

CLIMATE CHANGE

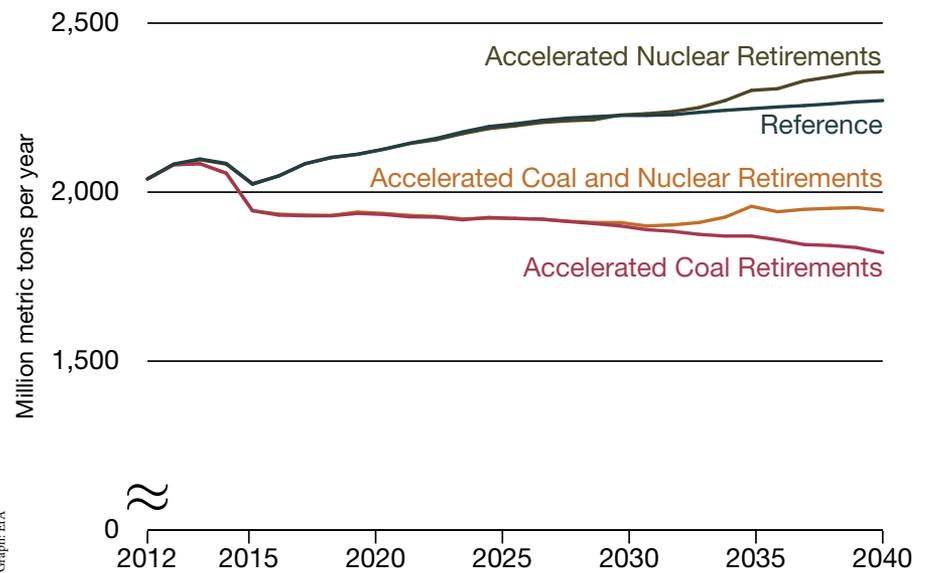
Studies vary in detail on need for nuclear power

The report issued in April by the Intergovernmental Panel on Climate Change (IPCC) has been interpreted by some to include a recommendation that noncarbon-emitting energy sources, including nuclear power, should increase production by more than three times their current level by 2050 (NN, May 2014, p. 18, and this issue, p. 78). A more pressing concern for U.S. power reactor licensees these days is the economics of current reactor operation in an electricity market in which there is no formal financial disincentive to reduce operation of fossil-fired capacity, and therefore no incentive specifically to generate nuclear electricity for the purpose of mitigating global warming. Three studies issued shortly after the IPCC report generally agree on the climate situation but come nowhere near the IPCC's hint about tripling nuclear output.

With considerable fanfare, in early May the White House issued its National Climate Assessment (NCA), a many-authored and heavily referenced report that attempts to embrace the full range of impacts that global warming (anthropogenic and otherwise) will have, and may already be having, on the ecology, economy, and population of the United States. In keeping with recent administration statements on climate change, the NCA is not exclusively about what must be done to avert or limit global warming, but also about what must be done to adjust to or overcome the effects of warming that are already taking place and will probably continue to occur.

The NCA addresses coastal facilities (including energy-related ones) affected by rising sea levels; the effects of hotter summers and shorter winters on water availability and growing seasons; increased frequency and intensity of large-precipitation storms on all forms of infrastructure and habitation; and (in the case of steam electric power plants) limits that could result from warmer cooling water, both outlet and inlet. The NCA may be the most comprehen-

The National Climate Assessment drew the most public attention, while the Annual Energy Outlook and a report by the Center for Climate and Energy Solutions had more to say about nuclear power.



Electric power sector carbon dioxide emissions in four cases, 2012–2040

sive document to date on the possible effects of global warming on specific regions of the United States.

Even the fourth chapter, on energy supply and use, is so heavily geared toward the adjustment of existing facilities to global warming that there is no specific plan to shift electricity production from fossil fuels to low-/zero-carbon-emitting sources, and only general statements that this would be worthwhile. The lack of detailed recommendations anywhere in the report may have resulted from an effort to make the NCA a scientific document and not a policy tract.

