


|    | A   | B                       | C                       | D                       | E                       | F                       | G                       | H                | I | J | K | L | M | N |
|----|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------|---|---|---|---|---|---|
| 1  | <b>Coal extraction data</b>   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 2  | <b>Richard Heede</b>  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 3  | <b>Climate Mitigation Services</b>  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 4  | File started: 11 January 2005   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 5  | Last modified: November 2011  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 6  | <b>Copyright Climate Mitigation Services</b>  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 7  |                    |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 8  | <b>Coal India Ltd.</b>  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 9  | www.coalindia.in      Kolkata, West Bengal      IPO in 2011   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 10 | <b>Production / Extraction data</b>   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 11 | <b>90 percent state-owned (Ministry of Coal)      yellow column indicates original reported units</b> |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 12 | <b>Year</b>   | <b>Lignite</b>          |                         | <b>Hard Coal</b>        |                         | <b>Total Coal</b>       |                         |                  |   |   |   |   |   |   |
| 13 |   | <b>Gross production</b> | <b>Gross production</b> | <b>Gross production</b> | <b>Gross production</b> | <b>Gross production</b> | <b>Gross production</b> |                  |   |   |   |   |   |   |
| 14 |   | Million tons/yr         | Million tonnes/yr       | Million tons/yr         | Million tonnes/yr       | Million tons/yr         | Million tonnes/yr       |                  |   |   |   |   |   |   |
| 15 |   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 16 | 1946  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 17 | 1947  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 18 | 1948  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 19 | 1949  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 20 | 1950  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 21 | 1951  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 22 | 1952  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 23 | 1953  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 24 | 1954  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 25 | 1955  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 26 | 1956  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 27 | 1957  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 28 | 1958  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 29 | 1959  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 30 | 1960  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 31 | 1961  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 32 | 1962  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 33 | 1963  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 34 | 1964  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 35 | 1965  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 36 | 1966  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 37 | 1967  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 38 | 1968  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 39 | 1969  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 40 | 1970  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 41 | 1971  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 42 | 1972  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 43 | 1973  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 44 | 1974  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 45 | 1975  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 46 | 1976  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 47 | 1977  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 48 | 1978  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 49 | 1979  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 50 | 1980  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 51 | 1981  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 52 | 1982  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 53 | 1983  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 54 | 1984  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 55 | 1985  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 56 | 1986  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 57 | 1987  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 58 | 1988  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 59 | 1989  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 60 | 1990  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 61 | 1991  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 62 | 1992  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 63 | 1993  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 64 | 1994  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 65 | 1995  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 66 | 1996  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 67 | 1997  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 68 | 1998  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 69 | 1999  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 70 | 2000  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 71 | 2001  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 72 | 2002  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 73 | 2003  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 74 | 2004  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 75 | 2005  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 76 | 2006  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 77 | 2007  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 78 | 2008  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 79 | 2009  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 80 | 2010  |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 81 |   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 82 | <b>Total</b>  | <b>743</b>              | <b>551</b>              | <b>11,199</b>           | <b>8,343</b>            | <b>12,469</b>           | <b>8,052</b>            | <b>1973-2010</b> |   |   |   |   |   |   |
| 83 | 1980-2010 India total: 7,518      Coal India % of India 71.2%   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 84 | CMS: re-classify to sub-bituminous      Metallurgical coke 0.00%      100.00%                         |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |
| 85 | <b>Coal Types:</b>  | Lignite                 | 6.61%                   | Sub-bituminous          | 93.39%                  | Metallurgical coke      | 0.00%                   |                  |   |   |   |   |   |   |
| 86 |   |                         |                         |                         |                         |                         |                         |                  |   |   |   |   |   |   |

The EIA data in columns D to J are shown for total coal production by rank in India, and is used to calculate a default value for Coal India's production by rank. Coal India's total coal production is shown in column K, based on data in page 2.

Coal India/Ministry of Coal is assumed to produce 88 percent of total Indian coal. (Also see Singherani Collieries, equal to 7 percent of Indian production)

