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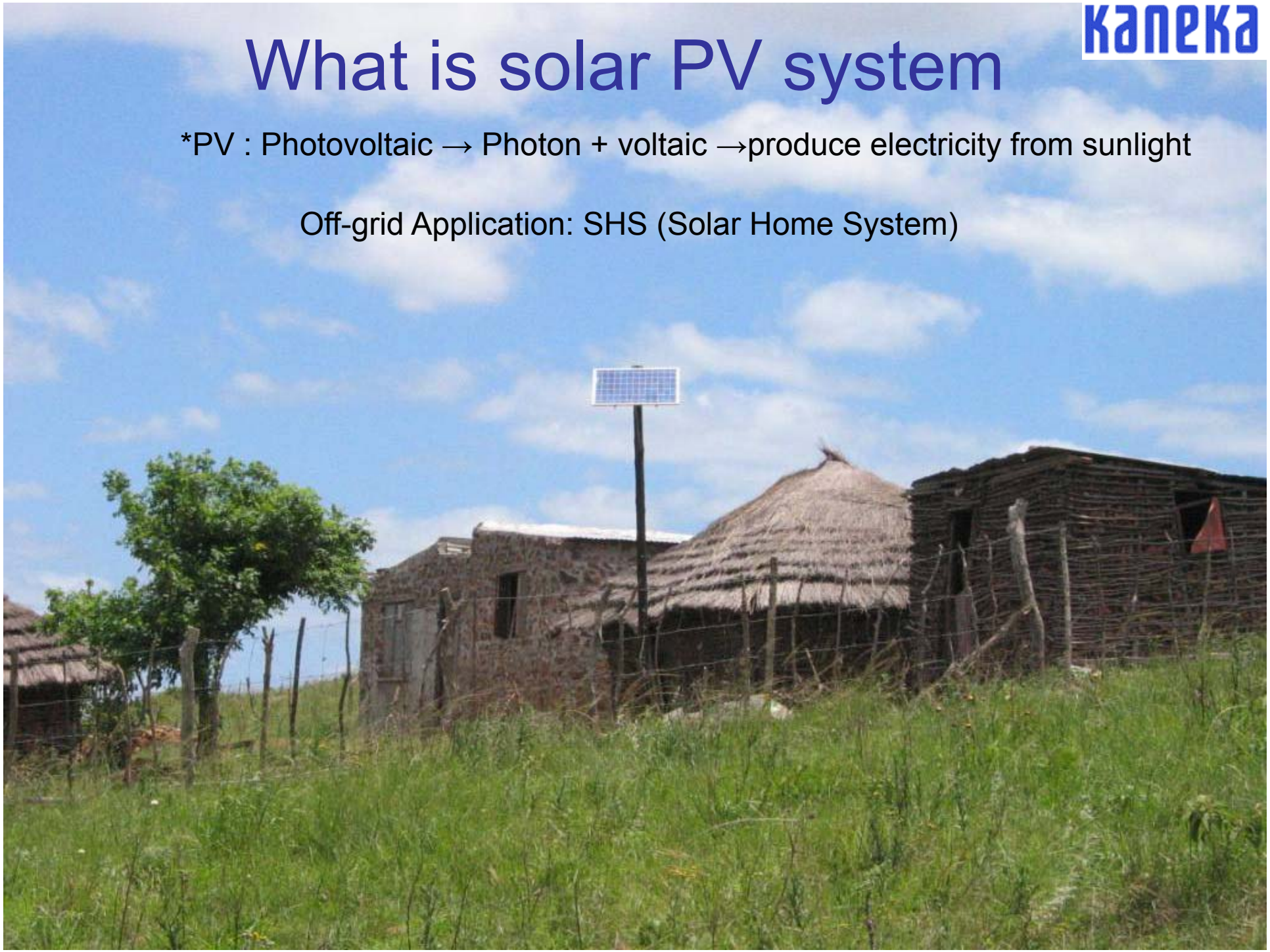
Presentation
for ESDM PV Workshop

July 15th, 2008
KANEKA CORPORATION

What is solar PV system

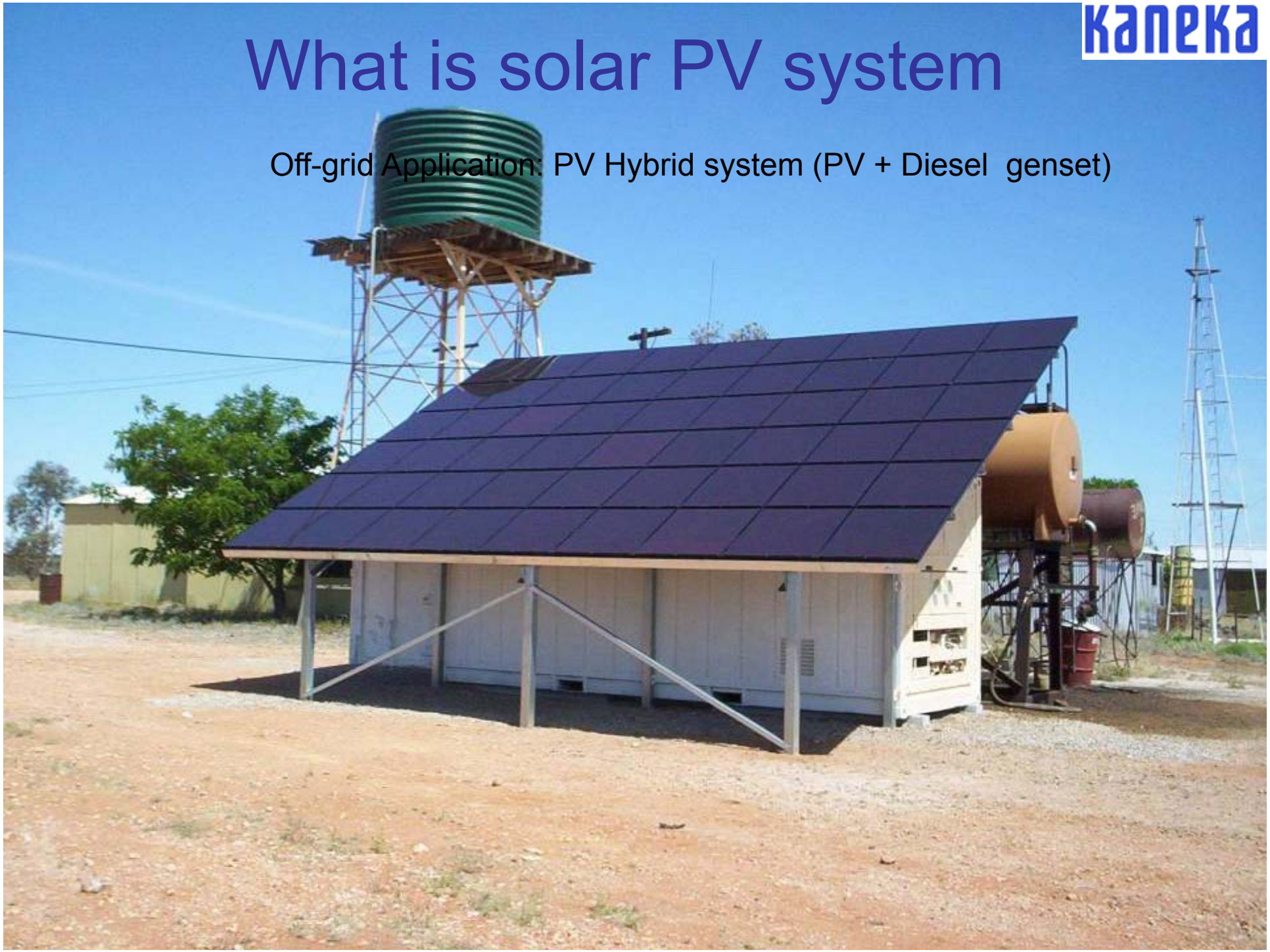
*PV : Photovoltaic → Photon + voltaic →produce electricity from sunlight

