

China's Distributed Solar PV Ambitions – Policies and Challenges

Asia Solar Energy Forum 2015

June 15, 2015 | Manila | The Philippines

Frank Haugwitz | Director | Frank.Haugwitz@aecea.com.de
Asia Europe Clean Energy (Solar) Advisory Co. Ltd. (AECEA)

Policy & Regulatory Landscape

Since 2013 – Distributed Generation Actively Promoted

Aug 2013: 18 Demo Areas for DG approved

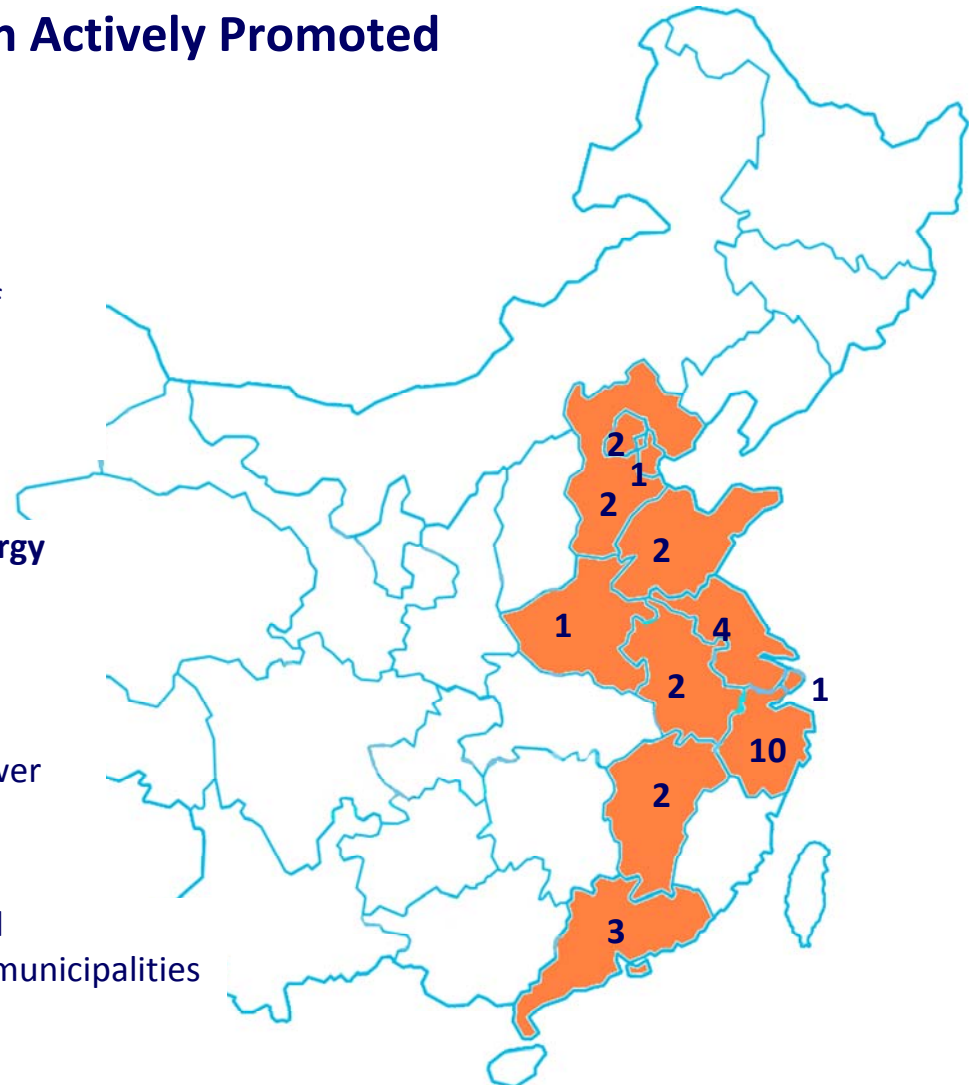
- ❖ 2013-2015 implementation period (1823 MW)
- ❖ 2013: 793 MW alone
- ❖ FIT RMB 0.42 / kWh + local retail electricity tariff based on desulphurization + local subsidy
- ❖ Focus industrial & commercial systems
- ❖ Self-Generation – Self-Consumption Model

Jan 2014: 81 New Energy Demo Cities + 8 New Energy Demo Industrial Parks approved by NEA

- ❖ Spread across 28 Provinces + Municipalities
- ❖ 2014-2015 implementation period
- ❖ Includes city-level specified targets (e.g. xx m² rooftop-space for solar PV, XX % share of RE power generation capacity, etc.)

