



CASE STUDY

CUSTOMER

Birbhum, West Bengal
(Application - Polymer Industry)

Introduction / Overview about Polymer Industry:

At the core of the polymer sector is the creation of Low-Density Polyethylene (LDPE), a versatile material that has redefined modern production across industries such as packaging, construction, and healthcare. LDPE's remarkable flexibility and durability stem from its unique molecular structure, formed by polymerizing ethylene gas under specific conditions, resulting in both low density and branching. Its capacity for easy processing and moulding makes it indispensable in crafting a range of items, from plastic films and containers to medical equipment and pipes. Notably present in everyday life through its use in plastic bags and wraps, LDPE production is adapting to meet environmental concerns by exploring greener alternatives, refining recycling approaches, and optimizing manufacturing methods for reduced waste and energy use. LDPE's continued prominence underscores its role in propelling sustainable innovation across various sectors.

Challenge/ Problem statement (BEFORE):

- a. Power factor is less than 0.93
- b. Power factor incentive is @27K
- c. Highest power factor incentive slab to be achieved
- d. Current Harmonics I-THDi is > 25%

Objective Set:

- a. Power factory penalty shall be NIL
- b. Incentive shall be achieved for >0.99 slab
- c. ROI shall be less than 2 years
- d. Harmonics shall be met as per IEEE 519:2014

Various Solutions discussed (Future plan):

- a. Traditional APFC have limitations like
 - i. Capacitor life is affected due to switching ON & OFF of contactor
 - ii. Leading PF cannot be corrected
 - iii. Linear correction in PF is limited by number of steps & values chosen
 - iv. Possibility of resonance, transients due to Switching of Capacitors
 - v. Response time is slow and It cannot correct the Unbalance on line
- b. We proposed Advanced Static Var generator (ASVG) of 250kVAr rating which is 3 Level IGBT based Modular unit with TFT display. It provides stepless reactive power compensation. It works on both lagging as well as leading PF. It has superior dynamic response and fast power factor correction time.

BEFORE:

April, 2023 WBSEDCL Bill:

Energy Charge		Normal	Peak	Off-peak	Energy/Min Charge (Rs)	1813928.15
Rate	EC (p/KWH)	731	871	554	Rebate on EC (Rs.)	0.00
	P.F. Reb (-) / Sur (+) (%onEC)	-1.50	-2.00	-1.00	Addl. EC (Rs.)	0.00
	L.F. Reb (-) (p/KWH)	20			Total EC (Rs.)	1813928.15
Chargeable	KWH	113400.000	63455.000	77800.000	*Demand Charge	206592.00
IEC Amount	Rs.	828954.0000	553962.1500	431012.0000	Addl. DC (Rs.)	29760.00
Chargeable	PF	0.9338	0.9326	0.9353	Total DC (Rs.)	236352.00
PF	Rs.	-12434.31	-11079.24	-4310.12	Reb on DC (on TP)	
Demand Charge						
Rate	Normal (Rs/KVA/month)	384.00				
Chargeable	Normal KVA	538.00				
	Addl. KVA	155.00				
Rebate (-)/Surcharge (+) (Rs.)						
LF Reb (-) / Sur (+)						-50931.00
PF Reb (-) / Sur (+)						-27823.67
MVCA Chages @0.00 Paise/KWH						0.00
###Govenment subsidy						
## Other Arrear Charges						-122.19

AFTER SOLUTION is implemented:

July, 2023 WBSEDCL Bill:

Energy Charge		Normal	Peak	Off-peak	Energy/Min Charge (Rs)	1840734.65
Rate	EC (p/KWH)	731/730	873/872	554/553	Rebate on EC (Rs.)	0.00
	P.F. Reb (-) / Sur (+) (%onEC)	-8.00	-9.00	-7.00	Addl. EC (Rs.)	0.00
	L.F. Reb (-) (p/KWH)	7			Total EC (Rs.)	1840734.65
Chargeable	KWH	116830.000	60830.000	82265.00	*Demand Charge	214656.00
IEC Amount	Rs.	853988.3500	531025.6200	455720.6800	Addl. DC (Rs.)	33600.00
Chargeable	PF	0.9976	0.9981	0.9981	Total DC (Rs.)	248256.00
PF	Rs.	-68319.07	-47792.30	-31900.45	Reb on DC (on TP)	
Demand Charge						
Rate	Normal (Rs/KVA/month)	384.00 / 384.00				
Chargeable	Normal KVA	559.00				
	Addl. KVA	175.00				
Rebate (-)/Surcharge (+) (Rs.)						
LF Reb (-) / Sur (+)						-18194.75
PF Reb (-) / Sur (+)						-148011.82
MVCA Chages @0.00 Paise/KWH						0.00
###Govenment subsidy						
## Other Arrear Charges						0.00

RESULT AND CONCLUSION:

- ✓ PF rebate amount improved from INR 27,823 to 1,48,022
- ✓ PF penalty is NIL
- ✓ PF achieved of 0.997
- ✓ Current Harmonics reduced to < 5%

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