GLOBAL TRANSMISSION AND DISTRIBUTION REPORT – INFRASTRUCTURE, UPCOMING PROJECTS, INVESTMENTS, KEY OPERATORS AND ANALYSIS TO 2020
Global Transmission Power Length to Reach XX Million Circuit Kilometers by 2020

In 2014, the electric power transmission network consisted of XX million Circuit kilometers (Ckm) of high-voltage transmission lines and had a capacity of XX million Mega Volt Amperes (MVA). In 2009, the total transmission line length was XX million Ckm, and between 2009 and 2014 it increased at a Compound Annual Growth Rate (CAGR) of XX%. Most of the power capacity addition was in renewable technology. Installed wind power capacity increased at a CAGR of XX% from XX Gigawatts (GW) to XX GW, between 2009 and 2014. In the 2015–2020 forecast period, it is expected to increase at a CAGR XX%. Increase in power capacity will be one of the reasons for transmission length additions. The transmission line length is expected to increase at a CAGR of XX%, reaching XX million Ckm in 2020.

China to Add Half of Global Transmission Line in Forecast Period

China’s transmission length increased from XX thousand Circuit kilometers (Ckm) to XX thousand Ckm, at a CAGR of XX%, between 2009 and 2014. In the forecast period, it is expected to increase at a CAGR of XX%, reaching XX thousand Ckm in 2020. It is forecasted that China will add XX thousand Ckm between 2015 and 2020, equivalent to XX% of the total transmission line added in the forecast period. India, Brazil, Russia, the US, Iran, Indonesia, Saudi Arabia, Vietnam and Algeria complete the list of the 10 countries with the highest transmission line additions in the forecast period, adding XX%, XX%, XX%, XX%, XX%, XX%, XX% and XX%, respectively.

T&D Infrastructure in Asia-Pacific, Middle-East and Africa Managed by State-Owned Companies

In China, the transmission sector is dominated by two state-owned agencies: the State Grid Corporation of China (SGCC) and China Southern Power Grid (CSG). China’s national grid consists of six regional grids. The SGCC deals with the east, central, northwest, and northeast grids, and CSG operates in areas not covered by the SGCC. India’s electricity generation and T&D activities are mainly managed by central and state-level government companies. The majority of power transmission is managed by PowerGrid, a central government enterprise. In Saudi Arabia, Saudi Electricity Company (SEC) dominates the power sector and, through its wholly owned subsidiary National Grid, provides most of its generation and all of its transmission. In South Africa, the electricity structure is mainly government-controlled and is dominated by the vertically integrated power utility Eskom, which generates, transmits and retails power. Private participation in its electricity sector is negligible.
# Table of Contents

## 1 Table of Contents

1. Table of Contents ....................................................................................................................... 4

1.1 List of Tables .................................................................................................................... 11

1.2 List of Figures ................................................................................................................... 14

## 2 Transmission and Distribution Market, Global ........................................................................... 18

2.1 Power Generation Infrastructure, Global ........................................................................... 18

2.1.1 Power Generation Infrastructure, Global, Cumulative Installed Capacity, 2009–2020 ... 18

2.1.2 Power Generation Infrastructure, Global, Cumulative Installed Capacity by Country, 2014 ............................................................................................................................. 20

2.1.3 Power Generation Infrastructure, Global, Net Capacity Addition by Country, 2015–2020 ..................................................................................................................................... 22

2.2 Transmission Infrastructure, Global ................................................................................... 24

2.2.1 Transmission Infrastructure, Global, Length and Capacity, 2009–2020 ................................. 24

2.2.2 Transmission Infrastructure, Global, Top Countries by Length and Capacity, 2014 ...... 25

2.2.3 Transmission Infrastructure, Global, Increase in Transmission Line Length, 2015–2020 ..................................................................................................................................... 27

2.2.4 Transmission Industry, Global, Investments, 2009–2020............................................. 29

2.3 Distribution Infrastructure, Global ...................................................................................... 31

2.3.1 Distribution Infrastructure, Global, Length and Capacity, 2009–2020 ............................ 31

## 3 Transmission and Distribution Market, China ............................................................................ 33

3.1 Power Generation Infrastructure, China, Overview ........................................................... 33

3.1.1 Power Generation Infrastructure, China, Installed Capacity, 2009–2020 ....................... 33

3.1.2 Power Market, China, Macro Indicators, 2009–2014 ......................................................... 34

3.2 Transmission Infrastructure, China .................................................................................... 36

3.2.1 Transmission Infrastructure, China, Capacity, 2009–2020 ............................................. 36

3.2.2 Transmission Infrastructure, China, Length, 2009–2020 ................................................. 37

3.2.3 Transmission Infrastructure, China, Substations, 2009–2020 ........................................ 39

3.2.4 Transmission Infrastructure, China, Key Upcoming Transmission Projects, 2015 ...... 41
# Table of Contents

## 3.3 Distribution Infrastructure, China

3.3.1 Distribution Infrastructure, China, Capacity, 2009–2020 ........................................... 42
3.3.2 Distribution Infrastructure, China, Length, 2009–2020 ................................................ 44
3.3.3 Distribution Infrastructure, China, Substations, 2009–2020 ........................................ 45

## 3.4 Transmission Industry, China, Investments, 2009–2020 ................................................ 47

## 3.5 Transmission and Distribution Industry, China, Industry Analysis ................................. 49

## 3.6 Transmission and Distribution Industry, China, Key System Operators ......................... 49

## 3.7 Transmission and Distribution Industry, China, Major Government Initiatives ............... 50

3.7.1 Power Sector Restructuring and Privatization .............................................................. 50
3.7.2 Initiatives in Power Grid Infrastructure ........................................................................ 50
3.7.3 Technical Rule for Connecting Wind Farms to the Power Network .............................. 51
3.7.4 China’s Ultra High Voltage Transmission Project ......................................................... 51

## 4 Transmission and Distribution Market, India ...................................................................... 52

