



China's 13th Five-Year Plan for solar – a look at 2017 and beyond

Market update | At the end of 2016 China published a long-awaited plan that will determine the course of PV deployment for the next five years. China solar industry expert Frank Haugwitz unpicks the plan and assesses the country's chances of surpassing 100GW of capacity this year

China's National Energy Administration (NEA) officially released its 13th Five-Year Plan (2016-2020) for solar development on 16 December 2016. The plan stipulates targets, measures, regulatory issues, challenges and focal areas, and reconfirms, for example, China's 2020 solar target of 110GW, split into 105GW of solar PV and 5GW of concentrating solar power (CSP), which was already included in China's "Power Sector Reform Plan" released in October 2016. The plan re-confirms further that by the end of 2020 the total installed solar PV power generation capacity will exceed 105GW, which according to AECEA is considered a minimum target. Selected highlights of the plan are discussed below.

Distributed generation

Interestingly, the plan no longer contains a specific target for distributed generation, contrary to the October announcement, in which a 60GW target was communicated. In light of today's total of less than 10GW of distributed generation, a more than six-fold increase in the coming four years would

have very likely proven to be unrealistic. Nevertheless, distributed generation does enjoy as expected a very prominent position in the just released plan. For example, it says that up to 100 distributed generation demonstration zones shall be set up across the country and within each zone 50% of existing buildings and 80% of all new-build buildings shall deploy rooftop systems. At the same time new business models shall be created, designed to stimulate demand in the distributed generation segment.

Against this background, China is home to approximately 1,500 so-called "industrial development zones" covering approximately 10,000km² and an earlier conducted investigation estimated a rooftop potential of approximately 80GW, which from a quantitative perspective is undoubtedly sufficient. Despite the obvious potential, AECEA has learned that on average five to seven commercial/industrial roofs out of 10 investigated by developers are structurally not feasible and therefore will not be suitable for installing a rooftop system. Hence,

the lead time to successfully identifying a proper roof is significant. Other constraints such as rooftop ownership identification are not factored in yet.

Plan key points

Introduced in 2015, the competitive bidding-based "Top Runner" programme expanded from initially 1GW in Datong, Shanxi Province, to 5.5GW across multiple provinces last year, thus accounting for approximately 30% of last year's guiding target of 18.1GW. As anticipated Top Runner remains a prominent feature of China's domestic market landscape in future. A number of previously conducted provincial top runner tender schemes that resulted in low bid levels – significantly lower than last year's FIT – will not only have been the reason for the relatively significant FIT reduction (13-19% depending on the region) effective 1 January 2017, but as well to continue and possibly expand further in future.

According to the five-year plan the FITs are expected to drop by more than 50%



Credit: GCL New Energy

compared to 2015 levels by 2020, thus achieving grid parity. Taking the recent decision regarding the reduced FIT effective 1 January into account, the plan implies that future FIT reductions between 2018 through to 2020 will be lesser and AECEA estimates are in the range of $\pm 10\%$ annually. Finally, the wording within the plan equally suggests that perhaps no FiTs will be granted beyond 2020, if grid parity indeed will have been realised.

In light of China's concerted efforts to achieve a "relatively well-off society" by 2020, the so-called "poverty alleviation projects" featuring 3-5kW solar PV systems for low-income households (RMB3,000/annum) across hundreds of counties led to the approval of 5.1GW during the summer of 2016. Demand for such systems is expected to remain strong throughout the 13th five-year plan period given that there are 2.8 million eligible households.

The plan equally highlights the potential of so-called agro-PV projects, where for example greenhouses and fish-ponds use solar PV for power generation, and so-called

renewable energy hybrid systems, where whatever locally available renewable energy resources are simply combined. China is home to a significant number of hydro/PV or wind/PV projects already today. Against this background China's State Grain Administration announced its intention to implement the installation of 1GW of rooftop systems on its grain warehouses across the country by 2020.

Beyond being home to the world's largest solar PV manufacturing industry and the largest PV end market, China is also aiming at the bigger picture of the solar industry. In this context, the plan very prominently features proposals covering solar thermal applications, i.e. solar water heating and commercial/industrial heating and cooling.

