

**SUMMARY OF CHINA’S 12<sup>TH</sup> FIVE-YEAR PLANS**  
**RELATING TO THE SOLAR INDUSTRY**

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**I. OVERVIEW**

The Chinese government exercises significant control and direction over its solar power industry. In addition to pervasive state ownership of the industry, China maintains a number of industrial plans and other policy directives that afford the government a high degree of decision-making authority over the development of the solar industry and that permit the government to intervene extensively in the operations of individual solar companies. These plans include China’s 12<sup>th</sup> Five-Year Plan for National Economic and Social Development (the “12<sup>th</sup> FYP”), released in March 2011 and covering the 2011-2015 period, and China’s 12<sup>th</sup> Five-Year Plan for the Solar Photovoltaic Industry (the “Solar 12<sup>th</sup> FYP”), issued in February 2012 and covering the same five-year period.

These plans significantly increase the government’s control over the development of the solar industry, permitting the government to manage virtually every aspect of the industry. Substantial government assistance is also mandated to carry out the goals identified in these plans.

**II. CHINA’S INDUSTRIAL PLANS AUTHORIZE MASSIVE GOVERNMENT SUPPORT FOR AND CONTROL OVER THE SOLAR INDUSTRY**

**A. The Plans Identify the Solar Industry as a Strategic Emerging Industry that Should be Targeted for Preferential Treatment**

China’s 12<sup>th</sup> FYP sets forth which industries, enterprises, and products should be targeted for preferential treatment during the 2011-2015 period. In particular, the plan identifies seven “strategic emerging industries”<sup>1</sup> and mandates the provision of government subsidies and other support to develop these industries. Among the seven strategic emerging industries is “new energy,” which includes solar power.<sup>2</sup> Indeed, the plan explicitly calls for the development of “solar energy utilization and photovoltaic and photo-thermal power generation” and for the transformation of the solar industry into a “leading and pillar” industry.<sup>3</sup>

China’s Solar 12<sup>th</sup> FYP states that “[t]he expedited development of China’s solar PV industry is of great importance”<sup>4</sup> and that the “industry will continue to maintain rapid development” from

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<sup>1</sup> The seven emerging industries are biotechnology, new energy, high-end equipment manufacturing, energy conservation and environmental protection, clean-energy vehicles, new materials, and next generation IT.

<sup>2</sup> The 12<sup>th</sup> Five-Year Plan for National Economic and Social Development at Section 1 of Chapter 10, Part III (hereinafter “12<sup>th</sup> FYP”).

<sup>3</sup> 12<sup>th</sup> FYP at Section 1 of Chapter 10, Part III.

<sup>4</sup> 12th Five-Year Plan for the Solar Photovoltaic Industry at Introduction (hereinafter “Solar 12<sup>th</sup> FYP”).

2011-2015.<sup>5</sup> The plan sets forth the goals of “strengthen[ing] China’s PV industry,” “promot[ing] the innovation of key technologies,” “improv[ing] production techniques,” and “enhanc[ing] the overall competitiveness of China’s PV industry.”<sup>6</sup> To accomplish these objectives, the Chinese government will “strengthen national macro policy guidance, persist in overall industry planning and reasonable industrial deployment, and set norms for the healthy development of the PV industry.”<sup>7</sup>

**B. The Plans Call for Government Subsidies and Other Assistance to Develop the Solar Industry**

The 12<sup>th</sup> FYP calls for substantial government subsidies to support China’s strategic emerging industries, including solar. Indeed, news reports indicate that subsidies for the seven strategic emerging industries will total more than \$1.5 trillion.<sup>8</sup> Subsidies appear to include cash grants as well as preferential tax, fiscal, and procurement policies. For example, the plan calls on the government to:

- “Set up special funds for the development of new strategic industries and industrial investment. Expand the size of government startup investment in rising industries ... and guide social capital to be invested in innovative startups;”<sup>9</sup>
- “Make comprehensive use of financial preferential policies, such as risk compensation, and encourage financial institutions to strengthen credit support;”<sup>10</sup> and
- “Guide tax support policies for investment and consumption” in the solar industry.<sup>11</sup>

The Solar 12<sup>th</sup> FYP also calls for government subsidies and other assistance for China’s solar industry. Specifically, the plan mandates that the government:

- Provide “policy support and price subsidies”<sup>12</sup> and other support to help “leading enterprises to grow in strength;”<sup>13</sup>
- Implement “policies in the areas of industry, taxation, and finance to actively promote the healthy development of China’s PV industry;”<sup>14</sup>

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<sup>5</sup> *Id.* at Introduction and II.

<sup>6</sup> *Id.* at III(a).

<sup>7</sup> *Id.* at III(b)(i).

<sup>8</sup> *See, e.g., China Mulls \$1.5 Trillion Boost for Strategic Industries*, Reuters, December 2, 2010.

