Adaptation and Mitigation Measures in Egypt and Some Arab Countries

-Current state and future recommendations

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Abstract
The current situation of vulnerabilities caused by accelerating impacts of Climate Change, CC, and the adaptation and mitigation measures taken by some Arab countries is investigated. The aim of this paper is twofold, the first is to define the current situation and future measures that Egypt is taking or has to take in order to face the accelerating impacts of climate change. The second is to define the differences or similarities of such impacts in the Arab region that has countries of different economical, social and political structures. If common, regional, Climate Change impacts exist, collaborative measures can be taken and a better adaptation capacity can be developed in the region. In this paper a comparative study for Egypt, Saudi Arabia, United Arab Emirate, UAE, and Sudan is provided. It was found that the most pressing issues in the four countries are sea level rise and water scarcity. This research paper claims the need for “researchers capacity building” in the area of climate change research to enable them carrying ambitious research projects.

Keywords: Adaptation, Mitigation, Arab Countries, Capacity Building, Water Scarcity, Sea Level Rise, Climate Change.


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Infrastructure and Forecasting Models for Integrating Natural Gas Grid within Smart Grids

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Abstract
Almost all the current literature is focused on smart grids as a neat way to manage power generation and its delivery. This trend was acceptable in the period of idea generation and development; however in the delivery phase, we will have to further extend the concept and broaden its application. The smart grids should consider more energy related applications, e.g., including and monitoring the Natural Gas Grid and enhancing their role in supporting peak load shifting applications within the smart grid. This paper shares the current efforts for promoting smart grid concept by investigating integration of gas grid into smart power grids. Three ways for potential integration; in addition to PHEVs, and possible energy grid architecture, were presented. The importance of forecasting models on the energy grid infrastructure development and its infrastructure requirements were elaborated.

Keywords: Forecasting models, Grid infrastructure model, Smart energy grid, gas grids, Smart grid.

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Governmental intervention approaches to promote renewable energies

—Special emphasis on Japanese feed-in tariff

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Abstract

Almost all countries have issued laws and regulations to promote renewable energy (RE). However, the applications and motivations of such laws as well as achievements have been different. Currently, the Japanese government has announced its targets to expand the electricity feed-in tariff scheme for solar power, along with other energy sources, within two years to meet the goal set by the Japanese Prime Minister who, in the 15th United Nations Climate Change Conference (COP15) held in September 2009, proclaimed to cut 25% of greenhouse gas (GHG) emissions from the 1990 levels by 2020. In this paper, the current Japanese energy policies and measures for promoting RE in comparison to popular methods followed worldwide are explored. Furthermore, a Least Cost Feed-in Tariff (LCFIT) Simulation Model for Japanese case was developed to calculate the optimal mix of technologies to reach certain targets. The LCFIT also calculates the tariff that should be proposed for each technology and the total cost for the program with and without a carbon tax and estimates the premium added to the bill of the customer every month.

Keywords: Feed in Tariff, renewable energy, Carbon Tax, Least Cost Feed in Tariff model, policy.

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Demand-driven optimization approach for biomass utilization networks

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Abstract
Building Biomass Networks (B-NETs) is one of the techniques used to overcome the seasonal fluctuation in biomass supply and tapping new utilizations ways. The B-NETs are built based on a super class model for the available and possible kinds of utilization processes in the local area. Hence, the decision of selecting possible networks and scenarios can be made before using optimization methods to fix on the optimal network. In this paper, an optimization model for a Demand-driven biomass processing network is proposed. This is done through selecting alternative production paths for the same product depending on the resources availability. The unit process capacities and biomass resource availability constraints were presented to overcome their limitations in the local area. The genetic algorithms (GAs) were used in solving the problem because of their ability to deal with large search spaces and capability to calculate material flows, through networks, with no previous estimations.

Keywords: Biomass Utilization Networks, Demand-driven, Network flow, Genetic Algorithms.

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References


Superstructure-based design and operation for biomass utilization networks

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Abstract
This paper is providing a design and evaluation methodology for biomass utilization networks (B-NETs) planning in local areas. The methodology is an effort to integrate various exertions of many researchers as well as stakeholders in the biomass field including process technologies, local area classification and renewable energy mechanisms to design and evaluate B-NETs. The proposed design methodology has three steps: classification, problem formulation and suggesting solution methods. The core part of plan-ning the B-NETs utilization methodology is the superstructure that is a super class model for the processes of biomass utilization networks that has to be built for the local area. The biomass utilization super-structure (BUSS) relates the biomass resources to their products, available processes, and possible future processes of utilization in static manner. Although the local area BUSS is static in nature, it shows the decision makers what kinds of B-NETs are, or can be, available in their area. It is important to note that for each super class process there exist a number of elemental technologies, or what we call unit process (UP) that can perform the job under the same condition with different processing constraint. To support the design and operation process a technological information infrastructure (TII) needs to be built to work as an information pool and simulation tool. With the support of TII and the BUSS different scenarios can be synthesized, analyzed and compared. Scenarios development enables the designer to check processing alternatives as well as biomass promotion mechanisms that fit the concerns of various stakeholders. The results of the methodology application can be given in the form of suggestions of a specific network class(es) or scenarios that can be applied in a class of localities with the same characteristics. Following to methodology configuration, a proposal for optimization methods is discussed and a case study for comparing biomass network scenarios in mountainous city is introduced.

Keywords: Demand Driven, Biomass Network Scenarios, superstructure, resources management,  .

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