ACCEPTANCE OF ANCILLARY SERVICES AND WILLINGNESS TO INVEST IN PV-STORAGE-SYSTEMS

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Acceptance as an important factor for the success of energy projects

- Energy East Pipeline draws Halifax protest - Stop Energy Halifax calls for public meetings
  (The Canadian Press, January 26, 2015)

- South Africans protest against monopoly by state-run power utility
  (ShanghaiDaily, February 04, 2015)

- EuPD: Independence in demand from consumers
  (pv magazine, October 17, 2012)

- Fracking debate in the UK: does it affect you?
  (The Guardian, January 30, 2015)

- Solar energy meets resistance in aesthetics-minded Texas suburbs
  (The Dallas Morning News, February 04, 2015)

- Nature Studies: For all the attractions of solar power, it shouldn’t blight the countryside
  (The Independent, January 26, 2015)

- Germany’s Energy Poverty: How Electricity Became a Luxury Good
  (SpiegelOnline, September 4, 2013)
Dimensions of acceptance in the example of renewable energies

- Positive recognition of renewable energies
- Displeasure of renewable energies
- Energy cooperatives
- PV owners
- Protest against wind turbines

Source: Zoellner, Rau, et al., Akzeptanz Erneuerbarer Energien und sozialwissenschaftliche Fragen, 2009
Rejection or resistance don’t play an important role in the case of PV-storage systems so far, because they don’t have an effect on other people.

For people to invest in PV-storage-systems they do only have to rate them positive but also an active action which in this case means willingness to invest is needed.

Goal of this study was to

1. find out which level of acceptance PV owners have regarding storage systems,
2. analyze under which conditions PV owners might be willing to invest in PV-storage-systems and
3. see how the acceptance varies with grid relieving operating modes.
The project PV-Benefit

- storage technology
- storage dimensioning
- modes of operation

- effects on distribution networks
- effects on transmission networks

- business and economic effects
- ecological issues (LCA for batteries)
- social issues (acceptance and willingness-to-invest)

www.pv-nutzen.rwth-aachen.de
Method of the survey

- 532 face-to-face interviews with private PV owners in Germany
- PV owners were chosen by a standard random route procedure
- 20 sample points are representative of the PV systems installed in Germany
- Only PV systems installed in 2010 or later
- The survey was conducted during the period from May to August 2014 by SOKO Institute, Bielefeld
In general a large amount of 70% is willing to invest in PV-storage-systems

Between the funding options of partial reimbursement of costs and a interest-free loan for 5 years, the PV owners clearly prefer a partial reimbursement which suits the KfW funding in Germany.
About 50% have already picked up information and 60% have already heard of the KfW funding.

About 30% denied both questions, which shows that there is already a awareness of the possibility of installing a PV-storage-system.

Information on purchasing a PV-storage-systems:
- Yes: 49%
- No: 51%

Awareness of KfW-funding for PV-storage-systems:
- Yes, I know it well: 25%
- Yes, I know it but don't know the details: 40%
- No: 35%
Independence as most important reason for purchasing a storage system

Reasons for purchasing a storage system

- Independence from the energy supplier
- Limiting the risks associated with the investment
- Self-consumption to cover costs
- Contribution to the success of energy system transformation
- Maximize the return

Legend:
- 1-very important
- 2
- 3
- 4
- 5
- 6-plays no role whatsoever
High costs as greatest obstacle for storage systems

Reasons against a storage system

- Investment to high
- Life or usage period uncertain
- Investment to risky
- Pos. effect on self-consumption uncertain
- Pos. effect on energy transf. uncertain
- Seems not ecological
- Premises are not appropriate
- Doubts regarding technical safety

Legend: 1-very important  2  3  4  5  6-plays no role whatsoever
25% don’t know what payback period can be expected for the storage system and over 35% guess 9 to 12 years.

The maximal investment costs for a storage that doubles the self-consumption rate from 30% to 60% should lie between 3000 to 6000 €, although an even bigger share is not able to answer the question.

It seems that respondents don’t feel prepared to answer this questions and don’t know for sure what economic circumstances to expect.
Respondents were asked to assume the return rate of a PV system by 4 % in order to supply a fixed starting point before asking their expected return rate for a PV-storage-system.

The return expectations increase by an average of 1 % (Optimising self-consumption) to 2 % (Grid relieving operational mode).
General influence and acceptance of different storage usage strategies

**Negative effect of a compulsory common-benefit share**
- in all circumstances: 18%
- more yes: 21%
- more no: 7%
- under no circumstances: 1%
- don't know: 35%
- no answer: 21%

**Acceptance of communication and data interface**
- in all circumstances: 23%
- more yes: 33%
- more no: 18%
- under no circumstances: 1%
- don't know: 4%
- no answer: 18%

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Remuneration and security of financing: security as most accepted frame condition

Common-benefit operating mode

- Common-benefit is properly remunerated
- Payback period not endangered
- Data protection ensured
- No direct external controllability possible
- External communication strongly encrypted
- Ensures PV increase without grid expansion

Bar chart shows the percentage of respondents who answered in different categories for each item:
- In all circumstances
- More yes
- More no
- Under no circumstances
- Don't know
- No answer

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High acceptance for external access from grid operator under any frame condition

External access from grid operator

- **Usage is properly remunerated**
- **Production with renewable energy increases**
- **Less grid expansion in the region necessary**

- Only 3% of the respondents answered ‘under no circumstances’ in all cases and about 5% answered ‘in all circumstances’ in all cases.
- Overall, a grid reliving operational mode is not a major hurdle – it might even be a selling point.
Conclusions

- The majority of PV owners endorse PV-storage-system but do not invest yet. So there seems to be a positive rating for PV-storage-systems which does not lead to action so far.

- PV owners are aware of the possibility of having a storage system, but seem not to be well informed about the economic circumstances.

- Major obstacles are high investment costs (and hence insufficient economic feasibility) and uncertain battery life time.

- Grid relieving operational modes are highly accepted if there are frame conditions that on the one hand properly remunerate the PV-storage owners and on the other hand guarantee a positive effect for the energy system.
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Thank you.

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