# APPENDIX G

# COST-EFFECTIVENESS LIMIT AND CAPITAL RECOVERY FACTORS

## APPENDIX G

## CARL MOYER PROGRAM REVISED COST-EFFECTIVENESS LIMIT AND CAPITAL RECOVERY FACTORS

Per statute, the Air Resources Board (ARB or the Board) updates the cost-effectiveness limit and capital recovery factors annually. At the date of approval of the 2011 Carl Moyer Program Guidelines (April 28, 2011), the cost-effectiveness limit was $16,640 per weighted ton of pollutants reduced and the discount rate to determine capital recovery factors for various project lives was 2 percent. Effective April 1, 2012 the cost-effectiveness limit was updated to $17,080 and a discount rate of 2 percent remained in effect. Effective April 1, 2013, the cost-effectiveness limit is updated to $17,460 and the discount rate is updated to 1 percent. The updated cost-effectiveness limit ($17,460) and capital recovery factors (as shown in Table G-3b) may be used for contracts executed by air districts beginning April 1, 2013 but must be used starting July 1, 2013. ARB will continue to update these factors annually through a mail-out.

### Revised Cost Effectiveness Limit

In order to receive Carl Moyer Program funding, each project must meet the specified maximum cost-effectiveness limit. Cost-effectiveness is a measure of the dollars provided to a project for each ton of covered emissions reduced. To calculate Carl Moyer Program cost-effectiveness, the project grant amount is annualized based upon the project's life and an appropriate discount rate. This annual cost is divided by the project's estimated emission reductions to determine the overall cost-effectiveness of the covered emissions reduced as indicated in Appendix C.

Using the California Consumer Price Index (http://www.dir.ca.gov/dlsr/CPI/PresentCCPI.PDF, http://www.dir.ca.gov/dlsr/CPI/EntireCCPI.PDF), and the California Department of Finance method (http://www.dof.ca.gov/HTML/FS_DATA/LatestEconData/FS_UseCPI.php) of converting the Consumer Price Index to an inflation rate, a change in the cost-effectiveness limit can be determined over a specified time period (annually). Table G-1 shows the changes in the cost-effectiveness limit over time based on changes in the Consumer Price Index.

**Table G-1**
**Cost-Effectiveness Limit Criteria**

| Year | Annual CA CPI | Percent (%) change (inflation rate) | Annual modified amount | Revised CE cap |
|---|---|---|---|---|
| 1998 | 163.7 | NA | NA | $12,000 |
| 1999 | 168.5 | 2.93% | $352 | $12,352 |
| 2000 | 174.8 | 3.74% | $462 | $12,814 |
| 2001 | 181.7 | 3.95% | $506 | $13,319 |
| 2002 | 186.1 | 2.42% | $323 | $13,642 |
| 2003 | 190.4 | 2.31% | $315 | $13,957 |
| 2004 | 195.4 | 2.63% | $367 | $14,324 |
| 2005 | 202.6 | 3.68% | $528 | $14,852 |
| 2006 | 210.5 | 3.90% | $579 | $15,431 |
| 2007 | 217.4 | 3.28% | $506 | $15,938 |
| 2008 | 224.8 | 3.40% | $541 | $16,479 |
| 2009 | 224.1 | -0.31% | -$51 | $16,428 |
| 2010 | 227.0 | 1.29% | $212 | $16,640 |
| 2011 | 233.0 | 2.66% | $443 | $17,084 |
| 2012 | 238.3 | 2.25% | $385 | $17,469 |

Revised Capital Recovery Factors

The CRF used for determining the annualized costs of Carl Moyer Program grants are based on a discount rate. The CRF uses an interest rate and project life to determine the rate at which earnings could reasonably be expected if the same funds were invested over a length of time.

Previous versions of the guidelines updated the CRF using the average annual yield of United States (U.S.) Treasury securities (http://federalreserve.gov/releases/h15/) with a 3-year, 5-year, 7-year, and 10-year maturation over a specific period of time. Annual data for 2010 using the average rates of return for U.S. Treasury securities over that year (January to December 2010) yielded a revised discount rate as shown in Table G-2a below:

**Table G-2a**
**Discount Rate Factor (Available for use through June 30, 2012)**

| Average Monthly Rate - 2010 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Average |
| 3 year | 1.49% | 1.40% | 1.51% | 1.64% | 1.32% | 1.17% | 0.98% | 0.78% | 0.74% | 0.57% | 0.67% | 0.99% | 1.11% |
| 5 year | 2.48% | 2.36% | 2.43% | 2.58% | 2.18% | 2.00% | 1.76% | 1.47% | 1.41% | 1.18% | 1.35% | 1.93% | 1.93% |
| 7 year | 3.21% | 3.12% | 3.16% | 3.28% | 2.86% | 2.66% | 2.43% | 2.10% | 2.05% | 1.85% | 2.02% | 2.66% | 2.62% |
| 10 year | 3.73% | 3.69% | 3.73% | 3.85% | 3.42% | 3.20% | 3.01% | 2.70% | 2.65% | 2.54% | 2.76% | 3.29% | 3.21% |
| **Overall average for January-December 2010** | | | | | | | | | | | | | **2.22%** |

