ASIA CLEAN ENERGY FORUM 2015

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China's National Solar Photovoltaic Policy: What are the lessons learned since 2009

Asia Clean Energy Forum 2015

June 18, 2015 | Manila | The Philippines

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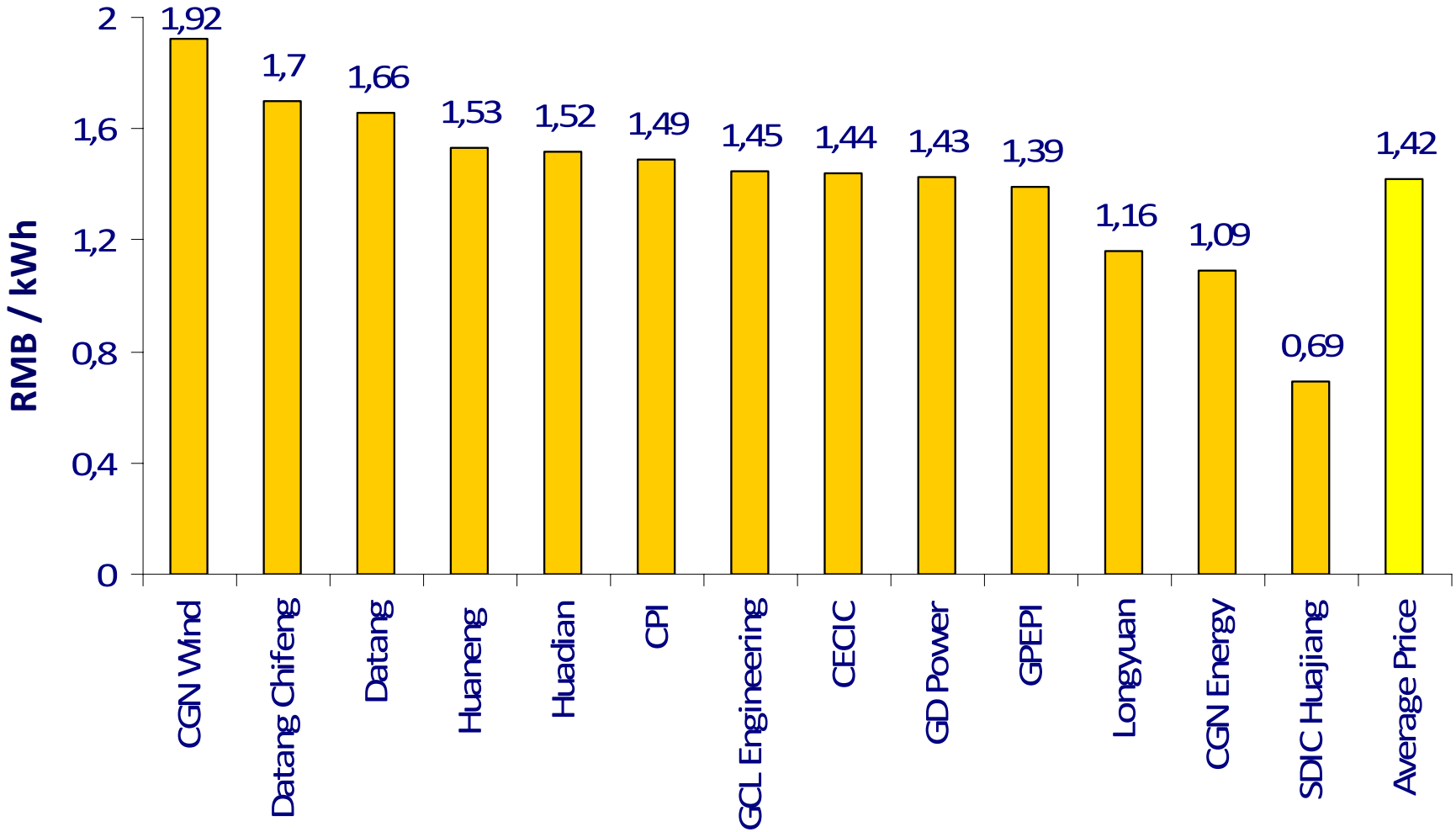
National Tendering 2009

