D 8.5 ENCOMPASS ECOSYSTEM REPORT

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EXECUTIVE SUMMARY

This document is the Deliverable **D8.5 enCOMPASS ecosystem report** which is specified in the enCOMPASS Description of Action as follows:

"*Mapping of relevant actors and stakeholders. Analysis of social, environmental and business requirements, also beyond the two pilots; identification of possible business models for exploitation of enCOMPASS, based on D7.1. An update will be produced at month 36, focusing on the various geographic areas of Europe, starting from the countries of the project partners and outlining possible business plans.*"

The D8.5 deliverable provides the following main contributions:

- Definition of the **actors and stakeholders** and their **mapping** along the sustainability axes of social, business and environmental responsibility, highlighting how an energy efficiency platform positively affects these perspectives. Four stakeholder and actor segments have been considered:
    - **Energy sector players**, including electricity metering and metering infrastructure manufacturers, sensor network providers, engineering and energy management companies, ICT tool vendors, service providers to utilities and software and application integrators
    - **Social groups**, e.g. energy intensive SMEs, NGOs, public regulators and agencies
    - **Public administrations,** including national and European governments and bodies, municipalities, regional and national administration offices, regulators
    - **Residential / Business users**.
- Analysis of the **social, environmental and business requirements**, with respect to the four actor and stakeholder segments mentioned above. The general idea is to see, from a business perspective, how these three pillars of sustainability are relevant for the identified stakeholders. The analysis considers also the following starting points:
    - The preliminary analysis of **regulations requirements** and relevant main policies at the European and national level reported in D8.2 "Technology, market and regulatory watch report"
    - The analysis of **market needs** for the utility companies and the customer groups targeted by enCOMPASS already reported in the Deliverable D8.4 "Intermediate exploitation plan". These needs are reconsidered here in this D8.5 deliverable, with respect to the four stakeholder segments mentioned above.
    - Energy prices for social, economic, environmental trends, affecting residential (households) and businesses related to energy usage and its effects.
- Description of **how enCOMPASS targets the user** from the perspective of social, environmental and business needs (i.e. the three sustainability axes) for a successful exploitation.
    - Exploitation plans related to the individual project assets already reported in D8.1 "Early Exploitation and IPR plan" and D8.4 "Intermediate exploitation plan", along with the identified target customers and users and the relevant benefits for them, **are confirmed** at this stage of the project, with an **extension** regarding the asset "Card game for energy saving awareness" for which an update is provided here in D8.5 with regards to the sustainability axes of social, business and environmental and the relevant stakeholders.
- Updated overview of the enCOMPASS **business models**, that confirms and extends the preliminary model already outlined in D8.4 "Intermediate exploitation plan". A preliminary analysis of the proposed business model based on a "Business Model Canvas (BMC)" methodology is also provided, to be further detailed for the different value propositions, different target segments

and respective business models in the D8.6 “Final exploitation plan” at the final stage of the project.

This deliverable is one of the main outputs of the project task “T8.2 Business modelling and business ecosystem building” and in this perspective it complements, and leverages on, the work already started and reported in D8.2 “Technology, market and regulatory watch report” and D8.4 “Intermediate exploitation plan”.

Final business models will be further detailed in the D8.6 “Final exploitation plan”.

In addition to the above WP8 deliverables, D8.5 has the following main relationships with deliverables of other WPs:

- All the deliverables of WP9 (Communication and Dissemination)

  Indeed, all the activities of WP8 and WP9 run in close interaction with the aim of fostering a fertile environment for the project reception, and to validate and extend the project business reach. Dissemination is recognized as one of the key strategies of the plan, and the business model and sales strategies outlined in D8.4 and D8.5 will leverage on advertising, promotion and social media and communication tools developed in WP9.

- D2.2 “Final Requirements”, D2.3 “Functional system specifications” and D6.2 “Platform architecture and design”

  Inputs from WP2 and WP6, and in particular the functional system specifications and the architecture specification of the enCOMPASS platform produced in these WPs, are necessary technical inputs to the definition of the product and service and therefore of its overall ecosystem and exploitation strategies.

1. INTRODUCTION

The content of this deliverable is organized as follows:

- **Section 2** contains the map of relevant actors.
- **Section 3** contains the needs of the different dimensions of sustainability with respect to energy efficiency platforms.
- **Section 4** provides an explanation of how enCOMPASS targets the needs.
- **Section 5** reports the current business models of enCOMPASS.
- **Section 6** draws the conclusions.
- **Section 7** contains the list of references.

2. MAP OF THE RELEVANT ACTORS AND STAKEHOLDERS FOR A SUSTAINABILITY-ORIENTED ENERGY SAVING AND EFFICIENCY ECOSYSTEM

The relevant actors are presented in this section. Each one is mapped along the sustainability axes of social, business and environmental responsibility, highlighting how an energy efficiency platform impacts these perspectives.

2.1 PUBLIC ADMINISTRATIONS

National and European governments and bodies are responsible for defining a Country's energy policy, thus they play a crucial role in the whole energy efficiency process. Governments do set the energy efficiency goals and also energy efficiency related measures and requirements such as for example the fact that consumers need to be able to access their own energy consumptions data. In Switzerland, for example, the Swiss Federal Office of Energy's objective within the smart-metering rollout accordingly to the framework of the 2050 energy strategy is that almost 80% of the consumers will have access to their consumptions data through an internet based portal by 2027.

Public administration (e.g. Municipalities, regional and national administration offices) plays a dual role in direct and indirect energy savings, usually being a very large employer they can affect the behaviour of a very large amount of people. Public administrations also own and manage a large portfolio of buildings (offices, schools) where energy can directly be saved. Additionally, within those buildings there is an important flow of external people, which can also be influenced by energy saving measures.

Regulators (e.g. Swiss Federal Electricity Commission ElCom in Switzerland) are responsible for monitoring compliance with the Country's laws related to electricity. Energy efficiency platforms as well as high resolution energy consumption data can be used by regulators as an instrument to check whether energy tariffs might impact efficiency in consumption.