total coal production excludes metallurgical coal, per EIA

| Total Lignite Production (EIA & BuMines) | Estim Coal India product'n (88% & 80.9%) | Total Bituminous Production (EIA, Sh tons) | Estim Coal India product'n (88%) |
|--|--|--|----------------------------------|
| million tonnes                           | million tonnes                           | million tonnes                             | million tonnes                   |
| 0.1                                      | 0.0                                      | 58   | 46                               |
| 0.1                                      | 0.1                                      | 62   | 49                               |
| 0.2                                      | 0.2                                      | 68   | 54                               |
| 1.1                                      | 0.9                                      | 73   | 58                               |
| 1.7                                      | 1.4                                      | 69   | 55                               |
| 2.5                                      | 2.0                                      | 74   | 59                               |
| 2.8                                      | 2.3                                      | 75   | 60                               |
| 3.2                                      | 2.6                                      | 75   | 60                               |
| 4.5                                      | 3.6                                      | 76   | 61                               |
| 4.6                                      | 3.7                                      | 83   | 66                               |
| 3.9                                      | 3.1                                      | 81   | 65                               |
| 4.1                                      | 3.3                                      | 76   | 61                               |
| 4.2                                      | 3.4                                      | 81   | 65                               |
| 4.4                                      | 3.5                                      | 86   | 69                               |
| 4.6                                      | 3.6                                      | 91   | 73                               |
| 4.7                                      | 3.8                                      | 96   | 76                               |
| 4.9                                      | 3.9                                      | 101  | 80                               |
| 5.0                                      | 4.0                                      | 106  | 84                               |
| 5.2                                      | 4.2                                      | 111  | 88                               |
| 5.4                                      | 4.3                                      | 115  | 92                               |
| 5.5                                      | 4.1                                      | 120  | 89                               |
| 7.2                                      | 5.3                                      | 136  | 100                              |
| 7.7                                      | 5.7                                      | 142  | 104                              |
| 7.3                                      | 5.4                                      | 149  | 109                              |
| 7.8                                      | 5.8                                      | 176  | 130                              |
| 8.6                                      | 6.3                                      | 181  | 133                              |
| 10.6                                     | 7.8                                      | 198  | 146                              |
| 12.4                                     | 9.1                                      | 198  | 146                              |
| 13.9                                     | 10.2                                     | 213  | 156                              |
| 13.9                                     | 10.3                                     | 220  | 162                              |
| 15.6                                     | 11.4                                     | 232  | 171                              |
| 17.6                                     | 13.0                                     | 252  | 186                              |
| 17.4                                     | 12.8                                     | 262  | 193                              |
| 18.3                                     | 13.5                                     | 270  | 198                              |
| 21.3                                     | 15.7                                     | 279  | 206                              |
| 24.4                                     | 18.0                                     | 296  | 218                              |
| 24.8                                     | 18.3                                     | 290  | 213                              |
| 25.4                                     | 18.7                                     | 313  | 230                              |
| 25.5                                     | 18.8                                     | 318  | 234                              |
| 24.8                                     | 18.2                                     | 331  | 244                              |
| 26.7                                     | 19.7                                     | 343  | 253                              |
| 27.4                                     | 20.1                                     | 361  | 266                              |
| 28.7                                     | 21.1                                     | 367  | 270                              |
| 30.8                                     | 22.7                                     | 390  | 287                              |
| 33.5                                     | 24.7                                     | 413  | 304                              |
| 33.3                                     | 24.5                                     | 440  | 324                              |
| 34.5                                     | 25.4                                     | 466  | 343                              |
| 37.5                                     | 27.6                                     | 494  | 364                              |
| 35.7                                     | 26.3                                     | 533  | 392                              |
| 38.2                                     | 28.1                                     | 573  | 422                              |
| 39.2                                     | 28.8                                     | 588  | 432                              |



Zimmermann's: 71 million tonnes

Total est. & actual Coal India prodn 1970-2004 EIA data for India

million tonnes 71 Coal India established 1973

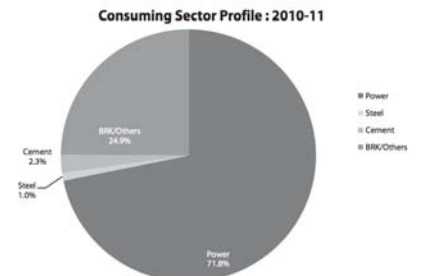
| Year | Total est. & actual Coal India prodn (million tonnes) | 1973-2010 | 1980-2010 | 1999-2010 |
|------|---|-----------|-----------|-----------|
| 1973 | 87  | 89        | 92        | 96        |
| 1974 | 88  | 92        | 96        | 109       |
| 1975 | 91  | 96        | 101       | 115       |
| 1976 | 96  | 101       | 106       | 111       |
| 1977 | 101   | 106       | 111       | 118       |
| 1978 | 106   | 111       | 115       | 126       |
| 1979 | 111   | 116       | 120       | 136       |
| 1980 | 116   | 126       | 143       | 149       |
| 1981 | 118   | 132       | 156       | 166       |
| 1982 | 126   | 143       | 166       | 176       |
| 1983 | 132   | 149       | 176       | 180       |
| 1984 | 143   | 156       | 180       | 180       |
| 1985 | 146   | 166       | 180       | 180       |
| 1986 | 146   | 176       | 180       | 180       |
| 1987 | 157   | 180       | 180       | 180       |
| 1988 | 166   | 180       | 180       | 180       |
| 1989 | 176   | 180       | 180       | 180       |
| 1990 | 208   | 180       | 180       | 180       |
| 1991 | 211   | 180       | 180       | 180       |
| 1992 | 211   | 180       | 180       | 180       |
| 1993 | 211   | 180       | 180       | 180       |
| 1994 | 211   | 180       | 180       | 180       |
| 1995 | 211   | 180       | 180       | 180       |
| 1996 | 211   | 180       | 180       | 180       |
| 1997 | 211   | 180       | 180       | 180       |
| 1998 | 211   | 180       | 180       | 180       |
| 1999 | 211   | 180       | 180       | 180       |
| 2000 | 211   | 180       | 180       | 180       |
| 2001 | 211   | 180       | 180       | 180       |
| 2002 | 211   | 180       | 180       | 180       |
| 2003 | 211   | 180       | 180       | 180       |
| 2004 | 211   | 180       | 180       | 180       |
| 2005 | 211   | 180       | 180       | 180       |
| 2006 | 211   | 180       | 180       | 180       |
| 2007 | 211   | 180       | 180       | 180       |
| 2008 | 211   | 180       | 180       | 180       |
| 2009 | 211   | 180       | 180       | 180       |
| 2010 | 211   | 180       | 180       | 180       |

