

northeast group, llc

Emerging Markets Smart Grid: Outlook 2017

BRICS

Central & Eastern Europe

Eurasia

Latin America

Middle East & North Africa

South Asia

Southeast Asia

Sub-Saharan Africa

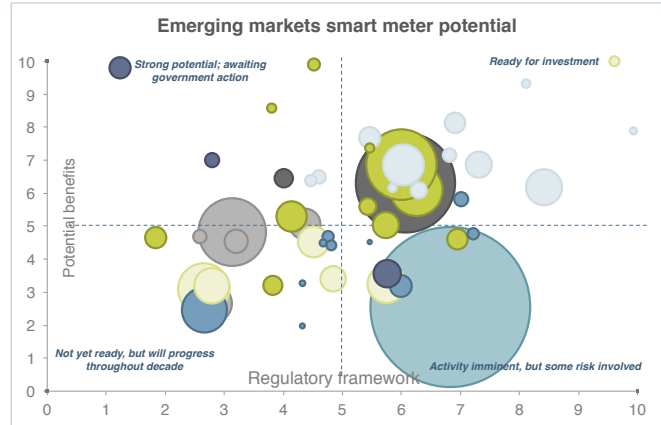
January 2017 | www.northeast-group.com

Emerging Markets Smart Grid: Outlook 2017

Northeast Group's *Emerging Markets Smart Grid: Outlook 2017* is the sixth edition of its annual emerging markets smart grid overview. This study looks ahead over the next decade to project where smart grid infrastructure investment will occur in developing countries. To-date, most smart grid investment has been concentrated in developed countries. This mainly includes countries in North America, Western Europe, and East Asia. These markets represent over 75% of the current installed base of smart meters and many of the pioneering distribution automation, analytics, home energy management, and other smart grid initiatives. But many countries in the rest of the developing world are positioning themselves to quickly catch up. The 50 countries in this study have all begun to explore smart grid deployments, and in many cases have advanced regulatory frameworks and extensive pilot projects in place. With GDP growth rates more than double those in the developed world (5.1% per year from 2017 – 2021), these 50 countries will have the funds available to undertake significant grid modernizations.

Emerging market countries can reap immediate benefits from smart grid infrastructure investment. Many of these countries suffer from rampant non-technical losses – mostly due to electricity theft – that cost in aggregate \$64.7 billion dollars each year in lost or unbilled revenue. Furthermore, all of the countries in this study face high rates of electricity demand growth, straining existing infrastructure, and worsening what are in many cases already unreliable electric grids.

The findings from this study show that 40% of the countries are already ready for significant investment in smart grid infrastructure. This means that they not only have well-developed regulatory frameworks, but also have the underlying market conditions (through high T&D loss rates, high electricity prices, and enough high-income residents) to justify smart meter deployments. Other smart grid initiatives will follow smart metering, with distribution automation the second largest overall segment (\$51bn from

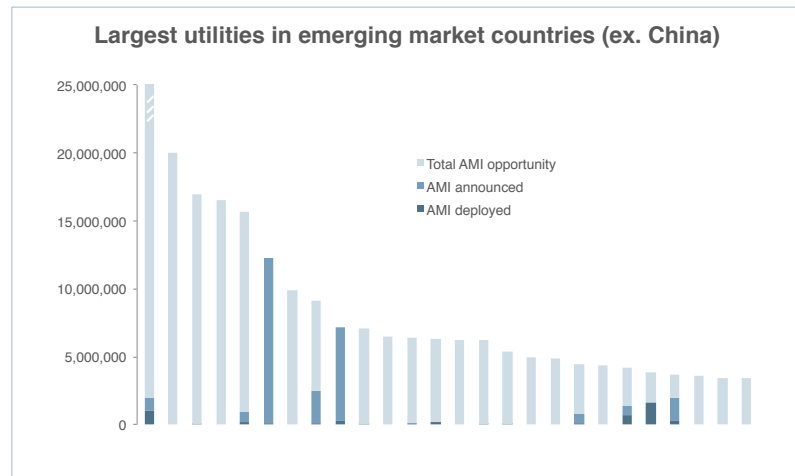


Nigeria
 Population: 178,721,000
 GDP/capita at PPP (2015): \$6,145
 GDP growth (Avg. 2013-2015): 4.5%