<sup>9</sup> 12<sup>th</sup> FYP at Section 3 of Chapter 10, Part III.

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

<sup>12</sup> Solar 12<sup>th</sup> FYP at II(b).

<sup>13</sup> *Id.* at III(b)(i).

<sup>14</sup> *Id.* at VI(a).

- “Actively expand the domestic PV market” through “reasonable tariffs, moderate financial subsidies, and active financial support;”<sup>15</sup> and
- “Support technological innovation,” strengthen “R&D for key technologies,”<sup>16</sup> and support the production of domestic equipment.<sup>17</sup>

**C. The Solar Plan Mandates the Increased “Internationalization” of the Solar Industry, in Keeping with China’s “Going Abroad” Strategy**

The Solar 12<sup>th</sup> FYP acknowledges that China’s solar industry is primarily targeted toward export markets, as “most solar cell products are exported to overseas markets.”<sup>18</sup> With many “Chinese enterprises rank[ing] among the world’s top ten,”<sup>19</sup> the plan calls on the government to help increase the industry’s global expansion and sets forth the following objectives:

- “Implement[] the ‘going out’ strategy, and actively participat[e] in international competition;”<sup>20</sup>
- “Consolidate the industry’s position in the international market”<sup>21</sup> and “meet demand in the international market”<sup>22</sup> so that “Chinese PV enterprises’ international influence will be greatly enhanced;”<sup>23</sup> and
- “Improve the industry’s capability to cope with international competition and market risks . . . Strengthen international exchanges and cooperation, optimize the industry’s development environment, improve export risk insurance mechanisms, encourage enterprises to actively seek overseas investments, and reinforce and expand domestic enterprises’ presence in the international market.”<sup>24</sup>

**D. The Solar Plan Calls for the Promotion and Support of “National Champions”**

The Solar 12<sup>th</sup> FYP calls for the creation and support of “national champions” by providing assistance to China’s large, competitive solar companies and by increasing the strength of such entities through subsidies and government-supported (*i.e.*, mandated) mergers and acquisitions.

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<sup>15</sup> *Id.* at VI(d).

<sup>16</sup> *Id.* at III(b)(ii).

<sup>17</sup> *Id.* at III(b).

<sup>18</sup> *Id.* at II(b).

<sup>19</sup> *Id.* at V(b)(i).

<sup>20</sup> *Id.* at II(d).

<sup>21</sup> *Id.* at III(b)(iii).

<sup>22</sup> *Id.* at IV(c)(i).

<sup>23</sup> *Id.* at III(c)(iii).

<sup>24</sup> *Id.* at VI(g).

The plan further establishes output and revenue targets for the large solar companies. Specifically, the plan calls for the government to:

- “Concentrate efforts on supporting leading enterprises to grow in strength. Encourage key PV enterprises to promote resource integration, mergers, and reorganization.”<sup>25</sup> “[S]upport highly competitive enterprises with low production costs to merge and transform ailing PV enterprises;”<sup>26</sup> and
- “Support ... major enterprises to grow stronger so that by 2015, leading polysilicon enterprises will reach 50,000 metric tons per year, and major enterprises will reach 10,000 metric tons per year; leading solar cell enterprises will reach the 5GW level, and major enterprises will reach the 1GW level. By 2015, in China there will be one PV enterprise with annual sales revenue exceeding RMB 100 billion, 3-5 PV enterprises with annual sales revenue exceeding RMB 50 billion, and 3-4 enterprises specializing in PV equipment manufacturing with annual sales revenue exceeding RMB 1 billion.”<sup>27</sup>

**E. The Plans Authorize the Government to Direct and Control Minute Details of the Solar Industry**

The plans provide the Chinese government considerable authority to direct and control virtually every aspect of the development of the solar industry, including the following:

- **Output levels** (see Section D above)
- **Technology and environmental standards**
  - “The recovery rate of silicon tetrachloride, hydrogen chloride, and hydrogen shall be no less than 98.5%, 99%, and 99%, respectively.”<sup>28</sup>
  - “By 2015, average total power consumption shall be lower than 120 kWh/kg, the conversion efficiency for monocrystal silicon cells will reach 21%, that of polysilicon cells will reach 19%, and that of amorphous silicon thin-film cells will reach 12%.”<sup>29</sup>
  - “New types of thin-film solar cells will be industrialized.”<sup>30</sup>
  - “Promote technological advancement and industrialization of silicon-based thin-film cells and copper indium gallium (di)selenide (CIGS) thin-film cells. Improve the conversion efficiency of thin-film cells.”<sup>31</sup>

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<sup>25</sup> *Id.* at III(b)(i).

<sup>26</sup> *Id.* at VI(c).

<sup>27</sup> *Id.* at IV(c)(i).

<sup>28</sup> *Id.* at III(c)(ii).

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*

<sup>31</sup> *Id.* at IV(c).