4.1 Power Generation Infrastructure, India, Overview .......................................................... 52
4.1.1 Power Generation Infrastructure, India, Installed Capacity, 2009–2020 ....................... 52
4.1.2 Power Market, India, Macro Indicators, 2009–2014 .................................................... 53

## 4.2 Transmission Infrastructure, India .................................................................................. 55

4.2.1 Transmission Infrastructure, India, Capacity, 2009–2020 ............................................. 55
4.2.2 Transmission Infrastructure, India, Length, 2009–2020 ................................................. 56
4.2.3 Transmission Infrastructure, India, Substations, 2009–2020 ........................................ 58
4.2.4 Transmission Infrastructure, India, Key Upcoming Transmission Projects, 2015 ......... 60
4.2.5 Transmission Infrastructure, India, Key Upcoming Interconnection Projects, 2015 ....... 61

## 4.3 Distribution Infrastructure, India ..................................................................................... 62

4.3.1 Distribution Infrastructure, India, Capacity, 2009–2020 ............................................... 62

## 4.4 Transmission Industry, India, Investments, 2009–2020 ................................................ 64

## 4.5 Transmission and Distribution Industry, India, Industry Analysis ............................... 66

## 4.6 Transmission and Distribution Industry, India, Key System Operators ........................ 66
# Table of Contents

4.7 Transmission and Distribution Industry, India, Major Government Initiatives ...............67  
4.7.1 Electricity Act, 2003 .......................................................................................................67  
4.7.2 Extension of Power for All by 2012 Plan .................................................................69  
4.7.3 Rural Electrification Program .....................................................................................69  
4.7.4 Policies for Foreign Investment in the Power Market ................................................70  
4.7.5 Investment Laws and Regulations Affecting Private Players .....................................70

5 Transmission and Distribution Market, Germany ............................................................72  
5.1 Power Generation Infrastructure, Germany, Overview ..............................................72  
5.1.1 Power Generation Infrastructure, Germany, Installed Capacity, 2009–2020 ............72  
5.1.2 Power Market, Germany, Macro Indicators, 2009–2014 ........................................74

5.2 Transmission Infrastructure, Germany ........................................................................75  
5.2.1 Transmission Infrastructure, Germany, Capacity, 2009–2020 ....................................75  
5.2.2 Transmission Infrastructure, Germany, Length, 2009–2020 ......................................77  
5.2.3 Transmission Infrastructure, Germany, Substations, 2009–2020 .............................78  
5.2.4 Transmission Infrastructure, Germany, Key Upcoming Transmission Projects, 2015 ...80  
5.2.5 Transmission Infrastructure, Germany, Key Interconnection Projects, 2015 ............81

5.3 Distribution Infrastructure, Germany ...........................................................................82  
5.3.1 Distribution Infrastructure, Germany, Length, 2009–2020 ........................................82

5.4 Transmission Industry, Germany, Investments, 2009–2020 ......................................84

5.5 Transmission and Distribution Industry, Germany, Industry Analysis .......................86

5.6 Transmission and Distribution Industry, Germany, Key System Operators ...............86

5.7 Transmission and Distribution Industry, Germany, Government Initiatives ...............87  
5.7.1 Target Grid 2050 ........................................................................................................87  
5.7.2 Utility Restructuring ..................................................................................................87

6 Transmission and Distribution Market, UK .......................................................................88  
6.1 Power Generation Infrastructure, UK, Overview .........................................................88  
# Table of Contents

6.1.2 Power Market, UK, Macro Indicators, 2009–2014 .............................................................. 90
6.2 Transmission Infrastructure, UK ........................................................................................... 91
6.2.1 Transmission Infrastructure, UK, Length, 2009–2020 ..................................................... 91
6.2.2 Transmission Infrastructure, UK, Substations, 2009–2020 ........................................... 93
6.2.3 Transmission Infrastructure, UK, Key Upcoming Transmission Projects, 2015 ............. 95
6.2.4 Transmission Infrastructure, UK, Key Upcoming Interconnection Projects, 2015 ............ 96
6.3 Distribution Infrastructure, UK ........................................................................................... 96
6.3.1 Distribution Infrastructure, UK, Length, 2009–2020 ..................................................... 96
6.5 Transmission and Distribution Industry, UK, Industry Analysis ........................................ 100
6.6 Transmission and Distribution Industry, UK, Key System Operators ............................ 100
6.7 Transmission and Distribution Industry, UK, Government Initiatives ............................ 101
7 Transmission and Distribution Market, US .......................................................................... 102
  7.1 Power Generation Infrastructure, US, Overview .............................................................. 102
    7.1.2 Power Market, US, Macro Indicators, 2009–2014 .................................................. 104
  7.2 Transmission Infrastructure, US .................................................................................... 105
    7.2.1 Transmission Infrastructure, US, Capacity, 2009–2020 ............................................ 105
    7.2.2 Transmission Infrastructure, US, Length, 2009–2020 ............................................. 106
    7.2.3 Transmission Infrastructure, US, Substations, 2009–2020 ....................................... 108
    7.2.4 Transmission Infrastructure, US, Key Upcoming Transmission Projects, 2015 ......... 110
    7.2.5 Transmission Infrastructure, US, Key Upcoming Interconnection Projects, 2015 ....... 111
  7.3 Distribution Infrastructure, US ....................................................................................... 111
    7.3.1 Distribution Infrastructure, US, Length, 2009–2020 ................................................ 111
  7.4 Transmission Industry, US, Investments, 2009–2020 ...................................................... 113
  7.5 Transmission and Distribution Industry, US, Industry Analysis ........................................ 115
  7.6 Transmission and Distribution Industry, US, Key System Operators ............................ 115
# Table of Contents

7.7 Transmission and Distribution Industry, US, Government Initiatives .......................................................... 116
  7.7.1 Energy Policy Act 2005 ......................................................................................................................... 116
  7.7.2 US Department of Energy – Loan Guarantee Program ........................................................................... 117
  7.7.3 Interconnection Standards ................................................................................................................... 117
  7.7.4 Net Metering Laws .......................................................................................................................... 118

