Energy Policy 107 (2017) 96–108

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

Business model for cross-border interconnections in the Mediterranean basin

Rahmatallah Poudineh[a], Alessandro Rubino[b,*]

[a] Oxford Institute for Energy Studies, Oxford, UK
[b] University of Bari, Italy

ARTICLE INFO

JEL classification:
L43
L51
L94
K23

Keywords:
Interconnection
Business model
Mediterranean basin
Regulatory framework
MTI

ABSTRACT

Given the complementarity of electricity systems in the north and south Mediterranean basin, a greater integration and trade can help achieving national and regional energy policy objectives of security of supply, cost optimisation and sustainability. However, the issues such as different electricity market structures, regulatory and institutional diversity and disparate level of political stability make interconnection investment between north and south a risky undertaking. Due to high perceived risk, delivery of interconnection projects through the EU regulated model is less likely, or only possible at prohibitively high rate of returns. The merchant transmission initiative (MTI), on the other hand, seen as an exception under the EU laws, can be approved only if the project meets a set of strict conditions. Here we show that a hybrid business model in which the main benefits of a merchant model are maintained within a regulated structure, that involves minimal regulatory changes to national electricity markets, offers an appropriate response to the existing investment challenges in the Euro-Mediterranean basin. We highlight the main components of the proposed model and show how it addresses the key features of a viable business model regarding investment incentives, risks, governance and compatibility with the region's energy scenario.

1. Introduction

The existing Mediterranean energy infrastructures was mostly designed and built more than 50 years ago and were based on the national-level energy policies and security of supply priorities of the time. Since then, the energy landscape has changed dramatically. Now, national dynamics must be harmonised with regional and global developments and policies. In particular, climate change policies and energy security measures have greatly impacted the existing energy infrastructures and transmission grids, and are expected to continue doing so in the foreseeable future (Steinbach, 2013; Oseni and Pollitt, 2016). In order to achieve the national and regional energy policy objectives, the infrastructural endowment will need to be updated in most countries of the region. For the electricity grid, a combination of short-term goals and long-term patterns will guide development of the transmission network in the coming decades. Reinforced interconnection between Member States (MS) in the EU and South and East Mediterranean Countries[1] (SEMCs) are required in order to achieve more secure and more sustainable energy systems. This is also compatible with other energy policy objectives. For example, the EU member states are required to comply with the completion of an integrated Internal Energy Market (IEM) by 2020.

From an economic perspective, development of the interconnection in the Mediterranean region requires a business model that not only addresses the common regulatory challenges of grid infrastructures, such as incentive for investment and efficient operations, but also takes into account the risk and heterogeneities among the countries of the region. There is a sharp difference between the North Mediterranean Countries (NMCs) and SEMCs in terms of stage of development, power sector structure, market openness and maturity, regulations and institutions and political stability. These differences have manifested themselves in different energy needs and regulatory priorities in relation to the energy trilemma of affordability, reliability and sustainability. Europe emphasises interconnections among MS in order to achieve the 10% electricity interconnection target envisaged by the Barcelona European Council in 2002 and reinforced in the recent Energy Union communication (European Commission, 2015). For SEMCs the greatest challenge, on the contrary, is to accommodate existing and future demand while ensuring system stability. These aspects have inevitably important implications on transmission net-

* Corresponding author.
E-mail address: alessandro.rubino@eui.eu (A. Rubino).
[1] Algeria, Egypt, Libya, Morocco, Tunisia, Turkey, Israel, Jordan, Lebanon, Palestine, and Syria.

http://dx.doi.org/10.1016/j.enpol.2017.04.027
Received 9 December 2016; Received in revised form 14 April 2017; Accepted 15 April 2017

work and interconnections.

The cross-border interconnections, as other capital-intensive networks, are natural monopolies which have traditionally operated under incentive regulation, a regulatory paradigm which still constitutes the main business model for interconnections in the EU region. However, the EU regulated investment model has been unable to unlock investment in cross-border interconnection (van Koten, 2012). The insight from economic theory that regulators can encourage competition "for the market" where competition "in the market" is not feasible, attracted interest in a new business model known as Merchant Transmission Initiative (MTI). Under this model, private investors enter the market with the incentive that they will be exempted (fully or partially) from the regulatory restrictions which prevail under the regulated model. Nonetheless, the MTI model is considered an exception to the EU laws, and private investors still face various other challenges investing in interconnection in a heterogeneous region.

This paper analyses the issue of interconnection development in the Mediterranean basin and highlights the challenges of the EU model to stimulate investment in cross border transmission lines. The contribution of this paper is two folded. First, it presents the characteristics of regulated investment model and MTI and demonstrate why these two models, in their pure forms, are not suitable to enhance cross border interconnection in the Euro-Mediterranean region. Second, the paper characterises the specifications of a viable business model for interconnectors in the region and propose a hybrid approach, with the aim to minimize market risks to investors while improving security of supply. The suggested business model operates with minimal regulatory changes needed in the domestic markets and is more compatible with the energy scenario, institutional diversity, risk attitude and governance structure that prevails in the region.[2]

The next section discusses energy scenarios in the Mediterranean region and its implications for electricity grid infrastructures. Section 3 assesses the state of the existing and planned interconnectors in the Mediterranean region. Section 4 discusses the main economic properties of regulated investment model *vis a vis* MTI and presents the substantive treatment of MTI under the EU regulation. The regulatory framework for a viable business model for cross-border interconnection is discussed in Section 5. Section 6 proposes some conclusions.

