SMALL-SCALE, BIG IMPACT – UTILITIES' NEW BUSINESS MODELS FOR "ENERGIEWENDE"

Wolfgang Arthur MARKO[1]

Introduction

The European electricity industry looks back on two decades of major changes: The liberalization has just been mastered, but the rising diffusion of renewable energy generation and especially small-scale distributed renewable energy generation (DREG) poses new challenges. Electricity from renewables has priority in the grid and is supported by feed-in-tariffs in many countries in order to realize the "Energiewende". Hence, big power plants have to be operated under partial load for long periods and therefore do not reach their full efficiency and specific electricity production costs (€/kWh) rise. This puts pressure on the fossil power plants, and many modern and efficient combined-cycle gas turbine plants (CCGT) are switched off. Consequently, the classic utility business model (UBM) summarized as "invest in a plant, earn a return, and turn the meters" is seriously challenged and additional business models (BM) for DREG seem vital.

This paper addresses the questions of how utilities can survive the "Energiewende" and even benefit from the diffusion of renewable energy, which roles utilities can play in a combined centralized-distributed electricity generation, and which BMs could be suitable for small-scale DREG. Therefore, we introduce the major challenges for the utilities and their BMs concerning "Energiewende"

- the development targets for renewable energies,
- the cost pressure and aging of conventional power plants,
- the change of customer interests and their bargaining position, and
- the role of industries' cognitive barriers concerning DREG.

Based on the results of a real-world BM research (Marko et al. 2013), we present a new generic BM development tool for DREG and five new utilities' BMs for small-scale DREG focused on optimized energy solutions for the customers and suitability regarding market potential and utilities' capabilities.

Methodology

This paper is based on the results of a joint project with partners from academia and a large Austrian utility, which has already gained some experience in DREG, but wanted to establish a broader, more systematic approach in this field. Thus, we were interested in possibilities for integrating small-scale DREG units (< 250 kWel) into the value creation and proposition of utilities – two of the core elements of a BM. Therefore, we investigated the BM situation of utilities worldwide (n = 11), which are using renewable energy technologies at micro- or small-scale level (< 250 kWel) and conducted brief literature research on BMI in the field of renewable energies. The outcome of this analysis was used (1) to illustrate the challenges of European utilities concerning "Energiewende", (2) to sketch utilities' real-world BMs with the help of Business Model Canvas (Osterwalder & Pigneur 2010) and (3) to develop the different characteristics for the BM morphology[2], a specific morphological field scheme (Zwicky & Wilson 1967). Using this tool, the results of the qualitative real-world BM research, and the literature base we (4) developed specific BMs for small-scale DREG.

Findings

The results are twofold: Firstly, a generic tool for BM development for small-scale DREG framed as morphological fields (Figure 1) and secondly, five concrete new utilities' BMs for mass and individual

[1] TU Graz, Institut für Unternehmungsführung und Organisation, Kopernikusgasse 24/IV, 8010 Graz, +43 316 873 7503, wolfgang.marko@tugraz.at, ufo.tugraz.at

[2] Morphological fields have already been used to structure and analyze BMs in other industries (Lay et al. 2009).

customers from a technological perspective (**Fehler! Verweisquelle konnte nicht gefunden werden.**) are presented. These are named (1) Combined

Characteristic	Subcharacteristic	Expression								
Customer Interface	Customer segments	Mass Customers			Individual Customers					
		One-family dwelling	Flat	Agriculture	Trade and small industry	Multiple dwelling	medium-sized Property	Hotel industry	Municipality	Local heat network
	Distribution channels	Own						Partner		
		Sales force		Online		Events		Partner stores	Online	
	Relationships	Customer acquisition			Customer retention			Upselling		
		Personal assistance	Key Account	Automated	Personal assistance	Key Account	Automated	Personal assistance	Key Account	Automated
Value Proposition	Products and services	low complexity				medium complexity			high complexity	
		Power	Heat	Service / Maintenance	Insurance	Consulting	Provision of facilities	Planning and Installation	Ownership/ Contracting	Operation
Infrastructure Management	Key activities	Energy management	Primary energy carrier management	Risk pooling		Consulting	Facility sales	Project management	Facility administration	Facility operation
	Key resources	Know-how			Manpower				Facility	Financing and Funding
		Operation	Market	Technology	Consulting	Operations	Services	Sales		
	Key partners	IT companies	Agents / consultants	Financier	Facility manufacturers	Installers	Operators	Service partners		
Financial Aspects	Revenue model	Product-related			Product- and service-related			Service-related		
		Feed-in	Base rate	Output-related fee	Facility sale	Facility contracting	Performance contracting	Consulting	Operation	Service/Maintenance/ Insurance
	Cost structure	IT costs	Infrastructure costs	Primary energy carrier	Total facility costs	Shared facility costs	Consulting	Operation	Service/ Maintenance/ Insurance	Sales and Marketing

Figure 1 Business Model Morphology for Small-scale Distributed Renewable Energy Generation

Heat and Power Plant Contracting, (2) Fuel Cell Contracting, (3) Complete Service Package, (4) Heat Intensive and (5) Power Intensive. The BMs are focused on optimized energy solutions for the customers and suitability regarding market potential as well as utilities' organizational capabilities.

Customer Segment / Business Model / Technology	Mass Customers		Individual Customers		
	BM 1	BM 2	BM 3	BM 4	BM 5
	Combined Heat and Power Plant Contracting	Fuel Cell Contracting	Complete Service Package	Heat Intensive	Power Intensive
Combined Heat and Power Plant	✔		✔	✔	✔
Fuel cell		✔	✔		
Small Wind Turbine			✔		
Small Hydro Power			✔		
Photovoltaics			✔	✔	✔
Thermal Storage		✔	✔	✔	✔
Electric Storage		✔	✔	✔	✔

Figure 2 Small-Scale Distributed Renewable Energy Generation Business Models and their Technology Fit

Literature:

Marko, W.A., Granda, J.A. & Vorbach, S., 2013. *Energiewende – Utilities' New Business Models for Distributed Renewable Energy Generation*, Paper presented at the Corporate Responsibility Research Conference CRRC 2013 in Graz, Austria, 12th-13th September 2013, (in press) Available at: http://isis.uni-graz.at/de/forschen/isis-reports/

Osterwalder, A. & Pigneur, Y., 2010. *Business Model Generation*, Hoboken: John Wiley & Sons Inc.

Zwicky, F. & Wilson, A.G. eds., 1967. *New methods of thought and procedure*. Contributions to the Symposium on Methodologies, New York: Springer.