NEA Tenders the First Project – 10 MW / Gansu Province

Key Features

- Tendering Authority: National Energy Administration (NEA)
- Location: Dunhuang / Gansu Province
- 10 MW ground-mounted PV Power Plant
- Tender Announcement December 10, 2008
  - Competitive Bidding Mechanism
  - Proposed FIT above RMB 4 won't be accepted by NEA
  - Operation Time 25 years
  - Local Content Requirement 80%
  - Construction Time 1.5 years
  - Evaluation Criteria – lowest bid/tariff wins
  - March 20, 2009 in total 69 Chinese Co. submitted quotations
  - Tender Result Announcement: June 10, 200

National Tendering 2009



National Tendering 2010

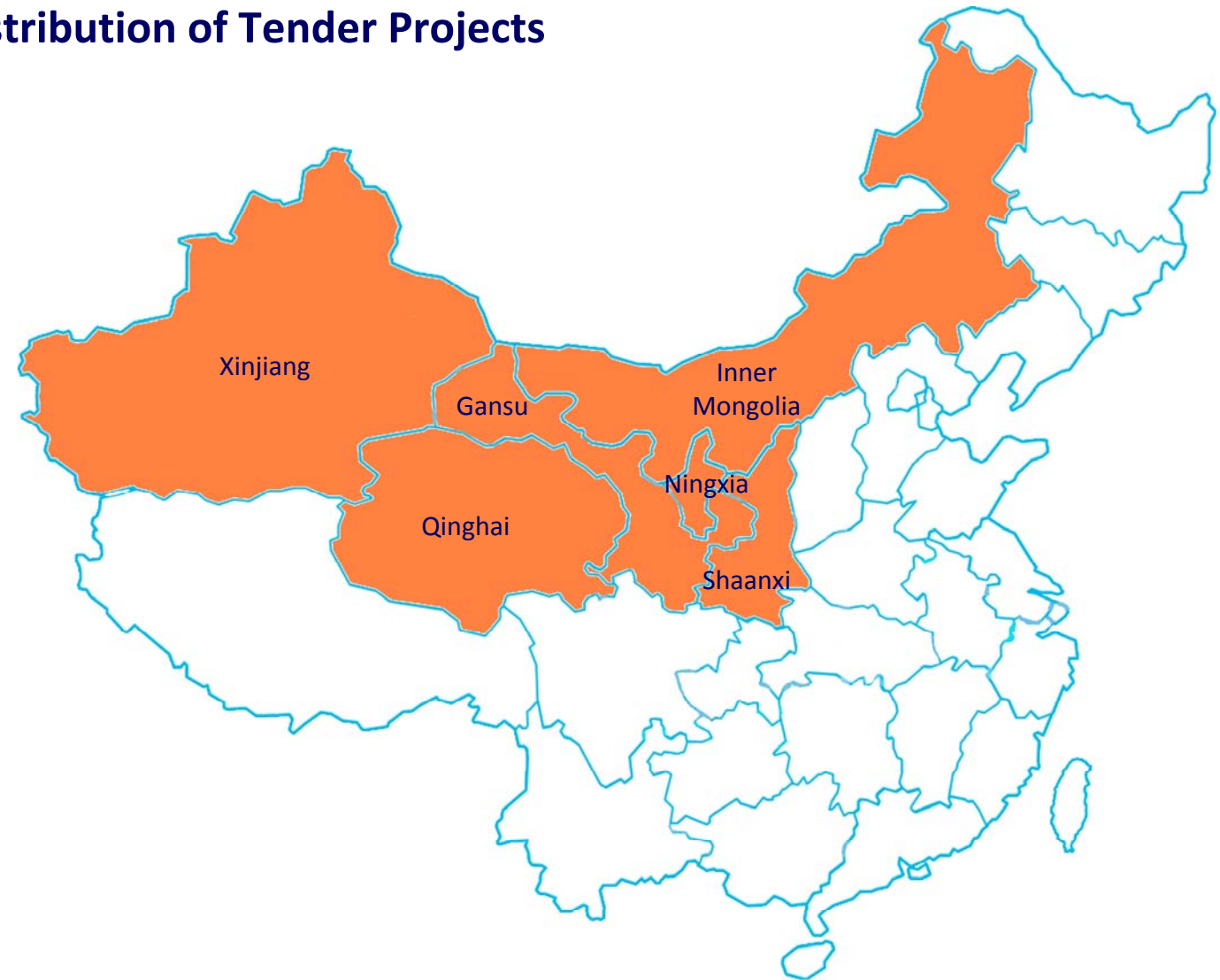
NEA Tenders 280 MW spread across Six Provinces

