INTERNATIONAL TRADE ADMINISTRATION

TopMarkets
A Market Assessment Tool for U.S. Exporters

2018 Top Markets Report
Smart Grid

A Market Assessment Tool for U.S. Exporters

March 2019

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Victoria Gunderson served as the lead author of this report. Special thanks to **Jacob Barkin** who contributed to data analysis of the country data sheets. Additional thanks to **ITA Commercial Service** energy sector specialists for their critical insights

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EXECUTIVE SUMMARY

The Department of Commerce's International Trade Administration (ITA) *2018 Smart Grid Top Markets Report* (*SG TMR*) examines the wider trends affecting the global development of smart grid technologies as well as analyzes the opportunities and challenges for U.S. exporters over the next five years. Each subset of the smart grid sector faces different competitiveness challenges, and every global market possesses a unique set of characteristics, which require nuanced and tailored trade policy and export promotion approaches. The *SG TMR* series is designed to provide market insights for U.S. companies as well as inform U.S. policymakers on global markets where U.S. government (USG) resources can have the largest impact in support of U.S. competitiveness.

What is smart grid?
The smart grid is a modernized electricity transmission and distribution network that includes two-way communication systems and enables the integration of technologies that will modernize the grid to improve its efficiency, reliability, sustainability, and security. In the context of this report, the term "smart grid industry" is used interchangeably with other industry nomenclature (e.g., grid modernization) to describe the ecosystem of goods, services, and technologies that support the transmission, distribution, and storage of electricity.

This is the fourth annual report in the *SG TMR* series. ITA evaluated 146 markets for data availability, current export market size, USG strategic engagement, and U.S. Department of Commerce overseas presence. Fifty-six global markets met all data availability criteria. (See Appendices.) Markets evaluated for the first time in 2018 include: Dominican Republic, Greece, Hungary, Kuwait, Panama, Slovakia, and the United Arab Emirates.

Neighboring markets – Canada and Mexico – lead the *SG TMR* Overall rankings. At the sub-sector level, emerging economies with high electricity demand growth rank higher in the Transmission and Distribution (T&D) Equipment sub-sector, while markets with aggressive renewable energy deployment targets rank higher in the overall rankings, particularly in the Smart Grid Information Communications Technology (ICT) and Energy Storage sub-sectors. Generally, small variations in relative rankings, among markets or year-on-year comparisons, are not statistically significant.

Top Ten SG TMR Ranked Markets, 2018

RANK	Overall	T&D Equipment	Smart Grid ICT	Energy Storage
1	Canada	Canada	UK	UK
2	Mexico	Ghana	Canada	Canada
3	UK	Mexico	Japan	Japan
4	Japan	Dominican Republic	Denmark	Australia
5	Australia	Vietnam	Sweden	Germany
6	Denmark	Morocco	Finland	Denmark
7	Philippines	Philippines	Australia	China
8	China	United Arab Emirates	Germany	Korea
9	Vietnam	India	Mexico	Chile
10	India	Ethiopia	Ireland	Netherlands

In 2017, global investment in electricity transmission and distribution networks increased to $303 billion. [1] This increased investment led to a rise in global trade of related goods and services. Global trade of T&D equipment – a subset of goods that underpins global T&D networks – improved to $34.34 billion in 2017, which represents a $1 billion increase from 2016. [2]

SG TMR Segment	Opportunities	Challenges & Barriers
Overall	Digitalization Energy Access Targets in Emerging Markets Coupling T&D Projects with Demand Side Management Microgrids	Protectionist National Policies Standards and Interoperability Electricity Price Sensitivity and the Regulatory Environment Cross-Broder Data Flow Policies and Regulations
T&D Eqiupment Sub-Sector	New Transmission for Renewable Energy Integration Microgrids Multilateral Development Bank Projects	Increased Number of Global Competitors Protectionist National Policies Complex Global Supply Chains
Smart Grid ICT Sub-Sector	Renewable Energy Integration Solutions Cybersecurity Software Distribution & Substation Automation Virtual Power Plants	Rapid Technology Evolution Quest for Industry-Wide Interoperable Platform Lack of Utility Working Capital Data Localization Policies
Energy Storage Sub-Sector	Solar plus Storage Non-Wires Alternatives Diesel Generator Replacement	Accessing Clean Energy Subsidies Too Much Domestic Demand Safety and Standards Development

The United States was the second largest investor in T&D networks and the global leader in so called "smart" energy technology investment. [1] [3] In 2017, the United States continued to be the leading global importer of T&D equipment, followed by Saudi Arabia and the United Kingdom.

The United States remained the third-largest global supplier of T&D equipment in 2017, behind China and Germany. Due to the limitations of the harmonized tariff system (HTS), an analysis is not possible to accurately assess global competitiveness using trade data in the Smart Grid ICT sub-sector. U.S. firms in information technology, networking technology, software, and technology services continue to be widely viewed as ICT industry leaders. European firms serve as the biggest source of competition in the Smart Grid ICT sub-sector. In energy storage, Northeast Asian countries (Korea, Japan, and China) have identified the industry as strategic and governments are looking to bolster market opportunities for their firms. These firms serve as the primary competition for U.S. manufacturers of battery technologies, but also serve as strategic partners with U.S. software firms and as a source of foreign direct investment (FDI) for the United States.

In 2017, the United States saw more than $43 billion in FDI for T&D equipment manufacturing facilities. Additionally, U.S. electric generation, transmission, and distribution utilities drew more than $76 billion in FDI. [4]

A complex set of global trends could shape the market for U.S. exporters from 2019-2023. Drivers for the deployment and development of grid modernization equipment, technology, and services vary by region and by sub-sector. Investment in the sector and the opening of new global markets are strongly influenced by the policy and regulatory environment. In 2017, the global focus on trade, import tariffs, and government efforts to promote national champions increased. Global competition to supply goods and services for the electricity system has intensified for U.S. exporters. The promulgation of local content requirements, data localization regulations, and other protective policies has resulted in sectoral market access barriers on every continent. As such, the USG has focused on reducing trade barriers and opening markets to enhance free, fair, and reciprocal trade.

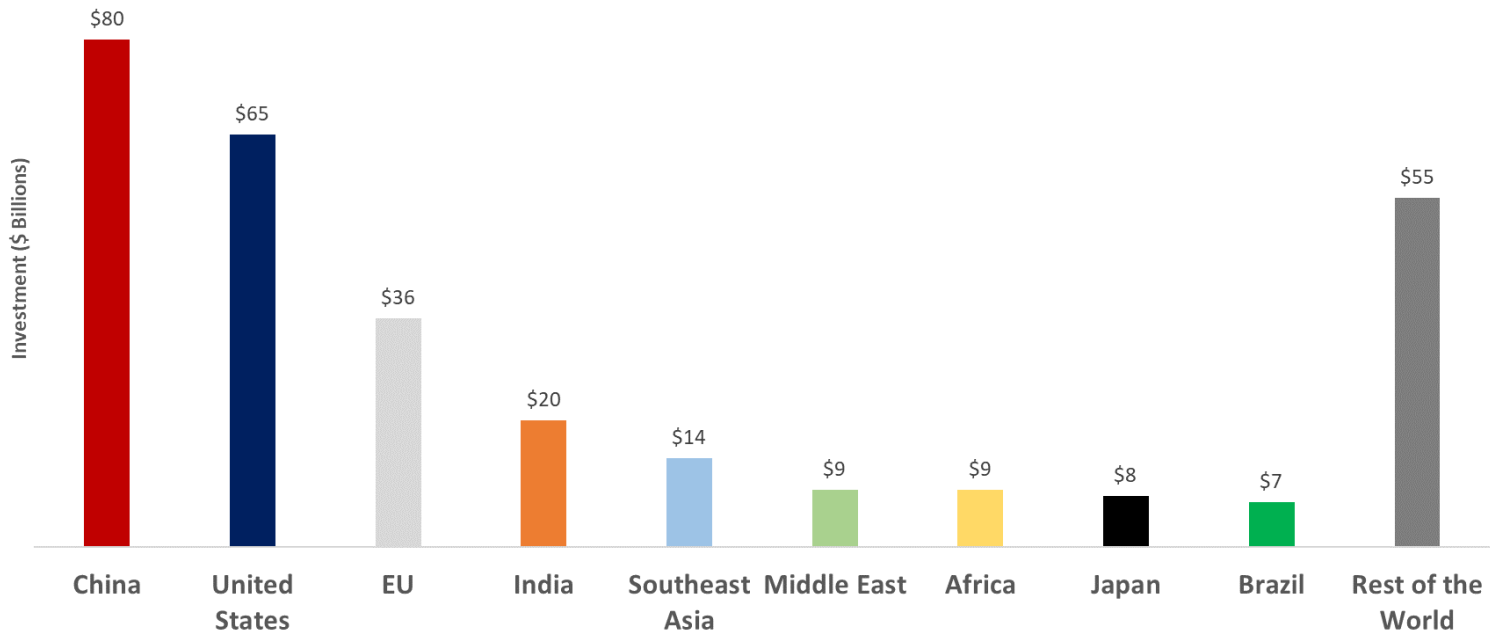
U.S. exporters will find opportunities due to aggressive renewable energy deployments, desire for digitalization, coupling of demand-side management (DSM) with T&D projects, and deployment of microgrids for energy access. Conversely, U.S. exporters will be challenged by a lack of interoperability platforms and the failure of regulations to keep up with technological advancements. Given that electricity is considered to be a public good, price sensitivity remains a noteworthy challenge even when considered on a lifecycle cost basis.

KEY FINDINGS

Global Investment

Global investment in electricity transmission, distribution, and storage networks accounted for 17 percent of spending in the energy sector in 2017. Investment in the sector grew by one percent from 2016 to reach $303 billion. [1] Investments in markets not included in the Organization for Economic Co-operation and Development (non-OECD) exceeded investment in OECD markets by $29 billion in 2017. Overall, China was the leading global investor, followed by the United States. Breaking it down, the United States is estimated to be the largest global investor in the energy "smart" technologies that underpin the Smart Grid ICT and Energy Storage sub-sectors. [3]

Investment in Electricity Networks by Market, 2017



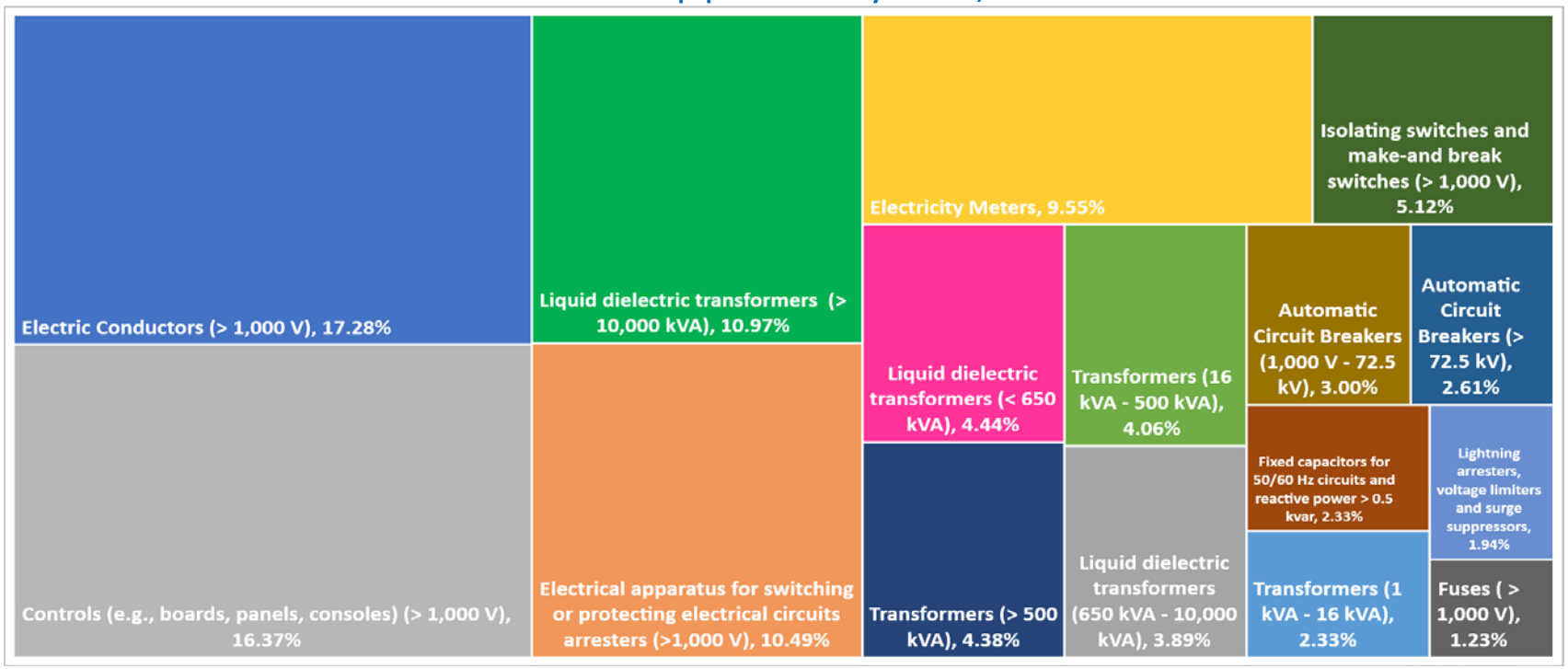
Data Source: International Energy Agency, World Energy Investment Outlook, 2018.

T&D Equipment Trade

Existing global trade data based on the current HTS include product codes that capture accurate and relevant export revenues for a subset of T&D equipment rather than the entire smart grid market. For the most part, HTS product codes for the wide range of hardware, software, and networking technologies are either non-existent or too broad to separate the smart grid applications for these technologies as opposed to other applications (e.g., broadband Internet, electric vehicles). Furthermore, neither government or international institutions collect data on international trade in smart grid services, such as consulting, information technology (IT) system integration, and consumer energy efficiency programs.

Among traded goods for the electrical grid – or T&D equipment – electric conductors are the most widely traded. In 2017, these goods accounted for more than 17 percent of the market. [2]

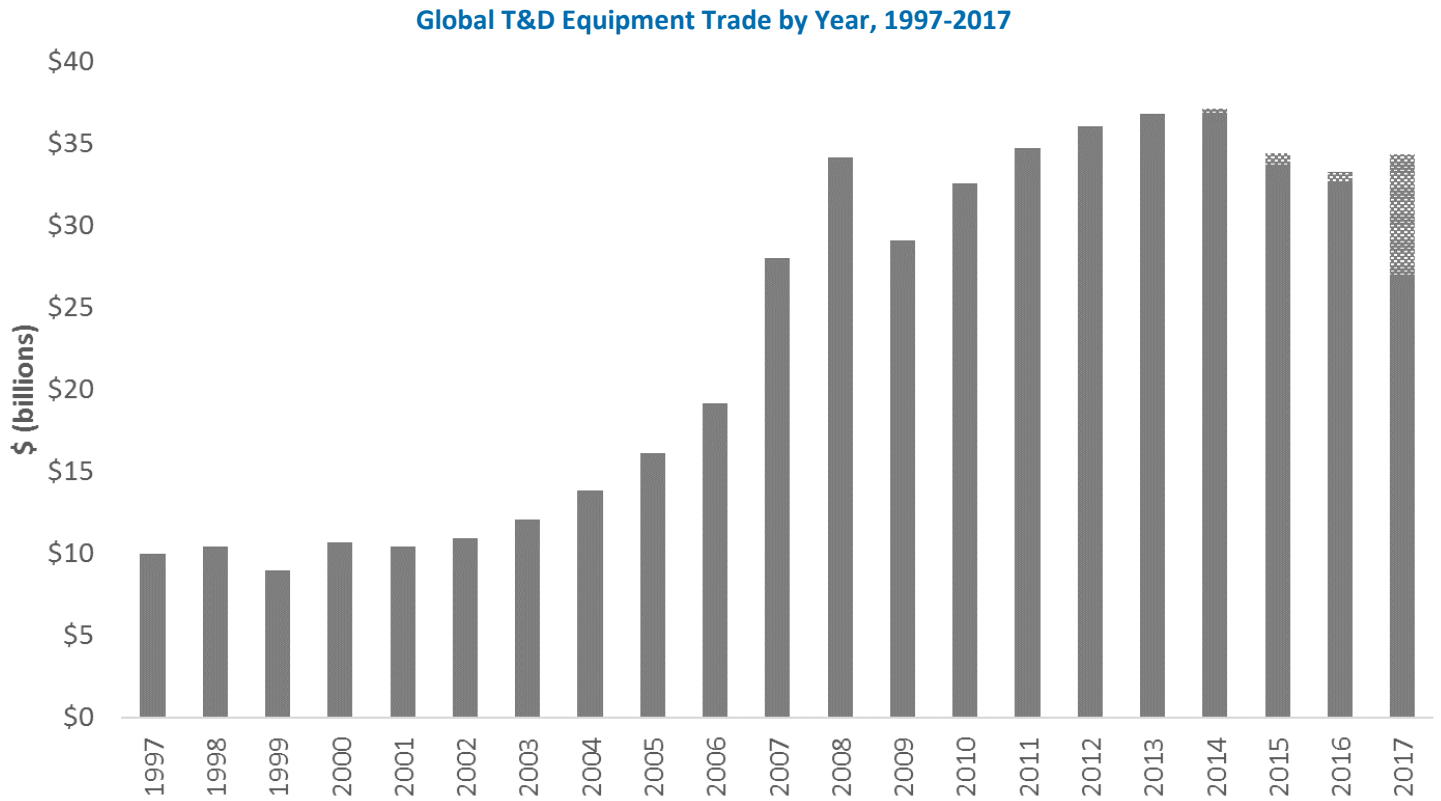
Global T&D Equipment Trade by Product, 2017



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

T&D Equipment Global Trade

Global trade in T&D equipment topped $34.34 billion in 2017. This is a small increase from 2016 of approximately $1 billion. Eighty-three percent of global markets saw an increase or reported no change to their T&D equipment imports over the last year. The largest year-on-year import growth was seen by Malaysia ($174 million increase) and Italy ($141 million increase), while the largest decreases in exports from 2016 to 2017 occurred in Chile ($249 million decrease) and Brazil ($238 million decrease). [2]

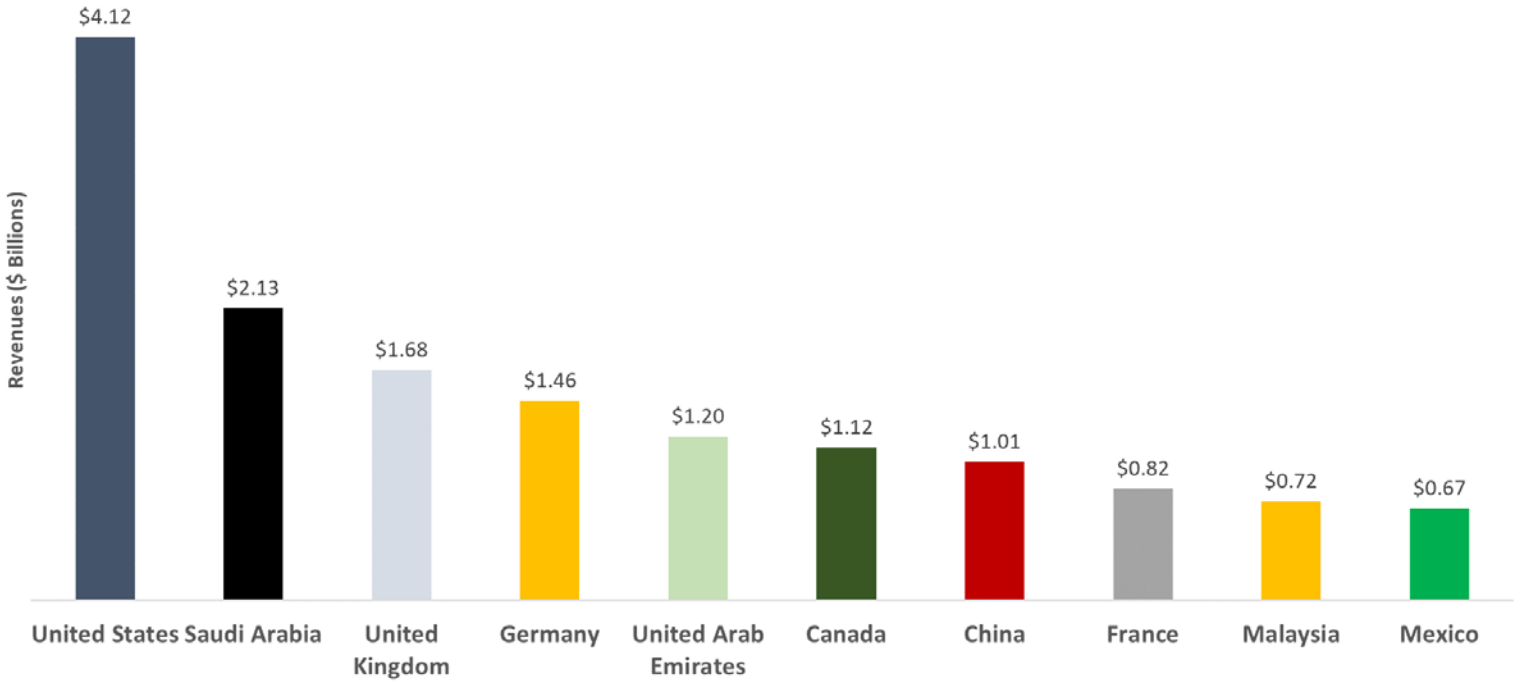


Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.
Note: T&D equipment imports were estimated based on the most recent reported data for markets that had not reported their 2015, 2016, or 2017 T&D equipment imports to the United Nations by August 31, 3018. Estimated data is represented in the bar graphic by striped bars.

T&D Equipment Imports

The United States is the largest T&D equipment import market in the world. In 2017, it accounted for 15 percent of global imports. This is almost twice the size of the next largest import market —Saudi Arabia. It is worth noting, that import market size does not directly correlate with total investment in T&D networks. This is especially striking for Middle Eastern markets, where more than half of electricity network investment is fulfilled via imports. The United States fulfilled at least 6 percent of its 2017 investment through imported goods, while China, India, and Brazil met at least 1.2 percent, 1.6 percent, and 4.3 percent, of domestic demand with imports, respectively. Local content requirements and other preferential policies for domestic manufacturers in these markets drove the lower reliance on imported goods. [2]

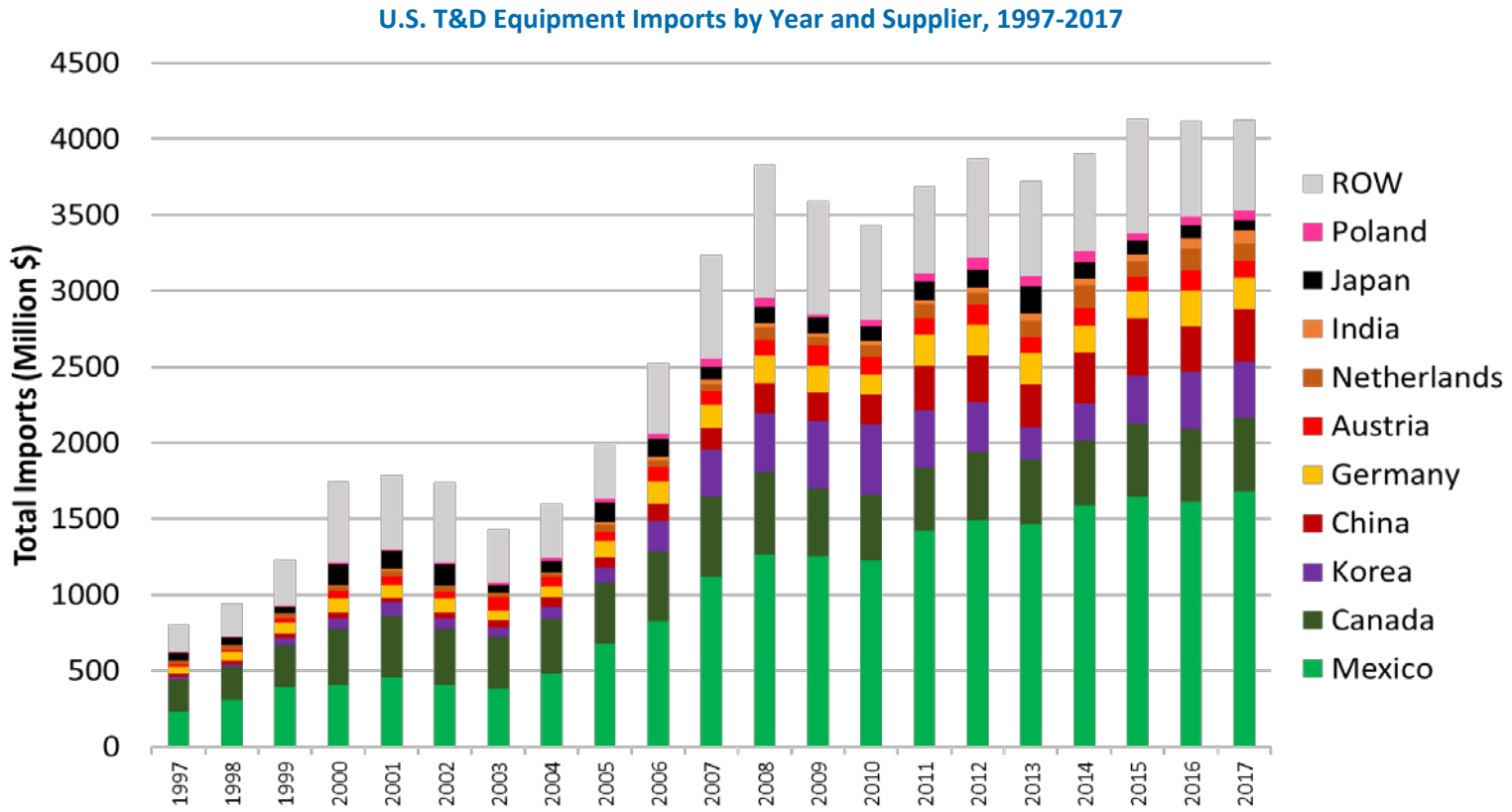
Top T&D Equipment Importers by Market, 2017



Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.
*Denotes data from 2016 as 2017 data was not reported by August 27, 2018.

U.S. T&D Equipment Imports

U.S. imports of T&D equipment have continued to rise over the last two decades. However, from 2016 to 2017 imports held at $4.12 billion. This is a minor decrease from peak U.S. imports in 2015 of $4.13 billion. In 2017, Mexico remained the leading supplier to the United States. It captured 41 percent of the market share. Other top suppliers included Canada, Korea, and China with 11 percent, 9 percent, and 8 percent of the market share, respectively. [5]



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

U.S. T&D Equipment Imports

For leading global T&D suppliers, the U.S. market remains one of the most critical to access. Of the top ten suppliers to the U.S. market, the United States is the number one export market for six of these suppliers: Mexico, Canada, Korea, China, Austria, and Netherlands. In the case of Canada and Mexico, the United States is the primary destination for most of their manufactured T&D equipment at 90 percent and 88 percent of export market share, respectively. [5]

U.S. T&D Equipment Imports by Supplier, 2017

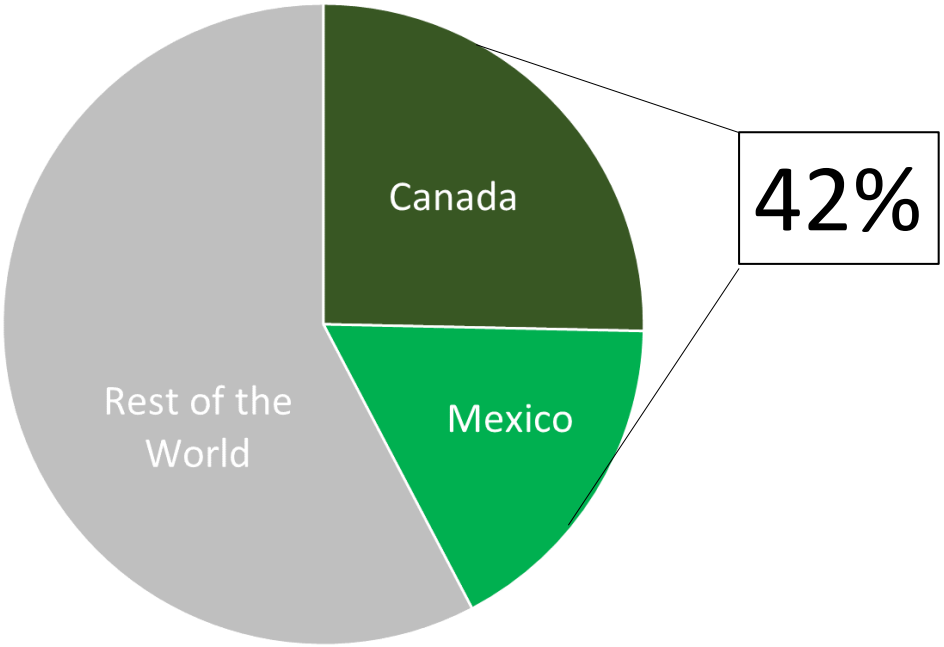
Top 10 U.S. Suppliers	U.S. Rank Among Supplier's Export Markets	Share of Supplier Revenues From U.S. Imports
1. Mexico	1	90%
2. Canada	1	88%
3. Korea	1	31%
4. China	1	9%
5. Germany	2	7%
6. Austria	1	28%
7. Netherlands	1	32%
8. India	2	9%
9. Japan	5	8%
10. Poland	4	9%

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

North American Trade

Canada and Mexico remain the most important markets for the U.S. smart grid industry. Not only are the North American partners critical U.S. suppliers, but together the markets account for 42 percent of all U.S. T&D equipment exports. In 2017, U.S. exports to these markets totaled more than $840 million. [5]

U.S. T&D Equipment Exports by Market, 2017



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

U.S. Exports

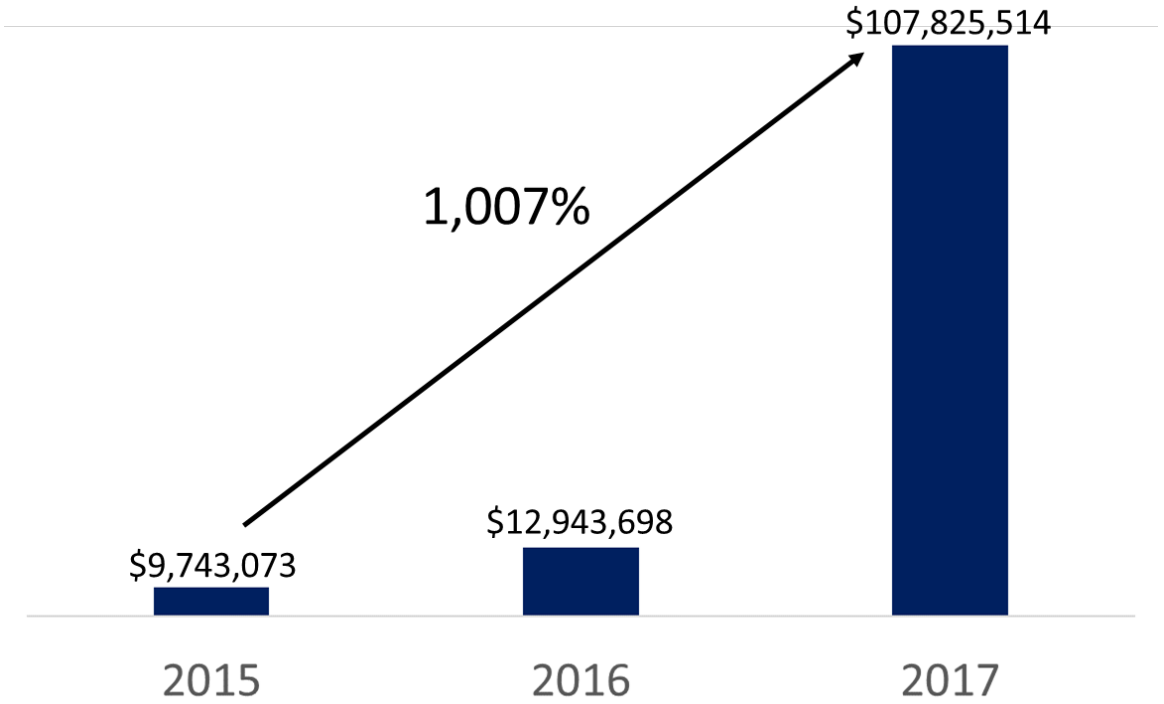
U.S. T&D equipment exports peaked in 2012 and have seen a steady decline since. From 2016 to 2017, U.S. exports of T&D equipment decreased by more than three percent. U.S. export revenues reached the lowest revenue in a decade and dropped below $2 billion for the first time since 2007. [5]

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

U.S. Exports

Among the 56 U.S. export markets profiled in the *2018 SG TMR*, only 25 percent increased their T&D equipment imports from the United States in 2017. The most striking increase was seen in U.S.-Ghana trade. From 2015 to 2017, U.S. T&D equipment exports to Ghana rose by 1,008 percent to reach $107,825,154. This resulted in Ghana being the third largest U.S. export market in 2017. It accounted for more than six percent of the total U.S. exports. [5]

U.S. T&D Equipment Exports to Ghana by Year, 2015-2017

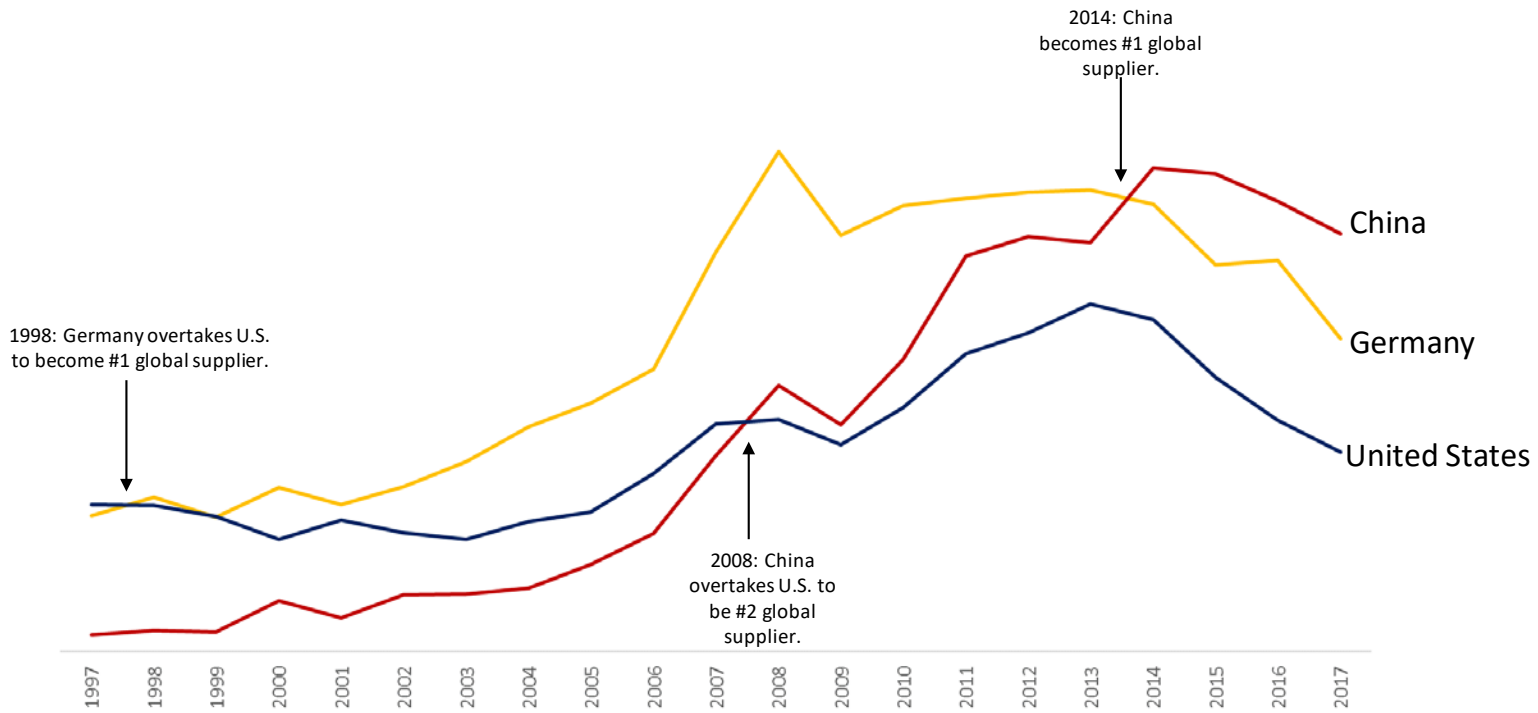


Data Source: U.S. Census Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

Leading Global Exporters

Despite the overall decrease in U.S. (and global) T&D equipment exports in 2017, the United States remains globally competitive. In 2017, the United States was the third largest supplier of T&D equipment. However, over the last twenty years the United States has dropped from the leading global supplier of T&D equipment at almost 14 percent global market share to less than 7 percent in 2017. During this same period, China became the leading global supplier of T&D equipment. China overtook the United States in 2008 during the economic recession and surpassed Germany in 2014. [2]

Global T&D Equipment Exports by Year and by Supplier, 1997-2017



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

Top Ten Global Suppliers

Looking across the top ten global suppliers of T&D equipment, not only has China emerged as a leading global supplier over the last two decades, but Mexico, Korea, and India have all increased their global market share. Global competition to supply T&D equipment has increased. New players are entering the market and there is a rise of emerging economy global suppliers. This is being driven by global demand for these products and emphasizes the high potential of this sector to generate exports, increase growth of domestic economies, and meet domestic critical infrastructure needs. As a result, governments are implementing policies and regulations to provide a competitive advantage to their domestic smart grid technology industries. This presents a challenge to U.S. exporters looking to tap into markets where national champions and strong, preferential policies, such as local content requirements, are ubiquitous, and access to financing is limited for foreign firms. [2]

Top 10 Global T&D Equipment Suppliers by Year, 1997-2017

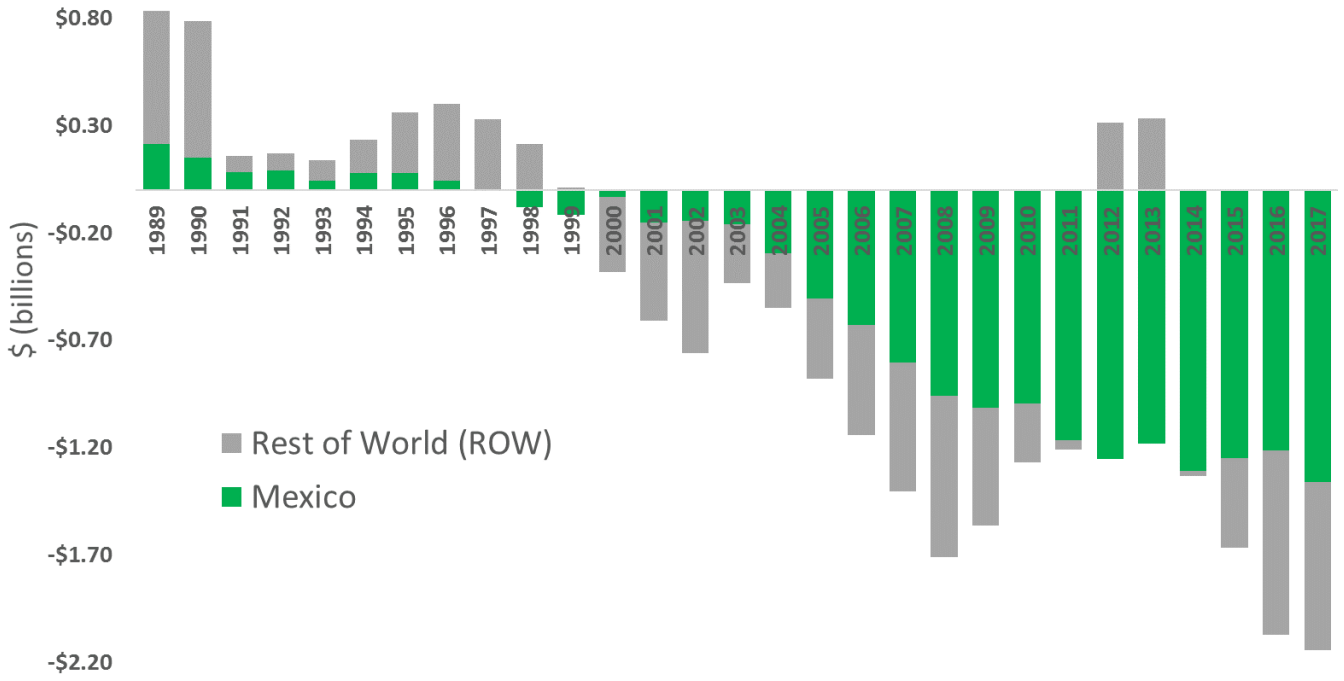
1997	2007	2017
1. United States	1. Germany	1. China
2. Germany	2. United States	2. Germany
3. Japan	3. France	3. United States
4. France	4. China	4. Mexico
5. United Kingdom	5. Italy	5. Italy
6. Switzerland	6. Mexico	6. Korea
7. Italy	7. Japan	7. India
8. Sweden	8. Korea	8. France
9. Canada	9. Switzerland	9. Japan
10. Mexico	10. Turkey	10. Switzerland

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

U.S.-Mexico Trade

Mexico's rise as a leading global supplier is directly tied to its relationship with the United States. Mexico sends 90 percent of its T&D equipment exports to the United States, while the United States only sends 16 percent of its exports to Mexico. The United States has run a trade deficit in T&D equipment with Mexico for twenty consecutive years, but only four consecutive years with the rest of the world. [5]

U.S. T&D Equipment Balance of Trade by Market and by Year, 1997-2017



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

Global Suppliers

Competition to supply T&D equipment varies by region. The United States is a top-ten supplier to every region. It fares much better in nearest neighbor markets where 60 hertz frequency grids dominate, U.S. standards are more readily deployed, and supply chain logistics are eased. Similar trends are seen for exporters in other markets – nearest neighbors tend to dominate. This is most prominent in North America, Europe, Central Asia, East Asia and the Pacific. In emerging markets with limited domestic manufacturing and few large regional players, such as the Middle East, North Africa, and Sub-Saharan Africa, the landscape varies and a mix of suppliers from East Asia and Europe are competing with the United States to gain regional footholds. Additionally, multinational firms dominate the T&D equipment sector with multi-country manufacturing presences. As such, U.S.-headquartered firms may source from non-U.S. manufacturing facilities based on regional competitiveness, regulatory policies, shipping costs, and project specifications. The country of origin of the good, not the firm's headquarters, limits the analysis. [2]

