World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:12, No:06, 2018

Identification of Electric Energy Storage Acceptance Types: Empirical Findings from the German Manufacturing Industry

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Abstract : The industry, as one of the main energy consumer, is of critical importance along the way of transforming the energy system to Renewable Energies. The distributed character of the Energy Transition demands for further flexibility being introduced to the grid. In order to shed further light on the acceptance of Electric Energy Storage (ESS) from an industrial point of view, this study therefore examines the German manufacturing industry. The analysis in this paper uses data composed of a survey amongst 101 manufacturing companies in Germany. Being part of a two-stage research design, both qualitative and quantitative data was collected. Based on a literature review an acceptance concept was developed in the paper and four user-types identified: (Dedicated) User, Impeded User, Forced User and (Dedicated) Non-User and incorporated in the questionnaire. Both descriptive and bivariate analysis is deployed to identify the level of acceptance in the different organizations. After a factor analysis has been conducted, variables were grouped to form independent acceptance factors. Out of the 22 organizations that do show a positive attitude towards ESS, 5 have already implemented ESS and show a positive attitude towards ESS. They can be therefore considered 'Dedicated Users'. The remaining 17 organizations have a positive attitude but have not implemented ESS yet. The results suggest that profitability plays an important role as well as load-management systems that are already in place. Surprisingly, 2 organizations have implemented ESS even though they have a negative attitude towards it. This is an example for a 'Forced User' where reasons of overriding importance or supporters with overriding authority might have forced the company to implement ESS. By far the biggest subset of the sample shows (critical) distance and can therefore be considered '(Dedicated) Non-Users'. The results indicate that the majority of the respondents have not thought ESS in their own organization through yet. For the majority of the sample one can therefore not speak of critical distance but rather a distance due to insufficient information and the perceived unprofitability. This paper identifies the relative state of acceptance of ESS in the manufacturing industry as well as current reasons for hindrance and perspectives for future growth of ESS in an industrial setting from a policy level. The interest that is currently generated by the media could be channeled and taken into a more substantial and individual discussion about ESS in an industrial setting. If the current perception of profitability could be addressed and communicated accordingly, ESS and their use in for instance cooperative business models could become a topic for more organizations in Germany and other parts of the world. As price mechanisms tend to favor existing technologies, policy makers need to further access the use of ESS and acknowledge the positive effects when integrated in an energy system. The subfields of generation, transmission and distribution become increasingly intertwined. New technologies and business models, such as ESS or cooperative arrangements entering the market, increase the number of stakeholders. Organizations need to find their place within this array of stakeholders.

Keywords : acceptance, energy storage solutions, German energy transition, manufacturing industry
Conference Title : ICRSE 2018 : International Conference on Renewable and Sustainable Energy
Conference Location : San Francisco, United States
Conference Dates : June 06-07, 2018