

## **D1.3-C: Requirements analysis, specification and evaluation**

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## **Summary**

*The requirements Analysis specification and evaluation (Release 2) is a public document delivered in the context of WP1, Task 1.3: Specification and evaluation of customer, end users requirements and barriers with regard to requirements of the eDIANA system, based on analyses of documents, reports and interviews with representatives of the different stakeholders that could play a role in the energy efficiency in buildings field.*

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## **Abbreviations**

eDIANA	Embedded Systems for Energy Efficient Buildings
iEi	intelligent Embedded interface
MCC	Macro Cell Concentrator
CDC	Cell Device Concentrator
SW	Software
PC	Personal Computer
CE	Consumer Electronic
UI	User Interface

## **Introduction**

This deliverable establishes the requirements for the eDIANA system, it contains the requirements from the viewpoints of all the major stakeholders (Construction companies, Building owners, Installers, Architects/designers, Appliance manufacturers, Energy retailers and Consumers, all phases of usage (installation, daily usage and dismantling) and all system components (Monitoring and measuring systems, Control and actuation systems, Generation and storage control system, Cell user interface, Cell level concentrator, MacroCell level concentrator), when needed a differentiation is made between office and consumer usage of the system.

This document is intended for all consortium members but could also be used by other parties that want to be inspired on what a system like eDIANA could do.

In deliverable 1.3-A (which is included as chapter 1 in this deliverable), we have looked at the requirements of the different stakeholders. These requirements have been worked out into requirements for the different parts of the eDIANA system, the results of this exercise have been reported in chapter 2. With deliverable 1.3-B the work in task 1.3 was almost complete, and this final form, 1.3-C, reflects comments from other workpackages on requirements that cannot be fulfilled or requirements that have been overlooked and should be included.

The requirements in this chapter are based on interviews, previous research and the experience of experts from all the partners contributing in this task and other partners in the consortium. This document is used as input in the work packages 2 until 8 and specifies the most important requirements the eDIANA system should adhere to.

# 1. Requirements from major stakeholders

## 1.1 Construction companies

### 1.1.1 Market analyses

Clients and customers (the market) today demand a reduction of time and cost when speaking of construction of housing, while at the same time increasing the demands concerning quality and environmental issues. As a consequence of this, information and communication flows have become more important to control, when attempting to reduce development times.

Right information at the right place and time throughout the entire process of house building will help to eliminate a lot of non-value adding activities.

These new demands necessitate a more transparent house building process, competent personnel (education and training), and the ability to perform changes necessary to survive in a competitive market.

In the life cycle of a building there are several stages that are to take in consideration when referencing energy efficiency. As we can see in Figure 1 the majority of energy consumption takes place in the use stage while little in the operational phase.

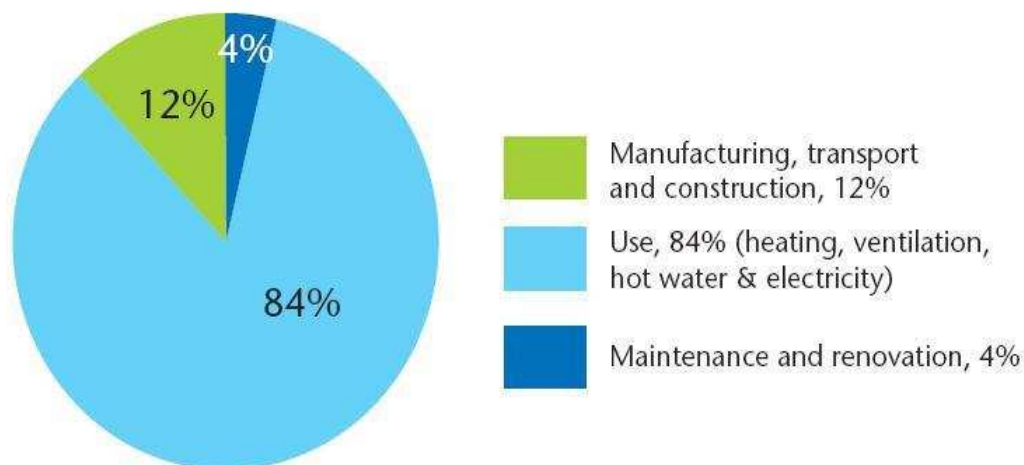


Figure 1 : Life cycle energy use

Source: Building and Environment Vol. 32 No4 1997.

The energy employed in the extraction, processing and transport of materials is known as embodied energy. Consumption of embodied energy will rise in the attempts of implementing energy efficient solutions as a consequence of bringing new devices for the operational stage.

It appears to be a contradiction in the efforts to gain energy efficiency while spending energy in another stage. However, the *use stage* represents a large

lifespan in comparison to the operational stage and, therefore, counteracting the energy wasted and saving for the time remaining.

Sustainable buildings will have a long life, and adaptable, low-energy design can prolong the service life of a building. Anticipating and “designing out” maintenance and repair, and design flexibility for change of use during its lifetime, can also extend service life. Durability and longevity of building materials therefore becomes important. The life of buildings is decreasing and this trend needs to be reversed to avoid shorter construction–demolition cycles resulting in greater annual energy use because the embodied energy is spread over a shorter period.

Policy and regulation is a matter that every stakeholder must have by their side when trying to practice methods that enable buildings to be energy efficient.

Governments have introduced relevant policies in this area but more needs to be done.

Policies are needed to stimulate energy-efficient approaches in six areas: urban planning, building codes, information, incentives and taxes, energy pricing, enforcement measurement and verification.

### 1.1.2 High level requirements

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.1.2.1	Interoperability between existing energy management systems and the eDIANA platform	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Each component will have its own specification. Specifications ought to define compatibility with other systems and open access for devices.	
<b>Rationale</b>	Interoperability enables a wide range of services and products to meet stakeholder’s needs.	
<b>Quantification</b>	<b>N.A.</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.1.2.2	Scalable system	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Ease to expand system's functionalities.	
<b>Rationale</b>	To support building expansion. The system has to be able to add devices and functionalities as required by the building properties.	
<b>Quantification</b>	<b>N.A.</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.1.2.3	Enable integration of buildings in the smart grid	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The future Smart Grid will integrate buildings in an energy network where each building will be able to share surplus generated electricity.	

<b>Rationale</b>	In case a building generates energy it will share storage data with the local utility
<b>Quantification</b>	<b>N.A.</b>

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.1.2.4	Standardized solution	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	eDIANA platform ought to fulfill standards requirements	
<b>Rationale</b>	Standardization allows every system to be open for integration and to any service out of the core construction industries.	
<b>Quantification</b>	<b>N.A.</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.1.2.5	Enable building district integration	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

User Types	Traceability Nature Description
<b>Description</b>	Systems within buildings will have to communicate with each other. Each system should be able to connect to a WAN or a VPN.
<b>Rationale</b>	Integration of buildings within districts would enable services for entities that require district level information.
<b>Quantification</b>	<b>N.A.</b>

## 1.2 Building owners

### 1.2.1 Market analyses

The huge market of building and apartment has shown a great momentum up to some years ago, while having a strong negative trend in the last years. At the moment, the "big bubble" around building and apartment prices is still showing its bad effects on the market. The rate of new constructions is very low, the level of sale price and rentals is struggling in a permanent crisis. The banks, pressed by financial problems, do not give out loans so easily and the money available for people who want to buy a property is limited. All above is putting pressure on building and apartment owners, who are scared about the current and future value when selling their properties or the level of income they can get by renting them. On top of that, even big investment funds that historically are focused on investing in building and apartments are also suffering due to such crisis and the decrease of the value of properties. Stock values of real estate companies are also going down quickly.

Above considerations are surely not exhaustive and somehow naive, but clearly show that there is today a strong pressure on building and apartment market and this situation is creating a lot of problems to a large part of the population, in particular in countries (like Italy) where investing in building and apartments is a widespread historical approach.

As a general consequence, people are more and more carefully looking at the way to preserve the value of their properties and their investments. There may be various ways of achieving this goal: one being selecting a specific geographical area to invest directly in by buying locally building or apartments (not so easy for common people with not so much money to invest and not so much knowledge about foreign markets), another being to invest only in investment funds that can by themselves differentiate the investments on different geographical areas or building types (quite expensive and not always a 100% preferred solution, especially in countries, Italy, where direct ownership of a house is still perceived as the most stable investment for common people).

A different approach is to invest in building and apartment where the quality is high (having a “special” location, quality of construction raw material, etc.); in fact, while the market trend is in general negative today, it is always possible to identify specific sectors that are always very stable (even during a strong crisis) or even show a positive trend; one of such sector Is the one related to building and apartment of high quality. The biggest losses are always concentrated onto building of medium and low quality.

High quality does not mean only a special location or an historical site: recently, the trend is more and more to give privilege to building and apartments with low energy requirements (if not at zero energy requirements, ideally). Price and market value of such properties can be much higher than the one of similar type traditional property or even a recently restored one that, however, still showing high energy requirements.

Moreover, the cost of energy from traditional energy sources has pushed to start manufacturing new building (or restoring old ones) with special care at low energy requirements if not near-zero emissions. Again, the price and vale of such properties can be much higher than the one of traditional properties without such advanced characteristics. This process is fuelled by Governments and EU institutions, in order to reduce the emissions and to decrease the general needs of energy. Strong money incentives can be gained (up to 55% of restoring cost in Italy), if one implements such characteristics. The current market trends bring high attention to the items of energy saving, quality of material for the constructions, as well as usage of zero-emissions energy sources. This trend is perfectly in line with the objectives of eDIANA project that is to investigate tools, methodologies and solutions to efficiently manage energy in building and apartments.

As a conclusion of above short considerations, it is clear that apartment owners will consider such smart solutions (like the one being proposed in eDIANA project) as one of the ways to achieve two important goals:

1. to reduce daily expenses for energy management today
2. to maintain (if not increase) the value of their property in the future

### **1.2.2 High level requirements**

Req. Number	Title	Originator:
Req. 1.2.2.1	Intuitive, not intrusive installation (plug-and-play)	ST
Description	eDIANA platform ought to be easy to install, showing a low impact on existing installations and building topology.	

	Ideally, a full plug-and-play solution would be desirable
Rationale	Heavy impact on existing installations or building topology is a major cost that will increase the overall cost of the solution, this requiring a longer period for compensating the initial investment
Quantification	Installation cost, duration of the period needed to compensate the initial investment

Req. Number	Title	Originator:
Req. 1.2.2.2	Cost of the solution (HW + SW)	ST
Description	eDIANA platform ought to show a reasonable cost, comparing to other types of solutions that increase the efficiency of the building in various areas	
Rationale	The cost of the eDIANA solution is a major choice factor, thus impacting the length of the period for compensating the initial investment. In fact, the decision for such solution is taken with the aim of having a gain in the medium long term; if this period is too long, the interest of the people will decrease dramatically.	
Quantification	eDIANA cost level, length of the period for compensating the initial investment	

Req. Number	Title	Originator:
Req. 1.2.2.3	Standard-compatible solution	ST
Description	eDIANA platform ought to be based on well recognized and widespread standards	
Rationale	Standardization allows every system to be open for integration of equipment from various vendors, thus increasing the reliability of the solution, the number of options, putting pressure on prices for the solutions due to large economy of scale	
Quantification	Percentage of standard-compliant blocks vs. proprietary blocks in a given solution or system	

Req. Number	Title	Originator:
Req. 1.2.2.4	Scalability and modularity	ST

Description	eDIANA platform ought to be scalable and modular
Rationale	Scalability and modularity allow for tuning the investment to the current needs, while having the possibility to upgrade the solution in the future, if needed. In particular, with modularity, it is possible to combine modules from different vendors, thus leaving the maximum freedom to customers to build a solution tailored to their own needs. This will keep at the minimum the cost of the solution and the length of the period for compensating the investments
Quantification	Granularity of solution, level of openness to modules from different vendors (certification would be key!)

Req. Number	Title	Originator:
Req. 1.2.2.5	Clear, intuitive and standard GUI	ST
Description	eDIANA platform ought to show a clear, intuitive Graphical User Interface, if not supporting standard ones from the computer and phones industry	
Rationale	More and more, people is used to work with well-known user interfaces, that are widespread in computers and mobile phones; using such user interfaces (or a derivation of them) will increase a lot the acceptance from users and will reduce the time to learn how to use it in an efficient way. This will impact the level of saving that one can achieve, thus reducing the length of the compensation period	
Quantification	N.A.	

