Future Utility Business Models: An Economic Perspective

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Overview

- Theories of the firm and DNOs
- Consumer behaviour
- From a DNO to DSO Business Model
- Conclusions
Theories of the Firm

Why firms exist:

- **The Capabilities Approach** - Firm exists because of capabilities and core competencies

- **The Property Rights View** – A particular set of assets (firms) under joint ownership

What determines firm size:

- **Neoclassical view** - Technology, market size, entry barriers

- **Transaction cost view** - Market vs. hierarchy - cost of discovering prices
Scale, Scope, and Growth

❖ Economies of Scale
  • Technical economies: Size of production
  • Non-technical economies: Size of the firm as a whole

❖ Economies of Scope
  • Products complement/substitute in service/quality and reduce average costs.

❖ Firms tend to want to grow
  • Important for lumpy investments and R&D

Griffiths and Wall, Applied Economics 2012
Consumer Behaviour and Social Acceptance
Customer vs. Citizen

- Need to recognize the dual end-user role
  - ‘Customer’ vs. ‘Citizen’
- Need to know when we talk to which
- Consumers are expected to behave in a certain way, so may not respond well
- How policies are framed and communicated matters

*Place the focus on ‘empowering’ the consumer in the market place*
Behavioural Economics

- Need to better understand consumer behaviour in energy demand and markets.

- Consumers may behave with a budget.

- We value things that we own more highly than equivalent things we could buy.

- They value a windfall gain less than a regular expenditure.

- So, how options/choices are designed/communicated matters for consumer decisions.

The Economist
Consumer - Cost Minimizer or Utility Maximizer

Figure 2: Example: Effect of tariff model within eTellingence

Source: EWE AG.

http://www.e-energy.de/de/etelligence.php
Network Business Model
From DNO to DSO
New Business Models - Context

- Low demand growth (e.g., 0.8% in US)

- Low short-term price elasticity
  - Competition in price can be unprofitable

- *What can a slow growing market offer to DNOs or other actors?*

- Demand for energy services, and its value to consumers, is increasing
DSOs in Europe

2,400 electricity distribution companies

260 million connected customers, of which 99% residential customers and small businesses

240,000 people employed

2,700 TWh a year

Unbundling applies to the more than 190 DSOs with 100,000 and more end users

Source: Eurelectric (2013)
### No. of DNOs in Europe - Declining

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Source: Eurelectric (2013)
Distributed resources:

- DG
- Storage
- Energy efficiency
- Demand response
- Network investments

Well-placed to aggregate the benefits (and costs) of ‘distributed resources’ at low transaction costs
From DNO to DSO - 2

- Can contribute to national load balancing through dispatchable DG and DSM
- Can improve network investment efficiency

- Integration of distributed supply/demand resources
  - Technical integration: Bidirectional power flows
  - Economic integration: Connection or UoS charges
    - “Competition for the market”,
    - Periodic contracts with existing/new bidders, on non-discriminatory basis
    - Small actors can enter through aggregators
    - Auctions
Figure 20 • Generation capacities by grid-level connection in Germany in 2010


Source: IEA (2013)
Figure 24 • Potential outlines of enhanced interfaces between the transmission and distribution level

Market with active distribution level participation and distributed generation

Transmission level

- Infrastructure planning
- Infrastructure operations
- Electricity market

Distribution level

- Aggregated active generation
- Aggregated active loads

Information flow
Physical electricity flow
New flows

Source: IEA (2013)
Features of a DSO Model - Summary

- Aggregates complementary/substitute distributed resources

- Market based
  - ‘Competition for the market’ instead of ‘competition in the market’
  - Periodic auctions

- Low transaction costs

- Benefits from scale and scope

- Utilizes synergies with network investments

- Reduces information asymmetry and uses local network knowledge
From DNO to DSO

Source: Poudineh and Jamasb (2014)
DSO - Revenues and Costs

- **TSO**
  - Residential customers
  - Commercial customers
  - Industrial customers
  - DG operator
  - Storage operator
  - Retail supplier

- **DSO**
  - Connection charge
  - UoS charge
  - Local balancing
  - Data supply
  - Premium reliability

- **Costs**
  - Grid reinforcement
  - UoS charge
  - Ancillary services
  - Energy loss
  - Operation and maintenance

- CDS contract
  - Demand response
  - Energy Efficiency
  - Capacity payment
R&D and Innovation

- Market failure
  - Social discount rate > Private discount rate

- Energy sector among least R&D intensive industries

- Generation - the fastest growing segment is the renewables, which receive support

- Networks - nothing happens unless an allowable cost!

- Allow experiments
  - Ofgem’s Innovation Zones and LCNF schemes
Conclusions

- Theory can guide us to some properties of business models
- Scale and scope matter for distributed ‘resource integration’ - demand/supply/storage
- ‘System integration’ benefits – e.g. grid
- Need for a unifying measure of energy services
- Promote innovation, R&D, experiments
- Technology, regulator, transaction costs define the boundaries between firm (DNO), market, sector

*Need for a regulatory model and framework for DSOs*
References

• EURELECTRIC (2013).


Thank you

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