|           | O   | P             | Q             | R             | S             | T             | U             | V             | W             | X             | Y             | Z | AA | AB | AC | AD | AE | AF | AG |
|-----------|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---|----|----|----|----|----|----|----|
| <b>1</b>  | <b>OPERATIONAL STATISTICS</b>                 |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>2</b>  | <b>Year Ending 31st March</b>                 |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>3</b>  | 1. (a) Production of Raw Coal (MillionTonnes) |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>4</b>  | Underground                                   |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>5</b>  | Opencast                                      |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>6</b>  | <b>Total</b>                                  | <b>431.32</b> | <b>431.26</b> | <b>403.73</b> | <b>379.46</b> | <b>360.91</b> | <b>343.39</b> | <b>323.58</b> | <b>306.36</b> | <b>290.69</b> | <b>279.65</b> |   |    |    |    |    |    |    |    |
| <b>7</b>  | b) Overburden Removal (million Cum)           |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>8</b>  | <b>Total</b>                                  | <b>732.13</b> | <b>682.03</b> | <b>645.13</b> | <b>607.56</b> | <b>537.65</b> | <b>533.94</b> | <b>516.11</b> | <b>497.00</b> | <b>501.20</b> | <b>490.13</b> |   |    |    |    |    |    |    |    |
| <b>9</b>  | 2. Off take (Raw Coal) (MillionTonnes)        |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>10</b> | Power   |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>11</b> | Steel/Hard Coke                               |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>12</b> | Railway                                       |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>13</b> | Others  |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>14</b> | <b>Total</b>                                  | <b>424.50</b> | <b>415.88</b> | <b>401.46</b> | <b>375.33</b> | <b>351.14</b> | <b>333.66</b> | <b>321.55</b> | <b>304.44</b> | <b>289.22</b> | <b>282.43</b> |   |    |    |    |    |    |    |    |
| <b>15</b> | 3. Average Manpower                           |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>16</b> | 4. Year-end Manpower                          |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>17</b> | 5. Productivity                               |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>18</b> | A) Average per Man per Year (tonnes)          |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>19</b> | B) Output per manshift (OMS)                  |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>20</b> | i) Under Ground (Tonnes)                      |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>21</b> | ii) Open Cast (Tonnes)                        |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |
| <b>22</b> | iii) Overall (Tonnes)                         |               |               |               |               |               |               |               |               |               |               |   |    |    |    |    |    |    |    |

(b) Sectorwise dispatch of coal & coal products

Sector-wise break-up of dispatch of coal & coal products for 2010-11 against target and last year's actual is given below:

| Year        | 2010-11 |          |         | 2009-10 |       | Growth over Last Year |  |
|-------------|---------|----------|---------|---------|-------|-----------------------|--|
|             | Target  | Dispatch | % Seln. | Actual  | Abs.  | %                     |  |
| Power (JIT) | 332.78  | 304.15   | 91.4    | 298.03  | 6.12  | 2.1                   |  |
| Steel       | 4.37    | 4.21     | 96.4    | 3.78    | 0.43  | 11.5                  |  |
| Cement      | 7.51    | 9.69     | 129.0   | 9.25    | 0.44  | 4.7                   |  |
| Fertilizer  | 3.01    | 2.78     | 92.4    | 2.81    | 0.17  | 6.5                   |  |
| Export      | 0.02    | 0.00     | 0.01    | 0.01    | -0.01 |                       |  |
| Others      | 109.82  | 102.61   | 93.4    | 101.46  | 1.15  | 1.1                   |  |
| Dispatch    | 457.51  | 423.44   | 92.6    | 415.14  | 8.30  | 2.0                   |  |

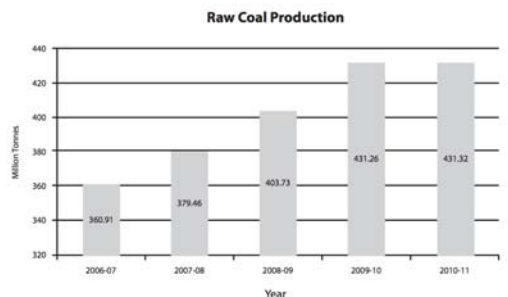


Coal India AnnRpt for 2010-2011, page 19.

Coal India AnnRpt for 2010-2011.

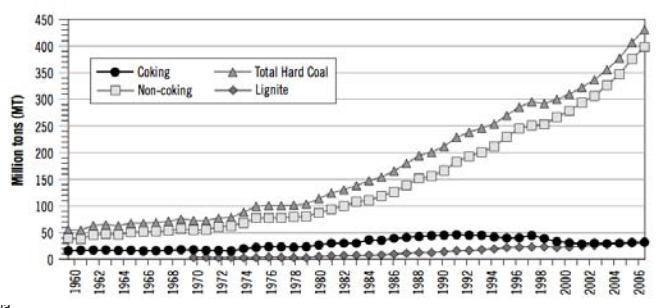
| Grades            | Fiscal                      |                          |                             |                          |                             |                          |                             |                          |                             |                          |
|-------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|
|                   | 2008                        |                          | 2009                        |                          | 2010                        |                          | 2011                        |                          | 2012 (1st QTR)              |                          |
|                   | Raw coal production Mill Te | % of Raw coal production | Raw coal production Mill Te | % of Raw coal production | Raw coal production Mill Te | % of Raw coal production | Raw coal production Mill Te | % of Raw coal production | Raw coal production Mill Te | % of Raw coal production |
| Non Coking Coal 1 | 353.30                      | 93.1                     | 377.19                      | 93.4                     | 395.13                      | 91.6                     | 389.97                      | 90.4                     | 87.192                      | 90.5                     |
| Coking Coal 2     | 26.16                       | 6.9                      | 26.54                       | 6.6                      | 36.13                       | 8.4                      | 41.35                       | 9.6                      | 9.117                       | 9.5                      |
| <b>Total</b>      | <b>379.46</b>               | <b>100.0</b>             | <b>403.73</b>               | <b>100.0</b>             | <b>431.26</b>               | <b>100.0</b>             | <b>431.32</b>               | <b>100.0</b>             | <b>96.309</b>               | <b>100.0</b>             |

coalindia.in/performance.aspx



Coal India AnnRpt for 2010-2011.

