

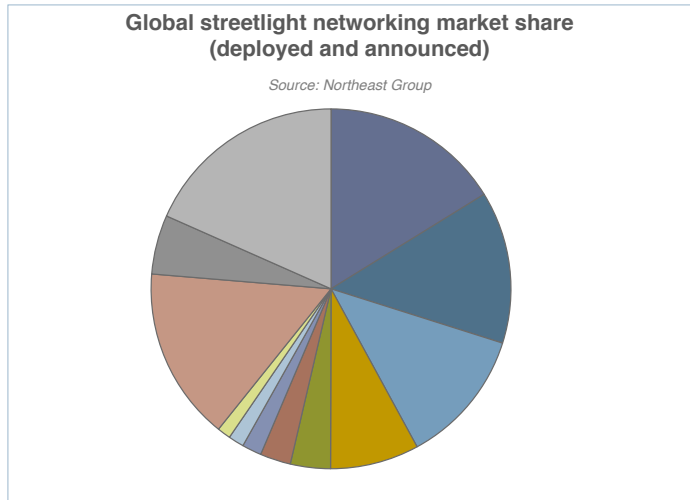
northeast group, llc

Global LED and Smart Street Lighting: Market Forecast (2017 – 2027)

Volume IV
November 2017 | www.northeast-group.com

Global LED and Smart Street Lighting: Market Forecast (2017 – 2027)

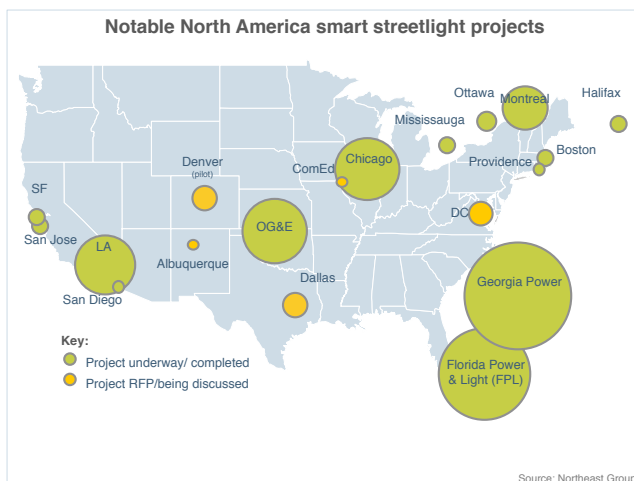
There are currently 317 million streetlights in the world. This number will grow to 363 million total streetlights by 2027. The public outdoor lighting market is currently undergoing a period of change where legacy streetlights are being replaced with new and more efficient LED, or solid-state lighting, technology. Taking this new technology a step further, these LED streetlights are also being networked together with communications to become “smart” streetlights. This study analyzes and forecasts the global market for both LED and smart street lighting through 2027.



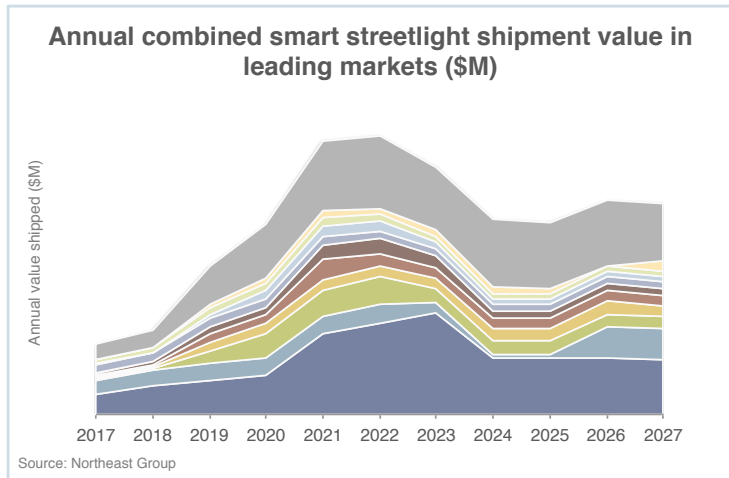
LED streetlights will transform cities and municipalities across the globe over the next decade. LEDs offer longer lifetimes, lower energy consumption, and reduced maintenance expenses when compared with legacy streetlight technologies. LEDs are quickly becoming the dominant source of lighting in cities around the world and from 2017 to 2027, global investment in LED street lighting is expected to be \$53.6 billion.

