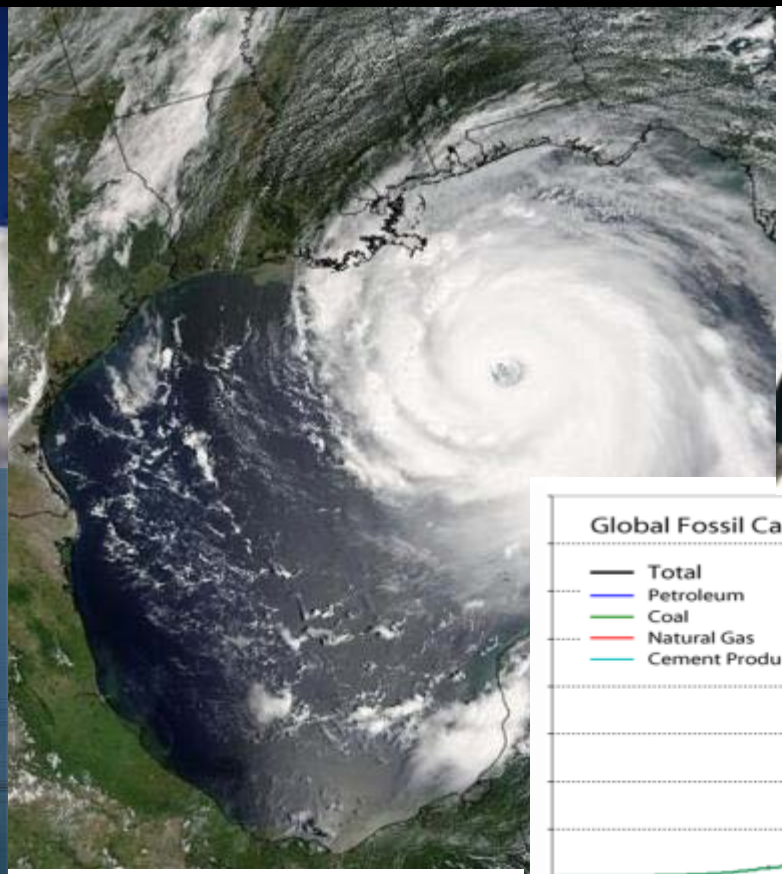
Trinasolar
The power behind the panel.

PV Sustainability Through Collaborative Quality Management

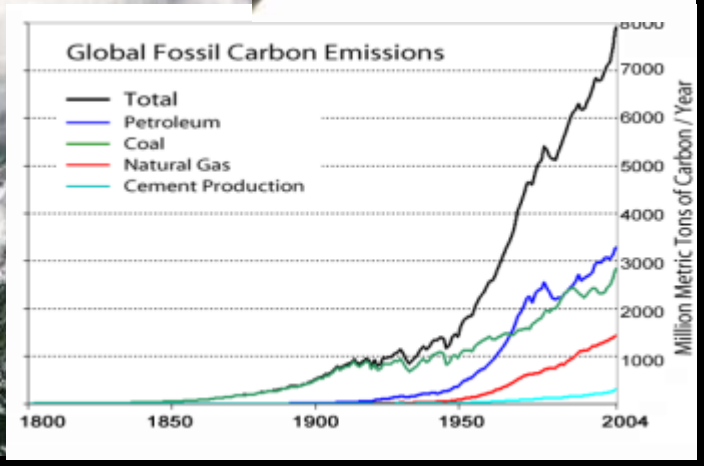
Jifan Gao

Chairman & CEO
Trina Solar

Climate Change and Energy Crisis Endanger Human



HurricaneKatrina, cat. 5

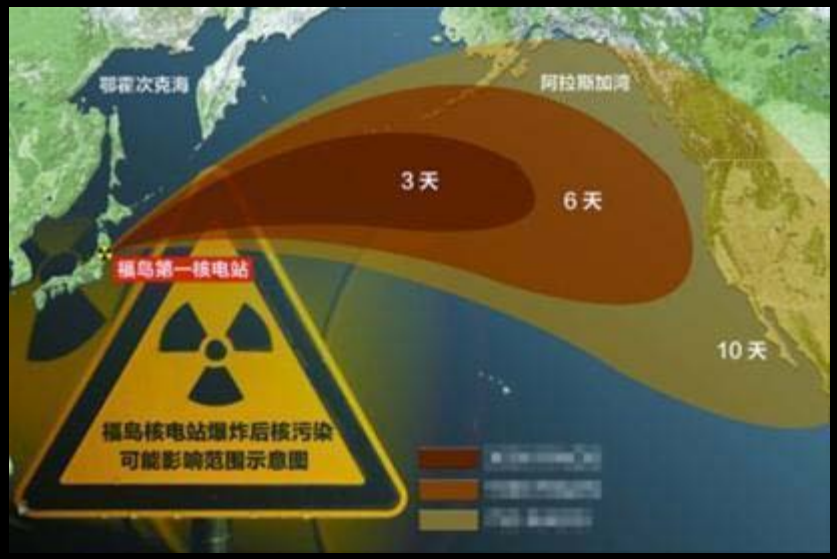


Trinasolar
The power behind the panel.

Clean Energy is Our New Hope

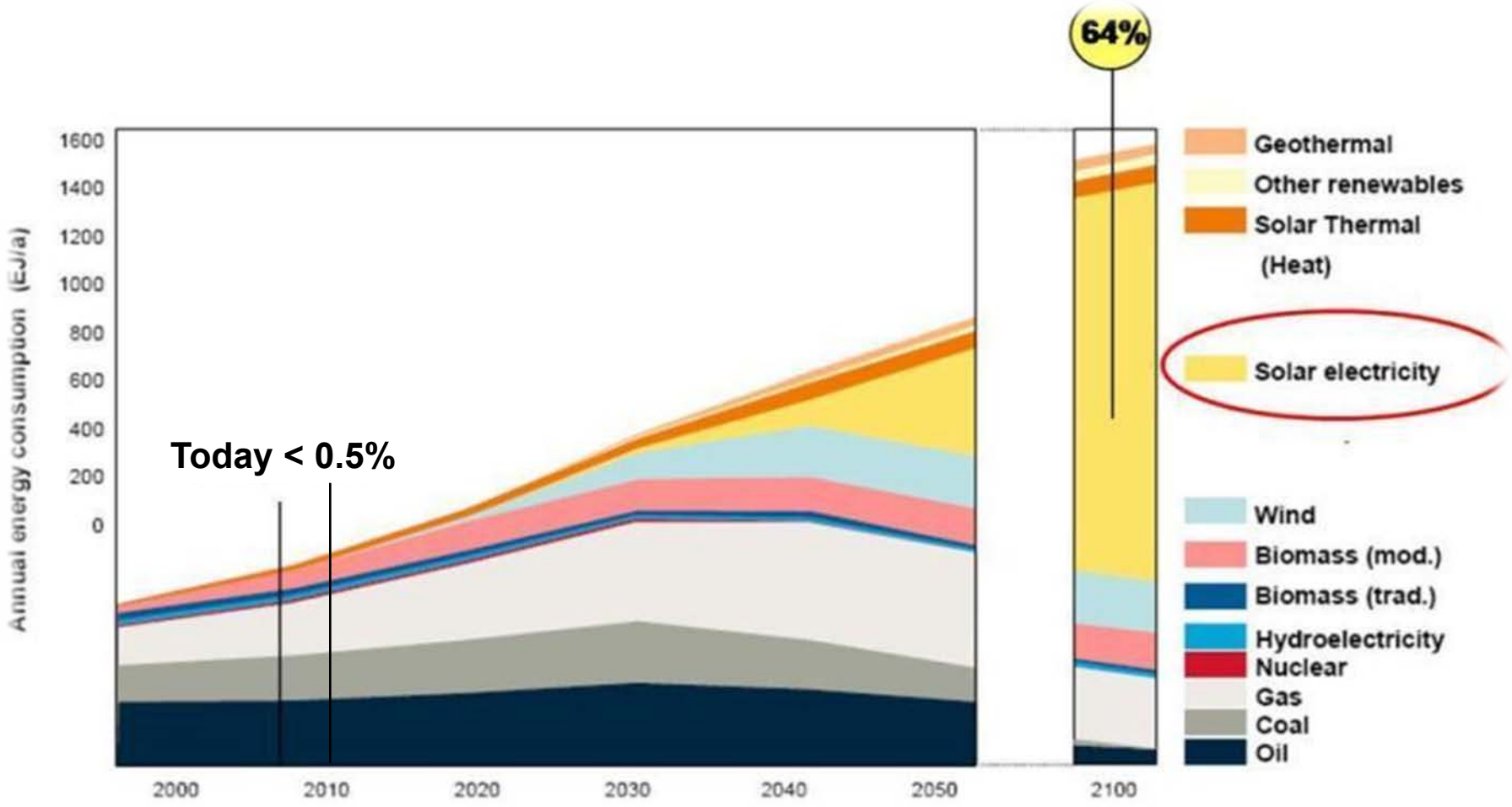
Solar—Safe and Clean Energy for the future

?



