



BINA TENAGA ENERGY SDN BHD

YOUR POWER FACTOR SOLUTIONS
1428671-U



ESTABLISHED 2006

01 CORPORATE PROFILE



Established in 2006, Bina Tenaga Energy Sdn Bhd (BTESB) is a Malaysian power quality engineering specialist focused on improving power factor and power system performance.

02 PQMS — BINATENAGA MACRO-MICRO INTEGRATED SYSTEM



Sustainable Power Factor from Incomer to Critical Feeders

- Reduce surcharge.
- Lower OPEX.
- Extend asset life.

Our PQMS solution delivers measurable value across your power distribution system.



03 OUR CORE SERVICES



PFCS / DETUNED APFCS

Power Factor Correction Systems and Detuned Automatic Power Factor Correction Systems.



UPGRADE, RESTORE & RETROFIT

Upgrade existing systems. Restore underperforming PFCS. Retrofit for improved efficiency and reliability.



ENGINEERING & TECHNICAL SUPPORT

End-to-end engineering, commissioning, testing and lifecycle technical support.

04 PROCUREMENT ENABLER



- ✓ Supports procurement facilitation.
- ✓ Trusted technology credentials.
- ✓ Local technology endorsement.



MINISTRY OF FINANCE
MALAYSIA

05 SIRIM 2022



- Certified to SIRIM QAS international standard.
- Compliant with IEC/EN Performance & Safety Standards.

06 MyHIJAU 2022



Recognized under the MyHIJAU Mark for energy conservation and greenhouse gas reduction contribution.

07 MySTI 2024



Recognized as locally developed Malaysian R&D technology.

08 MySTI / MOF PROCUREMENT ADVANTAGES

1		5% Procurement KPI	MOF KPI recognition of 5% procurement value for MySTI government vendors.
2		Additional 10% Score	Additional 10% technical evaluation score advantage during tender assessment.
3		Direct Negotiation	Eligible for direct negotiation, subject to Approval from Ministry.
4		Compliance Assurance	Supports government initiatives for local innovation and technology development.

09 MOF GUIDELINE PK1.4



Domestic Goods, Services and Works in Government Procurement.