Figure 2: Coal production in India (1960-2006)



Chikkatur, Ananth P. (2008) A Resource and Technology Assessment of Coal Utilization in India,

Operational Statistics, Coal India AnnRpt 2010-2011, page 33.

| "Off take (Raw Coal)", in million tonnes |                |                |                |                |                |
|--|----------------|----------------|----------------|----------------|----------------|
| Power                                    | Steel /Coke    | Railway        | Others         | Total          | Raw coal prodn |
| million tonnes                           | million tonnes | million tonnes | million tonnes | million tonnes | million tonnes |

|      |        |       |   |        |        |        |
|------|--------|-------|---|--------|--------|--------|
| 1999 | 195.08 | 15.45 | - | 53.11  | 263.64 | 260.58 |
| 2000 | 207.43 | 13.87 | - | 52.51  | 273.81 | 268.14 |
| 2001 | 217.18 | 12.37 | - | 52.88  | 282.43 | 279.65 |
| 2002 | 219.93 | 12.28 | - | 57.01  | 289.22 | 290.69 |
| 2003 | 234.23 | 12.18 | - | 58.03  | 304.44 | 306.36 |
| 2004 | 248.86 | 11.70 | - | 60.99  | 321.55 | 323.58 |
| 2005 | 256.65 | 10.02 | - | 66.99  | 333.66 | 343.39 |
| 2006 | 262.14 | 9.85  | - | 79.15  | 351.14 | 360.91 |
| 2007 | 280.15 | 10.01 | - | 85.17  | 375.33 | 379.46 |
| 2008 | 296.74 | 9.00  | - | 95.72  | 401.46 | 403.73 |
| 2009 | 298.87 | 8.92  | - | 108.09 | 415.88 | 431.26 |
| 2010 | 304.30 | 9.50  | - | 110.70 | 424.50 | 431.32 |

|         |          |        |                              |        |          |          |
|---------|----------|--------|------------------------------|--------|----------|----------|
|         | 2,826.48 | 119.70 | -                            | 827.24 | 3,773.42 | 3,818.49 |
| Percent | 74.9%    | 3.2%   | 0.0%                         | 21.9%  | 100%     |          |
|         |          |        | Thermal coal total 2000-2010 |        | 96.8%    |          |
|         |          |        | Coking coal total 2000-2010  |        | 3.2%     |          |

CIL data on accident statistics: website data on HSE & accident rates

| Year | Fatal Acc. |            | Serious Acc. |          | Fatality rate & serious injury rate |        | production: "Fatalities" / "Fatal A" |                 |
|------|------------|------------|--------------|----------|-------------------------------------|--------|--------------------------------------|-----------------|
|      | Accident   | Fatalities | Accident     | Injuries | Per MT                              | Per MT | Per MT                               | MT (fatalities) |
| 1975 | 177        | 233        | 1,456        | 1,515    | 2.62                                | 17.03  | 88.9                                 |                 |
| 1976 | 177        | 249        | 1,194        | 1,248    | 2.72                                | 13.63  | 91.5                                 |                 |
| 1977 | 177        | 197        | 1,198        | 1,255    | 2.23                                | 14.19  | 88.3                                 |                 |
| 1978 | 139        | 154        | 1,180        | 1,227    | 1.73                                | 13.78  | 89.0                                 |                 |
| 1979 | 114        | 147        | 1,090        | 1,143    | 1.61                                | 12.55  | 91.3                                 |                 |
| 1980 | 112        | 129        | 1,132        | 1,202    | 1.35                                | 12.54  | 95.6                                 |                 |
| 1981 | 127        | 145        | 1,214        | 1,276    | 1.35                                | 11.90  | 107.4                                |                 |
| 1982 | 123        | 148        | 1,161        | 1,218    | 1.32                                | 10.86  | 112.1                                |                 |
| 1983 | 127        | 160        | 980          | 1,026    | 1.36                                | 8.70   | 117.6                                |                 |
| 1984 | 123        | 134        | 603          | 605      | 1.05                                | 4.73   | 127.6                                |                 |
| 1985 | 136        | 152        | 507          | 524      | 1.15                                | 3.97   | 132.2                                |                 |
| 1986 | 133        | 154        | 508          | 525      | 1.08                                | 3.68   | 142.6                                |                 |
| 1987 | 130        | 141        | 558          | 577      | 0.90                                | 3.69   | 156.7                                |                 |
| 1988 | 137        | 151        | 552          | 576      | 0.91                                | 3.44   | 165.9                                |                 |
| 1989 | 131        | 150        | 626          | 654      | 0.85                                | 3.72   | 176.5                                |                 |
| 1990 | 121        | 135        | 590          | 633      | 0.75                                | 3.53   | 180.0                                |                 |
| 1991 | 115        | 120        | 476          | 508      | 0.58                                | 2.51   | 206.9                                |                 |
| 1992 | 131        | 150        | 443          | 492      | 0.69                                | 2.20   | 217.4                                |                 |
| 1993 | 118        | 132        | 441          | 461      | 0.61                                | 2.14   | 216.4                                |                 |
| 1994 | 113        | 186        | 673          | 697      | 0.84                                | 3.14   | 221.4                                |                 |
| 1995 | 113        | 192        | 575          | 612      | 0.83                                | 2.65   | 231.3                                |                 |
| 1996 | 96         | 110        | 484          | 505      | 0.44                                | 2.02   | 250.0                                |                 |
| 1997 | 99         | 111        | 486          | 519      | 0.43                                | 1.99   | 258.1                                |                 |
| 1998 | 91         | 104        | 395          | 427      | 0.40                                | 1.64   | 260.0                                |                 |
| 1999 | 93         | 102        | 467          | 502      | 0.40                                | 1.98   | 255.0                                |                 |
| 2000 | 80         | 100        | 547          | 583      | 0.37                                | 2.16   | 270.3                                |                 |
| 2001 | 70         | 105        | 529          | 564      | 0.38                                | 2.06   | 276.3                                |                 |
| 2002 | 62         | 69         | 482          | 509      | 0.24                                | 1.74   | 287.5                                |                 |
| 2003 | 60         | 64         | 447          | 467      | 0.21                                | 1.48   | 304.8                                |                 |
| 2004 | 66         | 70         | 491          | 508      | 0.21                                | 1.55   | 333.3                                |                 |
| 2005 | 76         | 97         | 391          | 405      | 0.29                                | 1.20   | 334.5                                |                 |
| 2006 | 51         | 106        | 317          | 336      | 0.30                                | 0.96   | 353.3                                |                 |
| 2007 | 55         | 57         | 326          | 340      | 0.15                                | 0.92   | 380.0                                |                 |
| 2008 | 52         | 64         | 337          | 342      | 0.16                                | 0.86   | 400.0                                |                 |
| 2009 | 25         | 29         | 117          | 119      | 0.13                                | 0.53   | 223.1                                |                 |