8 Transmission and Distribution Market, Brazil ............................................................................................... 119
  8.1 Power Generation Infrastructure, Brazil, Overview .................................................................................. 119
    8.1.1 Power Generation Infrastructure, Brazil, Installed Capacity, 2009–2020 ........................................ 119
    8.1.2 Power Market, Brazil, Macro Indicators, 2009–2014 ...................................................................... 120
  8.2 Transmission Infrastructure, Brazil .......................................................................................................... 122
    8.2.1 Transmission Infrastructure, Brazil, Capacity, 2009–2020 ............................................................... 122
    8.2.2 Transmission Infrastructure, Brazil, Length, 2009–2020 ................................................................. 123
    8.2.3 Transmission Infrastructure, Brazil, Substations, 2009–2020 ......................................................... 125
    8.2.4 Transmission Infrastructure, Brazil, Key Upcoming Interconnection Projects, 2015................. 126
  8.3 Distribution Infrastructure, Brazil ........................................................................................................... 127
    8.3.1 Distribution Infrastructure, Brazil, Length, 2009–2020 ................................................................. 127
  8.4 Transmission Industry, Brazil, Investments, 2009–2020 ....................................................................... 129
  8.5 Transmission and Distribution Industry, Brazil, Industry Analysis ..................................................... 131
  8.6 Transmission and Distribution Industry, Brazil, Key System Operators ............................................. 131
  8.7 Transmission and Distribution Industry, Brazil, Government Initiatives ........................................... 132
    8.7.1 New Model Electricity Law ............................................................................................................. 132
    8.7.2 The Inova Program ......................................................................................................................... 133

9 Transmission and Distribution Market, Saudi Arabia ................................................................................... 135
  9.1 Power Generation Infrastructure, Saudi Arabia, Overview .................................................................. 135
    9.1.2 Power Market, Saudi Arabia, Macro Indicators, 2009–2014 ...................................................... 136
  9.2 Transmission Infrastructure, Saudi Arabia ............................................................................................. 138
## Global Transmission and Distribution Report – Infrastructure, Upcoming Projects, Investments, Key Operators and Analysis to 2020

### Table of Contents

9.2.1 Transmission Infrastructure, Saudi Arabia, Capacity, 2009–2020................................. 138
9.2.2 Transmission Infrastructure, Saudi Arabia, Length, 2009–2020........................................... 139
9.2.3 Transmission Infrastructure, Saudi Arabia, Substations, 2009–2020................................. 141
9.2.4 Transmission Infrastructure, Saudi Arabia, Key Upcoming Interconnection Projects, 2015 .......................................................... 142
9.3 Distribution Infrastructure, Saudi Arabia................................................................................. 143
  9.3.1 Distribution Infrastructure, Saudi Arabia, Capacity, 2009–2020........................................ 143
  9.3.2 Distribution Infrastructure, Saudi Arabia, Length, 2009–2020......................................... 145
9.4 Transmission Industry, Saudi Arabia, Investments, 2009–2020 ............................................ 147
9.5 Transmission and Distribution Industry, Saudi Arabia, Industry Analysis............................ 149
9.6 Transmission and Distribution Industry, Saudi Arabia, Key System Operators...................... 149
9.7 Transmission and Distribution Industry, Saudi Arabia, Regulations........................................ 150
  9.7.1 The Electricity Law ........................................................................................................ 150
  9.7.2 Private Participation and Reforms ................................................................................. 150
10 Transmission and Distribution Market, South Africa................................................................. 152
  10.1 Power Generation Infrastructure, South Africa, Overview.................................................. 152
    10.1.1 Power Generation Infrastructure, South Africa, Installed Capacity, 2009–2020............ 152
    10.1.2 Power Market, South Africa, Macro Indicators, 2009–2014 ...................................... 153
  10.2 Transmission Infrastructure, South Africa........................................................................... 155
    10.2.1 Transmission Infrastructure, South Africa, Capacity, 2009–2020................................. 155
    10.2.2 Transmission Infrastructure, South Africa, Length, 2009–2020..................................... 157
    10.2.3 Transmission Infrastructure, South Africa, Interconnection Projects, 2015............... 158
  10.3 Distribution Infrastructure, South Africa............................................................................... 158
    10.3.1 Distribution Infrastructure, South Africa, Capacity, 2009–2020.................................... 158
    10.3.2 Distribution Infrastructure, South Africa, Length, 2009–2020...................................... 160
  10.4 Transmission Industry, South Africa, Investments, 2009–2020........................................... 163
  10.5 Transmission and Distribution Industry, South Africa, Industry Analysis.......................... 165
  10.6 Transmission and Distribution Industry, South Africa, Key System Operators.................... 165
# Table of Contents

10.7  Transmission and Distribution Industry, South Africa, Regulations .......................... 166
10.7.1 Transmission Network, Development Plan, 2013–2020 ........................................ 166
10.7.2 Integrated National Electrification Plan ............................................................... 170
10.7.3 Independent System and Market Operator Bill .................................................... 171
10.7.4 New Build Program ............................................................................................ 171

11  Appendix .................................................................................................................. 173
11.1 Abbreviations ......................................................................................................... 173
11.2 Bibliography ........................................................................................................... 174
11.3 Definitions .............................................................................................................. 175
11.3.1 Power ................................................................................................................ 175
11.3.2 Installed Capacity .............................................................................................. 175
11.3.3 Electricity Generation ....................................................................................... 175
11.3.4 Renewable Energy Resources ....................................................................... 175
11.4 Methodology .......................................................................................................... 175
11.4.1 Coverage .......................................................................................................... 176
11.4.2 Secondary Research ......................................................................................... 176
11.4.3 Primary Research ............................................................................................. 177
11.4.4 Modeling and Forecasting .............................................................................. 177
11.4.5 Data on Macro Indicators ............................................................................... 177
11.4.6 Investments in Transmission Infrastructure ..................................................... 177
11.5 Disclaimer .............................................................................................................. 178
# Table of Contents

