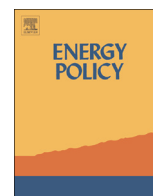




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# From demand side management (DSM) to energy efficiency services: A Finnish case study



Eeva-Lotta Apajalahti <sup>a,\*</sup>, Raimo Lovio <sup>a</sup>, Eva Heiskanen <sup>b</sup>

<sup>a</sup> Aalto University School of Business, Department of Management Studies, Organization and management, P.O. Box 21230, 00076 Aalto, Finland

<sup>b</sup> National Consumer Research Centre, P.O. Box 142, 00531 Helsinki, Finland

## HIGHLIGHTS

- Energy companies struggle to become energy service providers
- We explore the development of new energy saving business solutions
- Dispersed organisational structure leaves energy saving business as isolated function
- Strong consumer scepticism towards energy companies as providers of energy saving
- More emphasis on the changing company-customer relationship is needed

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## ABSTRACT

Energy conservation is expected to contribute significantly to climate change mitigation and energy security. Traditionally, energy companies have had strong role in providing Demand Side Management (DSM) measures. However, after energy market liberalization in Europe, energy companies' DSM activities declined. In response, the EU issued Directive (2006/32/EC) on energy end-use efficiency and energy services (ESD) to motivate energy companies to promote energy efficiency and conservation, closely followed by Directive (2012/27/EU) on energy efficiency (EED), requiring the setting up energy efficiency obligation schemes. Despite strong political and economic motivation, energy companies struggle to develop energy efficiency services in liberalised energy markets due to *conflicting institutional demands*, which arise from contradicting policy requirements and customer relations. The main challenges in developing new innovative energy efficiency services, evidenced by an in-depth case study, were (1) the unbundling of energy company operations, which makes it difficult to develop services when the contribution of several business units is required and (2) the distrust among energy end-users, which renders the business logic of energy saving contract models self-contradictory. On the basis of the research, avenues out of these dilemmas are suggested.

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## 1. Introduction

Energy efficiency and conservation are expected to be among the key solutions to energy and climate concerns. The International Energy Agency has estimated that by 2035, energy end-use efficiency and electricity savings have the highest potential to reduce carbon dioxide emissions to estimated safe levels, representing approximately two-thirds of the reduction target (IEA WEO, 2012: 253). In addition, increasing energy efficiency and conservation may be the most cost-effective means to reach the

EU 20-20-20 targets, i.e., to reduce carbon dioxide emissions and primary energy use by 20 per cent by the year 2020.

Existing energy companies are likely to be at the core of the energy transition for several years to come, because they control the energy infrastructure and the existing customer base. They have also been part of several decades of efforts to promote energy efficiency via demand-side management (DSM) programmes (Didden and D'haeseleer, 2003; Sousa et al., 2013). However, since the emergence of market liberalization, the role of energy companies has been increasingly called into question. Didden and D'haeseleer (2003) argue that benefits for energy companies in implementing DSM initiatives have become obscure, making energy companies seem 'unnatural' providers of energy efficiency and.

\* Corresponding author.

E-mail addresses: [eva-lotta.apajalahti@aalto.fi](mailto:eva-lotta.apajalahti@aalto.fi) (E.-L. Apajalahti), [raimo.lovio@aalto.fi](mailto:raimo.lovio@aalto.fi) (R. Lovio), [eva.heiskanen@ncrc.fi](mailto:eva.heiskanen@ncrc.fi) (E. Heiskanen).

As the natural role of energy companies in the implementation of DSM programs has declined, regulation has emerged to place energy efficiency and conservation back on the agenda of energy companies. The Energy Services Directive (ESD) (2006/32/EC) included obligations for energy companies to fulfil certain requirements in terms of energy advice, communication, feedback and billing. Furthermore, the ESD also emphasized the importance of shifting towards energy services rather than increasing sales of energy. More recently, the new Energy Efficiency Directive (EED) (2012/27/EU) obliges member states to set up energy efficiency obligation (or comparable) schemes, i.e. to require energy companies to save a certain percentage of their customers' energy end-use. As energy companies have decades of experience in providing energy advice, it would be a natural step to develop energy service business models that bring revenues from reducing energy end-use.

