P2P energy trading trial in Fremantle

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Major Government Investment

Universities (Research & Innovation)

City of Fremantle
Australian Government Department of Industry, Innovation and Science
CSIRO
DATA 61
Curran University
Murdoch University
Curtin Institute of Computation

Industial & Private Sector Partners
<table>
<thead>
<tr>
<th>Phase</th>
<th>Characteristic</th>
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<td>Phase 1 Emergence of novelty</td>
<td>Innovation emerges to solve a problem in the existing regime. It is nurtured by a small actor network (of technology pioneers and innovators) sharing expectation about the future performance of the innovation. To improve the price and performance they experiment to improve the design and figure out user preferences.</td>
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<td>Phase 2 Probing &amp; Learning</td>
<td>The supporting network evolves into an established group or community of specialists, producers or consumers. These actors work together to improve the innovation through learning about market preferences and understanding the necessary legislative change.</td>
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<td>Phase 3 Breakthrough and wide diffusion</td>
<td>With the help of external pressures and internal momentum, the innovation gains more actor and legislative support improves the price/performance ratio, achieves economies of scales and improved learning curves. The linkages and co-development of new system elements are increasing, resulting in building new infrastructures, new governmental agencies and professional organizations.</td>
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<td>Phase 4 Stabilization of the new regime</td>
<td>New socio-technical regime is created around the innovation with new infrastructure, new widely adopted user practices, policies and regulations.</td>
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Tariff structure
Supply charge
Network supply charge $2.20/day
Capacity charge $1.10/day
Electricity charge
Peak (3pm-9pm) $0.0909/kWh; off peak $0.0572/kWh
Renewable energy buy back rate
$0.04/kWh
P2P trading platform operators charge (paid by buyer) $0.005/kWh
P2P sale price – set by participants
Satisfaction with retailer

Reason to join trial

Year of installation PV
Trading efficiency in P2P energy trading market

- 1 Dec 2018 – 12 Feb 2019
- 18 Participants (5 consumers, 13 prosumers)

- P2P Trade: 2414.46 kWh, 10%
- P2G Trade: 21360.95 kWh, 86%
- Missed trade: 890.37 kWh, 4%
A. The efficiency period for trading is between 11 AM and 11.30 AM (at 11.30 AM: energy to trade close to eTraded and demand at the lowest).

B. The inefficiency period for trading is between 3.30 PM – 4.30 PM when demand starts to increase (4pm when it is the biggest different between energy to trade and eTraded).
Peer-to-Peer Energy Trading
Peer-to-Peer Energy Trading

Minimum and maximum numbers of transactions for different settlement times

![Graph showing the minimum and maximum numbers of transactions for different settlement times. The x-axis represents the number of transactions, and the y-axis represents the time in seconds. The graph indicates the variability in transaction numbers across different settlement times.]
Households’ energy consumption vs energy consumed for blockchain mining activities
Key themes emerging from the follow on workshop where the P2P trading model and associated tariff structure was revealed to trial participants

- Financial incentives matter
  - Fixed charges discouraged many potential participants
  - Trial participants expected subsidy to encourage uptake
- Alignment with community values
  - Design too market driven and not community/customer oriented
  - Social equity – disadvantaged will be less able to trade
  - Costs for P2P provider acceptable if leads to lower costs for the customer and community
- P2P market design
  - Local trading not reflected in tariff structure (lower transmission costs) and should be scaled to reflect energy efficiency outcomes
  - Risk high for prosumers as the trial had limited number of consumers so likely to attract low buy back rate.