## 1.1 List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1:</td>
<td>Power Generation Infrastructure, Global, Installed Capacity (GW), 2009–2020</td>
<td>19</td>
</tr>
<tr>
<td>Table 2:</td>
<td>Power Generation Infrastructure, Global, Installed Capacity by Country (GW), 2014</td>
<td>21</td>
</tr>
<tr>
<td>Table 3:</td>
<td>Power Generation Infrastructure, Global, Net Capacity Addition by Country (GW), 2015–2020</td>
<td>23</td>
</tr>
<tr>
<td>Table 4:</td>
<td>Transmission Infrastructure, Global, Length (million Ckm) and Capacity (million MVA), 2009–2020</td>
<td>25</td>
</tr>
<tr>
<td>Table 5:</td>
<td>Transmission Infrastructure, Global, Length (’000 Ckm) and Capacity (’000 MVA) Addition by Country, 2015–2020</td>
<td>27</td>
</tr>
<tr>
<td>Table 6:</td>
<td>Transmission Infrastructure, Global, Line Addition (’000 Ckm), 2015–2020</td>
<td>29</td>
</tr>
<tr>
<td>Table 7:</td>
<td>Transmission Industry, Global, Investment ($bn), 2009–2020</td>
<td>30</td>
</tr>
<tr>
<td>Table 8:</td>
<td>Distribution Infrastructure, Global, Length (million Ckm) and Capacity (million MVA), 2009–2020</td>
<td>32</td>
</tr>
<tr>
<td>Table 9:</td>
<td>Power Generation Infrastructure, China, Installed Capacity (GW), 2009–2020</td>
<td>34</td>
</tr>
<tr>
<td>Table 10:</td>
<td>Power Market, China, Macro Indicators (TWh), 2009–2014</td>
<td>35</td>
</tr>
<tr>
<td>Table 11:</td>
<td>Transmission Infrastructure, China, Capacity (’000 MVA), 2009–2020</td>
<td>37</td>
</tr>
<tr>
<td>Table 12:</td>
<td>Transmission Infrastructure, China, Length (’000 Ckm), 2009–2020</td>
<td>38</td>
</tr>
<tr>
<td>Table 13:</td>
<td>Transmission Infrastructure, China, Number of Substations (’000), 2009–2020</td>
<td>40</td>
</tr>
<tr>
<td>Table 14:</td>
<td>Transmission Infrastructure, China, Key Upcoming Transmission Projects, 2015</td>
<td>41</td>
</tr>
<tr>
<td>Table 15:</td>
<td>Distribution Infrastructure, China, Capacity (’000 MVA), 2009–2020</td>
<td>43</td>
</tr>
<tr>
<td>Table 16:</td>
<td>Distribution Infrastructure, China, Length (’000 Ckm), 2009–2020</td>
<td>45</td>
</tr>
<tr>
<td>Table 17:</td>
<td>Distribution Infrastructure, China, Number of Substations (’000), 2009–2020</td>
<td>46</td>
</tr>
<tr>
<td>Table 18:</td>
<td>Transmission Industry, China, Investment ($bn), 2009–2020</td>
<td>48</td>
</tr>
<tr>
<td>Table 19:</td>
<td>Power Generation Infrastructure, India, Installed Capacity (GW), 2009–2020</td>
<td>53</td>
</tr>
<tr>
<td>Table 20:</td>
<td>Electricity Profile, India, Macro Indicators (TWh), 2009–2014</td>
<td>54</td>
</tr>
<tr>
<td>Table 21:</td>
<td>Transmission Infrastructure, India, Capacity (’000 MVA), 2009–2020</td>
<td>56</td>
</tr>
<tr>
<td>Table 22:</td>
<td>Transmission Infrastructure, India, Length (’000 Ckm), 2009–2020</td>
<td>57</td>
</tr>
</tbody>
</table>
Table of Contents

Table 23: Transmission Infrastructure, India, Number of Substations ('000), 2009–2020 ......................... 59
Table 24: Transmission Infrastructure, India, Key Upcoming Transmission Projects, 2015 ......................... 60
Table 25: Distribution Infrastructure, India, Capacity ('000 MVA), 2009–2020 ........................................ 63
Table 26: Transmission and Distribution Industry, India, Investment ($bn), 2009–2020 ......................... 65
Table 27: Power Generation Infrastructure, Germany, Installed Capacity (GW), 2009–2020 .................. 73
Table 28: Power Market, Germany, Macro Indicators (TWh), 2009–2014 .............................................. 74
Table 29: Transmission Infrastructure, Germany, Capacity ('000 MVA), 2009–2020 ............................ 76
Table 30: Transmission Infrastructure, Germany, Length (Ckm), 2009–2020 ....................................... 78
Table 31: Transmission Infrastructure, Germany, Number of Substations ('000), 2009–2020 ............... 79
Table 32: Transmission Infrastructure, Germany, Key Upcoming Transmission Projects, 2015 ............ 80
Table 33: Distribution Infrastructure, Germany, Length ('000 Ckm), 2009–2020 .................................. 83
Table 34: Transmission Industry, Germany, Investment ($bn), 2009–2020 .......................................... 85
Table 35: Power Generation Infrastructure, UK, Installed Capacity (GW), 2009–2020 ....................... 89
Table 36: Power Market, UK, Macro Indicators (TWh), 2009–2014 ...................................................... 91
Table 37: Transmission Infrastructure, UK, Length ('000 Ckm), 2009–2020 ........................................ 92
Table 38: Transmission Infrastructure, UK, Number of Substations, 2009–2020 ............................... 94
Table 39: Transmission Infrastructure, UK, Key Upcoming Transmission Projects, 2015 ..................... 95
Table 40: Distribution Infrastructure, UK, Length ('000 Ckm), 2009–2020 ......................................... 97
Table 41: Transmission Industry, UK, Investment ($bn), 2009–2020 .................................................... 99
Table 42: Power Generation Infrastructure, US, Installed Capacity (GW), 2009–2020 ......................... 103
Table 43: Power Market, US, Macro Indicators (TWh), 2009–2014 ...................................................... 104
Table 44: Transmission Infrastructure, US, Capacity ('000 MVA), 2009–2020 ....................................... 106
Table 45: Transmission Infrastructure, US, Length ('000 Ckm), 2009–2020 ......................................... 107
Table 46: Transmission Infrastructure, US, Number of Substations ('000), 2009–2020 ....................... 109
## Table of Contents

