MANUFACTURE OF
Electric Wires and Cables

2018
During the past five years, increased construction activity and expanded energy infrastructure spurred demand for the Wire and Cable Manufacturing industry’s products.
Small and medium-sized enterprises (SMEs) are essential enablers of Qatar’s aspiration to build a diversified and sustainable economy. As the private sector development arm of the Government, we hold our national strategic development agenda – Qatar National Vision 2030 – central to all of our endeavors. We hold a firm belief that it is our core responsibility to contribute to the ongoing efforts of diversifying our sources of national income and creating a knowledge-based economy. We always knew that in order to chart the type of progressive economic and social path envisioned by our State, we need to become imaginative and proactive in our approach for our future generations.

In doing so, QDB’s role is not limited to financing enterprises, as it provides SMEs and entrepreneurs with a wide range of non-financial services. Our ultimate objective is to become a “partner of first resort” for Qatar’s current and future entrepreneurs and SMEs. Thus, we realized that one of the most important ways to achieve our aspiration is through enabling access to granular market insights and trends, which is a pre-requisite for strong business ventures.

In line with our above objectives to establish a reliable data and analysis, and in order to extend a meaningful support to Qatari entrepreneurs and SMEs, QDB intends to publish a series of reports on potential opportunities available across various sectors in the local market. These series aim to provide entrepreneurs with potential opportunities and perspectives about these sectors, including competitive sectorial landscape and data about existing companies.

This report focuses on the ‘Manufacture of Electrical Wires and Cables’, a sector that is likely to play an important role in the country’s growth and development. This sector comprises product segments such as low voltage wires and power cables; medium-, high- and extra-high-voltage power cables; copper telecom cables; winding wires; instrumentation and control cables and overhead conductors.

The real estate and infrastructure industry drives the growth of the electrical wires and cables sector. During 2006 to 2017, the Qatar’s electrical wires and cables sector grew at a CAGR of 5.1% from QAR 3.51 billion in 2006 to an estimated QAR 6.08 billion in 2017. According to the latest statistics published by MDPS in 2016, this sector had three manufacturing establishments that together employed a workforce of 458 personnel in 2015. The production value and gross value added by this sector in 2015 was estimated at QAR 1,346.5 million and QAR 61.2 million, respectively.

This sector has developed substantial capabilities over the years and can currently serve a wide range of the country’s requirements. All product segments in this sector are driven by the real estate and infrastructure industry, and therefore, are likely to witness substantial demand due to the pipeline of upcoming projects.

On behalf of everyone at Qatar Development Bank, I hope that you will benefit from this report.

Abdulaziz bin Nasser al-Khalifa  
Chief Executive Officer
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**ACRONYMS AND ABBREVIATIONS**

The following acronyms and abbreviation are used:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>°C</td>
<td>Degree Celsius</td>
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<tr>
<td>AAAC</td>
<td>All Aluminum Alloy Conductor</td>
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<tr>
<td>ACCC</td>
<td>Aluminum Conductor Composite Core</td>
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<tr>
<td>ACSR</td>
<td>Aluminum Conductor Steel-Reinforced cable</td>
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<tr>
<td>BS</td>
<td>British Standards</td>
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<tr>
<td>BW</td>
<td>Building Wires</td>
</tr>
<tr>
<td>CAGR</td>
<td>Compounded Annual Growth Rate</td>
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<tr>
<td>CATV</td>
<td>Cable TV</td>
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<tr>
<td>EHV</td>
<td>Extra-High Voltage</td>
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<tr>
<td>EPC</td>
<td>Engineering, Procurement and Construction</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>FEWA</td>
<td>Federal Electricity &amp; Water Authority of the UAE</td>
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<tr>
<td>FIFA</td>
<td>Fédération Internationale de Football Association</td>
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<tr>
<td>GCC</td>
<td>Gulf Cooperation Council</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GE</td>
<td>General Electric</td>
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<tr>
<td>GOIC</td>
<td>Gulf Organization for Industrial Consulting</td>
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<tr>
<td>HS Code</td>
<td>Harmonized System Code</td>
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<tr>
<td>HV</td>
<td>High Voltage</td>
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<tr>
<td>HVAC</td>
<td>Heating, Ventilation and Air Conditioning</td>
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<tr>
<td>ISCC</td>
<td>Integrated Solar Combined Cycle</td>
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<tr>
<td>ISIC</td>
<td>International Standard Industrial Classification</td>
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<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<tr>
<td>ITC</td>
<td>International Trade Centre</td>
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<tr>
<td>IWPP</td>
<td>Independent Water &amp; Power Project</td>
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<tr>
<td>KACARE</td>
<td>King Abdullah City for Atomic &amp; Renewable Energy</td>
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<tr>
<td>KSA</td>
<td>Kingdom of Saudi Arabia</td>
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<tr>
<td>KV</td>
<td>Kilovolt</td>
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<tr>
<td>LME</td>
<td>London Metal Exchange</td>
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<tr>
<td>LSF</td>
<td>Low Smoke and Fume</td>
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<tr>
<td>LSHF</td>
<td>Low Smoke Halogen Free</td>
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<tr>
<td>LSOH</td>
<td>Low Smoke Zero Halogen</td>
</tr>
<tr>
<td>LV</td>
<td>Low Voltage</td>
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<tr>
<td>MDPS</td>
<td>Ministry of Development Planning and Statistics</td>
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<tr>
<td>MENA</td>
<td>Middle East and North Africa</td>
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<tr>
<td>MEP</td>
<td>Mechanical, Electrical and Plumbing</td>
</tr>
<tr>
<td>mm</td>
<td>Millimetre</td>
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<tr>
<td>MT</td>
<td>Metric Ton</td>
</tr>
<tr>
<td>MTPA</td>
<td>Metric Ton Per Annum</td>
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<td>MV</td>
<td>Medium Voltage</td>
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<td>OPWP</td>
<td>Oman Power and Water Procurement Company</td>
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<tr>
<td>PVC</td>
<td>Polyvinyl Chloride</td>
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<tr>
<td>QAR</td>
<td>Qatari Riyal</td>
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<td>QCS</td>
<td>Qatar Construction Specifications</td>
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<td>QDB</td>
<td>Qatar Development Bank</td>
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<tr>
<td>QICC</td>
<td>Qatar International Cables Company</td>
</tr>
<tr>
<td>SEC</td>
<td>Saudi Electricity Company</td>
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<tr>
<td>SME</td>
<td>Small and Medium Enterprises</td>
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<tr>
<td>SWCC</td>
<td>Saline Water Conversion Corporation KSA</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strengths, Weaknesses, Opportunities and Threats</td>
</tr>
<tr>
<td>UAE</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
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<tr>
<td>XLPE</td>
<td>Cross Linked Polyethylene Wire</td>
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The electrical wires and cables sector comprises insulated wires and cables made of steel, copper and aluminum. Aluminum and copper are used for conduction of electricity. Steel is not used for conduction of electricity, but as a protective armor or as a reinforcement in certain types of cables. The product segments included in this sector are:

a. Low-voltage wires and power cables
b. Medium-, high- and extra-high-voltage power cables
c. Copper telecom cables
d. Winding wires
e. Instrumentation and control cables
f. Overhead conductors

Overhead conductors only use aluminum, which is lightweight and inexpensive as compared to copper. All other product segments use copper, which has better electrical conductivity and lower resistance as compared to aluminum.

The real estate and infrastructure industry drives the growth of the electrical wires and cables sector. According to the latest statistics published by MDPS in 2016, this sector had three manufacturing establishments that together employed a workforce of 458 personnel in 2015. The production value and gross value added by this sector in 2015 was estimated at QAR 1,346.5 million and QAR 61.2 million, respectively.

Doha cables, the market leader accounts for 26.5% followed by QICC and General switchgear that hold approximately 13.1% and 0.2% of the market share respectively. The rest of the market (60.2%) is serviced through imports.

Copper wires and cables: Copper wires and cables comprises product segments such as a) low-voltage wires and power cables, b) medium-, high- and extra-high-voltage power cables c) copper telecom cables d) winding wires and e) instrumentation and control cables.

The global market for copper wires and cables, sized at 28.8 million MT in 2017 is expected to reach 38.9 million MT in 2026, implying a CAGR of 3.4%. In terms of global trends, fiber optic cables are replacing copper telecom cables. The GCC region real estate and infrastructure industry has driven the copper cables and wires market to 1.33 million MT in 2017.

Qatar’s copper wires and cables market grew at a CAGR of 6.1% in quantity terms from 119,281MT in 2006 to 227,850MT in 2017. In value terms, the market reached QAR 6.09 billion in 2017 having paced up at a CAGR of 5.1% from QAR 3.51 billion in 2006. The 2010 to 2017 market segmentation indicates that, in quantity terms, low-
voltage wires and power cables segment constituted 64.7% of the market, followed by medium-, high- and extra-high-voltage power cables, which had a 30.2% share of the market. The last few years have witnessed growing preference for fire performance products in the low-voltage wires and power cables segment, which formed 20% of the product segment. Other product segments, such as winding wires, copper telecom cables and instrumentation and control wires have small market shares of 2.38%, 1.37% and 1.37%, respectively.

Qatar’s bourgeoning real estate and infrastructure industry offers opportunities for new manufacturing units in the copper wires and cables segment. Doha metro rail project is likely to require 3,000km of low-voltage cables and 400km of medium-voltage cables1. Going ahead, the copper wires and cables market is expected to grow at CAGR of 2.58% from 227,850MT of gross weight in 2017 to an estimated 286,544MT in 2026. In value terms, the market is expected to pace up at a CAGR of 3.86% from QAR 6.09 billion in 2017 to QAR 8.56 billion in 2026.

During 2017 to 2026, low-voltage wires and power cables are likely to remain the largest segment constituting 65.3% of the market, in quantity terms followed by medium-, high- and extra-high-voltage cables with a 30.5% market share. Other segments, such as control and instrumentation cables, and winding wires would have small market shares of 1.4% and 2.4%, respectively. Copper telecom cables, which had a 1.77% market share during 2010 to 2015, would witness further substitution by fiber optic cables taking its average market share during 2017 to 2026 down to 0.4%.

Qatar is home to three electrical cable manufacturers that collectively had an installed capacity of 104,500MT of gross cable weight in 2017. The leading manufacturers, i.e., Doha Cables and Qatar International Cable Company offer a wide range of products that form nearly 95% of the market. Both have been joint ventures between established Qatari business groups and multi-national cable manufacturers. The benefits of partnering with an established multi-national cable manufacturer include access to technical expertise and know-how, access to the established marketing, sales and distribution network of the international partner, which helps to penetrate into export markets and the ability to source products not manufactured in Qatar from other manufacturing locations of the international partner.

Going forward, domestic players are expected to ramp up their installed capacities in near term and considering a new player (21,429MT gross weight) commencing operations in end of 2017, the demand supply gap is expected to narrow to 54,993MT of gross cable weight in 2017. Thereafter, assuming no new plants are coming up, the demand-supply gap is expected to broaden to 113,687MT in 2026.

Qatar’s domestic produce is likely to be cost competitive in the export market as most of the cable manufacturers in the GCC region, including those in Qatar, rely on imports for sourcing copper rods. This places Qatar on an equal footing with its competitors in the GCC region. Imports from Saudi Arabia and the UAE are marginally cheaper (2% to 10%) and it is possible for domestic players to compete with and substitute imports in Qatar and export to other countries.

In the short term, fall in oil prices, reduced government expenditure and subdued real-estate development would affect the market. The market is likely to remain price sensitive as this sector offers little or no scope for product differentiation on technical grounds. In the medium to long term, the strengths and the opportunities outweigh the weaknesses and threats due to a larger market size, moderate pace of growth, competitiveness of domestic produce and the pipeline of upcoming projects in Qatar.

A large market size – which is expected to further grow (227,850MT gross weight growing at 2.58% compounded annually till 2026) – means an opportunity for new players to tap into QAR 275 million (6,522MT gross weight) worth of average incremental business every year, from 2017 to 2026. This implies that subject to competitive challenges, opportunities exist for mid-sized players (approximately 28,000 MT p.a. gross weight capacity running at 70% utilization) to enter the market every three years. The outlook for copper wires and cables market in Qatar appears promising due to the pipeline of upcoming projects and bodes well for companies operating in the market.

1 Qatar Rail website
Overhead conductors: Overhead conductors are critical components of electricity distribution infrastructure used in electricity transmission networks to transmit electricity over long distances. Aluminum has virtually no competition from other metals in the overhead conductors' segment as it is one of the most economical ways of transmitting electricity over long distances due to its light weight and low cost.

The global overhead conductor market advanced at a CAGR of 5.98%, between 2006 and 2017, reaching 3.89 million MT in 2017 from 2.21 million MT in 2006. The global overhead conductor market is expected to grow at a CAGR of 4.92% from 2017 to reach 6.00 million MT in 2026. In value terms, the market size for aluminum overhead conductor is expected to grow at a CAGR of 6.6% during 2017 to 2026, owing to the increase in demand for overhead conductors and recovery in aluminum prices that are expected to grow at a CAGR of 1.6% during 2017 to 2026.

According to industry sources, investments worth USD 137 billion would be required in the GCC region’s power sector for electricity generation, transmission and distribution during 2016 to 2020, to meet the growing electricity demand. Investments in expanding the electricity transmission network and inter-country electricity grid projects in the region would drive the demand for overhead conductors, which is expected to grow at a CAGR of 4.0% to reach 256,422MT in 2026 from 179,852MT in 2017.

The demand for overhead conductors in Qatar is constrained by the small geographical area of the country and limited applications of the product. Local manufacturers do not produce overhead conductors and the market is serviced entirely through imports. Qatar’s overhead conductor market size was 1,001MT (QAR 9.6 million) in 2017. Going forward, the demand for overhead conductors in Qatar is expected to grow at a CAGR of 2.6% from 1,001MT in 2017 to 1,262MT in 2026. In value terms, the market is forecast to grow at a CAGR of 4.2% from QAR 9.6 million in 2017 to reach a value of QAR 14.0 million in 2026.

Targeting exports with focus on international markets is crucial for new entrants into the market. The grid interconnection projects in the MENA region, such as the Saudi Arabia-Jordan project, Saudi Arabia-Egypt project, among others would provide major demand opportunities for overhead conductor manufacturers.

Cable manufacturers in Qatar do not produce aluminum overhead conductors. Out of the ten manufacturers in the GCC region, nine produce copper wires and cables as well. Many of these companies originally started as copper wire and cable manufacturers and subsequently expanded into aluminum overhead conductor. Major manufacturers in the GCC region, such as Midal Cables, DUCAB and Oman Cables, procure molten aluminum directly from smelters, which is converted into wire rods through a continuous process. This saves the time and cost of processing aluminum ingots or billets into wire rods.

In the medium to long term, availability of raw materials, low-energy costs and growing demand in the GCC region augurs well for entrepreneurs to start manufacturing in Qatar. The export potential from Qatar along with the scope for import substitution would offer opportunities for entrepreneurs to establish aluminum overhead conductor manufacturing plant in Qatar.

Entrepreneurs planning to set up an overhead conductor manufacturing plant in Qatar may choose to enter into a joint venture with an aluminum smelter such as Qatalum to receive molten aluminum. This would also help aluminum smelters to forward integrate into intermediate and finished products. The plant and machinery of the proposed venture will have to be integrated with that of Qatalum. Considering the export potential of 22,683MT in 2026 and assuming 70% import substitution, a new entrant can achieve production of up to 23,566MT in 2026. This indicates an opportunity for setting up an aluminum overhead conductor manufacturing plant with an installed capacity of 33,666MT p.a. running at 70% utilization and focusing on export markets.

2 Technavio, World Bank, Team Analysis; 3 APICORP’s MENA power investment: finance and reform challenges
1.1 Sector Overview

The electric wires and cables sector comprises insulated wires and cables made of steel, copper and aluminum.

Aluminum and copper are used for conduction of electricity. Steel is not used for conduction of electricity but as a protective armor in certain types of cables, such as steel wire-armored cables to prevent puncture and breakage of the copper\(^4\). In case of aluminum cables, such as aluminum-conductor steel-reinforced (ASCR) cables, steel is used as a reinforcement in the core to increase the cable’s strength and maintain its original shape while being heated and put under other loads\(^5\).

The product segments in this sector include:

- a. Low-voltage wires and power cables
- b. Medium-, high- and extra-high-voltage power cables
- c. Copper telecom cables
- d. Winding wires
- e. Instrumentation and control cables
- f. Overhead conductors

A brief overview of wires and cables is provided below:

**Wire:** A wire is a single, generally cylindrical, flexible strand such as stranded wire or a rod such as solid wires of metal\(^6\). Wires can be made in square, hexagonal, flattened, rectangular or other forms. Wires work as a single conductor with one or a few strands of copper or aluminum filaments conducting electricity.

Solid wires possess a solid-core conductor, which usually comprises a single strand of wire — usually bare or sometimes insulated. Solid wires are less resistant vis-à-vis stranded wires, which provide greater resistance to electricity. These wires are less flexible with extra rigidity, making them an appropriate anti-corrosive substitute for sensitive environments.

Stranded wires are a group of insulated or exposed wires that are flexible and can be routed as per the requirements.

**Cable:** A cable is composed of two or more wires that run in parallel and are bonded, twisted or braided together to form a single entity\(^7\). These wires are insulated and carried inside an outer protective covering known as a cable jacket.

**Conductor:** A conductor is a material through which electricity, heat or sound can flow\(^8\). An electrical conductor is a substance in which electrical charge carriers, usually electrons, move easily from atom to atom with the application of voltage. The ability to conduct electricity is called electrical conductivity. In context of electrical cables, conductors refer to aluminum overhead conductors used in long distance transmission of electricity.

\(^4\) Elsewedy Electric; \(^5\) Aluminum Leader; \(^6, 7, 8\) Wikipedia
1.2 Product Segments Identification

This sector can be divided into the following six segments:

Table 1: Product Segments and their Description

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-voltage wires and power cables</td>
<td>This segment includes building wires and low-voltage power cables that have voltages of less than one kilovolt (KV). These wires and cables are used for conducting electricity in buildings, structures and capital goods. It also includes wires and cables with unique specifications, such as fire-resistant cables, rubber cables and flexible wires.</td>
</tr>
<tr>
<td>Medium, high and extra-high voltage power cables</td>
<td>This segment includes the following cables:</td>
</tr>
<tr>
<td></td>
<td>• Medium-voltage cables — used in electricity transmission and distribution where voltage capacity is between 1 to 33KV;</td>
</tr>
<tr>
<td></td>
<td>• High-voltage (33 to 220KV) and extra-high voltage cables (above 220KV) — used in electricity transmission.</td>
</tr>
<tr>
<td>Copper telecom cables</td>
<td>Copper telecom cables are used in telecommunication access network, indoor telephone network, switchboards, cable TV distribution, microwave transmission and mobile telecommunication.</td>
</tr>
<tr>
<td>Winding wires</td>
<td>Winding wire, also known as enameled or magnet wire, is an insulated electrical conductor used in the construction of motors, transformers and other electromagnetic equipment. The wire is used in three areas of energy conversion: electrical to electrical, electrical to mechanical and mechanical to electrical.</td>
</tr>
<tr>
<td>Instrumentation and control cables</td>
<td>This segment includes the following cables:</td>
</tr>
<tr>
<td></td>
<td>• Instrumentation cables — used for reducing noise and signal interference, to deliver clear signals in harsh environments and general manufacturing operations.</td>
</tr>
<tr>
<td></td>
<td>• Control cables — used for transmission of information related to the state, location or operating conditions of objects being controlled.</td>
</tr>
<tr>
<td>Overhead conductors</td>
<td>Overhead conductors are used in overhead electricity transmission lines that transmit electricity from power plants to sub-stations. These overhead conductors do not have any insulation and are made of aluminum.</td>
</tr>
</tbody>
</table>

9 HSBC Global Research; 10 Leoni AG; 11 Superior Essex; 12 IDEALINK; 13 Ki Cable Co. Ltd.; 14 Aluminum Leader
1.2.1 Low-Voltage Wires and Power Cables

The different types of low-voltage wires and power cables are:

A. **Building wires**: Building wires (BW) are low-voltage insulated conductors that form the last leg of an electricity distribution network. They are associated with electrical devices used in buildings or other structures.

B. **Low-voltage power cables**: A power cable is a combination of one or more electrical conductors used for conducting electricity. Low-voltage cables (LV cables) form a part of the electricity distribution network where the voltage capacity is less than 1KV.

C. **Other insulated wires and cables**
   1. **Fire resistant**: Fire-resistant cables are used in public buildings, spaces which see congregation of people and environments that require the personnel and equipment to be protected from fire due to the high level of risks associated with it.
   2. **Flexible wires**: Flexible wires have properties of bending and flexing easily. These cables are used in elevators, household devices and appliances. Moreover, these can tolerate varying temperatures and voltage grades.
   3. **Rubber cables**: Tough rubber-sheathed cables comprise a black outer sheath of rubber with several conductors inside. The rubber offers an abrasion-resistant, corrosion-resistant, waterproof, protective covering for an insulated electricity cable. They are used for industrial purposes, which require high levels of mechanical stress.

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15. Wikipedia; 16. Prysmian Group; 17. MESC Prospectus
1.2.2 Medium, High and Extra-High Voltage Power Cables

Power cables are divided in the following categories based on their voltage carrying capacity. These are as follows:

A. **Medium voltage**: Medium-voltage cables (MV cables) form a part of the electricity transmission and distribution network where voltage capacity is between 1KV to 33KV. They carry electricity from the high-voltage cables (HV cables) to LV cables.

B. **High voltage**: HV cables are used at voltages between 33KV to 220KV. These always form a part of the electricity transmission network.

C. **Extra-high voltage**: Extra-high voltage cables (EHV cables) are used for electricity transmission at voltages above 220KV.
1.2.3 Copper Telecom Cables

Telecom cables help in the transmission of voice, data and other forms of communication signals using electromagnetic signals through a fixed-line connection\textsuperscript{18}. Copper telecom cables are used in telecommunication access network, indoor telephone network, switchboards (interconnected circuits of telephones used to establish telephone calls between users), cable TV distribution (CATV) and mobile telecommunication (connecting mobile network's antenna and base station). Nowadays, fiber optic cables are replacing copper telecom cables. However, copper telecom cables are likely to be used in applications such as CAT-6 cables for last mile connectivity to telephones, voice transmission and in-building networks.

1.2.4 Winding Wire

Winding wire, also known asenameled or magnet wire, is an insulated copper conductor used in building motors, transformers and other electromagnetic equipment, which require tight coils of wire\textsuperscript{19}. When wound into a coil and energized, winding wire creates an electromagnetic field.

The wire has usage in three areas of energy transformation: electrical to electrical, electrical to mechanical, and mechanical to electrical.

A. Electrical to electrical transformation includes transformers that are used to transfer electricity. Transformers are used by utility companies for generating electricity and power voltage conversion and in electrical controls for industrial and domestic purposes.

B. Electrical-to-mechanical transfer is necessary for motorized appliances, automobiles, industrial machinery and residential and commercial HVAC systems. Winding wire is a key constituent in these applications.

C. Mechanical-to-electrical transformation occurs when machine power is converted into electricity. This type of transformation includes generators, which convert mechanical power into electrical energy through the use of winding wires.

Applications of winding wires include electric motors, generators, transformers, compressors, inductors, relays and solenoid valves.

\textsuperscript{18} European Commission; \textsuperscript{19} Superior Essex Inc
1.2.5 Instrumentation and Control Cables

Instrumentation and control cables are used in control systems in industrial and manufacturing facilities. An instrumentation cable is composed of two or more pairs of twisted conductors, while an assembly of three or more single conductors tends to be used for control applications.