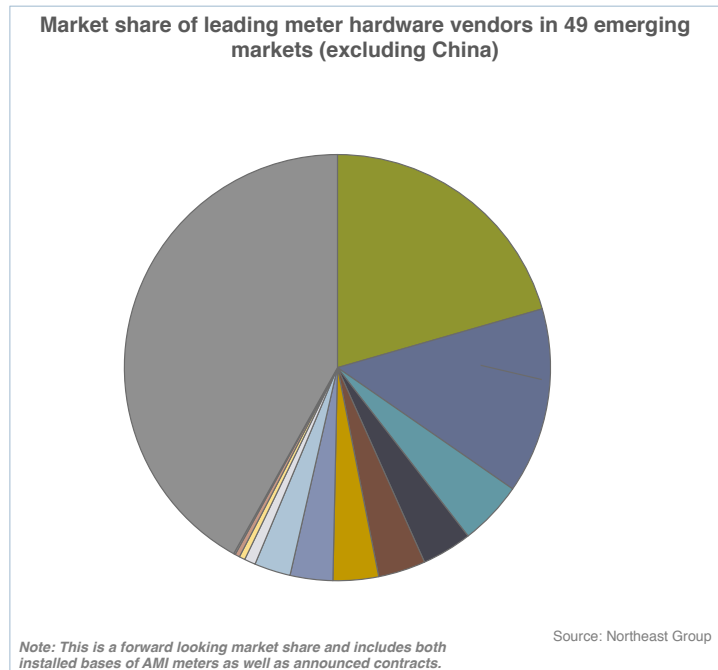
Industry structure
 Total meters: 8,762,007
 Residential meters: 6,016,580
 Smart meters (2015): 181,086
 (2015 est. for 2016-17: 200,000)

Regulatory framework
 Smart meter target: Smart meters are an explicit goal of industry modernization, but no official target.
 Roll-out progress: All utilities currently active in piloting smart meters.
 Funding/financial incentives: Create Advance Payment for Metering Implementation (CPMI) (should have been implemented).
 Technical standards: No technical standards to date.
 Deployment plans: Utilities developing deployment plans.
 Major infrastructure investment: The President approved the National Integrated Infrastructure Master Plan (NIIMP) for the country to run from 2014 to 2020.
 CO₂ target: 45% reduction by 2030.
 Dispatched generation incentives: No relevant DG incentives.
 EV incentives: No incentives.
 Distribution programs: Distribution has been limited.

Further detail
 AMI: First notable deployments in 2015, with tenders for over 100,000 meters in near-term. CPMI Advance Payment for Metering Implementation (CPMI) scheme expected to fund millions of prepaid meter deployments in coming years. 5 utilities already have deployment targets of over 100,000 meters and up to 2 million; there are no set AMI targets, but some prepaid meters could have smart functionality in the medium term.
 Grid applications: Bulk SCADA, some transmission investment to incorporate new generation, but no set meter plans.
 Home energy management/distributed generation: IED meters undeployed; some solar potential.



2017 to 2027). In addition to regulatory frameworks and T&D loss rates, further key criteria for assessing smart grid potential include existing industry structures, current electricity prices (and whether or not they are subsidized), financing mechanisms, the potential for operational benefits, and other efficiencies. Of the 50 countries, almost all of the Central & Eastern European (CEE) countries studied meet these criteria, while some countries in Latin America, Middle East & North Africa, and Southeast Asia do as well. Meanwhile, the other countries in this study show the potential to progress quickly over the course of the coming decade.



