

Maine Electricity and Solid Waste Emission Baseline 1990 - 2020

The Maine electricity and solid waste emissions baseline has been estimated for 1990 through 2020. Electricity emissions are consumption-based to reflect actual use of electricity within the state by all sectors. The methodology used to develop the consumption emission estimates treats the state as a distinct unit, with estimated emissions from the power imported (or exported) added to (or subtracted from) the total emissions from the in-state power plants. In years when Maine is a net power importer (1995, 1997, and 1998 only) it is assumed that all of the generation in the state is consumed within the state. The emissions from the power imports are taken as the product of the net power imports (in MWh) and the average emission rate for the other five New England states; these emissions are then added to the emissions from Maine plants. In years when Maine is a net exporter, the product of the net power exports and the average state emission rate is subtracted from the emissions from Maine plants to obtain the consumption-based emissions. Since in-state generation is assumed to be used first and foremost to meet in-state demand, for 2000 and the years following the Maine renewable portfolio standard (RPS) is assumed to be met if at least 30% of in-state generation is from renewable sources.

For 1990 through 2004, the electricity consumption emission estimates have been developed from emission estimates developed by NESCAUM for Maine power plants from annual fuel consumption, and other annual data, in the US Energy Information Administration (EIA) *Electric Power Annual*. The consumption-based electricity emissions in 1990 are 2,228 thousand MTCO₂e using this methodology.¹

The emission estimates from 2005 through 2020 were estimated by Tellus Institute from model runs conducted with the EIA National Emissions Modeling System (NEMS), using the above methodology. Maine electricity demand is estimated by allocating the regional demand to the state based on share of population (for residential demand), commercial gross state product (GSP), and industrial GSP. Maine's population is assumed to increase at an annual rate of 1.15% and commercial GSP at a rate of 3.5%; industrial GSP is assumed to remain flat. The renewable portion of total state generation exceeds the 30% RPS threshold for all years modeled. The emission savings for each of the

¹ To confirm that this value represents a reasonable estimate of Maine's 1990 emissions baseline, a check was performed using the state electricity demand in 1991 from electricity contracts for serving all Maine consumers presented in the Maine *Final Report of the Commission on Comprehensive Energy Planning*, May 1992 (supplied by the Maine PUC). The associated emissions for 1991 were derived by matching the fuel types with the contracts; the 1991 emissions were then back-forecast one year to 1990 based on state electricity demand. The 1990 numbers obtained from both methods were very close (2,150 thousand MTCO₂e from analyzing the contracts). Maine DEP then instructed CCAP to use the consumption-based methodology described above for each year from 1990-2200 for purposes of consistency.

electricity supply GHG reduction policy options will be estimated using this method as well.

The waste sector emissions for 1990 through 2020 were developed by NESCAUM using the US EPA Inventory tool and state-specific information. The waste estimates include emissions from municipal and industrial landfills, municipal solid waste incineration, and municipal wastewater.

