

2014

A STUDY BY THE MPW INSTITUTE LLC:

# SMART HOME/ SMART ENERGY IOS APPS - READY FOR ENERGY SERVICES?



# The MPW Study

Controlling applications and energy use from a smart phone or tablet is no more a vision – it is state of the art. The apps needed to provide this ability vary greatly in scope, approach and usability.

This study is providing a quick overview about the major attributes of these apps with a special focus on what we call ‘energy services readiness’.

This attribute is derived from our vision that in the future the energy market will gradually be transformed into a market for energy services. This significant development can be described as a shift from selling kilowatt hours to selling energy services like heated rooms, lighted offices and air conditioned apartments. Energy services might even include selling TVs including the electricity needed for five years, thus representing life cycle cost of an appliance and in this way allowing a customer to make purchas-

ing decisions based on this information, and not the initial purchase price only.

We believe that this development is made possible by the emerging of ‘smart’ technologies that enable the measurement of energy usage with direct control of various appliances.

The study breaks down the concept of ‘energy services readiness’ into attributes that are already available in smart meter and smart home apps. You will find it interesting to figure out the market leaders and how these key players contribute to this rapidly developing market.



### About MPW

As an operation with interdisciplinary activities, MPW Legal & Tax and MPW Consulting GmbH provide committed consultancy services for players in the energy services market. Our joint consultancy spectrum enables us to provide comprehensive business, tax, legal, technical and sales-related consultancy - all from a single source.

MPW Institute LLC represents those activities of MPW which revolve around the scientific reviewing of global or national issues in the energy services sector and which take place outside the scope of actual consulting projects. Within this unit we conduct research projects and surveys of a scientific nature, devise publications and organise and mount events. MPW Institute LLC is based in New York City.

## Methodology and defining the attributes

The smart home market is still a niche market in Europe. The customer awareness of smart home products and systems is present, but has not been significant enough to build a mature market. One of the barriers to smart home adoption lies in the absence of standards regarding technology, protocols and software. Further key challenges are lack of customer trust, confidence and engagement. Reconciling the needs of different stakeholders as well as finding and creating new customer propositions which support sustainable business models are additional challenges.

There are many providers from different industries active on the market, for example utilities, telecommunication companies, manufacturers and innovative start-ups amongst others, making a variety of smart home products available on the market. Due to the lack of an industry-wide standard, these products are usually incompatible with a products launched by a competitor. Some providers use proprietary protocol, which is provider specific and the customers are restricted to their products only. But there are international communication protocols as well, such as Z-wave and en-Ocean, which seem to ensure that the products implemented with the particular standard work together. IT giants like Google and Apple try to assemble partners on their respective platforms.

The systems themselves also vary from provider to provider. Some systems work with a central hub, which is connected to the home broadband router; some systems need to be installed in the customers' distribution panel and then to the home network. The technical solutions

however have usually no impact on the functionality, control or visualisation of the smart home apps.

Some suppliers specialize in particular services, for example Verisure in home security systems, tado in heating control and Fortum valpas in energy monitoring. Others provide their customers with full home automation packages, such as AlertMe, Alarm.com and Lowe's Iris. The pricing of smart home systems is also variable. Most suppliers offer packages (including central hub and certain devices), but customers can also buy the components separately or expand their system by buying extensions. Besides the cost for the basic smart home system, some suppliers charge one-time fees for the app and monthly fees for operation cost. But generally speaking, automating a home is not as costly as it used to be, with the package prices varying between 200€ to 600€.

This study aims to investigate smart energy and smart home apps' attributes in particular regard to the 'energy services readiness' of the apps. We chose 42 exemplary smart energy or smart home apps for the study from well-known manufacturers such as RWE, Nest, Honeywell, Vattenfall or Opower from the iOS App Stores in Germany, United Kingdom, United States and Finland.

There are around 130 smart energy apps and 450 smart home apps available in the German App Store. In the Finnish App Store there are approximately 140 smart energy and 434 smart home apps available. 154 smart energy and 459 smart home apps are obtainable in the U.K. App Store, while 158 smart energy and 491 smart home apps are available in the U.S. App Store. (All figures in March-May 2014). Although the app stores are full

<b>Visualisation</b>
- <i>Effectiveness (does visualisation provide value?)</i>
- <i>Efficiency (does visualisation help the user performing a task?)</i>
- <i>Usability (how easily do the users interact with the system?)</i>
- <i>Usefulness (is the visualisation useful?)</i>
<b>Usability</b>
- <i>Learnability (is learning to use the app easy?)</i>
- <i>Efficiency (can users quickly perform tasks?)</i>
- <i>Memorability (after not using, how easy can proficiency be reestablished?)</i>
- <i>Satisfaction (how pleasant is it to use the design?)</i>
<b>Energy efficiency readiness</b>
- <i>Neighbour comparison</i>
- <i>Single consumption monitoring of devices (costs of consumption)</i>
- <i>General overview of energy services (e.g. monthly consumption of warmth)</i>
- <i>Individualised energy-efficiency tips</i>

(chart 1: evaluation register - basic attributes)

of smart home and smart energy apps in every country chosen in this study, the seller of the app is rarely from the same country.

We divided the features of the applications into 'basic attributes' (see chart 1) and 'performance attributes' (see chart 2). As for 'basic attributes' we have evaluated visualisation, usability and 'energy service readiness'. We were only able to evaluate visualisation and usability if there was demo data available.

The evaluation of the visualisation is based on the following attributes:

- effectiveness: does visualisation provide value?
- efficiency: does visualisation help the user performing a task?
- usability: how easily do the users interact with the system?
- usefulness: is the visualisation useful?

The evaluation of the usability is based on the following attributes:

- learnability: is learning to use the app easy?
- efficiency: can users quickly perform tasks?
- memorability: after not using, how easy can proficiency be reestablished?
- satisfaction: how pleasant is it to use the design?

The evaluation of energy efficiency readiness of the apps is based on four attributes. Firstly, neighbour comparison, which gives users an overview of how their energy usage and patterns are in comparison to their neighbours. This comparison is deemed to be the most effective in improving energy efficiency. Secondly, single consumption monitoring of devices, which shows the user how much energy a single device, for example a fridge, is currently consuming and what the cost is. Thirdly, the general overview of energy services, which shows the current amount of power usage and the corresponding cost. Lastly, customised energy-efficiency tips, which provides the users with

recommendations on how they can lower their energy bill, for example by changing a gas flame or heated electrical element to an induction cook top.

The basic attributes were evaluated according to the following rating scale:

<i>Excellent</i>	10-9
<i>Very good</i>	8-7
<i>Good</i>	6-5
<i>Fair</i>	4-3
<i>Poor</i>	2-1

As performance attributes (see chart 2) we have evaluated technical independency, software intelligence (software learnability) and performance features, which we have defined as lighting control, heating control, control of household devices, fire safety, security system control, notification and scenarios. The performance features were assessed on a scale of 1 or 10 (10 for yes, 1 for no).

Software intelligence is defined as software learnability, which means the system can learn the customers' activity patterns and help optimise a schedule that fits the customer. Some software are able to learn the users preferences and then program themselves to help the customer save energy.

Technical independency can be defined as the possibility to connect smart home devices from other providers with the existing system. The system is independent if it uses an international communications protocol instead of a proprietary protocol.

We evaluated security system on the basis of the following features:

- fire safety (app sends a notification if the smoke detector indicates an emergency),
- security system control (app alerts customers of movement at home when they are away (burglar alarm), some apps enable customers to lock and un-

<b>Technical independency</b>
- Possibility to connect devices from other provider
<b>Software intelligence</b>
- Software learnability
<b>Performance feature (according to the provider)</b>
Lighting control
Heating control
Control household devices
<b>Security system</b>
Fire safety
Security system control
Notification (e-mail/sms)
Scenarios
<i>(chart 2: evaluation register - performance attributes)</i>

lock doors remotely as well as to watch live feed from security cameras),

- notifications (app sends notification via push feed, email or sms) and
- scenarios (for example away, on vacation, etc. which allows customers to set multiple devices with one click).

