PCS

Power Conversion System

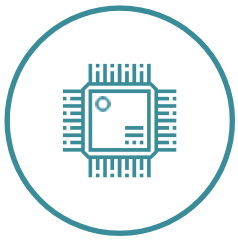
The Best Technology
for your photovoltaic
and storage system

EEI ITALIAN POWER TECHNOLOGY
CustomerService@eukapower.com
03-555-2988
新竹縣竹北市環北路一段323號6樓
EUKA POWER 傑明新能源股份有限公司

Applications

The EEI power converters are used to:
- Solar power plants
- Hybrid power plants
- power quality (eg voltage regulation)
- peak shaving
- load levelling
- off grid power supply(UPS)
- management of power unbalance

Inverter



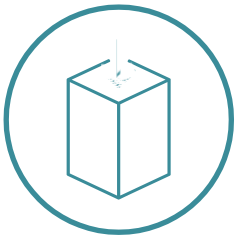
Inverter enclosure made of steel panels. Front opening through lockable doors to ease access to all parts. Side and rear access through bolted panels.
Inverter drive specifications:

- IGBT power circuit, film capacitors and low inductance connections
- Digital management of control parameters, alarm diagnostics, analogue and digital I/O signals from dedicated microcontroller and DSP software
- 400V three-phase and neutral AC output

Safety and reliability

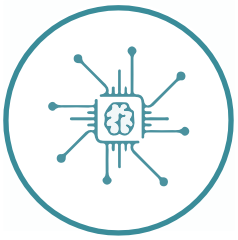
Inverters are manufactured following systematic and rigorous production and testing processes. All products developed by EEI are ISO 9001 certified.
Power surge protections from both gridand battery side are installed to prevent damages on the inverter drive.

Main components included inside enclosure



Three-phase output circuit breaker, ultra rapid fuses, contactors for grid side insertion,iron core three-phase filter reactors.

Auxiliary and control circuits ponents included inside enclosure

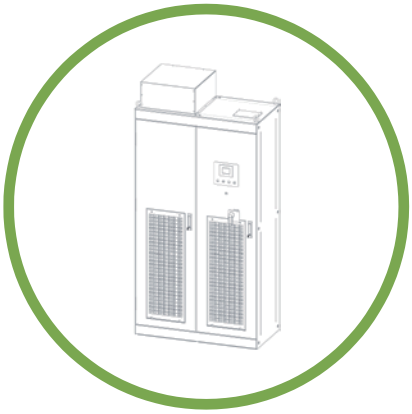


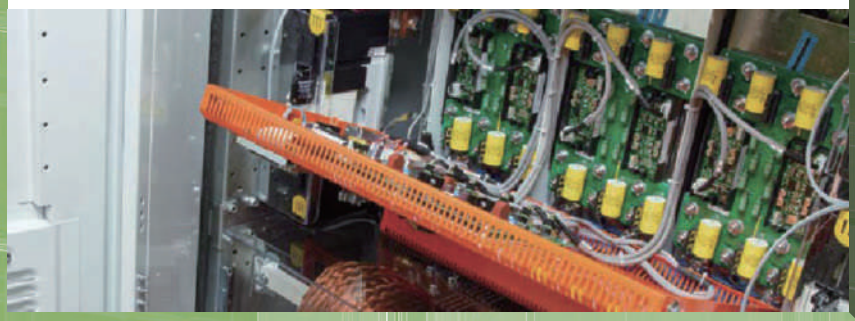
- Power supply for 24Vdc auxiliary services
- Power supply for 230Vac auxiliary services
- Circuit breakers for internal fan protections
- Circuit breakers for auxiliary circuits
- Terminal block for power cables and signal cables

Interface and communication

The EEI converters are equipped with a data-logger unit and a touch-screen display that provides storage of past log files and alarm list. Communication protocol is TCP/MODBUS.
Additional parts provided:
- Manually operated switches
- Signal lights for voltage presence
- Emergency push-button