Antwerp, Belgium – 40MW
World's Largest Rooftop Installation

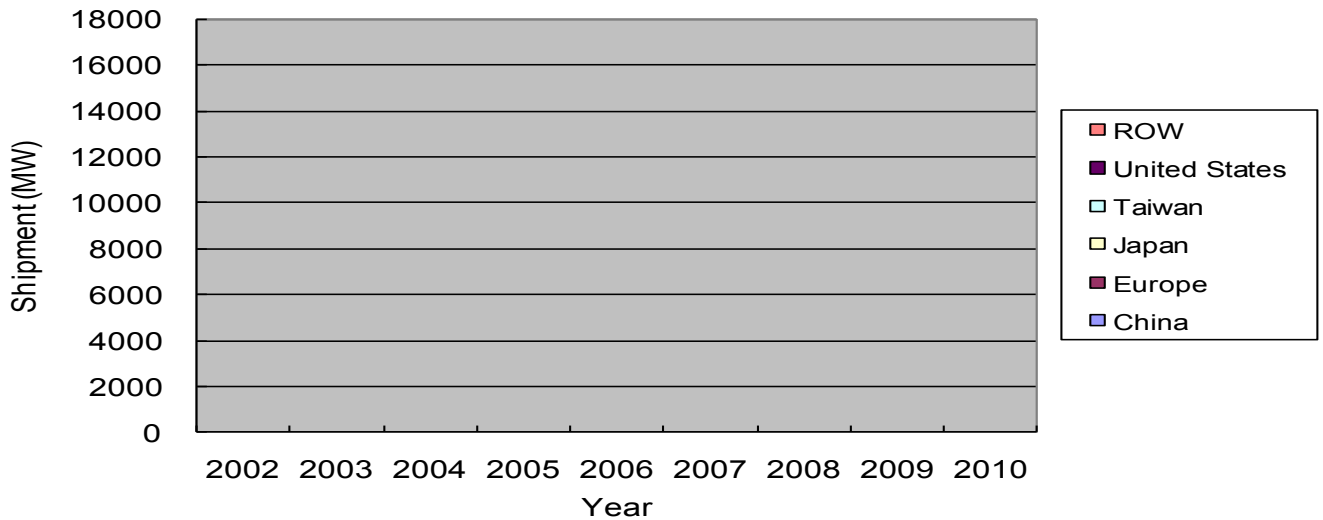
21st Century will be the Solar Century



PV Has Been Scaled Up

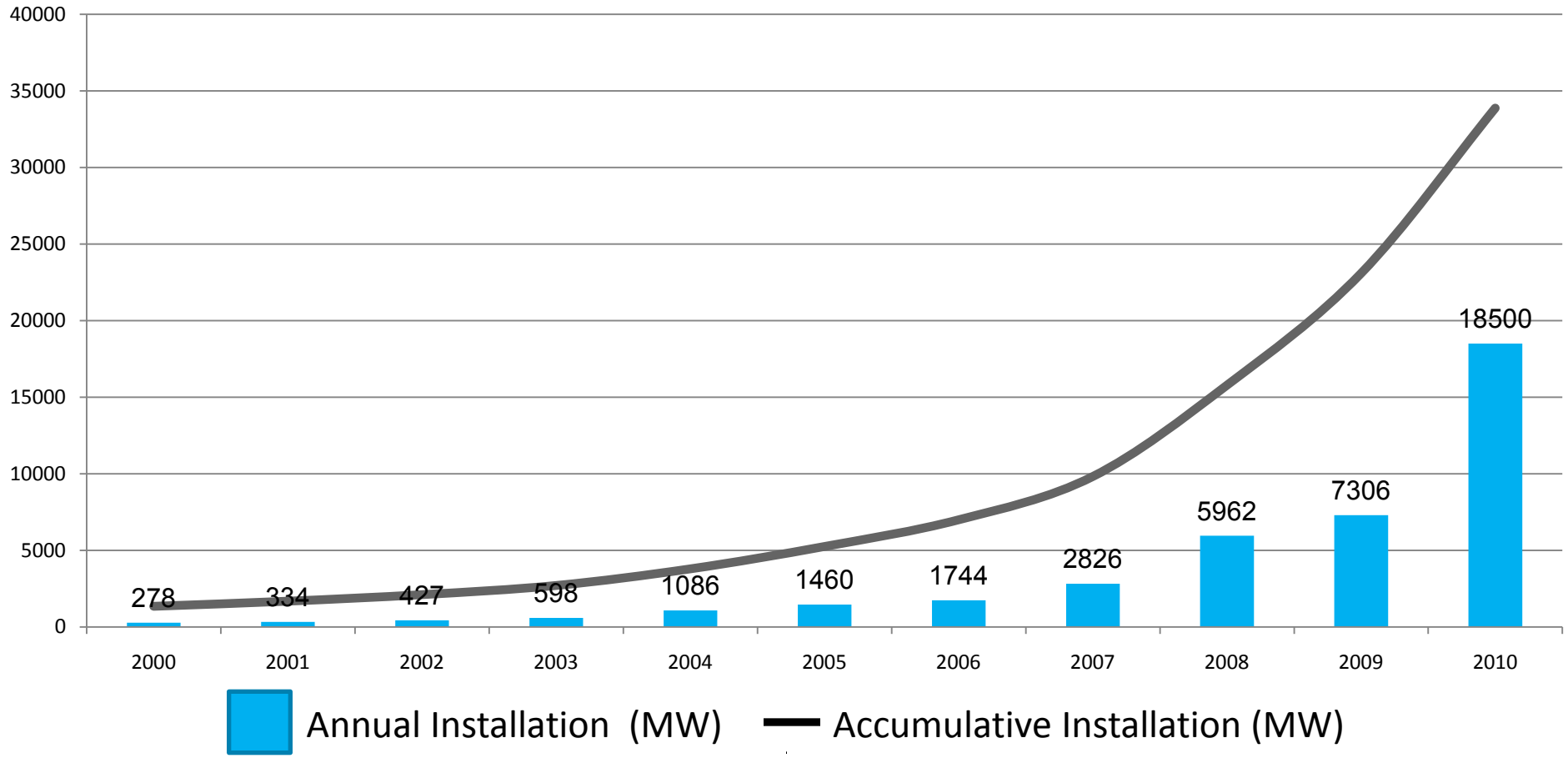
2010, China Mainland produced about 50% of PV worldwide. In MW

Region	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	10	10	50	200	400	1088.0	2600.0	4011.0	8000.0
Europe	135	193.35	314	470	657	1062.8	2000.0	1930.0	2000.0
Japan	251	363.91	602	833	928	920.0	1300.0	1508.0	1700.0
China (Taiwan)						450.0	900.0	1300.0	2500.0
United States	120	103.2	140	154	202	266.1	432.0	595.0	800.0
ROW	45	73.8	89	102	314	663.1	668.0	1316.0	1200.0
Total	**561**	**744.26**	**1195**	**1759**	**2500**	**4000.0**	**7900.0**	**10660.0**	**16200.0**