A. Instrumentation cables are used to lessen noise and signal interference, and carry clear signals in challenging environments and manufacturing processes\(^{20}\). They are used for analytical, flow or level measurements. They are used in data acquisition systems, connections to instruments, computer networking, public address systems, digital control, analog control or measuring and communication systems\(^{21}\).

B. Control cables are used for transmitting information about the state, location or operating conditions of objects being controlled\(^{22}\). They send low-voltage data or signals to control the functioning of an equipment. It is used where direct access to such objects is difficult. These cables find applications in traffic signals, offshore oil & gas, ship & marine industries and onshore applications such as petrochemical plants, refineries and LNGs\(^{23}\).

1.2.6 Overhead Conductors

Utility companies use overhead conductors for the transmission of electricity from power plants to sub-stations. Aluminum being low cost and lightweight is used as a conductor vis-à-vis copper.

Key types of overhead conductors include: Aluminum conductor steel reinforced (ACSR), All aluminum alloy conductor (AAAC) and Aluminum conductor composite core (ACCC) cable\(^{24}\).

\(^{20}\) iDEALINK; \(^{21}\) Teleflex; \(^{22}\) KI Cable Co, Ltd.; \(^{23}\) Prysmian SpA; \(^{24}\) Aluminium Leader
### 1.3 HS Codes of Product Segments

Following are the HS codes that have been identified for the wires and cables market:

#### Table 2: HS Codes of Electric Wires and Cables Products

<table>
<thead>
<tr>
<th>Product Segment</th>
<th>HS Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage wires and power cables</td>
<td>74081100</td>
<td>Copper wire: of refined copper: of which the maximum cross sectional dimension exceeds six mm</td>
</tr>
<tr>
<td></td>
<td>74081900</td>
<td>Copper wire: of refined copper: other</td>
</tr>
<tr>
<td></td>
<td>74082100</td>
<td>Copper wire: of copper alloys: copper zinc base alloys (brass)</td>
</tr>
<tr>
<td></td>
<td>74082200</td>
<td>Copper wire: of copper alloys: of copper nickel base alloys or copper nickel zinc base alloys (nickel silver)</td>
</tr>
<tr>
<td></td>
<td>74082900</td>
<td>Copper wire: Of copper alloys: other</td>
</tr>
<tr>
<td></td>
<td>85440000</td>
<td>Insulated (including enameled or anodized) wire, cable</td>
</tr>
<tr>
<td></td>
<td>85442000</td>
<td>Insulated co axial cable &amp; other co axial electric conductor</td>
</tr>
<tr>
<td></td>
<td>85442090</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with: Co axial cable and other co axial electric conductors: other</td>
</tr>
<tr>
<td></td>
<td>85443000</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with: Ignition wiring sets and other wiring sets of a kind used in vehicles, aircraft or ships</td>
</tr>
<tr>
<td></td>
<td>85444220</td>
<td>Electric cable of a cross-section not exceeding ten mm</td>
</tr>
<tr>
<td></td>
<td>85444290</td>
<td>Other fitted with connectors</td>
</tr>
<tr>
<td></td>
<td>85444900</td>
<td>Electric conductors, for a voltage &lt;= 80 V, insulated, not fitted with connectors, n.e.s.</td>
</tr>
<tr>
<td></td>
<td>85444920</td>
<td>Electric cable of a cross-section exceeding 10 mm and a voltage exceeding 300 V</td>
</tr>
<tr>
<td></td>
<td>85444949</td>
<td>Other voltage exceeding 80 v</td>
</tr>
<tr>
<td></td>
<td>85445000</td>
<td>Insulated electric conductors, for a voltage not exceeding 80 volts</td>
</tr>
<tr>
<td>Product Segment</td>
<td>HS Code</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>85445110</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, fitted with connectors, n.e.s.: Electric cable over ten mm wide and over 300 volts</td>
</tr>
<tr>
<td></td>
<td>85445120</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, fitted with connectors, n.e.s.: Electric wires not exceeding ten mm cross section</td>
</tr>
<tr>
<td></td>
<td>85445190</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, fitted with connectors, n.e.s.: other</td>
</tr>
<tr>
<td></td>
<td>85445910</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, not fitted with connectors, n.e.s.: Electric cable over ten mm wide and over 300 volts</td>
</tr>
<tr>
<td></td>
<td>85445920</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, not fitted with connectors, n.e.s.: Electric wires not exceeding 10 mm cross section</td>
</tr>
<tr>
<td></td>
<td>85445990</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, not fitted with connectors, n.e.s.: other</td>
</tr>
<tr>
<td></td>
<td>85446010</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled wit: Other electric conductors, for a voltage not exceeding 1000 V: Electric cable over ten mm wide</td>
</tr>
<tr>
<td></td>
<td>85446020</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled wit: Other electric conductors, for a voltage not exceeding 1000 V: Electric wire not exceeding ten mm cross section</td>
</tr>
<tr>
<td></td>
<td>85446090</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled wit: Other electric conductors, for a voltage not exceeding exceeding 1000 V: Other</td>
</tr>
<tr>
<td></td>
<td>85442010</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled wit: Co axial cable and other co axial electric conductors: Electric cable over ten mm wide and over 300 V</td>
</tr>
<tr>
<td></td>
<td>85444210</td>
<td>Electric cable of a cross-section exceeding ten mm and a voltage exceeding 300 v, with connectors</td>
</tr>
<tr>
<td></td>
<td>85444910</td>
<td>Electric cable of a cross-section exceeding ten mm and a voltage exceeding 300 v, without connectors</td>
</tr>
</tbody>
</table>

*Note: As low-voltage cables are less than 1,000 V, some low-voltage cables get included in the above HS Codes, which include all cables over 300V. As per insights from primary interviews, low voltage cables (upto 1,000V) for 60% (in volume) while the rest 40% covers medium, high and extra high power cables.
## HS Codes of Wires and Cables Products

<table>
<thead>
<tr>
<th>Product Segment</th>
<th>HS Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Copper telecom cables</strong></td>
<td>85442020</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with coaxial cable and other coaxial electric conductors: Cable for telegraph &amp; telephone ten pairs or more</td>
</tr>
<tr>
<td></td>
<td>85442030</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with coaxial cable and other coaxial electric conductors: Wire for telegraph &amp; telephone less than ten pairs</td>
</tr>
<tr>
<td></td>
<td>85444230</td>
<td>Telegraph and telephone cable incorporating ten pairs of wire or more</td>
</tr>
<tr>
<td></td>
<td>85444240</td>
<td>Telegraph and telephone cable consisting of less than ten pairs of wire</td>
</tr>
<tr>
<td></td>
<td>85444990</td>
<td>Other telegraph and telephone cable</td>
</tr>
<tr>
<td></td>
<td>85444999</td>
<td>Other telegraph and telephone cable</td>
</tr>
<tr>
<td></td>
<td>85445130</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, fitted with connectors, n.e.s.: Lines for telegraph &amp; telephone ten pairs or more</td>
</tr>
<tr>
<td></td>
<td>85445140</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, fitted with connectors, n.e.s.: Lines for telegraph &amp; telephone less than ten pairs</td>
</tr>
<tr>
<td></td>
<td>85445930</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, not fitted with connectors, n.e.s.: Line for telegraph &amp; telephone two pairs or more</td>
</tr>
<tr>
<td></td>
<td>85445940</td>
<td>Electric conductors, for a voltage &gt; 80 V but &lt;= 1.000 V, insulated, not fitted with connectors, n.e.s.: Line for telegraph &amp; telephone less than two pairs</td>
</tr>
<tr>
<td></td>
<td>85446030</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with other electric conductors, for a voltage not exceeding 1000 V: Cable for telegraph &amp; telephone ten pairs or more</td>
</tr>
<tr>
<td><strong>Instrumentation and control cables</strong></td>
<td>85444000</td>
<td>Insulated electric conductors, for a voltage not exceeding 80 volts</td>
</tr>
<tr>
<td></td>
<td>85444100</td>
<td>Electric conductors for a voltage &lt;= 80 V, insulated, fitted with connectors, n.e.s.</td>
</tr>
<tr>
<td></td>
<td>85444921</td>
<td>Electric cable of a cross-section not exceeding 10 mm for a voltage not exceeding 80 V</td>
</tr>
<tr>
<td></td>
<td>85444929</td>
<td>Other; for a voltage not exceeding 80 V</td>
</tr>
</tbody>
</table>
## HS Codes of Wires and Cables Products

<table>
<thead>
<tr>
<th>Product Segment</th>
<th>HS Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumentation and control cables</td>
<td>85444931</td>
<td>Line for telegraph &amp; telephone containing more than 10 pairs or more: of voltage not exceeding 80 V</td>
</tr>
<tr>
<td></td>
<td>85444939</td>
<td>Other voltage not exceeding 80 V</td>
</tr>
<tr>
<td></td>
<td>85444941</td>
<td>Telegraph, telephone containing less than 10 pairs, of voltage not exceeding 80 V</td>
</tr>
<tr>
<td></td>
<td>85444991</td>
<td>For a voltage not exceeding 80 V</td>
</tr>
<tr>
<td>Winding wire</td>
<td>85441000</td>
<td>Insulated winding wire</td>
</tr>
<tr>
<td></td>
<td>85441100</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with Winding wire: Of copper</td>
</tr>
<tr>
<td></td>
<td>85441900</td>
<td>Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fiber cables, made up of individually sheathed fibers, whether or not assembled with Winding wire: Other</td>
</tr>
<tr>
<td>Overhead conductors</td>
<td>76051100</td>
<td>Aluminum wire.: Of aluminum, not alloyed: Of which the maximum cross sectional dimension exceeds seven mm</td>
</tr>
<tr>
<td></td>
<td>76051900</td>
<td>Aluminum wire.: Of aluminum, not alloyed: Other</td>
</tr>
<tr>
<td></td>
<td>76052100</td>
<td>Aluminum wire.: Of aluminum alloys: Of which the maximum cross sectional dimension exceeds seven mm</td>
</tr>
<tr>
<td></td>
<td>76052900</td>
<td>Aluminum wire.: Of aluminum alloys: Other</td>
</tr>
</tbody>
</table>

### 1.4 Raw Materials Requirements

The key raw materials used are copper rods and aluminum rods, for which the HS codes are listed below:

**Table 3: Raw Materials Consumed in Wires and Cables Manufacturing**

<table>
<thead>
<tr>
<th>HS Code</th>
<th>Raw Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>74071000</td>
<td>Copper bars, rods and profiles: of refined copper</td>
</tr>
<tr>
<td>76041000</td>
<td>Bars, rods and profiles, aluminum, not alloyed</td>
</tr>
<tr>
<td>76042900</td>
<td>Aluminum bars, rods and profiles: of aluminum alloys: Other</td>
</tr>
</tbody>
</table>
2. Copper Wires and Cables

2.1 Global Market Overview

The copper wires and cables market comprises products that are used for electrification purposes. The market has grown, driven by development of transmission, distribution and telecommunication networks, to meet the rising electricity demand of the society.

2.1.1 Current and Historical Market Trends

The global demand for copper wire and cables is influenced by trends in the global economy. Between 2006 and 2017, the market size registered a CAGR of 2.7% reaching 28.8 million MT in 2017, while the global real GDP CAGR was 2.5% during the same period.

The global market grew by 4.8% in 2007 and registered a marginal growth of about 1% in 2008. When the financial crises hit the global economy in 2008, its impact was felt on the copper wires and cables market, with the market size declining by 5.1% in 2009 to reach 21.5 million MT. However, the market recovered swiftly in 2010 and 2011, growing by 7.4% and 8.2%, respectively. Between 2011 and 2015, the market grew steadily at a CAGR of 2.5%. During 2016 and 2017, the copper wires and cables witnessed marginal growth of 2.1% due to slowdown in the global economy.

Between 2006 and 2017, Africa and the Middle East region witnessed the highest CAGR of 5.0%, followed by the Rest of Asia-Pacific and South Asia region, which grew at 3.4%, Americas at 2.9%, China grew at 2.7%, while Europe grew at a CAGR of 1.5%.

Chart 1: Global Copper Wires and Cables Demand, 2006 – 2017

Source: Team analysis based on data from MetalBulletin

HSBC Global Research; USDA Economic Research Service

[Manufacture of Electric Wires and Cables Sector in Qatar]
2.1.2 Market Size Breakup by Geography

Regionally Europe is the largest market for copper wires and cables accounting for 28% of the total market in 2017, followed by China, which has a 24% share of the market. Asia-Pacific and South Asia (except China) region accounts for 21% of the market, followed by the Americas at 16%, and Africa and the Middle East at 11%.

In 2016, the growth registered in China’s wires and cables demand was amongst the slowest since 1996 due to economic slowdown\textsuperscript{27}. The Chinese slowdown also affected three North East Asian countries with Japan, South Korea and Taiwan seeing declining output in 2016. Market growth was further pulled down by a major fall in the Russian market due to the US and EU sanctions and also due to the decreasing demand in other crucial markets such as Brazil, Australia, Japan, France and Canada. The market in North America was weak with the demand from the oil & gas sector declining sharply as new investment had almost stopped.
2.1.3 Market Size Breakup by Products

Low-voltage wires and power cables, which includes building wires, is the largest segment within the copper wires and cables market, accounting for 58% of the global market. Low-voltage wires and cables have a large share of the market as they are extensively used for electricity distribution across commercial and housing applications, industrial, railways and airports, among others.

The second largest segment is medium, high and extra high voltage-power cables accounting for 15% of the market. Copper telecom cables and winding wires each account for 10% of the market, while instrumentation and control cables have a 7% share of the global copper wires and cables market.

**Chart 3: Global Copper Wires and Cables Market Segmentation by Product, 2017**

Source: Team analysis based on data from Deutsche Bank

[Image: Chart showing market segmentation by product, with low voltage wires and power cables accounting for 58% of the market, medium, high and extra high voltage cables for 15%, copper telecom cables and winding wires for 10%, and instrumentation and control cables for 7%]
2.1.4 Market Trends

The market trends in the global copper wires and cables market are:28

- Decline in the demand for copper telecom wires and cables: Copper telecom wires and cables are witnessing a fall in demand as they are steadily being replaced in telecom networks by fiber optic cables, which allow faster transmission and reduce signal loss.

- Mergers and acquisitions due to industry fragmentation: The fragmented structure of the global wires and cables market has led to mergers and acquisitions, as companies try to expand inorganically to strengthen their geographical presence or product capabilities. According to data from Bloomberg, the highest merger and acquisition activity, cumulatively valued at USD 5.7 billion, was observed in 2007 with 142 deals.


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Source: Team analysis based on data from Bloomberg

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28 HSBC Global Research
2.1.5 Demand Forecast

Between 2017 and 2026, driven by global macro-economic scenario, the global copper wires and cables market is expected to grow at a CAGR of 3.4% reaching 38.9 million MT in 2026. During the same period, the global real GDP is expected to register a CAGR of 3.1%.

Geographically, the growth in the market would be led by an increasing demand from Africa and the Middle East (CAGR of 4.6% during 2017 to 2026), Asia-Pacific and South Asia region (CAGR of 3.9%) and the Americas (CAGR of 3.9%), as these regions would witness sustained investment in infrastructure and construction sector. The copper wires and cables market in China (CAGR of 3.4%) and Europe (CAGR of 2.1%) is expected to witness relatively slow growth in the coming years.29

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29 MetalBulletin
2.1.6 Key Market Players

The key players in the global market have been profiled below:

Table 4: Key Global Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Overview</th>
<th>2015 Sales USD million</th>
<th>Key Products</th>
</tr>
</thead>
</table>
| Prysmian      | 1900 | Prysmian is headquartered in Milan, Italy. The company has 88 manufacturing plants and operates in over 50 countries.                                                                                      | 8,171                 | • Energy projects (high-voltage underground cables, submarine cables and subsea umbilicals, risers & flowlines for oil & gas)  
                                                                 |                     | • Energy products (copper and aluminum low voltage, medium voltage and high-voltage wires and cables, and specialty cables for certain industries such as automotive, shipping and aerospace)  
                                                                 |                     | • Telecom (optical fiber, optical cables, connectivity components and accessories and copper cables)                                                                                                 |
| Nexans        | 1994 | Nexans is based in Paris, France. The company has 91 manufacturing plants and operates in over 40 countries.                                                                                               | 6,925                 | • Transmission, distribution & operators (copper and aluminum low voltage, medium voltage and high voltage cables and related accessories, as well as copper and optical fiber cables for public telecommunications networks)  
                                                                 |                     | • Industry (specialty cables for harnesses, and for the shipbuilding, railroad and aeronautical manufacturing industries)                                                                                     
                                                                 |                     | • Building (cables for building market and private telecom network)                                                                                                                                 |
| General Cable | 1927 | General Cable is headquartered in Kentucky, US. The company has 38 manufacturing plants and operates in over 35 countries.                                                                                  | 4,225                 | • Energy (transmission conductor & cable, distribution conductor & cable, substation cable, generation cable, cable compounds)  
                                                                 |                     | • Construction (building wire, power cord and cordset)                                                                                                                                                 |
                                                                 |                     | • Industrial (instrumentation cable, control & power, low voltage, medium voltage and industrial cable)                                                                                                    |
                                                                 |                     | • Specialty (cables for automotive, military, mining, nuclear, oil & gas, rail & transit, transportation products and wire harnesses & assemblies)                                                     |
                                                                 |                     | • Communications (datacom, electronics, fiber optic and telecommunications cable)                                                                                                                                 |
                                                                 |                     | • Aluminum rod & strip                                                                                                                                                                                 |

30 Company websites and Annual Reports of companies
<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Overview</th>
<th>2015 Sales USD million</th>
<th>Key Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Sumitomo</td>
<td>1897</td>
<td>Sumitomo is based in Tokyo, Japan and is a diversified conglomerate. The company operates in around 40 countries.</td>
<td>6,446</td>
<td>• Materials (copper wire rods, aluminum alloy wires and bars)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Electric power-related products (underground and submarine cables up to 500 kV, submarine power transmission cables up to 500 kV, accessories for extra high voltage and submarine cable system, overhead conductors, accessories for medium voltage cables)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Industrial electric wires and cables (cables for housing, low voltage, medium voltage, rubber cables, flexible lead wires, power generation cables, instrumentation cables and wiring units)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Superconducting products (superconducting magnets and coils, superconducting cables and superconducting wires)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Information and communication (optical fibers and optical fiber cables, optical connectors, optical system, optical transceiver, modules, optical devices, and wireless devices, and products for electronic devices)</td>
</tr>
<tr>
<td>5</td>
<td>Southwire</td>
<td>1937</td>
<td>Southwire is headquartered in Georgia, US. The company has 19 manufacturing plants and operates in over 67 countries.</td>
<td>4,800</td>
<td>• Electrical (wire and cable products to distribute power inside homes and buildings)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Energy (overhead conductors, low, medium and high voltage cables and bare copper)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• OEM (copper and aluminum wire and rod to original equipment manufacturers)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Industrial (industrial wire and cable for coal, natural gas, geothermal, peaking units, emission controls and emission reduction)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Engineered products (specialty cables such as flexible high current copper grounding systems, water-cooled power cables, welding cables and conducting bus bar systems)</td>
</tr>
</tbody>
</table>
### Key Global Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Overview</th>
<th>2015 Sales USD million</th>
<th>Key Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Furukawa Electric</td>
<td>1884</td>
<td>Furukawa is headquartered in Tokyo, Japan. Globally, the company operates in around 28 countries.</td>
<td>7,454</td>
<td>• Telecommunications (optical fiber cables, metal communication cables, electronic appliance wires, optical components, network equipment, LAN cable, etc.)</td>
</tr>
<tr>
<td>7</td>
<td>LS Cable</td>
<td>1962</td>
<td>LS Cable is based in Gyeonggi-do, South Korea. The company has 10 manufacturing plants and operates in about 27 countries.</td>
<td>2,997</td>
<td>• Energy (low voltage, medium voltage, high voltage, extra-high voltage, submarine cables, instrumentation &amp; control cables, overhead wire and bus duct)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Industrial cable (industrial specialty cables for power projects and shipping industry, industrial cables, automobile cables, harness &amp; module and tubes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Telecommunication (optical fiber cables and related products, structured cabling system and radio frequency systems cables)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Materials copper rod, magnet wires and aluminum rod</td>
</tr>
<tr>
<td>8</td>
<td>Hitachi</td>
<td>1956</td>
<td>Hitachi is headquartered in Tokyo, Japan. Globally, the company operations in Asia, North America, and European region, among others</td>
<td>2,464</td>
<td>• Electric wires and cables (electric power and industrial systems, electronic and telecommunication materials, electric equipment materials, and industrial rubber products)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Information systems (information networks and wireless systems for telecommunications infrastructure)</td>
</tr>
</tbody>
</table>

31 Sustainability Report 2016; 32 Hitachi Metals Product Catalog
### Key Global Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Overview</th>
<th>2015 Sales USD million</th>
<th>Key Products</th>
</tr>
</thead>
</table>
| Leoni AG  | 1917 | Leoni is headquartered in Nuremberg, Germany. The company has 80 manufacturing plants (automotive wiring systems and cables combined) and operates in about 32 countries.                                                                                                                   | 2,036                  | Wires and cables for:  
  - Communication & infrastructure  
  - Industry and healthcare  
  - Electrical appliances assemblies  
  - Conductors & copper solutions |
| Xignux    | 1956 | Xignux is headquartered in Nuevo Leon, Mexico. The company has 25 manufacturing plants (Cables, Transformers, Infrastructure and Foods division combined) and operates in about 30 countries.                                                                                                           | 2,373                  |  
  - Bare wires and cables\(^{33}\)  
  - Control cables  
  - Extra high voltage cables  
  - Flexible cables and cords  
  - High voltage cables  
  - Low voltage wires and cables  
  - Magnet wire  
  - Medium tension cables  
  - Mine cables  
  - Overhead and underground power cables  
  - Renewable energy cables |

\(^{33}\) Viakon’s website (Xignux subsidiary)
2.1.7 Pricing Mechanism and Margins

Copper raw material forms a substantial portion of the selling price of copper wires and cables. Manufacturers hedge their commodity exposure by placing an order for raw material at the same time while accepting a customer order and by varying product pricing frequently. Prices of copper wires and cables are linked to the London Metal Exchange (LME) prices for copper. Selling price for copper wires and cables on the day of order confirmation is calculated using the following formulae:

\[ P_1 = P_0 - (LME_0 - LME_1) \times V.F. \times \text{Exchange Rate} \]

Where,

\[ P_1 = \text{Invoice price/km}, \quad P_0 = \text{Quoted price/km} \]
\[ LME_0 = \text{LME price for copper in USD/MT when quotation was offered} \]
\[ LME_1 = \text{LME price for copper in USD/MT when order was confirmed} \]
\[ V.F. = \text{Variation factor (weight of copper in MT per km of cable)} \]
\[ \text{Exchange Rate} = \text{Exchange rate of the currency against USD 1.00} \]

The below chart displays historical and forecast LME prices for copper:

Copper prices peaked during 2006 to 2007 and 2010 to 2011, with the metal quoting USD 7,118/MT in 2007 and USD 8,828/MT in 2011. However, the price rise trend reversed in 2012 and since then a sharp decline in copper prices have been witnessed owing to the drop in copper demand in China, poor global economic growth and excess supply. Between 2012 and 2015, copper prices declined 30.8% reaching USD 5,510/MT in 2015. Copper prices further declined by 11.7% in 2016. However, as the demand-supply imbalance is corrected over the long-term, the declining price trend is expected to reverse and copper prices are expected to grow at a CAGR of 1.5% from USD 5,750/MT in 2017 to reach USD 6,590/MT in 2026.

\[ ^{34} \text{CNN Money}; \quad ^{35} \text{World Bank} \]
2.2 GCC Market Overview

2.2.1 Current and Historical Market Trends

The GCC region copper wires and cables market witnessed a CAGR of 4.2% during 2006 to 2017, with the market demand reaching 1.33 million MT in 2017 from 0.85 million MT in 2006 driven by buoyant construction sector, infrastructure projects and investments by utility companies in building power and communication networks. The thriving construction sector has stimulated demand for cables used in residential, commercial and industrial construction, as well as in development of utility networks. Infrastructure investments such as ports, airports, metro, entertainment parks, creation of free zones among others in the GCC region has been one of the key reasons for the market growth. The Global Infrastructure Investment Index 2016, which ranks countries that are most attractive for infrastructure investments, ranks Qatar and the UAE on second and third positions globally, respectively after Singapore, showcasing the infrastructure potential in these countries.

