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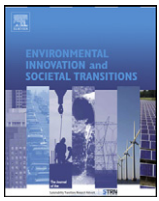

The emerging funding gap for the European Energy Sector—Will the financial sector deliver?☆

Robin Jacobsson[a], Staffan Jacobsson[b,*]

[a] *Institute for Management of Innovation and Technology (IMIT), Gothenburg, Sweden*
[b] *IMIT and Environmental Systems Analysis, Chalmers University of Technology, Gothenburg, Sweden*

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ABSTRACT

In the EU policy debate, there is an emerging understanding of the existence of a substantial gap between current investment levels and those required to reach the 2020 energy targets. For energy supply and transmission alone, the gap is estimated to be almost €500 billion. Bridging this funding gap requires the financial sector to supply the capital needed by firms in their entrepreneurial activities. Over the last thirty years, the financial sector has, however, shifted its focus towards speculative and high-risk financial investments with short periods of investment and high returns. It is quite plausible that the ability of the EU to bridge the funding gap and realise the desired process of Schumpeterian "creative destruction" in the energy sector will be constrained by this shift. We conclude that an adequate mobilisation of financial resources may require public investments to be greatly increased and/or a reform of the financial system.

1. Introduction

By 2020, the EU aims to reduce its greenhouse gas (GHG) emissions by 20 per cent (EC, 2011a), or by about 1117 million tonnes.[1] A range of investments needs to be undertaken in order to reach

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* Corresponding author. Tel.: +46 317721213; fax: +46 317722172.
E-mail address: staffan.jacobsson@chalmers.se (S. Jacobsson).

[1] Elaboration on EEA (2011), table ES.8.

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this goal. These include those that allow for an increase in the supply of renewable electricity from about 630 TWh in 2010 to 1216 TWh in 2020 (EC, 2010a) and the building or upgrading of 50 000 km of electricity transmission lines (Euroactiv, 2010). The scale of investment increases beyond 2020 as we move towards an 80 per cent reduction in GHG emissions, or more. For instance, 100 000 new wind turbines may need to be built, along with 5000 km^2 of solar panels, 200 million electric vehicles and 100 million heat pumps (ECF, 2010a). Indeed, one of these items alone, offshore wind power, is judged to constitute "... the largest single infrastructure project ever undertaken by mankind" (Massy, 2010).

Access to and cost of capital is a central determinant of the pace of this transformation process. European policy-makers are aware that funding constitutes a bottleneck, indeed an emerging concept in the policy literature is the notion of a "funding gap"[2] (EC, 2011b,c,e; De Jager et al., 2011; KPMG, 2010). This necessarily directs our attention to the functioning of the European capital market and the ability of the financial sector to sustain the much needed process of Schumpeterian "creative destruction" (Schumpeter, 1942) in the energy sector, i.e. the process whereby new technologies (e.g. offshore wind power and wave power) replace incumbent technologies (e.g. coal power).

The financial sector has undergone profound changes in terms of its business logic over the past decades where attention has shifted from investment in the productive sector, such as power plants, towards investment in financial products, such as derivative trading. The purpose of this article is, therefore, to raise questions about the role of the financial sector in the on-going large-scale transformation of the energy sector in the European Union, directing the attention of both policy-makers and researchers to potential problems in mobilising the required financial capital.[3]

The article is structured as follows. Section 2 estimates the size of the funding gap for the energy sector alone. Section 3 analyses why there is a risk that the funding gap will not be bridged. Section 4 summarises our argument and indicates two policy options. It also gives some ideas for further research. Throughout the paper we give illustrative examples from offshore wind power.

2. Size of the funding gap

To reach the EU energy targets for 2020, a minimum of €1.1–1.3 trillion needs to be invested (elaboration on EC, 2011c; De Jager et al., 2011). Key observers argue, however, that the current investment levels jeopardize the attainment of these goals. For instance, De Jager et al. (2011, p. 111) recently stated that investments are "... too low to enable the achievements of EC objectives." Ernst and Young (2011) agrees, arguing that "... funding from banks, corporates and capital markets is at its lowest for the past decade" and are unlikely to supply the needed capital. Hence, there is an emerging understanding that there is a serious gap between current investment levels and those required to reach the EU 2020 energy targets. This understanding is also found amongst individual member states. A case in point is the UK where the Government (DECC, 2011, p. 27) highlighted this challenge[4]:

> "*Ofgem has estimated that we need at least 110 bn pounds of new investment in electricity generation and transmission in the period of 2020. To put this in context, in the last decade the market invested less than half that amount*."

To meet the EU targets, investments of €500–700 billion[5] are required for energy supply (electricity and heat),[6] €200 billion are needed for transmission networks and storage whilst distribution networks (and smart grids) need €400 billion (EC, 2011b,c; De Jager et al., 2011).[7]

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[2] This is also referred to as finance or investment gap.

[3] We are, thus, focussing on one function in the dynamics of innovation systems (Jacobsson and Bergek, 2011).

[4] Ofgem is the Office of the Gas and Electricity Markets Authority.

[5] EC (2011c) suggests that meeting the renewable energy supply targets will cost €500 billion whilst De Jager et al. (2011) argues the same targets will cost €700 billion, hence the range in our estimate.

[6] The figures on the required investment levels come from EU sources and have been calculated using the PRIMES and Green-X models. These models estimate required investment amounts and divide the amount by the number of years the study covers. In this case, the studies stretch from 2010 to 2020.

[7] De Jager et al. (2011) and EC (2011b) differ slightly in the factors included in their definitions, with EC including CCS and natural gas infrastructure, whilst De Jager et al. focuses solely on RES technology.