2.2 ENERGY SECTOR PLAYERS

An energy saving platform, such as enCOMPASS platform, is an asset that can be placed in the context of its "value chain". At the bottom of this chain we find raw data, generated by the metering infrastructure. The platform elaborates such data and produces added value that becomes of immediate value for the energy utility at the operational level (e.g. user consumption behaviour to allocate power flows). The next upper level is the strategic value of the data for the energy utility to analyse the impact of customer behaviour on its pricing structure or planning future investments in the energy infrastructure. Further up in this chain are multiple actors which include both the public administration, interested in the medium to long term impact of the user behaviour, NGOs, who want to support a smooth transition to clean and renewable energies. At the top level we have the end user himself, who takes advantage of the energy saving platform to navigate through the complexity of a liberalised market with different tariffs promoting different energy consumption styles.

Metering and metering infrastructure manufacturers as well as sensor network providers are located at the bottom of the above mentioned "value chain" of an energy saving platform. Those actors are responsible to deliver reliable measurements and data of both energy consumption as well as environmental parameters. Additionally, they shall guarantee open access to those data by defining standards to be used by the sector.

Software and application integrators shall gather the data and measurements from smart meters and from sensors, process them, and feed the energy saving platform. Very big amounts of data shall be processed and predictive algorithm shall be used in order to provide value-added information to the users.

Engineering and energy management companies, service providers as well as ICT tool vendors can offer to utilities a ready-to-use platform which can easily be branded, personalized, deployed and scaled among the consumers. Additionally, they could offer services like data analysis and consumption evaluation in order to provide feedbacks to utilities or even directly to final consumers (accordingly to business relationships). In this level of the value chain a competition among the companies offering their services and solution is expected. An energy saving platform shall be seen as first step of a more in-deep energy consultancy helping both consumer and service seller's side to assess further improvements.

Power utilities do have the direct contact with the final consumer and thus they are key players in the energy efficiency value chain. Utilities do have access to metering and consumption data of customers and can use them, accordingly to data protection regulations, to better understand their consumer's behaviours and to estimate future energy consumptions and power peaks. An energy efficiency platform is a useful tool to be offered to customers by power utilities, and helps these latter to move from pure energy reseller to service reseller.

2.3 SOCIAL GROUPS

A variety of non-governmental organizations exist, which aim to raise awareness and interest about the need for a wiser energy consumption, and to help consumers (in a general term) to spend less and in a better way. Such groups can be interested in energy efficiency platforms as a mean to pursue and achieve their goals more effectively.

Some examples of such associations or organizations in Europe, which specialized their operation purpose on the support of energy market stakeholders and are also focused to help consumers to spend less and in a better, are reported below:

- In Germany
  - The Verband Kommunaler Unternehmen e.V. (VKU) is the German Association of Local Utilities of municipally determined infrastructure undertakings and economic enterprises. These are companies that provide services of general interest in Germany within the framework of local self-government. Working in the context of an economic system driven by competition, they serve the interests of citizens by maintaining a service structure that counteracts the forces of market concentration and forms an integral part of Germany's social market economy. The VKU is the association for local public utilities, which do not primarily pursue private commercial objectives but are guided by public welfare obligations. In the German democratic system, they operate under local self-administration to serve "citizen value", i.e. to meet the needs of the local community. The type of capital they form and secure is a community-oriented asset." (Resolution of the VKU Executive Committee of 26 February 2008).
    (https://www.vku.de/en/)
  - The Federal Association of German Energy and Climate Protection Agencies (eaD) is the association of those agencies that work daily to implement the energy and climate policy goals in the regions and municipalities. One of the most important goals of the energy and climate protection agencies is to use the energy as efficiently as possible. It is the task of the energy agencies to identify existing potentials and to develop them as economically as possible. This also takes place within the framework of information campaigns and events implemented by the members of the eaD.

(https://energieagenturen.de/)

- The Alliance #efficiency Turnaround is a broad alliance of actors from business and society who want to make energy efficiency the second pillar of the energy turnaround. With its weight in society as a whole, the Alliance wants to attract more attention to this issue. The alliance is not a new umbrella organization or political actor, but a platform for the coordination of independent associations and initiatives. The various industry and interest representatives are given the opportunity to exchange information and positions on the subject of energy efficiency. Further organisations are encouraged to participate in the initiative. Association of Energy Market Innovators (BNE): Market, competition, innovation - BNE and its members are committed to these three elements. After all, continuous development is the key to success in tomorrow's digital and renewable world of energy. For more than fifteen years, the BNE has been representing the interests of grid-independent energy suppliers and energy service companies in Germany. Its members operate on all levels of the value chain: **from electricity and gas distribution to smart energy and other services, right through to mobility. Making sure that new business models get a fair chance is at the core of BNE's work**.

- In Switzerland
  - Pro Natura, Swiss League for the Protection of Nature, the oldest environmental organisation in Switzerland.
    (https://www.pronatura.ch/en)
    One of Pronatura's main objectives is to conserve natural resources and protect nature, therefore Pronatura is also highly involved in all kind of energy saving topics, especially related to renewable energies such as hydroelectric and wind power generation.
  - SES (Schweizerische Energie Stiftung), organization which works for an ecological, equitable and sustainable energy policy. Its strategy promotes better energy efficiency and use of renewable energy resources other than fossil fuels or nuclear power.
    (https://www.energiestiftung.ch/english.html)
  - Energieschweiz (lit. „Swissenergy"), whose program was set up by the Federal Council to promote energy efficiency and renewable energy. The program raises public awareness in Switzerland about energy issues, promotes innovative projects and supports training and professional training opportunities for specialized personnel.
    (https://www.svizzeraenergia.ch/)
- in Greece
  - Greenpeace Hellas, being the Greek partner of the international non-governmental organization for the protection of the natural environment.
    (https://www.greenpeace.org/greece/)
  - WWF Hellas, being the Greek partner of the international environmental organization WWF - (World Wide Fund for nature).
    Its main objectives are:
    (a) the conservation of global biodiversity
    (b) to ensure the sustainable use of renewable natural resources
    (c) to promote the reduction of pollution and wasteful consumption.
    (http://www.wwf.gr/)
  - Hellenic Energy Saving Society is a non-governmental organization which was founded having as its main aims both to inform the citizens and to conduct activities in order to save energy, so as to protect the environment from the gasses, fumes / smog and the waste which are emitted in the process of energy production. Moreover, it is an organization which is engaged in protecting the natural sources so that the latter can be preserved for the generations to come.

