

# Aimtec Photovoltaic Converters



# Agenda

**1** Introduction to PV

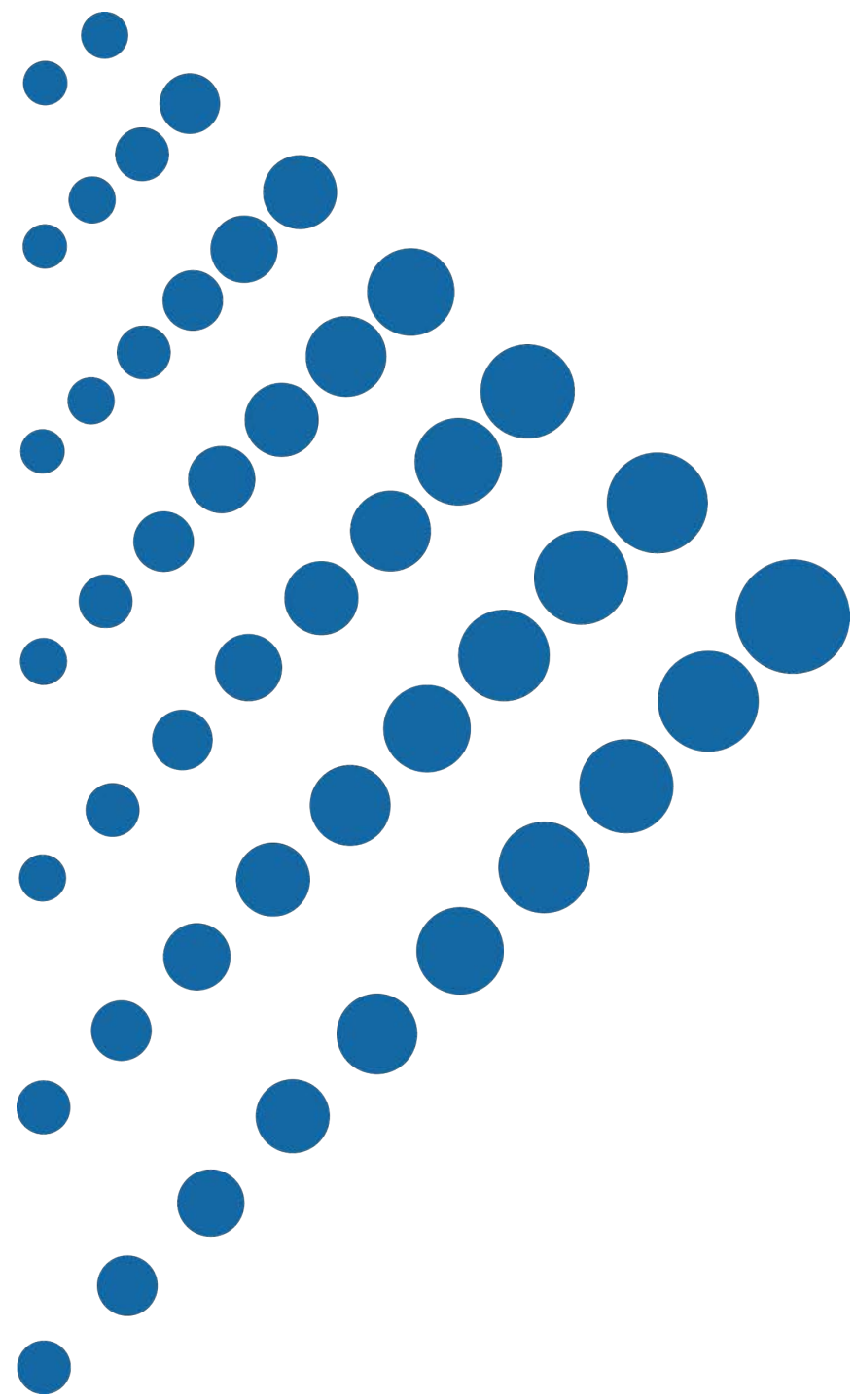
**2** Aimtec Converter Applications

**3** Features

**4** Products

**5** Benefits





# Introduction to Photovoltaics





## What is PV?

Generally speaking, Photovoltaics (PV) is a term used to describe the technology used to convert sunlight into electrical current using semiconducting materials like silicon.

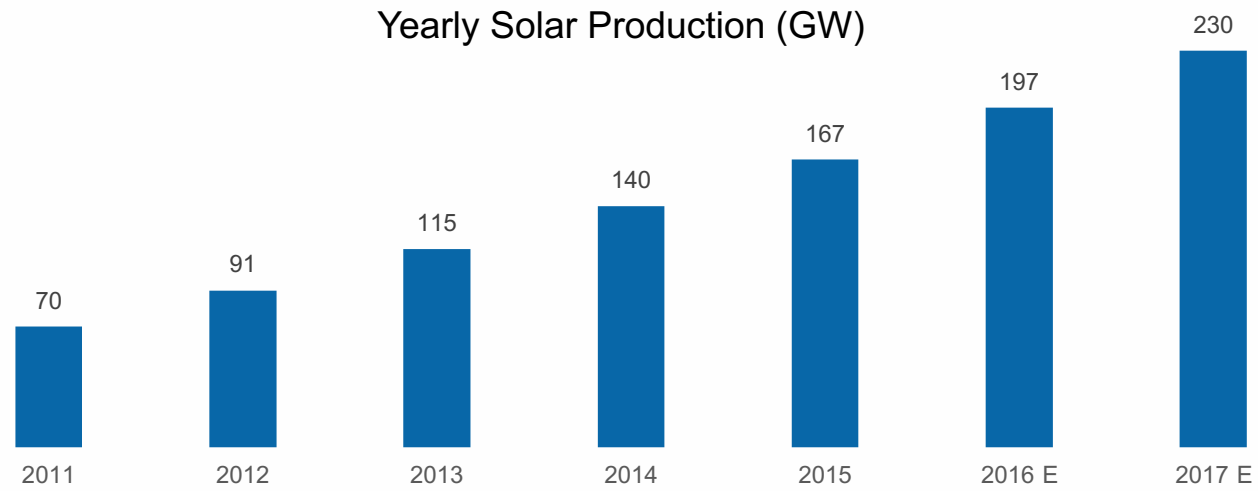
The advantages of using solar is that it a renewable energy that does not emit any greenhouse gasses (GHG) while it is in operation.