The market demand has kept pace with the rising electricity consumption in the GCC region, which increased from 304 billion kWh in 2006 to 555 billion kWh in 2017, rising at a CAGR of 5.6% during 2006 to 2017.

In terms of country-wise growth, during 2006 to 2017, the copper wires and cables market grew the fastest in Qatar at a CAGR of 6.1%, followed by 5.6% in Saudi Arabia, 2.8% in UAE, 2.7% in Oman, 2.2% in Kuwait, and a CAGR of 2.0% in Bahrain.

![Chart 7: GCC Copper Wires and Cables Demand, 2006 – 2017](image)

Source: Team analysis based on data from MESC Prospectus and GOIC

Team Analysis, MESC Prospectus; Wire & Cable Arabia 2015; Arcadis; GOIC
2.2.2 Market Size Breakup by Geography

In terms of geographical segments, Saudi Arabia is the largest market in the GCC region for copper wires and cables, accounting for 38% of the total market (1.33 million MT) in 2017, due to larger population and geographical coverage, followed by the UAE, which has a 27% share of the market. Qatar comes third accounting for 17% of the market, followed by Oman, which has 8% share of the market. Kuwait has a 7% share of the GCC region market and Bahrain, the smallest of all in terms of geography, has a 3% share of the market.

Source: Team analysis based on data from MESC Prospectus

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40 Team Analysis, MESC Prospectus
2.2.3 Market Size Breakup by Products

Low-voltage wires and power cables is the largest segment of the copper wires and cables market, accounting for 59% of the market in the GCC region. The second-largest segment is medium, high and extra high voltage-power cables accounting for 28% of the market. Control and instrumentation cables account for 7% of the market, winding wires have and copper telecom wires have 4% and 2% share of the copper wires and cables market in the GCC region, respectively.

Chart 9: GCC Copper Wires and Cables Market Segmentation by Product, 2017

Source: Team analysis based on data from MESC Prospectus
2.2.4 Current Market Trends and Drivers

Diversification of product mix: Due to stiff price competition in standardized products, market players are focusing on the niche product segments such as high voltage, extra high voltage and fire performance cables that have relatively less competitive pressure\(^\text{41}\).

For instance, Qatar International Cables Company (QICC) and Bahra Cables started manufacturing high voltage-power cables in 2015, to meet the growing demand. Dubai-based DUCAB also started manufacturing high-voltage power cables 2011 onward, helping reduce UAE’s dependence on imports\(^\text{42}\).

Rising preference for fire performance cables: Building wires and low-voltage cables are used in public buildings that have to accommodate a large number of people. During fire incidents in public buildings, the most common cause of death is suffocation due to smoke. Reduction or absence of smoke during fire can reduce fatalities, hence customers prefer low voltage-wires and cables that are fire resistant or emit very small quantities of smoke during fire.

Major projects such as the Doha metro and FIFA 2022 stadiums require fire performance wires and cables. Across the GCC region, there is a growing preference for fire-rated cables.

\(^{41}\) Integer Research; \(^{42}\) Utilities Middle East
Key projects in the GCC region driving the demand for electrical cables include:

Table 5: Key Projects in the GCC region

<table>
<thead>
<tr>
<th>Project’s Name</th>
<th>Country</th>
<th>Type of Project</th>
<th>Project Value (USD million)</th>
<th>Year of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 KACARE - Renewable Energy Program</td>
<td>KSA</td>
<td>Power Plant</td>
<td>150,000</td>
<td>2025</td>
</tr>
<tr>
<td>2 KACARE - Nuclear Power Reactor</td>
<td>KSA</td>
<td>Power Plant</td>
<td>70,000</td>
<td>2032</td>
</tr>
<tr>
<td>3 Middle East Development - Al Noor City in Bahra</td>
<td>KSA</td>
<td>Real Estate</td>
<td>32,000</td>
<td>2024</td>
</tr>
<tr>
<td>4 SRO - Riyadh Dammam High-Speed Rail</td>
<td>KSA</td>
<td>Infrastructure</td>
<td>32,000</td>
<td>2023</td>
</tr>
<tr>
<td>5 Jeddah Metro Company - Jeddah Public Transportation Program (JPTP)</td>
<td>KSA</td>
<td>Infrastructure</td>
<td>30,400</td>
<td>2023</td>
</tr>
<tr>
<td>6 KACARE - Sustainable City</td>
<td>KSA</td>
<td>Real Estate</td>
<td>30,000</td>
<td>2036</td>
</tr>
<tr>
<td>7 JDURC - Heart of Jeddah Development (HOJ)</td>
<td>KSA</td>
<td>Real Estate</td>
<td>20,000</td>
<td>2034</td>
</tr>
<tr>
<td>8 Dubai Holding - Jumeirah Central</td>
<td>UAE</td>
<td>Real Estate</td>
<td>20,000</td>
<td>2024</td>
</tr>
<tr>
<td>9 Dubai Holding/Emaar Properties JV - Dubai: Bawadi</td>
<td>UAE</td>
<td>Real Estate</td>
<td>16,000</td>
<td>2026</td>
</tr>
<tr>
<td>10 MMRTC - Mecca Metro</td>
<td>KSA</td>
<td>Infrastructure</td>
<td>16,000</td>
<td>2030</td>
</tr>
<tr>
<td>11 Oman Rail - Oman National Infrastructure</td>
<td>Oman</td>
<td>Infrastructure</td>
<td>15,600</td>
<td>2022</td>
</tr>
<tr>
<td>12 QRAIL - QIRP: Passenger &amp; Freight Rail</td>
<td>Qatar</td>
<td>Infrastructure</td>
<td>15,000</td>
<td>2030</td>
</tr>
<tr>
<td>13 SWCC - Jubail 3 IWPP</td>
<td>KSA</td>
<td>Power Plant</td>
<td>5,400</td>
<td>2022</td>
</tr>
<tr>
<td>14 SEC - Al-Uqair South Power Plant</td>
<td>KSA</td>
<td>Power Plant</td>
<td>5,200</td>
<td>2025</td>
</tr>
<tr>
<td>15 SEC - Ras Abu Qamis Plant</td>
<td>KSA</td>
<td>Power Plant</td>
<td>4,500</td>
<td>2023</td>
</tr>
<tr>
<td>16 SEC - Taibah Integrated Solar Combined Cycle (ISCC) Plant</td>
<td>KSA</td>
<td>Power Plant</td>
<td>4,000</td>
<td>2020</td>
</tr>
<tr>
<td>17 KAHRAMAA - Transmission: Phase 13: cables, substations</td>
<td>Qatar</td>
<td>Substation, Control Centre</td>
<td>3,300</td>
<td>2019</td>
</tr>
<tr>
<td>18 OPWP – 2,700 MW Power Plant</td>
<td>Oman</td>
<td>Power Plant</td>
<td>3,000</td>
<td>2022</td>
</tr>
<tr>
<td>19 FEWA – 2,200 MW Power Plant in Northern Emirates</td>
<td>UAE</td>
<td>Power Plant</td>
<td>2,500</td>
<td>2021</td>
</tr>
<tr>
<td>20 MEW - Nuwaiseeb Power Plant</td>
<td>Kuwait</td>
<td>Power Plant</td>
<td>2,500</td>
<td>2020</td>
</tr>
</tbody>
</table>

43 MEED Projects
2.2.5 Demand Forecast

Between 2017 and 2026, the GCC region copper wires and cables market is expected to grow at a CAGR of 2.5%, driven by rising electricity consumption, reaching a market size of 1.66 million MT in 2026 from 1.33 million MT in 2017. During the same period, driven by population growth and economic development, GCC region’s electricity consumption is expected to register a CAGR of 3.3% reaching 745 billion kWh in 2026, driven by rising population.

The two key pillars driving the market’s growth in the next ten years are real estate and infrastructure projects, such as the USD 32 billion expansion of Al Maktoum International Airport at Dubai World Central, the USD 140 billion infrastructure development in Qatar and other projects in Saudi Arabia, Kuwait, Bahrain and Oman. The GCC interconnection power grid project in which member countries have been making large investments will also be a vital driver of the growth in demand for power cables. The project, which has a total capacity of 1,200MW, links all GCC countries. The first stage of the interconnection project involved capital investments of about USD 1.1 billion, showcasing its prospects to revitalize the power cables market in the GCC region.

The decline in oil prices has a direct impact on expenditure budgets of utility companies as they are state-owned. However, over the medium to long term, this negative impact would be mitigated by the infrastructure investments, as the GCC region countries take steps toward economic diversification.

During 2017 to 2026, the market in Saudi Arabia is expected to register a CAGR of 1.0% reaching 556,591MT, while the UAE market is likely to grow at a CAGR of 4.6% reaching 529,526MT in 2026. Qatar’s copper wires and cables market is forecast to advance at a CAGR of 2.6%, reaching 286,544MT in 2026.

Oman’s market would witness a rise in demand at a slower pace (CAGR of 1.1%) to reach 122,962 MT in 2026. Kuwait and Bahrain’s market would pace up at a CAGR of 1.4% and 5.1% reaching 104,153MT and 63,787MT in 2026, respectively.
2.2.6 Key Market Players

Competition in the GCC region copper wires and cables market is fierce with local manufacturers playing a major role in market supply.

Key cable manufacturers established in the 1970s and 1980s such as Saudi Cable, Riyadh Cables, Jeddah Cables, and DUCAB that dominated the market, are facing competition from relatively new entrants such as Bahra Cables, Al Fanar, RESCAB, QICC (Nexans Qatar), Elsewedy (in Saudi Arabia and Qatar), and Power Plus. Moreover, many newly entered manufacturers are benefiting on their close business links with end-consumers. For instance, Saudi Bin Ladin Group (a diversified conglomerate and end user) owns both, Bahra Cable and Electric House (distributor of wires and cables in GCC region), while Al Fanar has a well-known distribution network in Saudi Arabia and a sister concern Al Fanar Construction, which is involved in EPC contracting.

The key players in the GCC region market have been profiled below:

Table 6: Key GCC Region Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Country</th>
<th>Manufacturing locations</th>
<th>Key Products</th>
<th>Total Capacity</th>
</tr>
</thead>
</table>
| 1.   | Riyadh Cables Group of Companies | 1984 | Saudi Arabia | Four plants in Riyadh for wire and cables, one for PVC compounding plant, and one copper rod plant | 1. Low voltage wires and power cables  
- Building wire (LSF or non-LSF)  
- Low voltage power cables (LSF or non-LSF)  
2. Medium, high and extra-high voltage power cables  
- Medium voltage power cables  
- High voltage power cables  
3. Telecom cables  
- Telecom cables  
4. Instrumentation and control cables  
- Control cables  
5. Optical Fiber  
- Optical fiber cables  
6. Others  
- Copper rod  
- PVC compounds | 240,000 MTPA |

Footnotes:
45 Integer Research;
46 Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, and National Cables Industry)
### Key GCC Region Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Country</th>
<th>Manufacturing locations</th>
<th>Key Products</th>
<th>Total Capacity MTPA</th>
</tr>
</thead>
</table>
| 2 | Bahra Advanced Cable Manufacture Company Limited | 2008 | Saudi Arabia  | One factory in Bahra, Jeddah | 1. Low-voltage wires and power cables  
|   |                                                |      |               |                             | • Building wires (fire resistant and non-fire resistant) (LSF or non-LSF) (LSOH or non-LSOH)  
|   |                                                |      |               |                             | • Low-voltage power cables (fire resistant and non-fire resistant) (LSF or non-LSF) (LSOH or non-LSOH)  
|   |                                                |      |               |                             | 2. Medium-, high- and extra-high-voltage power cables  
|   |                                                |      |               |                             | • Medium voltage power cables (LSOH or non-LSOH)  
|   |                                                |      |               |                             | • High- and extra-high-voltage power cables  
|   |                                                |      |               |                             | 3. Instrumentation and control cables  
|   |                                                |      |               |                             | • Control cables  | 120,000 MTPA |
| 3 | Jeddah Cables Company Ltd./ Energyc Cables     | 1988 | Saudi Arabia  | Four plants in KSA          | 1. Low-voltage wires and power cables  
|   |                                                |      |               |                             | • Building wires (LSOH or non-LSOH) (fire-resistant and non-fire resistant)  
|   |                                                |      |               |                             | • Low-voltage power cables (LSOH or non-LSOH) (fire resistant and non-fire resistant)  
|   |                                                |      |               |                             | 2. Medium-, high- and extra-high-voltage power cables  
|   |                                                |      |               |                             | • Medium voltage power cables  
|   |                                                |      |               |                             | • High- and extra-high-voltage power cables  
|   |                                                |      |               |                             | 3. Instrumentation and control cables  
|   |                                                |      |               |                             | • Control cables  | 120,000 MTPA |

*Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, and National Cables Industry)*

[ Manufacture of Electric Wires and Cables Sector in Qatar ]
### Key GCC Region Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Country</th>
<th>Manufacturing locations</th>
<th>Key Products</th>
<th>Total Capacity&lt;sup&gt;46&lt;/sup&gt;</th>
</tr>
</thead>
</table>
|4  | Dubai Cable Company (Private) Limited / DUCAB | 1979 | UAE     | Five plants: One plant in Jebel Ali, Dubai (HV, MV, LV and instrumentation & control cables); two plants in Mussafah, Abu Dhabi (HV, LV, building wire, flexible cables and copper rod) and one plant in Kizad, Abu Dhabi (aluminum rod and wires) | 1. Low voltage wires and power cables  
   |                                           |      |         |                                                                                         | • Building wires (LSF or non-LSF) (fire-resistant and non-fire resistant) | 110,000 MTPA                |
|   |                                           |      |         |                                                                                         | • Low-voltage wires and cables (LSF or non-LSF) (fire-resistant and non-fire resistant)                 |                             |
|   |                                           |      |         |                                                                                         | • Flexible rubber wire and cables                                                                      |                             |
|   |                                           |      |         |                                                                                         | 2. Medium-, high- and extra-high-voltage power cables                                                 |                             |
|   |                                           |      |         |                                                                                         | • High-voltage power cables                                                                            |                             |
|   |                                           |      |         |                                                                                         | • Medium-voltage power cables (LSF or non-LSF)                                                         |                             |
|   |                                           |      |         |                                                                                         | 3. Instrumentation and control cables                                                                  |                             |
|   |                                           |      |         |                                                                                         | • Instrumentation and control cables                                                                   |                             |
|   |                                           |      |         |                                                                                         | 4. Winding wires                                                                                      |                             |
|   |                                           |      |         |                                                                                         | • Transformer windings                                                                                 |                             |
|   |                                           |      |         |                                                                                         | 5. Others                                                                                              |                             |
|   |                                           |      |         |                                                                                         | • Copper rod and wires                                                                                 |                             |
|   |                                           |      |         |                                                                                         | • Automobile wire harnesses                                                                           |                             |
|5  | Oman Cables Industry (SAOG)               | 1984 | Oman   | One plant in each of Sohar and Muscat                                                    | 1. Low-voltage wires and power cables  
   |                                           |      |         |                                                                                         | • Building wires and cables (fire-resistant and non-fire resistant) (LSF or non-LSF) (LSOH or non-LSOH) | 110,000 MTPA                |
|   |                                           |      |         |                                                                                         | • Low-voltage power cables (fire-resistant and non-fire resistant) (LSF or non-LSF) (LSOH or non-LSOH) |                             |
|   |                                           |      |         |                                                                                         | 2. Medium-, high- and extra-high-voltage power cables                                                 |                             |
|   |                                           |      |         |                                                                                         | • Medium voltage power cables                                                                          |                             |
|   |                                           |      |         |                                                                                         | 3. Instrumentation and control cables                                                                  |                             |
|   |                                           |      |         |                                                                                         | • Low-voltage control cables                                                                         |                             |

<sup>46</sup> Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, and National Cables Industry)
### Key GCC Region Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Country</th>
<th>Manufacturing locations</th>
<th>Key Products</th>
<th>Total Capacity</th>
</tr>
</thead>
</table>
| 6 | Saudi Cable Company                            | 1976 | Saudi Arabia| Jeddah                 | 1. Low-voltage wires and power cables  
• Low-voltage power cables (fire-resistant and non-fire-resistant) (LSF or non-LSF) (LSOH or non-LSOH)  
• Building wires (fire resistant and non-fire resistant) (LSF or non-LSF) (LSOH or non-LSOH)  
2. Medium-, high- and extra-high-voltage power cables  
• Medium-voltage power cables (fire-resistant and non-fire-resistant) (LSF or non-LSF) (LSOH or non-LSOH)  
• High- and extra-high-voltage cables  
3. Telecom cables  
• Communication cables  
4. Instrumentation and control cables  
• Industrial and instrumentation cable  
5. Optical fiber  
• Optical fiber cables | 85,000 MTPA |
| 7 | Gulf Cable and Electrical Industries Company K.P.S.C. | 1975 | Kuwait      | Four plants in Kuwait   | 1. Low-voltage wires and power cables  
• PVC-insulated low-voltage cables  
• XLPE insulated low voltage cables  
• Conductors For Earthing  
2. Medium-, high- and extra-high-voltage power cables  
• Medium-voltage power cables  
3. Telecom cables  
• Telephone cables  
4. Instrumentation and control cables  
• Instrumentation cables  
5. Others  
• Auxiliary, pilot, coaxial and data transmission cables  
• Cable jointing  
• Copper rod | 50,000 MTPA for copper and aluminum combined |

---

46 Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, and National Cables Industry)
## Key GCC Region Players in Electrical Wires and Cables Market

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Country</th>
<th>Manufacturing locations</th>
<th>Key Products</th>
<th>Total Capacity&lt;sup&gt;46&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Elsewedy Cables KSA</td>
<td>2006</td>
<td>Saudi Arabia</td>
<td>One plant in Yanbu Al Sinaiyah</td>
<td>1. Low-voltage wires and power cables</td>
<td>45,000 MTPA for copper and aluminum combined</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>• Low-voltage power cables</td>
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<td>2. Medium-, high- and extra-high-voltage power cables</td>
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<td>• Medium voltage power cables</td>
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<td>• High- and extra-high-voltage power cables</td>
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<td>3. Winding wires</td>
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<td></td>
<td>• Winding wires</td>
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<td>9</td>
<td>Al Fanar</td>
<td>1989</td>
<td>Saudi Arabia</td>
<td>One plant in Al Fanar Industrial City, Third Industrial Zone, Riyadh</td>
<td>1. Low-voltage wires and power cables</td>
<td>45,000 MTPA</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Building wires (LSHF and non-LSHF)</td>
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<td>• Low-voltage power cables (LSHF and non-LSHF)</td>
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<td>2. Medium-, high- and extra-high-voltage power cables</td>
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<td>• Medium-voltage power cables</td>
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<td>3. Telecom cables</td>
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<td>• Telecom cables</td>
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<td>4. Instrumentation and control cables</td>
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<td>• Low voltage control cables</td>
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<td>5. Others</td>
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<td></td>
<td>• Signal and data cables</td>
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<td>10</td>
<td>National Cables Industry</td>
<td>2001</td>
<td>UAE</td>
<td>One plant in Sharjah</td>
<td>1. Low-voltage wires and power cables</td>
<td>40,000 MTPA</td>
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<td>• Low-voltage power cables</td>
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<td>• Building wires</td>
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<td>2. Medium-, high- and extra-high-voltage power cables</td>
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<td></td>
<td>• Control cables</td>
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</tbody>
</table>

<sup>46</sup> Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, and National Cables Industry)

[Copper Wires and Cables]
2.2.7 Market Outlook

In the short to medium term, declining oil and gas prices affecting utility infrastructure expenditure, increasing competitive rivalry leading to margin pressures and oversupply, and increasing customer expectations are some of the key challenges facing the industry.

Going forward, the market is expected to post a healthy CAGR of 2.5%, reaching 1.66 million MT in 2026 from 1.33 million MT in 2017, driven by investments by GCC countries in building transmission and distribution networks, transport infrastructure such as metro, and tourism facilities such as hotels and entertainment parks. Thus, the outlook for copper wires and cables market in the GCC region appears to offer growth opportunities for companies in the market.
2.3 Qatar Market Overview

2.3.1 Low-Voltage Wires and Power Cables

Low-voltage wires and cables have a voltage of less than 1KV and form the last leg of an electricity distribution network. These wires and cables are used for conducting electricity in buildings, structures and in capital goods. Low-voltage wires and cables are used in carrying out electrical works in real estate development toward the end of construction period after the completion of civil works.

2.3.1.1 Demand Analysis

A. Current and Historical Market Trends

Low-voltage wires and power cables constitute the largest segment of the copper wires and cables market in Qatar. Across 2006 to 2017, the market size followed real estate development trends\(^47\). The market size grew consistently at a CAGR of 17.1% from 77,736MT (QAR 2.20 billion) in 2006 to 124,929MT (QAR 2.9 billion) in 2009, driven by growth in completed real estate built-up area, which peaked at 7.62 million sqm in 2009\(^48\). The market size contracted in 2010, owing to reduced new project launches in 2008 to 2009 due to economic slowdown and remained steady across 2010 to 2013. Thereafter, the market recovered and is estimated to have reached 148,657MT (QAR 3.69 billion) in 2017.

Source: Team analysis based on data from primary interviews and Trade Map

\(^{47}\) Team Analysis; \(^{48}\) MDPS
B. Demand Drivers

a. **Demand drivers**: Real estate projects, such as residential, commercial, hospitality and industrial are the demand drivers for low-voltage wires and power cables.

b. **Customer segment**: Mechanical, electrical and plumbing (MEP) contractors constitute the customer segment for the low-voltage wires and power cables.

c. **Key influencers**: Low-voltage wires and power cables are standardized products that are available with traders and distributors. MEP consultants influence decision on the type of product, insulation, brand, among others, while architects and interior designers, who determine the number of electrical points and the location of electrical appliances, influence the quantity required.
C. Demand Forecast

Going forward, the market demand is expected to grow at a CAGR of 2.61% from 148,657MT in 2017 to an estimated 187,421MT in 2026. It is also estimated that the metro rail project will require 3,000km of low-voltage cables during this period\textsuperscript{49}. In value terms, the market is expected to grow at a CAGR of 3.93% to reach QAR 5.22 billion in 2026 from QAR 3.69 billion in 2017. In the short to medium term, the market is expected to contract, in quantity and value terms, due to reduced demand and fall in copper prices, respectively.

\textsuperscript{49} Qatar Rail
2.3.1.2 Trade Analysis

A. Imports

The analysis of historical import data reveals that imports for low-voltage wires and power cables increased from 78,022MT in 2005 to 111,661MT in 2015, at a CAGR of 4.06%. In value terms, imports advanced at a CAGR of 6.74% between 2006 and 2015, reaching QAR 2.52 billion in 2015 from QAR 1.40 billion in 2006. During this period, trends in growth and fall of imports followed that of the market.


