Power Quality Recommendations in Mushroom Farm

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Abstract*: *Mushroom development is one of the most gainful agribusiness that can be begun with least speculation and space. Mushroom cultivating in India is developing consistently as an elective wellspring of salary. Here is the finished direction on paddy straw mushroom, shellfish mushroom and catch mushroom generation in India. This paper proposes power quality recommendations in small scale mushroom farm located in Sulur, Coimbatore

Keywords: **power quality, energy audit, mushroom farm, energy recommendations**

I. INTRODUCTION

Mushrooms have been perceived by Food and Agriculture Association (FAO) as nourishment thing adding to the protein supplement to the eating regimen of creating nations like India, where there is substantial reliance on oat eats less carbs. The noteworthy highlight of mushroom is that this nutritious and classy nourishment is developed altogether from squander items and changes over a wide range of horticultural and modern waste into substrate on which the development of mushroom is bolstered. In the wake of collecting the mushroom, the strong leftover left is natural fertilizer with regular supplements to further improve the dirt. Notwithstanding changing over the loss into significant item, it improves the pay and gives extra profitable work to the makers. Keeping in see the expanding request of mushroom because of globalization and opening of the economy. Along these lines, this article is an endeavor to investigate the present situation of the mushroom business. Employment, Energy and Equipment are the major operating costs of any business. Energy cost is top rated. In this manuscript power quality recommendations in small scale mushroom farm located in Sulur, Coimbatore is presented. The recommendations are based on the present operating status of the plant.

II. LOAD DETAILS

The farm is situated at sulur, Coimbatore. The sanctioned demand is 450kVA, power provider is TANGEDCO. The details of power are shown in Table 1 and Table 2 describes existing power facility available in the farm.

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Table 1 Electricity Details

Source of Power Supply	Sanctioned Demand	Billed Demand, kVA	Average Power Factor
TANGEDCO	450 KVA	405 KVA	0.85

Table 2 Existing Power Facility

Description	Nos.	Rating
Transformer (kVA)	1	800 KVA
DG (kVA)	0	3 X 500 KVA
Capacitors (kVAr – HT/LT)	LT	NIL
M V panel	1	
Distribution Boards	3	

III. ENERGY STUDY AND RECOMMENDATIONS

The key equipments in mushroom farms are usually cooling unit, cooling racks, boiler, centrifugal blowers, compost filling line, bag filling machine, DG set etc. may be required. Some of the equipments ate optional. The complete energy study was taken in the farm for three days. The details of study and recommendation were given as per the present condition of the farm.

A. Transformer Incomer

Initially Transformer Incomer at MV Panel data was taken and shown in Table 3.

Table 3 Transformer Incomer data

Parameters	Without Capacitor
Voltage	409.7
Current	355.2
Power in KW	199.8
Power Factor	0.77 lag
$V_{THD\ \%}$	2.8 %
$I_{THD\ \%}$	36,7 %

The Total voltage harmonics (%V_{thd}) is 2.8 % without capacitors are within the limit as specified in the IEEE 519-1992 .i.e 5%. The Total Current harmonics (% I_{thd}) is 36.7 % without capacitors Excess the limit of 8 %. The instantaneous power factor is 0.73 to 0.78 lagging without capacitor. The Power factor maintained at Transformer is varying from 0.73 to 0.84.

Recommendation

Connect 150 KVAR APFC De tune harmonic filter with 7% block reactor at M V Panel to maintain the unity power factor or Connect 100 A 3Phase 4 Wire Active harmonic filter at M V Panel

B. Sub Switch Board 1

Table 4 SSB 1 Data

Parameters	Readings
Connected Capacitor	NIL
Cable size	2Runs of 3 1/2 C,300 SQMM Aluminum XLPE
Voltage	409.2
Current	236.2
Power in KW	119.55
Power Factor	0.68 lagg
$V_{THD\ \%}$	1.9 %
$I_{THD\ \%}$	23.9 %

Table 4 shows the details of Sub Switch Board (SSB) 1 at MV Panel. The voltage harmonics (%V thd) is 1.9 % are within the limit as specified in the IEEE 519-1992.i.e 5%. The Total Current harmonics (% I_{thd}) is 23.9% More than the limit of as specified in the IEEE 519-1992.i.e 8 %. The instantaneous power factor is 0.68 lagging without capacitor.

Recommendation

From the above table Harmonics Amplified by VFD unit. To Avoid Harmonic Amplification Connect 50 KVAR Detune passive filter 7% reactor + 525V passive filter at SSB level.

C. Sub Switch Board 2

In SSB 2, the voltage harmonics (%V thd) is 1.9 % are within the limit as specified in the IEEE 519-1992.i.e 5%. The Total Current harmonics (% I thd) is 31.9% More than the limit of as specified in the IEEE 519-1992.i.e 8 %. The instantaneous power factor is 0.99 lagging without capacitor. The details of SSB 2 shown in table 5.

Table 5 SSB 2

Parameters	Readings
Connected Capacitor	NIL
Cable size	1Runs of 3 1/2 C, 240 SQMM Aluminum XLPE
Voltage	406.2
Current	16.30
Power in KW	11.40
Power Factor	0.99 lagg
$V_{THD\ \%}$	1.9 %
$I_{THD\ \%}$	31.9 %

Recommendation

From the table 5 Harmonics Amplified by VFD unit. To Avoid Harmonic Amplification Connect 50 KVAR Detune passive filter 7% reactor + 525V passive filter at SSB level.

D. Sub Switch Board 3

In SSB 3 (Table 6), The voltage harmonics (%V_{thd}) is 1.9 % are within the limit as specified in the IEEE 519-1992.i.e 5%. The Total Current harmonics (%I_{thd}) is 30.9%. More than the limit of as specified in the IEEE 519-1992.i.e 8 %. The instantaneous power factor is 0.94 lagging without capacitor.

Table 6 SSB 3

Parameters	Readings
Connected Capacitor	NIL
Cable size	2Runs of 3 1/2 C,300 SQMM Aluminum XLPE
Voltage	404.9
Current	29.79
Power in KW	18.08
Power Factor	0.94 lagg
V.THD %	1.9 %
I THD %	30.9 %

Recommendation

From the above table Harmonics Amplified by VFD unit. To Avoid Harmonic Amplification Connect 50 KVAR Detune passive filter 7% reactor + 525V passive filter at SSB level.

IV. CONCLUSION

Improving working parameters of the farm towards wellbeing also, improved effectiveness. The before mentioned suggestions are a portion of the better purposes of vitality economy measures being attempted and to be attempted in the farm. The above measures are planned for running existing apparatuses to the most extreme conceivable adequacy. We need to diminish the avoidable misfortunes to the most extreme in the transmission of vitality from one state to other in the gear and we are attempted to match existing productivity of types of gear to suit the procedure. At the same time we attempt to improve the current encompassing conditions encompassing the types of gear to suit and solace the supplies, that they can give better yield to process.

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