Expert Insights

台灣發展風力發電產業的現況與前景

English translation appears on page 23

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有感於 2011 年日本 311 大地震引發海嘯及福島核電廠輻射外洩等重大災難，台灣開始省思能源方針，同年 11 月 3 日台灣馬總統公布新能源方針，主軸為「確保核安、穩健減核」與「打造綠能低碳環境、逐步邁向非核家園」，其中全力推動再生能源、穩定電力供應及降低碳排放為打造綠能低碳環境的推動重點。2012 年公布「千架海陸風力機」目標，先開發陸域風場，再擴展離岸海域風場；2030 年風力裝置容量合計達 4,200 MW（其中離岸風力機裝置容量為 3,000 MW）。2012 年 7 月經濟部公告離岸風力發電示範系統獎勵辦法 :2015 年前完成 2 個民營及 1 個台灣經營示範風場，共計 6 架示範風力機，惟台電配合台灣機組製造可延長至 2020 年；2020 年前完成 3 個示範風場共計 300 MW 離岸風力機裝置容量。

近來台灣陸域風場開發受到居民及環保團體的強烈抗爭，本島設置量恐接近上限，隨著千架海陸風力機計畫及離岸風電示範獎勵辦法的啟動，台灣期透過內需離岸風場帶動大型風力發電產業鏈發展。現台灣之風力發電產業鏈結構雖略具雛型，然尚無實際參與離岸風電之經驗，亦缺乏相關技術能力，需與海外合作藉以提高自主能量。由於離岸風場開發難度更甚陸域，民營得標商目前以海外成熟風機系統為優先考量，台灣業者目前缺乏運轉實績，暫難切入市場。目前，為能讓台灣當地業者確立自行生產風機系統的自主能力，台灣運用工業合作計畫資源協助業者自海外引進相關技術，然 3 GW 離岸風場開發尚面臨環評法規、漁業補償、躉購電價及航運安全等課題，加上整機、海事工程施工船舶設備投資規模高達百億元以上，亟待台灣在風場開發方針及產業基礎建設方面予以積極協助。

中鋼公司長期為台灣金屬工業領頭羊，已累積相關土木及海事船舶工程技術的堅實基礎，且具充份能力供應風力機機組、塔架、船體所需鋼材，本身亦具備優良企業形象，加上台灣順應世界綠能趨勢推動離岸風電能源方針，積極規劃投入離岸風力發電產業，希望能建構離岸風力發電產業的整體供應鏈。2013 年 12 月中鋼董事會通過成立「風電事業發展委員會」，下設風電業務處、工程處及技術處。為配合台灣的自行生產整機示範案，中鋼將自海外引進風電整機技術。日立目前積極開發 5 MW 離岸風力機，其設計係考量日本所處地域之多颱風、多地震以及雷電易生等自然環境因素。2013 年中鋼與日立已簽署合作備忘錄，因日本與台灣地處環境相近，日立的離岸風力系統如能引進台灣，將對台灣風能電力供應有極大效益，也期望未來台日合作能為台灣創造新興產業。

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Current Status and Future Prospects of the Wind Power Industry in Taiwan

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In the wake of the 2011 Great East Japan Earthquake and tsunami that caused radiation leaks at the Fukushima Nuclear Power Station, Taiwan began a rethink of its energy policy. On November 3 of the same year, a new energy policy was announced by President Ma Ying-jeou that included, “ensuring nuclear safety, steadily reducing dependence on nuclear energy” and “creating a low-carbon environment and gradually progressing toward a non-nuclear homeland.” The push to create a low-carbon, green energy environment focuses on adoption of renewable energy, a stable power supply, and carbon emissions reduction. A target of “1000 marine and terrestrial wind turbines” was announced in 2012. The development of terrestrial wind farms will take place first, before expansion to include offshore marine wind farms. By 2030, total installed wind power capacity will reach 4,200 MW (with offshore wind turbines having an installed capacity of 3,000 MW). In July 2012, the “Incentive Program of Offshore Wind Power Demonstration System” was announced by the Ministry of Economic Affairs. These called for the completion of one government-run and two private sector demonstration wind farms with a total of six demonstration wind turbines by 2015, though the Taiwan Power Company project can be extended to 2020 if it uses Taiwan-built turbines. Three additional demonstration wind farms with a total offshore installed wind power capacity of 300 MW are also to be completed by 2020.

The development of terrestrial wind farms in Taiwan has recently been met with intense opposition by residents and environmental groups, so the number of installations on main island of Taiwan is probably reaching its upper limit. With the launch of the Thousand Wind Turbines Project and the Offshore Demonstration Incentive Program, Taiwan will use domestic demand from offshore wind farms to drive the development of a large wind power industry chain. Though the wind power industry chain in Taiwan is beginning to take shape, it does not have any actual experience in offshore wind power operations and lacks necessary technical skills. Overseas assistance is therefore necessary to improve self-sufficiency. As the development of offshore wind farms is far more difficult than terrestrial farms, the private operators who submitted winning bids have given priority to mature overseas wind turbine systems. Taiwanese operators lack actual operating experience so will find it difficult to enter the market for now. To help local Taiwanese businesses establish homegrown wind turbine system production capabilities, Taiwan is drawing on the resources of the Industrial Cooperation Program to introduce relevant technologies from overseas. The development of a 3-GW offshore wind farm, however, faces issues such as environmental impact assessment regulations, fisheries compensation, feed-in pricing, and navigational safety. Investment in turbine units marine engineering ships, and equipment will also exceed NTD 10 billion. Government support is therefore necessary for wind farm and infrastructure development.

China Steel Corporation (CSC) has long been the leader of Taiwan’s metal industries and has accumulated extensive experience in civil and maritime engineering technology. It is also fully capable of providing the steel needed for turbine units, towers, and ship hulls. CSC also has a good corporate image. With Taiwan’s push to promote offshore wind power in line with global green energy trends, CSC has been actively planning to enter the offshore wind power industry and hopes to establish a complete supply chain for the industry. In December 2013, the CSC Board of Directors approved the formation of a “Wind Power Business Development Committee” to oversee the Wind Power Business Office, Engineering Office, and Technology Office. To support Taiwan’s turbine production demonstration project, CSC will introduce overseas technology for the manufacture of complete wind turbine units. Hitachi is currently working to develop a 5-MW offshore wind farm. Its design takes into account the fact that Japan’s geographic location means it experiences frequent typhoons, earthquakes, and lightning strikes. CSC signed a memorandum of understanding with Hitachi in 2013. Due to the similarities between the physical environments of Taiwan and Japan, if the Hitachi offshore wind power system can be introduced to Taiwan as planned, this will be very beneficial to wind power supply in Taiwan. It is also hoped that future Taiwan-Japan cooperation will help create a new emerging industry for Taiwan.