

# Prayag Bricks Varanasi

India is a fast developing country it is rapidly moving towards urbanization, and for proper growth of the country electricity is the key driver. Energy is an important input in all sectors of any country's economy. The word Energy has now become analogous to fossil fuels viz., coal, oil, and natural gas. These are the sources which are used commercially on a large scale worldwide. The development of any country is directly proportional to its energy consumption.

As it is a well known fact that fossil fuels are in depleting stage and we can not rely on them for future. Secondly they produces harmful GHG's on burning which lead us to climate change like global warming. In developing countries like India, climate change could represent an additional stress on ecological and socioeconomic systems that are already facing tremendous pressures due to rapid urbanization, industrialization and economic development. So it is essential to switch to renewable sources of energy as well as use energy sources efficiently. Paper mills, sugar mills etc can go for cogeneration by which they can fulfill the power demand of their industry as well supply surplus amount of electricity to grid which can fill the demand and supply gap of power up to some extant

Biomass assessment for the power generation in the range of 100 Km. taking Saila Khurd as center point in the state of Punjab has been done. This assessment is done to setup a 6 MW biomass based power plant. The main sources of biomass in this area are agro waste, forestry waste, waste from industries and biomass from cattle. This study has been done to assess whether the biomass is in sufficient amount or not for the life time of power plant. This study has been done in the districts of Punjab. These districts are Nawanshahr, Hoshiarpur, Ludhiana, Rupnagar, Jaladhar, Fatehgarh Sahib and Mohali. Una district also comes in the range of our study but it comes in state HP so due to political problems this district has not been considered.

## **1.1 Purpose of study**

This study is sponsored by ABC paper ltd for assessment of biomass for their biomass based 6 MW power plant. As India has a large gap between demand and supply of power so also this can be useful to fill this gap up to some extent. **If this biomass has not been used for any productive work it creates pollution as well if power plant will be setup it provide employment to local people, so this study has been done to solve three basic problems:**

- Demand and supply gap of power.
- Unemployment.
- Disposal of biomass.

## **1.2 Methodology**

To carry out the biomass assessment the whole area is divided in to radius wise ranges taking Saila Khurd as centre point. Firstly block which comes in the radius of 0-25 Km. are taken then block which falls under 25-50 Km. then in the radius of 50-75 Km. finally in the radius of 75-100 Km. are taken for proper study. In this study the total generated amount of biomass, locally consumed biomass and surplus amount of biomass and what are the biomass material available in the state has been covered.

## Chapter 2

Blocks and their districts falling under different distance radius. In the study, radius measurement is actually road distance instead of Aerial distance.

## 2.1 Districts and blocks falling under study range

### 2.1.1 In the radius of 0-25 Km.

| <b>Districts</b> | <b>Blocks</b>       |
|------------------|---------------------|
| NawanShehar      | <u>Nawan Shehar</u> |
| Hoshiarpur       | <u>Garhshankar</u>  |
|                  | <u>Mahilpur</u>     |

### 2.1.2 In the radius of 25-50 Km.

| <b>Districts</b> | <b>Blocks</b> |
|------------------|---------------|
| NawanShehar      | Banga         |
|                  | Aur           |
|                  | Balachaur     |
|                  | Saroya        |
| Hoshiarpur       | Hoshiarpur I  |
|                  | Hoshiarpur II |

### 2.1.3 In the radius of 50-75 Km.

| <b>Districts</b> | <b>Blocks</b>  |
|------------------|----------------|
| NawanShehar      | Bhunga         |
|                  | Dasuya         |
|                  | Tanda          |
|                  | Phagwara       |
| Hoshiarpur       | Ludhiana-I     |
|                  | Ludhiana-II    |
|                  | Samrala        |
|                  | Machiwara      |
|                  | RupNagar       |
|                  | Anandpur Sahib |
|                  | Nurpur Bedi    |
|                  | Phillaur       |
|                  | Rurka Kalan    |

|  |         |
|--|---------|
|  | Shahkot |
|--|---------|

#### 2.1.4 In the radius of 75-100 Km.

| Districts  | Blocks         |
|------------|----------------|
| Hoshiarpur | Mukerian       |
|            | Talwara        |
|            | Hajipur        |
| Jalandhar  | Adampur        |
|            | Bhogpur        |
|            | Jalandhar East |
|            | Jalandhar West |
|            | Lohian         |
|            | Nakodar        |
|            | Nurmahal       |
| Ludhiana   | Dehlon         |
|            | Pakhowal       |
|            | Doraha         |
|            | Sudhar         |
|            | Sidhwanbet     |
|            | Khanna         |
| RupNagar   | Chamkaur Sahib |
|            | Majri          |
|            | Morinda        |
| Fatehgarh  | Bassi Pathana  |
| Mohali     | Kharar         |

### Chapter 3

#### In the radius of 0-25 Km.

- Total Population 384574
- Rural Population 346991.41

### **3.1 Land Pattern**

- Total area 109363 ha.
- Area under forest 22154 ha.
- Area under agriculture 105039 ha.

