



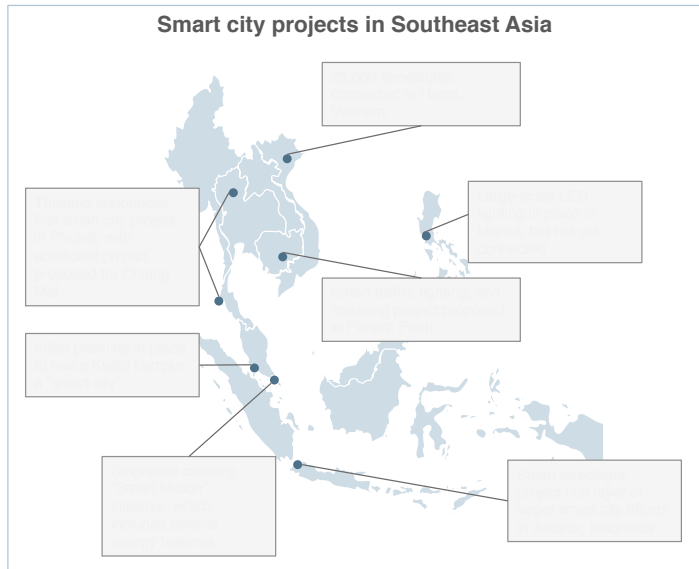
**northeast** group, llc

## Southeast Asia Smart Grid: Market Forecast (2016 – 2026)

Volume III  
March 2016 | [www.northeast-group.com](http://www.northeast-group.com)

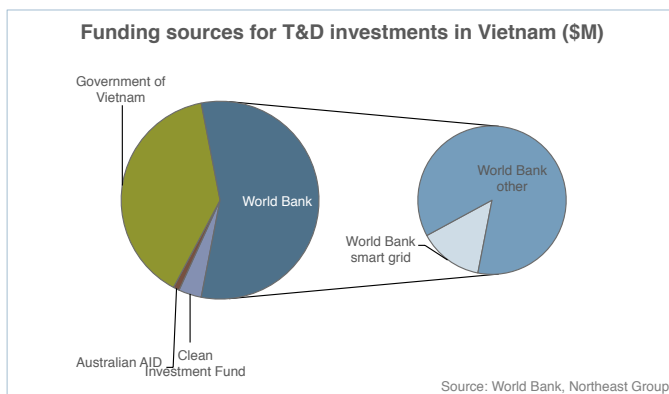
## Southeast Asia Smart Grid: Market Forecast (2016 – 2026)

Southeast Asia is a growing smart grid market that continues to show extensive progress and promises significant benefits for consumers and large opportunities for vendors by the end of this decade. Countries in the region continue to grow and electrify quickly, accelerating the benefits of smart grid and spurring governments to develop smart grid roadmaps and deployment plans. In recent years, smart grid deployments have begun in Singapore; Malaysia has set deployment plans for rolling out over 8 million AMI meters;



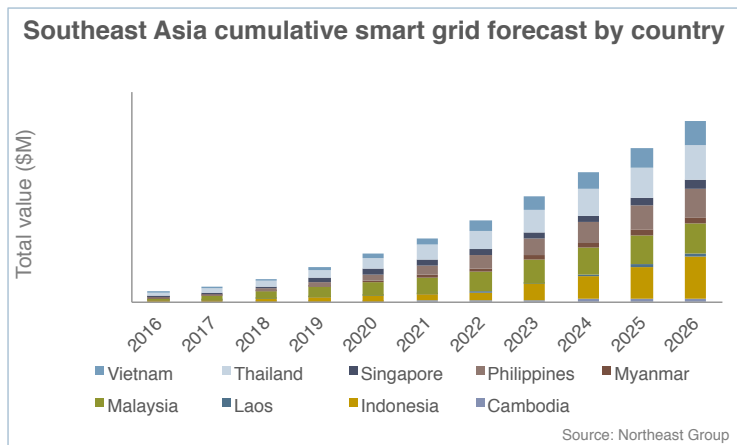
Thailand has established numerous pilot projects that will total over 1 million AMI meters; and external aid has begun to support smart grid throughout the region. Overall, Southeast Asia still trails the developed countries and leading emerging market regions for smart grid potential, but in recent years, it has closed the gap significantly, and high growth ensures continued progress in the near term.

As a region, Southeast Asia has the highest projected GDP growth rate of all emerging smart grid markets, outside of China and India. All countries, except for Singapore and Thailand, will see GDP growth rates average near or above 5% per year through 2020. These high GDP growth rates are not guaranteed however, and will present structural, political, and social challenges to Southeast Asian countries. Understanding how these countries plan to manage their corresponding electricity demand growth is critical to understanding the role that smart grid infrastructure will play in Southeast Asia.