- **Increase R&D and use of domestically produced equipment**
  - “Support the R&D and industrialization of key production equipment used for polysilicon, silicon ingots/silicon wafers, cells and modules, thin-film cells, and power generation applications . . . .”<sup>32</sup>
  - “The localization rate of production equipment and auxiliary materials for PV cells will reach 80%, and Chinese enterprises will master key technologies involved in PV grid connection, manufacturing of energy storage equipment, and system integration.”<sup>33</sup>
  
- **Cost of PV power generation**
  - “By 2015 . . . the cost of PV modules will drop to 7,000 yuan/kW, that of PV systems will drop to 13,000 yuan/kW, and that of power generation will drop to 0.8 yuan/kWh. By 2020, PV power generation will become economically competitive as the cost of PV modules will fall to 5,000 yuan/kW, that of PV systems to 10,000 yuan/kW, and that of power generation to 0.6 yuan/kW.”<sup>34</sup>
  - Notably, this statement appears to indicate that Chinese producers are selling solar modules below their cost. The plan states a goal of reducing the cost of PV modules to 7,000 yuan per kw (\$1,100 per kw or \$1.10 per watt) by 2015. However, current pricing of Chinese PV modules is already significantly below this target, indicating sales below cost.
  
- **Specific products, technologies and processes to be developed and supported, such as:**
  - *High purity polysilicon*: “Support solar-level polysilicon production technology involving low energy consumption and low cost.”<sup>35</sup>
  - *Silicon ingots and silicon wafers*: “Support high-efficiency, low-cost, large-size ingot technology, focusing on the development of quasi-single crystal ingot technology. Achieve breakthroughs in key technologies for new-type slicing below 150-160 micron, such as cutting technology for silicon carbide and steel wires, in order to improve the quality of silicon wafers, the number of wafers per unit of silicon materials, and to reduce silicon material losses during slicing.”<sup>36</sup>
  - *Crystalline silicon cells*: “Aggressively develop and industrialize crystalline silicon cells with a high conversion rate and a long service life. Provide key support for the research and application of low-reflectivity texturing technology, selective emitter technology, electrode alignment technology, plasma passivation technology, low-temperature electrode technology, and full back junction

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<sup>32</sup> *Id.* at IV(b).

<sup>33</sup> *Id.* at III(c)(ii).

<sup>34</sup> *Id.* at III(c)(iv).

<sup>35</sup> *Id.* at V(a).

<sup>36</sup> *Id.* at V(b).

technology. Pay attention to key technologies of thin-film silicon, crystalline silicon heterojunction solar cells, as well as other new types of solar cells.”<sup>37</sup>

- *Thin-film cells*: “Focus on the development of laminated and multi-junction thin-film cells, which combine amorphous silicon (a-Si) and microcrystalline silicon (μc-Si). Reduce light-induced degradation of thin-film cells. Encourage enterprises to research and develop 5.5<sup>th</sup> generation or above high-efficiency and large-area silicon thin-film cells. Develop roll-to-roll production techniques for flexible silicon-based thin-film solar cells.”<sup>38</sup>
- **Promote the rational development of the industry, including specifying the geographic location for development**
  - “[G]uide industries like polysilicon to move toward the western regions.”<sup>39</sup>
  - “[C]onstruct solar energy power stations with total installed capacity of over 5 million kW with focus on Tibet, Inner Mongolia, Gansu, Ningxia, Qinghai, Xinjiang, and Yunnan.”<sup>40</sup>

#### **F. China Limits Access to its Solar Market by Foreign Investors**

In an effort to protect its domestic industries, China’s industrial policies also appear to limit access to the Chinese solar market by foreign investors.

- According to the World Bank, the Chinese government restricts new entrants and capacity expansions in “controlled industries” such as solar power and solar polysilicon<sup>41</sup> – restrictions that can be used to limit foreign investment.
- The Chinese government restricts foreign investment in industries that are considered “pillar” or “strategic” industries, such as solar. According to the U. S. trade representative (USTR), in addition to restrictions imposed via China’s foreign investment catalogue and other policy directives, China can impose additional restriction on investment through its foreign investment screening process, particularly in “pillar industries,” using poorly defined powers granted to regulators under the rules governing foreign mergers and acquisitions.<sup>42</sup>

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<sup>37</sup> *Id.* at V(c).

<sup>38</sup> *Id.* at V(d).

<sup>39</sup> *Id.* at VI(c).

<sup>40</sup> 12<sup>th</sup> FYP at Section 3 of Chapter 11, Part III.

<sup>41</sup> *China 2030: Building a Modern, Harmonious, and Creative High-Income Society*, The World Bank and the Development Research Center of the State Council, the People’s Republic of China, (2012) at 149.

<sup>42</sup> 2011 USTR Report to Congress on China’s WTO Compliance at 7.