

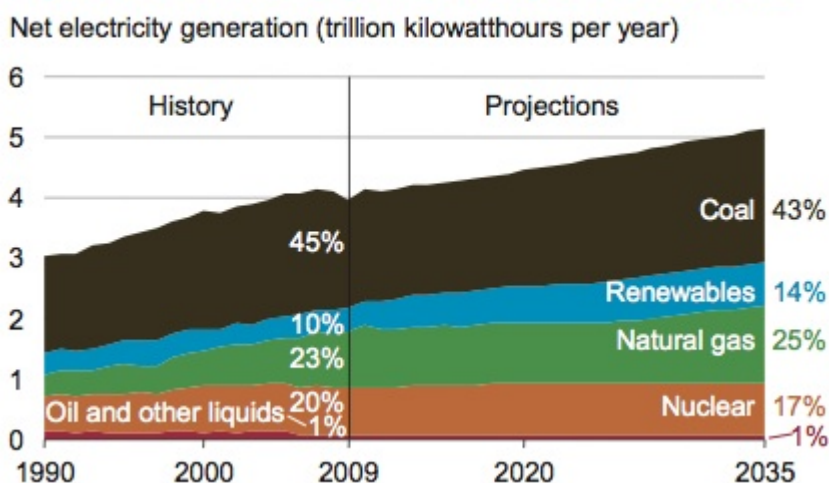
In a recent [post](#) on Grist, Keith Schneider found President Obama's 80% "clean" energy goal rather incredible:

Arguably the central provision of President Obama's [State of the Union](#) address last night was the proposal to generate 80 percent of the nation's electricity from clean energy sources by 2035 — including nuclear energy and "carbon capture and storage" coal technology. Getting there will take a miracle, the same sort of pie in the sky thinking that allowed our president to also present the daft notion of giving 80 percent of Americans access to high-speed rail by 2035. This in a country that last built a great rail station over a century ago.

Analysis of this 2035 "clean" energy goal has been all over the blogs; Grist has helpfully posted a [summary](#). I will leave aside the astute [criticism](#) that a plan with coal will never be considered a *clean* energy plan (see my discussion of [mountaintop removal](#)). Instead, I would like to focus on whether the plan is achievable or rather, as Schneider would have it, "pie in the sky."

Comparing the 2035 plan to the dead Kerry-Graham-Lieberman (KGL) cap-and-trade bill, Michael Levi (from Council on Foreign Relations) described the 2035 plan as [more ambitious](#) for the electricity sector. I think that say more about the weaknesses of KGL than the strengths of the 2035 plan.... But Levi's main point is that KGL would have only gotten us to 74% "clean" electricity sources by 2035.

**Figure 12. Electricity generation by fuel, 1990-2035**

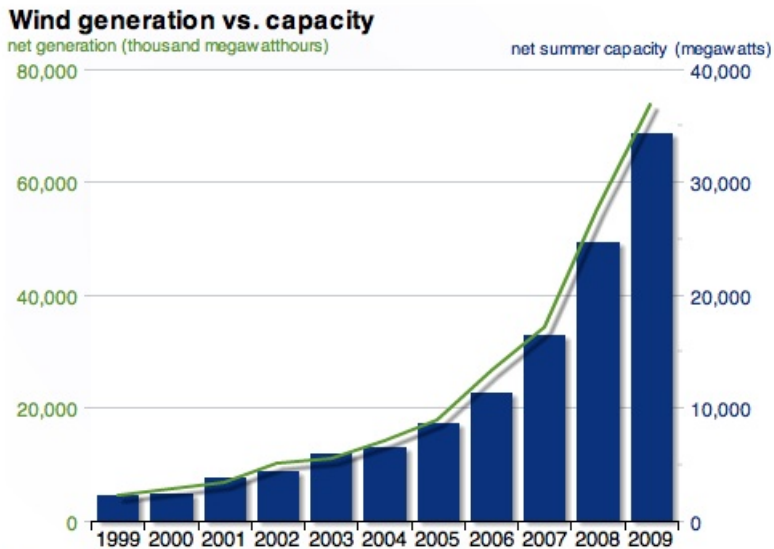


Schneider, on the other hand, focuses—rightly—on coal generation. He points out that 80% “clean” energy requires “replacing at least 500 gigawatts of conventional coal-fired generation with cleaner alternatives,” according to Department of Energy (DOE) projections. But, looking at [recent estimates](#) from the U.S. Energy Information Administration (EIA), I find Schneider’s math a bit suspect. (EIA is the arm of DOE that does statistical analysis and projections of energy markets, and their 2011 reference case projections give us a prediction, not surprisingly, of electricity generation in 2035.)

43% estimated coal generation in 2035 means 330 gigawatts according to EIA, not 500 gigawatts. In terms of kilowatthours generated per year, that would be 2197, or 43% of total net electricity generation, as shown in the chart on the left. And President Obama would leave 20% of total energy “dirty”, which must mean coal (he basically defines everything else as “clean.”) So President Obama would leave approximately 50% of the coal generation alone.

What happens to the other 50% of electricity generated by coal? Well, to meet President Obama’s goal, it must be transformed into either “clean” coal (impossible) or natural gas generation (more likely). Other scenarios include transformation of coal generation to wind or solar generation.

Nevertheless, that is a significant amount of coal generation to have to replace with cleaner alternatives, as Schneider points out. But I would argue that coal prices will only go up from here, due mostly to demand from China. Energy output from US coal production arguably [peaked in the late 1990s](#), and the US has the largest proven recoverable coal reserves in the world. Meanwhile, China needs all the energy it can get; one report thinks it could absorb all current Asia-Pacific coal exports by 2013, at current rates. So the price of coal will increase because of demand from China (and India).



Source: U.S. Energy Information Administration.

Which brings us to renewables. Wind generation has [increased exponentially](#) in the U.S. between 1999 and 2009. Guess what happens if coal prices increase? And the exponential nature of the increase in wind generation is important and, in my opinion, often overlooked. It suggests a rapidly evolving capability to site wind projects in the U.S. and, if it continues, wind generation will likely exceed many estimates of future U.S. renewable use.

In summary, I see a lot of price pressures on coal: supply pressure from a decrease in quality mines and environmental concerns; demand pressure from China and India; and increases in cost of generation as "clean" coal technology becomes a national mandate. Meanwhile, wind generation is on the rise and many states now have renewable energy portfolios. My question for President Obama is not whether we will reach 80% by 2035, but whether we should be doing more?