BUREAU OF ECONOMIC GEOLOGY

INDEPENDENT THINKING

CEE CENTER FOR ENERGY ECONOMICS

MARKETVIEWS

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CEE'S 22ND ANNUAL MEETING

Discussions concentrated around the price impact of geopolitical risks: nationalism, populism, and the roles of China, Russia and the Middle East. Uninformed, emotions-based policy and regulatory decisions and NIMBYism, both affected by changing demographics, are key uncertainties that continue to push renewables and block infrastructure development that hinder oil and gas investments, especially in the U.S., and sustain energy poverty around the world.

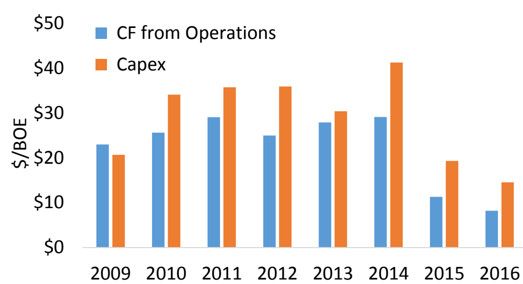
Cyber security of the energy systems remained a key risk after its emergence in 2016. The move towards "smart" distributed energy resources and intermittent renewables enhance these concerns.

IS U.S. SHALE GAS EXPERIENCE UNIQUE?

(Based on an article by Dr. Foss in OIES Forum of November 2017)

A persistent question since late 2014 was whether the U.S. oil and gas producers, increasingly wedded to tight rock plays, would be able to adjust to low oil prices. In fact, most had already adjusted, leaving methane-rich locations as the gas price collapsed after 2008. The rush to compete for and develop tight oil acreage has sustained U.S. domestic gas supply near 90 BCFD. *In effect, the U.S. 'shale' gas component is now largely a by-product of the industry's ability to sustain liquids (including NGLs) production.* The tight rock plays tend to be characterized by 'gas drives'. As wells are fractured, pressures drop, and gas comes out of solution providing the 'push' to move liquids into wellbores. This push creates the hallmark of tight rock production: the very steep initial production rates followed by subsequent, equally steep, declines. The longer laterals with more powerful fracs improved productivity of acreage but possibly widened the gap between initial and tail production.

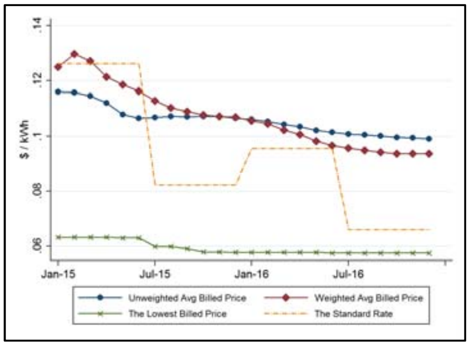
Commercial responses to this resource abundance have focused largely on exports (light oil and condensate in excess of that needed by U.S. refineries for feedstock; processed NGLs; LNG; refined products and chemicals). The Lower 48 states, particularly along the Gulf Coast, are experiencing an historic build-out of midstream and export-focused projects and capacity (you can download CEE's Industrial Projects database from the password-protected page for CEE Partners). For all of these exciting developments, the most striking observation over time has been the inability for the greater producer community to hold Capex spending within cash flow.



We wonder whether other locations around the world will be able to commercialize tight rock plays at the U.S. scope and pace any time soon.

The vast U.S. oil and gas industry system is defined by complicated dynamics across highly fragmented value chains that require interdependence among intensely competitive business segments. This situation, along with the predominance of private surface land and minerals ownership, nimble and deep capital markets, and –

The retail competition in electricity



Falling wholesale electricity prices allow for declining standard rate offers, which encourages more customers to return to default standard service provided by local utilities. Competitive energy retailers lower their prices to keep customers. It is not clear, however, that this is a sustainable "competitive retail market" for them. Full research paper can be found [here](#).

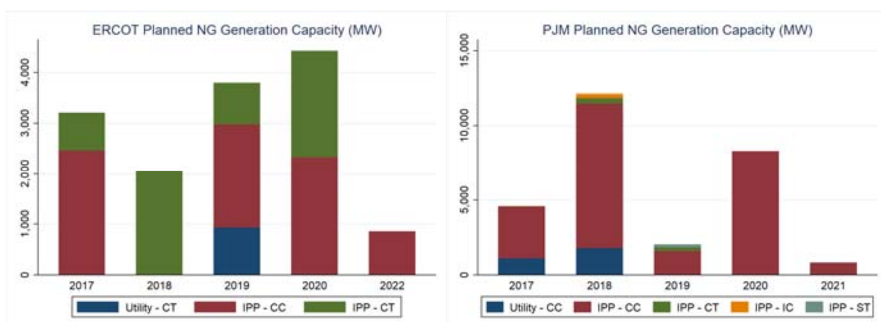
thus far – light-handed regulation, makes the U.S. situation unique. *We wonder, in fact, whether other locations will be able to commercialize tight rock plays at similar scope and pace any time in the near future?*

"IRRATIONAL EXUBERANCE" BY IPPS?

We have been arguing that competitive electricity markets, with the possible exception of the ERCOT market, are in retreat. In an environment of low natural gas prices and subsidized renewables with near-zero dispatch costs, energy and capacity prices have not been adequate to generate sufficient revenues for many generators. The threat (e.g., Clean Power Plan) and the reality (e.g., MATS) of new environmental regulations induced the retirement of about 55 GW of coal capacity since 2011 in this low-price environment. Another 20 GW is expected to retire by 2020. Several nuclear plants (4.5 GW) were also retired; more are expected.

These conditions induced a vicious cycle of subsidies. New York and Illinois saved a few nuclear plants with subsidies, structured as zero-emissions credits, which were challenged as undermining markets. Other states have been considering lifelines for their nuclear plants that would avoid similar challenges. The DOE NOPR, recently rejected by FERC, was an effort to formalize subsidies for baseload coal and nuclear plants. FERC has other outstanding rulemakings to enhance market-based compensation. In the meantime, several system operators have implemented changes in energy price formation, mainly to internalize out-of-market make-whole payments, and in capacity markets, mainly to treat subsidized renewables differently and to generate sufficient revenues for expansion of dispatchable capacity that could contribute to system reliability.

Although none of these changes have proven to yield sufficient revenues yet, there are many merchant plants in the pipeline in ERCOT and PJM.



The increasing share of wind and solar in the ERCOT market could justify the expansion of CT capacity. Luminant's recent decision to retire 4.5 GW of coal capacity in early 2018 should help the CC plants but it is hard to imagine that their developers knew for sure that those retirements would come at the time of project decisions. In contrast, coal retirements in the PJM region since the early 2010s and the access to cheap Marcellus gas have been driving CC expansion.

But, given the financial stress in the merchant sector, who is building? Although some household names such as Calpine and Panda are on the list, many are relatively new LLCs backed by U.S. and non-U.S. private equity. This trend is worth tracking. The survival of competitive markets may well depend on it.

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