Off-grid Application: SHS (Solar Home System)



What is solar PV system

Off-grid Application: PV Hybrid system (PV + Diesel genset)

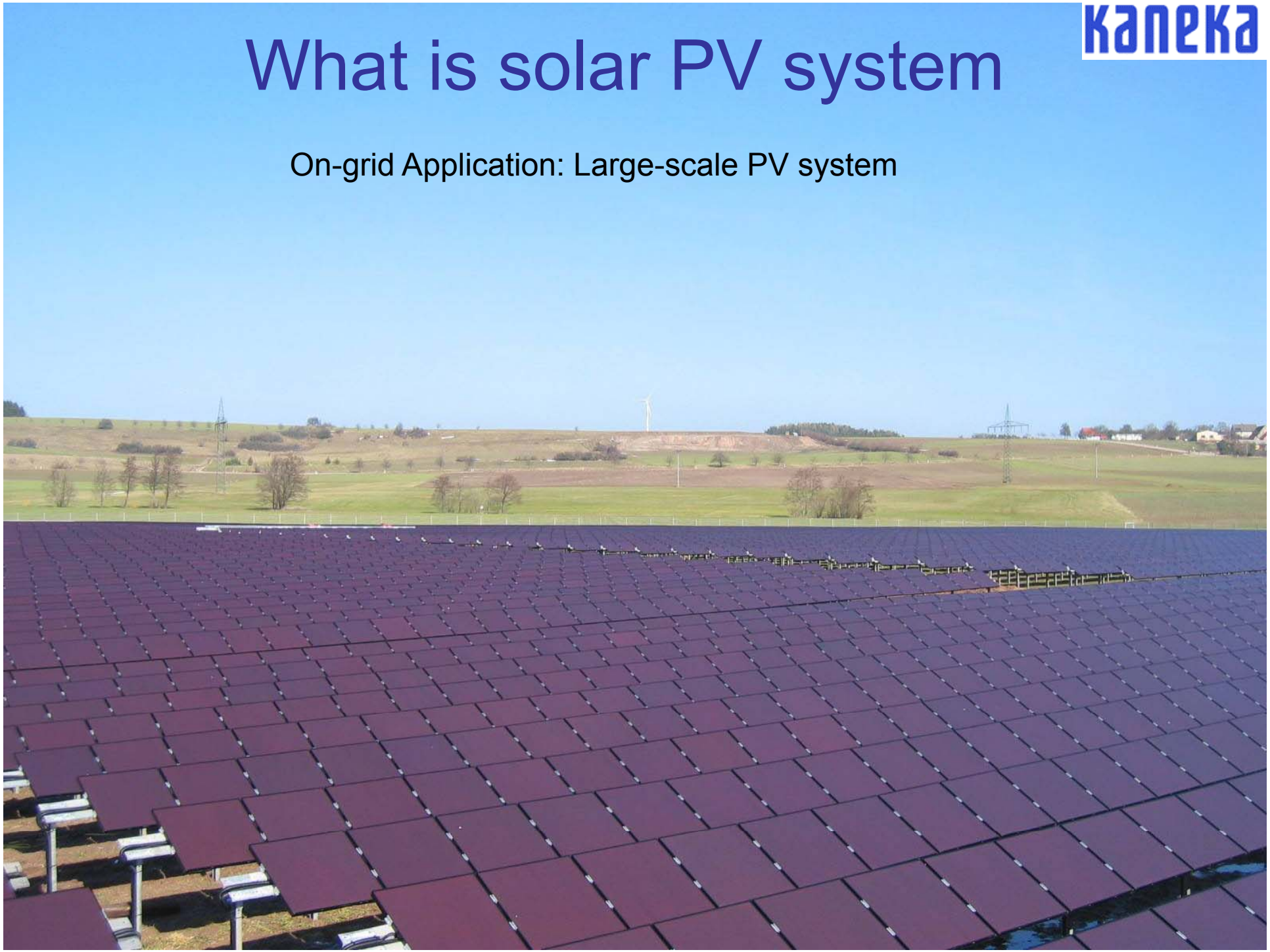


What is solar PV system

On-grid Application: Residential PV system

What is solar PV system

On-grid Application: Large-scale PV system



PV growth worldwide

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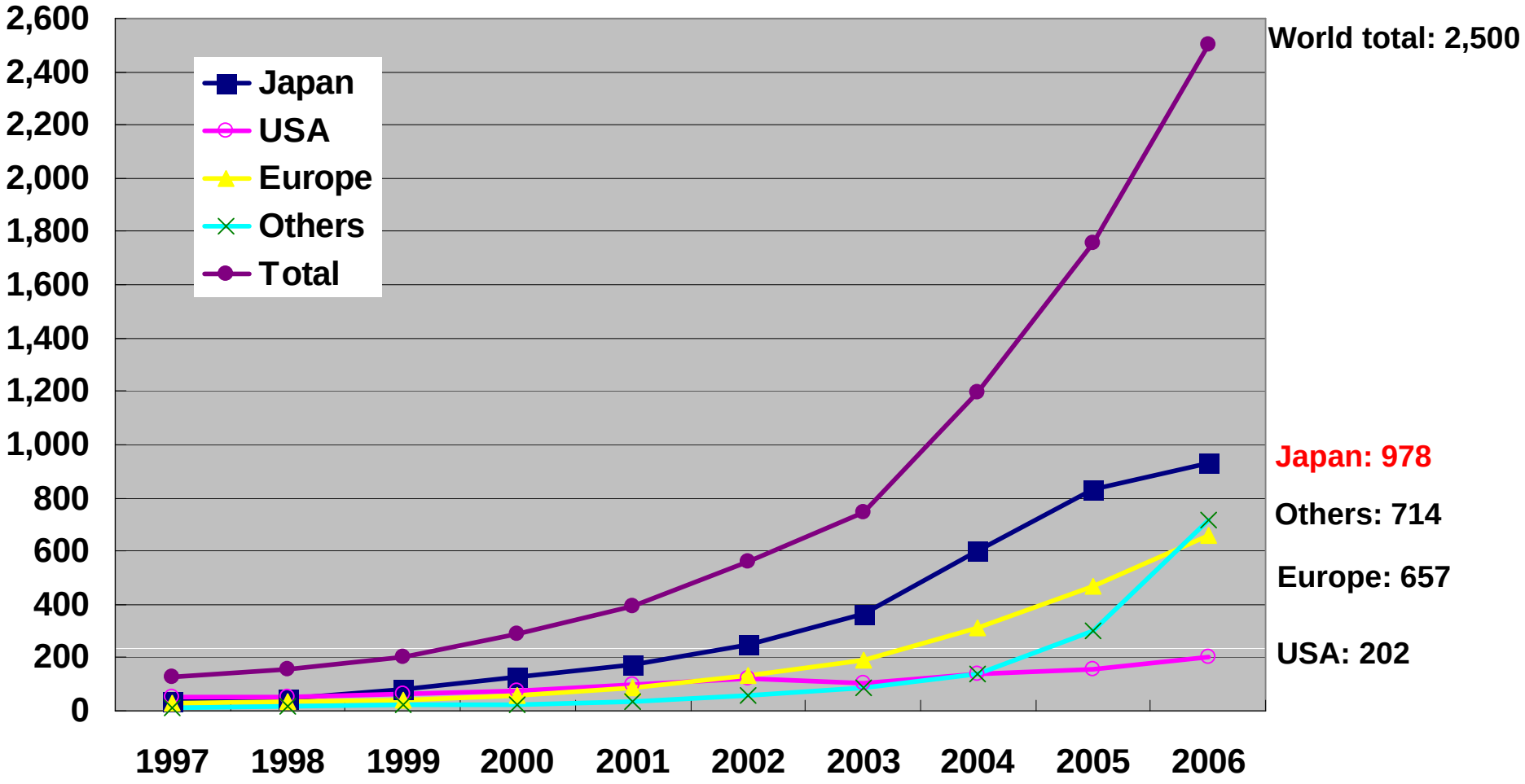
Worldwide PV Production