Perhaps most significantly, 21 of the 50 countries in this study have some form of smart meter target. In the cases of CEE countries such as Estonia, this is already leading to large-scale deployments and full smart meter penetration can be expected in the near term. In other countries, the targets serve as guides or only mandate deployments to high-consumption residents. In all cases though, these targets are pushing regulators to adopt complimentary regulations that will drive the smart grid market. Additionally, smart meter pilots have already begun in many of the other countries where there are not yet targets. As a result, the overall smart meter penetration rate for the 50 countries in this study is expected to reach 74% by 2027.

Key questions answered in this study:

- What are the key themes for the global smart grid market in 2017?
- How will new LPWAN standards affect emerging market deployments?
- Which tenders are expected for 2017 and which tenders are stalling?
- What smart grid activity took place in emerging markets in 2016 and what is expected for 2017?
- Who were the leading international vendors in emerging markets? What is their market share in emerging markets? Who are the most important local vendors?
- What is the forecast market for AMI, distribution automation, wide area measurement, home energy management, and IT in each emerging market region?
- How do emerging markets compare with developed countries in forecast deployments?
- Which countries were most active in developing smart grid-related policies and which countries took a step back?

Table of Contents

i. Executive Summary	1
1. Themes for 2017	7
1.1 Theme 1: M&A activity	7
1.2 Theme 2: New LPWAN communication standards	8
1.3 Theme 3: Even as deployments begin to take off, the major utilities are still open	10
1.4 Theme 4: Tenders in some emerging market countries are dragging	11
1.5 Update on 2016 themes	11
2. Global overview	14
2.1 Smart meter potential in emerging markets	14
2.2 Developments in 2016	20
2.3 Business case drivers	24
2.4 Regulatory drivers	28
3. Emerging markets smart grid market forecast	35
4. Vendor activity	42
4.1 Leading meter hardware vendors	42
4.2 Leading communications-only vendors	51
4.3 Local and other metering vendors	54
4.4 Leading distribution automation vendors	54
5. Regional and country summaries	62
6. BRICS	65
6.1 China	69
7. Central & Eastern Europe	71
7.1 Bulgaria	75
7.2 Croatia	77
7.3 Czech Republic	79
7.4 Estonia	81
7.5 Hungary	83
7.6 Latvia	85
7.7 Lithuania	87
7.8 Poland	89
7.9 Romania	91
7.10 Slovakia	93
7.11 Slovenia	95
7.12 Turkey	97
8. Eurasia	99
8.1 Kazakhstan	103
8.2 Kyrgyzstan	105
8.3 Russia	107
8.4 Ukraine	109
8.5 Uzbekistan	111
9. Latin America	113
9.1 Argentina	117
9.2 Brazil	119
9.3 Chile	121
9.4 Colombia	123
9.5 Dominican Republic	125
9.6 Ecuador	127

Table of Contents (cont.)	
9.7 Mexico	129
9.8 Paraguay	131
9.9 Peru	133
9.10 Venezuela	135
10. Middle East & North Africa	137
10.1 Bahrain	141
10.2 Egypt	143
10.3 Israel	145
10.4 Jordan	147
10.5 Kuwait	149
10.6 Lebanon	151
10.7 Oman	153
10.8 Qatar	155
10.9 Saudi Arabia	157
10.10 United Arab Emirates	159
11. South Asia	161
11.1 India	165
11.2 Pakistan	167
11.3 Sri Lanka	169
12. Southeast Asia	171
12.1 Indonesia	175
12.2 Malaysia	177
12.3 Philippines	179
12.4 Singapore	181
12.5 Thailand	183
12.6 Vietnam	185
13. Sub-Saharan Africa	187
13.1 Ghana	191
13.2 Nigeria	193
13.3 South Africa	195
14. Appendix	197
14.1 Methodology	197
14.2 Smart grid overview	201
14.3 List of companies and acronyms	214

List of Figures, Boxes, and Tables	
Emerging markets smart grid: key takeaways	5
Emerging markets smart meter potential	6
Figure 1.1: Recent major smart grid M&A activity	7
Figure 1.2: LPWAN IoT standards	9
Figure 1.3: Largest utilities in emerging market countries (ex. China)	10
Figure 1.4: Timeline of Egypt AMI tender	11
Figure 1.5: Chinese vendor AMI activity	12
Figure 2.1: Global smart grid activity	14
Figure 2.2: Smart grid regulatory country index	15
Figure 2.3: Smart grid potential benefit country index	16
Figure 2.4: Emerging markets smart meter potential	17

List of Figures, Boxes, and Tables (cont.)