The weighting of the attributes is as follows:

<i>Visualisation</i>	25 %
<i>Usability</i>	25 %
<i>Energy service readiness</i>	50 %
<b>Weighted rating (soft)</b>	<b>100 %</b>

<b>Technical independency</b>	<b>20 %</b>
<b>Software intelligence</b> - <i>software learnability</i>	<b>20 %</b>
<b>Performance features</b> - <i>lighting control</i> - <i>heating control</i> - <i>control household devices</i>	<b>40 %</b> 20 % 50 % 30 %
<b>Security system</b> - <i>fire safety</i> - <i>security system control</i> - <i>notifications</i> - <i>scenarios</i>	<b>20 %</b> 30 % 30 % 20 % 20 %
<b>Weighted rating (hard)</b>	<b>100 %</b>

<i>Ability to control appliances</i>	<i>power + heat</i>
<i>Ability to control costs</i>	<i>power + heat</i>
<b>Controlling</b>	<b>50 %</b>

## Key findings of the study

### 1. Widely common in the apps is an intuitive interface and a user-friendly design. (See chart 3)

Most of the 42 apps in this study have an interface that the users can intuit easily. A simple design makes the interaction with the app pleasant. A „swingometer“ (for example AlertMe or Lowe’s Iris) gives the customer a quick overview of their average energy use.

The newest functionality and design concepts are very

important characteristics of an app, since consumers searching for the best smart home system will base their purchase decision upon characteristics like visualisation and usability of the app.

### 2. Learning to use a smart home app is easy. (See chart 4)

Learning to use the apps is easy, assumed the consumer is familiar with smartphone apps and has used apps several times. Even after a longer period of time, proficiency can be reestablished relatively quickly. It is easy to per-

Provider	Visualization	Effectiveness	Efficiency	Usability	Usefulness
Lowe's Iris	9,5	9	9	10	10
AlertMe	9,3	10	9	9	9
Loxone	9,0	9	9	9	9
Vattenfall EnergyWatch Suomi	8,5	8	9	9	8
My Smart Appliances by Whirlpool	8,5	8	9	9	8
ayControl 3 smarthome App	8,5	9	8	9	8
Total connect comfort by Honeywell	8,3	9	8	8	8
Eaton xComfort	8,0	7	6	10	9
illwerke vkw SmartHome	7,8	8	7	8	8
Enexoma smartCONTROL.app	7,8	8	7	8	8
Control4	7,3	9	6	7	7
Greenpocket	6,8	9	-	9	9
TaHoma	6,5	7	7	6	6
Homee	6,3	6	7	6	6
PLC Smart Home	6,3	5	8	7	5
Enexoma smartMeter.app	6,0	8	-	8	8
MeterClient	5,8	7	-	8	8
Fortum Valpas	5,5	7	-	8	7
Bidgely	5,3	8	-	7	6
Telenec Smart Home Mobile*	4,8	4	5	6	4

chart 3: visualization

Provider	Usability	Learnability	Efficiency	Memorability	Satisfaction
AlertMe	9,5	9	10	10	9
Lowe's Iris	8,8	8	9	8	10
Loxone	8,8	8	9	8	10
My Smart Appliances by Whirlpool	8,8	9	10	9	7
Vattenfall EnergyWatch Suomi	8,5	9	9	9	7
ayControl 3 smarhome App	8,5	8	9	8	9
illwerke vkw SmartHome	7,8	8	7	8	8
Enexoma smartCONTROL.app	7,8	8	7	8	8
PLC Smart Home	7,8	9	9	9	4
Eaton xComfort	7,3	8	7	7	7
Greenpocket	7,0	9	-	9	10
Control4	6,8	8	7	5	7
TaHoma	6,8	8	7	6	6
Homee	6,8	7	7	7	6
Fortum Valpas	6,8	10	-	10	7
Total connect comfort by Honeywell	6,3	8	7	3	7
Vitotrol	6,0	6	7	6	5
Enexoma smartMeter.app	5,8	8	-	7	8
MeterClient	5,5	8	-	8	6
Telenec Smart Home Mobile	5,5	6	6	6	4

chart 4: usability

form tasks with the apps and only one of 42 apps crashed multiple times during the rating. We were only able to rate efficiency if it is possible to perform a task with the app. Apps that only control usage and costs; Greenpocket, Forum Valpas, Enexoma smartMeter app and MeterClient were not rated on this part.

Learnability and efficiency are the most important features for consumers as well as a pleasant and useful design.

### 3. Only a few apps have the features neighbour comparison and individualized energy-efficiency. (See chart 5)

Surprisingly only 5 of 42 apps use big data to compare the consumption with available data from neighbours. Studies show that social pressure is the most powerful tool in reducing household energy consumption. If consumers receive personalized information about their energy consumption and if they can compare their consumption with their (fictional) neighbours, consumers start paying attention on their energy waste and start changing their behaviour.

In order for consumers to monitor, control and compare their energy consumption, suppliers need to understand the power of the huge amount of big data available and start using it.

Provider	Energy efficiency readiness	Neighbour comparison	Single consumption monitoring of devices	General overview of energy services	Individualized energy-efficiency tips
Thermostat by Opower	10,0	10	10	10	10
AlertMe	7,8	1	10	10	10
Fortum Valpas	7,8	10 **	1	10	10 **
Bidgely	7,8	1	10	10	10
GreenWave Reality	7,8	10	10	10	1
Cloogy	7,8	10	10	10	1
Tendril	7,8	10	10	10	1
Lowe's Iris	5,5	1	10	10	1
Vattenfall EnergyWatch	5,5	1	10	10	1
Enexoma smartMeter.ap	5,5	1	10	10	1
MeterClient	5,5	1	10	10	1
Smart-Home Qivicon	5,5	1	10	10	1
Alarm.com	5,5	1	10	10	1
Savant TrueControl	5,5	1	10	10	1
INSTEON for Hub	5,5	1	10	10	1
Rockethome	5,5	1	10	10	1
Xfinity by Comcast	5,5	1	10	10	1
RWE SmartHome App	5,5	1	10	10	1
Nest	5,5	1	1	10	10
SolarCity Smart Thermo	5,5	1	10	10	1

chart 5: energy efficiency readiness

\*\*Fortum Valpas neighbour comparison und individualized energy-efficiency tips are only available when accessing the system on the web.

Environmentally conscious consumers monitor their behaviour with the help of monthly consumption or general overview. In order to reach the less environmentally conscious consumers, a combination of energy consumption reports and individualized energy-tips via email, sms or app should be a standard component of a smart home app.

A general overview of energy consumption, for example monthly or yearly, as well as the possibility to monitor the consumption of a single device is mostly a basic feature in smart home / smart energy apps.

**4. Most smart home systems work with a proprietary protocol and the software is fairly unintelligent. (See**

**chart 6,7)**

Only 11 of 42 smart home systems use international standards and are compatible with products from other manufacturers.

The lack of an international standard for communication protocols is one of the main reasons why smart home systems have not reached the mass-market. Furthermore consumers assume and expect that they only need one app to control all devices in the house, instead of multiple apps, for example one app for controlling the lighting, another for security system and a third for monitoring the costs.

Provider	Technical independency	Possibility to connect devices from other provider
GreenWave Reality	10	10
Homee	10	10
INSTEON for Hub	10	10
Rockethome	10	10
AlertMe	10	10
Alarm.com	10	10
Nest	10	10
digitalSTROM	10	10
tapHOME	10	10
PLC Smart Home	10	10
Greenpocket	10	10

chart 6: technical independency

Provider	Software intelligence	Software learnability
AlertMe	10	10
Alarm.com	10	10
Nest	10	10
Loxone	10	10
SmartThings	10	10
Xfinity by Comcast	10	10
Tado	10	10
Allure EverSense	10	10
Bidgely	10	10

chart 7: software intelligence

Just 9 of 42 smart home systems learn the behaviour of the user and program themselves to fit the users schedule or identify the source of inefficiency in the house and recommend an energy-saving solution (for example renew heating or reduce lighting load).