According to the plan, in the remaining four years the combined area for solar thermal applications shall double to 800 million m^2 by 2020. Equally bullish is the NEA in promoting the development of an indigenous CSP industry, in order to realise the 5GW target set for 2020. AECEA is of

China's solar industry is showing no signs of slowing down

the opinion that the promotion of a local CSP industry and the deployment of 5GW is driven by a number of factors such as a desire to use CSP for baseload purposes, through the scaling-up of production capacities to bring down the cost, hence being in the position to create and meet the demand outside of China.

A surprise is that out of 31 provinces, autonomous regions and municipalities just 11 have been selected as so-called target regions for presumably continued large-scale deployment, i.e. both ground-mounted utility-scale and distributed generation for a total 99GW. Destinations that until now have been favoured for PV deployment, such as Yunnan, Xinjiang and Gansu Province in particular, are not explicitly mentioned. However, the latter are expected to serve as so-called "transmission corridors" from West to East China.

Unfortunately, electrical energy storage (EES) for stationary purposes was not explicitly mentioned in the plan especially since a dozen or more companies, either established solar PV manufacturers or battery manufacturers, are already expanding in this area. China's EES industry hoped that the government would introduce a market incentive programme designed to promote the local deployment of EES systems in the commercial and industrial sector, similar to other countries. The plan however does foresee activities in the area of intelligent mini/micro-grids which would imply the deployment of EES systems.

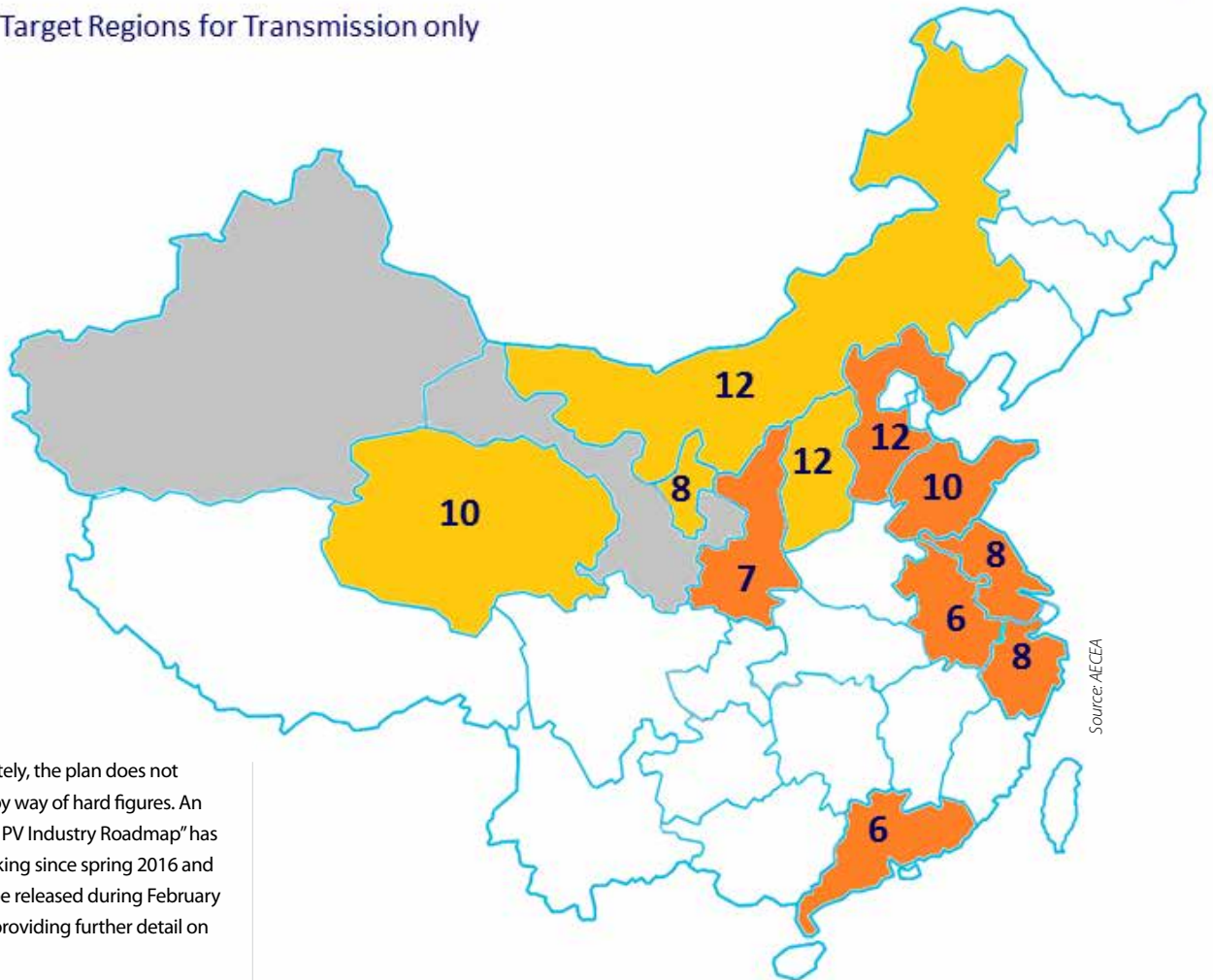
As expected, the plan emphasises China's upstream sector in terms of industrial upgrading, innovation, restructuring, consolidation and international coopera-

