2016 Top Markets Report Renewable Energy Sector Snapshot

Hydropower

Despite receiving little attention within the United States, the global hydropower industry is poised to install a significant amount of new capacity by the end of the decade. Unfortunately, the international competitiveness of U.S.-based technology suppliers in the hydro sector remains constrained. Five foreign manufacturers, some of whom even have U.S. manufacturing facilities, dominate the turbine market for "large hydropower" technologies. U.S. companies enjoy a more competitive position in the "small hydro" market, particularly when projects are constructed in the Western Hemisphere.

Industry Overview

Taken together, large and small hydropower capacity globally exceeds all other renewable energy sources combined. Total installed capacity worldwide now exceeds 1100 GW with new large hydro installations occurring almost exclusively in the Asia-Pacific and Central and South America. [1]

Based on industry projections, ITA expects the global hydropower industry to cumulatively install over 300 GW of new capacity outside the United States between now and the end of the decade. The sector is projected to account for nearly half of all renewable energy development in that time frame.

The United States has the third largest installed hydropower capacity of any country in the world behind China and Brazil.[2] Today, the sector accounts for 79 GW of power capacity in the United States – the second largest source of non-fossil fuel generation behind nuclear power.[3]

Yet since the 1960s, major hydropower development has essentially stopped. The United States has not commissioned a new large hydropower dam in well over a generation. Only three percent of domestic hydropower capacity has been installed since 1990,

Hydropower Export Markets (2016-2017)

1. **Canada**
   large market; large share
2. **India**
   large market; small share
3. **Venezuela**
   large market; small share
4. **Brazil**
   large market; small share
5. **Mexico**
   small market; large share
6. **Peru**
   large market; small share
7. **Russia**
   large market; small share
8. **Vietnam**
   large market; small share
9. **Philippines**
   large market; small share
10. **Malaysia**
    small market; small share

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with just one GW of new capacity added since 2000.[4]

Most forward-looking domestic capacity growth is expected to occur in the form of efficiency improvements at existing dams and the installation of power generating equipment at small dams that were constructed for some other purpose – i.e., river navigation, flood control, etc. Furthermore, the volume of factory orders for equipment needed for such projects would be less compared to solar and wind installations, and require more customization.

As a result of this stagnation in manufacturing, the global hydropower industry's expansion over the next several years will largely occur without the involvement of U.S. equipment suppliers. In fact, according to ITA's projections, U.S. exporters will capture just two percent of the global import market. Anecdotal evidence suggests that this number could be slightly higher for service exporters, who often compete more effectively overseas.

Export Opportunities

Over the next two years, ITA expects the world to install at least 64 GW of new hydropower capacity outside the United States, trailing both wind and solar in terms of global development.

China will account for the vast majority of the world's investment in large hydropower. Driven by increasing demand for new energy sources to reduce the carbon footprint of its power mix, China is aiming to reach 350 GW of large hydropower capacity by 2020.[5] However, China ranks very low for U.S. export potential. This reflects China's reliance on its domestic manufacturing of hydro equipment and its deep supply chain.
Almost all of new large hydropower projects regardless of location will be supplied with turbines from one of five dominant turbine producers.[6] European producers Andritz (Austrian), Alstom (French), and Voith (German) should continue to dominate turbine sales outside of China, while Dongfang Electric and Harbin Electric will likely capture almost all turbine contracts in China. As a result, hydropower exports are expected to account for just 16 percent of U.S. clean energy exports through 2017 despite the hydropower industry accounting for one-third of the value associated with clean energy development during that time period.

While U.S.-owned hydro manufacturers do not enjoy a competitive position within the large hydro market, the three dominant European turbine suppliers all have some manufacturing capacity in the United States and often export from their U.S. facilities to projects in Canada and Latin America. In fact, despite limited growth compared to other markets, Canada again ranks number one on ITA's list of projected export markets in the sector, matching its ranking in last year's report.

ITA expects Canada to install roughly 1.5GW of new hydropower capacity over the next two years, with U.S. suppliers capturing roughly 25 percent of the value associated with this development. More than two-thirds of hydropower exports in the near-term are expected to go to Canada and India combined, with most other markets accounting for three percent or less of total hydropower exports.
Trade data with Chile, on the other hand, shows increasing imports of small and medium hydro equipment but a shrinking U.S. share of these imports. Thus our ranking for Chile has dropped from number two in last year's report to a disappointing number 16.

While large hydro projects – which are getting few and far between, even for emerging markets – do not offer U.S. exporters a likely opportunity, the United States does possess a strong small hydro industry (generally defined as supporting projects below 30 MW). The industry often produces power for off-grid communities, small towns along rivers, and generates power from existing dams used for other purposes. Additionally, many U.S. companies are already developing small run-of-river technologies that are more environmentally sustainable than traditional dams and can produce power for rural, off-grid projects.

A large slice of the hydropower market is also the addition of capacity at existing dam facilities, which often requires considerable engineering expertise. Several U.S. firms excel in this subsector and should benefit from capacity upgrades globally.

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Challenges

Like all renewable energy solutions, hydropower has its share of detractors. Concerns range from environmental to the impact of drought. This may ultimately slow the growth in this sector and reduce opportunities. Furthermore as exporters, the U.S. hydro industry does not have a strong enough domestic base to take advantage of the existing global demand. As a result, most opportunities indicated by the rankings are in the Western Hemisphere.

[1] Bloomberg New Energy Finance, Market Size database.
[2] Bloomberg New Energy Finance, "Hydropower Research Note: US Hydro in 2013 – a trickle or a flood" (9 July 2013) pp. 2
[3] Bloomberg New Energy Finance, "Hydropower Research Note: US Hydro in 2013 – a trickle or a flood" (9 July 2013) pp. 1
[4] Bloomberg New Energy Finance, "Hydropower Research Note: US Hydro in 2013 – a trickle or a flood" (9 July 2013) pp. 1
[5] China's 2014 National Energy Development Strategic Plan, as summarized by Bloomberg New Energy Finance
[6] Bloomberg New Energy Finance, "Hydropower Research Note: Sizing up global hydropower growth in 2012" (4 April 2013) pp. 1

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