Req. Number	Title	Originator:
Req. 1.2.2.6	Predictability of performances	ST
Description	eDIANA platform ought to show clear ways of predicting the performances of a given solution, thus allowing the common user to set up a clear and reasonable "business model" for the return of the investment.	
Rationale	Again, the value of such solution for the building owner is strictly related to the way the initial investment is recovered. Even if this period is short, it must be clearly understandable by the customer and, ideally, there must be a simple way for each common customer to build his own "business model" without the help of a technician. In fact,	

	such "business model" may vary due to changing external conditions, personal needs, system upgrade, etc. thus making difficult to pay a technician every time the customer want to modify it or simply to check that the initial assumption are still valid. SW tools would be desirable to help and guide the user in such analysis.
Quantification	Availability of effective and rational tools to prepare and update a personal "business model"

Req. Number	Title	Originator:
Req. 1.2.2.7	Easy and fast maintenance	ST
Description	eDIANA solutions ought to be easy to maintain, with little or zero need of intervention of a specialized technician, except in very few cases. On-board Self-check features and debugging modes would be desirable. Fast feedback by Hot Lines and Web Sites would be desirable to help to solve troubleshootings	
Rationale	Maintenance is always a critical point, when purchasing an electronic equipment; this is true both in terms of cost of the intervention and in terms of stop of normal operation. Frequent needs of intervention (maybe by specilized technicians) and long stop of normal operation would simply kill the products	
Quantification	Number and frequency of troubleshooting and average time needed to solve it (stop of normal operation)	

Req. Number	Title	Originator:
Req. 1.2.2.8	Look of the solution	ST
Description	eDIANA equipment must have an attractive look in order to fit properly among the building furniture	
Rationale	Today, such kind of equipment can be regarded as fully part of the furniture, like large screen TV, HiFi sets, etc. A nice and attractive look is a must to ensure good acceptance by the customers. Starting from the same features, different looks should be possible, to fit into various apartment styles and locations.	
Quantification	Large range of looks of products	

Req. Number	Title	Originator:
Req. 1.2.2.8	Remote control and intervention capability	ST
Description	eDIANA products ought to allow for the (optional) control from remote location (through web or mobile phone) both in case of simple monitoring and modifications of the current settings and in case of alarms and troubleshooting	
Rationale	People spend large part of his life outside the home and it is highly desirable to have remote access through usual channels (web, mobile phone, etc.) to monitor the situation, change settings and deal with alarms and troubleshooting.	
Quantification	number and quality of remote capabilities, feedback time for the system, especially in case of alarms	

Req. Number	Title	Originator:
Req. 1.2.2.9	Personal profile programming	ST
Description	eDIANA products ought to allow for the programming of a the personal profile of a given user; it should be possible to save different profiles for different users sharing the same building in different time frames	
Rationale	Users will have very different requirements and preferences that can also vary in time. So, it is desirable that each user is provided with a large enough set of options to be selected or not and a large set of parameters to be defined, in order to optimize the operation of the eDIANA products. A time base would also be needed, to program variation of the settings in time. All of this, of course, inside an intuitive programming environment. Limited programmability and versatility would be perceived as a limitation and would be accepted for very low cost equipment	
Quantification	number and quality of programmable features and parameters	

Req. Number	Title	Originator:
Req. 1.2.2.10	Backward compatible with existing equipment	Apptech
Description	EDIANA should support the addition of legacy equipment already present in a building	

Rationale	Users will have very different requirements and preferences that can also vary in time. So, it is desirable that each user is provided with a large enough set of options to be selected or not and a large set of parameters to be defined, in order to optimize the operation of the eDIANA products. A time base would also be needed, to program variation of the settings in time. All of this, of course, inside an intuitive programming environment. Limited programmability and versatility would be perceived as a limitation and would be accepted for very low cost equipment
Quantification	Percentage of legacy equipment found in existing buildings that could be made compliant with the eDIANA architecture

## 1.3 Installers

### 1.3.1 Market analysis

According to the experience of FAGOR, two main markets can be identified for the installation of home automation/management systems. The first one comes out during the construction of a building, and allows a proper integration of automation elements inside the structure of the building, and the installation of ad-hoc communication infrastructures such as cabling. In this case, electronic systems providing automation features can be installed inside appliances during the manufacturing process, thus reducing costs for the appliance manufacturer.

The second installation market occurs when a user wants a full installation of a home automation system on an existing flat/apartment, or wants an upgrade on an already installed system. In this case, installation costs are higher, and the use of communication systems which avoid the deployment of additional cabling would be the preferred choice (e.g. powerline or wireless communications). Moreover, additional electronic systems need to be integrated in existing appliances, which requires the use of small-sized elements (due to size constraints inside appliances), conventional mechanical tools, and simple connector/cable interfaces to the control boards of the appliances. Installers also need to perform the configuration of the automation system, which must be a simple, fast, and reliable process. The configuration process should also perform a diagnosis of the whole system, providing a detailed feedback and indicating possible error sources and location. An installation manual detailing a clear step-by-step procedure is fundamental in this case.

### 1.3.2 High level requirements

Req. Number	Title	Originator:
Req. 1.3.2.1	Cell-level communication Network open	Fagor

	to wired and wireless implementations	
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The Cell-level communication Network can be implemented as a wireless or as wired solution. Best would be if both solutions are available to user choice, with no significant cost penalty.	
<b>Rationale</b>	A network supporting indiscriminately PLC nodes and wireless (ZigBee-like) nodes will be acceptable by most users (including radio frequency sensitive ones). The Cell Level Manager designer is able to determine the amount of time, addressing, and other resources needed to achieve the required Cell Level functions.	
<b>Quantification</b>	N.A.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.3.2.2	Installation, Maintenance at reduced complexity and cost	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	

<b>Description</b>	The installation and maintenance should be feasible for non-professionals.
<b>Rationale</b>	Simplicity in the installation and maintenance of the system will reduce costs and increase the acceptability of the users.
<b>Quantification</b>	No new wires, Plug&Play

## **1.4 Architects/designers**

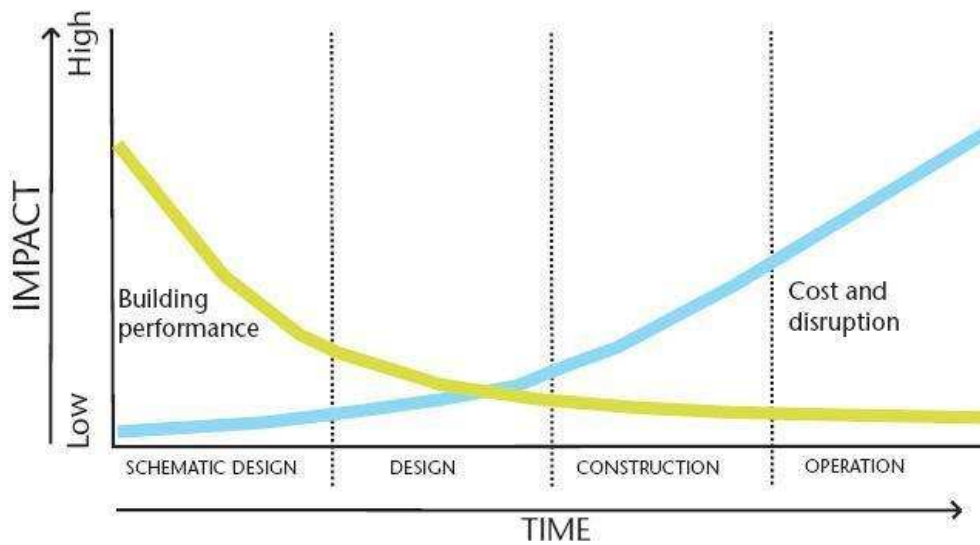
### **1.4.1 Market analyses**

Many professionals are involved at different stages of a design project, and many factors need to be taken into account: climate, building shape, comfort levels, materials and systems, occupant health and security. Most projects follow a sequential approach, finalizing one stage before moving to the next, with free structures aligned to this linear approach and compartmentalization.

Designers need to be able to carry out extra iterations, revisiting earlier stages to optimize the many factors and introduce cost-effective innovations at an early stage. An Integrated Design Process (IDP) involves all participants in the early design phase of the project. Multi-disciplinary workshops bring together owners, architects, engineers and others. They cooperate across the different specialties rather than working in the traditional "silo" approach that involves little communication between specialists and results in buildings with sub-optimal performance.

IDP (Integrated Design Process) can achieve improved building performance with lower costs and fewer disruptive changes during the later project stages. Figure 2 shows that the earlier in the process that IDP occurs, the greater the impact on building performance and the lower the impact on costs.

**Figure 2: The benefits of early integration**



Source: Solidar, Berlin Germany

### 1.4.2 High level requirements

Req. Number	Title	Originator:
Req. 1.4.2.1	Energy Efficiency Simulating SW	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Architects require energy simulation software in order to generate requirements for the design process.	
Rationale	This tools help understand how a building design will operate and perform.	
Quantification	N.A.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.4.2.2	eDIANA SW module for building design tools.	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	A software module that enables the user to integrate eDIANA components to the building design.	
<b>Rationale</b>	When setting performance targets architects have to consider installing the systems necessary for ongoing energy monitoring when the building is brought to use.	
<b>Quantification</b>	<b>N.A.</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.4.2.3	BIM supported eDIANA SW module	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Building Information Modeling (BIM) encompasses building geometry, spatial relationships, geographic information, and	

	quantities and properties of <a href="#">building</a> components.
<b>Rationale</b>	eDIANA platform must be able to have access to all relevant building's information in order to generate more accurate analysis on its performance.
<b>Quantification</b>	N.A.

## 1.5 Appliance manufactures

### 1.5.1 Market analyses

#### 1.5.1.1 Philips Consumer Lifestyle

User awareness is foreseen as one of the key factors on energy saving. Feedback appears to be an effective strategy for reducing energy consumption according to a review of intervention studies [1]. It has been found that the more frequent the feedback is the more effective it is. For example continuous display of electricity consumption was associated with an average saving of 12% in USA [2]. In a study performed in Netherlands [4] households were encouraged to reduce their energy use with an internet-based tool. A combination of tailored information (essential data for a specific household) goal setting (goal to save: 5 %) and tailored feedback was used. The combination of interventions resulted in energy saving of 5 1 % in a period of 5 months white the control group (no interventions) used more energy than before. From the viewpoint of energy reduction of CE devices people should have to be able to monitor their energy consumptions very well since feedback appears to be an effective strategy for reducing energy consumption. Indeed, people need feedback on the energy consumption of their CE devices to make intelligent choices related to their energy use. There is need for a system that gives continuous feedback on energy use in a way that is easy to understand.

'Green Innovation', "Sustainable Energy", "Low Power Standby" etc... are all issues that are currently having Philips' attention. The Long Term roadmap of Philips reflects this trend. It is undoubtedly that Philips will bring eDIANA-like requirements/functionality in our products. The Roadmap is updated on a yearly basis and when the market requires it, eDIANA-like functions will be introduced in our consumer products. The eDIANA deliverables (e.g. proof of concept etc...) will be weighted when determining the Roadmap.

#### 1.5.1.2 Lighting control (Apptech)

Although most lighting control manufacturers want their system to interoperate with other systems they want to this in a controlled way, in order to defend their business interests and key business control points. Most lighting control companies will therefore only accept a system based on open standards if they can interface with this from their own closed control network.

### 1.5.1.3 Fagor Electrodomésticos

The interest of Fagor Electrodomésticos, as one of the main domestic appliances manufacturers in the European market, is the development of household devices able to send and receive commands related with the energy management.

Focusing on low cost and interoperability, it is required that these commands are as standard as possible.

### 1.5.2 High level requirements

Req. Number	Title	Originator:
Req. 1.5.2.1	Max Distance of control of every CE device in the home and nearest network manager or repeater.	Philips Consumer Lifestyle
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Allow the user to systemize any selection of CE devices anywhere in and around the house. Distances might vary from close to zero cm. up to over 10 m. through walls and ceilings.	
Rationale	Limitations on placement are hard to communicate	
Quantification	The maximum distance between control point and CE devices	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.5.2.2	Popular, simple, easy and enjoyable-use devices (e.g. NetTV and Smart Phones) for quick visualization and feedback of energy consumption per (cluster of) CE device(s)..	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	From the viewpoint of energy reduction of CE devices people should have to be able to monitor their energy consumptions very well since feedback appears to be an effective strategy for reducing energy consumption. There is need for a system that gives continuous feedback on energy use in a way that is easy to understand.	
<b>Rationale</b>	People need feedback on the energy consumption of their CE devices to make intelligent choices related to their energy use.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.5.2.3	Representation of CE device types	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>

<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Semantics to be used for the representation of the various CE device types, the functions they bear and the types of energy consumption management procedures that can be applied on them.	
<b>Rationale</b>	Reduces effort needed by the users; User friendly and functional interface; only then can the mass market be targeted. Increases acceptability by the end users	
<b>Quantification</b>	Percentage of users that succeeds at the task.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.5.2.4	Simple control devices	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Popular, simple, easy and enjoyable-use devices (e.g. NetTV and Smart Phones) for control (cluster of) CE devices (e.g. on/off/sleep/timers/...) in a quick and easy way without the need of consulting a user manual after first experiences.	
<b>Rationale</b>	Reduces effort needed by the users; User friendly and functional interface; only then can the mass market be targeted. Increases acceptability by the end users	
<b>Quantification</b>	Percentage of users that think this requirement is met;	

	Amount of user actions needed to control.
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Req. Number	Title	Originator:
Req. 1.5.2.5	No influence by other control systems	Philips Consumer Lifestyle
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Control of (cluster of) CE devices is not allow to be influenced by other systems and vice versa.	
Rationale	Consumers want a simple and clear control system.	
Quantification	Amount of successful interaction by other systems	

Req. Number	Title	Originator:
Req. 1.5.2.6	Easy installation	Philips Consumer Lifestyle
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	CE devices could be easy connected to standard smart	

	energy meter devices.
<b>Rationale</b>	Consumers want the simple system. Reduces effort needed by the users; Increases acceptability by the end users
<b>Quantification</b>	Percentage of users that think this requirement is met; Amount of user actions needed to install.

Req. Number	Title	Originator:
Req. 1.5.2.7	Easy connection	Philips Consumer Lifestyle
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Exchange of (monitoring/control) data via regular/existing channels like e.g. WiFi, Powerline. No extra cable should be needed to connect.	
Rationale	Consumers want the simple system. Reduces effort needed by the users; Increases acceptability by the end users	
Quantification	Percentage of users that think this requirement is met; Amount of user actions needed to connect.	

Req. Number	Title	Originator:
Req. 1.5.2.8	Energy management	Philips Consumer Lifestyle
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	

<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	Allow planning energy management/demand of CE devices.
<b>Rationale</b>	Increases acceptability by the end users
<b>Quantification</b>	Percentage of users that think this requirement is met

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.5.2.9	Low Bill of Materials	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Add none to very little to the power consumption and very little to the price of the CE devices.	
<b>Rationale</b>	Quick mass market entrance	
<b>Quantification</b>	Market share / Market introduction period	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.5.2.10	Home network architecture	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	Provide enhanced home network architecture for the energy consumption monitoring and management.
<b>Rationale</b>	Precondition for an efficient and sustainable eDIANA foundation / platform at home
<b>Quantification</b>	Number of redesign during a fixed period of years

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.5.2.11	Open eDIANA foundation	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Provide open, distributed, energy monitoring/control foundation with strong scalable properties, able to provide (web based) services and tools, e.g. to create applications for the user who will be able to identify the power consumption patterns in his home, and analyse them in order to adopt measures that lead to more efficient energy consumption - e.g. by changing his consuming patterns (timing), using the eDIANA system to shut down or put in low power consumption state unnecessary devices automatically etc.	
<b>Rationale</b>	Increases acceptability by the end users	
<b>Quantification</b>	Percentage of users that think this requirement is met	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
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Req. 1.5.2.12	Common Communication foundation	Philips Consumer Lifestyle
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Provide common communication foundation that allows the definition of a smart domestic environment able not only to get information on power consumption from CE devices, but also to extract a richer set of data including user profiles and physical parameters (like e.g. temperature and lighting level in selected points, presence, etc.)	
<b>Rationale</b>	Increases acceptability by the end users	
<b>Quantification</b>	Percentage of users that think this requirement is met	

Req. Number	Title	Originator:
Req. 1.5.2.13	Metrics	Philips Consumer Lifestyle
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Provide appropriate metrics, which will convey the energy profile of CE devices broken down into values corresponding to the energy consumption of internal functions	
Rationale	Increases acceptability by the end users	
Quantification	Percentage of users that think this requirement is met	

Req. Number	Title	Originator:
Req. 1.5.2.14	Closed subnetworks	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	It should be possible to create a closed subnetwork that is interfacing with the open backbone network of EDIANA	
Rationale	Only then will lighting control companies be willing to contribute to the eDIANA network	

**Quantification**

## **1.6 Energy retailers**

One of the stakeholders in the energy value chain are the energy retailers having their specific interests in the value chain. This paragraph summarizes a number of retailers and derives requirements based upon them when applicable.