|     | A | B  | C | D | E | F | G | H | I | J | K | L | M | N |
|-----|---|--|---|---|---|---|---|---|---|---|---|---|---|---|
| 87  |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 88  |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 89  |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 90  |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 91  |   | <b>EIA "International Energy Statistics" 1980 - 2010 for India</b> |   |   |   |   |   |   |   |   |   |   |   |   |
| 92  |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 93  |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
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| 111 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 112 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 113 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 114 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 115 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 116 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 117 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 118 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 119 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 120 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 121 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 122 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 123 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 124 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
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| 126 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 127 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 128 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
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| 138 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 139 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
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| 163 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
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| 165 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 166 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
| 167 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |
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| 170 |   |  |   |   |   |   |   |   |   |   |   |   |   |   |

|                     | D       | E         | F  | H       | J          |
|---------------------|---------|-----------|----|---------|------------|
| subt. 1980-2010     | 675,759 | 9,543,227 | -  | 387,025 | 10,218,986 |
| percent of 2009     | 6.25%   | 93.75%    |    | 100.00% |            |
| <b>% 1980-2010:</b> | 6.61%   | 93.39%    | 0% |         |            |

Note: Coal India does not specify the carbon content or calorific value of its coals (other than "thermal coal," "coke," and "other." CMS would normally apply average U.S. thermal coal emission factor (2.266 tCO<sub>2</sub>/tonne). However, given the low very low calorific values of Indian powerplant coals compared to US plants (see below), CMS assigns the EF of sub-bituminous to Coal India's thermal coal production (1.864 tCO<sub>2</sub>/tonne).

| Details, %               | Kahalgaon | Simhadri | Sipat | US (Ohio) | China (Long Kou) |
|--------------------------|-----------|----------|-------|-----------|------------------|
| Carbon                   | 25.07     | 29.00    | 30.72 | 64.2      | 62.8             |
| Hydrogen                 | 2.95      | 1.88     | 2.30  | 5.0       | 5.6              |
| Nitrogen                 | 0.50      | 0.52     | 0.60  | 1.3       | 1.4              |
| Oxygen                   | 6.71      | 6.96     | 5.35  | 11.8      | 21.7             |
| Moisture                 | 18.5      | 15.0     | 15.0  | 2.8       | 11.0             |
| Sulphur                  | 0.17      | 0.25     | 0.40  | 1.8       | 0.9              |
| Ash                      | 46.0      | 46.0     | 45.0  | 16.0      | 7.7              |
| Calorific Value, kcal/kg | 2450      | 2800     | 3000  | 6378      | 6087             |

Ultimate analysis of non-coking (thermal) coal from three power stations (Kahalgaon, Simhadri, and Sipat) is shown along with analysis of Ohio coal of the United States and Long Kou coal from China.

Source: Visuvasam *et al.*, 2005.

Chikkatur, Ananth P. (2008) A Resource and Technology Assessment of Coal Utilization in India, Pew Center on Global Climate Change, October 2008, 48 pp.  
See pages 7-9 (Resources) and pp 15-15 (Quality).

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Table III.5(a) : Production of Coal in India Since Independence

| Year    | Total production of coal (million tonnes) | Percentage increase (+) or decrease (-) over the previous year | Production of coking coal (million tonnes) | Percentage increase (+) or decrease (-) over the previous year | Ratio of coking coal to total production of coal |
|---------|---|--|--|--|--|
| 1       | 2   | 3  | 4  | 5  | 6  |
| 1947*   | 30.07                                     | (+) 0.99   | —  | —  | —  |
| 1948    | 29.82                                     | (-) 0.83   | —  | —  | —  |
| 1949    | 31.45                                     | (+) 5.18   | —  | —  | —  |
| 1950    | 32.31                                     | (+) 2.66   | —  | —  | —  |
| 1951    | 34.43                                     | (+) 6.16   | —  | —  | —  |
| 1952    | 36.22                                     | (+) 4.94   | —  | —  | —  |
| 1953    | 35.85                                     | (-) 1.03   | —  | —  | —  |
| 1954    | 36.77                                     | (+) 2.50   | 13.8                                       | —  | —  |
| 1955-56 | 38.40                                     | (+) 4.24   | —  | —  | —  |
| 1956-57 | 40.94                                     | (+) 6.20   | —  | —  | —  |
| 1957-58 | 44.81                                     | (+) 8.64   | —  | —  | —  |
| 1958-59 | 46.68                                     | (+) 4.01   | —  | —  | —  |
| 1959-60 | 48.59                                     | (+) 3.93   | —  | —  | —  |
| 1960-61 | 55.67                                     | (+) 12.72  | 16.1                                       | —  | —  |
| 1961-62 | 55.18                                     | (-) 0.89   | —  | —  | —  |
| 1962-63 | 63.45                                     | (+) 13.03  | —  | —  | —  |
| 1963-64 | 65.13                                     | (+) 2.58   | —  | —  | —  |
| 1964-65 | 62.78                                     | (-) 3.74   | —  | —  | —  |
| 1965-66 | 67.73                                     | (+) 7.31   | 17.0                                       | —  | 25.10  |
| 1966-67 | 68.56                                     | (+) 1.21   | 16.6                                       | (-) 2.41   | 24.21  |
| 1967-68 | 68.52                                     | (-) 0.06   | 15.9                                       | (-) 4.40   | 23.20  |
| 1968-69 | 71.41                                     | (+) 4.05   | 17.2                                       | (+) 7.56   | 24.09  |
| 1969-70 | 75.71                                     | (+) 5.68   | 18.1                                       | (+) 4.97   | 23.90  |
| 1970-71 | 72.95                                     | (-) 3.78   | 17.8                                       | (-) 1.69   | 24.40  |
| 1971-72 | 72.06**                                   | (-) 1.24   | 16.7                                       | (-) 6.59   | 23.17  |
| 1972-73 | 76.87***                                  | (+) 6.26   | 16.3                                       | (-) 2.45   | 21.20  |
| 1973-74 | 83.10                                     | (+) 7.50   | 15.8                                       | (-) 3.16   | 19.01  |
| 1974-75 | 87.00                                     | (+) 4.48   | 17.7                                       | (+) 10.73  | 20.34  |
| 1975-76 | 99.68                                     | (+) 12.72  | 25.1                                       | (+) 29.48  | 25.18  |
| 1976-77 | 101.04                                    | (+) 1.35   | 29.6                                       | (+) 15.20  | 29.29  |
| 1977-78 | 101.00                                    | (-) 0.04   | 29.9                                       | (+) 1.00   | 29.60  |
| 1978-79 | 102.20                                    | (+) 1.19   | 29.5                                       | (-) 1.34   | 28.86  |
| 1979-80 | 103.98                                    | (+) 1.74   | 29.9                                       | (+) 1.36   | 28.76  |
| 1980-81 | 114.00                                    | (+) 9.84   | 31.7                                       | (+) 6.02   | 27.80  |
| 1981-82 | 124.90                                    | (+) 9.56   | 35.5                                       | (+) 11.99  | 28.42  |
| 1982-83 | 130.40                                    | (+) 4.40   | 37.8                                       | (+) 6.48   | 28.99  |
| 1983-84 | 137.57                                    | (+) 5.50   | —  | —  | —  |
| 1984-85 | 147.45                                    | (+) 7.18   | —  | —  | —  |