Key Features

- Tendering Authority: National Energy Administration (NEA)
- Location: 6 Provinces
- In total 280 MW of utility-scale ground-mounted PV Power Plans (20-30 MW)
- Tender Announcement: June 23, 2010
  - Guiding Principle: Competitive Bidding Mechanism to determine FIT Level
  - Proposed tariffs above RMB 2 won't be accepted by NEA
  - Operation Time 25 years
  - Local Content Requirement – no longer included
  - Construction Time 1.5 years
  - Overriding Evaluation Criteria – Lowest Bid / Lowest Tariff
  - In total 135 bids submitted by August 10, 2010
  - 50 participating companies, 14 privately owned companies were disqualified

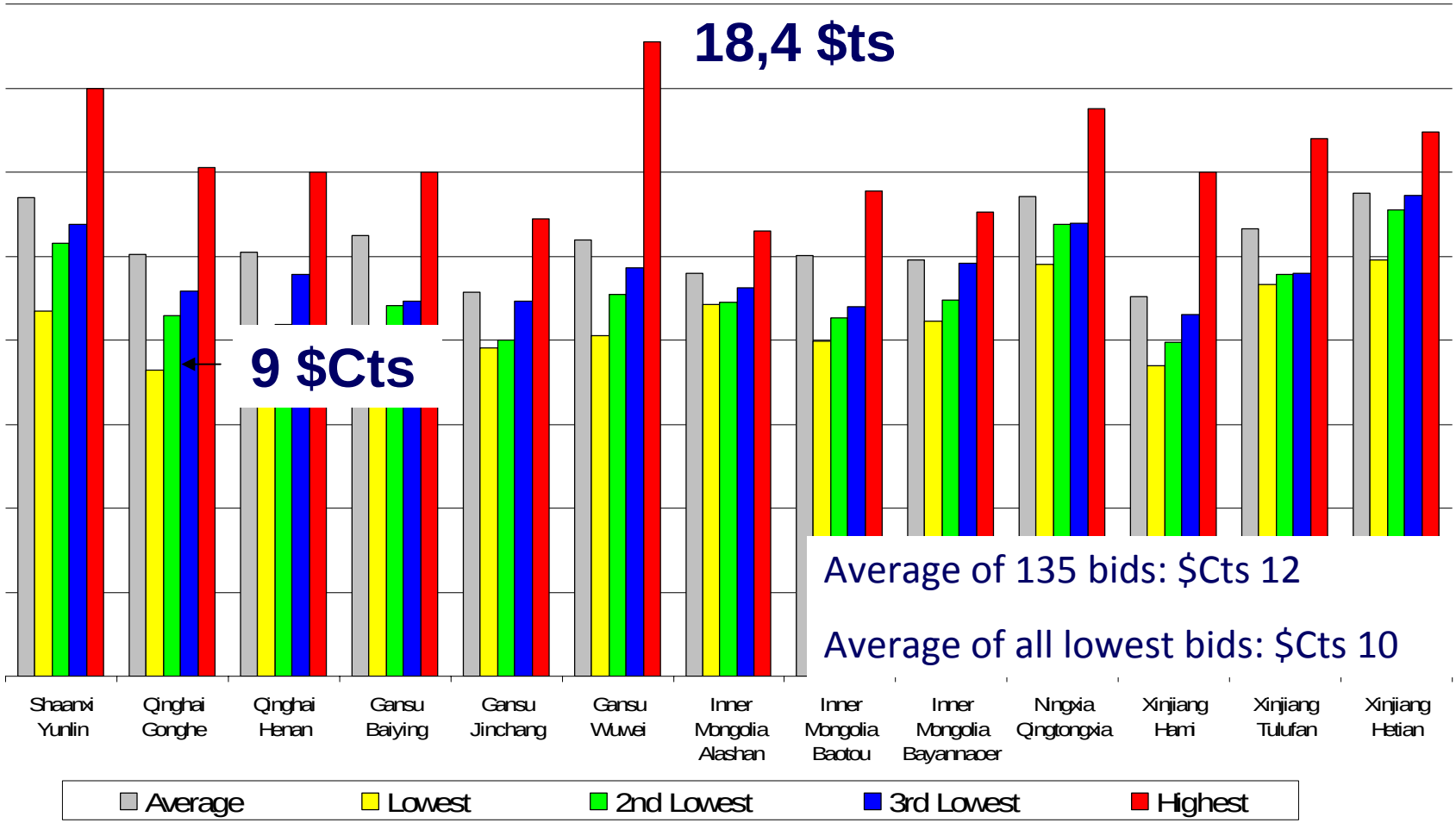
National Tendering 2010

Geographical Distribution of Tender Projects



National Tendering 2010

Proposed FIT



National Tendering 2009-2010

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Lessons Learned

- Artificially Low FIT proposed by participating companies
- Privately Owned Companies were at a disadvantage compared to large-scale SOE
- Quality was no evaluation criteria for components and system operations
- 1.5 years construction time caused practical lessons were generated with great delay
- Duration of FIT payments were not clear at this stage 15 – 25 year timeframe
- Smaller companies were unable to compete / participate