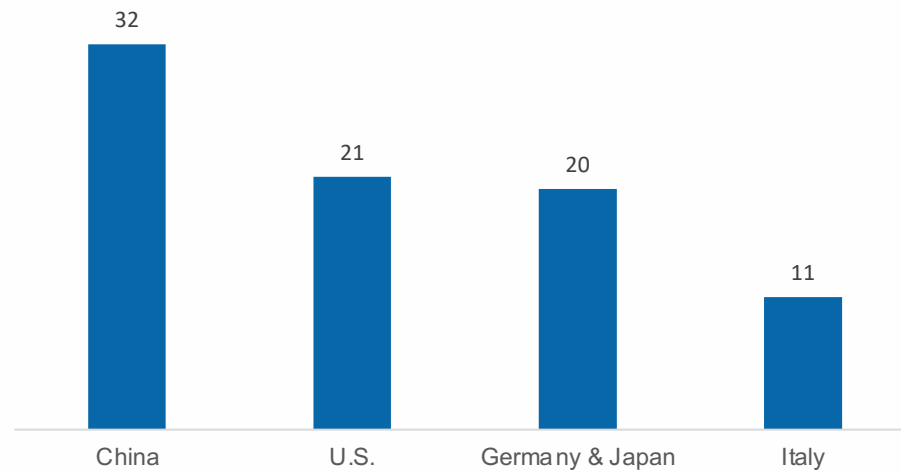


# Solar Growth

### Yearly Solar Production (GW)



### Solar Production by Country (GW)



## Costs are decreasing

As number of installations increase, the costs decrease due to the following:

- Economies of scale
- Technological advancements

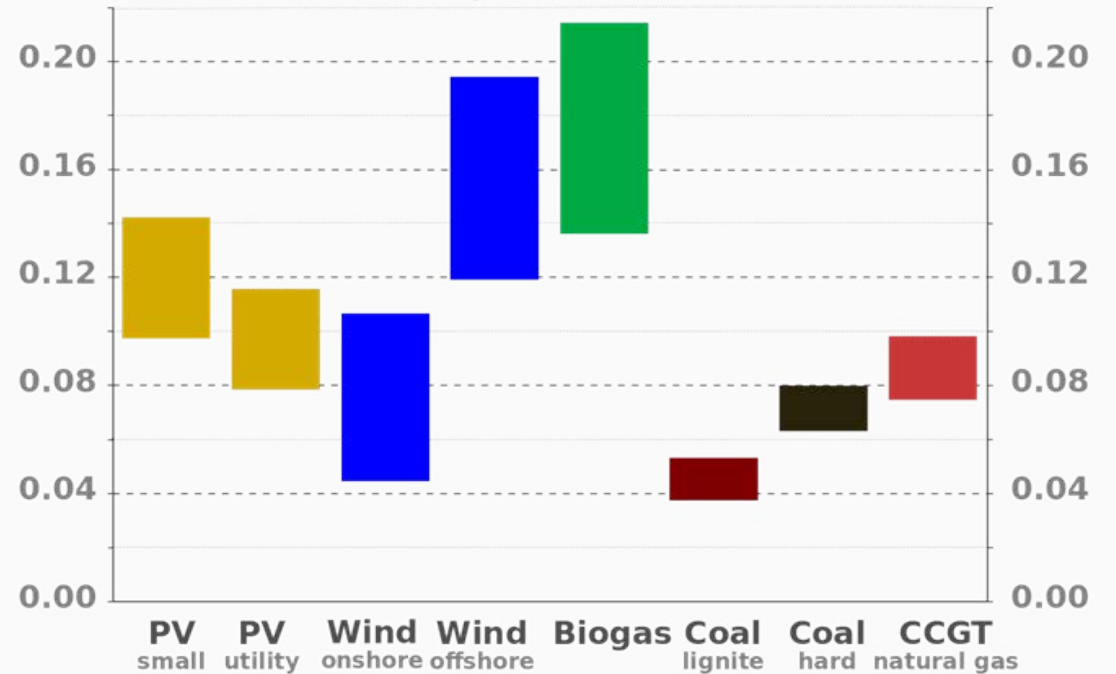
Price dropped over 70% in the last 10 years

