



BINA TENAGA ENERGY SDN BHD

your power factor solution

1428671-U

www.binatenaga.com.my

Measurement & Calibration • Unique Design & Installation • Comprehensive Maintenance

POWER FACTOR CORRECTION SYSTEM



- Carbon Avoidance
- ESG Compliance



MyHP00013/23

PROTECTING THE CLIMATE THROUGH POWER FACTOR CORRECTION

About Company

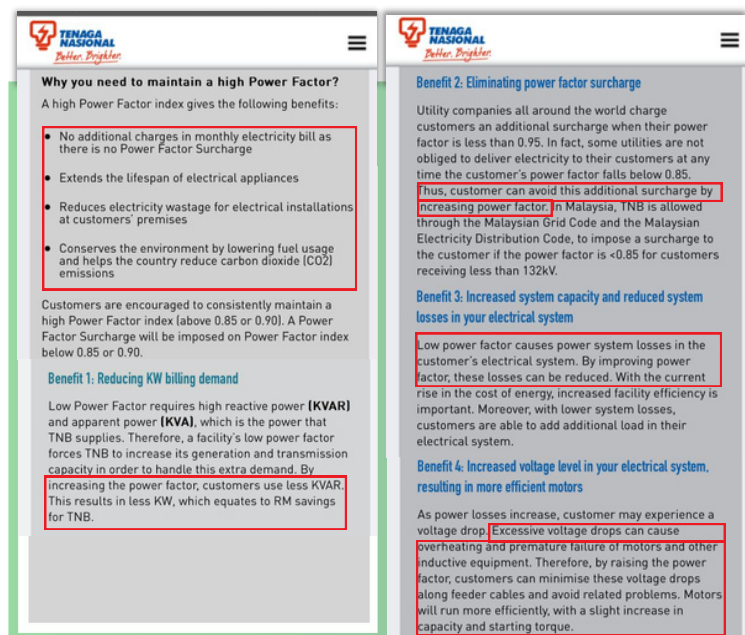
- Bina Tenaga Energy has been established in 2006 as a sole proprietor company.
- Bina Tenaga Energy Sdn Bhd has been established in 2021 with the same product & owner
- Certified by SIRIM Qas International Sdn Bhd
- Product listed in MyHijau and MySTI Directory

Bina Tenaga Energy Sdn Bhd ("BTESB") principally engaged in correcting Power Factor and optimising efficient power usage via our PFCs equipment to reduce an electricity overheads.

With over 15 years' experiences and proud records in reducing three main components of energy (i.e) kWh, kVar & kVarh, we offer a total sustainable energy efficiency solutions that benefits not only end users but to the government, power producers and distributors as well as solar providers.



WHAT TNB SAYS ABOUT POWER FACTOR?



Why you need to maintain a high Power Factor?
A high Power Factor index gives the following benefits:

- No additional charges in monthly electricity bill as there is no Power Factor Surcharge
- Extends the lifespan of electrical appliances
- Reduces electricity wastage for electrical installations at customers' premises
- Conserves the environment by lowering fuel usage and helps the country reduce carbon dioxide (CO₂) emissions

Customers are encouraged to consistently maintain a high Power Factor index (above 0.85 or 0.90). A Power Factor Surcharge will be imposed on Power Factor index below 0.85 or 0.90.

Benefit 1: Reducing KW billing demand
Low Power Factor requires high reactive power (KVAR) and apparent power (KVA), which is the power that TNB supplies. Therefore, a facility's low power factor forces TNB to increase its generation and transmission capacity in order to handle this extra demand. By increasing the power factor, customers use less KVAR. This results in less KW, which equates to RM savings for TNB.

Benefit 2: Eliminating power factor surcharge
Utility companies all around the world charge customers an additional surcharge when their power factor is less than 0.95. In fact, some utilities are not obliged to deliver electricity to their customers at any time the customer's power factor falls below 0.85. Thus, customer can avoid this additional surcharge by increasing power factor. In Malaysia, TNB is allowed through the Malaysian Grid Code and the Malaysian Electricity Distribution Code, to impose a surcharge to the customer if the power factor is <0.85 for customers receiving less than 132kV.

