Entrepreneurs as drivers of the energy transition
(but do they have to build the road first too?)

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Where we are & where we want to go
Who are the Swiss energy startups?

Is it hard to be a driver of the transition?

Can collaborations accelerate the transition?

Entrepreneurs as drivers of energy transition?
Background

- BEng. Environmental engineer (Canada) & MSc. Environmental scientist (Switzerland)
- 5 years of applied science research in Switzerland

Energy Entrepreneurship

Energy behaviour change
Swiss heterogeneity
Opportunities mostly in electricity

Source: Schweizerische Gesamtenergiestatistik 2016

- Households
- Industry
- Services
- Transport
- Agriculture + diff.
European renewable prices disrupting traditional business models

Producers: each >3% total demand, earning less/kWh

Retailers: Large, medium & small customer segments pass on costs
Power in the hands of a few

Fraction of total utilities (N=650)

- 50% served by 12/650
- 70% served by 10%
Fossil-free electricity mix... to stay?

- Solar
- Geothermal
- Wind
- Thermal power
- Hydro
- Other

*Source: BFE, Schweizerische Elektrizitätsstatistik 2017 (Fig. 5)
OFEN, Statistique suisse de l'électricité 2017 (fig. 5)*
Policy goals are ambitious

1. Increase energy efficiency
2. Expand new renewables
3. Nuclear phase-out

Digitisation
Decentralisation
(Decarbonisation)
Complexity
Flexibility
Transition is underway with serious impact on incumbents and tangible opportunities for start-ups.
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Online database (N=200+)

Exploratory interviews (N=17)

2014 – ongoing

Entrepreneurs as drivers of energy transition?
Tracking the startups since 2014

🌐 www.innovation-monitor.ch

350 Startups

→ 215 Energy
Emergence after policy and business opportunities

- CO2 tax
- Partial liberalisation & solar FiT
- Building efficiency programme expansion
- Fukushima & New Energy Strategy introduced
Producing renewable energy

- Development of decentralized electricity production technology: solar panels, wind turbines, storage solutions

“[Installers and planners] chose technologies they know and which do not cause any problems”
- Fuel cell developer
Reducing electricity demand

- Changing end consumer patterns through feedback, incentives, consultants. Technology and service providers.

"Utilities are a key aggregator of household consumers, thus we have to reach them through that channel" – Energy efficiency device producer
Ensuring availability and flexibility

- Active in many parts of the energy supply chain to address problems related to predictions, storage, availability, safety, and pricing

“The system is complex and changing, sector actors need new knowledge and skills” – Grid stability prediction software developer
Start-up Challenges

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**Swiss Energy Business Environment**

**Customer Acceptance**
- Potential customers are not aware of value proposition
- Potential customers struggle with understanding the value proposition
- High concern for data security and privacy

**Sector Barriers**
- Incumbent companies act as gatekeepers
- Key actors are risk averse
- Building legitimacy in a conservative environment
- Long investment/contract cycles client-side as entry barrier
- Energy technology development and manufacturing are capital intensive

**Regulatory Framework**
- Future political and legal situation is uncertain
- (Indirectly) Energy prices
Start-up scene emerged from policy change and market opportunities, but significant challenges exist.
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Comparative online survey

Energy (n = 44/105)

Fintech (n = 39/216)

2015 - 2016
Energy and finance – similarities and differences

**Energy sector**
- Market design
- National
- ...

**Finance sector**
- Highly regulated
- Dominated by large incumbents
- Emerging start-up scene
- Societally critical, risk averse
- Economic relevance
- Compliance
- International
- ...

Eichler, M., Grass, M., & Torti, A. (2013). The financial Sector and the Economy: A Pillar or a Burden? SECO Strukturerichterstattung 50/1
Both are indeed start-up samples...
Top challenges → Same for both groups

1. conservative and risk-averse environment
2. uncertain regulatory framework
3. gain customer trust
4. cover operational costs
5. find investors
6. high development and production costs
7. convince customers of offer
8. skilled employees
9. finding distribution channels

But we need to look closer....
... but different

conservative and risk-adverse sector*
uncertain political and regulatory framework**
customer trust*

**cover operational costs**
find investors**
access to relevant information***
we require hard-to-find resources**
find appropriate business model**

*p<.05, **p<.01, ***p<.001 (t-test)
Energy start-ups use more support

- events and networking
- spinoff program
- training**
- coaching**
- awards*
- infrastructure**

*p<.05, **p<.01, (χ²)
Energy start-ups lack access to market

Typical collaboration partners:

Universities*

Fintech: 8%
Energy: 45%

Incumbents*

Fintech: 67%
Energy: 39%

*p<.05
Energy start-ups are unique in the extent of their challenges to growth.
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Structured interviews

1 utility + 2 start-ups

1 Tech. Dev. + 3 start-ups

2017 – ongoing
Different goals = different models

- R&D
- Startup Programme
- Corporate incubation
- Acquisition
- Equity investment
- Scouting
- Idea generation
- Probe & learn

Shared resources

Risk for incumbent
Bilateral relations

**Traits:**
- *Established company leads*
- *Enhances existing innovation*
- *Risk management strategies: driven by need for innovation or market-change*
Expectations vs. Reality

**Startups**
- Bring product to market
- 1 large customer attracts the next
- Provide specialized skill or product
- Reputation and survival

**Incumbents**
- Looking for innovation in services, products, access to existing or new markets
- Risk management

**Continuing contracts**
- Further customers make first collaboration fade

**Learning just as valuable as investment**
- Pivoting occurs within collaboration
- Cultural clashes

Expectations fulfilled!

More variability than anticipated.
Start-ups benefit greatly from collaboration but competences challenged for majority of Swiss utilities.
Take home messages

1) Energy start-ups are on a bumpy road
   - Energy specific support
   - More sector involvement
   - Variety in collaborations

2) Policy development can play a bigger role
   - Realise indirect impacts of policy
   - Create conditions for uninhibited growth
   - Push (& pull) sector to move
Thank You

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