### **1.6.1 Market analyses**

#### ***1.6.1.1 Anode***

Anode BV is a small independent electricity supplier. It operates local and international on the European energy exchange markets. The company also operates as an energy trader on a bilateral basis. Essentially the company is positioned as an intermediate to consumers, business consumers, and producers. Key values are reliability, client satisfaction and sustainable business results.

The company will need access to pricing information, demand quantity information, demand timeslot information, supply quantity information, supply timeslot information, quality of service information to meet their business goals.

#### ***1.6.1.2 DELTA (Comfort BV & Energy BV)***

DELTA offers small- and large scale multi-utility solutions. The company is investing heavily in innovation and sustainable solutions. Delta produces electricity, acts as an energy trading company and supplies electricity and gas to consumers and business consumers. Past years the company is making an effort to achieve sustainable energy supply. This covers production of bio-fuels, innovative solar technologies and production of solar cells. The company recognizes the need for a transition towards affordable, sustainable solutions. As the world gets more and more complex customers are experiencing the need for straightforward, comfortable, tailor made products. DELTA responds to meet these requirements by integrating products and services. In this way the company aims to relieve the customer. Key values are continuity, phlegmatic, reliability, independent, sustainable. The company supports consumers to reduce energy consumption. It is achieved by helping customers to register their energy consumption history and offering reference energy consumption figures. Understanding of energy consumption of devices is supported. Efforts are made to growing awareness of less energy consuming usage patterns of devices by consumers.

In order to support the energy consumption reduction efforts the consumer will need energy consumption information of consumer devices, consumption pattern information, capacity information, low energy consumption pattern information.

### **1.6.1.3 Dong Energy**

Dong Energy is a Scandinavian energy company. The company invests continuously in more efficient sustainable techniques dealing with energy. The ultimate goal is to deliver energy having zero GHG emission to consumers and business consumers. By applying local practices the business establishes a close relation with customers. In order to boost the reliability of energy delivery the company has an international network. Key values are attention, reliable, quick, accurate, accessible and concerned. Dong Energy is partner of the Better Place responsible for the energy supply of this project. The project involves 50000 charging spots in Denmark for electric vehicles. The energy will be produced by the slack capacity of windmills. The batteries of the EV's can be used as a storage medium. At night the batteries will be charged while the day after the stored energy will be consumed. It establishes a way of decoupling of energy production and energy consumption. Dong is also strongly involved in energy consumption reduction of consumers. It involves in supporting consumers getting awareness of their energy consumption patterns by supporting them in register their energy consumption and comparing their consumption to target consumption values. Consumers are also supported when directing their energy consumption by consulting services.

In order to support the energy consumption reduction efforts the consumer will need energy consumption information, consumption pattern information, capacity information, low energy consumption pattern information. Access to reference consumption data will also be necessary.

### **1.6.1.4 E.ON Benelux**

E.ON is one of the largest energy companies in Europe. E.ON is primarily an electricity production company. The company also operates as an energy trader. E.ON Benelux concentrates on the production and supply of electricity, heat to power companies and the energy-intensive industry. The mission of the company is to raise the efficiency of energy production and consumption. In order to be able to supply reliable, affordable and sustainable energy it is inevitable to combine several energy generation methods. E.ON is investing 63 milliard Euro to achieve a sound basis for sustainable affordable and reliable energy supply. Over 10 percent of the investment is assigned to development of sustainable energy technologies. The company aims to reduce the CO<sub>2</sub>-emission to 50 percent of the emission of 1990. This should be achieved in 2030. Key values are integrity, transparent, trust, mutual respect, courage and social responsibility. To ensure balanced investment decisions E.ON examines plans from the basis of the sustainability triangle (People, Planet, Profit), whereby price, reliability of supply and environmental aspects form balanced parts of the decision process.

### **1.6.1.5 Electrabel GDF SUEZ**

Electrabel is as a part of GDF SUEZ one of the leading energy providers in the world, the company is active across the entire energy value chain, in electricity and natural gas, upstream to downstream. The Group develops its businesses (energy, energy

services and environment) around a responsible-growth model to take up the great challenges: responding to energy needs, fighting against climate change and maximizing the use of resources. The company relies on diversified supply sources as well as flexible and highly efficient power generation in order to provide innovative energy solutions to individuals, cities and businesses. A transition from fossil fuel generated energy to environmental friendly energy is considered to be inevitable as well as a change in the way of think about energy saving. Meeting energy needs, ensuring a secure energy supply, repelling climate changes and improving the use of resources are major objectives. In order to reduce energy consumption the company offers consumers information, consulting services and access to external consulting services about ways to save their energy consumption.

In order to support the energy consumption reduction efforts the consumer will need tools to manage and predict their energy consumption.

#### ***1.6.1.6 Essent***

Essent is a large Dutch energy company delivering gas and electricity to customers and business customers. Distribution, trading, and delivery of energy are key activities of the company. Most of the delivered energy is produced by the company itself. Essent is aiming to develop to a leading sustainable energy delivering company. Key vales are pro-active, responsible, cooperate, prove.

In order to support the energy consumption reduction efforts the consumer will need tools to register, analyze, manage and monitor their energy consumption. This enables consumers to know their energy consumption, to take action to reduce the amount of consumption or change the consumption pattern and to keep track of their efforts to do so.

#### ***1.6.1.7 GasTerra***

GasTerra is an international company trading in natural gas. it operates on the European energy market and has a significant share of the Dutch gas market. The company is customer-focused and strives to maintain long-term relationships with market players and to put in place sales contracts which express the market value of the natural gas and related services. GasTerra is committed to sustainable development as a guiding principle for its strategy and actions. The company recognises the great importance of energy transition to sustainable energy supplies and initiates projects in this area. Key values are customer focus, effectiveness, improvement, integrity, respect.

#### ***1.6.1.8 Greenchoice***

Greenchoice is an energy company delivering solely green energy. The company considers future customers to be aware of the environment when dealing with energy. Main objective to Greenchoice is the support of customers in changing to customers who are very conscious about their energy consumption. Energy saving by customers and sustainable energy generation by those customers themselves are key

factors to achieve balanced, sustainable energy consumption. By offering fair prices of energy delivered by customers the company stimulates sustainable energy generation by customers themselves. Greenchoice has explicit time-based objectives to have customers dealing more consciously with energy. In 2009 25% of the customers should know their energy consumption and the energy prices. In 2010 customers are getting involved in energy generation and GHG gas reduction. This means 25% of the customers chose a specific way of energy generation, generate their own energy or participate in a CO2 compensation programme. In 2011 customers should be actively involved with energy saving (25 % saves 300kwh) or is generating energy (25% of the customers compared to 2010).

In order to achieve the objectives customers should be able to register, analyze, manage and monitor their energy consumption, be able to generate energy in a sustainable way, be able to deliver energy, register energy delivery, register energy production and deal with congestion in the network. Legislation restriction concerning delivery and subsidy should be taken into account.

#### **1.6.1.9 MAIN Energie**

MAIN Energie is an energy delivering company. The real estate market is the core-business of MAIN. Delivery and management of energy on a no cure no pay basis on one hand and continuous service providing on a high service level on the other hand are key factors. Energy consumption monitoring, estate inventories, energy scans of buildings and consulting services are part of them. Key values are quality, personal approach, transparent.

In order to support the energy consumption reduction efforts the consumer will need tools to register, manage and predict their energy consumption.

#### **1.6.1.10 Nederlandse Energie Maatschappij**

Nederlandse Energie Maatschappij is the largest independent energy supplier operating on the Dutch market. The company aims to promote competition and consumer service in the energy market. Transparency, consumer profit and service are key elements to achieve this. The customer should benefit as much as possible. The company objectives should be reached while taking social responsibility and innovation into account. Key values are personal approach and customer focus.

Nederlandse Energie Maatschappij emphasizes the need for sustainable energy by delivering 100% CO2-emission free electricity. The company strains the need for less energy consumption by supporting consumers to become more conscious of their energy consumption and ways to save energy consumption.

In order to support the energy consumption reduction efforts and raise the consciousness of consumers about their energy consumption the consumer will need tools to register, analyze, manage and monitor their energy consumption.

**1.6.1.11 OXXIO**

OXXIO is an energy company aiming to exploit the free energy market to the maximum. The company is having an active role in innovation and creating reliable services offering low cost products while Oxxio supplies 100% sustainable electricity to their customers. The company strives to offer products which enables saving energy consumption. Oxxio is developing smart solutions to deal with energy in a better way. Currently the company is offering products like energy manager, energy scan, smart meter, energy saving consulting. Key values are customer advantage, sustainability, innovation, reliability.

In order to achieve the objectives customers should be able to register, analyze, manage and monitor their energy consumption. Energy consumption data collection to generate and classify reference consumption data and patterns will be required as well.

**1.6.1.12 NUON**

NUON is an energy company covering the whole energy value chain, operates in a global market and takes account of the worldwide environment problem. The company aims to expand the energy production from natural sources like wind, sun, water, heat and cold as much as possible. NUON is strengthening the position in production and midstream gas. The company is transforming from a customer commodity supplier to a trusted energy adviser. An objective is to become a CO2 neutral company by implementing CO2 emission reducing technologies. Key values are care, respect, entrepreneurial, improve.

In order to support the transformation of the company to an adviser the consumer need to be provided with tooling to register, manage and monitor their energy consumption. This enables consumers to know their energy consumption, enable the company to advise about actions take to reduce the amount of consumption or change the consumption pattern and to keep track of their efforts to do so.

**1.6.1.13 RWE**

RWE is a large international energy company operating across the entire energy value chain. The company has a large investment program to create innovative products and services in order to be able to establish a save and reliable energy delivery solutions. This covers sustainability issues and environment saving issues . It results in using more efficient energy, more sustainable energy and development of innovative concepts for CO2 storage, energy production facilities and e-mobility. RWE has gained experience in CHP and cogeneration and the related delivery of energy by business consumers in the greengrocery branch.

**1.6.1.14 Westland Energie Services**

Westland Energie Services is an energy company servicing customers and business customers especially greengrocers. The company offers a complete and innovative

product portfolio joining technique, sustainability, service and cost reduction. The company offers energy solutions essential to the success of businesses. Westland Energie Services developed specific products to meet challenging complex energy problems like CHP and cogeneration equipment to support decentralized energy generation, heat management solutions to manage heat storages and modulating heat generating equipment and consulting services concerning energy consumption. The company also provides solutions to customers who are delivering local generated energy to the network. The delivery raises a typical problem called network congestion. Westland Energy Services gained a lot of experience in this area including development of congestion management solutions.

In order to achieve the objectives customers should be able to register, analyze, manage and monitor their energy consumption, be able to generate energy in a sustainable way, be able to deliver energy, register energy delivery, register energy production and deal with congestion in the network. Network capacity information, congestion prediction information should be available. Energy producers should be able to offer bid information for switching off to avoid congestion.

#### **1.6.1.15 Naturgas Energia**

Naturgas Energia is an energy group which aims to supply gas and electricity to businesses and individuals at competitive prices. Transmission and distribution of gas are carried out within a regulated market, whereas the marketing of gas and electricity is carried out within a free market.

At the end of 2008, the Group had 690.032 service points in the regulated market and provided 628.294 customers with gas and 41.486 with electricity in the free market.

Its facilities are located in eight autonomous communities, specifically in the Basque Country, Asturias, Catalonia, Castile and Leon, Extremadura, Madrid, Murcia and Navarre. The network of the gas pipes of Naturgas Energía amounts to over 5.870 kilometres and 1.333 million euro revenue in 2008. The company leads the gas market in the Basque Country and in Asturias, and it is the second electricity company in the Basque Country. It has more than 315 employees and is integrated in HC Energía of the EDP Group.

#### **1.6.2 High level requirements**

Based upon the summary of energy retailers we can derive general end user requirements.

