The Role of Grid-Connected Energy Efficiency and Renewable Energy in Reducing Emissions

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Abstract

Meeting existing electricity demands and future electricity growth through improved energy efficiency and increased renewable energy generation has the potential to reduce both GHGs and ambient air pollutants. Fossil fuel and nuclear plants compose the majority of the base-load power supply in the United States. Currently, energy efficiency and renewables are seldom used to meet or displace these base load demands, however, these zero emission technologies can be quite effective at meeting marginal and peak load.

As renewable energy and energy efficiency further penetrates the energy supply market, the emission benefits of these technologies are becoming evermore important. The emission benefits can be quantified through a variety of different methodologies; dispatch modeling and future capacity expansion are two of the primary methods for estimating avoided emissions. Dispatch modeling attempts to correlate each emissions-free megawatt-hour with the avoided emissions from a specific power plant-generated megawatt-hour, thereby reducing the power plant's emissions and providing transparent accounting for the avoided emissions. The future capacity expansion methodology attempts to quantify the emissions avoided by displacing new fossil capacity through the addition of energy efficiency and renewables.

This presentation will focus on the potential for further reducing grid-connected power plant emissions by expanding the use of energy efficiency and renewable energy technologies. Although this presentation focuses on the U.S. power grid, the methodologies discussed should be transferable to other national or regional grids.