10 INDUSTRIES SERVED



Commercial
Buildings



Manufacturing
& Industrial



Utilities &
Infrastructure



Healthcare



Education



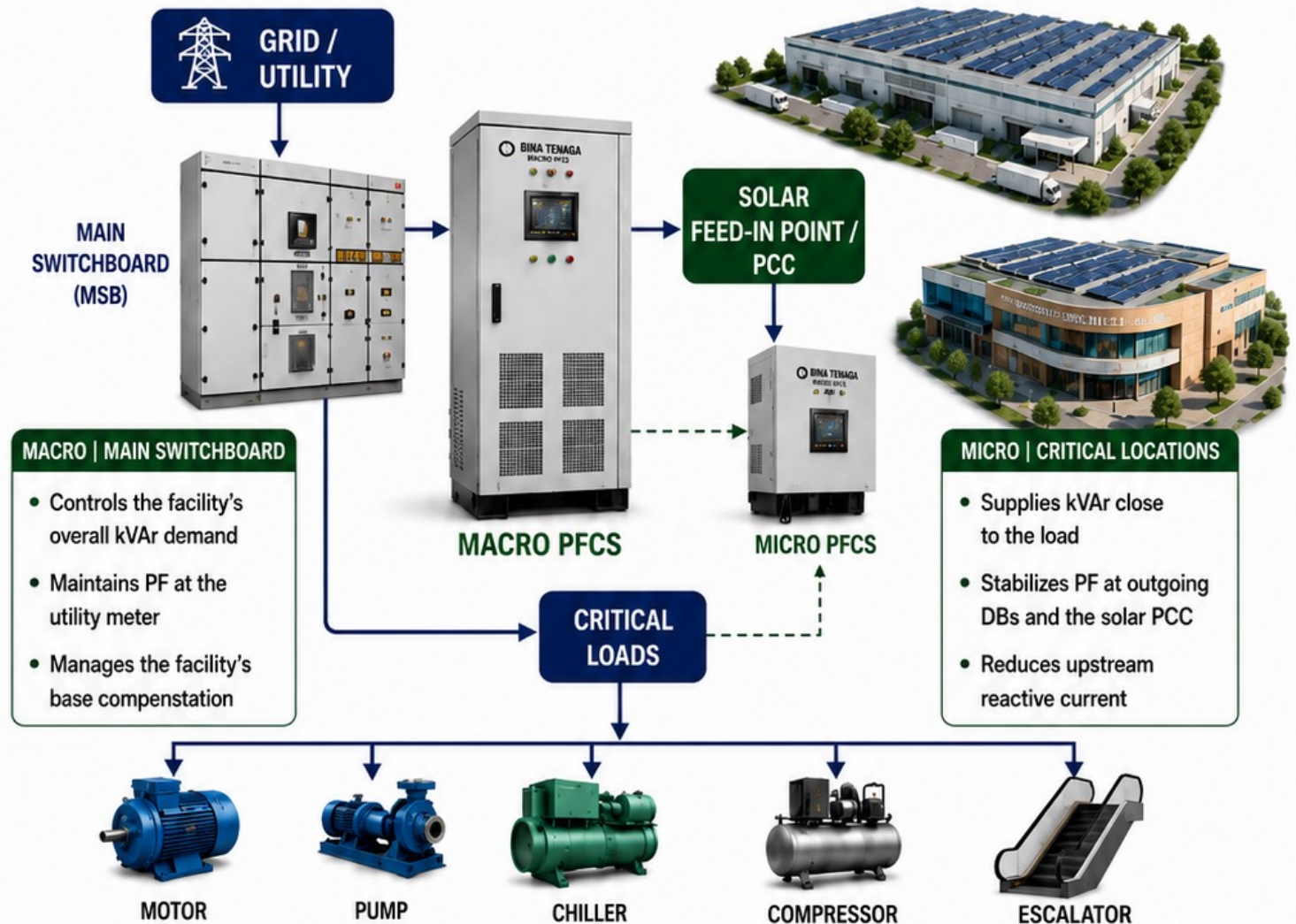
Retail &
Hospitality

BTESB – Your Trusted Power Quality Partner
Delivering Sustainable Power. Driving Performance. Creating Value.

MACRO-MICRO INTEGRATED PFCS ARCHITECTURE

Reactive Power Control from the MSB to the Solar Feed-In Point

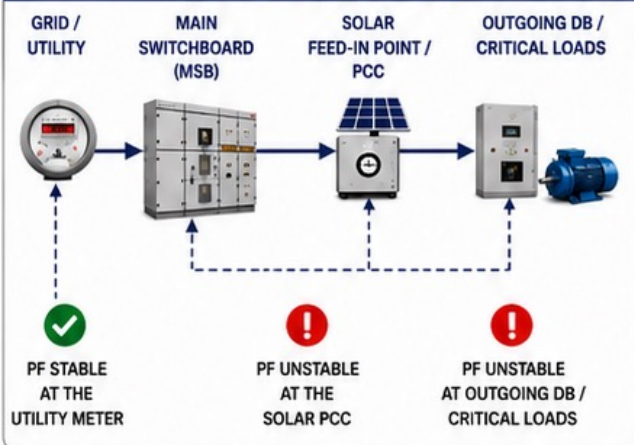
Factories • Shopping Malls • Large Commercial Facilities



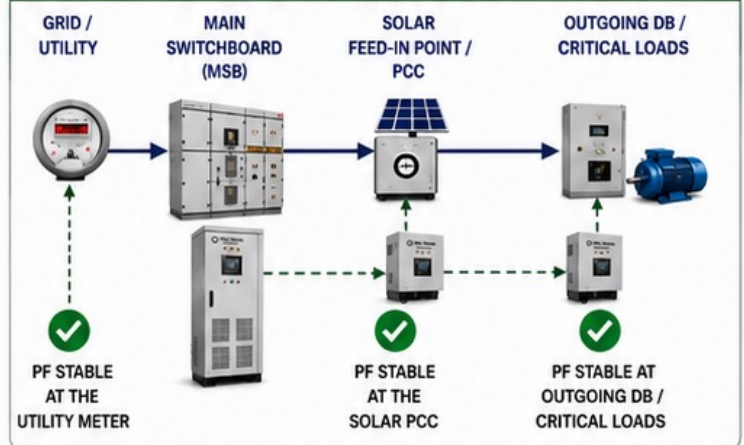
WHY CAN SOLAR REDUCE GRID POWER FACTOR?

