



northeast group, llc

Southeast Asia Smart Grid: Market Forecast (2018 – 2027)

Volume IV
September 2018 | www.northeast-group.com

Southeast Asia Smart Grid:
Market Forecast (2018 – 2027)

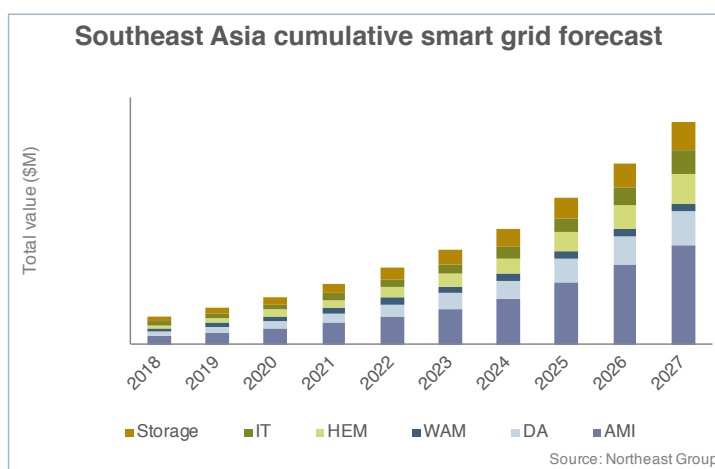
Northeast Group, LLC
1316 9th St NW, Suite 6
Washington, DC 20001

www.northeast-group.com

This report is an original work produced by Northeast Group, LLC and may not be reproduced, copied or cited without express written permission. Those 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.

Southeast Asia Smart Grid: Market Forecast (2018 – 2027)

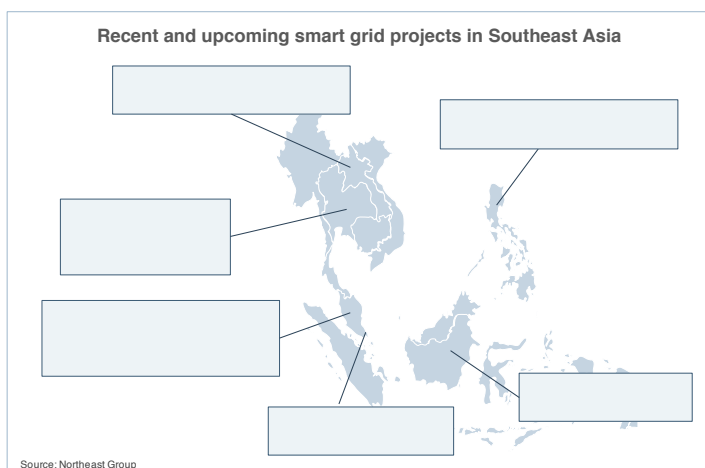
The Southeast Asian smart grid infrastructure market has developed more slowly than previously anticipated, but a handful of regional leaders are likely to ensure growth over the decade. Singapore, Thailand, and Malaysia are either currently conducting or preparing for large-scale advanced metering infrastructure (AMI) rollouts, setting a model for regional



neighbors to follow. Their leadership is especially important as the region lacks some of the most typical drivers of smart metering and other smart grid segments. With some exceptions, T&D losses are relatively low for an emerging market region, nor are electricity prices or consumption sufficiently high to serve as a leading business case driver.

Regulations that either mandate or encourage smart grid infrastructure buildout could be necessary for the market to reach its potential, and these are now becoming better developed. Current deployments are being driven within the wider context of national drives for cleaner energy portfolios and energy efficiency improvement. Smart city plans factor heavily into these visions, with nearly every country in the region having developed smart city projects, with varying degrees of investment.

Indonesia presents by far the largest market opportunity at nearly 60 million residential electricity customers, but will only begin to develop widespread smart grid projects at the tail end of the forecast period. Thailand and Vietnam, each about a third the size of the Indonesian market, represent the second and third largest market opportunities.



Each will also develop relatively late, with Thailand aiming for a nationwide AMI rollout by 2036, and Vietnam having only drawn up very rough smart grid roadmaps to date. In Malaysia, the nation's largest utility TNB recently began an 8.3 million-meter rollout, which combined with smart city projects in Kuala Lumpur, ensures

that it will remain a regional leader, along with Singapore and Thailand. Other countries so far have less developed smart grid markets, but international assistance could improve the outlook.

