

The Clean Power Plan May Revive Interest In Nuclear Generation In Some Regions

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The dim prospects for nuclear-generated power in the United States may have received a glimmer of light from the Environmental Protection Agency's Clean Power Plan (CPP). Nuclear industry representatives are encouraged by adjustments in the final CPP compared to the proposed CPP, yet it remains to be seen how much of a lifeline the final CPP offers future nuclear generation. The likely outcome is that the CPP will help fuel growth in nuclear generation in those regions hardest hit by the CPP, but will fall short of a national renaissance for nuclear as was once hoped for ten years ago.

Nuclear generation has faced considerable challenges in recent years. Nuclear energy is at a competitive disadvantage in deregulated electricity markets. Low-cost natural gas and subsidized, and increasingly competitive, renewables are driving down market prices. Reduced energy prices, according to Moody's, could lead as much as ten percent of the nation's nuclear fleet into early retirement. Multiple nuclear facilities have already shut down, including the premature retirement of the Vermont Yankee nuclear plant, which was licensed to continue operations until 2032. Nuclear operators fare better in regulated markets where public service commissioners set long-term rates incorporating capital and operating expenses. But, even in those markets, high maintenance and waste management and disposal costs associated with nuclear generation can make nuclear less attractive than the alternatives.

Enter the CPP which was issued in final form on August 3. Under the CPP, the EPA has set a goal of reducing power plant emissions nationwide by 32 percent by 2030, an increase from 30 percent under the proposed rule. The CPP assigns each state an individual CO₂ emissions reduction target, and allows the state the flexibility to choose how to meet its standard within the "building blocks" identified in the final rule. The EPA also adopted uniform emission performance rates for fossil-fuel plants, regardless of where they are located. This change to the proposed rule favors states that have already worked to reduce CO₂ emissions and increases the burden on traditional coal states such as those located in the PJM and Midcontinent ISO footprints. The CPP further identifies state-specific rate- and mass-based goals for CO₂ reduction, thus setting the stage for emissions trading programs. States have until 2018 to submit final compliance plans for a 2022 initial compliance date. If a state fails to design a plan, or submits an inadequate plan, the EPA can impose a federal plan.

The final CPP is more favorable to the nuclear energy industry than the proposed rule. Two changes in the final CPP are particularly noteworthy, as the final rule (1) calls for greater reductions in carbon emissions and (2) encourages "mass-based" trading regimes. The final rule adopts mass-based standards that cap the total yearly amount of carbon that an entire state's power sector can emit. Interstate programs for trading emission allowances may benefit at-risk nuclear facilities by increasing costs of fossil-fueled plants, making nuclear generation more competitive.

The final rule also incorporates feedback provided by the nuclear industry. For example, under the proposed rule, under-construction reactors were treated as already in existence. As a result, states would not have received full credit for CO₂ reductions resulting from these plants becoming operational. The final CPP, however, allows carbon reductions that result from nuclear plants currently under construction to count towards compliance, as well as power uprates that will increase existing plants' carbon-free output. This change is particularly welcome in the southeastern states where these new reactors are being constructed. However, the final rule did not go as far as some in the nuclear industry would have preferred. For one, the CPP does not credit existing nuclear power plants in reaching emission reduction targets, which would further increase existing at-risk units' chances of survival. Nuclear industry representatives also noted that the rule fails to recognize the effect on CO₂ emissions resulting from the relicensing of facilities. In other words, the final rule does not recognize emissions-related benefits of keeping current nuclear facilities online.

As expected, the CPP has generated significant controversy. Already, 15 state attorneys general have filed for an emergency stay of the CPP while its legality is challenged in the courts. In light of the legal challenges to come, the questions of whether, when and how to comply with the CPP will continue to roil the industry, and may dampen any broad-based enthusiasm for nuclear energy. However, the CPP may give a boost to the nuclear industry in some regions of the country where states face sizable CO₂ reduction requirements but the shale gas revolution has not yet taken a strong hold. Grid operators expect the CPP, among other initiatives of the EPA like the Mercury and Air Toxics Standards (MATS) rules, to cause significant generation retirements in the coming years. But the big question for nuclear generation is whether it can compete with gas-fired or renewable generation in replacing the retiring generation. For example, PJM recently released the second of two studies on the effect of the CPP on reliability in the PJM region, and, among other findings, PJM concluded that generation needs could exceed available resources by as early as 2022 in a scenario where 32 GW of existing generation is at-risk of retirement and by 2028 under a 16 GW at-risk scenario. PJM also says that its analyses show that all of the wind-powered facilities that the EPA anticipates to be available will not make it online to cover the shortfall, and that historical transmission build-out rates are not sufficient to meet the EPA's wind penetration rate assumptions. This means there is room for other generation options in PJM. However, given PJM's location on top of some of the biggest shale deposits in the US, it is more likely that gas-fired generation will bridge the gap there. Nuclear generation is more likely to gain a toehold in the Southeast (where additional nuclear generation is already under development) and possibly in Texas (which has a high concentration of coal generation and where, although plans for two new nuclear units were shelved due to unfavorable market conditions, the NRC licensing process continues for those units).

Small modular reactors are one aspect of the nuclear industry, in particular, that may receive a boost from the rule. Small modular nuclear reactors are an alternative to traditional nuclear generation. Modular nuclear reactors are prefabricated, require limited site preparation, and have much shorter construction schedules. Modular facilities can be built in as little as 18 months, while conventional nuclear plants may be under construction for as long as 10 to 15 years. If additional generation is needed to meet demand, more modules can be added incrementally. Coupling modular reactors with intermittent renewables may produce higher efficiencies and maintain stronger grid reliability. Under the CPP, states must demonstrate that their proposals take into account grid reliability, which may also benefit modular nuclear generation that, unlike intermittent resources, can operate 24/7. This, coupled with the December 2014 DOE solicitation for up to US\$12.6 billion in loan guarantees for Advanced Nuclear Energy Projects that specifically calls out small modular reactors as a key area of interest, may propel renewed interest in small modular reactors.

The challenges ahead for nuclear generation are not going to disappear solely because of the CPP. However, like the energy sector as a whole, the CPP has certainly caught the attention of the nuclear industry. The CPP's impact on new and existing nuclear generation will continue to play out in the years to come.

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