Solar reduces grid kW, while motors and inductive loads still require kVar. Even when the inverter is set to PF 1.0, the PF at the feed-in point is not necessarily 1.0.

BEFORE – Macro Only



AFTER – Macro + Micro



MACRO CONTROLS THE ENTIRE FACILITY,
MICRO SOLVES PROBLEMS AT CRITICAL LOCATIONS.

SAMB PFCS – ENERGY EFFICIENCY & TECHNICAL PERFORMANCE

July 2026 Interim M&V | IPMVP Option B | 2025 Baseline

KEY FINDING

Raw kWh increased as plant output changed,
but kWh/m³ normalisation identifies genuine efficiency improvement.

$$\text{SEC} = \text{Electricity Consumption (kWh)} \div \text{Treated Water Production (m}^3\text{)}$$

ACTUAL PFCS INSTALLATION REFERENCE



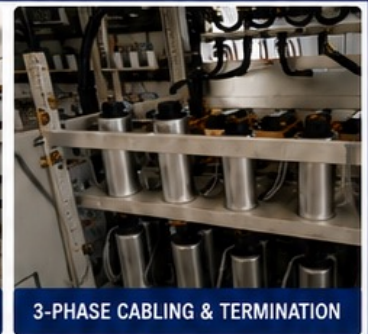
500 kVAr PFCS PANEL



POWER CABLING & VENTILATION



BUSBAR & CAPACITOR-BANK
WORKMANSHIP



3-PHASE CABLING & TERMINATION

LACC1 – CHIN-CHIN



2.46% VERIFIED SEC SAVING

5,086.50 kWh SAVED



RAW ELECTRICITY

- 2025 Average: 195,539 kWh/month
- July 2026: 201,928 kWh
- Raw change: **+3.27%**



TECHNICAL PERFORMANCE

POWER FACTOR

0.87 → 0.95

IMPROVED



REACTIVE ENERGY (kVArh)

110,478 → 66,701

-39.6%



APPARENT ENERGY (kVAh)

224,378 → 212,556

-5.3%



SEC NORMALISATION

- 2025 Baseline SEC: 0.32020 kWh/m³
- July 2026 SEC: 0.31233 kWh/m³
- July 2026 production: 646,520 m³
- Normalised baseline: 207,014.50 kWh
- Verified saving: **5,086.50 kWh | 2.46%**

LAM – MERLIMAU



3.21% VERIFIED SEC SAVING

20,173.46 kWh SAVED



RAW ELECTRICITY

- 2025 Average: 574,918 kWh/month
- July 2026: 607,470 kWh
- Raw change: **+5.66%**



TECHNICAL PERFORMANCE

POWER FACTOR

0.92 → 0.95

IMPROVED



REACTIVE ENERGY (kVArh)

249,718 → 189,866

-24.0%



APPARENT ENERGY (kVAh)

629,395 → 639,442

+1.6%



SEC NORMALISATION

- 2025 Baseline SEC: 0.18632 kWh/m³
- July 2026 SEC: 0.18033 kWh/m³
- Normalised baseline: 627,643.46 kWh
- Verified saving: **20,173.46 kWh | 3.21%**

RAW CONSUMPTION vs PRODUCTION-NORMALISED EFFICIENCY



Raw kWh

measures total electricity consumed and is affected by water volume, operating hours and motor loading.



More production can still deliver lower kWh/m³ when production rises faster than electricity use.

kWh/m³ (SEC)

measures electricity required to produce 1 m³ and is the preferred practical efficiency indicator for water-treatment plants.



COMBINED VERIFIED SAVING:

25,259.96 kWh

$$\text{SEC} = \text{Electricity Consumption (kWh)} \div \text{Treated Water Production (m}^3\text{)}$$

1 PROJECT OVERVIEW



Client / Facility

TH Properties Sdn Bhd –
BIMB Tower, Jalan Perak,
Kuala Lumpur



Application

Distributed Phase-Star Auto PFCS
installation at building
electrical-load points



Objective

Stabilise PF, reduce reactive-power
demand and electrical losses, and
improve load-system efficiency



Relevant Building Load

Blower system and other
commercial-building loads



2 BASELINE & CUMULATIVE REPORTED OUTCOME



2023 BASELINE:

4,049,166
kWh



2024–2025 CUMULATIVE
REPORTED SAVING:

322,905
kWh



2024–2025 REPORTED
FINANCIAL SAVING:

RM234,875



BEST COMPLETED YEAR:

2025

213,378 kWh | 5.11%
reported saving

3 REPORTED SAVINGS TREND

Reporting Year	Total Saving in kWh	% Savings (Reported 12-month saving)	% Savings (Monthly-only saving)	Total Saving in RM
2024	109,527	2.65%	3.98%	83,266
2025	213,378	5.11%	6.82%	151,609

2.65%



5.11%

Reported annual saving rate
nearly doubled from 2024 to 2025.