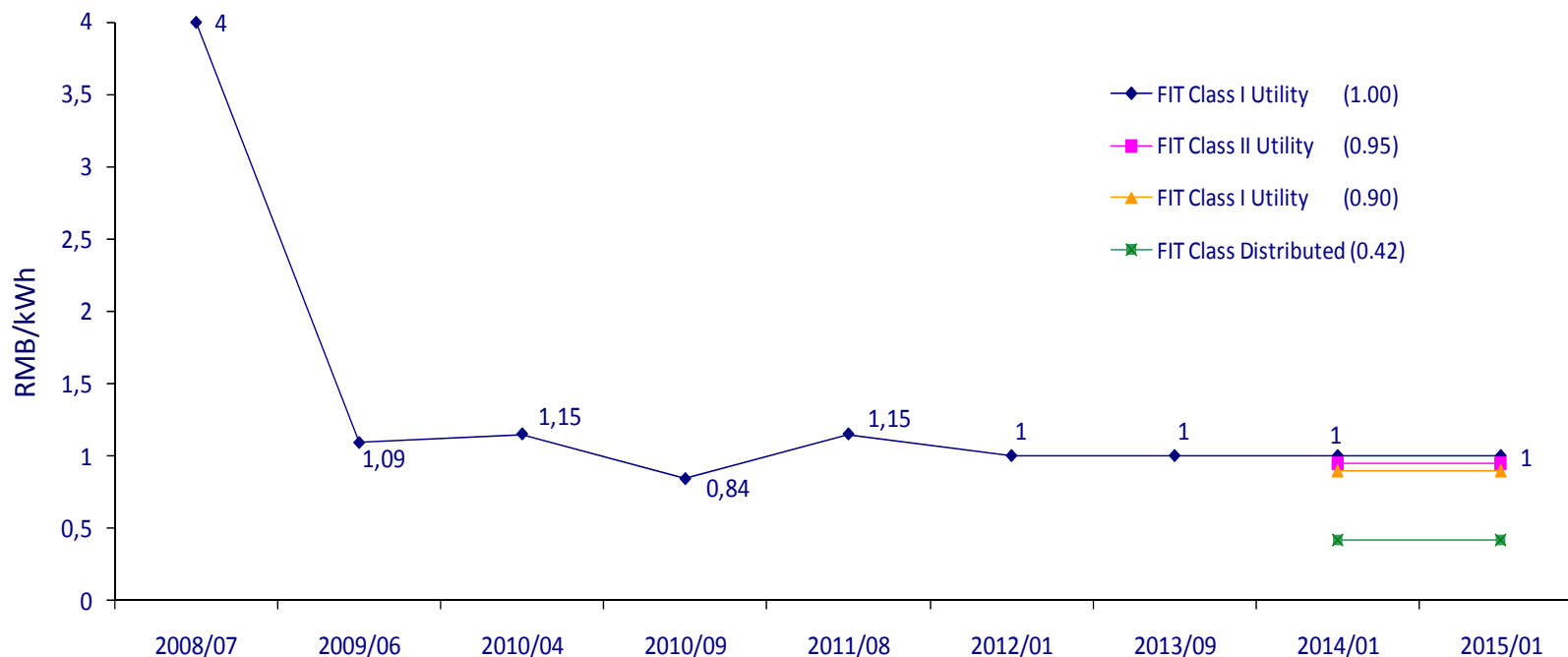
Dec 2014: Further 12 Demo Areas for DG approved

- ❖ In total 30 Demo areas across 11 provinces and municipalities
- ❖ 1/3 of all demo areas in Zhejiang Province alone
- ❖ In total 3.55 GW earmarked



Policy & Regulatory Landscape

National Feed-in-Tariff Development (07/2008 – 01/2015)



- ❖ Early FIT were awarded to natl. demo projects in Inner Mongolia and Shanghai / Chongming Island
- ❖ 06/2009 and 09/2010 FIT were the result of a national competitive bidding process
- ❖ 2012 through 2015 a fairly stable level of FIT
- ❖ **2014 witnessed the introduction of a FIT specifically designed for distributed generation**

Source: NEA

Policy & Regulatory Landscape

China's National Solar PV FIT Status (since 01/2014)

Local Solar Resource Benchmark Class	Utility-Scale (Ground-Mounted Solar PV)	Distributed Generation (Industrial and Commercial Rooftop Solar PV)	
	Feed-In-Tariff (FIT) (RMB/kWh)	Self-Generation and Self-Consumption (RMB/kWh)	Self-Generation and Excess PV Feed-Back to the Grid (RMB/kWh)
I	0.90	Local Retail Electricity Tariff + 0.42	Local Wholesale Coal-Fire Tariff + 0.42
II	0.95		
III	1.00		

