



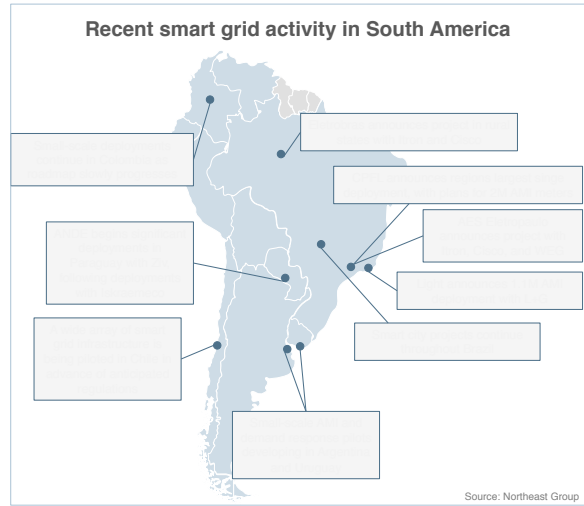
northeast group, llc

South America Smart Grid: Market Forecast (2015 – 2025)

Volume III
August 2015 | www.northeast-group.com

South America Smart Grid: Market Forecast (2015 – 2025)

South America is one of the most attractive emerging market regions for smart grid infrastructure investment. The region is comprised of countries with developing regulatory frameworks and core business case indicators that point towards immediate benefits from smart grid infrastructure. From 2015 to 2025, the region’s total smart grid market will cumulatively reach \$38.1 billion. This includes investment in advanced metering infrastructure (AMI), distribution automation (DA), wide area measurement (WAM), home energy management (HEM), information technology (IT), and battery storage.



This study covers all ten Latin countries in South America, which share several key characteristics. They are fast growing economies with burgeoning middle classes, yet still have some of the highest electricity theft rates in the world. They have abundant renewable sources of power—particularly large hydropower—but their grids are struggling to meet rising demand. Further distributed renewable energy resources are also becoming increasingly attractive across the region. Lastly, they have governments eager to keep electricity prices low, but wary of increasing subsidies.

Smart grid projects at Brazilian utilities							
Utility	AMI	DA	DG	Storage	EVs	IT/ Analytics	Smart buildings

Throughout South America, smart grid infrastructure is now viewed as a solution to many of the challenges the region is facing. Eight of the ten countries already have significant pilot projects in place, while half of the countries have developed some form of smart grid roadmap. Brazil is leading the way with pilot projects dating back to the mid-2000s, recently announced plans for over 3 million new AMI meters, and a

number of smart city projects that are testing out a variety of smart grid applications. Furthermore, Brazil's government has set regulations for smart meter deployments and created incentives for residents to install small-scale solar PV along with smart meters. As the largest country in the region, Brazil will drive the market—its conditions are similar to most other South American countries and regional standardization is improving.

But Brazil is not alone in its smart grid development. Ecuador has set an even more ambitious timeline for smart grid deployments, while Colombia and Peru are in the process of finalizing smart grid roadmaps. Chile is developing its own smart city projects, Argentina is funding smart grid R&D, and even Paraguay is developing smart meter pilot projects. Beyond AMI, distribution automation is a focus for almost all South American utilities due to poor reliability, and several South American countries are also currently developing phasor measurement unit projects throughout the transmission grid.

The key driver of these initiatives is the unique near-term and long-term benefits South American countries will receive from smart grid infrastructure. Unlike some of the more developed emerging market countries, South American utilities will receive near-term savings from smart meter deployments by reducing non-technical losses. At 15%, the regional transmission and distribution (T&D) loss rate is among the highest in the world. But there are also important long-term benefits to smart grid infrastructure that help win governmental support—rising middle classes mean that demand response programs will grow in importance and developing the region's strong solar, wind, and small hydro resources will require smart grid to help manage the increased variability. Utilities can therefore make near-term deployments to help reduce non-technical losses, while laying the groundwork for long-term benefits.

Current smart grid activity remains in the early stages and there are some challenges to overcome. Most notably, concrete regulatory incentives have failed to develop in the past two years as governments seek to find ways to finance their ambitious plans to largely low-income residents. But these factors are slowly changing—incomes are rising, smart grid infrastructure costs are falling, and regional collaboration is creating regulatory frameworks that can be adopted throughout the region. As a result, South American countries are poised to reap the significant benefits of smart grid, with significant investment expected throughout the forecast period.