(Source: RTS Corporation)

PV growth worldwide

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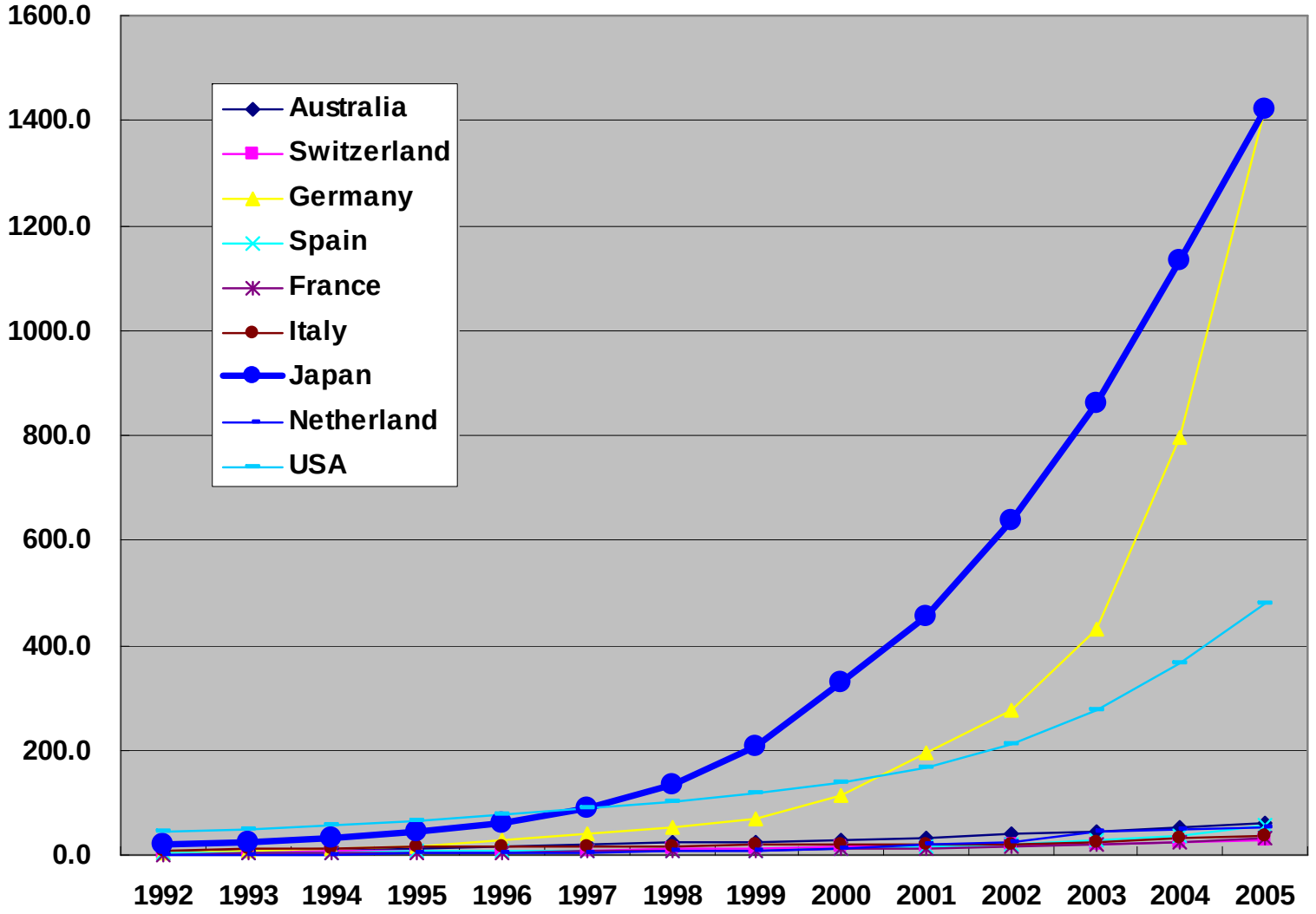
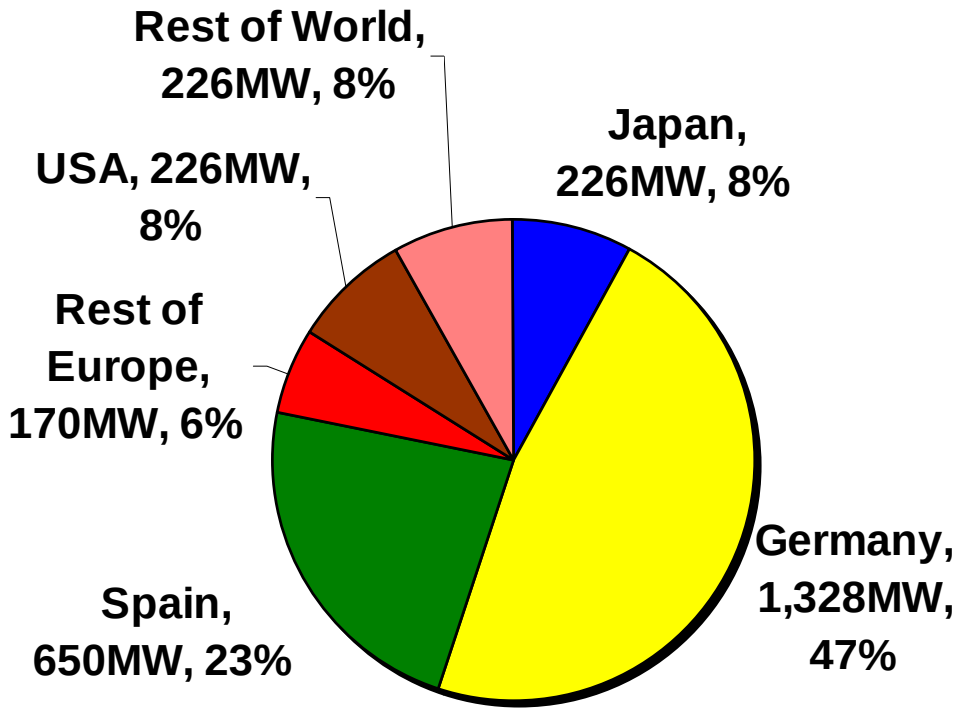
Cumulative worldwide PV installation