Implementing smart grid infrastructure can help Southeast Asian countries with high growth in ways beyond simply helping manage energy supply shortages through demand response and other programs. As these economies grow, existing grid infrastructure will increasingly prove insufficient, and power reliability will become more of an issue. Smart grid infrastructure throughout the transmission

and distribution networks will help utilities proactively address weaknesses and maintain higher power quality and reliability. Additionally, economic growth could lead to higher rates of non-technical losses as new customers are added to the grid and their bills increase due to higher consumption rates – this has already been seen in Laos and Vietnam. Currently, Southeast Asian countries have low-to-moderate theft rates when compared with other emerging markets, but without smart meters non-technical losses could grow alongside the overall economies.



In the past two years since the second volume of this study was published, many of these factors have already played out. Southeast Asian countries have grown as fast as previously projected, and smart grid activity has kept pace. Work has continued on projects in Malaysia, the Philippines, Singapore, and Thailand, as well as new stronger regulations, particularly in Malaysia. Projects and policies like these are expected to increase throughout the region in the medium term, as all countries in the region will be facing challenges that smart grid infrastructure will be best placed to address. With stronger regulatory models to follow and indicators pointing towards greater savings from smart grid infrastructure, deployments will be well developed in all major Southeast Asian countries by early in the next decade.

Key questions answered in this study:

- Where are the newest smart grid announcements and deployments in Southeast Asia?
- How large will the smart grid market be in 9 countries across 15 sub-segments?
- What are utility deployment plans for the near-to-medium term?
- When will countries transition to prepaid AMI metering?
- Who are local vendors partnering with for smart grid projects?

## Table of Contents

i. Executive summary	1
i.i What's new in 2016?	4
i.ii Southeast Asia smart grid summary	15

## Table of Contents (cont.)

i.iii Country summaries	23
ii. Methodology	29
<b>1. Introduction</b>	<b>34</b>
1.1 What is smart grid?	34
1.2 Smart grid's role in regional interconnection	46
1.3 How has smart grid been used elsewhere in the world?	48
<b>2. Southeast Asia smart grid snapshot</b>	<b>56</b>
2.1 The region in comparison	58
2.2 Regional drivers	61
2.3 Regional challenges	66
<b>3. Regional market forecast</b>	<b>70</b>
<b>4. Singapore</b>	<b>79</b>
4.1 Electricity industry structure	81
4.2 Smart grid regulatory environment	83
4.3 Market forecast	85
4.4 Utility activity	88
<b>5. Thailand</b>	<b>91</b>
5.1 Electricity industry structure	93
5.2 Smart grid regulatory environment	96
5.3 Market forecast	99
5.4 Utility activity	102
<b>6. Malaysia</b>	<b>109</b>
6.1 Electricity industry structure	111
6.2 Smart metering regulatory environment	114
6.3 Market forecast	117
6.4 Utility activity	120
<b>7. Philippines</b>	<b>125</b>
7.1 Electricity industry structure	127
7.2 Smart grid regulatory environment	130
7.3 Market forecast	133
7.4 Utility activity	136

## Table of Contents (cont.)

<b>8. Indonesia</b>	<b>140</b>
8.1 Electricity industry structure	142
8.2 Smart grid regulatory environment	145
8.3 Market forecast	148
8.4 Utility activity	151
<b>9. Vietnam</b>	<b>155</b>
9.1 Electricity industry structure	157
9.2 Smart grid regulatory environment	160
9.3 Market forecast	162
9.4 Utility activity	164
<b>10. The rest of the region</b>	<b>168</b>
10.1 Cambodia	169
10.2 Laos	172
10.3 Myanmar	174
<b>11. Vendor activity</b>	<b>178</b>
11.1 Domestic vendors	178
11.2 International vendors active in smart grid in Southeast Asia	180
<b>12. Appendix</b>	<b>191</b>
12.1 List of companies covered in this report	191
12.2 List of acronyms	193

## List of Figures, Boxes, and Tables

Southeast Asia smart grid: key takeaways	2
Changes in Southeast Asia smart meter potential	6
Notable smart grid activity in Southeast Asia in the past year	7
Recent smart grid projects and plans in Southeast Asia	8
Recent smart grid-related policies in Southeast Asia	10
Examples of external funding for smart grid in Southeast Asia	11
Smart city projects in Southeast Asia	13
Comparison to 2014 forecast	14
Main smart grid drivers and barriers in Southeast Asia	15

