

# KACO SUN

Magazine for Solar Professionals  
Winter 2010/Spring 2011

New KACO  
production facility  
in Ontario



## In this Issue:

KACO opens its first North American manufacturing plant in London, Ontario, Canada

Benefits of **blueplanet** 02xi Series Inverters

I ♥ PV Campaign Winner

We are all Maldivians

Dear KACO friends,

As the year 2010 comes to a close, this 7th edition of our KACO SUN magazine gives us the opportunity to look back at a year full of achievement for KACO new energy Inc.

We have successfully matured from a US niche player with 3 small residential inverters to a full line supplier of PV inverters from 1.5kW to 100kW. With this increased line of products we have been able to gain a strong foothold with the largest PV distribution houses in the US, such as Aten Solar, DC Power Systems and Session Solar. (Please see pages 12 and 13 for more information on this issue's featured distributors).

At the same time we were able to strengthen our cooperation with large scale commercial PV project developers and integrators such as Morgan Stanley Solar Solutions and Sungevity. We are especially proud to be the sole inverter supplier to Sungevity, one of the nation's most innovative and fastest growing residential integrators. Together with Sungevity, KACO was a strong part of the Solar on the White House campaign (page 16) and also brought Solar to the "White House of the Maldives." Please see our report on pages 18 and 19 for more information on how the President of the island nation of the Maldives is fighting climate change with the help of companies such as Sungevity and KACO new energy.

We can also look back at the successful announcement of our transformerless inverter series. This technology is still relatively new to the US PV industry, but it makes up the majority of the PV inverters in the largest markets in the World, like Germany, Italy and Spain. The rationale is simple: If you take out the transformer, you lower the cost and increase the efficiency! You will find more details about this product on pages 10 and 11.

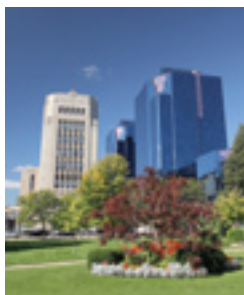
This Winter edition of KACO SUN also coincides with the annual CANSIA show in Toronto. And as the cover page shows, we are excited about the Ontario PV market for 2011. And rightly so, since we just announced the opening of our KACO new energy facility in London, Ontario. With a total initial annual capacity of over 100MW, this facility will be the backbone of our continued dedication to the Ontario market. With our dedicated, local Ontario sales team, we expect to have Ontario be our biggest North American regional market by the end of 2011.

I wish you all the best for a successful 2011!



Peter Flachsmann  
CEO KACO new energy, Inc., USA





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# KACO goes Canuck!

## KACO new energy opens manufacturing facility in London, Ontario

KACO new energy opened its first manufacturing facility in North America in the City of London's Skyway Industrial Park. KACO will roll out the XP series 83 kW and 100 kW blueplanet inverters built at this facility in Ontario, Canada by the end of 2010. This development ensures KACO will provide Canadian and American markets with the popular XP central inverter line built in North America before the start of 2011. **"We are very pleased by the welcome and support we have received from the City of London and the London Economic Development Corporation"**, said Peter Flachsmann, CEO of KACO new energy, Inc. "We strongly believe in Ontario's Green Energy Act FIT and microFIT programs and are looking forward to expanding our business in Canada. Ontario offers very competitive conditions for development and production internationally, and London offers a highly skilled and competent workforce."

The inverters produced at this facility will solidify KACO new energy as a leader in the Ontario marketplace and make certain the **blueplanet** inverter line is compliant with stringent Ontario Power

**The new state of the art facility will employ energy saving measures to ensure that KACO maintains adherence to its net zero emissions production strategy.**

Authority (OPA) requirements for domestically sourced content. This will provide installers across the province access to the central XP and residential 02xi blueplanet inverter series produced in the province.

The new state of the art facility will employ energy saving measures to ensure that KACO maintains adherence to the KACO net zero emissions production strategy. This production method insists that the blueplanet inverters be produced in the most carbon neutral manner possible.

At least 50 full time employees will be hired to operate the 25,000 sq. foot facility by the end of 2010. KACO plans to expand the facility to over 40,000 sq. feet in 2011 to accommodate the production of new inverter models. "The KACO investment demonstrates strong confidence and commitment to our community," says Mayor Anne Marie DeCicco-Best. "We warmly welcome the company and know it will be successful establishing its operations in London."



*Downtown, London, ON*

Recently KACO new energy Group announced that the company has delivered more than 3GW of PV inverters to their customers world wide. To facilitate a continuation of this exponential production growth KACO expects to produce an additional 330 MW of blueplanet inverters in calendar year 2011 at the London, Ontario facility. This additional production will help KACO maintain a leadership position as one of the most reliable and immediate providers of PV inverters. This additional capacity will help to guarantee that KACO will meet previously announced goals of over 3 GW of worldwide inverter production in 2011.

The complete 02xi inverter series including the 1502xi, 2502xi, 3502xi and 5002xi inverters will be available from the London facility by January 1st, 2011. The KACO team in the US is excited about this development and has already begun spreading the word to existing KACO partners. **KACO Canadian Regional Sales Manager John Hewetson has expressed that "this development puts KACO squarely in the position to capture a large portion of the growing Ontario FIT and microFIT market."** Mr. Hewetson is now pleased to offer OPA compliant inverters for the Ontario as well as North and South American markets. Peter White, President and CEO of the London Economic Development Corporation indicated, "London's reputation as a strong manufacturing center with exceptional research institutes, education facilities and a talented workforce continues to attract top global companies to our community. It has been a pleasure working with KACO executives to support their investment in London and we look forward to continuing to work with them to facilitate their growth in Canada."