- Long periods btw. release and tender results announcement kept industry in limbo
- Lack of Transparency, i.e. no mechanism requiring disclosure of practical lessons learned among industry stakeholder
- FIT were only granted for 25.000 kWh generated, after that the new on-grid tariff were determined by the pricing authority

Natl. Rooftop & Natl. Golden Sun

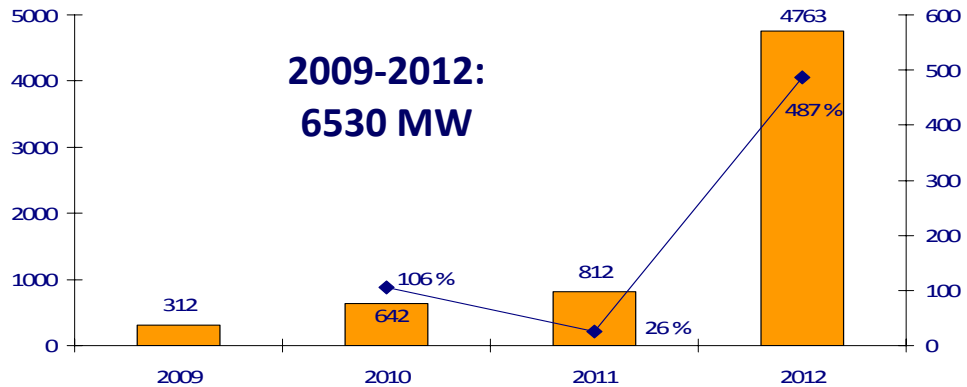
Capital Subsidy Support Schemes (2009-2012)

Natl. Rooftop (2009-2012)

➔4 phases: facilitated approx. 520 MW

Natl. Golden Sun (2009-2012)

➔4 phases: facilitated approx. 5708 MW



Lessons Learned

- Natl. authority changed programe criteria every year caused lack of predictability
- Natl. criteria left many issues unclear, e.g. no clear timeframe for project execution
- Grid connection approval was under jurisdiction of State Grid, not NEA
- Financing of projects was unclear, conflicting authorities engaged
- No technical standard procedures from installation to grid connection to operation
- Developers lacked experience in evaluating mechanical loads of rooftops
- Project ownership were not clear
- No independent project inspection, verification, certification, acceptance scheme
- Capital subsidies did not sufficiently incentivise developers to deliver high quality projects in terms of deployed components and achieved performance ratios