(Source: RTS Corporation, Solarbuzz)

PV growth worldwide

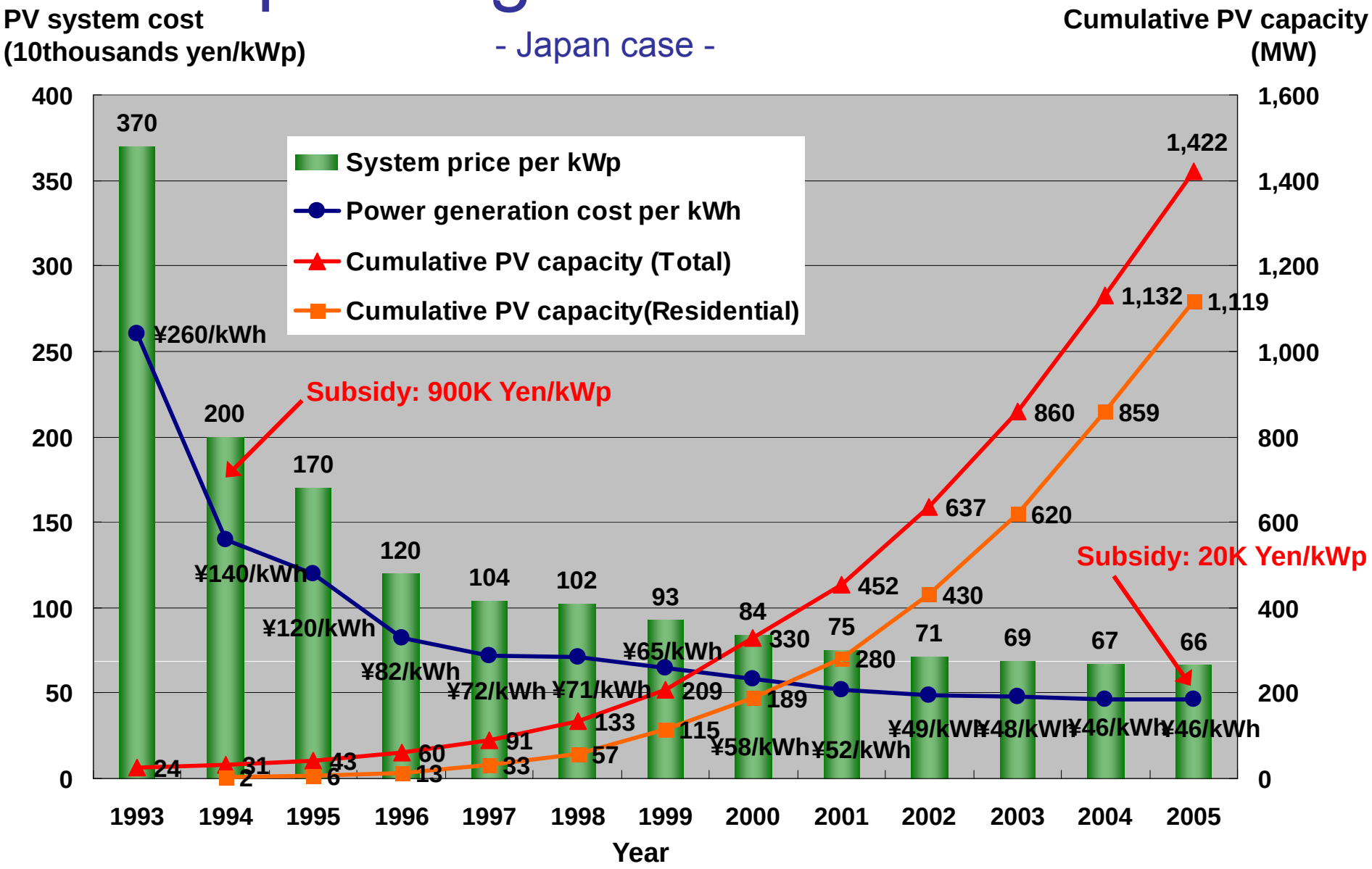
Worldwide PV installations by market in 2007



(Source: Solarbuzz)

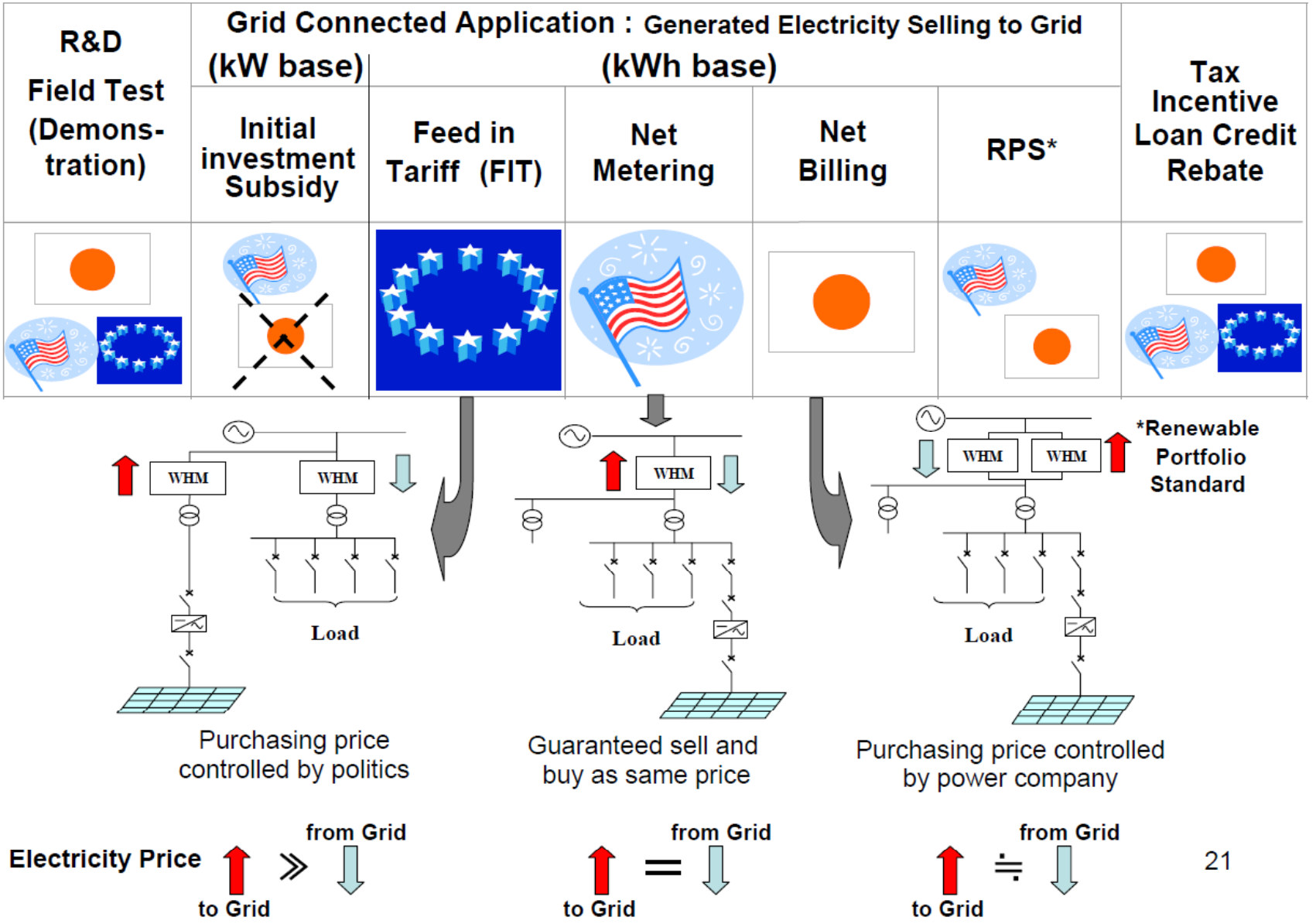
PV power generation cost trend

- Japan case -



(Source: Source: Ministry of Economy, Trade and Industry of Japan)