\* Production statistics were earlier maintained by calendar years.

\*\* This figure includes production of taken over coking coal mines from October, 1971.

\*\*\* This figure includes production of taken over non-coking coal mines from February, 1973 and production of BCCL (Bharat Coking Coal Limited - a subsidiary company of Coal India Limited).

Source : (1) *Businessman*, 12 Years Commemoration Souvenir Number on N.C.D.C Ltd. Statistical Trend, p. 15.(2) *Coal Statistics*, Annual, Government of India, Department of Coal, Vol. A-1/80-81, p. 54.Prasad, Anubhuti Ranjan (1986) *Coal industry of India*, S.B. Nangia, New Delhi, 256 pp.

## COAL PRODUCTION IN INDIA, 1940-1959

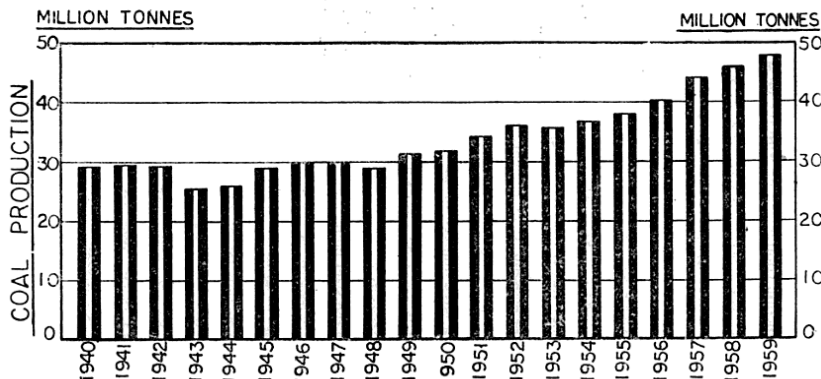


Fig. III.3

Prasad, Anubhuti Ranjan (1986) *Coal industry of India*, S.B. Nangia, New Delhi, 256 pp.

**Cell:** G9

**Comment:** Rick Heede:

The Ministry of Coal has under its administrative control the Coal India Limited, a Public Sector Undertaking, with its 8 subsidiary companies. The Coal India Limited with its headquarters at Calcutta is the Holding company in respect of its subsidiaries. It is also the apex body in coal industry and is responsible for laying down the policy guidelines and coordination work of subsidiaries. It also does the investment, planning, manpower, management, purchase of heavy machineries, financial budgeting etc on behalf of all its subsidiaries. The Ministry of Coal has also under its administrative control the Neyveli Lignite Corporation(NLC) with Registered Office at Chennai and Corporate Office at Neyveli in Tamil Nadu. The company is engaged in the exploitation of lignite deposits.

MBendi.co.za quote: "About 88% of the total coal production in India is produced by various subsidiaries (a total of 390 mines) of Coal India Ltd. which is the largest supplier of coal (and one of the largest taxpayers) in the country. Although Coal India is currently State controlled, although efforts are being made to open the industry to Indian private investors. At present all private mines are allowed to operate only if they are producing coal to supply a specific industry (e.g. power station, industry). Coal India has seven coal producing subsidiary companies; viz. Central Coalfields, Eastern Coalfields (Sanctoria), Bharat Coking Coal (Dhanbad), Northern Coalfields (Nagpur), Western Coalfields, Southern Eastern Coalfields (Bilaspur), Mahanandi Coalfields (Sambalpur) and the Central Mine Planning & Design Institute (CMPDI) at Ranchi Bihar, which is entrusted with the job of providing total research and consultancy support to the industry. South Eastern Coalfields are planning to increase production from two of its operations, the Gevra and Dipka mines that supply coal to power stations. The only other major producer outside of CIL, is the Singareni Collieries Company that is located in Andhra Pradesh. Singareni contributes about 7-8 % of India's overall coal production, amounting to approximately 20 Mt each year."