# Critical comparisons: What makes a good inverter?

Inverters are commonly rated according only to their CEC efficiency. It is a key parameter when comparing competing products. However, efficiency alone does not provide a decisive conclusion about a product's inherent value.

After all, an operator profits most when his PV system is achieving the highest possible yield. Apart from efficiency, additional factors play a key role. What are the characteristics of a good inverter?

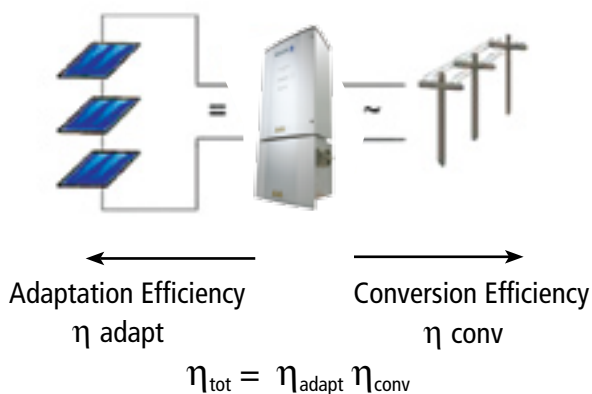


Figure 1: Formula for the overall efficiency level  
(Source: KACO new energy GmbH)

by Martin Frick, KACO new energy GmbH

The term efficiency is frequently used synonymously with the conversion efficiency level. The overall efficiency  $\eta_{\text{tot}}$ , which is made up of the conversion efficiency and the adaptation efficiency, however, provides a meaningful statement on an inverter's efficiency.

## The Conversion Efficiency

The conversion efficiency describes the ratio between the input and output power and the quality of the power electronics. Here, common specifications include the maximum efficiency and the CEC efficiency. The CEC efficiency is calculated using the following formula.

$$\eta_{\text{CEC}} = 0.04 \cdot \eta_{10\%} + 0.05 \cdot \eta_{20\%} + 0.12 \cdot \eta_{30\%} + 0.21 \cdot \eta_{50\%} + 0.53 \cdot \eta_{75\%} + 0.05 \cdot \eta_{100\%}$$

The values are recorded at three different PV voltages (minimum, nominal and maximum input voltage) at six levels for the nominal output. The average value of this measured data yields the CEC efficiency, which is rounded off in 0.5% increments.

However, the CEC efficiency has several deficiencies. For example, the power loss caused by higher module temperatures is not taken into account and an undersized or oversized PV generator is also not considered. In addition, the weighting factors are calculated from the average hourly irradiation values. As a result, the weighting of the factor for 75% of the nominal output is excessively high.

## The Adaptation Efficiency

The adaptation efficiency describes the inverter's capacity to convert the energy supplied by the PV generator. It is a feature for rating the MPP tracker's control properties.

Temperature and irradiation as well as the static and dynamic behavior of the MPP tracker are significant. The tracking speed provides information on the ability to record the impact of fast and unexpected changes occurring in the irradiation (e.g., due to clouds passing by). The adaptation efficiency does not describe the mismatching of the modules.

The static MPP tracking efficiency describes the ratio between the DC power that is effectively drawn by the inverter to the power supplied by the PV generator under constant conditions during this time. In contrast, the dynamic efficiency is the sum of the MPP energy, which is absorbed under temporary varying conditions at different power levels, in relationship to the maximum potential DC power.

## Critical comparisons:

The following factors influence the static behavior of the MPP tracker and can reduce the yield:

- Incorrect systematic MPP determination of the DC voltage
- Strong deviation from the MPP with specific tracking behavior
- Large 100 Hz ripple with single-phase inverters
- Output limit that cuts off the MPP
- MPP outside of the voltage range
- MPP tracking at the local maxima under partial shading

Good inverters achieve a static adaptation efficiency of over 99.2%.

The dynamic behavior of an MPP tracker depends on the following factors:

- Static MPP efficiency
- Change in the MPP voltage
- MPP tracking speed
- Correct function of the MPP tracking algorithm
- Inverter stability
- Statistical frequency of the dynamic changes

Good devices achieve values over 99.1%.

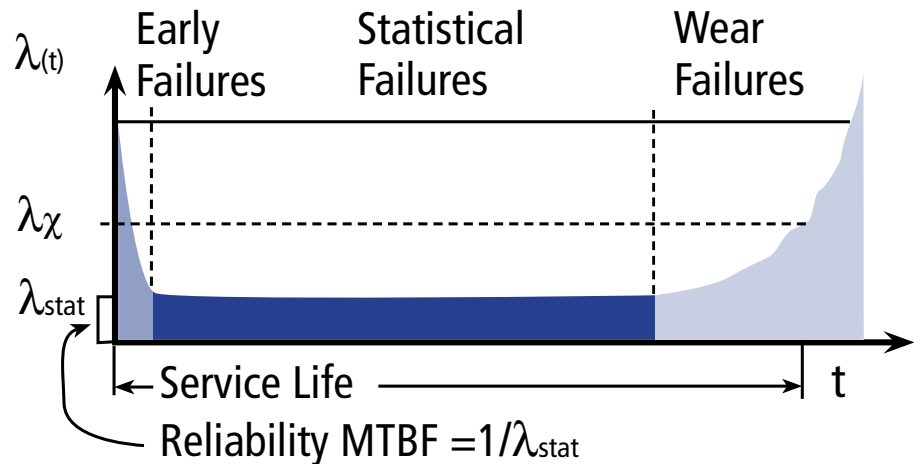


Figure 2: A device's typical service life  
(Source: KACO new energy GmbH)

Although a PV module's temperature has a direct influence on the voltage and, therefore, the MPP tracking, it only marginally affects the MPP tracking speed due to the thermal mass of PV modules. The impact of the changing irradiation levels is also negligible if the changes occur to a minor extent – in other words, if the changes occur under a constantly clear sky at high levels and under constantly cloudy days at low levels.

