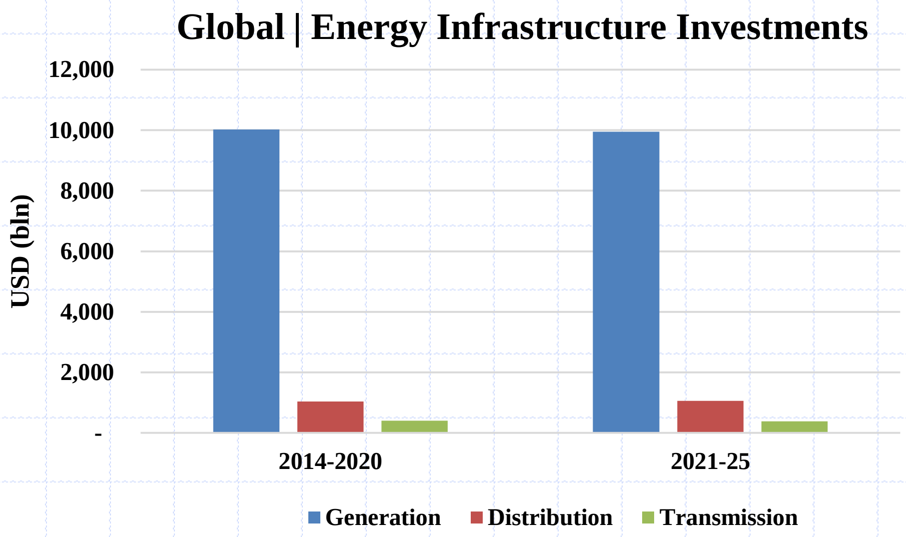
# Electrical Engineering

**December 2016**

# Global Energy Infrastructure Investments

- USD 6.8 trillion investment planned in global Transmission & Distribution till 2035
- 26% investment in Transmission & 74% investment in Distribution
- Asia contributes to 52% of future investments
- Major growth expected in the industry




| Global \| Investment in Energy Infrastructure, 2014-2035 (USD bln) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Transmission | | | Distribution | | | T&D |
| | Additions | Refurbishment | Total | Additions | Refurbishment | Total | Total |
| Asia | 689 | 229 | 918 | 1,759 | 877 | 2,636 | **3,554** |
| North America | 153 | 171 | 324 | 263 | 433 | 696 | **1,020** |
| Europe | 63 | 94 | 157 | 180 | 409 | 589 | **746** |
| Latin America | 96 | 31 | 127 | 216 | 92 | 308 | **435** |
| Africa | 115 | 20 | 135 | 240 | 46 | 286 | **421** |
| Oceania | 24 | 40 | 64 | 130 | 219 | 349 | **413** |
| Middle East | 45 | 16 | 61 | 131 | 34 | 165 | **226** |
| **Total** | 1,185 | 601 | 1,786 | 2,919 | 2,110 | 5,029 | **6,815** |

**Source: International Energy Agency – World Energy Investment Outlook 2014 -**
https://www.iea.org/publications/freepublications/publication/WEIO2014.pdf

# Pakistan | Electricity Production and Demand

- Supply deficit country
- Sustainable demand growth potential
- 14,716 MW capacity expected to be added in next 5 years

| | Actual | | |
|---|---|---|---|
| | Generation Capability (MW) | Demand during Peak Hours (MW) | Surplus / (Deficit) (MW) |
| FY10 | 12,751 | 18,467 | (5,716) |
| FY11 | 13,193 | 18,521 | (5,328) |
| FY12 | 12,320 | 18,940 | (6,620) |
| FY13 | 14,600 | 18,827 | (4,227) |
| FY14 | 16,170 | 20,576 | (4,406) |
| FY15 | 16,500 | 21,701 | (5,201) |
| | Projected | | |
| | Generation Capability (MW) | Demand during Peak Hours (MW) | Surplus / (Deficit) (MW) |
| FY16 | 17,551 | 22,457 | (4,906) |
| FY17 | 20,641 | 23,816 | (3,175) |
| FY18 | 25,077 | 25,140 | (63) |
| FY19 | 29,171 | 26,439 | 2,732 |
| FY20 | 31,216 | 27,725 | 3,491 |

