# Study Project on Co-Generation Plant of 12MW at SSKL, Kopargaon

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## ABSTRACT

*The proposed project activity is a cogeneration plant, coming up within the premises of Sanjivani Sahakari Sakhar Karkhana Ltd. (SSSKL) in Ahmednagar district of Maharashtra. Prior to the project activity SSSK Ltd. was running cogeneration units of rated capacities 12 MW to cater to its steam and electricity needs. The modification that the project activity will bring about is the associated boilers with a 12 MW cogen unit.*

*The new unit which is scheduled to be set up during the year 2012-13 will work in conjunction with the existing 12 MW plant and will supply committed quantities of steam and power to the sugar mill, during both crushing and non-crushing season. Surplus power will be sold to the Maharashtra State grid. The activity leads to appropriate coupling of energy production with biomass-based product manufacturing process, enabling the exploitation of the tremendous environmental and social benefits associated with cogeneration*

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Cogeneration is not a new concept in sugar industries. Sugar factories are typically energy independent, employing co-generation for their own internal steam and power requirements. However in the absence of financial incentives to sell surplus power, the technology chosen is low cost and inefficient. Typically, this produces just enough energy for the sugar plant's own consumption. In the absence of the incremental power generation and supply by co generating plants, the regional electricity companies generate power from their existing thermal and hydro based power plants and peak power from diesel and naptha plants. Where additional generation capacity is planned, this will generally be thermal. The proposed project - increasing power generation at the plant and leading to export of power to local grid - will therefore supplement current and planned energy production from traditional fossil fuel based power plants

**1.2 CO-GENERATION EQUIPMENT RATING-**

**1) Transformer-**

2) Freq- 50hz
3) No Load Voltage Hv- 415v/Lv 217v
4) No Load Current – Hv 9.5amp /Lv 16amp
5) Phase – 3
6) Impedance- 3.36%

**RELAYS IN CO-GENERATION**

- Float Charging Fail
- Annunciation Relay
- Dc Under/Over Voltage Relay
- Overall Fault Indication

- Float/Bust Indi. Relay
- Fcb Charger Fail
- Battery Over Voltage Relay
- Battery Earth Leakage Relay
- Dc Over Load Relay
- **Potentional Transformer (Protection)**
- Make:- Techno Vidyut
- Stand;- Is- 3456
- Highest System Voltage :- 145kv
- Insulation Level :- 275kv Rms/600kv
- Freq. :- 50hz
- Min. Total Creepage :- 36-25mm
- Rated Prim. Voltage:- 132kv
- Rated Dynamic Voltage :- 110v
- Rated Voltage Factor :- 1.2cont. &
- 1.5 For 30 Sec
- Quantity Of Oil :- 50ltr
- Prim. Neutral;- Ext. Earthed
- Core;- 3
- Steam Turbine-
- Rated Power- 12mw
- Speed- 1500/7000rpm
- Inlet Steam Press. – 43.3kg/Cm²
- Inlet Steam Temp. - 470℃
- Exct. Steam Press. – 9.05kg/Cm²
- Exhaust Steam Press. – 1.5kg/Cm²
- **Synchronous Generator-**
- Kva- 15000
- Kw- 12
- Rpm- 1500
- Power Factor – 0.8lag
- Stator Voltage – 11kv
- Stator Amp. – 787amp
- Duty.- Continuous
- Connection- Star
- Amb./ Inlet Temp- 50℃
- Exct. Voltage- 156v
- Exct. Current- 401amp

**Alternator-**
Kva:-15000
Kw:-12000
P F:-0.8leg
Rpm:-1500
Stator Vtg:-11000
Stator Amp:-786
Duty:-Continious

**Tap Changer**
Type:- D 111 200-Y-60/60-18-17-0
Motor :- 415v Ac
Control Voltage :- 110v Dc
Resistance :- 7.26Ω
Step Voltage :- 952.63v
Load Current 87.48amp

**Mva Power Transformer(11/132kv)**
Rating:-17500kv
Rated Votg:-132000/11000v

Rated Current:-76.54amp/918051amp
Phase/Frequency:-3/50hz
Cooling:-Onan
Oil Capacity:-20065ltr
Impendance:-10%
Noload Loss:-10000w
Full Load Loss:-70000w