MASTER INVERTER SERIES





SUITABLE FOR INSTALLATION OF MPPT STRING BOOST AND DC BATTERY CHARGER

EEI Master Inverter Series
for a wide renewable energy integration

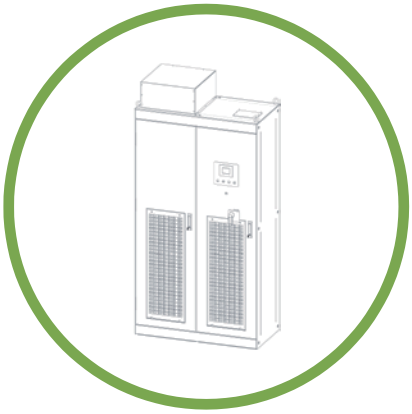
EEI Master Inverter Series is the solution for integration of PV systems and storage systems. It is designed to offer the most flexible integration of solar or battery, with the possibility to use the solar energy through the EEI MPPT String BOOST and batteries through EEI DC Battery Charger.

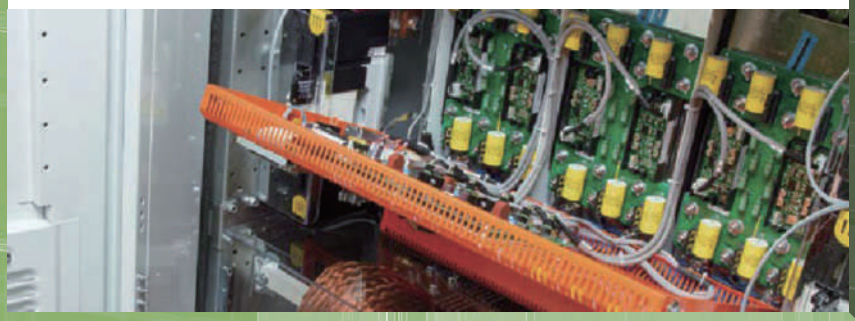
The hallmarks of the EEI Master Inverter Series converters are:

- Flexible integration with MPPT String Boost and DC Battery Charger
- Extended power capability through parallel
- Grid tie and off-grid functioning

	EEI MASTER 100	EEI MASTER 300
AC OUTPUT PARAMETERS		
Rated power	100 kW	330 kW
Maximum power	110 kVA	360 kVA
Nominal voltage	400V 3Ph + N	400V 3Ph
AC Voltage range	+10% /-10%	+10% /-10%
Nominal frequency	50 / 60 Hz	50 / 60 Hz
Nominal frequency range	47,5...51,5 Hz / 56,4...62,4 Hz	47,5...51,5 Hz / 56,4...62,4 Hz
Nominal Current	145A	476A
Power Factor	adjustable between 0.85 and 1	adjustable between 0.85 and 1
Max Admissible Short Circuit Current	35kA	35kA
THD(I)	< 3%	< 3%
PV INPUT PARAMETERS		
N° of MPPT BOOST inputs	2	4
Maximum DC current per input	100A	150A
EFFICIENCY		
Maximum	> 98 %	> 98%
GENERAL DATA		
Dimensions (W / H / D)	800 / 2300 / 600 mm	1200 / 2450 / 600 mm
Weight	500kg	975kg
Operating temperature range	0°C / +50°C	0°C / +50°C
Max humidity (non-condensing) / Max altitude	95 % / asl 2000m	95 % / asl 2000m
PROTECTIONS		
PV side disconnection device	MCCB	MCCB
EMC filter	Included	Included
AC-side disconnection device	AC circuit breaker	AC circuit breaker
AC overvoltage protection	Surge Suppressors	Surge Suppressors
PV DC overvoltage protection	Surge Suppressors	Surge Suppressors
RCM	Included	Included

