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Digital Innovation

From Producing to Balancing

The Smart Home :
an opportunity for Utilities
to become a new « Digital Home Operators »

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The Smart Home and Utilities

From Producing to Balancing

- Digital broadband to the home opened the access to different services : voice, television, audio… The **GAFAMs** have already taken strong positions but not yet for two categories of services : **Security** and **Energy**

- **Energy** is an unique opportunity for the **Utilities** to become a new « **Digital Operator** » like Digital TV and Telcos did respectively 30 and 20 years ago

- **Smart metering and Load controlling** allows to contribute to the grid balancing. While bringing true value to the customers (**savings** and **comfort**), it also allows the **Utilities** to increase its **benefits** (by additional revenues from the grid) and **customer loyalty**

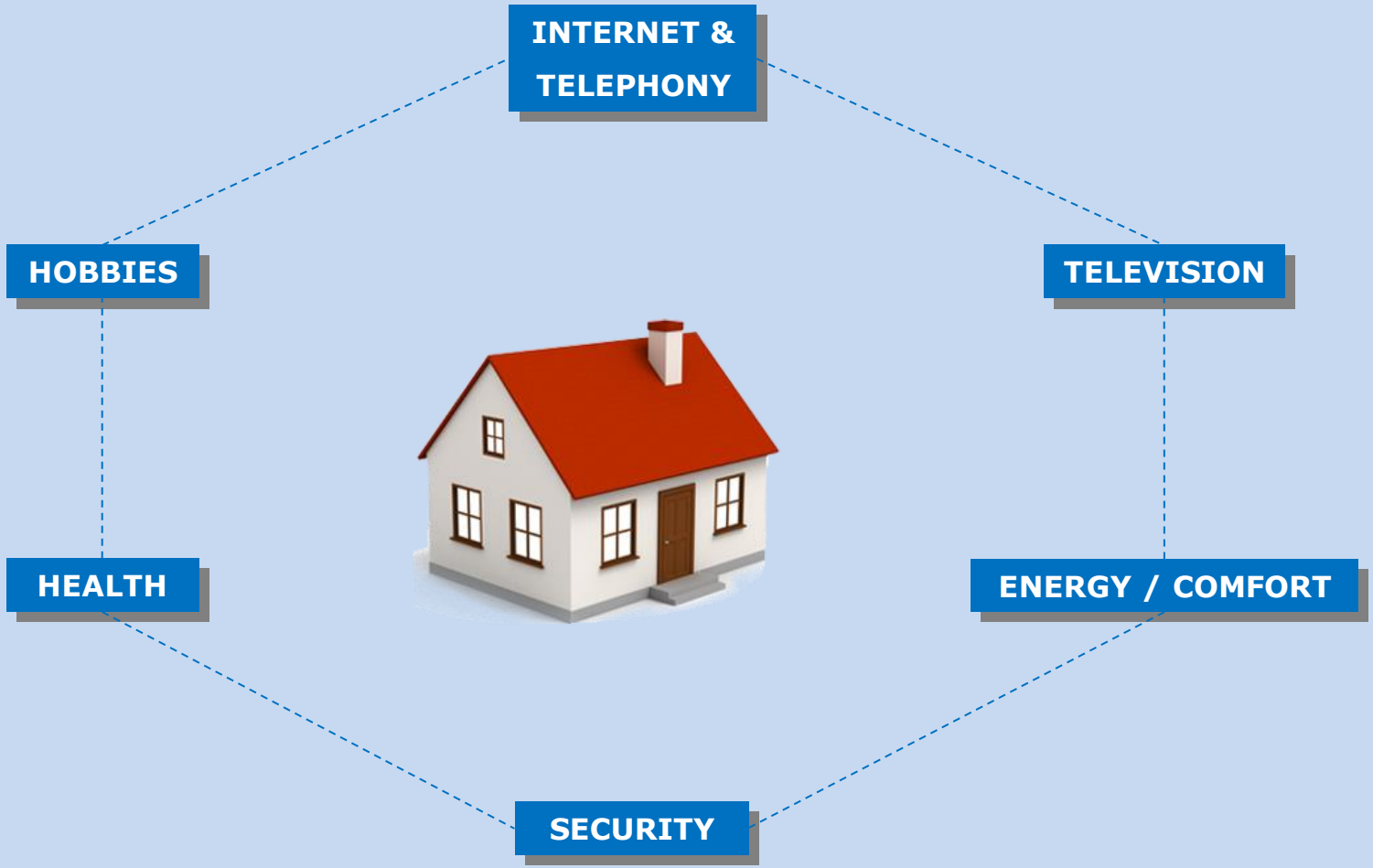
- **End-to-end systems** (hardware and back-end) can be developed today to provide such a service at reasonable cost. The profitability can be easily ensured by adapting the monthly subscription fee.