<b>Req. 1.6.2.1</b>	<b>No influence by other control systems</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

eDIANA Level	eDIANA Component	Category
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>		
<b>Description</b>	Provide tools to register, analyze, manage, monitor and predict their energy consumption.	
<b>Rationale</b>	In order to support the energy consumption reduction efforts the consumer will need tools to register, analyze, manage, monitor and predict their energy consumption. This enables consumers to know their energy consumption, to take action to reduce the amount of consumption or change the consumption pattern and to keep track of their efforts to do so.	
<b>Quantification</b>		

Req. 1.6.2.2	No influence by other control systems	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>		
<b>Description</b>	Provide data collection to generate and classify reference consumption data and patterns	
<b>Rationale</b>	Energy consumption data collection to generate and classify reference consumption data and patterns will be required as well. This enables consumers to relate their energy	

	consumption and energy reduction efforts to those of consumers having equal conditions.
<b>Quantification</b>	

<b>Req. 1.6.2.3</b>	<b>Tools for energy delivery</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>		
<b>Description</b>	Provide tools to deliver energy, register energy delivery, register energy production and deal with congestion in the network	
<b>Rationale</b>	Customers should be able to generate energy in a sustainable way, be able to deliver energy, register energy delivery, register energy production and deal with congestion in the network. Legislation restriction concerning delivery and subsidy should be taken into account to.	
<b>Quantification</b>		

<b>Req. 1.6.2.4</b>	<b>Manage network activity</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

<b>User Types</b>	
<b>Description</b>	Provide system to manage network capacity information, congestion prediction information and switch off consumers.
<b>Rationale</b>	Network capacity information, congestion prediction information should be available in order to make right decisions on energy delivery by customers. Energy producers should be able to offer bid information for switching off to avoid congestion.
<b>Quantification</b>	

<b>Req. 1.6.2.5</b>	<b>Dynamic pricing</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>		
<b>Description</b>	Provide system to access to pricing information, demand quantity information, demand timeslot information, supply quantity information, supply timeslot information, quality of service information.	
<b>Rationale</b>	Companies will need access to pricing information, demand quantity information, demand timeslot information, supply quantity information, supply timeslot information, quality of service information to meet their business goals.	
<b>Quantification</b>		

<b>Req. 1.6.2.6</b>	<b>No influence by other control systems</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

eDIANA Level	eDIANA Component	Category
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>		
<b>Description</b>	The system should be designed in such a way that capacity, coverage, security and flexibility as well as interoperability requirements are met.	
<b>Rationale</b>	As a consequence a large amount of data will be needed to collect and distribute. The communication between the involved systems will face problems in the area of capacity, coverage, security and flexibility which have to be solved. The systems should be interoperable to a great extent offering the required flexibility.	
<b>Quantification</b>		

## 1.7 Consumers

### 1.7.1 Market analyses

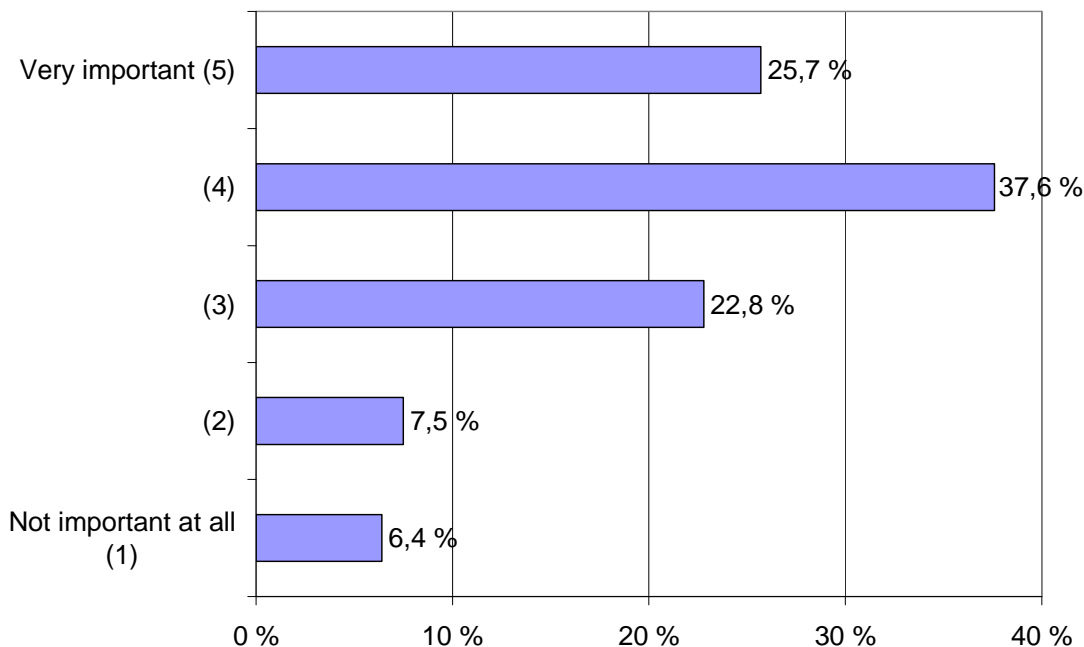
Giving people information does not necessarily lead to behavioural changes or energy savings. Instead, feedback appears to be an effective strategy for reducing energy consumption according to a review of intervention studies [1]. It has been found that the more frequent the feedback is, the more effective it is. For example, continuous display of electricity consumption was associated with an average saving of 12% in USA [2]. In another study [3], the effects of daily and monthly feedback on gas consumption were compared. It was found that those who received monthly feedback saved less than those who received daily feedback (7.7% vs. 12.3%).

In a study performed in Netherlands [4] households were encouraged to reduce their energy use with an internet-based tool. A combination of tailored information (essential data for a specific household), goal setting (goal to save: 5 %), and tailored feedback was used. The combination of interventions resulted in energy saving of 5.1 % in a period of 5 months, while the control group (no interventions) used more energy than before.

### **1.7.1.1 Attitudes and opinions toward energy conservation and energy monitoring**

In a study performed in Finland [5], attitudes and opinions of inhabitants about energy conservation and energy monitoring were studied by a quantitative interview survey with a nationally representative sample. The interviews were carried out by telephone with a total of 3,094 respondents.

The results presented in Figure 1 show that 63% of the Finns think that it is very important or important to improve the possibilities to monitor energy consumption at home. It was also found that people think their own actions have a high influence on energy consumption: in a scale from 1 (very low influence) to 5 (very high influence), a mean value of 4.0 was received.



The figure shows the importance to improve the possibilities to monitor energy consumption at home (N=3008, mean: 3.7) [5].

Several studies (for example [6]) have shown that people are willing to pay for energy-saving attributes.

### **1.7.1.2 Need for improvement**

Inhabitants have low possibilities to monitor their energy consumption. In Finland, the monthly bills are based on estimated consumption, i.e. the consumption of the previous year, because the energy meters are typically read only once a year. This means that a household receives an additional bill or is paid after the meters are read. [5]

From the viewpoint of energy conservation people should have to be able to monitor their energy consumptions very well since feedback appears to be an effective

strategy for reducing energy consumption. People need feedback on their energy consumption to make intelligent choices related to their energy use. There is need for a system that gives inhabitants continuous feedback on their energy use in a way that is easy to understand.

In a later step of the Task 1.3, it is targeted to find end user requirements for household energy monitoring by interviewing (qualitative interviews) Finnish residents. It is also aimed to show some paper prototypes to interviewees to gather their opinions and preferences. For example, it is needed to know whether it is enough that inhabitants see the trend of their total energy consumption or do they also need information on how much each device consumes?

## 1.7.2 High level requirements

### 1.7.2.1 Generic requirements

Req. Number	Title	Originator:
Req. 1.7.2.1	Compatibility	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	The eDIANA system should work with existing products & system at home, without the user needing to replace these products.	
Rationale	This is necessary because users are not willing to replace all their products at once	
Quantification	By measuring the percentage of products present in random selected households that is compatible with the eDIANA system.	

Req. Number	Title	Originator:
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Req. 1.7.2.2	Organic growth	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The eDIANA system should be able to start with a small working set and be extended later, there might also be two separate systems in one building that are later merged	
<b>Rationale</b>	Consumers want to make small investments at a time	
<b>Quantification</b>	The smallest investment needed to get a working system. The size of incremental investments needed to get additional functionality	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.3	Range	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The eDIANA system should allow placement of devices everywhere in its house	
<b>Rationale</b>	Limitations on placement are hard to communicate	

<b>Quantification</b>	The maximum distance between two devices
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Req. Number	Title	Originator:
Req. 1.7.2.4	Feedback time	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	All feedback should be immediate	
Rationale	Behavioural feedback over longer time periods will lead to less change in the behaviour	
Quantification	The time elapsed after which feedback is received.	

Req. Number	Title	Originator:
Req. 1.7.2.6	Maximum delays in communications and processing of data	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Maximum data communication and processing delay between event occurrence and its reporting in another	

	network node
<b>Rationale</b>	To avoid users having negative perception due to excessive reaction time of appliances to users demands.
<b>Quantification</b>	At Cell level: 1-5 seconds At Building Level: <b>1 second</b> At District Level: <b>3 seconds</b>

Req. Number	Title	Originator:
Req. 1.7.2.7	Availability of Cell-level Devices power Consumption/Production Data in near-real-time	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
<b>Description</b>	When the Cell level Device concentrator knows the status and Devices Consumption/Generation power Data in near-real-time, historic and instant data is ready to be delivered to the user (via display units), and to the Cell and Macro Cell algorithms (via Communication networks).	
<b>Rationale</b>	The Cell level Manager is the best suited entity to collect the mentioned data (status and Devices Consumption/Generation of power) in near-real-time, historic and instant data is ready to inform the user, and the Cell and Macro Cell algorithms.	
<b>Quantification</b>	The Cell Level Manager (or home comfort and energy management system) is able to take decisions concerning the amount of energy to be used or produced according to its means, the user preferences, and opportunities or request information received from the utilities or other qualified intermediaries (Macro Cell Manager, Utility/Operator,...).	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.8	Availability of pricing data in near-real-time	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Utilities are able to provide near-real-time pricing data to the cell.	
<b>Rationale</b>	The embedded intelligence in the Cell Manager requires to be informed about the best pricing opportunities to take decisions according to the programmed user interest and preferences.	
<b>Quantification</b>	The Cell Level Manager (or home comfort and energy management system) is able to take decisions concerning amount of energy to be used or produced according its means, the user preferences, and opportunities or requests information received from the utilities or other qualified intermediaries.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.9	Amortization time	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

User Types	Traceability Nature Description
<b>Description</b>	Benefits obtained from the use of eDIANA system should equal the cost of the investment made by the user in less than 3 years
<b>Rationale</b>	At least an annual 10% of energy cost reduction must be achieved with the Home energy system.
<b>Quantification</b>	Home energy system price should be around 200 €.

Req. Number	Title	Originator:
Req. 1.7.2.10	Cell level Max number of devices.	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
<b>Description</b>	Maximum number of devices inside the Cell.	
<b>Rationale</b>	Determination of the maximum number of devices allows cost efficient design of the management system.	
<b>Quantification</b>	Each Home management system will not have to manage more than 100 differentiated devices at cell level.	

Req. Number	Title	Originator:
Req. 1.7.2.11	Low-complexity equipment	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information	Affected Devices or Elements	

<b>Direction</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	The energy-efficiency manager device should be perceived by the users as a new appliance to incorporate into the house, whose function is to minimize consumed energy cost.
<b>Rationale</b>	Simple configuration and use.
<b>Quantification</b>	Home management system must be easy to program and to use, as a washing machine or DVR.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.12	Upgradeability	QUINTOR
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The system should allow for upgradeability of software components	
<b>Rationale</b>	New versions of software should be installed on the fly	
<b>Quantification</b>		

### **1.7.2.2 Task / Usage phase related requirements**

Each phase of the product life cycle in which the consumer uses the energy efficiency system brings along its own specific requirements. Following usage phases are distinguished, starting from the first encounter with the system up to re-use and disposal of the system:

- Pre-purchase, purchase and transport

- Unpack
- Initial installation & configuration & programming
- Daily use
- Modification of the system set-up (extension, merging, re-clustering, down scaling)
- Recovering / repairing the system in case of loss / failure / breakdown
- Dismantling the system

The sequence of tasks presented below follows a logical path but, in practice, there may well be significant overlaps between tasks.

For each specific phase of the product life cycle, also examples of possible performance measures are given. The examples are not meant to be all encompassing, but just to give an idea on the kind of measures one could think of. Some examples have a certain resemblance as they are variants on the same theme. The possible performance measures are numbered and indicated with '*Ppm*'. Numbers or values mentioned in these measures serve as rough indication, they are marked '\_' and might need refinement for a specific solution.

**1.7.2.3 Pre-purchase and purchase and transport**

Req. Number	Title	Originator:
Req. 1.7.2.13	In store communication, benefits	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	When placed in a store the benefits should be clearly communicated	
Rationale	Only if the consumers understands the benefits they will buy the product	
Quantification	Percentage of people that understand the benefits after seeing the package for a limited amount of time	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.14	In store communication, purpose	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	When placed in a store the purpose of each module should be clearly communicated	
<b>Rationale</b>	Only if the consumers understands the purpose of a module they will buy the module	
<b>Quantification</b>	Percentage of people that understand the purpose of a module after seeing the package for a limited amount of time	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.15	In store communication, possibilities	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	

<b>Description</b>	When placed in a store the possibilities of the system should be clearly communicated
<b>Rationale</b>	Only if the consumers understands the possibilities they will buy the product
<b>Quantification</b>	Percentage of people that understand the possibilities after seeing the package for a limited amount of time

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.16	In store demonstration	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	It should be possible to demonstrate the system in a store	
<b>Rationale</b>	Demonstration is a powerful means of convincing people to buy an innovative product	
<b>Quantification</b>	Percentage of shop owners that are willing to demonstrate the product in their store	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.17	Transportation	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>

<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	It should be possible to transport the system by consumer transportation means: foot, bike, car, public transport	
<b>Rationale</b>	Contributes highly to initial consumer satisfaction	
<b>Quantification</b>	Percentage of people that rate the packaging as transportable	

In case the system will be marketed via other distribution channels (e.g. the utility), req 1.7.2.1-1.7.2.3 are still valid. Besides this, the system should:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.18	Calculation of expected benefit	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Users should be able to get a personalised indication of the amount of energy/money they can save when installing the eDIANA system given their specific situation	
<b>Rationale</b>	Allows rational decision making to invest in the system	
<b>Quantification</b>	Correctness of estimation when verified with real homes	

**1.7.2.4 Unpack**

When arrived home, the energy efficiency system should:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.19	Meaning	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Communicate a clear unambiguous and relevant meaning / purpose / identity of each of the present system components	
<b>Rationale</b>	Contributes to the understanding by the users	
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.20	Relations	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	

<b>Description</b>	Provide an overview of the possible relationships between the components
<b>Rationale</b>	Contributes to the understanding by the users
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.21	Unambiguous	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Communicate a clear unambiguous and relevant meaning / purpose / identity of each of the present system components	
<b>Rationale</b>	Contributes to the understanding by the users	
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.22	Overview	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Provide an overview of the possible relationships between the components	
<b>Rationale</b>	Contributes to the understanding by the users	
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement	

### 1.7.2.5 Initial installation & configuration & programming

This phase includes all actions that the user has to do with the components of the energy efficiency system in order to make the system ready for daily use. With **installation**, all physical actions are meant that are required to mount the controlled devices into their intended position in fixtures, wall sockets or differently and bring the control system into their operational mode. With **configuration** all user actions are meant that are required to establish the relation between control system and controlled device(s). With **programming**, all user actions are meant that are required to make the system capable to respond in a user-determined way.

Installation, configuration and programming might ask differentiated actions from the user in the order mentioned. It is not excluded however that certain actions for installation might also fulfil configuration & programming purposes. In the same way, also the order of each of these sub-phases might differ per solution.

It is desired that the energy efficiency system comes into a kind of 'basic use' mode with as least as possible user actions, meaning that some (basic) control (or at least visualisation of energy use) is available. The underlying thought here is that users will be encouraged to continue the use of / interaction with their energy efficiency system when they find the system actually responding to their actions. It is not encouraging for them if it would take a lot of time and / or a lot of user actions before they see a first result of the system.

In this respect, auto-installation solutions are definitely worthwhile to consider, however attention should be paid that the result of auto-installation matches the user expectations.

