Renewable Energy and Resource Curse

on the possible consequences of solar energy in North Africa

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Abstract

The African continent possesses a vast amount of various types of natural resources. Accordingly, a large number of African countries export their natural resources. These natural resources include important energy sources such as oil and natural gas, in turn the export of these energy sources plays a crucial role in the economics and politics of many African countries. Despite its crucial role, the heavy reliance on natural resource exports by African countries is often related to the term 'resource curse'.

Unfortunately, negative terms such as 'resource curse', 'oil curse' and 'aid curse' have now become synonymous with the African continent and several studies have accentuated that such 'curses' exist in many African countries.

The world is facing a 'new energy era' as many countries, including African countries, are changing their policies to promote the use of renewable energy. Here, North Africa has been receiving attentions due to their enormous potential for solar energy production, as well as other renewable energies such as wind energy, from the Sahara desert. For example, organizations such as Desertec Industrial Initiative (DII), with the Moroccan Agency for Solar Energy (MASEN) signed a Memorandum of understanding regarding a large cooperative solar project in Morocco in May 2011.

Despite the potential benefits that North Africa can gain from the establishment of solar power in the region, it remains a matter of concern as solar energy is also a type of energy, and one cannot underestimate the possibility that this could become a new curse. As such, this thesis will deal with this crucial issue by presenting a projection of the potential for the five North African countries (Algeria, Egypt, Libya, Morocco, and Tunisia) to suffer from a solar energy curse.

As the use and study of solar energy in North Africa is still in its infancy, there is limited data and information available. As such the projection of the potential for solar energy to become a new curse is based on data and literature regarding the current and ongoing resource curse. To supplement this, data and information from other countries which have had more experience with renewable energy, such as Germany and Spain, is applied.

By looking at the current resource curse, under the assumption that a solar energy curse will be similar to the current resource curse, the combination of the poor institutional quality and the enormous size of resource rents is selected as the cause of the resource curse.

In the case of institutional quality, the institutional quality of the five North African countries in 2011 are compared to the five selected resource cursed boundary-countries and the five selected resource curse avoided/escaped boundary-countries by using the World Governance Indicator (WGI). The result is that their institutional qualities are closer to the resource cursed boundary-countries

which suggest that they have the potential to suffer from a solar energy curse if their institutional qualities are to remain poor in the future.

In the case of rent size, the solar energy rent is projected and compared to the average oil and natural gas rent size of the Middle East and North Africa (MENA) countries during the period of 1993-2009. The outcome of the comparison is that solar energy rent, or even when combined with wind energy based on a different study, is projected to be much lower than the average oil and natural gas rent size of the MENA countries.

When combining the two findings, solar energy is not projected to become a new curse for the five North African countries due to the small size of the projected solar energy rent. However, it is found that, under the assumption that the oil and natural gas will remain in the future in the three North African energy exporters (Algeria, Egypt, Libya), the successful establishment of the solar energy in these countries can prolong the time for them to rely on their fossil-fuels exports, therefore, prolonging the current resource curse.

The finding that the solar energy will not become a new curse for the five North African countries does not mean however that there is no future potential for them to suffer from this 'curse'. It is found that what are called the resource curse effects are not solely caused by the enormous resource rents but are often problems that many countries have already been suffering from for quite some time, regardless of the resource rent. As such, resource rents can be perceived as an element which has added extra fuel in intensifying the existing problems within the region. The enormous size of resource rents accentuates the problems that are related to the resources. This, however, results in a rather deceptive perspective as one will see the problems as the resource curse effects, when they are often existing problems that they have been suffering from irresponsive of the resource and its rent. In other words, the reason why existing problems, especially in energy exporting countries, are perceived as the effect of the resource curse is because the 'flame' created by enormous extent of resource rents has been concealing the core and existing issues.

This is not to say that the resource curse does not exist, or the enormous resource rent size is not the cause of the resource curse and its effects. What is important is that good institutional quality, which is an important factor that aids the improvement of accountability, transparency, democracy and other factors, played a crucial role in the countries that avoided/escaped the resource curse, and also can help in dealing with the existing problems which may appear, or become, a future 'curse'.

Unfortunately, by looking at the current chaotic events and complexities in the region, e.g the Arab Spring and its impacts, it is difficult to project whether institutional quality is to improve in the future. There are different ways in perceiving the current status of the region. For example, Tunisia's regime change is considered as a positive outcome of the Arab Spring (Hlepas, 2013), whereas Weill

(2012) finds that the impacts of the current consequences of the Arab Spring, i.e the regime change in Tunisia, is unpredictable and remains to reveal itself. In fact, the current chaotic events and uncertainties in the region make it difficult for one to project future institutional quality, and more importantly, possibility for the five North African countries to suffer from a new curse or the prolonging of the current resource curse for the North African energy exporters. Nevertheless, these countries are entering, or have already entered, the crucial turning point which can determine their path to the future. The five North African countries should take this turning point as the opportunity in improving their institutional quality which will help them to avoid possible 'curses' and, more importantly, lead them to sustainable development.

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List of abbreviations

bbl/d	Barrels Per Day
Bcf	Billion Cubic Feet
Bcm	Billion Cubic Meters
CSP	Concentrating Solar Thermal Power
DII	Desertec Industrial Initiative
DNI	Direct Normal Irradiance
EIA	U.S Energy Information Administration
EEG	Renewable Energy Sources Act
FiT	Feed in Tariff
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GPF	Government Pension Fund
GW	Gigawatt
HVDC	High Voltage Direct Current grid
IMF	International Monetary Fund
JREF	Japan Renewable Energy Foundation
kWh	Kilowatt per hour
LCOE	Levelized Cost of Electricity
LNG	Liquefied Natural Gas
m^2	Square meter
m^3	Cubic meter
MASEN	Moroccan Agency for Solar Energy
mb/d	Million Barrels per day
MENA	Middle East and North Africa
ME	Middle East
Mtoe	Million Tonnes of Oil Equivalent
MW	Megawatt
MWh	Megawatt per hour
NA	North Africa
NDPVF	Niger Delta People's Volunteer Force
NDV	Niger Delta Vigilante
NNOC	Nigerian National Oil Corporation
NNPC	Nigerian National Petroleum Corporation
OPEC	Organization of Petroleum Exporting Countries
PV	Photovoltaic
RES	Renewable Energy Sources
SBI	Sustainable Budget Index
SSA	Sub-Saharan Africa
Tcf	Trillion cubic feet
TWh	Trillionwatt per hour
UAE	United Arab Emirates
UCM	Unobserved Components Model
WDI	World Development Indicators
WGI	The Worldwide Governance Indicators
y	Year