



2016 Top Markets Report **Smart Grid** Sector Snapshot

Transmission & Distribution (T&D) Equipment

State of the Market

Global trade in transmission and distribution (T&D) equipment exports saw an overall decline of 4 percent reflective of the global downward economic trend over the last year of available global export data (2014).ⁱ This reflects a return to pre-2011 annual global trade revenues following two years of consecutive year-to-year declines in 2013 and 2014, and reduces the CAGR to 9 percent for the previous decade.

However, according to the International Energy Agency, approximately \$5 trillion will be invested in T&D infrastructure globally from 2015-2030.ⁱⁱ Thus suggesting that despite a downward trend in global T&D equipment trade, opportunities for U.S. exporters will persist.

U.S. Competitiveness

Overall, U.S. T&D equipment exports have performed well in recent years. Total export revenues for the T&D equipment sector reached nearly \$2.0 billion in 2015. Exports to Canada and Mexico accounted for almost 45 percent of this total, and the top ten markets makeup over two-thirds.ⁱⁱⁱ As Figure 7 illustrates, U.S. T&D equipment exports declined 4 percent year-to-year from 2014, but still reflect a long-term growth trend with a 9 percent CAGR over the previous decade. U.S. global market share dropped to approximately 8 percent.

As Figure A4 illustrates, top U.S. T&D export markets do not completely align with those of all goods. Relative to other industries, U.S. T&D equipment manufacturers have captured significant returns in nations like Saudi Arabia and Colombia.

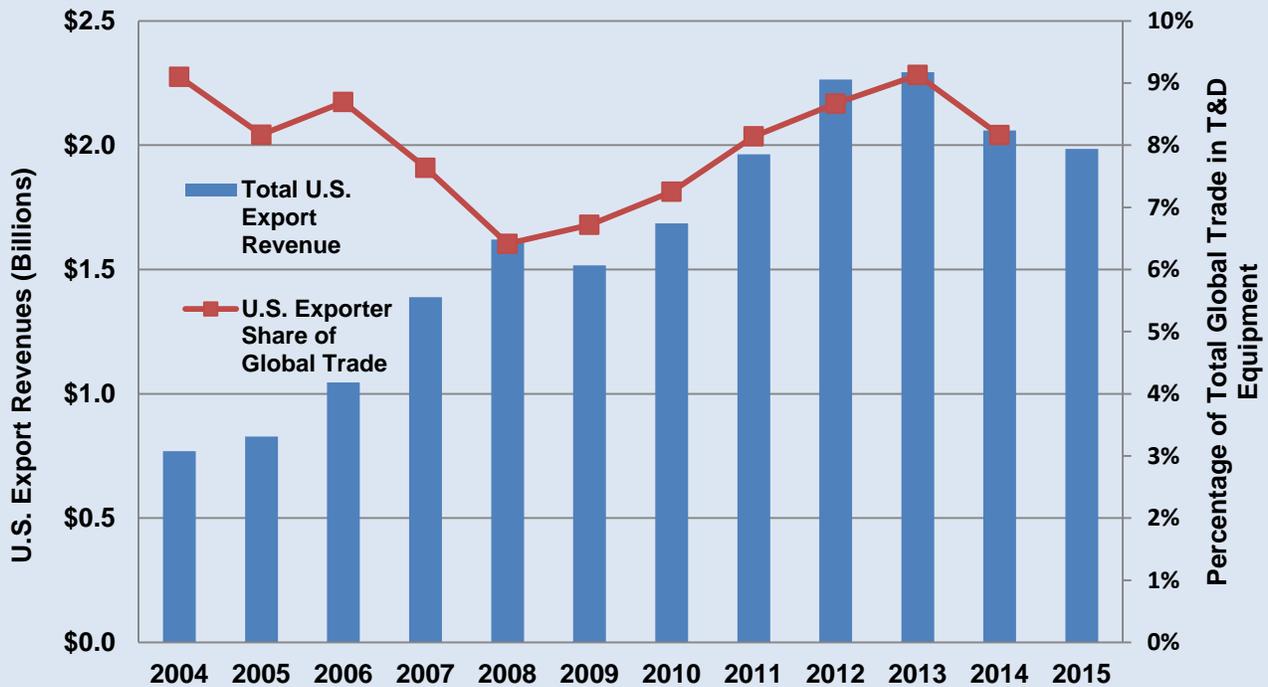
Figure 1: T&D Equipment Sub-Sector Rankings (Top 20)

1. Mexico
2. Vietnam
3. India
4. Nigeria
5. Saudi Arabia
6. Malaysia
7. Chile
8. Indonesia
9. Canada
10. Philippines
11. Turkey
12. Korea
13. China
14. Singapore
15. Australia
16. Colombia
17. Thailand
18. Israel
19. Poland
20. United Kingdom

Rankings

The T&D equipment sub-sector rankings focus on markets with high growth in the products and services necessary for the build-out, modernization and automation of T&D networks. For example, trade in T&D equipment receives a higher weight in this ranking, as does electricity demand growth,

Figure 2: U.S. T&D Equipment Exports and Global Market Share



Source: U.S. Census Trade Data via the Trade Policy Information System of the U.S. Department of Commerce: International Trade Administration

energy supply investment and other factors driving the build-out of the grid.