**5. One third of smart home systems offer full home automation. (See chart 8)**

As stated before, some systems are construed in particular services for example home security, others in full home au-

Provider	Performance feature (according to the provider)	Lighting control	Heating control	Control household devices
Loxone	10	10	10	10
SmartThings	10	10	10	10
GreenWave Reality	10	10	10	10
Homee	10	10	10	10
INSTEON for Hub	10	10	10	10
Rockethome	10	10	10	10
Lowe's Iris	10	10	10	10
Eaton xComfort	10	10	10	10
illwerke vkw SmartHome	10	10	10	10
Enexoma smartCONTROL.app	10	10	10	10
TeleneC Smart Home Mobile*	10	10	10	10
Smart-Home Qivicon	10	10	10	10
RWE SmartHome App	10	10	10	10
Vivint	10	10	10	10

chart 8: performance features

tomation. Performance features, such as turning the lights on with the app or adjusting the heating, are basic features most of the smart home or smart energy apps can control.

In addition some systems include or can be combined with a security system control including fire alarm, burglar alarm and notifications via email or sms if an alarm is triggered.

Most of the apps have predefined scenarios or schedules, which allow the customer to set automatic light and thermostat adjustments based on the time of the day or an event, e. g. dinner party.

14 of 42 smart home systems are full home automation systems capable of controlling lighting, heating and household devices. In the future the smart home systems specialising in particular services have to widen their product in to full home automation or the systems has to be compatible with products from other providers, since consumers will expect full automation from a smart home system.

#### **6. Preprogrammed scenarios allow a convenient operation of the smart home system. (See chart 9)**

28 of 36 apps that can control devices enable the consumer to launch predefined settings governing the behaviour of all connected devices. Consumers can configure different settings to match different situations, for example movie night, on vacation or wake up. After programming the different scenarios, consumers only need to push one button and for example all lights go off, heating is turned down and the blinds go down.

These scenarios are one of the most important feature in a smart home. They allow the consumer to leave the house

with a clear mind and without a doubt if, for example, they forgot the iron on or not.

Most apps send out notifications if something is happening in the house while the consumer is away. Remotely locking and unlocking the doors as well as checking the status of the doors while away is still a fairly rare feature.

#### **7. Controlling the smart home needs further development since both appliance and cost control is not yet found in many apps. (See chart 10)**

While 21 out of 42 apps have the ability to control power as well as heat appliances, only 8 out 42 apps allow cost control in both areas power and heat.

Many of the apps can either only control the devices or monitor energy consumption. Those apps that can do both have the advantage that customers can understand the impacts of their own behaviour and can thus start changing they way they use energy and start avoiding energy waste.

Only apps with this functionality can really be called ready for an energy services business model.

Provider	Security system	Fire safety	Security system control	Notification (e-mail/sms)	Scenarios
INSTEON for Hub	10	10	10	10	10
Rockethome	10	10	10	10	10
Eaton xComfort	10	10	10	10	10
Smart-Home Qivicon	10	10	10	10	10
Vivint	10	10	10	10	10
AlertMe	10	10	10	10	10
Alarm.com	10	10	10	10	10
Loxone	8,2	10	10	1	10
GreenWave Reality	8,2	10	10	1	10
Lowe's Iris	7,3	1	10	10	10
TeleneC Smart Home Mobile*	7,3	10	1	10	10
RWE SmartHome App	7,3	10	1	10	10
Xfinity by Comcast	7,3	1	10	10	10
Total connect comfort by Honeywell	7,3	1	10	10	10
Savant TrueControl	7,3	1	10	10	10
ADT Pulse	7,3	1	10	10	10

chart 9: security system

Provider	Ability to control appliances	Ability to control cost	Weighted Rating (Ability)
AlertMe	p+h	p+h	10,0
Alarm.com	p+h	p+h	10,0
GreenWave Reality	p+h	p+h	10,0
Smart-Home Qivicon	p+h	p+h	10,0
Savant TrueControl	p+h	p+h	10,0
INSTEON for Hub	p+h	p	7,5
Rockethome	p+h	p	7,5
Xfinity by Comcast	p+h	h	7,5
Eaton xComfort	p+h	p	7,5
Lowe's Iris	p+h	p	7,5
RWE SmartHome App	p+h	p	7,5

chart 10: ability to control (p=power, h=heating)



## AlertMe\*

### Introduction

AlertMe, a UK company, provides energy and home monitoring hardware and services. AlertMe is a technology innovator in cloud-based smart home services, which helps partners deliver the benefits of the smart grid and smart home to consumers. With their platform, home hub and home area network, AlertMe provides insight that enables customers to control their energy use as well as devices and applications in the home.

### Technology

Based on a multi-protocol home gateway and cloud-based applications, AlertMe integrates many devices and services in the home through an app to create a system that connects everything. Integrated with SmartData, the system can learn to create intelligent automation.

AlertMe works with or without a Smart Meter and is there-

fore uniquely positioned to support Utility and Smart Grid partners, Telecommunications operators, Software and Applications developers, Home Electronics and Appliance OEMs.

The platform is based on a SmartHub that connects to the cloud via broadband router. The SmartHub communicates wirelessly with AlertMe devices and third party enabled devices in the home.

### App features

#### Smart Data

Smart data provides insights from smart meter data for advice on home energy use as well as home systems data for intelligent automation that learns the customers habits and preferences to automatically manage home devices.



### *Smart Energy*

AlertMe app allows customers to monitor their energy use anywhere and anytime, in order to reduce waste and save money.

### *Smart Heating*

Smart heating allows customers to programme and remotely control heating over the app.

### *Smart Monitoring*

Smart monitoring 'magic rules' provide the ability to intelligently automate devices so they work together and the system learns the customers habits and preferences to automatically adapt without a constant intervention by the customer. It includes applications such as security sensors, safety detectors, cameras, keypads, locks, thermostats, key fobs and connected home appliances.

### **Benefits of the app**

The platform is affordable and expandable. It combines multi-protocol connectivity for devices in the home, with a cloud service and applications that can be accessed anywhere using a single log in and user interface via Smartphone. AlertMe also provides personalised insights through advanced data analytics using both specific user data, compared to other users and combined with third party data such as demographics, weather etc.



## Lowe's Iris\*

### Introduction

Lowe's is an American chain of retail home improvement and appliance stores. Lowe's Iris is a do-it-yourself home management system, which lets its user monitor, control and secure their home.

### Technology

Iris is a reliable and easy one-stop solution that can be set up and customize for the users home in about an hour. Iris works with three components: the hub, the cloud platform and the combination of wireless sensors and devices. The hub is the centrepiece, that connects sensors and devices to the platform. It supports ZigBee, Z-Wave and WiFi wireless protocols, one hub can support up to 200 devices. Iris only supports compatible devices that are marked by a „works with Iris“ logo.

The hub is connected to an open port on a broadband

modem or router and it communicates wirelessly with the installed devices and sensors via cloud platform. The wireless communication between the hub and the devices can be improved with an Iris range extender.

There are three different home management starter kits available: Safe & Secure, Comfort & Control and Smart. Each kit includes a hub and specific collection of accessories designed to customize the home. Besides the starter kits, Iris offers two core service levels, basic and premium. The basic service plan includes basic control of Iris devices and email, text or voice call alerts if the alarm is triggered. In addition to that, the premium plan contains extended video camera live streaming, recording and storage; Iris Magic for configuring rules across multiple Iris devices; home modes settings across all installed devices and voice control through Iris mobile app.



The add-on services are care and cellular connection. Care service consists of instant messaging for personal emergencies, monitoring of activity and movement, receiving alerts when help is needed or when daily routines change unexpectedly. Cellular connection is divided in backup: Iris stays connected when broadband fails and covers all normal system operation (up to 5 MB of data), and in primary: continuous connectivity to Iris through the cellular network and it covers all normal system operation (up to 20 MB of data)

### App features

Depending on the service plan (basic or premium), account holder can receive notification when alarm or alert is triggered and access notifications in system history. Account holder can turn devices on or off remotely and set on/off schedules for all Iris devices, they can stream video and record it on command or according to alarms and events.

Customers can control their thermostat remotely, view electricity consumption in real time and automatically turn off devices when energy consumption settings are exceeded. Locks can be opened and closed remotely or by schedule and access PINs, and customers can receive arrival/departure notifications. Furthermore premium account holders can create if/then custom rules across their system, use modes to control all Iris devices with a push of a button and assign default settings for alarms, locks, lights and video cameras for each mode.