Benefit 3: Increased system capacity and reduced system losses in your electrical system
Low power factor causes power system losses in the customer's electrical system. By improving power factor, these losses can be reduced. With the current rise in the cost of energy, increased facility efficiency is important. Moreover, with lower system losses, customers are able to add additional load in their electrical system.

Benefit 4: Increased voltage level in your electrical system, resulting in more efficient motors
As power losses increase, customer may experience a voltage drop. Excessive voltage drops can cause overheating and premature failure of motors and other inductive equipment. Therefore, by raising the power factor, customers can minimise these voltage drops along feeder cables and avoid related problems. Motors will run more efficiently, with a slight increase in capacity and starting torque.



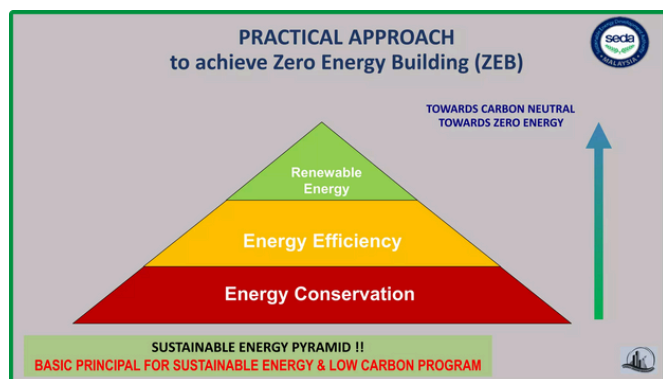
WHAT IS POWER FACTOR

Power Factor is an index used to measure the efficient used of electricity. This index is measured on a range of 0 -1.0. Thus, a high power factor level indicates high level of efficiency electricity usage and vice versa. Low power factor means high wastage of energy supplied/used.

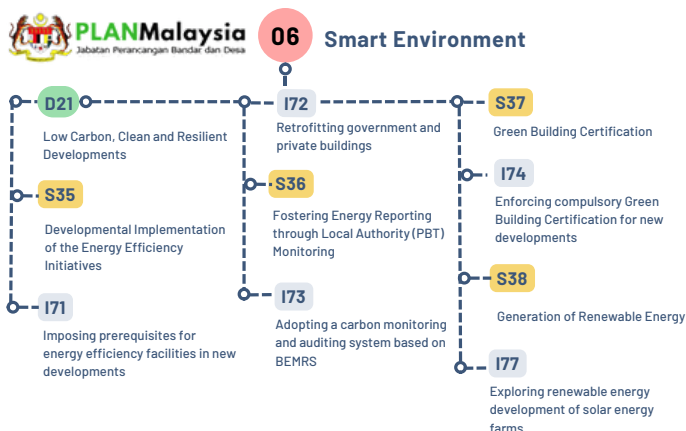


WHY ENERGY EFFICIENCY (EE) IS IMPORTANT?

- **(National Energy Policy (NEP) 2020-2040)** - Aims to improve economic resilience and ensure energy recovery while achieving equality and universal access as well as ensuring environmental sustainability.



POLICY (D), STRATEGY (S) AND INITIATIVES (I)



Energy efficiency can be defined using the same or less amount of energy to produce the better output or using less energy to accomplish the same task or to enjoy the same comfort level.



IS PFCs LEGAL? WHAT SURUHANJAYA TENAGA (ST) SAYS

A statutory body established under the Energy Commission Act 2001, Suruhanjaya Tenaga (ST) or the Energy Commission is responsible for regulating the energy sector, specifically the electricity and piped gas supply industries, in Peninsular Malaysia and Sabah.



- The Energy Commission aims to balance the needs of consumers and providers of energy to ensure safe, secure, reliable supply and economic efficiency & affordability, protect public interest, and foster economic development and competitive markets in an environmentally sustainable manner.



WHAT YOU SHOULD DO IMMEDIATELY?