Top 10 T&D Equipment Suppliers by Import Region, 2017

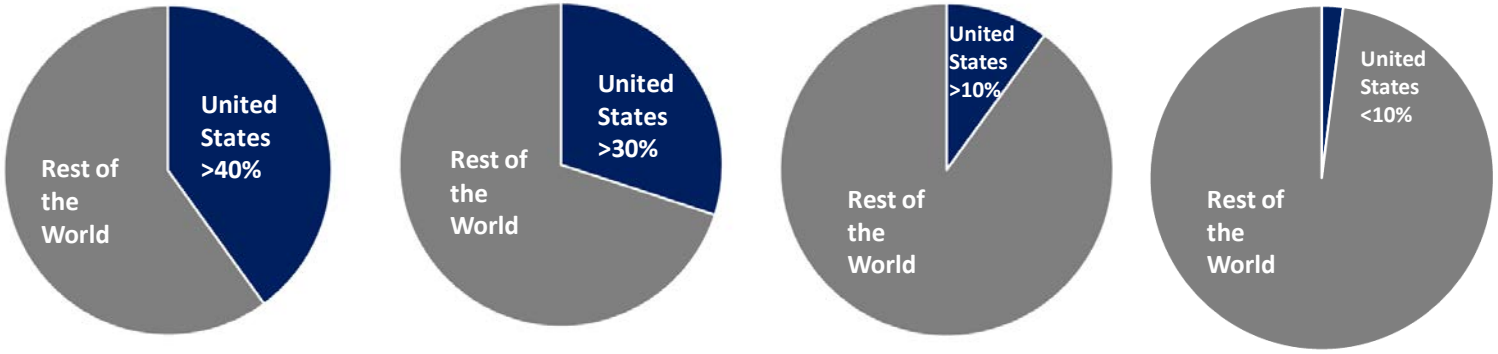
North America	Latin America & the Caribbean	Europe & Central Asia	Middle East & North Africa	Sub-Saharan Africa	East Asia & the Pacific
1. Mexico	1. China	1. Germany	1. Korea	1. China	1. China
2. United States	2. United States	2. Italy	2. Germany	2. Germany	2. Japan
3. Canada	3. Brazil	3. Poland	3. China	3. India	3. Korea
4. China	4. Germany	4. Switzerland	4. Italy	4. France	4. Germany
5. Korea	5. Spain	5. China	5. Turkey	5. Austria	5. United States
6. Germany	6. Italy	6. France	6. France	6. Italy	6. India
7. Austria	7. France	7. Hungary	7. United States	7. United States	7. Singapore
8. India	8. Mexico	8. India	8. India	8. Norway	8. Thailand
9. Netherlands	9. India	9. United States	9. UAE	9. Japan	9. Taiwan
10. Japan	10. Colombia	10. Czech Republic	10. Lebanon	10. Switzerland	10. Switzerland

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

U.S. Export Destinations

Among the 56 markets ranked in *2018 SG TMR*, U.S. T&D equipment exporters have a market share greater than 40 percent in only three markets globally: Canada, Dominican Republic, and Mexico. U.S. market share exceeds 30 percent in Costa Rica and more than 10 percent in Colombia, Egypt, Israel, Nicaragua, the Philippines, and the United Kingdom. U.S. suppliers have less than 10 percent market share in the remaining 46 markets and in some cases, do not even rank among the top ten suppliers among *SG TMR* markets. [5]

Top U.S. T&D Equipment Destinations by Percentage of Imports and by Market, 2017



Canada
Dominican Republic
Mexico

Costa Rica

Colombia
Egypt
Israel
Nicaragua
Philippines
United Kingdom

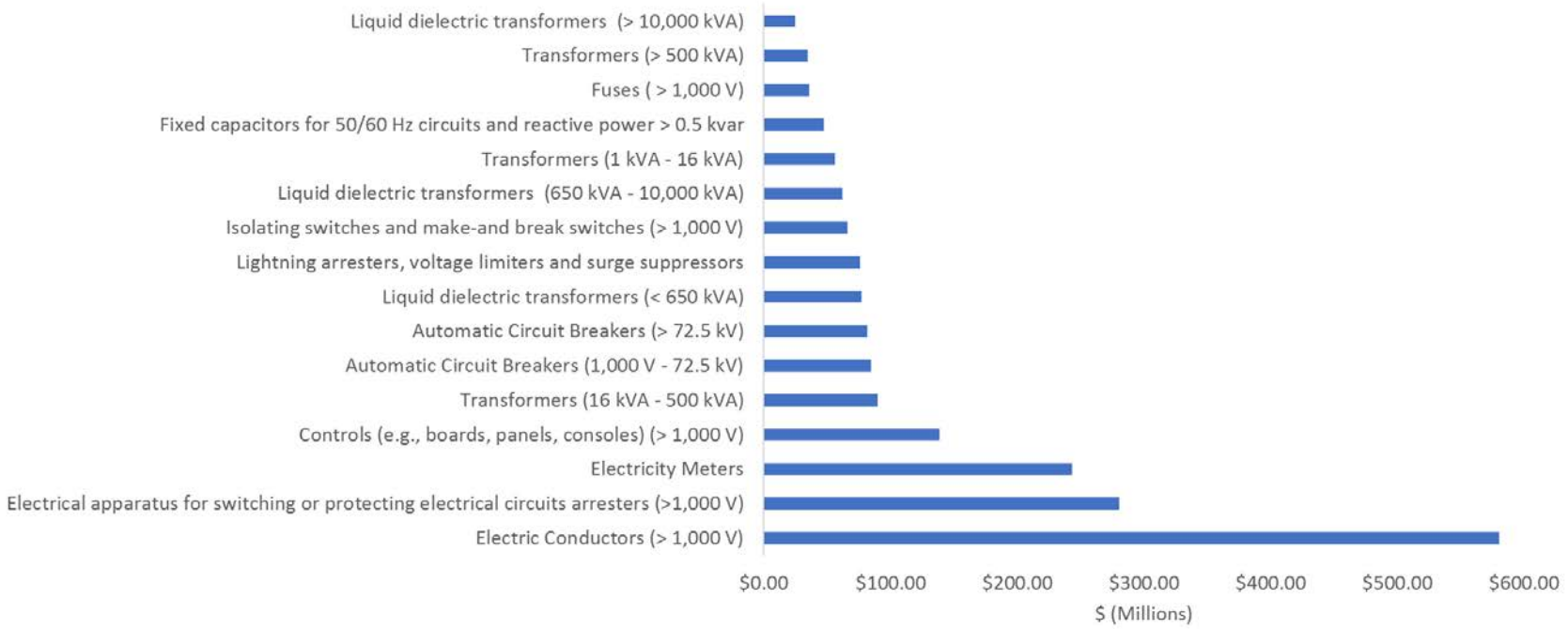
… 46 Markets …

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

U.S. Exports by Product

Electrical conductors (such as wire cables) are the leading U.S. T&D equipment product exported around the world. Electrical conductors (greater than 1,000 volts) accounted for 29 percent of U.S. export revenues in 2017. This is followed by electrical apparatus for switching or protecting circuit arresters, electricity meters, and controls (for systems greater than 1,000 volts) with 14 percent, 12 percent, and 7 percent market share, respectively. [5]

U.S. T&D Equipment Exports by Product, 2017



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

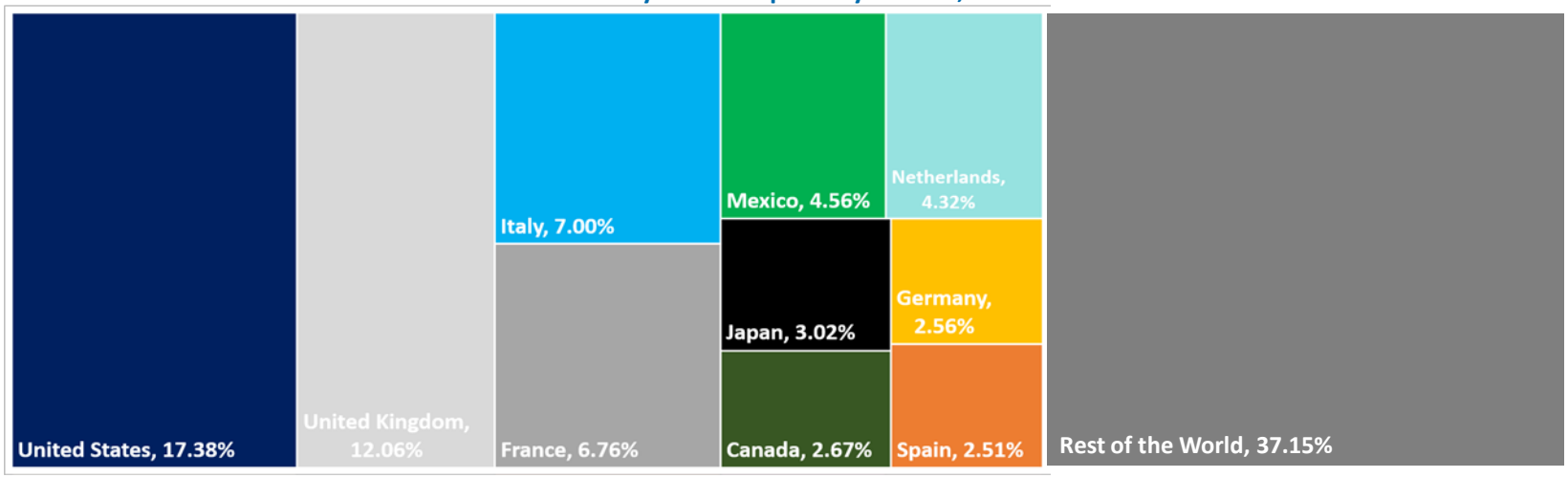
Metering: Top Importers

There has been significant global focus on the deployment of electricity meters by electricity distribution utilities. Smart metering is widely viewed as an enabling technology for grid modernization. Smart meter deployment creates market opportunities for smart grid ICT firms to provide software and analytical packages. Smart meters further serve as a leading technology to meet deployment of the full suite of advanced metering infrastructure (AMI).

In many markets, meter deployment has largely been policy driven. For example, the European Union (EU) targeted having 80 percent of electricity meters in each Member State be "smart" by 2020 (conditioned on Member State assessments). Some European markets have already met this target, while others are unlikely to meet the 2020 deadline. In the United States, smart metering deployments were spurred by the 2009 American Recovery and Reinvestment Act, which has resulted in penetration in the United States approaching 60 percent.

In 2017, 114.9 million smart meters were installed worldwide, with a global penetration of 38 percent. [6] This does not reflect the quantity of meters traded as domestic demand for meters is met by both domestic and foreign suppliers. Furthermore, trade data cannot differentiate between "smart" and non-ICT enabled meters. However, it is worth exploring the data to understand general trade flows in metering. In 2017, the top destinations for traded electricity meters were the United States, United Kingdom, and Italy. [2]

Electricity Meter Imports by Market, 2017

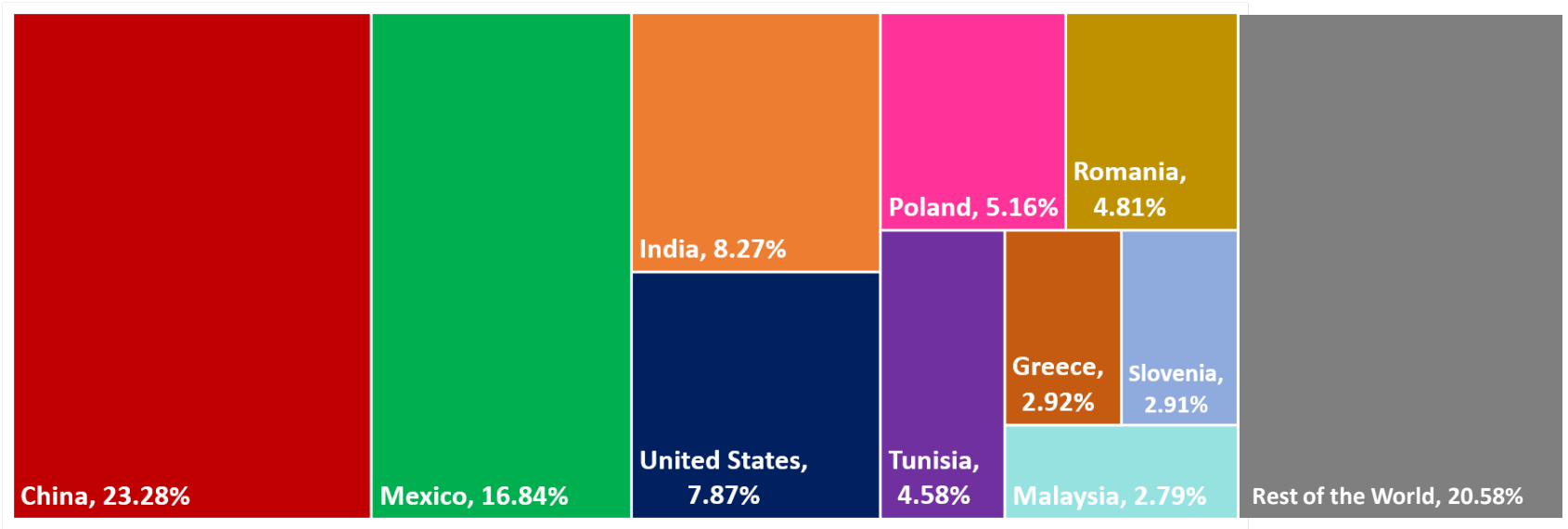


Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

Metering: Suppliers

Global trade in electricity meters approached $3 trillion in 2017. China is the leading supplier capturing more than 23 percent of the market share in 2017. Mexico, India, and the United States are also ranked in the top four leading global suppliers. [2]

Electricity Meter Suppliers by Market, 2017



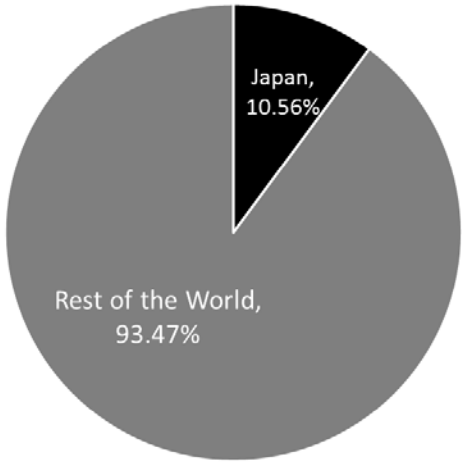
Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

Metering: Suppliers

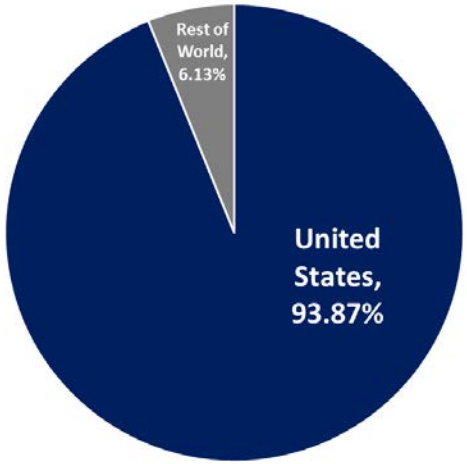
Not only is China the leading global supplier of electricity meters, but it has also captured a more diversified client portfolio than its top competitors. China's top export destination (Japan) captures just more than 10 percent of market share. On the other hand, Mexico, the second leading global supplier, sends 93 percent of its electricity meter exports to the United States. A similar export market distribution is seen for the third largest market supplier, India, which sends 86 percent of its meters to the United Kingdom. [2]

Electricity Meter Suppliers by Import Market, 2017

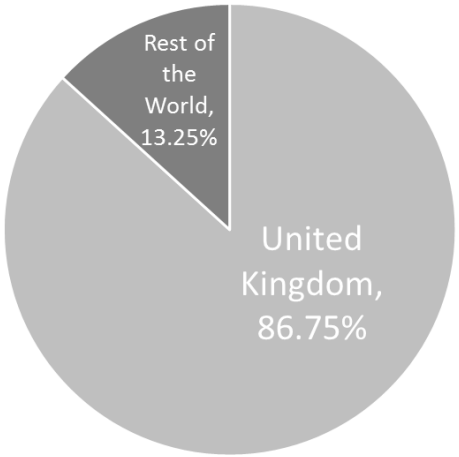
1. China Export Destinations



2. Mexico Export Destinations



3. India Export Destinations

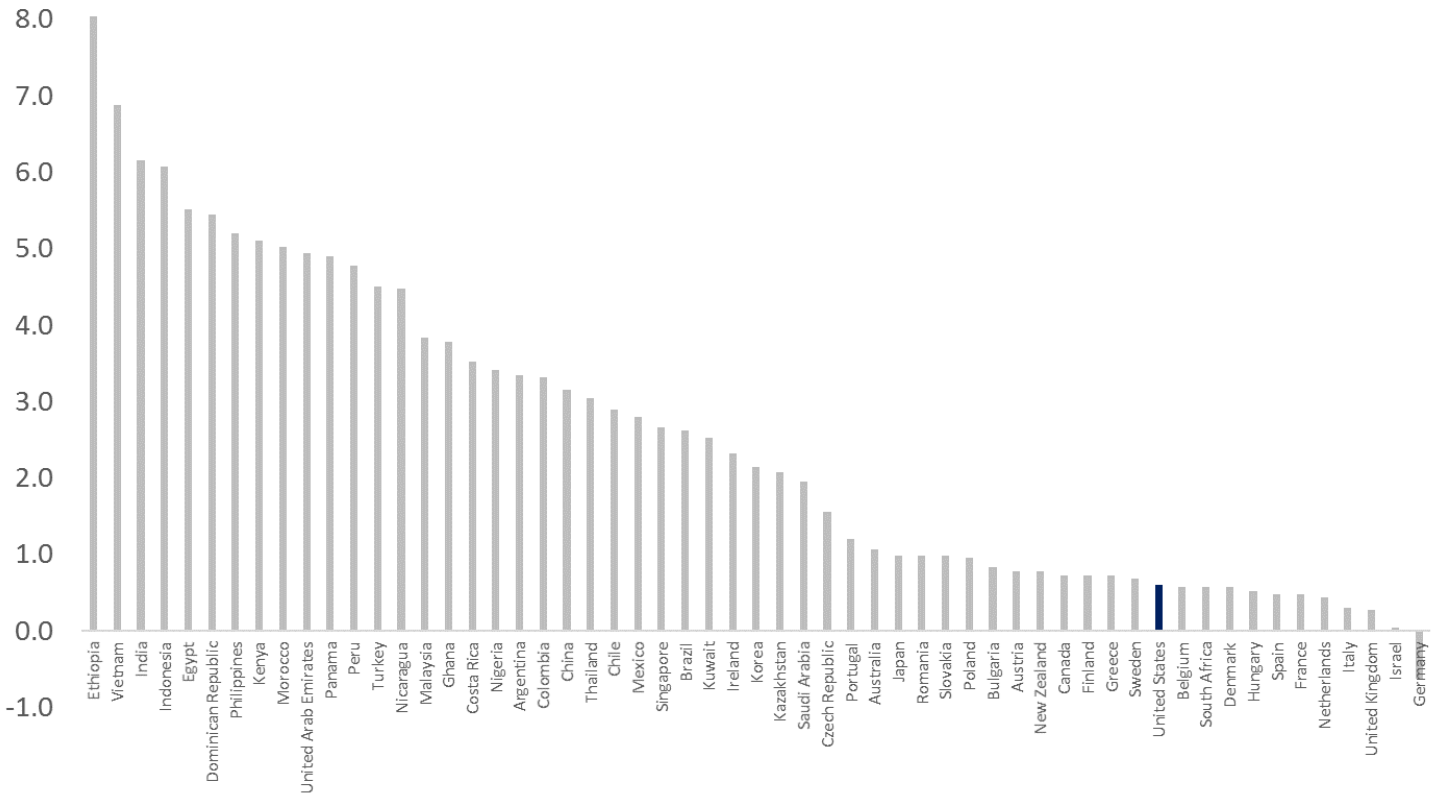


Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

Electricity Demand

Energy consumption growth is largest in emerging economies and is a key market growth indicator for U.S. exporters of T&D equipment. There is a diverse range of expected average growth of electricity consumption over the next five years (2019-2023). Ethiopia leads all top markets with expectations of almost eight percent annual average growth. Emerging economies (non-OECD markets) demonstrate the greatest near-term growth potential, while high income markets (OECD) demonstrate lower electricity demand growth projections. Germany is the only market included in the *2018 SG TMR* to have a predicted annual average decrease in electricity demand over the next five years. [7]

Average Annual Electricity Demand Growth by Market, 2019-2023

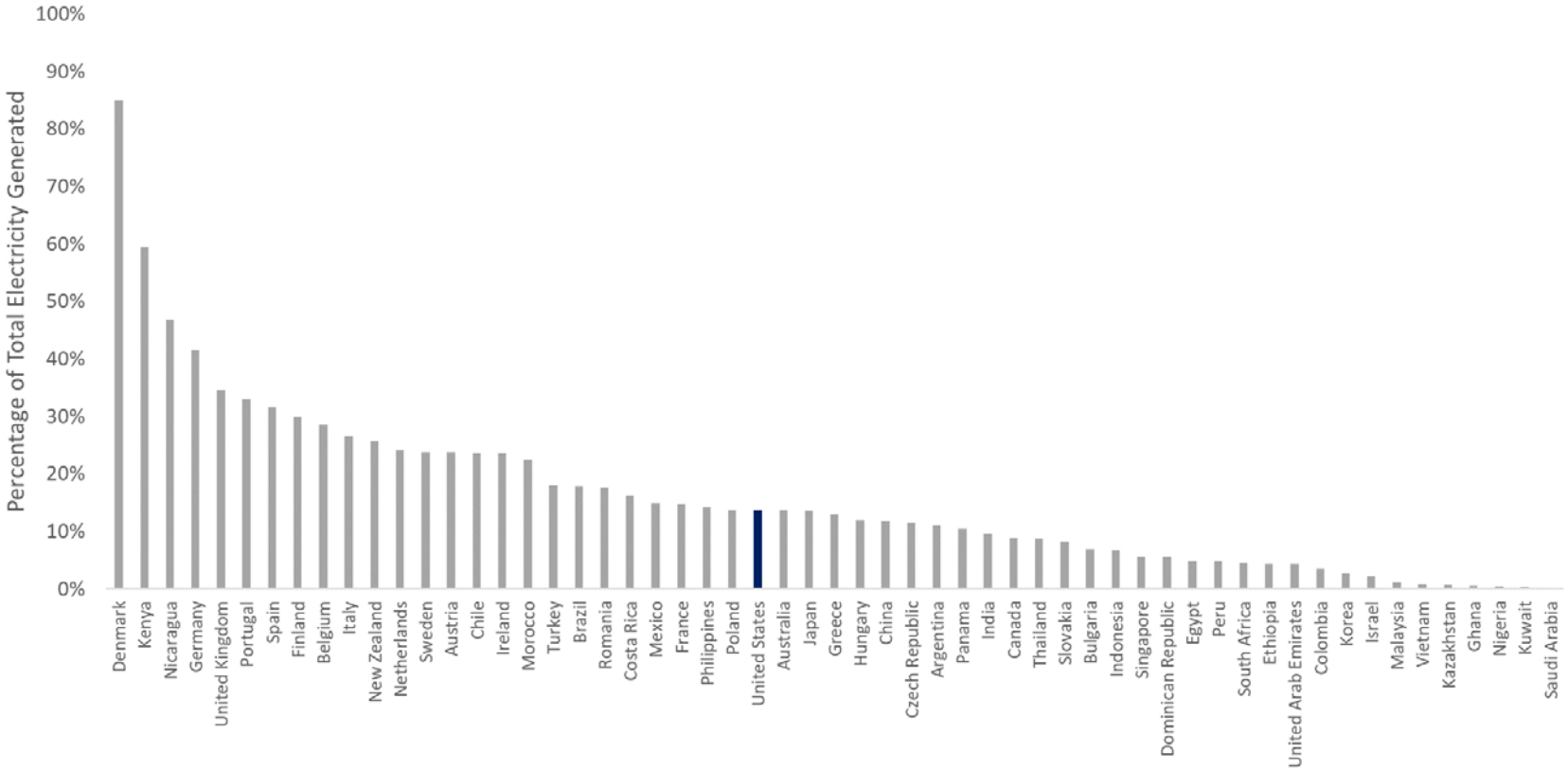


Data Source: Business Monitor International

Renewable Energy Deployment

Aggressive non-hydropower renewable energy projections bring opportunities for U.S. smart grid firms. Grid management challenges driven by deployment of intermittent resources result in increased opportunities for U.S. exporters of smart grid ICT solutions and energy storage systems. Denmark is projected to be the global leader in non-hydropower renewable deployment in 2023. Even despite aggressive mandates, markets with robust oil and gas reserves (e.g., Saudi Arabia) are least likely to deploy non-hydropower renewable energy. [7]

Projected Non-Hydropower Renewable Energy as Share of Electricity Mix, 2023

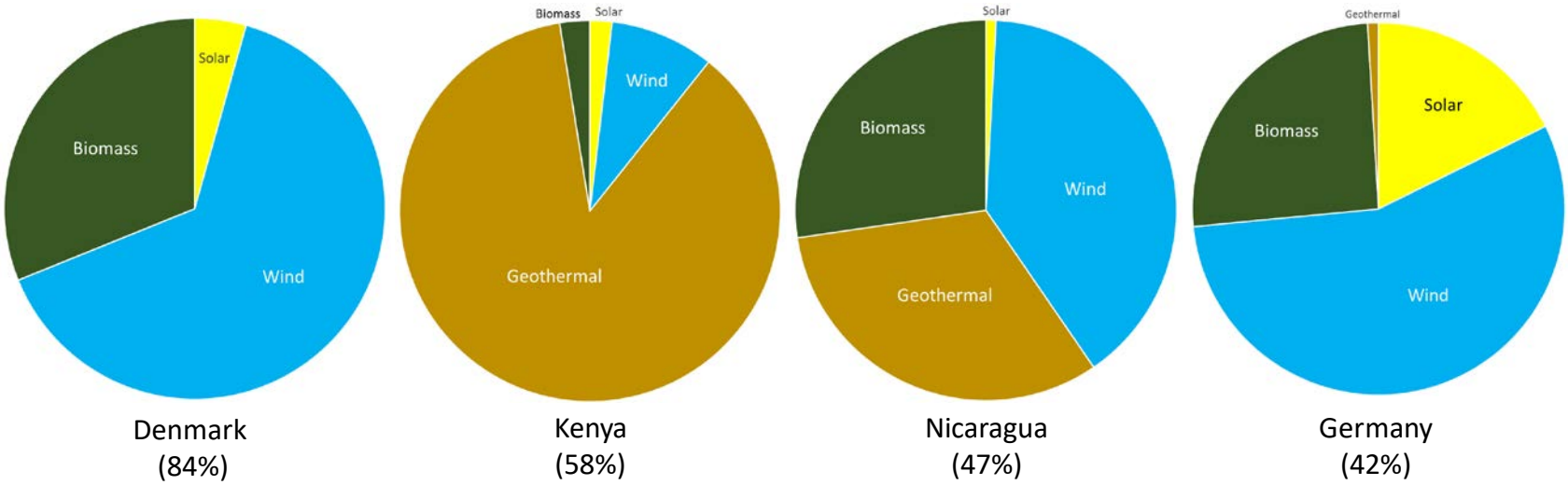


Data Source: Business Monitor International

Variation Exists Even Within Non-Hydropower Renewable Energy

Even among the four markets projected to have the highest percentages of non-hydropower renewable energy (solar, wind geothermal, and biomass) on their systems in 2023, a wide range of resource mixes is expected to be deployed. The technical grid management solutions will subsequently vary even further depending on the specific resource mix amid non-hydropower renewable energy sources. Grid management challenges resulting from intermittent resources will present the greatest opportunity for U.S. smart grid providers. This includes weather and demand management forecasting software, voltage management solutions (e.g., smart inverters), and energy storage solutions. [7]

Projected Non-Hydropower Renewable Energy Deployments by Source, 2023



Denmark (84%) | Kenya (58%) | Nicaragua (47%) | Germany (42%)

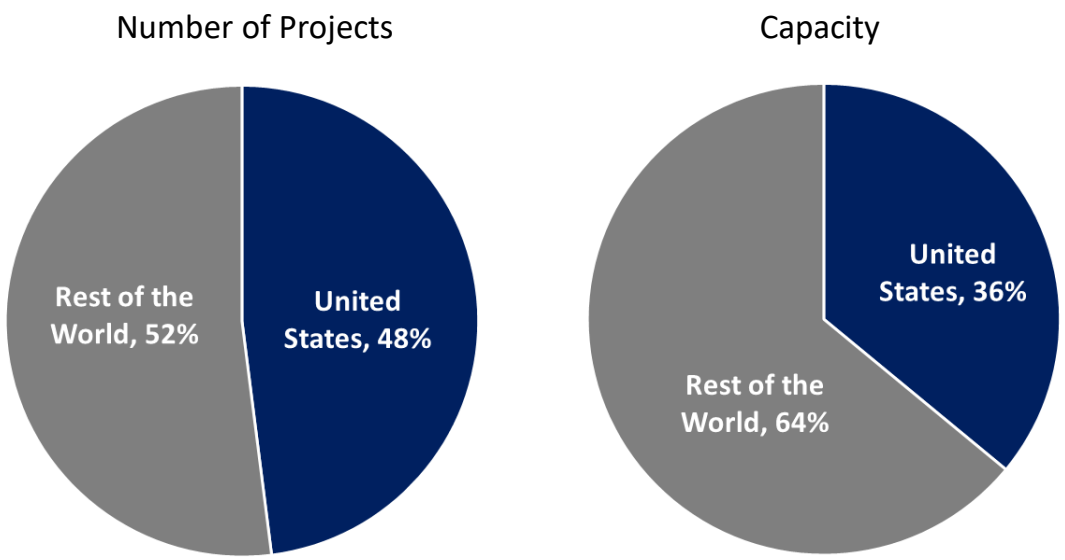
Data Source: Business Monitor International

Energy Storage

Renewable energy deployment is a driver for smart grid ICT and energy storage deployments. According to ITA analysis of the U.S. Department of Energy (DOE) Global Energy Storage Database, the most frequently identified use-cases for electrochemical energy storage projects in the United States are related to solutions to address challenges from renewable energy deployments. The top use-case is renewable energy firming. However, many of the grid management challenges such as energy shifting, voltage support, and black start could be enhanced by increased renewable energy deployment.

Global utility-scale electrochemical energy storage capacity estimates vary by databases. Among the almost 1,000 operational, under construction, and announced projects included in the DOE Global Energy Storage Database, almost half the projects and more than 36 percent of capacity of utility-scale energy storage are in the United States. Other global markets with substantially deployed capacity include China, Korea, Germany, Japan, Australia, and the United Kingdom. [8]

Electrochemical Energy Storage Deployments to Date by Market



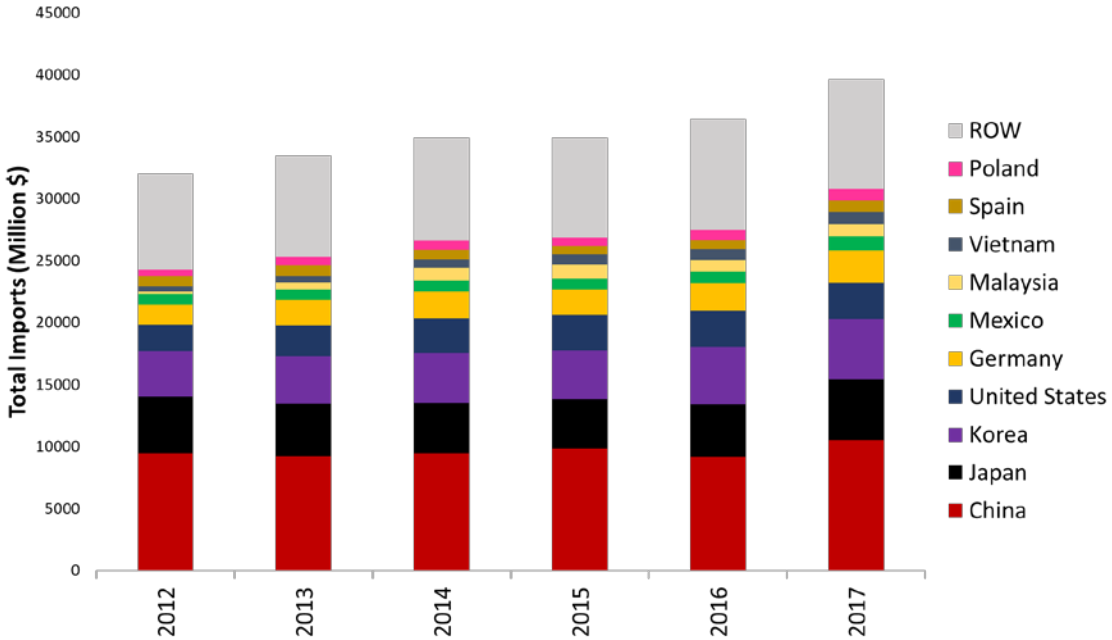
Data Source: U.S. Department of Energy, Energy Storage Global Database, http://www.energystorageexchange.org/.

Global Battery Trade

Energy storage systems deploy a wide range of manufactured electrical equipment products in addition to related software and services. Most of the core electrical equipment deployed in these systems are included in the general "T&D Equipment" category previously discussed. However, the T&D Equipment category does not contain batteries and other products that include substantial products for non-electricity sector end-use. However, given that the battery is the key component of an energy storage system, broad analysis on general battery trade can inform deployments by electric utilities and U.S. competitiveness in the sector.

In 2017, global battery trade (for all end-use applications) increased by 8.8 percent, with global supply dominated by North East Asian manufacturers. China remained the leading supplier of batteries with 26.5 percent of the market share, followed by Japan and Korea with 12.4 percent and 12.3 percent market share, respectively. The United States was the fourth largest global supplier, accounting for 7.4 percent of the market. **[2]**

Global Battery Trade by Year and by Top 10 Suppliers, 2012-2017

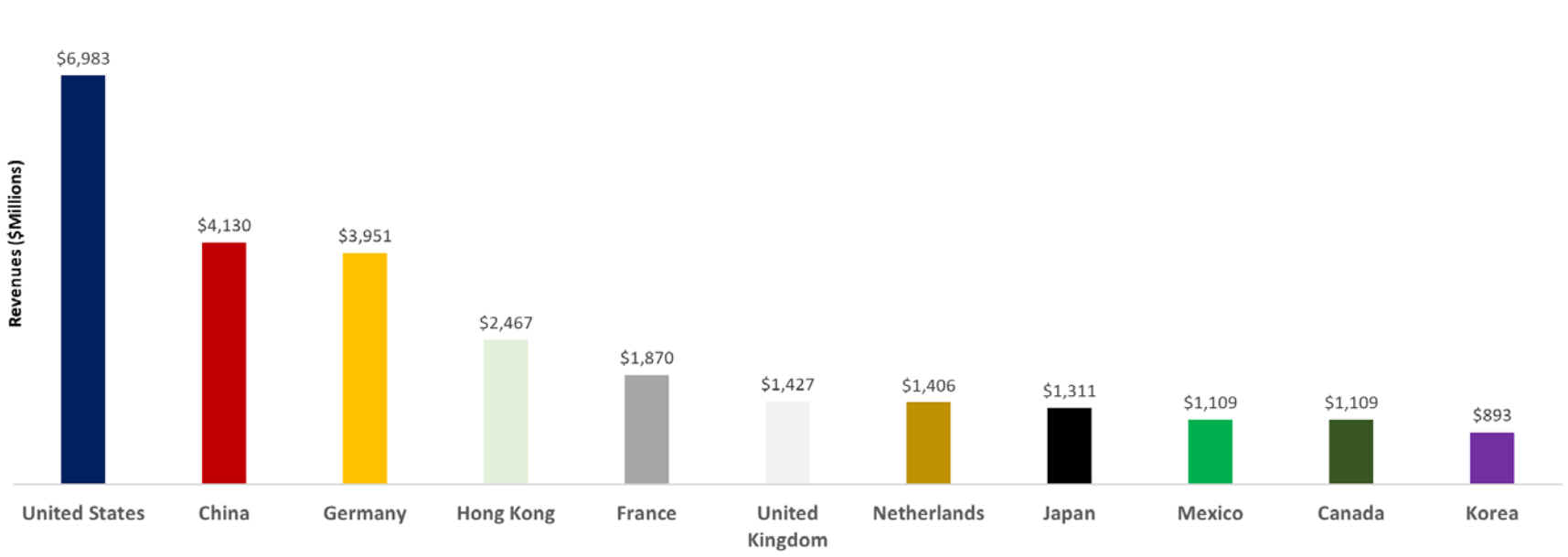


Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

Top Importers of Batteries

In 2017, the United States was the leading global importer of batteries (for all end-use applications) and accounted for 17.6 percent of global imports. It was followed by China and Germany with 10.4 percent and 10.0 percent global market import share, respectively. **[2]**

Top Battery Imports by Market, 2017



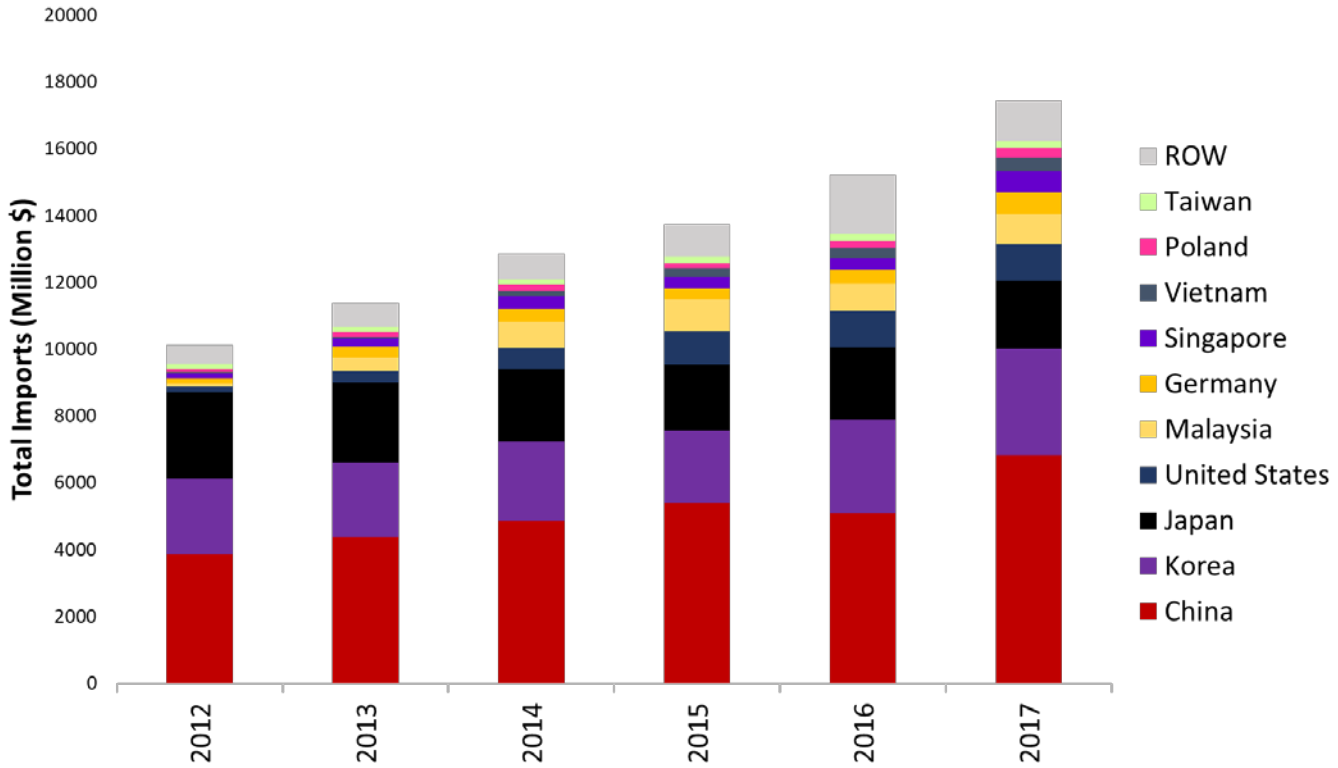
Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

Global Trade of Lithium Ion Batteries

Among electrochemical battery storage projects, 67 percent of the projects in the U.S. DOE Global Energy Storage Database deploy lithium ion batteries. [8] The increase in deployment of lithium ion chemistry is being driven by cost decreases, improved economies of scale, and policies to support the electrification of transportation.