Table 2.1: Biggest shifts in regulatory framework score	21
Table 2.2: Biggest shifts in potential benefit score	21
Figure 2.5: Biggest movers in smart meter potential	22
Figure 2.6: Largest installed base of AMI meters	22
Figure 2.7: Notable smart meter activity in 2016	23
Figure 2.8: Average electricity prices by region	24
Figure 2.9: Annual GDP growth (2017 – 2021)	24
Figure 2.10: Global T&D losses	24
Figure 2.11: Per-capita electricity consumption	24
Figure 2.12: T&D losses by % and dollars lost	25
Figure 2.13: Annual electricity demand growth	26
Figure 2.14: Typical number of outages per month (SAIFI)	27
Figure 2.15: Typical duration of outages per month (SAIDI)	27
Figure 2.16: Smart meter targets in emerging markets	29
Table 2.3: Smart meter funding mechanisms	30
Table 2.4: Outside smart grid funding bodies	30
Table 2.5: Smart meter interoperability standards in Europe	31
Table 2.6: Electricity network spending in emerging markets (2014 – 2020)	32
Figure 2.17: CO ₂ emissions targets in emerging markets	33
Figure 2.18: Renewable energy incentives in emerging markets	33
Table 2.7: Types of electric vehicle incentives	34
Figure 3.1: Emerging markets smart grid forecast by region	35
Table 3.1: Emerging markets smart grid forecast by region	36
Figure 3.2: Regional electricity meter market sizes in 2017	36
Figure 3.3: Regional electricity meter market sizes in 2027	37
Table 3.2: Emerging markets smart grid forecast by segment	38
Figure 3.4: Emerging markets smart grid forecast by segment	38
Table 3.3: Emerging markets distribution automation forecast	39
Figure 3.5: Emerging markets distribution automation forecast	39
Figure 3.6: Global AMI forecast comparison	40
Figure 3.7: Global smart grid forecast comparison	40
Figure 4.1: Market share of leading vendors in 49 emerging markets	42
Table 4.1: Leading international smart meter hardware vendors	43
Table 4.2: Leading Chinese meter vendors	51
Table 4.3: Leading communications-only vendors	51
Table 4.4: Additional hardware vendors active in emerging market smart meter projects	54
Figure 4.2: Market share of leading vendors in BRICS	58
Figure 4.3: Market share of leading vendors in Central & Eastern Europe	58
Figure 4.4: Market share of leading vendors in Eurasia	59
Figure 4.5: Market share of leading vendors in Latin America	59
Figure 4.6: Market share of leading vendors in Middle East & North Africa	60
Figure 4.7: Market share of leading vendors in South Asia	60
Figure 4.8: Market share of leading vendors in Southeast Asia	61
Figure 4.9: Market share of leading vendors in Sub-Saharan Africa	61
Figure 6.1: Smart meter potential in BRICS	65
Figure 6.2: Average electricity prices by region	66

List of Figures, Boxes, and Tables (cont.)