Source: China NDRC, Q1 2011

Global PV Installment Keep Growing



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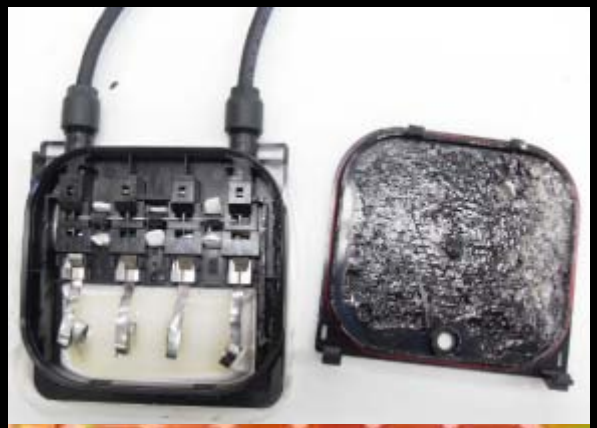
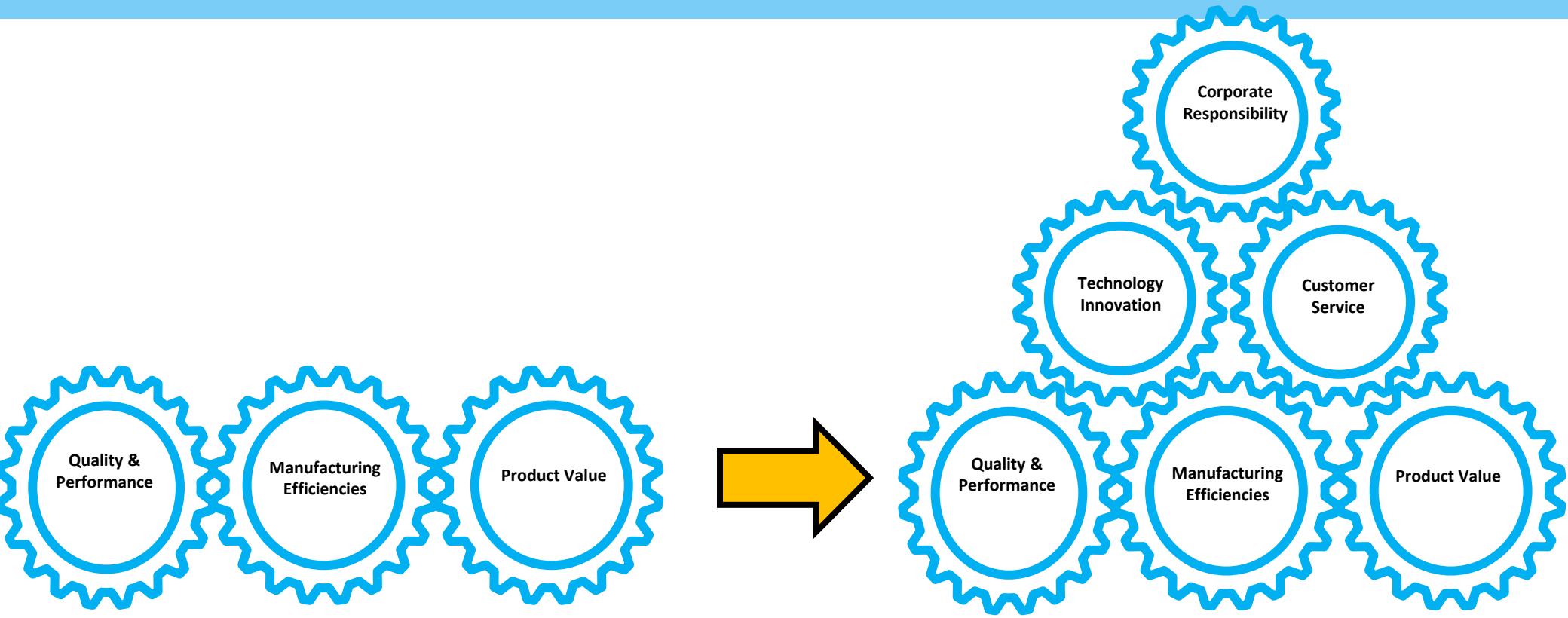
China NDRC

Quality Still Under Challenge



Seeking for Excellence, Seeking for Win-win



Trina Solar Company Snapshot

Trinasolar

- Founded in 1997, in Changzhou, China
- $1.86Bn **Revenue** in 2010
- >17,000 employees worldwide
- Listed on the NYSE (under TSL ticker)
- One integrated manufacturing campus

TSL LISTED NYSE

Our Advantage: Vertically Integrated Business Model

Ingot

Wafer

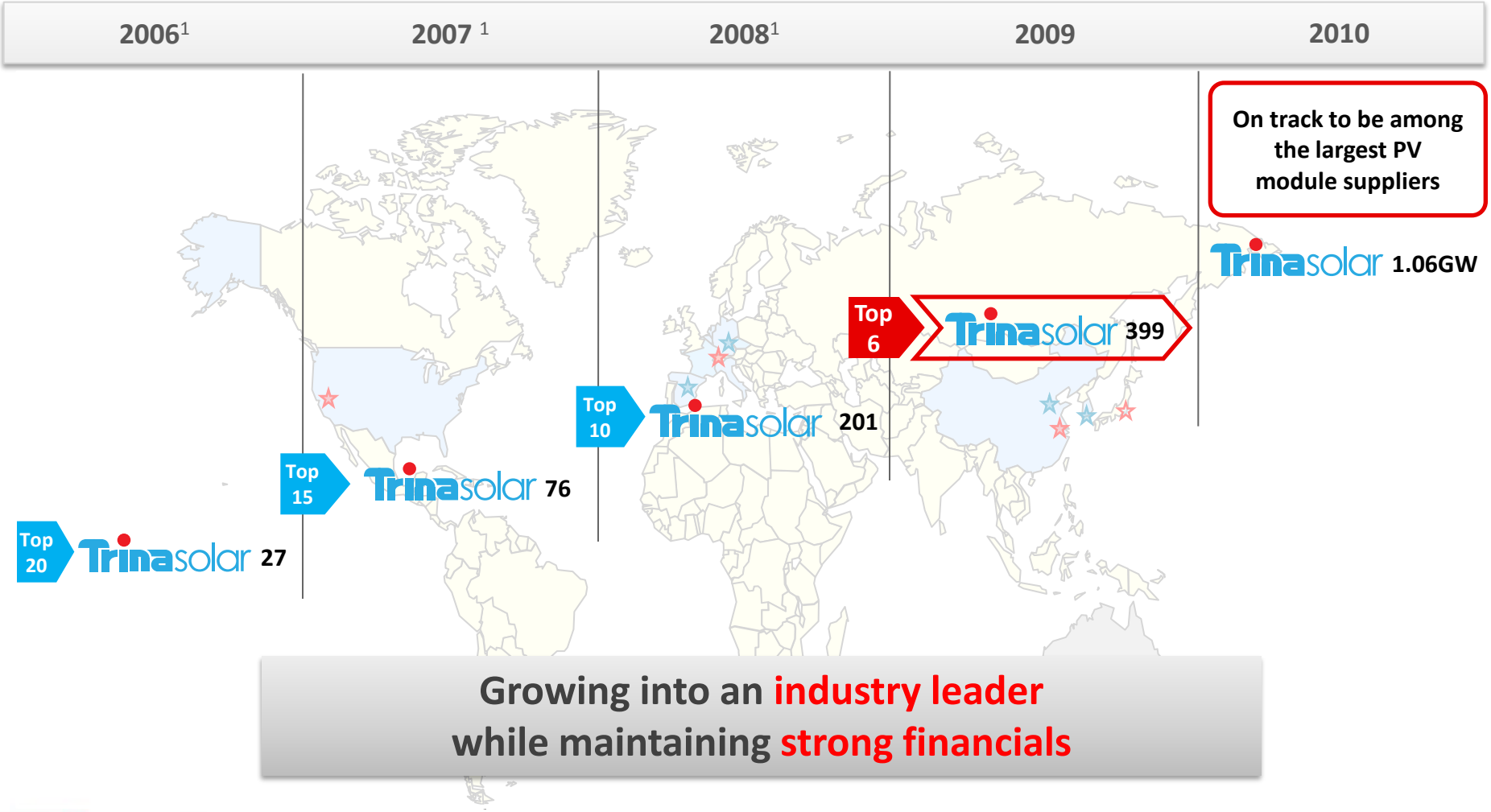
Cell

Module

System

Fast Growth

Module Shipments, in MW



Growing into an industry leader while maintaining strong financials

Trinasolar
The power behind the panel.

1_Source: Navigant Consulting, Solar Outlook 01-2010

International Organization

11 branch locations, **16,000+** employees from about **20 nationalities**

...