4 MANAGEMENT INTERPRETATION

- ✓ 2025 delivered the strongest completed-year result: 213,378 kWh.
- ✓ Reported kWh saving increased by 103,851 kWh from 2024 to 2025.
- ✓ Reported annual saving rate improved from 2.65% to 5.11%.
- ✓ The 2024–2025 cumulative reported saving is 322,905 kWh.
- ✓ Distributed PFCS supports local reactive-power compensation closer to building loads.

5 HOW PFCS CREATES THE SAVING



Local reactive-power compensation



Lower upstream reactive-current flow



Reduced kVA loading and I^2R losses



Improved electrical efficiency



Lower kWh input under comparable operation

Technical verification should also track PF, kVAh, kVAh, current and operating hours.

6 DATA INTERPRETATION NOTE



All savings and percentages are reported values from the supplied project summary.



The infographic covers completed reporting years 2024 and 2025 only.



Weather, occupancy, operating hours and building-load changes should be normalised for formal M&V.



Current and copper-loss reduction cannot be quantified without PF-before/ PF-after and data.



8 UPSTREAM PANELS



8 DOWNSTREAM PANELS



PF PERFORMANCE MONITORED
AT DUAL 33 kV INCOMERS

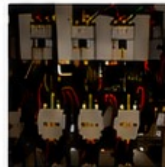
1 WHY RETROFIT?

- ✓ Restore ageing or underperforming capacitor-bank stages
- ✓ Upgrade compensation to match current operating loads
- ✓ Improve reliability, protection and maintainability
- ✓ Extend usable life of the existing PFCS infrastructure
- ✓ Coordinated restoration across upstream and downstream compensation points.

2 TECHNICAL UPGRADE SCOPE



Capacitor Bank Replacement & kVAR Upgrading



Contactor & MCCB Replacement



Reactor Replacement



Panel Rewiring



Protection Relay Installation



Thermal Infrared Inspection



Megger / Insulation Test

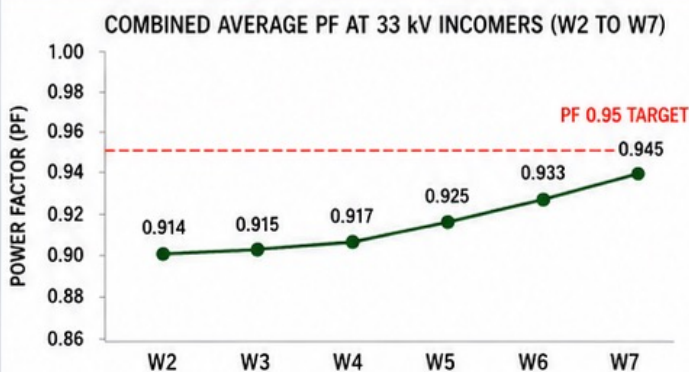


Protection Relay Functional Test



Testing, Commissioning & PF Fine-Tuning

3 ONGOING PERFORMANCE – W2 TO W7



PF values are exact from the supplied weekly ongoing-performance record.

METRIC	W2	W7	IMPROVEMENT	STATUS
33 kV Incomer 1 PF	0.929	0.954	+0.025 PF point	Achieved >0.95
33 kV Incomer 2 PF	0.898	0.930	+0.032 PF point	Further optimisation required
Combined 33 kV Incomer PF	0.914	0.945	+0.031 PF point	Improving toward 0.95

4 TECHNICAL INTERPRETATION

- Progressive improvement confirms effective restoration and staged commissioning.
- 33 kV Incomer 1 has crossed the 0.95 operating target.
- 33 kV Incomer 2 remains the priority for remaining PFCS stages, load matching and relay tuning.
- Final verification should be completed under representative production loading.

