Table 12.1 – Renewable Energy Impacts Calculation

Conversion Formula: *Step 1* *Capacity (A) x Capacity Factor (B) x Annual Hours (C) = Annual Electricity Generation (D)*
Step 2 *Annual Electricity Generation (D) x Competing Heat Rate (E) = Annual Output (F)*
Step 3 *Annual Output (F) x Emissions Coefficient (G) = Annual Emissions Displaced (H)*

Technology	Wind	Geothermal	Biomass	Hydropower	PV	Solar Thermal
(A) Capacity (kW)	11,558,205	2,232,495	6,594,096	78,312,583	280,355	388,893
(B) Capacity Factor (%)	36.0%	90.0%	80.0%	44.2%	22.5%	24.4%
(C) Annual Hours	8,760	8,760	8,760	8,760	8,760	8,760
(D) Annual Electricity Generation (kWh)	36,449,954,187	17,600,991,128	46,211,427,727	303,176,455,525	552,579,314	831,235,472
(E) Competing Heat Rate (Btu/kWh)	10,107	10,107	10,107	10,107	10,107	10,107
(F) Annual Output (Trillion Btu)	368	178	467	3,064	6	8
(G) Carbon Coefficient (MMTCB/Trillion Btu)	0.01783	0.01783	0.01783	0.01783	0.01783	0.01783
(H) Annual Carbon Displaced (MMTC)	6.569	3.172	8.328	54.635	0.100	0.128

Sources:
Capacity: Projected values for the year 2006 from EIA, *Annual Energy Outlook 2006,* DOE/EIA-0383 (2006) (Washington, D.C., February 2006), Table A16, 2005.
Capacity factors: Hydropower calculated from EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table A16. All others based on DOE, *Renewable Energy Technology Characterizations*, EPRI TR-109496, 1997, and program data.

Heat Rate: EIA, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, D.C., August 2005), Table A6.

Carbon Coefficient: DOE, GPRA2003 Data Call, Appendix B, page B-16, 2003.

Notes:
For illustrative purposes only, displacement of fossil generation depends on power system generation portfolio and dispatch order.
Capacity values exclude combined-heat-and-power (CHP) data, but include end-use sector (industrial and commercial) non-CHP data.
Competing heat rate from Fossil-Fueled Steam-Electric Plants heat rate.