In general for this phase the energy efficiency system must:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.23	No expertise required	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

eDIANA Level	eDIANA Component	Category
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	<p>Allow to be installed, configured and programmed with no special expertise required.</p> <p>Note: It is assumed that consumers have the knowledge to plug and unplug electrical appliances and that they are capable of exchanging a lamp in a fixture. Also basic understanding of how to work with a PC and internet browsing is expected.</p>	
<b>Rationale</b>	Only then can the mass market be targeted	
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement	

Req. Number	Title	Originator:
Req. 1.7.2.24	Documentation	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	<p>Be accompanied by proper documentation / information that provide a clear (step by step) guide to the successful installation, configuration and programming of the energy efficiency system.</p>	

<b>Rationale</b>	Only then can the mass market be targeted
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.25	Feedback	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Provide appropriate and meaningful feedback on the intermediate status and (successful or non-successful) results of installation, configuration and programming.	
<b>Rationale</b>	Reduces frustration during the installation process	
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.26	Recognition	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

User Types	Traceability Nature Description
<b>Description</b>	Provide best possible means to enable easy recognition of controllable entities (e.g. by enabling configurable labelling).
<b>Rationale</b>	Reduces frustration during the installation process
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement

Upon **installation**, the (components of) the energy efficiency system must:

Req. Number	Title	Originator:
Req. 1.7.2.27	No tools	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
<b>Description</b>	Allow to be installed without the need of using tools (other than the tools that would normally be required to exchange bulbs, mount fixtures or exchange switching modules in wall sockets)  Note: in case the components of the energy efficiency system require installation and possibly replacement of existing modules behind wall mounted switches and sockets or in parts of the fixture, the components should allow to be installed by means of the same tools that would otherwise be required for electrical installation & connection at home.	
<b>Rationale</b>	Reduces frustration during the installation process	
<b>Quantification</b>	Percentage of people that think the product adheres to this requirement	

Req. Number	Title	Originator:
Req. 1.7.2.28	Physical	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Have shapes and sizes that allow mounting into the available spaces for which the components are intended. E.g. power outlet sockets (next to other plug-in units), wall and ceiling cavities or fixtures.	
Rationale	Reduces adaptations needed by the consumers	
Quantification	Percentage of people that think the product adheres to this requirement	

Upon **configuration**, the (components of) the energy efficiency system must:

Req. Number	Title	Originator:
Req. 1.7.2.29	Easy commissioning	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>Description</b>	Allow to quickly and easily create a control relation between the control system and controlled devices / light points, with the least possible user actions.
<b>Rationale</b>	Reduces effort needed by the users
<b>Quantification</b>	Amount of atomic user actions needed

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.30	No need for a manual	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow to be configured with help of a quick reference card only (so not the complete user manual), without any other tools.	
<b>Rationale</b>	Reduces effort needed by the users	
<b>Quantification</b>	Percentage of users that is able to get the system working without reading the full manual	

Upon **programming**, the (components of) the energy efficiency system must:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.31	User friendly programming	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>

<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow to quickly and easily program desired behaviour into the control system with help of a user manual or on-screen wizard, without any other tools	
<b>Rationale</b>	Reduces effort needed by the users	
<b>Quantification</b>	Percentage of users that succeeds at the task	

### 1.7.2.6 Daily use

When being used normally ('daily'), the (components of the) energy efficiency system must:

Req. Number	Title	Originator:
Req. 1.7.2.32	Allow for simple, easy and enjoyable use.	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	The system should not interfere with the normal behaviour of consumers in and around their house	
Rationale	Increases acceptability by the end users	
Quantification	Percentage of users that think this requirement is met	

Req. Number	Title	Originator:
Req. 1.7.2.33	Most important functions are the most easy to use	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>Description</b>	Allow to be used for basic functionality by regular inhabitants (including children over 6 years) and visitors of households, assuming they have knowledge and experience of using conventional light switches in a home environment.
<b>Rationale</b>	Increases acceptability by the end users
<b>Quantification</b>	Percentage of users that think this requirement is met

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.34	Compatible with existing products	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Work together with existing products (e.g. light switches and dimmers) in a logical way.	
<b>Rationale</b>	Increases acceptability by the end users	
<b>Quantification</b>	Percentage of products in a random selected house that adheres to this property	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.35	Local override	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow, this means switching products on or off when physically in the presence of the product.	
<b>Rationale</b>	Increases acceptability by the end users	
<b>Quantification</b>	Percentage of eDIANA products that adheres to this property.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.36	Power interruptions	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Respond in an expected / acceptable way to power interruptions.	
<b>Rationale</b>	Power outs are to be expected, during the lifetime of the system.	
<b>Quantification</b>	Chance that the system will function after a power interruption	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.37	Minimal user intervention	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

eDIANA Level	eDIANA Component	Category
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow for unobtrusive use of control system with as least as possible distraction from the social context the user is in, requiring as limited time and attention from the user as possible.	
<b>Rationale</b>	Consumers want the system to function without needing to interfere	
<b>Quantification</b>	Average amount of interaction needed to let the system function for a specified time period.	

Req. Number	Title	Originator:
Req. 1.7.2.38	Influence by other systems	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Not allow to be influenced unintended by other systems (in case of wireless: cars / AV / neighbour lighting systems, in case of powerline communication: other pc, events on the powerline)	
<b>Rationale</b>	Consumers want the system to function without needing to interfere	
<b>Quantification</b>	Average amount of interaction needed to let the system	

	function for a specified time period.
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Req. Number	Title	Originator:
Req. 1.7.2.39	Overview of settings	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	User should be able to easily request an overview of the configuration and programmed settings.	
Rationale	User needs to be able to see if it is configured properly	
Quantification	Percentage of people that think that this requirement is met	

Req. Number	Title	Originator:
Req. 1.7.2.40	Benchmark	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>Description</b>	Provide benchmark data with own energy use (e.g. previous similar period) or energy use of others, who have a comparable situation
<b>Rationale</b>	This leads to decrease of energy usage (when people are performing worse than their peers)
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.41	Benchmark	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Propose personalised and easy to follow-up tips on how to save energy	
<b>Rationale</b>	This leads to decrease of energy usage	
<b>Quantification</b>	Percentage of people who find the tips usefull	

### ***1.7.2.7 Modification of the system set-up (extension, merging, re-clustering, down scaling)***

This phase covers all possible changes to the system set-up that might occur as a user need after having used the system for a certain period of time. This includes many different types of changes to the system such as reconfiguring the relation between existing controls and controlled light points, reprogramming, adding or removing components from the energy efficiency system and merging two separately used systems into one. It is assumed that the user has already gotten used to the system behaviour in daily use, and that the knowledge and experience of all initial user actions for installation, configuration & programming is less obvious present in the memory of the user. Also user instructions / manual might not or not easily be available.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.42	Easy changing of relation	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow to quickly and easily change a control relation between the control system and controlled devices / light points, with the least possible user actions.	
<b>Rationale</b>	Reduces effort needed by the users	
<b>Quantification</b>	Amount of atomic user actions needed	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.43	No need for a manual	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow to be reconfigured with help of a quick reference card only (so not the complete user manual), without any other tools.	

<b>Rationale</b>	Reduces effort needed by the users
<b>Quantification</b>	Percentage of users that is able to get the system working without reading the full manual

Upon **programming**, the (components of) the energy efficiency system must:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.44	User friendly reprogramming	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow to quickly and easily reprogram desired behaviour with help of a quick reference card only, without any other tools.	
<b>Rationale</b>	Reduces effort needed by the users	
<b>Quantification</b>	Percentage of users that succeeds at the task	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.45	Easy flexibility	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information</b>	<b>Affected Devices or Elements</b>	

<b>Direction</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	Allow to quickly and easily add or remove components with as least as possible user actions.
<b>Rationale</b>	Reduces effort needed by the users
<b>Quantification</b>	Percentage of users that succeeds at the task

**1.7.2.8 Recovering / repairing the system in case of loss / failure / breakdown**

This phase or situation occurs when (a part of) the energy efficiency system cannot respond correctly anymore to commands from the control system. This can have several causes, either related to the control system or to the controlled units. In addition to the possibility that a component of the energy efficiency system breaks down (e.g. at end of life after several years), the controlled units also have a chance of getting lost. In order to restore the energy efficiency system such that all established functionality becomes available again, malfunctioning or missing components should be replaced.

When malfunctioning, the energy efficiency system must: When malfunctioning, the energy efficiency system must:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.46	Easy flexibility	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	

<b>Description</b>	Communicate in the best possible way the type of malfunctioning and the components involved.	
<b>Rationale</b>	Reduces effort needed by the users	
<b>Quantification</b>	Percentage of users that succeeds at the task	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.47	Minimal disruption	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow components of the energy efficiency system to be replaced with minimal disruption of system settings and at least as possible user actions.	
<b>Rationale</b>	Reduces effort needed by the users	
<b>Quantification</b>	Percentage of users that succeeds at the task	

### **1.7.2.9 Dismantling the system**

This situation occurs when the user intends to remove (a part of) the energy efficiency system from the location where the energy efficiency system is installed. Possible reasons for this can be the breakdown of individual components or the wish to make (a part of) the energy efficiency system available for use at another locations.

When components of the energy efficiency system are removed from their working location because the user intends to dispose of them, the (components of the) energy efficiency system must:

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.48	Disposal requirements on the product	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Communicate the disposal instructions on the components itself, such that no manual is needed to correctly dispose of them.	
<b>Rationale</b>	Manual will probably be gone by the time the system is dismantled	
<b>Quantification</b>	Percentage of users that succeeds at the task	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.49	Full reset	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow to be made 'factory new' (virgin) in a quick and easy way with as least as possible user actions.	

<b>Rationale</b>	Allows easy resell and or reuse of components
<b>Quantification</b>	Percentage of users that succeeds at the task

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.7.2.50	Full reset	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Not carry any 'burden' from the removed components in the remaining energy efficiency system set-up.	
<b>Rationale</b>	Will allow the system to perform over a long time period	
<b>Quantification</b>	Time it takes before the systems gets to slow after adding and removing components	

## 1.8 Office end-users

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.8.1	Allow for simple, easy and enjoyable use.	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

User Types	Traceability Nature Description
<b>Description</b>	The system should not interfere with the normal behaviour of consumers in and around their house
<b>Rationale</b>	Increases acceptability by the end users
<b>Quantification</b>	Percentage of users that think this requirement is met

Req. Number	Title	Originator:
Req. 1.8.2	Most important functions are the most easy to use	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
<b>Description</b>	Be capable to offer and perform the most relevant functions (to be derived from the commercial proposition) in a quick and easy way without the need of consulting a user manual after first experiences.	
<b>Rationale</b>	Increases acceptability by the end users	
<b>Quantification</b>	Percentage of users that think this requirement is met	

Req. Number	Title	Originator:
Req. 1.8.3	Usable by all inhabitants	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category

Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Allow to be used for basic functionality by regular users (including visitors), assuming they have knowledge and experience of using conventional light switches in a home environment.	
Rationale	Increases acceptability by the end users	
Quantification	Percentage of users that think this requirement is met	

Req. Number	Title	Originator:
Req. 1.8.4	Compatible with existing products	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Work together with existing products (e.g. light switches, printers and PCs) in a logical way.	
Rationale	Increases acceptability by the end users	
Quantification	Percentage of products in a random selected house that adheres to this property	

Req. Number	Title	Originator:
Req. 1.8.5	Local override	Philips Applied Technologies
Priority	Status	Criticality

<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow, this means switching products on or off when physically in the presence of the product.	
<b>Rationale</b>	Increases acceptability by the end users	
<b>Quantification</b>	Percentage of eDIANA products that adheres to this property.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.8.6	Power interruptions	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Respond in an expected / acceptable way to power interruptions.	
<b>Rationale</b>	Power outs are to be expected, during the lifetime of the system.	
<b>Quantification</b>	Chance that the system will function after a power interruption	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.8.7	Minimal user intervention	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Allow for unobtrusive use of control system with as least as possible distraction from the social context the user is in, requiring as limited time and attention from the user as possible.	
<b>Rationale</b>	Consumers want the system to function without needing to interfere	
<b>Quantification</b>	Average amount of interaction needed to let the system function for a specified time period.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.8.8	Influence by other systems	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Not allow to be influenced unintended by other systems (in	

	case of wireless: cars / AV / neighbour lighting systems, in case of powerline communication: other pc, events on the powerline)
<b>Rationale</b>	Consumers want the system to function without needing to interfere
<b>Quantification</b>	Average amount of interaction needed to let the system function for a specified time period.

Req. Number	Title	Originator:
Req. 1.8.9	Benchmark	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Provide benchmark data with own energy use (e.g. previous similar period) or energy use of others, who have a comparable situation	
Rationale	This leads to decrease of energy usage (when people are performing worse than their peers)	
Quantification		

Req. Number	Title	Originator:
Req. 1.8.10	Benchmark	Philips Applied Technologies
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category

<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Propose personalised and easy to follow-up tips on how to save energy	
<b>Rationale</b>	This leads to decrease of energy usage	
<b>Quantification</b>	Percentage of people who find the tips usefull	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 1.8.11	Benchmark	Philips Applied Technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Provide options for competition/ peer pressure or social motivational strategies	
<b>Rationale</b>	This leads to decrease of energy usage	
<b>Quantification</b>	Percentage of users that indicate they change their behaviour because they want to compete with their colleges	

## 2. Requirements

### 2.1 Purchase and Installation

#### 2.1.1.1 General

Req. Number	Title	Originator:
2.1.1.1.1	Energy & load info	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Every appliance should be able to provide and transmit information on their energy consumption or power load.	
Rationale	Energy management starts with providing relevant information to the end user, in order to help him understand his energy consumption.	
Quantification	Energy consumption in Wh, power demand in W.	

Req. Number	Title	Originator:
2.1.1.1.2	Appliance failure mode	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>Description</b>	In failure situations, the end user should get a message informing about the status of the appliance.
<b>Rationale</b>	If an appliance has a technical problem during its operation (e.g. a water leak for a washing machine), the appliance should be able to send a message reporting that there is a failure.
<b>Quantification</b>	Depending on the intelligence embedded in the machine, the message sent can be very simple: "appliance stopped" or more complex "water linkage in the dishwasher".

Req. Number	Title	Originator:
2.1.1.1.3	Issue alarm	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
<b>Description</b>	The appliance is able to raise alarms and to allow some energy efficiency actions to be taken. A representative example is the situation when the door of the fridge is left open.	
<b>Rationale</b>	There are situations where energy is consumed without any benefit for the end user.	
<b>Quantification</b>	N.A.	