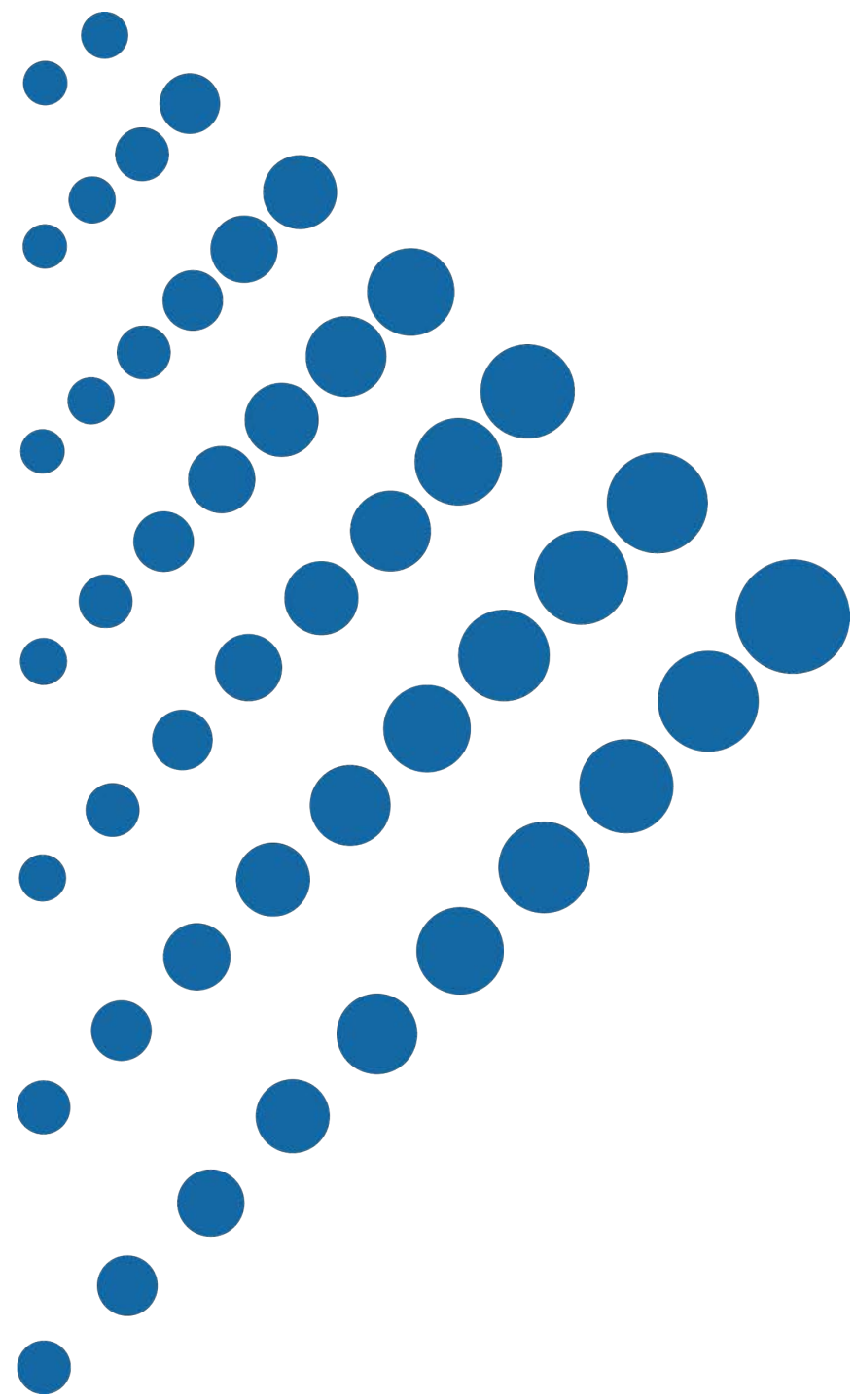
- German tariff ranges from \$0.09 to \$0.13/kWh supplied to the grid
- In the US, companies and home owners can deduct 30% of the cost of the PV system.

Many other programs exist across the world

### Levelized Cost of Electricity in € per kWh

Source: Fraunhofer ISE, Germany November 2013





# Aimtec Converter Application





## Aimtec Power Supply Requirements for PV Applications

1. High voltage for the combiner box and similar applications that connect directly to multiple solar arrays:
  1. Ultra-wide input voltage range
  2. CSP
  3. OVP
  4. OCP
2. Power supply for powering the electronics (microprocessors etc.):
  1. High isolation between circuits
  2. High efficiency to reduce power consumption and heat produced
  3. High reliability to minimize equipment failures after deployment



## Power Supplies are Used in Many PV Applications

### PV Combiner Box

#### 1. Communications Chips:

Fixed input 1 W with SV/3.3V output

#### 2. Control Chip. DSP etc.

Non-isolation BUCK chips or LDO for lower voltage.