Prominent International vendors are already active, and the region is likely to be a major destination for Chinese and Indian vendors in particular due to the offer of lower-cost AMI hardware. Falling costs could be essential to market growth, as cost concerns have slowed projects across the region. The combination of declining costs, improving regulatory frameworks, and the accumulation of regional experience with AMI deployments will lead Southeast Asia to provide some of the most promising emerging market opportunities in the global smart grid market.

Key questions answered in this study:

- How large will the smart grid market be across Southeast Asia?
- Which countries in the region have developed plans for national rollouts?
- What recent regulatory developments will impact the market?
- Which major international and local vendors are best positioned to supply the region?

Research Deliverables: 199-page PDF copy of study + executive summary presentation + dataset

Table of Contents

i. Executive summary	1
1. What's New in 2018	9
2. Southeast Asia smart grid snapshot	25
2.1 The region in comparison	27
2.2 Regional drivers	30
2.3 Regional challenges	34
3. Regional market forecast	37
4. Singapore	47
4.1 Electricity industry structure	49
4.2 Smart grid regulatory environment	51
4.3 Market forecast	52
4.4 Utility activity	55
5. Thailand	60
5.1 Electricity industry structure	62

Table of Contents (cont.)	
5.2 Smart grid regulatory environment	64
5.3 Market forecast	66
5.4 Utility activity	69
6. Malaysia	75
6.1 Electricity industry structure	77
6.2 Smart metering regulatory environment	79
6.3 Market forecast	82
6.4 Utility activity	85
7. Philippines	89
7.1 Electricity industry structure	91
7.2 Smart grid regulatory environment	93
7.3 Market forecast	95
7.4 Utility activity	99
8. Indonesia	104
8.1 Electricity industry structure	106
8.2 Smart grid regulatory environment	108
8.3 Market forecast	110
8.4 Utility activity	113
9. Vietnam	116
9.1 Electricity industry structure	118
9.2 Smart grid regulatory environment	120
9.3 Market forecast	122
9.4 Utility activity	125
10. The rest of the region	129
10.1 Cambodia	130
10.2 Laos	133
10.3 Myanmar	136
11. Vendor activity	140
11.1 Domestic vendors	140

Table of Contents (cont.)

11.2 International vendors active in smart grid in Southeast Asia	145
11.3 Chinese vendors active in smart grid in Southeast Asia	156
12. Appendix	161
12.1 Methodology	161
12.2 Smart grid overview	166
12.3 Global smart grid activity	180
12.1 List of companies and acronyms covered in this report	183

List of Figures, Boxes, and Tables

Southeast Asia smart grid: key takeaways	3
AMI deployments at top Southeast Asian distribution utilities	4
Market share of leading residential AMI meter hardware vendors	5
Market share of leading residential AMI meter hardware vendors	6
Market share of leading residential AMI meter communications vendors	7
Market share of leading residential AMI meter communications vendors	8
Figure 1.1: Recent and upcoming smart grid projects in Southeast Asia	10
Figure 1.2: Smart grid plans at TNB in Malaysia	11
Figure 1.3: Thailand Smart Grid Roadmap	12
Figure 1.4: Status of national AMI rollouts in Southeast Asia	13
Figure 1.5: MERALCO AMI deployment proposal	13
Table 1.1: AMI projects and plans in Southeast Asia	14
Figure 1.6: Existing smart grid regulatory activity in the Philippines	16
Table 1.2: Smart grid-related policy developments in Southeast Asia	18
Table 1.3: Battery storage and microgrid developments in Southeast Asia	19
Table 1.4: Other smart city developments	21
Figure 1.7: Comparison to 2016 forecast	24
Figure 2.1: Emerging markets smart meter potential	26
Figure 2.2: Per-capita electricity consumption	28
Figure 2.3: Per-capita CO ₂ emissions	29