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

Global projected GDP growth (2016 – 2020)	15
Projected GDP growth in Southeast Asia (2016 – 2020)	16
Annual electricity demand growth in Southeast Asia	16
Smart grid roadmaps and planned activity in Southeast Asia	17
International meter vendor presence in smart grid-related projects in Southeast Asia	17
10-year added cost per kWh of smart metering in Southeast Asia	18
T&D losses in Southeast Asia	18
Smart grid progress in Singapore	19
Smart grid projects in Thailand	20
Projected annual AMI deployments at TNB	21
Smart grid forecast by country	22
Smart grid forecast data by country	22
Northeast Group Smart Grid Forecasting Model	33
Figure 1.1: Smart grid value chain	34
Figure 1.2: Smart grid model highlighting focus in Southeast Asia	35
Table 1.1: Benefits of AMI in Southeast Asia	38
Table 1.2: Demand response options	41
Figure 1.3: ASEAN grid interconnections	46
Figure 1.4: Global smart grid activity	49
Figure 1.5: Cumulative AMI investment by region up to 2016	50
Figure 1.6: Cumulative DA investment by region up to 2016	50
Figure 1.7: Cumulative AMI investment by region from 2016 – 2026	51
Figure 1.8: Cumulative DA investment by region from 2016 – 2026	51
Figure 2.1: Emerging markets smart meter potential	57
Figure 2.2: Per-capita electricity consumption	59
Figure 2.3: Per-capita CO <sub>2</sub> emissions	60
Figure 2.4: Projected GDP growth (2016 – 2020)	60
Figure 2.5: Annual electricity demand growth in Southeast Asia	62
Figure 2.6: Renewable sources of energy in Southeast Asia	63
Figure 2.7: Renewable energy potential in 2030	63
Figure 2.8: T&D losses in Southeast Asia	65
Table 2.1: Smart grid market drivers and barriers in Southeast Asia	66
Figure 2.9: 10-year added cost per kWh of smart meter investments in Southeast Asia	66
Figure 2.10: Average smart grid regulatory scores in emerging markets	68

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

Figure 3.1: Southeast Asia AMI penetration rate	70
Figure 3.2: AMI penetration rate in Malaysia, Singapore, and Thailand	70
Figure 3.3: Southeast Asia cumulative smart grid forecast by country	71
Table 3.1: Southeast Asia cumulative smart grid forecast data by country	71
Figure 3.4: Southeast Asia cumulative smart grid forecast	72
Table 3.2: Southeast Asia cumulative smart grid forecast data	72
Figure 3.5: Annual AMI deployments in Southeast Asia	73
Figure 3.6: AMI cost breakdown	73
Figure 3.7: Cumulative AMI forecast by segment	75
Table 3.3: Cumulative AMI forecast data by segment	75
Figure 3.8: Cumulative DA forecast by segment	76
Table 3.4: Cumulative DA forecast data by segment	76
Figure 3.9: Cumulative HEM forecast by segment	77
Table 3.5: Cumulative HEM forecast data by segment	77
Figure 3.10: Cumulative IT forecast by segment	78
Table 3.6: Cumulative IT forecast data by segment	78
Table 4.1: Singapore key data	79
Figure 4.1: Singapore AMI penetration rate	79
Table 4.2: Smart grid indicators in Singapore	80
Box 4.1: Political risk in Singapore	83
Figure 4.2: Singapore cumulative smart grid forecast	85
Table 4.3: Singapore cumulative smart grid forecast data	85
Figure 4.3: Singapore cumulative AMI forecast	86
Table 4.4: Singapore cumulative AMI forecast data	86
Figure 4.4: Smart grid progress in Singapore	89
Table 5.1: Thailand key data	91
Figure 5.1: Thailand AMI penetration rate	91
Table 5.2: Smart grid indicators in Thailand	92
Figure 5.2: Electricity industry structure in Thailand	94
Box 5.1: Political risk in Thailand	97
Table 5.3: Smart grid roadmaps in Thailand	98
Table 5.4: Thailand cumulative smart grid forecast data	100
Figure 5.3: Thailand cumulative smart grid forecast	100
Table 5.5: Thailand cumulative AMI forecast data	102