#### 3. Main Power Supply:

Usually get the power from PV array or backup battery

### PV Inverter

#### 1. Main Control System

PV power : AM40W-6001SS-NZ  
DC-DC 15W-50W

#### 2. 485 communication

DC-DC fixed input 1W series

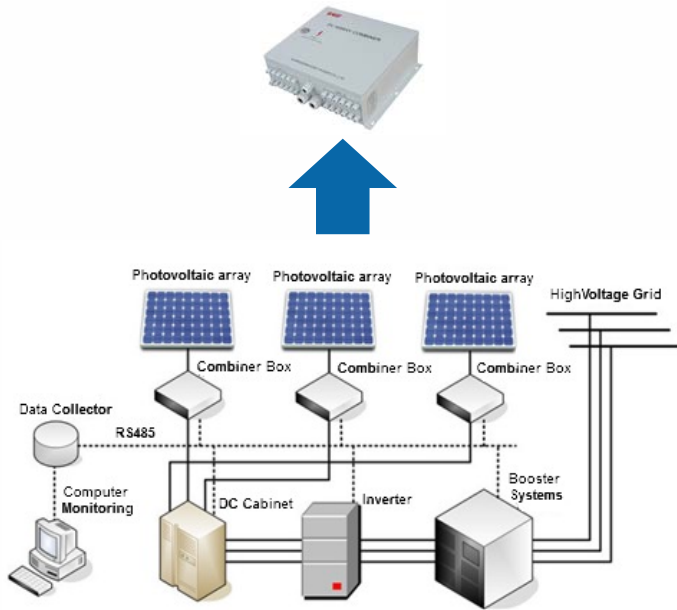
#### 3. Driving circuitry

### PV Array

Photovoltaics MMPT Tracker

# Segmentation and Power Solution

## PV Combiner Box



### AM5W-60005S-NZ

Function: Main power of control panel

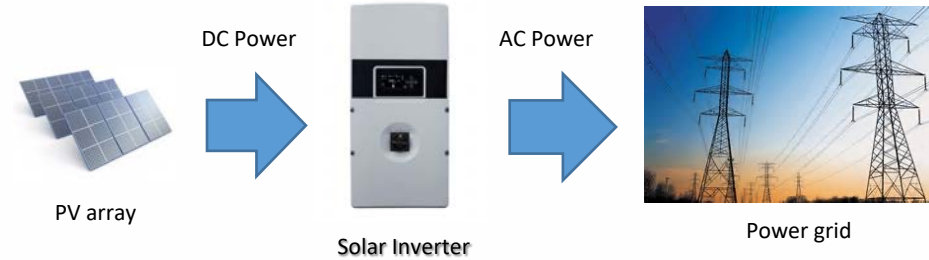
### AM1DS-0505SH30-NZ

Function: Power supply of hall sensor

### AM1DS-0505SH30-NZ

Function: Power supply of RS485

## Solar Inverter / Combiner



### AM15E-2415SZ

Function: Power supply of main processor and entire control board

### AMSRI-7805-NZ

Function: Power supply of digital circuit and 485