Source: Team analysis based on data from Trade Map
B. Exports

The analysis of historical export data indicates that export volumes were marginal across 2006 to 2009 when Qatar had a very small capacity for domestic manufacturing. From 2010, export increased as two new manufacturing units, i.e. Doha Cables and Qatar International Cables Co., were established and peaked at 10,115MT (QAR 169.8 million) in 2013. Primary interviews indicate that, during 2010 to 2015, exports were irregular owing to market competition. Across 2006 to 2015, exports constituted an average of 23.4% of domestic production. 

Chart 14: Qatar’s Low Voltage Wires and Power Cables Exports, 2006 – 2015

Source: Team analysis based on data from Trade Map
C. Trade by Source and Destination

I. Imports

UAE has been the single largest source of imports for the period from 2010 to 2015, while Russia has quickly increased its share over the last four years.

The analysis of total import data from 2010 to 2015 (USD 1,853.7 million) indicates that the UAE (38% share), Russia (18%), South Korea (10%), Italy and France with 4% each, are the major sources of imports for low-voltage wires and power cables into Qatar.

![Chart 15: Key Sources of Low Voltage Wires and Power Cables Imports, 2010 – 2015](image)

Source: Team analysis based on data from Trade Map
II. Exports

GCC countries dominate as destinations of Qatari exports, with UAE and Saudi Arabia dominating in each of the years from 2010 to 2015. The analysis of total export data from 2010 to 2015 (USD 44.75 million) indicates that the UAE (39% share), Saudi Arabia (31%), Kuwait, Bahrain and Yemen with 7%, 6% and 4% respectively, are the major destinations for exports from Qatar.

*Chart 16: Key Destinations of Low Voltage Wires and Power Cables Exports, 2010 – 2015*

Source: Team analysis based on data from Trade Map
D. Share of Imports in Domestic Consumption

During 2006 to 2009, the requirement of wires and low-voltage cables in Qatar was almost entirely met by imports as Qatar’s domestic manufacturing capabilities were limited to 450MT per annum set up by General Switchgear and Lighting Industries Co. in 2005. Two new domestic manufacturing facilities, Doha Cables and Qatar International Cables Co. (QICC), that commenced operations in 2010 drove import substitution to bring the percentage share of imports in the range of 69% to 74% during 2013 to 2017.

Going forward, it is estimated that share of imports is likely to remain in range of 65% to 70% during 2017 and 2026.

Chart 17: Qatar’s Low Voltage Wires and Power Cables Consumption 2006 – 2017

Source: Team analysis based on data from Trade Map
2.3.1.3 Pricing Analysis

Copper raw material costs constitute a significant portion of the selling price of low-voltage copper wires and power cables. Manufacturers hedge their commodity exposure by placing an order for raw material at the time of accepting a customer order and by varying product pricing frequently. The prices of low-voltage copper wires and cables are linked to the London Metal Exchange (LME) prices of copper.

In addition to the prevailing LME price, the pricing of low-voltage wires and cables is dependent on a number of factors, such as the amount of copper per unit length, the type of insulation, other specifications, time available to deliver order and order quantity.

Additionally, non-product factors that impact pricing decisions are the utilization level of the manufacturing facility and the strategic importance of customers. For instance, if the facility is loaded with orders, prices would be quoted steeply. Similarly, if the customer is a key account, with potential for future business, then pricing would be favorable to the customer. The prices of low-voltage wires and cables are quoted on per meter basis, while those of building wires are quoted on per roll basis, where one (1) roll equals 100 yards or 91.4 meters.

The selling price on the day of order confirmation is calculated using the following formula:

\[
P_1 = P_0 - (LME_0 - LME_1) \times V.F. \times \text{Exchange Rate},
\]

where:
- \(P_1\) = Invoice price/meter
- \(P_0\) = Quoted price/meter
- \(LME_0\) = LME price of copper in USD/MT when quotation was offered
- \(LME_1\) = LME price of copper in USD/MT when order was confirmed
- \(V.F.\) = Variation factor (weight of copper in MT per meter of cable)
- \(\text{Exchange Rate}\) = Exchange rate of the currency against USD 1.00

The tables shown below provide the price range for key product items:

### Table 7: Prices of Key Product Items: Building Wires

<table>
<thead>
<tr>
<th>Product</th>
<th>Quoted Price*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Building wire: 1 core × 2.5 sq. mm.</td>
<td>QAR 42 to 55 per roll</td>
</tr>
<tr>
<td>2 Building wire: 1 core × 4 sq. mm.</td>
<td>QAR 75 to 93 per roll</td>
</tr>
<tr>
<td>3 Building wire: 1 core × 6 sq. mm.</td>
<td>QAR 100 per roll</td>
</tr>
<tr>
<td>4 Building wire: 1 core × 16 sq. mm.</td>
<td>QAR 185 per roll</td>
</tr>
</tbody>
</table>

### Table 8: Prices of Key Product Items: Low-voltage Cables

<table>
<thead>
<tr>
<th>Product</th>
<th>Quoted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Low-voltage cables: 4 core × 10 sq. mm.</td>
<td>QAR 15 to 17 per meter</td>
</tr>
<tr>
<td>2 Low-voltage cables: 4 core × 16 sq. mm.</td>
<td>QAR 22 to 24 per meter</td>
</tr>
<tr>
<td>3 Low-voltage cables: 4 core × 25 sq. mm.</td>
<td>QAR 30 to 32 per meter</td>
</tr>
<tr>
<td>4 Low-voltage cables: 4 core × 70 sq. mm.</td>
<td>QAR 62 to 63 per meter</td>
</tr>
<tr>
<td>5 Low-voltage cables: 4 core × 300 sq. mm.</td>
<td>QAR 230 to 254 per meter</td>
</tr>
<tr>
<td>6 Low-voltage cables: 1 core × 800 sq. mm.</td>
<td>QAR 188 to 227 per meter</td>
</tr>
</tbody>
</table>

* 1 roll is equal to 91.4 meters.
The selling price of low-voltage wires and power cables would follow the trends shown by LME copper prices. The average selling prices have steadily reduced from 2013 to 2016 but have recovered in 2017 with price being QAR 24,865/MT. Going ahead, they are expected to be driven by LME prices for copper and grow at a CAGR of 1.29% and reach an estimated value of QAR 27,894/MT of gross weight in 2026.

Manufacturer’s margin for building wires and low voltage cables vary between 5% to 10%. Margins for traders vary in the range of 2% to 7%. The margin earned by traders vary depending upon factors such as order size, payment terms, product specification etc.

Chart 18: Qatar’s Low Voltage Wires and Power Cables Selling Price Forecast, 2013 – 2026

Source: World Bank
2.3.1.4 SWOT Analysis and Michael Porter’s Five Force Analysis

A. SWOT Analysis

Figure 1: SWOT Analysis: Low-Voltage Wires and Power Cables

**STRENGTHS**

- Low-voltage wires and power cables is the largest segment, expected to constitute 65.3% of the copper wires and cables market during 2017 to 2026
- Qatar market is expected to grow at a CAGR of 3.93% to reach QAR 5.22 billion in 2026. Large market and a moderate growth rate is a strength
- Low-voltage wires and power cables are crucial for providing electricity to electrical appliances

**WEAKNESS**

- Low-voltage wires and power cables are standardized products with low profit margins

**OPPORTUNITIES**

- Growing construction sector and upcoming real estate projects present an opportunity
- Opportunity for import substitution as approximately 70% of the market is serviced by imports
- As demand is expected to outstrip supply (domestic installed capacity), there is an opportunity for new players

**THREATS**

- Volatility in the prices of raw materials, especially copper, may affect margins for manufacturers
- The low-voltage wire and power cables is an extremely price-sensitive market with intense competitive rivalry

**SUMMARY**

In the medium to long term, the strengths and opportunities are expected to outweigh the weaknesses and threats. Planned capacity expansion by domestic players, the competitiveness of domestic production and demand-supply surplus are the clear indicators of opportunities for new players.
B. Michael Porter’s Five Force Analysis

Figure 2: Michael Porter’s Five Forces Analysis: Low-Voltage Wires and Power Cables

**COMPETITIVE RIVALRY**

High
- Competitive rivalry in the low-voltage wires and power cables market is high. Doha Cables, QICC and General Switchgear and Lighting Industries are the three domestic players, in addition to 15 to 20 players in the GCC region, indicating a high level of competition. It is a highly price-sensitive market, and therefore, there is intense competitive rivalry among the players.

**BARGAINING POWER – SUPPLIERS**

High
- Copper costs constitute a significant portion of the selling price of low-voltage wires and power cables. Cable manufacturers have no control over copper rod production or international market copper prices. Therefore, the bargaining power of copper rod suppliers is high.

**BARGAINING POWER – CONSUMERS**

High
- In the low-voltage wires and power cables segment, the bargaining power of consumers is very high due to a large number of players operating in the segment. MEP contractors are highly demanding and extremely price conscious as they can choose from 15 to 20 cable manufacturers.

**THREAT OF NEW ENTRY**

High
- The threat of new entrants in low-voltage wires and power cables market is high. As compared to other electrical cable products, the manufacturing of low-voltage products is neither technology intensive nor capital intensive. A large market growing at a moderate pace can attract potential new entrants.

**THREAT OF SUBSTITUTION**

Low
- The threat of substitution is low as there is no product substitute for low-voltage copper wires and power cables. Aluminum wires and cables cannot be used in low-voltage electrical appliances as they are not designed to be compatible with aluminum.
Manufacture of Electric Wires and Cables Sector in Qatar
Copper Wires and Cables
2.3.2 Medium-, high- and extra-high-voltage power cables

All electrical power cables in this product segment exceed 1,000V and are used extensively in electricity transmission projects.

Medium-voltage cables are used when voltage capacity required is between 1KV and 33KV; high-voltage cables are used when voltage capacity required is between 33KV and 220KV, while extra-high-voltage cables are used when voltage required is above 220KV.

2.3.2.1 Demand Analysis

A. Current and Historical Market Trends

The medium-, high- and extra-high-voltage power cable market grew rapidly from 32,485MT (QAR 1.13 billion) in 2006 to peak at 55,778MT (QAR 1.58 billion) in 2009. This can be attributed growth in Qatar’s electricity transmission and distribution network required to serve the country’s burgeoning electricity consumption from real estate developments. The market size contracted in 2010 due to subdued real estate activity and remained steady till 2013. Thereafter, the market grew to reach an estimated 67,682MT (QAR 1.84 billion) in 2016 and is estimated to be 69,447MT (QAR 2.14 billion) in 2017, growing at a CAGR of 7.15% during 2006 and 2017.

Chart 19: Qatar’s Medium-, High-, Extra-High Voltage Power Cables Demand, 2006 – 2017

Source: Team analysis based on data from primary interviews and Trade Map
B. Demand Drivers

a. Demand drivers: Electricity generation and transmission-related projects, such as substations and transmission network, re-laying of underground cables due to road widening, are the demand drivers for medium-, high- and extra-high-voltage power cables.

b. Customer segment: Utility companies and MEP contractors constitute the customer segment for medium-, high- and extra-high-voltage power cables.

c. Key influencers: Medium-, high- and extra-high-voltage cables are products customized to meet client requirements. MEP consultants and engineers who design projects are the key influencers.
C. Demand Forecast

Going forward, the market demand is expected to grow at a CAGR of 2.61% reaching 87,556MT in 2026 from 69,447MT in 2017. The growth in market would be led by expansion in Qatar’s electricity transmission and distribution network, which would be required to meet the country’s increasing electricity demand.

It is estimated that the metro rail project will require 400km of medium-voltage cables during this period. In value terms, the market is expected to grow at a CAGR of 3.83% from QAR 2.13 billion in 2017 to an estimated QAR 2.99 billion in 2026.

Chart 20: Qatar’s Medium-, High-, Extra-High Voltage Power Cables Demand Forecast, 2017 – 2026

Source: Team analysis based on data from Trade Map

Qatar Rail
2.3.2.2 Trade Analysis

A. Imports

The analysis of historical import data reveals that the imports of medium-, high- and extra-high-voltage power cables increased rapidly from 32,675MT (QAR 555 million) in 2006 to 56,612MT (QAR 1,491 million) in 2009 at a CAGR of 20.1%. Thereafter, imports decreased rapidly due to the compound effect of reduced market size and successful import substitution by domestic players, such as Doha Cables and QICC. Imports broadly remained steady during 2010 to 2015, except for a dip in 2013, and reached 22,427MT (QAR 484 million) in 2015.

Source: Team analysis based on data from Trade Map
B. Exports

The analysis of historical export data indicates that export volumes were marginal during 2006 to 2009, when Qatar did not have any domestic manufacturing facility. Exports during this period were re-exports or rejected imports being exported back to their source.

From 2010, exports have registered a substantial surge as two new manufacturing units, i.e. Doha Cables and Qatar International Cables Co. (QICC) were established. Exports peaked at 4,903MT (QAR 80.1 million) in 2013. Primary interviews indicate that, across 2010 to 2015, exports were irregular owing to market competition. During 2006 to 2015, exports constituted an average of 11.5% of domestic production.


Source: Team analysis based on data from Trade Map
C. Trade by Source and Destination

I. Imports

The analysis of total historical import data from 2010 to 2015 (USD 2,478.52 million) indicates that Egypt (25% share), the UAE (16%), Saudi Arabia (15%), Oman (13%) and South Korea (7%) are the major sources of imports for medium-, high- and extra-high-voltage power cables into Qatar. Primary interviews with traders indicate that imports from Egypt are most likely to be from Doha Cables’ parent firm, Elsewedy Electric. Furthermore, extra-high-voltage cables from Japan and South Korea are most preferred in Qatar, as manufacturers from these countries are known for supplying products of very high quality.

As can be seen from the chart below, Egypt has been a consistent source of imports over the observed five years’ period. Imports from UAE have increased significantly since 2012, while the share for imports from Saudi Arabia has shown a corresponding decline.

Chart 23: Key Sources of Medium-, High-, Extra-High Voltage Power Cables Imports, 2010 – 2015

Source: Team analysis based on data from Trade Map
II. Exports

UAE and Saudi Arabia have dominated the share of exports from Qatar over the five-year period, while exports to Bahrain, Oman and Iran have varied greatly on an annual basis. The analysis of total export data from 2010 to 2015 (USD 155.95 million) indicates that the UAE (33%), Saudi Arabia (25%), Oman (11%), Bahrain (8%) and Iran (6%) are the major destinations for exports from Qatar.

![Chart 24: Key Destinations for Medium-, High-, Extra-High Voltage Power Cables Exports, 2010 – 2015](source)

D. Share of Imports in Domestic Consumption

During 2006 to 2009, the requirement of medium-, high- and extra-high-voltage cables in Qatar was entirely met by imports as Qatar did not have any domestic manufacturing capability in this product segment. Two new domestic manufacturing facilities, i.e. Doha Cables and Qatar International Cables Co. (QICC), that commenced operations in 2010 drove import substitution to bringing the percentage share of imports in the range of 38% to 45% during 2013 to 2017.

During 2017 and 2019, the share of imports in the domestic consumption is expected to further decline to approximately 33%. However, going ahead, assuming no new plants are established, the share of imports would increase to 43% of the market in 2026.
2.3.2.3 Pricing Analysis

Copper raw material costs constitute a significant portion of the selling price of medium-, high- and extra-high-power cables. Manufacturers hedge their commodity exposure by placing an order for raw material at the time of accepting a customer order and by varying product pricing frequently. The prices of medium-, high- and extra-high-voltage power cables are linked to the London Metal Exchange (LME) prices of copper.

Pricing of medium-, high- and extra-high-voltage wires and cables is determined by a combination of factors, such as the prevailing LME prices, the amount of copper per unit length, the type of insulation, other specifications, time available to deliver order and order quantity.

Additionally, non-product factors that impact pricing decisions are the utilization level of the manufacturing facility and the strategic importance of customers. For instance, if the facility is loaded with orders, prices would be quoted steeply. Similarly, if the customer is a key account, with potential for future business, then pricing would be favorable to the customer.

Medium-, high- and extra-high-voltage cables are highly customized products manufactured as per specific project requirements. The prices of these cables are quoted on per kilometer basis.

The selling price on the day of order confirmation is calculated using the following formula:

\[ P_1 = P_0 - (\text{LME}_0 - \text{LME}_1) \times \text{V.F.} \times \text{Exchange Rate}, \]

where

- \( P_1 \) = Invoice price/km, \( P_0 \) = Quoted price/km
- \( \text{LME}_0 \) = LME price of copper in USD/MT when quotation was offered
- \( \text{LME}_1 \) = LME price of copper in USD/MT when order was confirmed
- \( \text{V.F.} \) = Variation factor (weight of copper in MT per km of cable)
- \( \text{Exchange Rate} \) = Exchange rate of the currency against USD 1.00

![Chart 25: Qatar's Medium-, High-, Extra-High Voltage Power Cables Consumption, 2006 – 2017](image-url)

Source: Team analysis based on data from Trade Map
The tables given below provide the price range for key product items:

**Table 9: Prices of Key Product Items: Medium-Voltage Power Cables**

<table>
<thead>
<tr>
<th>Product</th>
<th>Quoted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-voltage power cables (33kV) 1 core × 500 sq. mm.</td>
<td>QAR 186,000 per km</td>
</tr>
<tr>
<td>Medium-voltage power cables (11kV) 3 core × 240 sq. mm.</td>
<td>QAR 190,000 to 225,000 per km</td>
</tr>
</tbody>
</table>

The selling price of medium-, high- and extra-high-voltage power cables would follow the trends shown by LME copper prices. The average selling prices have steadily reduced from 2013 to 2016. They are expected to grow at a CAGR of 1.19% from QAR 30,767/MT of gross weight in 2017 to an estimated QAR 34,214/MT of gross weight in 2026.

**Chart 26: Qatar’s Medium-, High-, Extra-High Voltage Power Cables Selling Price Forecast, 2013 – 2026**

Source: World Bank
2.3.2.4 SWOT Analysis and Michael Porter’s Five Force Analysis

A. SWOT Analysis

Figure 3: SWOT Analysis: Medium-, High- and Extra-High-Voltage Power Cables

**STRENGTHS**
- Growing electricity consumption and transmission network would drive the market at a robust pace (CAGR 3.9% in value terms) to QAR 3.0 billion in 2026
- Domestic players have been able to reduce the country’s dependence on imports by substituting them with domestically manufactured products
- Better margins than low-voltage wires and power cables

**OPPORTUNITIES**
- Investments in the expansion and upgradation of transmission networks and growing construction sector projects provide growth opportunities
- Opportunity for import substitution as about 40% of the market is serviced by imports
- As demand is expected to outstrip supply (domestic installed capacity), there is an opportunity for new players

**WEAKNESS**
- Manufacturing of high- and extra-high-voltage cables requires extensive technical know-how, as compared to low-voltage wires and power cables
- Smaller share (30.5%) of the copper wires and cables market size than low-voltage wires and power cables

**THREATS**
- The medium-voltage wire and power cables is a price-sensitive market with competitive rivalry among the established players
- Volatility in the prices of raw materials, especially copper, can affect margins for manufacturers

**SUMMARY**
In the medium to long term, the strengths and opportunities are expected to outweigh the weaknesses and threats. Infrastructure projects, the development of transmission and distribution networks, the competitiveness of domestic production and demand-supply surplus are the clear indicators of opportunities for new players in this segment.
B. Michael Porter’s Five Force Analysis

Figure 4: Michael Porter’s Five Forces Analysis: Medium-, High- and Extra-High-Voltage Power Cables

**BARGAINING POWER – SUPPLIERS**

High
- Copper costs constitute a significant portion of the selling price of medium-, high- and extra-high-voltage power cables. Cable manufacturers have no control over copper rod production and prices. Therefore, the bargaining power of the suppliers of copper rods is high.

**BARGAINING POWER – CONSUMERS**

Moderate to High
- Competitive rivalry in the medium- and high-voltage wires and power cables market is high. Doha Cables and QICC are the two domestic players, in addition to 15 to 20 players in the GCC region, indicating a high level of competition. It is a very price-sensitive market and therefore there is intense competitive rivalry among the players.
- In the case of extra-high-voltage power cables, the competitive rivalry is medium, as a few manufacturers in the GCC region have the technical capabilities to manufacture these cables.

**THEREAT OF NEW ENTRY**

Low to Moderate
- The threat of new entrants in the medium-voltage wires and power cables market is moderate as the manufacturing of medium-voltage and high-voltage power cables is moderately technology intensive. However, in the extra-high-voltage power cables market, the threat of entry is very low as the manufacturing of these cables requires significant technical expertise.

**THREAT OF SUBSTITUTION**

Low
- Qatar regulations mandate the use of copper as conductor material for all underground transmission and distribution lines. The threat of substitution for medium-, high- and extra-high-voltage power cables is low as there is no product substitute for these cables in underground transmission networks.
- Medium-, high- and extra-high-voltage power cables have to be laid underground for capacity expansion in developed areas more densely and cannot be substituted by overhead aluminum conductors. Aluminum conductor is used only for overhead lines.

**COMPETITIVE RIVALRY**

Moderate to High
- In the medium- and high-voltage power cables segment, the bargaining power of consumers is high that can be ascribed to the presence of a large number of players in the GCC region. However, in the extra-high-voltage power cables segment, utility companies are extremely quality conscious. They can choose from a few established global players and therefore bargaining power is moderate.

[Manufacture of Electric Wires and Cables Sector in Qatar]
2.3.3 Copper Telecom Cables

Copper telecom cables are used in telecommunication access network, indoor telephone network, switchboards (interconnect circuits of telephones used to establish telephone call between users), cable TV distribution (CATV), microwave transmission and mobile telecommunication (connecting the mobile network’s antenna and base station). Nowadays, fiber optic cables are replacing copper telecom cables. However, copper telecom cables will still be used in applications such as CAT-6 cables for last-mile connectivity to telephones, voice transmission and in-building networks.

2.3.3.1 Demand Side Analysis

A. Current and Historical Market Trends

The copper telecom cable market grew rapidly from 1,206MT (QAR 23.0 million) in 2006 to reach 5,788MT (QAR 150.4 billion) in 2009, driven by growing real estate developments. The market size steadily contracted until 2013 due to subdued real estate activity and growing preference for fiber optic cables. Thereafter, the market that is entirely served by imports demonstrated irregular patterns to reach 1,142MT (QAR 32.2 million) in 2017. This may be attributed to the upgradation of old telecom networks or new developments in peripheral areas that were not connected with fiber optic network.

Chart 27: Qatar’s Copper Telecom Cables Demand, 2006 – 2017

Source: Team analysis based on data from primary interviews and Trade Map
B. Demand Drivers

a. **Demand drivers**: Expansion of telecom network, if any, last-mile connectivity for telephones and intra-building telecom networks are the demand drivers for telecom copper cables.

b. **Customer segment**: MEP contractors constitute the customer base for telecom copper cables.

c. **Key influencers**: MEP consultants are the key influencers.
C. Demand Forecast

Going forward, demand for copper telecom cables is expected to reduce substantially. Primary interviews indicate that over the next 10 years, demand is expected to decline by 80% to 85%. Fiber optic cables would not fully replace copper telecom cables due to the residual use of copper telecom cables in voice transmission, last leg connectivity to telephone (i.e., CAT-6 cables) and for in-building networks. The market size would contract from 1,142MT (QAR 32.2 million) in 2017 to 720MT (QAR 22.8 million) in 2026.

Chart 28: Qatar’s Copper Telecom Cables Demand Forecast, 2017 – 2026

Source: Team analysis based on data from Trade Map
2.3.3.2 Trade Analysis

A. Imports

The analysis of historical import data reveals that imports for copper telecom cables increased from 1,251MT in 2006 to 5,788MT in 2008. Thereafter, they declined steadily to 594MT in 2013. In 2014 and 2015, the market experienced irregular rise and fall taking the 2015 imports to 4,481MT.