(www.hess.gr)

- In Italy
  - Legambiente (League for the Environment), the most widespread environmental organization in Italy – (https://international.legambiente.it)
  - CODACONS, the Coordination of associations for the defense of the environment and the rights of users and consumers,
  - Terranostra, the Association for the agritourism, the environment and the territory promoted by the National Coldiretti Confederation

Many other examples exist through Europe that are not mentioned here, for the sake of brevity.

2.4 RESIDENTIAL / BUSINESS USERS

Residential users need to be involved in the use of the energy saving platform. The main goal for residential users is to get them conscious of their consumptions and habits regarding energy and energy saving, and make them change such habits towards lower energy usage. Many people do not have any idea about how much energy is consumed within their household, the related costs and how they can have a different impact without affecting their comfort levels. Energy saving platforms shall therefore illustrate in a simple and direct way those metrics (kWh and money) making them develop a sense of awareness and decide to change their habits.

Business and industrial users might have large energy consumptions and are especially interested in achieving energy savings that can result in a reduction of energy costs (e.g. reducing consumption peaks by shifting some loads). Therefore, knowing their consumptions in a detailed way as well as receiving feedbacks and analysis might help them improving the energy efficiency.

3. NEEDS - ANALYSIS OF SOCIAL, ENVIRONMENTAL AND BUSINESS REQUIREMENTS

In this section, the requirements for a successful exploitation of the enCOMPASS platform are considered. The illustration is divided in three main types of needs (social, environmental and business).

Needs or requirements of different stakeholders are set by both personal agendas and national or even international regulations or political agendas (e.g. Paris agreement, EU policy framework for energy- and climate for 2050, Germany's Climate Action Plan 2050, etc.) as already reported for European and national initiatives and regulations of the pilot countries in section 2 of the Deliverable D 8.2 "Technology, market and regulatory watch report".

Deliverable D8.4 "Intermediate exploitation plan" already focused on market needs of the various stakeholders of the encompass approach, that were defined in the deliverables D2.1 "Use Cases and Early Requirements" and D2.2 "Final Requirements". Based on the results of the section 3.1 of the former deliverable D8.4, the needs are reconsidered from a more general point of view in the following sections.

The relevant actors and stakeholders enCOMPASS is addressing are reported in section 2. Based on these reported actors and stakeholders the analysis of various needs has been done. The affected players are concentrated in groups. These are:

Table 1: Groups of relevant stakeholders

Public administrations	**General public**	**Energy market actors**	**Social groups**
• International authorities • National authorities • Local authorities • Municipalities	• Residential Users • Business Users (industrial, commercial) • Social groups	• Utility companies • Metering manufacturers • Engineering companies • Energy management companies • Consulting companies • Service providers • ICT tool vendors	• Educational facilities • Cultural facilities • NGOs

3.1 SOCIAL NEEDS

Social needs depend on various cultural, social, environmental and even political factors. The most substantial drivers of social needs are [1]:

- Cultural affiliation
- Social integrity
    - original income level
    - demographics
    - personal preferences
    - behavioural factors
    - education
    - availability of information
- Regulatory obligations
- Social habits

These factors do influence the personal behaviour and thus the personal needs of every single stakeholder, not only for the enCOMPASS project, but in general. Related to the enCOMPASS goals the following needs can be extracted from social behaviour drivers, as listed above:

Table 2: Social needs related to energy use and its effects for different stakeholders

Stakeholder	Social needs
Public administrations	• Inform about energy related topics • Gain knowledge of specific energy efficiency potential and pass on to general public • Help members of general public to fulfil their energy needs/demands • Respond to demands of general public • Play role model function for energy goals (e.g. decrease energy expenditure, reduce CO_2 footprint, obey to political administration regulations for energy efficiency)
General public	• Gain information/knowledge about the context of energy supply and the own demand • Know own energy efficiency potential • Ensure long-term safeguard of living-standard for later generations
Energy market actors	• Keep fulfilling their mission in terms of ensuring access to energy to businesses, households, etc. – that is, ensure energy as a primary resource is available with continuity in order to support daily life and activities at all levels of society • Correctly tailor production and offer, reduce costs, eliminate wastes, build long term action plans ensuring their business is sustainable in the long run • Strengthen the relationship between local utilities and the citizen /customer (transition to "customer-centric" business)
Social groups	• Address and secure natural resources of humanity and justice for all living beings • Drive change in the efficient use of energy • Gain knowledge of specific energy efficiency potential and pass on to general public • Help members of general public and representations of market stakeholders to fulfil their needs/demands • Acquire knowledge for advocacy towards the regulators

3.2 ENVIRONMENTAL NEEDS

Since the first discussions about the fast warming of planet earth in the 1990 years, renowned climate researchers are convinced that the global warming is caused by humanity. In the climate agreement of Paris in 2016 196 nations committed themselves to protect the environment and fight against the climate change. In fact that means, that fossil energies must be completely abandoned by 2050, because these are the easiest to reduce. [4]

Estimations of the impact on global emissions of the current nationally set reduction targets, as submitted under the Paris Agreement, would lead to global greenhouse gas emissions of 52-58 Gt CO2eq per year in 2030. Paths reflecting these targets would not limit global warming to 1.5°C, even if they were enhanced after 2030 by very ambitious increases in the scale and targets of emission reductions. [5]

The overall objective must be to avoid the negative consequences of climate change for sustainable development, poverty eradication and gender equality efforts. According to the Intergovernmental Panel on Climate Change, limiting the risks of global warming by 1.5°C in the context of sustainable development and poverty eradication requires systemic transitions that can be achieved by increasing investment in adaptation and mitigation, policy instruments, accelerating technology innovation and behavioural change. [5]

Considering these facts, the following environmental needs appear related to the encompass approach:

Table 3: Environmental needs related to energy use and its effects for different stakeholders

Stakeholder	Environmental needs
Public administrations	• Fulfil international/national regulations regarding energy efficiency, consumption, greenhouse gas emissions, etc.) • Ensure energy supply in the city/community • Lower energy wastes and CO2 footprint for the greater good of current and future generations of citizens
General public	• Responsible use of resources/energy • Energy supply is not at risk • Healthier environment due to lower CO2 footprint connected with energy wastes and energy production activities
Energy market actors	• Prevent / slow down global warming through operation of renewable energy power plants and solutions to increase energy efficiency Improve the current use of resources/energy to limit waste and increase efficiency Implement and use energy usage prediction models to ensure no cut offs in energy supply under any conditions
Social groups	• Address and prevent natural disasters • Protect the natural resources of nature for all living beings • Prevent and mitigate the negative consequences of climate change

3.3 BUSINESS NEEDS

Regarding needs of business matters, the most obvious factor is the price for electricity. Observing the development of the electricity price for end consumers, it is noticeable that this has been rising steadily for several years. It is estimated that the price will not fall significantly in the future. Comparing the prices of EU-28 (cp. Figure 1, left), it is obvious that the financial burden for energy applications in residential homes is continuously rising. Thus, the main need for residential end users is the understanding of energy pricing and consumption to get best transparency in financial matters.