Possible Future Design

- ❖ Introduction of more competitive elements, i.e. developers offer a discount on the FIT
- ❖ Clearer distinction btw. utility and distributed generation type of projects
- ❖ Level of FIT to be determined by project size
- ❖ VAT rebate extended beyond 2015 and possibly integrated
- ❖ Urbanization & Green Building Development may lead to the introduction of a specific FIT for BIPV

Note: Local Wholesale Coal-Fire based Tariff Range RMB 0.35-0.45/kWh; Local Retail Electricity Tariff Range RMB 0.5-1/kWh

Policy & Regulatory Landscape



Distributed Solar PV – Business Models for Industrial & Commercial Sys.

Case I	Case II	Case III
<p>100% Self-Generation + 100% Self-Consumption</p> <ul style="list-style-type: none"> ❖ Basic Financials <ul style="list-style-type: none"> Local Retail Electricity Tariff (RMB 0.5-1/kWh) + RM 0.42 / kWh FIT Payment 20 years ❖ Crucial Issues <ul style="list-style-type: none"> Metering equipment to measure quantity generated kWh needed Requires reverse power flow precaution equipment by the PV system owner Level of local retail electricity tariff at a given time is determined by the utilities Future adjustment of local retail electricity tariffs are not foreseeable Load stability important 	<p>100% Self-Generation + 80% Self-Consumption + 20% Sold to the Grid</p> <ul style="list-style-type: none"> ❖ Basic Financials <ul style="list-style-type: none"> Local Retail Electricity Tariff + RM 0.42 / kWh for self-use + Local wholesale tariff (RMB 0.35-0.45/kWh) for excess power sold to the grid according to % share FIT Payment 20 years ❖ Crucial Issues <ul style="list-style-type: none"> Single factories/user requires numerous meters to monitor the generation, self-consumption, and sale of excess power Forecasting of self-consumption and sale of excess power could be challenging – contractual adjustments of consumption vs. sale could proof challenging 	<p>100% Self-Generation + 100% Sold to the Grid</p> <ul style="list-style-type: none"> ❖ Basic Financials <ul style="list-style-type: none"> Local wholesale tariff (RMB 0.35-0.45/kWh) for excess power sold back to the grid FIT Payment 20 years ❖ Crucial Issues <ul style="list-style-type: none"> Financially the least profitable model of all, due to low local wholesale tariff offered Transformer station needs to invested by the grid company Future upside adjustment of wholesale tariffs will be offered to PV plant owner/operators is unclear Only if multiple bldg use the same electrical meter electricity can be sold to multiple bldg's

Policy & Regulatory Landscape



Distributed Solar PV – Critical Issues Hampering Fast Execution of Projects

- ❖ **Identification of “roof ownership”** requires a longer lead time, hence higher soft costs
- ❖ The number of **structurally suitable roofs** available might be considerable less than anticipated, because the majority were built using colored steel, which is less sturdy compared to concrete and thus are subject to significant shorter lifespan
- ❖ **Contract risk**, if the bldg owner decides he doesn't want to pay for the PV electricity anymore and wants to renegotiate or the ownership of the bldg changes
- ❖ Will factories still be around in 20 years? If from a macro perspective the **average life span of privately owned companies** is less than 3 years, 60% will go bankrupt in 5 years and 85% will disappear within 10 years?
- ❖ To **mobilize local funding** for distributed solar projects proofed to be a major challenge, due to the perceived risk and smaller capacities

Policy & Regulatory Landscape



2014 September Distributed PV Policy Announcements – Summary

- ❖ Conduct Rooftop Resources, identify priority projects e.g. in Dev Zones
- ❖ Design of new / renovated buildings shall incorporate PV applications
- ❖ **Broaden Scope of “eligible” projects and up to capacity of 20 MW**
- ❖ **Developer can choose support policy previously granted to utility projects**
- ❖ Local Protection, i.e. local content policies are no longer allowed
- ❖ Establishing local financial support schemes encouraged
- ❖ Nationwide monitoring and reporting scheme to be established
- ❖ Developer and end-user can directly negotiate the tariff