5 ESTIMATED CURRENT & COPPER-LOSS IMPACT

SIMPLE CALCULATION – COMBINED PF MOVEMENT

- PF improves: 0.914 → 0.945
- Remaining copper loss: $(0.914^2 - 0.945^2) = 0.9355$
- Estimated copper-loss saving: $1 - 0.9355 = 0.0645 = 6.45\%$

Same kW + same voltage → higher PF → lower current → lower I^2R loss

$$\text{Copper-loss saving (\%)} = [1 - (\text{PF Before} \div \text{PF After})^2] \times 100$$

ITEM	PF BEFORE → AFTER	ESTIMATED CURRENT REDUCTION	ESTIMATED COPPER-LOSS REDUCTION
33 kV Incomer 1	PF 0.929 → 0.954	2.62%	5.17%
33 kV Incomer 2	PF 0.898 → 0.930	3.44%	6.76%
Combined 33 kV PF proxy	PF 0.914 → 0.945	3.28%	6.45%



Estimate applies only to the copper-loss component under comparable kW, voltage, operating hours and network conditions; it is not total plant kWh saving.

6 DATA INTERPRETATION NOTE



All savings and percentages are reported values from the supplied project summary.



The infographic covers completed reporting years 2024 and 2025 only.



Weather, occupancy, operating hours and building-load changes should be normalised for formal M&V.



Current and copper-loss reduction cannot be quantified without PF-before/ PF-after and data.

RETROFIT OUTCOME: HIGHER PF • RESTORED CAPACITY • IMPROVED PROTECTION • EXTENDED ASSET LIFE



1 KEY SOLAR FINDING

HIGHEST NEM EXPORT:

20,963 kWh

JANUARY 2025

INCOMING PF MAINTAINED AT 0.98

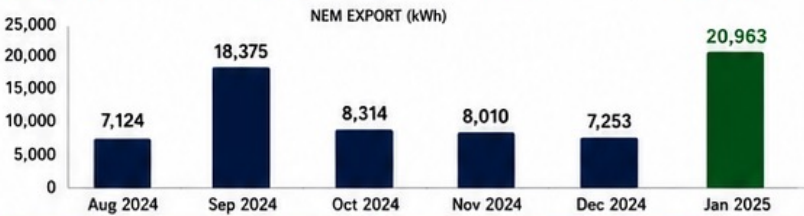
Koito recorded its highest six-month NEM export while the reported incoming PF remained strong at 0.98.



Peak export was 14.08% higher than the previous high of 18,375 kWh in September 2024.

2 SIX-MONTH NEM EXPORT & PF RECORD

MONTH	NEM EXPORT (kWh)	INCOMING PF (REPORTED)	PFCS STATUS
August 2024	7,124	0.96	Before PFCS
September 2024	18,375	0.96	Before PFCS
October 2024	8,314	0.96	Before PFCS
November 2024	8,010	0.98	After PFCS
December 2024	7,253	0.98	After PFCS
January 2025	20,963	0.98	After PFCS



Before PFCS: PF 0.96

After PFCS: PF 0.98

3 HIGHEST-EXPORT OPERATING SNAPSHOT – JANUARY 2025

Grid energy	435,309 kWh
Reactive energy	94,637 kVArh
Recorded demand	1,167 kW
Equivalent hours	373 h
NEM export	20,963 kWh
Reported incoming PF	0.98
Bill	RM261,105



At the highest NEM export, reported PF did not deteriorate; it remained at the post-installation level of 0.98.

4 WHY SOLAR CAN CHALLENGE PF



KOITO RESPONSE



5 LOCAL OUTGOING EVIDENCE

BEFORE / LOWER-PF SNAPSHOT



PFavg 0.819

AFTER / IMPROVED-PF SNAPSHOT



PFavg 0.944



Compressor-panel snapshots demonstrate improved local PF at a major inductive load point.



Separate reported 1000 A machinery outgoing DB result: PF 0.888 → 0.968



These local readings support the case for compensation at outgoing points, not only at the main inverter.

6 PFCS INSTALLATION ARCHITECTURE

5 outgoing units: Air Compressor 1 • Air Compressor 2
SSB-K1 • SSB-K2 • CP-CA



Local compensation manages reactive power before it flows through the upstream network.