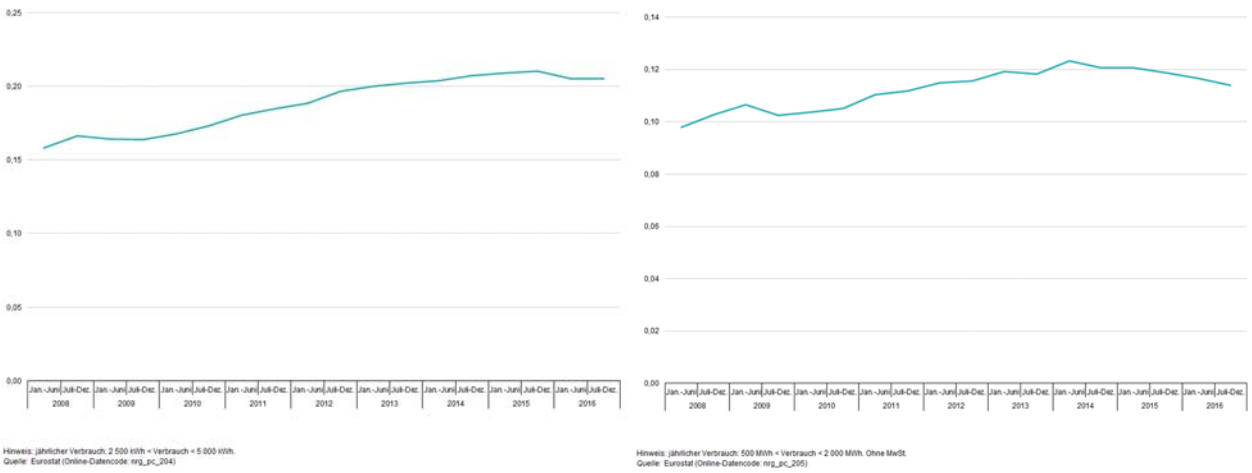

Figure 1: Electricity price by type of user in EU (household – left; industry – right) [2]

Industrial customers also experience a long-term increase of electricity costs (cp. Figure 1, right). Although the stock electricity prices were lower in 2016 than in 2014, the price trend keeps growing (cp. Figure 2).

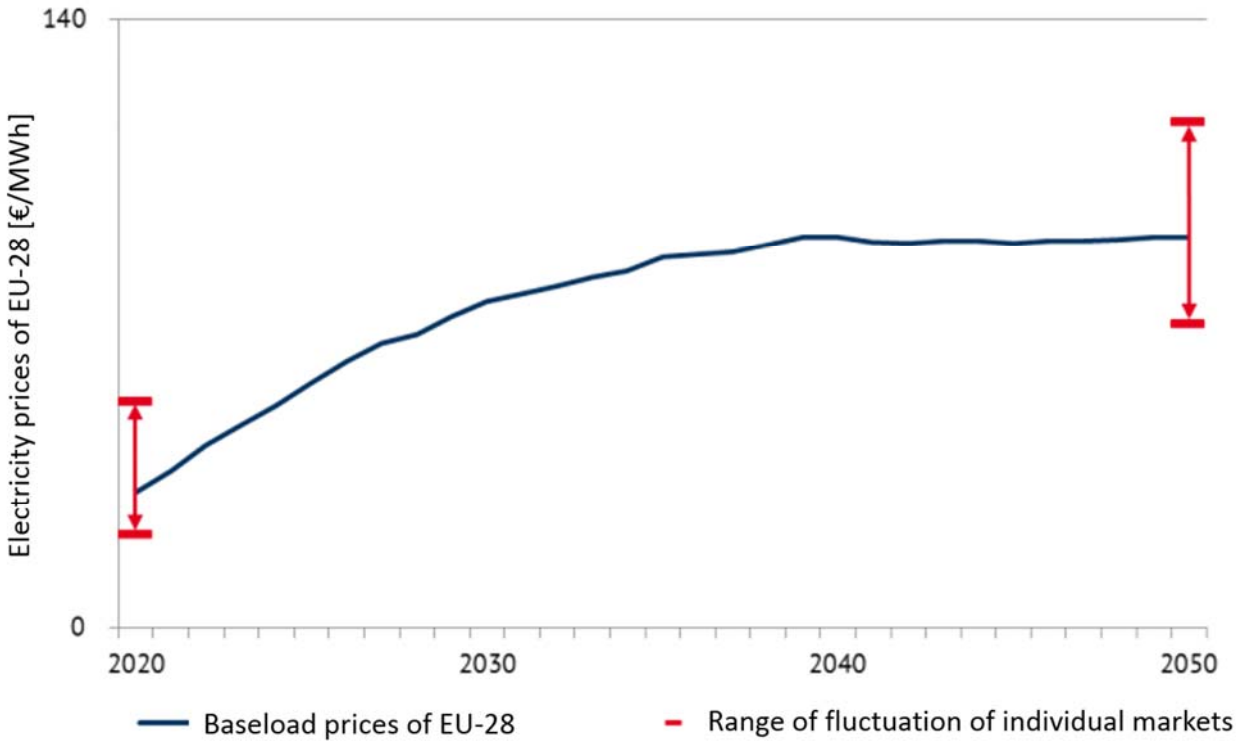

Figure 2: Forecast of energy prices of EU-28 until year 2050 [3]

Deliverable D8.4 already reported about customers' expectations from energy providers' offering services and products. In the focus of the customer is simply the personalised advice on energy bills, energy consumption and use of energy. Out of these expectations the special requirement for players of the energy sector, more precisely utility companies and supporting third party companies, results in meeting the customers' expectations.

To achieve this, especially small utility companies need a platform to set up their business models without having to develop everything by themselves.