Evolution of National FIT

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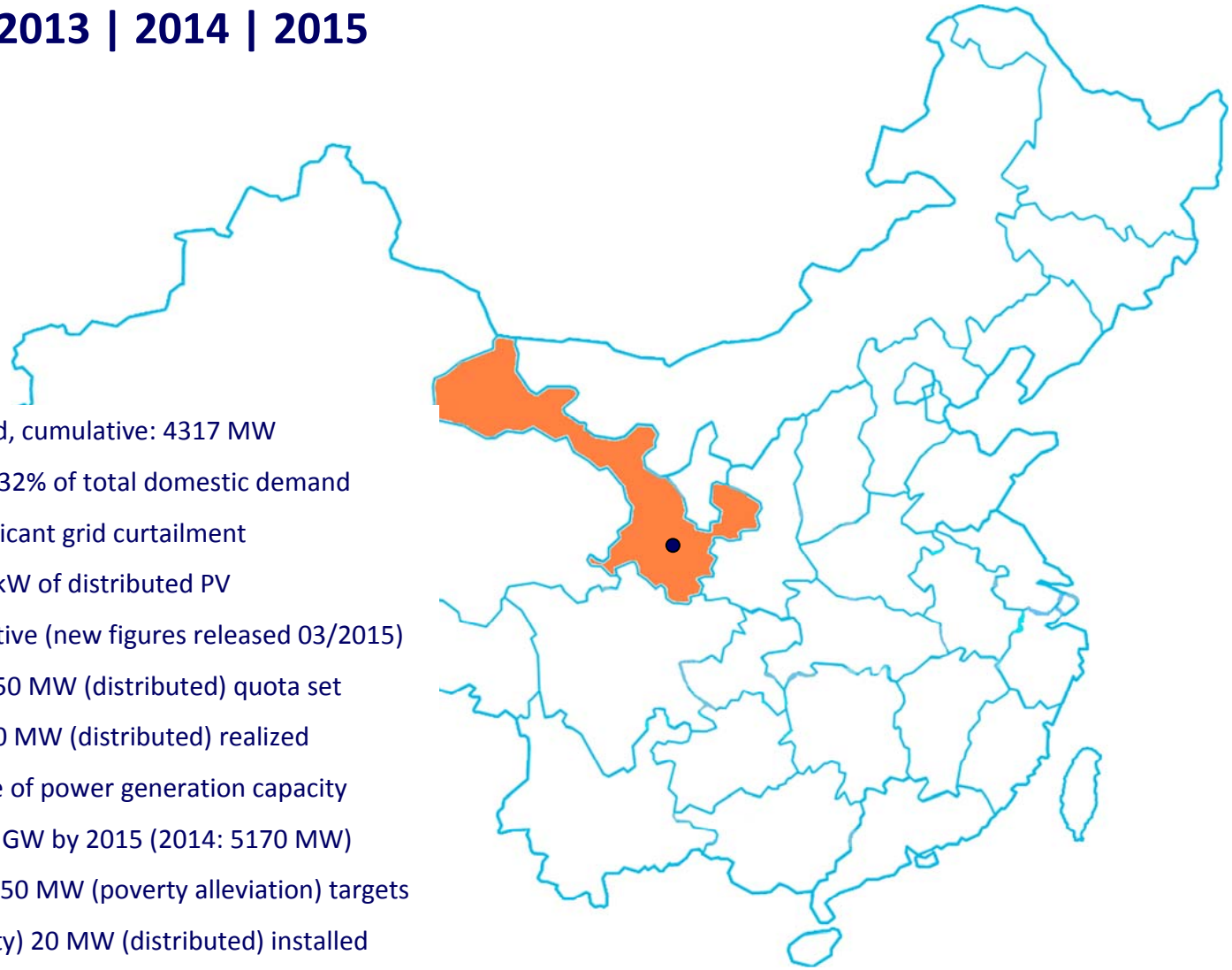
Early Considerations 2008 - 2011