- The model can be easily adapted to **other business cases (PV self-consumption, electrical mobility…)**

The Connected Home

The Services and the Actors

The Smart Home : a Service overview



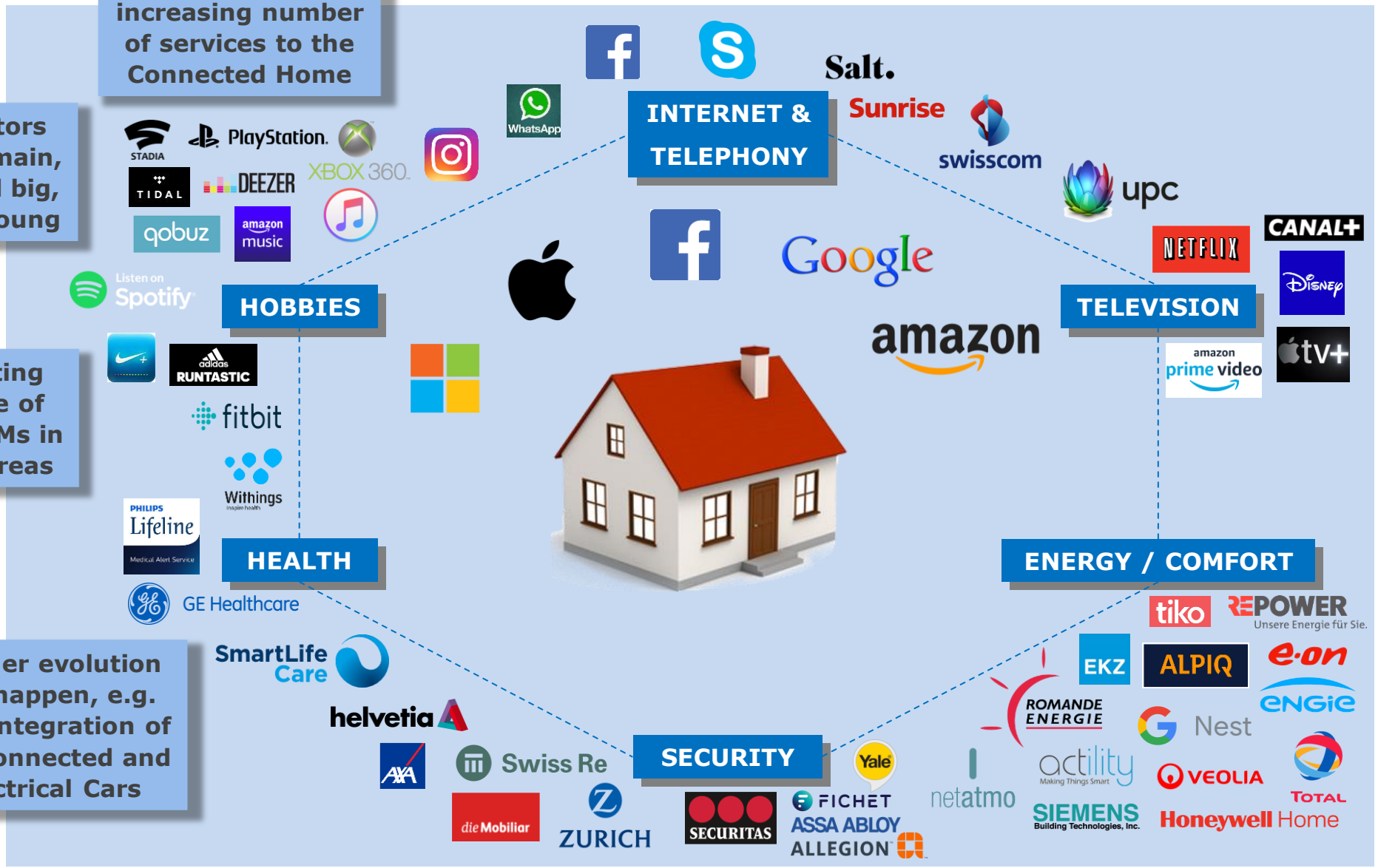
The Smart Home : the actors (Swiss flavour)