## Control Unit of a Combiner Box

### AM3T-2405S-NZ

Function: Main power of control panel

### AM1DS-0505SH30-NZ

Function: Power supply of RS485

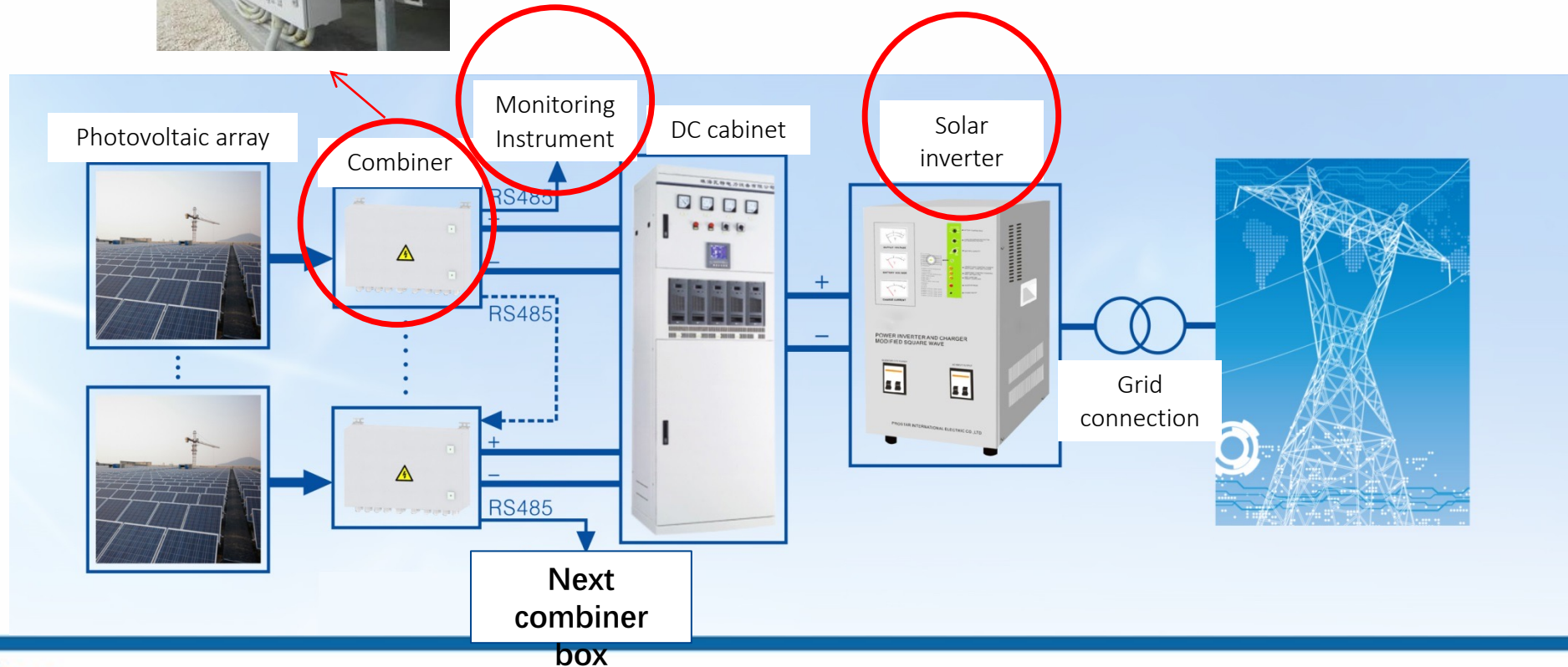


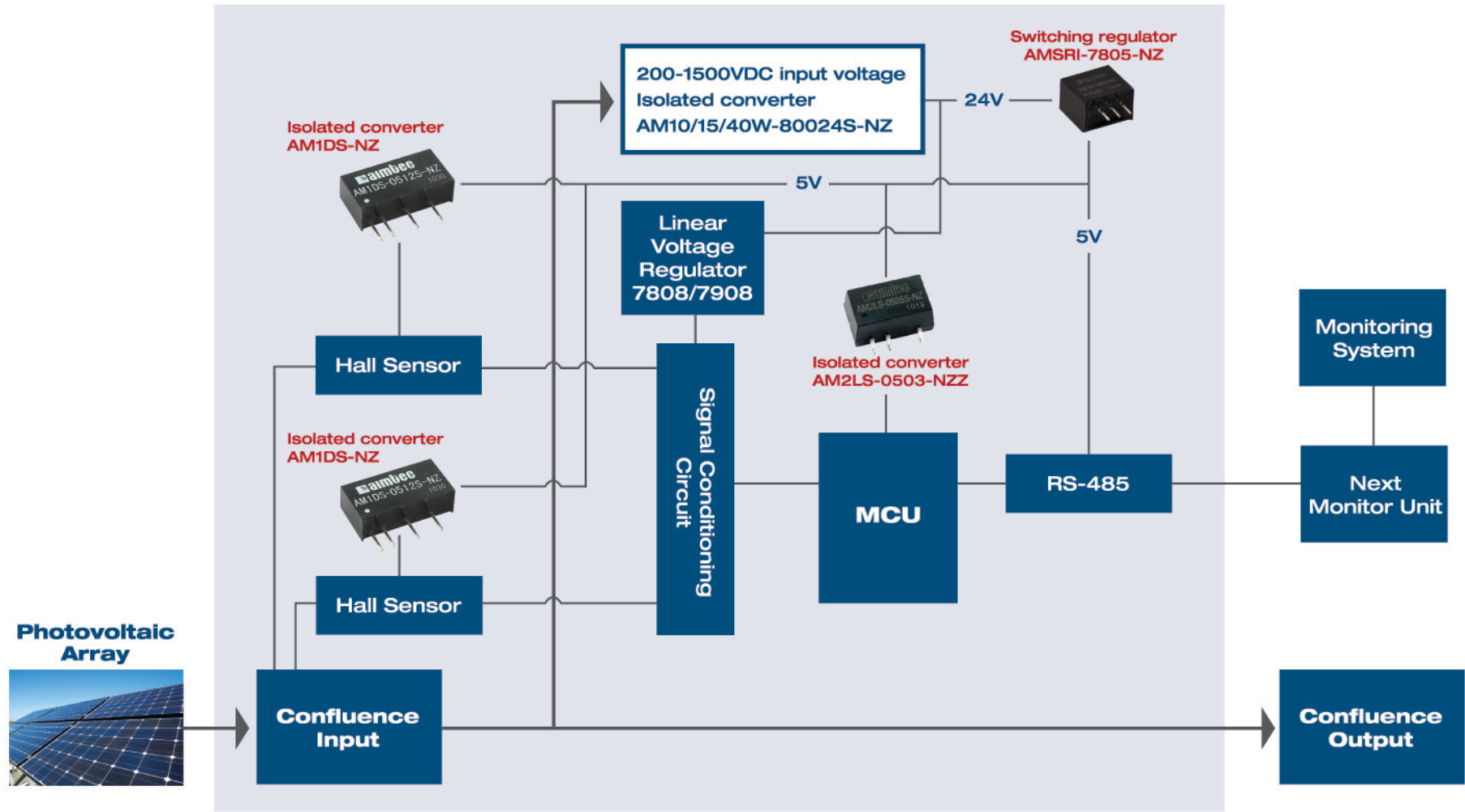
# Segmentation and Power Solution

PV converters can be used in :

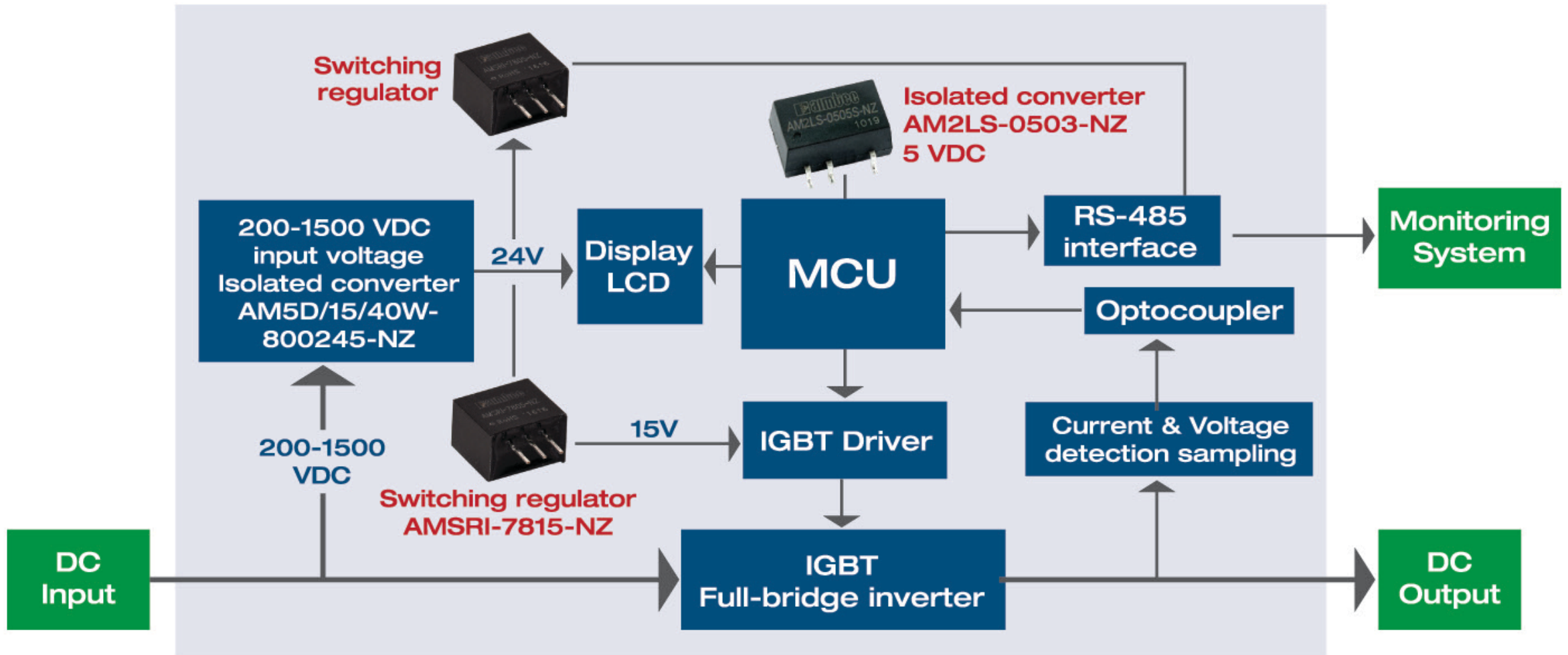


- Combiner Box
- Solar Inverter
- Monitoring Instrument





Power Solution for Monitoring Unit of PV Combiner Box



Power Solution for Monitoring Unit of Photovoltaic Inverter



## Real World Applications

### Off-Grid

- Solar Home Systems
- Solar Water Pump systems
- RV and Marine Power
- Oil monitoring systems
- Solar Bus
- Remote Telecommunication stations

### Generation

- Small size PV plant
- PV charging
- Utility scale applications
- Building integrated photovoltaics

