Project challenge:

DIGITALIZATION OF ELECTRICAL INFRASTRUCTURE

Country challenge-provider: Germany
Germany’s green shift to renewables has led to high electricity prices.
Our focus

Digital consumers: positive spill-over effect on the entire value chain

E-customers can foster renewables integration and reduce costs by:

- Responding to market signals, modifying their consumption and habits
- Producing renewable electricity to satisfy their own consumption needs
THE SOLUTION: AdELE
Adaptive Electric Loads for E-customer

AdELE tells you when energy is cheaper

Other inputs
- Day Ahead market
- Forecast
- Historical Consumption

Recommended by Central System

- Cloud Based
- Big Data Analytics
- Machine Learning

Solar System

Home residential consumers

In-Home Device

Real time consumption / production

dELE
AdELE gives recommendations and works on every mobile device with user-friendly interface.
The benefits of AdELE

AdELE gives advice to E-customer to shift consumption
E-customer follows AdELE
E-customer spend less on electricity
Retailer gets economic advantage in the wholesale market
AdELE’s business model

**Value proposition**—*Obtain costs savings for our Company as energy retailer developing a cloud-based system which will guide end-customers behavior through an App*

### Savings
- Reducing the cost of buying electricity on the wholesale market
- Number of households
- Consumption per household
- Economy on buying price
- Probability of following advise
- Savings (retailer) **35 Mln EUR** per year

### Costs
- Creating and maintaining cloud infrastructure of AdELE
- Installation of devices
- Development of AdELE **33 Mln EUR** in 1st year
- Discount to E-customer
- Marketing
- Maintenance **19 Mln EUR** per year

### Key Figures
- **Payback period (retailer)** 4 years
- **Average profit (retailer)** 9.5 Mln EUR
- **Savings (per household/year)** 70 EUR

*https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC*
Implementation plan

28 months will take to make AdELE working on both phases

**PHASE 1: Households customers**

- **2 months**
  - Customer’s survey to address App requirements
- **10 months**
  - AdELE system development
- **2 months**
  - Testing on selected customers
- **2 months**
  - Installing devices to customers
- **16 months**
  - Results analysis
  - Decision of expanding business to other customers segment

**PHASE 2: Industrial / Commercial customers**

- **4 months**
  - Understanding potential
  - Plan for optimizing industrial processes
- **4 months**
  - Testing on selected customers
- **4 months**
  - Full roll-out

**12 months**
Conclusions: AdELE is a powerful tool to reduce electricity bills and enhance transparency...

**Digitalization** of the electric infrastructure is necessary, but not enough

**Active participation** of citizens will create an efficient and sustainable energy ecosystem

**Policies and regulations** have a key role to play in enabling new business models, technologies and innovation
EU ELECTRICITY MARKET LIBERALIZATION

➢ In Germany the retail market is continuing to develop very positively as more than 4.6 million household customers switched supplier in 2016. This is the highest figure since the start of liberalization process.

➢ In addition, almost 2.4 million household customers switched tariffs with the same supplier.

*Italy is phasing out (June 2019); Spain reformed tariff in 2014 as to totally reflect spot prices.

Germany has the second highest residential electricity prices in the EU-28 - Electricity prices for household consumers ranged from 9.6 €/100 kWh in Bulgaria to 30.5 €/100 kWh in Denmark and Germany in 2017.
composition of average electricity price in ct/kWh using 3,500 kWh/year, 2016-2018

In 2017:
➢ Surcharges, taxes and levies account for over 54% of the average electricity price for household customers
➢ The net network charge including billing, metering and meter operations accounts for a share of around 24.6%
➢ The share of the electricity price that the supplier can control (energy and supply costs and the margin) thus accounts for around 21.5%

While generation and distribution costs remained relatively flat, the main driver of the significant overall cost increase over the past years is mainly linked to taxes and surcharges, which include support to renewable development (i.e. EEG surcharge).

The price component for energy remained more or less stable while since 2014 there has been a decrease in the price component controlled by the supplier. This decrease could be related in particular to the continuing low wholesale prices in 2016.
GERMAN NON-HOUSEHOLDS ELECTRICITY PRICES

Germany has the first highest non-residential electricity prices in the EU-28

Source: Eurostat
## DISTRIBUTION SYSTEM OPERATORS (DSOs)

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Transport of electricity over the high-to-low voltage grid</th>
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</thead>
</table>
| Key activities | • Asset management  
• Network development  
• Operations and maintenance  
• Tariff-setting  
• Metering (sometimes) |
| Challenges | • Cost pressure  
• Decentralized generation  
• Unbundling  
• Demographical shift  
• Energy efficiency  
• Smart Grid / Metering |
| Players | • Regional or local distribution system operators (DSOs) |

### Number of DSOs

- **Germany**: 855
- **Spain**: 4
- **Sweden**: 175
- **Italy**: 163
- **France**: 1
- **Norway**: 159
- **Austria**: 130
- **Denmark**: 101
- **Finland**: 89
- **Belgium**: 26
- **Poland**: 18
- **Netherlands**: 8
- **UK**: 18
- **Portugal**: 1
- **Greece**: 1
According to Annex I of Directive 2009/72/EC, Member States should roll-out electricity smart meters to 80% of consumers by 2020, unless the result of a Cost Benefits Analysis (CBA) is negative, with full roll-out to be completed by 2022.

The German CBA results suggested a staggered rollout, starting with larger generators and consumers. The rollout is segmented by annual consumption (i.e. exceeding 10,000 kWh, from 2020 onwards exceeding 6,000 kWh), production and meter cost per customer per annum.

The EU Clean Energy Package, published on November 30, 2016 proposed that local utilities or suppliers will have to offer smart meters to all consumers – where technically feasible. This will supersede the previous Directive which allowed Member States to opt out (negative CBA). All legislative proposals included in the Clean Energy Package are currently undergoing the EU legislative process.
## Business plan

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<th>Unit</th>
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<td>households</td>
<td>1 000 000</td>
<td>N</td>
<td>4 people per client</td>
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<tr>
<td>device cost</td>
<td>30</td>
<td>eur</td>
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<tr>
<td>development</td>
<td>3 000 000</td>
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<td>estimate</td>
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<tr>
<td>maintenance</td>
<td>500 000</td>
<td>eur/year</td>
<td>10 people * 4k eur per month</td>
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<td>marketing</td>
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<td>if shift consumption by 1 hour</td>
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<tr>
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<td>World Bank</td>
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<tr>
<td>cost of discount</td>
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<td>av. Profit (5 years)</td>
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