For social groups like NGOs it is important to secure their budget to continue operations. Thus, they have to campaign and gain followers, willing to support the organisation. It is important to support solutions and projects that underline the meaningfulness of the social group's activities.

Table 4: Business needs related to energy use and its effects for different stakeholders

Stakeholder	Business needs
Public administrations	• Monetary savings / financial situation • Cost effectiveness
General public	• Monetary savings / financial situation • Cost effectiveness
Energy market actors	• Persisting in a market getting more complex and rising competitors Re-source use • Monetary savings / financial situation • Meet customer expectations on services and products • Find partners/assets to create new business models using IoT platforms
Social groups	• Secure the financing for the long-term operation

4. HOW ENCOMPASS PLATFORM SOLVES THE NEEDS

4.1 ENCOMPASS VS. SOCIAL NEEDS

This section analyses how enCOMPASS targets the user from the perspective of social, environmental and business needs for a successful exploitation.

Energy is part of life in such a way that people often use it without thinking about the sources and impact on the environment. In addition, energy usage is directly connected to human progress, in a way that on a world scale simply reducing the use of energy might even hinder such human progress. As a consequence and to avoid major disruptions to it, but also in order to prevent climate changes and other tragedies which the planet and humanity cannot afford (energy extraction, transportation, and use can have negative consequences to the health, environment, and economics of a society), awareness of the economic, social and environmental cost of using energy has become a permanent need: the only viable option is consuming better, i.e. rationalising and optimising the way energy is used reducing waste to a minimum.

Although domestic smart metering has been introduced to consumers, it is still not easy for them to know how much electricity they are using. From this perspective, streamlining energy use requires changes to the very fabric of society.

Energy use by people and businesses has been considered a technical problem rather than a social one, as most of the energy saving platforms currently existing on the market approach the social dimension of energy use in very different ways or rather do not consider it as central in their approach. A common outcome of various research shows that consumers are unable to assess whether their own consumption is low, average or high.

People are willing and able to adapt their behaviour to energy-saving lifestyles if given the necessary feedback, support, and incentives. While detailed feedback can raise people's awareness of their consumption, community influence, which is recognized as an important factor in energy-saving initiatives, has the potential to drive residents towards a more persistent behavioural change. Social habits can motivate people to question their behaviour if they discover it is not "socially desirable".

enCOMPASS enables consumers to know their electrical consumption and **stimulates behavioural change** at social level, by use of innovative elements, such as user-friendly visualizations, context-awareness, adaptive gamification, context-aware energy saving recommendations, incentivizing awareness on the base of individual preferences such as **preserving the environment and saving money**.

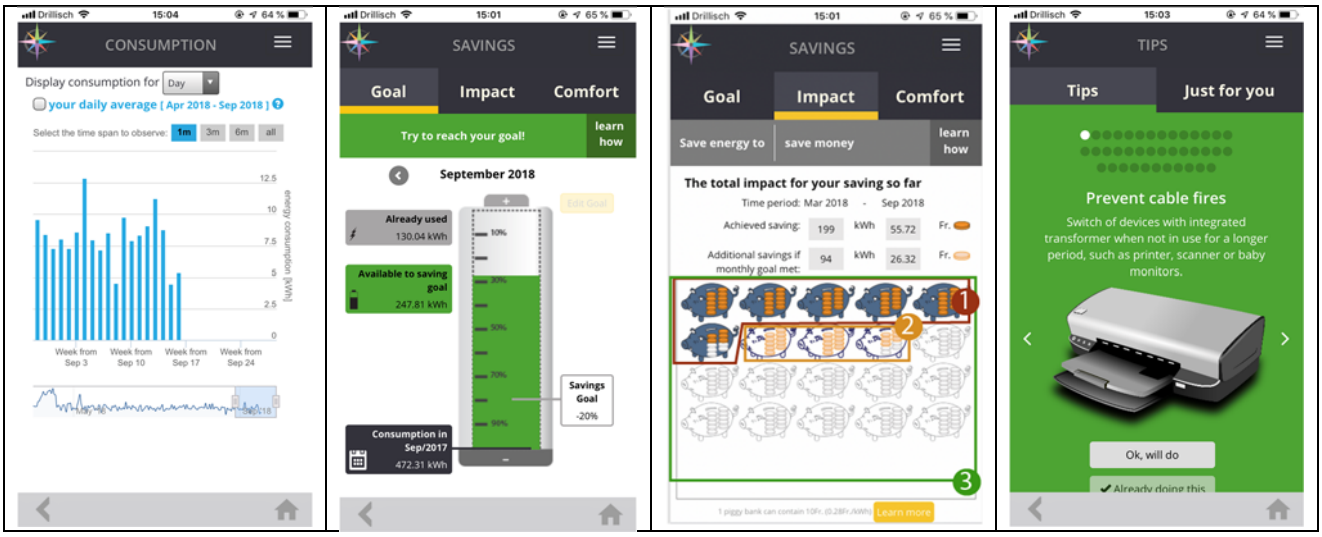

Figure 3: examples of how enCOMPASS visualizes consumption data and turns them into actionable insights and recommendations towards energy saving

Personal recommendations on energy saving actions and comparisons with the corresponding electrical consumption in the past, before applying the energy saving actions, allow consumers to gain awareness of the impact of their decisions and choices, in order for them to take steps to reduce their electricity use and carbon footprint.

Another distinguished feature of enCOMPASS is the direct targeting of schools, with an **innovative game-based approach to support the education towards sustainability**. Educational programs throughout Europe at all levels, but especially at the primary and secondary level, already address the subjects of climate change and sustainability. enCOMPASS integrates into such European educational approach with a novel perspective, based on the use of both traditional games and digital games, to provide an engaging and informative experience, which can effectively complement the traditional activity of teachers in class. The game rules are designed in such a way that energy conservation is promoted as a **collective and cooperative effort**, which strengthens the social ties and the sense of participation to a collective effort towards a more sustainable future.

Figure 4: the enCOMPASS FUNERGY card and digital game is designed to promote energy conservation as a collective effort of the society

As shown in the previous chapter 3 , the drivers of social needs span cultural affiliation, income level, personal preferences, education, availability of information, regulatory obligations or social habits such as the

level of acceptance of peer-group pressure. In the following, we present how enCOMPASS platform influence consumer behaviour from the perspective of these factors.