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

Figure 2.4: Projected GDP growth (2016 – 2020)	29
Figure 2.5: Annual electricity demand growth in Southeast Asia	31
Figure 2.6: Renewable sources of energy in Southeast Asia	32
Figure 2.7: Renewable energy potential in 2030	32
Table 2.1: Smart grid market drivers and barriers in Southeast Asia	33
Figure 2.8: T&D losses in Southeast Asia	34
Figure 2.9: 10-year added cost per kWh of smart metering in Southeast Asia	35
Figure 2.10: Average smart grid regulatory scores in emerging markets	36
Figure 3.1: Southeast Asia AMI penetration rate	37
Figure 3.2: AMI penetration rate in Malaysia, Singapore, and Thailand	37
Figure 3.3: Southeast Asia cumulative smart grid forecast by country	38
Table 3.1: Southeast Asia cumulative smart grid forecast data by country	38
Figure 3.4: Southeast Asia cumulative smart grid forecast	39
Table 3.2: Southeast Asia cumulative smart grid forecast data	39
Figure 3.5: Annual AMI deployments in Southeast Asia	40
Figure 3.6: AMI cost breakdown	41
Figure 3.7: Average cost per-endpoint	41
Figure 3.8: Cumulative AMI forecast by segment	43
Table 3.3: Cumulative AMI forecast data by segment	43
Figure 3.9: Cumulative DA forecast by segment	44
Table 3.4: Cumulative DA forecast data by segment	44
Figure 3.10: Cumulative HEM forecast by segment	45
Table 3.5: Cumulative HEM forecast data by segment	45
Figure 3.11: Cumulative IT forecast by segment	46
Table 3.6: Cumulative IT forecast data by segment	46
Table 4.1: Singapore key data	47
Figure 4.1: Singapore AMI penetration rate	47
Table 4.2: Smart grid indicators in Singapore	48
Box 4.1: Political risk in Singapore	51
Figure 4.2: Singapore electricity price plans	52
Figure 4.3: Singapore cumulative smart grid forecast	53

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

Table 4.3: Singapore cumulative smart grid forecast data	53
Figure 4.4: Singapore cumulative AMI forecast	54
Table 4.4: Singapore cumulative AMI forecast data	54
Figure 4.5: Smart grid progress in Singapore	56
Table 4.5: Smart grid projects in Singapore	58
Table 5.1: Thailand key data	60
Figure 5.1: Thailand AMI penetration rate	60
Table 5.2: Smart grid indicators in Thailand	61
Figure 5.2: Electricity industry structure in Thailand	62
Box 5.1: Political risk in Thailand	63
Figure 5.3: Smart grid-related policies under consideration in Thailand	64
Figure 5.5: Thailand cumulative smart grid forecast data	67
Table 5.3: Thailand cumulative smart grid forecast	67
Figure 5.6: Thailand cumulative AMI forecast data	68
Table 5.4: Thailand cumulative AMI forecast	68
Figure 5.7: PEA’s Pattaya smart grid project	70
Table 5.5: Smart grid projects in Thailand	73
Table 6.1: Malaysia key data	75
Figure 6.1: Malaysia AMI penetration rate	75
Table 6.2: Smart grid indicators in Malaysia	76
Box 6.1: Political risk in Malaysia	78
Figure 6.2: Smart grid plans at TNB in Malaysia	79
Table 6.3: Feed-in tariff rates and installations in Malaysia	80
Figure 6.3: 5 strategic pillars of Malaysia’s New Energy Policy	81
Figure 6.4: Malaysia cumulative smart grid forecast	83
Table 6.4: Malaysia cumulative smart grid forecast data	83
Figure 6.5: Malaysia cumulative AMI forecast	84
Table 6.5: Malaysia cumulative AMI forecast data	84
Figure 6.6: Projected annual AMI deployments at TNB	85
Table 6.6: TNB pilot project details	86
Table 6.7: Smart grid projects in Malaysia	88