An always increasing number of services to the Connected Home

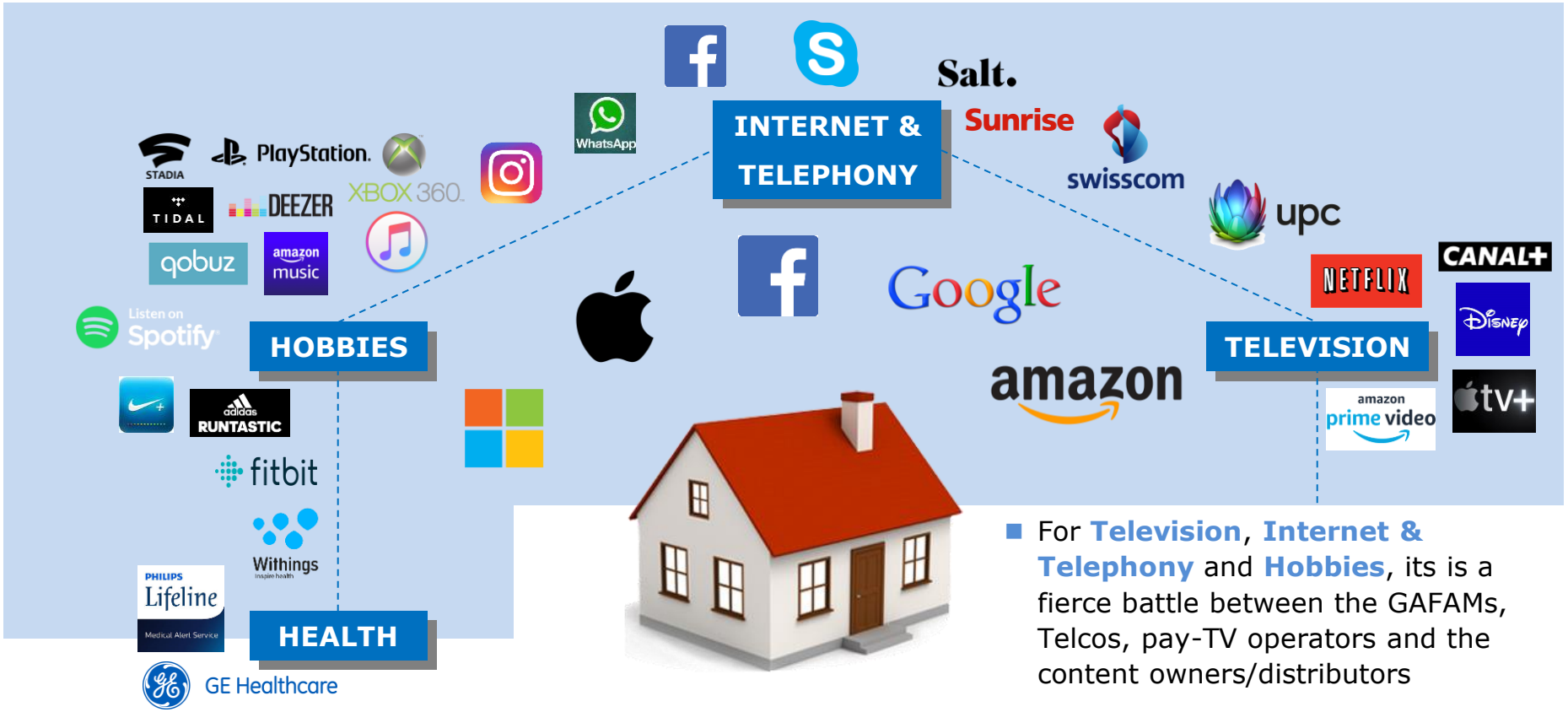
Many actors in the domain, small and big, old and young