Support Coping with Climate Change

Trina Solar Establish

Come up with China1st Conceptual BIPV

Listed on NYSE

China State Key PV S&T Lad approved to set in Trina

Milestone: annual sales 10 Bil RMB

WEF 1st Shaper for Solar Globally

1997 2000 2006 2010

1997 2007 2009 2010 2011

KYOTO PROTOCOL

Bali Climate Change Conference

UN Summit for Climate Change

Climate Change Conference in Bangkok

Copenhagen COP15

Cancun COP16

Durban COP17

Model of Green Growth

GreenTech Media 2010 ranking based on quality, capacity and technology

First Solar (FSLR U.S.)
Trina Solar (NYSE: TSL) (China)
Yingli Green Energy (NYSE: YGE) (China)
Suntech Power(NYSE: STP) (China)
REC (REC.OL) (Norway)
Astronergy (China)
Solibro GmbH (Germany)
LDK Solar (NYSE: LDK) (China)
SunPower (Nasdaq: SPWRA) (U.S.)
Solar Frontier (5002.T)(Japan)
Sharp (SHCAY.PK) (6753.T in Japan)
Canadian Solar (Nasdaq: CSIQ) (China)
EGing Photovoltaic Technology (China)
Abound Solar (U.S.)
Solarfun (Nasdaq: SOLF) (China)

World-Class Environment, Health, Safety

Solar Scorecard 2011, world ranking for PV manufacturer's toxics coalition

COMPANY	OVERALL SCORE		RECYCLING	GREEN JOBS	TOXICS	DISCLOSURE
SolarWorld		91				
Trina Solar		89				
REC		87				
First Solar		87				
SunPower		85				
Yingli Solar		72				

*Sharp and Suntech contacted SVTC and worked to have a constructive dialogue, but did not complete the survey.

The Key for Overall Score

Sunny
This company is an industry leader and is on the right track toward ensuring that solar PV is green and clean.

Partly Sunny
This company has taken some big steps toward creating a clean PV industry but does not address all of the issues effectively.

Cloudy
This company responded to the survey but has not taken the necessary steps toward creating a clean PV industry.

Rainy
This company did not respond to our survey and is not transparent; it's not clear if they are committed to sustainability and social justice.

(1) *Solar scorecard 2011*

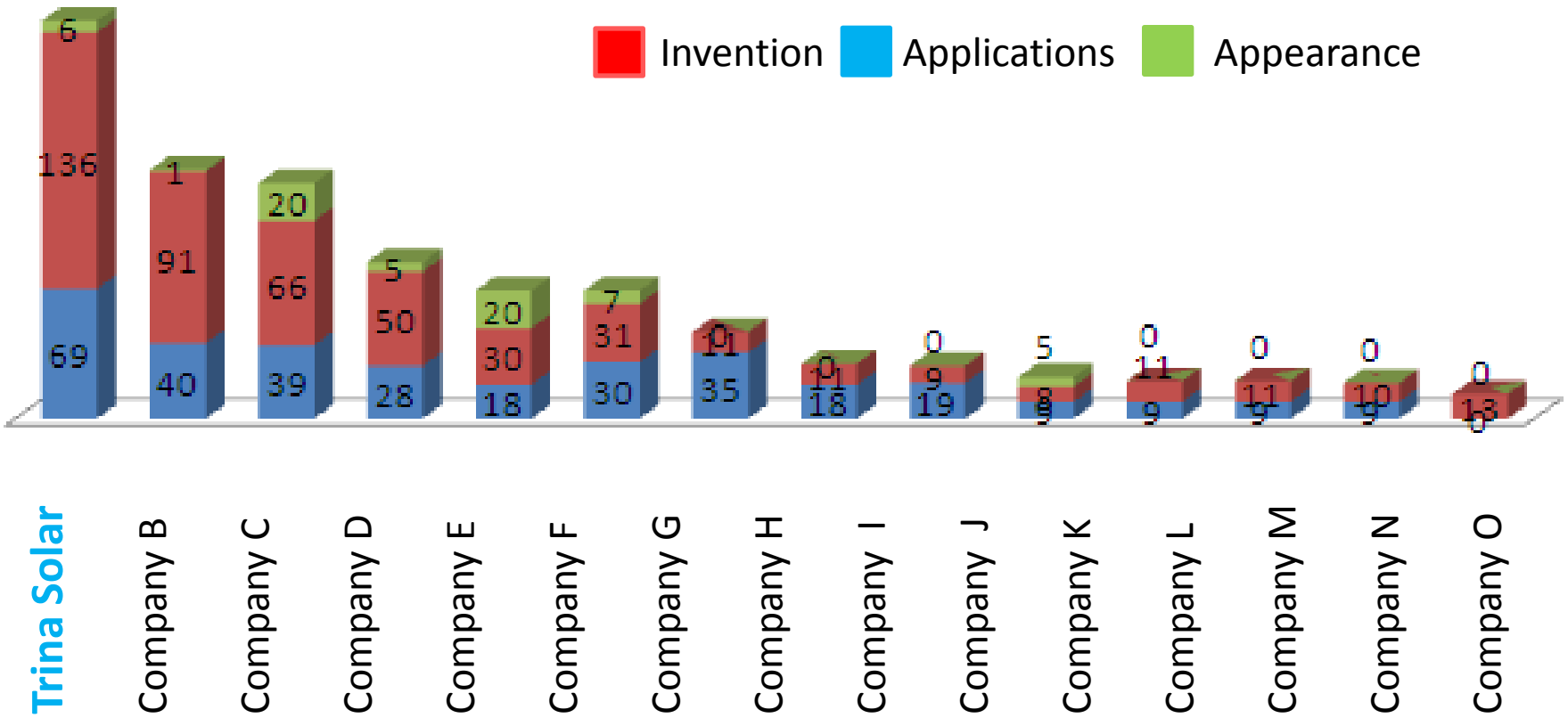
Sustainability Leader

PRTM 2011 ranking based on sales growth, brand, market share, profitability, marcap and financing status (1)

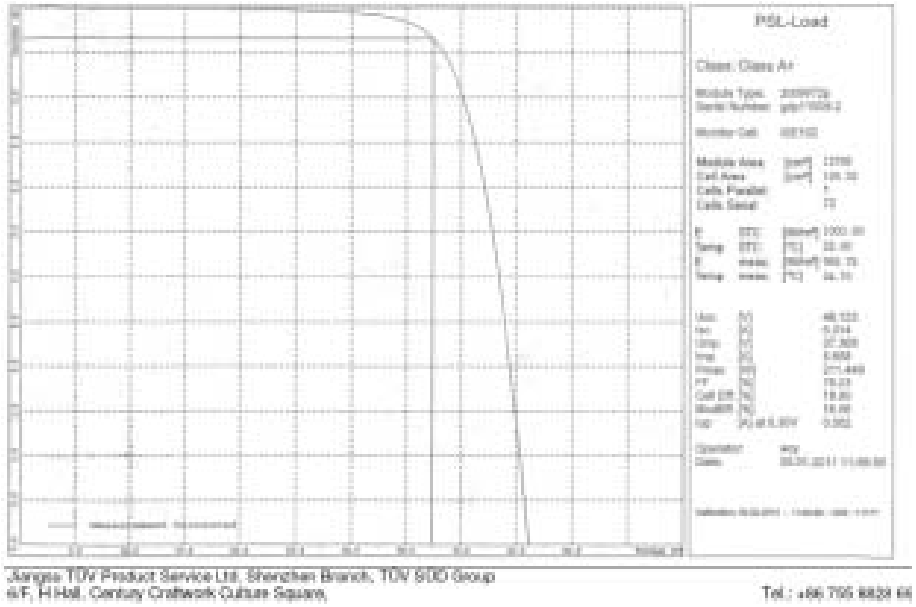
Name	Country	Score	Score change 2010 to 2011	2011 Rank	Rank change 2010 to 2011
Trina Solar Limited	CN	51.5	-10.5	1	↑ 1
First Solar, Inc.	US	63.5	48.5	2	↓ -1
LDK Solar Co. Ldt.	CN	63.5	N/A	2	N/A
Renesola Ltd.	CN	63.5	-109.5	2	↑ 21
JA Solar Holdings Co., Ltd.	CN	65.0	-53.5	5	↑ 9
Yingli Green Energy Holding Co., Ltd.	CN	80.5	-7.0	6	→ 0
Gintech Energy Corporation	TW	90.0	-23.5	7	↑ 6
Motech Industries, Inc.	TW	91.0	-37.5	8	↑ 7
Renewable Energy Corporation ASA	NO	94.5	26.5	9	↓ -4
JinkoSolar Holding Co., Ltd.	CN	104.0	N/A	10	N/A
Neo Solar Power Corp.	TW	106.5	N/A	11	N/A
Suntech Power Holdings Co., Ltd.	CN	109.0	43.5	12	↓ -9
Hanwha SolarOne, Ltd.	CN	121.0	11.0	13	↓ -2
SunPower Corporation	US	124.5	57.0	14	↓ -10
Canadian Solar Inc.	CN	125.5	26.5	15	↓ -5