### Other

- Large size PV plant
- Rooftop

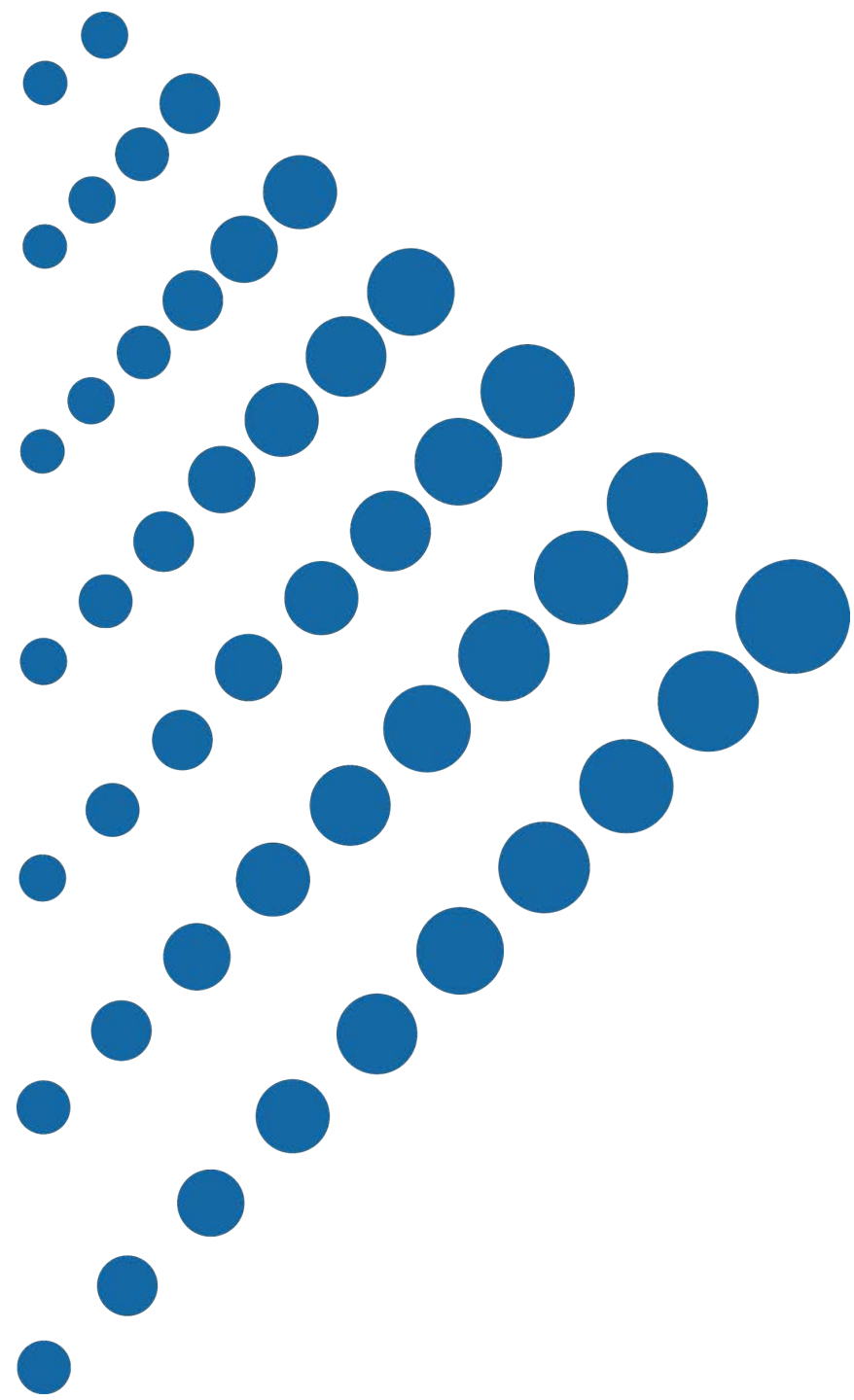


## Popular Applications

PV Power Generation  
High Voltage Inverters  
Railway Stations







# Features



## New Ultra-Wide Input DC-DC Converters

4000VAC isolation

100-1500VDC input across 3 different ranges and 18 different products





## Versatile Specifications & Features



**200~1500VDC**  
Ultra-wide Input Voltage



Suitable for high altitudes  
Applications(>5000 meters)

# CE/UL

**EN62109** Certified  
**UL 1741** Certified



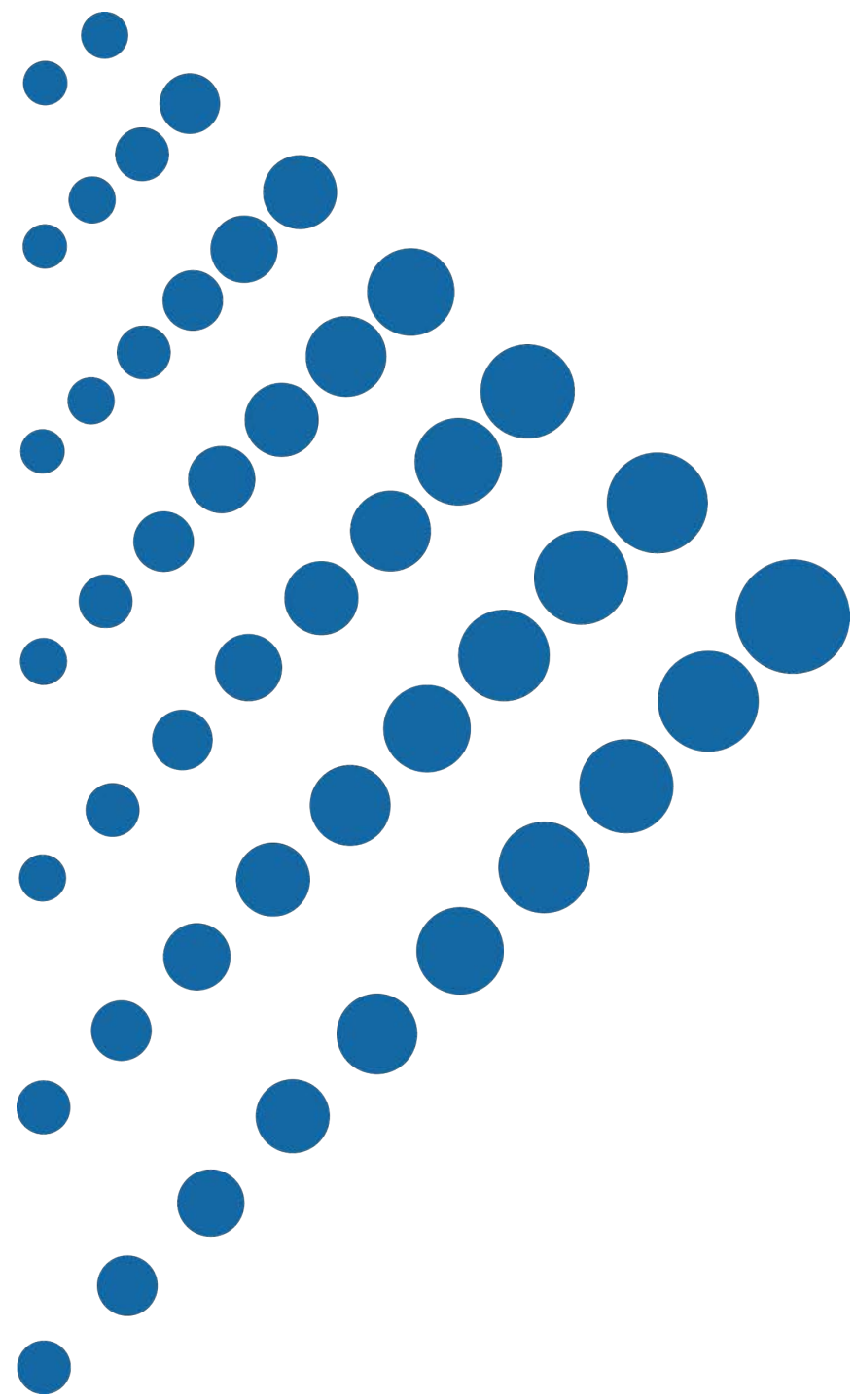
**Input under-voltage**  
**protection**