Table 47: Transmission Infrastructure, US, Key Upcoming Transmission Projects, 2015 .................................. 110
Table 48: Distribution Infrastructure, US, Length (million Ckm), 2009–2020 .................................................. 112
Table 49: Transmission Industry, US, Investment ($bn), 2009–2020 ................................................................. 114
Table 50: Power Generation Infrastructure, Brazil, Installed Capacity (GW), 2009–2020 .......................... 120
Table 51: Power Market, Brazil, Macro Indicators (TWh), 2009–2014 ............................................................... 121
Table 52: Transmission Infrastructure, Brazil, Capacity ('000 MVA), 2009–2020 ........................................... 123
Table 53: Transmission Infrastructure, Brazil, Length ('000 Ckm), 2009–2020 ................................................ 124
Table 54: Transmission Infrastructure, Brazil, Number of Substations, 2009–2020 ....................................... 126
Table 55: Distribution Infrastructure, Brazil, Length (million Ckm), 2009–2020 ............................................. 128
Table 56: Transmission Industry, Brazil, Investment ($bn), 2009–2020 .......................................................... 130
Table 57: Power Generation Infrastructure, Saudi Arabia, Installed Capacity (GW), 2009–2020 ............... 136
Table 58: Power Market, Saudi Arabia, Macro Indicators (TWh), 2009–2014 .................................................. 137
Table 59: Transmission Infrastructure, Saudi Arabia, Capacity ('000 MVA), 2009–2020 ............................ 139
Table 60: Transmission Infrastructure, Saudi Arabia, Length ('000 Ckm), 2009–2020 ................................. 140
Table 61: Transmission Infrastructure, Saudi Arabia, Number of Substations, 2009–2020 ....................... 142
Table 62: Power Market, Saudi Arabia, Planned Interconnection Projects, 2014–2019 .............................. 143
Table 63: Distribution Infrastructure, Saudi Arabia, Capacity ('000 MVA), 2009–2020 .............................. 144
Table 64: Distribution Infrastructure, Saudi Arabia, Length ('000 Ckm), 2009–2020 ................................. 146
Table 65: Transmission Industry, Saudi Arabia, Investment ($bn), 2009–2020 .............................................. 148
Table 66: Power Generation Infrastructure, South Africa, Installed Capacity (GW), 2009–2020 ............. 153
Table 67: Power Market, South Africa, Macro Indicators (TWh), 2009–2014 ................................................. 154
Table 68: Transmission Infrastructure, South Africa, Capacity ('000 MVA), 2009–2020 ........................... 156
Table 69: Transmission Infrastructure, South Africa, Length ('000 Ckm), 2009–2020 .............................. 158
Table 70: Distribution Infrastructure, South Africa, Capacity ('000 MVA), 2009–2020 .............................. 160
Table of Contents

Table 71: Distribution Infrastructure, South Africa, Length (’000 Ckm), 2009–2020 ........................................ 162
Table 72: Transmission Industry, South Africa, Investment ($bn), 2009–2020 ...................................................... 164
Table 73: Power Market, South Africa, Transmission Development Plan, 2013–2022 ....................................... 167
Table 74: Power Market, South Africa, Eastern Province, Major New Grid Assets, 2013–2022 ......................... 168
Table 75: Power Market, South Africa, Northern Province, Major New Grid Assets, 2013–2022 .................. 169
Table 76: Power Market, South Africa, West Province, Major New Grid Assets, 2013–2022 ....................... 170
Table 77: Abbreviations .................................................................................................................................. 173

1.2 List of Figures

Figure 1: Power Generation Infrastructure, Global, Installed Capacity (GW), 2009–2020 ............................... 19
Figure 2: Power Generation Infrastructure, Global, Installed Capacity by Country (GW), 2014 .................... 20
Figure 3: Power Generation Infrastructure, Global, Net Capacity Addition by Country (GW), 2015–2020 .... 22
Figure 4: Transmission Infrastructure, Global, Length (million Ckm) and Capacity (million MVA), 2009–2020 ........................................................................................................................................... 24
Figure 5: Transmission Infrastructure, Global, Length (’000 Ckm) and Capacity (’000 MVA) Addition by Country, 2015–2020 .......................................................... 26
Figure 6: Transmission Infrastructure, Global, Line Addition (’000 Ckm), 2015–2020 ................................. 28
Figure 7: Transmission Industry, Global, Investment ($bn), 2009–2020 ......................................................... 30
Figure 8: Distribution Infrastructure, Global, Length (million Ckm) and Capacity (million MVA) by Country, 2009–2020 .................................................................................................................................. 31
Figure 9: Power Generation Infrastructure, China, Installed Capacity (GW), 2009–2020 ......................... 33
Figure 10: Power Market, China, Macro Indicators (TWh), 2009–2014 ......................................................... 35
Figure 11: Transmission Infrastructure, China, Capacity (’000 MVA), 2009–2020 .................................... 36
Figure 12: Transmission Infrastructure, China, Length (’000 Ckm), 2009–2020 .................................. 38
Figure 13: Transmission Infrastructure, China, Number of Substations (’000), 2009–2020 .................... 39
Table of Contents