MASTER INVERTER SERIES





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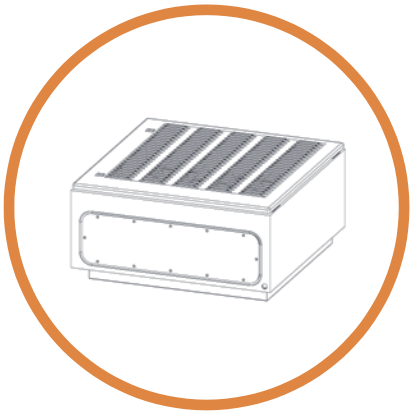
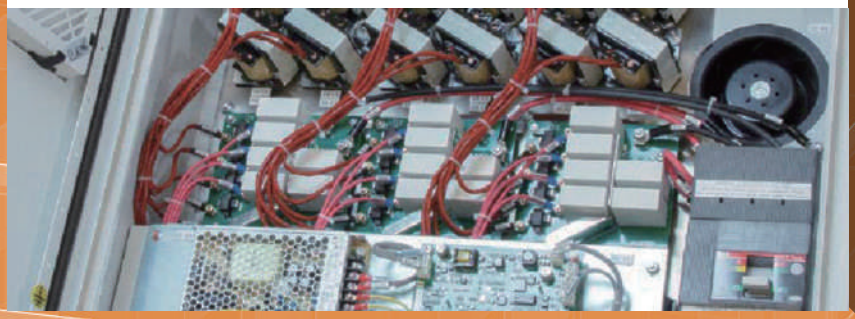
		M750
DC Voltage	Range	500~935V/MAX 1000V
	Resolution	100mV
	Accuracy	±0.5% (Full Scale)
AC Current	Range	1010A
	Resolution	100mA
	Accuracy	±0.5%(Full Scale)
AC POWER	Range	320V/560kVA; 380V/665kVA; 440V/770kVA
	Resolution	100mW
	Accuracy	±1%(Full Scale)
Performance	Operating Mode	CP (Constant Power)
AC input	Voltage range	320~440 Vac
	Frequency	60Hz
	Power Factor	>0.99
	I_THD	<3%
	Protection	OVP, UVP, OCP, OPP, unbalanced phase
General	Protection	OVP, UVP, OCP, OPP
	Interface	ModBUS TCP/IP (Ethernet)
	Operating Temperature/ Humidity	0°C ~ 50°C / 0~90RH%
	Cooling	Air cooling
	Altitude	2000m
	Noise Level	<80db
	Protection Class	IP20
	Dimension (Expectation)	600mm deep x 2000mm wide x 2200mm high
	Weight (Expectation)	~ 1250kg

MPPT STRING BOOST SERIES





ENHANCE YOUR PV POWER OUTPUT

EEI MPPT String Boost Series
for a flexible and modular solar integration

Multiple factors can limit the performance of a photovoltaic system:

- Shade
- Dirt
- Different temperature
- Mismatching and panel aging
- Damaged panels
- Current inversion on low voltage strings

MPPT String Boost is a DC/DC converter which implements evolved Maximum Power Point Tracking MPPT, capable of optimizing the power produced by each string.
One-of-a-kind on the market, the EEI MPPT BOOST operates on string and not module level.
This feature makes it easy to install, cost-effective and efficient.

In traditional system, the different behavior of the strings forces the inverter to work on a point of the V-I curve which optimizes only some of the strings. Each single string would need tobe optimized to collect all the energy.

MPPT String Boost can collect this energy and make it available to the centralized inverter.

- Different string length and slope can be used in the same plant
- Improve output for unbalanced and aged strings
- Detect and monitor the health of PV strings

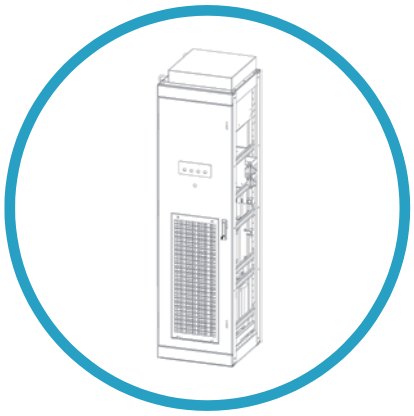
MPPT String Boost is available in eight and sixteen inputs models, suppliedin a kind of **“**Active Combiner Box**”**. The monitoring functionalities are integrated. All the information about the string’s behavior will be available onthe Operator Panel.

