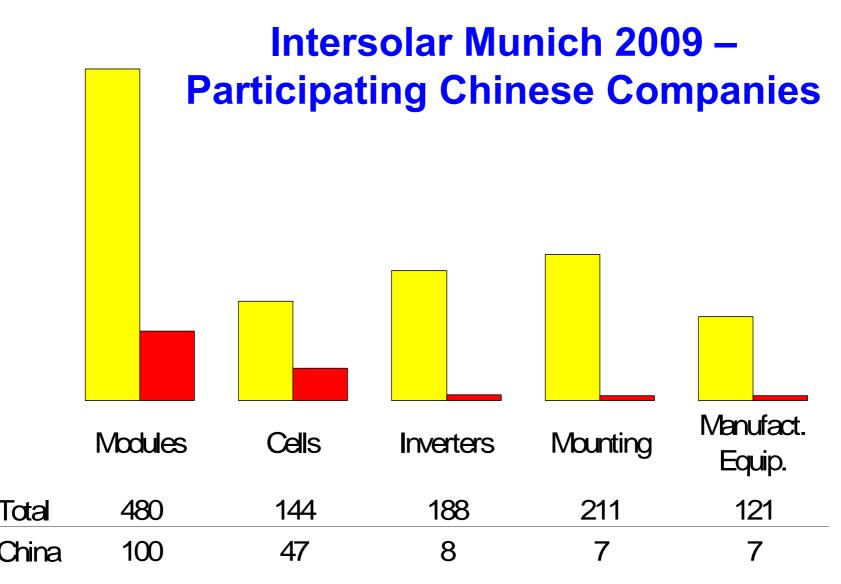
"PV Market Update from China and Look into the Crystal Ball"

Seminar "Solar Energy – A Window to the future" Penang, Malaysia June 15, 2009 Frank Haugwitz

China Dynamics – Snapshot 1



Source: Official Exhibition Catalogue Intersolar 2009

China Dynamics – Snapshot 2

- Hunan Prov.: 1 GW module cap.; 30.000 t UMG-Si; 10.000 t polysilicon; 200 MW mono-si wafer, 1 GW poly-si wafer by 2012
- Jiangxi Prov.: € 400 Mio invest.: 3 GW module cap.; 3 GW cell cap.; 1 GW wafer cap.
- Zhejiang Prov.: ReneSola will construct a combined 5 MW BIPV
- Jiangsu Prov.: By 2011: Target of 10 GW prod.-cap (module and cells)
- Shandong Prov.: €130 Mio for Cell and Module Prod.-Cap.
- Jiangsu Prov.: €60 Mio invest.:200 MW thin-film cell prod.
- Zhejiang Prov.: €300 Mio invest.: 1 GW thin-film cell prod.
- Jiangsu Prov.: 1,5 MW Roof-Top project (Suntech)
 - Qinghai: €6 bln. Solar Dev. Plan until 2015
 - Hubei Prov.: €100 Mio invest.: 30 MW plant
 - Jiangxi Prov.: Q-Cells & LDK Joint Venture
 - Qinghai Prov.: 10 MW plant announced
- Yunnan Prov.: 200 MW Roof-Top Prog.
- Fujian Prov.: 16 MW plant
 - Jiangxi Prov.: 30 MW plant

cell prod.Investment € 7 blnch)Prod.-Capacities510.000 t poly-silicon30.000 t UMG-Si30.000 t UMG-Si4 GW Module4 GW Module2 GW Wafer, 3 GW Cell1,2 GW Thin-Film Cell

May 14-30, 2009

Installations: approx. 300 MW

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ient Co.

Jining, Shandong 1500 r

Sinosteel Scie-tech Development Co. Jiangsu Zhongneng Polysilicon Development Co. Ltd. Xumou, Hangsu 1000 1

Nitel Solar Ltd. **Usale-Shirskove** 37001

Duwy Silicon Park Co. Ltd. Sering Heber 5001

Shenzhou Silicon Industry Co. Ltd. Hubbot, Innere Mongole ISPOT'