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

Figure 5.4: Thailand cumulative AMI forecast	102
Figure 5.5: PEA's Pattaya smart grid project	103
Table 5.4: Smart grid projects in Thailand	104
Table 6.1: Malaysia key data	109
Figure 6.1: Malaysia AMI penetration rate	109
Table 6.2: Smart grid indicators in Malaysia	110
Box 6.1: Political risk in Malaysia	112
Figure 6.2: Smart grid plans at TNB in Malaysia	115
Figure 6.3: 5 strategic pillars of Malaysia's New Energy Policy	116
Table 6.3: Feed-in tariff rates and installations in Malaysia	116
Figure 6.4: Malaysia cumulative smart grid forecast	118
Table 6.4: Malaysia cumulative smart grid forecast data	118
Figure 6.5: Malaysia cumulative AMI forecast	119
Table 6.5: Malaysia cumulative AMI forecast data	119
Figure 6.6: Projected annual AMI deployments at TNB	120
Table 6.6: TNB pilot project details	121
Table 6.7: TNB pilot project customer outreach	122
Table 7.1: Philippines key data	125
Figure 7.1: Philippines AMI penetration rate	125
Table 7.2: Smart grid indicators in the Philippines	126
Box 7.1: Political risk in the Philippines	128
Figure 7.2: Existing smart grid regulatory activity in the Philippines	131
Figure 7.3: Philippines cumulative smart grid forecast	134
Table 7.3: Philippines cumulative smart grid forecast data	134
Figure 7.4: Philippines cumulative AMI forecast	135
Table 7.4: Philippines cumulative AMI forecast data	135
Figure 7.5: MERALCO's initial smart grid pilot	137
Table 7.5: USTDA smart grid activity in Philippines	138
Table 8.1: Indonesia key data	140
Figure 8.1: Indonesia AMI penetration rate	140
Table 8.2: Smart grid indicators in Indonesia	141
Box 8.1: Political risk in Indonesia	145
Figure 8.2: Feed-in tariffs in Indonesia	146
Figure 8.3: Planned solar installations in Indonesia	147



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

Figure 8.4: Indonesia cumulative smart grid forecast	149
Table 8.3: Indonesia cumulative smart grid forecast data	149
Figure 8.5: Indonesia cumulative AMI forecast	150
Table 8.3: Indonesia cumulative AMI forecast data	150
Figure 8.6: Annual meter deployments in Indonesia	152
Table 9.1: Vietnam key data	155
Figure 9.1: Vietnam AMI penetration rate	155
Table 9.2: Smart grid indicators in Vietnam	156
Box 9.1: Political risk in Vietnam	158
Figure 9.2: Electricity regulatory structure in Vietnam	159
Table 9.3: Vietnam cumulative smart grid forecast data	162
Figure 9.3: Vietnam cumulative smart grid forecast	162
Table 9.4: Vietnam cumulative AMI forecast data	163
Figure 9.4: Vietnam cumulative AMI forecast	163
Figure 9.5: Smart grid roadmap for EVN in Vietnam	165
Figure 9.6: Funding for T&D investments in Vietnam	166
Table 10.1: Cambodia key data	169
Figure 10.1: Cambodia AMI penetration rate	169
Figure 10.2: Electricity prices and GDP/capita in Southeast Asia	170
Figure 10.3: Cambodia cumulative smart grid forecast	170
Table 10.2: Cambodia cumulative smart grid forecast data	171
Figure 10.4: Cambodia cumulative AMI forecast	171
Table 10.3: Cambodia cumulative AMI forecast data	171
Table 10.4: Laos key data	172
Figure 10.5: Laos AMI penetration rate	172
Table 10.5: World Bank smart grid project in Laos	172
Figure 10.6: Laos cumulative smart grid forecast	173
Table 10.6: Laos cumulative smart grid forecast data	173
Figure 10.7: Laos cumulative AMI forecast	174
Table 10.7: Laos cumulative AMI forecast data	174
Table 10.8: Myanmar key data	175
Figure 10.8: Myanmar AMI penetration rate	175
Figure 10.9: Highest global T&D loss rates	175
Table 10.4: Myanmar cumulative smart grid forecast data	176

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

Figure 10.5: Myanmar cumulative smart grid forecast	176
Table 10.5: Myanmar cumulative AMI forecast data	177
Figure 10.6: Myanmar cumulative AMI forecast	177
Figure 11.1: Leading smart grid vendors in Southeast Asia	178
Figure 11.2: Market share of leading meter hardware vendors in Southeast Asia	179
Table 11.1: Other leading smart grid vendors in Southeast Asia	181
Figure 11.3: International meter vendor presence in in Southeast Asia	183
Table 11.2: Vendor partnerships and activity	184

## Order Form – Southeast Asia Smart Grid: Market Forecast (2016-2026)

### 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.

SINGLE USER     ENTERPRISE LICENSE

### Customer information

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.*