There is limited research on how today's energy companies integrate energy end-use efficiency and conservation into their business models in the context of liberalised electricity markets, which have dramatically changed the companies' operating environment. The former role of the energy company as a provider of public goods for local communities has been replaced with the market principles of increasing returns and profit maximization. Furthermore, the unbundling of energy company operations into separate business units has led to a situation where the electricity retailer is operating in a competitive electricity market, whereas other business units such as the distribution network have remained local monopolies (Vine et al., 2003). The current discussion on DSM in Europe focuses on demand response (i.e., load shifting rather than energy efficiency) and the monitoring and control solutions enabled by a smart grid (Calastres, 2011; Darby et al., 2013; Torriti, 2012). Policy analyses of Energy Efficiency Obligation Schemes (Bertoldi et al., 2010; Eyre et al., 2009; Warren, 2014) usually focus on effectiveness in terms of energy saved. However, only few studies (Hannon et al., 2013; Sousa et al., 2013) have examined the drivers and barriers for energy companies to make a genuine shift to providing energy services as a part of their business model. In particular, there is a research gap in how market liberalization influences customer relations and organizations' internal capacities to provide energy services.

Thus, there is a clear need for deeper exploration of the role of energy companies in promoting energy end-use efficiency and conservation, given the complex relationships between different policy targets, the operations of energy companies and the energy end-users' perspectives. Our research question is: how can energy end-use efficiency and conservation be incorporated deeper into company operations, i.e., into the development of new energy services enabling a shift beyond compliance-only strategies? We provide an evidence from an in-depth case study on the main motives for and challenges of this shift by a large municipally owned Finnish electricity retailer (Case Retailer) which combines the Case Retailer's and end-users' perspectives on the development of energy services.

This article is structured as follows. The following section introduces the methods and the research gap based on the relevant literature on demand-side management and new business development in the fields of energy efficiency and conservation. Section 3 presents the findings on the motives and challenges of the Case Retailer for developing the energy service business within the Finnish policy context, including complementary perspectives from a consumer survey. The broader significance of these findings is discussed in Section 4, followed by conclusions and policy implications.

## 2. Methods

### 2.1. Research context and gap: developing energy service-based business solutions

The role of energy companies in promoting energy efficiency and conservation has been conceptualised in the past literature under the term Demand Side Management (DSM). DSM refers to actions taken to reduce energy end-use (i.e., promote energy efficiency or energy saving/conservation – these terms are here used interchangeably) or shift the timing of energy end-use (load shifting) (see e.g. IEA DSM, 2009). While the conditions for traditional DSM in the context of liberalized energy markets have been called into question (Didden and D'haeseleer, 2003; Sousa et al., 2013), the notion of DSM is high on the policy agenda (Warren, 2014). Current drivers include the need for more flexible demand in response to the increasing amount of intermittent production. Renewed interest is also triggered by the building up of a smart grid, including smart meters that enable more accurate monitoring of energy usage (Calastres, 2011; Torriti, 2012). Heightened concern for climate change has renewed an interest in a performance-based energy system, which focuses on energy services such as light and heat, rather than energy supply (Steinberger et al., 2009). In this most recent phase, regulatory DSM has re-entered the European scene in the form of energy efficiency obligation schemes (Sousa et al., 2013).

In Europe, energy efficiency obligation schemes have been in place for several years in the UK, Denmark, France, Italy and parts of Belgium (Bertoldi et al., 2010; Moser, 2012), and they are now required in some form in all member states by the EU Directive (2012/27/EU) on energy efficiency (EED). Yet there is little research on how regulation helps or hinders energy companies in turning into service providers. Most of the evaluations of energy efficiency obligations schemes have focused on the direct impacts, i.e. energy and CO<sub>2</sub> savings, whereas less research is conducted on whether such schemes help to change business models in energy supply (see Bertoldi et al., 2010; Eyre et al., 2009).

Recent research suggests that many energy companies are gradually recognizing the need to make the shift from energy supplier to service provider, but that few have yet made this shift successfully, even on a small scale (Bonnemaizon and Batat, 2011; Hannon et al., 2013). Some authors attribute the slow development of performance-based energy services to the political power of energy companies, which resist such requirements as long as they can benefit from their current business model (Hannon et al., 2013; Steinberger et al., 2009). It has been argued that large companies are slow movers and that energy companies lack dedicated organizational structures for service development (Thieme et al., 2013).

Reasons for energy companies' difficulties in turning into service providers might also be found in their relations to and ways of communicating with customers (Bonnemaizon and Batat, 2011; Stone and Ozimek, 2010; Thieme et al., 2013). Indeed, the traditional public-service company with a captive consumer base tended to conceptualise customers as "loads" (Gustavsson, 1999) and hence the development of customer relations is a relatively new challenge for energy companies. Deeper customer relations are required, in particular, when companies aim to go beyond mere information provision and develop chargeable services that offer new sources of revenue (Hannon et al., 2013). The development of such service-based offerings brings benefits in terms of customer loyalty and potential ways out of price competition (Gehring, 2002), yet it also requires a deeper relationship with customers (Bonnemaizon and Batat, 2011; Stone and Ozimek, 2010).

Previous studies offer some indications of the challenges faced by energy companies when transforming into service providers in

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