Check your monthly electricity bill to find out whether the utility imposes any surcharge on low power factor

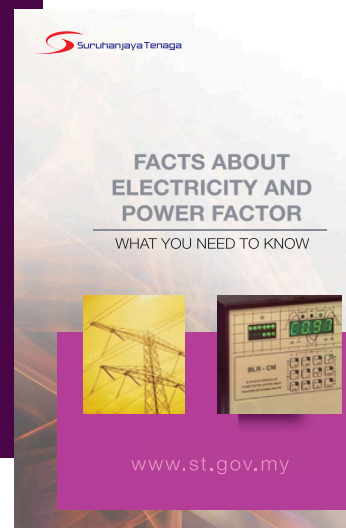
If in doubt, consult the nearest Suruhanjaya Tenaga Office or Tenaga Nasional Berhad or an electrical consultant

If necessary, seek the advice of an electrical consultant on how to improve the power factor of your installation.

REMEMBER!

Higher power factor will not only save your money but will also help to improve the performance of our electricity supply system.

Suruhanjaya Tenaga (Energy Commission)
No. 12, Jalan 1st Mile, Phase 2, 61100, Putrajaya.
Tel Free Number: 1-800-9225-78 (ST)
T: 03 8670 8500 F: 03 8688 8637
E: info@st.gov.my



FACTS ABOUT ELECTRICITY AND POWER FACTOR
WHAT YOU NEED TO KNOW

www.st.gov.my



**BINA TENAGA
ENERGY SDN BHD**
YOUR POWER FACTOR SOLUTIONS 1428671-U

MEASUREMENT & CALIBRATION | UNIQUE DESIGN & INSTALLATION |



COMPREHENSIVE MAINTENANCE



**Technology
International Standard**



IEC/EN 60670-1: 2015
Enclosure & System Safety
For Ready Made Panel



IEC/EN 60529
Resistance to dust, liquids, and
accidental contact.



IEC/EN 60252-1
Star Capacitor Performance



IEC/EN 60831-1/2: 2014
Delta Capacitor Performance



IEC/EN 61921
Enclosure & System Safety
For Custom Made Panel

PRODUCT RANGE



CERTIFICATION



MyHijau



SIRIM



MySTI

TYPE OF PRODUCTS



READY-MADE MODEL



CUSTOM-MADE MODEL



SINGLE PHASE

Network rated voltage	250/400V AC 50Hz
Reactive power rating	9kVar-50kVar
Operating mode	Manual Star Delta
Product or component type	Power Factor Correction System (Single Phase - Three Phase)



3 PHASE

Network rated voltage	250/400V AC 50Hz
Reactive power rating	100kVar
Operating mode	Manual Star Delta
Product or component type	Power Factor Correction System (Three Phase)



3 PHASE WITH PFR

Network rated voltage	250/400V AC 50Hz
Reactive power rating	100-150kVar
Operating mode	Automatic Star Delta
Product or component type	Power Factor Correction System (Three Phase)

with PFR



BENEFITS OF PFCS-BINA TENAGA

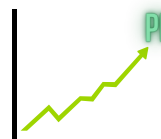
1

Avoid/ eliminate power factor surcharge to increase system capacity & energy usage efficiency



2

To increase & maintain power factor unit at optimum level in the long run.
Increase grid stability and sustainability



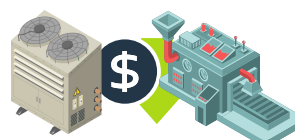
3

To increase active power flow distribution of solar energy



Other Benefit

Reduce OPEX for maintenance
Prolonging CAPEX life cycle





Benefit 1: To eliminate power factor surcharge

Before Installation PFCS (Mosque A)

BIL ELEKTRIK ANDA

No. Akaun : [REDACTED]
 No. Kontrak : 6001553792
 Deposit : RM2,870.49
 No. Invois : 6587788970