13th Five-Year Plan (2016-2020) for solar development

- By 2020: 105GW (PV) and 5GW (CSP) – no sub-target for distributed generation
- 11 target regions identified for GW deployment
- Four target regions identified for GW deployment including 13 West-East Transmission Corridors"
- Two target regions identified for "transmission"
- Feed-in tariff levels expected to drop by more than 50% compared to 2015 levels by 2020, then at grid parity
- FIT levels for CSP expected to drop from current RMB1.15/kWh to RMB0.8/kWh by 2020
- Technology benchmarks set for cell (multi/mono) efficiency levels to be reached by 2020
- Focal area: Distributed generation – multiple measures identified to stimulate demand
- Focal area: Top Runner programme, poverty alleviation programme, agro-PV, RE-hybrid projects
- Focal area: Solar thermal for hot water, district heating and cooling – 800 million m^2 by 2020
- Focal area: Comprehensive industrial strengthening – pursue "go global" strategy (up and downstream)
- By 2020 the PV Industry expected to create 7 million jobs



- Target Regions for Deployment (GW)
- Target Regions for Deployment (GW) and Transmission
- Target Regions for Transmission only



Source: AECEA

tion. Unfortunately, the plan does not provide much by way of hard figures. An updated “China PV Industry Roadmap” has been in the making since spring 2016 and is expected to be released during February 2017, possibly providing further detail on this area.

China outlook

2016 was the first year of the 13th Five-Year Plan (2016-2020) period and was one that witnessed record installations amounting to 34.24 GW, representing 126% growth year on year. The cumulative installed capacity reached 77.42GW, an 81% year-on-year increase. This year will be the

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second year of the 13th Five-Year Plan and according to AECEA there are no signs yet indicating a slowing down of the Chinese solar PV market dynamics. In particular, the new FiT reductions of between 13 and 19% will ensure demand remains strong until 30 June 2017; according to AECEA’s estimates up to 20GW of new capacity is considered realistic by then and for the entire 2017 overall 25 or possibly 30GW. AECEA is of the opinion that by the end of 2017 China will be the first country to have exceeded the 100GW mark of installed solar PV capacities.

AECEA assumes that beyond 2017 the NEA will further expand the Top Runner programme, meaning a larger share of the total market will subject to competitive bidding. Provincial tender schemes for the remaining share of projects subject to regular feed-in tariff could become mandatory. Overall, the guiding ideology will be that competition drives down prices, leads

Target regions identified for both deployment and transmission in 13th Five-Year Plan

to less FIT payments, less demand and further consolidates the heavily fragmented market. An increase of industrial benchmarks would help too. The launch of a national emission trading scheme scheduled for 2017 will serve as an additional tool or source of potential revenues where again the market forces will play a significant role. In terms of market segments, future policies will rather address the promotion of distributed generation. From 2018 through 2020 AECEA anticipates the setting of lower annual installation targets in the range of 10-15 GW along with a stricter enforcement compared to the past.

For a detailed analysis of the future of the top runner programme, turn to p.22