> Dalu Polysilicon Co. Ltd. Habbet, targete Mongole

Linzhou Zhongsheng Semiconductor Silicon Material Co. Ltd. Linzhou, Henan 300.0

Honbridge Holdings Ltd. Jining Shandong, 1000 t*

Yangguang Silicon Co. Shizushan, Kingka, 1500 t

Isla Silicon (Olnohai) Co. Ltd. Coning Original 2000 t

Luoyang Zhonggui High-Tech Co. Ltd. Lucylang, Henan, 3000 I

> Henan XunTian'ni Tech Co. Ltd. Fangcheng, Henan, 3000 t

CICO Chaolei Industry Co. Ltd. Xinin, Sichuan, 1500 t

> Renesola Weisham Skihuan, 15001

Emei Semiconductor Materials Factory & Institute Emeishan Sichoan 5001

> Donglang Electric Corp. Leshan Sichuan 1500 t

Sichuan Xinguang Silicon-Tech Co. Ltd. Leshan Schuan 1260 1

Sichuan Yongxiang Polysilicon Co. Ltd. Leshan, Sichuan

1000 t

Dago New Materials Co. Ltd. Yunnan Metallurgical General Co. Wanghou, Jiangsu Quijing, Yunnan 4000 t 3000 f

Solargiga Energy Holdings Ltd. Instau Lisoning 400 1

> Penhua Smelting Co. Ltd. Linghai, Liacoing

Jiangsu Shunda PV-Tech Co. I Yangshou, Jiangsu 6050 t

Sharp Corp.

≈ € 10 bln investment \approx 55 companies

≈ 100.000 t under construction

2008: ≈ 4500 t output; total demand \approx 15000 t

May 09: Ø US\$ 48 kg

Shaanni Non Ferrous Metals Xian 1250 8 Jaco Solarsi Ltd. --Xiamen, Fujian 2100 t CSG Yichang Silicon Material Co. Ltd. Nan'an Sanjing Silicon Refining Co. Ltd.

Ningbo Sela

Nincibo, Zheji,

2000 1

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LDK Solar Hi-Tech Co. Ltd.

Enoxin Technology Corp.

