Statistical Analysis on Performance Data of Thermal Power Stations

Summary:

If we take average net generation of all seven stations from **April 2011 to May 2016** and plot it on pie chart then we can observe that **Chandrapur** has maximum electricity generation after that **Khaperkheda, Nashik, Parli, Paras, Koradi, Bhusawal** resp. Note that NG calculated from April to March.

|  |  |
| --- | --- |
| **Stations** | Avg NG 2011-16 |
| Chandrapur | 740.288 |
| Khaperkheda | 523.598 |
| Nashik | 313.497 |
| Parli | 278.162 |
| Paras | 232.544 |
| Koradi | 180.572 |
| Bhusawal | 135.024 |

**Now plot it for each separate year**

|  |  |
| --- | --- |
| **Stations** | **Avg NG 2011-12** |
| Chandrapur | 1017.486 |
| Khaperkheda | 444.238 |
| Parli | 374.991 |
| Nashik | 315.138 |
| Koradi | 245.962 |
| Paras | 212.585 |
| Bhusawal | 171.841 |

|  |  |
| --- | --- |
| **Stations** | Avg NG 2012-13 |
| Khaperkheda | 401.148 |
| Nashik | 314.814 |
| Parli | 307.573 |
| Paras | 222.505 |
| Koradi | 179.982 |
| Bhusawal | 150.895 |
| Chandrapur | 0.000 |

|  |  |
| --- | --- |
| **Stations** | Avg NG 2013-14 |
| Chandrapur | 826.506 |
| Khaperkheda | 537.774 |
| Nashik | 306.522 |
| Parli | 250.664 |
| Paras | 249.885 |
| Koradi | 172.586 |
| Bhusawal | 152.242 |

|  |  |
| --- | --- |
| **Stations** | Avg NG 2014-15 |
| Chandrapur | 948.820 |
| Khaperkheda | 626.115 |
| Parli | 338.861 |
| Nashik | 310.842 |
| Paras | 216.552 |
| Koradi | 169.060 |
| Bhusawal | 78.310 |

|  |  |
| --- | --- |
| **Stations** | Avg NG 2015-16 |
| Chandrapur | 923.929 |
| Khaperkheda | 616.454 |
| Nashik | 320.778 |
| Paras | 263.798 |
| Koradi | 131.151 |
| Bhusawal | 120.63 |
| Parli | 104.226 |

**Efficiency :**

For calculating efficiency firstly we need to find possible generation in 24 hrs for every plant.

**Possible Generation in 24 hrs (MU) =24 ×**

Using above formula we can calculate possible generation in 24 hrs as shown in following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Power Plant** | | **Generation in 24 hrs (MU)** | |
| **Stations** | **Plant (MW) 2011-13** | **Plant (MW) 2013-16** | **in 24 hrs(2011-13)** | **in 24 hrs(2013-16)** |
| Chandrapur | 2340 | 2340 | 56.16 | 56.16 |
| Khaperkheda | 1340 | 840 | 20.16 | 32.16 |
| Parli | 1130 | 1130 | 27.12 | 27.12 |
| Nashik | 630 | 630 | 15.12 | 15.12 |
| Koradi | 620 | 620 | 14.88 | 14.88 |
| Paras | 500 | 500 | 12 | 12 |
| Bhusawal | 420 | 420 | 10.08 | 10.08 |

Using above table values we can calculate possible generation for 1 year (i.e. April to March). Note that 2012 and 2016 are leap years so both have 366 days.

Now possible generation in 1 year (i.e. April to March) can be calculated as :

**Possible Generation in 1 year (MU)= 365 days × Possible Generation in 24 hrs**

Using above formula we can calculate possible generation for 1 year as shown in following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Power Plant** | | **Possible Generation(MU)** | | | | |
| **Stations** | **Plant (MW) 2011-13** | **Plant (MW) 2013-16** | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **2015-16** |
| Chandrapur | 2340 | 2340 | 20554.56 | 20498.4 | 20498.4 | 20498.4 | 20554.56 |
| Khaperkheda | 1340 | 840 | 9925.92 | 9898.8 | 11738.4 | 11738.4 | 11770.56 |
| Parli | 1130 | 1130 | 7378.56 | 7358.4 | 9898.8 | 9898.8 | 9925.92 |
| Nashik | 630 | 630 | 5533.92 | 5518.8 | 5518.8 | 5518.8 | 5533.92 |
| Koradi | 620 | 620 | 5446.08 | 5431.2 | 5431.2 | 5431.2 | 5446.08 |
| Paras | 500 | 500 | 4392 | 4380 | 4380 | 4380 | 4392 |
| Bhusawal | 420 | 420 | 3689.28 | 3679.2 | 3679.2 | 3679.2 | 3689.28 |

Now Actual total generation in 1 year is given as follows:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Power Plant** | | **Actual Generation(MU)** | | | | |
| **Stations** | **Plant (MW) 2011-13** | **Plant (MW) 2013-16** | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **2015-16** |
| Chandrapur | 2340 | 2340 | 2062.086 | 12209.83 | 0 | 9918.073 | 11385.84 |
| Khaperkheda | 1340 | 840 | 12209.83 | 5330.859 | 4813.777 | 6453.282 | 7513.382 |
| Parli | 1130 | 1130 | 5330.859 | 4499.896 | 3690.874 | 3007.971 | 4066.334 |
| Nashik | 630 | 630 | 2951.544 | 3781.66 | 3777.767 | 3678.265 | 3730.103 |
| Koradi | 620 | 620 | 3781.66 | 2951.544 | 2159.782 | 2071.034 | 2028.721 |
| Paras | 500 | 500 | 2551.016 | 2551.016 | 2670.064 | 2998.624 | 2598.618 |
| Bhusawal | 420 | 420 | 4499.896 | 2062.086 | 1810.74 | 1826.904 | 939.716 |

**Efficiency (%)= × 100**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Power Plant** | | **Efficinecy** | | | | |
| **Stations** | **Plant (MW) 2011-13** | **Plant (MW) 2013-16** | **2011-12** | **2012-13** | **2013-14** | **2014-15** | **2015-16** |
| Chandrapur | 2340 | 2340 | 59.40% | 0.00% | 48.38% | 55.55% | 49.45% |
| Khaperkheda | 1340 | 840 | 72.25% | 65.42% | 54.98% | 64.01% | 57.61% |
| Parli | 1130 | 1130 | 45.33% | 37.29% | 30.39% | 41.08% | 11.55% |
| Nashik | 630 | 630 | 68.34% | 68.45% | 66.65% | 67.59% | 63.76% |
| Koradi | 620 | 620 | 54.20% | 39.77% | 38.13% | 37.35% | 26.49% |
| Paras | 500 | 500 | 58.08% | 60.96% | 68.46% | 59.33% | 66.07% |
| Bhusawal | 420 | 420 | 55.89% | 49.22% | 49.65% | 25.54% | 35.97% |