But LEDs are not the sole element in modernized public outdoor lighting. Networked “smart” streetlights help cities further reduce costs with their dimming capabilities and reduced maintenance costs. As the costs for networked streetlights also decline, these smart streetlights will find a growing role in cities and municipalities across the globe. Smart street lighting is already taking off in major markets such as the US, UK, and China. In many developed

countries, smart streetlights are serving as part of larger “smart city” concepts, where communications networks can be used to link items such as electricity and water meters, traffic lights, parking meters, waste bins, and other infrastructure. Smart streetlights also greatly improve safety conditions in a city by reducing the “down time” of streetlights. In many emerging market metropolises—and US cities—that are managing rising street crime, this will be a particularly strong benefit.



While there are still challenges to overcome, the rapid growth of LED and smart street lighting is providing clear examples and benefit cases for cities in diverse contexts to follow. Given these clear advantages, LED and smart streetlights are projected to reach 89% and 29% of the total streetlight market, respectively, by 2027. This will total a \$64.2 billion market opportunity over the next decade.



Key questions answered in this study:

- What are the market shares of the leading smart streetlight vendors?
- How large will the market for LED and smart streetlights be across 125 countries?
- How are new LPWAN communications options impacting the smart streetlight and smart city markets?
- What is the streetlight ownership structure in the leading markets?
- Who are the key vendors throughout the smart streetlight value chain?
- What hurdles to smart street lighting have been overcome and which ones remain?

Deliverables: *Global LED and Smart Street Lighting: Market Forecast (2017 – 2027)* includes a 158-page PDF study, executive summary presentation, and a dataset in excel covering 125 individual countries with more than 30,000 data points.

India	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Streetlights (units)	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X
Total LED Streetlights (units)	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X
Total LED Streetlight Value (\$M)	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X
Cobrahead/shoebox units	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X
Cobrahead/shoebox value (\$M)	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X
Decorative units	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X
Decorative value (\$M)	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X
High wattage (>50 W) units	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X
High wattage (>50 W) value (\$M)	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X
Smart/Networking units (nodes)	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X	X.X
Smart/Networking value (\$M)	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X	\$X.X

Table of Contents

i. Executive Summary	1
1. What's new in 2017?	4
2. The benefits of LED and smart streetlights	17
3. Challenges for LED and smart streetlight systems	27
4. Case studies	42
5. Market forecast	63
6. Leading markets	74
7. Vendors	81
8. Appendix	121
8.1 Methodology	121
8.2 LED and smart lighting overview	124
8.3 Introduction to smart infrastructure	135
8.4 List of abbreviations and companies covered	144

List of Figures, Boxes, and Tables

Global LED and smart street lighting: key takeaways	3
Figure 1.1: LPWAN IoT options	4
Table 1.1: Streetlight communications comparison	5
Table 1.2: Smart city applications	7
Figure 1.2: Notable Americas smart streetlight projects	9
Figure 1.3: Notable EMEA smart streetlight projects	10
Figure 1.4: Notable Asia-Pacific smart streetlight projects	12
Figure 1.5: Global streetlight networking market share (deployed and announced)	13
Figure 1.6: Global streetlight networking market share (deployed by end of 2017)	14
Figure 1.7: Comparison of networked streetlight market share in 2016 and 2017	14
Table 1.3: Notable smart streetlight partnerships in the past year	15
Table 2.1: HPS to LED wattage cross-reference	17
Table 2.2: LED streetlight costs and benefits	18
Figure 2.1: LED streetlight cost benefit in high income, high electricity price country	19
Figure 2.2: LED streetlight cost benefit in low income, low electricity price country	19
Table 2.3: Smart streetlight costs and benefits	20
Figure 2.3: Smart streetlight cost benefit in high income, high electricity price country	21
Figure 2.4: Smart streetlight cost benefit in low income, low electricity price country	22

