# 4.1 - Projections of Renewable Electricity Net Capacity

(Gigawatts)

| Renewable Energy | Data Sources | Projections 2001 | 2005 | 2010 | 2015 | 2020 |
|---|---|---|---|---|---|---|
| Geothermal | AEO2003 - Reference Case | 2.86 | 3.03 | 3.54 | 4.08 | 5.00 |
| | AEO2003 - High Renewables | 2.86 | - | 4.12 | - | 6.82 |
| | OPT GPRA | - | 3.10 | 5.35 | - | 11.98 |
| Wind | AEO2003 - Reference Case | 4.29 | 7.24 | 8.47 | 10.06 | 11.05 |
| | AEO2003 - High Renewables | 4.29 | - | 11.68 | - | 36.91 |
| | OPT GPRA | - | 8.32 | 11.55 | - | 40.76 |
| Solar[1] | AEO2003 - Reference Case | 0.37 | 0.57 | 0.92 | 1.08 | 1.37 |
| | AEO2003 - High Renewables | 0.37 | - | 0.95 | - | 2.13 |
| | OPT GPRA | - | 0.70 | 1.83 | - | 6.12 |
| Hydroelectric | AEO2003 - Reference Case | 79.45 | 79.89 | 80.01 | 80.01 | 80.01 |
| | AEO2003 - High Renewables | 79.45 | - | 80.01 | - | 80.01 |
| | OPT GPRA | - | 81.26 | 82.88 | - | 83.88 |
| Biomass/Wood (excluding cogen) | AEO2003 - Reference Case | 1.77 | 2.01 | 2.07 | 2.14 | 2.18 |
| | AEO2003 - High Renewables | 1.77 | - | 2.07 | - | 3.30 |
| | OPT GPRA | - | 1.66 | 1.92 | - | 2.52 |
| Biomass Cogeneration | AEO2003 - Reference Case | 4.41 | 4.96 | 5.88 | 6.89 | 7.76 |
| | AEO2003 - High Renewables | 4.41 | - | 6.35 | - | 9.23 |
| | OPT GPRA | - | NA | NA | - | NA |
| MSW and LFG | AEO2003 - Reference Case | 3.53 | 4.06 | 4.31 | 4.50 | 4.65 |
| | AEO2003 - High Renewables | 3.53 | - | 4.31 | - | 4.65 |
| | OPT GPRA | - | NA | NA | - | NA |
| **Total Renewable Energy** | AEO2003 - Reference Case | 96.69 | 101.77 | 105.20 | 108.76 | 112.00 |
| | AEO2003 - High Renewables | 96.69 | - | 109.49 | - | 143.04 |
| | OPT GPRA (excludes MSW and Biomass Cogeneration) | - | 95.03 | 103.53 | - | 145.26 |

**Sources:** EIA Annual Energy Outlook 2003, DOE/EIA-0383 (03) (Washington, D.C., January 2003), Tables A17 and F8.
OnLocation GPRA04 Benefits Estimates Using NEMS, in "GPRA NEMS Final.xls"

**Notes:**
[1] Solar thermal and photovoltaic energy.

## Table 4.2 Projections of Renewable Electricity Net Generation

(Billion Kilowatthours)

| | Data Sources | Projections | | | | |
|---|---|---|---|---|---|---|
| **Renewable Energy** | | **2001** | **2005** | **2010** | **2015** | **2020** |
| Geothermal | AEO2003 - Reference Case | 13.8 | 15.31 | 19.81 | 24.33 | 31.78 |
| | AEO2003 - High Renewables | 13.8 | - | 24.43 | - | 46.52 |
| | OPT GPRA | - | 16.07 | 34.76 | - | 88.56 |
| Wind | AEO2003 - Reference Case | 5.78 | 19.28 | 23.62 | 29.14 | 32.7 |
| | AEO2003 - High Renewables | 5.78 | - | 35.34 | - | 131.8 |
| | OPT GPRA | - | 22.32 | 32.55 | - | 156.17 |
| Solar[1] | AEO2003 - Reference Case | 0.51 | 1 | 1.83 | 2.23 | 2.89 |
| | AEO2003 - High Renewables | 0.51 | - | 1.97 | - | 4.64 |
| | OPT GPRA | - | 1.59 | 3.76 | - | 11.65 |
| Hydroelectric | AEO2003 - Reference Case | 218 | 306 | 306.12 | 305.6 | 305.3 |
| | AEO2003 - High Renewables | 218 | - | 306.12 | - | 305.3 |
| | OPT GPRA | - | 308.12 | 315.50 | - | 318.30 |
| Biomass/Wood (excluding cogen) | AEO2003 - Reference Case | 9.38 | 18.14 | 21.27 | 22.28 | 21.88 |
| | AEO2003 - High Renewables | 9.38 | - | 21.54 | - | 26.8 |
| | OPT GPRA | - | 15.28 | 22.14 | - | 18.98 |
| Biomass Cogeneration | AEO2003 - Reference Case | 28.7 | 31.89 | 37.23 | 43.15 | 48.21 |
| | AEO2003 - High Renewables | 28.7 | - | 40 | - | 56.8 |
| | OPT GPRA | - | NA | NA | - | NA |
| MSW and LFG | AEO2003 - Reference Case | 22 | 29.16 | 31.03 | 32.41 | 33.49 |
| | AEO2003 - High Renewables | 22 | - | 31.03 | - | 33.49 |
| | OPT GPRA | - | NA | NA | - | NA |
| **Total Renewable Energy** | AEO2003 - Reference Case | 298 | 420.8 | 440.9 | 459.2 | 476.2 |
| | AEO2003 - High Renewables | 298 | - | 460.44 | - | 605.3 |
| | OPT GPRA (excludes MSW and Biomass Cogeneration) | - | 363.38 | 408.71 | - | 593.66 |