TERIMA KASIH
 Kerana
 Membayar Dalam
 Tempoh 30 Hari
TNB Caroline
 1-300-88-5454

Jumlah Perlu Dibayar: RM 1,494.30

Tarikh Bil: 27.05.2023

Bil: OPC

	Amaun	Bayar Sebelum	Terima Kasih
Tunggakan	RM 0.00		
Caj Semasa	RM 1,494.29		
Penggunaan	RM 0.01		
Jumlah Bil	RM 1,494.30	26.06.2023	
Bil. Terdahulu	RM 2,661.30	Bayaran Akhir	RM 2,661.30
(28.04.2023)		(09.05.2023)	
Jenis Bacaan	: Bacaan Semasa		
Tempoh Bil	: 30.04.2023 - 27.05.2023 (28 Hari)		
Tarif	: B: Persekitaran Diskaun		
		Faktor Prosta	1.00000
Blok Tarif (kWh)		Kegunaan (kWh)	Kadar(RM)
200		200.00 (200 X 1.00000)	0.4350
>200			0.5090
Jumlah		2,796.00	1,408.36

Untuk maklumat bil dan bayaran terdahulu, sila layari: <http://www.majlis.gov.my> atau hubungi Customer Care 1 300 88 5454

Untuk gambaran bekalan atau kerosakan lampau, jumpa TNB atau hubungi pejabat telefon: 15454

Semua bil dikurangkan bagi bayaran selepas 30 hari dari tarikh bil. Untuk maklumat Peraturan-Peraturan (Skema Pemegang Lesen 1990

Bayaran melalui cek sah setelah tempoh 30 hari.

Jumlah bil sebenar tanpa subsidi adalah RM146.76. Subsidi yang diberikan oleh Kerajaan adalah RM651.47.

Keterangan	Tidak Kena ST	Kena ST	Jumlah
Kegunaan kWh	2,796.00	0.00	2,796.00
Kegunaan RM	1,408.36	0.00	1,408.36
ICPT (RM0.037/kWh)	103.45	0.00	103.45
Diskaun TNB	151.19	0.00	151.19
Surcag Angkadar Kuasa (0.80)	113.39	0.00	113.39
Kegunaan Bulan Semasa KWTBB (1.6%)	1,474.01	0.00	1,474.01
Caj Semasa			1,494.29

No. Meter	Faktor Meter	Bacaan Meter	Kegunaan	Unit
		Dahulu	Semasa	
M 719430588	1.00000	194,949.00	201,745.00	2,796.00 kWh
M 719430588	1.00000	919.00	930.00	20.00 kW
M 719430588	1.00000	192,024.00	194,095.00	2,071.00 kVARh



TERIMA KASIH
Kerana
Membayar Dalam
Tempoh 30 Hari
TNB Caroline
1-300-88-5454

- Bill before PFCS
- Surcag Angkadar Kuasa - RM113.39
- PF @ 0.80
- Bill (kWh usage) - RM1,408.36
- kVarh - 2,071

- Bill after PFCS
- Surcag Angkadar Kuasa - nil
- PF @ 0.98
- Bill (kWh usage) - RM1,378.84
- kVarh - 601

After Installation PFCS (Mosque A)

Jumlah Bil Anda (RM)

1,352.00

KLIK DI SINI UNTUK PEMBAYARAN

Sila bayar sebelum
26 Jun 2024

→

Ringkasan Bil Anda:

Baki Terdahulu (RM)

0.00

+

Caj Semasa (RM)

1,352.00

+

Pelaksanaan Penggunaan (RM)

0.00

Untuk maklumat terperinci, sila rujuk di muka surat setelah

Caj Elektrik Anda Bagi Tempoh 6 Bulan

Caj Bulanan (RM)

D15-23

(BS) RM1,176.45

JAN-24

(BS) RM1,269.20

FEB-24

(BS) RM1,475.20

MAR-24

(BS) RM1,533.50

Maklumat Tambahan Untuk Anda

Beban Diinyapkan

11.00kW

Kehendak Maksima Tetapan

0.00kW

Faktor Beban

0.19

Angkadar Kuasa

0.98

Keterangan	Tanpa ST	Dengan ST	Jumlah
Jumlah Penggunaan Anda (2,738 kWh)	RM 1,378.84	0.00	1,378.84
ICPT (RM0.037/kWh)	RM 101.31	0.00	101.31
Diskaun TNB	RM -148.01	0.00	-148.01
Caj Penggunaan Bulan Semasa	RM 1,332.14	0.00	1,332.14
Kumpulan Wang Tenaga Boleh Baharu (1.6%)	RM		19.86
Caj Semasa	RM		1,352.00

