Open Energy Exchange (OEEX) Profile

Project Name: OEEX
FIWARE Accelerator: SpeedUp!Europe
Grant Funding: March to October 2015
Level of Grant funding secured: €75,000
Target Sector: Green Energy

Company: Open Energy Exchange
Country: Germany
Web: www.oeex.org
Contact person: Tobias Linnenberg
Email: Tobias.Linnenberg@hsu-hh.de

Vision and Market Need

Open Energy Exchange (OEEX) aims to establish a virtual Consumer-to-Consumer (C2C) Energy Marketplace. The market need has been validated through market research carried out in cooperation with TU Hamburg from September 2015 – February 2016.

The research found that private prosumers (those who both consume and produce energy) wish to exchange energy with other prosumers and consumers in their local area. At present most prosumers consume only 20% of the energy generated by their plants in real time. Increasingly there is a focus on consuming the energy of their own plant and allowing them to make power available as required in their neighbourhood.

The research found that consumers are driven by price sensitivity and an interest in reducing their household carbon emissions by using local green energy sources where available.

Finally, the research reinforced previous findings that there is a need to stabilise energy grids by matching demand and supply.

OEEX provides a Software as a Service (SAAS) offering facilitated through the OEEX app and the OEEX Smart Plug.

The OEEX free app presents information on the green power being produced in the local vicinity. Off the shelf hardware is upgraded with OEEX firmware to offer prosumers and consumers the OEEX Smart Plugs which allow green energy to be used by household applicances.

Target Market and Revenue Streams

Germany is the current target market as there are currently 1.5 million renewable plants in the country. OEEX plans to enter other European and international markets where renewable plant infrastructure and demand for its services exists. This will be done on a phased basis, leveraging lessons learnt from Germany.

OEEX has a multiple revenue stream model and different types of customers. Primary customers are electricity suppliers and grid operators and secondary customers are private households.

Revenue stream opportunities with electricity suppliers include receiving a small fixed fee per household connected to the OEEX platform. The benefits to the electricity supplier include lower customer retention costs, increased insight into

customer behaviour and portfolio optimisation opportunities based on analysis of likely demand.

Revenue stream opportunities with grid operators include fixed fee per kWh based on local flexibility markets enabled by the OEEX platform. The key benefit to the grid operator include local flexibility of demand and production to guarantee higher levels of grid stability.

Revenue stream opportunities with prosumers include a brokerage fee based on sales for producers and purchases for consumers facilitated by the OEEX platform. The key benefit for prosumers is the ability to direct trade their energy and as a result, secure higher prices.

Revenue stream opportunities with consumers include a percentage fee based on consumption. The key benefit for consumers is lower energy prices.

OEEX platform enables the purchasing of green energy at lower costs because it essentially arbitrages and matches supply and demand. It enables devices that ordinarily would be used in the early morning and evening (when energy prices are high) to automatically work during the day (when energy prices are typically very low because that is when most green energy is produced).

OEEX Smart Plug can either provide an incremental revenue opportunity or can be used as a loss leader to facilitate customer acquisition, depending on market dynamics.

Competitive Positioning

Competitors include utility companies providing services through a closed system (e.g. vandebron, sonnen, buzzn) as well as traders and energy suppliers offering software development services in the energy sector (e.g. Lumenaza, piclo, NEXT Kraftweke).

Vandebron offers P2P energy trading but not in realtime. Vandebron reads the electricity meters of the producers and consumers at the end of the year and checks the aggregated energy consumption and production. As there is no live matching there is no relief for the transmission grids. Furthermore Vandebron is a utility and thus requires its customers to have a contract with the company and leave their original energy supplier. As a result they are a rival to energy suppliers such as eon, RWE etc.

Sonnen also offers P2P Energy trading in the form of a utility (similar to Vandebron). Sonnen's offer is closely connected to their battery storages. They are not interested in serving customers outside their battery-universe.

Buzzn also offers P2P energy trading (similar to Vandebron).