Figure 6.3: Annual GDP growth (2017 – 2021)	66
Figure 6.4: Global T&D losses	66
Figure 6.5: Per-capita electricity consumption	66
Figure 6.6: Market share of leading vendors in BRICS	67
Figure 7.1: Smart meter potential in Central & Eastern Europe	71
Figure 7.2: Average electricity prices by region	72
Figure 7.3: Annual GDP growth (2017 – 2021)	72
Figure 7.4: Global T&D losses	72
Figure 7.5: Per-capita electricity consumption	72
Figure 7.6: Market share of leading vendors in Central & Eastern Europe	73
Figure 8.1: Smart meter potential in Eurasia	99
Figure 8.2: Average electricity prices by region	100
Figure 8.3: Annual GDP growth (2017 – 2021)	100
Figure 8.4: Global T&D losses	100
Figure 8.5: Per-capita electricity consumption	100
Figure 8.6: Market share of leading vendors in Eurasia	101
Figure 9.1: Smart meter potential in Latin America	113
Figure 9.2: Average electricity prices by region	114
Figure 9.3: Annual GDP growth (2017 – 2021)	114
Figure 9.4: Global T&D losses	114
Figure 9.5: Per-capita electricity consumption	114
Figure 9.6: Market share of leading vendors in Latin America	115
Figure 10.1: Smart meter potential in Middle East & North Africa	137
Figure 10.2: Average electricity prices by region	138
Figure 10.3: Annual GDP growth (2017 – 2021)	138
Figure 10.4: Global T&D losses	138
Figure 10.5: Per-capita electricity consumption	138
Figure 10.6: Market share of leading vendors in Middle East & North Africa	139
Figure 11.1: Smart meter potential in South Asia	161
Figure 11.2: Average electricity prices by region	162
Figure 11.3: Annual GDP growth (2017 – 2021)	162
Figure 11.4: Global T&D losses	162
Figure 11.5: Per-capita electricity consumption	162
Figure 11.6: Market share of leading vendors in South Asia	163
Figure 12.1: Smart meter potential in Southeast Asia	171
Figure 12.2: Average electricity prices by region	172
Figure 12.3: Annual GDP growth (2017 – 2021)	172
Figure 12.4: Global T&D losses	172
Figure 12.5: Per-capita electricity consumption	172
Figure 12.6: Market share of leading vendors in Southeast Asia	173
Figure 13.1: Smart meter potential in Sub-Saharan Africa	187
Figure 13.2: Average electricity prices by region	188
Figure 13.3: Annual GDP growth (2017 – 2021)	188
Figure 13.4: Global T&D losses	188
Figure 13.5: Per-capita electricity consumption	188
Figure 13.6: Market share of leading vendors in Sub-Saharan Africa	189
Figure 14.1: Smart grid value chain	201

In addition to the figures and tables shown above, each country summary includes the following:

Table: Industry structure;

Table: Regulatory framework;

Chart: Regional smart meter potential;

Chart: Regional electricity consumption per capita (kWh);

Chart: Regional electricity prices (cents per kWh);

Chart: Regional T&D losses (%).

Therefore, this study includes an additional 128 unique charts and tables in addition to those cited above.

Order Form – Emerging Markets Smart Grid: Outlook 2017

Pricing

Single user – \$3,750 | Enterprise license – \$5,400

Clients purchasing a single user license are limited to one user for this report. The enterprise license allows all employees within a single organization to view the report. Any forwarding or sharing of the report to others who have not paid for it is strictly forbidden.

Email orders: Fill out and scan the sheet below. Please email orders to **ben.gardner@northeast-group.com**

Telephone: We can be reached at **+1.202.538.0848**. Please have all of the information below ready to expedite your order.

Customer information

SINGLE USER ENTERPRISE LICENSE

NAME		POSITION		COMPANY			
ADDRESS							
CITY		STATE		POSTAL CODE		COUNTRY	
TELEPHONE			EMAIL				

Credit card information

Card type:

VISA MASTERCARD AMERICAN EXPRESS DISCOVER

CARD NUMBER		EXPIRATION DATE					
CV CODE							
CARDHOLDER'S NAME		SIGNATURE		DATE			
BILLING ADDRESS							
CITY		STATE		POSTAL CODE		COUNTRY	

By purchasing this report I agree to abide by the following terms and conditions: 1. Single-user license - use of this report is restricted to one individual. 2. Enterprise license – use of this report is restricted to individuals within a single enterprise or organization. I agree not to forward or share this report to others who have not paid for its use.