COAL POWER PLANTS

Opportunities Exist for DOE to Provide Better Information on the Maturity of Key Technologies to Reduce Carbon Dioxide Emissions

What GAO Found

DOE does not systematically assess the maturity of key coal technologies, but GAO found consensus among stakeholders that CCS is less mature than efficiency technologies. Specifically, DOE does not use a standard set of benchmarks or terms to describe the maturity of technologies, limiting its ability to provide key information to Congress, utilities, and other stakeholders. This lack of information limits congressional oversight of DOE’s expenditures on these efforts, and it hampers policymakers’ efforts to gauge the maturity of these technologies as they consider climate change policies. In the absence of this information from DOE, GAO interviewed stakeholders with expertise in CCS or efficiency technologies to identify their views on the maturity of these technologies. Stakeholders told GAO that while components of CCS have been used commercially in other industries, their application remains at a small scale in coal power plants, with only one fully integrated CCS project operating at a coal plant. Efficiency technologies, on the other hand, are in wider commercial use.

Commercial deployment of CCS is possible within 10 to 15 years while many efficiency technologies have been used and are available for use now. Use of both technologies is, however, contingent on overcoming a variety of economic, technical, and legal challenges. In particular, with respect to CCS, stakeholders highlighted the large costs to install and operate current CCS technologies, the fact that large scale demonstration of CCS is needed in coal plants, and the lack of a national carbon policy to reduce CO₂ emissions or a legal framework to govern liability for the permanent storage of large amounts of CO₂. With respect to efficiency improvements, stakeholders highlighted the high cost to build or upgrade such coal plants, the fact that some upgrades require highly technical materials, and plant operators’ concerns that changes to the existing fleet of coal power plants could trigger additional regulatory requirements.

CCS technologies offer more potential to reduce CO₂ emissions than efficiency improvements alone, and both could raise electricity costs and have other effects. According to reports and stakeholders, the successful deployment of CCS technologies is critical to meeting the ambitious emissions reductions that are currently being considered in the United States while retaining coal as a fuel source. Most stakeholders told GAO that CCS would increase electricity costs, and some reports estimate that current CCS technologies would increase electricity costs by about 30 to 80 percent at plants using these technologies. DOE has also reported that CCS could increase water consumption at power plants. Efficiency improvements offer more potential for near term reductions in CO₂ emissions, but they cannot reduce CO₂ emissions from a coal plant to the same extent as CCS.