Policy & Regulatory Landscape

2014 Sept Distributed PV Policy Announcements – Eligible Project Types

Fish Ponds



Agriculture



Mountain Slopes

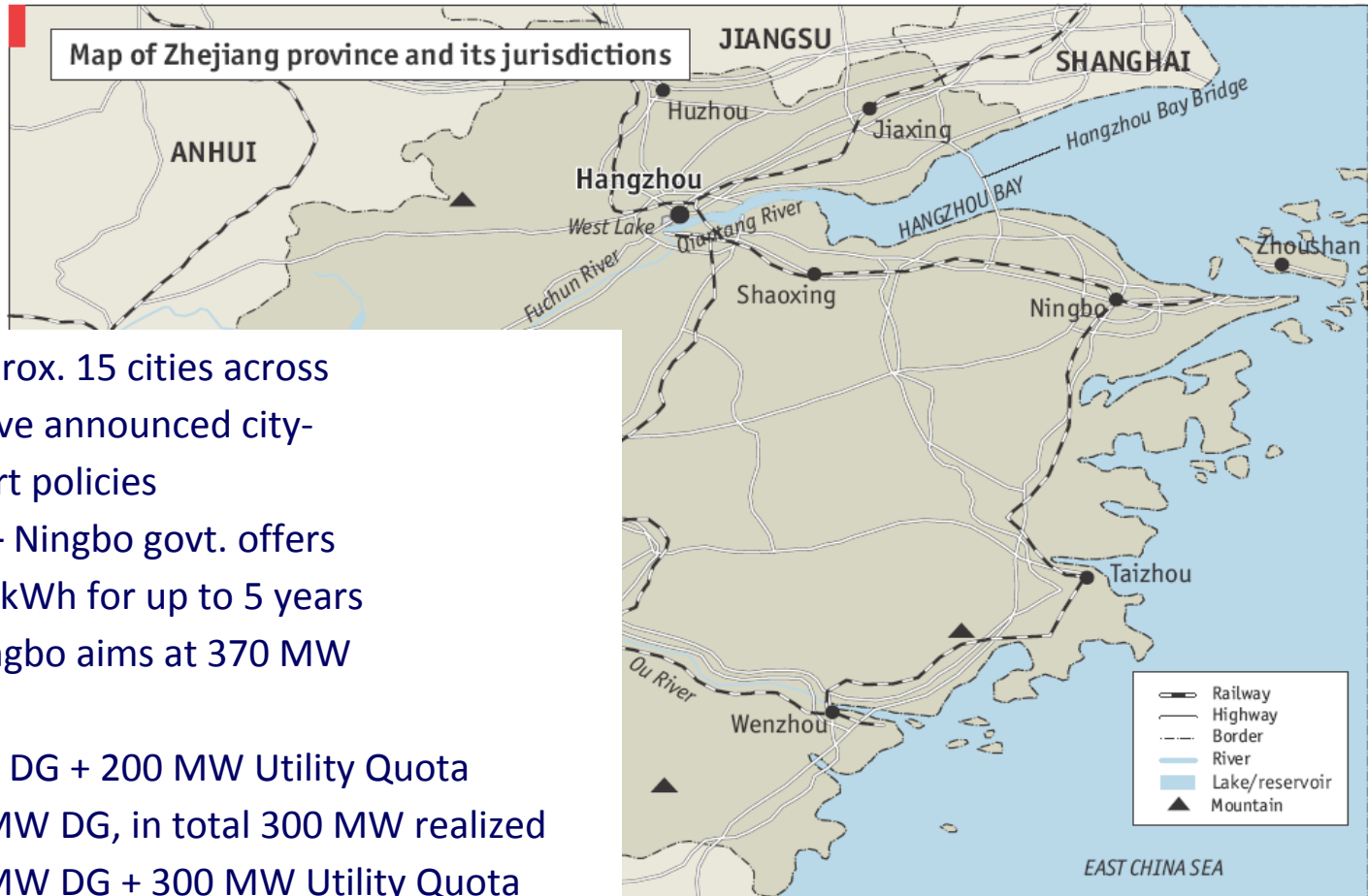


Future Solar Highway



Policy & Regulatory Landscape

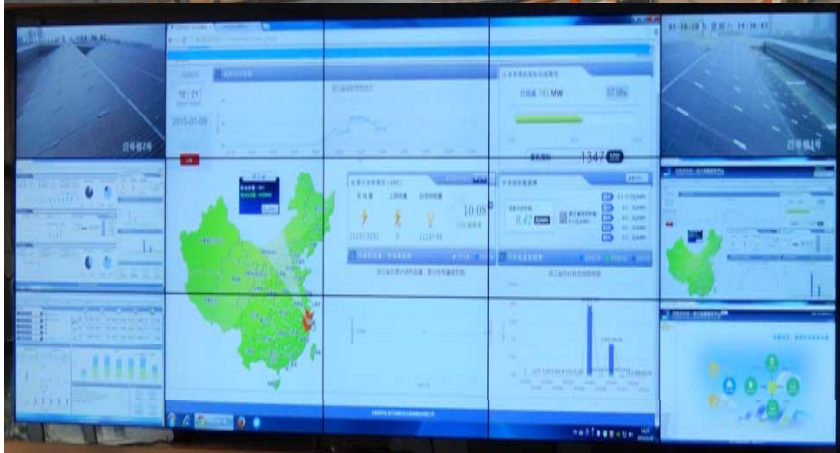
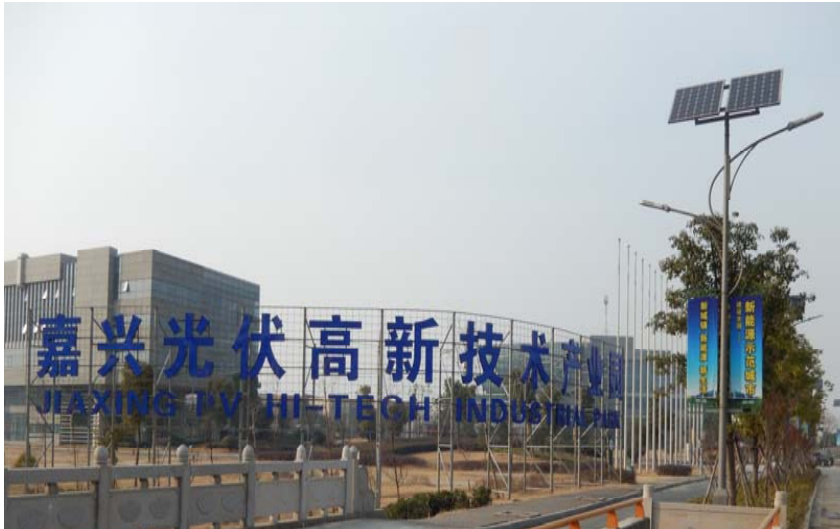
Zhejiang Province Formulates City Level Support Policies for DG



- ❖ To date approx. 15 cities across Zhejiang have announced city-level support policies