Key questions answered in this study:

- Where are the newest smart grid announcements and deployments in South America?
- How large will the smart grid market be in 10 countries across 15 sub-segments?
- Which countries are poised to take the next steps for smart grid regulatory development?
- Which local vendors are active and who are the leading international vendors?

Table of Contents

i. Executive summary	1
i.i What's new in 2015?	5
i.ii South America smart grid overview	17
ii. Methodology	24
1. Introduction	28
1.1 What is smart grid?	28
1.2 How has smart grid been used elsewhere in the world?	40
2. South America smart grid snapshot	48
2.1 The region in comparison	50
2.2 Regional drivers	52
2.3 Regional challenges	62
3. Regional market forecast	68
4. Brazil	77
4.1 Electricity industry structure	79
4.2 Smart grid regulatory environment	84
4.3 Market forecast	93
4.4 Utility activity	96
5. Chile	111
5.1 Electricity industry structure	124
5.2 Smart grid regulatory environment	126
5.3 Market forecast	133
5.4 Utility activity	136
6. Colombia	142
6.1 Electricity industry structure	144
6.2 Smart grid regulatory environment	146
6.3 Market forecast	149
6.4 Utility activity	152
7. Argentina	142
7.1 Electricity industry structure	157
7.2 Smart grid regulatory environment	159

Table of Contents (cont.)

7.3 Market forecast	164
7.4 Utility activity	168
8. Ecuador	173
8.1 Electricity industry structure	175
8.2 Smart grid regulatory environment	177
8.3 Market forecast	180
8.4 Utility activity	183
9. Peru	186
9.1 Electricity industry structure	188
9.2 Smart grid regulatory environment	190
9.3 Market forecast	192
9.4 Utility activity	194
10. Paraguay	196
10.1 Electricity industry structure	198
10.2 Smart grid regulatory environment	200
10.3 Market forecast	201
10.4 Utility activity	204
11. Uruguay	206
11.1 Electricity industry structure	208
11.2 Smart grid regulatory environment	209
11.3 Market forecast	211
11.4 Utility activity	214
12. Venezuela	216
12.1 Electricity industry structure	218
12.2 Smart grid regulatory environment	219
12.3 Market forecast	221
12.4 Utility activity	224
13. Bolivia	226
13.1 Electricity industry structure	228
13.2 Smart grid regulatory environment	231
13.3 Market forecast	232

Table of Contents (cont.)

13.4 Utility activity	235
14. Vendor activity	237
14.1 South America-based vendors	237
14.2 International vendors	248
15. Appendix	266
15.1 List of companies covered in this study	266
15.2 List of acronyms	270

List of Figures, Boxes, and Tables

South America smart grid: key takeaways	4
Smart meter potential in South America (2013 – 2015)	6
AMI deployments and announcements in South America	7
Recent smart grid activity in South America	8
Recent smart grid projects in South America (2014 – 2015)	9
Chinese meter vendor activity in South America	10
Recent smart grid international cooperation in South America	11
Smart grid drivers and barriers in South America	17
Distribution losses in South America	18
Growth in per-capita electricity consumption (2014 – 2025)	19
Renewable energy potential and incentives in South America	19
AMI vendor activity in Brazil	20
Leading smart metering vendors in South America	21
South America smart grid forecast	22
South America smart grid forecast data	22
Smart grid forecast by country	23
Smart grid forecast data by country	23
Northeast Group Smart Grid Forecasting Model	27
Figure 1.1: Smart grid value chain	28
Figure 1.2: Smart grid model	29
Table 1.1: Benefits of AMI in South America	32
Table 1.2: Demand response options	35
Figure 1.3: Global smart grid activity	40
Figure 1.4: Cumulative AMI investment by region up to 2015	41