### **3.2 Industries**

There are around 163 Khadi and Village level industries which provide employment to around 348 local people, then there are around 2170 small scale industries which provide employment to around 4938 people, around 17 large scale industries provide employment to around 8550 people.

There are 1 sugar mill, 8 rice sheller, 33 saw mills and 10 brick kilns.

#### **3.2.1 Saw Mills**

There are 33 Saw Mills in the range of 0-25 km. which process around 4950 MT wood, produce 1485 MT wood chips and generate 247.5 MT saw dust on per year basis.

### **3.3 Biomass generation from industrial activities**

Total biomass which is generated on per year basis is 131400 MT by industrial activities. Around 117963 MT biomass is consumed in different activities; rest 13437 MT biomass is surplus which can be used for power generation.

### **3.4 Agro industries**

Biomass which is generally obtained from agro industries is in the form of Rice Husk Baggase and Wood based.

**Table**

**3.5 Forestry**

Area which comes under forest is 22154 ha. Biomass which is obtained from forests is mainly fuel wood.

Total amount 221540 MT/year.

Consumed in different activities 41639 MT/year.

Surplus amount 179901 MT/year

**3.6 Biomass from agriculture**

Biomass from agriculture is obtained in the form of crop residue.

Total amount of crop residue 365689 MT/year

Crop residue consumed in different activities 241326 MT/year

Surplus amount of crop residue 124363 MT/year

**Table**

| Crops Name           | Type          | Residue Generation (MT/Year) |
|----------------------|---------------|------------------------------|
| <b>Khariff Crops</b> |               |                              |
| Paddy                | Straw         | 68418.94                     |
|                      | Husk          | 78975.97                     |
|                      | Bran          | 145.53                       |
|                      | Hull          | 21571.06                     |
| Maize                | Stalks        | 11846.40                     |
|                      | Cobs          | 3290.67                      |
| Other cereals        | Stalks        | 116.42                       |
|                      | Husk          | 10.91                        |
| Sugar cane           | Tops & Leaves | 1078.55                      |

|                    |        |                  |
|--------------------|--------|------------------|
|                    | Trash  | 719.04           |
| <b>Total</b>       |        | <b>186173.47</b> |
| <b>Rabi Crops</b>  |        |                  |
| Wheat              | Straw  | 197568.55        |
|                    | Pod    | 32329.40         |
| Oil seed           | Stalks | 3783.05          |
| Sun flower         | Stalks | 8052.66          |
| Cotton             | Stalks | 9.06             |
| Fodder             | Straw  | 16749.00         |
| <b>Total</b>       |        | <b>258491.72</b> |
| <b>Grand Total</b> |        | <b>444665.19</b> |

### 3.7 Biomass from cattle

Total livestock population is around 4,26,900 so sufficient amount of biomass can be obtained from livestock.

Total biomass generation in the radius of 0-25 Km. is around 1194506 MT/year. In this amount around 771638 MT biomass is consumed in different activities per year so the surplus amount which can be used for power generation (productive) is around 361597 MT/year.

## Chapter 4

### In the radius of 25-50 Km.

- Total Population 696769
- Rural Population 575688.823

#### **4.1 Land Pattern**

- Total area 167849 ha.
- Area under forest 9504 ha.
- Area under agriculture 217891 ha.

#### **4.2 Industries**

There are 374 khadi and village level industries which provide employment to around 442 local people. Then there are 439 small scale industries and provide employment to around 1385 people and 2076 large scale industries provide employment to 111 people.

There are 110 Saw Mills.

##### **4.2.1 Saw Mills**

There are 110 saw mills in the range of 25-50 Km which process 16500 MT wood, generate 4950 MT wood chips and 825 MT saw dust on per year basis.

#### **4.3 Biomass generation from industrial activities**

Total capacity of saw mills is 100-150 MT/year which generate 5775 MT biomass per year in which 4207.5 MT biomass is consumed in different activities and the surplus amount which is left and can be used for power generation is 1567.5 MT/year

#### **4.4 Agro industries**

Biomass which is generally obtained from agro industries is in the form of Rice Husk Baggase and Wood based.

**Table**

**4.5 Forestry**

The total forest area which comes in the radius of 25-50 Km. is around 9504 ha. Biomass which is obtained from forests is mainly fuel wood.