- ❖ April 2014 – Ningbo govt. offers RMB 0.10 / kWh for up to 5 years
- ❖ By 2015 Ningbo aims at 370 MW
- ❖ 2014: 1 GW DG + 200 MW Utility Quota
- ❖ 2014: 270 MW DG, in total 300 MW realized
- ❖ 2015: 700 MW DG + 300 MW Utility Quota

Policy & Regulatory Landscape

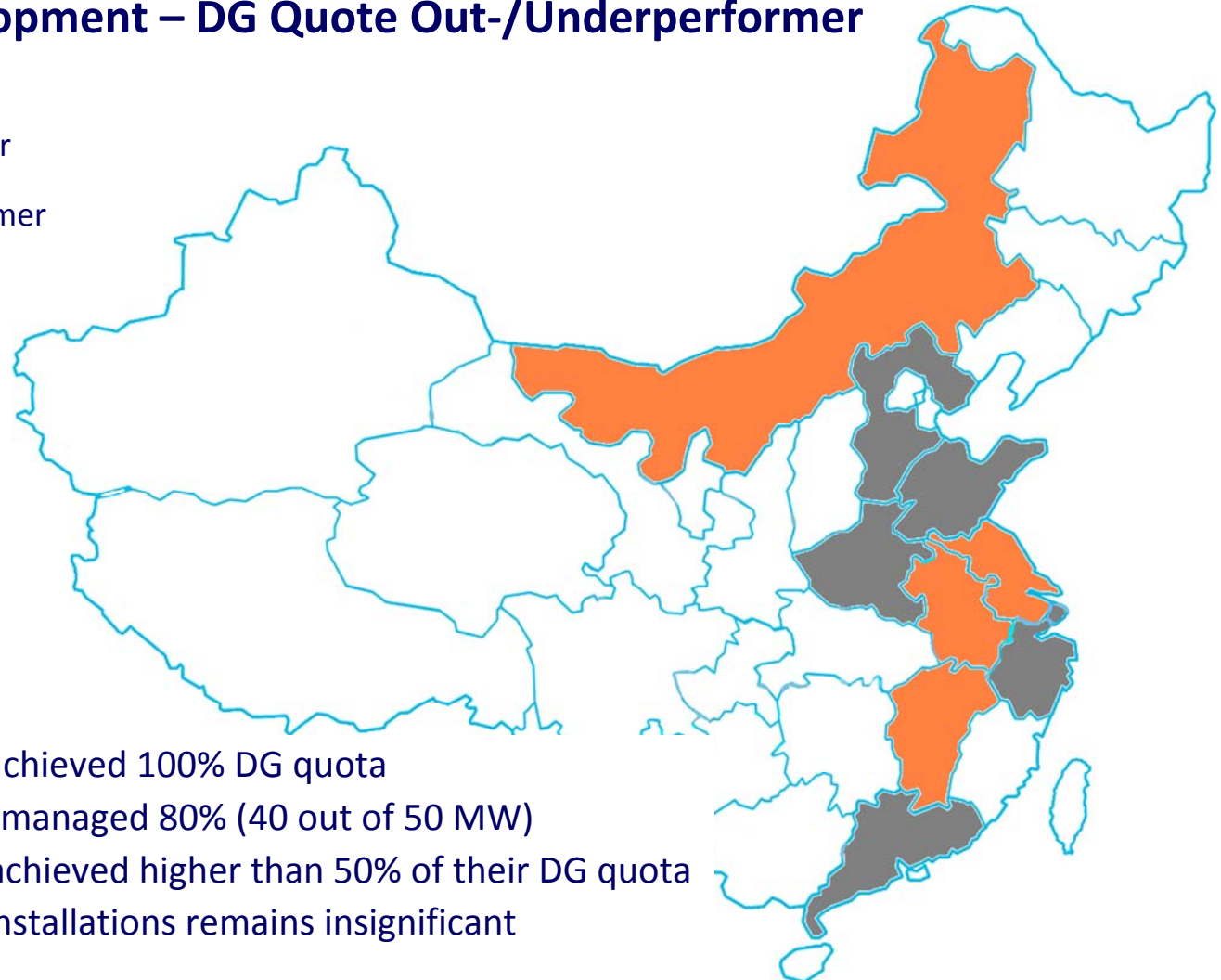
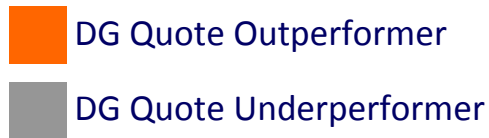
Zhejiang / Jiaxing – A National Model for Local Distributed Solar PV Policy