In 2017, global trade of lithium ion batteries (for all end-use applications) increased by 14.6 percent from 2016. China was the leading global supplier and accounted for 39.2 percent of the market share. China was followed by Korea, Japan, and the United States with 11.7 percent, 6.3 percent, and 5.2 percent market share, respectively. [2]

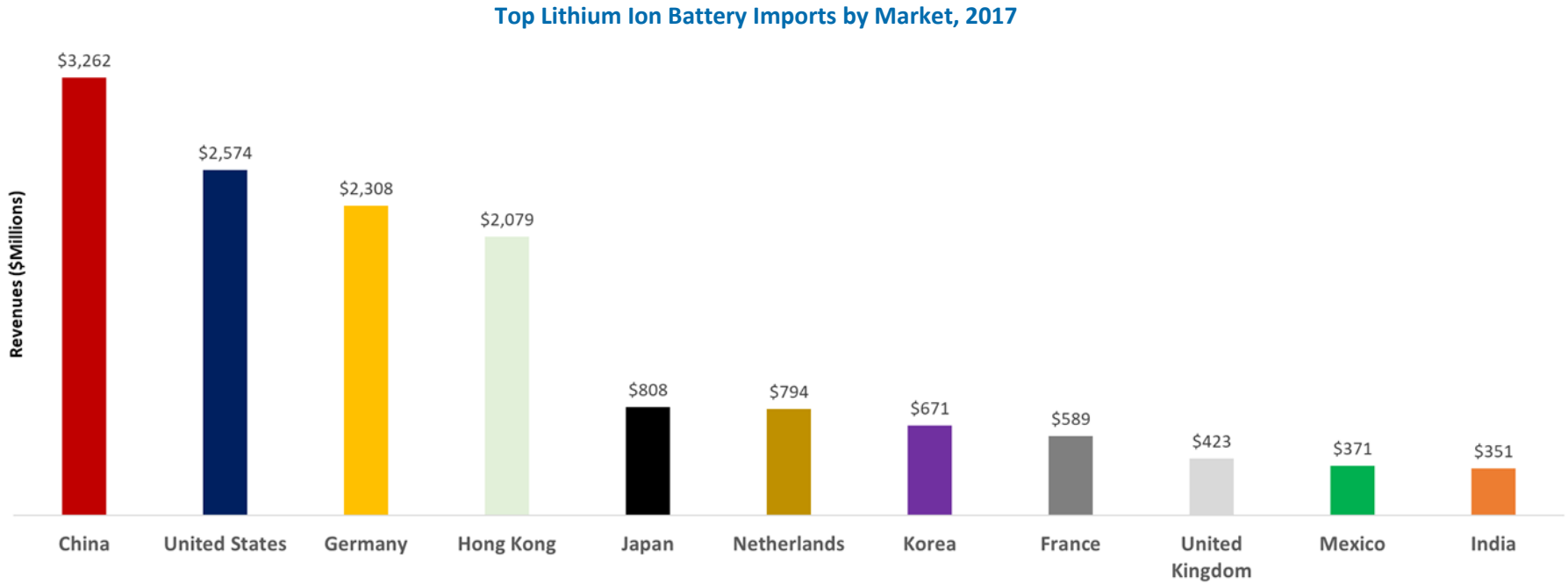
Global Lithium Ion Battery Trade by Year and by Top 10 Suppliers, 2012-2017



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

Top Importers of Lithium Ion Batteries

In 2017, China was not only the leading supplier, but also the leading importer of lithium ion batteries (for all end-use applications). China imported 18.7 percent of traded lithium ion batteries. Other leading importers included the United States (14.5 percent of market share) and Germany (13.2 percent of market share). **[2]**

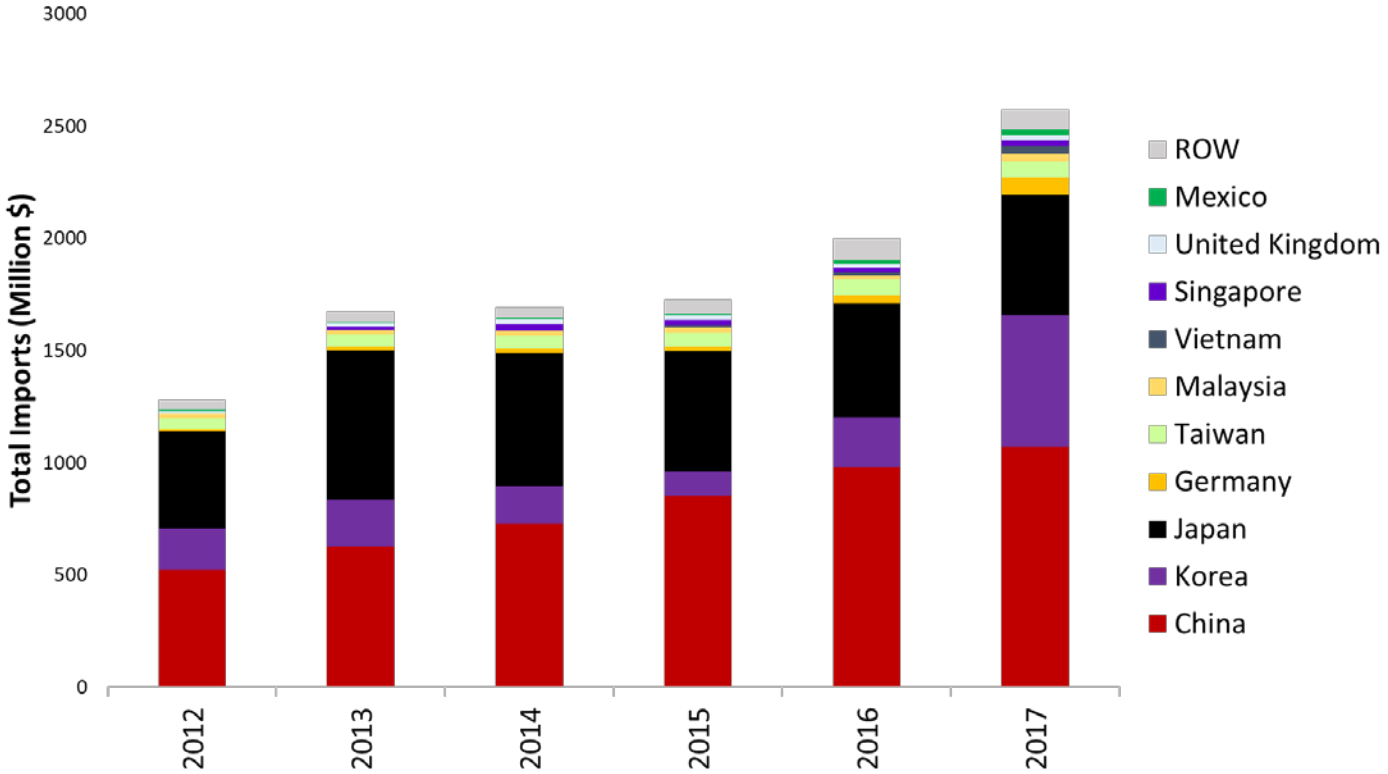


Data Source: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.

U.S. Lithium Ion Battery Imports

In 2017, U.S. imports of lithium ion batteries (for all end-use applications) increased by 28.8 percent from 2016 to reach $2.57 billion in revenues. Northeast Asian suppliers accounted for 85 percent of U.S. lithium ion battery imports. China was the leading market supplier with 41.6 percent market share in 2017. Next in line were Korea and Japan with 22.7 percent and 20.9 percent market share, respectively. **[2]**

U.S. Lithium Ion Battery Imports by Year and by Supplier, 2012-2017



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

COUNTRY DATA SHEETS

The following *Country Data Sheets* provide key market data to inform U.S. exporters and USG officials of opportunities and challenges in all 56 *SG TMR* markets. Each data sheet includes:

- *SG TMR* rankings Overall and for three sub-sectors: T&D Equipment, Smart Grid ICT, and Energy Storage;
- Market insights that qualitatively highlight trends and policies in the market;
- Trade data that demonstrate U.S. competitiveness in the region and the balance of trade with the United States; and
- Electricity data including electricity generation mix, generation capacity, electricity consumption growth trends, and smart meter penetration.

Data sources included on the following *Country Data Sheets* are as follows:

- United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration for T&D Equipment Import, Export, and Balance of Trade Data; [2]
- Business Monitor International: Electricity Generation by Source, Electricity Capacity, Electricity Consumption, Average Annual Electricity Consumption Projections, 2019-2023, Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023, and Population Data; [7] and
- Bloomberg New Energy Finance: Smart Meter Penetration Rates. [6]

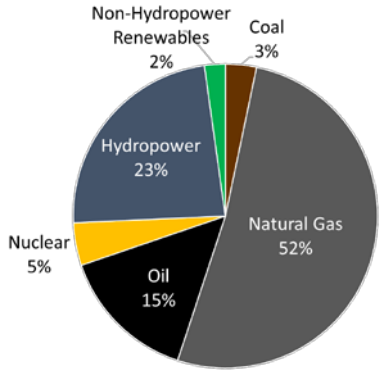
Argentina Data Sheet

Overall Rank	T&D Equipment
#49	#39
Smart Grid ICT	**Energy Storage**
#46	#46

Key Market Insights

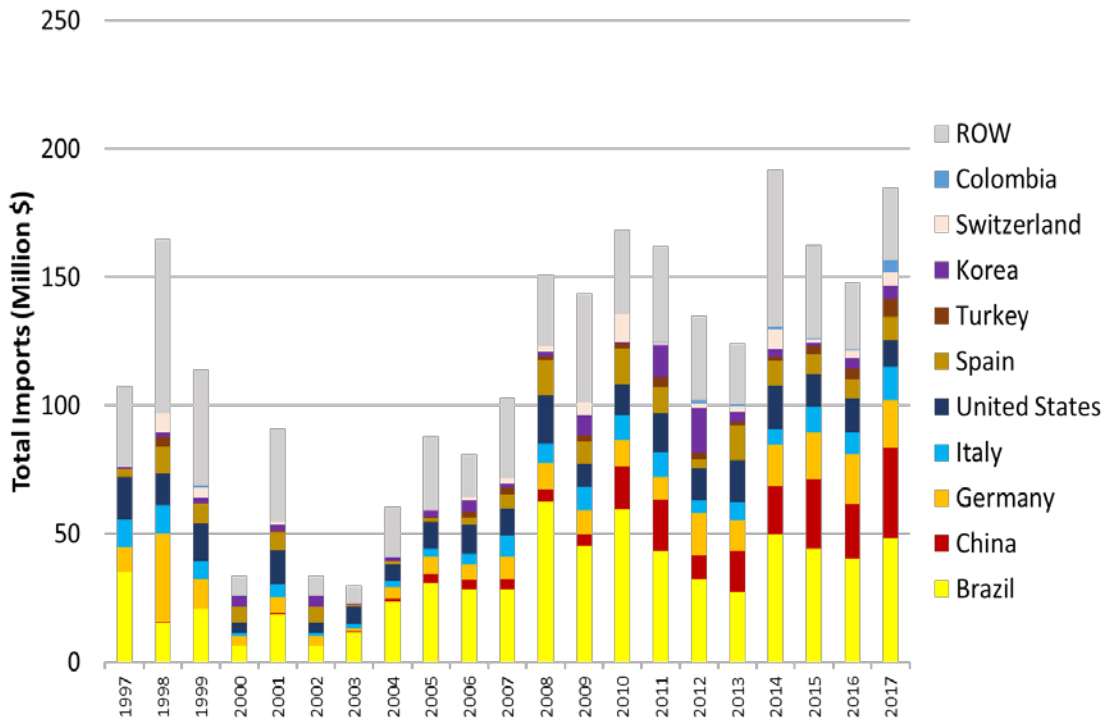
- The promulgation of new renewable energy, energy efficiency, and electric vehicle polices has been approved following the 2015 political shift. This has the potential to open market opportunities for smart grid providers despite the low *SG TMR* rankings.
- Following a decade hiatus, USG funding programs administered by Export-Import Bank of the United States (EXIM) and U.S. Trade and Development Agency (USTDA) re-opened in Argentina in late 2016.

Electricity Generation by Source, 2017



Key Argentina Data	
T&D Equipment Imports from U.S., 2017	$10,494,285
U.S. T&D Equipment Imports from Argentina, 2017	$170,805
U.S. T&D Equipment Balance of Trade with Argentina, 2017	$10,323,480
Electricity Capacity, 2017 (MW)	41,655.0
Electricity Consumption, 2017 (TWh)	133.1
Average Annual Electricity Consumption Projections, 2019-2023	3.34%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	11%
Population, 2017 (Millions)	44.27
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

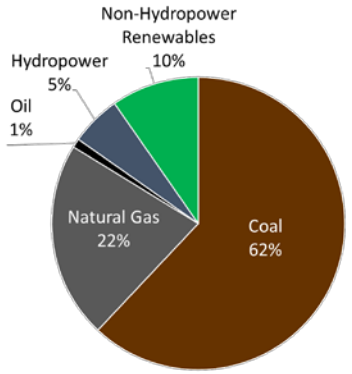
Australia Data Sheet

Overall Rank	T&D Equipment
#5	#29
Smart Grid ICT	**Energy Storage**
#7	#4

Key Market Insights

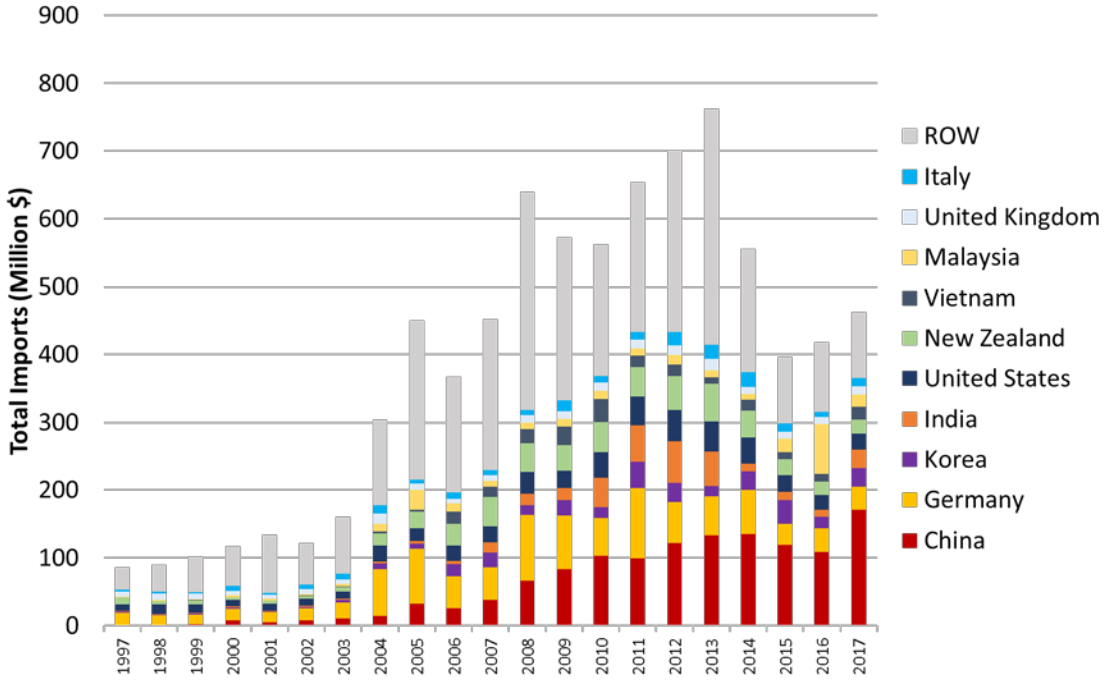
- Australia has been taking measures to modernize its energy infrastructure, reduce coal usage, and increase renewable energy penetration.
- State and local governments play a strong role in the design, development, and operation of Australia's electrical system. As a result, commercial opportunities for U.S. firms will vary by region.
- Early wins by U.S. firms have opened the door to further commercial opportunities for energy storage solutions to improve grid stability and bolstered its *SG TMR* Energy Storage Sub-Sector ranking.

Electricity Generation by Source, 2017



Key Australia Data	
T&D Equipment Imports from U.S., 2017	$23,370,620
U.S. T&D Equipment Imports from Australia, 2017	$12,674,784
U.S. T&D Equipment Balance of Trade with Australia, 2017	$10,695,836
Electricity Capacity, 2017 (MW)	70,752.0
Electricity Consumption, 2017 (TWh)	229.4
Average Annual Electricity Consumption Projections, 2019-2023	1.06%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	14%
Population, 2017 (Millions)	24.45
Smart Meter Penetration, 2017	32%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

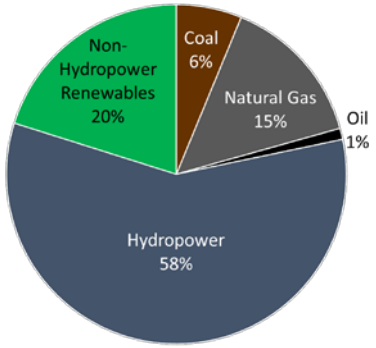
Austria Data Sheet

Overall Rank	T&D Equipment
#26	#40
Smart Grid ICT	**Energy Storage**
#25	#17

Key Market Insights

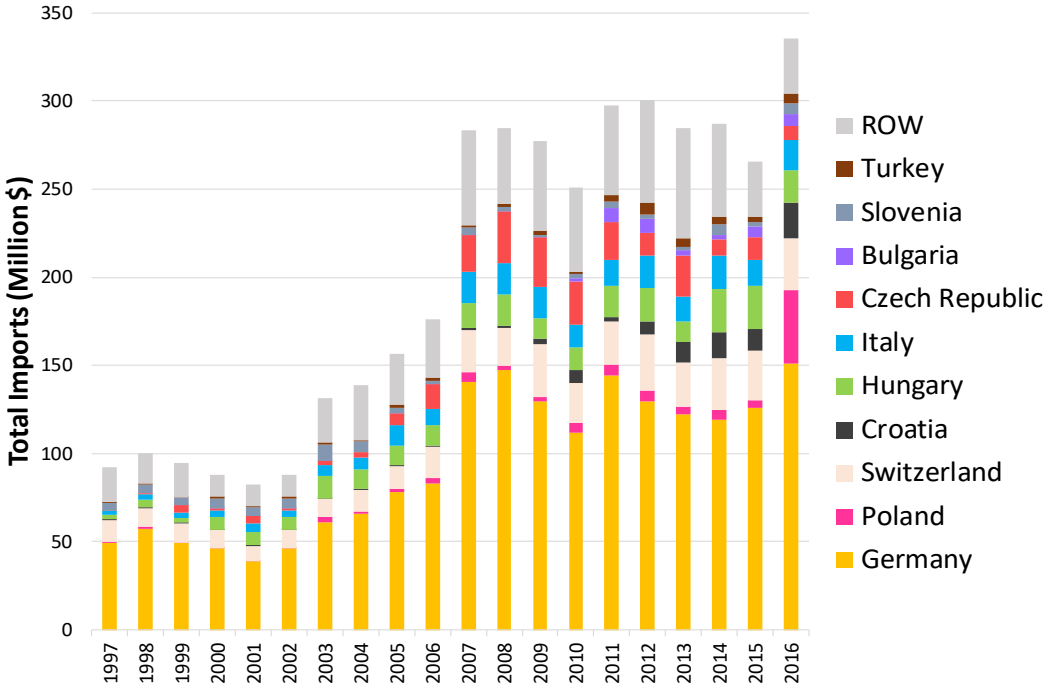
- The original roll-out plan for smart meters was adjusted in 2016 to reflect the reality that 95 percent deployment by 2019 would be impossible. The new roll-out timeframe aims for 80 percent deployment by the end of 2020 and 95 percent by the end of 2022.
- Austria and Germany transmission power markets are scheduled to split in October 2018 because of renewable energy penetration on the German system leading to grid stability challenges. Interestingly, this runs counter to the general European Union's goal of increasing regional interconnections.

Electricity Generation by Source, 2017



Key Austria Data	
T&D Equipment Imports from U.S., 2016*	$3,849,506
U.S. T&D Equipment Imports from Austria, 2017	$113,066,847
U.S. T&D Equipment Balance of Trade with Austria, 2016*	-$130,599,258
Electricity Capacity, 2017 (MW)	25,881.3
Electricity Consumption, 2017 (TWh)	65.0
Average Annual Electricity Consumption Projections, 2019-2023	0.78%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	24%

T&D Equipment Imports by Year and by Supplier, 1997-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

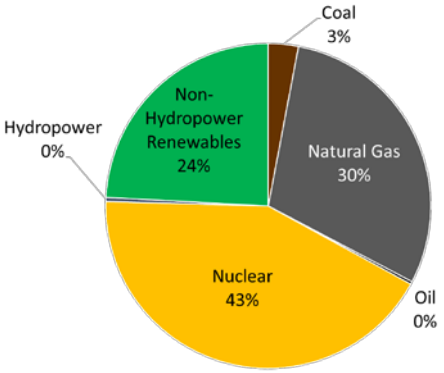
Belgium Data Sheet

Overall Rank	T&D Equipment
#25	#27
Smart Grid ICT	**Energy Storage**
#29	#19

Key Market Insights

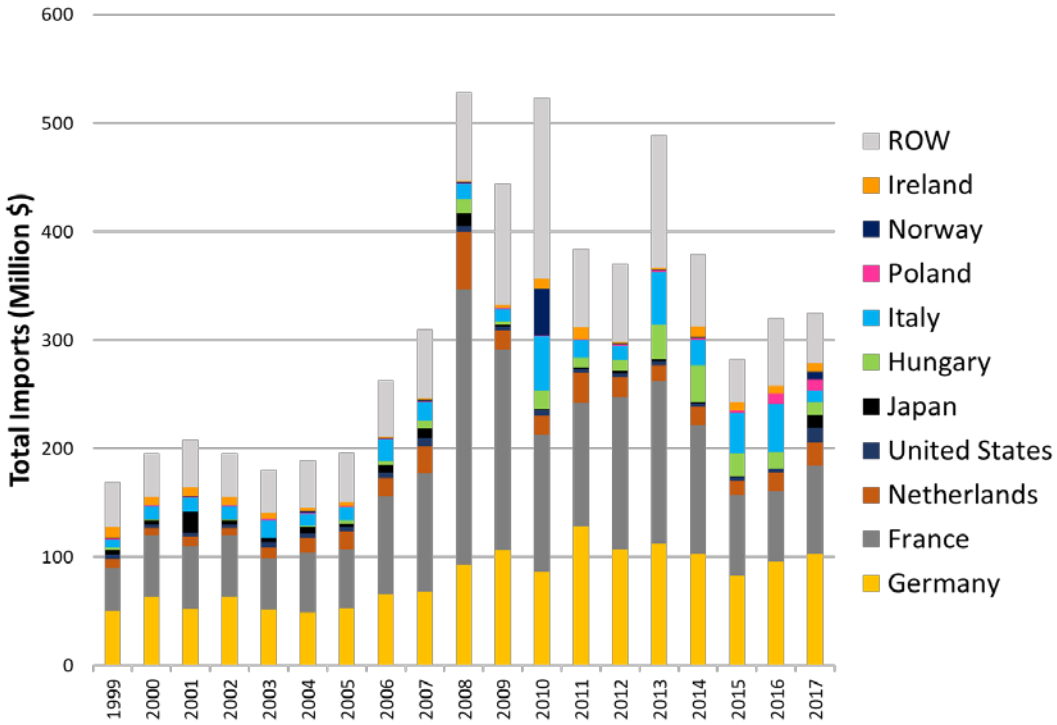
- Groundbreaking change is expected for 2018 as Atrias, a joint initiative of Belgium's five most important distribution system operators (DSO), implements MIG6.0 and a new clearinghouse application. The new "clearinghouse" will simplify the data exchange between participants in the energy market, while the new market model will incorporate the latest technologies (e.g. smart meters).
- Amid a competitive market, the greatest opportunity for U.S. firms will result from collaboration with research institutes, development agencies, and small-to-medium enterprises on the regional level.

Electricity Generation by Source, 2017



Key Country Data	
T&D Equipment Imports from U.S., 2017	$13,974,666
U.S. T&D Equipment Imports from Belgium, 2017	$8,944,722
U.S. T&D Equipment Balance of Trade with Belgium, 2017	$5,029,944
Electricity Capacity, 2017 (MW)	21,269.7
Electricity Consumption, 2017 (TWh)	82.9
Average Annual Electricity Consumption Projections, 2019-2023	0.58%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	29%
Population, 2017 (Millions)	11.43
Smart Meter Penetration, 2017	1%

T&D Equipment Imports by Year and by Supplier, 1999-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

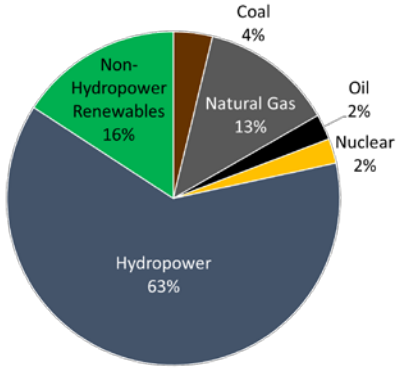
Brazil Data Sheet

Overall Rank	T&D Equipment
#35	#36
Smart Grid ICT	**Energy Storage**
#28	#45

Key Market Insights

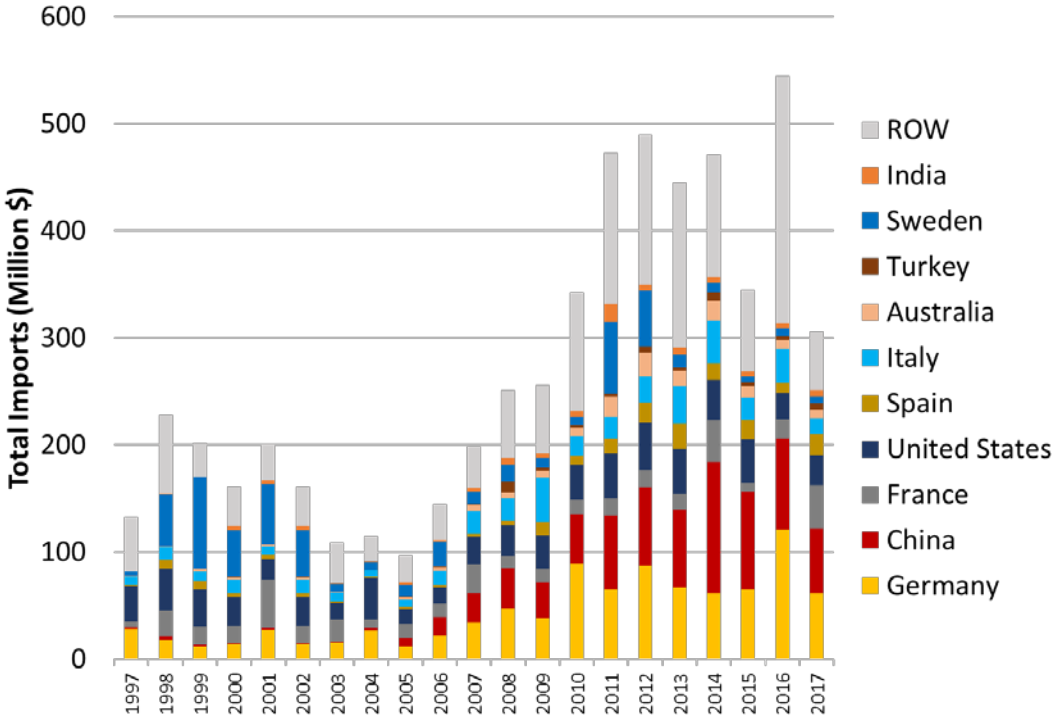
- Brazil is the largest electricity market and the largest investor in T&D equipment in Latin America. Sixty percent of the distribution customers are served by privately-owned utilities.
- Three utilities of Eletrobras, the largest state-owned utility, were recently privatized. Discussions continue regarding the privatization of the three remaining utilities that are part of the group.
- The Brazilian business environment is challenging for new-to-market U.S. smart grid exporters because participation often requires strong local partnerships and longer timelines for investment.

Electricity Generation by Source, 2017



Key Brazil Data	
T&D Equipment Imports from U.S., 2017	$27,543,662
U.S. T&D Equipment Imports from Brazil, 2017	$36,597,855
U.S. T&D Equipment Balance of Trade with Brazil, 2017	-$9,054,193
Electricity Capacity, 2017 (MW)	158,825.2
Electricity Consumption, 2017 (TWh)	508.9
Average Annual Electricity Consumption Projections, 2019-2023	2.62%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	18%
Population, 2017 (Millions)	209.29
Smart Meter Penetration, 2017	3%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

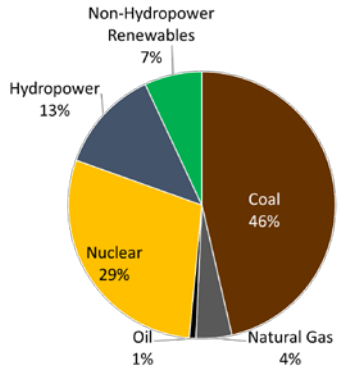
Bulgaria Data Sheet

Overall Rank	T&D Equipment
#53	#56
Smart Grid ICT	**Energy Storage**
#45	#54

Key Market Insights

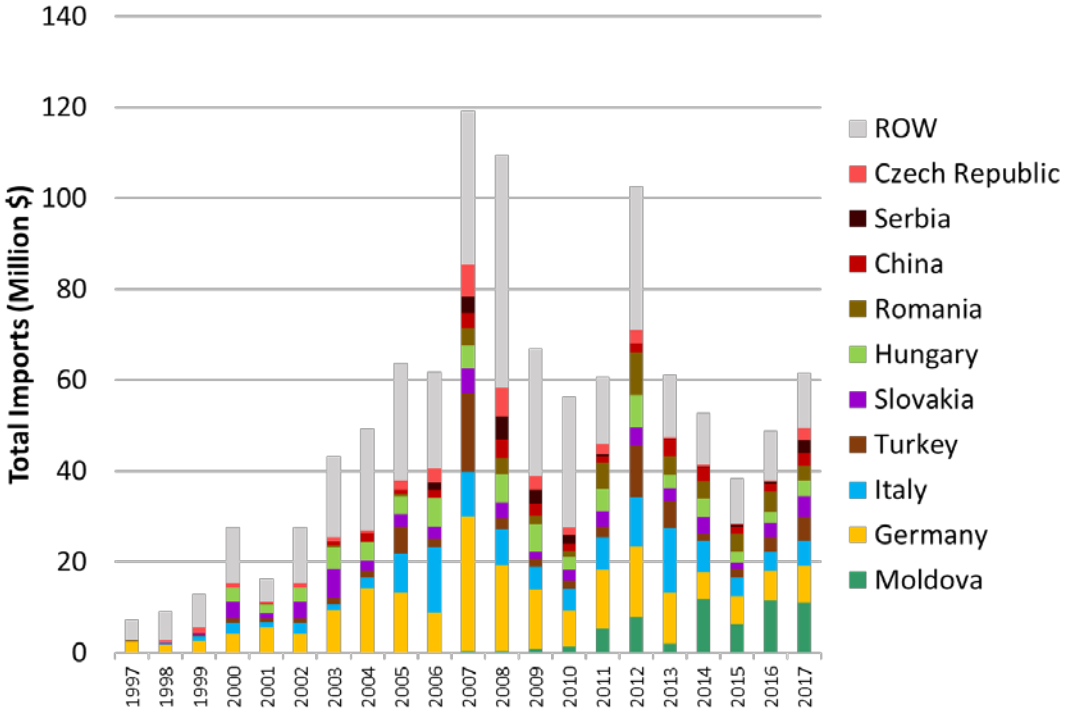
- Despite the legal unbundling of the three distribution system operators, each firm still maintains regional monopolies.
- Observers of Bulgaria's energy market frequently highlight the high dependency of the country on the import of Russian gas and technology, the frequent changes in the legislative and regulatory environment, and 'energy poverty' as the major challenges in the energy restructuring process.

Electricity Generation by Source, 2017



Key Bulgaria Data	
T&D Equipment Imports from U.S., 2017	$117,922
U.S. T&D Equipment Imports from Bulgaria, 2017	$166,710
U.S. T&D Equipment Balance of Trade with Bulgaria, 2017	-$48,788
Electricity Capacity, 2017 (MW)	11,040.9
Electricity Consumption, 2017 (TWh)	32.3
Average Annual Electricity Consumption Projections, 2019-2023	0.84%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	7%
Population, 2017 (Millions)	7.08
Smart Meter Penetration, Regional Average, 2017	14%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

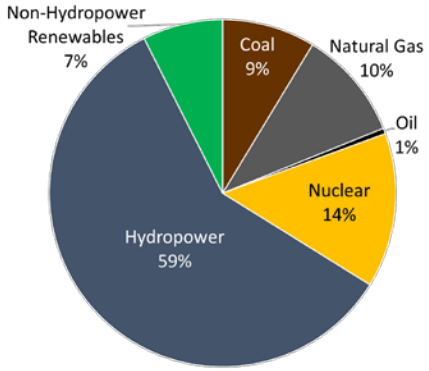
Canada Data Sheet

Overall Rank	T&D Equipment
#1	#1
Smart Grid ICT	**Energy Storage**
#2	#2

Key Market Insights

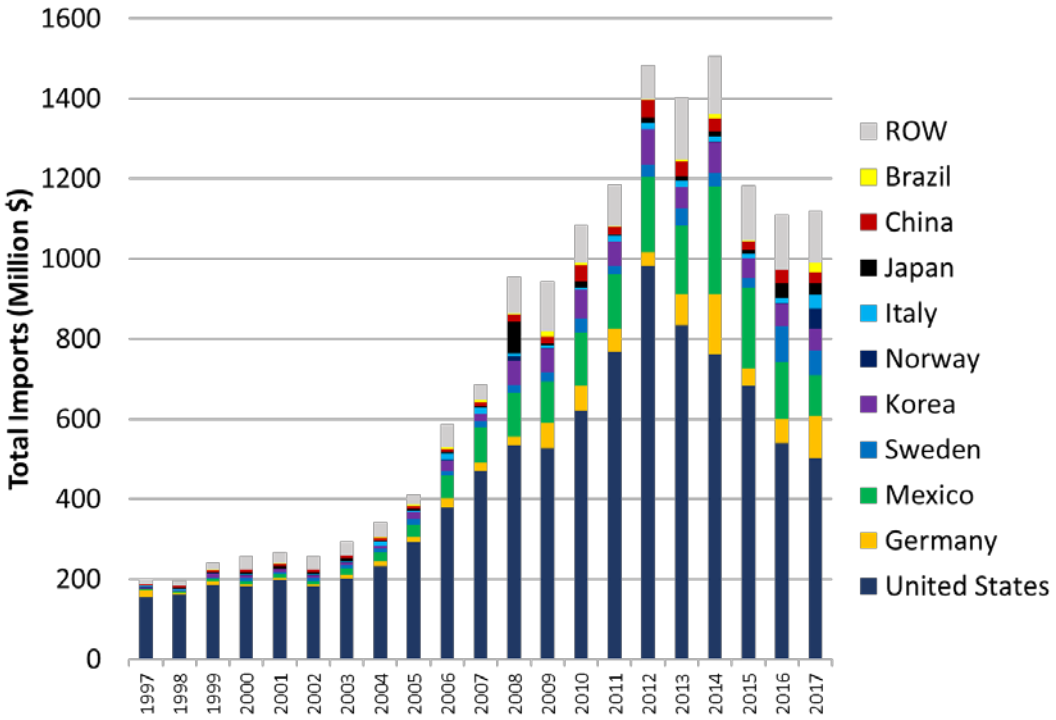
- Canada is the United States' top smart grid trading partner and a global leader in smart grid ICT deployments.
- Canada needs to invest in its aging electricity infrastructure, and some provinces are planning large build-outs and upgrades to transmission lines.
- Canada is also looking at the next generation of smart meter implementation and to the latest opportunities from processing the huge volume of data collected from the smart metering.
- U.S. exporters are highly competitive in Canada and face few barriers to doing business.

Electricity Generation by Source, 2017



Key Canada Data	
T&D Equipment Imports from U.S., 2017	$501,695,427
U.S. T&D Equipment Imports from Canada, 2017	$482,610,186
U.S. T&D Equipment Balance of Trade with Canada, 2017	$19,085,241
Electricity Capacity, 2017 (MW)	149,995.0
Electricity Consumption, 2017 (TWh)	555.4
Average Annual Electricity Consumption Projections, 2019-2023	0.72%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	9%
Population, 2017 (Millions)	36.62
Smart Meter Penetration, 2017	79%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

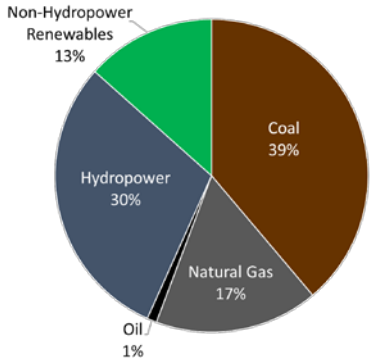
Chile Data Sheet

Overall Rank	T&D Equipment
#11	#18
Smart Grid ICT	**Energy Storage**
#21	#9

Key Market Insights

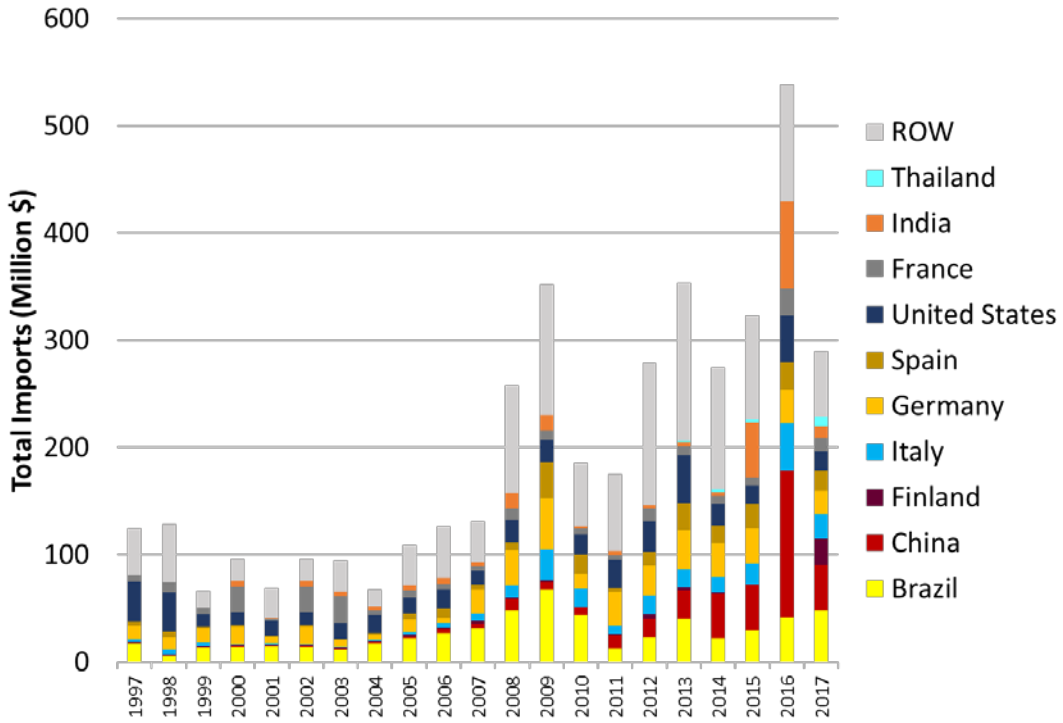
- The National Electricity System, created in 2017 with the connection of the northern and central grids, is expected to improve reliability and security.
- Law 20.698, also known as Law 20/25, requires that companies with more than 200 MW of installed capacity generate 20 percent of electricity from renewable sources by 2025.
- The *Energia 2050* policy provides a roadmap for energy development, with targets for energy efficiency and smart grid development.

Electricity Generation by Source, 2017



Key Chile Data	
T&D Equipment Imports from U.S., 2017	$17,582,491
U.S. T&D Equipment Imports from Chile, 2017	$319,092
U.S. T&D Equipment Balance of Trade with Chile, 2017	$17,263,399
Electricity Capacity, 2017 (MW)	25,355.0
Electricity Consumption, 2017 (TWh)	73.1
Average Annual Electricity Consumption Projections, 2019-2023	2.9%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	24%
Population, 2017 (Millions)	18.05
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

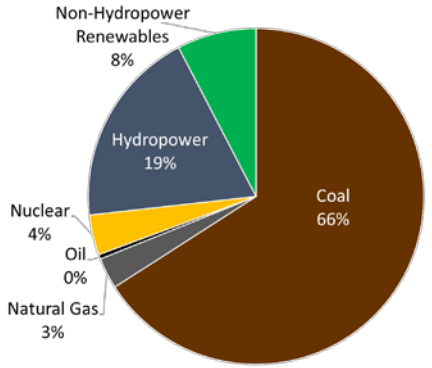
China Data Sheet

Overall Rank	T&D Equipment
#8	#17
Smart Grid ICT	**Energy Storage**
#18	#7

Key Market Insights

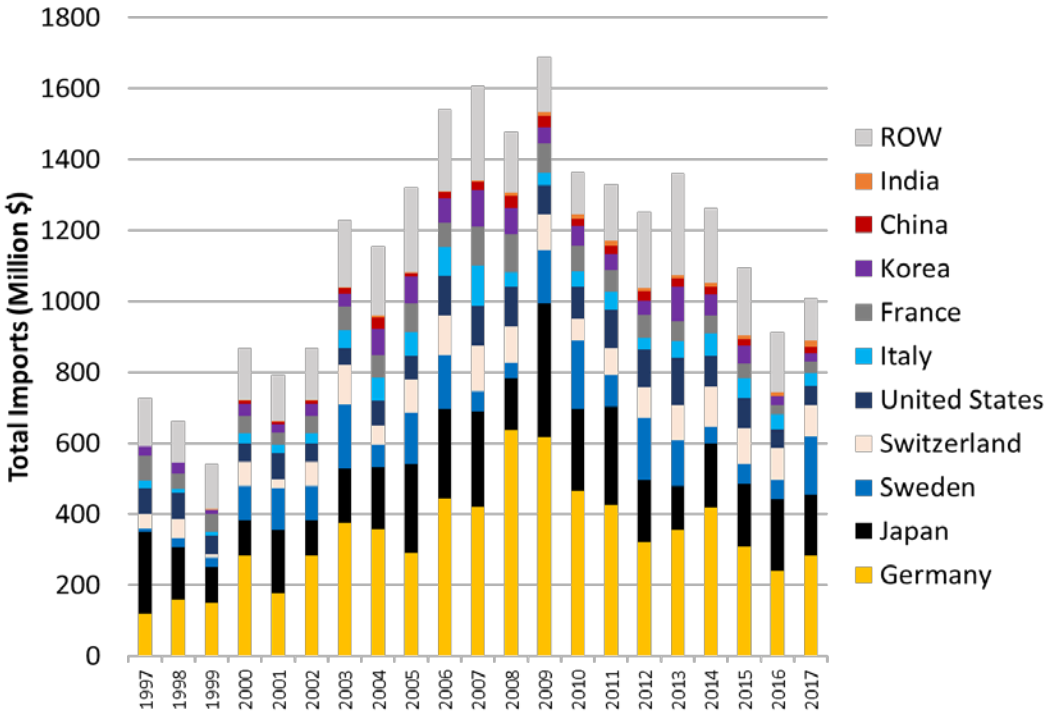
- China is the world's largest market for electricity infrastructure development, which presents an enticing opportunity for U.S. exporters to provide solutions to increase operational and network efficiency, address renewables integration and management, and implement demand-side management programs
- Despite the high *SG TMR* rankings, U.S. exporters face robust challenges in entering the Chinese market because state-owned enterprises (SOEs) have almost complete control over the energy sector and preferences for domestic firms are fostered through government policies such as Made in China 2025.