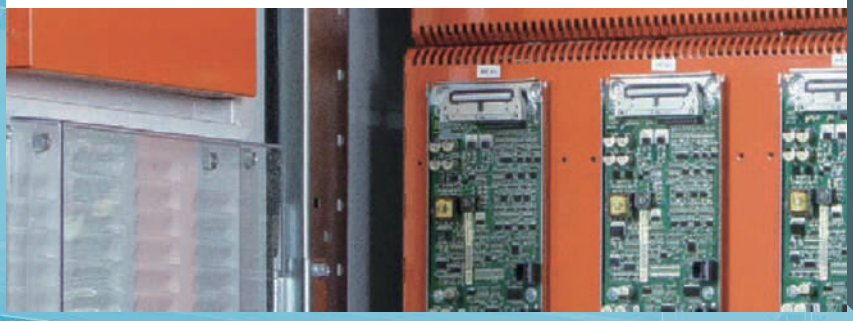
Other advantages:

- Reduction of cables size
- Higher efficiency between boosters and inverters
- Working point monitoring function
- Different panel technology can be used in the same plant

	EEI MPPT 200kW	EEI MPPT 100kW
PV INPUT PARAMETERS		
N° of inputs	16	8
N° of MPPT	8	4
Voltage range	450~750V	450~750V
Max Current per input	20 A	20 A
OUT PARAMETERS		
N° of output	2	2
Rated output voltage	750 V	750 V
Disconnectin device	DC switch 1000V	DC switch 1000V
EFFICIENCY		
Maximum	>99%	>99%
GENERAL DATA		
Dimensions (W / H / D)	1300x550x260 mm	1300x550x260 mm
Weight	80 KG	70 KG
Operating temperature range	-10°C~ +50°C	-10°C~ +50°C
Cooling	Natural Cooling	Natural Cooling
Power supply	Self-powered	Self-powered
Protection degree	IP 54	IP 54
Communication	RS485- WIFI(optional)	RS485- WIFI(optional)
PROTECTIONS		
Input protection	Fuse on both positive and negative	Fuse on both positive and negative
Output protection	SPD	SPD

DC BATTERY CHARGER SERIES





INTEGRATE YOUR ENERGY STORAGE

EEI DC Battery Charger Series
for an easy and fast energy storage expansion

DC Battery Charger Series is the solution for integration of battery in Storage Systems and also in Hybrid Systems.

It is designed to offer wide voltage range of battery connection, with dedicated input for each battery rack for the most flexible managememt of you Energy Storage.

The hallmarks of the DC Battery ChargerSeries converters are:

- Wide battery voltage range
- Extended energy capacity thanks to modularity and parallel
- Dedicated and independent input for each battery rack
- Battery control via standard communication protocol

	EEI BC 100-L	EEI BC 300-L
BATTERY INPUT PARAMETERS		
Rated power	100 kW	300 kW
Voltage range	500 ~ 730 V	500 ~ 730 V
N° of input	2	3
Max Current per input	100 A	200 A
Max S.C. Current per input	40kA	40kA
EFFICIENCY		
Maximum	> 98 %	> 98%
GENERAL DATA		
Dimensions (W / H / D)	400 / 2300 / 600 mm	600 / 2300 / 600 mm
Weight	300KG	500KG
Operating temperature range	0°C / +50°C	0°C / +50°C
Max humidity (non-condensing) / Max altitude	95 % / asl 2000m	95 % / asl 2000m
PROTECTIONS		
Battery Side Disconnection Device	MCCB	MCCB
IMD	Optional	Optional