7 MANAGEMENT INTERPRETATION

- ✓ January 2025 delivered the highest NEM export in the six-month dataset.
- ✓ Reported incoming PF remained 0.98 during this highest-export month.
- ✓ Post-installation PF was consistently reported at 0.98 for November 2024 through January 2025.
- ✓ The data supports coordinated incoming, outgoing PFCS and solar-inverter operation.
- ✓ High export alone does not prove continuous PF compliance; interval monitoring remains necessary.



KOITO MAINTAINED REPORTED INCOMING PF 0.98
EVEN AT HIGHEST NEM EXPORT MONTH – JANUARY 2025.





PFCS-BINATENAGA ENERGY SAVINGS PERFORMANCE AT NB POULTRY PROCESSING

Efficient Operations. Sustainable Growth.



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



Modern Processing Facility
for a Sustainable Food Supply



NB POULTRY PROCESSING INDUSTRIES
SDN. BHD.
(Formerly Known as Nersha Enterprise)

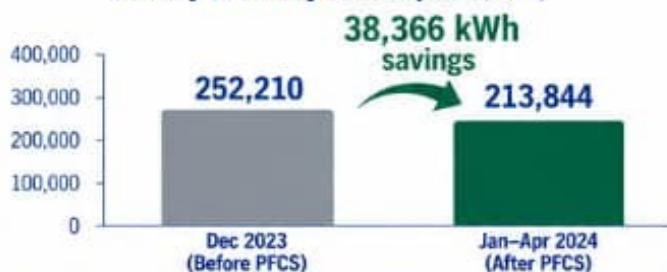


Healthy Birds
Quality Processing
Sustainable Supply

1 DEMONSTRATED ENERGY & COST SAVING (2024) (BEFORE PRODUCTION INCREASE)

After the installation of PFCS, NB Poultry recorded lower electricity consumption in 2024 compared to December 2023 baseline, while operating at similar production levels.

Monthly Electricity Consumption (kWh)



Energy Saving

38,366 kWh



Electricity Cost Saving

RM21,262

REDUCTION DURING DEMONSTRATED SAVING PERIOD (Dec 2023 vs Jan-Apr 2024)



kVAh

▼27,968 kVAh
(-10.5%)



kVAh

▼39,412 kVAh
(-7.8%)

3 WHAT IF PF IS NOT CORRECTED? ESTIMATED MONTHLY PF SURCHARGE (2023)

NB Poultry's PF had previously dropped to about 0.87 – 0.88 in 2023, close to TNB's surcharge threshold of 0.85. If PF falls below 0.85, an additional PF surcharge will be imposed every month.



Estimated Monthly PF Surcharge (Example)

Assumed PF	0.80
Reactive Power Charge Rate	RM0.015 / kVAh
Monthly kVAh (Dec 2023)	267,405
Estimated PF Surcharge per month	RM4,011



Without PF correction, ~RM4,011 per month could have been incurred in December 2023 alone, in addition to higher losses and lower system efficiency.

2 SUSTAINED PF UNDER HIGHER PRODUCTION (2026)

From May 2024 onwards, production and storage requirements increased significantly. Despite higher electrical demand and longer utilisation, the PFCS continues to maintain good Power Factor under changing load conditions.

Month	kWh	Maximum Demand (kW)	Equivalent Hours*
Jan-26	310,750	543	572.28
Feb-26	273,610	535	511.42
Mar-26	294,489	554	531.57
Apr-26	297,277	531	559.84
May-26	299,831	563	532.56
Jun-26	292,663	567	516.69
Jul-26	322,637	593	544.08
AVERAGE	298,794	~555	538.35

2026
Power Factor

~0.93 – 0.96



Sustained
good PF under
higher production
and utilisation.

* Equivalent Hours =
kWh / Maximum Demand (kW).
It is a utilisation indicator and
should not be interpreted as
actual clock operating hours.



Total Electricity Consumption (Jan – Jul 2026)
2,091,557 kWh

4 POWER FACTOR PERFORMANCE (2023 – 2026)

Power Factor Trend



PF maintained at ~0.93 – 0.96 under higher production and utilisation in 2026.

Strong improvement from historical low of ~0.87 to sustained good PF under changing load profile.

5 KEY TAKEAWAYS & FINANCIAL IMPACT



38,000 kWh

energy saving in 2024 (before production increase), equivalent to **RM21,262** cost saving.