*Source: Team analysis based on data from Trade Map*
B. Exports

The analysis of historical export data indicates that export volumes were very irregular across 2006 to 2015. Sizable quantities of exports witnessed in 2009, 2010, 2012, 2013 and 2015 are likely to have been due to re-exports.

Chart 30: Qatar’s Copper Telecom Cables Exports, 2006 – 2015

Source: Team analysis based on data from Trade Map
C. Trade by Source and Destination

I. Imports

Before imports from South Korea dominated the total share (since 2014), Saudi Arabia and the US used to be the largest sources of imports to Qatar. Rise in imports from South Korea and China has reduced the absolute amount of telecom cables being imported from the US and Saudi Arabia.

The analysis of total import data from 2010 to 2015 (USD 153.23 million) indicates that South Korea (51% share of imports) was the leading source of imports into Qatar. Other sources such as China (7%), the US (5%), Saudi Arabia (5%) and the UK (4%) had minor shares during this period.

Source: Team analysis based on data from Trade Map
II. Exports

The analysis of total export data from 2010 to 2015 (USD 3.15 million) indicates that the UAE (58%), Oman (21%) and Saudi Arabia (9%) are the key destinations for exports from Qatar. UAE has consistently accounted for a large share of Qatari exports of telecom cables. India, Saudi Arabia, Oman and Germany have accounted for intermittent peaks in exports as represented in the graph below.

![Graph showing key destinations for copper telecom cables exports, 2010–2015](image)

**Chart 32: Key Destinations for Copper Telecom Cables Exports, 2010 – 2015**

Source: Team analysis based on data from Trade Map

D. Share of Imports in Domestic Consumption

During 2006 to 2017, the requirement of copper telecom cables in Qatar is entirely serviced by imports. Primary interviews indicate that the domestic players do not manufacture copper telecom cables in Qatar and source requirements, if any, from their manufacturing units in other countries. Going forward, the requirement of copper telecom cables in Qatar is likely to be entirely met by imports.
### Pricing Analysis

Copper raw material constitutes a major portion of the total selling price of copper telecom cables. Manufacturers hedge their commodity exposure by placing an order for raw material at the time of accepting a customer order and by varying product pricing frequently. The prices of copper telecom cables are linked to the LME prices of copper.

In addition to the prevailing LME price, the pricing of copper telecom cable is dependent on a number of factors, such as the amount of copper per unit length, the type of insulation, other specifications, time available to deliver order and order quantity. Additionally, non-product factors that impact pricing decisions are the utilization level of the manufacturing facility and the strategic importance of customers. For instance, if the facility is loaded with orders, prices would be quoted steeply. Similarly, if the customer is a key account, with potential for future business, then pricing would be favorable to the customer.

The selling price on the day of order confirmation is calculated using the following formula:

\[
P_1 = P_0 - (LME_0 - LME_1) \times V.F. \times \text{Exchange Rate},
\]

where:
- \(P_1\) = Invoice price/meter
- \(P_0\) = Quoted price/meter
- \(LME_0\) = LME price of copper in USD/MT when quotation was offered
- \(LME_1\) = LME price of copper in USD/MT when order was confirmed
- \(V.F.\) = Variation factor (weight of copper in MT per meter of cable)
- \(\text{Exchange Rate}\) = Exchange rate of the currency against USD 1.00
The tables given below provide the price range for key fast-moving items:

**Table 10: Prices of Key Product Items: Copper Telecom Cables**

<table>
<thead>
<tr>
<th>Product</th>
<th>Quoted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper telecom cable: CAT-6 with 4 pair</td>
<td>QAR 450 per roll of 305 meters</td>
</tr>
<tr>
<td>Copper telecom cable: CAT-5 with 4 pair</td>
<td>QAR 310 per roll of 305 meters</td>
</tr>
<tr>
<td>Copper telecom cable: CAT-3 with 4 pair</td>
<td>QAR 240 per roll of 200 meters</td>
</tr>
</tbody>
</table>

The selling price of copper telecom cables would follow the trends shown by LME copper prices. The average selling prices have steadily reduced from 2013 to 2016. They are expected to be driven by LME copper prices and grow at a CAGR of 1.27% from QAR 28,215/MT of gross weight in 2017 to an estimated QAR 31,616/MT of gross weight in 2026.
2.3.3.4 SWOT Analysis and Michael Porter’s Five Force Analysis

A. SWOT Analysis

Figure 5: SWOT Analysis: Copper Telecom Cables

**STRENGTHS**

- Copper telecom cables network is inexpensive as compared to fiber-to-the-desk (FTTD) networks.\(^{53}\)
- Copper cable is capable of transmitting both data and electricity. It is therefore suitable for application in horizontal network transmission and device end.

**OPPORTUNITIES**

- Opportunities to cater to voice transmission, last leg connectivity to telephone (i.e., CAT-6 cables) and for in-building networks.

**WEAKNESS**

- Copper telecom cables is a small market that is getting substituted with fiber optic cables.
- Copper telecom cables suffer from lower transmission speed and more signal loss over a long distance than fiber optic cables.

**THREATS**

- Technological development in fiber optic can make it cheaper in FTTD applications.
- Copper telecom cables face the threat of being replaced by next-generation fiber optic cables.

**SUMMARY**

Copper telecom cables are fast getting replaced by fiber optic cables. The threats and weaknesses are likely to outweigh the strengths and opportunities in the medium to long run.

\(^{53}\) Commscope
B. Michael Porter’s Five Force Analysis

Figure 6: Michael Porter’s Five Forces Analysis: Copper Telecom Cables

**BARGAINING POWER – SUPPLIERS**
High
- Copper is a major component of end product cost. Manufacturers have no control over copper prices and the production of copper rods. Therefore, the bargaining power of the suppliers is high.

**THREAT OF NEW ENTRY**
Low
- The threat of new entrants in the copper telecom cables market is low. Copper telecom cables are getting substituted with fiber optic cables and are an unattractive proposition for new entrepreneurs.

**THREAT OF SUBSTITUTION**
High
- The threat of substitution for copper telecom cables is high. These cables are being replaced by fiber optic cables that have more transmission speed and less incidences of signal loss.

**COMPETITIVE RIVALRY**
High
- Competitive rivalry in the copper telecom industry is high. Domestic companies do not manufacture these cables and the market is driven by imports.

**BARGAINING POWER – CONSUMERS**
High
- The bargaining power of consumers is high due to several players operating in the segment.
2.3.4 Winding Wires

Winding wires are insulated copper conductors that are used in the construction of motors, transformers and other electromagnetic equipment that require tight coils of wire\textsuperscript{54}. The wires have usage in three areas of energy transformation: electrical to electrical, electrical to mechanical and mechanical to electrical.

2.3.4.1 Demand Analysis

A. Current and Historical Market Trends

Driven by the requirements of assembly, repair and maintenance of industrial electrical equipment, such as motors, generators and transformers, the market size for winding wires was estimated at 7,650MT (QAR 141.9 million) in 2006. The market size was relatively steady during 2006 to 2009 and decreased during 2009 to 2011, owing to reduced economic and industrial activity. Thereafter, the market recovered and is estimated to be 5,460MT (QAR 126.4 million) in 2017.

Source: Team analysis based on data from primary interviews and Trade Map

\textsuperscript{54} Superior Essex
B. Demand Drivers

a. **Demand drivers:** The manufacturing, assembly, repair and maintenance of industrial electrical equipment, such as motors, generators, transformers, compressors and inductors, drive demand for winding wires. These equipment are used in a wide range of projects, such as utilities projects, industrial projects and real estate projects.

b. **Customer segment:** The customer segment for winding wires includes manufacturers and maintenance contractors of electrical industrial equipment.

c. **Key influencers:** The demand for winding wires is influenced by consultants advising on the manufacturing, assembly, repair and maintenance of industrial electrical equipment, such as motors, generators, transformers, compressors and inductors.
C. Demand Forecast

The winding wires market is forecast to grow at a CAGR of 2.61% reaching 6,884MT (QAR 184.5 million) in 2026 from 5,460MT (QAR 126.4 million) in 2017 due to growth in the industrial activity.

Chart 36: Qatar’s Winding Wires Demand Forecast, 2017 – 2026

Source: Team analysis based on data from Trade Map
2.3.4.2 Trade Analysis

A. Imports

During 2006 to 2015, the market was entirely serviced by imports. The imports were relatively steady during 2006 to 2009 and declined from 2009 to 2011, owing to reduced industrial activity. Thereafter, the imports recovered to reach 4,903MT (QAR 123 million) in 2015.

**Chart 37: Qatar’s Winding Wires Imports, 2006 – 2015**

Source: Team analysis based on data from Trade Map
B. Exports

The analysis of historical export data indicates that export volumes were irregular during 2006 to 2015. Most of the imports were concentrated during 2009 to 2013 and were likely to be re-exports from Qatar.

Chart 38: Qatar’s Winding Wires Exports, 2006 – 2015

Source: Team analysis based on data from Trade Map
C. Trade by Source and Destination

I. Imports

The analysis of total import data from 2010 to 2015 (USD 176.62 million) indicates that Egypt is the leading source of imports (49% share) followed by the UAE (10% share), Italy (6% share), the UK (5%) and China (4%) for winding wires into Qatar. Primary interviews indicate that imports from Egypt are most likely to be from Doha Cables’ parent firm, Elsewedy Electric. Italy’s share of Qatar’s import market has displayed significant reduction, from being the single largest source of imports in 2010 to accounting for under 0.1% of the total imports in 2015.

Source: Team analysis based on data from Trade Map
II. Exports

The analysis of total export data from 2010 to 2015 (USD 2.95 million) indicates that the UAE (72% share) is the dominant destination for exports followed by Saudi Arabia (9%), India (7%), Bahrain (5%) and Germany (2%).

The UAE and Saudi Arabia have been key destinations for exports during 2010 to 2015. However, their share has reduced from 2011 to 2015 as Qatar has been exporting to large number of countries during 2013 to 2015.

Source: Team analysis based on data from Trade Map
D. Share of Imports in Domestic Consumption

During 2006 to 2017, the requirement of winding wires in Qatar was entirely serviced by imports. Primary interviews indicate that the domestic players do not manufacture winding wires in Qatar and source requirements, if any, from their manufacturing units in other countries.

It is estimated that during 2017 and 2026, the entire demand for winding wires in Qatar will be fulfilled through imports.

Source: Team analysis based on data from Trade Map
2.3.4.3 Pricing Analysis

Copper raw material cost constitutes a major portion of the total selling price of winding wires. Winding wires are standardized as they have to serve industrial equipment’s and hence they are low margin products. Manufacturers hedge their commodity exposure by placing an order for raw material at the time of accepting a customer order and by varying product pricing frequently. The prices of winding wires are linked to the LME prices of copper.

In addition to the prevailing LME price, the pricing of winding wires is dependent on a number of factors, such as the amount of copper per unit length, the type of insulation, other specifications, time available to deliver order and order quantity. Additionally, non-product factors that impact pricing decisions are the utilization level of the manufacturing facility and the strategic importance of customers. For instance, if the facility is loaded with orders, prices would be quoted steeply. Similarly, if the customer is a key account, with potential for future business, then pricing would be favorable to the customer.

The selling price on the day of order confirmation is calculated using the following formula:

\[ P_1 = P_0 - (LME_0 - LME_1) \times V.F. \times \text{Exchange Rate}, \]

where

- \( P_1 \) = Invoice price/meter, \( P_0 \) = Quoted price/meter
- \( LME_0 \) = LME price of copper in USD/MT when quotation was offered
- \( LME_1 \) = LME price of copper in USD/MT when order was confirmed
- \( V.F. \) = Variation factor (weight of copper in MT per meter of cable)

The selling price of winding wires would follow the trends shown by LME copper prices. The average selling prices have steadily reduced from 2013 to 2016. They are expected to be driven by LME copper prices and grow at a CAGR of 1.64% from QAR 23,158/MT of gross weight in 2017 to an estimated QAR 26,803/MT of gross weight in 2026.

Chart 42: Qatar’s Winding Wires Selling Price Forecast, 2013 – 2026

![Chart 42: Qatar’s Winding Wires Selling Price Forecast, 2013 – 2026](chart.png)

Source: World Bank
2.3.4.4 SWOT Analysis and Michael Porter’s Five Force Analysis

A. SWOT Analysis

Figure 7: SWOT Analysis: Winding Wires

**STRENGTHS**
- Wide application in various industrial electrical equipment
- Niche market growing at a CAGR of 2.61% from 5,460MT (QAR 126.4 million) in 2017 to 6,884MT (QAR 184.5 million) in 2026

**WEAKNESS**
- Small market size as compared to other product segments
- Winding wires are standardized as they have to serve industrial equipment’s and hence they are low margin products

**OPPORTUNITIES**
- Growing market on account of increased industrial activity, utility projects and real estate projects
- Opportunity to diversify product mix and client mix

**THREATS**
- Volatility in the prices of raw materials, especially copper, can affect margins for manufacturers

**SUMMARY**
In the medium to long term, the winding wires market would continue to remain a small niche market primarily driven by the industrial sector. The strengths and opportunities would marginally outweigh the weaknesses and threats, as there is an opportunity to diversify product mix and customer mix.
B. Michael Porter’s Five Force Analysis

Figure 8: Michael Porter’s Five Forces Analysis: Winding Wires

**BARGAINING POWER – SUPPLIERS**

High

- Copper raw material costs constitute a major portion of the selling price of winding wires with manufacturers having no control over copper rod production or copper prices. Therefore, the bargaining power of the suppliers of copper rods is high.

**COMPETITIVE RIVALRY**

High

- The competitive rivalry in the winding wires market is high due to small market size, low margin and price-sensitive nature of the product.

**BARGAINING POWER – CONSUMERS**

High

- In the winding wires segment, the bargaining power of consumers is high due to a large number of players operating in the segment in the GCC region.

**THREAT OF NEW ENTRY**

Moderate

- The threat of new entrants in the winding wires market is medium as the product requires technical expertise but the small domestic market is unlikely to attract new players focusing exclusively on winding wires. Domestic players in Qatar do not manufacture these cables and the market is serviced through imports.

**THREAT OF SUBSTITUTION**

Low

- The threat of substitution for winding wires is low as there is no product substitute for these wires. Winding wires are a requirement in electrical and electronic equipment, such as motors, transformers, pump sets, switchgears and hand tools.
2.3.5 Instrumentation and Control Cables

Instrumentation and control cables are used for control applications in industrial and manufacturing facilities. Instrumentation cables are used to lessen noise and signal interference, and carry clear signals in tough environments and manufacturing processes, while control cables are used for transmission of information on the state, location or operating conditions of objects being controlled.

2.3.5.1 Demand Analysis

A. Current and Historical Market Trends

The instrumentation and control cables market size was estimated at 205MT (QAR 6.7 million) in 2006. Driven by the growth in new industrial developments, road widening and infrastructure developments, it grew rapidly to reach 3,144MT (QAR 92.8 million) in 2017.

Chart 43: Qatar’s Instrumentation and Control Cables Demand, 2006 – 2017

Source: Team analysis based on data from primary interviews and Trade Map
B. Demand Drivers

a. Demand drivers: Industrial developments, oil and gas sector projects, new road development projects, road widening, establishment of new traffic signals and infrastructure developments, such as metro rail, are the demand drivers for instrumentation and control cables.

b. Customer segment: MEP contractors for infrastructure and industrial sector projects, and industrial sector companies constitute the customer segment.

c. Key influencers: MEP consultants and engineering consultants are the key influencers.

C. Demand Forecast

During 2017 to 2026, the demand for instrumentation and control cables, driven primarily by the industrial and infrastructural developments is likely to increase at a CAGR of 2.61%, in quantity terms, reaching 3,964MT in 2026 from 3,144MT in 2017.

In value terms, the market would pace up at a CAGR of 3.58% to reach QAR 127.5 million in 2026 from QAR 92.8 million in 2017.

Source: Team analysis based on data from Trade Map
2.3.5.2 Trade Analysis

A. Imports

The analysis of historical import data reveals that the imports of instrumentation and control cables increased from 205MT in 2006 to 3,212MT in 2015, increasing at a CAGR of 35.8% between 2006 and 2015. The growth in imports has witnessed trends similar to those in the market size.

Source: Team analysis based on data from Trade Map
B. Exports

The analysis of historical data indicates that export volumes were negligible from 2009 to 2014. Exports increased to 1,456MT (QAR 35.9 million) in 2015, which is likely to include re-exports and exports from domestic production.

Chart 46: Qatar’s Instrumentation and Control Cables Exports, 2006 – 2015

Source: Team analysis based on data from Trade Map
C. Trade by Source and Destination

I. Imports

The analysis of total import data from 2010 to 2015 (USD 79.25 million) indicates that the US (17%), Italy (12%), the UK (11%), China (8%) and Malaysia (6%) are the major sources of import of instrumentation and control cables into Qatar.

Imports from the US peaked in 2013, and since then Italy has been a leading source of imports. In recent years (2014 and 2015) China has emerged as a major source of imports by accounting for over 7% of annual import in 2015, up from just over 2% in 2011.

Chart 47: Key Sources of Instrumentation and Control Cables Imports, 2010 – 2015

Source: Team analysis based on data from Trade Map
II. Exports

Exports to Saudi Arabia have shown a considerable growth in 2015, dwarfing exports to all other major destinations. The analysis of total export data from 2010 to 2015 (USD 10.69 million) indicates that 90% of the exports were to Saudi Arabia, followed by the UAE (4%), Iraq (3%), Bahrain and Oman (1% each).

Chart 48: Key Destinations for Instrumentation and Control Cables Exports, 2010 – 2015

Source: Team analysis based on data from Trade Map
D. Share of Imports in Domestic Consumption

Instrumentation and control cables requirements in Qatar during 2006 to 2009 were entirely met by imports. Establishment of new plants in 2010 led to import substitution with the share of imports falling to 32% in 2012. Rapid market growth from 2012 to 2017 attracted more imports taking the share of imports to 100% in 2015. On an average, across 2006 to 2017, imports serviced 75% of the domestic consumption.

Going ahead, imports are likely to play a pivotal role in fulfilling the Qatar’s demand for instrumentation and control cables. The share of imports is likely to remain in a range of 61% to 69% during 2017 and 2026.

Chart 49: Qatar’s Instrumentation and Control Cables Consumption, 2006 – 2017

Source: Team analysis based on data from Trade Map
2.3.5.3 Pricing Analysis

Copper raw material costs constitute a major portion of the selling price of instrumentation and control cables. Manufacturers hedge their commodity exposure by placing an order for raw material at the time of accepting a customer order and by varying product pricing frequently. The prices of instrumentation and control cables are linked to the LME prices of copper.

In addition to the prevailing LME price, the pricing of instrumentation and control cables is dependent on a number of factors, such as the amount of copper per unit length, the type of insulation, other specifications, time available to deliver order and order quantity.

Additionally, non-product factors that impact pricing decisions are the utilization level of the manufacturing facility and the strategic importance of customers. For instance, if the facility is loaded with orders, prices would be quoted steeply. Similarly, if the customer is a key account, with potential for future business, then pricing would be favorable to the customer.

Prices of instrumentation and control cables are quoted on per meter basis.

The selling price on the day of order confirmation is calculated using the following formula:

\[ P_1 = P_0 - (LME_0 - LME_1) \times V.F. \times \text{Exchange Rate,} \]

where

- \( P_1 \) = Invoice price/meter,
- \( P_0 \) = Quoted price/meter
- \( LME_0 \) = LME price of copper in USD/MT when quotation was offered
- \( LME_1 \) = LME price of copper in USD/MT when order was confirmed
- \( V.F. \) = Variation factor (weight of copper in MT per meter of cable)
- \( \text{Exchange Rate} \) = Exchange rate of the currency against USD 1.00

These cables are customized and pricing differs as per client specifications.
The table given below provides a broad price range.

**Table 11: Prices of Key Product Items: Instrumentation and Control Cables**

<table>
<thead>
<tr>
<th>Product</th>
<th>Quoted Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumentation and control cables (1 pair × 1.5 sq. mm.)</td>
<td>QAR 8 to 10 per meter</td>
</tr>
<tr>
<td>Instrumentation and control cables (1 pair × 2.5 sq. mm.)</td>
<td>QAR 10 to 12 per meter</td>
</tr>
<tr>
<td>Instrumentation and control cables (5 pairs × 1.5 sq. mm.)</td>
<td>QAR 16 to 19 per meter</td>
</tr>
<tr>
<td>Instrumentation and control cables (10 pairs × 1.5 sq. mm.)</td>
<td>QAR 26 to 29 per meter</td>
</tr>
</tbody>
</table>

The selling price of instrumentation and control cables would follow the trends shown by LME copper prices. The average selling prices have steadily reduced from 2013 to 2016. They are expected to be driven by LME copper prices and grow at a CAGR of 0.95% from QAR 29,527/MT of gross weight in 2017 to an estimated QAR 32,153/MT of gross weight in 2026.

![Chart 50: Qatar’s Instrumentation and Control Cables Selling Price Forecast, 2013 – 2026](chart.png)

*Source: World Bank*
2.3.5.4 SWOT Analysis and Michael Porter’s Five Force Analysis

A. SWOT Analysis

Figure 9: SWOT Analysis: Instrumentation and Control Cables

**STRENGTHS**
- Wide application in various industrial and infrastructure projects
- Niche market growing at a CAGR of 3.58% from QAR 92.8 million in 2017 to QAR 127.5 million in 2026
- Play the critical role of control and communicating signals in environment when direct access to objects is difficult
- Margins better than low-voltage wires and power cables

**WEAKNESS**
- High lead time and specialized technology required for the manufacturing of instrumentation and control cables
- Small market size as compared to other product segments

**OPPORTUNITIES**
- Qatar focus to strengthen its industrial sector and projects, such as metro rail, provides an opportunity for instrumentation and control cables
- Opportunity for import substitution as 61% of the market is serviced by imports in 2017
- Opportunity to diversify product mix and client mix

**THREATS**
- Adverse impact on the demand for instrumentation and control cables owing to the decline in oil prices with the subsequent delays and cancelation of projects
- Volatility in the prices of raw materials, especially copper, can affect margins for manufacturers

**SUMMARY**
In the medium to long term, the instrumentation and control cables market would continue to remain a small niche market primarily driven by the industrial and infrastructure sector. The strengths and opportunities would marginally outweigh the weaknesses and threats, as there is an opportunity to diversify product mix and customer mix.
B. Michael Porter’s Five Force Analysis

Figure 10: Michael Porter’s Five Forces Analysis: Instrumentation and Control Cables

BARGAINING POWER – SUPPLIERS
High
• Copper raw material costs constitute a major portion of the selling price of winding wires with manufacturers having no control over copper rod production or copper prices. Therefore, the bargaining power of the suppliers of copper rods is high

BARGAINING POWER – CONSUMERS
High
• The instrumentation and control cables market is a buyer’s market with high bargaining power of consumers. Customers have an opportunity to choose from several regional manufactures

COMPETITIVE RIVALRY
High
• Competitive rivalry in the instrumentation and control cables market is high. In addition to QICC, a local manufacturer, prime competition arises from imported brands, such as MESC Specialized cables

THREAT OF NEW ENTRY
Moderate
• The threat of new entrants in instrumentation and control cables is medium as the manufacturing of these cables requires specialized technical know-how. The small domestic market is unlikely to attract new players, focusing exclusively on instrumentation and control cables

THREAT OF SUBSTITUTION
Low
• The threat of substitution is low as instrumentation and control cables do not have any substitutes
2.3.6 Supply Analysis

2.3.6.1 Key Players

Qatar is home to three electric wire and cable manufacturers that have been established over the past decade. A brief overview of local players is given below.