Dominating presence of the GAFAMs in certain areas

Further evolution will happen, e.g. with integration of the Connected and Electrical Cars



For half of the services, a crowded battlefield



- For **Television**, **Internet & Telephony** and **Hobbies**, its is a fierce battle between the GAFAMs, Telcos, pay-TV operators and the content owners/distributors

- For these 3 services, the GAFAMs have a dominant position. But they have to fight with content owners/distributors (Netflix, Disney) which aim at addressing directly the end users

- **Health** in the consumer space starts being addressed by Apple and Google (which acquires Fitbit), but this is still a place where no strong position has been conquered yet. But GAFAMs are working hard on IA topics to enter the professional Health market, and Amazon unvealed its plan to address connected consumer healthcare

For the other half, a battle still to be engaged

- In **Energy/Comfort**, the GAFAMs have no position: they simply have no access the end users data. Google tried with Nest but did not succeed

- In **Energy/Comfort**, utilities are in a strong position; they own the subscribers and have access to all their energy data. This is the time to digitalize their services and products, and to sell « Energy as a Service ». This is possible thanks to the deployment of Smart Meters and IoT solutions, the availability of residential storage. It also allows to address environmental issues (grid stability, energy sharing…)

- **Security** is an opportunity for insurance companies. With latest IoT technologies, digital security systems are affordable enough to propose « Security as a Service », reducing burglaries and indemnifications costs while increasing customer loyalty. Partnering with Connected Lock vendors could lead to new business models and further market penetration

- **Health** is a place too for insurance companies, which already launched offers for elderly/dependant people. It is time to go further, probably in partnership with the medical industry

Utilities, User savings and Grid balancing

The Business Model

Let's focus on Energy…

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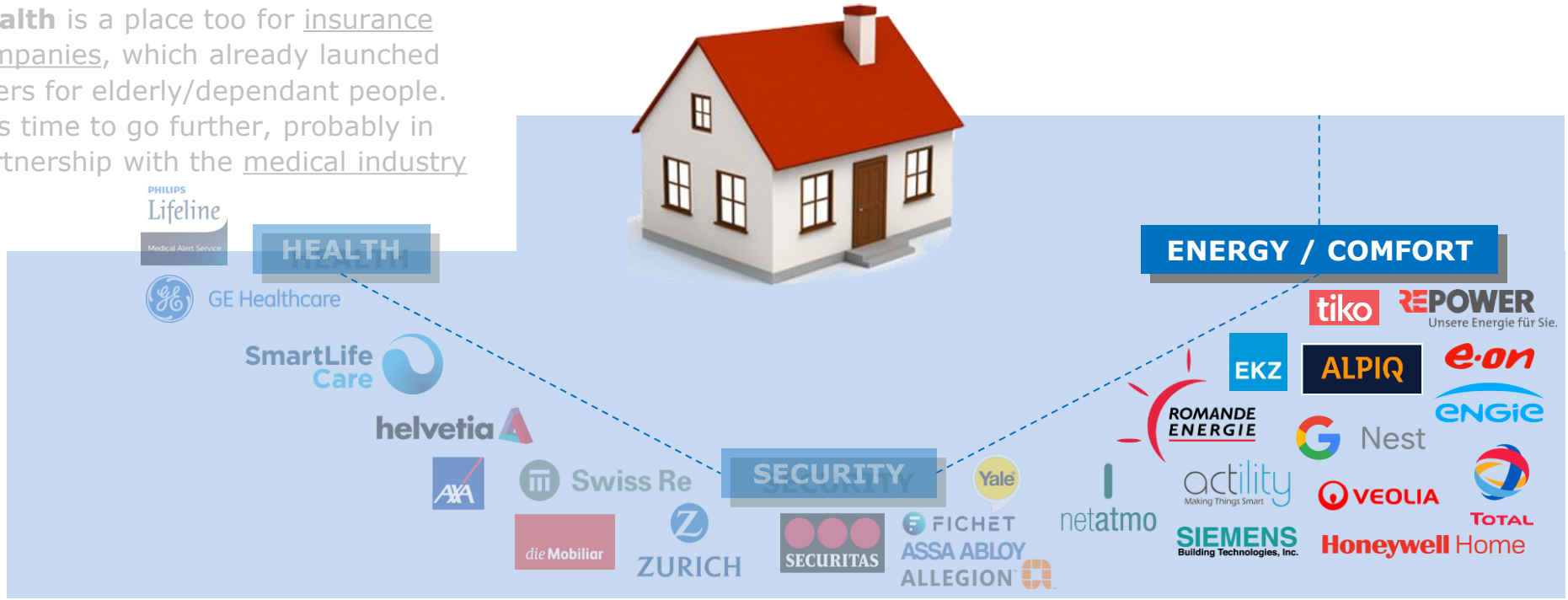
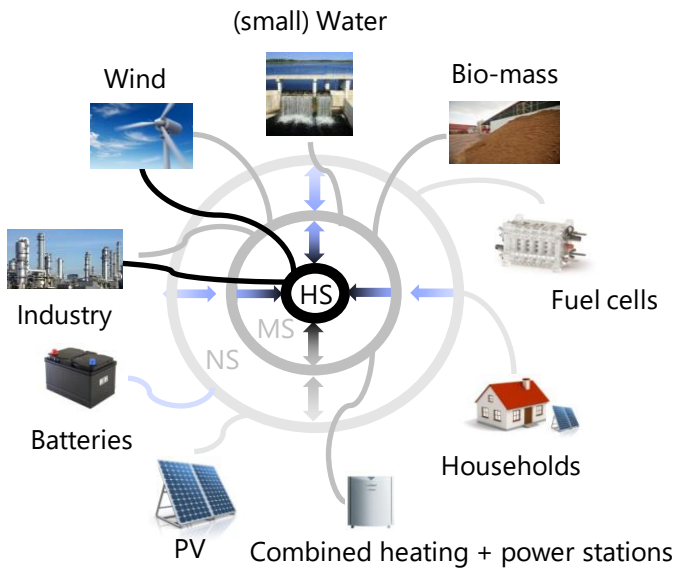