**Source: State of Industry Report 2014-2015**
http://www.nepra.org.pk/industryreports.htm

# Pakistan | Infrastructure Investment Plan

| NTDC (including K-Electric) Grid Station Investment Plan | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Period | 500/220 kV Grids | | | | 220/132 kV Grids | | | |
| | No. | MVA Capacity | Expected COD | Estimated Investment PKR mln | No. | MVA Capacity | Expected COD | Estimated Investment PKR mln |
| **New Grid Station** | | | | | | | | |
| 2015-16 | 3 | 3,750 | 2016-17 | 20,399 | 8 | 5,750 | 2016-17 | 26,233 |
| 2016-17 | 1 | 1,500 | 2019-20 | 3,500 | | | | |
| **Extension** | | | | | | | | |
| 2015-16 | 1 | 430 | 2016-17 | 697 | - | - | - | - |
| **Addition/Reinforcement of Transfoermers at Overloaded Grid Stations** | | | | | | | | |
| 2015-16 | 1 | - | 2016-17 | 1,413 | - | - | - | - |
| 2016-17 | - | - | - | - | - | - | - | - |
| 2017-18 | - | - | - | - | 6 | 3,000 | 2019-20 | 16,400 |

| Description | Amount Injected (in USD mln) to Reinforce/Expand 220 KV K-Electric's Transmission System | | | | | | Investment Plan (in USD mln) to Reinforce/Expand 220 KV K-Electric's Transmission System | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2013-14 | | | 2014-15 | | | 2015-16 | | | 2016-17 | | |
| | FC | LC | Total | FC | LC | Total | FC | LC | Total | FC | LC | Total |
| Grid Stations | - | - | 671 | - | - | 1,568 | - | - | 38 | - | - | 48 |
| Transmission | - | - | 405 | - | - | 425 | - | - | 61 | - | - | 71 |
| SCADA | - | - | - | - | - | - | - | - | 10 | - | - | 12 |
| Reinforcement | - | - | 67 | - | - | 30 | - | - | 18 | - | - | 29 |
| **Total** | **-** | **-** | **1,143** | **-** | **-** | **2,023** | **-** | **-** | **126** | **-** | **-** | **160** |

FC: Foreign Currency
LC: Local Currency
SCADA: Supervisory control and data acquisition

**Source: State of Industry Report 2014-2015**
http://www.nepra.org.pk/industryreports.htm

# Pakistan | Electrical Engineering | Industry Players

| | Dec-12 | Dec-13 | Dec-14 | Dec-15 | 9MCY16 |
|---|---|---|---|---|---|
| Distribution Transformer | 46,017 | 43,693 | 22,297 | 24,504 | 34,800 |
| Power Transformer | 106 | 60 | 67 | 98 | 89 |
| Energy Meter | 821,747 | 939,817 | 1,803,756 | 1,116,652 | 2,238,515 |
| Swithgear | - | - | 33,244 | 25,032 | - |

**Market Shares of Switch Gears**

| | 2014 | 9MCY16 |
|---|---|---|
| PEL | 25% | 25% |
| Siddiq Sons | 20% | 20% |
| FICO | 18% | 18% |
| Schenider | 16% | 16% |
| Pem Pak | 11% | 11% |
| Seimens | 10% | 10% |
| Total | 100% | 100% |

**Market Shares of Distribution Transformers**

| | 2014 | 9MCY16 |
|---|---|---|
| PEL | 42% | 39% |
| Transfopower | 21% | 24% |
| Elmetec | 10% | 10% |
| JF Industries | 2% | 8% |
| Pan Power | 3% | 7% |
| Skypower | 0% | 7% |
| Others | 22% | 5% |
| Total | 100% | 100% |

**Market Shares of Power Transformers**

| | 2014 | 9MCY16 |
|---|---|---|
| PEL | 60% | 80% |
| Heavy Electrical Complex | 40% | 20% |
| Total | 100% | 100% |

**Market Shares of Energy Meters**

| | 2014 | 9MCY16 |
|---|---|---|
| Creative | 18% | 19% |
| Micro Tech | 7% | 16% |
| KBK | 18% | 15% |
| PEL | 25% | 13% |
| Accurate | 4% | 9% |
| Others | 28% | 28% |
| Total | 100% | 100% |

- PEL market leader in transformers & switch gears
- Presence of both foreign & domestic players
- Exit of Siemens from Distribution Transformers in CY15
- Decline in the share of PEL and Escorts in energy meters

Source: Industry Players

# Domestic Industry | Outlook

**Outlook | Positive**

**+ High investment in infrastructure**

**+ Significance of energy sector for growth**

**+ Demand growth potential is high**

**- Delay in planned increase of country’s generation capacity could slowdown development of transmission & distribution infrastructure**

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