Electricity Generation by Source, 2017



Key China Data	
T&D Equipment Imports from U.S., 2017	$54,944,917
U.S. T&D Equipment Imports from China, 2017	$342,792,732
U.S. T&D Equipment Balance of Trade with China, 2017	-$287,847,815
Electricity Capacity, 2017 (MW)	1,783,830.4
Electricity Consumption, 2017 (TWh)	5,865.6
Average Annual Electricity Consumption Projections, 2019-2023	3.16%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	12%
Population, 2017 (Millions)	1,409.52
Smart Meter Penetration, 2017	94%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

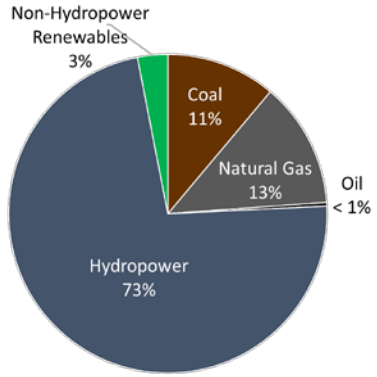
Colombia Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#37	#22	#36	#48

Key Market Insights

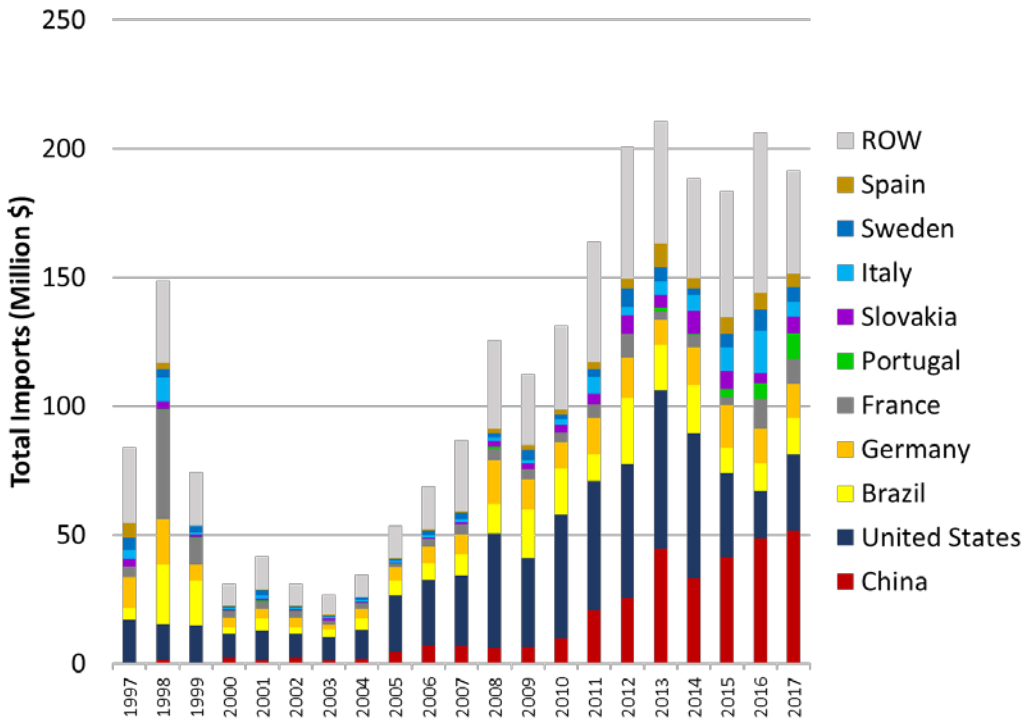
- With the approval of Law 1715 in 2014, the government is making efforts to promote private ventures. This includes holding the first renewable energy auctions, promoting energy efficiency, and implementing demand-side management systems.
- Colombian imports of electric power generation equipment benefit from proximity to the United States and from the U.S.-Colombia Trade Promotion Agreement, which eliminated Colombian import duties on equipment, spare parts, and accessories for the power sector.

Electricity Generation by Source, 2017



Key Columbia Data	
T&D Equipment Imports from U.S., 2017	$29,646,827
U.S. T&D Equipment Imports from Columbia, 2017	$6,210,296
U.S. T&D Equipment Balance of Trade with Columbia, 2017	$23,436,531
Electricity Capacity, 2017 (MW)	17,131.7
Electricity Consumption, 2017 (TWh)	61.7
Average Annual Electricity Consumption Projections, 2019-2023	3.32%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	3%
Population, 2017 (Millions)	49.07
Smart Meter Penetration, 2017	0%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

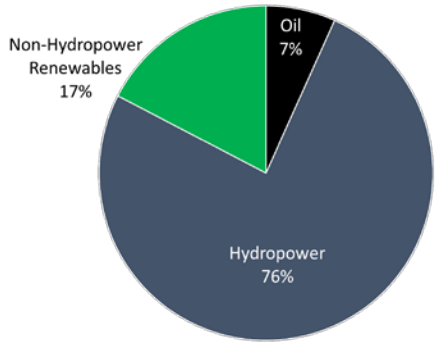
Costa Rica Data Sheet

Overall Rank	T&D Equipment
#50	#38
Smart Grid ICT	**Energy Storage**
#51	#43

Key Market Insights

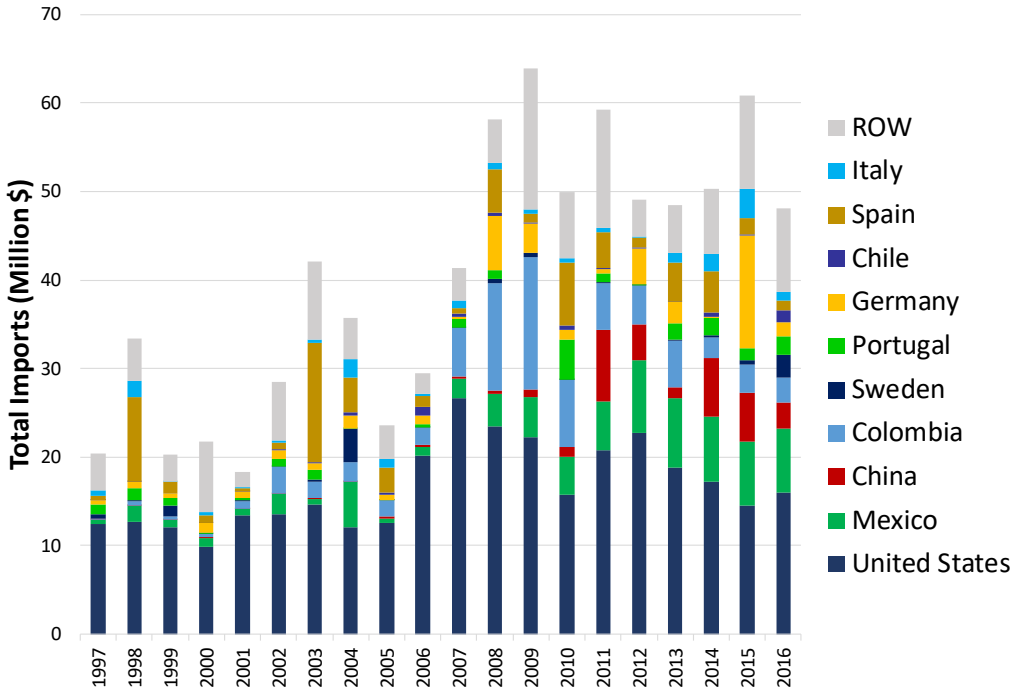
- The Inter-American Development Bank has extended a $500 million line of credit to the Instituto Costarricense de Electricidad to upgrade, expand, and develop renewable energy and grid infrastructure in the country. This is expected to include smart meters and other AMI products and services.
- The Central American Electrical Interconnection System (SIEPAC) is conducting a regional grid study to understand how best to interconnect and manage the electricity system across Central America.

Electricity Generation by Source, 2017



Key Costa Rica Data	
T&D Equipment Imports from U.S., 2016*	$16,056,466
U.S. T&D Equipment Imports from Costa Rica, 2017	$752,236
U.S. T&D Equipment Balance of Trade with Costa Rica, 2016*	$15,803,619
Electricity Capacity, 2017 (MW)	3,993.1
Electricity Consumption, 2017 (TWh)	11.2
Average Annual Electricity Consumption Projections, 2019-2023	3.52%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	16%
Population, 2017 (Millions)	4.91
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 1997-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

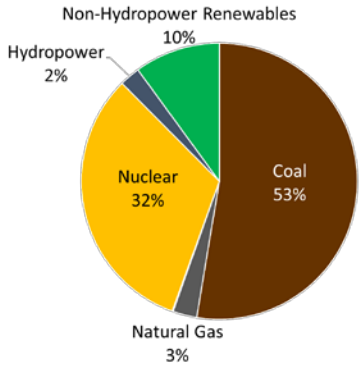
Czech Republic Data Sheet

Overall Rank	T&D Equipment
#38	#45
Smart Grid ICT	**Energy Storage**
#34	#26

Key Market Insights

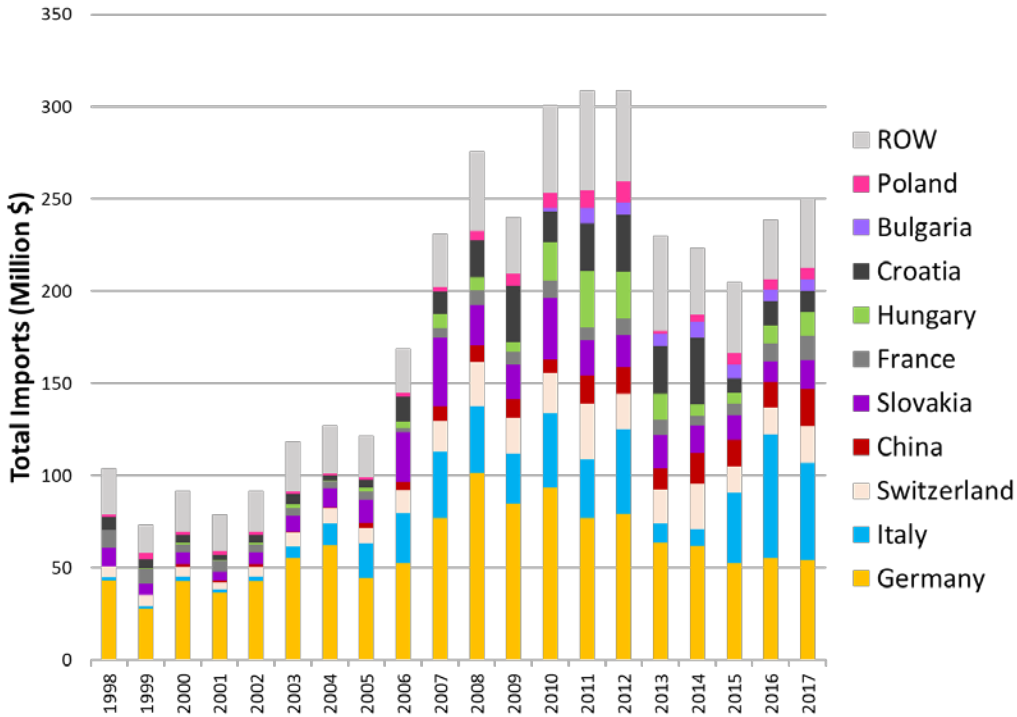
- The Czech government made a decision not to proceed with the roll-out of smart metering under the European Union directive 2009/72/ES in both the electricity and gas sectors following a cost-benefit analysis undertaken by the Czech government.
- The Czech Republic is interconnected with the Austrian, German, Polish and Slovak markets. The relatively high interconnection rate is generally positive, but it also has a downside. The Czech network suffers from unscheduled flows of power originating in Germany.

Electricity Generation by Source, 2017



Key Czech Republic Data	
T&D Equipment Imports from U.S., 2017	$4,001,756
U.S. T&D Equipment Imports from Czech Republic, 2017	$16,932,310
U.S. T&D Equipment Balance of Trade with Czech Republic, 2017	-$12,930,554
Electricity Capacity, 2017 (MW)	21,597.1
Electricity Consumption, 2017 (TWh)	62.5
Average Annual Electricity Consumption Projections, 2019-2023	1.56%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	11%
Population, 2017 (Millions)	10.62
Smart Meter Penetration, Regional Average, 2017	14%

T&D Equipment Imports by Year and by Supplier, 1998-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

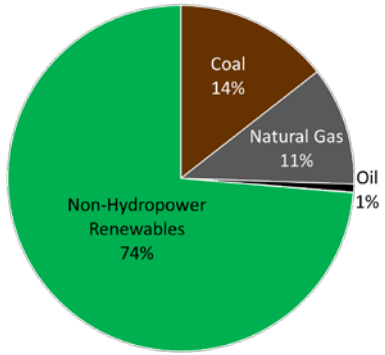
Denmark Data Sheet

Overall Rank	T&D Equipment
#6	#35
Smart Grid ICT	**Energy Storage**
#4	#6

Key Market Insights

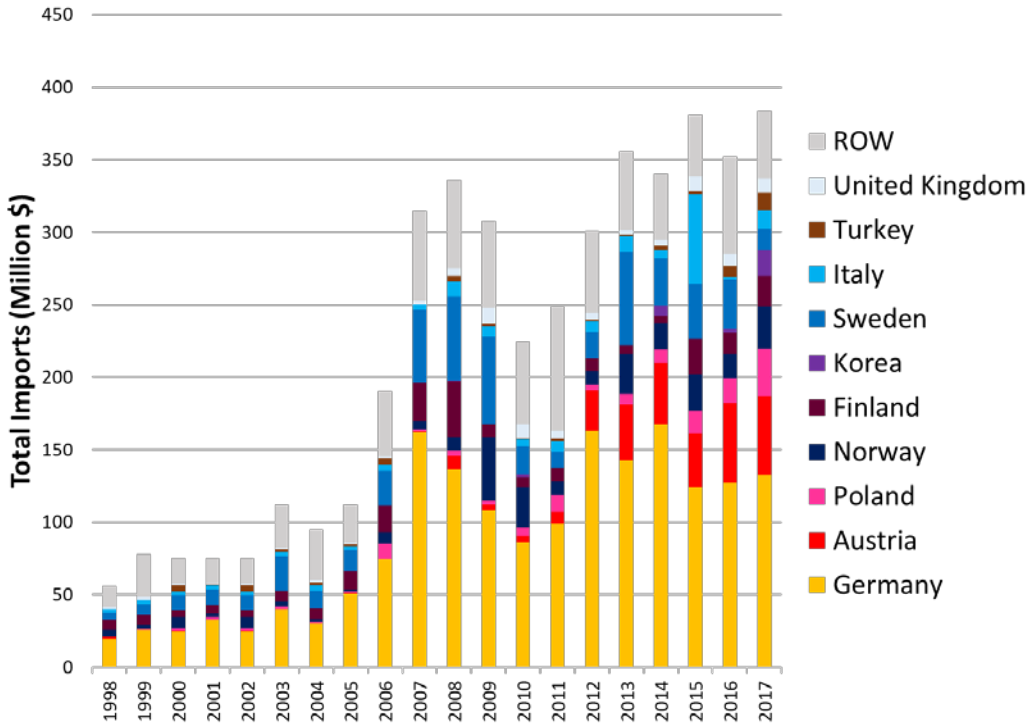
- Denmark's *SG TMR* ranking is bolstered by aggressive renewable energy targets and a National Smart Grid Strategy. However, U.S. firms will face robust local and regional competition.
- The Danish government has put forward an ambitious plan that 100 percent of Denmark's electricity and heat will come from renewable energy by 2035 and that, by 2050, the entire energy supply -- electricity, heat, industry and transportation will come from renewable energy sources.

Electricity Generation by Source, 2017



Key Denmark Data	
T&D Equipment Imports from U.S., 2017	$893,368
U.S. T&D Equipment Imports from Denmark, 2017	$5,326,499
U.S. T&D Equipment Balance of Trade with Denmark, 2017	-$4,433,131
Electricity Capacity, 2017 (MW)	14,743.3
Electricity Consumption, 2017 (TWh)	33.1
Average Annual Electricity Consumption Projections, 2019-2023	0.58%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	85%
Population, 2017 (Millions)	5.73
Smart Meter Penetration, 2017	71%

T&D Equipment Imports by Year and by Supplier, 1998-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

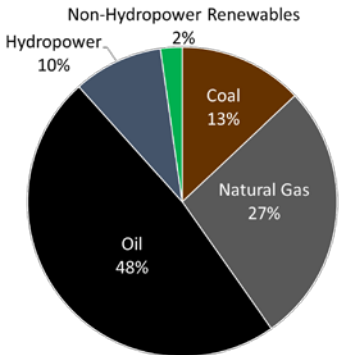
Dominican Republic Data Sheet

Overall Rank	T&D Equipment
#27	#4
Smart Grid ICT	**Energy Storage**
#42	#34

Key Market Insights

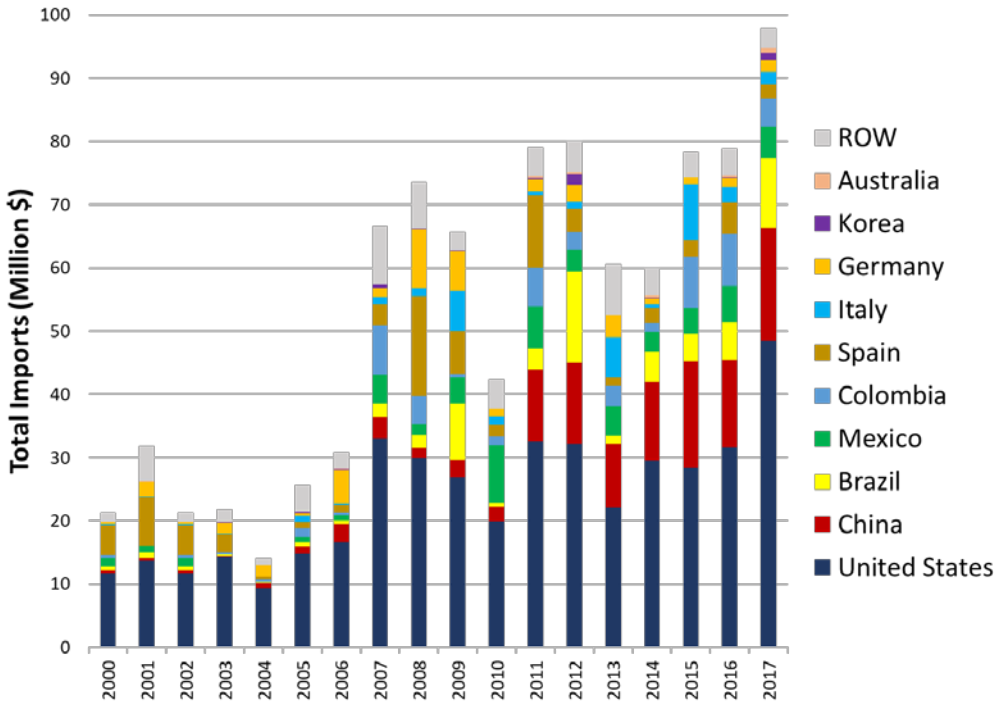
- State-owned companies dominate the Dominican Republic utility industry.
- The distribution segment is divided into three public companies: Edeeste, Edenorte and Edesur. All the state-owned companies are managed by the Corporación Dominicana de Empresas Eléctricas Estatales.
- Energy storage installations which are in place demonstrate the role storage can play in increasing grid resiliency during extreme weather events.

Electricity Generation by Source, 2017



Key Dominican Republic Data	
T&D Equipment Imports from U.S., 2017	$48,453,200
U.S. T&D Equipment Imports from Dominican Republic, 2017	$16,143,258
U.S. T&D Equipment Balance of Trade with Dominican Republic, 2017	$32,309,942
Electricity Capacity, 2017 (MW)	4,013.9
Electricity Consumption, 2017 (TWh)	15.6
Average Annual Electricity Consumption Projections, 2019-2023	5.44%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	5%
Population, 2017 (Millions)	10.77
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 2000-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

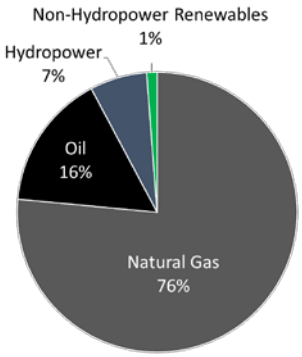
Egypt Data Sheet

Overall Rank	T&D Equipment
#32	#13
Smart Grid ICT	**Energy Storage**
#40	#31

Key Market Insights

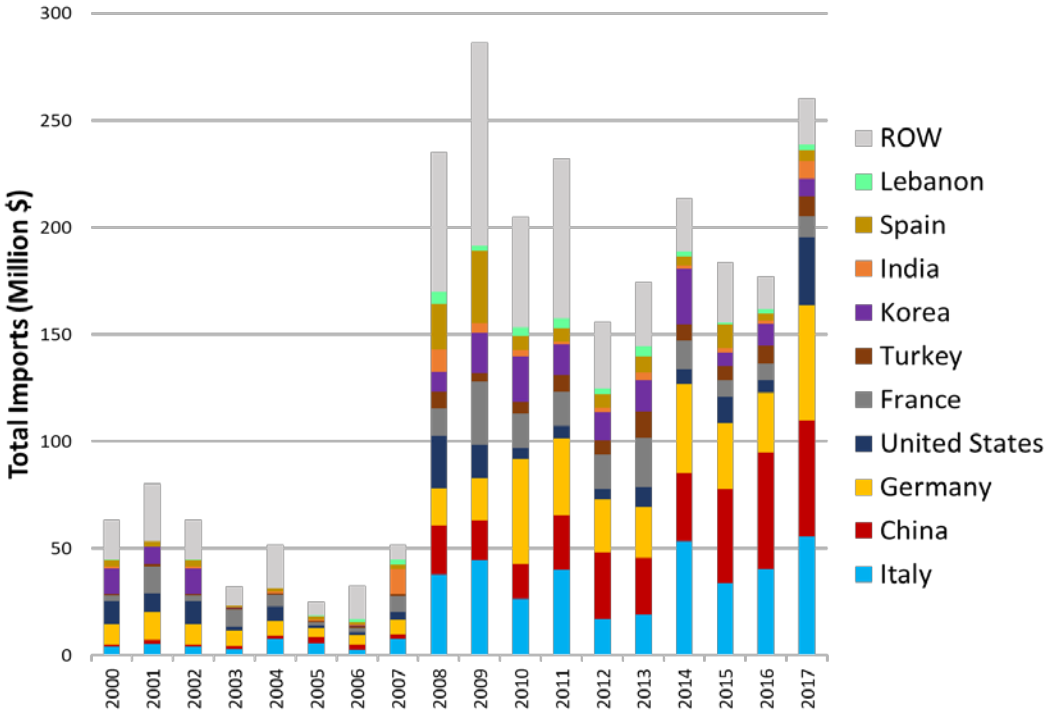
- Egypt's power supply is under strain from a growing industrial sector, aging infrastructure and a rising population. Blackouts occur regularly.
- As a result, the government of Egypt has sought to increase its generation capacity, which drives a need for expansion of T&D networks. However, political and financial instability – coupled with rising protectionism – create risks for power infrastructure projects and will dampen near-term opportunities for U.S. exporters.

Electricity Generation by Source, 2017



Key Egypt Data	
T&D Equipment Imports from U.S., 2017	$31,847,130
U.S. T&D Equipment Imports from Egypt, 2017	$128,530
U.S. T&D Equipment Balance of Trade with Egypt, 2017	$31,718,600
Electricity Capacity, 2017 (MW)	47,519.4
Electricity Consumption, 2017 (TWh)	174.6
Average Annual Electricity Consumption Projections, 2019-2023	5.52%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	5%
Population, 2017 (Millions)	97.55
Smart Meter Penetration, 2017	2%

T&D Equipment Imports by Year and by Supplier, 2000-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

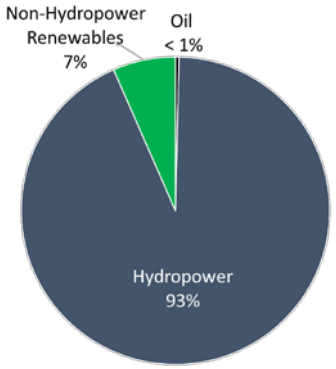
Ethiopia Data Sheet

Overall Rank	T&D Equipment
#47	#10
Smart Grid ICT	**Energy Storage**
#53	#53

Key Market Insights

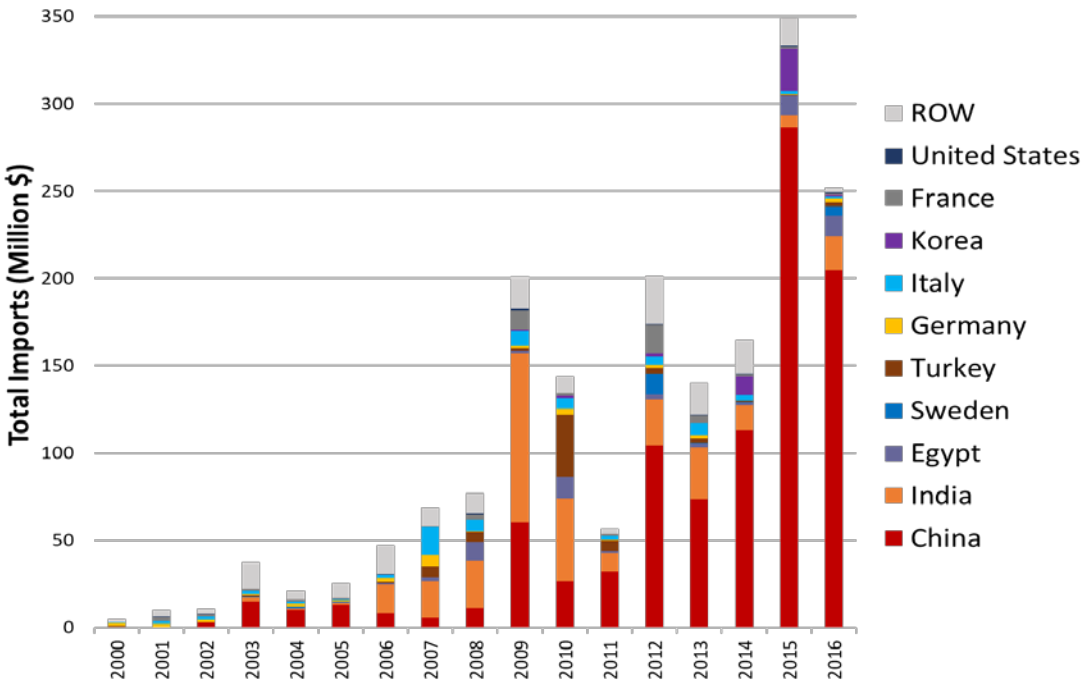
- Ethiopia has one of the world's fastest growing electricity markets. This growth will likely create a need to build out T&D infrastructure.
- Under the Universal Electricity Access Plan, the government of Ethiopia hopes to extend universal electricity access by 2025. As a result, near-term market opportunities for U.S. exporters will be concentrated in the T&D equipment sub-sector.
- U.S. exporters will likely face project delays and political uncertainty resulting in high risks for investments.

Electricity Generation by Source, 2017



Key Ethiopia Data	
T&D Equipment Imports from U.S., 2016*	$533,292
U.S. T&D Equipment Imports from Ethiopia, 2017	$0
U.S. T&D Equipment Balance of Trade with Ethiopia, 2016*	$533,292
Electricity Capacity, 2017 (MW)	4,890.0
Electricity Consumption, 2017 (TWh)	10.7
Average Annual Electricity Consumption Projections, 2019-2023	8.04%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	4%
Population, 2017 (Millions)	104.96
Smart Meter Penetration, 2017	1%

T&D Equipment Imports by Year and by Supplier, 2000-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

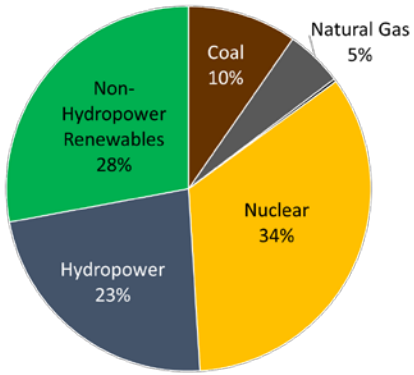
Finland Data Sheet

Overall Rank	T&D Equipment
#14	#42
Smart Grid ICT	**Energy Storage**
#6	#11

Key Market Insights

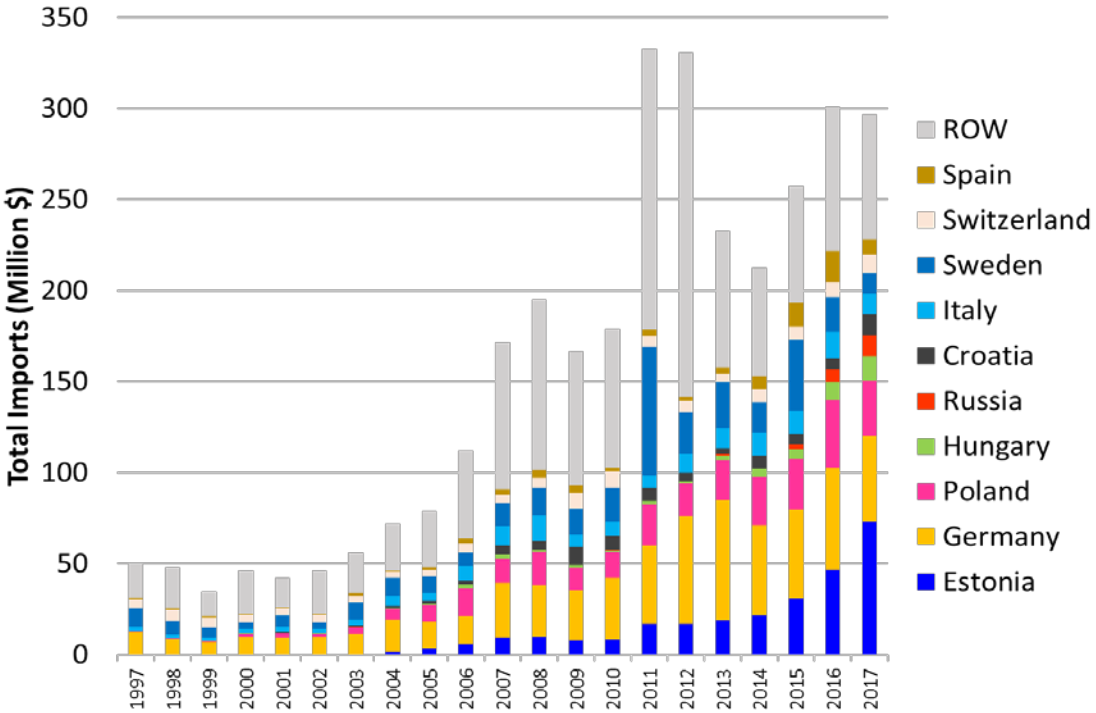
- A new Energy and Climate Strategy was published in November 2016 outlining the actions that will enable Finland to attain the targets specified in the government program and adopted in the European Union for 2030, and to systematically set the course for achieving an 80–95 percent reduction in greenhouse gas emissions by 2050.
- The Ministry of Economic Affairs and Employment appointed a Smart Grid Working Group, whose purpose is to explore the possibilities of deployment of smart grid technologies.

Electricity Generation by Source, 2017



Key Finland Data	
T&D Equipment Imports from U.S., 2017	$911,125
U.S. T&D Equipment Imports from Finland, 2017	$14,336,706
U.S. T&D Equipment Balance of Trade with Finland, 2017	-$13,425,581
Electricity Capacity, 2017 (MW)	18,662.7
Electricity Consumption, 2017 (TWh)	85.5
Average Annual Electricity Consumption Projections, 2019-2023	0.72%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	30%
Population, 2017 (Millions)	5.52
Smart Meter Penetration, 2017	99%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

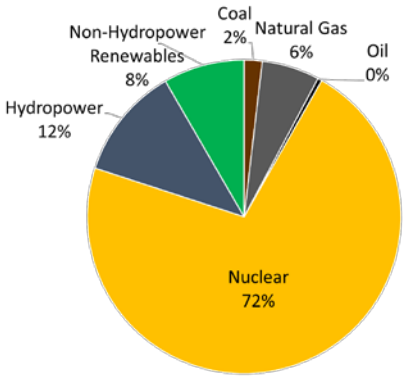
France Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#24	#47	#12	#15

Key Market Insights

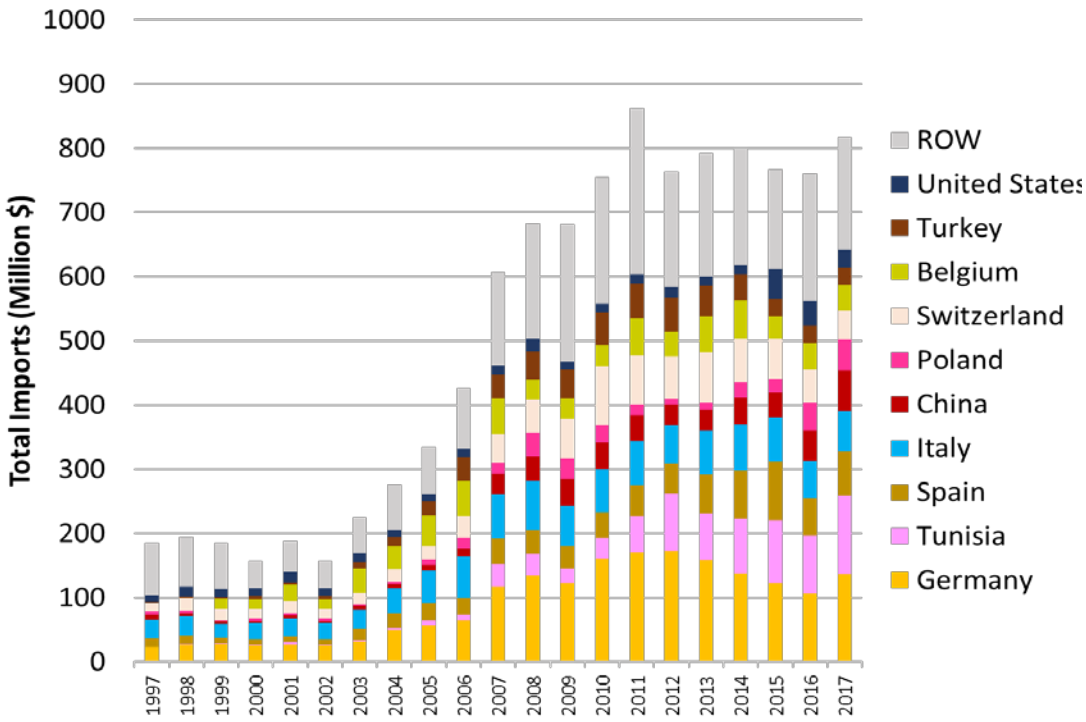
- France's Multi Energy Plan includes a goal to decrease energy consumption by 12.3 percent by 2023. Initiatives include carrying out energy-efficiency renovations, improving funding mechanisms for energy-efficiency initiatives, and allocating $3.5 billion to fund the renovation of social housing and public buildings.
- EDF, the global French distribution utility, announced that it will be investing $9.34 billion euros in energy storage by 2035, with the goal of developing an estimated 10 gigawatts of additional energy storage projects.

Electricity Generation by Source, 2017



Key France Data	
T&D Equipment Imports from U.S., 2017	$26,795,739
U.S. T&D Equipment Imports from France, 2017	$61,222,920
U.S. T&D Equipment Balance of Trade with France, 2017	-$34,427,181
Electricity Capacity, 2017 (MW)	134,093.9
Electricity Consumption, 2017 (TWh)	451.9
Average Annual Electricity Consumption Projections, 2019-2023	0.48%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	15%
Population, 2017 (Millions)	64.98
Smart Meter Penetration, 2017	24%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

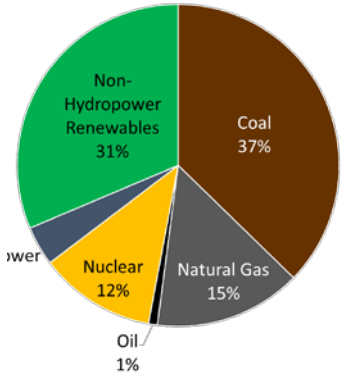
Germany Data Sheet

Overall Rank	T&D Equipment
#12	#49
Smart Grid ICT	**Energy Storage**
#8	#5

Key Market Insights

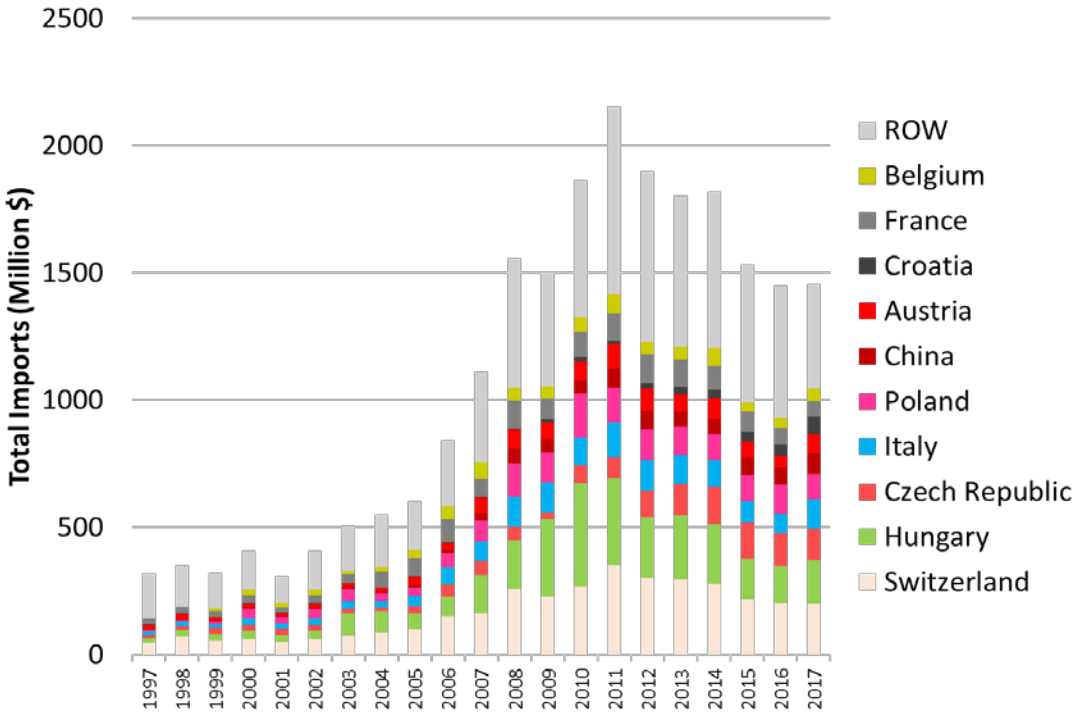
- Germany's electricity sector is undergoing a significant transformation away from the use of coal, natural gas, and nuclear and toward renewable energy sources such as solar and wind.
- Germany will need to deploy advanced grid technologies to effectively manage generation intermittency and will need to improve grid planning to efficiently transmit electricity from resource rich regions to load centers.
- Germany's continued expansion of renewable energy has also increased the demand for battery storage.

Electricity Generation by Source, 2017



Key Germany Data	
T&D Equipment Imports from U.S., 2017	$41,583,205
U.S. T&D Equipment Imports from Germany, 2017	$208,504,850
U.S. T&D Equipment Balance of Trade with Germany, 2017	-$166,921,645
Electricity Capacity, 2017 (MW)	223,185.0
Electricity Consumption, 2017 (TWh)	559.6
Average Annual Electricity Consumption Projections, 2019-2023	-0.62%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	42%
Population, 2017 (Millions)	82.11
Smart Meter Penetration, 2017	4%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

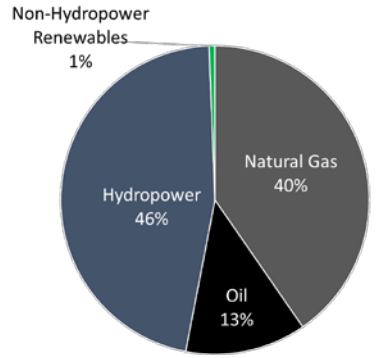
Ghana Data Sheet

Overall Rank	T&D Equipment
#21	#2
Smart Grid ICT	**Energy Storage**
#50	#50

Key Market Insights

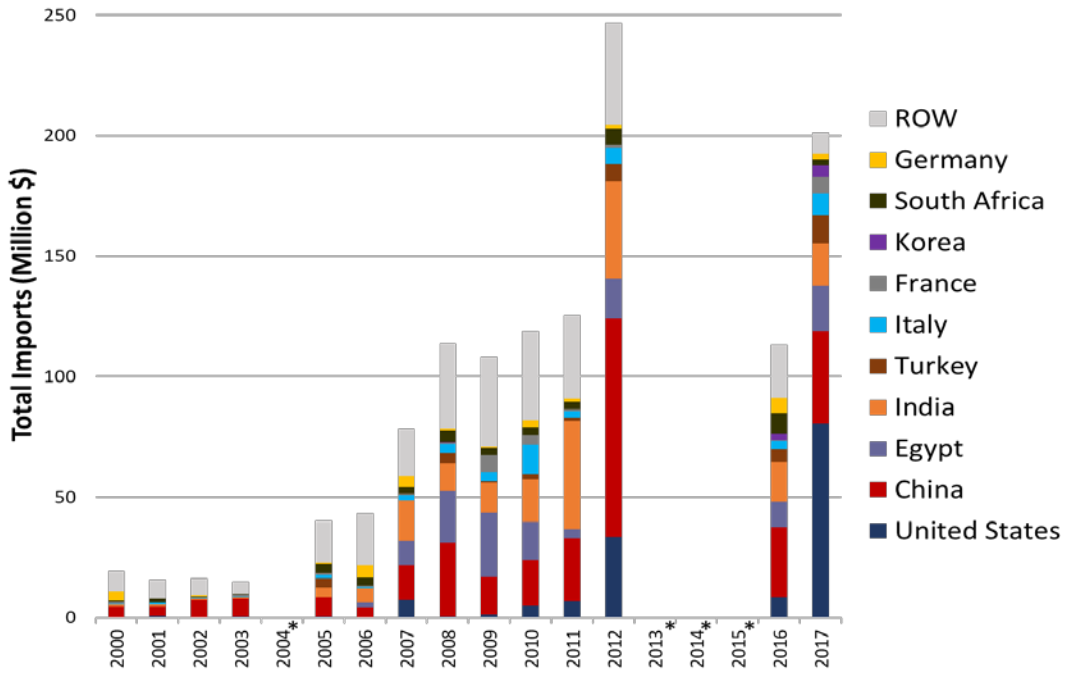
- Eighty-five percent of all Ghanaian households are connected to the national power grid, but the government is seeking entrepreneurial private sector participation to ensure the remaining 15 percent of the country also has access to affordable power.
- Ghana has been included in the USG's Power Africa initiative and is receiving further assistance through the USG's Millennium Challenge Corporation's (MCC) second compact with the country. This presents an opportunity for U.S. firms looking in the T&D Equipment Sub-Sector.

