

MARKETVIEWS

September 2017

CEE IS NOW A USER OF GPCM

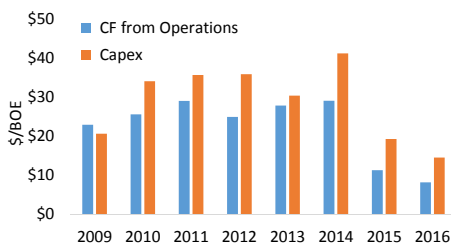
We thank RBAC Inc. for granting a free license for trial of GPCM, leading North American natural gas market model. We welcome them as a CEE donor.

We are the only university research center with the combination of GPCM and AURORAxmp, the power dispatch model.

These models serve our commercial focus well and allow us to explore gas-power linkages in more detail:

- pipeline and storage for power generation
- basis differentials for Bureau shale production outlooks
- gas & power developments in Mexico

CEE Producer Health Tracker



The Outspending of Cash Flow Continues. CEE research is focusing on implications for upstream longer term.

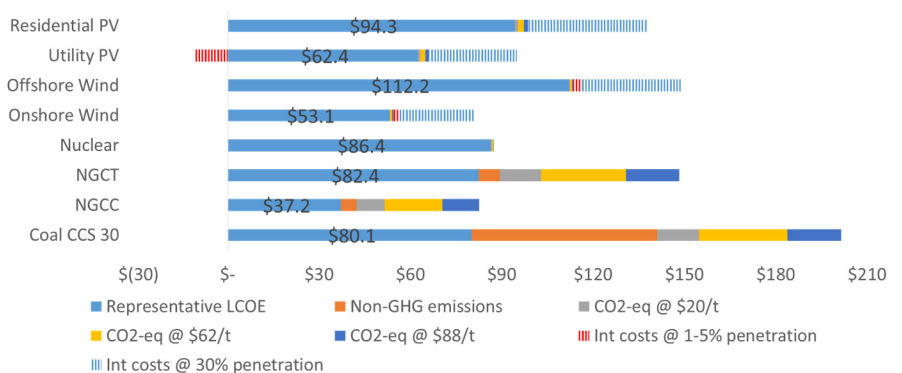
THE DEBATE ON 100% RENEWABLES

A recent article in PNAS, critiquing assumptions and methodologies of another PNAS article from 2015, which claimed that the U.S. could meet all of its energy needs (not just electricity) by 2050-55 from wind, water and solar power, led to an interesting back-and-forth between the lead authors. GTM interviews with [Mark Jacobson](#), lead author of the 2015 article, and [Christopher Clack](#), the lead author of the 2017 article, are well done.

We agree with most of the criticisms. However, we would add the lack of commercial investment considerations. Value creation across energy systems, including oil and gas, is under pressure, and has become dependent on a plethora of subsidies, especially in the power sector, rather than competitive market signals. Moreover, our recent research shows that many solar and wind companies are in financial distress despite subsidies they receive. The cost of transitioning towards 100% renewables should consider the cost of capital destruction.

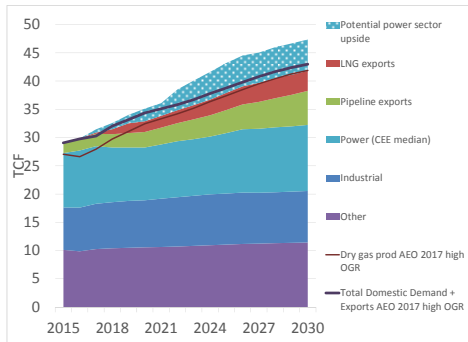
There is another social cost item that has not received enough attention: system integration costs associated with adding intermittent and variable resources into existing power systems. Some states consider social cost of carbon in resource planning. A fairer comparison would need to include system integration costs too.

Representative U.S. LCOE with Air Emission and System Integration Costs (\$/MWh)



These costs include new investment in transmission, balancing and backup generation capacity, and stranded costs of existing generators. The first two are often socialized across all ratepayers. The last one is borne by merchant generators, utilities, and their shareholders. Or, they seek subsidies (e.g., nuclear subsidies in NY and IL). As the share of renewables generation increase, these costs tend to be higher.

CEE U.S. Gas Demand Stack



Pipeline exports to Mexico may be higher but LNG exports may be lower than expected.

There is significant upside potential for gas-fired generation but subject to many policy risks: power market design changes, generation subsidies, renewables mandates, environmental regulations, and ability to build gas infrastructure.

A note on the DOE Grid Study

We agree with the DOE Grid Study in that the low price of natural gas has been the main driver of coal, and some older gas, plant retirements and forced states to pursue nuclear subsidies. We made this point among many others for a long time, lastly in our essay on the [future of competitive electricity markets](#).

However, the fast-paced addition of intermittent wind, and increasingly solar, capacity on the back of subsidies, caused system operators to ask thermal generators, including baseload plants, to ramp down their generation. Our study on ERCOT market shows an additional GW of wind generation would suppress wholesale price by up to \$4.5/MWh. This loss of revenue constitutes stranded costs. Low natural gas prices worsened the situation.

Although we agree that price formation in competitive electricity markets need to be fixed, we doubt that it will be sufficient to save these markets as state policies continue to impose subsidized resources on the power system. More on this existential threat to competitive electricity markets in the near future.

As the share of renewables increase, system integration costs, and economic, geopolitical, and environmental challenges along the minerals value chains will become more visible.

MINERALS VALUE CHAINS

A recent study on [geopolitics of renewables](#) coined the term “new resource curse.” We do not consider resources as “curses” as long as they are developed responsibly for the benefit of the society. But, we certainly agree that geopolitical and supply chain risks, and environmental impacts along these chains associated with minerals used in batteries, PV panels, and windmill components have not received enough attention. This is a topic we have raised in our annual and mid-year meetings for several years. We provided a more detailed discussion in our working paper [Battery Materials Value Chains](#) in April 2016, following a [snapshot](#) from November 2015. We followed these releases with [EV Diffusion and Raw Materials Supply Chains](#) in November 2016. We look forward to engaging with our partners to continue with this important research.

Contact Us

Center for Energy Economics

1801 Allen Parkway, Suite 220

Houston, Texas 77019

Telephone: 713-654-5400

Email: energyecon@beg.utexas.edu

Website: www.beg.utexas.edu/energyecon



Bureau of Economic Geology, Jackson School of Geosciences
The University of Texas at Austin