	EEI BC 100-H	EEI BC 300-H
BATTERY INPUT PARAMETERS		
Rated power	100 kW	300 kW
Voltage range	650 ~ 1000 V	650 ~ 1000 V
N° of input	1	3
Max Current per input	170 A	160 A
Max S.C. Current per input	40kA	40kA
EFFICIENCY		
Maximum	> 98 %	> 98%
GENERAL DATA		
Dimensions (W / H / D)	400 / 2300 / 600 mm	600 / 2300 / 600 mm
Weight	300KG	500KG
Operating Temperature Range	0°C / +50°C	0°C / +50°C
Max humidity (non-condensing) / Max altitude	95 % / asl 2000m	95 % / asl 2000m
PROTECTIONS		
Battery Side Disconnection Device	MCCB	MCCB
IMD	Optional	Optional

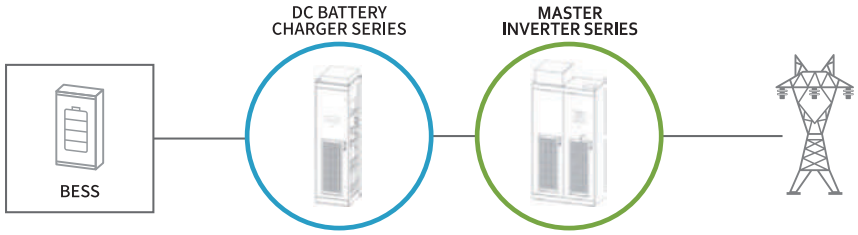
Application

Efficiency of
energy
storage systems

Solutions Overview

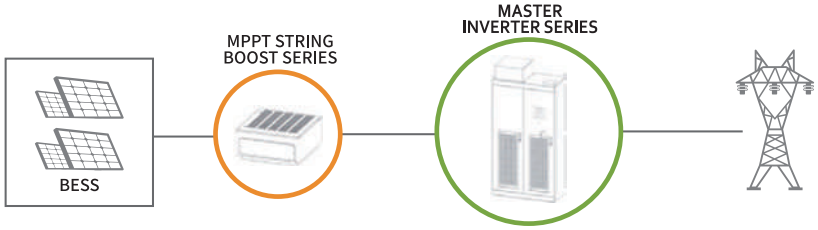
Pure Energy Storage System

SOLUTION 1 - EEI Master Inverter with DC Battery Charger for Energy Storage solution with huge battery typeintegration. This configuration allows to expand the batterystorage in future only integrating more DC Battery Charger and gives the maximum flexibility of the system with dedicated input for each battery rack.



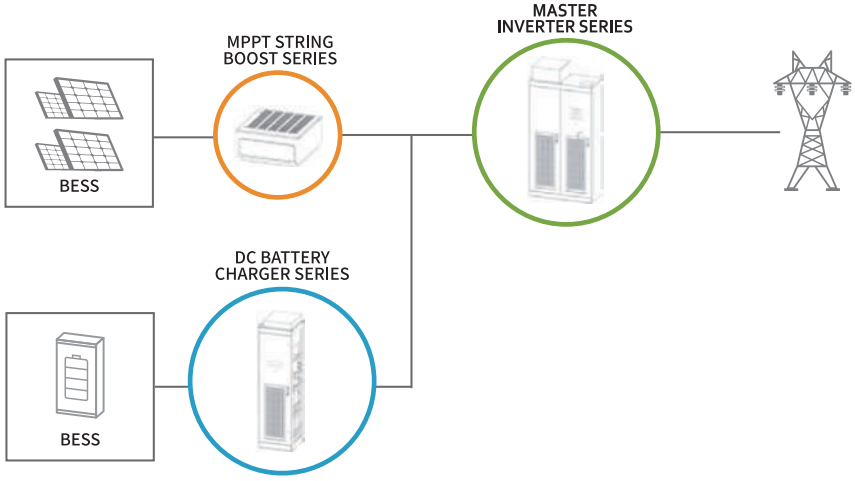
Pure Solar Energy System

SOLUTION 2 - EEI Master Inverter with MPPT String Boost for higher energy production, the Solar plant withdistributed MPPT control to maximize the investment or to refit the Solar plant with latest technology and flexibility on future battery integration and expansion.