PV incentives



(Source: JPEA)

Feed-In Tariff

Case of Germany and Spain

	Until 2007/12				Until 2008/12			
	Application	Size	FIT EUR/kWh	Decrease from the past year	Application	Size	FIT EUR/kWh	Decrease from the past year
Germany	Rooftop	≦30kW	0.4921	5%	Rooftop	≦30kW	0.4675	5%
		30～100kW	0.4682			30～100kW	0.4448	
		～1,000kW	0.4630			～1,000kW	0.4399	
		＞1,000kW	—	—		＞1,000kW	0.4399	—
	Free land	—	0.3796	6.5%	Free land	—	0.3549	6.5%
	Period	20years			Period	20years		

	Until 2008/9				Draft			
	Application	Size	FIT EUR/kWh	Decrease from the past year	Application	Size	FIT EUR/kWh	Decrease from the past year
Spain	All application	≦100kW	0.44	—	Rooftop	≦20kW	0.44	—
		～10,000kW	0.4175			20～200kW	0.39	
						＞200kW	0.33	
					Free land	—	0.31	
	Cap/Period	up to 1,200MW/25years			Cap/Period	up to 1,200MW/25years		

Case study: Investment to large-scale PV system

In case of c-Si PV sysem:

Free land installation in Germany	EUR/Wp	EUR/200kWp
System cost	**3.619**	**723,702**
(I) Payment		
Cash	0.724	144,740
Preferential loan (Payback period: 15yrs/Annual interest: 3.5%)	2.895	578,962
Payment total	**3.619**	**723,702**
(II) Annual expenditure		
Repair cost	0.023	4,600
Insurance cost	0.013	2,600
Miscellaneous	0.012	2,400
Annual expenditure total	**0.048**	**9,600**
(III) Amount repaid		
Loan repayment	3.854	770,829
Annual expenditure x 20yrs (inflation rate 2.5%)	1.226	245,232
Amount repaid total	**5.080**	**1,016,061**
(IV) Revenue		
Income from electric power selling (Installation on March, FIT: EUR0.355/kWh for 20yrs)	6.477	1,295,475
Interest income from electric power selling amount	0.325	64,951
Revenue total	**6.802**	**1,360,425**
(V) Calculation of profits and losses		
Revenue in 20yrs	**1.722**	**344,364**
Investment amount	**0.724**	**144,740**
Asset management ratio	**2.379**	
Asset management yield	**4.43%**	

Revenue is calculated based on:
-Generated output power is estimated as 900kWh/kWp/year in Germany.

(Remarks) These are just estimated figures for reference and are not guaranteed ones.

Case study: Investment to large-scale PV system

In case of c-Si PV sysem:

Free land installation in Germany	EUR/Wp	EUR/200kWp
System cost	**3.619**	**723,702**
(I) Payment		
Cash	0.724	144,740
Preferential loan (Payback period: 15yrs/Annual interest: 3.5%)	2.895	578,962
Payment total	**3.619**	**723,702**
(II) Annual expenditure		
Repair cost	0.023	4,600
Insurance cost	0.013	2,600
Miscellaneous	0.012	2,400
Annual expenditure total	**0.048**	**9,600**
(III) Amount repaid		
Loan repayment	3.854	770,829
Annual expenditure x 20yrs (inflation rate 2.5%)	1.226	245,232
Amount repaid total	**5.080**	**1,016,061**
(IV) Revenue		
Income from electric power selling (Installation on March, FIT: EUR0.355/kWh for 20yrs)	7.514	1,502,751
Interest income from electric power selling amount	0.377	75,303
Revenue total	**7.890**	**1,578,053**
(V) Calculation of profits and losses		
Revenue in 20yrs	**2.810**	**561,992**
Investment amount	**0.724**	**144,740**
Asset management ratio	**3.883**	
Asset management yield	**7.02%**	

Revenue is calculated based on:
-Generated output power is estimated as 1,044kWh/kWp/year like Indonesia.

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Case study: Investment to large-scale PV system

In case of a-Si PV sysem:

Free land installation in Germany	EUR/Wp	EUR/200kWp
System cost	**3.619**	**723,702**
(I) Payment		
Cash	0.724	144,740
Preferential loan (Payback period: 15yrs/Annual interest: 3.5%)	2.895	578,962
Payment total	**3.619**	**723,702**
(II) Annual expenditure		
Repair cost	0.023	4,600
Insurance cost	0.013	2,600
Miscellaneous	0.012	2,400
Annual expenditure total	**0.048**	**9,600**
(III) Amount repaid		
Loan repayment	3.854	770,829
Annual expenditure x 20yrs (inflation rate 2.5%)	1.226	245,232
Amount repaid total	**5.080**	**1,016,061**
(IV) Revenue		
Income from electric power selling (Installation on March, FIT: EUR0.355/kWh for 20yrs)	8.572	1,714,345
Interest income from electric power selling amount	0.429	85,867
Revenue total	**9.001**	**1,800,212**
(V) Calculation of profits and losses		
Revenue in 20yrs	**3.921**	**784,151**
Investment amount	**0.724**	**144,740**
Asset management ratio	**5.418**	
Asset management yield	**8.82%**	

Revenue is calculated based on:
-Generated output power is estimated as 1,191kWh/kWp/year like Indonesia.

(Remarks) These are just estimated figures for reference and are not guaranteed ones.

