PhD thesis: Energy Policy Development in the Middle East Using A Technology-Driven Energy Planning Approach

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Abstract

The Middle East and North Africa (MENA) region comprises the world's largest hydrocarbon-resource (i.e., oil and gas) holders. In many MENA regions, the export of oil and gas constitutes a large proportion of national GDP and is the key pillar of national wealth. In light of decelerating hydrocarbon production expansion going forward and dramatically surging domestic/regional energy consumption in the past and the foreseeable future, per capita energy exports from MENA countries are likely to dwindle and their wealth is consequently at serious risk.

Complacency and a business as usual strategy will continuously drive down domestic wealth. The preservation of domestic energy resources is instrumental for the retention or even the increase of local wealth levels. MENA countries must make energy-related policy decisions that reduce local energy intensities (i.e., energy efficiency) and exploit the regionally available abundant renewable energy resources. Today's oil wealth can be used to finance this transition, but these decision need to be made soon rather than later.

This thesis aims at creating an energy planning framework for energy policy analysis in the MENA region. The framework's contribution is its design particularly geared to MENA's distinct social, economic, and technical characteristics. Being particularly interested in the analysis of the technological potential, of in particular energy efficiency and renewable energy systems, the energy planning framework will follow a bottom-up approach. The framework is meant to be a helpful tool in the hands of MENA based energy policy analysts and modelers in order to analyze technology-oriented policy options and design efficient policy measures.

Today, energy policy analysis and planning is increasingly practiced in MENA, but regionally in a rather nascent stage. In order to support the increasing use of integrated energy planning---as well as to validate the framework---the model framework will be applied to the UAE in a country case study.