2. Energy scenario in the region (demand and supply)

Despite its long history of interactions, the Mediterranean today is a highly fragmented region that is facing unprecedented social, economic and political challenges. The region, in fact, is characterised by economic inequity, extending from the affluent north basin[3] to the areas of deep poverty and scarcity of resources in the south and east of the basin,[4] where the demographic rate is increasing faster. SEMCs that currently account for just above 25% of the total GDP of the region are expected to grow at twice the rate of the NMCs (see Fig. 1). In 2030, SEMCs will account for around one-third of the region's total GDP. At the same time, the population is growing at a faster rate in the SEMCs than the north and by 2030 60% of the population will be in countries on the south shore of the basin (OME, 2015).

The energy balance and regional trade flows will be significantly affected by these imbalances. Since energy demand in developing countries is correlated with GDP trends, it is expected that future demand will increase in the Middle East and North African countries (MENA). On the other hand, weak growth, the declining population trends, high retail electricity prices to recover the cost of public policies and the effective deployment of energy efficiency measures shall all contribute to reducing electricity consumption on the European side of the Basin. Nevertheless, despite this projected convergence, MENA countries in 2020 will still consume just half the electricity of the north on a per capita basis (see Fig. 2). In addition, notwithstanding most countries have close to 100% access to electricity, there is part of the population that either still lack access to electricity or suffers from scarce or insufficient electricity supply, especially in rural areas and in informal settlements.[5]

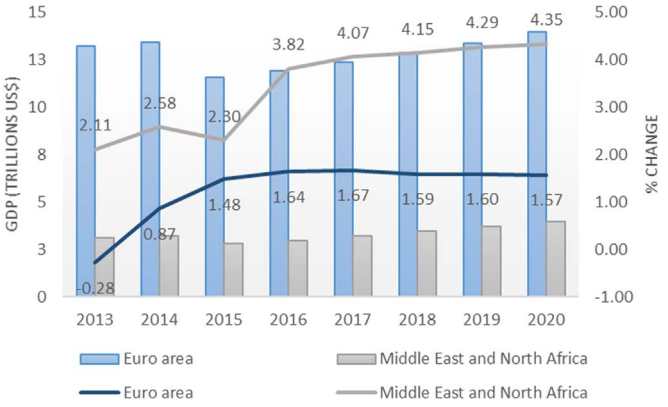

Fig. 1. Gross domestic product, constant prices and percent change.
Source: International Monetary Fund, World Economic Outlook Database, October 2015.

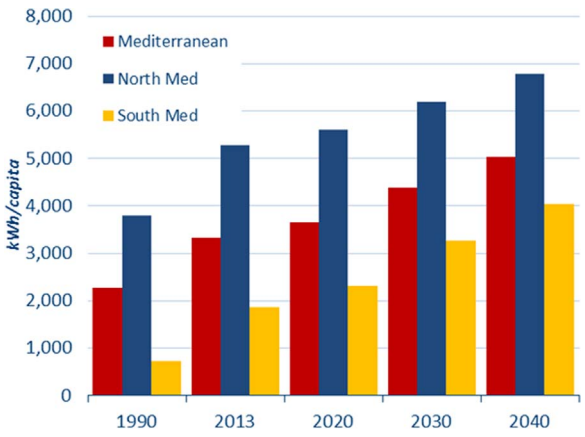

Fig. 2. Electricity demand per capita.
Source: OME (2015).

The expected demand increase in SEMCs elevates pressure on the existing infrastructure and increase the necessity of new investments. The World Bank in 2010[6] estimated that the region needs investments in excess of €27 billion a year (US$ 30 billion) up to 2040. This number represents about 3% of the region's total projected GDP, and implies a rate of investment three times higher than the rest of the world.

More recently the *Observatoire Mediterranéèn de l'Energie*, in 2015, estimated that over €715 billion will be needed by 2030 to meet additional generation needs. This level of investment is in line with

[2] While we acknowledge that the presence of political instability in some of the countries of the southern Mediterranean has an impact on the investment risk, we do not assume that interconnections will not have a material impact on reducing instability. Political instability in the SEMCs depends on various factors mostly related to the macroeconomic and social sphere, and have adverse implications for the business climate in the region.

[3] For the purposes of our analysis we follow OME classification and include as North Mediterranean Countries (NMCs) both EU countries (Cyprus, France, Greece, Italy, Malta, Portugal, Slovenia, Spain) and non-EU countries (Albania, Bosnia Herzegovina, Croatia, FYROM, Serbia).

[4] Algeria, Egypt, Libya, Morocco, Tunisia, Turkey, Israel, Jordan, Lebanon, Palestine, Syria.

[5] 20 million people in the region are without access to electricity, while at least 12 million use traditional biomass for cooking and heating (REN21, 2013, p.30).

[6] These reference figures are highly cited. It comes from a background document accessible via the following link: http://go.worldbank.org/88TPPX6OF0 (the entire document is not accessible anymore).