Req. Number	Title	Originator:
2.1.1.1.4	Clear and complete Installation Manual with installation SW program	ST
Priority	Status	Criticality

High	Initial	Mandatory
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Whole eDIANA Platform		Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined	eDIANA modules and products	
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	Req. 1.7.2.14 and 1.7.2.15	
<b>Description</b>	The eDIANA system should be equipped with adequate documentation and a set-up & installation program should be available for the administrator (for office) or the end user (for home) in order to proper and quick install the system	
<b>Rationale</b>	Acceptance of the system is strictly related to reliability and clarity of installation and maintenance procedures	
<b>Quantification</b>	Time needed for a typical installation or re-configuration of the system	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.1.1.1.5</b>	Clear and complete information about features and performance figures	<b>ST</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>High</b>	<b>Initial</b>	<b>Mandatory/</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Whole eDIANA Platform</b>		<b>Performance</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided /Shared/Undefined</b>	<b>eDIANA modules and products</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	

<b>Administrator</b>	<b>Req. 1.7.2.6, 1.7.2.7 and 1.7.2.8</b>
<b>Description</b>	Customer must be able to quickly get a clear view of performances and benefits of eDIANA products in order to be convinced that the investment is worth to do and to compare with similar systems from various vendors
<b>Rationale</b>	Investments for such kind of devices (especially for large building or offices) can be not negligible and performances must be adequate to ensure customer satisfaction
<b>Quantification</b>	Amount of information provided to the customer

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.1.1.1.6</b>	Automatic Notification for Firmware upgrade	<b>ST</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>Medium</b>	<b>Initial</b>	<b>Important/</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Cell Level</b>	<b>CDC</b>	<b>Reliability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided /Shared/Undefined</b>	<b>eDIANA modules and products</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Administrator</b>	<b>Req. 1.7.2.14, 1.7.2.18, 1.7.2.35, 1.7.2.38, 1.7.2.39</b>	
<b>Description</b>	Need for CDC's firmware upgrade should be automatically notified to the user/administrator through any of the available connections (e.g. wireless); firmware download should be authorized by the system administrator or end user	
<b>Rationale</b>	Various use cases are possible: firmware could contain bugs, firmware could be upgraded to provide more or better features, etc.	
<b>Quantification</b>	speed and transparency of the upgrade procedure (no troubleshooting should affect the measurements in the eDIANA equipments)	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
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<b>2.1.1.1.7</b>	<b>Firmware download for upgrade</b>	<b>ST</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>Medium</b>	<b>Initial</b>	<b>Important/</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Cell Level</b>	<b>CDC</b>	<b>Reliability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided /Shared/Undefined</b>	<b>eDIANA modules and products</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Administrator</b>	<b>Req. 1.7.2.14, 1.7.2.18, 1.7.2.35, 1.7.2.38, 1.7.2.39</b>	
<b>Description</b>	CDC's firmware upgrade should be downloaded through any of the available connections (e.g. wireless); firmware upgrade should by no mean affect the basic metering and controlling activity.	
<b>Rationale</b>	Various use cases are possible: firmware could contain bugs, firmware could be upgraded to provide more or better features, etc.	
<b>Quantification</b>	speed and transparency of the upgrade procedure (no troubleshooting should affect the measurements in the eDIANA equipments)	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.1.1.1.8</b>	<b>Self check after firmware upgrade</b>	<b>ST</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>High</b>	<b>Initial</b>	<b>Mandatory/</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Cell Level</b>	<b>CDC</b>	<b>Reliability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided</b>	<b>eDIANA modules and products</b>	

<b>/Shared/Undefined</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Administrator</b>	<b>Req. 1.7.2.14, 1.7.2.18, 1.7.2.35, 1.7.2.38, 1.7.2.39</b>
<b>Description</b>	After any modification of the firmware in the eDIANA CDC, it is worth to perform self check in order to guarantee the good functioning of the specific component and the overall network.
<b>Rationale</b>	First priority is always to ensure good functioning of the overall system
<b>Quantification</b>	Zero malfunctions after firmware upgrade.

### 2.1.1.2 Home specific

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.1	Auto discovery	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/ Closed/Cancelled	Mandatory
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Administrator</b>	<b>1.7.2.14, 1.7.2.22</b>	
<b>Description</b>	Whenever a new eDIANA compliant sensor is added to the system it should register itself in the system and be available to be coupled to any other component	
<b>Rationale</b>	Adding or removing sensors should be simple	

<b>Quantification</b>	
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<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.2	Feedback on status	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	1.7.2.16	
<b>Description</b>	Every component should indicate its status regarding its connection to the system	
<b>Rationale</b>	Without proper feedback during installation the user can get lost during installation	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.3	Overview network status	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/Clo	Mandatory

	sed/Cancelled	
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	1.7.2.16	
<b>Description</b>	Every component that has a screen allowing to show graphical data should be able to show the status and network connection of any device that is known to it.	
<b>Rationale</b>	Without proper feedback during installation the user can get lost during installation	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.4	No entering of coded	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Important
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information</b>	<b>Affected Devices or Elements</b>	

<b>Direction</b>	
Required/Provided /Shared/Undefined	
<b>User Types</b>	<b>Traceability Nature Description</b>
Administrator	1.7.2.20
<b>Description</b>	The eDIANA system should be configurable without the entering of world unique codes like: MAC-addresses, network channels and/or security codes
<b>Rationale</b>	Entering this types of codes is considered very complex by end-users
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.5	Graphical explanation of physical steps to take	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Important
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	1.7.2.22	
<b>Description</b>	Any device that has the possession of a graphical display should start up with a graphical wizard which takes the user through setting up this device and any other device that	

	does not have a graphical user interface. Showing both the configuration steps and the physical actions the user has to take on both devices in a integrated way.
<b>Rationale</b>	This helps the user to setup the system without a user manual
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.6	Adding devices using a wizard	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/Authorized/Developed/Delivered/Closed/Cancelled	Important
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	1.7.2.22	
<b>Description</b>	It should be possible to start the wizard to add additional devices to the network. This wizard should be able to start from any device with a graphical user interface	
<b>Rationale</b>	This helps the user to setup the system without a user manual	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
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Req. 2.1.1.2.7	Wizard for merging	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Important
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	1.7.2.2, 1.7.2.22	
<b>Description</b>	There should be a special wizard to help users merge two systems	
<b>Rationale</b>	This helps the user to setup the system without a user manual	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.8	Auto connect	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Important
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/

		Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
Administrator	1.7.2.22	
<b>Description</b>	Whenever the system detects a new part or subsystem there should, without any user intervention, appear corresponding icons in all the UI's present allowing the system to be reconfigured.	
<b>Rationale</b>	This helps the user to setup the system without a user manual	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.9	Leaflets	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	

End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.13, Req. 1.7.2.18, Req. 1.7.2.19
<b>Description</b>	A component should provide attractive leaflets that present typical use cases (also showing applications of other eDIANA components)
<b>Rationale</b>	
<b>Quantification</b>	

Req. Number	Title	Originator:
Req. 2.1.1.2.10	Separation	Philips Applied technologies
Priority	Status	Criticality
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory/Important /Useful/Optional
eDIANA Level	eDIANA Component	Category
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
Information Direction	Affected Devices or Elements	
Required/Provided /Shared/Undefined	Req. 1.7.2.14	
User Types	Traceability Nature Description	
End User/ Maintenance/ Macro-Cell/ Administrator		
<b>Description</b>	The eDIANA system should provide for separate macro cell and cell installation and operation facilities	
<b>Rationale</b>	Some control tasks should be at macro cell level (e.g. building control) and some should be at cell level (room or office)	

<b>Quantification</b>	
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<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.11	Scaling of registry system	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/Authorized/Developed/Delivered/Closed/Cancelled	Mandatory/Important/Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/Whole eDIANA Platform		Cost/Price/Design constraint/Memory Storage/Performance/Physical/Power Consumption/Reliability/Safety/Security/Standard/Compliance/Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided/Shared/Undefined	Req. 1.7.2.14	
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/Maintenance/Macro-Cell/Administrator		
<b>Description</b>	The eDIANA system should implement a component registry system that scales with the number of components within a (macro) cell, and which does not present a performance or reliability bottleneck	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.12	Prevent unintended registration	Philips Applied technologies

<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.14	
<b>Description</b>	The eDIANA system should prevent unintended registration or operation of devices outside their intended (macro) cell	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.13	Indication	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/

		Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.14, Req. 1.7.2.16, Reqq. 1.7.2.38	
<b>Description</b>	A component should present the user an (optional) audible and/or visual indication if they are operational and connected to other eDIANA components, or if they become non-operational	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.14	Security	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo sed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		

User Types	Traceability Nature Description
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.14, 1.7.2.30
Description	The eDIANA system shall provide security measures to prevent usage of components outside the intended (macro) cell or by unauthorized users
Rationale	
Quantification	

Req. Number	Title	Originator:
Req. 2.1.1.2.15	Overview available components	Philips Applied technologies
Priority	Status	Criticality
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/ Closed/Cancelled	Mandatory/Important /Useful/Optional
eDIANA Level	eDIANA Component	Category
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
Information Direction	Affected Devices or Elements	
Required/Provided /Shared/Undefined		
User Types	Traceability Nature Description	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.16, Req. 1.7.2.17, Req. 1.7.2.31, Req. 1.7.2.34	
Description	The user shall be allowed to retrieve an overview of the available components and eDIANA application	

<b>Rationale</b>	
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.16	Retrieve properties	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo sed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.16, Req. 1.7.2.17, Req. 1.7.2.31, Req. 1.7.2.34	
<b>Description</b>	The user shall be allowed to retrieve properties of the available components, such as physical location, identification and applications	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.17	Connectors	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo sed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.18, Req. 1.7.2.19	
<b>Description</b>	Components should be implemented with typical legacy connectors and/or with user friendly plug-and-play technology	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.18		Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo sed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/

		Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.20	
<b>Description</b>	A component should present a cell-unique identification to the user if the user needs to identify the component for his applications	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.19	Web based support	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	

End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.21
<b>Description</b>	The eDIANA system should facilitate web-based support for extensive help or troubleshooting
<b>Rationale</b>	
<b>Quantification</b>	

Req. Number	Title	Originator:
Req. 2.1.1.2.20	Interference with legacy devices	Philips Applied technologies
Priority	Status	Criticality
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Closed/Cancelled	Mandatory/Important /Useful/Optional
eDIANA Level	eDIANA Component	Category
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
Information Direction	Affected Devices or Elements	
Required/Provided /Shared/Undefined		
User Types	Traceability Nature Description	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.23	
<b>Description</b>	A component should allow to change protocol parameters (such as a used frequency band) to eliminate or minimize interference with legacy devices	
<b>Rationale</b>		

<b>Quantification</b>	
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Req. Number	Title	Originator:
Req. 2.1.1.2.21		Philips Applied technologies
Priority	Status	Criticality
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo sed/Cancelled	Mandatory/Important /Useful/Optional
eDIANA Level	eDIANA Component	Category
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
Information Direction	Affected Devices or Elements	
Required/Provided /Shared/Undefined		
User Types	Traceability Nature Description	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.23	
Description	A component should be able to auto-adapt protocol parameters to optimize its operation	
Rationale	Otherwise user intervention is needed	
Quantification		

Req. Number	Title	Originator:
Req. 2.1.1.2.22	Interoperability	Philips Applied technologies
Priority	Status	Criticality
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo	Mandatory/Important /Useful/Optional

	sed/Cancelled	
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
Required/Provided /Shared/Undefined		
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.26	
<b>Description</b>	A component should comply to legacy wireless and wired interoperability standards for the control of legacy components (such as for infrared and RF remote controls)	
<b>Rationale</b>		
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.1.1.2.23	Power-on	Philips Applied technologies
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
High/Medium/Low	Initial/Defined/ Authorized/ Developed/Delivered/Clo sed/Cancelled	Mandatory/Important /Useful/Optional
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/ Whole eDIANA Platform		Cost/Price/Design constraint /Memory Storage/ Performance/Physical/ Power Consumption/ Reliability/Safety/Security/ Standard/Compliance/ Usability

Information Direction	Affected Devices or Elements
Required/Provided /Shared/Undefined	
User Types	Traceability Nature Description
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.28
Description	A component should be capable to boot itself and become operational upon power-up
Rationale	
Quantification	

## 2.2 Daily usage

### 2.2.1 Monitoring and measuring systems

Variables to measure

Possible conclusions the systems should be able to draw

#### 2.2.1.1 General

Req. Number	Title	Originator:
Req 2.2.1.1.1	Individual Energy measurement	Apptech
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	The eDIANA system should be able to measure power	

	usage of individual devices in the building
<b>Rationale</b>	By measuring the individual energy consumption of devices in the building the user can determine what devices are spilling energy
<b>Quantification</b>	N.A.

Req. Number	Title	Originator:
Req 2.2.1.1.2	Group Energy measurement	Apptech
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	The eDIANA system should be able to measure power usage of groups of devices	
Rationale	By measuring the energy consumption of groups of devices in the building the user can determine what devices are spilling energy while using a minimal amount of sensors	
Quantification	N.A.	

Req. Number	Title	Originator:
Req 2.2.1.1.3	Virtual group Energy measurement	Apptech
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	

<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	The eDIANA system should be able to present energy usage of virtual groups of energy usage
<b>Rationale</b>	By grouping the individual usage of devices in groups the user gets more insights in his energy usage
<b>Quantification</b>	N.A.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req 2.2.1.1.4	Presence detection	Apptech
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The eDIANA system should be able to detect the presence of people in a certain room	
<b>Rationale</b>	By relating energy usage to presence, the user can be pointed to energy spilling	
<b>Quantification</b>	N.A.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req 2.2.1.1.5	Activity detection	Apptech
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>

<b>Information Direction</b>	<b>Affected Devices or Elements</b>
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	The eDIANA system should be able to detect and classify the activity people are taking in a certain room
<b>Rationale</b>	By relating energy usage to activity, the user can be pointed to energy spilling
<b>Quantification</b>	N.A.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req 2.2.1.1.6	Pattern detection	Apptech
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The eDIANA system should be able to detect patterns in energy usage	
<b>Rationale</b>	By detecting patterns in energy usage, the system can interact better to save needles spilling of energy	
<b>Quantification</b>	N.A.	

### 2.2.2 Control and actuation systems

In this section we formulate the requirements for daily control and actuation of the eDIANA system. We make a distinction between environment independent requirements, home specific and office specific requirements.