- High power generation cost per kWh were still far from being politically acceptable
- PV contribution to the overall energy mix were insignificant
- Export driven chin. PV Industry generated decent profits
- Chin. PV Industry is mainly privately owned
- Overlapping authorities of govt. institutions
- Determination of an acceptable FiT level difficult
- Avoidance of overheating of market
- Govt. favours a govt. controlled market development, i.e. by means of tenders

- However, the experience gained with the national tendering and the capital subsidy programs lead to the introduction to a Natl. FIT in August 2011

Impact of Natl. FIT

Gansu Province 2013 | 2014 | 2015



- 2013: 3842 MW installed, cumulative: 4317 MW
- 2013: attracted approx. 32% of total domestic demand
- 2013: Experienced significant grid curtailment
- 2013: installed just 300 kW of distributed PV
- 2014: 4200 MW cumulative (new figures released 03/2015)
- 2014: 500 MW (utility), 50 MW (distributed) quota set
- 2014: 970 MW (utility), 0 MW (distributed) realized
- 2014 Solar PV 12% share of power generation capacity
- Gansu 12th FYP target: 5 GW by 2015 (2014: 5170 MW)
- 2015: 250 MW (utility) 250 MW (poverty alleviation) targets
- Q1/2015: 570 MW (utility) 20 MW (distributed) installed

National FIT Status (since 01/2014)

- August 2011 – Single FIT for China – caused construction boom in West China resulting in grid curtailment, hence lower returns
- January 2014 – Introduction of Differentiated FIT Scheme – Allowing Greater Market Penetration
- January 2014 – Introduction of FIT designed for Distributed Generation