Electricity Generation by Source, 2017



Key Ghana Data	
T&D Equipment Imports from U.S., 2017	$80,557,625
U.S. T&D Equipment Imports from Ghana, 2017	$0
U.S. T&D Equipment Balance of Trade with Ghana, 2017	$80,557,625
Electricity Capacity, 2017 (MW)	3,472.0
Electricity Consumption, 2017 (TWh)	9.3
Average Annual Electricity Consumption Projections, 2019-2023	3.78%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	1%
Population, 2017 (Millions)	28.83
Smart Meter Penetration, Regional Average, 2017	1%

T&D Equipment Imports by Year and by Supplier, 2000-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.
*Denotes years Ghana did not report import data to the United Nations

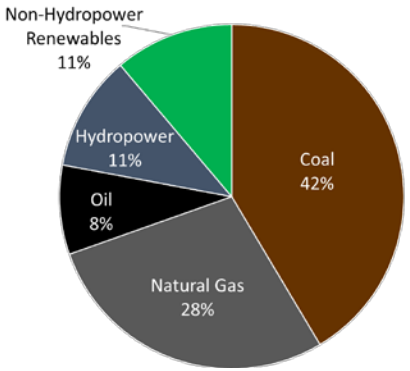
Greece Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#52	#50	#49	#39

Key Market Insights

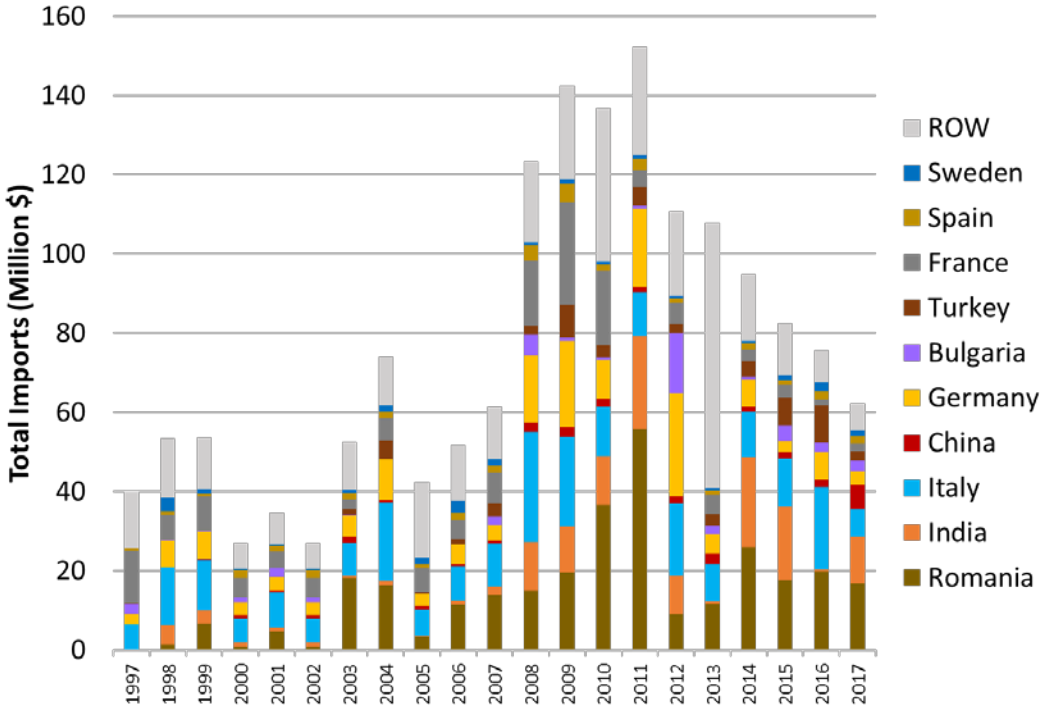
- The electricity system in Greece includes electrical systems on 32 non-interconnected islands that host 15 percent of the Greek population and account for 14 percent of total annual electricity consumption.
- The government of Greece has revised its 2017-2021 operational plan to include 12 strategic projects that cover a wide range of modernization activities, such as smart meters, remote control systems, improved customer service systems, and improved planning and procurement.

Electricity Generation by Source, 2017



Key Greece Data	
T&D Equipment Imports from U.S., 2017	$577,596
U.S. T&D Equipment Imports from Greece, 2017	$317,945
U.S. T&D Equipment Balance of Trade with Greece, 2017	$259,651
Electricity Capacity, 2017 (MW)	17,635.6
Electricity Consumption, 2017 (TWh)	52.3
Average Annual Electricity Consumption Projections, 2019-2023	0.72%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	13%
Population, 2017 (Millions)	11.16
Smart Meter Penetration, 2017	4%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

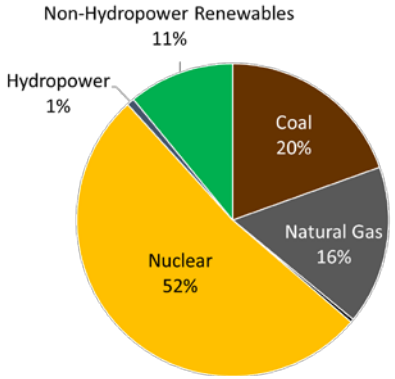
Hungary Data Sheet

Overall Rank	T&D Equipment
#53	#54
Smart Grid ICT	**Energy Storage**
#47	#44

Key Market Insights

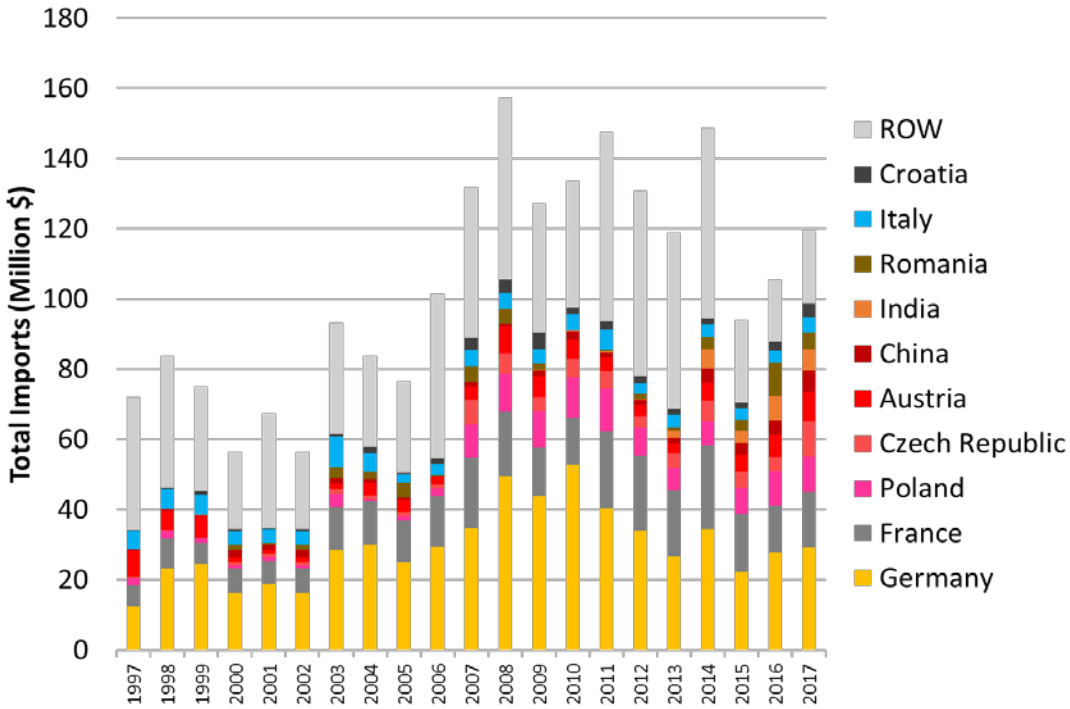
- Hungary is currently conducting a cost-benefit analysis for the deployment of smart grid solutions. A subsidiary of the national transmission system operator was established to manage the national pilot project over the next year.
- KOM Zrt., owned 100 percent by the Hungarian Independent Transmission Operator Company (MAVIR ZRt.) is responsible for the implementation of the Central Smart Grid Pilot Project. The main task of the project is to lay the foundation for smart metering, data collection, and testing.

Electricity Generation by Source, 2017



Key Hungary Data	
T&D Equipment Imports from U.S., 2017	$609,944
U.S. T&D Equipment Imports from Hungary, 2017	$3,567,920
U.S. T&D Equipment Balance of Trade with Hungary, 2017	-$2,957,976
Electricity Capacity, 2017 (MW)	8,107.3
Electricity Consumption, 2017 (TWh)	38.0
Average Annual Electricity Consumption Projections, 2019-2023	0.52%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	12%
Population, 2017 (Millions)	9.72
Smart Meter Penetration, 2017	2%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

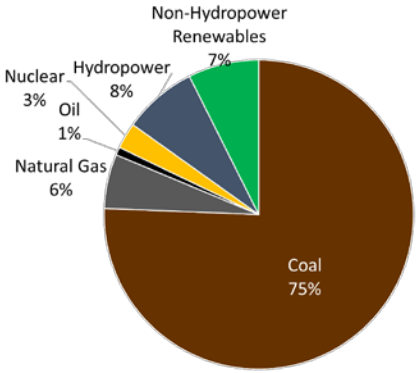
India Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#10	#9	#16	#21

Key Market Insights

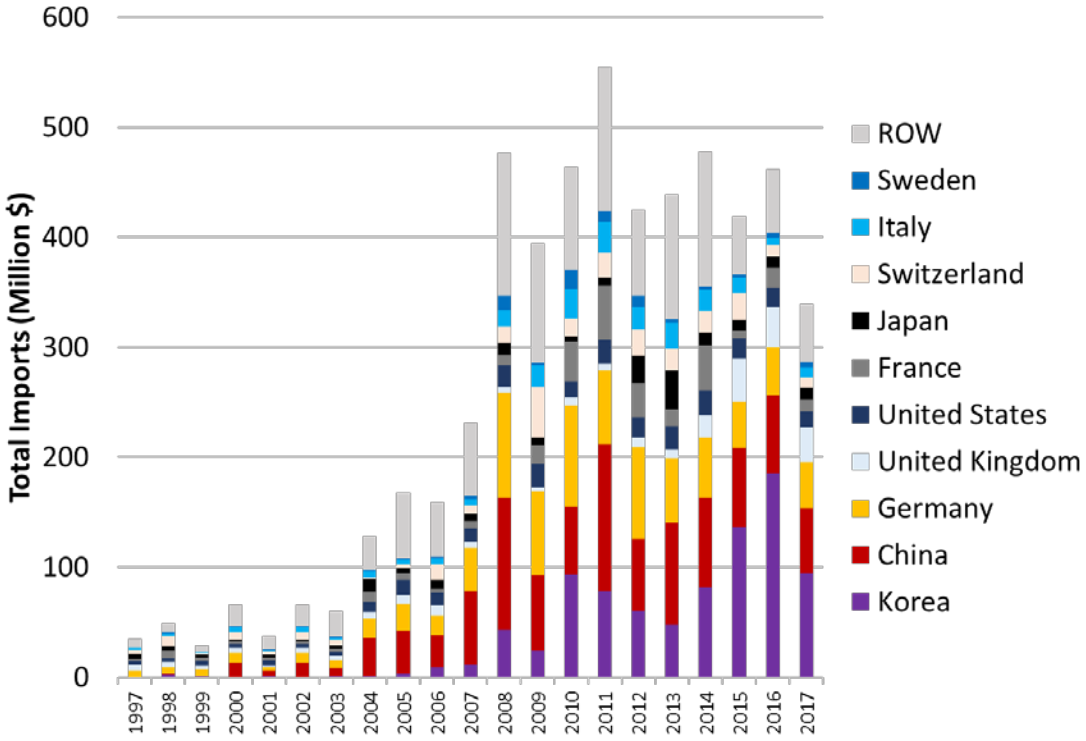
- Ambitious government policies for energy access and renewable energy deployment send positive signals that the Indian smart grid market presents opportunities for U.S. exporters.
- Nevertheless, the Indian market features notable challenges, including access to financing and policies preferring domestic manufactured goods (outlined in the Make in India campaign).
- Indian utilities struggle to gather adequate capital to invest in grid modernization and expansion.

Electricity Generation by Source, 2017



Key India Data	
T&D Equipment Imports from U.S., 2017	$13,683,963
U.S. T&D Equipment Imports from India, 2017	$86,237,591
U.S. T&D Equipment Balance of Trade with India, 2017	-$72,553,628
Electricity Capacity, 2017 (MW)	336,247.0
Electricity Consumption, 2017 (TWh)	1,233.6
Average Annual Electricity Consumption Projections, 2019-2023	6.16%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	10%
Population, 2017 (Millions)	1,339.18
Smart Meter Penetration, 2017	1%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

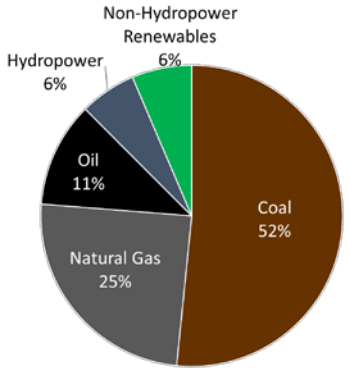
Indonesia Data Sheet

Overall Rank	T&D Equipment
#31	#11
Smart Grid ICT	**Energy Storage**
#38	#27

Key Market Insights

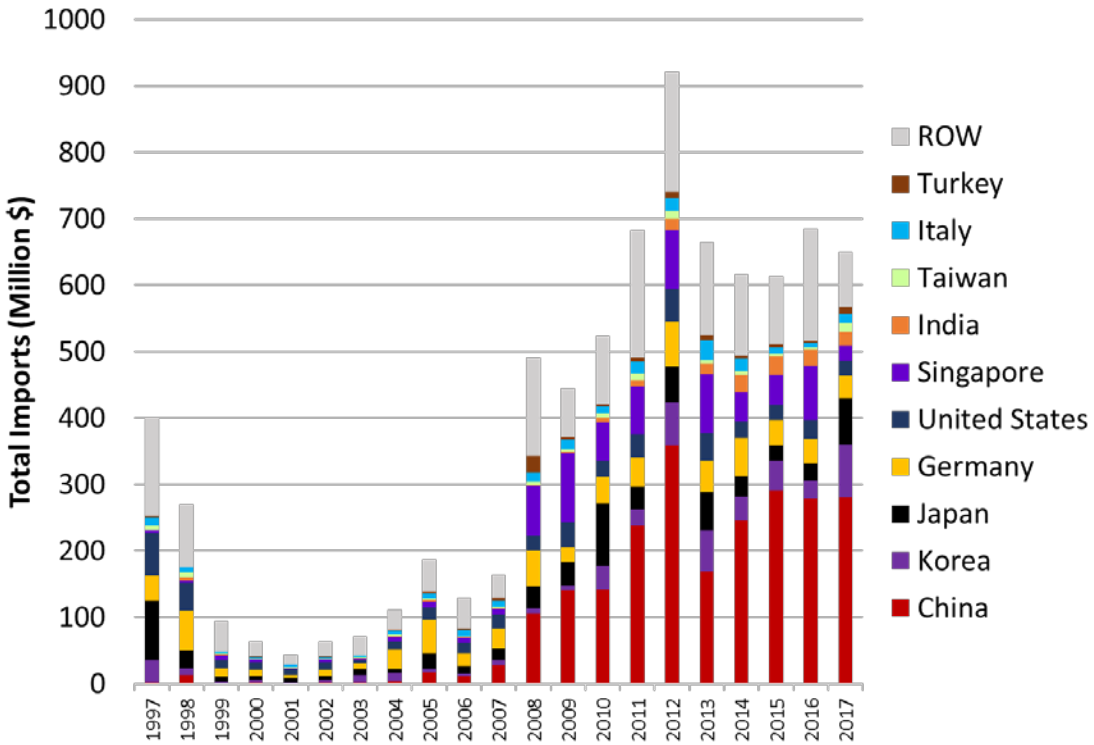
- Government regulations provide regulatory frameworks for increasing private sector participation in T&D and microgrids. However, Indonesian political dynamics mean that the actual issuance of such a microgrid license is likely to be quite challenging.
- Despite the low Energy Storage Sub-Sector *SG TMR* rankings, U.S. firms will benefit from opportunities to replace costly diesel generation on Indonesian islands as well as feed into emerging microgrids deployment.

Electricity Generation by Source, 2017



Key Indonesia Data	
T&D Equipment Imports from U.S., 2017	$23,362,416
U.S. T&D Equipment Imports from Indonesia, 2017	$1,825,352
U.S. T&D Equipment Balance of Trade with Indonesia, 2017	$21,537,064
Electricity Capacity, 2017 (MW)	61,006.0
Electricity Consumption, 2017 (TWh)	221.8
Average Annual Electricity Consumption Projections, 2019-2023	6.08%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	7%
Population, 2017 (Millions)	263.99
Smart Meter Penetration, 2017	2%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

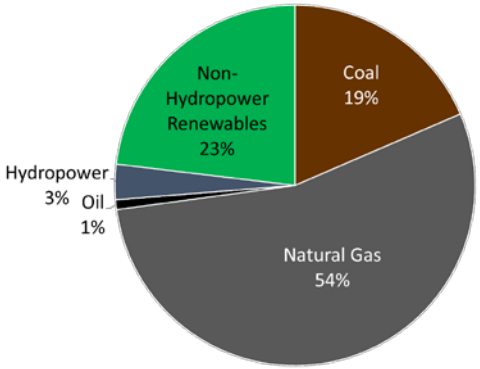
Ireland Data Sheet

Overall Rank	T&D Equipment
#15	#28
Smart Grid ICT	**Energy Storage**
#10	#16

Key Market Insights

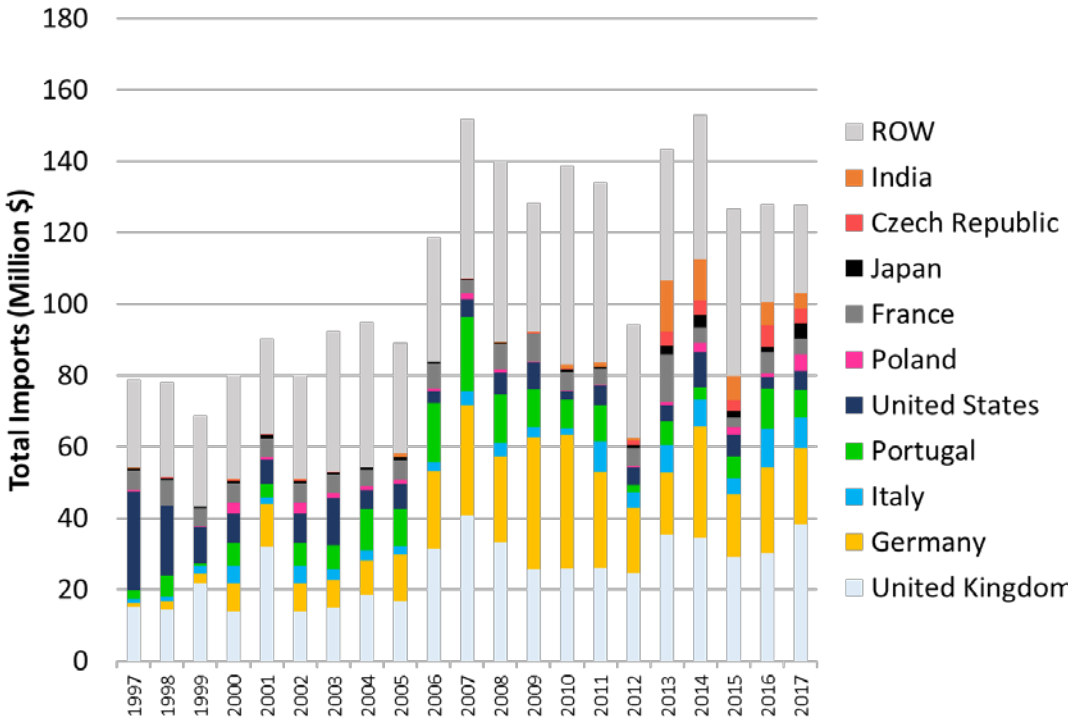
- The Commission for Energy Regulation has well-advanced plans for the development of Ireland's national smart metering that will cover 2.2 million electricity consumers and 600,000 gas consumers. The national rollout of smart metering is expected to commence in 2019.
- As security of supply is a key tenet of Irish energy policy, EirGrid has a Memorandum of Understanding with its French counterpart RTE (Réseau de Transport d'Electricité) to commission feasibility studies of building a submarine electricity interconnector between Ireland and France by 2025.

Electricity Generation by Source, 2017



Key Ireland Data	
T&D Equipment Imports from U.S., 2017	$5,252,545
U.S. T&D Equipment Imports from Ireland, 2017	$581,285
U.S. T&D Equipment Balance of Trade with Ireland, 2017	$4,671,260
Electricity Capacity, 2017 (MW)	9,778.8
Electricity Consumption, 2017 (TWh)	27.6
Average Annual Electricity Consumption Projections, 2019-2023	2.32%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	24%
Population, 2017 (Millions)	4.76
Smart Meter Penetration, 2017	1%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

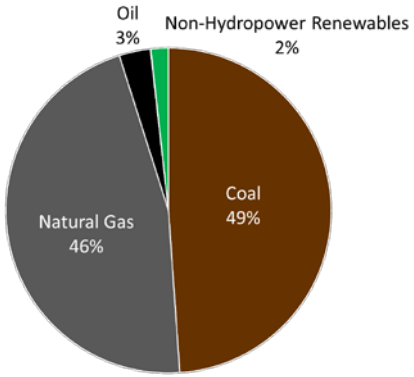
Israel Data Sheet

Overall Rank	T&D Equipment
#39	#48
Smart Grid ICT	**Energy Storage**
#33	#32

Key Market Insights

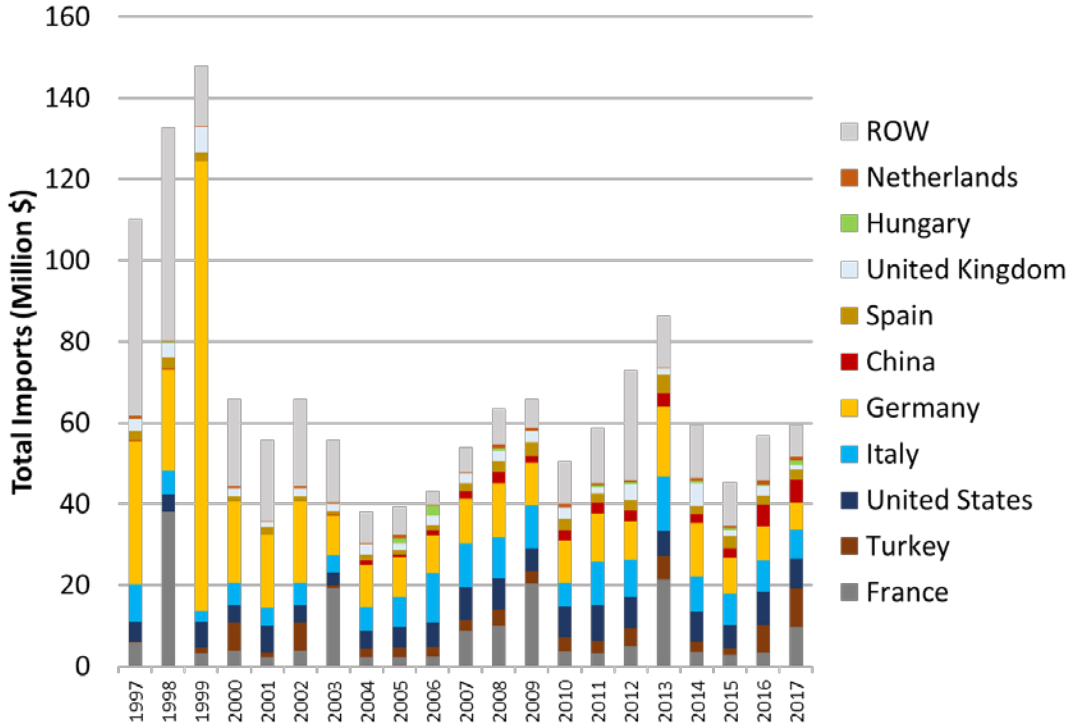
- The Israeli government approved electricity market reforms in 2018 to unbundle the Israeli Electricity Corporation (IEC). IEC will continue to distribute power, but generation will be open to competition.
- Smart grid investment is expected to triple as under the new electricity grid development plan. Major improvements to the grid in southern Israel are likely to improve the deployment and integration of renewable energy resources.

Electricity Generation by Source, 2017



Key Israel Data	
T&D Equipment Imports from U.S., 2017	$7,375,000
U.S. T&D Equipment Imports from Israel, 2017	$27,984,868
U.S. T&D Equipment Balance of Trade with Israel, 2017	-$20,609,868
Electricity Capacity, 2017 (MW)	17,438.0
Electricity Consumption, 2017 (TWh)	59.8
Average Annual Electricity Consumption Projections, 2019-2023	0.04%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	2%
Population, 2017 (Millions)	8.32
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

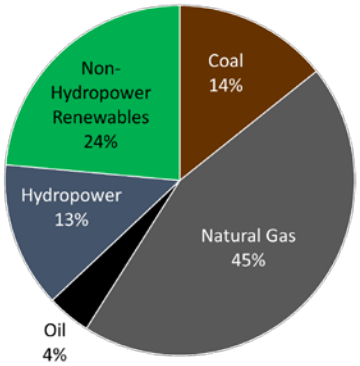
Italy Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#30	#53	#15	#18

Key Market Insights

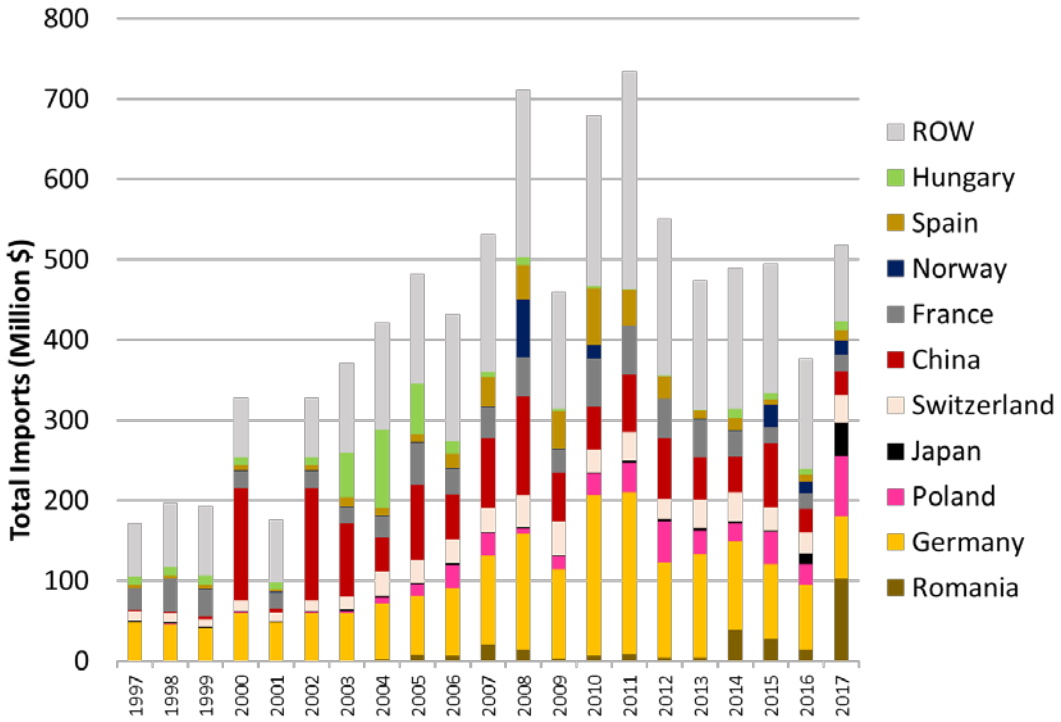
- While production of electricity from renewable sources alleviates Italy from its heavy dependence on foreign energy sources, which still make up 75 percent of Italy's primary energy needs, its low predictability causes imbalance and management challenges for a network that was engineered according to the requirements of a centralized generation model.
- The primary areas of investment in smart grids in Italy include the integration of renewables, grid automation (primary and secondary substations) and operating centers.

Electricity Generation by Source, 2017



Key Italy Data	
T&D Equipment Imports from U.S., 2017	$9,684,456
U.S. T&D Equipment Imports from Italy, 2017	$44,041,284
U.S. T&D Equipment Balance of Trade with Italy, 2017	-$34,356,828
Electricity Capacity, 2017 (MW)	114,511.3
Electricity Consumption, 2017 (TWh)	295.2
Average Annual Electricity Consumption Projections, 2019-2023	0.3%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	27%
Population, 2017 (Millions)	59.36
Smart Meter Penetration, 2017	100%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

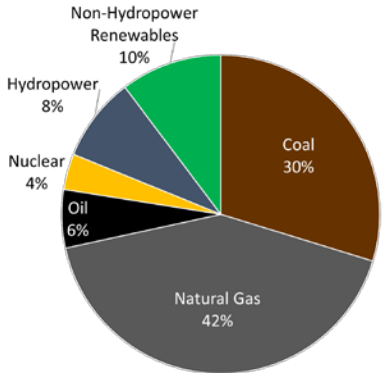
Japan Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#4	#31	#3	#3

Key Market Insights

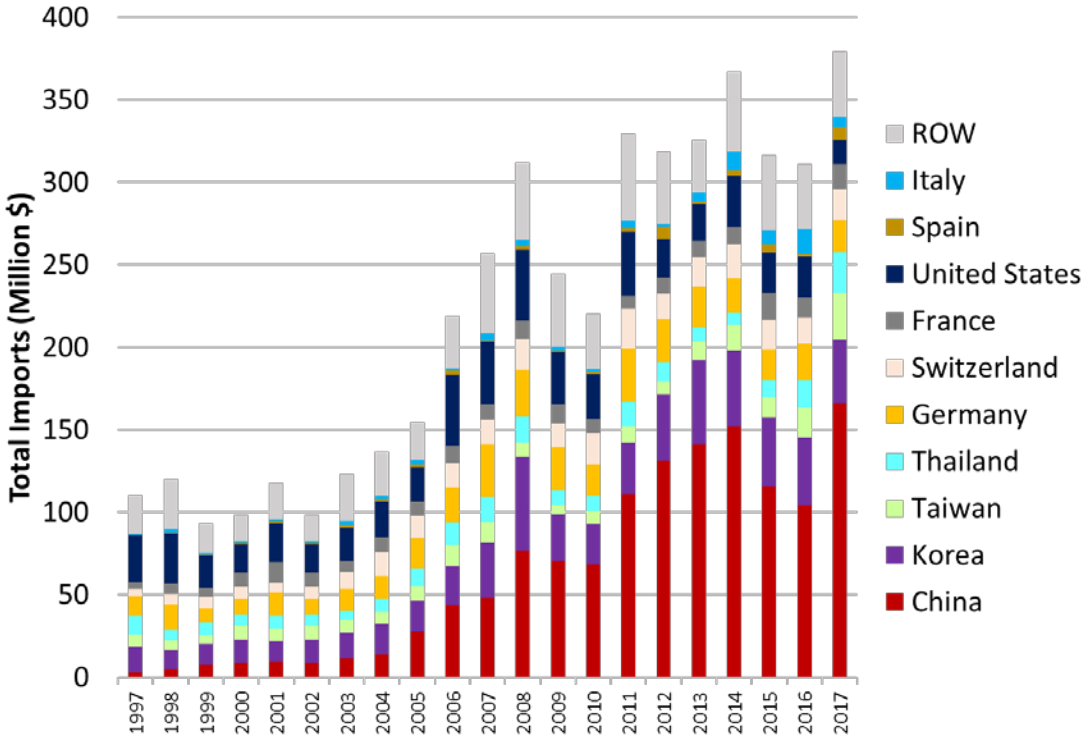
- Sustained reforms, including the break-up of vertically-integrated utilities and the creation of a nationwide grid operator, will help drive the pace and scope of new opportunities for U.S. suppliers.
- While U.S. suppliers face robust competition in Japan, they have increased their presence in the past few years. This is especially true for Smart Grid ICT firms supplying analytics and demand response programs.
- Strong relationships with Japanese partners will continue to be a requirement in this market.

Electricity Generation by Source, 2017



Key Japan Data	
T&D Equipment Imports from U.S., 2017	$14,412,344
U.S. T&D Equipment Imports from Japan, 2017	$68,203,546
U.S. T&D Equipment Balance of Trade with Japan, 2017	-$53,791,202
Electricity Capacity, 2017 (MW)	341,929.2
Electricity Consumption, 2017 (TWh)	921.9
Average Annual Electricity Consumption Projections, 2019-2023	0.98%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	14%
Population, 2017 (Millions)	127.48
Smart Meter Penetration, 2017	49%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

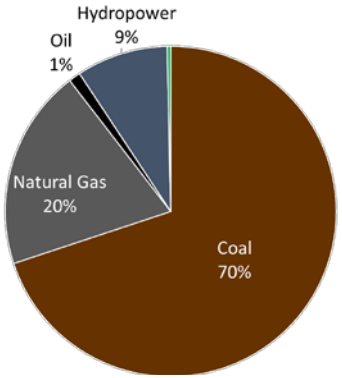
Kazakhstan Data Sheet

Overall Rank	T&D Equipment
#48	#32
Smart Grid ICT	**Energy Storage**
#48	#38

Key Market Insights

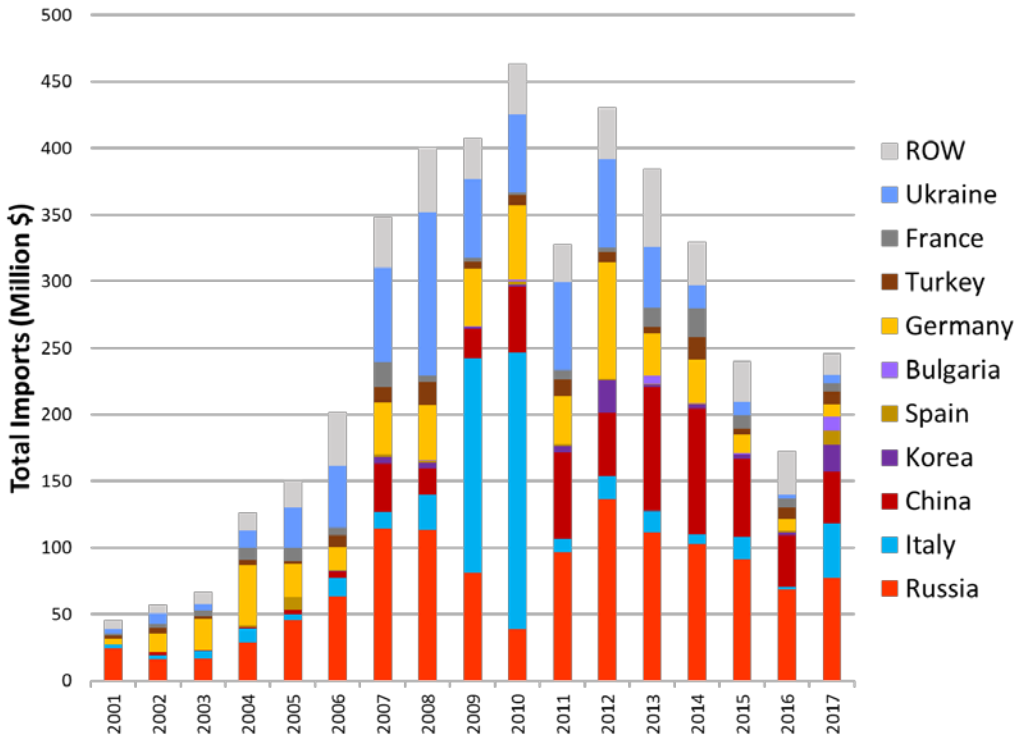
- The majority of Kazakhstan's generating capacity is in the northeast of the country while the southeast is the main power consumer. While north-south connections for the transfer of power exist, they are insufficient to meet southern demand.
- The European Bank for Reconstruction and Development (EBRD) reportedly plans to invest approximately $244.2 million in Kazakhstan renewable energy sources attracting private and international financial investment. Fifty-two renewable energy facilities will be built through 2020.

Electricity Generation by Source, 2017



Key Kazakhstan Data	
T&D Equipment Imports from U.S., 2017	$1,503,745
U.S. T&D Equipment Imports from Kazakhstan, 2017	$0
U.S. T&D Equipment Balance of Trade with Kazakhstan, 2017	$1,503,745
Electricity Capacity, 2017 (MW)	20,176.0
Electricity Consumption, 2017 (TWh)	95.4
Average Annual Electricity Consumption Projections, 2019-2023	2.08%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	1%
Population, 2017 (Millions)	18.20
Smart Meter Penetration, Regional Average, 2017	6%

T&D Equipment Imports by Year and by Supplier, 2001-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

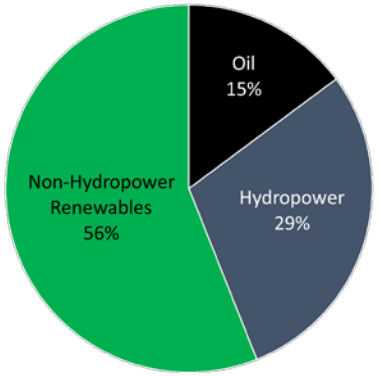
Kenya Data Sheet

Overall Rank	T&D Equipment
#42	#15
Smart Grid ICT	**Energy Storage**
#53	#36

Key Market Insights

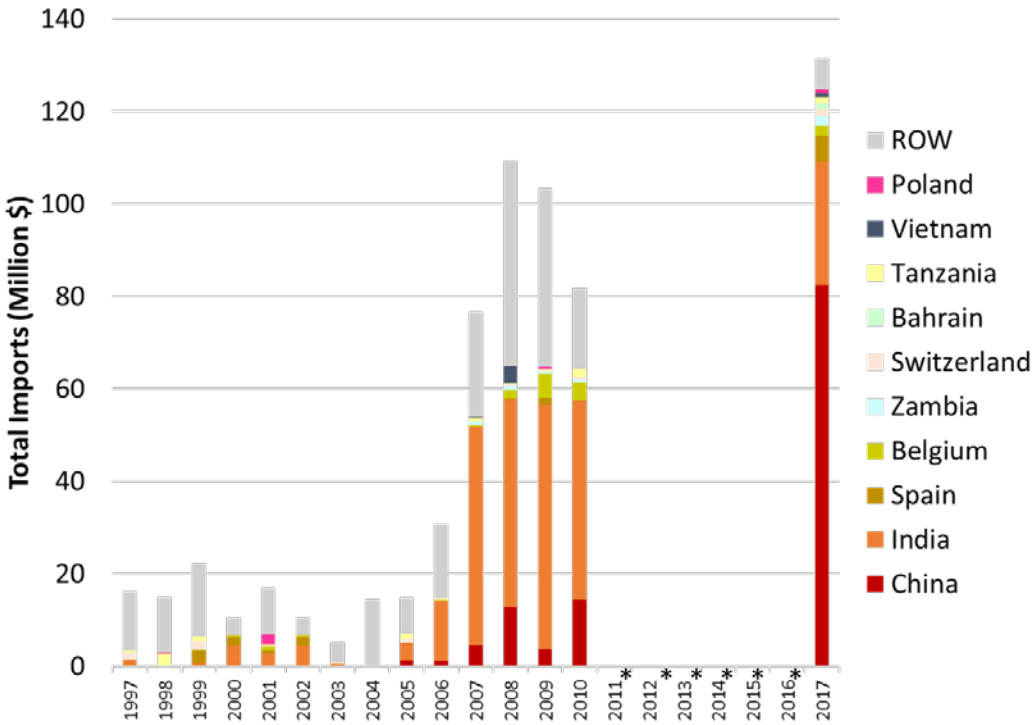
- Through the Last Mile Connectivity Program, and in partnership with the World Bank, Kenya is hoping to achieve its goal to reach near-universal access to electricity by 2020. This would mean adding 1 million new customers to the grid each year.
- Currently, there are 19 off-grid diesel-powered stations, but there are plans to convert these to solar-diesel hybrids as well as add 43 greenfield solar "mini-grids" through the Scaling Up Renewable Energy Program (SREP).

Electricity Generation by Source, 2017



Key Kenya Data	
T&D Equipment Imports from U.S., 2017	$415,028
U.S. T&D Equipment Imports from Kenya, 2017	$42,469
U.S. T&D Equipment Balance of Trade with Kenya, 2017	$372,559
Electricity Capacity, 2017 (MW)	2,368.6
Electricity Consumption, 2017 (TWh)	8.9
Average Annual Electricity Consumption Projections, 2019-2023	5.1%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	60%
Population, 2017 (Millions)	49.70
Smart Meter Penetration, Regional Average, 2017	1%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.
*Denotes years Kenya did not report import data to United Nations.