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

Table 7.1: Philippines key data	89
Figure 7.1: Philippines AMI penetration rate	89
Table 7.2: Smart grid indicators in the Philippines	90
Box 7.1: Political risk in the Philippines	92
Figure 7.2: Existing smart grid regulatory activity in the Philippines	94
Figure 7.3: Philippines cumulative smart grid forecast	96
Table 7.3: Philippines cumulative smart grid forecast data	96
Figure 7.4: Philippines cumulative AMI forecast	97
Table 7.4: Philippines cumulative AMI forecast data	97
Figure 7.5: MERALCO AMI deployment proposal	99
Figure 7.6: MERALCO's initial smart grid pilot	101
Table 7.5: USTDA smart grid activity in Philippines	102
Table 8.1: Indonesia key data	104
Figure 8.1: Indonesia AMI penetration rate	104
Table 8.2: Smart grid indicators in Indonesia	105
Box 8.1: Political risk in Indonesia	107
Table 8.3: Subsidized electricity prices	108
Table 8.4: Feed-in tariffs in Indonesia	109
Figure 8.2: Indonesia cumulative smart grid forecast	111
Table 8.5: Indonesia cumulative smart grid forecast data	111
Figure 8.3: Indonesia cumulative AMI forecast	112
Table 8.6: Indonesia cumulative AMI forecast data	112
Figure 8.6: Annual meter deployments in Indonesia	114
Table 9.1: Vietnam key data	116
Figure 9.1: Vietnam AMI penetration rate	116
Table 9.2: Smart grid indicators in Vietnam	117
Box 9.1: Political risk in Vietnam	119
Figure 9.2: Electricity regulatory structure in Vietnam	120
Table 9.3: Vietnam cumulative smart grid forecast data	123
Figure 9.3: Vietnam cumulative smart grid forecast	123
Table 9.4: Vietnam cumulative AMI forecast data	124

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

Figure 9.4: Vietnam cumulative AMI forecast	124
Figure 9.5: Smart grid roadmap for EVN in Vietnam	126
Table 9.5: World Bank Distribution Efficiency Improvement Project	126
Figure 9.6: Multilateral funding for T&D investments in Vietnam	128
Figure 10.1: Electrification rates	129
Table 10.1: Cambodia key data	130
Figure 10.2: Cambodia AMI penetration rate	131
Figure 10.3: Electricity prices and GDP/capita in Southeast Asia	131
Figure 10.4: Cambodia cumulative smart grid forecast	132
Table 10.2: Cambodia cumulative smart grid forecast data	132
Figure 10.5: Cambodia cumulative AMI forecast	133
Table 10.3: Cambodia cumulative AMI forecast data	133
Table 10.4: Laos key data	133
Figure 10.6: Laos AMI penetration rate	134
Table 10.5: World Bank smart grid project in Laos	134
Figure 10.7: Laos cumulative smart grid forecast	135
Table 10.6: Laos cumulative smart grid forecast data	135
Figure 10.8: Laos cumulative AMI forecast	136
Table 10.7: Laos cumulative AMI forecast data	136
Table 10.8: Myanmar key data	136
Figure 10.9: Myanmar AMI penetration rate	137
Figure 10.10: Highest global T&D loss rates	137
Table 10.9: Myanmar cumulative smart grid forecast data	138
Figure 10.11: Myanmar cumulative smart grid forecast	138
Table 10.10: Myanmar cumulative AMI forecast data	139
Figure 10.12: Myanmar cumulative AMI forecast	139
Figure 11.1: Leading smart grid vendors in Southeast Asia	140
Figure 11.2: Market share of leading residential AMI meter hardware vendors	141
Figure 11.3: Market share of leading residential AMI meter hardware vendors	143
Figure 11.4: Market share of leading residential AMI meter communications	146
Figure 11.5: Market share of leading residential AMI meter communications	148

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

Table 11.1: Other leading smart grid vendors in Southeast Asia	150
Figure 11.6: International meter vendor presence in in Southeast Asia	151
Table 11.2: Vendor partnerships and activity	152
Figure 12.1: Northeast Group Smart Grid Forecasting Model	165
Figure 12.2: Smart grid model highlighting focus in Southeast Asia	167
Table 12.1: Benefits of AMI in Southeast Asia	170
Table 12.2: Demand response options	173
Figure 12.3: ASEAN grid interconnections	178
Figure 12.4: Global smart grid activity	180
Figure 12.5: Cumulative smart grid investment from 2018 – 2027 by region	181
Figure 12.6: Annual smart grid and AMI investment by region in 2027	181
Table 12.3: Global smart grid drivers and activity	182

Order Form: Southeast Asia Smart Grid: Market Forecast (2018 – 2027)

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: Two options: (a) Fill out and scan the sheet below; or (b) Email us a request for a secure link to pay by credit card (specifying single user or enterprise license). 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.