The irradiation levels quickly change on clear days with clouds passing by. Changes between 300 W/m<sup>2</sup> and 1,000 W/m<sup>2</sup> do not significantly affect the MPP voltage. However, the transition from a lower to a higher irradiation level causes selective large and quick surges in the MPP voltage. Most of the MPP tracking procedures cannot follow these rapid changes. Over the course of a year, however, they only cause marginal yield reductions. Therefore, the tracking speed does not need to follow these rapid changes. In principle, a speed of approximately one percent of the MPP voltage per second is sufficient.

The adaptation efficiency affects a PV system's yield. The MPP tracker is more precise at a slower speed and less accurate when incorrectly tracking voltage at a faster speed.

### Availability and Failure Rates

Apart from high efficiencies, the inverter's availability is a valuable aspect of the inverters functionality. It is commonly specified based on the failure rates – in more specific terms, the Mean Time Between Failures (MTBF). This rate specifies the period between two failures, which are not the result of component wear. A device's service life is typically represented with a so-called 'bathtub curve'. This curve describes the trend of the failure probabilities of components and devices. In the beginning, an increased amount of early failures are to be expected. They are caused by faulty components and manufacturing defects. They are usually prevented by burn-in and in-circuit tests. KACO performs these types of tests to ensure maximum availability and the best possible MTBF in the industry. During the statistical failure phase, the failure probability is only marginal. It has a value of  $\eta_{stat}$ . The reciprocal value describes the MTBF. After this phase, the failure probabilities increase due to the increasing signs of wear. A device is considered to have exceeded its service life starting with a value of  $\eta_X$ .

The MTBF is a statistical parameter and is specified in Failures In Time (FIT). It can

# What makes a good inverter?

be calculated or determined through field tests – but such tests are expensive. Determining the MTBF primarily depends on the ambient conditions for the respective component or device (current and voltage load and ambient temperature). In this case, there are various options for calculating the values. KACO uses the standards MIL-HDBK-217, SN 29500 and IEC62380 for this. The common factor of these three methods is that the MTBF for a complete device is determined from the sum of the MTBF values of all individual components. The respective basic data, which is defined from large-scale field tests conducted under reference conditions, forms the basis for calculating the values of the individual components. The values for an individual component under the specified conditions (temperature, voltage, and current) are determined from the conversion factors. The three specifications primarily vary in their underlying basic data that is acquired according to different criteria and their respective conversion factors. The calculations of the MTBF values for a KACO inverter, which are based on the specified standard values, yield a long service life totaling approximately 7,498,500 hours or approximately 855.4 years.

However, various research methods demonstrated somewhat severe differences between the applied procedures and the results showed significant deviations from one another. Therefore, theoretically determined values are not always reliable. In particular, several influencing factors, which are not included in the calculations, play a critical role in a PV inverter's reliability. The device's availability strongly depends on the conditions that are derived from the interplay with the other PV system components. For example, defects caused by faulty designs or failures resulting from external influences (e.g., overvoltages caused by lightning strikes) may occur. In addition, the lower quality components in a PV system affect an inverter's failure probability.

The values derived from the calculations can provide an indication of a device's quality. However, they are not significantly

associated with inverter failures in real PV systems. The experiences from real systems are indispensable and offer valuable information on a device's reliability.

## Yield Losses Caused by Grid Separation

The inverters disconnect from the grid under certain grid conditions. In this case, the disconnection time in Germany is 180 seconds. Inverters disconnect from the grid relatively often in weak grids or if parameters are incorrectly set. An inverter that unnecessarily disconnects from the grid on an hourly basis results in yield losses of up to 8%. Therefore, the inverter must feature reliable and stable grid monitoring so that the device is only disconnected from the grid when it is actually necessary. KACO inverters rarely shut down due to grid frequency issues because they are programmed with flexible and reliable algorithms. This significantly contributes to the high energy yields of PV systems.

An inverter should not be measured solely on its conversion efficiency. The device should be judged by the multitude of factors described in this article and how it operates with the different components of the entire PV system. In particular, the adaptation efficiency plays a vital role in high PV system yields.

The MTBF calculations, which allow theoretical conclusions to be drawn on a device's failure probability, provide information about an inverter's reliability. However, various methods produce significantly different information. In addition, numerous influencing factors that occur when a PV inverter is operating are not taken into consideration. Field data of real PV systems are more meaningful.

In contrast, inverters with

very high efficiencies that consistently fail produce lower yields than devices that operate reliably. Therefore, a high availability and reliable monitoring in inverters are essential for high yields.

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# The Features and Benefits of the KACO blueplanet 02xi inverter solution

Reduce regular mounting time,  
Reduce manpower needed,  
Reduce transportation costs!

Generate higher yields,  
Generate higher ROI!