	National	Provincial	Municipal/ City	District	Desulfurization price
Subsidy mode	Generated power	Generated power	Generated power	Installation capacity	On-grid power
Duration	20yrs	20yrs	-	-	-
Level of Subsidy RMB	0.42 RMB/kWh	0.3 RMB/kWh 1-3 years 0.1 RMB/kWh afterwards	0.1 RMB/kWh	1 RMB/w	0.457 RMB/kWh

Domestic Deployment Trends

2014 Market Development – DG Quote Out-/Underperformer

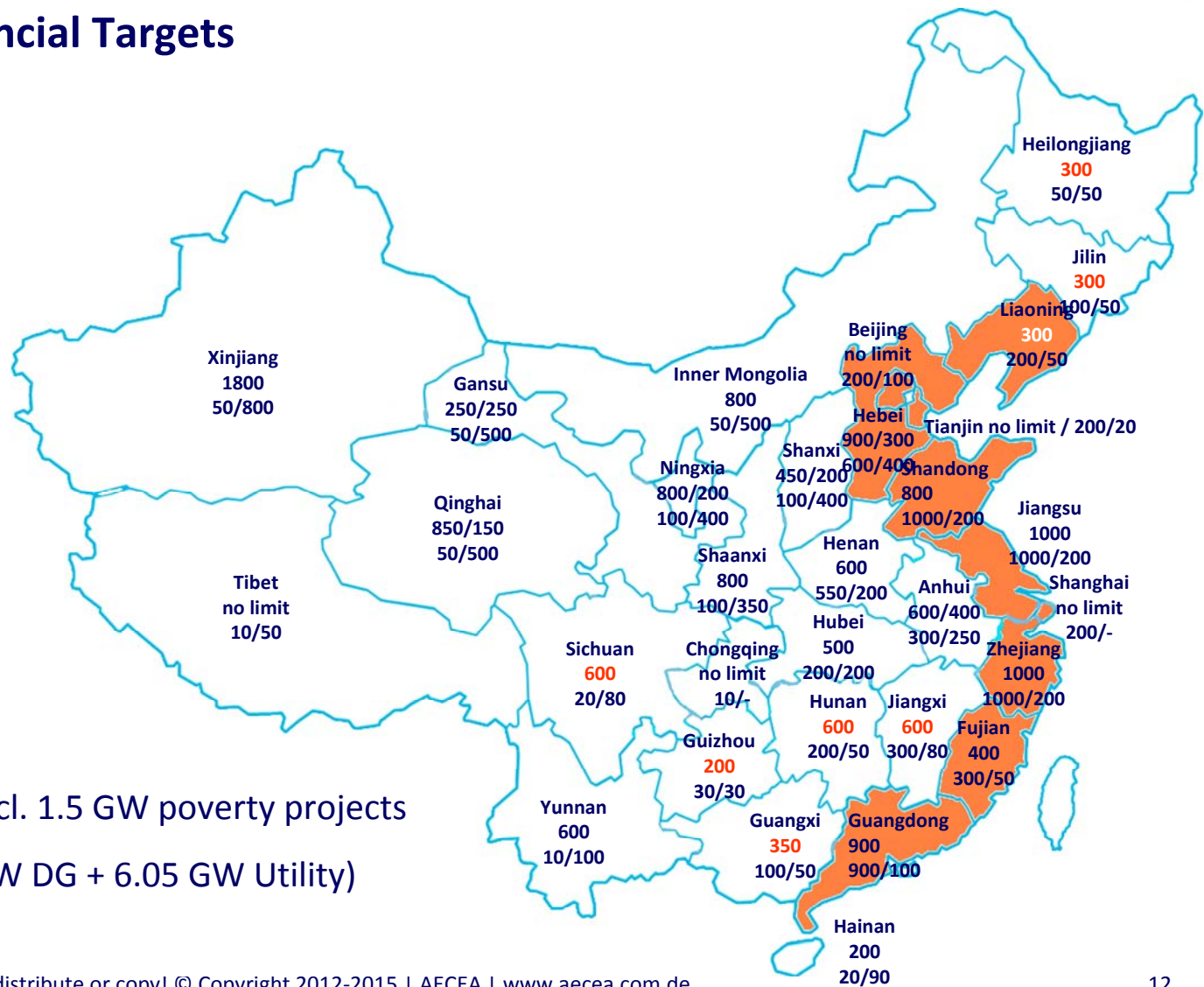


- ❖ No single provinces achieved 100% DG quota
- ❖ Only Inner Mongolia managed 80% (40 out of 50 MW)
- ❖ Only four provinces achieved higher than 50% of their DG quota
- ❖ Share of “roof-top” installations remains insignificant

Policy & Regulatory Landscape



2015/2014 Provincial Targets



❖ 2015: 17.8 GW (incl. 1.5 GW poverty projects)

❖ 2014: 14 GW (8 GW DG + 6.05 GW Utility)

Source: NEA March 2015

Confidential & Proprietary: Do not distribute or copy! © Copyright 2012-2015 | AECEA | www.aecea.com.de

Policy & Regulatory Landscape

2015: 17.8 GW Target – Profound Change of Regulatory Landscape

- ❖ Former deemed impractical “**Hard Target Policy**” replaced by “**Soft Target Policy**”
- ❖ The new “**flexible and pragmatic approach**” makes the target easier to achieve
- ❖ Streamlined administrative processes shall shorten project application procedures
- ❖ **Distributed Generation shall still be prioritized**
- ❖ Introduction of “**competitive bidding process**”
- ❖ **Monthly progress monitoring** of projects introduced