Through its six coal producing subsidiary companies, CIL is the country's largest coal producer. CIL has a share in: Bharat Coking Coal Ltd - Dhanbad, India has a share in: Central Coalfields Ltd - Bihar, India has a share in: Eastern Coalfields Ltd - West Bengal, India has a share in: Mahanadi Coalfields Ltd - Orissa, India has a share in: Northern Coalfields Ltd, India has a share in: South Eastern Coalfields Ltd - Bilaspur, India has a share in: Western Coalfields Ltd - Maharashtra, India has shareholder: Government of India, India.

CMS attributes 88 percent of total Indian coal production to Coal India Ltd.

See also: Prasad, Anubhuti Ranjan (1986) Coal Industry of India, S.B. Nangia, New Delhi, 256 pp.

**Cell:** J9

**Comment:** Rick Heede:

90% owned by Govt of India, 10% public. Coal India IPO for \$3.5 billion 20 Oct 2010. Reuters story. Coal demand to grow 11 percent/yr. Still listed as a "Govt of India Undertaking." Wiki: "In 2010, CIL's initial public offering (IPO) got subscribed 15.28 times, collecting a record over 2.4 trillion—the highest IPO subscription so far.[5] On the first day of its listing on the Sensex, its stock closed 40% higher than IPO price.[6] It is India's largest ever public offer from Coal India Ltd. to raise up to 15,000 crore (US\$2.73 billion).[7] It is currently 90% owned by the Government of India with the remaining 10% owned by the public."

**Cell:** J10

**Comment:** Rick Heede:

Times of India (2010) Coal India IPO fetches mind-boggling Rs 2.36L crore, 22Oct10. "MUMBAI: The Indian capital market turned black into gold this week. The initial public offer of Coal India was set to be the largest in Indian history from the moment it opened on Monday, but even the biggest bulls in the ring were left stunned by the money it mined by the time it closed on Thursday: a mobilization of Rs 2.36 lakh crore, over 15 times the target of Rs 15,500 crore."

See also:

The Guardian, Jeremy Leggett (2010) Coal India IPO shows the mountain we have to climb Company's prospectus did not mention climate change once in 510 pages of exhortation to invest. guardian.co.uk, 9Nov2010. "In the largest ever initial public offering on the Indian stock exchange, Coal India, a huge government-owned coal company, recently offered 10% of its shares to investors at home and abroad. What was at stake was essentially a \$35bn (£21bn) bankrolling of enhanced global warming by the capital markets. Yet Coal India's prospectus, crafted with the help of a clutch of big-name investment banks, did not mention climate change once in 510 pages of exhortation to invest. And invest the fund managers did, unfettered by risk regulation or any meaningful requirement to place a value on the climate consequences of their scramble for short-term profit. The offering was oversubscribed 15 fold, and the stock soared on the first day of trading, 4 November, valuing Coal India at \$49bn. Those ending up owning stock include 484 foreign funds, 195 mutual funds, 44 insurance companies, and many banks. Many of these investors were using ordinary citizens' money, and this would have included the nest eggs of people worried about global warming and its dire impact on the world by the time they retire. But those people are mostly allowed no say in where their pension funds, insurance premiums, and banking deposits are invested."

**Cell:** D11

**Comment:** Rick Heede:

Coal production by coal mining companies and state-owned enterprises, including subsidiaries of oil and gas companies.

Coal types produced are not ordinarily reported by coal operators (except for metallurgical coal). We distinguish, where possible and reasonably well known, between hard (bituminous and subbituminous) and soft (lignite or peat) coals, especially for the larger companies operating in regions such as India where soft coals are predominant. Soft coals have lower carbon content per tonne than do hard coals.

**Cell:** J17

**Comment:** Rick Heede:

Coal production 1947-1960 from Prasad (1986), page 132.

Prasad, Anubhuti Ranjan (1986) Coal industry of India, S.B. Nangia, New Delhi, 256 pp.

**Cell:** E27

**Comment:** Rick Heede:

"About 88% of the total coal production in India is produced by various subsidiaries (a total of 390 mines) of Coal India Ltd. which is the largest supplier of coal (and one of the largest taxpayers) in the country. Although Coal India is currently State controlled, although efforts are being made to open the industry to Indian private investors. At present all private mines are allowed to operate only if they are producing coal to supply a specific industry (e.g. power station, industry). Coal India has seven coal producing subsidiary companies; viz. Central Coalfields, Eastern Coalfields (Sanctoria), Bharat Coking Coal (Dhanbad), Northern Coalfields (Nagpur), Western Coalfields, Southern Eastern Coalfields (Bilaspur), Mahanandi Coalfields (Sambalpur) and the Central Mine Planning & Design Institute (CMPDI) at Ranchi Bihar, which is entrusted with the job of providing total research and consultancy support to the industry. South Eastern Coalfields are planning to increase production from two of its operations, the Gevra and Dipka mines that supply coal to power stations. The only other major producer outside of CIL, is the Singareni Collieries Company that is located in Andhra Pradesh. Singareni contributes about 7-8 % of India's overall coal production, amounting to approximately 20 Mt each year."

**Cell:** D29

**Comment:** Rick Heede:

Data for 1960-1971: Bureau of Mines, Minerals Yearbook, Table 54, various years.

Indian coal production 1980-2010 from Energy Information Administration (2010) International Energy Statistics, Coal Production, Lignite.

**Cell:** J30

**Comment:** Rick Heede:

US Bureau of Mines data.

**Cell:** M36

**Comment:** Rick Heede:

Parallel estimated coal production in India: 71 tonnes. Citing United Nations. At Coal India assumed equal to 88 percent of India, Coal India = 62.48 million tonnes.