Hybrid Solar and Battery System

SOLUTION 3 - EEI Master Inverter with MPPT String Boost and DC Battery Charger for hybrid integration of solarand battery conversion with the most flexible and expandable configuration. Ideal solution for new Solar plants with battery backup for maximize the investment but also for microgrid projects. This configuration allows to expand the battery storage in future only integrating more DC Battery Charger if the backup need increases or the Solar plant is expanded.



Application

Application	Advantage
Frequency Regulation	Offering frequency regulation to the grid operator
Renewable Utilization	PV & Wind Power Smoothing
Micro Grid	Distributed Power Networking
Peak Shaving & Load Leveling	Storing energy during times of lower demand and releasing energy when demand peaks
Power Quality	By introducing harmonic filters or reactors the harmonics are eliminated and the result is more efficient power usage and cost savings

PCS

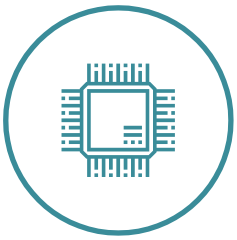
Power Conversion System

應 用

EEI能源逆變器常用於：

- 太陽能板
- 混合電力發電廠
- 提升能源品質
  （例如 電壓調節）
- 削峰填谷
- 平衡負載
- 離網時提供電源（ＵＰＳ）
- 管理能源平衡

逆 變 器



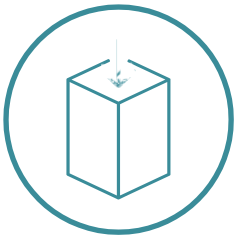
逆變器的外殼由鋼板組成，
可從前門與後面板開啟修繕
逆變器規格：

- IGBT電源電路、薄膜電容器和低電感連接
- 控制參數的數據管理、診斷警示、專用控制器與I/O 信號來自DSP軟體
- 400V 三相中性交流輸出

安全▪可靠

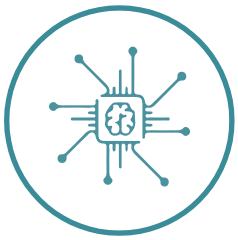
逆變器是依照嚴格的生產流程與測試所製造而成。
並有安裝電力保護的啟動裝置，防止逆變器損壞所有產品皆由EEI研發，並有ISO 9001認證。

主要組成零件



三相輸出斷路器，超快速
熔斷器、插入式電網側接觸器，
鐵芯三相濾波電抗器

輔助和控制電路元件



- 24Vdc 輔助服務電源
- 230Vac 輔助服務電源
- 保護內部風扇的斷路器
- 輔助電路斷路器
- 電源線和信號線接線端

溝通介面

EEI 轉換器配有數據記錄器與觸控螢幕，可存儲日誌文件和警報列表。通訊協議為 TCP/MODBUS。
提供附加部分:

- 手動控制開關
- 電壓信號燈
- 緊急按鈕

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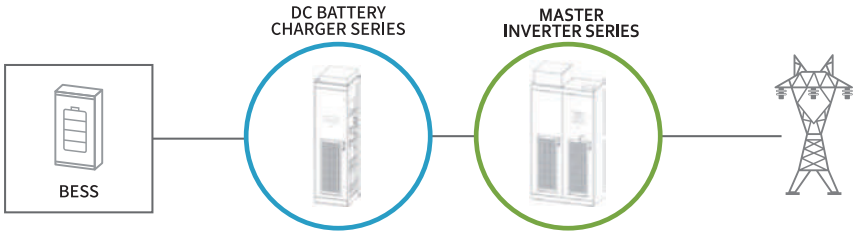
CustomerService@eukapower.com
03-555-2988
新竹縣竹北市環北路一段323號6樓
傑明新能源股份有限公司

