-in" in other larger S/W platforms developed by

progressive utilities and ESCOs. Within the SOCIALENERGY's context, RAT will be integrated in the SOCIALENERGY S/W platform and its operation will be pilot tested within WP5. The main target groups of RAT are:

- Individual researchers and research groups, who want to use RAT for research and experimentation purposes.
- Progressive electric utilities for business provisioning of new innovative EPs.
- ESCOs for providing useful business analytics for providing personalized marketing services (via context-aware reporting and recommendations) to their customers.

### 4.2.4. LCMS asset

#### *4.2.4.1 Asset Description*

The LCMS is one of the main SOCIALENERGY subsystems, based on a free and open-source software, which provides overall learning experiences to the end users. It will support open standards and interoperability specifications in order to be able to support inclusion of external modules providing additional functionalities. It will provide to target groups like educators, administrators and learners a set of learner-centric tools and collaborative learning environment. LCMS interacts with GSRN, so that GSRN can provide recommendation services to the user according to the educational content that is mostly keen on watching next based on his/her current educational profile and experiences in both SOCIALENERGY's real and virtual worlds. LCMS also inter-relates the "lessons learned" from the GAME with the real-life conditions in order for the user to be able to efficiently interact with his/her electric utility/retailer.

The main assets of the LCMS are learning objects (LOs), implemented as independent courses. Each independent course (learning object) will provide set of learning resources, activities and/or learning assessments, related to achieving some predefined learning goals, in terms of achieving some particular competencies. LCMS will contain sets of available learning resources (e.g. lecture note, video lecture, literature etc.), activities (e.g. forum, assignment, quiz etc.) and assessments.

Competency-based learning and assessment are essential features of the LCMS. The competences are structured according to tailor-made taxonomy of competences in the energy efficiency domain. The user competence taxonomy is represented in the LCMS through SOCIALENERGY competences' framework. Furthermore, competences of this taxonomy are associated with each individual user profile.

#### *4.2.4.2 Main functionalities*

The Learning Content Management System (LCMS) provides the user the opportunity to better comprehend the new concepts in the liberalized electricity markets and inter-relate the "lessons learned" from the GAME with the real-life conditions (cf. GSRN) in order to be able to efficiently interact with his/her electric utility/retailer. In LCMS, the user/player educates himself/herself offline to consolidate the new knowledge about good practices on energy efficiency. The main functionalities the LCMS will offer to its users are:

- Use of one-for-all-subsystems GSRN single user authentication.
- Support the realization of the received by GSRN Individual Learning Plan (ILP).

- Visualize through the LCMS individual Learner Dashboard each user's ILP, their LOs to master (courses and/or learning resources/activities), their assessments and results (achieved grades and competences, awarded badges and certificates, etc.).
- For each LCMS user/learner, create set(s) of LOs (courses and/or learning resources/activities), related to one or more competences included in the user's ILP.
- Competence-based assessment modes of user's knowledge and competences (quizzes, tests, tasks etc.) on the basis of clear and transparent rules for grading.
- Tools for monitoring users progress and feedback and support: notifications when certain events happen in a course, giving extensive reports, regarding various stages of learning history, provide various statistical analysis functions, learning analytics methods related to different events like security, logs and social activity, etc.
- Rewarding system for recognition of user's achievements: badges, printable PDF certificates etc., visualized in the LCMS Learner Dashboard.
- Social communication tools such as user groups by interests or using other relevant feature (competence level, etc), communicate via chat, forum, dialogue, messages, wikis, connect to social platforms (Facebook and Twitter) and post their achievements to social networks.

#### *4.2.4.3 Innovation*

The innovation of the LCMS assets lies in extending the focus for customization and personalization of the educational content to the end-users' needs. Thus, the LCMS will incorporate competency-based education models for broad target audience of users, learning providers, and stakeholders in the energy efficiency domain. For these purposes, a specific energy-efficiency-oriented competence taxonomy will be put in place that can be used further as an outcome to the energy-efficiency domain.

As the role of the LCMS will be to provide the user with the opportunity to better comprehend the new concepts in the liberalized smart grid markets and to inter-relate the "lessons learned", innovative gamification and story-telling approaches will be employed to make learning adapted to the end-users needs.

