

## **Renewable Energies in the Middle East and North African Region: can Private-Public Partnerships Address Existing Barriers and Risks?**

Nadejda Komendantova<sup>1,2 +</sup>

<sup>1</sup> International Institute for Applied Systems Analysis (IIASA), Schlossplatz 1, A-2361 Laxenburg, Austria

<sup>2</sup> Department of Environmental Systems Science, Institute for Environmental Decisions (ETH), Climate Policy Group, Zurich, Switzerland

**Abstract.** Despite ambitious energy policy targets and available resource potentials deployment of renewable energies in the Middle East and North African (MENA) region is mainly supported by public funding. Volumes of foreign direct investment (FDI) going into the renewable energy projects in the region are minimal. Evidence suggests that existing risks for investment and how these risks are perceived by investors is keeping back private investment or makes it more costly. This paper discusses which types of risks are affecting renewable energy projects and which ones of them could be addressed by the private public partnership (PPP) models. We find out that even though PPPs are suitable to address such types of risks as financial and project management, they might be less successful in addressing governance or public opposition risks.

**Keywords:** Middle East and North African region, renewable energy sources, private public partnerships.

### **1. Introduction**

Middle Eastern and North African (MENA) countries need to address the convergence of rising demands for energy, fossil fuel depletion, socio-economic development and climate change. The national governments of MENA countries are recognizing these challenges and settled ambitious targets for deployment of renewable energy, such as solar and wind. Also a number of international incentives exist to stimulate deployment of renewable energy in the region. Even though private incentives exist also, the majority of the renewable energy projects are supported by public funds. Currently private investors are reluctant to support projects in the region. In general, the level of foreign direct investment (FDI) in the MENA region is one of the lowest in the world and it is almost not existing in regards to renewable energy projects.

Previous research showed that one of the reasons for this is that private investors perceive risks connected with the region and with technology as being likely and serious for their investment. These perceptions are keeping investment back or increase weighted average costs of investment due to expected risk premiums for invested equity [1]-[4].

The literature on risk allocation and diffusion in financing says that private public partnerships (PPPs) are possible instrument for risk sharing [5], however it is also admitting that such risk sharing does not come without costs. Studies examined how risks are diffused by PPP financiers and argued that the risk diffusion process and the consequent need for advice might also add to the costs of PPP projects [6]. Besides, the majority of existing studies speak about the motivation to transfer risk from public side to the private side, there is much less research about how risk can be transfer from the private side to the public side, and almost no evidence about how risk perceptions of private investors could be addressed through PPP models.

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<sup>+</sup> Corresponding author. Tel.: +43 676 83 807 285  
E-mail address: komendan@iiasa.ac.at

Additionally, the study of stakeholders perceptions is important as PPP projects involve numerous parties and make relations among stakeholders much more complex than in other procurement systems.

Therefore, the aim of this paper is to provide insight on the following research questions:

- What are different risks, which can affect renewable energy projects?
- How and if these risks can be shared through a PPP model?

The current research aim is to understand if PPP models are suitable as risk sharing tools for private stakeholders and if participation in a PPP project, comparatively to purely private project, helps to address risk perceptions such as perceptions of regulatory risks due to cooperation with the public partner. Therefore, this research deals with the question of how and if PPP model can address risks perceptions. The second question is, if PPP model can address risk perceptions, then regarding to which types of risks existing in the MENA region. These two general questions are then narrowed to a more specific question regarding energy infrastructure, such as solar and wind, in the MENA region. However, this research deals only with perceived risks and does not deal neither with quantification of real risks in the financing models nor with efficiency of PPPs to deliver public services.

## **2. Background**

### **2.1. Barriers and risks for renewable energy investment in the MENA region**

The volumes of public spending for infrastructure needs, such as renewable energy, is decreasing globally. In Europe, there is a tendency to involve private capital into provision of services, which were usually regarded as the public ones. In developing countries there is a gap of up to 8% of GDP, which is needed to support infrastructure deployment [7]. If the deployment of renewable energy has to be scaled up, this would require involvement of private capital.

However, only a very minor share of private capital goes to the MENA region [8]. Risks for investment and especially perceptions of these risks by private equity stakeholders are currently major barriers for foreign private capital in the region. Under risk we understand, according to scientific literature [9], [10] financial consequences of an adverse event occurring and risk perceptions are how stakeholders estimate probabilities of risk to happen and if this risk is serious for their investment.