## Performance

High efficiency:	95.5% CEC efficiency on all 02xi series inverters ensures low energy losses
Wide MPPT range:	Highest string sizing flexibility with all modules and temperature ranges
Low start-up voltage:	KACO inverters wake up earlier and work longer than the competition
Designed for max. ROI:	Newest generation IGBTs and advanced MPPT algorithms

## Ease of installation

<b>easy</b> install T-bracket:	Minimizes mounting process to approximately 15 minutes
Lockable DC/AC disconnect:	Save up to \$150 with the pre-wired & separable integrated disconnects
Multiple knock-outs:	Knock-outs on bottom, sides and back offer great installation flexibility
Connection box:	Avoid costly channel raceways by directly connecting multiple inverters
Light weight:	KACO inverters are up to 50% lighter than comparably sized inverters
Reduced side clearance:	No fan cooling outlets on the sides
Field selectable voltages:	Use the same inverter in 208V, 220V or 240V grid settings

## Reliability

History:	KACO has been manufacturing power electronics for more than 60 years
Experience:	More than 2.5GW of inverters worth about \$1 billion installed worldwide
Split architecture design:	Power electronics are protected in a separate chamber
Sealed outdoor enclosure:	Protects power electronics from insects, dust, humidity and ocean air
DC reverse polarity protection:	Avoids potential damage to inverter caused by miswiring during installation
Redundant power capacitors:	Increases the lifetime of your inverter
Convection cooling:	No moving parts increases the uptime of your PV system

**Monitoring**

- KACO proLOG: Monitor up to 32 inverters as well as multiple sensors
- KACO watchDOG: Integrated monitoring card decreases costs and increases reliability to give you the most innovative
- Integrated RS485 card: Save over \$200 compared to some competitors
- Integrated night switch: Activates inverter display even after the PV system has shut down
- Integrated inverter display: Easy to use push-button interface to configure the inverter and access stored PV system data on LCD screen
- blueplanet web: Free monitoring option for residential systems up to 10kW

**Warranty - KACO is one of the few established inverter companies older than the warranties they offer**

- KACO easySwap policy: No hassle inverter exchange policy is linked to serial number not original owner  
No paperwork necessary
- Reimbursement policy: KACO's \$150 warranty service reimbursement is among the best in the industry
- KACO guarantee: 02xi Series inverter repairs after warranty will never be more than \$500
- 10 years standard warranty: Warranties are only as valuable as the strength and longevity of the manufacturer

Side by Side		KACO 5002xi	Solectria PVI 5000	PV Powered PVP 5200	Fronius IG Plus 5.0	SMA SB5000
Electrical	MPP tracking range	✓ 200 - 510 V	✓ 200-550 V	✗ 240 - 450 V	✗ 230 - 500 V	✗ 250 - 480 V
	Start-up voltage	✓ 200 V	≈ 235 V	✗ 255 V	≈ 230 V	✗ 300 V
	Available grid voltages	✓ 208 / 240 / 220	✗ 208 / 240	✗ 208 / 240	✓ 208 / 240 / 277	✓ 208 / 240 / 277
	CEC efficiency	≈ 95.5%	✓ 96%	✓ 96%	≈ 95.5%	≈ 95.5%
Mechanical	Dimension (HxWxD)	✓ 36 x 14 x 9.5 in.	✓ 30 x 18 x 8 in.	✗ 35 x 18 x 8 in.	✗ 36 x 17 x 10 in.	✗ 18 x 24 x 10 in. (without disc.)
	Weight	✓ 70 lbs.	✓ 60 lbs	✗ 162 lbs	≈ 83 lbs	✗ 141 lbs.
	Enclosure rating	✓ NEMA 3R	✓ NEMA 3R	✓ NEMA 3R	✓ NEMA 3R	✓ NEMA 3R
	Cooling method	✓ Convection	✓ Convection	✓ Convection	✗ Fan	✗ Fan
	Disconnects	✓ AC/DC standard	≈ DC standard	≈ AC/DC optional	≈ DC standard	✗ DC optional
Additional	Standard ports	✓ integrated RS485	✗ RS485 extra cost option	✗ RS485 extra cost option	✗ RS485 extra cost option	✗ RS485 extra cost option
	Internal monitor option	✓ watchDOG monitoring	✗ Solren Gateway	✗ Gateway	✗ Fronius data logger	✗ SB web box
	Mounting	✓ ~ 15 minutes	✓ ~ 15 minutes	✓ ~ 15 minutes	✗ ~ 30 minutes	✗ ~ 40 minutes
	Wiring	✓ prewired AC/DC disconnect	≈ prewired DC disconnect	✓ prewired AC/DC disconnect	≈ prewired DC disconnect	✗ disconnect assembly onsite
	Labor	✓ one person	✓ one person	✗ two people	✗ two people	✗ two people

## KACO blueplanet 00xi series US transformerless grid-tied inverters



The KACO transformerless (TL) **blueplanet** inverters in power classes of 6400 watts and 7600 watts are ready for the USA.

The National Electric Code, Article 690 (NEC 690.35) was amended to allow for underground PV arrays therefore enabling the use of these phenomenal machines. KACO is a leader in transformerless inverters throughout Europe and will steer the US industry with innovative TL products as well. Not only will these products offer enhanced CEC efficiency numbers they will also help PV systems all over the Americas produce more kWhs than ever before.

In the KACO approach to TL inverter design, low component count is paramount to increased reliability. Some transformerless (non-isolated) inverters use a boost converter. These approaches offer the same reliability as a traditional galvanically isolated inverter. The KACO approach has higher overall efficiency due to the use of only a single stage conversion. Isolated and non-isolated topography with boost converters result in lower efficiency due to more conversion stages which will reduce the kWh yield performance. TL inverters are completely non grounded on the DC input circuit and this poses new challenges for US installers. However, KACO engineers have over a decade of experience with this technology and will lead conversations about how to work with this exciting technology.



# Tigo Energy's Maximizer System and KACO's transformerless inverter: A perfect match

You have come to trust KACO new energy and Tigo Energy to deliver innovative, high-quality products: including Kaco's transformerless inverter, and Tigo's Module Maximizer. In North America, it turns out that these efforts are even better together.