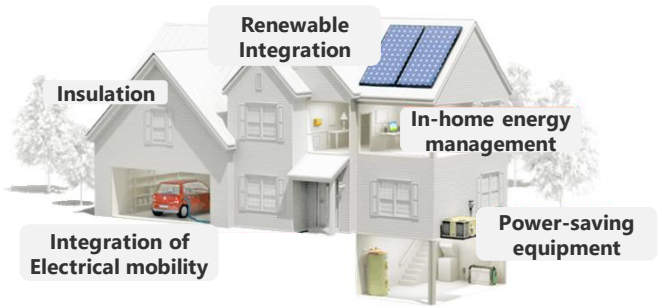
Household and contribution to the Grid

Installing Connected Home Energy Management Systems (HEMS)

In the dynamically connected electricity mains, …



… the household plays a decisive role



Connected electrical resources/loads

- Controlling the main electrical loads from households can contribute to the grid stability, in real-time (**frequency control**) or planned ahead (**peak shaving**). This is residential **Demand Side Management**
- Such **services are paid by the Grid**, which results in a revenue per household, which, from a passive consumer, becomes an active node

Digital Energy: an opportunity for Utilities

« From Producing to Balancing »

- By providing its subscribers with a **Home Energy Management System (HEMS)**, the **Utility** benefits from the following advantages
  - **ARPU** increase
    - The end user values **comfort** and **savings**. The customer could be ready to pay a small fee for that service (e.g. a few CHF per month)
    - While offering reduced bill and temperature control to the end user, **HEMS** generate additional revenues for the Utilities when used for **Demand Side Management** (fast regulation, peak shaving…)
  - **CHURN** reduction
    - The service can also be conditional to a minimum engagement period for the electricity contract, increasing then customer loyalty.
  - **CAPEX** is moderate
    - The Utility has an obligation to contribute to grid balancing. Doing balancing with **Demand Side Management** requires far less CAPEX than building a new power plant
  - **ENVIRONMENTAL** aspect
    - Balancing by Demand Side Management reduces overall power consumption