Total amount

Consumed in different activities 69082.65874

Surplus amount -69082.65874

**4.6 Biomass from agriculture**

Biomass from agriculture is obtained in the form of crop residue.

Total amount of crop residue 1056713.00

Crop residue consumed in different activities 437481.5515

Surplus amount of crop residue 619231.45

**Table**

| Crops Name           | Type          | Residue Generation (MT/Year) |
|----------------------|---------------|------------------------------|
| <b>Khariff Crops</b> |               |                              |
| Paddy                | Straw         | 233835.67                    |
|                      | Husk          | 150294.61                    |
|                      | Bran          | 2255.66                      |
|                      | Hull          | 78853.39                     |
| Maize                | Stalks        | 22544.19                     |
|                      | Cobs          | 6262.28                      |
| Other cereals        | Stalks        | 1804.53                      |
|                      | Husk          | 169.17                       |
| Sugar cane           | Tops & Leaves | 3942.67                      |
|                      | Trash         | 2628.45                      |
| <b>Total</b>         |               | <b>502590.62</b>             |
| <b>Rabi Crops</b>    |               |                              |
| Wheat                | Straw         | 438545.44                    |

|                    |        |                   |
|--------------------|--------|-------------------|
|                    | Pod    | 71761.98          |
| Oil seed           | Stalks | 5971.31           |
| Sun flower         | Stalks | 12879.65          |
| Cotton             | Stalks | 0.00              |
| Fodder             | Straw  | 24964.00          |
| <b>Total</b>       |        | <b>554122.38</b>  |
| <b>Grand Total</b> |        | <b>1056713.00</b> |

#### 4.7 Biomass from cattle

Total livestock population is around 10,29,700 so sufficient amount of biomass can be obtained from livestock.

Total biomass generation in the radius of 25-50 Km. is around 2356028 MT/year. In this amount around 1561923 MT biomass is consumed in different activities per year so the surplus amount which can be used for power generation (productive) is around 803523 MT/year.

## Chapter 5

In the radius of 50-75 Km.

- Total population 384574
- Rural population 346991.41

### **5.1 Land Pattern**

- Total area 429745 ha.
- Area under forest 34336 ha.
- Area under agriculture 529635 ha.

### **5.2 Industries**

There are 2209 khadi and village level industries which provide employment to 3581 people. Then there are 1451 small scale industries and provide employment to 8240 people and 58 large scale industries provide employment to 3730 people.

There are 4 sugar mills 25 rice sheller and 264 saw mills.

#### **5.2.1 Saw Mills**

There are total 264 saw mills which process 39600 MT wood, generate 11880 MT wood chips and 1980 MT saw dust on per year basis.

### **5.3 Biomass generation from industrial activities**

Biomass which is generated in different industrial activities are in the form of wood chips, saw dust and bagasse. Total 310590MT biomass is generated by industrial activities in which 277155 MT biomass is consumed in different activities and rest 33435 MT biomass is surplus which can be used for power generation.

#### 5.4 Agro industries

Biomass which is generally obtained from agro industries are in the form of Rice Husk Baggase and Wood based.

Total amount 515336 MT/year

Consumed in different activities 473049 MT/year

Surplus amount 42286 MT/year

#### 5.5 Forestry

The total forest area which comes in the radius of 50-75 Km. is around 62000 ha.

Biomass which is obtained from forests is mainly fuel wood.

Total amount 343360

Consumed in different activities 143892

Surplus amount 199468

#### 5.6 Biomass from agriculture

Biomass from agriculture is obtained in the form of crop residue.

Total amount of crop residue 2316677

Crop residue consumed in different activities 1287108

Surplus amount of crop residue 1029569

#### Table

| Crops Name           | Type   | Residue Generation (MT/Year) |
|----------------------|--------|------------------------------|
| <b>Khariff Crops</b> |        |                              |
| Paddy                | Straw  | 792084.03                    |
|                      | Husk   | 204745.51                    |
|                      | Bran   | 4305.94                      |
|                      | Hull   | 136171.80                    |
| Maize                | Stalks | 30711.83                     |
|                      | Cobs   | 8531.06                      |
| Other cereals        | Stalks | 3444.75                      |
|                      | Husk   | 322.95                       |

|                    |               |                   |
|--------------------|---------------|-------------------|
| Sugar cane         | Tops & Leaves | 6808.59           |
|                    | Trash         | 4539.06           |
| <b>Total</b>       |               | <b>1191665.52</b> |
| <b>Rabi Crops</b>  |               |                   |
| Wheat              | Straw         | 1079218.95        |
|                    | Pod           | 176599.46         |
| Oil seed           | Stalks        | 9978.30           |
| Sun flower         | Stalks        | 4320.83           |
| Cotton             | Stalks        | 33.46             |
| Fodder             | Straw         | 59606.00          |
| <b>Total</b>       |               | <b>1329757.00</b> |
| <b>Grand Total</b> |               | <b>2521422.52</b> |

### 5.7 Biomass from cattle

Total livestock population is around 4227600 so sufficient amount of biomass can be obtained from livestock.