Annual data for 2011 using the average rates of return for U.S. Treasury securities from January to December 2011 yielded a revised discount rate as shown in Table G-2b below:

**Table G-2b**

**Discount Rate Factor (Available for use April 1, 2013 through June 30, 2013)**

| Average Monthly rate - 2011 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Average |
| 3 year | 1.03% | 1.28% | 1.17% | 1.21% | 0.94% | 0.71% | 0.68% | 0.38% | 0.35% | 0.47% | 0.39% | 0.39% | 0.75% |
| 5 year | 1.99% | 2.26% | 2.11% | 2.17% | 1.84% | 1.58% | 1.54% | 1.02% | 0.90% | 1.06% | 0.91% | 0.89% | 1.52% |
| 7 year | 2.72% | 2.96% | 2.80% | 2.84% | 2.51% | 2.29% | 2.28% | 1.63% | 1.42% | 1.62% | 1.45% | 1.43% | 2.16% |
| 10 year | 3.39% | 3.58% | 3.41% | 3.46% | 3.17% | 3.00% | 3.00% | 2.30% | 1.98% | 2.15% | 2.01% | 1.98% | 2.79% |
| **Overall average for January - December 2011** | | | | | | | | | | | | | **1.81%** |

Rounding to a whole number yielded a discount rate of 2 percent in Table G-2b.

The most recent annual data for 2012 using the average rates of return for U.S. Treasury securities from January to December 2012 yield a revised discount rate as shown in Table G-2c below. Rounding to a whole number yields a discount rate of 1 percent.

**Table G-2c**

**Discount Rate Factor (Available for use beginning April 1, 2013)**

| Average Monthly rate - 2012 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Average |
| 3 year | 0.36% | 0.38% | 0.51% | 0.43% | 0.39% | 0.39% | 0.33% | 0.37% | 0.34% | 0.37% | 0.36% | 0.35% | 0.38% |
| 5 year | 0.84% | 0.83% | 1.02% | 0.89% | 0.76% | 0.71% | 0.62% | 0.71% | 0.67% | 0.71% | 0.67% | 0.70% | 0.76% |
| 7 year | 1.38% | 1.37% | 1.56% | 1.43% | 1.21% | 1.08% | 0.98% | 1.14% | 1.12% | 1.15% | 1.08% | 1.13% | 1.22% |
| 10 year | 1.97% | 1.97% | 2.17% | 2.05% | 1.80% | 1.62% | 1.53% | 1.68% | 1.72% | 1.75% | 1.65% | 1.72% | 1.80% |
| **Overall average for January – December 2012** | | | | | | | | | | | | | **1.04%** |

Refer to Table G-3a below for CRFs for various project lives at a 2 percent discount rate, and to Table G-3b below for CRFs for various project lives at a 1 percent discount rate. Each source category chapter will specify which project lives are acceptable to determine which CRF value to use.

**Table G-3a**
**Capital Recovery Factor (CRF) for Various Project Lives**
**At a Two Percent Discount Rate (As of April 2011)**

| Project Life | CRF |
|---|---|
| 1 | 1.020 |
| 2 | 0.515 |
| 3 | 0.347 |
| 4 | 0.263 |
| 5 | 0.212 |
| 6 | 0.179 |
| 7 | 0.155 |
| 8 | 0.137 |
| 9 | 0.123 |
| 10 | 0.111 |
| 11 | 0.102 |
| 12 | 0.095 |
| 13 | 0.088 |
| 14 | 0.083 |
| 15 | 0.078 |
| 16 | 0.074 |
| 17 | 0.070 |
| 18 | 0.067 |
| 19 | 0.064 |
| 20 | 0.061 |

**Table G-3b**
**Capital Recovery Factor (CRF) for Various Project Lives**
**At a One Percent Discount Rate (As of April 2013)**

| Project Life | CRF |
|---|---|
| 1 | 1.010 |
| 2 | 0.508 |
| 3 | 0.340 |
| 4 | 0.256 |
| 5 | 0.206 |
| 6 | 0.173 |
| 7 | 0.149 |
| 8 | 0.131 |
| 9 | 0.117 |
| 10 | 0.106 |
| 11 | 0.096 |
| 12 | 0.089 |
| 13 | 0.082 |
| 14 | 0.077 |
| 15 | 0.072 |
| 16 | 0.068 |
| 17 | 0.064 |
| 18 | 0.061 |
| 19 | 0.058 |
| 20 | 0.055 |