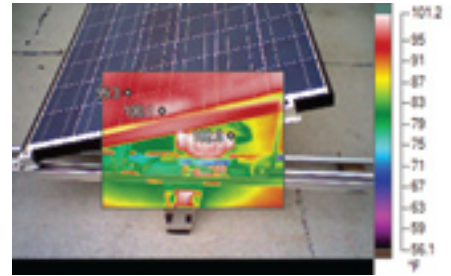
The transformerless inverter is a great solution, as it results in lower cost and improved efficiency. However, the NEC regulations (600V limit) present some unique challenges. This requirement keeps strings relatively short, since the sum of Voc at the coldest temperature must be below 600V. Therefore, the stand-alone transformerless KACO inverter can only reliably deliver 208Vac.

This constraint changes with Tigo involved. Because Tigo's Module Maximizers can control the voltage out of each string, you no longer have to design strings to Voc – instead, designers can size strings based on Vmp. So strings get ~20% longer. And more importantly, the transformerless, boost-free inverter can deliver 240Vac. The bottom line is a lower-cost and higher-performing solution for residential systems.

### Inverters don't belong on a roof

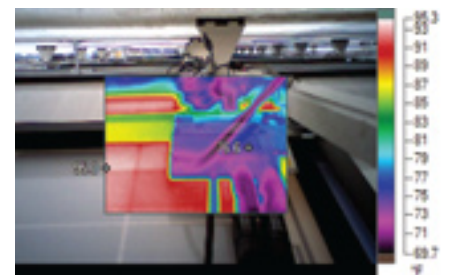
Module-level MPP control can improve system energy yield – and provide valuable data for maintaining a high system availability. However, you want the right amount of electronics in the right places. A micro-inverter architecture puts too many electronics on a roof. Transformers and capacitors do not belong in this harsh environment: they fail far too frequently, and generate heat which damages other system components. This is not just a theoretical or academic exercise. This is about system performance and reliability.

The math is straightforward: if you have a 200W module with a 95%-efficient micro-inverter behind it, then that micro-inverter is generating 10 watts of resistive heat. This creates a hot spot on the module:



This heat is horrible for the short-term performance, and long-term degradation of the module. If the micro-inverter doesn't fail in seven years, the module just might.

On the other hand, the Tigo Energy Module Maximizer is 99.6% efficient. So it generates less than a single watt of heat – far less than the ambient temperature. Because of this, look at how the Tigo Energy Module Maximizer does not change the thermal characteristics of your module:



If you want distributed MPP control, don't make the same mistake that others have. Use the intelligent combination of Tigo Energy and KACO new energy.

<http://www.tigoenergy.com/>

**Tigo**<sup>TM</sup>  
energy

# KACO blueplanet 00xi series

## US transformerless grid-tied inverters

### The KACO transformerless (TL) blueplanet inverters in power classes of 6400 watts and 7600 watts are ready for the USA.

The National Electric Code, Article 690 (NEC 690.35) was amended to allow for underground PV arrays therefore enabling the use of these phenomenal machines. KACO is a leader in transformerless inverters throughout Europe and will steer the US industry with innovative TL products as well. Not only will these products offer enhanced CEC efficiency numbers they will also help PV systems all over the Americas produce more kWhs than ever before.

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Model number		blueplanet 6400xi	blueplanet 7600xi	
<b>Input data (DC)</b>				
DC operating range	240 V	365 – 550 V <sub>dc</sub>	365 – 550 V <sub>dc</sub>	
	208 V	320 – 550 V <sub>dc</sub>	320 – 550 V <sub>dc</sub>	
Max. DC input voltage		600* V <sub>dc</sub>	600* V <sub>dc</sub>	
Nominal DC input current		21 A <sub>dc</sub>	24 A <sub>dc</sub>	
Max. DC input I <sub>sc</sub> current		36 A <sub>dc</sub>	36 A <sub>dc</sub>	
<b>Output data (AC)</b>				
Max. continuous output power (CEC)		6400 W	7600 W	
Max. over-current protection		50 A	50 A	
Max. continuous current	240 V	27 A <sub>ac</sub>	32 A <sub>ac</sub>	
	208 V	31 A <sub>ac</sub>	37 A <sub>ac</sub>	
AC operating range	240 V	211 – 264 V		
	208 V	184 – 226 V		
Frequency		60 Hz (59.3 – 60.5 Hz)		
Maximum efficiency	240 V	97.2%	97.1%	
	208 V	96.9%	97.0%	
CEC rated efficiency		96.5%	96.5%	
<b>Additional data</b>				
DC disconnect ratings		600 V, 4 x 16 A		
Cooling		True convection - ultimate reliability, with assist fan		
DC reverse polarity protection		Yes		
Ground fault protection		Integrated residual current detector		
Grounding		Ungrounded, transformerless inverter		
Visual displays		Backlit LCD w/ convenient night switch & push button controls		
Included accessory interfaces		<b>easyLink</b> RS485 & SymBus (Ethernet optional)		
Ambient temp @ max AC power		-4°F – +104°F (-20°C – + 40°C)		
Ambient operating temp		-4°F – +140°F (-20°C – + 60°C)		
Thermal protection		Yes		
Noise emissions		< 45 dB (near silent operation)		
Night power consumption		208V: 0.26W, 240V: 0.36W		
Warranty		Standard <b>easySwap</b> 10 years		
<b>Certifications</b>				
Safety compliance		UL 1741, IEEE 1547, NEC, CSA 22.2 No.107.1-01		
Communications compliance		FCC Part 15 Class A and B		
* - Unit will only feed power if the PV voltage is less than 550Vdc.				
<b>Mechanical Specifications</b>				
Model	Height (H)	Width (W)	Depth (D)	Weight
7600xi	44 1/8 in. (1121 mm)	14 in. (356 mm)	8 7/8 in. (226 mm)	95 lbs (43 kg)
6400xi	44 1/8 in. (1121 mm)	14 in. (356 mm)	8 7/8 in. (226 mm)	95 lbs (43 kg)
Enclosure		NEMA 3R		

# Where to Buy KACO Inverters

Looking to buy a KACO inverter? Check out this issue's featured distributors.

