Overview of photovoltaic industrial development in Jinzhou, Liaoning

Jinzhou Silicon-Material and Photovoltaic Industry Base has been confirmed as a national industrialization base of new and high technologies by the Ministry of Science and Technology of the People’s Republic of China on Jan 7th, 2011. This has contributed to a solid move towards Jinzhou’s strategic goal - to build a hundred billion value Photovoltaic industry and to become “The City of Photovoltaic”.

1 Photovoltaic industry flourishes in Jinzhou

Photovoltaic industry is the new mainstay industry of Jinzhou supported by local government. 30 companies such as Solargiga Energy Holdings Limited and Jinzhou New Century Quartz Glass Co., Ltd, are actively involved in supporting the industry.

The annual production value of Jinzhou photovoltaic industry was less than 500 million in 2005, 4.85 billion in 2009, and the value grew to 10 billion in 2010. Now Jinzhou is one of the largest monocrystalline silicon production base used for solar cell in China. There is a complete industry chain for crystalline silicon solar cells production. Meanwhile, new technologies such as amorphous silicon film cell were introduced. The industry is growing in a large-scale.

2 Photovoltaic base promotion

Jinzhou Silicon-Material and Photovoltaic Industry Base has made great progress with the aid of local government recent years.

2.1 Enhancement of industrial innovation

Development fund was established by local government to promote technology innovation. Between 2006 and 2010, 81 projects were carried out and 5 billion RMB was invested. 35 projects were supported by science and technology program with about 4.83 million fund (National fund 30.8 million, Province fund 23.5 million), plus almost 3 billion investment from industry and the society. 64 technology and industrial projects have been carried out and 421 key technological issues were resolved. The base has lots of industrial progress and gets 150 granted patents.

In 2006, research on “Low-cost Polysilicon Fabrication Technique” was included in the national “11th Five-year Technology Support Plan”. In 2007, the project of “Research and Industrialization of 200 μm High Efficiency Ultra-thin Silicon Chip used in Photovoltaic Battery” was among the national key new product plans. In 2009, “High Purity Arenaceous Quartz for Low-cost Polysilicon Technique” was awarded the national patent, also the first in this area in China. Also in 2009, the project of “6.5 MW Photovoltaic Lateral Grid Connect System” and “10 MW Large Scale Photovoltaic Grid Connect System” were among the national “Golden Sun Model Program”. At the same time, 28.25 million funding was awarded to the 3 MW Photovoltaic Lateral Grid Connect System. October the same year, “300,000 Watts Photovoltaic Utility System Model Project” was completed and put into use, generating 420,000 kWh energy annually, which could support 400 household for a year. This has saved 130 tons of coal and reduced 252 tons of carbon emission annually, which served as the first in the northeastern China. Meanwhile, there were major breakthrough in some projects like “N type Ultra Thin High Efficiency PV cell”, enabling the cell thickness to be as thin as 180 - 200 μm, EO efficiency to be 19%. The project “GFFD Photovoltaic Power Control System” has been moving on rapidly, with accreditation for 100 killowatts DC-AC converter by Beijing Jianheng Accreditation
Innovation ability of Industry Base is enhanced by public technology service platform. Advantages of universities and research institutes located in Jinzhou are taken. Many research centers such as Bohai University Experiment and Measurement Center, Electro-optic Functional Material National Key Lab, Photovoltaic Key Lab in Liaoning University of Technology, New Century Quartz Glass Technology and Engineering Center of Jinzhou, Low-cost Polysilicon Fabrication R&D Center, Tuoxin Electrical and Electronic Engineering & Technology Center of Jinzhou and Photovoltaic Power Grid Connect System Research Center. Those public service platforms for test, research and development have improved the innovation and integration among industry, and brought in new ideas for innovation. In terms of industrialization, long-term stable cooperation with universities and research institutes around the world is reached in the integration of production, teaching and research. Among those institutes are Russia National Rare Metal Research and Design Institute, Institute of Physics of Chinese Academy of Sciences, Tsinghua University, Tianjin University, Northeast University, Dalian University of Technology, etc. Technology coalition with Institute of Theoretical Physics of Chinese Academy of Sciences was set up on “Strategic Cooperation on Photovoltaic Industry” 8 such partnerships for industry-research cooperation, 1 State Industrial Technology Innovation Strategic Alliance, 1 State Post-doc Research Base were established. So far, the cooperation works well. Over 30 photovoltaic and silicon experts, research personnel from home and abroad have been involved in more than 10 projects in the Industry Base, and made great achievements.

2.3 Development of large-scale industry base

A number of photovoltaic companies have successively settled down in Jinzhou since 2008. 16 projects were proposed and 9 of them are under construction in 2010. A total investment of 3.511 billion will be put to achieve an annual output value of 7.201 billion.

At present Jinzhou Silicon-Material and Photovoltaic Industry Base has 59 enterprises, 3 State Engineering and Technology Research Centers, 3 State Key Labs, 1 Public Technology Test Center, 1 Service Center for National Innovation & Pioneering, 1 Photovoltaic Institute (secondary), 1 State Industrial Technology Innovation Strategic Alliance and has more than 10,000 employees, covering a total area of 16.9 sq km. There are photovoltaic and related enterprises, provincial engineering research centers and key laboratories and so on. Among those companies, there are 30 photovoltaic companies, 33 joint companies(Optoelectronics and electronic information related there are 13, 19 for equipment and engineering, 1 for metallurgy). A complete and highly complementary industrial chain has been formed. The chain contains products such as industry silicon, polycrystalline silicon, monocrystalline silicon, silicon wafer, solar cells and modules, quartz glass, photovoltaic engineering design and installation and related equipments. Annual monocrystalline silicon production reached 4000 tons, and 160 million silicon wafers were produced in 2010. Both rank second in China. The production capacity of quartz glass products is 1000 tons, industry silicon 17,000 tons, Solar grade polycrystalline silicon 4,000 tons, solar cells and components 250 MW, solar power generator 300 kW. In 2010, annual output value of Jinzhou Silicon-Material and Photovoltaic Industry Base was 10 billion and the profit was 1 billion.

3 Jinzhou, the city of photovoltaic

During the 12th five-year plan period, Jinzhou will focus on developing photovoltaic industry. Total output value is supposed to exceed 100 billion at the end of the period: 50,000 tons of polycrystalline silicon, 13,000 tons of monocrystalline silicon, 20,000 tons of poly ingot, 1.5 billion silicon wafer, 1.5 GW solar cells, 2 GW battery packs, 500 MW CIGS thin film solar cells, 700 MW a-Si solar cells, 200 MW light focusing batteries. Besides developing leading products, development of opto-electronic and supporting industry are also on the agenda. Jinzhou government has planned to build solar power grid connect system to provide electricity of 500 MW. Photovoltaic will become the pillar industry of Jinzhou, and Jinzhou will be built as the “City of Photovoltaic” in the future.

Mo Chen, general manager assistant, Jinzhou Prime Photovoltaic Science and Technology Co., Ltd;
Diankui Li, deputy secretary general, Jinzhou Branch of the Chinese Optical Society,
Email:lidiankui0408@yahoo.com.cn