Figure 14: Distribution Infrastructure, China, Capacity (‘000 MVA), 2009–2020 ........................................... 43
Figure 15: Distribution Infrastructure, China, Length (‘000 Ckm), 2009–2020 ............................................. 44
Figure 16: Distribution Infrastructure, China, Number of Substations (‘000), 2009–2020 ............................. 46
Figure 17: Transmission Industry, China, Investment ($bn), 2009–2020 .......................... 47
Figure 18: Transmission and Distribution Industry, China, Industry Analysis .......................... 49
Figure 19: Power Generation Infrastructure, India, Installed Capacity (GW), 2009–2020 ........... 52
Figure 20: Power Market, India, Macro Indicators (TWh), 2009–2014 ........................................... 54
Figure 21: Transmission Infrastructure, India, Capacity (‘000 MVA), 2009–2020 .......................... 55
Figure 22: Transmission Infrastructure, India, Length (‘000 Ckm), 2009–2020 .................................. 57
Figure 23: Transmission Infrastructure, India, Number of Substations (‘000), 2009–2020 .............. 58
Figure 24: Distribution Infrastructure, India, Capacity (‘000 MVA), 2009–2020 .......................... 62
Figure 25: Transmission and Distribution Industry, India, Investment ($bn), 2009–2020 .......... 64
Figure 26: Transmission and Distribution Industry, India, Industry Analysis .......................... 66
Figure 27: Power Generation Infrastructure, Germany, Installed Capacity (GW), 2009–2020 ........... 73
Figure 28: Power Market, Germany, Macro Indicators (TWh), 2009–2014 .......................... 74
Figure 29: Transmission Infrastructure, Germany, Capacity (‘000 MVA), 2009–2020 ................. 76
Figure 30: Transmission Infrastructure, Germany, Length (‘000 Ckm), 2009–2020 ...................... 77
Figure 31: Transmission Infrastructure, Germany, Number of Substations (‘000), 2009–2020 ........ 79
Figure 32: Distribution Infrastructure, Germany, Length (‘000 Ckm), 2009–2020 ......................... 83
Figure 33: Transmission Industry, Germany, Investment ($bn), 2009–2020 .......................... 84
Figure 34: Transmission and Distribution Industry, Germany, Industry Analysis ................. 86
Figure 35: Power Generation Infrastructure, UK, Installed Capacity (GW), 2009–2020 ............. 89
Figure 36: Power Market, UK, Macro Indicators (TWh), 2009–2014 ........................................... 90
Figure 37: Transmission Infrastructure, UK, Length (‘000 Ckm), 2009–2020 .......................... 92
Table of Contents

Figure 38: Transmission Infrastructure, UK, Number of Substations, 2009–2020 ................................................. 93
Figure 39: Distribution Infrastructure, UK, Length (‘000 Ckm), 2009–2020 .............................................................. 97
Figure 40: Transmission Industry, UK, Investment ($bn), 2009–2020 ................................................................. 98
Figure 41: Transmission and Distribution Industry, UK, Industry Analysis ......................................................... 100
Figure 42: Power Generation Infrastructure, US, Installed Capacity (GW), 2009–2020 ........................................ 103
Figure 43: Power Market, US, Macro Indicators (TWh), 2009–2014 .............................................................. 104
Figure 44: Transmission Infrastructure, US, Capacity (‘000 MVA), 2009–2020 .................................................. 105
Figure 45: Transmission Infrastructure, US, Length (‘000 Ckm), 2009–2020 .................................................. 107
Figure 46: Transmission Infrastructure, US, Number of Substations (‘000), 2009–2020 ..................................... 108
Figure 47: Distribution Infrastructure, US, Length (million Ckm), 2009–2020 ................................................ 112
Figure 48: Transmission Industry, US, Investment ($bn), 2009–2020 .............................................................. 113
Figure 49: Transmission and Distribution Industry, US, Industry Analysis ....................................................... 115
Figure 50: Power Generation Infrastructure, Brazil, Installed Capacity (GW), 2009–2020 ..................................... 119
Figure 51: Power Market, Brazil, Macro Indicators (TWh), 2009–2020 ............................................................ 121
Figure 52: Transmission Infrastructure, Brazil, Capacity (‘000 MVA), 2009–2020 ............................................ 122
Figure 53: Transmission Infrastructure, Brazil, Length (‘000 Ckm), 2009–2020 ................................................ 124
Figure 54: Transmission Infrastructure, Brazil, Number of Substations, 2009–2020 ....................................... 125
Figure 55: Distribution Infrastructure, Brazil, Length (million Ckm), 2009–2020 ............................................ 128
Figure 56: Transmission Industry, Brazil, Investment ($bn), 2009–2020 .......................................................... 129
Figure 57: Transmission and Distribution Industry, Brazil, Industry Analysis ......................................................... 131
Figure 58: Power Generation Infrastructure, Saudi Arabia, Installed Capacity (GW), 2009–2020 ..................... 135
Figure 59: Power Market, Saudi Arabia, Macro Indicators (TWh), 2009–2014 .................................................. 137
Figure 60: Transmission Infrastructure, Saudi Arabia, Capacity (‘000 MVA), 2009–2020 ................................. 138
Figure 61: Transmission Infrastructure, Saudi Arabia, Length (‘000 Ckm), 2009–2020 ........................................ 140
Table of Contents

Figure 62: Transmission Infrastructure, Saudi Arabia, Number of Substations, 2009–2020 .......................... 141
Figure 63: Distribution Infrastructure, Saudi Arabia, Capacity (’000 MVA), 2009–2020 ............................ 144
Figure 64: Distribution Infrastructure, Saudi Arabia, Length (’000 Ckm), 2009–2020 .............................. 145
Figure 65: Transmission Industry, Saudi Arabia, Investment ($bn), 2009–2020 ................................. 147
Figure 66: Transmission and Distribution Industry, Saudi Arabia, Industry Analysis ......................... 149
Figure 67: Power Generation Infrastructure, South Africa, Installed Capacity (GW), 2009–2020 ............... 152
Figure 68: Power Market, South Africa, Macro Indicators (TWh), 2009–2014 ........................................ 154
Figure 69: Transmission Infrastructure, South Africa, Capacity (’000 MVA), 2009–2020 ........................ 156
Figure 70: Transmission Infrastructure, South Africa, Length (’000 Ckm), 2009–2020 ......................... 157
Figure 71: Distribution Infrastructure, South Africa, Capacity (’000 MVA), 2009–2020 ......................... 159
Figure 72: Distribution Infrastructure, South Africa, Length (’000 Ckm), 2009–2020 ............................ 161
Figure 73: Transmission Industry, South Africa, Investment ($bn), 2009–2020 ................................. 163
Figure 74: Transmission and Distribution Industry, South Africa, Industry Analysis ........................... 165
2 Transmission and Distribution Market, Global