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		

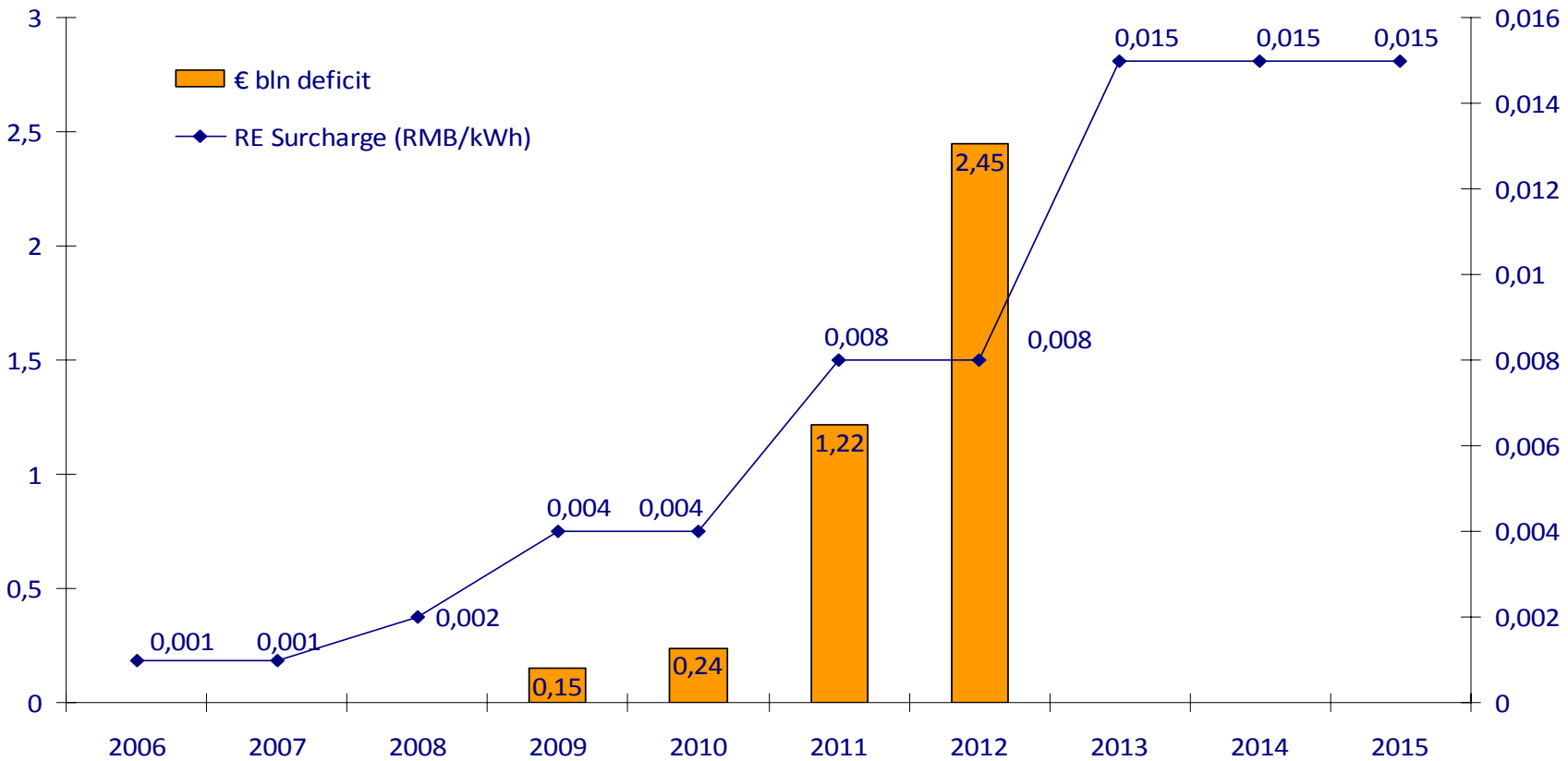
Possible Future Design

- Introduction of more competitive elements – discount on 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 Bldg. 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

RE Surcharge Development (2006-2015)



Policy & Regulatory Landscape

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Distributed Solar PV – Critical Issues Hampering Fast Execution of Projects

- To date, most DG projects are a result of the Golden Sun, based on a different business model
- Industrial & Commercial user may fear the variable electricity disrupts their production
- 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, indentify 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

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2014 Sept Distributed PV Policy Announcements – Eligible Project Types