The full 841-page report or specific chapters of the report can be downloaded at <www.globalchange.gov/ncadac>.

Two other recently issued reports address the growing economic stresses on nuclear power in the United States and how early retirements of reactors would affect the effort to meet greenhouse gas reduction goals. In April, the Department of Energy's Energy Information Administration (EIA) published *Annual Energy Outlook 2014 (AEO2014)*, which includes a section titled "Implications of Accelerated Power Plant Retirements," and the Center for Climate and Energy Solutions (CCES), a think tank in Arlington, Va., issued *Climate Solutions: The Role of Nuclear Power*.

The EIA outlook's treatment of nuclear power has previously been based mainly on how long existing reactors would operate (which has been extended as a result of li-

cense renewals), and, more recently, when new reactors might start up and how much energy they would provide. In *AEO2014*, the EIA also looks at the early retirement of reactors for economic reasons. This is combined with scenarios of accelerated retirements of coal-fired plants, most notably where their power is replaced by a low-/zero-carbon source. (To date, the most significant coal plant replacements have been natural gas-fired plants, leading to somewhat improved air quality but about the same greenhouse gas emissions.) As with the NCA, the AEO does not make recommendations, but the data presented (as in the accompanying figure) make it clear that accelerated nuclear retirements lead to more carbon dioxide emissions than the reference case.

There are many parts to *AEO2014*. The section on accelerated nuclear retirements is available for download at <www.eia.gov/forecasts/aeo/power_plant.cfm>.

The CCES report looks more specifically at the situation faced by power reactor licensees that operate as merchants in competitive electricity environments, including the effect of production tax credits for renewables on the priorities and pricing set by transmission systems. The larger view is used here also, however, with the observation that any decline in nuclear electricity production will lead to more CO₂ emissions

because baseload nuclear power would be replaced not by intermittent renewables but by baseload natural gas power.

This report comes closer than the others to a call for action, but even here it is not clearly stated that transmission system operators should be compelled to change their priorities on how power from different sources is priced. The report suggests, however, that the Environmental Protection Agency's recent move into the regulation of CO₂ as a pollutant (a highly controversial move that may be resisted in Congress and through the federal courts) could lead to a comparative pricing advantage of nuclear over fossil fuel, perhaps to the extent that the never-enacted carbon taxation would have provided. The report is available for download at <www.c2es.org/publications/climate-solutions-role-nuclear-power>.

After the releases of the IPCC report and the National Climate Assessment, Energy Secretary Ernest Moniz issued official statements. In the first statement, dated April 13, he noted that the IPCC report points out that “there are many low-carbon energy pathways to a prosperous future while mitigating climate change risks to a significant degree.”

“The president's Climate Action Plan lays out a series of new initiatives that are under way to bring new sources of renewable pow-

er online faster, reduce emissions from our fossil fuel plants and transportation sector, sustain nuclear power, and drive greater energy efficiency across our communities, businesses, and industries,” Moniz said. “The president's all-of-the-above approach entails making the technology investments that will enable all fuel sources to have a role in the future low-carbon marketplace—carbon capture and sequestration for fossil power plants, advanced biofuels and electrification for vehicles, next-generation nuclear power, lower-cost renewables, modernized energy infrastructure, and the manufacturing advances that will underpin a clean energy economy.”

Moniz's second statement, dated May 6, did not mention nuclear energy at all. In fact, it did not mention any energy source or efficiency measure. Following on the climate assessment's detailing of the regional effects of increased warming and the perceived need to adjust to the warming that is already happening at least as much as to take steps to avert further warming, Moniz said that work on the administration's Quadrennial Energy Review will include meetings with stakeholders at locations all over the country and will build on the climate assessment “to address the challenge of leveraging our diverse and rich energy landscape while enhancing U.S. energy security for decades to come.”—*E. Michael Blake* 