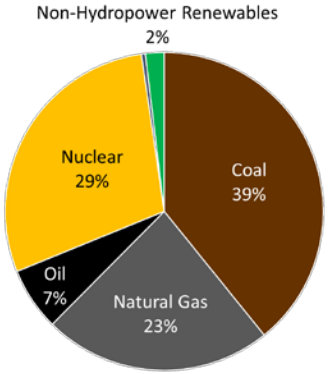
Korea Data Sheet

Overall Rank	T&D Equipment
#16	#23
Smart Grid ICT	**Energy Storage**
#27	#8

Key Market Insights

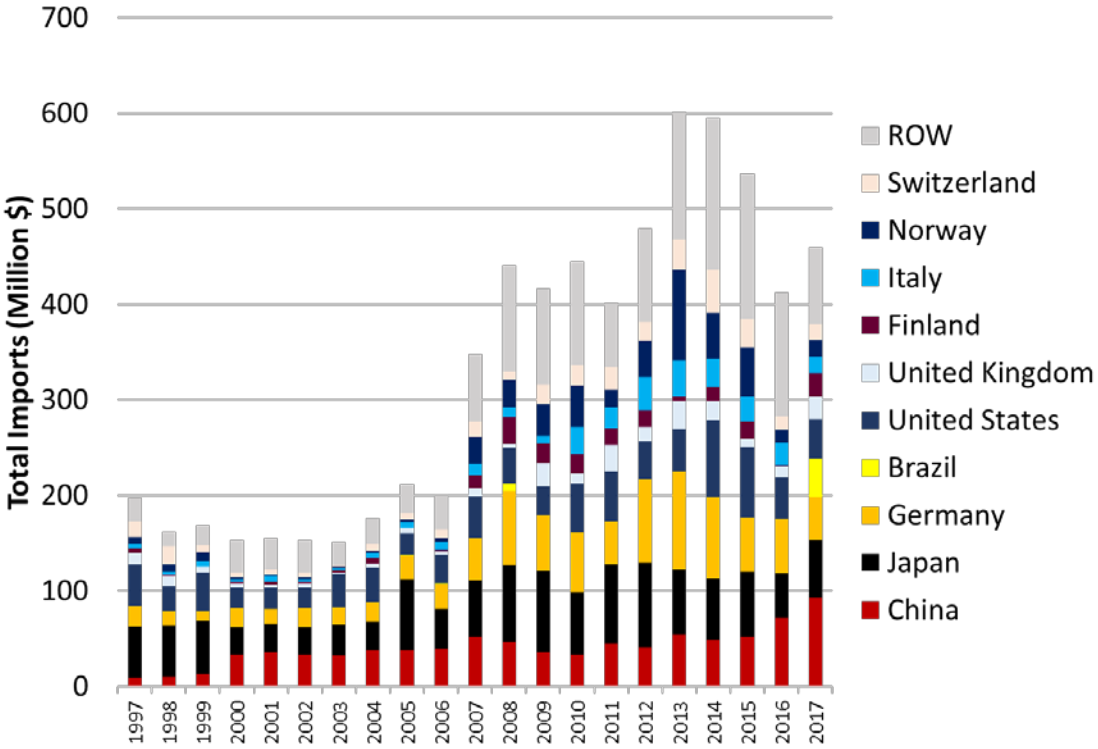
- The Korea Electric Power Corporation (KEPCO) is the state-owned power company and is responsible for the nation's transmission and distribution. Accordingly, Korea Power Exchange (KPX) was established and is responsible for the operation of the electricity market and power systems.
- Demand Response (DR) has grown substantially since its inception in 2014. It is also known as the 'Negawatt' market in Japan.

Electricity Generation by Source, 2017



Key Korea Data	
T&D Equipment Imports from U.S., 2017	$40,620,658
U.S. T&D Equipment Imports from Korea, 2017	$375,031,592
U.S. T&D Equipment Balance of Trade with Korea, 2017	-$334,410,934
Electricity Capacity, 2017 (MW)	107,446.9
Electricity Consumption, 2017 (TWh)	516.1
Average Annual Electricity Consumption Projections, 2019-2023	2.14%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	3%
Population, 2017 (Millions)	50.98
Smart Meter Penetration, 2017	22%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

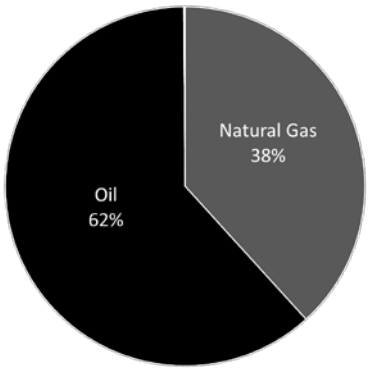
Kuwait Data Sheet

Key Market Insights

- In 2017, electricity tariffs increased to encourage conservation.
- Kuwait is expected to begin smart meter rollouts in 2019, following 2018 tenders for 880,000 smart meters.
- The government of Kuwait estimates that approximately 18 percent of all transformers do not meet the required transformer equipment standards and will be replaced.

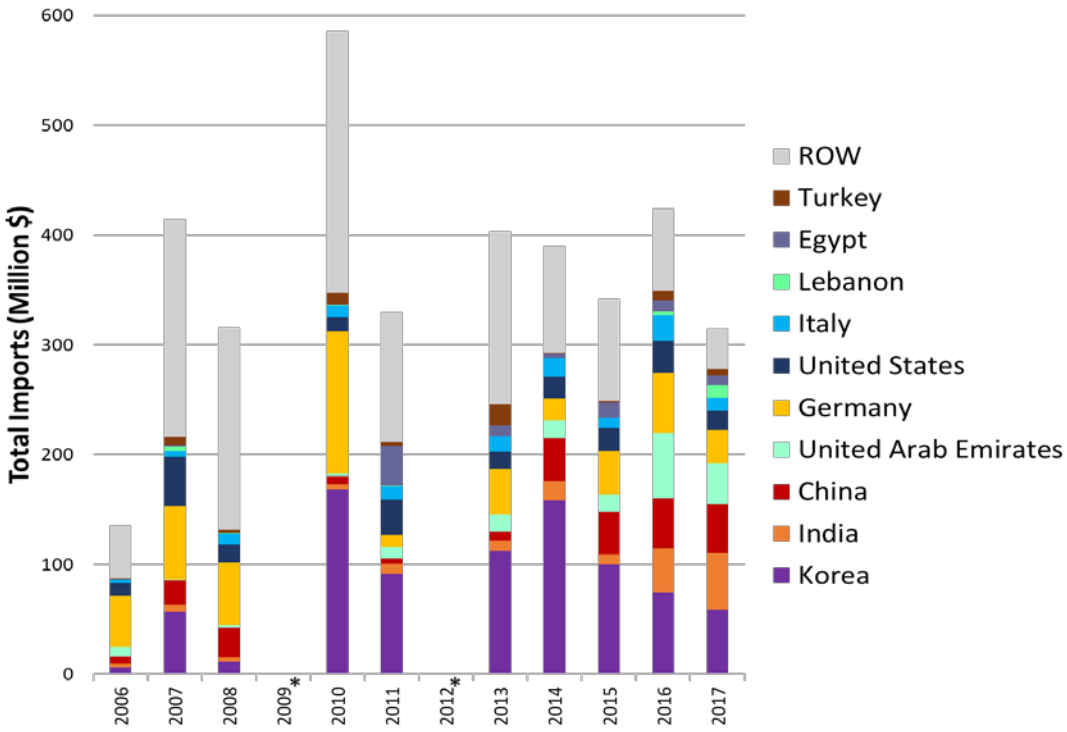
Overall Rank	T&D Equipment
#45	#26
Smart Grid ICT	**Energy Storage**
#44	#51

Electricity Generation by Source, 2017



Key Kuwait Data	
T&D Equipment Imports from U.S., 2017	$17,172,735
U.S. T&D Equipment Imports from Kuwait, 2017	$5,700
U.S. T&D Equipment Balance of Trade with Kuwait, 2017	$17,167,035
Electricity Capacity, 2017 (MW)	19,718.4
Electricity Consumption, 2017 (TWh)	62.1
Average Annual Electricity Consumption Projections, 2019-2023	2.52%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	0%
Population, 2017 (Millions)	4.14
Smart Meter Penetration, Regional Average, 2017	12%

T&D Equipment Imports by Year and by Supplier, 2006-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.
*Denotes years Kuwait did not report import data to United Nations.

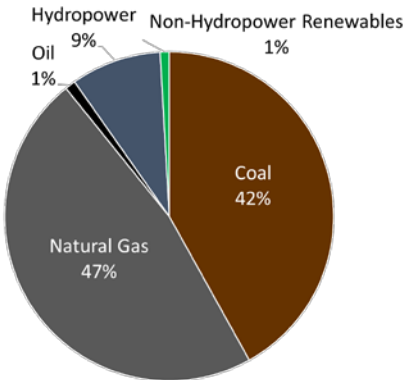
Malaysia Data Sheet

Overall Rank	T&D Equipment
#19	#12
Smart Grid ICT	**Energy Storage**
#20	#29

Key Market Insights

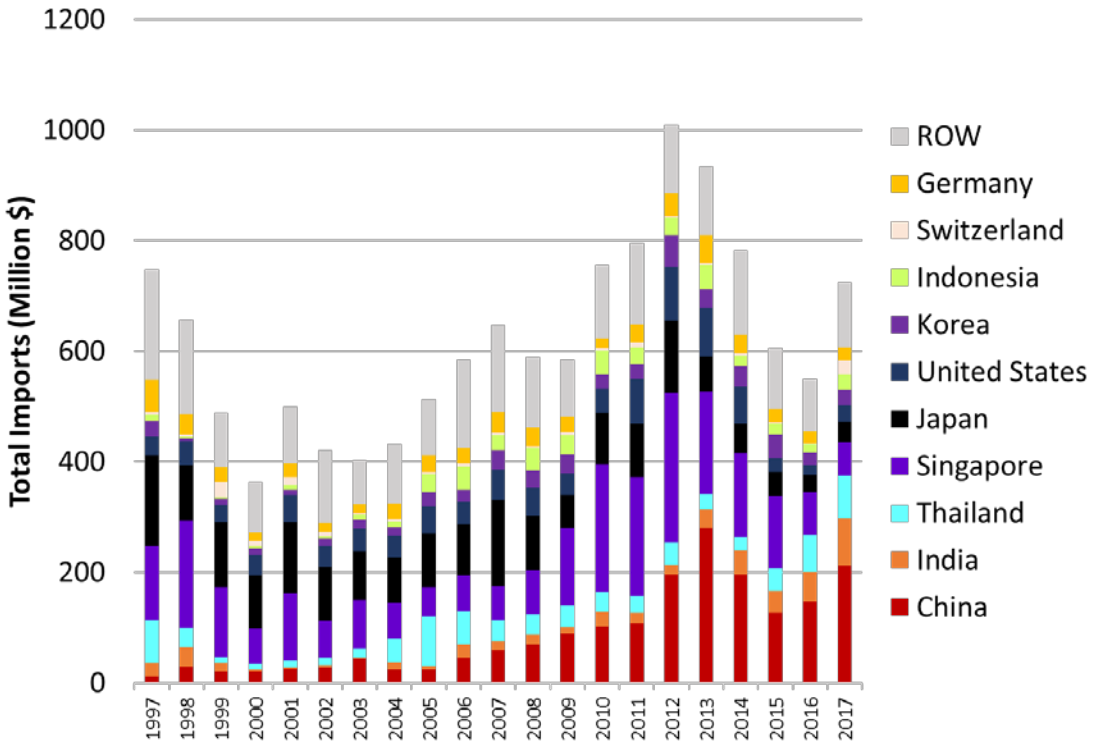
- Malaysia is focused on promotion of the "Grid of the Future" technologies that help improve reliability and increase efficiency.
- In Melaka, 340,000 smart meters are expected to be deployed, followed by additional 1.2 million smart meters in the Klang Valley.
- Tenaga Nasional Bhd (TNB), Malaysia's largest and only electric utility company, plans to install advanced metering infrastructure (AMI) or smart meters in 8.3 million homes across the country by 2023.

Electricity Generation by Source, 2017



Key Malaysia Data	
T&D Equipment Imports from U.S., 2017	$30,046,613
U.S. T&D Equipment Imports from Malaysia, 2017	$7,894,735
U.S. T&D Equipment Balance of Trade with Malaysia, 2017	$22,151,878
Electricity Capacity, 2017 (MW)	38,885.0
Electricity Consumption, 2017 (TWh)	148.8
Average Annual Electricity Consumption Projections, 2019-2023	3.84%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	1%
Population, 2017 (Millions)	31.62
Smart Meter Penetration, 2017	3%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

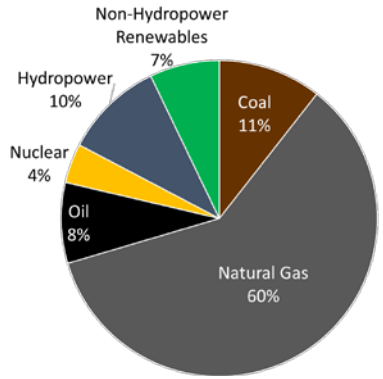
Mexico Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#2	#3	#9	#22

Key Market Insights

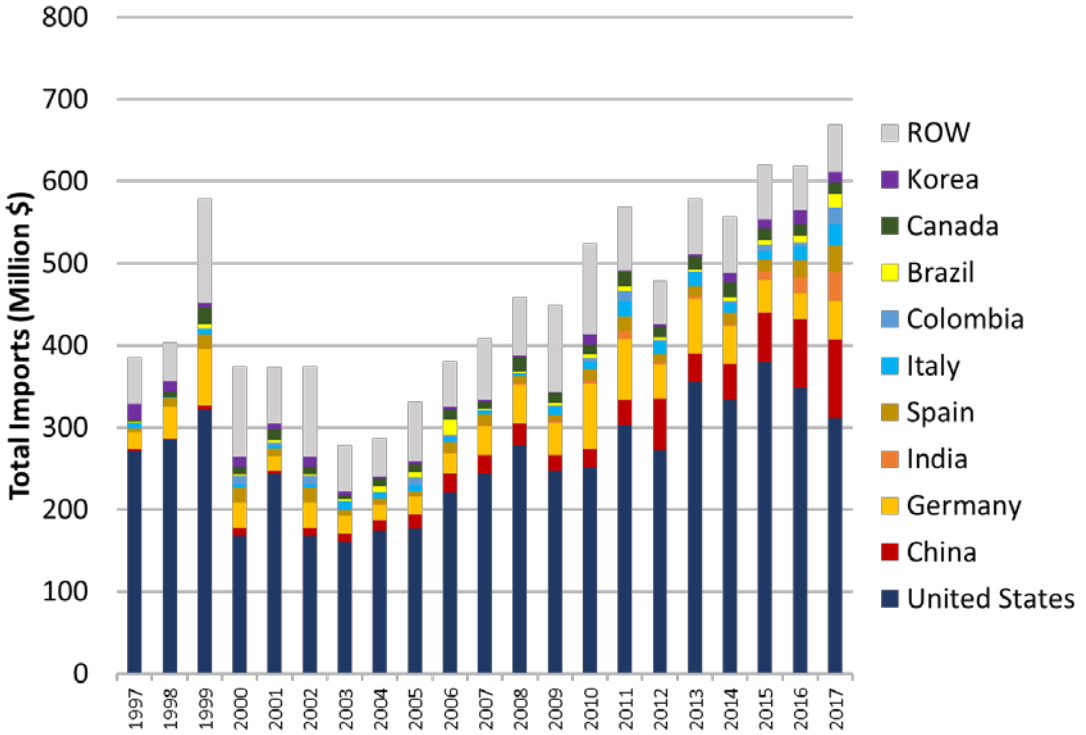
- Mexico's 2014 energy reforms have significantly improved the outlook for the Mexican smart grid market.
- Opportunities for U.S. exporters to Mexico are strong given the interconnection of the Mexican and U.S. electrical grids along the border, longstanding relationship between U. S. and Mexican firms, intergovernmental collaboration between both countries on energy issues, and the business potential brought about by the market's liberalization.

Electricity Generation by Source, 2017



Key Mexico Data	
T&D Equipment Imports from U.S., 2017	$310,944,553
U.S. T&D Equipment Imports from Mexico, 2017	$1,678,002,043
U.S. T&D Equipment Balance of Trade with Mexico, 2017	-$1,367,057,490
Electricity Capacity, 2017 (MW)	73,389.0
Electricity Consumption, 2017 (TWh)	262.1
Average Annual Electricity Consumption Projections, 2019-2023	2.8%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	15%
Population, 2017 (Millions)	129.16
Smart Meter Penetration, 2017	10%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

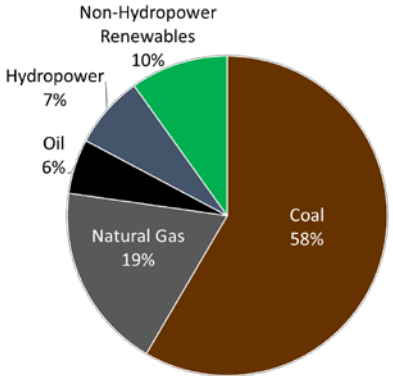
Morocco Data Sheet

Key Market Insights

- Morocco has a goal to increase its electricity from renewable energy to 42 percent by 2020 and 52 percent by 2030.
- The Autorité nationale de Régulation de l'Electricité (ANRE) was created in 2016 to serve as a dedicated electricity market regulator and regulate the market as it slowly opens to private investment in generation, distribution, and retail sales.

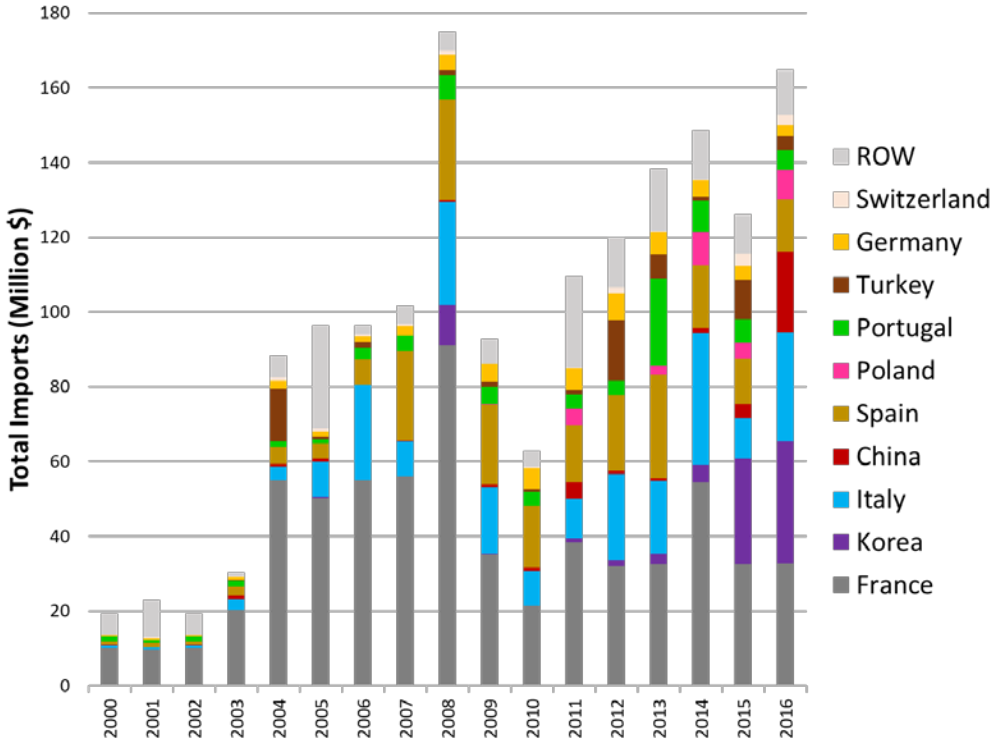
Overall Rank	T&D Equipment
#34	#6
Smart Grid ICT	**Energy Storage**
#43	#47

Electricity Generation by Source, 2017



Key Morocco Data	
T&D Equipment Imports from U.S., 2016*	$840,557
U.S. T&D Equipment Imports from Morocco, 2017	$57,855
U.S. T&D Equipment Balance of Trade with Morocco, 2016*	$829,594
Electricity Capacity, 2017 (MW)	8,801.2
Electricity Consumption, 2017 (TWh)	29.7
Average Annual Electricity Consumption Projections, 2019-2023	5.02%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	22%
Population, 2017 (Millions)	35.74
Smart Meter Penetration, 2017	2%

T&D Equipment Imports by Year and by Supplier, 2000-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

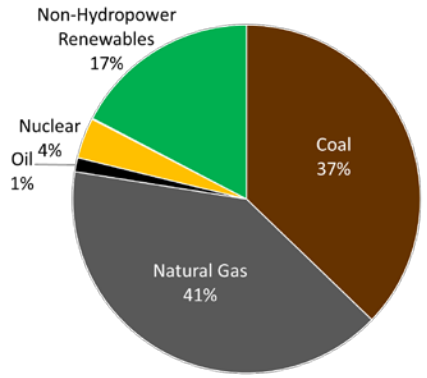
Netherlands Data Sheet

Overall Rank	T&D Equipment
#22	#41
Smart Grid ICT	**Energy Storage**
#13	#10

Key Market Insights

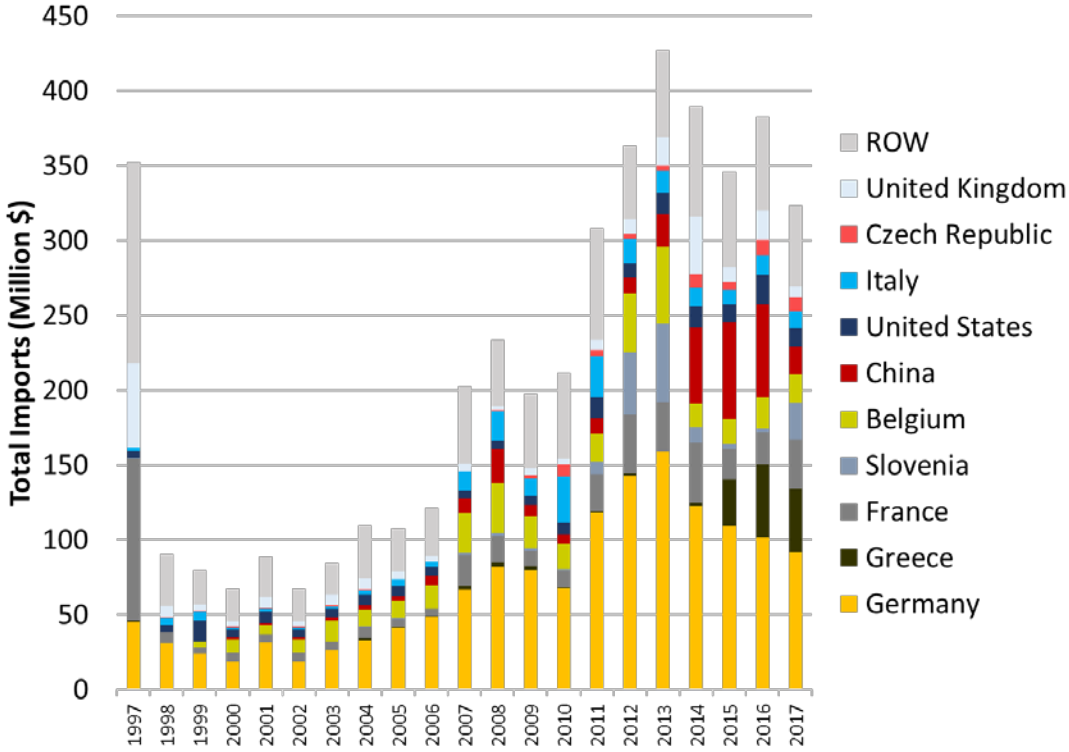
- While the Netherlands is not on track to meet the carbon reduction goals set by the European Union (EU), it is one of the first EU countries to announce plans to eliminate natural gas from the energy mix.
- The current government coalition is committed to a 49 percent reduction in carbon emissions by 2030, which would surpass the current EU target. This will drive renewable energy deployments.
- The Dutch government is accelerating the development of smart grids with its Intelligent Grids Innovation Program, which supports 94 pilot projects.

Electricity Generation by Source, 2017



Key Netherlands Data	
T&D Equipment Imports from U.S., 2017	$12,299,154
U.S. T&D Equipment Imports from Netherlands, 2017	$109,601,846
U.S. T&D Equipment Balance of Trade with Netherlands, 2017	-$97,302,692
Electricity Capacity, 2017 (MW)	33,414.2
Electricity Consumption, 2017 (TWh)	104.8
Average Annual Electricity Consumption Projections, 2019-2023	0.44%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	24%
Population, 2017 (Millions)	17.04
Smart Meter Penetration, 2017	47%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

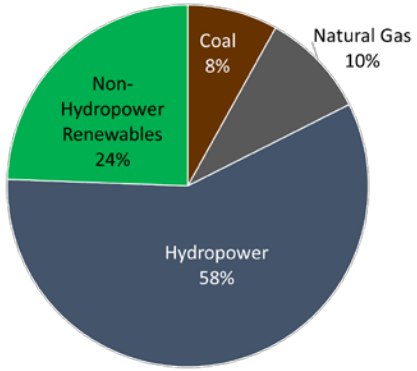
New Zealand Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#41	#51	#32	#35

Key Market Insights

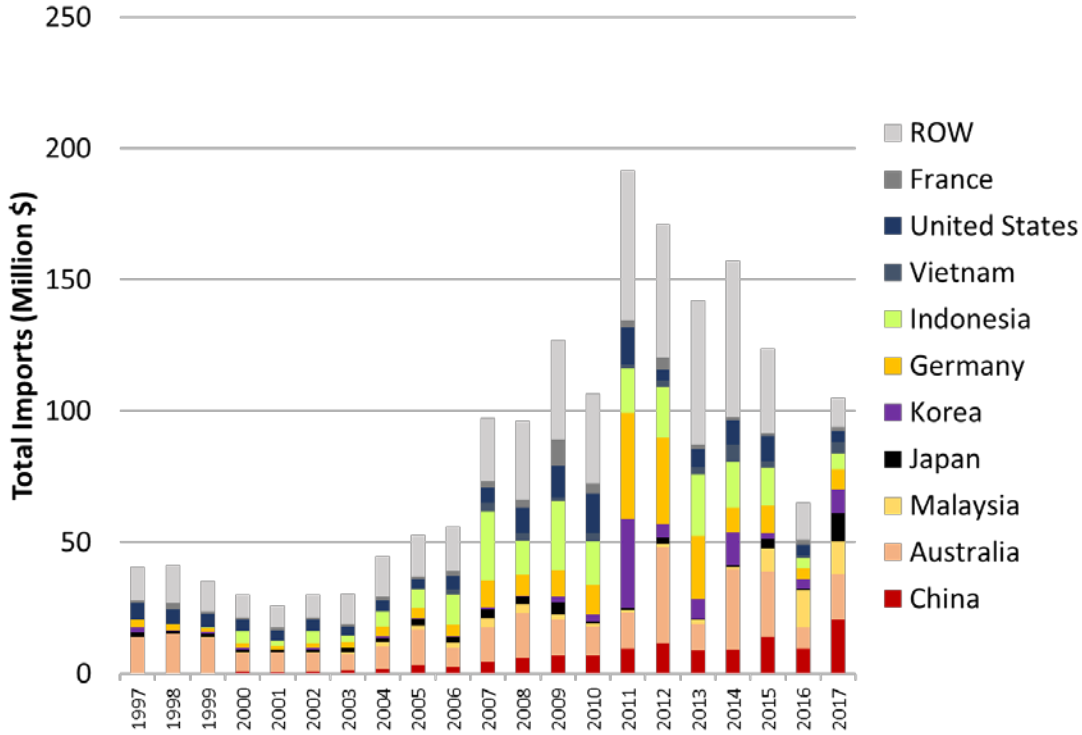
- The New Zealand Energy Strategy 2011-2021 sets the strategic direction for the energy sector and the role energy will play in the New Zealand economy.
- Since 2014, New Zealand has had a Smart Grid Forum focused on convening the private sector (industry, scientific and academic) with policy makers, regulators and consumers. It publishes reports to better increase public awareness and best practice sharing.

Electricity Generation by Source, 2017



Key New Zealand Data	
T&D Equipment Imports from U.S., 2017	$4,096,335
U.S. T&D Equipment Imports from New Zealand, 2017	$1,716,303
U.S. T&D Equipment Balance of Trade with New Zealand, 2017	$2,380,032
Electricity Capacity, 2017 (MW)	9,490.0
Electricity Consumption, 2017 (TWh)	40.2
Average Annual Electricity Consumption Projections, 2019-2023	0.78%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	26%
Population, 2017 (Millions)	4.71
Smart Meter Penetration, Regional Average, 2017	56%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

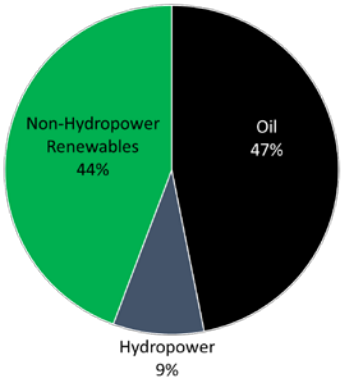
Nicaragua Data Sheet

Overall Rank	T&D Equipment
#56	#33
Smart Grid ICT	**Energy Storage**
#56	#53

Key Market Insights

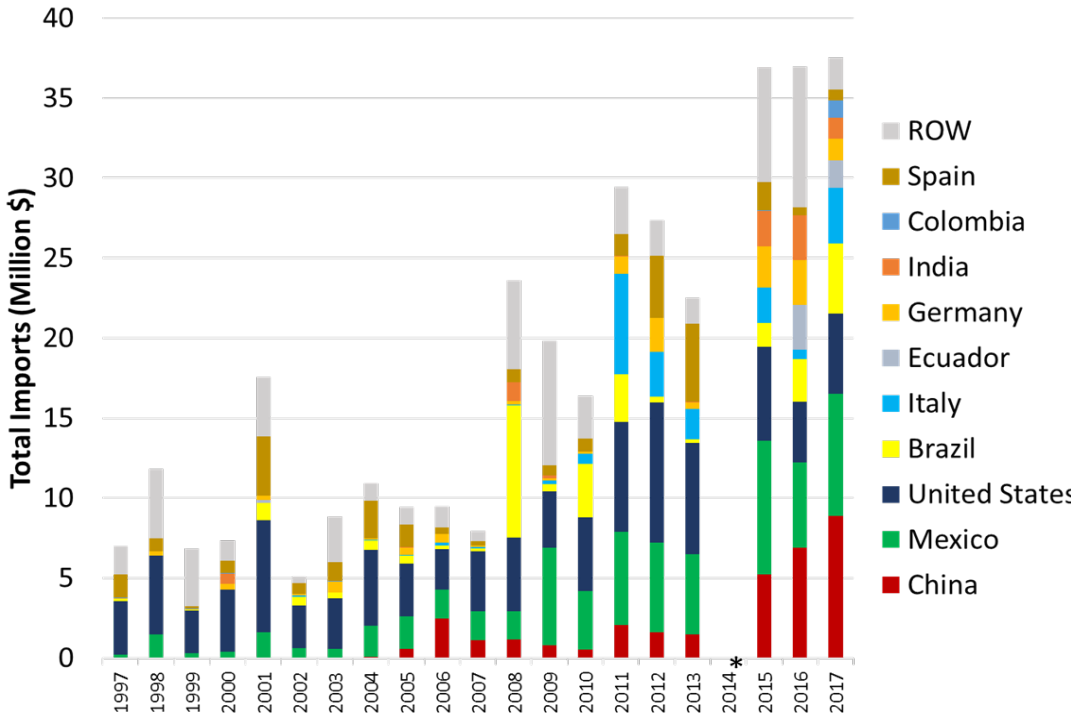
- In 2018, the Nicaraguan government agreed to gradually phase out electricity subsidies over the next five years.
- Electricity subsidy reform was a condition of the third phase of financing under the Inter-American Development Bank's Program to Strengthen the Electricity Sector in Nicaragua.
- According to Nicaragua's state-owned power transmission company (ENATREL), the national electrification level reached 90 percent in 2017 (an increase of 36 percent from electricity coverage of 54 percent in 2006).

Electricity Generation by Source, 2017



Key Nicaragua Data	
T&D Equipment Imports from U.S., 2017	$4,981,663
U.S. T&D Equipment Imports from Nicaragua, 2017	$0
U.S. T&D Equipment Balance of Trade with Nicaragua, 2017	$4,981,663
Electricity Capacity, 2017 (MW)	1,561.4
Electricity Consumption, 2017 (TWh)	3.9
Average Annual Electricity Consumption Projections, 2019-2023	4.48%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	47%
Population, 2017 (Millions)	6.22
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.
*Denotes year Nicaragua did not report import data to United Nations.

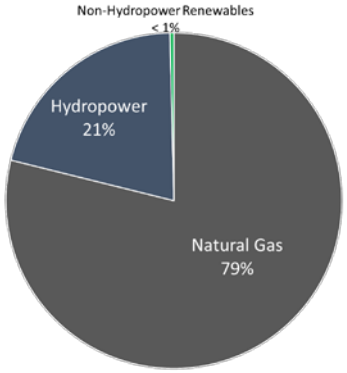
Nigeria Data Sheet

Overall Rank	T&D Equipment
#40	#30
Smart Grid ICT	**Energy Storage**
#39	#37

Key Market Insights

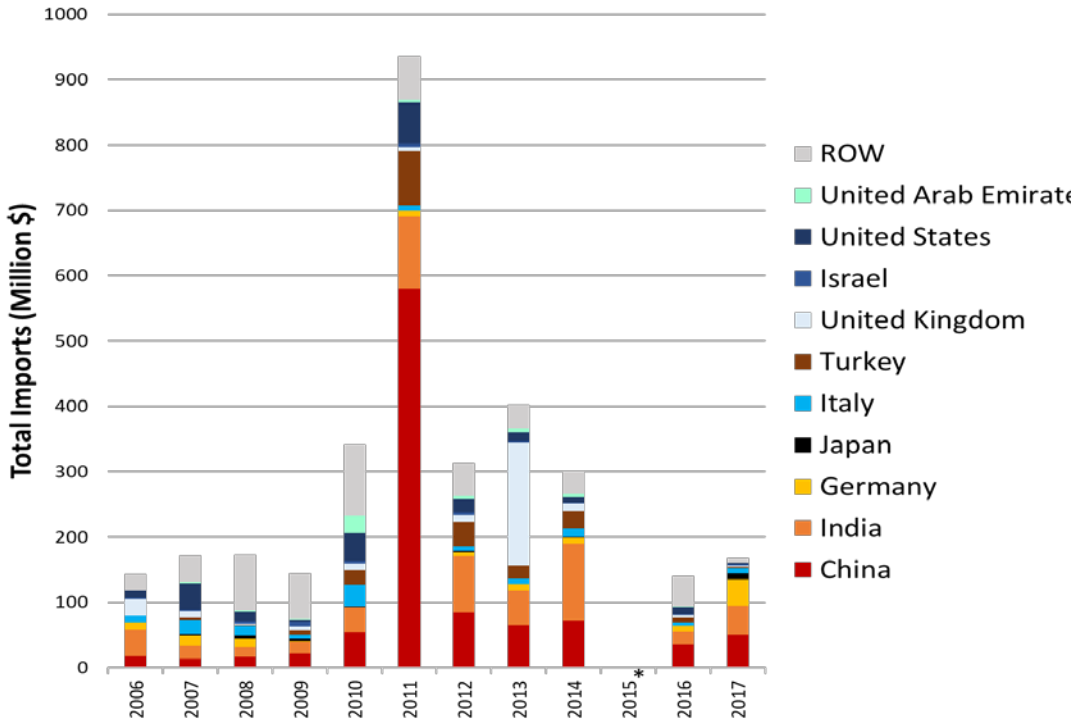
- Nigeria will need to overhaul its deteriorating T&D infrastructure to drive economic growth and provide electricity to the 40 percent of the population that is living without it.
- Nigeria has set ambitious targets under its Nigeria Vision 30-30-30. It seeks to install 30 GW of power by 2030, of which 30 percent would come from renewable energy sources.
- Active USG programs, such as the Power Africa Initiative, are helping to drive opportunities for T&D suppliers in Africa's most populous nation.

Electricity Generation by Source, 2017



Key Nigeria Data	
T&D Equipment Imports from U.S., 2017	$1,530,983
U.S. T&D Equipment Imports from Nigeria, 2017	$0
U.S. T&D Equipment Balance of Trade with Country, 2017	$1,530,983
Electricity Capacity, 2017 (MW)	10,792.2
Electricity Consumption, 2017 (TWh)	21.3
Average Annual Electricity Consumption Projections, 2019-2023	3.42%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	0%
Population, 2017 (Millions)	190.89
Smart Meter Penetration, 2017	0%

T&D Equipment Imports by Year and by Supplier, 2006-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.\
*Denotes year Nigeria did not report import data to United Nations.

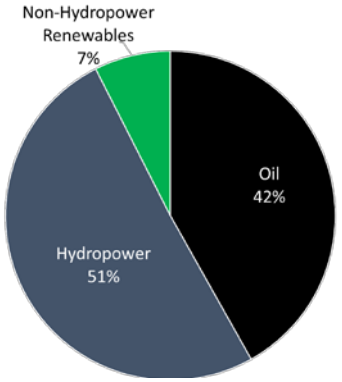
Panama Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#46	#14	#52	#52

Key Market Insights

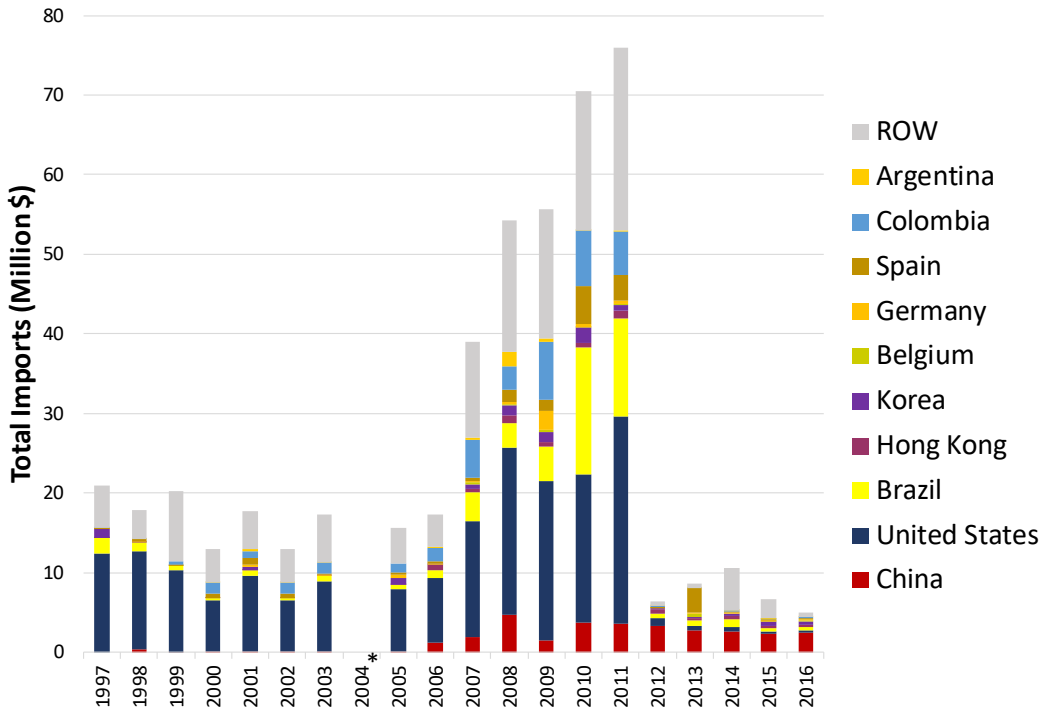
- Panama is seeking to lower electricity costs, as well as smooth out the supply, to increase its competitiveness for foreign direct investment.
- In 2018, the Electricity Transmission Company began prequalifying companies to design and construct the fourth transmission line from Chiriqui Grande to Panama III. The estimated investment is $520 million and being done in collaboration with the International Finance Corporation of the World Bank Group.
- Price and quality are the main factors in selecting equipment suppliers, followed by after-sale service.

Electricity Generation by Source, 2017



Key Panama Data	
T&D Equipment Imports from U.S., 2016*	$404,266
U.S. T&D Equipment Imports from Panama, 2017	$877,804
U.S. T&D Equipment Balance of Trade with Panama, 2016*	-$495,501
Electricity Capacity, 2017 (MW)	3,183.4
Electricity Consumption, 2017 (TWh)	9.2
Average Annual Electricity Consumption Projections, 2019-2023	4.9%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	10%
Population, 2017 (Millions)	4.10
Smart Meter Penetration, Regional Average, 2017	5%

T&D Equipment Imports by Year and by Supplier, 1997-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.
*Denotes year Panama did not report import data to United Nations.

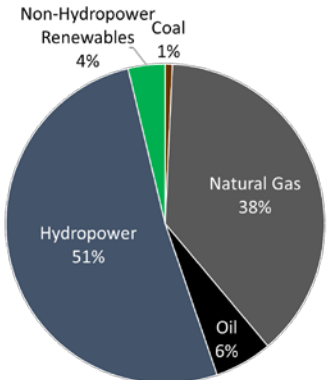
Peru Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#54	#25	#54	#56

Key Market Insights

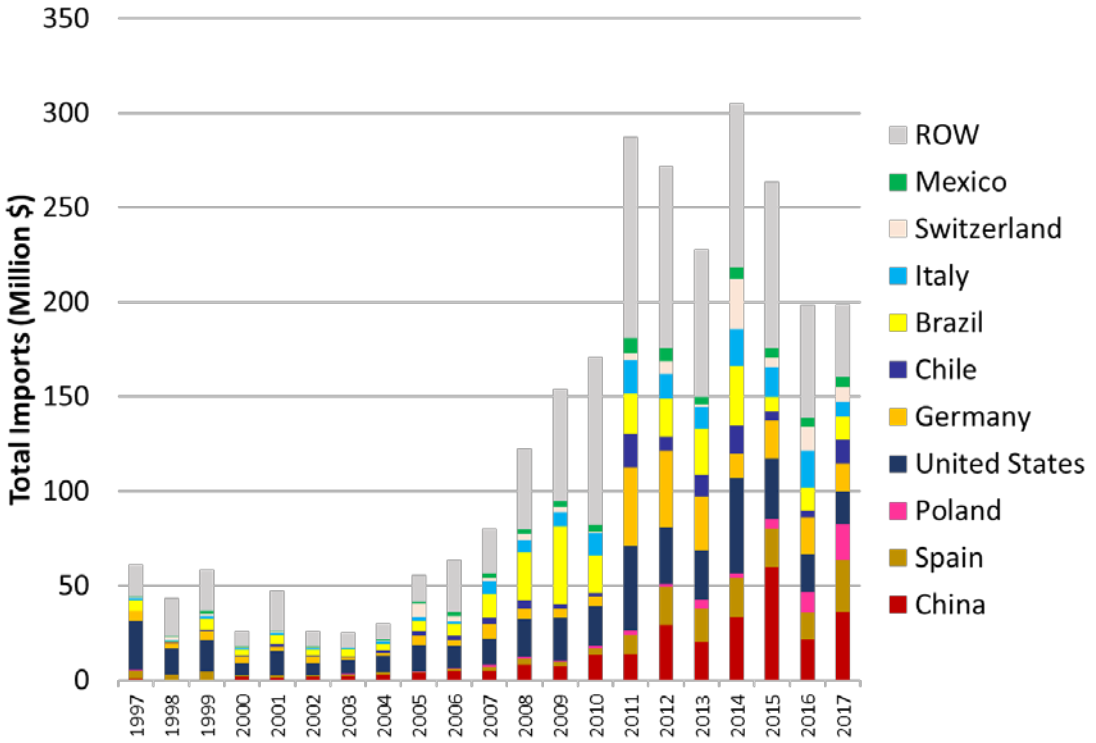
- Peru's grid operator is required to guarantee priority dispatch to electricity generated from renewable sources.
- Enel Distribución Perú is deploying smart meters in the market as a pilot to demonstrate the benefits of smart metering for energy management.