4.2 enCOMPASS vs. Environmental needs

A critical fact regarding environment is that most of energy is generated from burning fossil fuels like coal, gas or oil that result in the accumulation of carbon dioxide in the atmosphere so contributing to global warming and triggering changes in surrounding environment. Therefore, consuming less power translates into reducing the amount of toxic fumes released by power plants and conserving the planet natural resources.

As consumers improve the energy efficiency of their homes or businesses, the need for electricity decreases and thus rely less on carbon-intensive power plants. This reduces household or business demand from the power plants, which in turn benefits the environment by reducing their carbon dioxide emissions.

In order to reflect the impact on energy use over the environment, enCOMPASS uses visual metaphors that are easy to understand and fun to explore to translate energy consumption data from the abstract, numeric consumption data into a semantically understandable format for the users to making them aware of the need to save the environment and engaging into reducing greenhouse gas emissions.

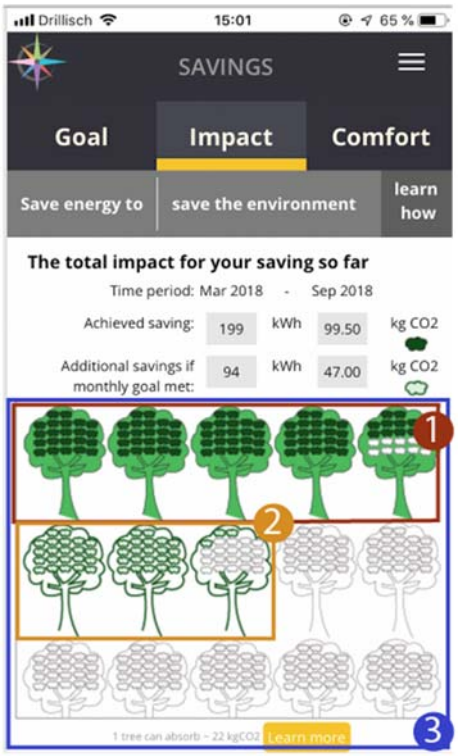

Figure 5: enCOMPASS visualization of energy saving impact on the environment

The next level of awareness addressed by the enCOMPASS platform regards the occupants of public buildings and schools. As fulfilling international and national regulations regarding energy efficiency, consumption and greenhouse gas emissions must be a constant objective of the public administrations, education is a key factor for achieving.

4.3 enCOMPASS vs. Business needs

Where once energy was seen as a commodity and merely something organisations needed to run efficiently, today a well-thought-out and managed energy strategy can help businesses increase profitability, win new customers and derive genuine competitive advantage over the market. This can be performed through reducing energy consumption through consistent actions.

The permanent background context shown in the previous chapter is that the business electricity prices often fluctuate reaching to high electricity bills translating in higher business cost– especially if using variable business electricity tariffs or if the business is SME with little financial flexibility. Being able to take proactive measures helps businesses to avoid higher unpredicted costs. enCOMPASS platform is a holistic solution that not only can reduce business costs but can introduce environmental solutions to help them meet their sustainability goals. The functionality delivered to public buildings and school occupants includes:

Context-aware energy saving recommendations

Collaborative recommendations help to find other users with similar characteristics, contexts and energy saving actions. The **building administration interface** provides **building managers** with privacy-aware insights into the energy consumption of user types, groups and rooms, offering information for indoor climate adjustments that save energy, and for the adjustment of the incentive model such as the point system and target goals.

Adaptive gamification for energy efficiency

enCOMPASS offers a rule-based engine that maps actions into achievements and assigns rewards. Actions are abstract occurrences that can be emitted by a variety of sources, such as building sensors (e.g. switching off an appliance, reaching a set temperature, saving a set amount of energy), and users (execution of a recommended action, in-game actions, manual data input, etc.). The rewards that can be offered by the building administrators can be immaterial (scores, badges) or material (coupons, redeemable goods).

Educational games of the schools and for the families

Education towards sustainability is a business need that cuts across multiple sectors. On one side, educational institutions are in search on new tools to innovate their teaching methodologies and engage millennials, who are more and more in need of ICT-supported educational tools.

On the other side, utility operators are seeking new routes to engage and retain their customers, especially in open liberalized markets, where competition will require operators to transition from energy vendors to all-round service providers.

enCOMPASS fits these business needs with it FUNERGY hybrid game, which couples a traditional card game and a mobile phone companion app. On one side, FUNERGY can be seen as an innovative game concept targeted to the educational sector, as a complement to the traditional teching materials on climate change, ecological issues and sustainability.

On the other side, FUNERGY can be an asset of a utility company, to enrich its Customer Relationship Management offer with a gamification application and an educational game that can help convey the sustainability values of the brand and of the company.

5. AN OVERVIEW OF THE ENCOMPASS BUSINESS MODELS

In this Section we first provide an overview of the **business model of the enCOMPASS platform**, which confirms and extends the preliminary model already outlined in D8.4 section 4.1. This business model is a model that elaborates on how enCOMPASS solution can create and deliver value to the potential stakeholders described in Section 2, and how they can get remunerated for doing this. The analysis of this Section is based on a well-known approach named "Business Model Canvas (BMC)"[1].

Second, the section contains also preliminary business model considerations about the **exploitation of FUNERGY, the card game developed by enCOMPASS**. Given, the different nature of such an asset, which is a hybrid game conceived to be exploitable both together with the enCOMPASS platform and without it, the asset is treated in a separate section.

In accordance with this approach, nine elements, being the driving force towards success, shall be specified as follows:

- Customer segments
- Key Partnerships
- Key Activities
- Revenue Streams
- Value Propositions
- Channels
- Key Resources
- Customer Relationships
- Cost Structure

In the following, we provide more details about each of the above-mentioned elements.

Customer Segments

This element is specified by answering the following basic questions:

- For whom is enCOMPASS creating value?
- What are the customer segments?

The customer segmentation is presented in Section 2 of this deliverable where actors and stakeholders have been described.

Key Partnerships

This element is specified by answering the following basic questions:

- Who are the key partners?
- Which key activities do the partners perform?

This element defines the network of partners that make the business model work. Within the implementation framework of the enCOMPASS platform, this network comprises the enCOMPASS consortium. It is noted that key/main partners, having the respective copyrights of individual assets, have been defined in Section 2 of D8.4. In addition, table 7 in section 4.2.1 of D8.4 lists all contacts with potential partners for possible exploitation of the platform, as identified today.