Lumenaza and piclo are both utilities and software service providers. This makes it hard for them to serve other utilities. They see them as rivals and do not want to buy their products. Lumenaza offers a product for flexible pricing, while piclo focuses on demand side management.

NEXT Kraftwerke is a energy broker for the supply side. Due to the expensive technology they use, they are restricted to large scale plants.

EPEXPOT is the European marketplace for energy (national marketplaces), but does not currently address local energy markets.

The competitive advantage is that OEEX is a first mover in B2B2C services. It provides a Software as a Service (SAAS) offering facilitated access to real time information on green power being produced in the local vicinity through the OEEX app and allow green energy to be used by household applicances on demand through the cheap off the shelf OEEX Smart Plug. OEEX will allow for flexible billing and varying tariffs througout the day with a link to either the EPEX Spot Energy Market or local energy production and the needs of local grid operators. This billing will be enabled on a device to device basis, making use of the data gathered by the smart plugs. In contrast to its competitors, OEEX does not position itself as a utilitym making it possible to sell its product in the form of a SAAS to the major utilities, strugging with increasing customer retention costs.

Diagram 1 below provides an overview of OEEX's competitive placing.

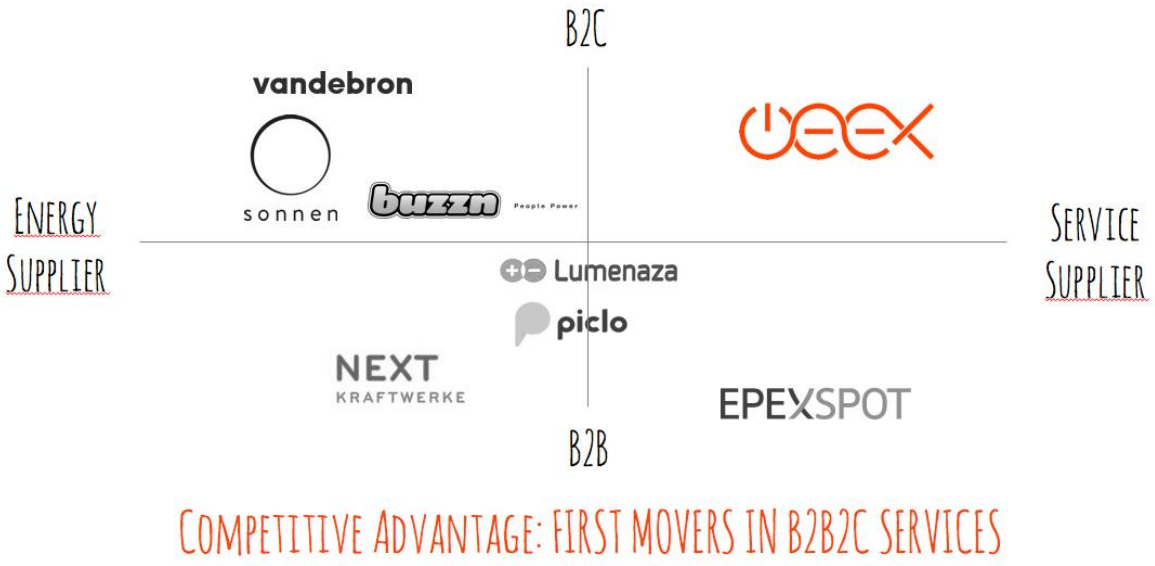

Diagram 1: OEEX Competitive Positioning

Enabling Technology

This energy SAAS solution leverages an Internet-of-things (IoT) approach. The back end which manages communication between the OEEX App and the OEEX Smart Plug is based on micro-services. These were developed during 2015 using REST APIs within a Service Oriented Architecture (SOA).

FIWARE provided an interesting way to facilitiate merging of different services to support end to end data streams required to enable the functionality of the OEEX platform. FIWARE Generic Enablers leveraged include

- *Orion Context Broker* to distribute data to different services;
- *POI Data Provider* to hold and distribute Point of Interest (POI) data and
- *KeyRock* to enable security.

An AI system runs in the background, matching flexibility of consumers, based on live data from consumer and prosumers and projected use and availability of data.

