The New Energy Economy: Perspective and Challenges of a Downstream Energy State

A case study of Georgia, Texas and the U.S. as a whole within the context of the EPA's recently proposed carbon rules reflects how states like Georgia with limited renewable potential may be forced downstream in the energy supply chain.

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I. Introduction

The concept of a ''new energy economy'' has become inextricably linked with sustainability and climate change to describe what some are characterizing as the issue of not only our generation, but perhaps the next several generations as well.[1] Just exactly what the new energy economy is, however, is highly subjective and oftentimes politically charged. To some, it represents the endgame of transitioning from an industrial society created and fueled by nuclear energy and fossilized energy sources (coal, oil, natural gas) to one supported predominantly, if not entirely, by renewable energy alone.[2] Within this group, environmental concerns associated with water, land, CO_2 emissions, and climate change are predominant issues that can be addressed by displacing fossil fuels and nuclear energy with large-scale deployments of renewable technologies. However, there is skepticism as to the adequacy of renewables and the extent to which they can be utilized for

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supporting an industrialized economy.[3,4] To others, the new energy economy means capitalizing on newly accessible reserves of tight oil and shale gas and transitioning the U.S. from dependence on foreign energy resources to a more self-sustaining, perhaps independent, energy base.[5,6] This group envisions the energy upsurge as spurring economic growth and jobs along with creating a more secure U.S. in terms of energy stability and, by proxy, economic stability.

EPA's recently proposed carbon rules[7] for new and existing power plants have generated a firestorm of both opposition and support, and the rules now serve as a lightning rod in the overall climate debate.[8] Supporters of the rules point to the work of IPCC AR5 as unequivocal evidence that carbon reductions are an environmental necessity for human society over the coming decades[9,10] while detractors point to the economic consequences of the rules and the limited impact the rules will have on addressing climate change.[11] Within the U.S., arguments against the rules also center on the limited impact of U.S. reductions in the larger global context as emissions from developing countries such as China are predicted to increase through 2030.[12] Whichever framework is chosen, the impacts of a new energy economy will vary as U.S. states have disparate geographical endowments of fossil and renewable energy resources. This article focuses on some of the fundamental energy and environmental challenges confronting states that are herein characterized as ''downstream'' in both the fossil fuel and renewable energy streams. In particular, the states of Georgia and Texas will be used as examples to illustrate how an individual state's natural energy resource base, economic productivity, and existing power generation capacity should be considered when developing policies targeting CO_2 emissions reductions.

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II. Resources and State Economies

The U.S. and most industrialized nations are built on some common basic resources that are critical to the national economy as well as to the sub-economies of individual states or regions. Water, minerals, metals, ores, timber, fish, and fertile land are a few. In the U.S., individual states were initially settled and economically developed based on their unique natural resource base and capacity for exploiting those resources into marketable commodities. Where some states excelled in agriculture and textiles others excelled in iron and steel, and a market economy facilitated exchange of products within and across state boundaries so that local resource insufficiencies could be overcome. Consequently, natural resources have always served to geographically distinguish individual state economies. The advent of the Industrial Revolution, fueled by high-density energy, marked the beginning of a new distinguishing resource, that being fossil fuels. Integrated into a market economy, the energy dense stores of coal, oil, and natural gas were imported into non-endowed states to provide supplemental capacity for offsetting some of that state's own natural resource insufficiencies for supporting electricity, mobility, and heat. In particular, the implementation of power generation technologies powered by high-quality energy spurred unprecedented economic growth throughout the U.S. As state and national economies developed and expanded, human and environmental health externalities associated with air, land, and water pollution emerged. These were often end-of-pipe issues that were addressed with environmental control technologies such as

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