**Doha Cables** started operations in May 2010 and is a joint venture between Al Faisal Group (Aamal Company QSC) and Elsewedy Electric, an Egypt-based electric wire and cable manufacturer ranked among the top-20 global and top-10 regional manufacturers\(^{55}\). Doha Cables’ manufacturing facility is located on a 70,000sqm land parcel in Mesaieed Industrial City. The plant started with an initial manufacturing capacity of 30,000MT p.a. of copper processing in 2010, which is currently being scaled up to 75,000MT p.a. of copper processing in 2017\(^{56}\).

**Table 12: Electric Wire and Cable Manufacturers in Qatar**

<table>
<thead>
<tr>
<th>Year</th>
<th>Company Name</th>
<th>Group</th>
<th>Products manufactured in Qatar</th>
<th>Copper processing capacity (MT)</th>
<th>Utilization % (2017)</th>
</tr>
</thead>
</table>
| 1    | Doha Cables  | JV between Al Faisal Holdings and Elsewedy Electric | • Building wires, low-voltage power cables  
• Medium-voltage power cables  
• High-voltage power cables | 75,000 | 70% - 80% |
| 2    | Qatar International Cables Company | JV between Al Mirqab Holding and Nexans SA | • Building wires, low-voltage power cables  
• Medium-voltage power cables  
• High-voltage power cables  
• Control cables | 21,600 | 90% - 95% |
| 3    | General Switchgear and Lighting Industries | NA | • Building wires | 1,000 | 40% - 45% |

\(^{55}\) Integer Research; \(^{56}\) Al Sewedy Electric
Qatar International Cables Company (QICC) started operations in October 2010 as a joint venture between Al Mirqab Holding, a Qatar-based business group, and Nexans SA, a French-based company ranked the world’s second-largest manufacturer. QICC’s manufacturing facility is located on a 70,000sqm land parcel in Mesaieed Industrial City. It started operations in 2010 with an initial manufacturing capacity of 20,000MT p.a. of copper processing. The plant was scaled up to 21,600MT p.a. of copper processing in 2016 and expected to be further expanded at 30,000MT by 2017. The company initially started with the manufacturing of building wire, low-voltage, medium-voltage cables and control cables, and has recently started manufacturing high-voltage power cables.

General Switchgear and Lighting Industries (GSLI) was established in 1999 as a switchgear manufacturer. However, in 2005, the switchgear business was transferred to its sister concern in Bahrain. In 2005, the company started manufacturing building wires from its 2,400sqm facility in Old Industrial Area with an installed capacity of 450MT p.a. of copper processing, which in 2009 was expanded to 1,000MT p.a. of copper processing. The company supplies building wires in the local market and exports them to its sister concern in Bahrain.

Imports constitute 60.2% of the market share. Doha Cables has 26.5% share of the 2017 market followed by QICC with 13.1% share.

Chart 51: Market-Share of Key Players in Qatar’s Copper Wires and Cables Market, 2017

Source: Team analysis based on data from primary interviews

*These market shares exclude products imported by Doha Cables and QICC from their parent companies or sister concerns in other countries to meet local customer orders.
2.3.6.2 Business Model Analysis

Wide range of products: Established domestic manufacturers, such as Doha Cables and QICC, manufacture a wide range of products, and within each product, there are several sub-products with different specifications. This helps to target different types of projects and customers.

International partner: The analysis of the business model of local manufacturers reveals that both companies — Doha Cables and QICC — have been set up as joint ventures between Qatari business groups and established multi-national cable manufacturers. Both Elsewedy Electric (Egypt) and Nexans SA (France) are market leaders in the regional and global markets, respectively. The benefits of partnering with an established multi-national cable manufacturer include:

- gaining access to technical expertise and know-how
- gaining access to the established marketing, sales and distribution network of the international partner that helps to penetrate into export markets
- being able to source products not manufactured in Qatar from other manufacturing locations of the international partner

Backward integration: A few GCC region manufactures, such as DUCAB (UAE) and Riyadh Cables (Saudi Arabia), have integrated backward into manufacturing copper rods and diversified into related products, such as cable compounding materials. However, manufacturers in Qatar are focused on producing electric wires and cables from imported copper rods. None of the manufacturers have a furnace for casting of copper rods in Qatar.

2.3.6.3 Domestic Production Competitiveness

The competitiveness of domestic production is influenced by raw material and other operational expenses, such as labor, rent and transport expenses.

Raw Materials: The key raw materials required for the manufacturing of wires and cables are copper rods and cable compounding materials. Qatar does not have domestic production facility for copper rods, but it has PVC and XLPE cable compounding companies, such as Al Hodaifi Cable Compounding and Qatar Plastic Additives & Industries Group. However, there is no significant adverse impact on the competitiveness of local cable manufacturers due to the absence of copper rod mill in Qatar. The majority of electric wires and cables manufacturers in the GCC region also depend on imports for sourcing copper rod.

Copper rods are imported from India, China or other GCC region suppliers, such as Fujairah Gold FZC and Union Copper Rod. A few cable manufacturers in the GCC region, such as Riyadh cables, DUCAB, Gulf Cable and Nuhas Oman, have integrated backward and manufacture copper rods from copper cathode.

Capital Expenditure: Higher raw material cost, salaries and rent in Qatar as compared to other GCC countries also impacts capital expenditure of the factory buildings. This will lead to higher depreciation that will impact the profitability.

Other Operational Expenses: Other operational expenses, such as salaries, rent and transport costs, are higher in Qatar than other GCC countries. However, these costs form a small portion of operational expenditure and therefore have a marginal impact on the cost of domestic production. Hence, higher other operational expenses do not have a major adverse impact on the competitiveness of wire and cable exports in Qatar.

Primary interviews indicate that if price of a particular cable product, at a given time, is USD 100 in Qatar, cable prices in Saudi Arabia and the UAE would be as follows:
Table 13: Comparison of Electrical Wires and Cables Prices in Qatar, the KSA and the UAE

<table>
<thead>
<tr>
<th>Country</th>
<th>Price USD/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qatar</td>
<td>100</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>90 - 95</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>95 - 98</td>
</tr>
</tbody>
</table>

Preference in government contracts: In a bid to encourage local manufactures, local regulations mandate 10% price preference for local wires and cables manufacturers in government tenders.

Time to market: Primary interviews indicate that in addition to price, quick turnaround time and timely delivery are crucial to winning contracts, as there is limited or no scope for product differentiation on technical grounds.

Opportunity for exports: During 2017 and 2026, it is estimated that domestic players will export 20% to 25% of the domestic production in case of low voltage wires and power cables. For medium-, high- and extra-high power cables around 10% to 15% of the domestic production and 25% to 30% of the instrumentation and control cables are likely to be exported to the international market.
2.3.7 Demand-Supply Analysis

Considering the three electrical cable manufacturing firms in Qatar, the 2016 installed capacity is estimated at 139,429MT of gross cable weight. Comparing with the total market (including imports), the 2016 demand-supply gap is estimated at 82,710MT.

**Chart 52: Qatar’s Copper Wires and Cables Demand-Supply Analysis, 2014 – 2026**

Going forward, domestic players are expected to ramp up their installed capacities in the near term, and considering a new player (21,429MT gross weight) commencing operations by end of 2017, the demand-supply gap is expected to narrow down to 54,993MT of gross cable weight in 2017. Thereafter, assuming no new plants are established, the demand-supply gap is expected to widen to 113,687MT in 2026.

Source: Team analysis based on data from primary interviews, Trade Map
2.3.8 Regulatory Analysis

2.3.8.1 General Regulations

Key regulations applicable to electric cable manufacturers in Qatar are listed below:

**Kahramaa regulations**: Qatar General Electricity & Water Corporation (Kahramaa) is Qatar’s sole transmission and distribution system owner and operator (TDSOO) for the electricity and water sector. Kahramaa provides specifications for electric wires and cables, undertakes testing and provides product approval.

Table 14: Kahramaa Specifications for Various Products

<table>
<thead>
<tr>
<th>Product Segment</th>
<th>Kahramaa Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Medium-voltage cables</td>
<td>EP-MS-P4/S3-040 &amp; 3-2014</td>
</tr>
<tr>
<td>2 Low-voltage cables</td>
<td>EP-MS-P4/S3-030 &amp; 2-2013</td>
</tr>
</tbody>
</table>

Table 15: List of Kahramaa Approved Manufacturers in Qatar

<table>
<thead>
<tr>
<th>Product Segment</th>
<th>Kahramaa Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Doha Cables</td>
<td>Qatar</td>
</tr>
<tr>
<td>2 QICC</td>
<td>Qatar</td>
</tr>
<tr>
<td>3 Nuhas Oman Cables</td>
<td>Oman</td>
</tr>
<tr>
<td>4 National Cables Industry</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>5 Riyadh Cables</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>6 Oman Cables</td>
<td>Oman</td>
</tr>
<tr>
<td>7 Bahra Cables</td>
<td>Saudi Arabia</td>
</tr>
</tbody>
</table>

57 Kahramaa website
To receive approval from Kahramaa, the manufacturer’s facility must be in operation for at least five years and should comply with all requirements set up by Kahramaa. The approval is valid for two years and requires periodic renewals.

For mid- to large-sized projects, where tenders specify Kahramaa-approved products as a pre-requisite, only Kahramaa-approved manufacturers are allowed to bid. However, in non-tendered small construction projects, such as villa construction and interior refurbishments, wires and cables are usually sourced from local traders and distributors.

While exporting to other GCC region countries, approvals of their electricity regulator is a pre-requisite, such as Abu Dhabi Water & Electricity Authority (ADWEA), Dubai Electricity & Water Authority (DEWA) and Saudi Electricity Company (SEC).

The International Electrotechnical Commission (IEC): It is the international standards and conformity assessment body for all fields of electrotechnology. The body has specifications for all types of wires and cables, which are followed as an industry norm. Some of the IEC specifications with respect to wires and cables are IEC 60502-1, IEC 60502-1, IEC 60332-3, IEC 62067, IEC 60840, IEC 60227 and IEC 60502-1. Conformity with IEC specifications ensures that the manufacturer’s product will meet international standards.

Civil Defense Department (Ministry of Interior): All building materials products need an approval from the Civil Defense Department (Ministry of Interior) as per Emiri Decree No. 9/2012. Qatar’s Civil Defense Department (QCD) approvals are required for each fire-rated product separately.

Qatar Construction Specifications 2014 (QCS 2014): Wires and cables manufacturers supply products to MEP contractors, who need to comply with QCS 2014. Cable manufacturers should be familiar with QCS 2014 and ensure that their product meets the requirements mentioned in Part 06 of Section 21 of QCS 2014.

Qatar Petroleum: For wires and cables sold to the oil and gas sector, the manufacturer needs to be approved by Qatar Petroleum.

Third-party certification companies, such as British Approvals Service for Cables (BASEC), Bureau Veritas, The Loss Preventions Certification Board — UK certification (LPCB) — and KEMA Netherlands, undertake certifications for various international standards, such as Quality Management System ISO 9001:2008, IEC specifications and standards, and OHSAS 18001:2007. In addition, all prospective entrepreneurs need to follow other applicable local laws on company registration, environmental approval, and industrial license to obtain land and building permissions for setting up a cable manufacturing facility in Qatar.
2.3.8.2 Regulations for Doha Metro Projects

With Doha Metro being a major demand driver for wires and cables, the following specifications must be complied with:\textsuperscript{58}

General Standards: Overall compliance is needed with all applicable provisions of:

- Kahramaa Technical Specifications
- Grid Code ENA-M1 (Kahramaa)
- Applicable International Electrotechnical Commission (IEC)
- Applicable European Standards (EN)
- Qatar Construction Specifications (QCS).

Particular specification requirements: In particular, it is mandatory to adhere to the following:

- IEC 60754-1: Tests of materials from cables during combustion. Determination of the amount of evolved halogen acid gas
- IEC 61034: Measurement of the smoke density of cables burning under defined conditions
- IEC 60332-1: Tests on electric and optical fiber cables under fire conditions, Part 1-1: Test for vertical flame propagation for a single insulated wire or cable apparatus
- IEC 60332-3: Tests on electric and optical fiber cables under fire conditions, Part 1-3: Test for vertical flame propagation for a single insulated wire or cable. Procedure for the determination of flaming droplets and particles.
- NFPA 101 and NFPA 130

\textsuperscript{58} Qatar Rail
2.4 Market Outlook

Qatar burgeoning real estate sector offers opportunities for new manufacturing units in the copper wires and cables segment. Going forward, the copper wires and cables market is expected to grow at a CAGR of 2.58% from 227,850MT of gross weight in 2017 to an estimated 286,544MT in 2026. In value terms, the market is expected to pace up at a CAGR of 3.86% from QAR 6.08 billion in 2017 to QAR 8.56 billion in 2026.

During 2016 to 2026, low-voltage wires and power cables would continue to remain the largest segment, constituting 65.3% of the market in quantity terms followed by medium-, high- and extra-high-voltage cables with 30.5% market share.

Other segments, namely control and instrumentation cables and winding wires, would have small market shares of 1.4% and 2.4%, respectively. Copper telecom cables that had 1.77% market share during 2010 to 2015 are likely to witness further substitution with fiber optic cables, taking its average market share during 2016 to 2026 down to 0.4%.

Qatar’s domestic production is likely to remain cost competitive in export market as most of the cable manufacturers in the GCC region including those in Qatar rely on imports for sourcing copper rods. This places Qatar on an equal footing with its competitors in the GCC region. Imports from Saudi Arabia and the UAE are marginally cheaper (2% to 10%) and it is possible for domestic players to compete with and substitute imports.

In the short term, fall in oil prices, reduced government expenditure and subdued real estate development would affect the market. The market is likely to remain price sensitive as this sector offers little or no scope for product differentiation on technical grounds. In the medium to long term, the strengths and opportunities would outweigh the weaknesses and threats due to large market size, moderate pace of growth, competitiveness of domestic production and upcoming projects pipeline in Qatar.

Large market size along with a robust pace of growth (227,850MT gross weight growing at 2.58% compounded annually till 2026) means an opportunity for new players to tap into QAR 275 million (6,522MT gross weight) worth of average incremental business every year, from 2017 to 2026. This implies that subject to competitive challenges, opportunities exist for one mid-sized player (approximately 28,000 MT p.a. gross weight capacity running at 70% utilization) to enter the market every three years. The outlook for copper wires and cables market in Qatar seems promising owing to the pipeline of upcoming projects and bodes well for companies operating in the market.
Copper Wires and Cables Highlights

2017 market size (QAR mn)

- Low-Voltage Wires and Power Cables: 3,696.4
- Medium-, High- and Extra-High-Voltage Power Cables: 1,264.7
- Copper Telecom Cables: 92.8
- Winding wires: 151.1
- Instrumentation and Control Cables: 32.2

CAGR (2017-2026) (%)

- Low-Voltage Wires and Power Cables: 3.93%
- Medium-, High- and Extra-High-Voltage Power Cables: 3.83%
- Copper Telecom Cables: 3.58%
- Winding wires: -3.79%
- Instrumentation and Control Cables: 4.29%

2015 Imports (QAR mn)

- Low-Voltage Wires and Power Cables: 2,527.4
- Medium-, High- and Extra-High-Voltage Power Cables: 122.7
- Copper Telecom Cables: 37.6
- Winding wires: 96.0
- Instrumentation and Control Cables: 1.1

2015 Exports (QAR mn)

- Low-Voltage Wires and Power Cables: 73.5
- Medium-, High- and Extra-High-Voltage Power Cables: 0.3
- Copper Telecom Cables: 35.9
- Winding wires: 92.8
- Instrumentation and Control Cables: 15.1

Share of imports in domestic consumption in 2017 (%)

- Low-Voltage Wires and Power Cables: 37.71%
- Medium-, High- and Extra-High-Voltage Power Cables: 100.00%
- Copper Telecom Cables: 100.00%
- Winding wires: 100.00%
- Instrumentation and Control Cables: 60.73%

Number of domestic players

- Low-Voltage Wires and Power Cables: 2
- Medium-, High- and Extra-High-Voltage Power Cables: 0
- Copper Telecom Cables: 0
- Winding wires: 0
- Instrumentation and Control Cables: 2
Cables Highlights

2026 market size (QAR mn)

Selling price in 2017 (QAR/MT)

Number of domestic players

Share of imports in domestic consumption in 2017 (%)
3. Overhead Conductors

Overhead conductors are critical components of electricity distribution infrastructure, used in electricity transmission networks to transmit electricity over long distances. There is no competition for aluminum in overhead conduction, as it the most economical metal to transmit electricity over long distances due to its light weight and low cost\(^59\).

Aluminum overhead conductors are manufactured using aluminum rods. Aluminum wire rods account for 10% of the global primary aluminum consumption\(^60\). According to industry sources, 65% of the global aluminum wire rod production is directed toward manufacturing of aluminum overhead conductors\(^61\).

3.1 Global Market Overview

3.1.1 Current and Historical Market Trends

The global demand for overhead conductors is driven by investment in electricity transmission infrastructure and influenced by global economic trends. Between 2006 and 2017, the overhead conductors market grew at a CAGR of 5.3%, from 2.21 million MT to 3.89 million MT\(^62\).

Chart 53: Global Overhead Conductors Demand, 2006 – 2017

Source: Team analysis based on data from Technavio

\(^{59}\) The Aluminum Association; \(^{60}\) CRU; \(^{61}\), \(^{62}\) Technavio
The overhead conductors market grew 10.2% in 2007, reaching 2.43 million MT. However, the financial crises during 2008 to 2009 had a negative impact on the market, leading to a decline in demand by 1.1% in 2008 and 6.3% in 2009. The market was able to recover quickly on growing demand and recorded a CAGR of 4.9% during 2011 to 2017, growing from 2.92 million MT to 3.89 million MT.

In value terms, the market size was valued at USD 8.32 billion in 2006 and was estimated at USD 10.28 billion in 2017, witnessing a CAGR of 1.94%.

3.1.2 Demand Forecast

The global overhead conductors market, which grew by CAGR of 5.3% during 2006 and 2017, is expected to contract by 0.4% i.e. CAGR of 4.9% during 2017 and 2026. The overhead conductors’ marker for 2026 is estimated to 6.00 million MT, rising from 3.89 million MT in 2017.

In value terms, the market size for aluminum overhead conductors was USD 10.28 billion in 2017. It is expected to grow at a CAGR of 6.6% during 2017 to 2026, reaching USD 18.21 billion in 2026, owing to an increase in demand for overhead conductors driven by growing electricity consumption and recovery in aluminum prices. Aluminum prices are expected to grow at a CAGR of 1.6% during the period.

Chart 54: Global Overhead Conductors Demand Forecast, 2017 – 2026

Source: Team analysis based on data from Trade Map
3.1.3 Key Players

Profiling of key players in the global market is given below:

**Table 16: Key Global Players in the Overhead Conductors Market**

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Overview</th>
<th>Overall 2015 Sales(^a), USD million</th>
<th>Key Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prysmian</td>
<td>1900</td>
<td>Prysmian is headquartered in Milan, Italy. The company has 88 manufacturing plants and operates in over 50 countries.</td>
<td>8,171</td>
<td>• All aluminum conductors (AAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• All aluminum alloy conductors (AAAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor, galvanized steel reinforced (ACSR/GZ)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor, aluminum clad steel reinforced (ACSR/AC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum alloy conductor, galvanized steel reinforced (AACSR/GZ)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum alloy conductor, aluminum clad steel reinforced (AACSR/AC)</td>
</tr>
<tr>
<td>Nexans</td>
<td>1994</td>
<td>Nexans is based in Paris, France. The company has 91 manufacturing plants and operates in over 40 countries.</td>
<td>6,925</td>
<td>• All aluminum alloy conductors (AAAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• All aluminum conductors (AAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor steel reinforced (ACSR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Two standard ACSR conductor twisted (ACSR-II)</td>
</tr>
<tr>
<td>General Cable</td>
<td>1927</td>
<td>General Cable is headquartered in Kentucky, US. The company has 38 manufacturing plants and operates in over 35 countries.</td>
<td>4,225</td>
<td>• All aluminum conductors (AAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• All aluminum alloy conductors (AAAC)</td>
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<td></td>
<td>• Aluminum conductor alloy reinforced concentric-lay-stranded (ACAR)</td>
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<td></td>
<td>• Aluminum conductor steel reinforced (ACSR)</td>
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<td></td>
<td>• Aluminum conductor aluminum clad steel reinforced (ACSR/AW)</td>
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<td></td>
<td></td>
<td></td>
<td>• All aluminum conductor/twisted pair (AAC/T-2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor steel reinforced/twisted pair (ACSR/T-2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum clad/aluminum stranded conductor (AWAC)</td>
</tr>
</tbody>
</table>

\(^a\) Bloomberg (information for Prysmian, Nexans, Sumitomo, and Furukawa Electric), Annual report (information for LS Cable, Midal Cable), Factiva (information for General Cable and Southwire)
<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Year</th>
<th>Overall 2015 Sales$^1$, USD million</th>
<th>Key Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Sumitomo</td>
<td>1897</td>
<td>6,446</td>
<td>• Low loss conductor - aluminum conductor steel reinforced (LL-ACSR/AS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Gap type conductor G (Z) TACSR</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• INVAR conductor (ZT (XT) ACIR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Noise-suppressed conductor (NS-TACSR)</td>
</tr>
<tr>
<td>5</td>
<td>Southwire</td>
<td>1937</td>
<td>4,800</td>
<td>• All aluminum conductors (AAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• All aluminum alloy conductors (AAAC)</td>
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<td></td>
<td></td>
<td>• Aluminum conductor alloy reinforced concentric-lay-stranded (ACAR)</td>
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<td></td>
<td></td>
<td>• Trapezoidal aluminum conductor steel reinforced concentric-lay-stranded (ACSR/TW)</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>• Trapezoidal all aluminum conductors shaped wire compact concentric-lay-stranded (AAC/TW)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor steel reinforced (ACSR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor steel reinforced aluminum clad (ACSR/AW)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor steel supported (ACSS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Trapezoidal aluminum conductor steel supported concentric-lay-stranded (ACSS/TW)</td>
</tr>
<tr>
<td>6</td>
<td>Furukawa Electric</td>
<td>1884</td>
<td>7,454</td>
<td>• Aluminum conductor steel reinforced (ACSR)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• All aluminum conductors (AAC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Aluminum conductor steel supported (ACSS)</td>
</tr>
</tbody>
</table>

$^1$ Bloomberg (information for Prysmian, Nexans, Sumitomo, and Furukawa Electric), Annual report (information for LS Cable, Midal Cable), Factiva (information for General Cable and Southwire)
# Key Global Players in the Overhead Conductors Market

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Overview</th>
<th>Overall 2015 Sales(^3), USD million</th>
<th>Key Products</th>
</tr>
</thead>
</table>
| LS Cable                    | 1962 | LS Cable is based in Gyeonggi-do, South Korea. The company has 10 manufacturing plants and operates in about 27 countries. | 2,997                                  | • Thermal resistant aluminum alloy conductors, aluminum clad steel reinforced (TACSR/AW)  
• High Tensile strength thermal resistant aluminum alloy conductors, extra high strength steel reinforced (Hi-TACSR/EST)  
• High tensile strength thermal resistant aluminum alloy conductors, aluminum clad steel reinforced (Hi-TACSR/AW)  
• Super-thermal resistant aluminum alloy conductors, aluminum clad Invar reinforced (STACIR/AW, Hi-STACIR/AW)  
• Extra-thermal resistant aluminum alloy conductors aluminum clad INVAR reinforced (XTACIR) |
| Midal Cables Co. Ltd. W.L.L. | 1977 | Midal Cables is based in Manama, Bahrain. The company has manufacturing plants in Bahrain, Saudi Arabia, Mozambique, Australia and Turkey. | 960                                    | • All aluminum alloy conductors (AAAC)  
• All aluminum conductors (AAC)  
• Aluminum alloy conductor steel reinforced (AACSR)  
• Aluminum conductor alloy reinforced (ACAR)  
• Aluminum conductor steel reinforced (ACSR)  
• Aluminum conductor aluminum clad steel reinforced (ACSR/AS)  
• Trapezoidal aluminum conductor steel reinforced concentric-lay-stranded conductor (ACSR/TW)  
• Aluminum clad steel supported (ACSS/AS)  
• High thermal and HTLS conductors  
• Special alloy conductors |

\(^3\) Bloomberg (information for Prysmian, Nexans, Sumitomo, and Furukawa Electric), Annual report (information for LS Cable, Midal Cable), Factiva (information for General Cable and Southwire)
3.1.4 Market Outlook

Electricity utility companies globally are expected to spend USD 351 billion annually during 2016 to 2026 in transmission and distribution infrastructure — both in installing the new infrastructure and repairing and replacing the old. The rising electricity demand, aging networks and new electricity-generation projects would drive the infrastructure spending. Investment in transmission and distribution is expected to be spread across major geographies across the world. Developing economies such as India and China would witness bulk of the new investments during 2016 to 2026, as they would target to meet growing electricity demand and upgrade their electricity grids.