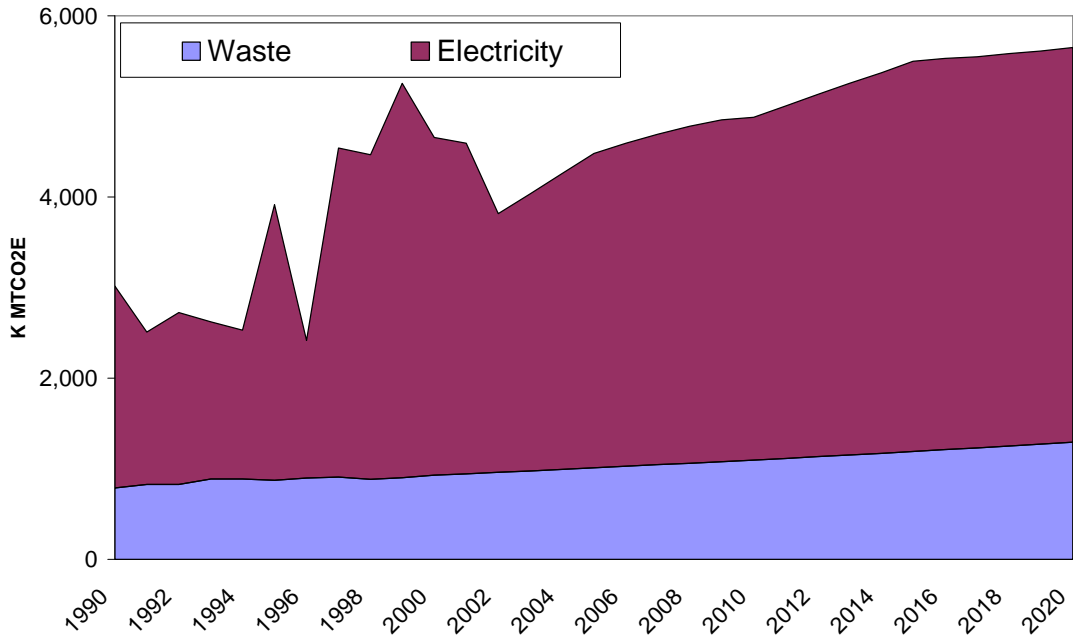
The table and graph on the following pages present the Maine electricity and solid waste emissions baseline for 1990 through 2020. The historical emissions increase significantly in 1995, 1997 and 1998 due to the closure of the Maine Yankee nuclear plant and a subsequent increase in power imports, while emissions decline sharply in 2002 due to a fall in demand from a cooler-than-normal summer. The emissions after 2004 are the levels that would be expected under business-as-usual conditions. Total electricity and solid waste emissions are projected to rise from 3,018 thousand MTCO₂e in 1990 to 4,881 thousand MTCO₂e in 2010 and 5,651 thousand MTCO₂e in 2020. Relative to 1990, the estimated emissions therefore increase by 1,863 thousand MTCO₂e (62 percent) in 2010 and 2,633 thousand MTCO₂e (87 percent) in 2020.

It is important to note that although the methodology discussed above was used to develop the electricity consumption-based emission baseline for the 1990-2020 period, in future years emissions associated with Maine consumption will likely be tracked using the ISO New England Generation Information System (GIS). Under the GIS, the emissions will correspond to those associated with the resource tags under contract to serve Maine demand. While this will likely continue to be dominated by in-state resources, it will likely also include tags from resources in other New England states, such as renewable resources built outside Maine to supply the Maine RPS or system power.

Maine Electricity Consumption and Electricity and Solid Waste Emissions

Year	Electricity Demand (GWh)	Emissions (thousand MTCO ₂ e)		
		Electricity	Waste	Total
1990	11,529	2,228	789	3,018
1991	11,383	1,679	831	2,510
1992	11,483	1,896	831	2,727
1993	11,952	1,733	889	2,622
1994	11,606	1,642	889	2,532
1995	11,561	3,040	875	3,914
1996	11,726	1,518	899	2,417
1997	11,959	3,630	912	4,542
1998	11,599	3,580	887	4,467
1999	11,944	4,354	902	5,256
2000	12,163	3,726	931	4,657
2001	11,836	3,649	946	4,596
2002	9,636	2,855	962	3,817
2003	11,317	3,060	978	4,038
2004	11,555	3,265	994	4,259
2005	11,819	3,470	1,011	4,481
2006	12,050	3,569	1,028	4,597
2007	12,221	3,649	1,045	4,694
2008	12,360	3,720	1,062	4,782
2009	12,441	3,771	1,080	4,851
2010	12,493	3,784	1,098	4,881
2011	12,568	3,891	1,116	5,007
2012	12,655	3,999	1,135	5,134
2013	12,734	4,101	1,153	5,255
2014	12,817	4,202	1,173	5,374
2015	12,933	4,307	1,192	5,499
2016	13,067	4,318	1,212	5,530
2017	13,172	4,318	1,232	5,550
2018	13,320	4,333	1,252	5,585
2019	13,452	4,340	1,273	5,614
2020	13,642	4,356	1,294	5,651

Electricity and Waste Baseline



The graph below presents the Maine electricity and solid waste emissions baseline and sample target emission levels for 2010 and 2020 based on a pro rata share of the total state GHG reduction target (i.e. 1990 levels in 2010, 10% below 1990 levels in 2020).

Emissions Baseline and Target