Total biomass generation in the radius of 50-75 Km. is around 5082069 MT/year. In this amount around 3332915 MT biomass is consumed in different activities per year so the surplus amount which can be used for power generation (productive) is around 1718110 MT/year.

## Chapter 6

In the radius of 75-100 Km.

- Total population 1961611
- Rural population 1443036

### **6.1 Land Pattern**

- Total area 475788 ha.
- Area under forest 31368 ha.
- Area under agriculture 710820 ha.

### **6.2 Industries**

There are 1711 khadi and village level industries which provide employment to 3065 people. Then there are 3694 small scale industries which provide employment to 22463 people. Then 16 large scale industries provide employment to 5699 people.

There are 4 sugar mills, 71 rice sheller and 283 saw mills.

#### **6.2.1 Saw Mills:**

There are 283 saw mills which process 42450 MT wood and generate 12735 MT wood chips and 2122.5 MT saw dust on per year basis.

### **6.3 Biomass generation from industrial activities**

Biomass which is generated in different industrial activities are in the form of wood chips, saw dust and bagasse. Total 220327.5 MT biomass is generated and 195747.75 MT is consumed in different activities then rest 24579.75 MT is surplus which can be used for power generation.

#### 6.4 Agro industries

Biomass which is generally obtained from agro industries is in the form of Rice Husk Baggase and Wood based.

Total amount 398272 MT/year

Consumed in different activities 361168 MT/year

Surplus amount 37103 MT/year

#### 6.5 Forestry

The total forest area which comes in the radius of 75-100 Km. is around 31368 ha.

Biomass which is obtained from forests is mainly fuel wood.

Total amount 313680 MT/year

Consumed in different activities 171416 MT/year

Surplus amount 142264 MT/year

#### 6.6 Biomass from agriculture

Biomass from agriculture is obtained in the form of crop residue.

Total amount of crop residue 3135262 MT/year

Crop residue consumed in different activities 1757032 MT/year

Surplus amount of crop residue 1378229 MT/year

#### Table

| Crops Name           | Type   | Residue Generation (MT/Year) |
|----------------------|--------|------------------------------|
| <b>Khariff Crops</b> |        |                              |
| Paddy                | Straw  | 1295242.38                   |
|                      | Husk   | 75703.51                     |
|                      | Bran   | 7325.61                      |
|                      | Hull   | 104579.94                    |
| Maize                | Stalks | 11355.53                     |
|                      | Cobs   | 3154.31                      |
| Other cereals        | Stalks | 5860.49                      |
|                      | Husk   | 549.42                       |

|                    |               |                   |
|--------------------|---------------|-------------------|
| Sugar cane         | Tops & Leaves | 5229.00           |
|                    | Trash         | 3486.00           |
| <b>Total</b>       |               | <b>1512486.19</b> |
| <b>Rabi Crops</b>  |               |                   |
| Wheat              | Straw         | 1401041.50        |
|                    | Pod           | 229261.34         |
| Oil seed           | Stalks        | 6596.75           |
| Sun flower         | Stalks        | 19947.59          |
| Cotton             | Stalks        | 303.20            |
| Fodder             | Straw         | 41328.50          |
| <b>Total</b>       |               | <b>1698478.87</b> |
| <b>Grand Total</b> |               | <b>3210965.05</b> |

### 6.7 Biomass from cattle

Total livestock population is around 10,29,700 so sufficient amount of biomass can be obtained from livestock.

Total biomass generation in the radius of 75-100 Km. is around 2356028 MT/year. In this amount around 1561923 MT biomass is consumed in different activities per year so the surplus amount which can be used for power generation (productive) is around 803523 MT/year.

## Chapter 7

### Conclusion

As energy scarcity is a big problem in our country so by setting up these type of captive power plants a part of burden can be reduced from the national grid, northern grid is already in a very poor condition and under over burden so these type of plants are very much essential to reduce extra burden, and grid failure.

As we go through the whole report we can easily conclude that the area for which the biomass assessment has been done is highly rich in biomass, so setting up of biomass based power plant is feasible for the area.

In this part of the country people are some how very much dependent on biomass for domestic purposes like domestic fuel and fodder, but still there are sufficient amount of surplus biomass, if we see the report we will find that around **hghfh** MT/year biomass is available in surplus amount which can easily be used for power generation.

So while studying the report ABC paper mill can go for a biomass based captive power plant.