Maklumat Meter

No. Meter	Bacaan Meter		Penggunaan	Unit
	Dahulu	Semasa		
M 719430588	231,983	234,721	2,738	kWh
M 719430588	1,140	1,159	19	kW
M 719430588	211,077	211,678	601	kVARh

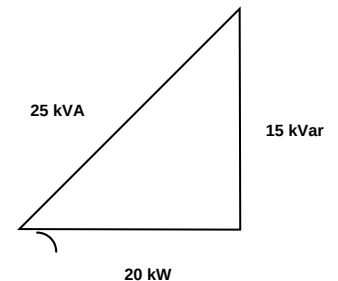
Bill analysis (Mosque A)

MONTH	May 2023 (Before PFCS-LCE)	June 2024 (After PFCS-LCE)
Cas Semasa (RM)	1,408.36	1,378.84
Surcharge Angkadar Kuasa (RM)	113.39	NIL
PF LVL	0.80	0.98
KVARH	2,071	601
KWH ALL	2,796	2,738

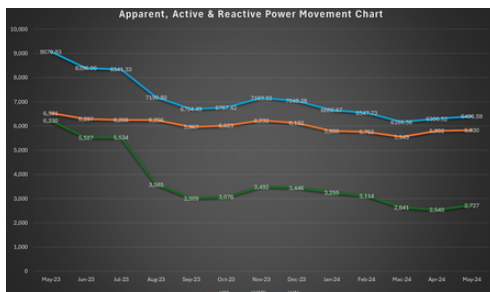
- kWh proportion from grid reduced from 100% - 80%
- Power factor unit has been recalculated by using kWh proportion (2,796kWh) and kVarh demand (2,071 kVarh)
- Based on May 2023 Bill, given:

Active Power, kW = 20 kW
Active Power per month, kWh = 2,796 kWh
Reactive Power per month, kVarh = 2,071 kVarh
Power factor: 0.80

kVar compensation



Performance Line Chart of Mini Market



Power	Before PFCS-LCE	Average after PFCS-LCE	Percentage of saving, %
Active Power, kWh	6,531	5,992	8%
Reactive Power, kVarh	6,230	3,496	41%
Apparent Power, kVAh	9,071	6,975	23%

Summary of bills comparison for Mini Market

	Before	After											
	May 2023	June 2023	July 2023	Aug 2023	Sept 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mac 2024	April 2024	May 2024
PF Unit	0.72	0.75	0.75	0.87	0.89	0.89	0.87	0.87	0.87	0.88	0.90	0.92	0.91
kWh	6,531	6,297	6,256	6,256	5,967	6,023	6,232	6,132	5,800	5,762	5,549	5,802	5,830
kVARh	6,230	5,527	5,534	3,585	3,009	3,076	3,492	3,446	3,255	3,114	2,641	2,540	2,727
Power Factor Surcharge (RM)	852	514	510	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Power Factor Surcharge (%)	24%	15%	15%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bill (RM)/ % Saving	-	133	152	152	312	281	166	221	405	426	544	404	389

INSTALLATION STARTED

INSTALLATION COMPLETED

Total saving in Power Factor surcharge : RM852 x 10 months = RM8,520
Total saving in bill (kwh consumption) : RM3,585

Before/ After		May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mac	April	May
	kVARh 2023 / 2023-2024	6,230	5,527	5,534	3,585	3,009	3,076	3,492	3,446	3,255	3,114	2,641	2,540	2,727
Before/ After	PF	0.72	0.75	0.75	0.87	0.89	0.89	0.87	0.87	0.87	0.88	0.90	0.92	0.91