The top T&D equipment markets are, therefore, more likely to be less-mature smart grid markets. Investments in these nations are more focused on the foundational grid modernization that is essential to the development of more advanced Smart Grid ICT that is still to come. Countries that have been long-standing markets for U.S. suppliers of the electric grid rank higher in this sub-sector. Additionally, Asian markets, where connecting new populations to the electric grid is a priority, will perform well in the T&D equipment sub-sector.

The T&D equipment sub-sector ranking reflects a heavy weight on Category 2, where three data sets form the foundation for the scores in this category. The three data sets are: U.S. exports of T&D equipment, trends of U.S. exports over last two years, and projected electricity consumption growth over next five years. This is described in detail in Appendix A.

Canada and Mexico continue to account for almost half of all U.S. T&D equipment global exports. Year-to-year trends show that Canada, Sweden, Brazil,

Russia, Japan and Singapore experienced the largest absolute drops in T&D equipment exports since

2013, while U.S. exports to Mexico, Korea and Italy increased the most significantly over the same time period.

The decline in T&D equipment exports can largely be explained by a drop in exports to Canada that accounted for almost half the global decrease. Other major trade partner markets with decreasing T&D equipment exports since 2013 include Sweden, Brazil, Russia and Japan. This is most obvious in the year-to-year decrease in T&D Equipment Sub-Sector rankings for Brazil (-17), Japan (-13) and Canada (-7), where it heavily influenced the decrease in Brazil's overall sector ranking.

The projected trend of the electricity sector over the next five years will influence the T&D equipment sub-sector significantly. Projected increases in electricity consumption over the next five years have been scaled back for Colombia, China and Singapore, dropping all three significantly in the T&D equipment sub-sector rankings by 13, 9, and 9 spots, respectively. Factors attributing to exports are consistent with trends in category 3 and are discussed in previous sections. Rationale for this is

discussed above, as it also affects the overall investment climate for the energy sector, as included in the Key Economic and Energy Sector Investment Indicators discussion.

Projected increases in electricity consumption over the next five years have been scaled back for Colombia, China and Singapore. On the other hand, the most rapid electricity consumption growth is anticipated to occur in emerging markets such as Vietnam, Nigeria, Indonesia and India; this includes the increased relative growth projections from 2015 among top markets.

Full comparison of year-to-year T&D equipment sub-sector rankings is included in Appendix B.

Technology, Capability, and Application Trends

The ITA predicts there are a number of T&D equipment sub-sector solutions that will be increasingly important as governments and regulators look to implement policies that expand regional grids, especially in Europe and China, while at the same time increasing the resilience and integration of distributed energy resources.

Ultra-high voltage (UHV) Transmission Lines

Co-location of energy resources and electricity load centers is an increasing challenge, especially as nations and regions look to transmit low-cost renewable energy. Coupled with shifts to the urbanization and deregulation of electricity markets, electricity is increasingly being looked to travel longer distances from the generation site to the end-user. UHV transmission lines enable larger amounts of electricity to travel a greater distance, up to three times further than the traditional high voltage transmission lines, with reduced losses and costs. China is currently the global leader in deployment of UHV transmission. Brazil, Africa and Europe all have commissioned lines.

Interconnection

This is the physical linking of electricity systems that allow the transfer of electricity across borders. As nations look to implement their climate change commitments, increase energy security, and reduce costs, ITA assesses that there will be an increased global focus on building infrastructure and creating

enabling policies and regulations for grids to interconnect. For example, new interconnections are being built in Poland and Lithuania to complete the synchronization of the electricity grid with the West as European Union countries look to increase energy security and “transition” the energy sector.

Microgrids^{iv}

A microgrid is a local energy grid with control capabilities to disconnect from the traditional grid and operate autonomously. The ITA assesses that microgrids will be increasingly deployed for critical infrastructure, for example, hospitals, to provide backup for the grid in case of emergencies. These systems can also be used to cut costs or connect to a local resource that is too small or unreliable for traditional grid use. A microgrid allows an energy consumer to be more energy independent and, in some cases, more environmentally friendly. Industrial energy users in locations with unreliable electricity access, such as remote and rural communities, or island nations, and regions without established infrastructure are being evaluated as principal candidates for microgrid deployment.

ⁱ United Nations Statistical Office, based on the Harmonized Tariff System (HTS) for the classification of trade commodities via the Trade Policy Information System of the U.S. Department of Commerce: International Trade Administration.

ⁱⁱ International Energy Agency (IEA), *World Energy Outlook*, 2015.

ⁱⁱⁱ U.S. Census Trade Data via the Trade Policy Information System of the U.S. Department of Commerce: International Trade Administration.

^{iv} U.S. Department of Energy, <http://www.energy.gov/articles/how-microgrids-work>