Electricity Generation by Source, 2017



Key Peru Data	
T&D Equipment Imports from U.S., 2017	$17,321,058
U.S. T&D Equipment Imports from Peru, 2017	$22,337
U.S. T&D Equipment Balance of Trade with Peru, 2017	$17,298,721
Electricity Capacity, 2017 (MW)	14,559.1
Electricity Consumption, 2017 (TWh)	46.0
Average Annual Electricity Consumption Projections, 2019-2023	4.78%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	5%
Population, 2017 (Millions)	32.17
Smart Meter Penetration, 2017	0%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

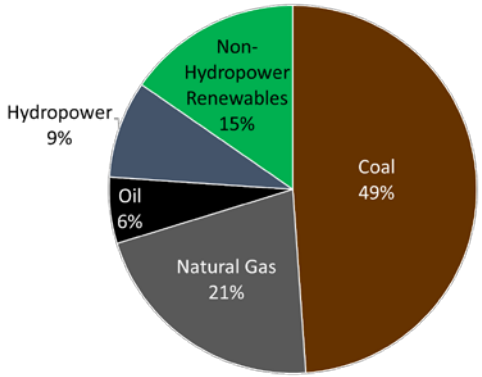
Philippines Data Sheet

Overall Rank	T&D Equipment
#7	#7
Smart Grid ICT	**Energy Storage**
#17	#13

Key Market Insights

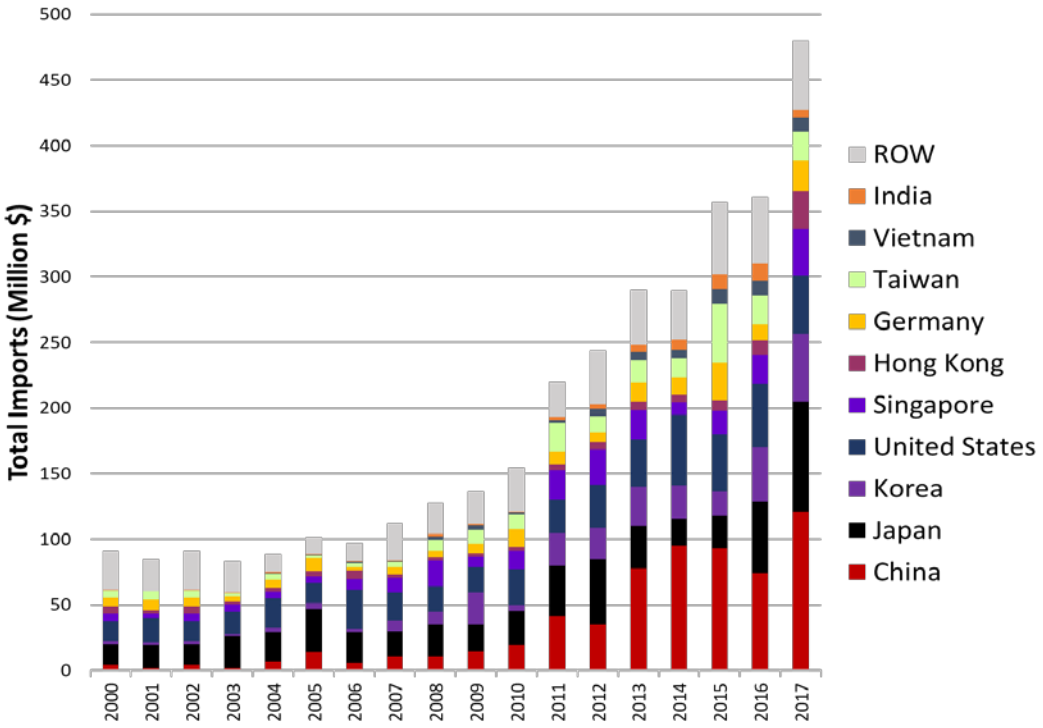
- The Philippines continues to experience rapid growth in its energy sector in response to increasing demand driven by significant domestic economic growth.
- The government is currently developing a policy on how to expand the use of renewable energy coupled with electricity storage to diversify the country's energy generation.
- U.S. smart grid exporters will face significant competition from China, Japan, and Europe in the transmission and distribution sectors.

Electricity Generation by Source, 2017



Key Philippines Data	
T&D Equipment Imports from U.S., 2017	$44,204,553
U.S. T&D Equipment Imports from Philippines, 2017	$9,719,271
U.S. T&D Equipment Balance of Trade with Philippines, 2017	$34,485,282
Electricity Capacity, 2017 (MW)	23,113.0
Electricity Consumption, 2017 (TWh)	81.6
Average Annual Electricity Consumption Projections, 2019-2023	5.2%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	14%
Population, 2017 (Millions)	104.92
Smart Meter Penetration, 2017	1%

T&D Equipment Imports by Year and by Supplier, 2000-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

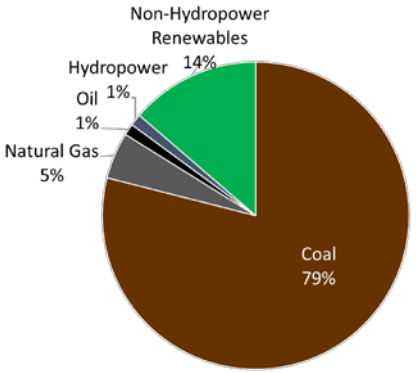
Poland Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#36	#37	#30	#40

Key Market Insights

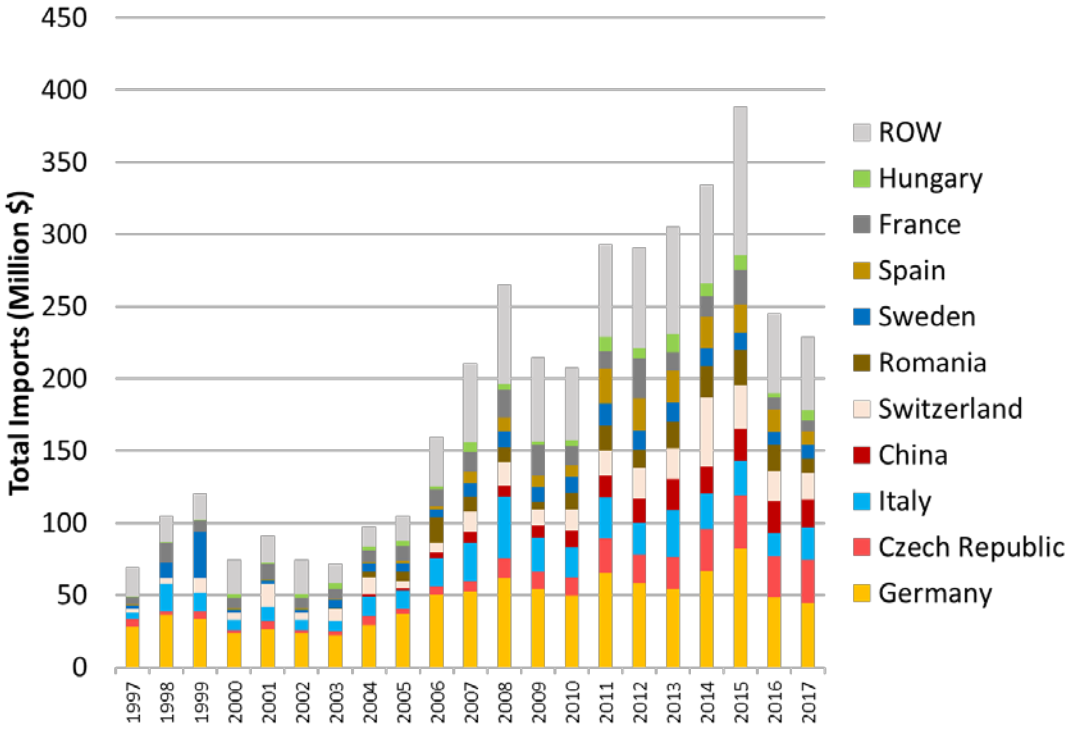
- AMI installations slowed down significantly in 2017, with a marginal number of new installations as legal proceedings have dampened interest in new metering tenders.
- U.S. suppliers of smart grid services interested in entering the Polish market should consider working with Polish partners, as Polish project sponsors usually mandate that any assistance should be available locally and in the Polish language.

Electricity Generation by Source, 2017



Key Poland Data	
T&D Equipment Imports from U.S., 2017	$4,048,411
U.S. T&D Equipment Imports from Poland, 2017	$67,066,348
U.S. T&D Equipment Balance of Trade with Poland, 2017	-$63,017,937
Electricity Capacity, 2017 (MW)	40,784.9
Electricity Consumption, 2017 (TWh)	150.0
Average Annual Electricity Consumption Projections, 2019-2023	0.96%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	14%
Population, 2017 (Millions)	38.17
Smart Meter Penetration, 2017	19%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

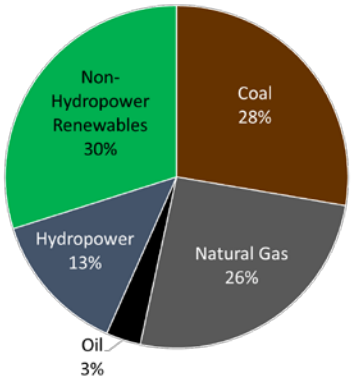
Portugal Data Sheet

Overall Rank	T&D Equipment
#29	#44
Smart Grid ICT	**Energy Storage**
#24	#20

Key Market Insights

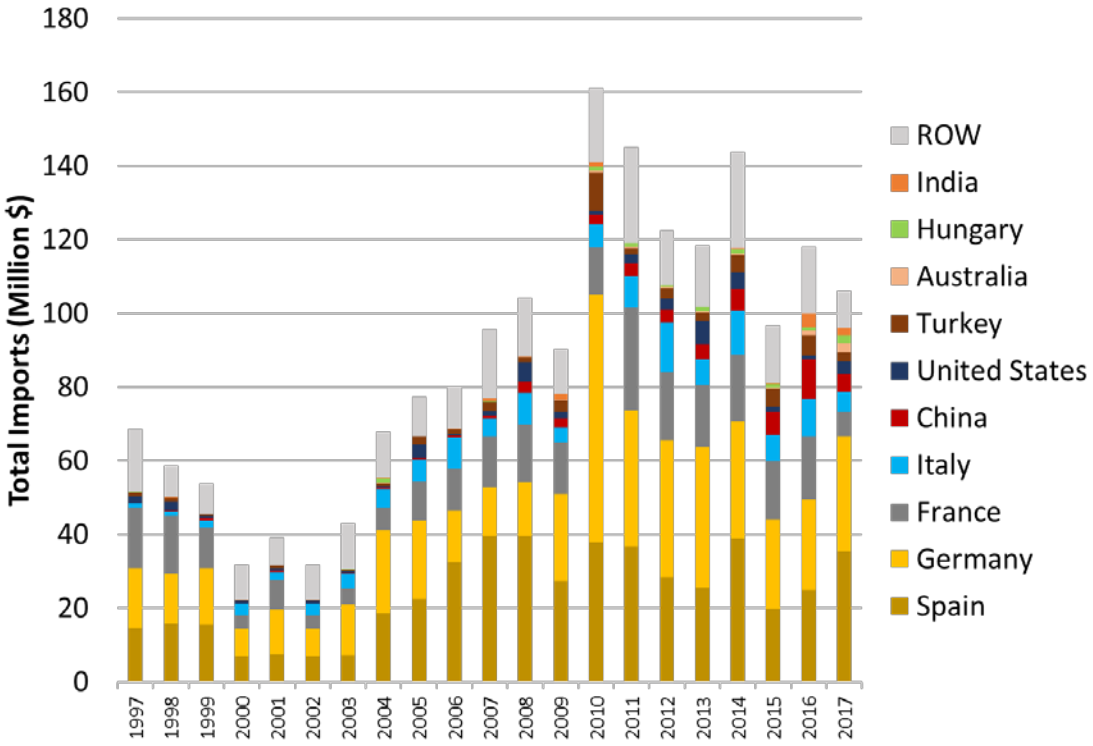
- Portugal's energy regulator, Entidade Reguladora dos Serviços Energéticos (ERSE), provides an economic incentive for distribution system operators to invest in smart grid.
- Former state-owned Energias de Portugal (EDP) continues to seek bids for investment to further privatize the utility. This will affect EDP's assets and operations in Portugal and abroad (including its U.S. assets) as well as potential opportunities for U.S. firms to supply products and services to the utility.

Electricity Generation by Source, 2017



Key Portugal Data	
T&D Equipment Imports from U.S., 2017	$3,283,827
U.S. T&D Equipment Imports from Portugal, 2017	$37,017,801
U.S. T&D Equipment Balance of Trade with Portugal, 2017	-$33,733,974
Electricity Capacity, 2017 (MW)	22,039.7
Electricity Consumption, 2017 (TWh)	51.8
Average Annual Electricity Consumption Projections, 2019-2023	1.2%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	33%
Population, 2017 (Millions)	10.33
Smart Meter Penetration, 2017	36%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

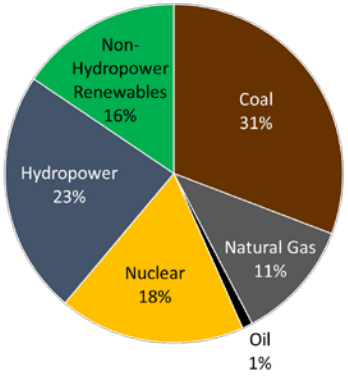
Romania Data Sheet

Overall Rank	T&D Equipment
#51	#52
Smart Grid ICT	**Energy Storage**
#41	#42

Key Market Insights

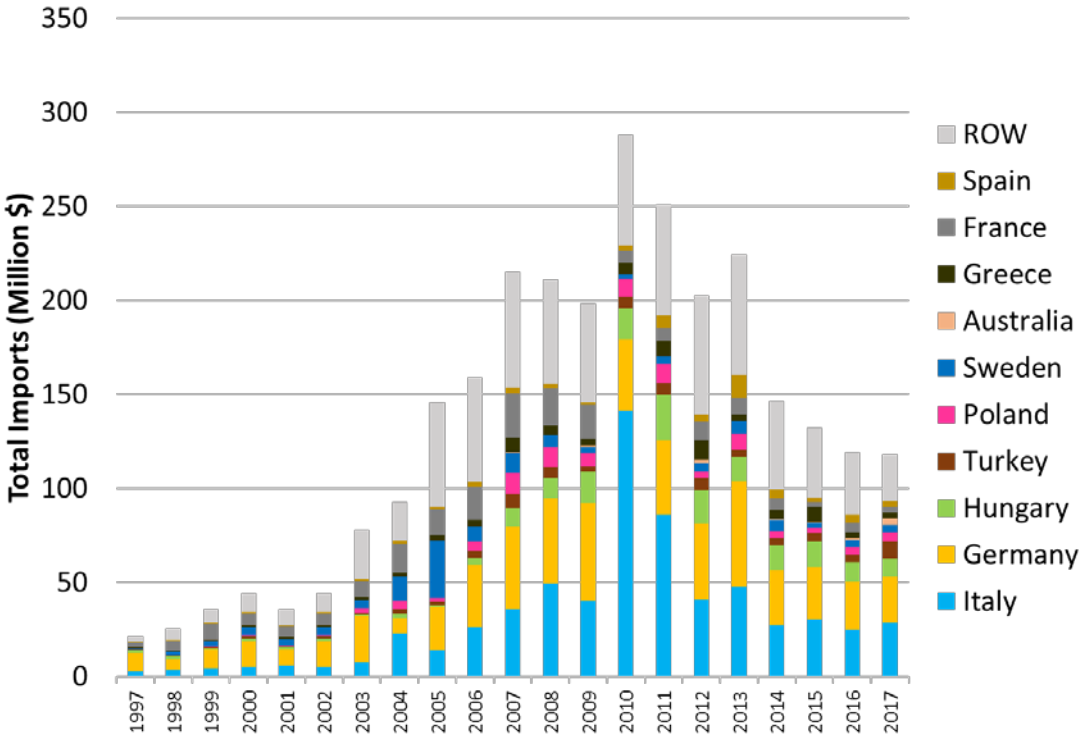
- The electricity transmission system in Romania and the interconnection system with the neighboring countries is managed and operated by the majority state-owned Transelectrica. The company is responsible for the electricity transmission, system and market operation, grid and market infrastructure development, and the security of the Romanian power system.
- Electricity distribution service is ensured by eight independent distribution system operators (DSOs) having exclusive electricity distribution rights in specific regions of the country.

Electricity Generation by Source, 2017



Key Romania Data	
T&D Equipment Imports from U.S., 2017	$1,764,964
U.S. T&D Equipment Imports from Romania, 2017	$5,086,897
U.S. T&D Equipment Balance of Trade with Romania, 2017	-$3,321,933
Electricity Capacity, 2017 (MW)	24,710.2
Electricity Consumption, 2017 (TWh)	51.6
Average Annual Electricity Consumption Projections, 2019-2023	0.98%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	18%
Population, 2017 (Millions)	19.68
Smart Meter Penetration, 2017	9%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

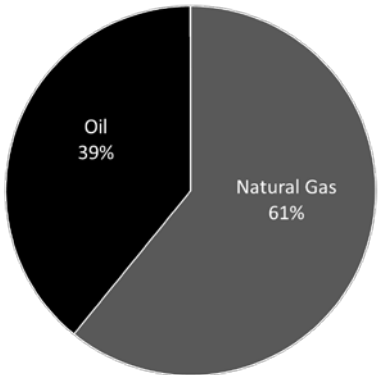
Saudi Arabia Data Sheet

Overall Rank	T&D Equipment
#23	#19
Smart Grid ICT	**Energy Storage**
#22	#25

Key Market Insights

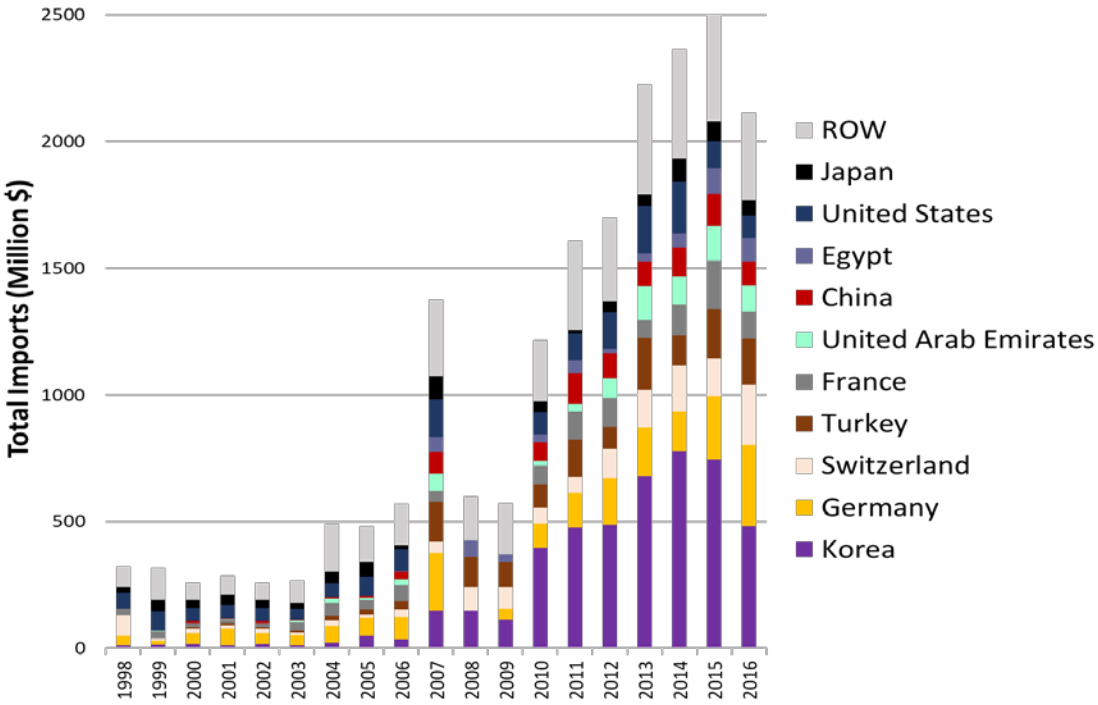
- Over the two years ending in 2016, global oil prices hit decade lows, creating uncertainty in the electricity market and impacting investment, policy, and regulatory decisions.
- As regional interconnections and renewable energy deployment plans move forward, there will be growing interest in implementing smart grid information communications technology (ICT) solutions.

Electricity Generation by Source, 2017



Key Saudi Arabia Data	
T&D Equipment Imports from U.S., 2016*	$89,763,038
U.S. T&D Equipment Imports from Saudi Arabia, 2017	$2,984
U.S. T&D Equipment Balance of Trade with Saudi Arabia, 2016*	$89,754,065
Electricity Capacity, 2017 (MW)	76,815.3
Electricity Consumption, 2017 (TWh)	304.5
Average Annual Electricity Consumption Projections, 2019-2023	1.96%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	0%
Population, 2017 (Millions)	32.94
Smart Meter Penetration, 2017	1%

T&D Equipment Imports by Year and by Supplier, 1998-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

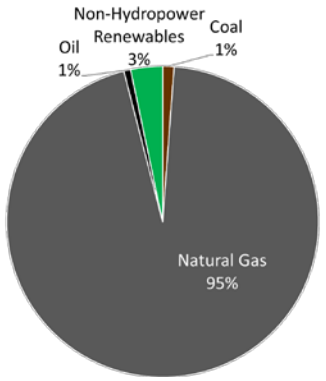
Singapore Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#17	#16	#14	#24

Key Market Insights

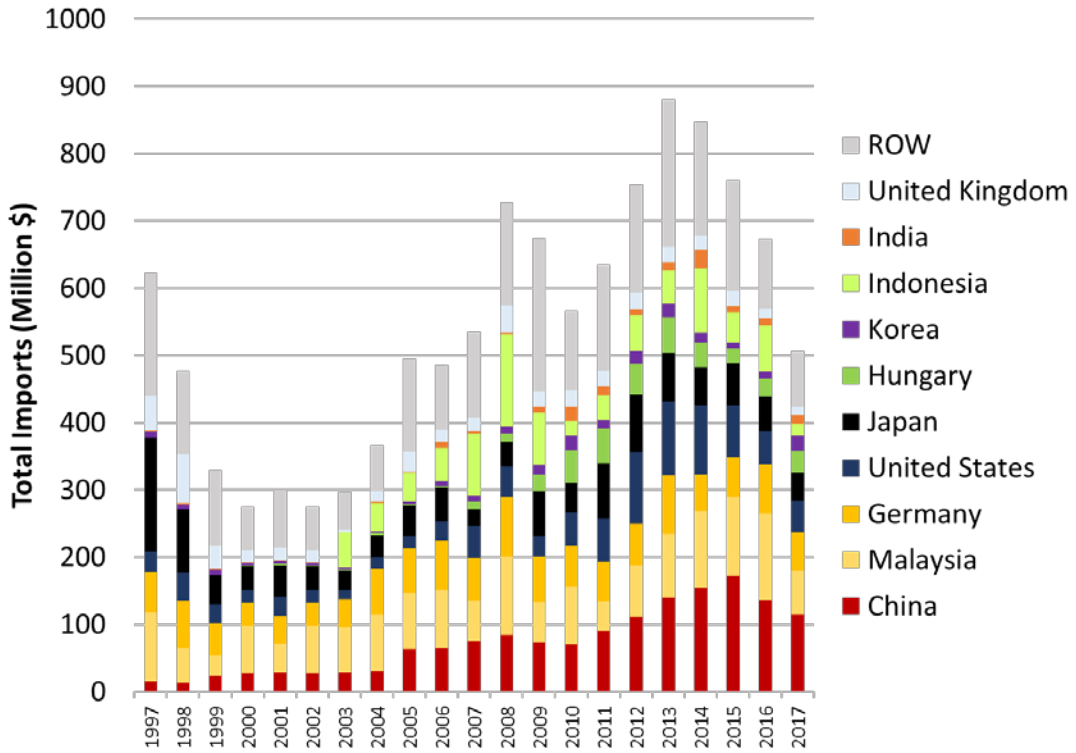
- Under Singapore's "Smart Nation" agenda, investment in the grid will continue as Singapore pursues moving all social and utility services online by 2023.
- The Energy Market Authority (EMA) has established a $18 million Energy Storage Programme to develop technologies that will enhance the overall stability and resilience of Singapore's power system.
- Sandia National Laboratory signed an energy storage cooperative agreement with EMA to cooperate on R&D for various storage applications on the grid.

Electricity Generation by Source, 2017



Key Singapore Data	
T&D Equipment Imports from U.S., 2017	$47,296,442
U.S. T&D Equipment Imports from Singapore, 2017	$2,157,200
U.S. T&D Equipment Balance of Trade with Singapore, 2017	$45,139,242
Electricity Capacity, 2017 (MW)	13,733.8
Electricity Consumption, 2017 (TWh)	50.6
Average Annual Electricity Consumption Projections, 2019-2023	2.66%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	5%
Population, 2017 (Millions)	5.71
Smart Meter Penetration, Regional Average, 2017	4%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

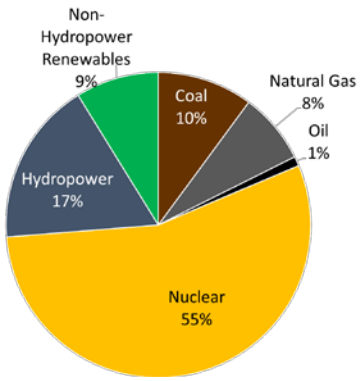
Slovakia Data Sheet

Key Market Insights

- Slovakia's day-ahead energy market has been coupled with the markets in the Czech Republic, Hungary and Romania since 2014. Short-term electricity trading with the Czech Republic and Hungary has existed since 2012.
- Renewable energy penetration is limited by insufficient transmission infrastructure.

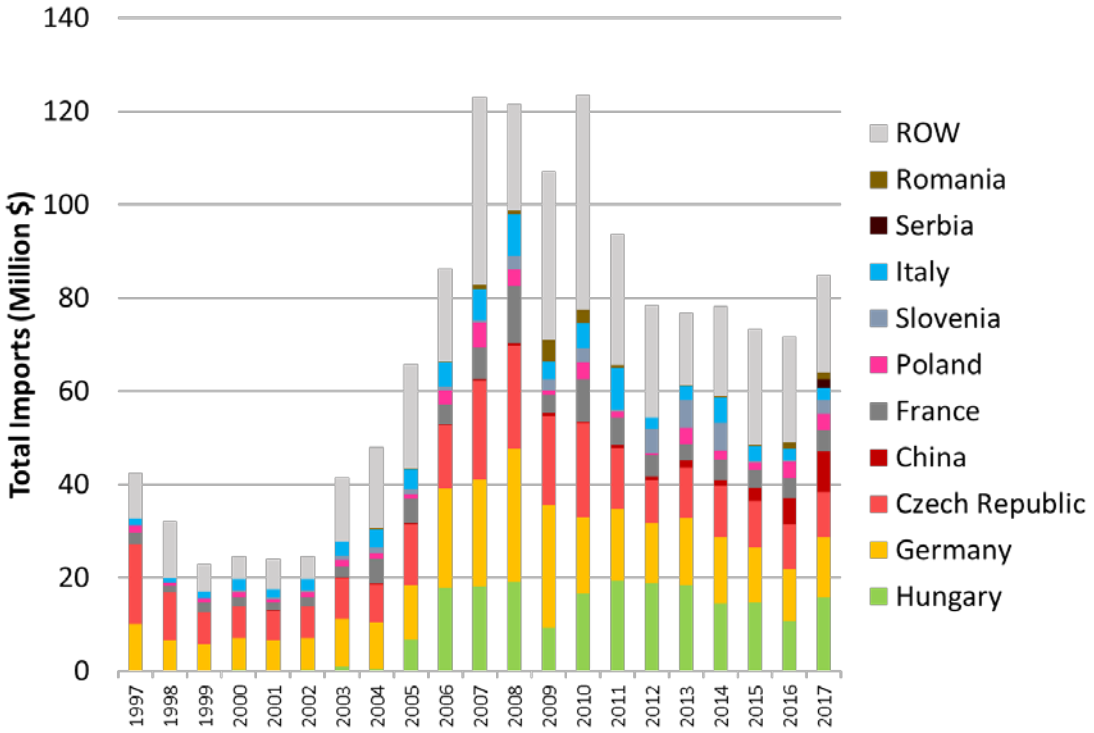
Overall Rank	T&D Equipment
#43	#34
Smart Grid ICT	**Energy Storage**
#37	#49

Electricity Generation by Source, 2017



Key Slovakia Data	
T&D Equipment Imports from U.S., 2017	$886,072
U.S. T&D Equipment Imports from Slovakia, 2017	$3,422,478
U.S. T&D Equipment Balance of Trade with Slovakia, 2017	-$2,536,406
Electricity Capacity, 2017 (MW)	7,774.2
Electricity Consumption, 2017 (TWh)	26.7
Average Annual Electricity Consumption Projections, 2019-2023	0.98%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	8%
Population, 2017 (Millions)	5.45
Smart Meter Penetration, Regional Average, 2017	26%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

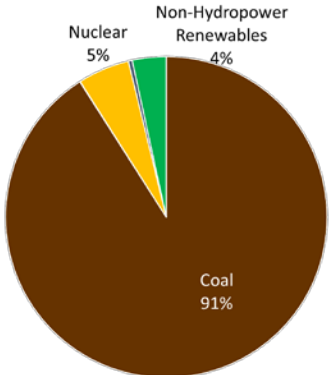
South Africa Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#44	#53	#35	#33

Key Market Insights

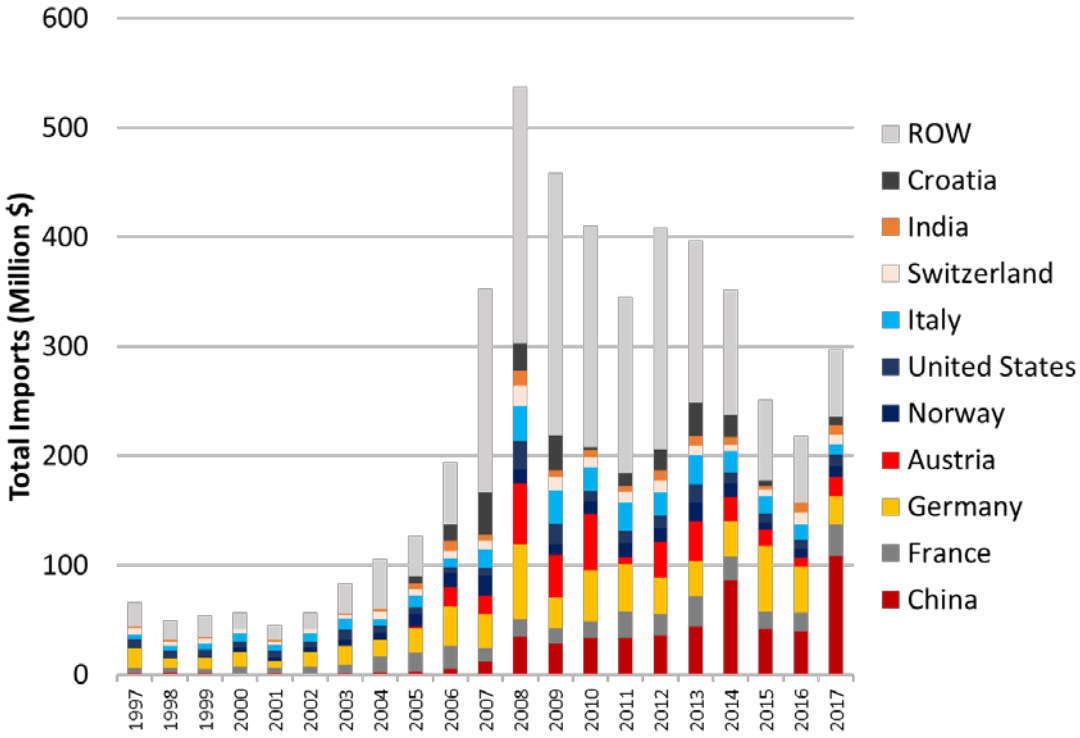
- South Africa is an anchor market for the region. ESKOM, the vertically integrated, state-owned power company, generates approximately 95 percent of the electricity used in South Africa, as well as sells electricity to neighboring countries, including Botswana, Lesotho, Mozambique, Namibia, Swaziland and Zimbabwe.
- Eskom and South Africa's 187 municipal governments are responsible for electricity distribution in South Africa. Many of the municipalities are experiencing financial problems. The maintenance backlog in the sector is valued at approximately $2.58 billion.

Electricity Generation by Source, 2017



Key South Africa Data	
T&D Equipment Imports from U.S., 2017	$10,109,060
U.S. T&D Equipment Imports from South Africa, 2017	$244,611
U.S. T&D Equipment Balance of Trade with South Africa, 2017	$9,864,449
Electricity Capacity, 2017 (MW)	53,882.0
Electricity Consumption, 2017 (TWh)	194.5
Average Annual Electricity Consumption Projections, 2019-2023	0.58%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	4%
Population, 2017 (Millions)	56.72
Smart Meter Penetration, 2017	6%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

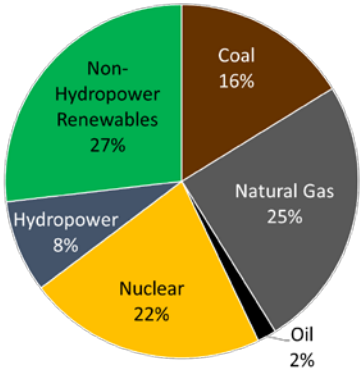
Spain Data Sheet

Overall Rank	T&D Equipment
#28	#46
Smart Grid ICT	**Energy Storage**
#23	#14

Key Market Insights

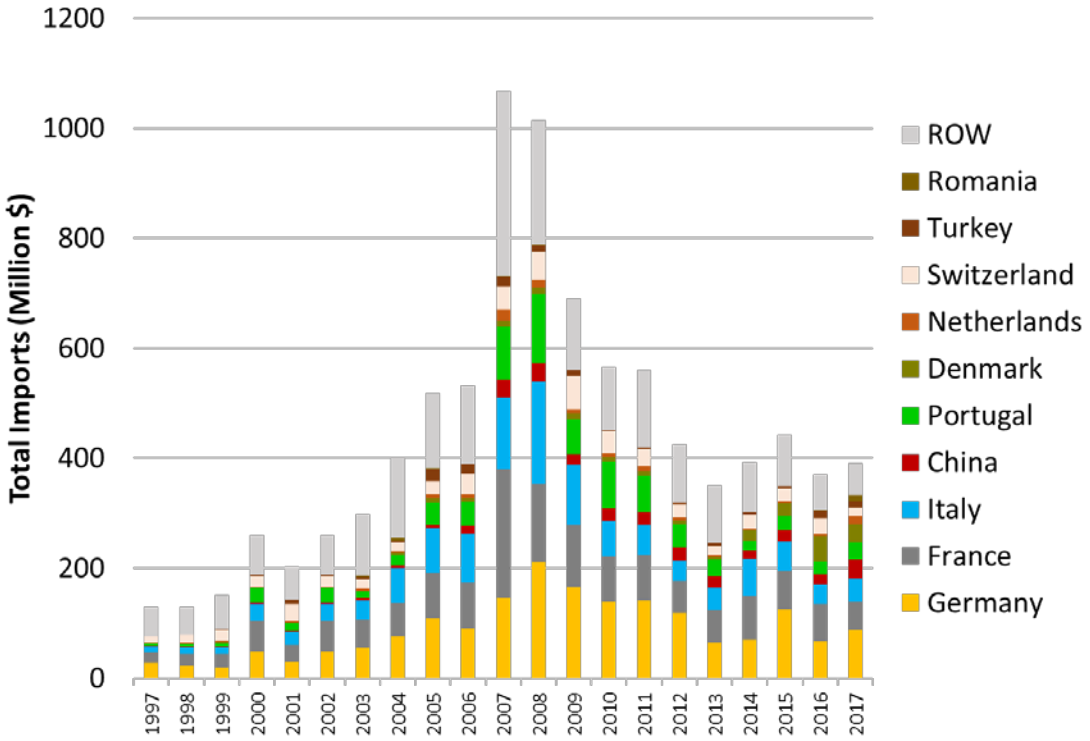
- Successful deployment of renewable energy – solar and wind – increase market opportunities for U.S. energy storage providers.
- Spain is hosting two of five demonstration projects under the EU program "FLEXIFIENCY." The NOBEL GRID and UPGRID projects bring together major DSOs, retailers and aggregators, software providers, research organizations and municipalities. The projects deploy advanced tools and ICT services to all actors in the smart grid and retail electricity market to ensure benefits from cheaper prices and more secure and stable grids.

Electricity Generation by Source, 2017



Key Spain Data	
T&D Equipment Imports from U.S., 2017	$7,024,929
U.S. T&D Equipment Imports from Spain, 2017	$41,560,075
U.S. T&D Equipment Balance of Trade with Spain, 2017	-$34,535,146
Electricity Capacity, 2017 (MW)	104,151.3
Electricity Consumption, 2017 (TWh)	242.3
Average Annual Electricity Consumption Projections, 2019-2023	0.48%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	32%
Population, 2017 (Millions)	46.35
Smart Meter Penetration, 2017	84%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

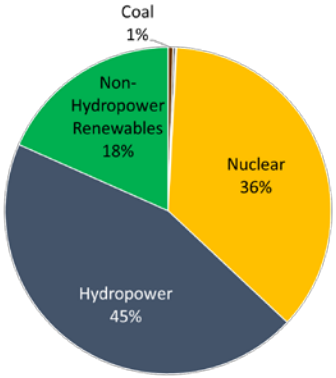
Sweden Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#18	#43	#5	#12

Key Market Insights

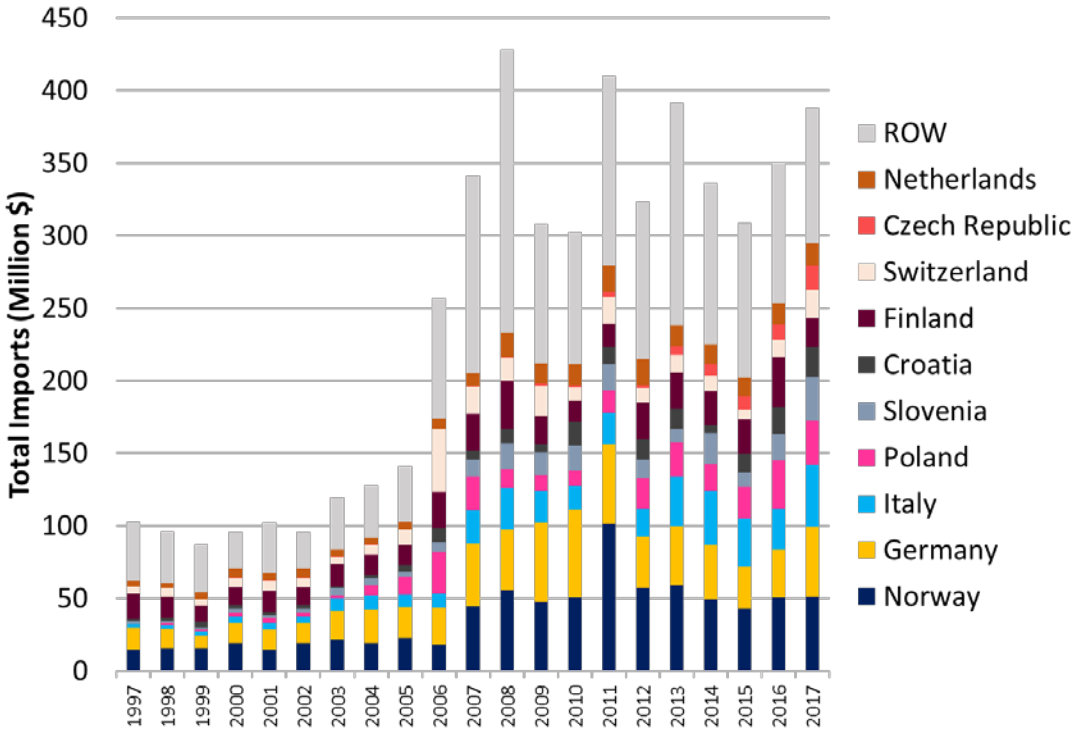
- Sweden is expected to replace its smart meters in 2018-2019. The replacements are required to meet specifications issued by the government.
- The government of Sweden subsidizes residential energy storage at 60 percent of the cost of a home battery pack up to 50,000 Swedish Krona (approx. $5,400). The initiative is motivated by Sweden's goal to become free from fossil fuels for electricity generation by 2040. However, the program is slated to conclude in 2019.