Simply contact one of our trusted distribution partners and they will help you through the procurement process.

If you are not currently a client of one of our existing distributors, contact us now and we'll arrange for a local dealer to contact you!



DC Power Systems is a full service wholesale distributor of renewable energy products. Working with our national network of qualified dealers and installers, we design and supply solar electric systems for business, residential and government applications. We are committed to promoting a world powered by sustainable energy.

**DC Power Systems**  
**1500 Valley House Dr.,**  
**Suite 210**  
**Rohnert Park, CA 94928**  
**707-992-3100**  
**Fax: 707-992-3199**  
**support@dcpower-systems.com**  
**www.dcpower-systems.com**



Session Solar is a full-service wholesale solar distributor and integrator. We offer U.S. contractors quality products at competitive prices and free design support. We also help businesses, utilities and governmental agencies go solar. As the U.S. subsidiary of SolarMarkt AG, founded in Germany in 1985, Session Solar maintains vigorous relationships to world-class PV research institutes and manufacturers in order to better serve our clients and grow the industry worldwide.

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**60 Old El Pueblo Rd.**  
**Scotts Valley, CA 95066**  
**831-438-9000**  
**Fax 831-438-9010**  
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Aten Solar focuses on providing solar panels or turn-key solutions for the global market place, while exercising our proven engineering, financing, marketing and logistics skills. As we are already active in renewable energy in North America and Europe, we expect to maintain our growth through the upcoming years throughout the world.

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Orange Solar is a distributor and turn-key provider of photovoltaic systems and components. With representations in Germany, Italy and Ontario we have designed and installed over 600 custom PV-systems to date. Our seven years of experience in this industry provide our clients with solid know-how when it comes to answering questions and offering technical design and system support. We are grateful to have a strong partnership with Kaco New Energy to backup our business philosophy with their state of the art product lineup. We are looking forward to supplying you inverters from Kaco in addition to other PV components such as modules, fast install racking solutions and balance of system.

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MindCanada Renewable Energy Project and Technology Experience MindCanada's experience providing EPC services for utility generation & distribution projects gives us great insight into utility automation services. MindCanada's Senior management have been providing energy generation and distribution services as part of their portfolio of large EPC projects for the last 30 years. Today, as utilities focus on green energy to improve operational efficiency and reliability and forgetting the environment, MindCanada is there with the knowledge and resources to carry out a single-source renewable energy solution.

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AS Solar Inc. distributes quality, experience and endless energy. We are the North American division of one of the leading international distributors of complete solar energy solutions for the residential and commercial markets, and have more than 12,000 PV installations under our belt. Our solutions range from five kilowatt systems up to 500 KW. Based in Ontario, Canada, a leading renewable energy market, we bring global knowledge and local experience to all our partners, from dealers and installers to manufacturers and end customers. We offer access to top-quality products that meet all local specifications, warehousing, logistics and extensive training and product support and can also offer project consultation. Most important, our partners can count on our "honesty promise" – we deliver what we promise.

**AS Solar Inc.**  
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# I heart PV campaign WINNER

We first introduced the popular "I Heart PV" campaign at Intersolar North America 2010 in San Francisco and were blown away by all the creative submissions in written and video form. The campaign ran for four months until Solar Power International, which took place in Los Angeles this October. KACO wanted to know why you love PV and in exchange for your participation KACO not only offered you the opportunity to have your voice heard in our print ads until October 2010 – but actually entered participants to win a trip to Germany for two. We received hundreds of submissions at industry events and trade shows as well as on the related website [www.iheartpv.com](http://www.iheartpv.com). Participants filled out the form, entered a written

submission and/or a video about their love affair with PV. After Solar Power International 2010 the big day had arrived and winner of the trip to Germany was officially drawn.

**Congratulations to Jim Laehy from Morrow-Meadows Corp. who loves PV, because it is new energy for a blue planet.**

Jim and his guest will visit the KACO new energy headquarters and enjoy beautiful Southern Germany in 2011. We will of course report about his time in Europe in one of the upcoming issues of the KACO Sun.

**Thanks to everybody who participated – All submissions were very thoughtful and creative!**

# I because...

# PV

it helps put  
people back to work!

*Chuck Rames, Program  
Director - Renewable Energy  
Division, Boots on the Roof*

it reminds me of my best friend: Dependable,  
adaptable, and full of sunshine.

*Stephen Lacey, Editor, RenewableEnergyWorld.com*

I don't have to feel guilty about  
making toast in the morning.

*Tor Valenza aka "Solar Fred,"  
UnThink Solar*

it is so sexy!

*Elmar Niewerth, CEO,  
Session Solar*

smart, clean energy is hot...  
like the sun.

*Heather Andrews Bias, PV installer/  
PV theory instructor with IBEW  
#357, Las Vegas*

it is empowering.

*Yousri Abdou, CEO, Aten Solar Corp.*

when my neighbor gets jealous and one ups me  
with a bigger system, she does everyone a favor.