彈性配置方案

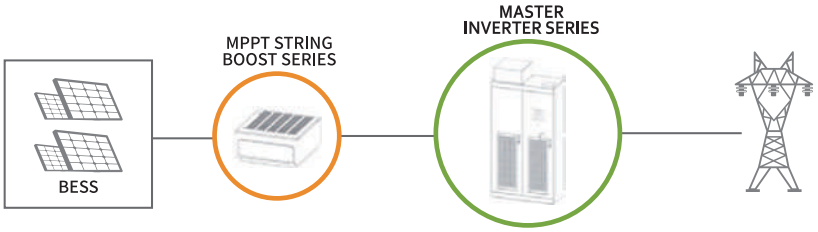
方案一 儲能系統

逆變器與電池充電器之組合，可集成大容量電池成儲能方案。 本方案具備在未來集成更多電池充電器以擴展電池容量之彈性，而電池充電器皆為每個電池組架設有其專屬輸入埠。



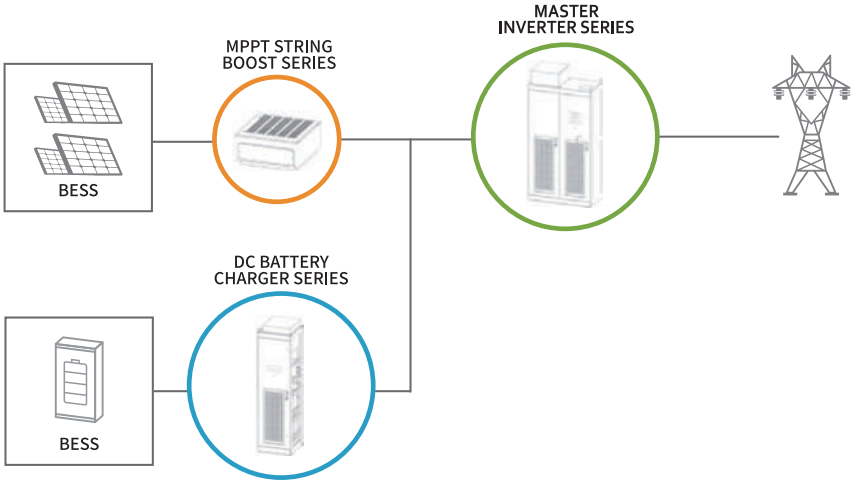
方案二 太陽能系統

逆變器與最大功率追蹤(MPPT)優化器之組合，可獲致更高發電產出，太陽能電站可因而在投資上獲取最大收益。該電站亦具備未來加裝電池之改造彈性。



方案三 結合電池儲能的太陽能電站

逆變器、最大功率追蹤(MPPT)優化器與電池充電器之組合，將構成太陽能與電池綜合集成解決方案，並可視需求靈活擴展。結合電池儲能的太陽能電站是理想解決方案，一可最大化投資收益，二可作為後備電源，亦適用微電網專案。本方案可透過集成更多電池充電器以因應不同場域電量的需求。



ESS 儲能系統的應用效能

應用項目	優點
頻率調節	專有算法可輕鬆快速地響應電網信號，提供頻率調節等輔助服務
再生能源利用	太陽能／風能平滑化
微電網	創建獨立控制的本地發電電網，確保關鍵負載的安全性，防止受任何意外事件影響
削峰填谷	離峰時間補充儲能系統電量，可利用時間電價降低充電成本
熱備用	在發電或輸電中斷時，提供備用電能
負載平衡	平衡日夜間用電的差距，減少夜間電力的浪費及補足日間高峰用電的不足
電能品質	提供功率因素校正功能和電壓調節功能