### **2.2. Public – private partnership (PPP) model**

Among the methods to measure impacts of risk sharing through PPP the economic rhetoric of “value for money” usually prevails and the costs of PPP project are calculated and compared with purely public or private project [11]. Thus, the quantitative approach dominates the PPP decision-making process because of the prevailing accounting logic while the qualitative concerns, such as risk perceptions of stakeholders involved into financing processes, remain downplayed. Prior studies also called for a greater scrutiny of the PPP policy process through a “more extensive case study or interview based investigation” [12], which would allow to identify indeterminacies, ambiguities, biases and subjective judgments required in the valuation of the risk transfer. This research would be necessary to understand perceptions and the decision-making process as the prevailing in the evaluation of PPPs “economic value for money” approach fails to acknowledge potentials for biases, mistakes and errors in the technical models of financial advisors, especially taken into reference that PPP appraisal is not a straightforward and objective process and that it involves a lot of subjective judgments required during the decision-making process about which risks to include or to exclude and how to measure them [13].

PPP model was also often criticized because it might lead to high costs in tendering, complex negotiations, cost constraints on innovation and conflicting objectives among project stakeholders [14]. PPP projects are likely to cause high contract bargaining costs, opportunistic behavior by one of the sides and failure to achieve goals up to dissolution of the partnership [15]. Also PPP projects might be prone to risks themselves as they require effective risk management associated with complex financing, legal, organizational and socio-political structure of the project [16].

## **3. Methodology**

Our methodology follows the concept of Walker’s (1997) model, which is based on an extensive literature review about governance and management of stakeholders’ interests in the PPP projects [17]. We classify all identified sixteen risks into four groups such as financial risks, project management risks, governance risks and civil society risks. The goal of this methodology is to develop a classification of identified in scientific literature risks and to map them into four groups.

The second goal is to develop a classification of expectations from stakeholders on risk-sharing through PPPs based on literature review about on-going and completed PPP projects worldwide. We developed a list of expectations, which stakeholders had on PPP models. We also classified these expectations into four groups such as financing, project management, governance and civil society.

Further step was to understand how participation in a PPP model can contribute to the risk sharing and address risks perceptions. Based on the literature about project financing, we developed a list of sixteen risks, which might be relevant for infrastructure projects in North Africa. Following this, we developed a preliminary risk allocation matrix to understand which types of risks are carried by which groups of stakeholders.

## 4. Results

### 4.1. Risks groups relevant for renewable energy generation projects

Our results allowed us to identify four groups of risks, which are relevant for energy generation projects, in general, and for renewable energy projects, in particular. These groups are financial, governance, project management and public opposition risks (Table 1).

Table 1: Groups and types of risks

Group of risks	Type of risks
Financial	Operational and revenue, liquidity, financing, foreign investment
Governance	Bad governance, political, regulatory, force majeure
Project management	Human capital, technology (technical), construction, management of capacities
Public opposition	Reputational, public acceptance, environmental and social

Source: collected by authors from different sources on PPP projects

The **financial risks** group includes multiple types of risks associated with financing, uncertainty about return and potential financial losses. Operating risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events (Basel II). The liquidity risk means that the asset cannot be sold on the market because of the lack of liquidity or due to other circumstances. The financing risk includes availability of financing and its costs as well as inflation and foreign exchange rate. The foreign investment risk includes the risks of rapid and extreme changes in value due to: smaller markets; differing accounting, reporting, or auditing standards; nationalization, expropriation or confiscatory taxation; economic conflict; or political or diplomatic changes. Valuation, liquidity, and regulatory issues may also add to foreign investment risk [18]-[20].

The **governance risks** group includes the bad governance risk, political risk, regulatory and force majeure risks. The bad governance risk is the lack of transparency and corruption. The political risk is the risk, which investors and corporations can face as a result of any political changes or decisions, which influence outcome and values of the project. This risk relates to non-market factors such as changes in policy and regulations. In a broader sense it also relates to force majeure risk and can include any event, which leads to political instability such as civil wars, insurrection, riots, coups etc. Under regulatory risks we understand legal and regulatory framework for Independent Power Producers (IPPs), under which a power purchase agreements (PPAs) are signed with the transmission company. The force majeure risk includes an extraordinary event or circumstance beyond control. It can be war, crime, riots and civil unrests, as well as terrorism and natural catastrophes [21]-[23].