Innovation Championing China PV Industry

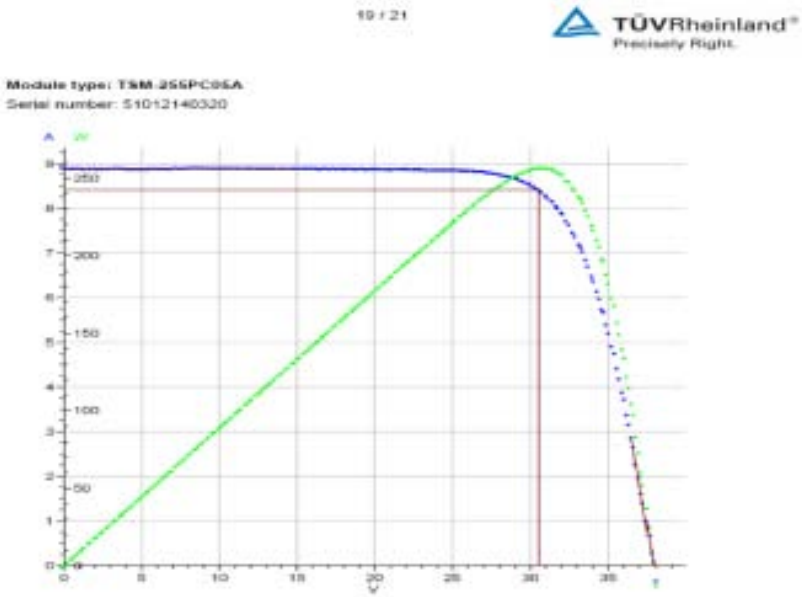
China Listed PV Companies



Innovation Progress



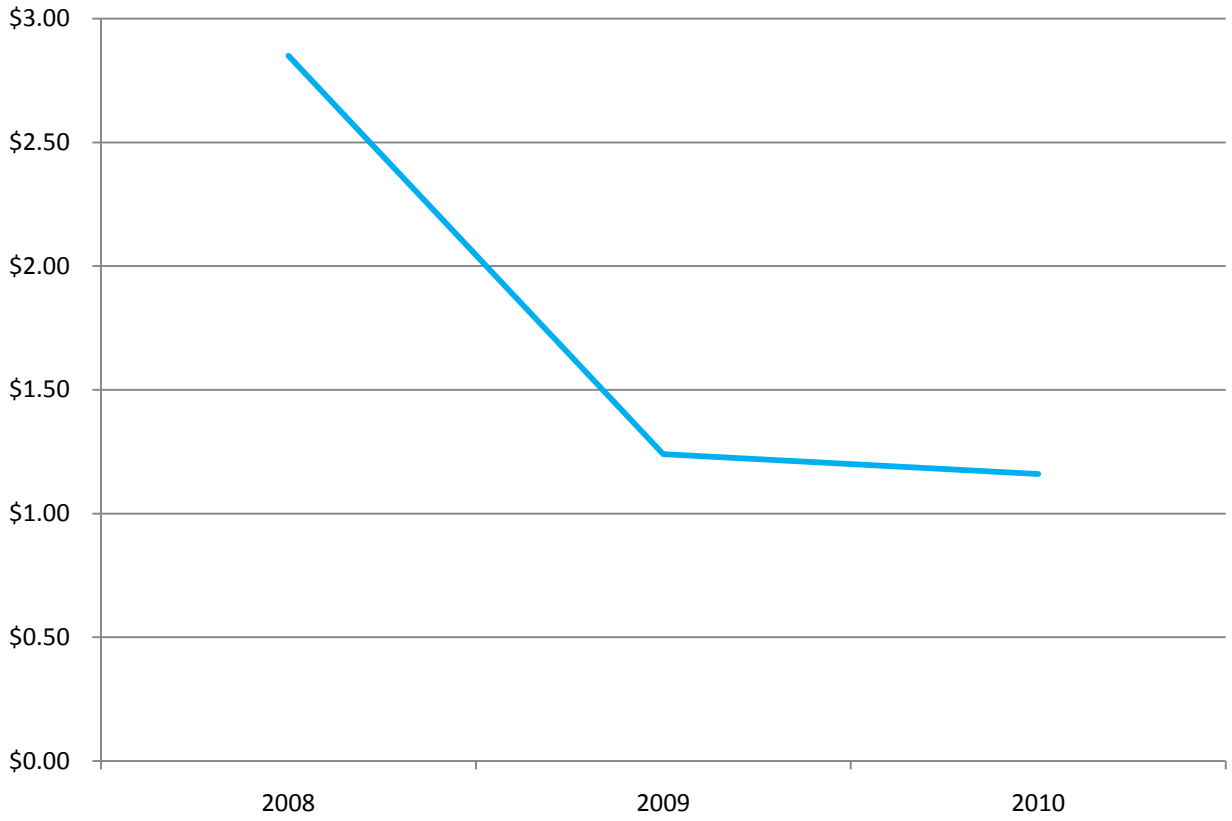
Pmax=211W
Cell Eff%:18.80%;
Module eff:16.56%



Pmax=257.2W
Cell Eff%:17.6%;
Module eff:15.7%

Remaining Cost-Leadership with Best Quality

In-house Blended (Mono & Multi) Cost per Watt (US$/W)



China State Key PV Science & Technology Lab @ Trina

Committee members: Top Experts in PV industry

Director: **Shen Hui**

Deputy Director: **Dr. Huang Qiang** from Trina

Chu Junhao , Academician from Shanghai Institute of Technical Physics

You xiaozeng, Academician from Nanjing University

Wang Zhonglin , Academician from UGA

Yang Deren, professor from Zhejiang University

Ji Liangjun, researcher from UL, USA

Bett , deputy director from ISE fraunhofer,Germany

Zhangyong, professor from UNC

Arnulf, researcher from JRC, Europe

Liu Zhengxin, reseacher from AIST, Japan

Dr.Feng Zhiqiang, from Trina

Dr. Zhang Zhen, from Trina

Collaboration to Bring Solar to Mainstream

70 **Researchers:** 10 PhDs from ISFH (DE), ANU(AU), NUS(SG) , YNU(JPN), CAS(CN), …

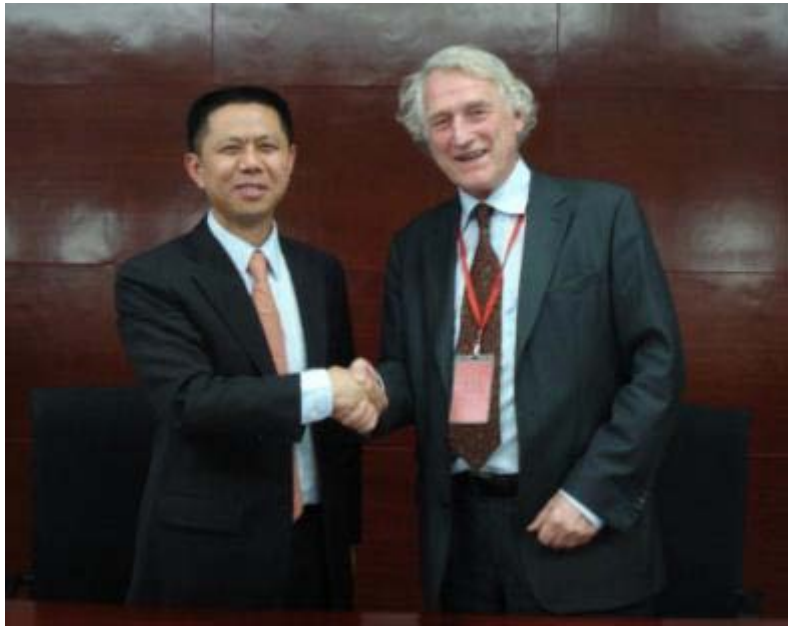
Member of academic committee from JRC (EU), AIST(JPN), Georgia Tech(US), CAS(CN), ISE (DE)…