**Sources:** EIA Annual Energy Outlook 2003, DOE/EIA-0383 (03) (Washington, D.C., January 2003), Tables A17 and F8.
OnLocation GPRA04 Benefits Estimates Using NEMS, in "GPRA NEMS Final.xls"

**Notes:**
[1] Solar thermal and photovoltaic energy.

# 4.3 - Projections of Renewable Electricity Carbon Dioxide Emissions Savings

(Million Metric Tons Carbon Equivalent per Year)

| | Data Sources | Projections | | | | |
|---|---|---|---|---|---|---|
| | | 2001 | 2005 | 2010 | 2015 | 2020 |
| **Renewable Energy** | | | | | | |
| Geothermal | AEO2003 - Reference Case | 2.66 | 3.04 | 3.66 | 4.00 | 4.88 |
| | AEO2003 - High Renewables | 2.66 | - | 4.51 | - | 7.14 |
| | OPT GPRA | - | 3.19 | 6.42 | - | 13.58 |
| Wind | AEO2003 - Reference Case | 1.11 | 3.83 | 4.36 | 4.79 | 5.02 |
| | AEO2003 - High Renewables | 1.11 | - | 6.53 | - | 20.21 |
| | OPT GPRA | - | 4.43 | 6.01 | - | 23.96 |
| Solar[1] | AEO2003 - Reference Case | 0.10 | 0.20 | 0.34 | 0.37 | 0.44 |
| | AEO2003 - High Renewables | 0.10 | - | 0.36 | - | 0.71 |
| | OPT GPRA | - | 0.32 | 0.69 | - | 1.79 |
| Hydroelectric | AEO2003 - Reference Case | 41.97 | 60.78 | 56.54 | 50.23 | 46.83 |
| | AEO2003 - High Renewables | 41.97 | - | 56.54 | - | 46.83 |
| | OPT GPRA | - | 61.20 | 58.28 | - | 48.83 |
| Biomass/Wood (excluding cogen) | AEO2003 - Reference Case | 1.81 | 3.60 | 3.93 | 3.66 | 3.36 |
| | AEO2003 - High Renewables | 1.81 | - | 3.98 | - | 4.11 |
| | OPT GPRA | - | 3.03 | 4.09 | - | 2.91 |
| Biomass Cogeneration | AEO2003 - Reference Case | 5.52 | 6.33 | 6.88 | 7.09 | 7.40 |
| | AEO2003 - High Renewables | 5.52 | - | 7.39 | - | 8.71 |
| | OPT GPRA | - | NA | NA | - | NA |
| MSW and LFG | AEO2003 - Reference Case | 4.24 | 5.79 | 5.73 | 5.33 | 5.14 |
| | AEO2003 - High Renewables | 4.24 | - | 5.73 | - | 5.14 |
| | OPT GPRA | - | NA | NA | - | NA |
| **Total Renewable Energy** | AEO2003 - Reference Case | 57.41 | 83.57 | 81.44 | 75.46 | 73.06 |
| | AEO2003 - High Renewables | 57.41 | - | 85.05 | - | 92.85 |
| | OPT GPRA (excludes MSW and Biomass Cogeneration) | - | 72.17 | 75.49 | - | 91.07 |
| Heat Rate | Btu/kWh | 10796 | 10593 | 9019 | 8266 | 7891 |
| Carbon Coefficient | MMTCE/Tbtu | 0.01783 | 0.01875 | 0.02048 | 0.01988 | 0.01944 |

**Sources:** Generation data: EIA Annual Energy Outlook 2003, DOE/EIA-0383 (03) (Washington, D.C., January 2003), Tables A17 and F8, and OnLocation GPRA04 Benefits Estimates Using NEMS, in "GPRA NEMS Final.xls"
Carbon emission coefficients and heat rates: US Department of Energy, GPRA2003 Data Call, Appendix B, pages B-13 and B-16, (September 14, 2001).

**Notes:**

Carbon Emissions Savings based on calculation: (10^9 kWh) * (Btu/kWh) * (TBtu/10^12 Btu) * (MMTCE/TBtu)

[1] Solar thermal and photovoltaic energy.