2.1 Power Generation Infrastructure, Global

2.1.1 Power Generation Infrastructure, Global, Cumulative Installed Capacity, 2009–2020

Thermal power is the dominant source of energy in most countries. In order to reduce the environmental impact of burning fossil fuels, governments across the world are encouraging research and development and rolling out policies and schemes that either incentivize or make mandatory the adoption of integrated gasification combined cycle, combined cycle gas turbine, carbon capture and sequestration and combined heat and power technologies.

Thermal power is the most reliable source of power, as it is produced at a higher capacity factor. Though it harms the environment, moving away completely from thermal power would jeopardize energy security. Renewable plants have lower capacity factors, and renewable resources are intermittent in nature. For example, large hydropower generation is severely affected by droughts. Even nuclear power, which is a clean and efficient resource, is not considered a desirable option after the Fukushima meltdown.

In terms of capacity, thermal power is the largest source of electricity in the world, followed by, in descending order, hydro, nuclear, and wind power. Between 2009 and 2014, global installed thermal capacity increased from XX Gigawatts (GW) to XX GW, at a Compound Annual Growth Rate (CAGR) of XX%. In the forecast period, it is expected to increase at a CAGR of XX%, reaching XX GW in 2020. Installed hydropower capacity increased at a CAGR of XX% from XX GW to XX GW, between 2009 and 2014. It is expected to increase at a CAGR of XX% in the forecast period, reaching XX GW in 2020. Installed nuclear capacity increased at a CAGR of XX% from XX GW to XX GW, between 2009 and 2014. It is expected to increase at a CAGR of XX% in the forecast period, reaching XX GW in 2020. Installed wind capacity increased at a CAGR of XX% from XX GW to XX GW, and is expected to increase at a CAGR of XX% in the forecast period, reaching XX GW.
Transmission and Distribution Market, Global

Figure 1: Power Generation Infrastructure, Global, Installed Capacity (GW), 2009–2020

Table 1: Power Generation Infrastructure, Global, Installed Capacity (GW), 2009–2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Thermal</th>
<th>Nuclear</th>
<th>Hydro</th>
<th>Wind</th>
<th>Solar</th>
<th>Geothermal</th>
<th>Biopower</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GlobalData, Power Database [Accessed on February 4, 2015]
Transmission and Distribution Market, Global

2.2 Transmission Infrastructure, Global

2.2.1 Transmission Infrastructure, Global, Length and Capacity, 2009–2020

In 2014, the electric power transmission network consisted of XX million Circuit kilometers (Ckm) of high-voltage transmission lines and had a capacity of XX million Mega Volt Amperes (MVA). In 2009, the total transmission line length was XX million Ckm, and between 2009 and 2013 it increased at a CAGR of XX%. It is expected to increase at a CAGR of XX% in the forecast period, reaching XX million Ckm in 2020.

![Figure 4: Transmission Infrastructure, Global, Length (million Ckm) and Capacity (million MVA), 2009–2020](chart)

Source: GlobalData, Power Database [Accessed on February 4, 2015]
Transmission and Distribution Market, Germany

5.1.2 Power Market, Germany, Macro Indicators, 2009–2014

Between 2009 and 2014, generation increased by XX%, from XX TWh to XX TWh, and consumption declined from XX TWh to XX TWh. Germany’s electricity losses from T&D averaged XX% of country’s generation. Germany is a net exporter of electricity. In 2014, it imported XX TWh and exported XX TWh.

**Figure 28: Power Market, Germany, Macro Indicators (TWh), 2009–2014**

![Power Market, Germany, Macro Indicators (TWh), 2009–2014 diagram](image)

Source: GlobalData, Power Database [Accessed on February 4, 2015]

**Table 28: Power Market, Germany, Macro Indicators (TWh), 2009–2014**

<table>
<thead>
<tr>
<th>Year</th>
<th>Generation</th>
<th>Imports</th>
<th>Consumption</th>
<th>Exports</th>
<th>T&amp;D losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: GlobalData, Power Database [Accessed on February 4, 2015]
11 Appendix