Peach, W. N., & James A. Constantine (1972) Zimmermann's World Resources and Industries, p. 364.

**Cell:** M43

**Comment:** Rick Heede:

Wiki: "Coal India Limited was formed in 1973 as Coal Mines Authority Limited. In 1975 it was changed to Coal India Limited as a holding company with five subsidiaries: Bharat Coking Coal Limited (BCCCL)(Dhanbad, Jharkhand), Central Coalfields Limited (CCL)(Ranchi, Jharkhand), Western Coalfields Limited (WCL)(Nagpur region), Eastern Coalfields Limited (ECL)(Sanctoria, Asansol, West Bengal), Central Mine Planning and Design Institute Limited (CMPDIL)(Ranchi, Jharkhand).

## Coal India

In 1985 two more subsidiaries were added: South Eastern Coalfields Limited (SECL)(Bilaspur),and Northern Coalfields Limited, Singrauli (NCL,Singrauli).

In 1992 one more subsidiary added: ? Mahanadi Coalfields Limited (MCL) (Sambalpur) One International Subsidiary: Coal India Africana Limitada (CIAL) (Mozambique).

### Cell: K45

#### Comment: Rick Heede (Feb10):

CMS has not found annual production data for Coal India from 1980 to 1999 -- except as a derivative of "fatal accident rate per million tonnes of coal production."

CMS calculates CIL coal production 1975 to 1999 on the basis of CIL-published data on its fatality rate and coal production per fatality per year (available at [www.coalindia.in](http://www.coalindia.in), at HSE statistics). It is worth noting that CMS' original calculation (81 percent of India's total lignite plus bituminous coal production, EIA data), reproduced in column "M", is in close agreement with CIL data.

Production for 1999-2010 is based on actual "off take" production data.

### Cell: E50

#### Comment: Rick Heede:

Indian lignite production for 1980-2010 attributed to Coal India Ltd is estimated at 81.1 of India's total lignite production based on CIL's percentage in 2010 (AnnRpt: "CIL accounted for 81.1% of India's production"). This is converted to metric tonnes from column D.

### Cell: H50

#### Comment: Rick Heede:

Indian hard coal production for 1980-2010 attributed to Coal India Ltd is estimated at 81.1 of India's total hard coal production based on CIL's percentage in 2010 (AnnRpt: "CIL accounted for 81.1% of India's production"). This is converted to metric tonnes from column G.

### Cell: Q61

#### Comment: Rick Heede:

Chikkatur, Ananth P. (2008) A Resource and Technology Assessment of Coal Utilization in India, Pew Center on Global Climate Change, Coal Initiative Reports White Paper Series, October 2008, 48 pp.

### Cell: K69

#### Comment: Rick Heede:

Coal India AnnRpt 2010-2011, Operational Statistics, page 19. This table details raw coal production as well as "off take (Raw Coal)" -- the definitions of which are not listed. We use off take coal to inform our consideration of Coal India's rank of coals mined (which is not available in their reports). However, we use "Production of raw coal" in the production estimate, which are somewhat higher than off take coal, and (presumably) include company's own use and combustion of coal.

### Cell: V69

#### Comment: Rick Heede:

Coal India AnnRpt 2008-2009, Operational Statistics.

### Cell: V71

#### Comment: Rick Heede:

Coal India AnnRpt 2010-2011, Operational Statistics.

### Cell: M79

#### Comment: Rick Heede:

CIL website, viewed 11Nov1: "Coal Reserves and Resources of CIL As of April 1, 2010, we had total coal resources of 64,786 million tons, comprising, pursuant of ISP classifications, Proved Geological Reserves of 52,546 million tons, Indicated Geological Reserves of 10,298 million tons and Inferred Geological Reserves of 1,942 million tons. As of April 1, 2010, from our total coal resources of 64,786 million tons, 30,356 million tons had been considered for mining studies (mine planning and feasibility studies), and the remaining coal resources of 34,430 million tons had not yet been considered for such mining studies. From the 30,356 million tons of coal resources that had been considered for mining studies as of April 1, 2010, 21,754 million tons has been estimated as our Extractable Reserves."

There are strong disagreements about India's coal reserve estimates. See Chikkatur (2008) A Resource and Technology Assessment of Coal Utilization in India, Pew Climate, and Heinberg (2009) Blackout: Coal, Climate, and the Last Energy Crisis.

### Cell: J80

#### Comment: Rick Heede:

EIA (2011) International Energy Statistics, Coal Production, all coal types, is available for 1980-2010. No data for 2010 (yet) on hard coal, lignite, ec. (2009 latest). CMS estimates lignite and hard coal production in 2010 on the basis of 2009 percentage of both coal types of the 2009 total.

### Cell: G85

#### Comment: Rick Heede:

Note: Coal India does not specify the carbon content or calorific value of its coals (other than "thermal coal," "coke," and "other." CMS would normally apply average U.S. thermal coal emission factor (2.266 tCO<sub>2</sub>/tonne) However, given the low very low calorific values of Indian powerplant coals compared to US plants (see below), CMS assigns the EF of sub-bituminous to Coal India's thermal coal production (1.864 tCO<sub>2</sub>/tonne).

### Cell: J90

#### Comment: Rick Heede:

EIA (2011) International Energy Statistics on World Coal Production (lignite, bituminous, anthracite, and metallurgical coal), by country; data for 1980-2009; total Primary Coal Production data extends to 2010. [www.eia.gov/emeu/internationalenergy.html](http://www.eia.gov/emeu/internationalenergy.html) or [www.eia.gov/countries/data.cfm](http://www.eia.gov/countries/data.cfm).

### Cell: D166

#### Comment: Rick Heede:

Chikkatur, Ananth P. (2008) A Resource and Technology Assessment of Coal Utilization in India, Pew Center on Global Climate Change, Coal Initiative Reports White Paper Series, October 2008, 48 pp.