Partners: SERIS (SG), MIT (US), CAS(CN)…

Collaboration to Bring Solar to Mainstream

Partnership with SERIS

Contract Research Agreement has been signed between Trina Solar and Solar Energy Research Institute of Singapore (SERIS) to develop super efficiency (21.5%-23.5%) silicon back-contacts solar cell



TIME IN PARTNERSHIP WITH CNN Specials

SEARCH TIME.COM

Heroes of the Environment 2008

A special report on the eco-pioneers fighting for a cleaner, greener future

Select a Section | Story | All Best and Worst Lists

Scientists & Innovators

BACK NEXT

31 of 32 | View All

Joachim Luther

By WILLIAM BOSTON Wednesday, Sep. 24, 2008

When he was a young professor of nuclear physics at the University of Oldenburg in the 1970s, Joachim Luther's office was often besieged by students waving antinuclear banners and shouting slogans. "I'm a scientist," says Luther, "so I figured it was important to test their

Partnership with IEC/TC 82 with a Great Start

IEC/TC82 Annual Conference in China

- Trina Solar starts to contribute to IEC/TC 82
- 2 Standards raised by Trina Solar representing China PV manufacturers
- Both believe that the collaboration need to be reinforced
- Trina Solar is willing to contribute more

Quality Assurance System

Forming Strategic Cooperation Partnerships with TUV, UL and CGC

Trinasolar CENTER FOR EXCELLENCE

- Over **30 in-house tests**, allows internal testing in accordance with IEC standards and those of internationally-trusted testing bodies

- **Long-term Strategic Partnership with** TUV Rheinland Group, Underwriters Laboratories Inc (UL) and China General Certification Centre (CGC).

- Material & Electrical testing to **increase panel durability** and **prolong product lifetime**
- Allows Trina Solar to confidently offer customers our customers **product and manufacturing warranties**

Sample Tests

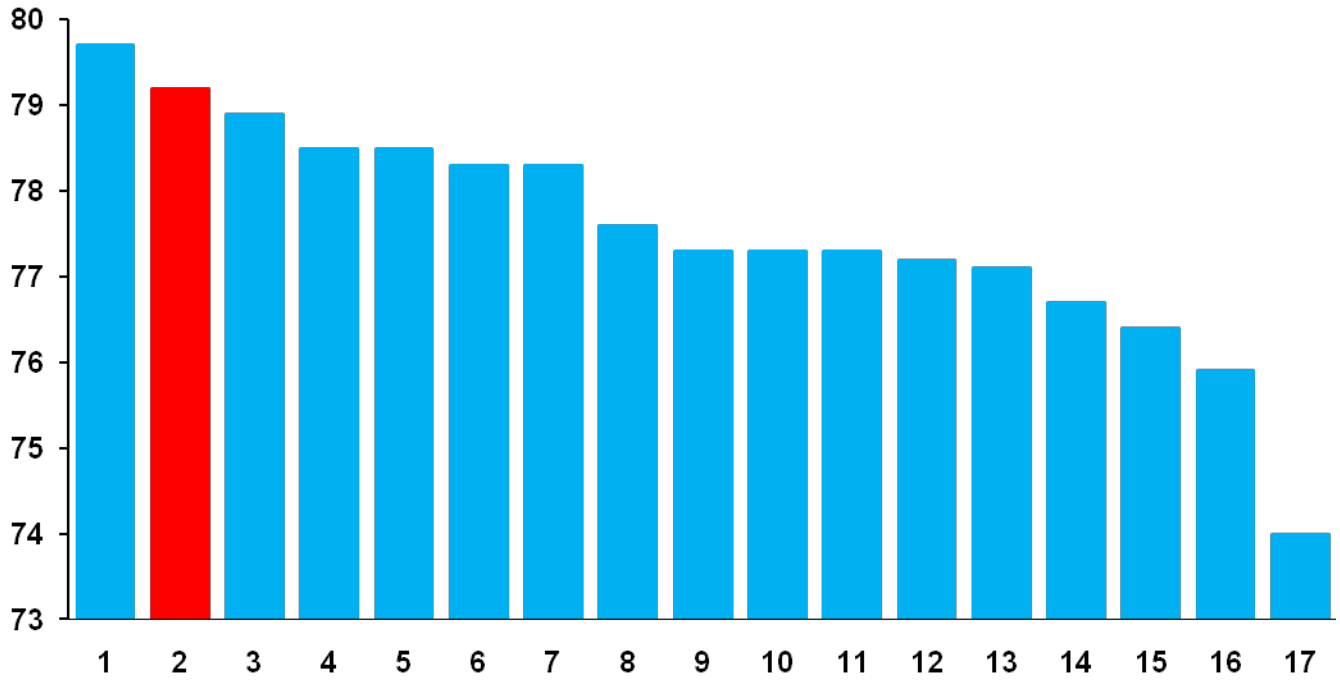
UV Test

Mechanical Loading Test

Power Determination Test

Quality Recognition: 2008

Monocrystalline Modules Ranked 2nd in the TUV Specific Energy Yield Report



14 Participants

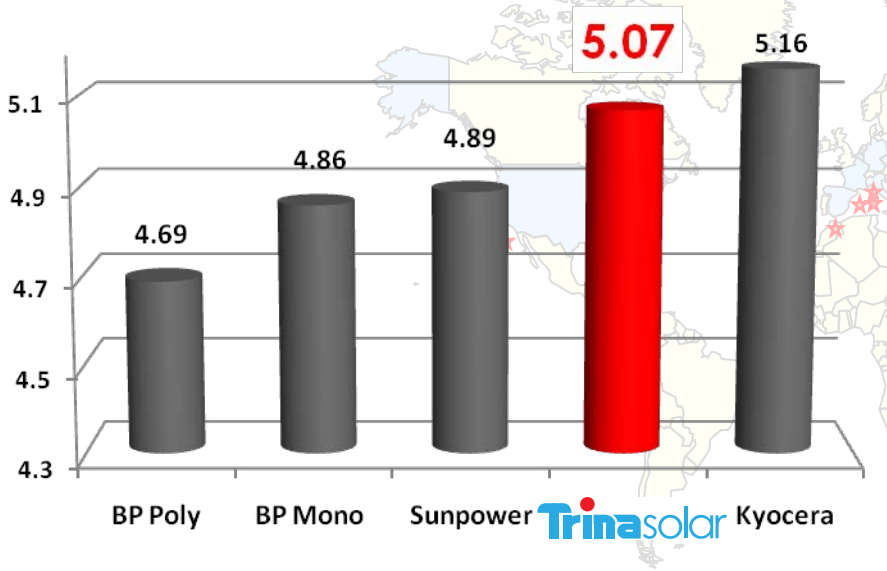
- Trina Solar
- BP Solar
- Energy Solutions
- EverQ GmbH
- Kyocera Fineceramics GmbH
- REC Scanmodule AB
- Scheuten Solar Technology GmbH
- Sharp Electronics Europe GmbH
- Siliken S.A.
- Solarwatt AG
- SolarWorld AG
- Solon AG für Solartechnik
- 3S Swiss Solar Systems AG
- Suntech Power

Note: TUV Rheinland testing period from Sep 1 to 30, 2008. Performance measured as actual output relative to theoretical output.
17 modules from 14 brands tested.