**Process of co-generation Equipment-**

1) Boiler:
2) Steam collector:
3) Steam Turbine
4) Alternator:
5) Steam condenser
6) PLC AND SCADA SYSTEM

**CO-GENERATION-**

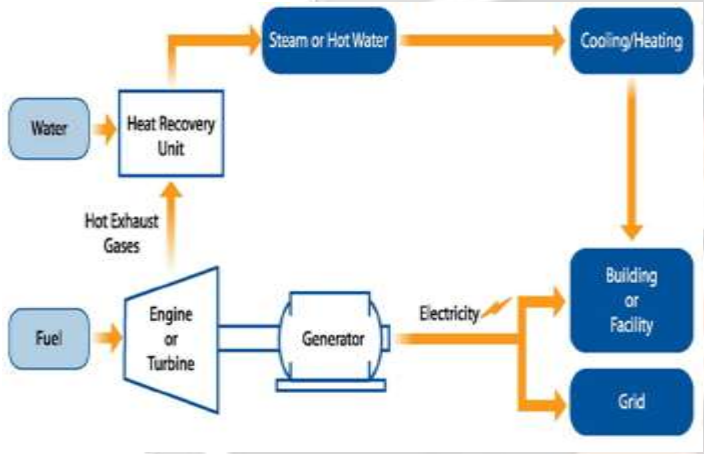


**Fig. Generation of Energy**

## 2. PRINCIPLE OF COGENERATION-

Cogeneration or Combined Heat and Power (CHP) is defined as the sequential generation of two different forms of useful energy from a single primary energy source, typically mechanical energy and thermal energy. Mechanical energy may be used either to drive an alternator for producing electricity, or rotating equipment such as motor, compressor, pump or fan for delivering various services. Thermal energy can be used either for direct process applications or for indirectly producing steam, hot water, hot air for dryer or chilled water for process cooling.

7) Cogeneration provides a wide range of technologies for application in various domains of economic activities. The overall efficiency of energy use in cogeneration mode can be up to 85 per cent and above in some cases.

**Scope**

Easily available raw material(Bagass) helpful for production of energy.
AUDIT AND RESEARCH
Sanjeevani Takli SSK Ltd, Tal- Kopargaon, Dist- Ahmednagar
Observation Table: Boiler-2: Make- NHEC/35 TPH/45 Kg/cm$^2$
Date of Audit: 8/1/2017

**Parameter Table**

| No | Parameter | Unit | Time Interval / Value | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **A** | **Feed Water** | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **Avg.** |
| **1** | **Feed Water-Pr** | **$Kg/cm^2$** | **60** | **59** | **60** | **61** | **59** | **60** | **60** | **59** | **60** |
| **2** | **Feed Water-Temp-Eco I/L** | **$^0C$** | **85** | **84** | **86** | **85** | **84** | **86** | **85** | **85** | **85** |
| | | | | | | | | | | | |
| **B** | **Steam** | | | | | | | | | | |
| **4** | **Steam generation Pr** | **$Kg/cm^2$** | **43** | **43.1** | **42.9** | **43** | **43.1** | **42.9** | **43.1** | **43** | **43** |
| **5** | **Steam generation-Temp** | **$^0C$** | **465** | **466** | **465** | **466** | **464** | **464** | **465** | **466** | **465** |
| **6** | **Steam generation-Flow** | **TPH** | **34** | **34.1** | **34** | **33.9** | **34** | **34.1** | **33.9** | **34.1** | **34** |
| | | | | | | | | | | | |
| **C** | **Flue Gas** | | | | | | | | | | |
| **7** | **FG Temp-APH O/L** | **$^0C$** | **135** | **135.1** | **134.9** | **135** | **135.1** | **134.9** | **135.1** | **134.9** | **135** |
| **8** | **$O_2$ in Flue Gas** | **%** | **6** | **5.9** | **6** | **6.1** | **6** | **5.9** | **6.1** | **5.9** | **6** |
| | | | | | | | | | | | |

## 4. CONCLUSION

We conclude that, the waste material of Sugarcane (Bagass) is helpful for production of energy source.

## 5. REFERENCE

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