### Benefits of the app

The new voice control app feature allows customers to use spoken commands. Iris is constantly improving the home management capabilities by adding new features periodically. With different starter kits, service plans and additional services, Iris is inexpensive and can be extended over time by adding accessories or changing service plans.



## Eaton xComfort\*

### Introduction

Eaton is an American power management company providing energy-efficient solutions that help customers effectively manage electrical, hydraulic and mechanical power. Eaton's xComfort is a wireless home automation system combining comfort, safety and energy management in a building.

### Technology

xComfort gives customers full remote control of all electronic devices in their homes. The system offers perfect and flexible solutions for light and shading control. The alarm feature provides reassurance with burglar and fire protection. Also, xComfort can be used to control either electric or water-circulation central heating.

All components of xComfort communicate wirelessly, which makes the installation comfortable and simple. The

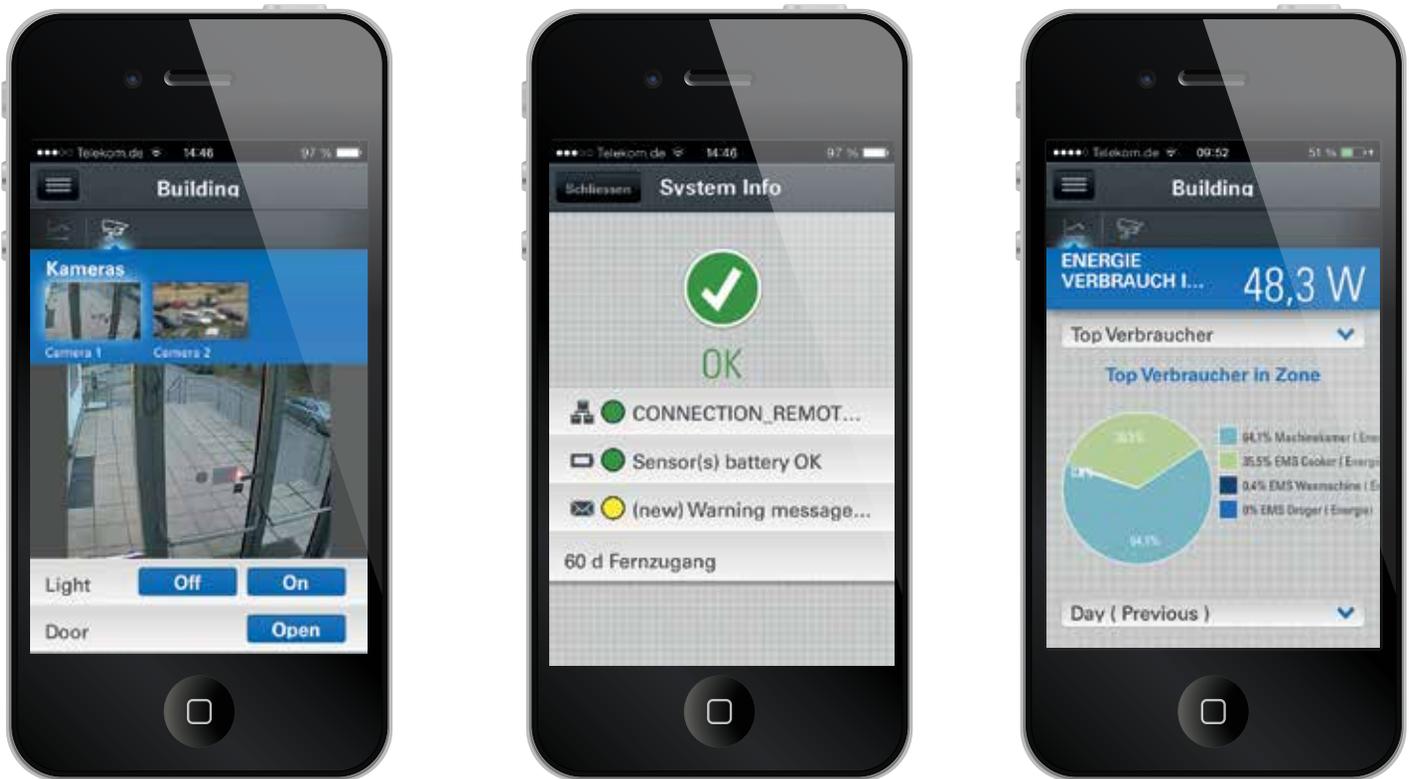
system works bidirectional, which ensures a reliable transmission of the signals. This means, that each transmitter receives an answer if its signals have been received and understood.

xComfort needs to be installed by an electrician, as it involves marking changes to electrical systems. An electrician sets up a solution with the desired light and heating control and associated time-switches. The system can be extended to include blinds and security cameras as well as TV, radio, doors and so on.

### App features

The xComfort smart home app provides customers with full access to wireless control of their houses wherever they are.

Comfort features include individual adjustment of lighting



scenarios, timing of blinds to go up and down at certain time periods of the day and setting up temperature profiles for each room according to the specific daily usage pattern. A master switch enables customers to turn off all lights and electrical appliances when leaving home.

Safety features include a central off button, which turns off selected power consumers when leaving the house; a panic button activates selected functions in order to scare any uninvited visitor and the presence simulation gives the impression of someone being home when no one really is. Energy management features include energy-efficient control of heating and cooling as well as visualisation of the energy consumption.

### Benefits of the app

Customers can control their devices by using the app and receive reports containing important information (e.g. tem-

perature both indoors and outdoors). Customers can also switch systems like heating, lights and alarm off and on. If, for example there is a leak, the temperature in the freezer increases or the alarm goes off, the details of the problem can be shown on the app. Furthermore customers can check if they have turned off their electrical devices (e.g. iron or coffee machines), and if not, they can switch them off no matter where they are.



## Loxone\*

### Introduction

Loxone Electronics GmbH is an Austrian Company focusing on developing and producing control solutions for all homes. Their aim is to make home automation interesting, affordable and accessible for everyone.

### Technology

The central piece of the Loxone home automation solution is the Miniserver. The Miniserver allows customers to control everything in and around their homes, ranging from simple blind control to intelligent and cost-efficient zoned heating systems.

Once the Miniserver is installed in the customers' distribution panel and connected to the home network, it can monitor inputs and control all devices. The Miniserver offers several analog and digital inputs and outputs, a LAN port and an EIB KNX® connector. Customers can expand

their home automation system by connecting extensions to the Miniserver, which increases the number of available inputs and outputs. Customers have the possibility to add up to 30 extensions to a single Miniserver without compromising the overall performance. Configuration software with numerous functions help customers set up their system and is available without charge. Furthermore there are several installation videos and guides available online for customers.

### App features

With the Loxone smart home app customers can control everything in their home. Customers can operate curtains, blinds and shutters flexibly and intelligently. For example, they could set up the shutters to close by sunset or open by sunrise, or awning to retract by wind automatically. Customers can also set up lighting scenes, even different colours for different scenes and dim lights to a perfect



level. Heating in each room can be individually controlled to a specific temperature. The heating “learns” after a 2 to 4 week training phase, how long it takes to get a room to the desired temperature and switches itself on automatically. It is also possible to adjust the heating mixer with Loxone’s heating control function. The heating controller can store statistics and figures which allows a year-on-year comparison. Besides, customers can choose different music in different rooms or synchronize them all. Specific music or radio station can be chosen for different scenarios.

Installed motion sensors detect intruders, which sets the burglar alarm on. The lights will go on, the blinds will open and a notification is sent per text message, email or even by a phone call. Customers can remotely control the alarm system and activate or deactivate the alarm with a switch, code or automatically.

### Benefits of the app

With the Loxone app customers can access, monitor and control their homes from anywhere. The app looks for the Miniserver on the LAN and automatically changes to roaming mode if necessary. With scenario setting, for example party or waking up, customers can choose specific lighting, music and shading to fit the occasion. Additionally, ‘Block Functions’ make advanced actions possible, such as selecting a colour for RGB lighting or setting up blinds to go to predefined positions.

The app connects automatically to the Miniserver and has been designed to make navigation easy and pleasant. The layout is clear, which makes navigation intuitive and fast. Loxone smart home app is completely free of charge.

The app provides a bidirectional connection with the Miniserver, which allows the comparison of switching states and status in real time.