Greater actually generated watt-power compared to c-Si PV modules

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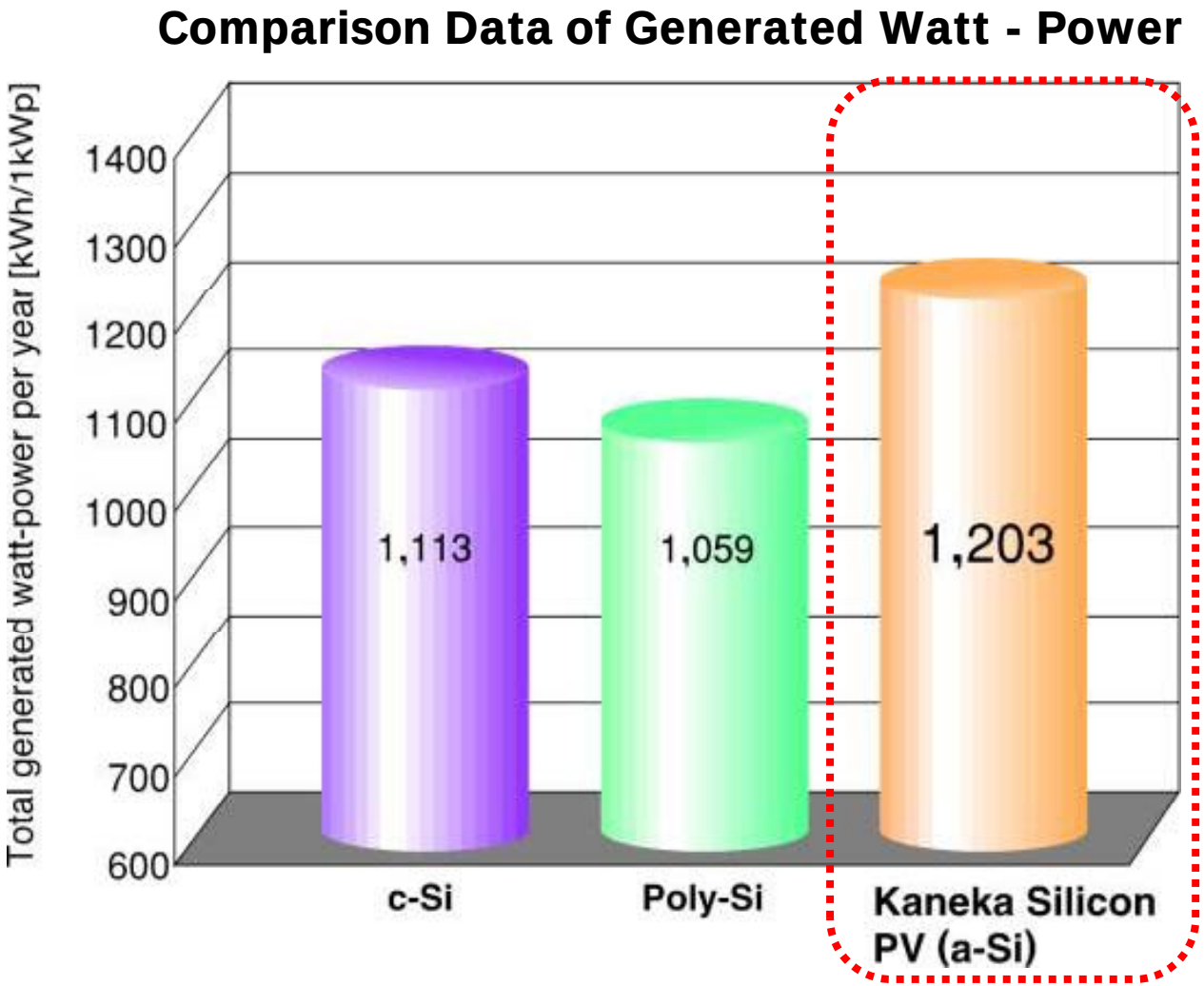
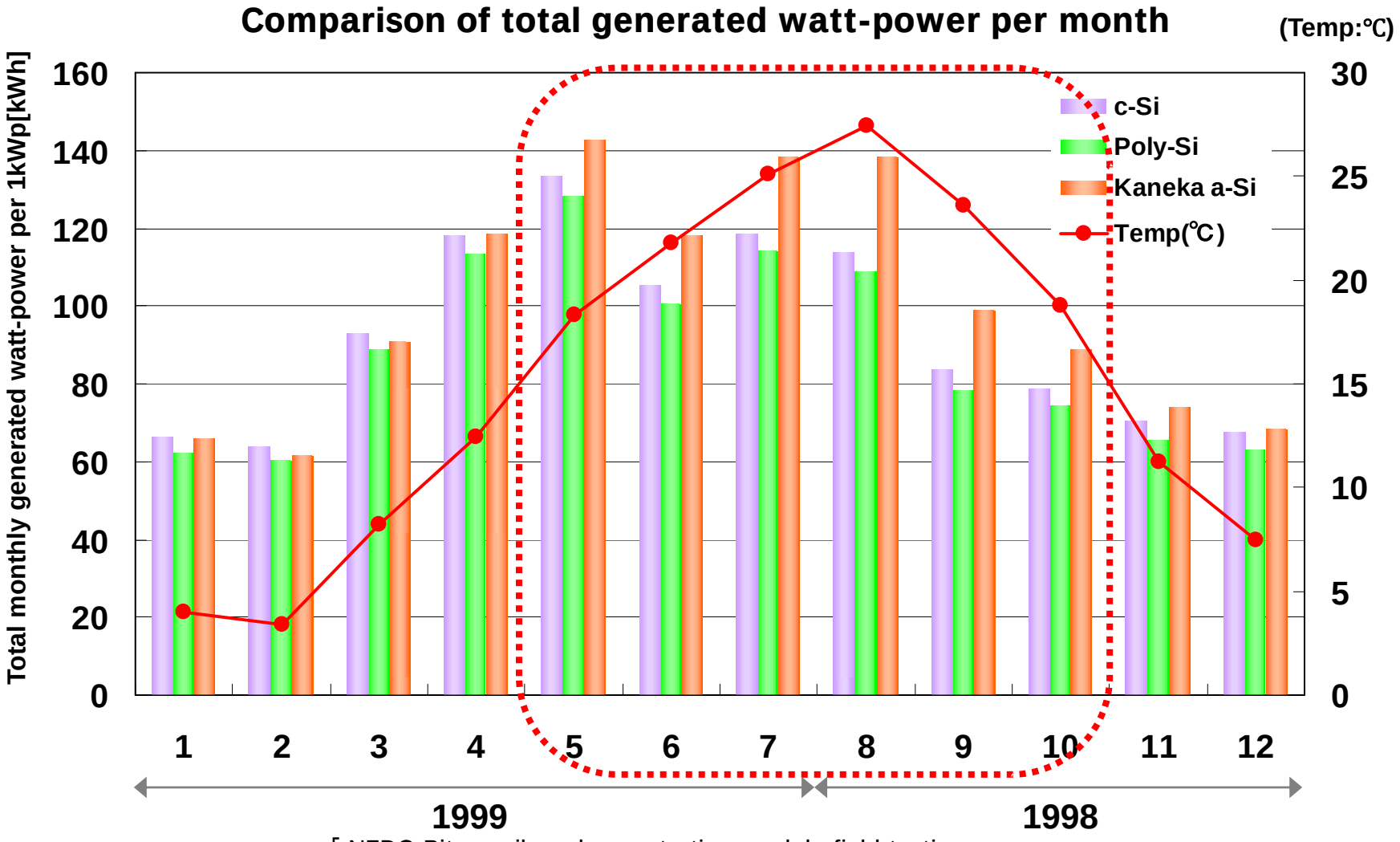


「NEDO Ritsumeikan demonstration module field testing」
Int. PVSEC-11, Sapporo, Hokkaido, Japan,1999
Location : Kusatsu Shiga, Japan
Direction : South, Angle 15.3°

Superior performance under high-temperature makes real difference in actual generated watt-power