Diagrams 2 - 4 below provide insights in the app functionality

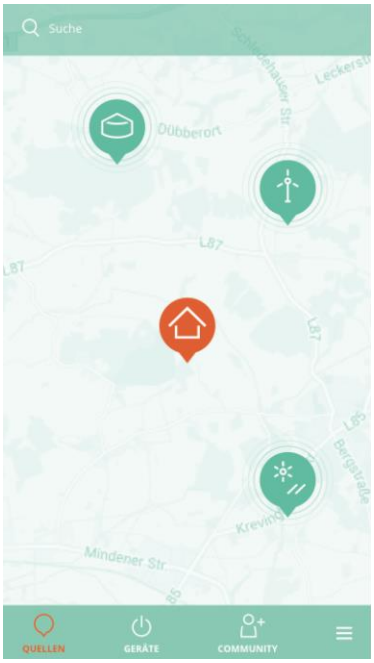

Diagram 2: View Green Energy Suppliers in your neigbourhood (1.5million in Germany)

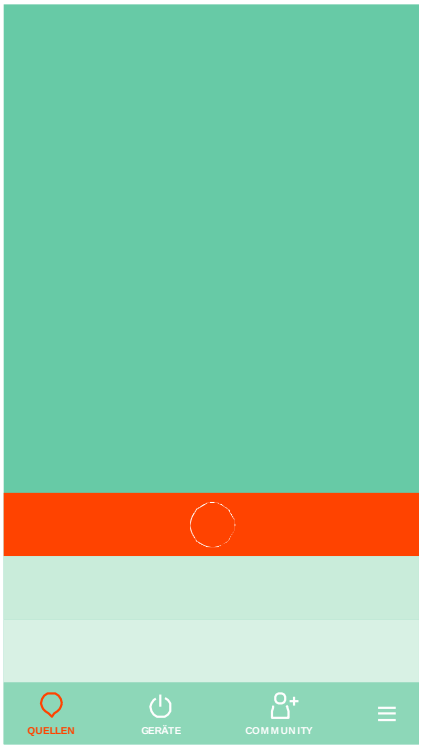

Diagram 3: See their production (red) in comparison to your consumption (white)

Diagram 4: Get Statistics on how much energy from the connected sources your devices have consumed

Progress to date

OEEX commenced technological research activities in November 2014, as part of university studies. In February 2015, OEEX secured a FIWARE Grant under the SpeedUp! Europe Accelerator as part of the FI-PPP Phase 3 Programme to develop a first version of the application and smart plug prototypes and undertake further market analysis.

Over the past 3 months the newest OEEX App has been developed to faciliate prosumers and consumers in Germany to identify and select green energy plants in their vicinity. This is connected to the smart plug and users can control the smart plug depending on the level of green energy production in their area. Electricity suppliers, gird operation and prosumers can see the production and demand data of the local plants and the electricity patterns at an aggregate level for consumers using the platform. Consumers can see usage patterns within their own home

Upcoming milestones include the public release of the app in April 2016, market integration functionality in October 2016 and release of the OEEX P2P Market in Q1 2017.

Market integration functionality refers to the ability to bill consumers based on information validated by metering operators. This allows decisions to be made by the platform in relation to leveraging the best available price for energy by turning devies on and off at appropriate times.

The OEEX P2P Market leveraging the billing functionality referred to above, to allow energy trading between consumers and operators fo the local green plants. The platform choose the most appropriate local green plant from which to use energy and the most appropriate time of day to utilise that energy. The objective is to select the best fit between production and demand so as to achieve the best price performance. The OEEX platform facitiates payments to the appropriate supplier for energy consumed.

To date in addition to the FIWARE Grant (€75,000), seed funding investment has been secured. OEEX is fund raising to raise a further €1 million in investment over the coming 12 months to fund further technology development, as well as marketing and sales activities.

OEEX has secured two awards to date: Young Innovator Awards @ European Utility Week 2015 and Energy App of the Year Award @ E-World Energy & Water 2016.