## Homee\*

### Introduction

Codeatelier is a German software engineering startup company. Codeatelier aims to create intuitive and user-friendly applications for their customers and business partners.

Their vision is to provide intelligent software solutions that contribute to the realization of customers' creative ideas.

### Technology

Homee transforms a FRITZ!Box from AVM into a central control for the whole house. Customers can control, monitor and atomise all Homee-compatible products installed in the house. Homee is operable only in combination with a compatible FRITZ!Box (not included in the shipment). Currently Homee supports FRITZ!Box 7390, 3370, 7270 and many more.

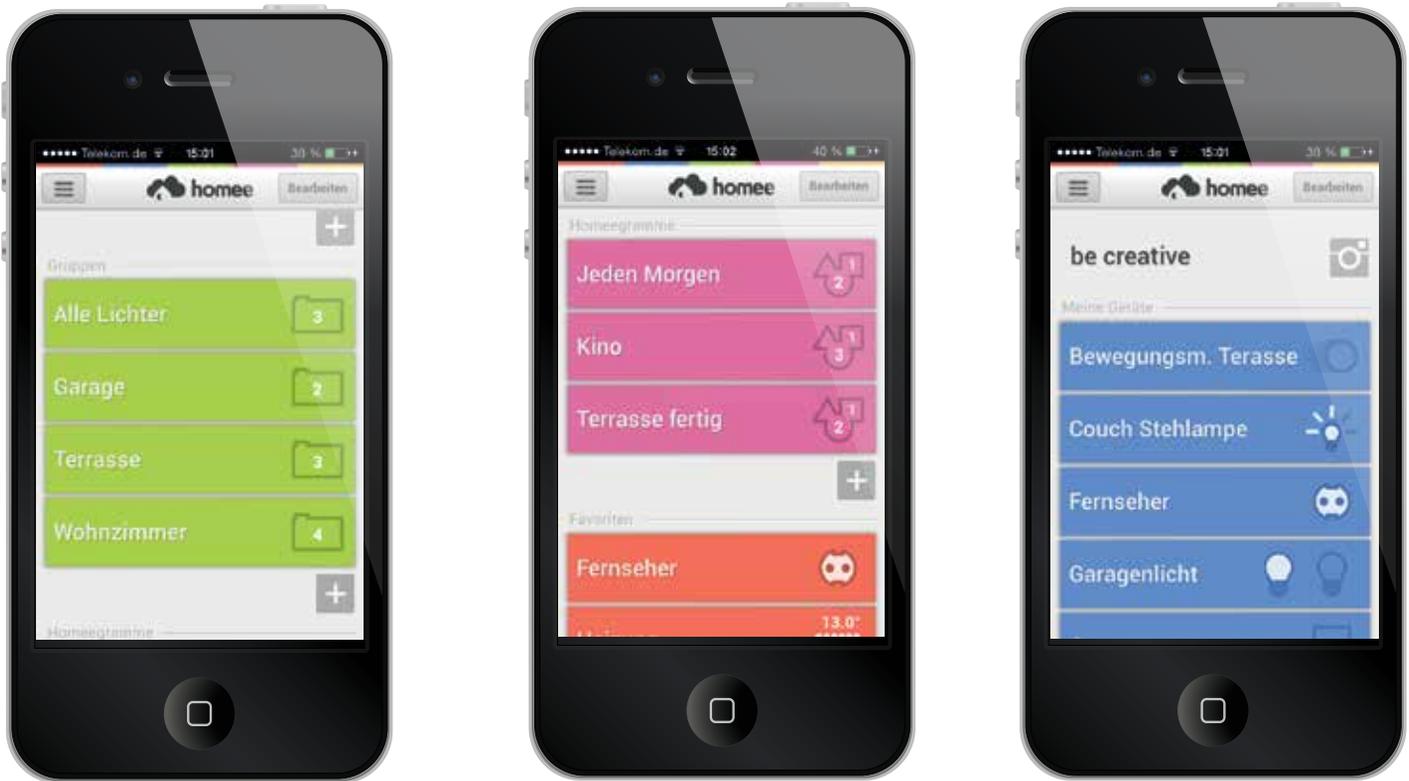
Installing Homee doesn't require any technical knowledge, it is intuitive to install and operate.

Once Homee is connected via USB to the customers DSL-Router, it transforms the Router into a control centre for the whole house.

Customers can buy all Homee-compatible products at the Homee online-shop. The communication between Homee app and the products is carried out via the international standard protocol Z-Wave.

Homee uses cryptographic technique, which is used for secure communication in the presence of third parties, for instance in online banking. Furthermore Homee makes sure, that the installed Homee-compatible products can be operated manually, if the FRITZ!Box or Homee is defect.

Furthermore the way Homee communicates is different to other home automation solutions. Homee communicates only with the customer directly without using a server,



where the personal data would be stored and possibly hacked.

### App features

With this app customers can communicate with Homee from wherever they are. At home, it is possible to operate Homee even if the internet is not working.

Homee can do more than just turn on or off the connected devices. Homee can automatically turn down the heating if a window is open, dim the lights when a movie starts on TV or send out a notification if it starts to rain and a window is open. All these tricks can be set up with the Homeegramms on the app.

### Benefits of the app

Homee app is designed to quickly perform tasks. It is free of charge and can be used from anywhere.

Homee system is inexpensive and can be used to, for example, only control heating or the system can be extended over time by including motion detectors, window sensors, etc.

Homee is still in its fledgling stages. Further enhancing the house will become possible in the near future, when new extensions become available.

## Conclusion

Since smart phones have become predominant, a smart home system that is not controllable via smart home app is non advantageous. Most consumers have a dismissive attitude towards using multiple smart devices when one is sufficient.

Smart home systems are growing, more and more features are developed for example health surveillance for elderly in the house or automated pet door. In the future smart home customers will expect a full automated system when buying a smart home system and not only a particular service. The system will have to be expandable from, for example, controlling lights and heating to full security system or health monitoring system.

Furthermore the environmental consciousness is growing and will become a bigger issue in the future. Monitoring and controlling the energy consumption will become a absolutely necessary feature in a smart home system.

The energy market is changing, energy services like heat supply or lighting will be combined with smart technologies. Consumers will no longer pay for consumed kWh, but consumed energy services, for example consumed TV hours, which allows consumers to directly link behaviour with pricing. Expanding the smart energy readiness of the apps is the next logical step - we are not there yet, as this study demonstrated.

---

I

Widely common in the apps is an intuitive interface and a user-friendly design.

II

Learning to use a smart home app is easy.

III

Only a few apps have the features neighbour comparison and individualized energy-efficiency.

IV

Most smart home systems work with a proprietary protocol and the software is fairly unintelligent.

V

One third of smart home systems offer full home automation.

VI

Preprogrammed scenarios allow a convenient operation of the smart home system.

VII

Controlling the smart home needs further development since both appliance and cost control is not yet found in many apps.

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# Annex

In the annex you will find a detailed chart of each app tested and evaluated in this study.



## Smart-Home Qivicon

(not available)

Available in German app store

qivicon.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>6,4</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>10,0</b>
<b>Weighted Rating TOTAL</b>	<b>nn</b>
- App price	(not available)
- Operation costs	n.s.



## AlertMe

1.1

Available in UK app store

alertme.com

Demo data available

<b>Visualisation</b>	<b>9,3</b>
- Effectiveness (does visualisation provide value?)	10
- Efficiency (does visualisation help the user performing a task?)	9
- Usability (how easily do the users interact with the system?)	9
- Usefulness (is the visualisation useful?)	9
<b>Usability</b>	<b>9,5</b>
- Learnability (is learning to use the app easy?)	9
- Efficiency (can users quickly perform tasks?)	10
- Memorability (after not using, how easy can proficiency be reestablished?)	10
- Satisfaction (how pleasant is it to use the design?)	9
<b>Energy efficiency readiness</b>	<b>7,8</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	10
<b>Weighted Rating (Soft)</b>	<b>8,6</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>8,2</b>
Lighting control	1
Heating control	10
Control household devices	10
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>9,3</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>10,0</b>
<b>Weighted Rating TOTAL</b>	<b>9,5</b>
- App price	0£
- Operation costs	n.s.