Quality Recognition: 2009

Test Results in Australian Deserts

Average daily power output from January to December 2009 (Unit : kWh/kWp)



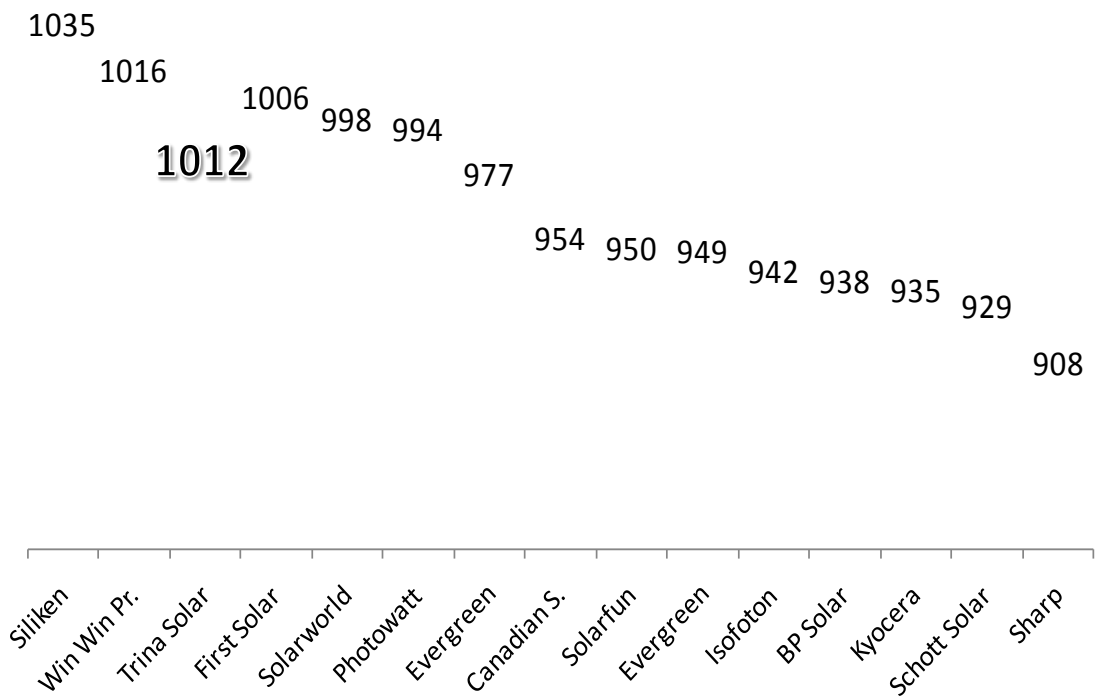
You get more with Trina modules

Trina vs.	
BP Mono	+8.0%
SPWR	+4.7%
BP Poly	+4.5%
Kyocera	-1.3%

Even in the desolate deserts in summer Australia, Trina Solar's modules shine with its superior quality

Quality Recognition : 2010

Results of the Photon solar module yield measurement results *(Jan to Nov 2010 in kWh/kWp)*



As seen in magazines:

Trina Solar panels are among the world's **top performers.**

Source: Photon International January 2011

Customers High Recognition

Projektbeschreibung:

Für das 14 Hektar große ehemalige Nato-Militärgelände "Hohrain" wurde eine neue Nutzungsmöglichkeit gesucht und gefunden. Die Gemeinde Dürbheim hat das Gelände aufgekauft und an Investoren verpachtet, die hier den Energiepark Dürbheim errichtet haben. Derzeit wird im Energiepark Dürbheim ausschließlich mittels Photovoltaik Strom produziert. Mit der erzeugten Energie könnte nicht nur der Strombedarf der Gemeinde Dürbheim gedeckt, sondern darüber hinaus auch noch Strom zur allgemeinen Nutzung ins öffentliche Netz eingespeist werden.
Das Fraunhofer Institut für Solare Energie (ISE) wird in der Zukunft die Anlage zu Forschungs- und Testzwecken in den Bereichen Speichern von Energie, Elektromobilität und Wechselrichter der nächsten und übernächsten Generation nutzen.
Der Energiepark Dürbheim ist mit einem Investitionsvolumen von 12 Mio. EUR und mit 5 Megawatt installierter Leistung eine der größten Photovoltaik-Anlagen im süddeutschen Raum.

Projektverlauf:

27.07.2009:	Vorstellung der Idee "Energiepark Dürbheim" im Gemeinderat
28.09.2009:	Gemeinderat stimmt Abschluss des Pachtvertrags mit der Energiepark Dürbheim GmbH zu
20.11.2009:	Pachtvertrag zwischen der Gemeinde Dürbheim und der Energiepark Dürbheim GmbH wird unterzeichnet
November 2009:	Beginn der Arbeiten auf dem Gelände
01.06.2010:	erste Stromeinspeisung aus dem 1. Teilfeld
31.10.2010	Fertigstellung der installierten Leistung von 5 Megawatt

Der Energiepark Dürbheim in Zahlen

Stahl	307 Tonnen entsprechend 95 Kilometer Stahlprofile
Kabel	196 Kilometer
Schotter	15.000 Tonnen
Solarmodule	22.360 Stück
Modultische	3.523 Stück
installierte Leistung	5 Megawatt
Energieproduktion	5.250 MWh/Jahr
CO_2-Einsparung*	3.000 Tonnen

*Quelle: Infozentrum UmweltWirtschaft, Bayerisches Landesamt für Umwelt

Projektentwicklung, Planung und Realisation des Energieparks:

Die Unternehmen der BES-Gruppe zeichnen für die Projektentwicklung, Planung und Realisierung des Energieparks verantwortlich. Im Auftrag der Energiepark Dürbheim GmbH haben die Mitarbeiter der BES-Gruppe innerhalb eines Jahres die gesamte Photovoltaik-Anlage geplant, das Gelände für den Bau vorbereitet, nach neuen Lösungen für die Aufständerung gesucht und die Anlage sowohl mechanisch als auch elektrisch realisiert.

Planen auch Sie den Bau einer Photovoltaik-Anlage? Dann sprechen Sie uns an, wir sind Ihr kompetenter Partner von der Idee bis zur Fertigstellung und übernehmen für Sie auf Wunsch auch die Betriebsführung.

Betriebsführung

Trinasolar — www.trinasolar.com — Modulhersteller

galileosolar — www.galileosolar.de — Komponentenlieferant

KACO — www.kaco-newenergy.de — Wechselrichterhersteller

sikla — Montagetechnik

Energiepark Dürbheim

BES GRUPPE
In Breiten 6
78589 Dürbheim
Tel.: +49 7424 98240-0
Fax: +49 7424 98240-95

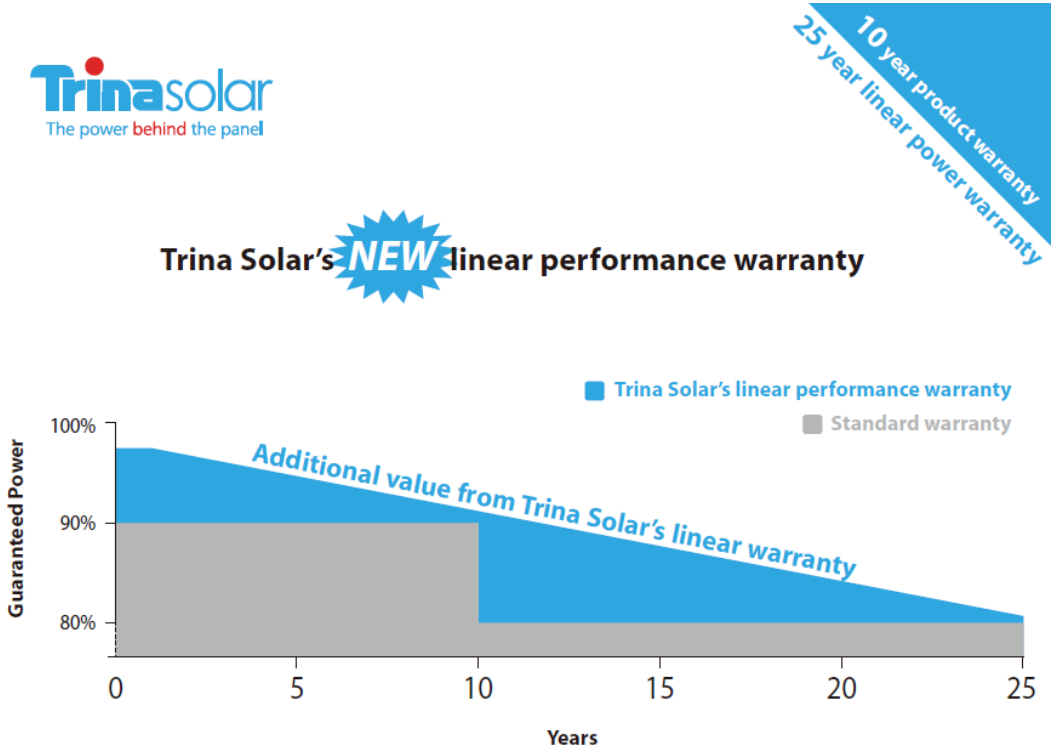
EPD
Energiepark Dürbheim GmbH
In Breiten 6
78589 Dürbheim
Tel.: +49 7424 982400
Fax: +49 7424 9824095

Industrial Leading Warranty

Description

Polycrystalline Products:
2.5 % in the first year, thereafter 0.7%
per year, ending with 80.7% in the 25th year after the Warranty Start Date

Monocrystalline Products:
3.5 % in the first year, thereafter
0.68% per year, ending with 80.18% in the 25th year after the Warranty Start Date.