*Ian Karleff, CEO, AS Solar Inc.*

Tell us why you  PV at [www.iheartpv.com](http://www.iheartpv.com)

Win a trip for two to Germany!

See website for contest rules.

Brought to you by

K A C O

[www.kaco-newenergy.com](http://www.kaco-newenergy.com) • 866 522 6765 new energy.

I   
PV

Since the summer of 2010 you've played the game and shown PV some love.

**...because it is  
new energy for a blue planet.**

Jim Laehy from Morrow-Meadows Corp.

We at KACO new energy think Jim is spot on and we will send him and a guest on a trip to visit and tour KACO headquarters in beautiful Southern Germany. Jim and his guest will enjoy the exquisite home of KACO new energy and the blueplanet inverters.

Our runner-up is Katharina Rathjen at Sun Empire Solar Systems in Melbourne, Australia.

Katharina says:

*I ♥ PV, because it is strong, reliable & clean - so much better than my boyfriend!*

**Now it is KACO's turn.**

**We ♥ PV, because of you. Your submissions confirmed for us that it is just as we suspected: It really is easy and fun to turn passion into power.**

[www.kaco-newenergy.com](http://www.kaco-newenergy.com) [www.iheartpv.com](http://www.iheartpv.com) (t) (866) 522 6765

**K A C O**   
new energy.

# White House goes solar

In the last issue of KACO Sun, (*Spring 2010*) we introduced the “Solar on the White House” initiative to you. In this issue, KACO is excited to follow-up on that important article.

In spring of 2010 a group of solar enthusiasts and advocates from across America offered free solar systems to the White House. Companies, individuals and organizations like KACO new energy, Sungevity, Tor Valenza aka Solar Fred, Free Hot Water, Heather Andrews, RenewableEnergyWorld.com, 350.org, SEIA and many, many more all joined forces to make their “solar voices” heard and to work towards one mutually shared goal: **Bring solar back...On the White House.**

Mission accomplished! And all participants are very proud and happy about this development. On October 5<sup>th</sup>, Secretary of Energy Steven Chu publicly announced the good news: **“The White House Goes Solar”**



*Posted by Secretary Steven Chu  
October 05, 2010 at 9:53 AM*

As you know, President Obama has a strong commitment to American leadership in solar technologies and the jobs they will create. Through the Recovery Act, we’re supporting the deployment of today’s solar technologies. And we will double our renewable energy generation capacity by 2012. We’re also investing in the next generation of solar power through the R&D programs at the Department of Energy.

Today, we’re taking an important next step. As we move toward a clean energy economy, the White House will lead by example. I’m pleased to announce that, by the end of this spring, there will be solar panels and a solar hot water heater on the roof of the White House.

These two solar installations will be part of a Department of Energy demonstration project. The project will show that American solar technology is available, reliable, and ready to install in homes throughout the country.

Around the world, the White House is a symbol of freedom and democracy. It should also be a symbol of America’s commitment to a clean energy future.

Steven Chu is the Secretary of Energy.

Source: <https://blog.energy.gov/blog/2010/10/05/white-house-goes-solar>



CO<sub>2</sub>-neutral production at KACO new energy

## KACO's solar inverter production certified by Steinbeis Transfer Center

KACO new energy is proud of its well-balanced climate-protection record. In September 2010 the solar inverter manufacturer received a certificate from Steinbeis Transfer Center in Stuttgart, confirming that the production processes of its three production sites are CO<sub>2</sub>-neutral. KACO even becomes an energy provider, taking into account the power generation of its own PV installations. The three production buildings alone produce an annual surplus of about 670 megawatt hours, thus saving 160 tons of carbon dioxide per year.

According to the audit report of the Steinbeis Transfer Center, ***"Production is CO<sub>2</sub>-neutral. Owing to the high proportion of renewables and the company's own power generation, the annual record of minus 160 tons of CO<sub>2</sub> is more than sufficiently balanced."***

KACO has achieved this goal by buying green energy from Lichtblick AG and Elektrizitätswerke Schönau (EWS). These providers can supply 90 –

100% of energy from renewables. Supported by the energy produced from the company's own PV installations (rooftop and curtain-wall façade systems) the two larger facilities, in combination with a Sky Carrier, are capable of contributing 350 kW. And of course, all non-production facilities are also equipped with PV systems.

"To us, CO<sub>2</sub>-neutral production is a matter of credibility", says Ralf Hofmann, President of KACO new energy. "We want to lead by example, showing what actually *is* possible". Consequently, Hofmann has attached great importance to receiving a confirmation of his ambitious goals from an independent authority. "Steinbeis-Transferzentrum Energie-, Gebäude- und Solartechnik mbH" is part of the global network of the SteinbeisFoundation, supporting knowledge and technology transfer between science, trade and industry.

For more information on KACO new energy's CO<sub>2</sub>-neutral production and philosophy, please contact [marketing@kaco-newenergy.com](mailto:marketing@kaco-newenergy.com)

# Climate Crisis Spotlight: Mohamed Naseed, President of the Maldives

Mohamed Nasheed, President of the Maldives, wants his country to become carbon neutral by 2020. He plans to establish 155 wind turbines, half a square kilometer of rooftop solar panels and a biomass plant burning coconut husks to provide clean energy for its population of 385,000.