## GreenWave Reality

1.65

Available in US app store

greenwavereality.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>7,8</b>
- Neighbour comparison	10
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,9</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>8,2</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>7,8</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>10,0</b>
<b>Weighted Rating TOTAL</b>	<b>7,9</b>
- App price	0\$
- Operation costs	n.s.



## Alarm.com

2.6.1

Available in US app store

alarm.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>7,3</b>
Lighting control	10
Heating control	10
Control household devices	1
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>8,9</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>10,0</b>
<b>Weighted Rating TOTAL</b>	<b>7,9</b>
- App price	0\$
- Operation costs	n.s.



## Lowe's Iris

1.7.0

Available in US app store

lowes.com/iris

Demo data available

<b>Visualisation</b>	<b>9,5</b>
- Effectiveness (does visualisation provide value?)	9
- Efficiency (does visualisation help the user performing a task?)	9
- Usability (how easily do the users interact with the system?)	10
- Usefulness (is the visualisation useful?)	10
<b>Usability</b>	<b>8,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	9
- Memorability (after not using, how easy can proficiency be reestablished?)	8
- Satisfaction (how pleasant is it to use the design?)	10
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>7,3</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>7,3</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,9</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>7,5</b>
<b>Weighted Rating TOTAL</b>	<b>7,0</b>
- App price	0\$
- Operation costs	9.99\$



## Savant TrueControl

522.0.0

Available in US app store

savantsystems.com

Demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>7,3</b>
Lighting control	10
Heating control	10
Control household devices	1
<b>Security system</b>	<b>7,3</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>4,8</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>10,0</b>
<b>Weighted Rating TOTAL</b>	<b>6,9</b>
- App price	0\$
- Operation costs	n.s.



## Eaton xComfort

1.1

Available in US app store

eaton.eu

Demo data available

<b>Visualisation</b>	<b>8,0</b>
- Effectiveness (does visualisation provide value?)	7
- Efficiency (does visualisation help the user performing a task?)	6
- Usability (how easily do the users interact with the system?)	10
- Usefulness (is the visualisation useful?)	9
<b>Usability</b>	<b>7,3</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	7
- Satisfaction (how pleasant is it to use the design?)	7
<b>Energy efficiency readiness</b>	<b>3,3</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>5,4</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>6,4</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>7,5</b>
<b>Weighted Rating TOTAL</b>	<b>6,7</b>
- App price	0€
- Operation costs	n.s.



## INSTEON for Hub

1.6.0

Available in US app store

insteon.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>8,2</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>7,5</b>
<b>Weighted Rating TOTAL</b>	<b>6,5</b>
- App price	0\$
- Operation costs (annually)	0\$



## Rockethome

1.0.2

Available in German app store

rockethome.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>8,2</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>7,5</b>
<b>Weighted Rating TOTAL</b>	<b>6,5</b>
- App price	0€
- Operation costs	4,90 €



## Xfinity by Comcast

4.2.6

Available in US app store

comcast.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>7,3</b>
Lighting control	10
Heating control	10
Control household devices	1
<b>Security system</b>	<b>7,3</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>6,6</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	h
<b>Weighted Rating (Ability)</b>	<b>7,5</b>
<b>Weighted Rating TOTAL</b>	<b>6,1</b>
- App price	0\$
- Operation costs	39,95\$



## RWE SmartHome App

1.6

Available in German app store

rwe-smarthome.de

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>7,3</b>
Fire safety	10
Security system control	1
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,9</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>7,5</b>
<b>Weighted Rating TOTAL</b>	<b>5,9</b>
- App price	0€
- Operation costs	14,95€ p. a.



## Loxone

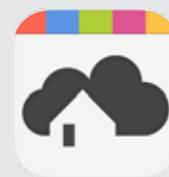
3.3

Available in German app store

loxone.com

Demo data available

<b>Visualisation</b>	<b>9,0</b>
- Effectiveness (does visualisation provide value?)	9
- Efficiency (does visualisation help the user performing a task?)	9
- Usability (how easily do the users interact with the system?)	9
- Usefulness (is the visualisation useful?)	9
<b>Usability</b>	<b>8,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	9
- Memorability (after not using, how easy can proficiency be reestablished?)	8
- Satisfaction (how pleasant is it to use the design?)	10
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,9</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>8,2</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>7,8</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>5,7</b>
- App price	0€
- Operation costs	0



## Homee

0.9.3

Available in German app store

hom.ee

Demo data available

<b>Visualisation</b>	<b>6,3</b>
- Effectiveness (does visualisation provide value?)	6
- Efficiency (does visualisation help the user performing a task?)	7
- Usability (how easily do the users interact with the system?)	6
- Usefulness (is the visualisation useful?)	6
<b>Usability</b>	<b>6,8</b>
- Learnability (is learning to use the app easy?)	7
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	7
- Satisfaction (how pleasant is it to use the design?)	6
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,8</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>4,6</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>7,1</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>5,2</b>
- App price	0€
- Operation costs	n.s.



## Nest

4.0.2

Available in US app store

nest.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	10
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	1
Heating control	10
Control household devices	1
<b>Security system</b>	<b>3,7</b>
Fire safety	10
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>6,9</b>
<b>Ability to control appliances</b>	h
<b>Ability to control cost</b>	h
<b>Weighted Rating (Ability)</b>	<b>5,5</b>
<b>Weighted Rating TOTAL</b>	<b>5,2</b>
- App price	0\$
- Operation costs	0\$



## Greenpocket

1.5.8

Available in German app store

greenpocket.de

Demo data available

<b>Visualisation</b>	<b>6,8</b>
- Effectiveness (does visualisation provide value?)	9
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	9
- Usefulness (is the visualisation useful?)	9
<b>Usability</b>	<b>7,0</b>
- Learnability (is learning to use the app easy?)	9
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	9
- Satisfaction (how pleasant is it to use the design?)	10
<b>Energy efficiency readiness</b>	<b>5,3</b>
- Neighbour comparison	1 *
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>6,1</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>3,2</b>
<b>Ability to control appliances</b>	
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,8</b>
- App price	0€
- Operation costs	n.s.

\*no neighbour comparison but "social metering" with facebook connection



## illwerke vkw SmartHome

1.2.6

Available in German app store

mein-evo-smarthome.de

Demo data available

<b>Visualisation</b>	<b>7,8</b>
- Effectiveness (does visualisation provide value?)	8
- Efficiency (does visualisation help the user performing a task?)	7
- Usability (how easily do the users interact with the system?)	8
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>7,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	8
- Satisfaction (how pleasant is it to use the design?)	8
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,4</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,0</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,8</b>
- App price	0€
- Operation costs	0



## Enexoma smartCONTROL.app

2.4.1

Available in German app store

enexoma.de

Demo data available

<b>Visualisation</b>	<b>7,8</b>
- Effectiveness (does visualisation provide value?)	8
- Efficiency (does visualisation help the user performing a task?)	7
- Usability (how easily do the users interact with the system?)	8
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>7,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	8
- Satisfaction (how pleasant is it to use the design?)	8
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,4</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,0</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,8</b>
- App price	0,89 €
- Operation costs	n.s.