[1] More details about the BMC approach can be found at the following link:
https://en.wikipedia.org/wiki/Business_Model_Canvas

Key Activities

This element is specified by answering the following basic questions:

- What are the activities enCOMPASS performs every day to deliver its value proposition?

The Key Activities are those enCOMPASS shall engage in to make its business model work. enCOMPASS approach, being a platform, shall essentially engage in the following activities so as to be considered as a sustainable solution:

- Platform and software support and maintenance.
- Mobile applications support and maintenance.
- Customer support.

A more detailed analysis of the activities undertaken by enCOMPASS approach can be found in Section 4 of this deliverable.

Revenue Streams

This element is specified by answering the following basic question:

- What are the main applicable revenue streams?

It is worth referring that enCOMPASS solution comprises data visualizers, data management components, software engines, algorithms, software services and hardware meaning that different distribution approaches as well as revenue streams may be applied. In accordance with the conclusions of Section 4 of D8.4, the developed assets (excluding the hardware components for which different distribution channels will be followed) will be mainly distributed through two methods, namely: a) the Software as a Service (SaaS) method and b) the Platform as a Service (PaaS) methods.

Additionally, in Section 4 of D8.4, a preliminary analysis of the applicable revenue streams (subscription, royalty, license) that can be used for the enCOMPASS approach, has been performed. In general, it is important to point out that the revenue streams concern the strategic way that a company seeks to be paid for delivering its products and services. In this deliverable, additional revenue streams are depicted in Figure 6:

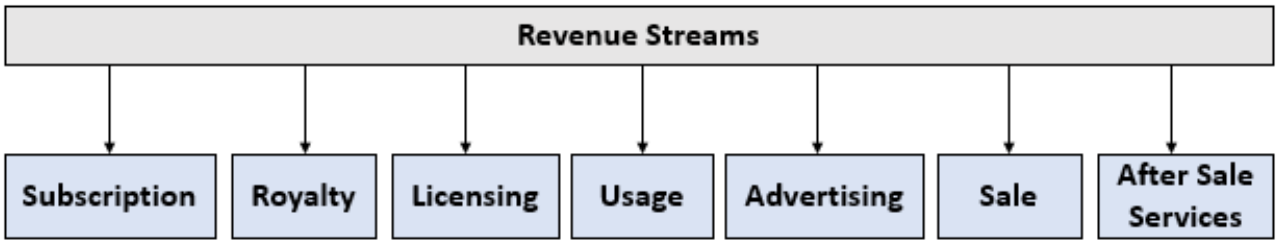

Figure 6: Core revenue streams

Subscription: will be used for the software services and data management components, whereas algorithms, data visualizers and software engines will be procured via royalty or license payments[2]. In the former case the revenue model will be based on the actual usage of the platform and the selected assets. The hardware components will be sold as products through the utilities companies. It is noted that, advertising can also be used as revenue stream, mainly for the case of the "MyEnCompass" application.

[2] For assets for which a subscription is required, it would be optimal in marketing terms, a free trial to be offered in order the users to get familiar with the conceptual and technical aspects.

The enCOMPASS platform can be provided in 2 versions the "Core" platform version and the "Extended" one as further described in D8.4. Each potential customer target group can choose the version that more accurately meets its needs.

The selling process includes two individual phases as shown in Figure 74. Notably, the most critical point is for enCOMPASS consortium to come in contact with potential utilities companies that are willing to purchase the products/services and they can effectively promote the enCOMPASS solution to wider marketplaces.

It is clear that the role of the utility companies is rather crucial towards the successful commercialization of the total solution.

On one hand, in both phases, both the "Core" version and the 'Extended" one can be available for purchase depending on the preferences of each customer group (either being a utility company or an end user) but, on the other hand, taking into account the market segmentation (see Section 2) and the respective needs (see Section 3), customized versions may be created.

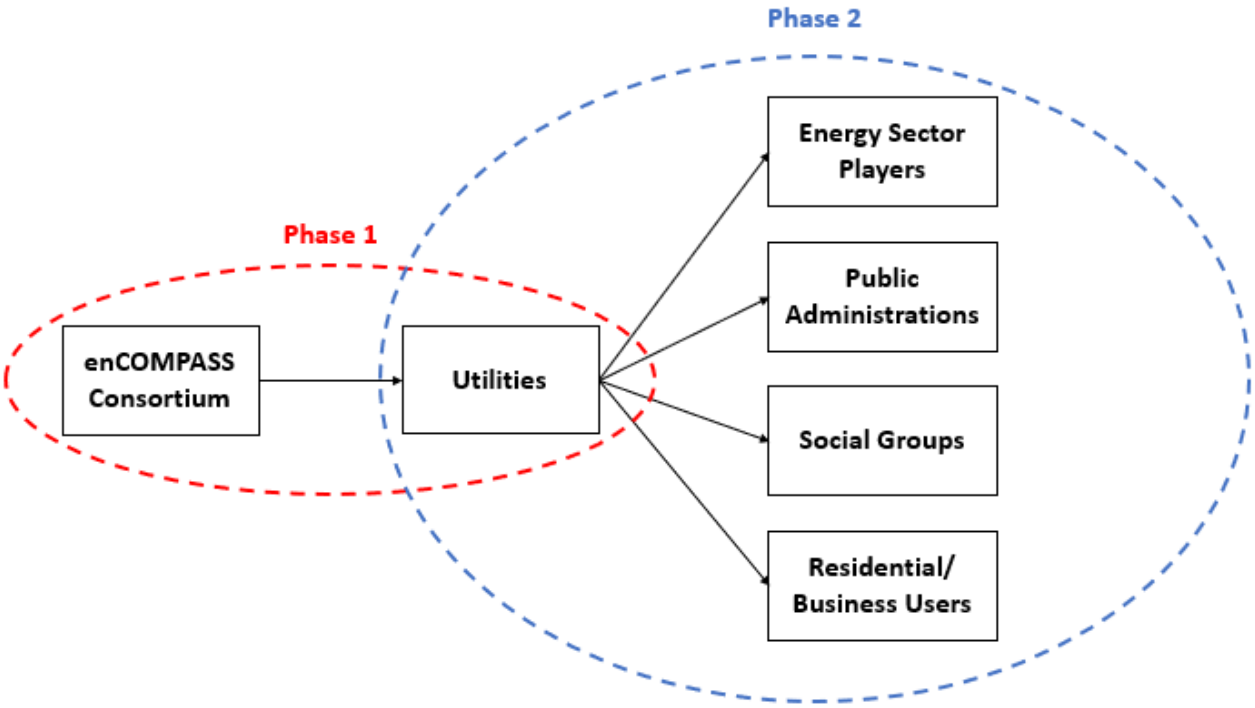

Figure 7: Phases of the sales process

Details about possible customized versions of the platform will be available in D8.6 "Final exploitation plan".

