

Scenarios for Future Internet Business@Energy

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Abstract: The energy sector currently faces challenges in carbon dioxide reduction, energy efficiency, new forms of energy production and distribution which includes energy supply by former energy consumers. E-mobility is another interesting part of the game. New driver systems, battery, billing, and smart grid technologies are setting the stage for tomorrow's Electric Ecosystem. This paper describes the two main scenarios for Future Internet Business in the sector energy.

Challenges

The following challenges in the energy industry are already given and will even increase:

- Trend for energy efficiency, focusing on innovative energy productions as well as encouraging a reduction of energy consumption.
- Increasing environmental awareness and regulations that create a demand for carbon dioxide reduced solutions.
- Private energy suppliers are emerging, taking part in the energy market.
- Stakeholders from different sectors and domains urge for integrated solutions to jointly work together and empower their business.

Situation

The current situation in the energy market is characterized by “centralized generation with one way power flow”, whereas in the future “decentralized generation with two way power flows” will emerge. This will raise the need for services that provide intelligent control of generation and demand. These “Electric Ecosystem Services” will be provided as SaaS-Utilities via Internet, e.g. as services to: view power consumption of private households (for private customers) or in the industry (companies as customers), view power generation vs. power consumption for energy prosumers, demand side management and decision support.

What are the fundamental questions?

1. How to **integrate different** customers, consumers, providers, prosumers, partners and their solutions in the Electric Ecosystem?
2. How to **efficiently manage storage and distribution** of electric energy when needed (time independence)?
3. How to **manage best price consumption and provision** of electric energy for personal use?
4. How to **manage mid- to long-term planning** in the electric energy community?
5. How to involve all relevant stakeholders in **information exchange** in a secure and reliable way?
6. How to **establish an Energy Service Platform, an Energy Service Network**?

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To answer the fundamental questions two main scenarios for Future Internet Business in the sector energy seem plausible:

- Business Scenario 1: Clean Slate
- Business Scenario 2: FI PPP Build Out

As-Is Situation (Status Quo)

The status quo for both scenarios is the same: Regarding energy pricing, the tariffs are fixed, i.e. no flexible pricing, e.g. depending on time of day (with the exception of night tariffs).

Currently for the individual energy consumption only the amount of current is measured, but not the load distribution over the day. Energy providers only get the accumulated data of load distribution.

Business Scenario 1: Clean Slate

This is the ultimate innovative and max impact scenario – the optimistic scenario.

The Scenario

This business scenario is characterized by:

- The market potential in Europe is very large. A lot of private members contribute to the platform electricity ecosystem.
- The high rate of mobile internet access makes it possible to manage the electricity ecosystem from any place at any time. Integration and usage of services is easy and always possible.

- The rate of private energy production based on new grid services is powerfully increasing.
- Energy consumption trend is increasing.
- Dynamic pricing is established, which is a prerequisite to make the services offered by the IT service provider valuable.
- Payment model of the IT service provider would be an optimization fee model.
- Standards for energy exchange are sustainably established. Subsidies of alternative energy have significantly contributed that customer and also producer accepted the Energy Service Platform and Energy Service Network. Legislative regulations created the right regulatory framework so that the prosumers produce the maximal output.

The smart grid services provided by the IT service provider comprise the following functionalities:

- Analysis of daily load distribution per customer (prerequisite: smart meters)
- Forecast of energy prices.
- Forecast of energy consumption for a customer (e.g. heating depending on season, weather) based on regression data analysis
- Recommendations for a customer how to distribute energy consumption over the day
- For energy “prosumers”: forecast of ideal time slots for energy production (e.g. wind turbine, solar collector) based on meteorological forecast
- For energy “prosumers”: show energy demand of customers in your proximity
- For municipalities: comparison of energy supply and demand within the municipality (energy planning support)

Innovation

This business scenario is based on **technical and process innovation** of energy supply, which is shifting from energy supply by centralized energy suppliers to decentralized energy supply by “prosumers” by the means of smart grids. These innovations create the need for new IT services that support cost optimization of energy consumers / prosumers.

The proposed IT services also represent **service and business model innovation** due to the novel IT services and the revenue by an “optimization fee”: the higher the increase of overall energy efficiency of one customer (due to the usage of the provided IT services), the lower the fees.

Business Scenario 2: FI PPP Build Out

This is a more realistic business scenario.

The Scenario

This business scenario is characterized by:

- The market potential in Europe is in an accepted range. The platform electricity ecosystem is used from both consumers and producer.
- The good rate of mobile internet access makes it easier to use the electricity ecosystem. An integration of new services is possible.
- The rate of private energy production based on new grid services is increasing.
- Energy consumption trend is lightly increasing.
- Dynamic pricing is possible, and a part of the customers use this service. The new payment model optimization fee of the IT service provider is offered and used by the costumers.
- Standards for energy exchange are defined and implemented, but are not it is rarely not appointed in the energy market place. Subsidies of alternative energy have partially contributed so that customer and also producer accept the Energy Service Platform and the Energy Service Network. Sometimes legislative regulations create a regulatory framework and the prosumers enhance their output. The amount of government's investments is driven by the respective economic situation – at times the economy is decreasing, investments are low.

Innovation

The innovation covered by this business scenario comes from **services innovation** (novel IT services) and **application innovation**: the services are provided in the new application domain “electric ecosystem”.

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References

[1] COIN (2008), “COIN Home Page”, COIN IP. Integrated project in the European Commission Seventh Framework Program (FP7-216256), <http://www.coin-ip.eu>