Benefit 2 - Maintain sustainable pf level 0.97-0.98 in the long run

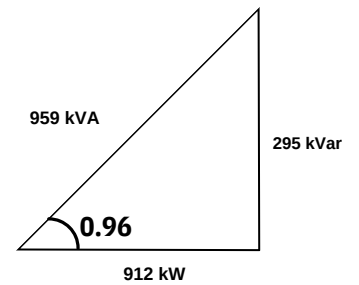
Bill analysis

MONTH	Feb 2024 (Already installed PFCS-LCE)	June 2024 (After PFCS-LCE)
Cas Semasa (RM)	96,666.01	95,708.15
Surcharge Angkadar Kuasa (RM)	N/A	N/A
PF LVL	0.96	0.97
KVARH	38,978	33,622
KWH ALL	120,404	133,134

- kWh proportion from grid reduced from 100% - **96%**
- Power factor unit has been recalculated by using kWh proportion (2,796kWh) and kVarh demand (2,071 kVarh)
- Based on Feb 2024 Bill, given:

Active Power, kW = 912 kW
 Active Power per month, kWh = 120,404 kWh
 Reactive Power per month, kVarh = 38,978 kVarh
 Power factor: 0.96

Calculation of kVar compensation



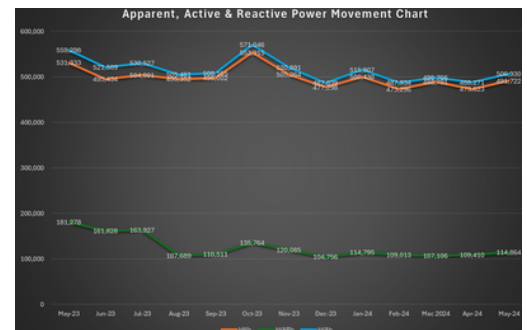
Summary of bills comparison for Commercial Building A

	Before	After											
	May 2023	June 2023	July 2023	Aug 2023	Sept 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024	April 2024	May 2024
PF Unit	0.95	0.95	0.95	0.98	0.98	0.97	0.97	0.98	0.97	0.97	0.98	0.97	0.97
kWh	531,333	495,434	504,001	495,352	498,002	553,915	505,264	477,298	500,430	473,296	488,791	473,623	491,722
kVarh	181,278	161,828	163,927	107,689	110,511	135,764	120,085	104,756	114,795	109,013	107,106	109,410	114,864
Bill (RM)/ % Saving	-	1,101	15,626	22,971	11,511	-	4,933	22,364	10,702	11,111	18,387	14,888	14,901