Electricity Generation by Source, 2017



Key Sweden Data	
T&D Equipment Imports from U.S., 2017	$5,099,856
U.S. T&D Equipment Imports from Sweden, 2017	$19,249,166
U.S. T&D Equipment Balance of Trade with Sweden, 2017	-$14,149,310
Electricity Capacity, 2017 (MW)	39,694.7
Electricity Consumption, 2017 (TWh)	135.1
Average Annual Electricity Consumption Projections, 2019-2023	0.68%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	24%
Population, 2017 (Millions)	9.91
Smart Meter Penetration, 2017	100%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

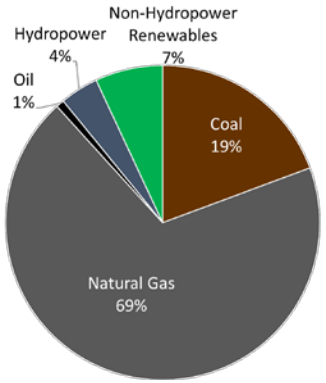
Thailand Data Sheet

Overall Rank	T&D Equipment	Smart Grid ICT	Energy Storage
#33	#24	#31	#41

Key Market Insights

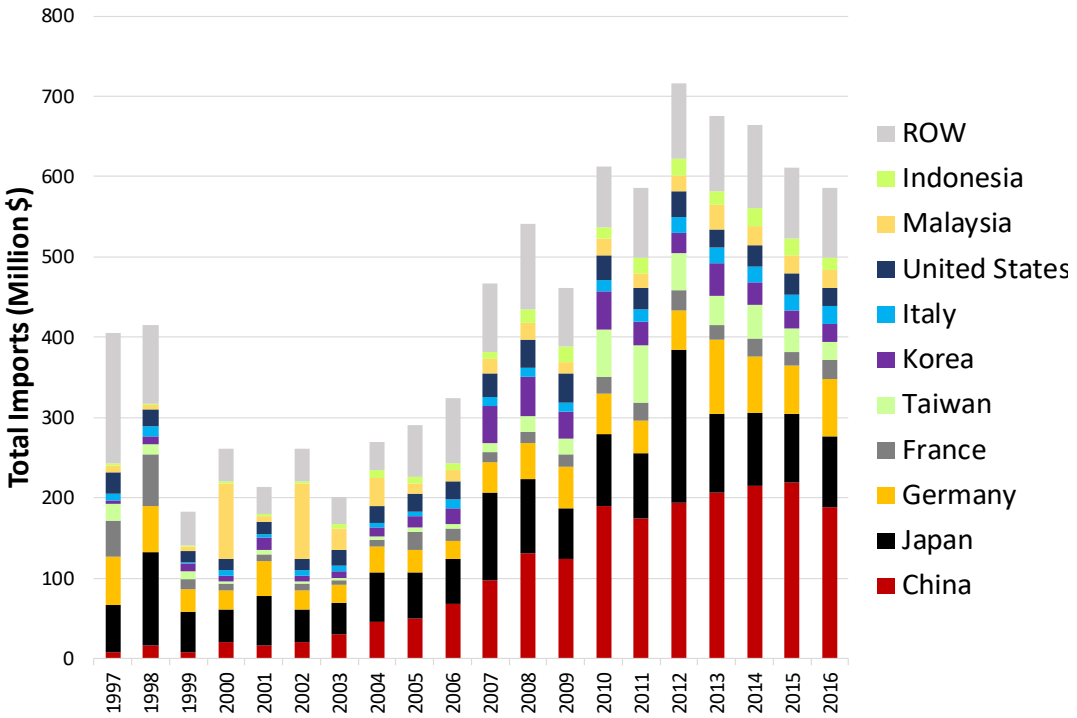
- Thailand's National Energy Policy Council has a national smart grid plan to reduce energy usage by 350 MW by 2036.
- State-owned utilities are expected to spend up to $5.6 billion in implementing up to five smart grid pilot projects under the guidance of Thailand's Ministry of Energy.
- Utility firms which will pilot smart grid technologies include the Electricity Generating Authority of Thailand, the Provincial Electricity Authority, and the Metropolitan Electricity Authority.

Electricity Generation by Source, 2017



Key Thailand Data	
T&D Equipment Imports from U.S., 2016*	$22,152,415
U.S. T&D Equipment Imports from Thailand, 2017	$4,751,760
U.S. T&D Equipment Balance of Trade with Thailand, 2016*	$18,883,278
Electricity Capacity, 2017 (MW)	46,011.0
Electricity Consumption, 2017 (TWh)	183.2
Average Annual Electricity Consumption Projections, 2019-2023	3.04%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	9%
Population, 2017 (Millions)	69.04
Smart Meter Penetration, 2017	2%

T&D Equipment Imports by Year and by Supplier, 1997-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

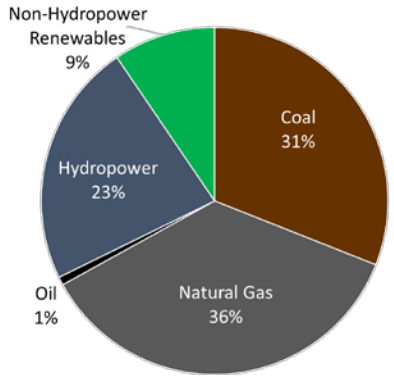
Turkey Data Sheet

Overall Rank	T&D Equipment
#20	#20
Smart Grid ICT	**Energy Storage**
#11	#30

Key Market Insights

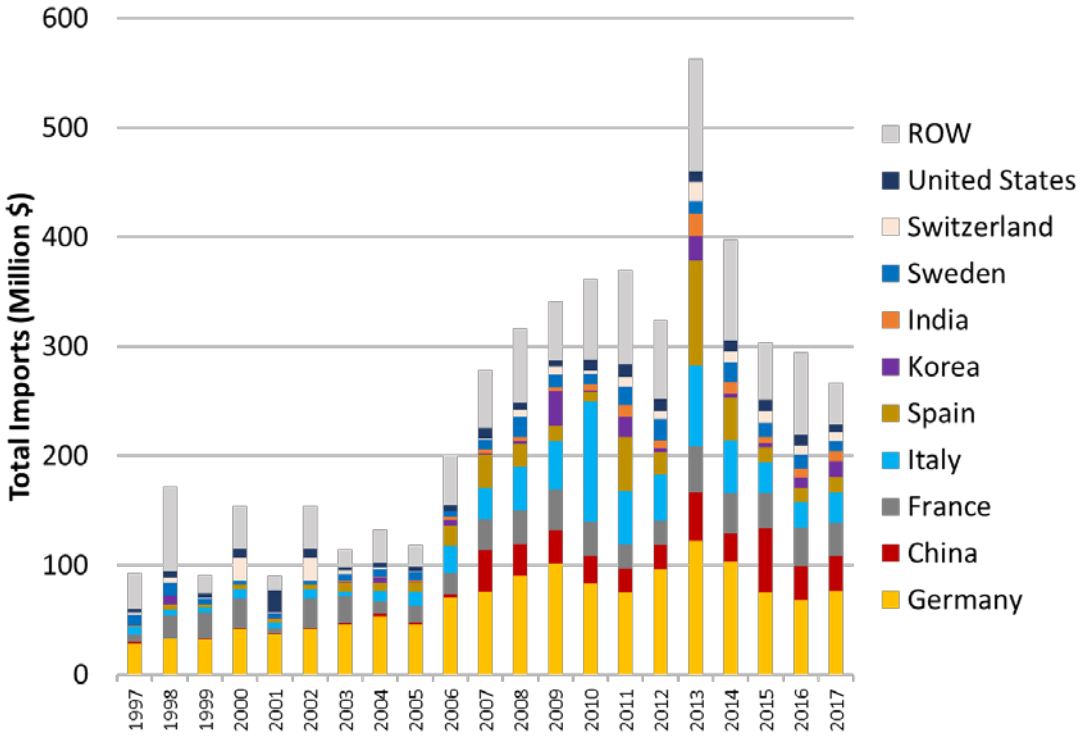
- Turkey's *SG TMR* ranking is bolstered by strong electricity demand growth, public- and private-sector investment in grid modernization, and steady progress in electricity market reforms.
- Turkish increases to regulated electricity rates have improved the smart grid investment climate.
- Turkey Smart Grid 2023 (TSG'2023) Vision and Strategy Roadmap highlights priority investment areas of the 21 Turkish distribution utilities.
- Frequency regulation challenges on the Turkish grid create opportunities for energy storage.

Electricity Generation by Source, 2017



Key Turkey Data	
T&D Equipment Imports from U.S., 2017	$7,057,507
U.S. T&D Equipment Imports from Turkey, 2017	$14,345,404
U.S. T&D Equipment Balance of Trade with Turkey, 2017	-$7,287,897
Electricity Capacity, 2017 (MW)	84,495.2
Electricity Consumption, 2017 (TWh)	241.6
Average Annual Electricity Consumption Projections, 2019-2023	4.5%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	18%
Population, 2017 (Millions)	80.75
Smart Meter Penetration, 2017	30%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

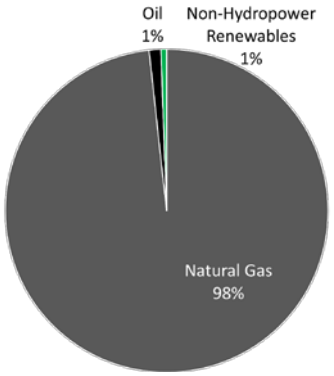
United Arab Emirates Data Sheet

Overall Rank	T&D Equipment
#13	#8
Smart Grid ICT	**Energy Storage**
#26	#23

Key Market Insights

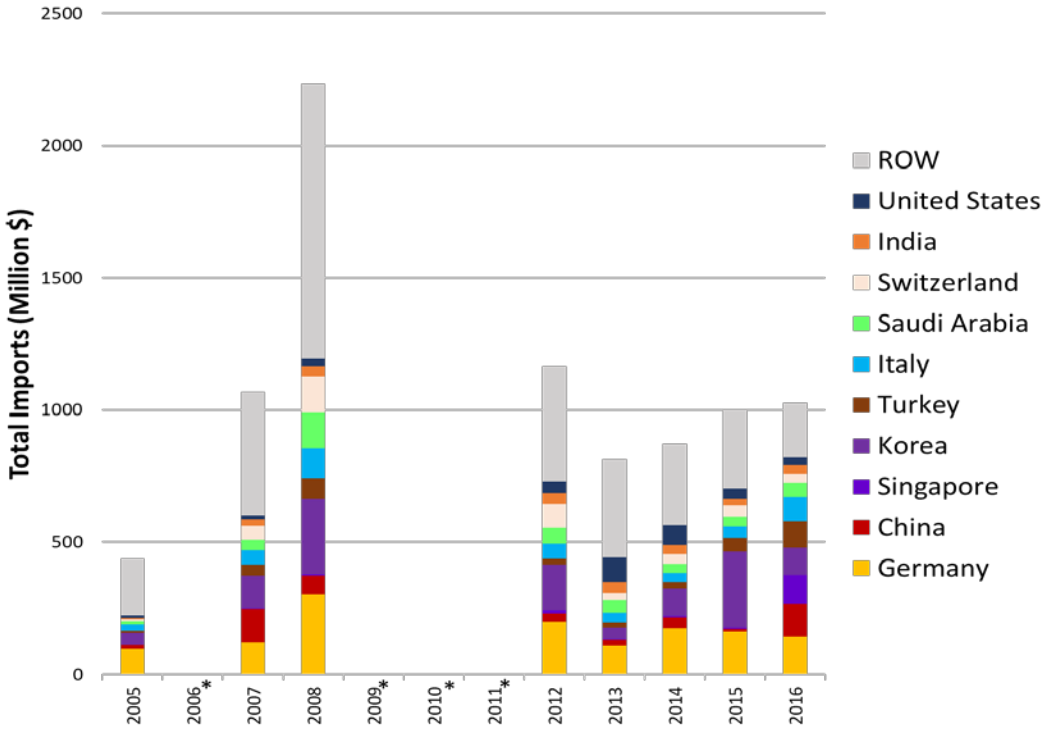
- Under its Energy Plan 2050, UAE aims to increase the consumption of clean energy by 50 percent and improve energy efficiency by 40 percent to save $190.5 billion.
- Dubai Electricity and Water Authority (DEWA) has allocated $1.905 billion for smart grid development.
- DEWA, Abu Dhabi Department of Energy (ADE), Sharjah Electricity and Water Authority (SEWA) have initiated AMI deployments.
- Council.

Electricity Generation by Source, 2017



Key United Arab Emirates (UAE) Data	
T&D Equipment Imports from U.S., 2016*	$27,585,206
U.S. T&D Equipment Imports from UAE, 2017	$59,545
U.S. T&D Equipment Balance of Trade with UAE, 2016*	$27,575,059
Electricity Capacity, 2017 (MW)	31,408.8
Electricity Consumption, 2017 (TWh)	120.3
Average Annual Electricity Consumption Projections, 2019-2023	4.94%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	4%
Population, 2017 (Millions)	9.40
Smart Meter Penetration (Regional Average), 2017	12%

T&D Equipment Imports by Year and by Supplier, 2005-2016



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.
*Denotes years the United Arab Emirates did not report import data to United Nations.

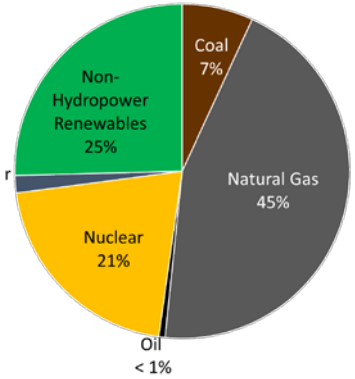
United Kingdom Data Sheet

Key Market Insights

- Increasing electricity demand, constrained supply, emphasis on energy security and challenging carbon reduction targets are driving transformation in energy and utilities in the UK, which is driving deployment of smart grids technologies.
- Technology providers are often required to customize their solutions or to be prepared to partner with UK firms.

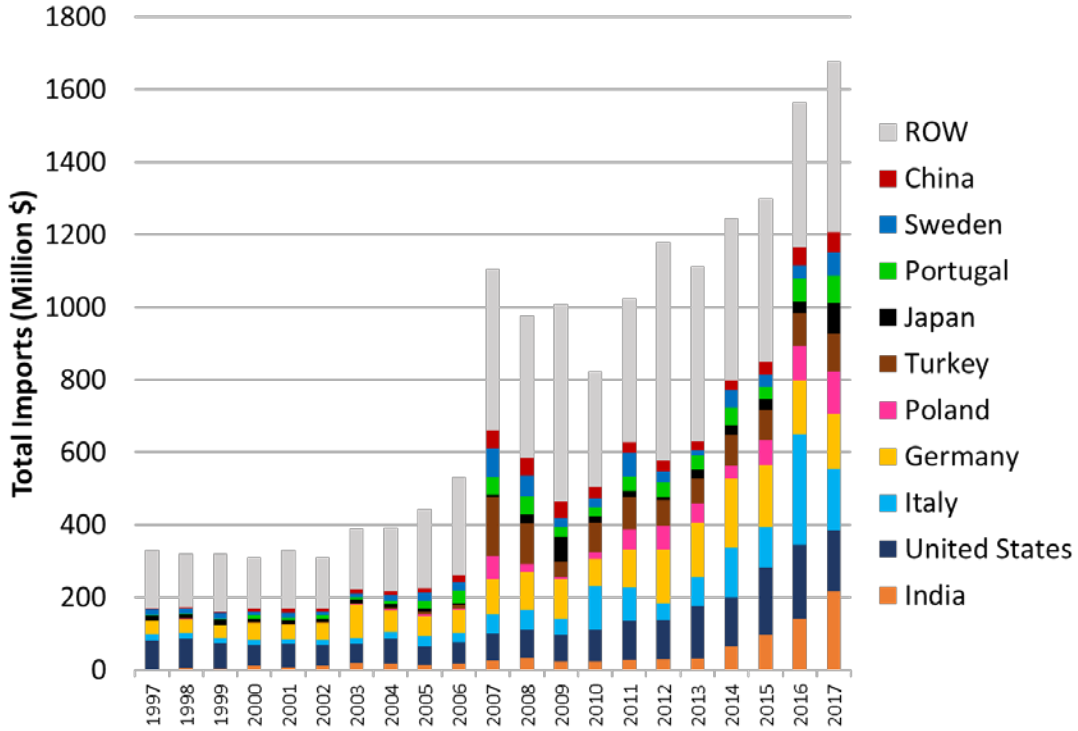
Overall Rank	T&D Equipment
#3	#21
Smart Grid ICT	**Energy Storage**
#1	#1

Electricity Generation by Source, 2017



Key United Kingdom Data	
T&D Equipment Imports from U.S., 2017	$168,894,834
U.S. T&D Equipment Imports from United Kingdom, 2017	$41,221,007
U.S. T&D Equipment Balance of Trade with United Kingdom, 2017	$127,673,827
Electricity Capacity, 2017 (MW)	99,401.2
Electricity Consumption, 2017 (TWh)	309.2
Average Annual Electricity Consumption Projections, 2019-2023	0.28%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	35%
Population, 2017 (Millions)	66.18
Smart Meter Penetration, 2017	24%

T&D Equipment Imports by Year and by Supplier, 1997-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

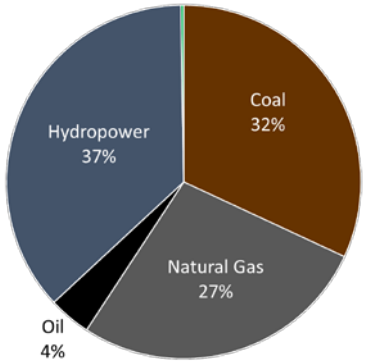
Vietnam Data Sheet

Overall Rank	T&D Equipment
#9	#5
Smart Grid ICT	**Energy Storage**
#19	#28

Key Market Insights

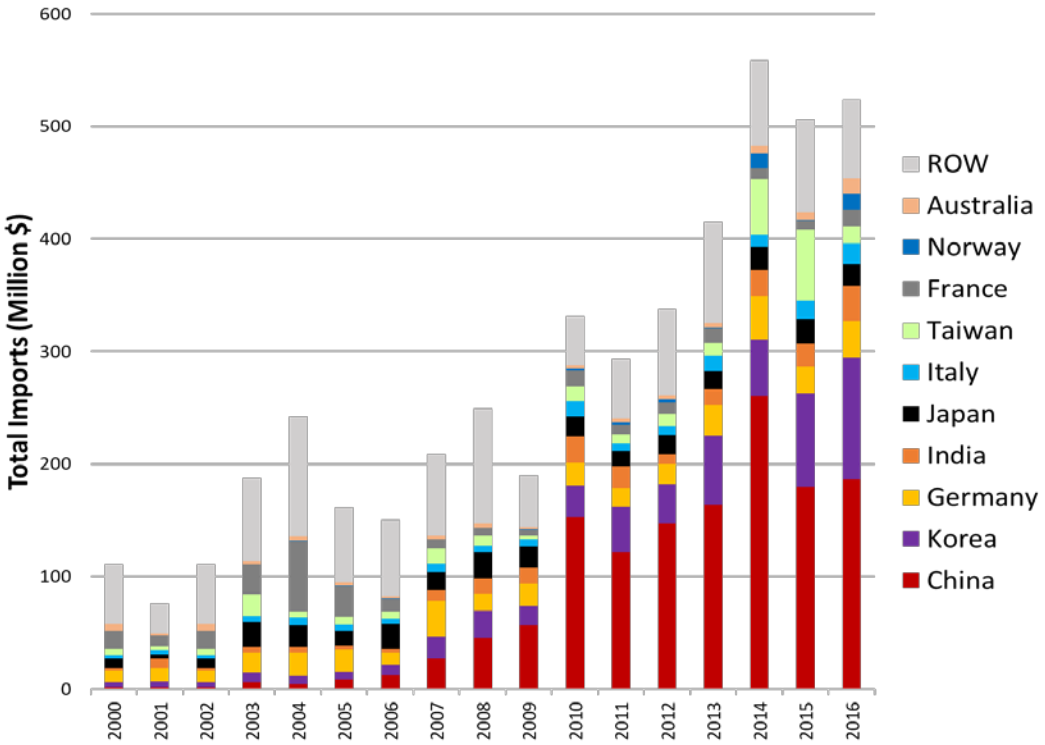
- Electricity of Vietnam (EVN), a state-owned enterprise that reports directly to the prime minister, is the largest buyer of electricity, and holds a controlling interest on T&D through subsidiaries.
- Vietnam is expected to invest $4.3 billion in T&D networks through 2020, which will increase demand for control and protection equipment and devices such as power transformers, circuit breakers, and ICT systems.
- Asian Development Bank and World Bank have committed $750 million and $500 million, respectively, to financing transmission upgrades, smart grid networks, and capacity building.

Electricity Generation by Source, 2017



Key Vietnam Data	
T&D Equipment Imports from U.S., 2016*	$11,318,922
U.S. T&D Equipment Imports from Vietnam, 2017	$3,401,818
U.S. T&D Equipment Balance of Trade with Vietnam, 2016*	$3,269,548
Electricity Capacity, 2017 (MW)	47,673.4
Electricity Consumption, 2017 (TWh)	148.1
Average Annual Electricity Consumption Projections, 2019-2023	6.88%
Projected Share of Non-Hydro Renewable Energy in Electricity Mix, 2023	1%
Population, 2017 (Millions)	95.54
Smart Meter Penetration, 2017	2%

T&D Equipment Imports by Year and by Supplier, 2000-2017



Data Sources: United Nations Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration.; Business Monitor International; Bloomberg New Energy Finance.

APPENDIXES

Appendix 1: Methodology & Rankings

Overview

The Smart Grid Top Market Report (*SG TMR*) rankings integrate data and information on global markets and trade, including the critical contributions of commercial specialists from U.S. Commercial Service posts in every country ranked in the report. Rankings for the *SG TMR* are based on 15 factors across five categories. The data to evaluate 146 markets are combined using a weighted scorecard methodology to produce relative rankings of the 56 subject markets. Markets are ranked both overall and for three sub-sectors: Transmission and Distribution (T&D) Equipment; Smart Grid Information Communication Technologies (ICT); and Energy Storage.

Smart Grid Top Market Report Methodology (2018)

	Category	Descirption	Number of Factor(s)	Data Source(s)	Weighting Percent			
					Overall	T&D Equipment	Smart Grid ICT	Energy Storage
1	Smart Grid Market Growth Potential	Industry data and information on policies, regulations, and other local drivers of the smart grid technologies and services market	7	U.S. Department of Commerce	30	--	70	20
2	Trade Factors and U.S. Competitiveness	Trade data and other information on exports of U.S. T&D equipment products and services in a given market	3	U.S. Department of Commerce; U.S. Census Trade Data; Business Monitor International	30	70	--	10
3	Energy Storage Growth Potential	Energy storage deployment and information on renewable energy deployment and other drivers for the energy storage system market	3	U.S. Department of Commerce; Business Monitor International; Bloomberg New Energy Finance; U.S. Department of Energy, Global Energy Storage Database	10	--	--	40
4	Key Economic and Energy Sector Investment Indicators	Broader economic data and power sector trends that effect investment in electricity infrastructure, and the development and growth of the smart grid in a given market	1	Business Monitor International	20	20	20	20
5	Strength of Domestic Industry	Trade data and other information on the extent to which demand for smart grid technology and services will be met by the domestic industry – as opposed to international trade – in a given market	1	Purdue University, Global Trade Atlas Project	10	10	10	10

Methodology: Category 1

The development of the smart grid in a given market is dependent on a range of factors that can be affected by policy, regulations, investment, electricity industry, consumers, and the wider economic and business environment. To estimate potential for export growth in each market, ITA developed a scoring system to evaluate smart grid market drivers and factors impacting the U.S. smart grid industry competitiveness. The scoring system is summarized below.

This part of the SG TMR analysis focuses on the market potential for exporters of integrated ICT and services and is based on contributions of smart grid commercial specialists from the U.S. Commercial Service posts in every country ranked in the report. No modifications to the criteria were made for the 2018 SG TMR, but the data set was updated based on new information.

Smart Grid Market Growth Potential Score Methodology, Category 1

	Driver	Weighting Percent	Criteria	Examples of Indicators
1	Government Commitment	10	Has the government developed ambitious smart grid deployment targets and a strategic plan to achieve them? Is the government likely to follow-through on this plan and achieve these targets?	Smart grid road map; smart meter target; engagement on standards and smart grid interoperability
2	Energy Policy Drivers	10	Are the country's policy and market objectives for the wider energy sector helping to drive deployment of the smart grid?	Renewable energy targets; carbon emissions reductions target; energy productivity targets
3	Regulatory Drivers	10	Do regulations in the electricity sector incentivize or directly support smart grid investment or development by utilities or other stakeholders?	Deregulated market structure; demand charge pricing; subsidies; performance-based pricing or targets
4	Grid Investment and Electricity Market Activity	10	Are utilities and other smart grid stakeholders investing in the modernization of the grid and smart grid solutions?	Public and private investment to date
5	Additional Smart Grid Drivers or Barriers	10	Are there other factors either supporting or hampering smart grid development in the market?	Electric vehicle policies or deployment targets; energy storage policies or deployment targets; T&D loss rates; privacy laws; smart cities incentive programs
6	Smart Grid Business Environment and U.S. Competitiveness	10	Does local competition or other business environment factors impact the export potential of U.S. smart grid products and services in the market?	U.S. interagency experience; presence and success of U.S. firms; local content requirements or other protectionist policies
7	Local Assessment of Smart Grid Market and Commercial Potential for U.S. Exporters	40	U.S. & Foreign Commercial Service specialists' assessment the subject smart grid market	Market size estimate; government engagement with U.S. Embassy staff; interest by U.S. firms

Methodology: Category 2

The *SG TMR* also quantifies opportunities for U.S. manufacturers of T&D equipment. In order to estimate U.S. export growth potential, this category score incorporates existing trade data, along with an analysis of additional market factors that impact growth potential.
The only methodology change from the 2017 *SG TMR* to the 2018 *SG TMR* was in Category 2, where the weighting factor of the T&D equipment export score from 33 percent to 50 percent.

Trade data was drawn from 24 ten-digit product codes from the Harmonized Tariff Schedule of the United States Annotated as published by the International Trade Commission (see Appendix 2).

The trade data trend analysis is supplemented by an electricity consumption trend score drawing on Business Monitor International electricity consumption predictions for the next five years (2018-2022). [7] This score quantifies potential growth in T&D infrastructure investment driven by a recent electricity consumption trends while also considering market factors—including national policy, financing, and other economic factors—that could potentially impact the build-out of T&D infrastructure.

The resulting category score and ranking is a relative measure of a market's potential for near-term growth in U.S. exports of T&D equipment.

Trade Factors and U.S. Competitiveness Score Methodology, Category 2				
	Factor	Weighting Percent	Data Set	Source
1	T&D Equipment Export Score	50	U.S. exports to the subject market by absolute revenue (2017), normalized	U.S. Census Trade Data via the Trade Policy Information System of the U.S. Department of Commerce: International Trade Administration. Data was accessed June 6, 2017 and includes 24 product lines at the ten-digit level.
2	T&D Equipment Growth Score	25	Percentage change in revenue of U.S. exports to the subject market (2015-2017), normalized	U.S. Census Trade Data via the Trade Policy Information System of the U.S. Department of Commerce: International Trade Administration. Data was accessed June 6, 2018 and includes 24 product lines at the ten-digit level.
3	Electricity Consumption Growth Score	25	Average projected annual electricity consumption growth by percentage (2019-2023), normalized	Business Monitor International, Accessed: May 30, 2018.

Methodology: Category 3

The Energy Storage Growth Potential score (*Category 3*) is the sum of three normalized, weighted data sets. Deployment scores focused on analysis of electrochemical energy storage solutions, rather than all energy storage technologies solutions (e.g., pumped hydropower and hydrogen fuel cells).

No modifications to the criteria were made for the *2018 SG TMR*, but the data set was updated based on new information.

Smart Grid Top Market Report Methodology, Category 3				
	Factor	Weighting Percent	Data Set	Source
1	Local Assessment of Energy Storage Market and U.S. Export Potential	25	U.S. & Foreign Commercial Service specialists' assessment the subject smart grid market, normalized	U.S. Department of Commerce
2	Renewable Energy Electricity Deployment Score	25	Percentage of electricity generated by non-hydropower renewable energy projected for 2023, normalized	Business Monitor International, Accessed: May 30, 2018.
3	Energy Storage Deployment Score	50	Quantitative assessment of current installed capacity of battery (electro-chemical) energy storage systems and total number of projects ranked on a 10 point scale	U.S. Department of Energy Global Energy Storage Database: http://energystorageexchange.org/. Accessed May 30, 2018.; Bloomberg New Energy Finance, Energy Smart Technologies Database. Accessed: June 4, 2018.

Methodology: Category 4

To incorporate broader economic and investment data that could impact the growth of smart grid markets, this score uses Business Monitor International's Power Risk/Reward Index of major international electricity markets. [9] Business Monitor International's score "considers a thorough and all-encompassing range of factors that affect the investment climate in the electricity sector." Because smart grid development and deployment depends on these wider factors – including the health of the electricity sector, the overall investment climate, and the national economy – Business Monitor International's score is a valuable addition to ITA's analysis. The data was accessed on May 23, 2018. [9]

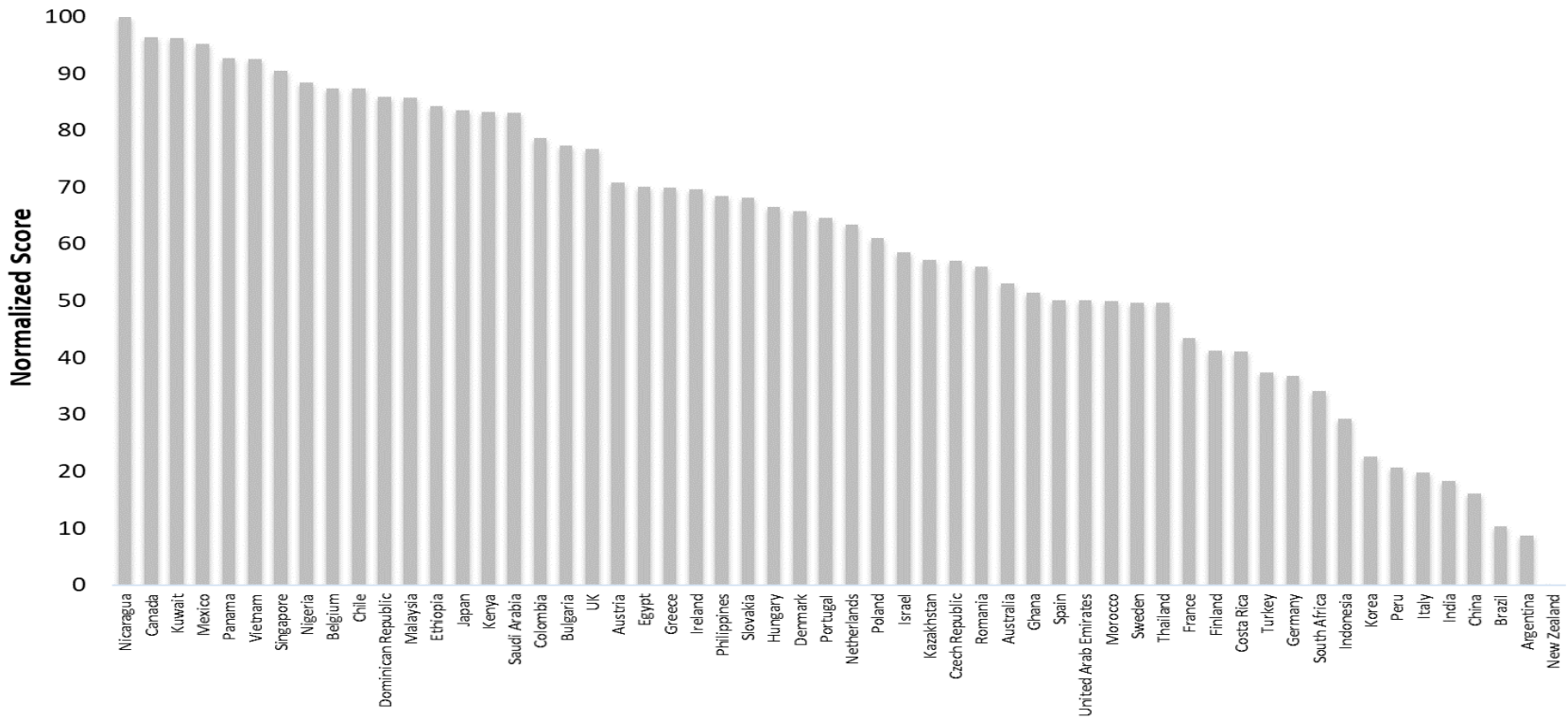
Business Monitor International's Power Sector Risk Reward Index Quad Chart, 2018

Source: Business Monitor International

Methodology: Category #5

The fifth component of the *SG TMR* analysis integrates data on the share of the market for electricity sector technologies that will be met by imports. This score is based on the analysis produced by Purdue University's Global Trade Analysis Project (GTAP), which estimates the share of commodities that various industries procure from foreign markets and domestic markets. GTAP's "import share" analysis includes an estimate for each country of the electronic equipment and machinery that the electricity sector procures for its operations. This category includes a range of equipment in the electricity sector, so it represents a useful proxy for utility reliance on imports to meet a country's technology needs. GTAP data did not change for the *2018 SG TMR* as the data set is updated on a five -year basis. [10]

Normalized *SG TMR Category 5* Score, 2018



Source: Purdue University, Global Trade Analysis Project.

Rankings: Results

Overall Rankings (2018)											
1	Canada	11	Chile	21	Ghana	31	Indonesia	41	New Zealand	51	Romania
2	Mexico	12	Germany	22	Netherlands	32	Egypt	42	Kenya	52	Greece
3	UK	13	United Arab Emirates	23	Saudi Arabia	33	Thailand	43	Slovakia	53	Hungary
4	Japan	14	Finland	24	France	34	Morocco	44	South Africa	54	Bulgaria
5	Australia	15	Ireland	25	Belgium	35	Brazil	45	Kuwait	55	Peru
6	Denmark	16	Korea	26	Austria	36	Poland	46	Panama	56	Nicaragua
7	Philippines	17	Singapore	27	Dominican Republic	37	Colombia	47	Ethiopia		
8	China	18	Sweden	28	Spain	38	Czech Republic	48	Kazakhstan		
9	Vietnam	19	Malaysia	29	Portugal	39	Israel	49	Argentina		
10	India	20	Turkey	30	Italy	40	Nigeria	50	Costa Rica		

T&D Equipment Sub-Sector Rankings (2018)											
1	Canada	11	Indonesia	21	UK	31	Japan	41	Netherlands	51	New Zealand
2	Ghana	12	Malaysia	22	Colombia	32	Kazakhstan	42	Finland	52	Romania
3	Mexico	13	Egypt	23	Korea	33	Nicaragua	43	Sweden	53	South Africa
4	Dominican Republic	14	Panama	24	Thailand	34	Slovakia	44	Portugal	54	Italy
5	Vietnam	15	Kenya	25	Peru	35	Denmark	45	Czech Republic	55	Hungary
6	Morocco	16	Singapore	26	Kuwait	36	Brazil	46	Spain	56	Bulgaria
7	Philippines	17	China	27	Belgium	37	Poland	47	France		
8	United Arab Emirates	18	Chile	28	Ireland	38	Costa Rica	48	Israel		
9	India	19	Saudi Arabia	29	Australia	39	Argentina	49	Germany		
10	Ethiopia	20	Turkey	30	Nigeria	40	Austria	50	Greece		

Smart Grid ICT Sub-Sector Rankings (2018)											
1	UK	11	Turkey	21	Chile	31	Thailand	41	Romania	51	Costa Rica
2	Canada	12	France	22	Saudi Arabia	32	New Zealand	42	Dominican Republic	52	Panama
3	Japan	13	Netherlands	23	Spain	33	Israel	43	Morocco	53	Kenya
4	Denmark	14	Singapore	24	Portugal	34	Czech Republic	44	Kuwait	54	Ethiopia
5	Sweden	15	Italy	25	Austria	35	South Africa	45	Bulgaria	55	Peru
6	Finland	16	India	26	United Arab Emirates	36	Colombia	46	Argentina	56	Nicaragua
7	Australia	17	Philippines	27	Korea	37	Slovakia	47	Hungary		
8	Germany	18	China	28	Brazil	38	Indonesia	48	Kazakhstan		
9	Mexico	19	Vietnam	29	Belgium	39	Nigeria	49	Greece		
10	Ireland	20	Malaysia	30	Poland	40	Egypt	50	Ghana		

Energy Storage Sub-Sector Rankings (2018)											
1	UK	11	Finland	21	India	31	Egypt	41	Thailand	51	Kuwait
2	Canada	12	Sweden	22	Mexico	32	Israel	42	Romania	52	Panama
3	Japan	13	Philippines	23	United Arab Emirates	33	South Africa	43	Costa Rica	53	Nicaragua
4	Australia	14	Spain	24	Singapore	34	Dominican Republic	44	Hungary	54	Ethiopia
5	Germany	15	France	25	Saudi Arabia	35	New Zealand	45	Brazil	55	Bulgaria
6	Denmark	16	Ireland	26	Czech Republic	36	Kenya	46	Argentina	56	Peru
7	China	17	Austria	27	Indonesia	37	Nigeria	47	Morocco		
8	Korea	18	Italy	28	Vietnam	38	Kazakhstan	48	Colombia		
9	Chile	19	Belgium	29	Malaysia	39	Greece	49	Slovakia		
10	Netherlands	20	Portugal	30	Turkey	40	Poland	50	Ghana		

Rankings: Year-on-Year Comparison

Small variation in relative rankings, among markets or year-on-year comparisons, are not statistically significant. The largest year-on-year shifts in rankings are summarized below. Methodology changes in *Category 2* (discussed above) to increase the weighting of large markets resulted in an increased number of year-on-year shifts in rankings. This resulted in some shifting of the Overall, T&D Equipment sub-sector, and Energy Storage sub-sector rankings. However, given the relatively slow timelines for electric utility procurement as well as timelines for formulation and implementation of policies and regulations, largely the outlook for U.S. exporters in 2018 remains similar to that presented in the *2017 SG TMR* and resulted in minimal year-on-year rankings shifts for the Smart Grid ICT sub-sector.

Year-on-Year Ranking Shifts Greater than 10 Rankings, 2017 to 2018

	Overall	T&D Equipment	Smart Grid ICT	Energy Storage
Rise	Germany (+10) Japan (+10)	United Kingdom (+16) Kazakhstan (+12)	Italy (+13) Philippines (+12)	Belgium (+10)
Drop	Kenya (-15) Ethiopia (-13) Malaysia (-12) Nigeria (-12) Bulgaria (-10)	Bulgaria (-27) Israel (-23) Poland (-15) Belgium (-14) Denmark (-14) Nigeria (-14) Italy (-13) Austria (-12) Spain (-10) South Africa (-10)		Malaysia (-12) Brazil (-12) Ghana (-10) Kenya (-10)

Appendix 2: Trade Data Product Information

United Nations (UN) and U.S. Census data accessed in this report and referred to throughout this report as "T&D equipment" leverages two sets of harmonized tariff schedule (HTS) codes. The six-digit level information is globally harmonized. The ten-digit product codes are based on the Harmonized Tariff Schedule of the United States Annotated as published by the International Trade Commission. In the context of electrochemical battery storage, eight six-digit HTS codes were identified and throughout the report will be referred to as "battery storage."

Electric Transmission & Distribution Grid Equipment, 6-digit HTS Codes	
850421	Liquid Dielectric Transformers, Not Exceeding 650kva
850422	Liquid Dielectric Transformers, Power Handling Capacity 650-10,000kva
850423	Liquid Dielectric Transformers, Exceeding 10, 000kva
850432	Other Transformers, Exceeding 1kva But Not Exceeding 16kva
850433	Other Transformers, Exceeding 16kva But Not Exceeding 500kva
850434	Other Transformers, Power Handling Capacity Exceeding 500kva
853210	Fixed Capacitors, for Use in 50/60hz Circuits, Not Less than 0.5kvar
853510	FUSES FOR ELECTRICAL APPARATUS, VOLTAGE > 1000 V
853521	AUTOMATIC CIRCUIT BREAKERS > 1000 V BUT < 72.5 KV
853529	AUTO CIRCT BREAKER VOLTAGE 72.5 KV OR MORE
853530	ISOLATING SWITCH & MAKE-&-BREAK SWTCH VOLT > 1000V
853540	Lighting Arresters, Voltage Limiters, Surge Suppressors, Exceeding 1,000v
853590	ELECT APPR F PRTCT TO ELECT CIRCT >1000 V NESOI
853720	CONTROLS ETC W ELECT APPR F ELECT CONT OVER 1000 V
854460	Other Electric Conductors, for a Voltage Exceeding 1, 000v
902830	Electricity Meters

Electric Transmission & Distribution Grid Equipment, 10-digit HTS Codes (United States)	
8504210040	LIQUID DIELECT TRANSFORMER GT 50KVA BUT LT=100KVA
8504210060	LIQUID DIELECT TRANSFORMER GT 100KVA BUT LT=500KVA
8504210080	LIQUID DIELECT TRANSFORMER GT 500KVA BUT LT=650KVA
8504220040	LIQUID DLCTC TRANSFORM GT 650KVA BUT LT= 2500 KVA
8504220080	LIQUID DLCTC TRANSFORM GT 2500KVA BUT LT=10000 KVA
8504230040	LIQUID DLCTC TRANSFORM GT 10000 BUT LT=100000 KVA
8504230080	LIQUID DLCTC TRANSFORMER EXCEEDING 100,000 KVA
8504330040	TRANSFORMERS, GT 50 KVA BUT LT= 500 KVA, NESOI
8504340000	TRANSFORMERS, GT 500 KVA, NESOI
8532100000	FIXED CAPACITORS,50
8535100020	FUSES IN CIRCUITS GT= 2300 V
8535100040	FUSES FOR VOLTAGE GT 1000 V BUT LT 2300V, NESOI
8535210000	AUTOMATIC CIRCUIT BREAKERS, GT 1000V BUT LT 72.5KV
8535290020	AUTOMATIC CIRCUIT BREAKERS GT= 345 KV
8535290040	AUTOMATIC CIRCUIT BREAKERS NESOI (72.5 KV
8535300040	ISOLATING & MAKE-AND-BREAK SWITCHES - KNIFE
8535300080	ISOLATING & MAKE-AND-BREAK SWITCHES - OTHER
8535400000	LIGHTNING ARRESTORS, VOLTAGE LIMITERS, SURGE SUPPLIES
8535908020	TERMINALS, ELECTRIC SPLICES & ELECTRIC COUPLINGS
8535908040	ELECTRICAL CONNECTORS, GT 1000 V, NESOI
8544602000	INSULATED ELECRIC CONDUCTOR W/ CONNECTRS, GT 1000V
8544604000	INSULATED ELECRIC CONDUCTOR, CU, GT 1000V, NESOI
8544606000	INSULATED ELECRIC CONDUCTORS GT 1000V, NESOI
9028300000	ELECTRICITY METERS

Electrochemical Battery Storage, 6-digit HTS Codes	
850760	LITHIUM ION BATTERIES
850790	PTS ELECT STORAGE BATTERIES INC SEPARATORS THEREOF
850710	LEAD-ACID BATTERIES OF A KIND USED FOR STG ENGINES
850720	LEAD-ACID STORAGE BATTERIES NESOI
850750	NICKEL-METAL HYDRIDE BATTERIES
850780	STORAGE BATTERIES NESOI
850730	NICKEL-CADMIUM STORAGE BATTERIES
850740	NICKEL-IRON STORAGE BATTERIES

Appendix 3: Citations

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[5] U.S. Census Trade Data via the Trade Policy Information System of the U.S. Department of Commerce, International Trade Administration., [Online]. [Accessed 6 June 2018].

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[9] Business Monitor International, "Power Sector Risk/Reward Index," [Online]. [Accessed 23 May 2018].

[10] Purdue University, *Global Trade Analysis Project,* 2015.

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