Energy/Utilities
Assumptions for the Business Model

ENERGY

Revenue for utility

- Est. revenue for frequency control per user and year — Frev = 100 CHF
- Est. revenue for peak shaving control per user and year — Prev = 33 CHF
- Revenue paid by user per year for HEMS — Crev = 36 CHF

Service cost for utility

- Operating the service per user per year — Sco = 36 CHF
- Connectivity cost per user per year — Cco = 0 CHF
  - We assume making use of the broadband access of the end user

Equipment cost (Capex)

- Hardware cost (meter, controllers) — Hcap = 150.00 CHF
- Installation cost — Icap = 150.00 CHF
  - The installation must be done by a professional

Energy/Utilities – the Business Model
Analysis per individual customer

ENERGY

Revenues (incl. Savings) and Expenses per customer			
Recurring revenues	Frequency services	CHF/year	CHF 100,00
	Peak shaving	CHF/year	CHF 33,00
	User subscription	CHF/year	CHF 36,00
		Total in €/year	**CHF 169,00**
OPEX	Connectivity cost	CHF/year/cust	CHF -
	Service cost (back-end)	CHF/year/cust	CHF 36,00
		Total in €/year	**CHF 36,00**
CAPEX	HW cost	CHF/cust	CHF 150,00
	Installation cost	CHF/cust	CHF 150,00
	Savings on customer acquisition	CHF/cust	CHF -
	Subsidies	CHF/cust	CHF -
	Initial payment by customer	CHF/cust	CHF -
		Total in €/cust	**CHF 300,00**

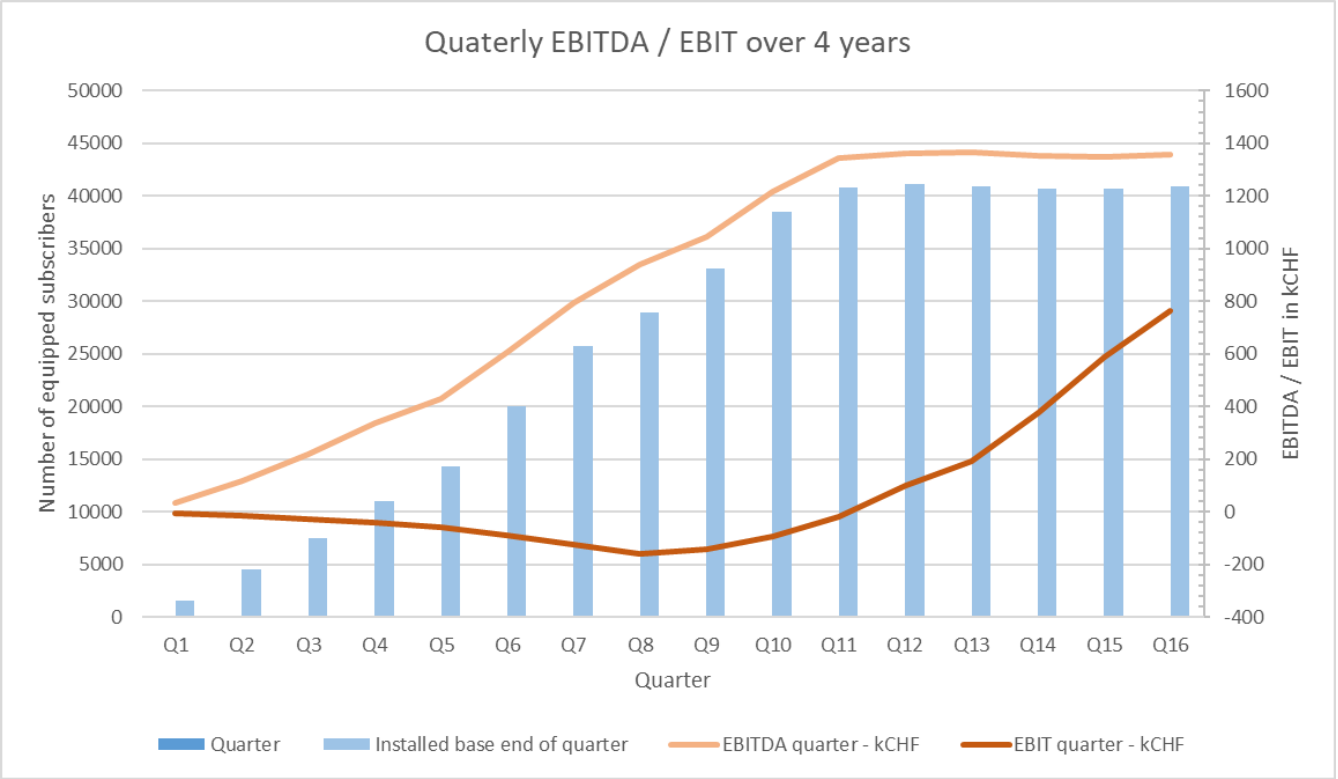
Cumulative cashflow year after year	
1 an	CHF -167,00
2 ans	CHF -34,00
3 ans	CHF 99,00
4 ans	CHF 232,00
5 ans	CHF 365,00