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

Figure 1.5: Cumulative distribution automation investment by region up to 2015	41
Figure 1.6: Cumulative AMI investment by region up to 2025	42
Figure 1.7: Cumulative distribution automation investment by region up to 2025	42
Figure 2.1: Emerging markets smart meter potential	47
Figure 2.2: Per-capita electricity consumption	49
Figure 2.3: Per-capita CO ₂ emissions	50
Figure 2.4: Projected GDP growth	51
Figure 2.5: T&D losses in South America	52
Figure 2.6: Large-scale power plants in South America	53
Box 2.1: Smart meter business case in South America	54
Figure 2.7: Payback on AMI meter from loss reduction at two Brazilian utilities	55
Figure 2.8: 10-year per meter savings from theft reduction	56
Figure 2.9: Growth in per-capita electricity consumption	57
Figure 2.10: Renewable sources of energy in South America	58
Figure 2.11: Annual manufacturing business losses due to power outages	59
Table 2.1: Appliance ownership in Brazil	60
Table 2.2 Smart grid market drivers and barriers in South America	62
Figure 2.12: Ten-year price per kWh of AMI endpoints	62
Figure 2.13: Per-capita electricity consumption in South America	63
Figure 2.14: Average regulatory scores in emerging markets	63
Figure 2.15: Percent hydro in generation mix	64
Figure 3.1: South America smart grid forecast	67
Table 3.1: South America smart grid forecast data	68
Figure 3.2: South America AMI penetration rate	68
Figure 3.3: Smart grid forecast by country	69
Table 3.2: Smart grid forecast data by country	69
Figure 3.4: Annual AMI deployments in South America	70
Figure 3.5: AMI cost breakdown	70
Figure 3.6: AMI forecast by segment	72
Table 3.3: AMI forecast data by segment	72
Figure 3.7: DA forecast by segment	73
Table 3.4: DA forecast data by segment	73
Figure 3.8: HEM forecast by segment	74
Table 3.5: HEM forecast data by segment	74

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

Figure 3.9: IT forecast by segment	75
Table 3.6: IT forecast data by segment	75
Table 4.1: Brazil key data	76
Figure 4.1: Brazil AMI penetration rate	76
Table 4.2: Smart grid indicators in Brazil	77
Figure 4.2: Contracted and forecasted new generation in Brazil	79
Figure 4.3: Utility ownership in Brazil (%)	79
Figure 4.4: Electricity regulatory structure in Brazil	83
Box 4.1: Political risk in Brazil	85
Figure 4.5: Conventional and “white” tariffs	87
Table 4.3: Smart grid-related government action in Brazil	88
Table 4.4: Smart grid funding through Inova Energia	90
Figure 4.6: EV incentives in Brazil	91
Figure 4.7: Brazil smart grid forecast	92
Table 4.5: Brazil smart grid forecast data	92
Figure 4.8: Brazil AMI forecast	93
Table 4.6: Brazil AMI forecast data	93
Table 4.7: Smart grid projects at Brazilian utilities	95
Figure 4.9: AMI vendor activity in Brazil	96
Table 4.8: Smart grid vendor activity at ten leading utilities in Brazil	96
Table 4.9: Brazilian utilities	97
Figure 4.10: T&D losses at Brazilian utilities	98
Table 4.10: Indicators for leading utility parent companies in Brazil	99
Figure 4.11: “Smart city” projects in Brazil	100
Box 4.2: Light’s Optimus program	106
Table 4.11: Improvement following smart grid deployments in Búzios	114
Table 5.1: Chile key data	124
Figure 5.1: Chile AMI penetration rate	124
Table 5.2: Smart grid indicators in Chile	125
Box 5.1: Political risk in Chile	129
Box 5.2: Chile’s renewable energy potential	132
Table 5.3: EV pilot incentives in Chile	133
Figure 5.2: Estimated monthly household power bills in South America	133
Figure 5.3: Chile smart grid forecast	134