The competence-based learning will be based on Individual Learning Plans – ILPs, connecting learning content to relevant competences, needed for an user, as measurable outputs of the learning. The ILP is a combination of the necessary LOs and produces an individual time-and-knowledge-bound learning package for every learner at each particular stage of their learning. Some individual learning units (videos, storytelling, etc.) and an indicative learning curriculum will be available for educational researchers and educators in the energy-efficiency domain. Finally, users will be informed about good energy efficiency practices and motivated about actions that may be taken from their side to harvest as many gains as possible from SOCIALENERGY system.

#### *4.2.4.4 Target Group*

The target groups of the LCMS include both project's end-users and other learners, community members, stakeholders and training providers. Therefore we can identify four different target groups of end-users:

- individual learners and learners' groups;
- public energy efficiency stakeholders – NGOs, energy efficiency projects, public-private partnerships;

- private and public energy efficiency companies – utilities, ESCOs;
- researchers, lecturers, and training providers in the energy-efficiency domain.

Therefore, LCMS (as an integrated S/W component inside the SOCIALENERGY S/W platform) will provide meaningful outputs to a broad range of stakeholders.

## 4.3. Individual partner exploitation plans

The following subsections present the exploitation plans on a per partner basis:

### 4.3.1. ICCS

| **ICCS Exploitation Plan** | |
| --- | --- |
| **Description** | **Background/Foreground Knowledge:**<br>The Institute of Communication and Computer Systems - ICCS (www.iccs.ntua.gr) is a research organisation associated with the School of Electrical and Computer Engineering of the National Technical University of Athens (NTUA). It has about 40 laboratories and research units presently active which are established by the implementation of several structural programmes such as Mediterranean Integrated Programme on Informatics of European Community (MIP-Informatics), Public Investment and Special Development Programmes of the Ministry of Education as well as European Programs as TIDE, AIM, RACE, STRIDE, Telematics, ESPRIT, eTEN, ICT, etc.<br><br>**ICCS objectives within SOCIALENERGY context:**<br>ICCS has rich previous experience in finding ways to bring game concepts in non–leisure contexts in order to enhance participants' engagement and achieving a gradual learning curve. In the context of SOCIALENERGY, ICCS will transfer the ICT technologies from its research portfolio by developing and testing already existing functionalities such as dynamic pricing, clustering, advanced searching and recommendation algorithms as well as experience in social network platforms' development. ICCS will lead the development of "SOCIALENERGY's real world" exploiting its know-how from its participation in EU research projects in the converged ICT/energy sector.<br>ICCS will elaborate on the development of the existing VIMSEN DSS toolkit https://github.com/vimsen, which has being developed by the ICCS team to be used by aggregators or Energy Service Companies (ESCOs) to monitor and manage decentralized RES prosumers, via a web-enabled software platform. The platform's implementation is based on virtualization techniques and a wide range of functionalities have been described, tested and validated in the context of the recently finished EU VIMSEN project. Results from various decision-making algorithms show that under different formations of prosumers' groups (i.e. "clusterings") can provide remarkable energy savings and monetary profits for the end users. Moreover, results showcase that the management of aggregated energy resources can outperform state-of-the-art solutions that manage resources at the individual prosumer's level. DSS toolkit is open-source and will be exploited within SOCIALENERGY project's context to integrate new functionalities and scientific algorithms.<br>SOCIALENERGY will play a very important role to evolve and experiment with ICCS existing S/W toolkit to constitute it more complete and able to act as a |