## Vattenfall EnergyWatch Suomi

1.5.59

Available in Finnish app store

[vattenfall.fi/energywatch](http://vattenfall.fi/energywatch)

Demo data available

<b>Visualisation</b>	<b>8,5</b>
- Effectiveness (does visualisation provide value?)	8
- Efficiency (does visualisation help the user performing a task?)	9
- Usability (how easily do the users interact with the system?)	9
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>8,5</b>
- Learnability (is learning to use the app easy?)	9
- Efficiency (can users quickly perform tasks?)	9
- Memorability (after not using, how easy can proficiency be reestablished?)	9
- Satisfaction (how pleasant is it to use the design?)	7
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>7,0</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	10
Heating control	1
Control household devices	10
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>3,2</b>
<b>Ability to control appliances</b>	<b>p</b>
<b>Ability to control cost</b>	<b>p</b>
<b>Weighted Rating (Ability)</b>	<b>4,5</b>
<b>Weighted Rating TOTAL</b>	<b>4,8</b>
- App price	0€
- Operation costs	0



## Telenec Smart Home Mobile\*

1.2

Available in German app store

telenec.smart-portal.net

Demo data available

<b>Visualisation</b>	<b>4,8</b>
- Effectiveness (does visualisation provide value?)	4
- Efficiency (does visualisation help the user performing a task?)	5
- Usability (how easily do the users interact with the system?)	6
- Usefulness (is the visualisation useful?)	4
<b>Usability</b>	<b>5,5</b>
- Learnability (is learning to use the app easy?)	6
- Efficiency (can users quickly perform tasks?)	6
- Memorability (after not using, how easy can proficiency be reestablished?)	6
- Satisfaction (how pleasant is it to use the design?)	4
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,1</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>7,3</b>
Fire safety	10
Security system control	1
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,9</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,7</b>
- App price	0€
- Operation costs	n.s.
*App crashes frequently	



### Total connect comfort by Honeywell

7.8

Available in US app store

mytotalconnect.com

Demo data available

<b>Visualisation</b>	<b>8,3</b>
- Effectiveness (does visualisation provide value?)	9
- Efficiency (does visualisation help the user performing a task?)	8
- Usability (how easily do the users interact with the system?)	8
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>6,3</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	3
- Satisfaction (how pleasant is it to use the design?)	7
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,1</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>7,3</b>
Lighting control	10
Heating control	10
Control household devices	1
<b>Security system</b>	<b>7,3</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>4,8</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,7</b>
- App price	0\$
- Operation costs	n.s.



## Control4

1.0

Available in US app store

control4.com

Demo data available

<b>Visualisation</b>	<b>7,3</b>
- Effectiveness (does visualisation provide value?)	9
- Efficiency (does visualisation help the user performing a task?)	6
- Usability (how easily do the users interact with the system?)	7
- Usefulness (is the visualisation useful?)	7
<b>Usability</b>	<b>6,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	5
- Satisfaction (how pleasant is it to use the design?)	7
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,0</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>7,3</b>
Lighting control	10
Heating control	10
Control household devices	1
<b>Security system</b>	<b>5,5</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>4,4</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,6</b>
- App price	0\$
- Operation costs	n.s.



## MeterClient

1.2.1

Available in German app store

ubitronix.com

Demo data available

<b>Visualisation</b>	<b>5,8</b>
- Effectiveness (does visualisation provide value?)	7
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	8
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>5,5</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	8
- Satisfaction (how pleasant is it to use the design?)	6
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>5,6</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>2,8</b>
<b>Ability to control appliances</b>	
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,6</b>
- App price	0€
- Operation costs	0



## SmartThings

1.5.1

Available in US app store

smarthings.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>0,5</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>5,5</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	10
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>7,3</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,5</b>
- App price	0\$
- Operation costs	0\$

**Tado**

1.82

Available in German app store

tado.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>3,3</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>1,6</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	1
Heating control	10
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,0</b>
<b>Ability to control appliances</b>	h
<b>Ability to control cost</b>	h
<b>Weighted Rating (Ability)</b>	<b>5,5</b>
<b>Weighted Rating TOTAL</b>	<b>4,4</b>
- App price	0€
- Operation costs	0



## My Smart Appliances by Whirlpool

1.0.2

Available in US app store

mysmartappliances.com

Demo data available

<b>Visualisation</b>	<b>8,5</b>
- Effectiveness (does visualisation provide value?)	8
- Efficiency (does visualisation help the user performing a task?)	9
- Usability (how easily do the users interact with the system?)	9
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>8,8</b>
- Learnability (is learning to use the app easy?)	9
- Efficiency (can users quickly perform tasks?)	10
- Memorability (after not using, how easy can proficiency be reestablished?)	9
- Satisfaction (how pleasant is it to use the design?)	7
<b>Energy efficiency readiness</b>	<b>3,3</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>5,9</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>3,7</b>
Lighting control	1
Heating control	1
Control household devices	10
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>2,4</b>
<b>Ability to control appliances</b>	<b>p</b>
<b>Ability to control cost</b>	<b>p</b>
<b>Weighted Rating (Ability)</b>	<b>4,5</b>
<b>Weighted Rating TOTAL</b>	<b>4,3</b>
- App price	0\$
- Operation costs	0\$



## Thermostat by Opower

1.19.3

Available in US app store

thermostat.opower.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>10,0</b>
- Neighbour comparison	10
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	10
<b>Weighted Rating (Soft)</b>	<b>5,0</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>1,4</b>
<b>Ability to control appliances</b>	<b>h</b>
<b>Ability to control cost</b>	<b>h</b>
<b>Weighted Rating (Ability)</b>	<b>5,5</b>
<b>Weighted Rating TOTAL</b>	<b>4,3</b>
- App price	0\$
- Operation costs	n.s.



## digitalSTROM

1.1.0

Available in German app store

digitalstrom.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	10
Heating control	1
Control household devices	10
<b>Security system</b>	<b>4,6</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,3</b>
<b>Ability to control appliances</b>	p
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>4,5</b>
<b>Weighted Rating TOTAL</b>	<b>4,3</b>
- App price	0€
- Operation costs	n.s.



## Vivint

2.6.1

Available in US app store

vivint.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>0,5</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>10</b>
Lighting control	10
Heating control	10
Control household devices	10
<b>Security system</b>	<b>10</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>6,4</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,2</b>
- App price	0\$
- Operation costs	0\$



## Enexoma smartMETER.app

1.12.5

Available in German app store

enexoma.de

Demo data available

<b>Visualisation</b>	<b>6,0</b>
- Effectiveness (does visualisation provide value?)	8
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	8
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>5,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	7
- Satisfaction (how pleasant is it to use the design?)	8
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>5,7</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>1,0</b>
<b>Ability to control appliances</b>	
<b>Ability to control cost</b>	p+h
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>4,2</b>
- App price	0
- Operation costs	n.s.



## Cloogy

1.2.0

Available in US app store

cloogy.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>7,8</b>
- Neighbour comparison	10
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,9</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	10
Heating control	1
Control household devices	10
<b>Security system</b>	<b>4,6</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>3,5</b>
<b>Ability to control appliances</b>	p
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>4,5</b>
<b>Weighted Rating TOTAL</b>	<b>4,1</b>
- App price	0\$
- Operation costs	n.s.



## EnergyHub

1.0.1

Available in US app store

energyhub.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>3,3</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>1,6</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	1
Heating control	10
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>3,2</b>
<b>Ability to control appliances</b>	<b>h</b>
<b>Ability to control cost</b>	<b>h</b>
<b>Weighted Rating (Ability)</b>	<b>5,5</b>
<b>Weighted Rating TOTAL</b>	<b>3,9</b>
- App price	0\$
- Operation costs	0\$

**ADT Pulse**

5.0.3.8752

Available in US app store

adtpulse.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>0,5</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>7,3</b>
Lighting control	10
Heating control	10
Control household devices	1
<b>Security system</b>	<b>7,3</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	10
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>4,8</b>
<b>Ability to control appliances</b>	p+h
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>5,0</b>
<b>Weighted Rating TOTAL</b>	<b>3,8</b>
- App price	0\$
- Operation costs	0\$



## SolarCity Smart Thermostat

1.3.2

Available in US app store

[solarcity.com/thermostat](http://solarcity.com/thermostat)

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>5,5</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>2,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>1,0</b>
<b>Ability to control appliances</b>	<b>h</b>
<b>Ability to control cost</b>	<b>h</b>
<b>Weighted Rating (Ability)</b>	<b>5,5</b>
<b>Weighted Rating TOTAL</b>	<b>3,7</b>
- App price	0\$
- Operation costs	n.s.



## Bidgely

2.2.1

Available in US app store

bidgely.com

Demo data available

<b>Visualisation</b>	<b>5,3</b>
- Effectiveness (does visualisation provide value?)	8
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	7
- Usefulness (is the visualisation useful?)	6
<b>Usability</b>	<b>3,8</b>
- Learnability (is learning to use the app easy?)	7
- Efficiency (can user quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	3
- Satisfaction (how pleasant is it to use the design?)	5
<b>Energy efficiency readiness</b>	<b>7,8</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	10
<b>Weighted Rating (Soft)</b>	<b>6,1</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>2,8</b>
<b>Ability to control appliances</b>	
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>2,5</b>
<b>Weighted Rating TOTAL</b>	<b>3,5</b>
- App price	0\$
- Operation costs	n.s.