「NEDO Ritsumeikan demonstration module field testing」
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Location : Kusatsu Shiga, Japan
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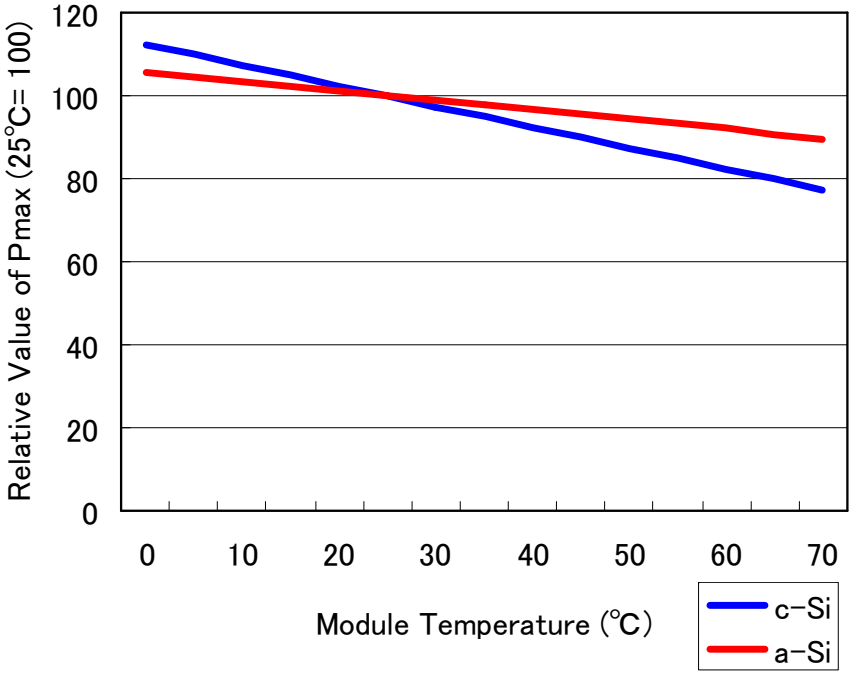
*Temperature data: Location=Ohtsu Shiga, Source=Japan Meteorological Agency

Superior performance under high-temperature



1) Smaller Temperature Coefficient.

Temp. coefficient(a) : **a-Si = -0.26%/℃**
c-Si = -0.5%/℃

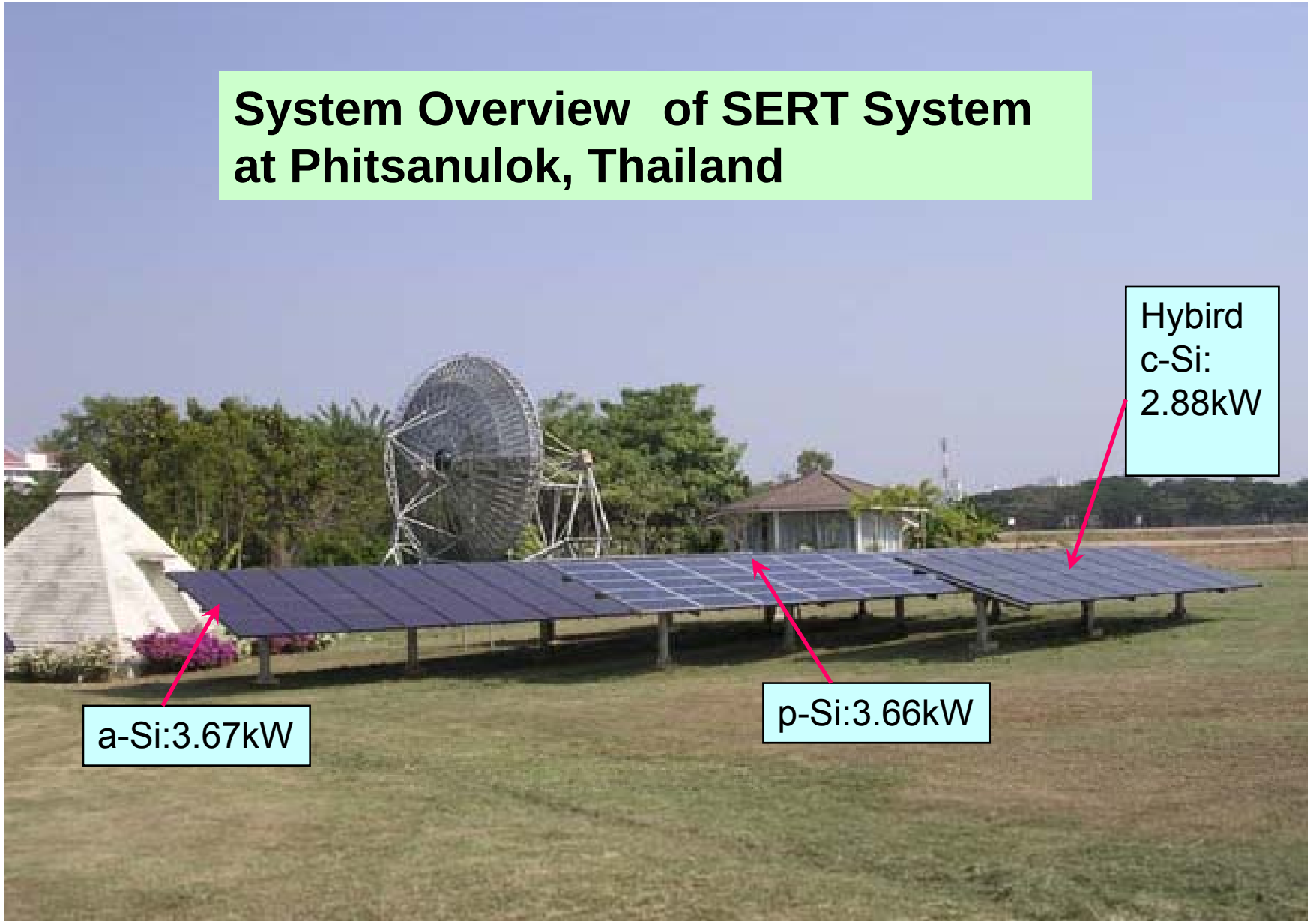
Effective performance of conversion efficiency
= Conv.Effic. X { 1+ a x (module temp. - 25℃) }

2) "Annealing Effect"

Characteristic Only Amorphous Silicon has.

Amorphous silicon regains its efficiency by temperature rising with its so-called "Annealing Effect."