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| | service to a more complex platform such as the existing commercial platform of INTELEN. It is ICCS aim to found a spin off company towards this goal. ICCS will also exploit the research that will be carried out through SOCIALENERGY in order to embed the findings of the project in (post-)graduate courses. In this way, graduate students will have the opportunity to learn technologies relevant with new architectures and algorithms for the development of: i) big data in energy consumption, ii) social informatics, iii) gamification. SOCIALENERGY will also highly enforce the research that Ph.D. students in National Technical University of Athens perform through its exploitation for the statement of new research problems that are vital for the industry and the research community in such a rising topic as energy efficiency. |
| **Exploitation Targets** | **By the end of the project**, the major exploitation targets based on the targeting exploitation opportunities described above are:<br>• Novel publications and active participation in high-quality international conferences and journals.<br>• Research Algorithms' Toolkit, which will be publicly available for use of its basic functionalities. DEMO videos about RAT will be provided to targeted customer segments. A draft business plan will be available at the end of the project as part of the respective SOCIALENERGY S/W platform.<br>• Research e-infrastructure for SOCIALENERGY-related algorithms' and schemes' experimentation.<br><br>**After the project's lifetime,** the major exploitation targets of ICCS will be the following:<br>• Use the SOCIALENERGY project's achievements to elaborate on a new innovative project proposal both at EU and national level.<br>• Continuously enhance the RAT's functionalities based on the feedback from many stakeholders, reviewers and business consultants towards releasing an improved S/W version.<br>• Continue efforts for integrating RAT and respective functionalities to a real commercial S/W platform dealing with energy efficiency issues.<br>• Explore the opportunity of integrating RAT in a well-known research e-infrastructure (national or EU level) towards evolving the platform to a well-known 'experimentation hub' for researchers.<br>• Further explore the opportunities to exploit the RAT as a 'plug-in' module to existing products of various ESCOs starting with INTELEN and NRG partners.<br>• Transfer the SOCIALENERGY background knowledge of 'ICTs for the energy sector' to new innovative project ideas such as energy efficiency, energy behavior analytics, gamification technologies for energy, socially-aware web platforms for sustainable energy management solutions, etc. |
| **Targeted end-users** | RAT is designed in a way that can be commercially exploitable as a standalone S/W toolkit, which can be integrated as S/W "plug-in" in other larger S/W platforms developed by progressive utilities and ESCOs. The main target groups of RAT are:<br>• Individual researchers and research groups, who want to use RAT for research and experimentation purposes.<br>• Progressive electric utilities for business provisioning of new innovative EPs. |

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| | • ESCOs for providing useful business analytics for providing personalized marketing services (via context-aware reporting and recommendations) to their customers. |

| Exploitation Activity | How? | Year | | | | Number of Events | Target Group |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | 1st | 2nd | 3rd | Later | | |
| Publications | To publish scientific papers in high-quality conferences/journals | **2** | **3** | **3** | **3** | >7 | International research community |
| Academic training events/schools | To train BSc, MSc and PhD students | | | **2** | **1** | 3 | Academic students |
| RAT for experimentation | Researchers to utilize the platform as an e-infrastructure | | | **X** | **X** | | Researchers from all over the world |
| S/W toolkit | | | | **X** | **X** | | Release of DEMO videos, open-source code and user manual |
| Organization of international academic events | | | **X** | **X** | | 2 | |
| Academic lectures/talks | | | | **X** | **X** | | Students |
| Spin-off company | To establish a spin-off company providing data analytics as a service | | | | **X** | | Progressive electric utilities and ESCOs |

### 4.3.2. INTELEN

| **INTELEN Exploitation Plan** | |
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| **Description** | **Background/Foreground Knowledge:**<br>INTELEN is a very strong Energy Informatics / cleantech ICT start-up/SME company, founded in 2011 by a core group of promising high-level PhDs and is considered as a National leading company group in Greece and Cyprus in applied research and application of modern IT, Internet Technologies and advanced Algorithms applied to the Energy ICT sector - Energy Information Systems and Services (smart metering, Meter Data management, Green ICT, Smart Grids, etc). The start-up has already won national and World level prizes (National Innovation Award 2007, presented to the Innovation Academy Microsoft 2008). INTELEN's core business is to provide utilities and people with powerful tools that transform real–time energy data into information that makes sense and drives energy consumption reduction and efficiency through real, long-lasting engagement. To do that, Intelen has developed a flagship product: DiG Engagement Platform for utilities' customers, which combines a range of historical, statistical, consumption, behavioural, demographic data with powerful algorithms that enable to identify with accuracy and precision when, where and how energy is consumed, to better segment customers and to generate targeted marketing campaigns based on customer profile. Intelen has a robust experience in energy data analytics and data mining/DR. Intelen's products are cloud-based data platforms that help utilities and businesses to stay on top of building's/users energy consumption. The company provides people with powerful tools that transform real-time energy data into information that makes sense and drives energy consumption reduction and efficiency through real, ling lasting engagement. To do that, Intelen has developed a series of smart algorithms that analyze, process, correlate and disaggregate energy and sensor/mobile/user contextual data. Intelen has also expertise in developing mobile apps and engagement/gamification platforms that can promote energy efficiency behaviour to building's occupants and ensure impressive, sustainable results, all while they are playing fun, engaging games.<br><br>**INTELEN objectives within SOCIALENERGY context:**<br>Intelen plans to develop and to enhance its core platform DiG, by adding/deploying the GSRN product and features to boost behavioural energy efficiency to its clients (existing and new ones). |
| **Exploitation Targets** | **By the end of the project**, the major exploitation targets will be:<br>• Exploitation of the GSRN platform and integration with Intelen's DiG product<br>• Use of additional features on GSRN to enrich existing product features<br>**After the project's lifetime,** the exploitation will be targeted at:<br>• Deploy all additional GSRN modules on DiG platform<br>• Promote GSRN value proposition and know-how to existing Intelen clients (Utilities) |
| **Targeted end-users** | • Utilities and Intelen clients<br>• Smart cities Intelen clients |