**2.2.2.1 General**

Req. Number	Title	Originator:
Req. 2.2.2.1.1	End user preferences	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	If the system takes decisions without taking into account the end user preferences, it will be rejected and some of its capabilities will be turned off by the end user.	
Rationale	The energy efficiency management system can take decisions based on several criteria. It must be up to the end user to decide which criteria to optimize. This should be done through the system interface during its initialization.	
Quantification	The system must act according to the end-user preferences.	

Req. Number	Title	Originator:
Req 2.2.2.1.2	Possibility to overwrite temporarily End User Preferences	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>Description</b>	Depending on the circumstances, the end user may have different priorities in mind. The system must therefore provide an easy way for the user to override its preferences for a fixed moment (that should be defined also by the end user).
<b>Rationale</b>	If the end user wishes to modify its preferences temporarily, the system must allow it.
<b>Quantification</b>	N.A.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req 2.2.2.1.3	End User Control	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The system will provide the end user with an easy way to deviate from actions taken by the system.	
<b>Rationale</b>	Users want to be able to control every appliance and electrical device in their homes at all times. If the system cannot provide such a service, chances are it will be strongly rejected.	
<b>Quantification</b>	N.A.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.2.2.1.4	Control and actuate the system by intuition.	PCL
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	Users must be able to control and the system in an easy and simple way without the need or consulting a user manual after first experiences	
Rationale	People will be inclined to use the system more, when they can control and actuate it by intuition.	
Quantification		

Req. Number	Title	Originator:
Req. 2.2.2.1.5	Small learning curve for first time users	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	When people use the system for the first time, it must be easy to learn. People should be able to control and actuate the system in a very small time amount after installing.	
Rationale	Customers will feel more motivated to use the product, when they don't have to spend a long time on learning the system.	

<b>Quantification</b>	
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Req. Number	Title	Originator:
Req. 2.2.2.1.6	Control and actuate the CE devices remotely or on the CE devices itself	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Design constraint
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	People must have the freedom to choose: control the EC devices remotely (e.g. with Smart Phone or NetTV) or control the EC devices on the device itself.	
Rationale	Enforce the system to users (when people cannot use their EC devices in a traditional way) can result in frustrated feelings. E.g. one person wants an extra hot shower because he is in the need for that after a long day skiing outdoors.	
Quantification		

Req. Number	Title	Originator:
Req. 2.2.2.1.7	Energy saving Suggestions	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Design constraint

<b>Information Direction</b>	<b>Affected Devices or Elements</b>
<b>User Types</b>	<b>Traceability Nature Description</b>
End User	
<b>Description</b>	Users should be able to see (e.g. on NetTV) how much money/energy they save, compared with the absence of an energy management system. Next to that the eDIANA system should give suggestions what users should do to save more money/energy. (e.g. turning of the lights in the garden will save them 15 Watt/hour)
<b>Rationale</b>	People will be inclined to use the system more, when they can control and actuate it by intuition.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.2.2.1.8	Dynamic and effective UI	PCL
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell		Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User		
<b>Description</b>	The UI (e.g. on the NetTV) has to provide information to the users in a dynamic and easy understandable way. Indicators like cost in € or low/medium/high use must be clear for end users.	
<b>Rationale</b>	Consumers will appreciate a simplified but effective and intuitive user interface for energy offering, use and benchmarking.	

<b>Quantification</b>	Percentage of users that succeeds at the task.
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Req. Number	Title	Originator:
Req 2.2.1.1.9	Standby killer	Apptech
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	The eDIANA system should be able to detect that a device is on standby and cut of the electricity use to save energy	
Rationale	Stand-by is one of the most common causes of energy spillage	
Quantification	N.A.	

### 2.2.2.1a Lighting

Req. Number	Title	Originator:
Req. 2.2.2.1a.1	Control light and intensity	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>End User</b>	
<b>Description</b>	The end user must be able to control the lights and their intensity according to the user's desired comfort. When doing that eDIANA should give inform about the energy usage
<b>Rationale</b>	Exchange between lighting preferences and energy usage will help the end user to find a balance between both.
<b>Quantification</b>	Percentage of users that succeeds at the task.

*2.2.2.1b White goods*

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.2.1b.1	Take advantage of tariffication options	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Some appliances could benefit from tariffication options, especially those which operation can be delayed (e.g. washing machines).	
<b>Rationale</b>	Utilities will offer different tariffication options to their customers depending on the time of the day, or at demand peaks. Some appliances could delay their start, lower the consumption, etc. when the price is higher.	
<b>Quantification</b>	N.A.	

*2.2.2.2 Home specific*

Req. Number	Title	Originator:
Req. 2.2.2.2.1	Control and actuate the system outside their home environment	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Design constraint
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	Users must be able to control and actuate the system outside their home environment. This can be done on a web based platform (e.g. Smart Phone or Laptop)	
Rationale	Control the system without being at home will improve energy efficiency.	
Quantification		

Req. Number	Title	Originator:
Req. 2.2.2.2.2	Real time awareness	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Design Constraint
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		

<b>Description</b>	Users must have the ability to be aware about the energy usage of their home at any time or place.
<b>Rationale</b>	Persistent feedback is needed to get the maximum out of the system. This will also make the user feeling more connected to the system what can result in a higher level of use and a decrease of energy usage.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.2.2.2.3	Representation of CE device types	PCL
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell		Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User		
<b>Description</b>	Semantics to be used for the representation of the various CE device types, the functions they bear and the types of energy consumption management procedures that can be applied on them.	
<b>Rationale</b>	Reduces effort needed by the users; User friendly and functional interface; only then can the mass market be targeted. Increases acceptability by the end users	
<b>Quantification</b>	Percentage of users that succeeds at the task.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.2.2.2.4	Multimodal control and actuation	PCL
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The home user must be able to interact with eDIANA in a multimodal way. This can be television, PC or mobile device	
Rationale	Multimodal communication will involve the user more in the eDIANA system. (e.g. eDIANA warning when watching TV or using a PC)	
Quantification		

2.2.2.2a White goods

Req. Number	Title	Originator:
2.2.2.2.a.1	Readjust water boiler temperature setting	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Being capable of altering the temperature setting parameter of the boiler.	
Rationale	The overall energy consumption is reduced, while occupants comfort is achieved.	

<b>Quantification</b>	The temperature setting of the boiler can be altered by the energy management system.
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Req. Number	Title	Originator:
2.2.2.2.a.2	Interrupt hot water service if occupants are not at home for a long time.	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	When the inhabitants leave for a long period (e.g. holidays), it may be interesting to decrease the temperature of the hot water tank. Nevertheless, their return must be anticipated, so that the water in the tank is heated in order to comply with anti-legionella regulations.	
Rationale	Interrupting (blocking completely) the water heater can both reduce the overall consumed energy and the maximum power demand.	
Quantification	N.A.	

Req. Number	Title	Originator:
2.2.2.2.a.3	Alternative ECO modes for washing machines	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information	Affected Devices or Elements	

<b>Direction</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	The energy management system should be able to request a different ECO program (ecological, fast, short, cold or similar washing programs) equivalent to that selected by the user, in order to consume less energy.
<b>Rationale</b>	Restricting the consumption by means of ECO program sets.
<b>Quantification</b>	N.A.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.2.2.a.4	Full blocking of washing process	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	While the washing process has not begun, the clothes/dishes can be kept safely inside the washing machine/dishwasher for several hours without affecting the final result. Thus, the washing process can be delayed as long as needed.	
<b>Rationale</b>	Being capable of fully blocking the washing machine and/or dishwasher from functioning, and thus delay energy consumption.	
<b>Quantification</b>	N.A.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
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2.2.2.2.a.5	Automatic restart of washing process	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	After the full blocking process has ended, the washing machine should be able to automatically restart the washing process without direct intervention of the user.	
<b>Rationale</b>	Have a function for automatic restart after a full blocking.	
<b>Quantification</b>	N.A.	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.2.2.a.6	Pause during washing process	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The system should be able to pause the current washing program while in between certain phases, so that the machine stops consuming power temporarily. While using this method can lower the peak power, the overall consumed energy might increase, since the water may need	

	to be heated up again.
<b>Rationale</b>	Being capable of pausing the washing process temporarily during certain stages
<b>Quantification</b>	N.A.

Req. Number	Title	Originator:
2.2.2.2.a.7	Raise fridge/freezer temperature temporarily	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	If there is a reason to reduce the energy consumption for a certain period of time the refrigerator/freezer are good candidates. The temperatures of the fridge/freezer as set by the user can be raised by the system for a certain time period without harming the contents. This can be important in peak times.	
Rationale	The opportunity to modify the temperature settings of the fridge/freezer. They are usually set by the user with no rational reasons, except for their personal preference.	
Quantification	N.A.	

Req. Number	Title	Originator:
2.2.2.2.a.8	Lower fridge/freezer temperature temporarily	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category

<b>Information Direction</b>	<b>Affected Devices or Elements</b>
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	In case the system knows exactly when a peak load period is expected and how long it will last, the temperature of the fridge and freezer can probably be lowered temporarily in order to avoid energy consumption during the scheduled peak time. This can also be used to accommodate peaks in local energy generation
<b>Rationale</b>	Store energy before a peak load period so as to avoid consuming energy during that period.
<b>Quantification</b>	N.A.

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.2.2.a.9	Switch off appliance temporarily	Fagor
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	The fridge/freezer can be shut down by the energy-management system for a short time period without harming the contents. This can be important in peak times.	
<b>Rationale</b>	Shutting down the fridge and/or freezer for a short period of time does not harm its content (as long as the door stays closed).	
<b>Quantification</b>	N.A.	

Req. Number	Title	Originator:
2.2.2.2.a.10	Delay some feature	Fagor
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	The Fast Cool, Fast Freeze, Cool bottle and Freeze drink features can be delayed or shifted to advantageous time periods (e.g. when cheaper energy is available) without harming the contents. This can be important in peak times. The end user receives some feedback, for instance at which time exactly the feature will be switched on. The end user can then agree/disagree with the proposed delay.	
Rationale	Some features supported by the fridge/freezer could probably be delayed without harming the content.	
Quantification	N.A.	

2.2.2.2b Brown goods

Req. Number	Title	Originator:
Req. 2.2.2.2b.1	Control light intensity of a television	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability

<b>Information Direction</b>	<b>Affected Devices or Elements</b>
<b>User Types</b>	<b>Traceability Nature Description</b>
End User	
<b>Description</b>	The end user must be able to control the light intensity of his television according to his preferences. eDIANA can interact with this by closing the bindings or suggesting to do that.
<b>Rationale</b>	Light intensity of a TV influences the energy usage of it.
<b>Quantification</b>	Percentage of users that succeeds at the task.

### 2.2.2.3 Office specific

#### 2.2.2.3a IT equipment

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.2.2.3a.1	Control ICT network	PCL
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell		Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
End User		
<b>Description</b>	In an office, eDIANA should be able to actuate a network during office hours (e.g. starting the printers in the morning). However the end user must have priority when he wants to change something	
<b>Rationale</b>	User friendly and energy efficient.	
<b>Quantification</b>	Percentage of users that succeeds at the task.	

**2.2.3 Generation and storage control system**

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>Req. 2.2.3.1</b>	<b>Generation technologies</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Generation and Storage</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system should support technologies for energy generation and energy storage such as microCHP and smart meters.	
<b>Rationale</b>	The system should be able to interface with e.g. microCHP, smart meters, .... In order to be able to manage the energy consumption patterns in home and office environments.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>Req. 2.2.3.2</b>	<b>Energy tools overview</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	

<b>User Types</b>	<b>Traceability Nature Description</b>
<b>End User</b>	
<b>Description</b>	The eDIANA system should enable Users to register, analyze, manage and monitor their energy.
<b>Rationale</b>	Users appreciate a system which handles easy register, analyze, manage and monitor tools.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>Req. 2.2.3.3</b>	<b>Feedback on energy usage</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system should be able to predict a consumption pattern of a user.	
<b>Rationale</b>	The user has a prediction of their energy usage and can decide to change its energy usage. Prediction information is also essential for energy companies to provide flexible pricing schemes to reduce energy peaks.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>Req. 2.2.3.4</b>	<b>Feedback on energy usage</b>	<b>QUINTOR</b>

Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system can recommend the user to take actions to reduce the amount of consumption or change the consumption pattern.	
Rationale	The user has a prediction of their energy usage and can decide to change its energy usage.	
Quantification		

Req. Number	Title	Originator:
2.2.3.5	Feedback on energy usage	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system should allow the user to keep track of their efforts to reduce the amount of consumption or change the consumption pattern.	

<b>Rationale</b>	Users will be satisfied to look back at the changes of their consumption or adjust their consumption pattern. Feedback on actions taken by the user will enhance the usability of the system.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.6</b>	<b>User energy overview generation</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system should be able to generate and classify reference consumption data and patterns.	
<b>Rationale</b>	Users appreciate an overview of their energy consumption in relationship to other users. Furthermore they can benefit from the information provided in order to further reduce energy consumption.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.7</b>	<b>User energy consumption and energy reduction comparison</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>

<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system enables users to relate their energy consumption and energy reduction and the energy consumption and energy reduction of users having equal conditions.	
<b>Rationale</b>	Comparing user energy consumption and energy reduction with others enables to optimize the energy consumption of a user.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.8</b>	<b>Energy consumption management</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		

<b>Description</b>	The eDIANA system enables users to manage energy consumption in a sustainable way.
<b>Rationale</b>	Users can adjust the system to how they want the system to work.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.3.9	Energy delivery registration	QUINTOR
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Macro Cell		Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system should be able to register energy delivery.	
<b>Rationale</b>	The information is needed for optimising energy usage.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.3.10	Energy production registration	QUINTOR
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Macro Cell		Usability

<b>Information Direction</b>	<b>Affected Devices or Elements</b>
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>End User</b>	
<b>Description</b>	The eDIANA system should be able to register energy production.
<b>Rationale</b>	The information is needed for feedback to the users as well as evidence.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.11</b>	<b>Automatic energy consumption</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system shall provide mechanism to switch on/off equipment or suspend energy consumption.	
<b>Rationale</b>	In case of network congestion the systems should be able to suspend loading of the electrical vehicle for a certain amount of time.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.12</b>	<b>Network capacity</b>	<b>QUINTOR</b>

Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system should be able to provide network capacity information.	
Rationale	Network capacity information is needed to optimise energy usage.	
Quantification		

Req. Number	Title	Originator:
2.2.3.13	Network congestion	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system should provide network congestion prediction information.	
Rationale	Network congestion prediction information is needed to avoid future network congestion.	