Significant reduction in 27,968 kVAh (-10.5%) and 39,412 kVAh (-7.8%) during the demonstrated saving period.



Avoided ~RM4,011 per month PF surcharge in 2023 (if PF not corrected and PF < 0.85), which could have increased electricity bill by ~RM48,000 per year.



PF sustained at ~0.93 – 0.96 in 2026 despite higher production and utilisation, proving PFCS effectiveness and supporting a more efficient and sustainable poultry processing operation.

NB POULTRY PROCESSING INDUSTRIES SDN. BHD.
Johor, Malaysia



Efficient
Operations



Reliable
Power Quality



Sustainable
Growth



A Brighter
Tomorrow

*Quality Chicken
for a Healthier Tomorrow*

PFCS PERFORMANCE AT MENARA ANSAR (WAQAF AN-NUR)

REAL DATA. REAL SAVINGS. SUSTAINED PERFORMANCE.

1 ELECTRICAL PERFORMANCE BEFORE & AFTER PFCS INSTALLATION (MAY 2023 – JAN 2024)

Parameter	Before PFCS	After PFCS Installation								Overall Reduction / Improvement
	May 2023	Jun 2023	Jul 2023	Aug 2023	Sept 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2024	
Power Factor (PF)	0.95	0.95	0.95	0.98	0.98	0.97	0.97	0.98	0.97	PF maintained at 0.97 – 0.98
Electricity Consumption (kWh)	392,434	358,367	365,101	353,327	358,520	411,375	371,891	352,691	375,588	-16,495 kWh (-4.2%)
Reactive Energy (kVarh)	181,278	161,828	163,927	107,689	110,511	135,764	120,085	104,756	114,795	-66,483 kVarh (-36.7%)
Maximum Demand (RM)	35,291	33,884	34,461	33,499	34,138	35,870	34,479	34,435	33,725	-1,566 kW (-4.4%)
Load Factor	0.45	0.45	0.43	0.43	0.44	0.47	0.45	0.42	0.45	Stable
Electricity Bill (RM)	259,874	238,996	243,426	235,728	239,342	271,273	247,321	236,316	248,665	-11,209 (-4.3%)

2 KEY SAVINGS ACHIEVED (MAY 2023 VS JAN 2024)



16,495 kWh

Lower electricity consumption

↓ -4.2%



66,483 kVarh

Reduction in reactive energy

↓ -36.7%



RM11,209

Lower electricity bill

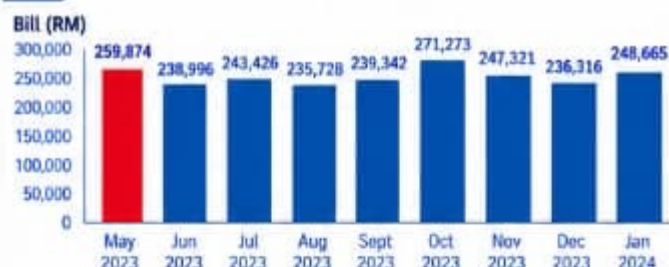
↓ -4.3%



PF improved and sustained

0.95 → 0.97 – 0.98
(Stable at high level)

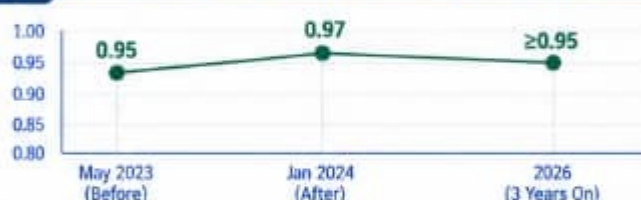
3 MONTHLY ELECTRICITY BILL COMPARISON



4 REACTIVE ENERGY (kVarh)



5 POWER FACTOR TREND (SUSTAINED UNTIL 2026)



PF STILL SUSTAIN AT ≥ 0.95 IN 2026

Despite higher utilisation over the years, the Power Factor remains at 0.95 and above, proving the long-term effectiveness of PFCS.

6 KEY TAKEAWAYS



16,495 kWh
energy saving
(-4.2%)



66,483 kVarh
reduction
(-36.7%)



RM11,209
lower electricity bill
(-4.3%)



PF sustained at ≥ 0.95 in 2026
(after 3 years)