11.1 Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Expanded form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating Current</td>
</tr>
<tr>
<td>ACL</td>
<td>Non-Regulated Contract Environment (Ambiente de Contratação Livre)</td>
</tr>
<tr>
<td>ACR</td>
<td>Regulated Contract Environment (Ambiente de Contratação Regulada)</td>
</tr>
<tr>
<td>ANEEL</td>
<td>Brazilian Electricity Regulatory Agency (Agência Nacional de Energia Elétrica)</td>
</tr>
<tr>
<td>AREP</td>
<td>Accelerated Rural Electrification Program</td>
</tr>
<tr>
<td>BNDES</td>
<td>National Development Bank (Banco Nacional de Desenvolvimento Econômico e Social)</td>
</tr>
<tr>
<td>BRIX</td>
<td>Brazilian Intercontinental Exchange</td>
</tr>
<tr>
<td>CAGR</td>
<td>Compound Annual Growth Rate</td>
</tr>
<tr>
<td>CCEE</td>
<td>Electric Energy Commercialization Chamber (Câmara de Comercialização de Energia Elétrica)</td>
</tr>
<tr>
<td>CEA</td>
<td>Central Electricity Authority</td>
</tr>
<tr>
<td>Ckm</td>
<td>Circuit kilometer</td>
</tr>
<tr>
<td>CSG</td>
<td>China Southern Power Grid</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>DME</td>
<td>Department of Minerals and Energy</td>
</tr>
<tr>
<td>DoE</td>
<td>US Department of Energy</td>
</tr>
<tr>
<td>ECRA</td>
<td>Electricity Co-Generation Regulatory Authority</td>
</tr>
<tr>
<td>ERCOT</td>
<td>Eastern, Western and the Electric Reliability Council of Texas</td>
</tr>
<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
</tr>
<tr>
<td>FERC</td>
<td>Federal Energy Regulatory Commission</td>
</tr>
<tr>
<td>FINEP</td>
<td>Brazilian Innovation Agency (Financiadora de Estudos e Projetos)</td>
</tr>
<tr>
<td>GCCIA</td>
<td>Gulf Cooperation Council Interconnection Authority</td>
</tr>
<tr>
<td>GW</td>
<td>Gigawatt</td>
</tr>
<tr>
<td>HVDC</td>
<td>High-Voltage Direct-Current</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td>INEP</td>
<td>Integrated National Electrification Plan</td>
</tr>
<tr>
<td>IREDA</td>
<td>Indian Renewable Energy Development Agency</td>
</tr>
<tr>
<td>ISMO</td>
<td>Independent System and Market Operator</td>
</tr>
<tr>
<td>ISO</td>
<td>Independent System Operators</td>
</tr>
<tr>
<td>KV</td>
<td>Kilovolt</td>
</tr>
<tr>
<td>LVRT</td>
<td>Low Voltage Ride Through</td>
</tr>
<tr>
<td>MME</td>
<td>Ministry of Mines and Energy</td>
</tr>
<tr>
<td>MNRE</td>
<td>Ministry of New and Renewable Energy</td>
</tr>
</tbody>
</table>
11.2 Bibliography


Appendix

11.3 Definitions

11.3.1 Power

Power refers to the rate of production, transfer or energy use, usually related to electricity. It is measured in Watts (W) and often expressed in kilowatts or Megawatts (MW). It is also known as real power or active power.

11.3.2 Installed Capacity

Installed capacity refers to the generator’s nameplate capacity as stated by the manufacturer, or the maximum rated output of a generator under given conditions. It is given in Megawatts (MW) on a nameplate affixed to the generator.

11.3.3 Electricity Generation

Electricity generation refers to the process of generating electricity from other forms of energy. It also refers to the amount of electricity produced, expressed in Gigawatt hours (GWh).

11.3.4 Renewable Energy Resources

Renewable energy resources are those that provide energy that is naturally replenished but limited in the amount of energy available per unit of time. Biomass, geothermal, solar, small hydro and wind are examples of renewable resources.

11.4 Methodology

GlobalData’s dedicated research and analysis teams consist of experienced professionals with advanced statistical expertise and marketing, market research and consulting backgrounds in the energy industry.

GlobalData adheres to the codes of practice of the Market Research Society (www.mrs.org.uk) and Strategic and Competitive Intelligence Professionals (www.scip.org).

All of GlobalData’s databases are continuously updated and revised. The following methodology has been followed for the collection and presentation of data presented in this report.
11.4.1 Coverage

The objective of updating GlobalData’s coverage is to ensure that it represents the most up-to-date vision of the industry possible.

Changes to the industry taxonomy are built on the basis of extensive research of company, association and competitor sources.

Company coverage is based on three key factors: market capitalization; revenues; and media attention and innovation and market potential.

An exhaustive search of 56 member exchanges is conducted and companies are prioritized on the basis of their market capitalization.

The estimated revenues of all major companies, including private and governmental, are gathered and used to prioritize coverage.

Companies that are making the news, or that are of particular interest due to their innovative approach, are prioritized.

GlobalData aims to cover all major news events and deals in the alternative energy industry, updated on a daily basis.

11.4.2 Secondary Research

The research process begins with extensive secondary research using GlobalData’s proprietary databases and external sources.

The secondary research sources that are typically referred to include, but are not limited to:

- Company websites, annual reports, financial reports, broker reports, investor presentations and SEC filings
- Industry trade journals and other literature
- Proprietary and external databases
- National government documents, statistical databases and market reports
- News articles, press releases and web-casts specific to the companies operating in the market
11.4.3 Primary Research

GlobalData conducts extensive primary interviews with industry participants and commentators in order to validate its data and analysis. A typical research interview fulfills the following functions:

- Obtains the interviewee’s perspective on the market size, growth trends, competitive landscape and future outlook
- Validates and strengthens secondary research findings
- Further develops the analysis team’s expertise and market understanding

Primary research involves e-mail interactions, telephone interviews and face-to-face interviews for each market, category, segment and sub-segment across geographies.

The participants who typically take part in such a process include, but are not limited to:

- Industry participants: CEOs, VPs, business development managers, market intelligence managers and national sales managers
- Outside experts: investment bankers, valuation experts, research analysts and key opinion leaders specializing in alternative energy industry

11.4.4 Modeling and Forecasting

In-house models are used to forecast data and in the event of data gaps. Historical data and the analysis of trends within it form the basis of all forecasting methodology. A range of qualitative and quantitative factors are taken into account to estimate future growth. The forecast data are validated by industry experts and in a back-of-envelope test.

11.4.5 Data on Macro Indicators

There is difference between electricity production and energy expenditure as captive power generation and consumption is not taken in to consideration in some cases.

11.4.6 Investments in Transmission Infrastructure

For calculating transmission investments in a country transmission voltage lines for which transmission length is provided has been considered.
Appendix

Investment in transmission infrastructure is based on base cost of transmission line in the country. For calculating investments in transmission infrastructure, factors such as terrain, materials used were not been considered.

11.5 Disclaimer

All Rights Reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher, GlobalData.

This report is a licensed product and should not to be reproduced without prior permission.