| Exploitation Activity | How? | Year | | | | Number of Events | Target Group |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | 1st | 2nd | 3rd | Later | | |
| GSRN platform promotion, case studies | Focused marketing to existing Intelen clients | | X | X | X | | Intelen customers<br>New utilities |
| Industry meetups, events | Promote GSRN concept and do presales in Utilities | X | X | X | X | 10 | Various industrial events that INTELEN is taking part |
| Collaboration with other research projects | Re-using knowledge and/or assets in other projects | | | | X | | |

### 4.3.3. NRG

| NRG Exploitation Plan | |
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| **Description** | **Background/Foreground Knowledge:**<br>Nurogames GmbH, Cologne/Germany is an independent games development company, founded in early 2006 by practised experts of the games and media industry.<br>Nurogames covers a wide range of work experience, comprising high-skill development for mobile and cross-platform games, leisure applications being our main field of activity.<br>The mobile division is specializing in the development, production and marketing of mobile applications for iOS and Android Smartphone and Tablet as well as contents, ranging from innovative applications like games, active screens, instant messaging etc. to pod-cast solutions.<br>Further working fields include the development of **mobile- and/or web-based e-learning games and game based e-learning solutions as well as the realization of online and browser games for an international market.**<br><br>**NRG objectives within SOCIALENERGY context:**<br>Nurogames plans to develop a game, which can be exploited commercially as a solution to educate and engage people in energy efficiency as well as to gain the knowledge and offer other gamified solutions within the energy market. |
| **Exploitation Targets** | **By the end of the project**, the major exploitation targets will be:<br>• Exploitation of the game as a commercial tool in learning/simulating energy expenditure. |

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| | • Optimization of the assets developed during the project to make them exploitable in other commercial projects of Nurogames.<br>**After the project's lifetime,** the exploitation will be targeted at:<br>• Using the developed assets to develop commercial games in different sectors.<br>• Enhancement of the proprietary engine, which will enable faster time to market through the reduction of the development effort. |
| **Targeted end-users** | • Energy efficiency focused companies<br>• Individuals with interest in learning about energy efficiency |

| **Exploitation Activity** | **How?** | **Year** | | | | **Number of Events** | **Target Group** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | **1st** | **2nd** | **3rd** | **Later** | | |
| S/W (Game) | Marketing, flyers of Nurogames. As a gaming publisher to use internal marketing channels to promote the game | | | **X** | **X** | | End-Consumers, Marketing agencies |
| Industrial trade fairs | Attendance of number of industrial events and serious gaming conferences for b2b contacts | **1** | **2** | **2** | **3** | 8 | Third parties, other SMEs |
| Collaboration with other research projects | Re-using knowledge and/or assets in other projects | | | | **X** | | |

### 4.3.4. SU-NIS

| **SU-NIS Exploitation Plan** | |
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| **Description** | **Background/Foreground Knowledge:**<br>SU-NIS is an interdisciplinary research and training centre of Sofia University, affiliated to the Faculty of Mathematics and Informatics. Its main objective is to strengthen the cooperation of reusing research and learning outcomes between the academic community and the industry - SMEs, NGOs, public administration and local community for coordinating the efforts in spreading the ICT wide implementation and use. The SU-NIS has strong experience working on more than 70 international theoretical and applied interdisciplinary research projects in IST and their applications.<br><br>The SU-NIS objectives within SOCIALENERGY context are to exploit SOCIALENERGY's foreground knowledge to enhance its expertise in its ongoing research activities, namely:<br>a) The software framework developed within the RAGE project,<br>b) The Lifelong Competence Development platform developed under the TENCompetence project,<br>c) The digital repository developed under Share.TEC -SHAring digital REsources in the Teaching Education Community, eContentPlus,<br>d) Serious Games Living lab operated by University of Sofia.<br><br>The modular learning units that will be developed in SOCIALENERGY will enhance the existing repository of SU-NIS.<br><br>SU-NIS will also exploit the research that will be carried out through SOCIALENERGY in order to embed the findings of the project in (post)-graduate courses. In this way, graduate students at Sofia University will have the opportunity to learn technologies relevant with new architectures S/W development of: a) social networks, b) serious games for non-leisure contexts, c) lifelong learning material, etc. |
| **Exploitation Targets** | **By the end of the project**, the major exploitation targets based on the targeting exploitation opportunities described above are:<br>• Novel publications and active participation in high-quality international conferences and journals;<br>• New Learning Objects, which will be publicly available for use of its basic functionalities.<br><br>**After the project's lifetime,** the major exploitation targets of SU-NIS will be the following:<br>The purpose of this task is to promote the innovation results of SOCIALENERGY to the scientific community, to the industrial community and to the general public. SOCIALENERGY will follow an open access dissemination model, providing on-line access to scientific information generated in the project free of charge to the end-user.<br>• Use the SOCIALENERGY project's achievements to elaborate on a new innovative project proposals both at EU and national level.<br>• Transfer the SOCIALENERGY background knowledge of ICTs for the energy sector to new innovative project ideas such as energy efficiency, energy behavior analytics, gamification technologies for |