## Fortum Valpas

1.0

Available in Finnish app store

fortum.fi

No demo data available\*

<b>Visualisation</b>	<b>5,5</b>
- Effectiveness (does visualisation provide value?)	7
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	8
- Usefulness (is the visualisation useful?)	7
<b>Usability</b>	<b>6,8</b>
- Learnability (is learning to use the app easy?)	10
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	10
- Satisfaction (how pleasant is it to use the design?)	7
<b>Energy efficiency readiness</b>	<b>7,8</b>
- Neighbour comparison	10
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	10
<b>Weighted Rating (Soft)</b>	<b>6,9</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	10
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>1,4</b>
<b>Ability to control appliances</b>	
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>2,5</b>
<b>Weighted Rating TOTAL</b>	<b>3,3</b>
- App price	0€
- Operation costs	0€

\*real data

\*\*some features are available only when accessing the system on the web

**Vitotrol**

3.1.30

Available in German app store

viessmann.de

Demo data available

<b>Visualisation</b>	<b>4,5</b>
- Effectiveness (does visualisation provide value?)	4
- Efficiency (does visualisation help the user performing a task?)	5
- Usability (how easily do the users interact with the system?)	6
- Usefulness (is the visualisation useful?)	3
<b>Usability</b>	<b>6,0</b>
- Learnability (is learning to use the app easy?)	6
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	6
- Satisfaction (how pleasant is it to use the design?)	5
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,1</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	1
Heating control	10
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>3,2</b>
<b>Ability to control appliances</b>	<b>h</b>
<b>Ability to control cost</b>	<b>h</b>
<b>Weighted Rating (Ability)</b>	<b>3,0</b>
<b>Weighted Rating TOTAL</b>	<b>3,1</b>
- App price	5,49€*
- Operation costs	n.s.

\*fullversion app 5,49€, demo for free



## PLC Smart Home

1.4.2

Available in German app store

sps-jalousiesteuerung.de

Demo data available

<b>Visualisation</b>	<b>6,3</b>
- Effectiveness (does visualisation provide value?)	5
- Efficiency (does visualisation help the user performing a task?)	8
- Usability (how easily do the users interact with the system?)	7
- Usefulness (is the visualisation useful?)	5
<b>Usability</b>	<b>7,8</b>
- Learnability (is learning to use the app easy?)	9
- Efficiency (can users quickly perform tasks?)	9
- Memorability (after not using, how easy can proficiency be reestablished?)	9
- Satisfaction (how pleasant is it to use the design?)	4
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,0</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>2,8</b>
Lighting control	10
Heating control	1
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>3,5</b>
<b>Ability to control appliances</b>	p
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>2,0</b>
<b>Weighted Rating TOTAL</b>	<b>2,9</b>
- App price	0€
- Operation costs	0€

**TaHoma**

1.0

Available in German app store

somfy-smarthome.de

Demo data available

<b>Visualisation</b>	<b>6,5</b>
- Effectiveness (does visualisation provide value?)	7
- Efficiency (does visualisation help the user performing a task?)	7
- Usability (how easily do the users interact with the system?)	6
- Usefulness (is the visualisation useful?)	6
<b>Usability</b>	<b>6,8</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	7
- Memorability (after not using, how easy can proficiency be reestablished?)	6
- Satisfaction (how pleasant is it to use the design?)	6
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	10
Heating control	1
Control household devices	10
<b>Security system</b>	<b>5,5</b>
Fire safety	1
Security system control	10
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>3,7</b>
<b>Ability to control appliances</b>	<b>p</b>
<b>Ability to control cost</b>	<b>p</b>
<b>Weighted Rating (Ability)</b>	<b>2,0</b>
<b>Weighted Rating TOTAL</b>	<b>2,9</b>
- App price	0€
- Operation costs	70,80€ p. a. or 299€



## Allure EverSense

1.4

Available in US app store

allure-energy.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>0,5</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>10</b>
- Software learnability	10
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	1
Heating control	10
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>4,6</b>
<b>Ability to control appliances</b>	<b>h</b>
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>3,0</b>
<b>Weighted Rating TOTAL</b>	<b>2,8</b>
- App price	0\$
- Operation costs	0\$



### ayControl 3 smarhome app

3.1.0

Available in German app store

aycontrol.com

Demo data available

<b>Visualisation</b>	<b>8,5</b>
- Effectiveness (does visualisation provide value?)	9
- Efficiency (does visualisation help the user performing a task?)	8
- Usability (how easily do the users interact with the system?)	9
- Usefulness (is the visualisation useful?)	8
<b>Usability</b>	<b>8,5</b>
- Learnability (is learning to use the app easy?)	8
- Efficiency (can users quickly perform tasks?)	9
- Memorability (after not using, how easy can proficiency be reestablished?)	8
- Satisfaction (how pleasant is it to use the design?)	9
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>4,8</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>2,8</b>
Lighting control	10
Heating control	1
Control household devices	1
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>2,1</b>
<b>Ability to control appliances</b>	p
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>2,0</b>
<b>Weighted Rating TOTAL</b>	<b>2,7</b>
- App price	0€
- Operation costs	n.s.



## Tendrill

1.24

Available in US app store

tendrillinc.com

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>7,8</b>
- Neighbour comparison	10
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	10
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>3,9</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>1</b>
Lighting control	1
Heating control	1
Control household devices	1
<b>Security system</b>	<b>1</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>1,0</b>
<b>Ability to control appliances</b>	
<b>Ability to control cost</b>	p
<b>Weighted Rating (Ability)</b>	<b>2,5</b>
<b>Weighted Rating TOTAL</b>	<b>2,5</b>
- App price	0\$
- Operation costs	n.s.



## Verisure

4.1.0

Available in Finnish app store

verisure.fi

No demo data available

<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy??)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>3,3</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	10
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>1,6</b>
<b>Technical independency</b>	<b>1</b>
- Possibility to connect devices from other provider	1
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	10
Heating control	1
Control household devices	10
<b>Security system</b>	<b>6,4</b>
Fire safety	10
Security system control	10
Notification (e-mail/sms)	1
Scenarios	1
<b>Weighted Rating (Hard)</b>	<b>3,9</b>
<b>Ability to control appliances</b>	p
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>2,0</b>
<b>Weighted Rating TOTAL</b>	<b>2,4</b>
- App price	0€
- Operation costs	n.s.

**tapHOME**

2.0

Available in German app store

taphome.eu

No demo data available



<b>Visualisation</b>	<b>0,0</b>
- Effectiveness (does visualisation provide value?)	-
- Efficiency (does visualisation help the user performing a task?)	-
- Usability (how easily do the users interact with the system?)	-
- Usefulness (is the visualisation useful?)	-
<b>Usability</b>	<b>0,0</b>
- Learnability (is learning to use the app easy?)	-
- Efficiency (can users quickly perform tasks?)	-
- Memorability (after not using, how easy can proficiency be reestablished?)	-
- Satisfaction (how pleasant is it to use the design?)	-
<b>Energy efficiency readiness</b>	<b>1,0</b>
- Neighbour comparison	1
- Single consumption monitoring of devices (costs of consumption)	1
- General overview of energy services (e.g. monthly consumption of warmth)	1
- Individualized energy-efficiency tips	1
<b>Weighted Rating (Soft)</b>	<b>0,5</b>
<b>Technical independency</b>	<b>10</b>
- Possibility to connect devices from other provider	10
<b>Software intelligence</b>	<b>1</b>
- Software learnability	1
<b>Performance feature (according to the provider)</b>	<b>5,5</b>
Lighting control	10
Heating control	1
Control household devices	10
<b>Security system</b>	<b>2,8</b>
Fire safety	1
Security system control	1
Notification (e-mail/sms)	1
Scenarios	10
<b>Weighted Rating (Hard)</b>	<b>5,0</b>
<b>Ability to control appliances</b>	p
<b>Ability to control cost</b>	
<b>Weighted Rating (Ability)</b>	<b>2,0</b>
<b>Weighted Rating TOTAL</b>	<b>2,4</b>
- App price	0€
- Operation costs	n.s.

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