

Greenhouse Gas Inventory and Electric Demand Predictions

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Statewide New Jersey greenhouse gas (GHG) emissions estimates have been developed by NJDEP based primarily on energy use data from USDOE Energy Information Administration. Additional NJDEP and EPA data have also been used for some sectors. Methods for estimating emissions are well established, but they continue to be refined and new NJ-specific data that will become available soon will improve the process. GHG emissions predictions in 2020 under a business-as-usual (BAU) scenario were developed with what were essentially linear projections of historic trends. This approach leads to an estimated BAU emission in 2020 of 154 million metric tons (MMT), but includes considerable uncertainty.

Preliminary estimates of 2005 and 2006 emissions are now available. These estimates reflect minor modifications in the methodology for some sectors, but the approach for fuel combustion estimates remains the same. The 2005 estimated emission is 137.3 MMT, and the 2006 estimated emission is 129.4 MMT. A sector-by-sector inspection of these data indicates that 6.9 MMT of the overall 7.9 MMT reduction was accounted for by the combination of the electricity generation, residential fuel use, and commercial fuel use sectors. Some of this reduction may be due to ongoing improvements in energy efficiency and increased use of renewable sources by these sectors. However, review of weather data suggests that reduced space heating and cooling needs in 2006 vs. 2005 played an important role. As measured by heating and cooling degree days,¹ 2006 had both a warmer winter and cooler summer.

The marked fluctuation of heating and cooling needs from one year to the next, as evinced by 2005 and 2006, illustrates the potential influence of extrinsic factors on trends in energy use and greenhouse gas emissions. Nevertheless, planning for the future necessitates predictions. The New Jersey Energy Master Plan (EMP)² presents predictions for electric use. Overall, growth of 1.38% per year between 2007 and 2020 is forecast in a BAU scenario. This rate of growth would lead to 97,800 GWh use in 2020. Peak demand is predicted to grow at a greater rate; 1.75% per year between 2007 and 2020.

The EMP identifies four big challenges: 1) growth in supply of electricity has not kept pace with growth in demand, 2) the price of energy has increased substantially recently, and has become more volatile, 3) without action, contribution to global warming and other pollution will continue, and 4) the State has much less authority over supply and price than it did before electricity generation and use was significantly deregulated in the late 90s. The EMP identifies five major actions to meet these challenges: 1) maximize energy conservation and energy efficiency, 2) reduce peak electricity demand, 3) strive to exceed the current renewable portfolio standard (RPS) and meet 30% of demand with renewables by 2020, 4) develop a 21st century infrastructure, and 5) invest in innovative clean energy technologies and businesses. If successful, these actions will lead to major reductions in demand and increases in supply of clean and renewable electric power.

However, potential significant difficulties exist. Major systems (e.g., the international market for petroleum) have been behaving in a dramatically non-linear manner recently. Further, reductions beyond the scale of the EMP are needed; NJ's Global Warming Response Act calls for a reduction in GHG emissions by 2050 to 80% below the 2006 level. The challenges ahead suggest it is important to: 1) take a long-term view, 2) expect variations from predictions, 3) strive for a broad-based, multi-faceted approach to meeting energy needs and cutting GHG emissions, and 4) maximize resiliency, redundancy, and flexibility.

¹ Heating and cooling degree days were estimated using monthly average temperature data from the NJ State Climatologist, <http://climate.rutgers.edu/stateclim/>. A heating or cooling degree day represents the difference between daily average temperature and 65 degrees F.

² <http://www.nj.gov/emp/>