- ❖ Performance of local govt. will determine the future setting of provincial quotas

Challenges

- ❖ **Timeline and milestones**, mid March, April, June, Sept **considered ambitious**
- ❖ Impact of “**market-based**” **competitive bidding process** – on financial attractiveness?
- ❖ Relatively **high targets set in already grid curtailment stricken provinces?**
- ❖ Provinces are pressured to perform good, if not quota adjustment, what about quality?
- ❖ 1.5 GW of poverty alleviation projects not all companies are interested
- ❖ **Several provinces lack of attractiveness** but shall achieve ambitious targets

Policy & Regulatory Landscape

2015 Provincial Project Evaluation Scheme – Hubei

- ❖ Individual project capacity below 30 MW & Local governmental entities shall not select more than 3 projects
- ❖ Evaluation Criteria (85 Points)
 - ❖ Solar Irradiation and Local Site Condition (10 points)
 - ❖ Technical Proposal (10 points)
 - ❖ Construction Plan (10 points)
 - ❖ Grid Connection and Power Consumption Plan (20 points)
 - ❖ Preliminary Work (20 points)
 - ❖ Previous Construction Experience (5 points)
 - ❖ **Discount on the FIT (10 points)**
- ❖ Additional (15 Points)
 - ❖ Located in a “New Energy Demonstration City” (2) | **Distributed Generation** (5) | Continuation of a project under construction (2) | Agro-Project, Poverty Alleviation Project (2) |
- Local Procurement of Components (2)**



China's 13th Five-Year-Plan (2016-2020)

AECEA
Asia Europe Clean Energy (Solar) Advisory Co. Ltd.