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| | energy, socially-aware web platforms for sustainable energy management solutions, etc. |
| **Targeted end-users** | SOCIALENERGY's LCMS training and knowledge dissemination activities will be mostly focused on researchers, students, communities and industry professionals. These activities will include the preparation of educational material for technical schools and universities, detailed presentations and guidebooks for professionals and on-line project presentations on SOCIALENERGY-related scientific topics publicly available through the project's website.<br>As educational partner for all learning activities aiming at assisting SOCIALENERGY platform's functionalities to be easily understood by its users, SU-NIS will also analyze requirements from an educational and social perspective, mainly by exploiting its participation and interaction with EU RAGE project. SU-NIS will transfer the good practices from RAGE.<br><br>The main target groups of LCMS are:<br>• Individual learners and learners' groups;<br>• Public energy efficiency stakeholders – NGOs, energy efficiency projects, public-private partnerships;<br>• Private and public energy efficiency companies – utilities, ESCOs;<br>• Researchers, lecturers, and training providers in the energy-efficiency domain. |

| **Exploitation Activity** | **How?** | **Year** | | | | **Number of Events** | **Target Group** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | **1st** | **2nd** | **3rd** | **Later** | | |
| Publications | To publish scientific papers in high-quality conferences/ journals | | **1** | **1** | **3** | >5 | International research community |
| Academic training events/schools | To train BSc, MSc and PhD students | | **1** | **1** | **2** | 4 | Academic students |
| Organization of international academic events | | **X** | **X** | **X** | | 3 | International research community |
| Academic lectures/talks | | **X** | **X** | **X** | **X** | | Students |

# 5. Conclusions

Conclusively, the consortium has now reached Milestones 2 and 3, meaning that the consortium has agreed on an initial business modelling and a long list of value propositions that could potentially be offered to targeted customer segments, such as electric utilities, retailers, ESCOs and governmental authorities. The consortium has also clear plans for data management, dissemination/communication and exploitation of project's results. Moreover, at the end of Month 6, all the architecture design and technical specifications work has been successfully finished and all the technical APIs for the interactions among the various subsystems have been agreed among the involved partners. The afore-mentioned achievements and work progress give pace to the core S/W implementation work that has already begun. Step-wise, the actual work schedule plan is the following:

- The core S/W implementation work will take place in the context of technical Work Packages 3 and 4. Partners will work mostly individually on the subsystem, that are responsible during the upcoming 3-4 months.
- Initial S/W integration procedures will take place from M9 onwards, in order for an initial DEMO to be shown during the 1st review in Luxembourg.
- Research work is being undertaken by the academic partners. ICCS works on the dynamic pricing models for the various innovative energy programs (EPs) as well as on the algorithms for EC creation/adaptation and context-aware reporting and recommendations. SU-NIS works on the data modelling for LCMS and the user taxonomy competence framework to identify the structure of the competences that will be directly addressed by the learning objects (LOs) developed in the SOCIALENERGY project. Furthermore, this work will help to assess the end-user's competences and level of proficiency after completion of the specific e-learning activities.
- The two commercial partners are focusing on the business/market analysis to further identify the customer segment's needs and interests and feed back the consortium with specific implementation ideas to be adopted during the S/W integration and pilot testing phase, which will start after M13.

It should also be noted that there will be two (2) updated deliverables regarding the intermediate and final versions of business modeling, dissemination and exploitation of results. The intermediate version (D6.2) will be released in Month 15, while the final version (D6.3) will be released at the end of the project (Month 30).