Total saving in bill (kwh consumption) : RM148,495

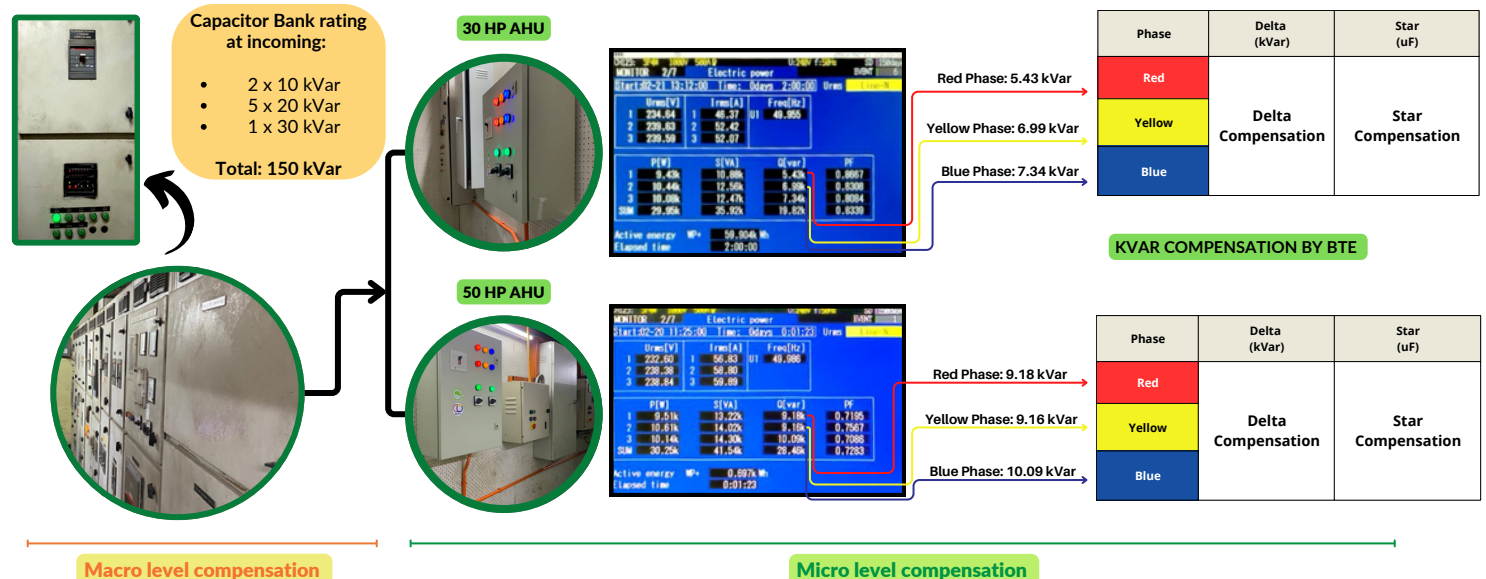
		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Before	kVarh 2022 / 2023	156,987	147,801	157,086	152,145	181,278	157,533	172,008	168,397	147,295	150,103	147,719	147,566
	PF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.96	0.96	0.91	0.96
After	kVarh 2023 / 2024	114,795	109,103	107,106	109,410	114,864	161,828	163,927	107,689	110,511	135,764	120,085	104,756
	PF	0.97	0.97	0.98	0.97	0.97	0.95	0.95	0.98	0.98	0.97	0.97	0.98

Performance Line Chart of Commercial Building A



Power	Before PFCS-Binatnaga	Average after PFCS-Binatnaga	Percentage of saving, %
Active Power, kWh	531,333	496,427	7%
Reactive Power, kVarh	181,278	121,646	33%
Apparent Power, kVAh	561,406	511,871	9%

Work Flow For Commercial Building A



Notes:

The compensation at **micro level** did not disturb any existing compensation at **macro level** which are the incoming level

1. Internal Connection

PFCS Bina Tenaga

Normal Capacitor Bank



Star Connection Capacitor

Delta Connection Capacitor



Delta Connection Capacitor

- Star-Delta Connection Capacitor
- Prevent under and over compensation issues

- Delta connection
- Under and over compensation issues unresolved

2. IEC (International Electrotechnical Commission)

IEC/EN 60670-1: 2015
Specifically Applied for
PFCS Bina Tenaga

International Electrotechnical Commission (IEC) that applies to boxes, enclosures, and parts of enclosures for electrical accessories. These accessories are intended for household or similar fixed electrical installations, both indoors and outdoors, and have a rated voltage of no more than 1,000 V a.c. and 1,500 V d.c.



PFCS Bina Tenaga

Applies to motor capacitors intended for connection to windings of asynchronous motors supplied from a single-phase system having a frequency up to and including 50 Hz, and to capacitors to be connected to three-phase asynchronous motors so that these motors may be supplied from a single-phase system.

IEC/EN 60252-1
Specifically Applied for
PFCS Bina Tenaga

IEC/EN 60529

IEC 60529 is an international standard that rates the resistance of electronic and electrical devices to dust, liquids, and accidental contact.

