THE SUPPLY OF ENERGY SERVICES : DO LOCAL SERVICE PROVIDERS USE DSO OR TELECOMMUNICATIONS NETWORK?

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Overview

The deployment of smart technologies in energy sector and environmental or energy paf icy goals have increase the rob of information needed to deliver energy services to end users. However, electricity firms need to overpass uncertainty linked to new business models, expected regulations and potentiel entrants, which are some factors from ail Chose that inhibit the smart grid transition (Shomali and Pinkse, 2016). Namely, Local Service Providers (LSPs) could offer several energy services to inform consumers and to help them improve their overafi energy efficiency. These services could be of a wide range, using sensors to manage consumption of appliances. Relying on energy boxes or smart meters, they could use different kind of user interface to display consumers' energy data, such as an in home display or an Internet platform. Ta provide these services and thus manage a bidirectional transfer of data, LSPs could use mainly two networks. The first one is the Distribution System Operator (DSO) network, wich could be used to send signais or informations to consumers, through for instance any in home display connected to the smart meter. They also could use the housefod electricity network with smart meters to receive some informations on consumption or directly manage some appliances, as it is currently done for water-heater under time of use tariffs. As the business of the DSO is regulated, LSPs should pay a regufated access fee to use the electricity network. Beside the DSO network, LSPs could afso use the "classic" telecommunication network, using for instance an energy box connected to the consumers' Internet access. ln this case, LSPs do not contract with the DSO but directly with consumers : on the one hand to provide the expected energy services and on the other hand to use a defined bandwith of their Internet access. in that case, LSPs couid have to compensate consumers for that bandwith. If not, LSPs could directly contract with f nternet Service Providers (ISPs) to use a defined bandwith at a negociated price, the Internet sector being competitive. Two effects couid be observed foliowing this negociation. The first one is that the Internet access price could drive the supply of energy services if the two networks are not substitute. Thus, ISPs market power impacts the LSPs activity on the energy sector. The second one is that if LSPs widely use the Internet network, ISPs must invest and develop it to make sure energy services couic' be served. Then, ISPs must recover their additional investment costs (Heidell and Ware, 2010).

Methods

We use a Hotelling model to study the choice for two LSPs between two networks to serve consumers (Kitahara and Matsumura, 2013). We assume the two LSPs are in competition on the energy service market (the downstream market). Each of them maximizes its profit on the downstream market. They couid use DSO's network or ISPs' network to provide their energy services. Thereafter, the use of DSO's network cornes at a regulated price, whereas it cornes at a negociated price for ISPs network. If they choose the DSO's network, they pay an access fee which is set by the regulator as maximizing the social weifare. Thus, the choice of a network to serve the demand relies on network costs, as a proxy of their efficiency, but also on the regulated access charge and the negociated price between ISPs and LSPs.

Results

We show that regulator Gourd, when optimizing the social welfare, set the regulated access charge as a function of supply, network costs and consumers switching costs. Using the DSO's network could also reduce the weight of its fixed costs and thus could create further social welfare improvements. Allthough duplicating at least some fixed costs, the use of the two networks is allowed due to the existence of switching costs for consumers. Then, as the regulator could have incentives to increase the levai of the access charge to optimize the social welfare, each LSP could use a network to serve consumers' demand in energy services. We also show that regulators of telecommunication and energy sectors could impact the competition on the downstream market of energy services. As in Fiocco and Scarpa (2011), in order to improve the social welfare, regulation authorities should coordinate themselves on the setting of the access charges and also regulate negociations rules between ISPs and LSPs.

Conclusions

The market of energy services is a great example of the co-existence of electricity and telecommunications networks often described in the context of smartgrid deployment. The choice of the DSO's network to provide energy services could increase the welfare as the access fee is regulated, as this network could be spread at a lower costs, and also as it could benefits from large increasing economies of scafe. However, LSPs could prefer to use ISPs' networks to have a direct access to consumers with their own technologies, and also to enhance their independence from DSO's activities. Then, the contract with the 1SPs could impact which consumers the LSPs couid provide through this network, because of the existence of switching costs and of an efficiency gap between the two networks. If consumers are captive, LSPs could charge higher pricing policies using ISPs' networks without any significant decrease in demand. Overalf, it could be welfare improving that LSPs use the same network, i,e the DSO's network to avoid additionnai duplication of costs. Obviously, if the reguiated price is too high (meaning the DSO's network is way too inefficient), LSPs should prefer to use the ISPs' networks even if they are exposed to ISPs' strategies, such as market power or recovering new costly investments costs.

References

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