Developed economies are expected to focus on smart grid infrastructure and renewable energy integration. Over the next decade, France plans to spend over USD 1 billion annually in transmission and distribution infrastructure, focusing on integrating renewable energy, while US-based utility companies would invest about USD 20 billion annually in transmission, compared with USD 10 billion in 2010. Such large-scale investment in transmission and distribution provides major growth opportunities for overhead conductor manufacturers.
3.2 GCC Market Overview

3.2.1 Current and Historical Market Trends

The aluminum overhead conductors market in the GCC region registered a CAGR of 6.5% during 2006 to 2017, with the market demand reaching 179,852 MT in 2017, from 89,588 MT in 2006. The growth in the market was attributed to buoyant demand from utility companies that invested significantly in building new electricity networks and expanding the existing ones in their countries. The investment was undertaken on account of rising industrialization, boosting electricity demand, growth in electricity-generation capacity, replacement of old infrastructure and the GCC grid interconnectivity project.

In value terms, the overhead conductors market in the GCC region was USD 337.89 million in 2006. During 2006 to 2017, it grew at a CAGR of 3.2% to reach USD 475.10 million. The low growth of the market, in value terms, was on account of a decline in prices of aluminum, which fell 4.7% during the period.

Chart 55: GCC Overhead Conductors Demand, 2006 – 2017

Source: Team analysis based on data from primary interviews, Trade Map

65 Utilities Middle East
3.2.2 Current Market Trends and Key Drivers

**Investments in transmission and distribution in the GCC region:**

With the increase in population and electricity consumption in the GCC region, large investments are required in the power sector. According to industry sources, the following investments would be required in GCC region’s power sector during 2016 to 2020 to meet electricity demand:

Such large investments in the transmission and distribution sector augur well for the demand of overhead conductors in the GCC region.

**Table 17: Power Sector Investments Required in GCC Region (in USD billion), 2016 - 2020**

<table>
<thead>
<tr>
<th>Country</th>
<th>Investments in Electricity Generation</th>
<th>Investments in Transmission and Distribution</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahrain</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Oman</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Qatar</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Kuwait</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>UAE</td>
<td>20</td>
<td>14</td>
<td>34</td>
</tr>
<tr>
<td>KSA</td>
<td>43</td>
<td>28</td>
<td>71</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>85</strong></td>
<td><strong>52</strong></td>
<td><strong>137</strong></td>
</tr>
</tbody>
</table>

**Interconnection of electricity grids among countries:** The Gulf Cooperation Council Countries Interconnection Authority (GCCIA) was established in 2001 with the aim of connecting the electricity network of six GCC member countries and enabling trading of electricity. With all the countries being connected to the grid by 2011, the total length of the grid spans about 1,200 km of overhead conductor lines and cables. In 2016, Jordan announced plans to connect its electricity infrastructure to the GCC grid via Saudi Arabia with the project estimated to cost approximately USD 200 million. The GCC power grid is also undertaking feasibility studies to connect to the European region through Turkey, as consumption in Europe peaks in winter, when the Gulf has excess capacity.

**Saudi Arabia–Egypt power grid:** Saudi Arabia and Egypt have planned a 1,320km interconnection grid with an investment of USD 1.6 billion, which will allow both the countries to share up to 3,000MW of electricity. The project is expected to be completed by the end of 2018 or early 2019.

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66 Northeast Group LLC; 67 Zawya Research; 68 Jordan Times; 69 The National; 70 Arab News
Table 18: Top Overhead Transmission Line Projects in the GCC Region

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Country</th>
<th>Value of the Project (USD million)</th>
<th>Completion</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOWE – Saudi–Turkey Power Interconnection</td>
<td>Saudi Arabia</td>
<td>1,500</td>
<td>2021</td>
<td>Planning</td>
</tr>
<tr>
<td>KAHRAMAA – Qatar Transmission Phase 13: Cables</td>
<td>Qatar</td>
<td>1,300</td>
<td>2020</td>
<td>Execution</td>
</tr>
<tr>
<td>SEC – Riyadh and Mecca HVDC Power Interconnector</td>
<td>Saudi Arabia</td>
<td>400</td>
<td>2019</td>
<td>Tendering</td>
</tr>
<tr>
<td>SEC – 380kV Qassim to Madinah Transmission Line: Phase 2</td>
<td>Saudi Arabia</td>
<td>150</td>
<td>2019</td>
<td>Tendering</td>
</tr>
<tr>
<td>SEC – Interconnection of Al-Rais Generation BSP (stage 2)</td>
<td>Saudi Arabia</td>
<td>150</td>
<td>2020</td>
<td>Planning</td>
</tr>
<tr>
<td>SEC – 380kV Ashbaliya BSP to AL Remal Bulk Supply Point (BSP)</td>
<td>Saudi Arabia</td>
<td>55</td>
<td>2019</td>
<td>Tendering</td>
</tr>
<tr>
<td>SEC – 380 kV OHL between Duba Green Power Plant to Al-Wajh BSP</td>
<td>Saudi Arabia</td>
<td>120</td>
<td>2019</td>
<td>Tendering</td>
</tr>
</tbody>
</table>

71 MEED Projects
3.2.3 Demand Forecast

Between 2017 and 2026, the GCC region overhead conductors market is expected to grow at a CAGR of 4.0%, from 179,852MT to 256,422MT. The growth in demand would be led by expansion of transmission networks in GCC countries and inter-country grid connection projects.

In value terms, the market is expected to grow at a CAGR of 5.6%, from USD 475.10 million in 2017 to USD 778.8 million in 2026.

Chart 56: GCC Overhead Conductors Demand Forecast, 2017 – 2026

Source: Team Analysis
### 3.2.4 Key Players

The key players in the aluminum overhead conductors market in the GCC region are:

<table>
<thead>
<tr>
<th>Table 19: Key GCC Region Players in Aluminum Overhead Conductors Market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
</tbody>
</table>
| Midal Cables Co. Ltd. W.L.L. | 1977 | Bahrain | One plant in Askar, Bahrain, and one in Dammam, Saudi Arabia | • All aluminum alloy conductors (AAAC)  
• All aluminum conductors (AAC)  
• Aluminum alloy conductor steel reinforced (AACSR)  
• Aluminum conductor alloy reinforced (ACAR)  
• Aluminum conductor steel reinforced (ACSR)  
• Aluminum conductor aluminum clad steel reinforced (ACSR/AS)  
• Trapezoidal aluminum conductor steel reinforced concentric-lay-stranded conductor (ACSR/TW)  
• Aluminum clad steel supported (ACSS/AS)  
• High thermal and HTLS conductors  
• Special alloy conductors | 300,000 MTPA |
| Oman Cables | 1984 | Oman | One plant in each of Sohar and Muscat | • All aluminum conductors (AAC)  
• Aluminum conductor steel reinforced (ACSR)  
• All aluminum alloy conductors (AAAC) | 50,000 MTPA |
| Dubai Cable Company (Private) Limited/ DUCAB | 1979 | UAE | Six plants: Two plants in Dubai (EHV, HV, MV, LV and instrumentation & control cables); three plants in Mussafah, Abu Dhabi (HV, LV, building wire, flexible cables and copper rod) and one plant in Kizad, Abu Dhabi (aluminum rod and wires) | • The company would start production of overhead conductors in 2017. | 50,000 MTPA |

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72 Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, Midal and National Cables Industry)
### Key GCC Region Players in Aluminum Overhead Conductors Market

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
<th>Country</th>
<th>Overall Manufacturing Locations</th>
<th>Key Products</th>
<th>Total Capacity(^2)</th>
</tr>
</thead>
</table>
| Jeddah Cables Company Ltd./Energya Cables              | 1988  | Saudi Arabia  | Four plants in Saudi Arabia                                                                   | • Aluminum conductor steel reinforced (ACSR)  
  • All aluminum alloy conductors (AAAC)  
  • All aluminum conductors (AAC)                                      | 20,000 MTPA                                                        |
| Riyadh Cables Group of Companies                       | 1984  | Saudi Arabia  | Four plants in Riyadh for wire and cables, one for PVC compounding plant, and one copper plant | • All aluminum conductors (AAC)  
  • All aluminum alloy conductors (AAAC)  
  • Aluminum conductor steel reinforced (ACSR)  
  • Aluminum conductor aluminum alloy reinforced (ACAAR) | 30,000 MTPA                                                        |
| Gulf Cable and Electrical Industries Company K.P.S.C.  | 1975  | Kuwait        | Four plants in Kuwait                                                                         | • All aluminum conductors (AAC)  
  • Aluminum conductor steel reinforced (ACSR)                                      | 50,000 MTPA for copper and aluminum combined |
| Elsewedy Cables KSA                                    | 2006  | Saudi Arabia  | One plant in Yanbu Al Sinaiyah                                                                | • All aluminum conductors (AAC)  
  • All aluminum alloy conductors (AAAC)  
  • Aluminum conductor steel reinforced (ACSR)                                      | 45,000 MTPA for copper and aluminum combined |
| National Cables Industry                               | 2001  | UAE           | One plant in Sharjah                                                                         | • All aluminum conductors (AAC)  
  • All aluminum alloy conductors (AAAC)  
  • Aluminum conductor steel reinforced (ACSR)  
  • Aluminum conductor steel reinforced (ACSR/AW)                                  | Not available                                                        |

\(^2\) Primary Interviews (information for Riyadh Cables, Jeddah, Oman Cables, Elsewedy Cable, Al Fanar, Midal and National Cables Industry)

(Overhead Conductors)
3.2.5 Market Outlook

The fall in oil prices that began in 2014 has adversely impacted the GCC region market in the short term. In value terms, the market contracted from USD 429.18 million in 2014 to USD 400.82 million in 2016, due to fall in LME aluminum prices. Going ahead, the market is expected to recover to USD 475.1 million in 2017 and reach USD 778.8 million in 2026.

In the medium-to-long term, availability of raw materials, low energy costs and growing electricity consumption augur well for overhead conductor manufacturers in the region. Grid interconnection projects such as Saudi Arabia–Egypt, Saudi Arabia–Jordan and Saudi Arabia–Turkey would drive demand, apart from development of transmission networks in each GCC country.

In value terms, the market is expected to grow at a CAGR of 5.6%, from USD 475.10 million in 2017 to USD 778.8 million in 2026.
### 3.3 Qatar Market Overview

#### 3.3.1 Demand Analysis

**A. Current and Historical Market Trends**

The demand for overhead conductors in Qatar is constrained by the small geographical area of the country and limited application of the product. Local manufacturers do not produce overhead conductors, and the market is serviced entirely through imports. During 2006 to 2009, the demand declined sharply at a CAGR of 17.4%, due to the economic downturn, reaching 446MT in 2009. Market demand recovered post-2009 and grew at a CAGR of 10.0%, to 1,001MT in 2017. In value terms, the market was sized at QAR 9.6 million in 2017.

![Chart 57: Qatar's Overhead Conductors Demand, 2006 – 2017](chart57.png)

*Source: Team analysis based on data from primary interviews, Trade Map*
B. Demand Drivers

a. **Demand drivers:** Electricity transmission projects and electricity grid interconnection projects among countries are the demand drivers for the aluminum overhead conductors market.

b. **Customer segment:** Customer segments include electricity utility companies and EPC contractors. When a new tender for an overhead transmission network is floated, EPC contractors may approach overhead conductor manufacturers with specifications for submitting a joint bid to build the transmission network project. The cost of overhead conductors accounts for 20% to 30% of transmission network development cost.

c. **Key influencers:** Engineering consultants are the key influencers in deciding the type of aluminum overhead conductor to be used, its thickness and other specifications.
C. Demand Forecast

Going forward, rising electricity consumption would drive the expansion of the electricity transmission network in Qatar. Due to this, the demand for overhead conductors is expected to grow at a CAGR of 2.6%, from 1,001MT in 2017 to 1,262MT in 2026.

In value terms, the market is forecast to grow at a CAGR of 4.2%, from QAR 9.6 million in 2017 to QAR 14.0 million in 2026.

Source: Team analysis based on data from Trade Map
3.3.2 Trade Analysis

A. Imports


Chart 59: Qatar’s Overhead Conductors Imports, 2006 – 2015

Source: Team analysis based on data from Trade Map
B. Exports

Qatar does not produce aluminum overhead conductors. During 2006 to 2015, exports in the country were marginal and irregular, and were primarily on account of re-exports.

Chart 60: Qatar’s Overhead Conductors Exports, 2006 – 2015

Source: Team analysis based on data from Trade Map
C. Trade by Source and Destination

I. Imports

Spain has been the single largest source of imports since 2010, while imports from Oman have started since 2013. The analysis of total import data from 2010 to 2015 (USD 17.58 million) indicates that Spain (48% share), India (10% share), the UK (5% share), Germany (4% share) and Oman (4%) are the major sources of overhead conductors imports for Qatar.

Source: Team analysis based on data from Trade Map
II. Exports

Qatar’s exports have been marginal as compared to the imports, and have fluctuated on an annual basis. The analysis of total export data from 2010 to 2015 (USD 95,000) indicates that Morocco, Saudi Arabia, the UAE, Pakistan and Bahrain are the major export destinations for Qatar.

Chart 62: Key Destinations for Overhead Conductors Exports, 2010 – 2015

Source: Team analysis based on data from Trade Map
D. Share of Imports in Domestic Consumption

During 2006 to 2017, the overhead conductors market was serviced entirely by imports. This trend is likely to continue during 2017 and 2026, provided there is no new manufacturing plant in Qatar.

Chart 63: Qatar’s Overhead Conductors Consumption, 2006 – 2017

Source: Team analysis based on data from Trade Map
3.3.3 Supply Analysis

3.3.3.1 Key Players

Cable manufacturers in Qatar do not produce aluminum overhead conductors. Hence, there is no domestic production of aluminum overhead conductors in Qatar.

3.3.3.2 Business Model Analysis

There are 10 companies in the GCC region that produce aluminum overhead conductors. Of these 10 manufacturers, nine also produce copper wires and cables. Many of these companies originally started as copper wire and cable manufacturers and subsequently expanded into aluminum overhead conductors.

DUCAB was established in 1979 and currently has a copper-processing capacity of 110,000 MT. The company has recently built an aluminum rod and overhead conductor plant with 50,000 MT of capacity, which is expected to be operational in 201673. Similarly, Oman Cables started aluminum rod and overhead conductor facility in 2010 with a capacity of 20,000 MT. Oman Cables was established in 1984 and currently has a copper-processing capacity of 110,000 MT74.

Within the GCC region, Bahrain-based Midal Cables is the only manufacturer that solely focusses on aluminum overhead conductors75. The company’s manufacturing plant is located next to Aluminum Bahrain’s (ALBA) smelter. It directly procures molten primary aluminum and casts it into aluminum rods using continuous casting process, which is used to manufacture cables.

3.3.3.3 Domestic Production Competitiveness

The aluminum overhead conductors market in Qatar is small, due to Qatar’s small geographic area and limited application of the product. Key raw material for manufacturing overhead conductors is available locally from Qatalum, which started operations in late 2009 with an annual capacity of 585,000MT of primary aluminum.

Availability of raw materials and low cost of energy make manufacturing of overhead conductors cost competitive in Qatar. However, given the small local market size, entrepreneurs must focus on the export markets while planning to set up an overhead conductors’ facility.

Opportunity for exports: Currently, Qatar does not have any domestic production facility for overhead conductors. Exports over the past few years, if any, had been due to re-exports.

Due to domestic availability of raw materials (i.e., primary aluminum) from Qatalum and low energy costs, aluminum overhead conductors produced in Qatar are expected to be cost competitive in export markets. The GCC region countries have a sizable share of global exports market due to raw material availability and low energy costs. The export potential of aluminum overhead conductors of Qatar has been calculated on a fair share basis, considering the export potential of GCC region countries.

During 2010 to 2015, the average share of the GCC region (excluding Qatar) in global exports was 19.1%. Bahrain led the region with a 13.6% share, and the remaining four countries collectively accounted for 5.5% of global exports. Midal Cables, Bahrain, being a large and well-established plant would continue to remain the leader, and it would be very difficult for any new plant to compete with it. Hence, it is assumed that a new aluminum overhead conductor plant in Qatar will be able to compete with the four GCC countries (excluding Bahrain), but not with Bahrain, and gain a fair share of 1.1% (i.e., 5.5% divided by five).

If a new overhead conductor plant comes up in Qatar, it is likely to gain a 1.1% share of the global exports market gradually during 2018 to 2022. Exports are expected to grow from 7,431MT in 2018 to 22,683MT in 2026.

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73 The National; 74 Company website; 75 Primary Interviews
Chart 64: Qatar’s Overhead Conductors Export Forecast, 2017 – 2026

Source: Team analysis based on data from Trade Map
3.3.4 Demand-Supply Analysis

The demand for overhead conductors in Qatar was about 705MT in 2014, and is expected to reach 1,262MT in 2026. The market is serviced through imports, as domestic electric cable manufacturers do not manufacture aluminum overhead conductors. In the absence of domestic manufacturing facility, the demand-supply gap is expected to be same as the market size.

Chart 65: Qatar’s Overhead Conductors Demand-Supply Analysis, 2014 – 2026

Market Size (Total demand incl. import projections)  Supply (Domestic installed capacity)  Demand-supply gap

Source: Team Analysis
3.3.5 Pricing Analysis

Aluminum raw material accounts for a significant portion of the production cost of aluminum overhead conductors, and in turn, their selling price. Manufacturers hedge their commodity exposure by placing an order for the raw material while accepting a customer order, and by varying product pricing frequently. Prices of overhead conductors are linked to the LME prices for aluminum.

Additionally, pricing is determined by a combination of factors, such as the product specifications, amount of aluminum per unit length, time available to deliver order and order quantity. Further, non-product factors that impact pricing decisions are the utilization level of the manufacturing facility and the strategic importance of customers. For instance, if the facility is loaded with orders, prices would be quoted steeply. Similarly, if the customer is a key account, with potential for future business, pricing would be favorable for the customer.

Selling price on the day of order confirmation is calculated using the following formula:

\[ P_1 = P_0 - (LME_0 - LME_1) \times V.F. \times \text{Exchange Rate} \]

Where,

- \( P_1 \) = Invoice price/km
- \( P_0 \) = Quoted price/km
- \( LME_0 \) = LME price for aluminum in USD/MT when quotation was offered
- \( LME_1 \) = LME price for aluminum in USD/MT when order was confirmed
- V.F. = Variation factor (weight of aluminum in MT per km of conductor)
- Exchange Rate = Exchange rate of the currency against USD 1.00

The below chart displays historical and forecast LME prices for aluminum.

**Chart 66: Qatar’s Aluminum Selling Price Forecast, 2001 – 2026**

Source: World Bank
Aluminum prices peaked in 2007 and 2011, with the metal quoting USD 2,638/MT in 2007 and USD 2,401/MT in 2011. However, the trend reversed in 2012 and since then prices have been on a steady decline, owing to excess production, falling crude oil prices and weak demand. Between 2012 and 2016, aluminum prices declined at a CAGR of 5.64%, reaching USD 1,604/MT in 2016 from USD 1,847/MT in 2012. However, as the demand-supply imbalance is corrected, the declining price trend is expected to reverse from 2017 onwards.

The prices are expected to grow at a CAGR of 1.6%, from USD 1,800/MT in 2017 to USD 2,070/MT in 2026.

Overhead conductor pricing: Prices for overhead conductors are linked to the prevailing LME price of aluminum metal. Primary interviews indicate that current selling price of aluminum overhead conductors is LME's aluminum price + USD 700 to 800/MT, implying that LME price accounts for 66.7% of the selling price.

The price of aluminum overhead conductors was QAR 9,865/MT in 2013, which declined to QAR 8,569/MT in 2016, in line with a decline in global aluminum prices. Going forward, the selling price for overhead conductors is expected to increase at a CAGR of 1.6% during 2017 to 2026, to reach QAR 11,055/MT.

Chart 67: Qatar’s Overhead Conductors Price Forecast, 2013 – 2026

Source: World Bank

76 World Bank; 77 S&P Global Platts
3.3.6 Regulatory Analysis

**Kahramaa regulations:** Kahramaa is Qatar’s sole transmission and distribution system owner and operator (TDSOO) for the electricity and water sectors. It provides specifications for overhead conductors, undertakes testing and is responsible for product approvals78.

<table>
<thead>
<tr>
<th>Table 20: Kahramaa Approved Manufacturers in Qatar</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kahramaa Approved Manufacturers in Qatar</strong></td>
</tr>
<tr>
<td><strong>Company</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
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<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

For Kahramaa approval, the manufacturer’s facility must be in operation for at least five years and should comply with all Kahramaa requirements. The approval is valid for two years.

**American Society for Testing and Materials (ASTM):** ASTM is an international standards organization that develops technical standards for a variety of products. ASTM has developed specifications for aluminum overhead conductors, which are followed by manufacturers globally for product standardization79. ASTM standards for overhead conductors include the following80:

78 Kahramaa website; 79 ASTM International; 80 The Aluminum Association
Table 21: ASTM Standards for Overhead Conductors

<table>
<thead>
<tr>
<th>Product</th>
<th>ASTM Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>All aluminum conductor (AAC)</td>
<td>B 231</td>
</tr>
<tr>
<td>Aluminum conductor steel reinforced (ACSR)</td>
<td>B 232</td>
</tr>
<tr>
<td>All aluminum alloy conductor (AAAC)</td>
<td>B 399</td>
</tr>
<tr>
<td>Aluminum conductor aluminum clad steel reinforced (ACSR/AW)</td>
<td>B 502</td>
</tr>
<tr>
<td>Aluminum clad steel wire</td>
<td>B 415</td>
</tr>
</tbody>
</table>

The International Electrotechnical Commission (IEC): The IEC is the international standards and conformity assessment body for all fields of electrotechnology. IECformulates specifications for all types of wires and cables. Key IEC specifications with respect to overhead conductors are IEC 61089 and IEC 61232. The compliance with IEC specifications can help the manufacturer’s product to meet international standards.

Civil Defense Department (Ministry of Interior): All building material products need an approval from the Civil Defense Department (Ministry of Interior) as per Emiri Decree No. 9/2012.

Qatar Construction Specifications 2014 (QCS 2014): Overhead conductor manufacturers supply products to EPC contractors, who need to comply with QCS 2014. Manufacturers need to ensure that their products meet the specifications and requirements mentioned in the Part 06 of Section 21 of QCS 2014.