Value Propositions

This element is specified by answering the following basic questions:

- What is the value enCOMPASS delivers to the customers?
- What are the needs that enCOMPASS platform addresses?

A value-creation model shall be specified. This comprises first identifying the customer segments (see Section 2) and, then, the offering that will add value for them.

This added value is of crucial importance, since attracting customers and making sales, has to truly solve a significant need (see Section 4) for a well-defined customer segment. In the full competitive markets the value added services are referred as “the key point for the successive commercialization of a product or a service”. A more detailed analysis of the existing competitive solutions can be found in Section 4 of D8.2.

Taking this into consideration, we would like to mention that the value proposition and the competitive advantages of the enCOMPASS platform are the following:

- **Offered Service**: enCOMPASS offers advanced consumption visualization, coupled with gamified behavioral stimuli, to an extent not offered by any of the competitive platforms. Thanks to its multi-faceted energy saving impact visualizations, enCOMPASS will be able to engage customers exploiting different kinds of motivation: economic, environmental and even using forms of edutainment fostered by learning materials and gamification stimuli.
- **Communication with users**: enCOMPASS uses an extremely varied spectrum of communication channels to engage and retain customers, including e-mail, mobile notification, and gamified competitions.
- **Installation of home device(s)**: enCOMPASS is designed to be device-neutral. It works with any smart meter and with ambient sensors of multiple third parties, connected with a variety of network infrastructures.

Channels

The Channels element reflects how enCOMPASS aims at delivering the developed solution to its customer segments. The principal promotion channel that can be exploited is the utilities companies. These companies can promote the enCOMPASS solution through their marketing departments using respective marketing strategies and promos.

Key Resources

An analytical description of the developed assets can be found in Section 2 of deliverable D8.4. For enCOMPASS, core resources will likely be human and intellectual assets. Intellectual resources include patents, copyrights, licenses, and customer knowledge.

Customer Relationships

This element defines the type of relationship enCOMPASS tends to establish with its customers segments. In this context, it is rather important for customers to have the choice to contact the responsible administrators (either the ones of enCOMPASS consortium or the ones of the respective utility company) at any time prior to or after the purchase and make the contact channels diverse and accessible: via e-mail or phone.

Another specific approach to customer relationship that can be implemented within the enCOMPASS solution is that of client care workers. This approach can be primarily deployed towards dealing with SaaS customers.

An additional customer relationship is the self-service. This type of relationship is often implemented for the B2C client model (utility company to end users). Except for automated updates and onboarding guidance, the utility company does not usually communicate with the end users in this case. Utility companies can draw on a self-service model that provides end users with an onboarding guide and a Help Center with FAQs. In some cases, end users are free to directly contact support via phone, chat, or e-mail.

Cost Structure

The costs that shall be considered for the enCOMPASS commercial version are mainly the support costs related to handling customer requests and retaining the audience and costs corresponding to human resources required for the further development and maintenance of the assets. The full costs structure will be defined in the final exploitation plan (D8.6).

5.1 FUNERGY BUSINESS MODEL

The enCOMPASS project has identified an original asset with strong exploitation potential: the FUNERGY game.

The global board games market's CAGR is expected to be close to 23%, in the period 2018-22 [8], mostly driven by the increasing demand for board games among millennials. With the increasing number of millennials preferring playing board games, such as Monopoly, Risk, and Scrabble, for socializing purposes, game-based cafes and bars have started appearing and are experiencing increasing appeal to users of all generations, but especially on millennials.

One trend in the market is growing developments of **hybrid games**, which feature digital apps based on board games connected to the same gameplay. With the massive diffusion of smartphones, board games producers have started developing mobile phone applications based on board games. Also, companies in the board games industry are exploiting various new digital technologies to develop board and card games equipped with a mobile applications, as a complement to the gameplay [8].

EnCOMPASS is harnessing this global trend, with a specific focus on the specialized market of hybrid games for education towards ecological issues and sustainability, target to schools and families.

FUNERGY fits perfectly into this business trend and will **pursue the deployment of hybrid games for education towards sustainability.**

The key idea of the business model of KAL, the producer of FUNERGY and of DROP, another successful prototype board game developed in the context of the FP7 SmartH2O project, is to launch a European line of hybrid educational games dealing with socially-sensitive issues, such as water and energy conservation.

The two cards games developed during the SmartH20 and enCOMPASS projects could be used as the starting titles of a line of educational games, to be distributed in the schools, toy stores and board game bars throughout Europe.

Figure 8: FUNERGY and DROP could become the forerunner of a European hybrid game series addressing also socially-sensitive topics

The business model to achieve such an objective is quite straightforward:

1. DROP is already available and is used as a sort of example of the quality of the "line", to establish commercial agreement with distributors in different countries.

2. FUNERGY is shown to test audiences, such as those attending the most important European game fairs, to explain both the enCOMPASS project goals and the purpose of the new game line, during the projet lifetime and the game development phase.

3. Because DROP is already available, it can be offered as the starting title of the line with, a production date scheduled around 3Q 2019.

4. Funergy will be printed as the second game of the line, in the 1Q 2020

5. Other games, not necessarily developed during future European Projects, will be developed further to complete the line.

Because both games are 100% language independent, they can be offered with multi-language rules, helping the potential distributors starting with small quantities in every country.

6. CONCLUSIONS

Previous sections broadly highlight both the complexity of the scenario and the multiple aspects to consider in order to drive changes in energy usage. Despite such complexity, it becomes clearer and clearer that en-COMPASS can effectively address all needs highlighted in the different target segments, stakeholders and actors and eventually drive the necessary change as of energy sustainability at all levels considered.

Final business models and exploitation plans will have to consider such complexity and articulate strategies and actions subsequently, focusing on the different value propositions and different target segments. The D8.6 “Final exploitation plan”, due at the end of the project, will confirm the exploitation plan, the route to market strategy and pricing model(s).

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