## Product Highlights



■ 5, 10, 15, 40 & 45 Watt DC/DC ■ up to 1500VDC input voltage ■ I/O isolation up to 4000VAC

New	Series	Input (VDC)	Single Output (VDC)	Operating Temperature (°C)	Isolation (VDC)	Case	Features
<b>5 Watt</b>							
	AM5W-NZ	100-1000	5	-40 to 70	4k	Encapsulated	Continuous SCP, OCP, OVP, Reversed connection protection
<b>10 Watt</b>							
	AM10W-NZ	100-1000, 200-1500	5, 9, 24	-40 to 70	4k	Encapsulated	Continuous SCP, OCP, OVP, Reversed connection protection
<b>15 Watt</b>							
	AM15W-NZ	100-1000, 200-1500	12, 15, 24	-40 to 70	4k	Encapsulated	Continuous SCP, OCP, OVP, Reversed connection protection
	AM15WM-NZ	200-1500	12, 15, 24	-25 to 70	4k	Encapsulated	Continuous SCP, OCP, OVP, Reversed connection protection
<b>40 Watt</b>							
	AM40W-NZ	200-1200, 200-1500	12, 15, 24	-40 to 70	4k	Encapsulated	Continuous SCP, OCP, OVP, Reversed connection protection Input UVP
<b>45 Watt</b>							
	AM45W-NST	150-1500 (1600 abs. max)	15/15 (dual separated)	-40 to 85	4K		Continuous SCP, OCP, OVP, Reversed connection protection Input UVP

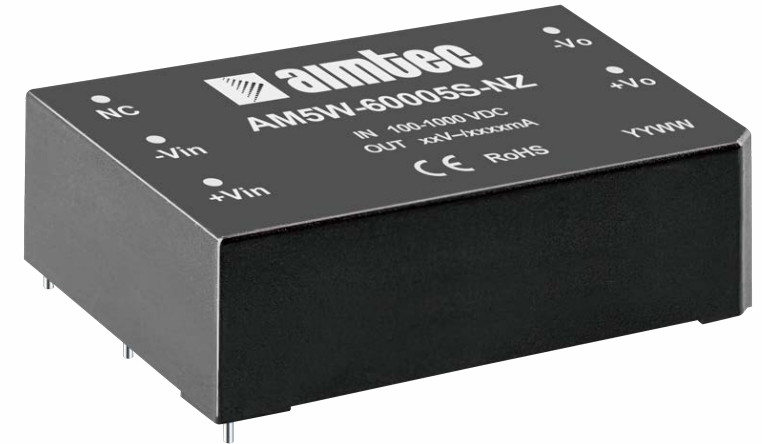


# Products



## Aimtec's Power Solution Products

- **PV Monitoring** → **NEW FAST GROWING MARKET**  
AM1LS-0505S-NZ, AM1DS-0505S-NZ, AM5W-60005-NZ
- **PV Home applications**  
AMEL5-5SJZ, AM1DS-0505S-NZ
- **PV Charging Stations – control unit** → **NEW MARKET**  
AM40W-800xx-NZ, AM1LS-0505SH30-NZ, AMSRI-7805-NZ
- **PV Off-Grid application**  
AM40W-80015-NZ, AMSRI-7805-NZ
- **Solar pump – control unit** → **NEW MARKET**  
AM40W-800xx-NZ, AM1LS-0505S-NZ
- **Others – solar tracking solutions**  
AMSR1-78-NZ, AMSR1.5-78-NZ