Third-party certification companies such as British Approvals Service for Cables (BASEC), Bureau Veritas and KEMA Netherlands undertake certifications for various international standards such as Quality Management System ISO 9001:2008, IEC specifications and standards, and OHSAS 18001:2007.

In addition, all prospective entrepreneurs need to follow other applicable local laws on company registration, environmental approvals, industrial license and building permissions for setting up an overhead conductors manufacturing facility in Qatar.

81 QCS 2014
3.3.7 SWOT Analysis and Michael Porter’s Five Force Analysis

A. SWOT Analysis

Figure 11: SWOT Analysis: Overhead Conductors

**STRENGTHS**

- Low cost of energy and domestic availability of raw materials make manufacturing the product cost competitive for exports
- Aluminum is about three times lighter and cheaper than copper, making aluminum the only viable option for overhead conductors\(^8\)

**OPPORTUNITIES**

- There is an expansion of electricity transmission networks to meet the growing electricity demand
- The GCC region electricity grid with its planned expansions is a major opportunity for manufacturers of overhead conductors
- The 1,320-km power grid planned between Egypt and Saudi Arabia is another key opportunity

**WEAKNESS**

- The market size for overhead conductors in Qatar is small, and is expected to grow at a CAGR of 2.6% to 1,262 MT in 2026, from 1,001MT (QAR 9.6 million) in 2017
- There is a reliance on export markets for business opportunities

**THREATS**

- Competition from existing regional and international players
- Conversion of overhead lines into underground copper cables is a major threat. For e.g., in March 2015, Kahramaa planned dismantling overhead lines between Doha South and Sailiya, as well as all lines from Abu Fontas generation station as part of its strategy and urban expansion requirements\(^9\)
- Volatility in prices of aluminum can affect manufacturers’ margins

**SUMMARY**

There is no competition for aluminum overhead conductors in the overhead conductors segment, owing to their low cost and light weight. The grid interconnection projects are major growth opportunities. In the medium-to-long term, the strengths and opportunities will outweigh weaknesses and threats, as Qatar’s domestic production is expected to be competitive in the export market due to domestic availability of raw materials and low energy costs.

\(^8\) Siemens AG; \(^9\) Gulf Times
B. Michael Porter’s Five Force Analysis

Figure 12: Michael Porter’s Five Forces Analysis: Overhead Conductors

**BARGAINING POWER – SUPPLIERS**

High
- Aluminum metal costs constitute a significant portion of the selling price of overhead conductors. Manufacturers of overhead conductors have no control over aluminum rod or primary aluminum production and their prices. Thus, suppliers of aluminum rods and primary aluminum have high bargaining power.

**BARGAINING POWER – CONSUMERS**

High
- The bargaining power of buyers, i.e., utility companies or EPC contractors, is high, due to the presence of a large number of players in the market and few customers. Customers are price conscious.

**THREAT OF NEW ENTRY**

Low
- The threat of new entrants in the overhead conductor’s market is low. The new entrant would have to enter a joint venture with smelters such as Qatalum to procure molten primary.

**COMPETITIVE RIVALRY**

High
- Competition in the overhead conductors market is high, as this is a low margin and high volume business with competition being driven by imported products.

**THREAT OF SUBSTITUTION**

Low to Moderate:
- The threat of substitution for overhead conductors is low, as the product has no substitutes in transmission of electricity over long distances using the overhead route. Aluminum overhead conductors is a necessity product for electricity transmission network due to its light weight and low cost.
3.4 Market Outlook

Going forward, the demand for overhead conductors in Qatar is expected to grow at a CAGR of 2.6%, from 1,001MT in 2017 to 1,262MT in 2026. In value terms, the market is forecast to grow at a CAGR of 4.2%, from QAR 9.6 million in 2017 to QAR 14.0 million in 2026.

Targeting exports with a focus on international markets is crucial for the new entrants. The grid interconnection projects in the MENA region such as the Saudi Arabia–Jordan and Saudi Arabia–Egypt would provide major demand opportunity for overhead conductor manufacturers.

In terms of challenges, the market is likely to remain significantly competitive and price sensitive. The decline in oil prices has impacted the budgets of state-owned utility companies in the short term. In the medium-to-long term, availability of raw materials, low energy costs and growing demand in the GCC region augur well for entrepreneurs to start manufacturing in Qatar.

The export potential from Qatar, along with scope for import substitution would offer opportunities for entrepreneurs to establish aluminum overhead conductor manufacturing plant in Qatar.

Entrepreneurs planning to set up overhead conductor manufacturing plant in Qatar may choose to enter a joint venture with an aluminum smelter such as Qatalum to receive molten aluminum. The plant and machinery of the proposed venture will have to be integrated with that of Qatalum. This would also help aluminum smelters to forward integrate into intermediate and finished products. Considering the export potential from Qatar of 22,683MT in 2026 and assuming 70% import substitution, a new entrant can achieve production of up to 23,566MT in 2026. This indicates an opportunity for setting up an aluminum overhead conductor manufacturing plant with an installed capacity of 33,666MT p.a. running at 70% utilization and focusing on export markets.
Overhead Conductors Highlights

- 2017 market size (QAR mn): 9.6
- 2026 market size (QAR mn): 14.0
- Selling price in 2017 (QAR/MT): 9,615.6
- 2015 Imports (QAR mn): 8.9
- 2015 Exports (QAR mn): 0
- Number of domestic players: 0
- CAGR (2017-2026) (%): 4.21
- Share of imports in domestic consumption in 2017 (%): 100.0
4. Setting up an Electric Wires and Cable Manufacturing Plant in Qatar

4.1 Copper Wires and Cables

Key aspects to be considered by entrepreneurs while setting up a copper wires and cables plant in Qatar include:

4.1.1 Key Success and Risk Factor for Cables Manufacturers

A. Investment in machinery
Most copper wires and cable products, such as building wires, low-voltage power cables and medium-voltage power cables, are a high-volume and low-margin business. These products as well as the technically complex products, such as high-voltage power cables, require potential entrants to invest in modern machinery and equipment. This would enable sophistication in manufacturing operations and help them achieve success in business operations.

B. Technical capabilities
Manufacturing copper electrical wire cables requires complying with applicable international and local standards. Entrepreneurs need to have relevant technical capabilities or enter into a joint venture with a partner having relevant technical capabilities.

C. Wide range of products
Established manufacturers have a wide range of products, and within each product, there are several sub-products with different specifications. This helps to target different types of projects and customers. Power cables is the largest product segment comprising different products such as building wires, low voltage cables, medium-, high- and extra-high-voltage power cable, rubber cables, fire resistant cables etc.

D. Access to market and strategic business linkages
Entrepreneurs need to develop a strong relationship and strategic linkages with MEP contractors, as this would help sustain a steady order book. As copper wires and cables are exportable, entrepreneurs need to focus on export markets for business opportunities. This would involve establishing offices and developing a sales and distribution network in key geographies worldwide for their products.

E. Quality and Operational proficiency
 Undertaking manufacturing operations in an efficient manner can help in cost optimization. Compliance to ISO norms for Quality (ISO 9001), OHSAS (ISO 18,001) and Environment (ISO 14001) may lead to operational improvement, standard operating procedures and bring in checks and balances. This can be a key tool in achieving efficiency in operations.

F. Customer centricity
Ability to anticipate customer requirements and satisfying customer needs within the given timelines are crucial to gain the trust of customers. Building and maintaining strong business relationships with customers is vital for success in this industry.
Table 22: Success Factors for Setting up a Copper Wires and Cables Manufacturing Plant

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Degree of Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A  Investment in machinery</td>
<td>High</td>
</tr>
<tr>
<td>B  Technical capabilities</td>
<td>High</td>
</tr>
<tr>
<td>C  Wide range of products</td>
<td>High</td>
</tr>
<tr>
<td>D  Access to markets and strategic linkages</td>
<td>High</td>
</tr>
<tr>
<td>E  Quality and Operational proficiency</td>
<td>Medium</td>
</tr>
<tr>
<td>F  Customer centricity</td>
<td>Medium</td>
</tr>
</tbody>
</table>
4.1.1.2 Risk Factors

Key risk factors involved in setting up a Copper Wires and Cables Manufacturing Plant include:

**Table 23: Risk factors involved in setting up a Copper Wires and Cables Manufacturing Plant**

<table>
<thead>
<tr>
<th>Risk</th>
<th>Impact</th>
<th>Mitigation</th>
</tr>
</thead>
</table>
| A Inadequate machinery and technical capabilities | • Poor manufacturing efficiency  
• Poor quality output  
• Delay in/or refusal of KAHRAMAA approval. | • Conduct detailed technical study.  
• Alliance with a JV partner who has strong technical background. |
| B Inadequate product mix                  | • Poor sales  
• Difficulty in retention of customers. | • Develop a wide range of products to cater to diverse needs of project |
| C Lack of visibility in export market     | • Fall in sales                                                       | • Participate in export promotion programs and develop network of distributors in export market. |
| D Poor quality and inconsistency in manufacturing | • Fall in sales  
• Difficulty in retention of customers.  
• Delay in/or refusal of KAHRAMAA approval. | • Adhere to good and leading manufacturing practices  
• Compliance with the international standards  
• Regular maintenance of the plant and machinery. |
| E Unavailability of raw material          | • Adverse impact on supply chain and delay in production schedule     | • Develop long term relationship with raw material suppliers  
• Adhere to good and leading practices in procurement. |
4.1.2 Manufacturing Process and Process Flow

Key steps involved in manufacturing of copper wires and cables are given below:

Figure 13: Copper Wires and Cables Manufacturing Process

Wire drawing and wiring

a. Coils of copper rod or wire rod (8 mm diameter) are purchased from raw material suppliers. In the first step, the diameter of the copper rod is reduced to about 2 mm by drawing.
b. Copper is formed into a wire of varying diameters by drawing it through a series of dies. Since the drawing process makes the copper hard and brittle, it undergoes a process of heat treatment called annealing.
c. Annealing is a process by which the conductor is heated to over 700°F and allowed to cool. It is used to allow conductors to be bent without breaking, remove stiffness and improve flexibility.
d. After annealing, a select number of copper wires as per the specification, are twisted and grouped together to make copper conductors. This process is called wiring.

Providing additional coverings

a. The cable may require additional layers such as electrical coverings or mechanical coverings to improve its protection or operation.
b. Electrical coverings or screens or shields help insulate electrical signals that could circulate in the cable owing to external interference. They also shield power cables to prevent them from interfering with the adjacent signaling circuits. These shields may be composed of braided strands of copper or aluminum, a non-braided spiral winding of copper tape, or a layer of conducting polymer.
c. Mechanical coverings or armours protect the cable from external damage that may occur from knocks, rodents or any other potential causes of damage. The armour is made from steel or aluminium and is available in the form of metal strips, wires or braids.

Applying the outer sheath

a. Cables typically possess an outer polymer covering for protection. This is called sheathing. The sheath protects the conductors and their insulation from external elements (such as moisture), which may modify their electrical properties. It also protects them from mechanical aggression, which may take place during cable installation.
b. The outer-sheath is applied via a process of extrusion at a high temperature. The sheath may be made from different materials, either thermoplastic (Polyvinyl Chloride, Polyethylene, Chlorinated Polyethylene, Thermoplastic Elastomer, Nylon) or a thermosetting plastic (Cross-Linked Polyethylene, Chloro-sulphanated Polyethylene, Ethylene Propylene Rubber). Lead sheathing may be used for underground cables.
Testing

Rigorous quality control checks have to be undertaken at every stage to ensure that the produced specimen meets the required specifications and delivers appropriate performance outputs. For example, the whole length of the cable undergoes a voltage test to ensure the insulation layer is without faults both after insulation stage and phase wiring stage.

Applying insulation cover

a. The insulation process involves addition of an insulating material by an extrusion process at a high temperature. Insulation ensures there are no current leakages.

b. Several insulating materials like PVC, XLPE, etc. can be used based on the characteristics of the cable required. An insulation material with high heat resistance allows the conductor to transmit more power than an insulation material of the same cross-section, with lower heat resistance.

Phase wiring to produce cables

Phase wiring is the grouping of different insulated conductors to form a multicore cable. Three or four insulated copper conductors are assembled into power cables. Phases can be identified by colouring or by numbering them.

Packaging

Wires and cables are packed in reels, cartons or wooden/metal drums as applicable. Packaging standards should be in accordance with international norms.
4.1.3 Raw Material Requirements

Copper rod and cable compounding material costs constitute a significant portion of copper wires and cables cost. Currently, domestic manufactures in Qatar and most of the players in other GCC region countries import copper rods. Some of the key raw material suppliers include: HINDALCO, Birla Copper, Sterlite from India and Ducab, Riyadh cables and Union copper from the GCC region.

Qatar has one production facility for cable compounding materials: Al Hodaifi Cable Compounding. Costs related to copper rods are influenced by global trends in the commodity prices. Entrepreneurs are unlikely to have any control on raw material prices. Hence, competitiveness in procurement and compliance with good practices in raw material and inventory management, such as economic order quantity and just-in-time, are essential.
4.2 Overhead Conductor

Key aspects to be considered by entrepreneurs while setting up an overhead conductor plant in Qatar include:

4.2.1 Key Success and Risk Factor for Cables Manufacturers

4.2.1.1 Success Factors

A. Investment in machinery
Aluminum overhead conductors is a high-volume and low-margin business. Companies need to operate at large capacities to maximize profit. For instance, Midal Cables has a capacity of 300,000 MT per year, Oman Cables and DUCAB each have a 50,000 MT capacity. Potential entrants must invest in modern machinery and equipment. This would enable sophistication in manufacturing operations and achieving success in business operations.

B. Technical capabilities
Manufacturing aluminum overhead conductors requires technical expertise to execute orders with optimum efficiency. Large manufactures such as Sumitomo, Midal and LS Cable also undertake research and development (R&D) activities for new conductor types, as well as improve the specifications of existing conductors.

C. Wide range of products
Manufacturers should focus on manufacturing different types of overhead conductors such as: Aluminum conductor steel reinforced (ACSR), All Aluminum Alloy conductor (AAAC) and Aluminum conductor composite core (ACCC) cable.

D. Access to market and strategic business linkages
Due to small market size in Qatar, entrepreneurs have to focus on export markets for business opportunities. This involves establishing offices and developing a sales and distribution network in key geographies worldwide for their products. Furthermore, since EPC contractors are major clients, potential entrants can look at entering into strategic tie-ups with EPC contracting firms in key countries, under which the EPC contractor and overhead manufacturer can undertake joint bidding for projects. This can improve the probability of winning projects.

E. Quality and Operational proficiency
Undertaking manufacturing operations in an efficient manner can help in cost optimization. Compliance to ISO norms for Quality (ISO 9001), OHSAS (ISO 18,001) and Environment (ISO 14001) may lead to operational improvement and standard operating procedures, and bring in checks and balances. This can be a key tool in achieving efficiency in operations.

F. Customer centricity
Ability to anticipate customer requirements and satisfying customer needs within the given timelines is crucial to gain the trust of customers. Building and maintaining strong business relationships with customers are critical for success in this industry.
Table 24: Success factors for setting up an Overhead Conductor Manufacturing Plant

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Degree of Importance</th>
</tr>
</thead>
<tbody>
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<tr>
<td>D Access to markets and strategic linkages</td>
<td>High</td>
</tr>
<tr>
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<td>Medium</td>
</tr>
<tr>
<td>F Customer centricity</td>
<td>Medium</td>
</tr>
</tbody>
</table>

4.2.1.2 Risk Factors
Key risk factors involved in setting up an overhead conductor manufacturing plant include:

Table 25: Risk factors involved in setting up an Overhead Conductors Manufacturing Plant

<table>
<thead>
<tr>
<th>Risk</th>
<th>Impact</th>
<th>Mitigation</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>• Poor quality output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Delay in/or refusal of KAHRAMAA approval.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Conduct detailed technical study.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Alliance with a JV partner who has strong technical background.</td>
</tr>
<tr>
<td>B</td>
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<td>• Poor sales</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Difficulty in retention of customers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop a wide range of products to cater to diverse needs of project.</td>
</tr>
<tr>
<td>C</td>
<td>Lack of visibility in export market</td>
<td>• Fall in sales</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Participate in export promotion programs and develop network of distributors in export market.</td>
</tr>
<tr>
<td>D</td>
<td>Poor quality and inconsistency in manufacturing</td>
<td>• Fall in sales</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Difficulty in retention of customers.</td>
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<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• Regular maintenance of the plant and machinery.</td>
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<tr>
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<td></td>
<td>• Develop long term relationship with raw material suppliers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Adhere to good and leading practices in procurement.</td>
</tr>
</tbody>
</table>
4.2.2 Manufacturing Process and Process Flow

Key steps involved in manufacturing of overhead aluminum conductors are given below:

Figure 14: Overhead Aluminum Conductor Manufacturing Process

1. Procurement of molten aluminum
   - The desired alloying elements (Magnesium, Silicon and Iron) are added to the molten aluminum from the smelting plants (QATALUM). Chemical analyses are done to control the chemical composition of liquid alloyed aluminum. Before casting, undesired gaseous are removed from the liquid.

5. Drawing of wires
   - Aluminum rods are drawn into wires of desired diameter.

6. Stranding
   - Depending on the construction of the conductor, reels of aluminum wire is loaded on the stranding machines which combines wires together to form the desired type of aluminum conductor.
   - Conductor is coiled on non-returnable wooden drums having different dimensions for each type of conductor.

[EMTA Conductor and Cables]
Casting of aluminum alloy bars

- Aluminum alloy bars are casted using continuous casting process.

Rolling of bars into rods

- Bars are rolled to manufacture aluminum rods of desired diameter. These are often treated in solutions to meet technical requirement of the alloyed rod. Various parameters such as surface finish, diameter, resistance and tensile strength of rods are controlled during this process.

Induction of aluminum alloy bars

- Aluminum alloy bars undergo induction after casting. This increases the temperature that helps in better rolling operation.

Packaging

- All drums are weighed and labeled. Packaging standards should be in accordance with international norms.

Testing

- Rigorous quality control checks have to be undertaken at every stage to ensure that the produced specimen meets the required specifications and delivers appropriate performance outputs.
4.2.3 Raw Material Requirements

Primary aluminum cost accounts for a significant portion of aluminum overhead conductor cost. The form in which primary aluminum is procured has an impact on the production cost and time. For instance, major manufacturers in the GCC region such as Midal Cables, DUCAB and Oman Cables procure molten aluminum directly from smelters, which is converted into wire rods, saving the time and cost of processing aluminum ingots or billets into wire rods.

Aluminum price is influenced by global trends in the commodity prices. Entrepreneurs are unlikely to have any control on raw material prices. Hence, competitiveness in procurement and compliance with good practices in raw materials and inventory management, such as economic order quantity and just in time, are essential.

All manufacturing units would have to comply with applicable international and local standards. Entrepreneurs should have relevant technical capabilities or arrange for a joint venture partner with the capabilities.
Manufacture of Electric Wires and Cables Sector in Qatar
Setting up an Overhead Conductors Manufacturing Plant in Qatar
## 5. Annexures

### 5.1 List of Key Projects in Qatar

Table 26: List of Key Projects in Qatar

<table>
<thead>
<tr>
<th>Project’s Name</th>
<th>Sector</th>
<th>Project Value (USD million)</th>
<th>Status</th>
<th>Completion date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kahramaa - Qatar Power Transmission System Expansion - Phase 11</td>
<td>Power and Water</td>
<td>411</td>
<td>Execution</td>
<td>2018</td>
</tr>
<tr>
<td>LREDC - Lusail City</td>
<td>Real estate</td>
<td>5,500</td>
<td>Tendering</td>
<td>2020</td>
</tr>
<tr>
<td>UDC - The Pearl Qatar</td>
<td>Real estate</td>
<td>14,000</td>
<td>Execution</td>
<td>2020</td>
</tr>
<tr>
<td>UDC - The Pearl Qatar - Viva Bahriya</td>
<td>Real estate</td>
<td>2,500</td>
<td>Execution</td>
<td>2020</td>
</tr>
<tr>
<td>Ashghal - New Doha Zoo</td>
<td>Real estate</td>
<td>6.8</td>
<td>Planning</td>
<td>2020</td>
</tr>
<tr>
<td>QRail - Qatar Rail Network Program - Phase 2</td>
<td>Infrastructure</td>
<td>3,000</td>
<td>Designing</td>
<td>2021</td>
</tr>
<tr>
<td>QRail - Doha Metro - Phase 1</td>
<td>Infrastructure</td>
<td>15,500</td>
<td>Execution</td>
<td>2020</td>
</tr>
<tr>
<td>NDISAC - Hamad International Airport (HIA)</td>
<td>Infrastructure</td>
<td>21,000</td>
<td>Execution</td>
<td>2020</td>
</tr>
<tr>
<td>NDISAC - Qatar Airport City - Phase 1</td>
<td>Infrastructure</td>
<td>140</td>
<td>Planning</td>
<td>2022</td>
</tr>
<tr>
<td>Barwa Real Estate Company - Lusail City - Phase 2 - Fox Hills</td>
<td>Real Estate</td>
<td>1,200</td>
<td>Execution</td>
<td>2019</td>
</tr>
<tr>
<td>Doha College - Abu Hamour Campus</td>
<td>Real Estate</td>
<td>82.4</td>
<td>Planning</td>
<td>2019</td>
</tr>
<tr>
<td>Manateq - Qatar Economic Zones</td>
<td>Real Estate</td>
<td>651.9</td>
<td>Execution</td>
<td>2019</td>
</tr>
<tr>
<td>QGIRC - Mozoon Towers</td>
<td>Real Estate</td>
<td>687</td>
<td>Execution</td>
<td>2019</td>
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<tr>
<td></td>
<td>Project’s Name</td>
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<tr>
<td>---</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------</td>
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<tr>
<td>14</td>
<td>QRail - Doha Metro - Phase 1 - Green Line</td>
<td>Infrastructure</td>
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<td>Execution</td>
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<td>15</td>
<td>QRail - Doha Metro - Phase 1 - Msheireb Downtown Doha and Education City Stations</td>
<td>Infrastructure</td>
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<td>Execution</td>
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<td>16</td>
<td>QRail - Doha Metro - Phase 1 - Red Line North</td>
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<td>Execution</td>
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<td>Qatar 2022 Supreme Committee - 2022 Stadiums - Lusail Iconic Stadium</td>
<td>Real Estate</td>
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<td>Planning</td>
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<tr>
<td>20</td>
<td>Qatari Diar - Doha Exhibition and Convention Center - Phase 3</td>
<td>Real Estate</td>
<td>760</td>
<td>Planning</td>
</tr>
</tbody>
</table>
6. References

2. HSBC Global Research. 2015. “European Cable Manufacturers” (accessed in August 2016)
34. MDPS Annual Bulletin of Industry & Energy Statistics (2014)
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Qatar Development Bank (QDB) was founded by Emiri Decree to grow Qatar’s private sector and diversify its economy. His Highness Sheikh Hamad Bin Khalifa Al Thani, the Father Amir, identified these as vital tasks in developing Qatar into a modern state. Since its establishment in 1997, QDB has been at the forefront of these efforts. It has worked with thousands of Qatari entrepreneurs and enterprises and has provided investment and guidance to brand-new start-ups and well-established corporations. QDB has built a reputation for identifying promising investment opportunities. Its focus is on growing SMEs in key sectors by offering several services via a single window to support expected growth. Through smart, targeted financing products and advisory support services, QDB is nurturing a sound and sustainable knowledge-based economy for Qatar.

For more information
Doha, Qatar
P.O. Box 22789
Tel.: (974) 4430 0000
Fax.: (974) 4435 0433
Email: research@qdb.qa
Website: www.qdb.qa

(974) 5060 6013