Fish Ponds

Agriculture

Mountain Slopes

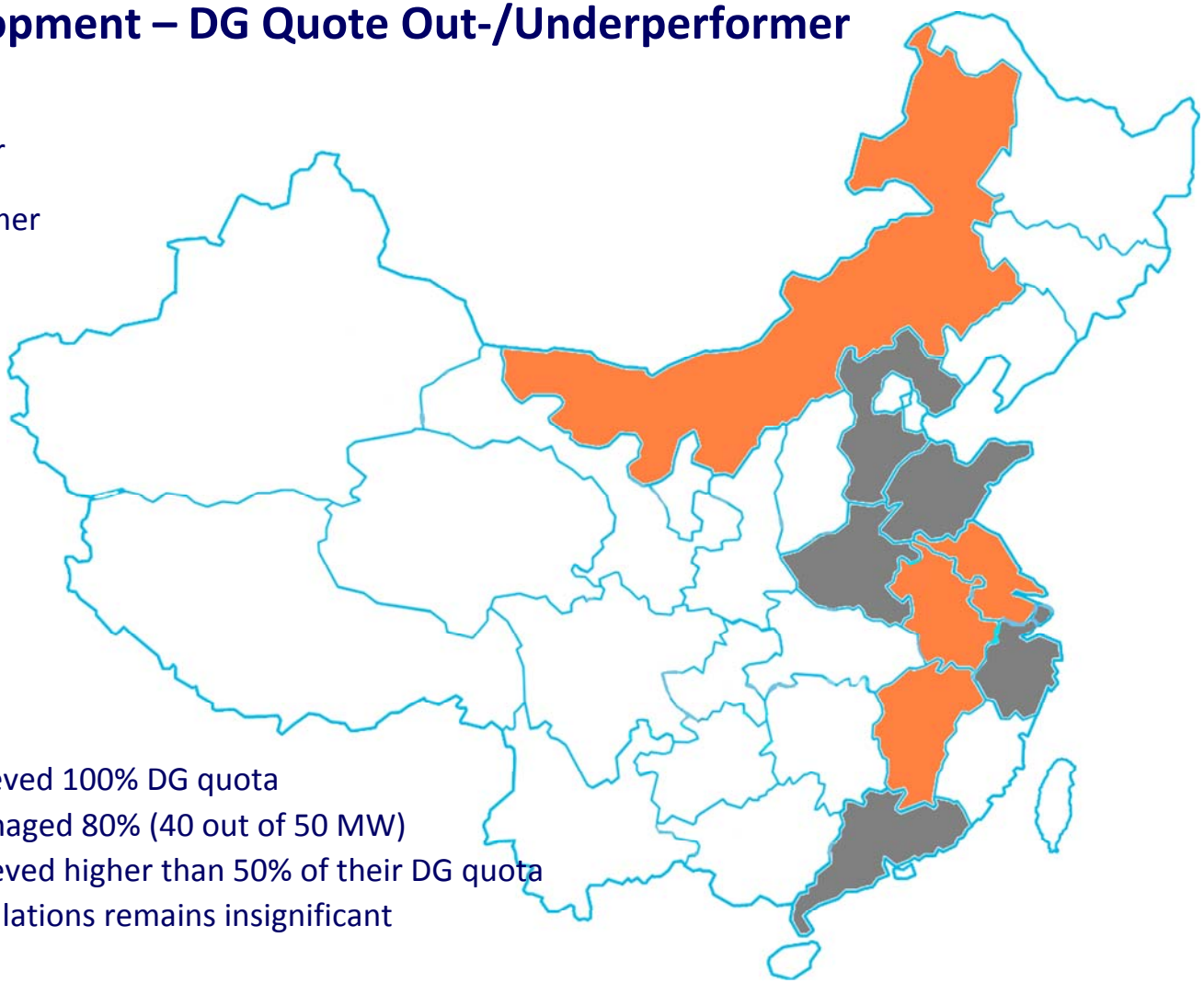
Future Solar Highway

Domestic Deployment Trends

2014 Market Development – DG Quote Out-/Underperformer

DG Quote Outperformer

DG Quote 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

Source: NEA March 2015

Domestic Deployment Trends

2015/2014 Provincial Targets

- 2015: 17.8 GW (incl. 1.5 GW poverty alleviation)
- 2014: 14 GW (8 GW DG + 6.05 GW Utility)
- 2015: Municipalities under State Council no limit set
- 2015: Several Provincial Targets considered challenging
- 2014 Experience shows targets are “not set in stone”

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
- DG still be prioritized when local govt. elaborate their respective construction plans
- **Introduction of "competitive mechanism / bidding process"**
- **Monthly progress monitoring of projects introduced**
- Overall performance of local governments will determine the future setting of provincial quotas

Challenges

- Re-Introduction of "**market-based" competitive bidding mechanism** – financial attractiveness?
- Relatively high targets set in grid curtailment stricken provinces
- Relatively high targets set in provinces enjoying lack of attractiveness, low irradiation levels
- Provinces are pressured to perform good, otherwise the quota will be adjusted, will quality be honored?

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)**

Policy & Regulatory Landscape

2015 Provincial Project Evaluation Scheme – Hubei

- Evaluation Results as of April 2015 – Evaluation Committee consisted of 5 Experts
- In total 40 projects approved with each up to max. 30 MW = 1.2 GW
- 40 projects are spread across 12 municipalities and prefectures and 13 are so-called “Agricultural Projects”
- Tendency towards “ local Hubei “ companies which includes subsidiaries from “ outside parent companies “
- If developers won’t realize or execute the project according to the submitted and approved schedule
  - Back-Up projects will fill in
  - **Project applications by the defaulting developers won’t be accepted in 2016**
  - The region where the project were supposed to be executed might be blacklisted as a “ restricted area “ for the coming year
- **Suspension of Developers from participating in future projects**
- **Yunnan:** if developers won’t realize the project within 2 year or re-sell the projects – **5 years suspension**
- **Xinjiang:** developers can’t sell project rights, change ownership, change construction plan, investment arrangement, etc. otherwise face a **5 year suspension to submit any further project application**

Thank You !

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