Driver for PV Development

❖ Macro-Economic Perspective

Energy Supply | Energy Security | Environmental Protection | GHG & Climate Change
China's Future Urbanization | Green Building Sector Development

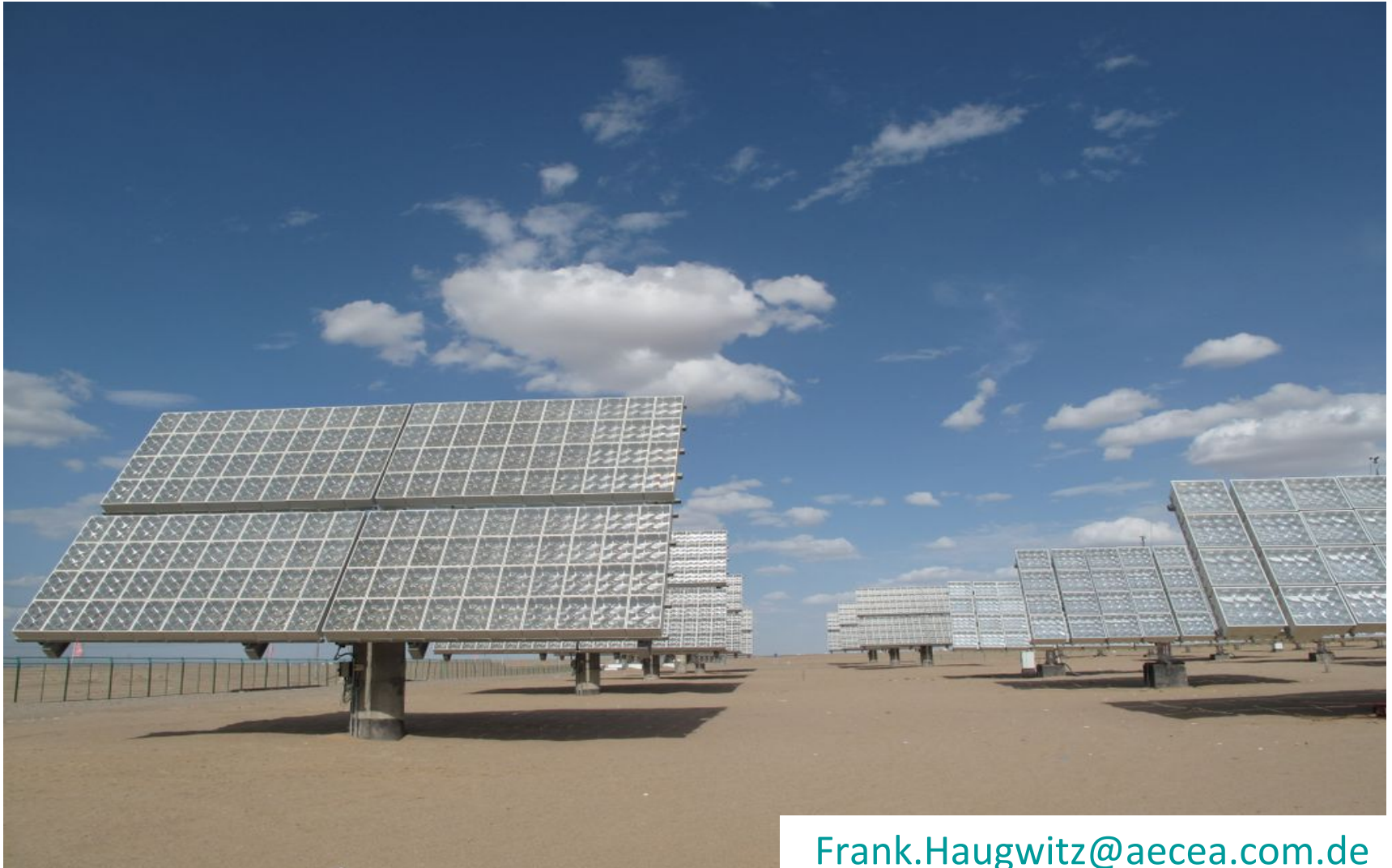
❖ Policy Agenda

Power Sector Reform (Utilities & Grid Operators) / Removal of Institutional Barriers
Pricing of Energy and Incentive Policies (Ceiling for Coal Consumption)
Financing (Adjustment of Feed-in-Tariff & Administering of RE Development Fund)

Distributed Generation (Key – Priority)

Grid Planning (Mini/Micro Grid & Integration of Variable Power Generation) & Storage
Domestic Carbon Market

Thank You !



Frank.Haugwitz@aecea.com.de