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

Table 5.4: Chile smart grid forecast data	134
Figure 5.4: Chile AMI forecast	135
Table 5.5: Chile AMI forecast data	135
Table 5.6: Leading Chilean distribution utilities	137
Table 6.1: Colombia key data	142
Figure 6.1: Colombia AMI penetration rate	142
Table 6.2: Smart grid indicators in Colombia	143
Figure 6.2: ISA's South American transmission assets	145
Table 6.3: Leading Colombian distribution utilities	146
Box 6.1: Political risk in Colombia	147
Figure 6.3: Colombia smart grid forecast	150
Table 6.4: Colombia smart grid forecast data	150
Figure 6.4: Colombia AMI forecast	151
Table 6.5: Colombia AMI forecast data	151
Figure 6.5: Percentage of Colombian utilities carrying out smart grid projects	153
Figure 6.6: Emcali's smart grid plans	155
Table 7.1: Argentina key data	157
Figure 7.1: Argentina AMI penetration rate	157
Table 7.2: Smart grid indicators in Argentina	158
Box 7.1: Political risk in Argentina	161
Figure 7.2: Argentina smart grid forecast	165
Table 7.3: Argentina smart grid forecast data	165
Figure 7.3: Argentina AMI forecast	166
Table 7.4: Argentina AMI forecast data	166
Figure 7.4: Electricity prices in South America	167
Figure 7.5: Electric bill for 150 kWh/month consumer at Edesur	167
Table 7.5: Leading Argentine distribution utilities	168
Figure 7.6: Edenor's proposed pilot TOU tariffs	169
Table 8.1: Ecuador key data	173
Figure 8.1: Ecuador AMI penetration rate	173
Table 8.2: Smart grid indicators in Ecuador	174
Box 8.1: Political risk in Ecuador	176
Figure 8.2: Ecuador's national smart grid plan	178
Figure 8.3: Ecuador smart grid forecast	181

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

Table 8.3: Ecuador smart grid forecast data	181
Figure 8.4: Ecuador AMI forecast	182
Table 8.4: Ecuador AMI forecast data	182
Figure 8.5: Distribution losses at Ecuadorean utilities	183
Table 8.5: Vendors already active in Ecuador	184
Table 9.1: Peru key data	186
Figure 9.1: Peru AMI penetration rate	186
Table 9.2: Smart grid indicators in Peru	187
Box 9.1: Political risk in Peru	189
Figure 9.2: Osinergmin’s smart grid roadmap	190
Figure 9.3: Peru smart grid forecast	192
Table 9.3: Peru smart grid forecast data	192
Figure 9.4: Peru AMI forecast	193
Table 9.4: Peru AMI forecast data	193
Table 10.1: Paraguay key data	196
Figure 10.1: Paraguay AMI penetration rate	196
Table 10.2: Smart grid indicators in Paraguay	197
Box 10.1: Political risk in Paraguay	199
Figure 10.2: Highest global distribution losses	201
Figure 10.3: Paraguay smart grid forecast	202
Table 10.3: Paraguay smart grid forecast data	202
Figure 10.4: Paraguay AMI forecast	203
Table 10.4: Paraguay AMI forecast data	203
Table 11.1: Uruguay key data	206
Figure 11.1: Uruguay AMI penetration rate	206
Table 11.2: Smart grid indicators in Uruguay	207
Box 11.1: Political risk in Uruguay	210
Figure 11.2: Estimated monthly household power bills in South America	211
Figure 11.3: Uruguay smart grid forecast	212
Table 11.3: Uruguay smart grid forecast data	212
Figure 11.4: Uruguay AMI forecast	213
Table 11.4: Uruguay AMI forecast data	213
Figure 11.5: UTE’s smart grid timeline	215
Table 12.1: Venezuela key data	216

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

Figure 12.1: Venezuela AMI penetration rate	216
Table 12.2: Smart grid indicators in Venezuela	217
Box 12.1: Political risk in Venezuela	220
Figure 12.2: Smart meter benefit indicators in South America	221
Figure 12.3: Venezuela smart grid forecast	222
Table 12.3: Venezuela smart grid forecast data	222
Figure 12.4: Venezuela AMI forecast	223
Table 12.4: Venezuela AMI forecast data	223
Table 13.1: Bolivia key data	226
Figure 13.1: Bolivia AMI penetration rate	226
Table 13.2: Smart grid indicators in Bolivia	227
Box 13.1: Political risk in Bolivia	230
Figure 13.2: Estimated monthly household power bills in South America	232
Figure 13.3: Bolivia smart grid forecast	233
Table 13.3: Bolivia smart grid forecast data	233
Figure 13.4: Bolivia AMI forecast	234
Table 13.4: Bolivia AMI forecast data	234
Figure 14.1: Leading smart grid vendors in South America	237
Figure 14.2: Market share of leading AMI vendors in South America	238
Figure 14.3: Market share of leading AMI vendors in South America (excluding Brazil)	239
Table 14.1: Other smart grid vendors based in South America	248
Table 14.2: Leading AMI hardware vendors in South America	250
Table 14.3: Leading vendors of additional AMI components in South America	251

Order Form – South America Smart Grid: Market Forecast (2015-2025)

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.