Actual Generated Output Power of PV System at Thailand



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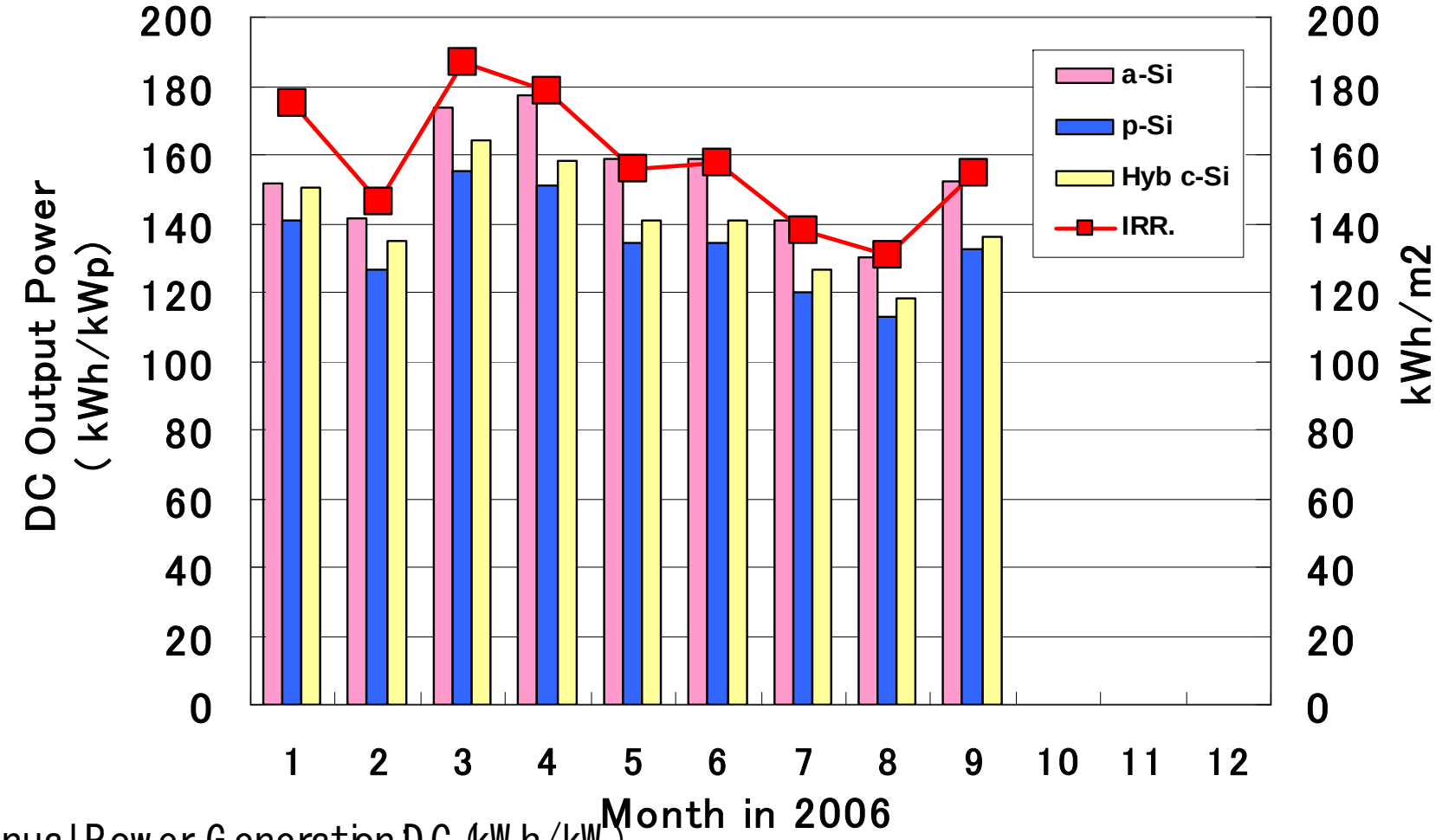
Actual Output Power of PV System at SERT, Thailand



Anual Power Generation DC (kWh/kW)

Hyb c-Si	p-Si	knanaka a-Si
1270	1208	1385

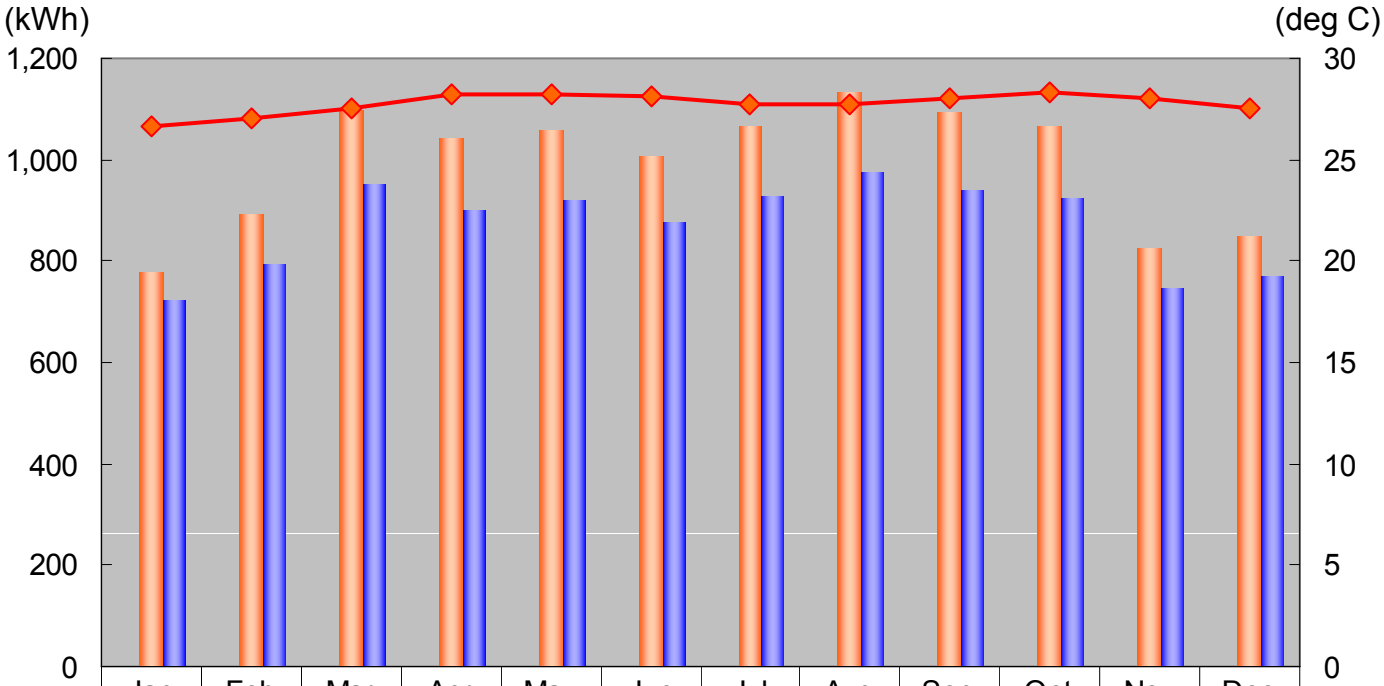
※From Jan to Sep in 2006

Solar Irradiation

1203kWh

Output power simulation of 10kWp PV system at Jakarta

Output power simulation of 10kWp PV system at Jakarta



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Irradiation(kWh/m2)	104	114	137	130	133	126	134	141	136	133	108	112
A-Si: AC power (kWh)	776	893	1,097	1,041	1,059	1,007	1,067	1,133	1,093	1,065	827	849
P-Si: AC power (kWh)	721	792	953	902	918	875	926	976	941	923	744	770
Air Temp.(deg C)	27	27	28	28	28	28	28	28	28	28	28	28

Annual output power by a-Si/10kWp system : 11,906kWh (+14% than p-Si)
Annual output power by p-Si/10kWp system : 10,441kWh

(Remarks)

(1) These are just estimated figures for reference and are not guaranteed ones. (2) AC power of 10kWp system of a-Si PV module and p-Si PV module. (3) Installation point: Jakarta, Indonesia. (4) Installation angle, direction: 10degree, North. (5) Inverter efficiency: 92% (6) Annual irradiation is estimated as 1,507/kWh/m2.