China Emerges as a Major Exporter of Wind Turbine Nacelles

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China emerged as a major exporter of wind turbine nacelles during 2011–20, a significant shift from the prior decade when almost all Chinese production was sold domestically. Both China-headquartered and Western original equipment manufacturers (OEMs) increased nacelle exports from China.

Wind turbine nacelles

This EBOT covers Chinese exports of finished nacelles, the major power generation component of wind turbines, which house the gearbox and generator.1 Export values in this EBOT are based on trade in HS 8502.31, wind-powered generating sets (gensets), which typically includes finished nacelles.2

China emerges as one of the leading exporters of wind-powered generating sets

Chinese exports3 of wind-powered generating sets increased from $351 million in 2011 to $1.1 billion in 2020, with exports rising even amidst record domestic demand in 2020 (figure 1). China is also exporting to an increasing number of countries, with the number of markets to which China exported more than $10 million in a particular year increasing from 9 in 2011 to 22 in 2020 (figure 2). However, Chinese exports accounted for less than 10 percent of the nacelle market outside of China in 2019.4

Figure 1: Chinese exports, wind gensets, 2011–20

Figure 2: Number of major export markets

Source: IHS Markit, Global Trade Atlas database.

China exports turbines to all regions, including some markets historically dominated by local suppliers such as Europe. The largest export destinations during 2011–20 were East Asia & Pacific (26 percent), Europe & Central Asia (21 percent), Latin America & the Caribbean (17 percent), Sub-Saharan Africa (14 percent), and North America (13 percent). Australia was the largest single country export destination (18 percent), followed by the United States (12 percent), and Pakistan (7 percent) (figure 3). However, the main export destinations vary by year.

Figure 3: Largest export markets, 2011–20

Source/notes: IHS Markit, Global Trade Atlas database; markets accounting for at least $10 million in exports; share is the percent of Chinese exports during 2011–20.

1 This EBOT does not cover wind turbine blades, hubs, towers, or parts of nacelles.
2 China's share of global exports is not included in this EBOT as countries differ on the extent to which other products (e.g., blades) are classified in HS 8502.31.
3 This section covers all exports from China. The next sections break out exports by Chinese and Western OEMs.
4 USITC staff estimate based on Chinese export data and estimates of nacelle shipments.

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Chinese OEMs are increasingly supplying foreign markets
Exports by Chinese OEMs increased from 213 megawatts (MW) in 2011 to 1.6 gigawatts (GW) in 2019 (figure 4).5 Despite the growth in exports, however, Chinese OEMs account for only a small share of the market outside of China.6 The largest export destinations were Australia, Pakistan, the United States, South Africa, and Panama during 2007–20 (figure 5).7

Figure 4: Exports by China-based OEMs, 2011–19

![Figure 4: Exports by China-based OEMs, 2011–19](chart1.png)

Figure 5: Exports by China-based OEMs, 2007–20

![Figure 5: Exports by China-based OEMs, 2007–20](chart2.png)


Chinese OEMs expanded exports by buying and developing their own projects abroad, thereby overcoming export barriers such as their lack of a track record in foreign markets. Many of these investments were supported by financing from Chinese lenders, such as the China Development Bank. Chinese OEM sales to unrelated parties were driven by low prices, the improving quality of their turbines, and more international activity by Chinese developers, contractors, and financial institutions.8

Western OEMs source nacelles from their plants in China for foreign projects
The U.S. and European OEMs with nacelle production in China (GE, Siemens Gamesa, and Vestas) also export from China.9 A majority of Chinese exports of wind gensets during 2019–20 originated in Tianjin, where Siemens Gamesa and Vestas have nacelle plants.10 China has become the primary location from which some OEMs serve certain foreign markets.11 The factors likely driving the growth in nacelle exports from China by Western OEMs include the geographic diversification of demand and lower production costs in China. Also, Western OEMs historically struggled to generate sales in China, resulting in significant unused production capacity at their Chinese plants.12

5 Chinese OEMs were not major exporters prior to 2011, with exports of 54 MW during 2008–10. CWEA data.
9 The volume of exports by Western OEMs is not available. Some OEMs are also increasing exports from India. Upadhay, Anindya, “Foreign Firms,” Jul. 30, 2019; company earnings calls; Verma, Sneha, “Siemens Gamesa’s,” Apr. 11, 2019.
11 IHS Markit, Global Trade Atlas database; Trade Data Information Services, Import Genius database.

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