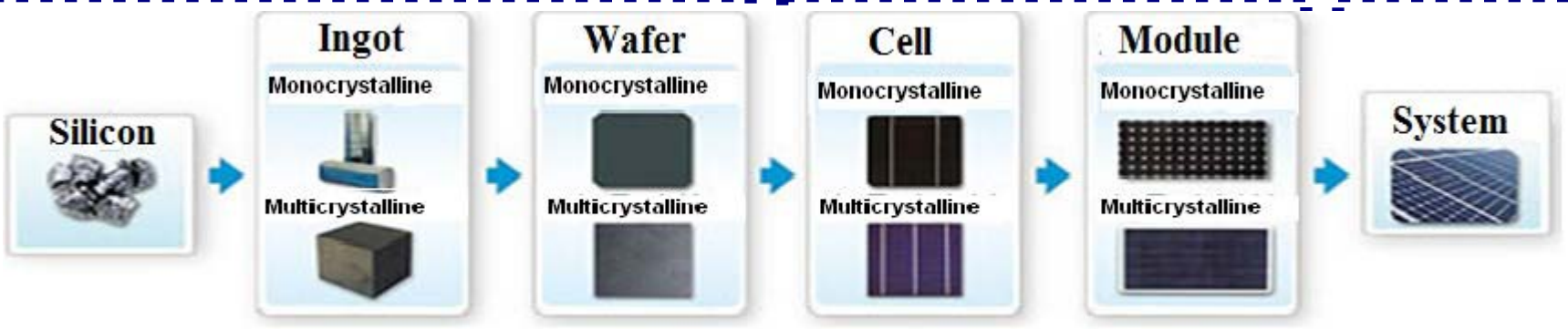


- **10 years product warranty**
- **25 years linear power warranty**
- **Positive power tolerance +3%**

Joint Our Efforts in Fighting Against Fakeries

Trina PV Park

—Joint Quality Management Cross Supply Chain



crucible, graphite, slicing wire, sawing , squaring, slurry recycle, silicon carbide, special gases, silicon nitride, cutting fluid, etc

photovoltaic glass, back sheet, compound of EVA and posterior segments, junction box, stringer, testing instruments, inverter, guide rollers, aluminum frame, silver paste, aluminum paste, silicon glue , soldering ribbon, equipment spare parts etc

Centralized photovoltaic power generation systems; building integrated components, solar lights and other solar energy application products

<——Testing & Certification, R&D——>

Produce Solar, Learn Solar, Use Solar Enjoy Solar

—Trina Solar Town

To attract 60-100 companies along the value chain, to jointly build up a 100 billion level industrial cluster and a world renown Integrated Solar Model Town in 2015

- **World top R&D platform based on State Key PV Lab**
- **World top testing and certification platform based on the Trina Center for Excellence**
- **International Trading and Exchange platform based on an international exposition center**
- **World leading PV education center with the contribution of world top universities and research institutions**

Green Growth, Our Target

ISO 14064

- **ISO14064：**CO2 emissions auditing（GHG）(2011)

To kick off the Trina Solar Low Carbon Development Campaign

PAS 2050

- **Product Carbon Footprint (through life cycle)**

PAS 2060

- **Carbon neutral international standards**

Carbon Trading

- Participation into the global carbon trade

Dow Jones Sustainability Index (2015)

Solar Industry Shaper of Davos WEF

Trina Solar as the world's first Global Growth Company (GGC) Industry Shaper in the solar sector

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

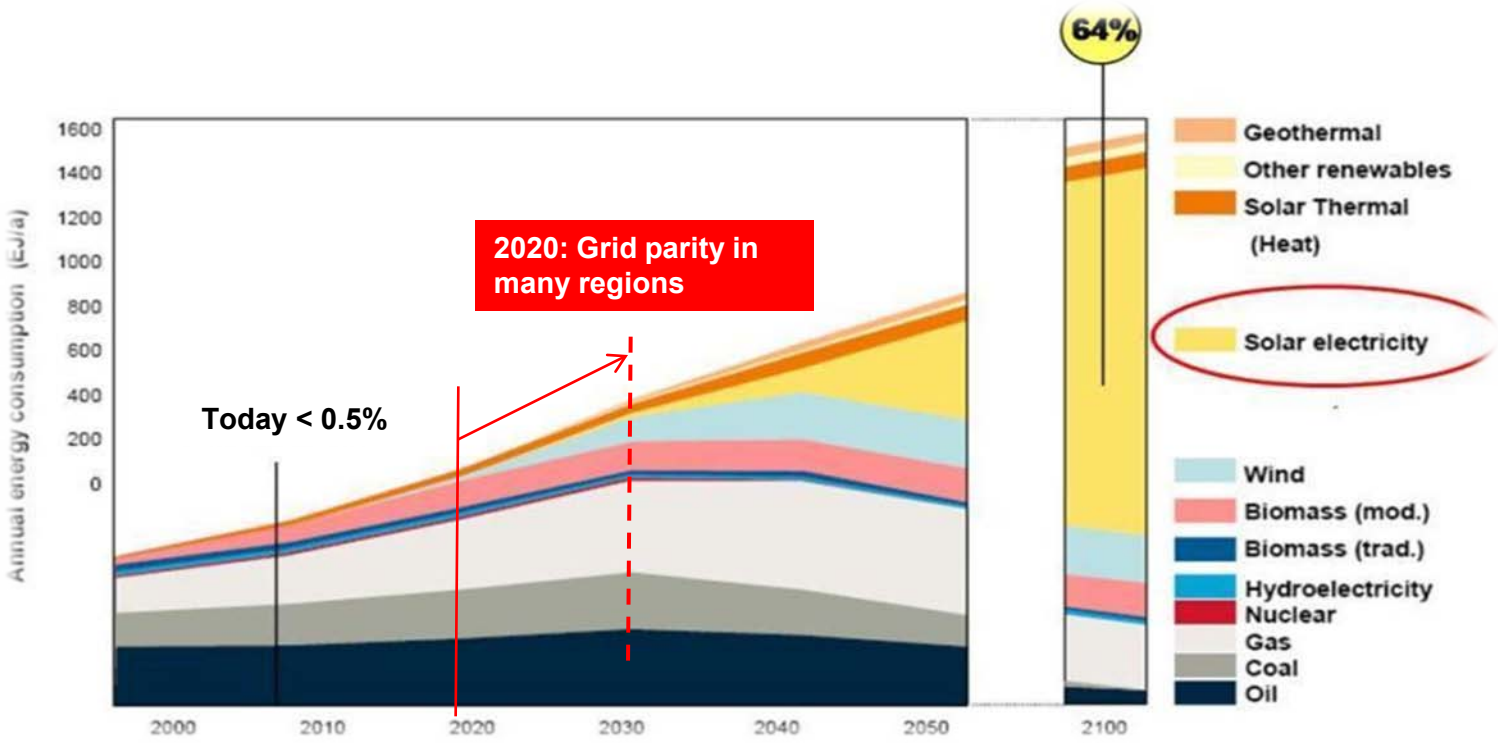
What We Have been Committed to

To Benefit Human Future with Clean Solar Energy through Collaboration !

1 hour sun ~ 1 year energy

IEC/TC 82 is The Right Platform to Promote PV Sustainability

Collaborate to Bring Solar to Mainstream in 2020



Trinasolar
The power behind the panel.

CHINA

JAPAN

KOREA

U.S.A.

SWITZERLAND

GERMANY

ITALY

SPAIN

THANK YOU

www.trinasolar.com