Xinyu, Jianoxi

Yyang, Hunan

Ychang, Hubei

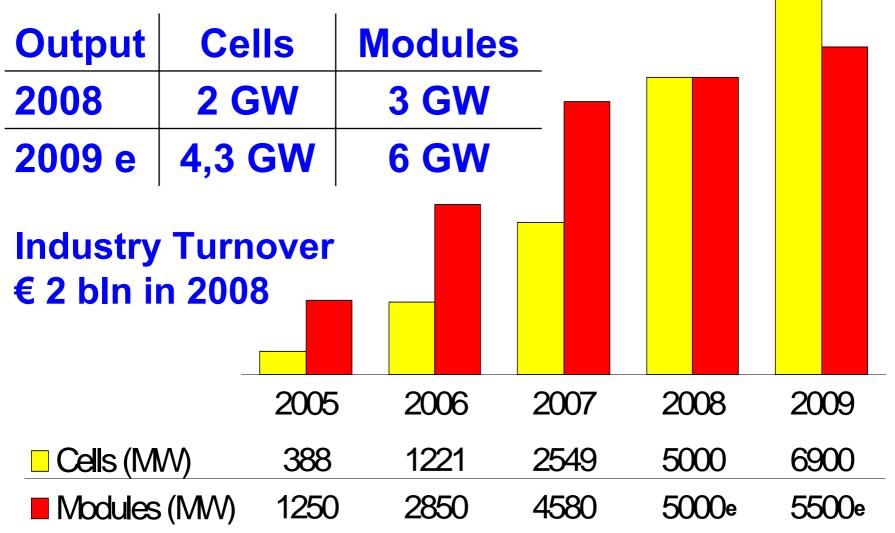
16 000 t

1600 it

1500 t

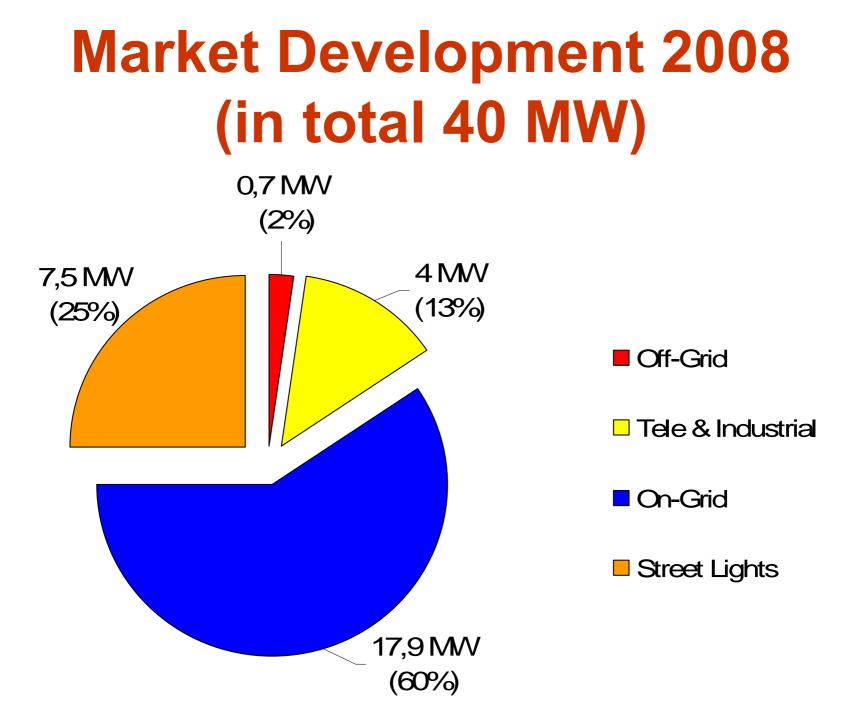
Nan'an, Fulian 3000 t

Cell & Module Production Capacity (2005-2009)



Source: ENF, CRESP, CLSA, own figures

Market Development 2000-2020 National **Targets MWp** 100C <u>19</u> \mathbf{O}



Political Framework

- January 06 RE-Promotion Law came into effect
 PV is a priority strategic energy resource
- Sept. 07 Mid & Long-Term Dev. Plan released (NDRC)
- Govt. Investment in larger PV-Systems 5-10 MWp announced – Focus Western Provinces
- CAS released a Solar Development Plan until 2050
- March 23, 2009 Subsidy Prog. announced by MoF

Ministry of Finance - Subsidy–Prog.



关于印发《太阳能光电建筑应用财政补助 资金管理暂行办法》的通知

财建[2009]129 号

各省、自治区、直辖市、计划单列市财政厅(局),新疆生产建设兵团财务局:

为贯彻实施《可再生能源法》,落实国务院节能减排战略部署,加快太 阳能光电技术在城乡建筑领域的应用,我们制定了《太阳能光电建筑应用财政补 助资金管理暂行办法》。现予印发,请遵照执行。

财政部

二〇〇九年三月二十三日

Ministry of Finance - Subsidy–Prog.

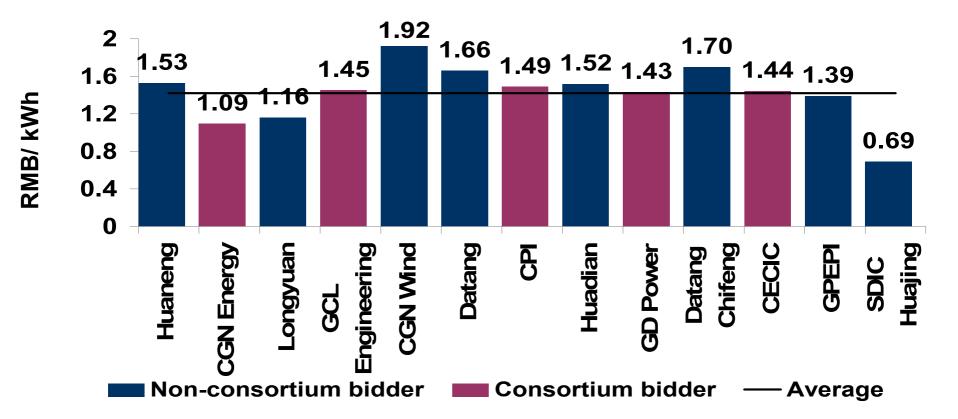
- Key Features
 - Subsidy € 2 / US\$ 2,93 / Wp installed
 - Priority BIPV (public buildings) incl. simple roof-top
 - Minimum capacity 50 kWp systems
 - Eligibility: cell type (mono, poly, thin) must have a minimum efficiency of 16, 14, and 6% respectively
 - Cap (Budget / Capacity) unknown
 - 2009 is a trial period (learning process)
 - Submission deadline 1) May 15 2) August 30, 2009

By May 15 submitted applications amounted to approx. 750 MW ! By August 30 ... GW !!!

National Energy Administration Gansu Prov., Dunhuang, 10 MW

- Key Features
 - Released on December 10, 2008
 - Competitive Bidding Procedure
 - Winners tariff guaranteed for 25000 kWh, beyond re-negotiated
 - Tariff above € 0.40 won't be accepted
 - Operation Time 25 yrs
 - Local Content Requirement 80%
 - Construction Time 1.5 yrs
 - Evaluation Criteria lowest bid/tariff wins
 - March 20, 18 Chinese Co. submitted quotations