Both Applied



Normal Capacitor Bank

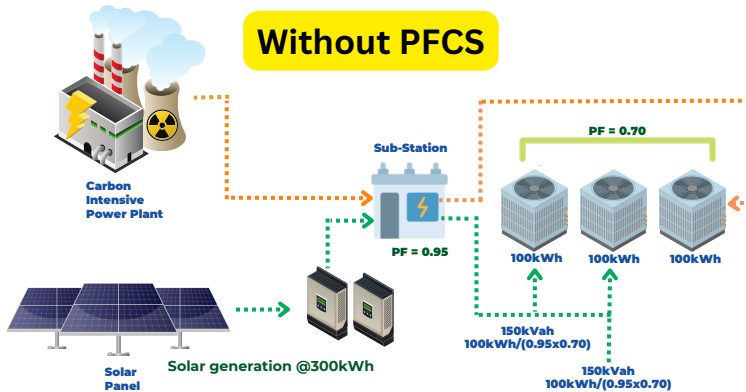
**READY-MADE
MODEL**

IEC/EN 60831-1/2: 2014
particularity, for power-factor correction of a.c. power systems having a rated voltage up to and including 1 000 V and frequencies of 50 Hz to 60 Hz.

Both Applied

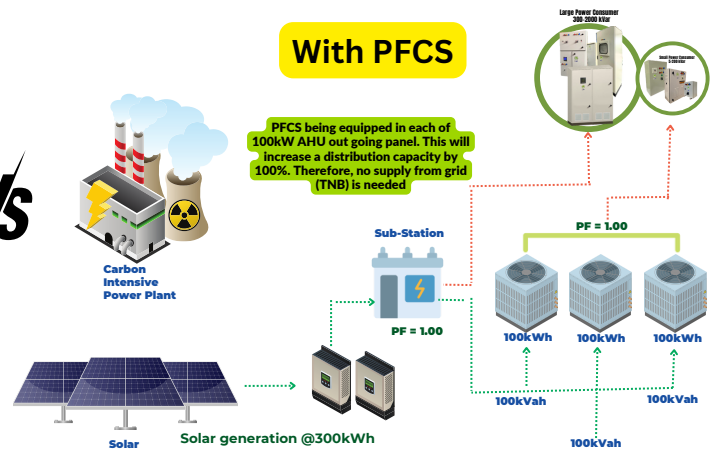
5. Impact On kWh Distribution

Without PFCS



VS

With PFCS



Normal Capacitor Bank	PFCS Bina Tenaga
Centralized compensation	Macro-Micro integrated compensation
Protect power factor unit at incoming level	Protect power factor unit at incoming-outgoing level
Smoother kWh flow at incoming level only	Smoother kWh flow at all distribution level
Unoptimized distribution of solar energy (300 kWh x solar tariff + 100kWh x grid tariff)	Optimized distribution of solar energy (300kWh x solar tariff)

3. SIRIM Performance Testing Comparison Table for PFCS Bina Tenaga

IEC/EN 60670-1: 2015 Specifically Applied for PFCS Bina Tenaga (Report No.: 2022EA1665)	IEC/EN 60529	On Site Performance Testing	Prototype Performance Testing
IEC/EN 60252-1 Specifically Applied for PFCS Bina Tenaga (Report No.: 2023EA0399)	IEC/EN 60831-1/2: 2014	Panel and Safety Testing (to be attached separately)	

4. IEC/EN 61921 for Custom-Made Model at Incoming Distribution Level



PREVENTIVE MAINTENANCE (full costs covered)	REMEDIAL MAINTENANCE (separate price to quote)
2 times visit per year for checking the health of PFCS-Bina Tenaga (Data Logging, Ampere & Volt Checking)	Specific checking relating to main capacitor bank & the whole reactive distribution line
To make replacement parts and component for the installed PFCS-LCE	To propose new change of parts and components for main capacitor bank in MSB (if necessary)
Gradually upgrading process of kVar Compensation will be done on to the PFCS-LCE (additional reactive compensation will be advised)	*measurement report to be submitted

OUR PARTNERS & CLIENTS



MOF Number : 357-0002363181



Company Number : 202101028371

Office, Showroom, Factory & Lab:

No 27, Jalan SILC 2/1
Kawasan Perindustrian SILC,
79200 Iskandar Puteri, Johor.

 info@binatenaga.com.my

 Power Factor Correction System
 powerfactorofficial

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 +6012 738 2563



Register Your Interest