## Maldives Facts:

- The Maldives consists of approximately 1,190 coral islands grouped in a double chain of 26 atolls, spread over roughly 56,000 square miles, making this one of the most disparate countries in the world.
- The Maldives is the lowest country in the world, with a maximum natural ground level of only 7 feet 7 inches (2.3 meters), and an average of only 4 feet 11 inches (1.5 meters) above sea level
- Over the last century, sea levels have risen about 8 inches (20 centimeters)
- Further rises of the ocean could threaten the existence of the Maldives, being the lowest country in the world

## Four years ago myself, and many fellow activists, sat in solitary confinement in Maldivian prison cells.

We sat in those jail cells not because we had committed any wrong. We sat in those cells because we had deliberately broken the unjust laws of dictatorship. We had spoken out for a cause in which we believed. That cause was freedom and democracy.

There were times, sitting in that prison, when I felt more alone than you can imagine. There were times when I started to believe the doubters, who said the Maldives would never become free. Sometimes it felt like the doubters were right. The dictatorship had the guns, bombs and tanks. We had no weapons other than the power of our words, and the moral clarity of our cause.

But, in spite of the odds, we refused to give up hope. We refused to listen to the voices of doubt and discouragement.

We won our battle for democracy in the Maldives. I stand before you today as the first democratically elected President in the history of my country.

**Four years later and a continent away, we meet here to confront another seemingly impossible task. We are here to save our planet from the silent, patient and invisible enemy that is climate change.**

*(Source: www.350.org - Prepared Remarks for 350.org "Survival Treaty / Suicide Pact" Event Klimaforum, 14 December 2009)*

I believe in humanity. I believe in human ingenuity. I believe that with the right frame of mind, we can solve this crisis. In the Maldives, we want to focus less on our plight; and more on our potential. We want to do what is best for the planet. And what is best for our economic self-interest. This is why, earlier this year, we announced plans to become carbon neutral in ten years.

**We will switch from oil to 100% renewable energy. And we will offset aviation pollution, until a way can be found to decarbonize air transport too. To my mind, countries that have the foresight to green their economies today, will be the winners of tomorrow.**

*(Source: www.350.org - "Maldives President Mohamed Nasheed's Survival Speech at the Climate Vulnerable Forum")*  
They will be the winners of this century. These pioneering countries will free themselves from the unpredictable price of foreign oil.

– President Mohamed Nasheed, Maldives (Source: 350.org)

## Male, Maldives – October 7, 2010

Maldivian President Mohamed Nasheed took action and joined with Sungevity ([www.sungevity.com](http://www.sungevity.com)) founder Danny Kennedy to finish the installation of a solar photovoltaic (PV) system on the top of the Mulee Aage, the official residence of the President. This system, designed and installed by California solar energy provider Sungevity, highlights President Nasheed's commitment to make the Maldives the world's first carbon-neutral nation.

"Solar power helps combat climate change, reduces our dependency on imported oil and most importantly cuts out electricity costs," said President Nasheed. "The Maldives stands at the front line of climate change and we don't have the luxury of time to sit and wait for the rest of the world to act. We are getting to work to start the transition from fossil fuels to renewable energy." The system on President Nasheed's residence will provide 11.5 kW of installed peak output. This is expected to save the Maldives more than \$300,000 over the life of the system. Sungevity designed the system remotely from its headquarters in Oakland, California and trained local staff to help install it. The President's staff will manage and maintain the system. **KACO new energy donated the inverters, LG the panels and Iron Ridge the racking system.**

Sungevity is also conducting an energy audit of Mulee Aage to identify ways to cut energy wastage. Renewable energy installation best practice always includes an energy audit, to identify immediate savings and cost-effective energy conservation measures.

"President Nasheed is making a wise, affordable investment for his country," said Danny Kennedy, Sungevity's founder, who joined President Nasheed on the roof to place the final panel. "We are proud he chose Sungevity to coordinate the design of a system from halfway around the world. Saving energy and going solar are the keys to unlocking economic growth and energy security. This shows that anyone, be they world leaders, like Presidents Nasheed and Obama, or American homeowners, can easily go solar and save money.

**It's that simple."**



## We are all Maldivians

by Danny Kennedy,  
Co-Founder and President of Sungevity

### Imagine that you live on an island in a vast ocean.

You have thin soil, precious little freshwater and finite resources from which to provide for your society. From that ocean you get some blessings but its waves also carry great risk. Hundreds of years into your use of it you find out that your technology is killing you.

You get electricity from turbines that are driving up the temperature, withering your food crops and bleaching the corals that bring the tourists – the backbone of your economy. You get mobility from the internal combustion engine that is polluting your freshwater and eroding the very land on which you stand. What do you do?

### You change your technology.

"To do otherwise is madness." That is the conclusion that President Nasheed of the Maldives shared with me last month as we worked together to put 48 LG solar panels with KACO **blueplanet** inverters on his house in Male, the capital of the country.

"For us climate change is not some future threat, it is happening now. And if we do not stop it we will all perish," he tells anyone who will listen.

This is why he worked with Sungevity to install 11.5 kw of solar power on his home. To walk the talk on moving to 100% renewable electricity. Pledging a Maldives-wide makeover to clean energy by 2020. And to save money - we estimate \$300,000 over the 25 year life of the system.

For the President this was a chance to show people how to combat climate change while saving money. Why hasn't the rest of the world figured this out? Are we mad? After all, we all live on an island of limited arable land, with finite resources and fresh water, surrounded by ocean. But with our poor power technology we are making our island in space uninhabitable. What to do?

### Answer: change our power sources.

Of course, technology alone won't set us free and this small act won't save us. But it is a first, clear step in a long journey. This is the significance of President Nasheed getting on the roof with us to install solar. We need inspiration and direct action taken by everyone from the Presidents to the people, in order to know there is an alternative to death by fossil fuels. By this act, may we realize that we are all Maldivians, and start to become the change we need. Shine on, Mr. President! Surrikiyaa. Thank you.

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