Electricity Currents

A Survey of Current Industry News and Developments

Natural Gas: 'Bridge,' or Gateway Drug?

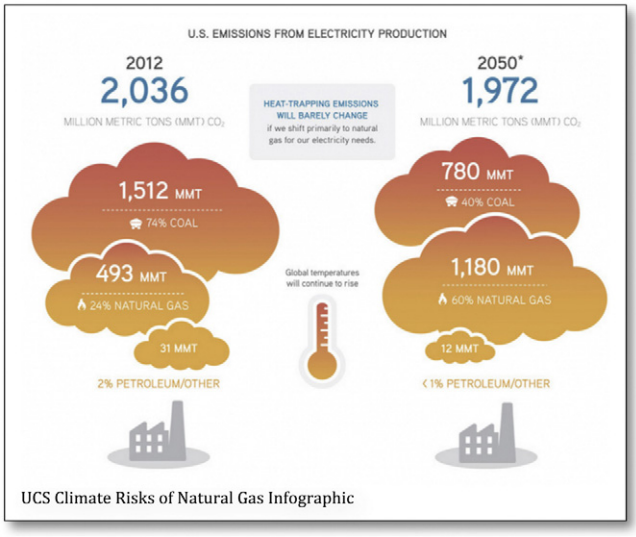
Every now and then, politicians propose pet projects that may get them local votes but not accomplish much else. There have, for example, been numerous proposals to build bridges where the traffic volume would not remotely justify the investment costs. These pork barrel projects are commonly referred to as *bridges to nowhere*.

In this context, many – this the editor of *Currents* – believe that the current bounty of cheap and plentiful shale gas, while certainly welcomed, is not and should not be viewed as a panacea to solve all U.S. energy and environmental problems, because it can't and won't.

In his **State of the Union** address in late January 2014, **President Obama** contradicted himself, perhaps unwittingly, when he reiterated his support for climate science by noting that, ''The debate is settled. Climate change is a fact,'' while vouching his support for increased extraction of, and reliance on, **natural gas**.

Continued on page 7

A Natural-Gas-Dominated Electricity System Would Continue to Heat Up the Planet



In Electricity Currents This Month:

Natural Gas: 'Bridge,' or Gateway Drug? 1
Calif. Renewables Targets: How High Is High Enough? 1
Basic Rethinking Required to Harmonize Central, Distributed Resources: EPRI View. 5

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Calif. Renewables Targets: How High Is High Enough?

Over the last decade or so, study after study has concluded that communities, states, countries, or continents can run mostly or exclusively on renewable energy resources – that is to say, achieving such a feat is not technically impossible. **Iceland**, **Norway**, **New Zealand**, **British Columbia**, **Brazil**, and **Quebec** are among countries or provinces relying disproportionately on renewable energy, in some cases approaching or exceeding 90 percent (thanks in part to enormous hydro and/or geothermal resources). These same studies generally acknowledge that raising the proportion of intermittent and/or non-dispatchable renewables in a network – unless we are talking about hydro with

multi-year reservoirs and pumped storage, baseload geothermal, or biomass – beyond a certain level will be a challenge for the system operator in reliability terms.

The inherent intermittency of wind and solar resources, currently the fastest-growing renewables, means that increasing amounts of backup generation, storage, and/or demand flexibility will be needed as the proportion of renewables rises beyond some *reasonable* threshold.

At some point, all studies concur, the law of *diminishing marginal returns* kicks in: adding more renewables will not only become more costly at the margin but will make the network unwieldy, unstable, unreliable, and – adding insult to injury – will offer little in terms of environmental gains, including carbon emission reductions.

That much is common knowledge. A recent study by **Energy & Environmental Economics** (E3) examines these fundamentals in ways that can be useful to policymakers and regulators who must ultimately decide what the right renewable target is, and/or are debating if they should aim higher in places such as California where a sizable percentage of voters, but not all, favor ever-higher levels.

And California is where the action is. Not only is it the most populous state in the country, it currently has one of the highest **renewable portfolio standards** (RPS), 33 percent by 2020. By most estimates, California will not merely meet the target, but actually overshoot it by a sizable margin if the current trends continue unabated.

Adding existing large hydro and other types of renewables installed before the RPS requirement went into effect means that the state's renewable share could easily exceed 50 percent by 2020. The balance comes from relatively clean natural gas-fired plants, two remaining operating nuclear reactors, plus significant amount of imports from out of state, much of it also renewable.

This being California, many, including Gov. **Jerry Brown**, believe that 33 percent is a good start, but not necessarily enough. The governor has repeatedly but casually mentioned 40 percent as an aspirational future target. And if the state is to have any chance of meeting its even more ambitious **climate bill**, passed in 2006, the renewable target must indeed go much higher.

Assembly Bill 32 (AB32) mandates that statewide **greenhouse gas emissions** must fall to the 1990 level by 2020, and 80 percent below the 1990 level by 2050. Decarbonizing the electricity sector, as expensive as it may be, is among the cheapest options around, since other sources of emissions, including from the transportation sector, are even more difficult and expensive to curtail.

The E3 study was funded by the state's five biggest power companies, the three large **investor-owned utilities** (IOUs) – **Pacific Gas & Electric Company** (PG&E), **Southern California Edison Company** (SCE), **San Diego Gas & Electric Company** (SDG&E) – plus two large **municipal** ones – the **Los Angeles Department of Water & Power** (LADWP) and the **Sacramento Municipal Utility District** (SMUD).

It examines the implications of raising the RPS beyond the existing 33 percent target by 2020. The massive report, in collaboration with **ECCO International** and **DNV Kema**, examines a number of future scenarios with different RPS targets for 2030.

Curiously, however, the E3 study is *not* looking for the correct answer, which is what would be the least cost way to get to, say, a 50 percent RPS, but rather what would happen to prices if we were simply to rise the percentage of intermittent renewables to 50 percent? In this context, E3 examines four alternative scenarios to reach 50 percent RPS by 2030:

- A large-solar case with mostly utility-scale photovoltaics;
- A small-solar case with mostly distributed PVs;
- A rooftop solar PV case; and
- A diverse renewables scenario.

Don't ask why sensible scenarios with more storage, more EV charging, more demand flexibility, and more regional coordination with neighboring states are not included. Perhaps the scenarios were dictated by the utilities that funded the study.

In all cases, it is assumed that renewables would be *curtailed* when total generation exceeds demand plus limited export capacity – a curious