EBIT/year if CAPEX amort. over 2 years	
1 an	CHF -17,00
2 ans	CHF -17,00
3 ans	CHF 133,00
4 ans	CHF 133,00
5 ans	CHF 133,00

- The elements above are the elements explained in the previous slide. Connectivity costs are zero with system making use of the end user broadband connection.
- Grid revenues are to be fine tuned depending on the devices under control and the country. Here we consider taking control of the water boiler and electrical heaters

Energy/Utilities – the Business Plan
EBITDA/EBIT analysis

ENERGY



- We took the same hypothesis as in the previous slides. We now considered a deployment starting at a few hundreds per month, with a peak at 2000 new users per month in second and third years, reaching circa. 40k equipped subscribers in three years
- We included a churn rate of 10% for customers after one year subscription
- With these hypothesis, we reach a **cumulative EBIT of 1.2 MCHF over 4 years**

Energy/Utilities – the Business Plan

4-year cumulative EBIT sensitivity

ENERGY

Cumulated EBIT from previous slide

Cumulated EBIT over 4 years (kCHF)									
-1.00 CHF/Month					0.00 CHF/Month				
200	4858	6963	9069	11175	200	6109	8214	10320	12426
166	1314	3419	5525	7630	166	2564	4670	6776	8881
133	-2126	-21	2085	4191	133	-875	1230	3336	5441
100	-5566	-3461	-1355	751	100	-4315	-2210	-104	2002
	350	300	250	200		350	300	250	200
1.00 CHF/Month					2.00 CHF/Month				
200	7360	9465	11571	13676	200	8610	10716	12822	14927
166	3815	5921	8027	10132	166	5066	7172	9277	11383
133	375	2481	4587	6692	133	1626	3732	5838	7943
100	-3064	-959	1147	3252	100	-1814	292	2398	4503
	350	300	250	200		350	300	250	200

Margin on monthly fee

CAPEX – Sum of Hardware cost and Installation cost Per user(CHF)

Average yearly revenue from the grid per user (CHF)

- The profitability depends on the
  - **CAPEX (HW and Installation cost)** per user : from CHF 200 to 350
  - **Average grid revenue** per user and per year : from CHF 100 to 200 per year
  - **Margin on the monthly fee** paid by client : from CHF -1.00 to +2.00 per month
- The table above shows the **sensitivity** to these parameters of **the four-year cumulative EBIT** for the deployment scenario described in the previous slide
  - Adapting the monthly fee/margin is the way to secure the profit

Energy/Utilities

Other applications with Similar Business models

ENERGY

- New opportunities are raising up, due to **residential batteries** (cf. Tesla). In that case, the HEMS helps managing **energy autarchy** for a home equipped with PV + Battery, while using **battery for grid balancing** brings more revenues per user
- Further business models can be elaborated by **« exchange »** of energy between residential customers. Using **blockchain mechanisms** could allow precise metering and accounting
- Grid balancing mechanisms are needed for countries moving from gas to electricity heating systems (Scotland, the Netherlands…)
- Complete new models will have to be defined with deployment of **electrical cars**, that will require **efficient grid-balancing solutions**
  - A basic/expensive option is to install a residential battery for each electrical car
  - More sophisticated could be the progressive implementation of batteries in the grid to balance the loads due to e-car charging… to be further investigated

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Thank you