## Aimtec Products Used in PV Installations

### PV Series

AM5W-NZ  
AM10W-NZ  
AM15W-NZ  
AM40W-NZ  
AM45W-NST



### DC-DC

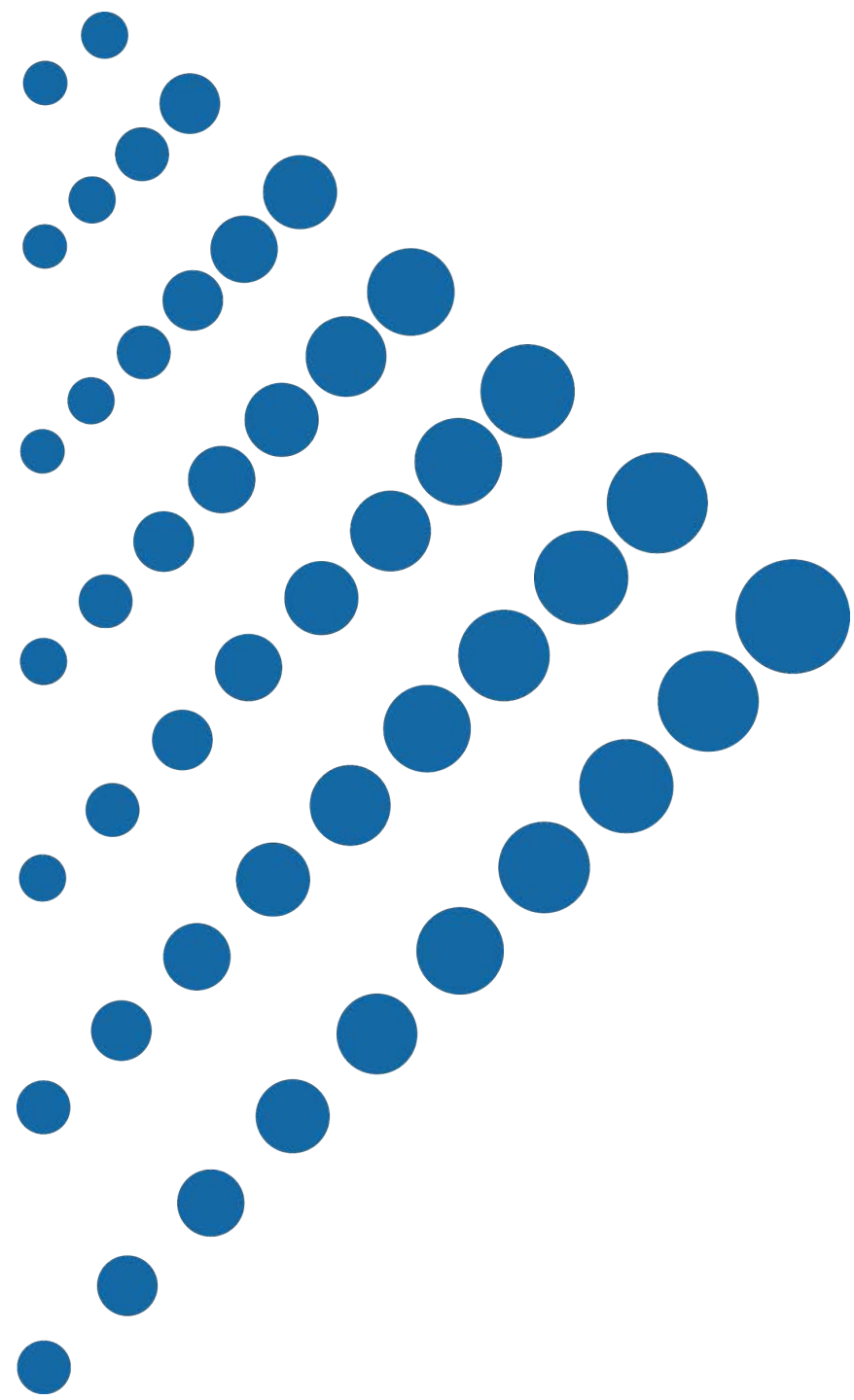
AM6/10/15/20/30C(W)- Z  
AM6/10/15T-Z  
AMSR1.5-NZ  
AM10/15/20/30E-Z



### Switching Regulators

AMSRI-78-NZ  
AMSR1-NZ  
AMSR1.5-NZ





# Benefits



## Advantages of 1500 VDC PV Solution vs 1000 VDC

### Benefits

Less strings and combiner boxes

Less arrays and PV inverters

Less AC subsystems

Lower component count

Lower system cost per Watt

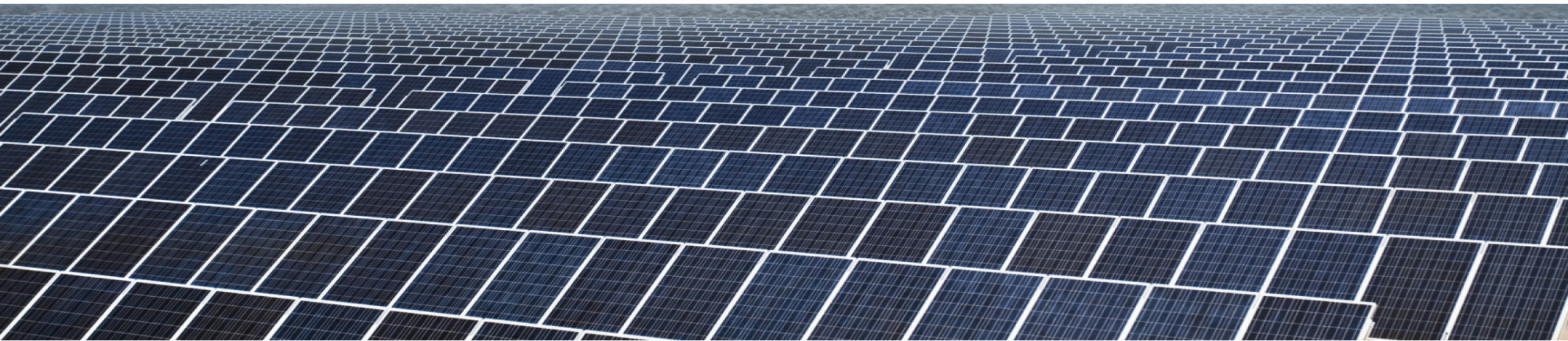
Overall efficiency gains of 1.5 – 2%

Example : 10MW PV power plant

568 less strings

38 less combiner boxes

Total saving: up to \$400K USD  
~0.04 USD/W





## What This Means for the Solar Industry

- New efficiency gains
- More power is created from the same amount of PV panels
- Lower production costs for manufacturers
- Lower overall price of the PV system for the customer
- Lower costs should increase the demand





## The Aimtec Difference in PV Products

- AM5W / 10W / 15W / 40W-NZ series
- Ultra-wide input ranges: 100-1000VDC | 200-1200VDC | 200-1500VDC
- Isolation Voltage: 4000 VAC
- Industrial grade operating temperatures: -40°C~+85°C
- EN62109 certification and pending UL508
- Multiple protection mechanisms
  - Output over voltage protection
  - Short-Circuit Protection (automatic recovery)
  - Input Reverse Voltage Protection- system stability
- Special features
  - No requirement for derating at -40 ~+70°C and 200 ~ 1500 VDC input
  - Best modular solution replacing existing discrete design solutions
  - Best prices on the market
  - LT= Stock or 2-3 weeks for samples



**Thank you for choosing Aimtec!**