<b>Quantification</b>	
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<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.14</b>	<b>Pricing information</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system shall support various schemes for pricing.	
<b>Rationale</b>	Companies can use this information to meet their business goals.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.15</b>	<b>Quantity information</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	

<b>End User</b>	
<b>Description</b>	The eDIANA system enables companies to access to demand quantity information.
<b>Rationale</b>	Companies can use this information to meet their business goals.
<b>Quantification</b>	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.16</b>	<b>Demand timeslot information</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system enables companies to access to demand timeslot information.	
<b>Rationale</b>	Companies can use this information to meet their business goals.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.17</b>	<b>Supply quantity information</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>

<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system enables companies to access to supply quantity information.	
<b>Rationale</b>	Companies can use this information to meet their business goals.	
<b>Quantification</b>		

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.3.18</b>	<b>Supply timeslot information</b>	<b>QUINTOR</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system enables companies to access to supply timeslot information.	
<b>Rationale</b>	Companies can use this information to meet their business goals.	
<b>Quantification</b>		

Req. Number	Title	Originator:
2.2.3.19	Quality of service information	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system enables companies to access to quality of service information.	
Rationale	Companies can use this information to meet their business goals.	
Quantification		

Req. Number	Title	Originator:
2.2.3.20	System capacity	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system should provide sufficient	

	communication bandwidth for information exchange.
<b>Rationale</b>	The system has to work with a minimum amount of bandwidth (this could be a problem with Power Line).
<b>Quantification</b>	

Req. Number	Title	Originator:
2.2.3.21	System coverage	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system should have enough coverage.	
Rationale	The system has to be able to reach a gateway.	
Quantification		

Req. Number	Title	Originator:
2.2.3.22	System security	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	

User Types	Traceability Nature Description
End User	
Description	The eDIANA system should provide mechanism to support security management.
Rationale	The system should cover enough security (e.g. different user groups with each their own functionalities and the switching on and off of appliances should be secure).
Quantification	

Req. Number	Title	Originator:
2.2.3.23	System flexibility	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Macro Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA system needs flexibility (e. g. the change of software in the gateway).	
Rationale	The system should be able to download software.	
Quantification		

Req. Number	Title	Originator:
2.2.3.24	System interoperability	QUINTOR
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category

<b>Macro Cell</b>		<b>Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The eDIANA system should be interoperable with the communication protocols.	
<b>Rationale</b>	The system has to work with various communication protocols (e.g. Zigbee).	
<b>Quantification</b>		

## 2.2.4 Cell user interface

### 2.2.4.1 General

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
Req. 2.2.4.1.1	adaptability	PCL
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell		Usability
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User</b>		
<b>Description</b>	The User Interface must be adaptable to different devices (TV, PC, Handheld, etc). Minor changes are needed for this.	
<b>Rationale</b>	The UI will be compatible with different devices, what leads	

	to more users with less effort
<b>Quantification</b>	

Req. Number	Title	Originator:
Req. 2.2.4.1.2	UI channels	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	We need two kinds of UI channels for eDIANA: a specific eDIANA channel/platform and a channel that can pop-up. The user will actively use the specific platform. The pop-up messages will first passively involve the end user	
Rationale	Stimulate interaction between eDIANA and end user in two ways.	
Quantification		

Req. Number	Title	Originator:
Req. 2.2.4.1.3	Daily behaviour setting	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	

User Types	Traceability Nature Description
End User	
Description	The user must be able to set his daily behaviour into the eDIANA calendar. (e.g. every weekday he wakes up at 7.00h). Next to that he must be able to set exceptional days (e.g. the end user is sick)
Rationale	The eDIANA system will run according to the user's location and activity in the house.
Quantification	

Req. Number	Title	Originator:
Req. 2.2.4.1.4	Single device information	PCL
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA UI must be able to provide the user information about each single electronic device. The end user must be able to interact with it through eDIANA	
Rationale	Provides the user the properties (e.g. energy usage) of the applications running	
Quantification		

Req. Number	Title	Originator:
Req. 2.2.4.1.5	User experience	PCL
Priority	Status	Criticality

eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The eDIANA UI must make the user feeling connected to it. This should lead to a motivated user who controls the system in a logic and intuitive way	
Rationale	Feeling connected will lead to actively involved users	
Quantification		

#### 2.2.4.2 Home specific

**Reg. 5.10** – Provide insights in actual energy use which are similar to the smart energy meter and the energy overview provided by the utility.

Req. Number	Title	Originator:
Req. 2.2.4.2.1	Users profiles	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Usability
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
End User		
Description	The interface should display energy profiles for each inhabitant and one profile for common use.	
Rationale	Energy consumption profiles will improve consumption awareness at home.	

<b>Quantification</b>	
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Req. Number	Title	Originator:
2.2.4.2.2	Home user interface	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Cell and MacroCell will share a unique user interface.	
Rationale	In case there is no system administrator, the end user will be the only one to manage home's energy consumption.	
Quantification		

### 2.2.4.3 Office specific

Req. Number	Title	Originator:
2.2.4.3.1	Office user interfaces	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	System administrator will have a more advanced user interface as workers will be able to see outside information	

	and comfort levels.
<b>Rationale</b>	As office workers won't need to be focused on energy management, systems administrator will have the overall control of the building, therefore, he/she needs to visualise the whole context.
<b>Quantification</b>	

## 2.2.5 Cell Device concentrator

### 2.2.5.1 General

Req. Number	Title	Originator:
Req. 2.2.5.1	Handle priorities of electrical equipment	VTT
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Performance
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Handle priorities of electrical equipment in a case of a price signal (from MCC): to turn off only non-essential equipment and not to turn off all equipment (could be a matrix with a priority value for each device).	
Rationale	This is necessary because all appliances should not be turned off in a case of a price signal	
Quantification	N.A.	

Req. Number	Title	Originator:
Req. 2.2.5.2	Handle out of home/office programs	VTT

Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Performance
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Handle "out of home" (and out of office) programs: to turn off certain equipment and not to turn off all equipment when leaving out. For example, turn off appliances that are on by accident or are – without a good reason – in a standby mode. For example, do not turn off fridge.	
Rationale	This is necessary because all appliances should not be turned off when people are out of home/office	
Quantification	N.A.	

Req. Number	Title	Originator:
Req. 2.2.5.3	Handle time-scheduled programs	VTT
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Performance
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	Handle time-scheduled programs. Turn off certain equipment with a (user-programmable) daily, weekly or yearly period.	
Rationale	This is necessary because all appliances should not be	

	turned off with a time-scheduled programs
<b>Quantification</b>	N.A.

Req. Number	Title	Originator:
Req. 2.2.5.4	Handle exceptions in turning electrical equipment off and on	VTT
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Performance
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	<p>Handle exceptions in turning electrical equipment off and on, for example</p> <ul style="list-style-type: none"> <li>- do not turn off the lights in a room where someone is present,</li> <li>- do not turn off the washing machine during its use,</li> <li>- do not finish a washing program when nobody will be home for the next four hours</li> </ul>	
Rationale	It is necessary to take into account practical constraints	
Quantification	N.A.	

Req. Number	Title	Originator:
Req. 2.2.5.5	Take care of end users' privacy	VTT
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Cell		Privacy

<b>Information Direction</b>	<b>Affected Devices or Elements</b>
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Description</b>	Do not show personal information to others
<b>Rationale</b>	People may avoid using a system if they have concerns on privacy
<b>Quantification</b>	N.A.

### **2.2.5.2 Home specific**

See above, none of the user requirements is specific for homes

### **2.2.5.3 Office specific**

See above, none of the user requirements is specific for offices

## **2.2.6 MacroCell level concentrator**

### **2.2.6.1 General**

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.6.1.1	Data Privacy	ACCIONA
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Description</b>	Cells data stored within MacroCell should not be made	

	public unless authorised.
<b>Rationale</b>	Cells information should be kept private as the end user has the right to publish them.
<b>Quantification</b>	

Req. Number	Title	Originator:
2.2.6.1.2	Security	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
Description	A service for information encryption, session and user id control should be included in order to keep valuable information safe.	
Rationale	This would make the information available for system administrator and end users only.	
Quantification		

Req. Number	Title	Originator:
2.2.6.1.3	Control Hierarchy	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	

<b>Description</b>	MacroCell concentrator holds the main decision centre.
<b>Rationale</b>	System administrator will have the responsibility of all functions.
<b>Quantification</b>	

Req. Number	Title	Originator:
2.2.6.1.4	Outside information access	ACCIONA
Priority	Status	Criticality
eDIANA Level	eDIANA Component	Category
Information Direction	Affected Devices or Elements	
User Types	Traceability Nature Description	
<b>Description</b>	The MacroCell concentrator will be able to access outside information and provide it to the system.	
<b>Rationale</b>	The user will be able to have access to local weather forecast, energy price in the case of energy trading, etc.	
<b>Quantification</b>		

## 2.2.7 Dismantling and replacement

### 2.2.7.1 General

Req. Number	Title	Originator:
2.2.7.1.1	Automatic dismantling procedure	ST
Priority	Status	Criticality

<b>Medium</b>	<b>Initial</b>	<b>Important</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Whole eDIANA Platform</b>		<b>Reliability/Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided /Shared/Undefined</b>	<b>eDIANA modules and products</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User/ Maintenance/ Macro-Cell/ Administrator</b>	<b>Req. 1.7.2.42</b>	
<b>Description</b>	It should be possible to easy activate the dismantling procedure with a simple command. The concerned module should automatically shut down and communicate to the other devices in the eDIANA platform that he is going down, so that the rest of the platform can adjust itself in a new adequate configuration	
<b>Rationale</b>	Shutdown of a specific module may happen at any time for various reasons... it must be an automatic process, with no manual intervention.	
<b>Quantification</b>	Level of human intervention in the dismantling process	

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.7.1.2</b>	<b>Automatic self adjustment</b>	<b>ST</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>High</b>	<b>Initial</b>	<b>Mandatory</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Whole eDIANA Platform</b>		<b>Reliability/Usability</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided</b>	<b>eDIANA modules and products</b>	

<b>/Shared/Undefined</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>
<b>Administrator</b>	<b>Req. 1.7.2.42</b>
<b>Description</b>	The eDIANA platform should be able to sense that a module is detaching and powering down and adjust his status and settings accordingly in order to maintain certain policies and targets, as set by the administrator (self-adjustment)
<b>Rationale</b>	Detaching and dismantling can happen for various reasons and the system must be able to recover / compensate this new situation
<b>Quantification</b>	Level of change in system performances after the dismantling

### 2.2.7.2 Home specific

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
<b>2.2.7.2.1</b>	<b>privacy</b>	<b>ST</b>
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
<b>High</b>	<b>Initial</b>	<b>Mandatory</b>
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
<b>Whole eDIANA Platform</b>		<b>Safety/Security</b>
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided /Shared/Undefined</b>	<b>eDIANA modules and products</b>	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>End User/</b>	<b>Req. 1.7.2.42</b>	
<b>Description</b>	The eDIANA system should have a method for controlling access to the main functions and commands, to prevent unexpected or intentional dismantling, if not allowed by owner of the home. In offices this feature will most probably be already part of the security access control, while in homes this is not usually provided.	

<b>Rationale</b>	Unexpected dismantling or intentional not allowed dismantling could harm the people in the home
<b>Quantification</b>	Presence of access control

### 2.2.7.3 Office specific

<b>Req. Number</b>	<b>Title</b>	<b>Originator:</b>
2.2.7.3.1	aknowledge request	ST
<b>Priority</b>	<b>Status</b>	<b>Criticality</b>
Medium	Initial	Useful
<b>eDIANA Level</b>	<b>eDIANA Component</b>	<b>Category</b>
Cell/Macro Cell/		Reliability/Safety
<b>Information Direction</b>	<b>Affected Devices or Elements</b>	
<b>Required/Provided /Shared/Undefined</b>	eDIANA modules and products	
<b>User Types</b>	<b>Traceability Nature Description</b>	
<b>Administrator</b>	Req. 1.7.2.42	
<b>Description</b>	When deciding to dismantle an eDIANA component or module in a large eDIANA platform/system, it is worth that the concerned component asks to system the permission to powerdown, in order not to jeopardize the overall set up and performances. Such request can be forwarded to the system at the beginning of the automatic dismantling procedure, thus flagging out the administrator if any problem raised by the system.	
<b>Rationale</b>	In large offices it is worth that a sanity check is performed before dismantling a component, in order not to jeopardize the overall operation	
<b>Quantification</b>	Reaction time of acknowledge after sending request to the system by the component	

### 3. Handicaps, system's drawbacks and overlooked requirements

#### 3.1 Purchase and Installation

##### 3.1.1 Overlooked requirements

Req. Number	Title	Originator:
	System installation requirements	<b>ACCIONA</b>
User Types	Traceability Nature Description	
Administrator		
Description	Show technical requirements on PC's processing power, Internet and LAN connection requirements for the eDIANA system to run smoothly.	
Rationale	This kind of information is relevant for installers to see whether the system complies with their building communications infrastructure and PC's O.S. and processor's frequency.	
Quantification	N/A	

##### 3.1.2 Handicaps and system's drawbacks

Req. Number	Title	Originator:
Req. 2.1.1.2.13	Indication	Philips Applied technologies/ACCIONA
User Types	Traceability Nature Description	
End User/ Maintenance/ Macro-Cell/ Administrator	Req. 1.7.2.14, Req. 1.7.2.16, Req. 1.7.2.38	
Description	A component should present the user an (optional) audible and/or visual indication if they are operational and connected to other eDIANA components, or if they become	

	non-operational
<b>Handicaps/Drawbacks</b>	iEi's physical user interface should only show visible indication to the user to avoid adding device's complexity.

## **Conclusion**

This document established the requirements for the eDIANA system. It analyses the needs of the different stakeholders and based on that defines detailed requirements for each part of the system. This requirement document is a detailed workout of the system that is described in a more accessible way in task 1.4.

All involved stakeholders have been analysed using interviews, reports and other documents and their most important requirements have been collected. Based on this requirements have been formulated for each of the parts of the eDIANA system.

The requirements are input to the other workpackages in eDiana which have the task to build a system according to the requirements specified. It is expected that the other workpackages will supply feedback on this deliverable based on what they encounter during the implementation this feedback will be incorporated in the final deliverable which will be ready in month 16.

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