The **project management risks** group includes human capital, technology, construction and management of capacities. The human capital risk is a risk of low availability of qualified personnel. Under technical risk we understand the probability of loss incurred through the execution of a technical process in which the outcome is uncertain. These can be untested engineering, technological or manufacturing procedures, which can result in the loss of time, resources, and possibly harm to individuals and facilities. Technical risk is also connected with new technologies. The key aspect of construction risk is that the project will not be completed and the construction might be delayed. Construction risk is closely related to regulatory risk and includes situations when permits needed to start the project are delayed or cancelled, the basic concessions for project are unexpectedly renegotiated and the core concession is revoked. The management of capacities risk is a risk of false management of capacities leading to damages or unexpected results [7], [24].

The **public opposition risks** group has the reputational, public acceptance, environmental and social risks. The reputational risk is a danger of damage to a good name of the company or a project due to reports in local mass media or actions from different stakeholders. The public acceptance is a risk of massive public protests against the project, low level of awareness about the project, dreaded risk connected with new technology. The environmental risk includes actual or potentials threats of adverse impacts on environment, including living organisms. The social risk includes adverse impacts from installations on human health [25]-[28].

#### 4.2. Expectations from private investors on risk sharing through PPP models

Based on available in scientific literature and reports about PPP projects evidence we identify recommendations from private investors on PPP models and how the risks could be shared through such models. The Table 2 shows different literature sources and developed recommendations on sharing specific types of risk.

Table 2: Expectations of stakeholders on risk sharing through PPP model

Risks	Expectations of Stakeholders on PPP	Available in literature evidence
Financial risks (operations and revenue, liquidity, financing, foreign direct investment)	Competitive pricing	[12], [27]
	Time and cost of bidding	[9], [29]
	Attractive internal rate of return	[30], [31], [32]
	Bankability	[33], [34]
	Value for money	[34], [35]
	Lowest level of equity possible	[35]
	Debt sizing	[36]
	Responsible credit application	[7]
Project Management risks (human capital, technology, construction, management of capacities)	Risk allocation through all project agreements	[28], [36]
	Achieving financial closing on acceptable terms and timely start of construction	[31], [37]
	Joint control with the bank over the financing model	[38]
	Cost overrun	[39]
	Ensure that impacts from cost overruns and other events does not have adverse effects on Debt-Service Coverage Ratio or Loan-Life Coverage Ration	[40]
	Generation of cash flow	[41]
Governance risks (bad governance, political, regulatory, force majeure)	Securing operational cash flow	[33], [42]
	Transparency during award process	[11], [43]
	Transparency during negotiation process	[6], [8]
	Competitive tender evaluation	[37], [41]
	Technology and Know-How Transfer	[40]
	Land-use issues	[44]
Public opposition risks	Regulatory issues	[40]
	Public acceptance issues	[45]
	Reputation issues	[46]

Source: authors collected from different literature sources

Our results show that PPP model can help to share the risks and thus be a vehicle for private investment into renewable energy in the MENA region. However, it will be mostly efficient in sharing financial and project management risks. Examples of successful application of PPP model for sharing of such types of risks exist. Financial risk can be shared between partners through competitive pricing, time and costs of bidding, attractive internal rates of return for invested capital, bankability of the project, the lowest possible level of equity required under this scheme, debt sizing and responsible credit application. The project management risks could be shared through such mechanisms as financial closure and timely start of

construction, joint control over costs overruns, securing of operational cash flows, technology and know-how transfer.

Less evidence exists if PPPs could actually address governance risks. At one side, they could increase transparency through the award process and competitive tender evaluation. At another side they could also increase complexity because of the management issues within PPPs. Also some sources claim that PPPs could be helpful to solve land-use issues, in models, for example, where public side contributes with the ground for installations. At another side, as they do not really include civil society, it is not certain if they could contribute to solvation of conflicts around land use issues. Finally, PPPs could be a tool to improve regulatory procedures but they could also complicate regulatory procedures in by making them more complex.

This is also very uncertain if PPPs could help to share the public opposition risk. Some sources provide evidence that they might be a tool to strengthen reputation of a company in eyes of local stakeholders, especially, if local government is involved. As the process of communication about the need of the project could be settled at the local governance level with involvement of local stakeholders into a PPP model, this could be also helpful for providing more clear and transparent information to local stakeholders and to contribute to a greater level of acceptance, we did not find evidence on contribution of PPPs to sharing the social and environmental risks.

Many government stakeholders believe that PPP models can provide a variety of benefits such as enhanced government capacity, reduction in costs and time of implementation. Our results show that PPPs might be successful in addressing some of risks, which are barriers for renewable energy projects. For instance PPP model might be successful to share project management or financing risks. However, additional efforts are necessary which would go beyond PPP models to address existing governance risks. Also PPPs show their particular weakness in addressing risks of public opposition against the projects.

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## 6. References

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