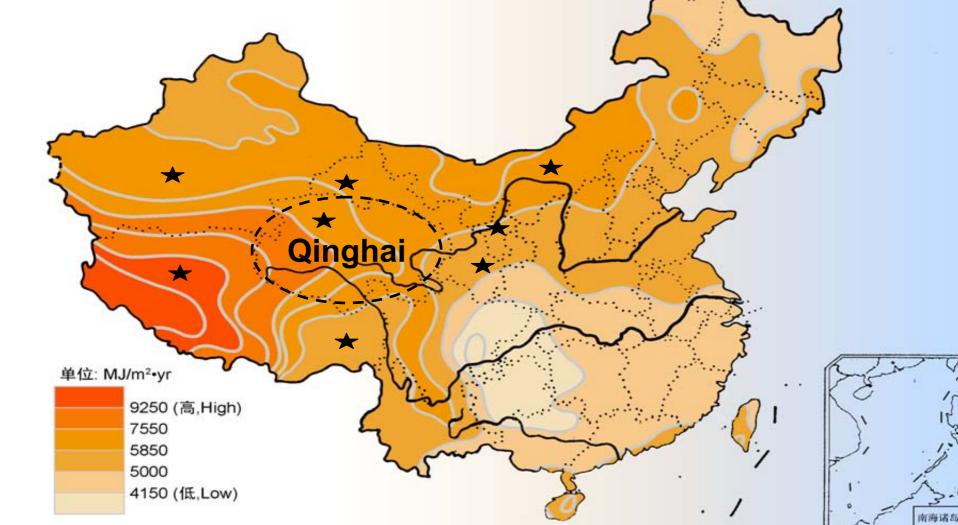
National Energy Administration Gansu Prov., Dunhuang, 10 MW



Winner (?) China Guangdong Nuclear Power Energy 2nd lowest bid \$ 0.16 or € 0.10 // kWh !

Source: NEF China

National Energy Administration Gansu Prov., Dunhuang, 10 MW



Energy from the Desert



National Energy Administration Feed-in-Tariff



发改价格[2008]1868 号

国家发展改革委关于内蒙古鄂尔多斯、上海崇明 太阳能光伏电站上网电价的批复

内蒙古自治区、上海市发展改革委:

报来的《关于内蒙古伊泰集团有限责任公司 205 千瓦太阳能聚光光伏示范电站上 网电价的请示》(内发改价字[2008]422 号)和《关于核定上海崇明前卫村太阳能光 伏电站上网电价的请示》(沪发改价公[2007]004 号)均悉。经研究,现批复如下: 一、核定内蒙古鄂尔多斯伊泰集团 205 千瓦太阳能聚光光伏电站和上海崇明前卫

村太阳能光伏电站上网电价为每千瓦时4元(含税)。

二、以上电价自光伏电站投入商业运营之日起执行,高出当地脱硫燃煤机组标杆 上网电价的部分纳入全国分摊。若项目运行成本高于核定的上网电价水平,当地政 府可采取适当方式给予补贴,或纳入当地电网销售电价统筹解决。

国家发展改革委

二oo八年七月二十一日

主题词: 能源 太阳能 电价 批复

Nationwide 2 projects receive FiT

Shanghai Chongming Island: 1 MW

Inner Mongolia: 205 kW

FiT: €0.40 / kWh

Duration: unclear

National Energy Administration Latest Developments

- NDRC/NEA submitted an "Energy Stimulus Programme" to the State Council late May 09
- Target: 18-20 % of total energy supply from renewable energies by 2020
- Main driver: National Energy Security Concern
- Total Investment: €140 430 bln
- PV relevant indications suggest:
 - New Natl. Target: 10-20 GW by 2020
 - Ground Mounted Program 3-5 GW by 2015
- FiT-Tariff of €0.10 / kWh (Dunhuang reference)

Summary & Outlook

Political Framework Conditions

- Targets, Programmes & Investments confirms the political commitment to promote the deployment of PV
- Previous focus on rural electrification replaced by on-grid application
- Stimulus Package for domestic economy facilitates finance / funding
- Net-Metering could serve as an additional driver to spur domestic market
- Support for Thin-Film because poly-crystalline considered as sufficiently mature

Industrial Development

- Potential to become the Future Global Centre of Production
- Compliance with intl. quality standards has a high priority
- Domestic silicon supply will further enhance cost-competitiveness
- Increasing investment in R&D to reduce dependency on foreign know-how

Market Development

- Explosive future domestic market development expected driven by new natl. targets, however installers base is in an infant stage
- Focus on EU / US Markets will remain unchanged, recent announcements to establish national and regional sales offices abroad
- Opportunities for foreign companies as equipment supplier / installer

Thank you for your attention !

Contact Frank Haugwitz EU-China Energy & Environment Programme Tel.: +86 10 6390 8988 Ext. 211 Mobile: +86 10 13901133214 E-Mail: Frank.Haugwitz@gmail.com // frank@eep.org.cn URL: www.frankhaugwitz.info // www.eep.org.cn