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

Figure 2.5: 10-year breakeven point for smart streetlights	23
Figure 2.6: Average electricity prices by region	24
Table 2.4: Additional benefits to smart streetlights	25
Table 2.5: Summary of cost-benefit analysis examples	26
Table 3.1: Challenges to implementing smart and LED streetlights	27
Table 3.2: Streetlight financing options	30
Table 3.3: Streetlight financing in Europe	31
Table 3.4: Streetlight ownership models	33
Figure 3.1: Countries with only state-owned utilities	34
Figure 3.2: Legal framework for assessing liability of streetlights	38
Table 3.5: Dimming criteria for the standard IESNA RP-8-05	39
Figure 4.1: Case study examples in this study	42
Table 4.1: Summary of case studies	43
Table 5.1: Total number of streetlights	63
Table 5.2: Cumulative investment in LED and smart streetlights	64
Figure 5.1: Cumulative investment in LED and smart streetlights	64
Figure 5.2: Global LED and smart streetlight penetration rate	65
Figure 5.3: Common types of LED streetlight fixtures	66
Figure 5.4: Average cost per streetlight of smart LED projects	67
Figure 5.5: LED streetlight forecast by lamp type	69
Table 5.4: LED streetlight forecast data by type	69
Figure 5.6: LED streetlight forecast with installation separate	70
Table 5.5: LED streetlight forecast data by region	70
Figure 5.7: Regional LED streetlight forecast (cumulative)	71
Figure 5.8: Regional LED streetlight forecast (annual)	71
Figure 5.9: Regional smart streetlight forecast (cumulative)	72
Table 5.7: Smart streetlight forecast data by region	73
Figure 5.10: Regional smart streetlight forecast (annual)	73
Figure 6.1: Annual LED streetlight value in leading markets	74
Figure 6.2: Annual smart streetlight value in leading markets	74
<i>Leading markets snapshots</i>	
United States	75
China	75
Japan	76

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

Germany	76
Brazil	77
India	77
Mexico	78
France	79
United Kingdom	79
Turkey	79
South Korea	80
Italy	80
Figure 7.1: Global streetlight networking market share (deployed and announced)	82
Figure 7.2: Global streetlight networking market share (deployed end of 2017)	82
Figure 7.3: Comparison of networked streetlight market share in 2016 and 2017	83
Figure 7.4: Streetlight networking market share in the Americas	83
Figure 7.5: Streetlight networking market share in EMEA	84
Figure 7.6: Streetlight networking market share in Asia-Pac	84
Table 7.1: Leading smart streetlight communications vendors	85
Table 7.2: Notable smart streetlight partnerships in the past year	85
Table 7.3: Streetlight vendor partnerships	86
Figure 7.7: Smart lighting value chain	86
Table 7.4: Streetlight communications vendors	87
Table 7.5: Streetlight control hardware vendors	103
Table 7.6: ESCOs and smart city integrators	110
Table 7.7: General LED lighting vendors	114
Figure 7.7: Location of smart streetlight vendors	116
Table 7.8: LED chip vendors	117
Figure 7.8: Relative manufacturing costs of LED components	118
Table 7.9: LED wafer vendors	119
Table 7.10: LED phosphor vendors	119
Table 7.11: LED driver vendors	119
Figure 8.1: LED and smart streetlight forecast methodology	122
Figure 8.2: Streetlight directional control	125
Table 8.1: LED streetlight benefits	125
Figure 8.3: Response to LED streetlight projects from Northeast Group survey	127
Table 8.2: Different types of streetlight luminaires	127

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

Figure 8.4: Types of streetlights in Brazil	129
Figure 8.5: Smart streetlight model	131
Table 8.3: Smart infrastructure market segments	134
Figure 8.6: Smart infrastructure overview	136
Table 8.4: Communications technologies	138
Figure 8.7: Smart grid value chain	139

Order Form – Global LED and Smart Street Lighting: Market Forecast (2017 - 2027)

Pricing (includes PDF study, executive summary slides and excel dataset)

Single user – \$4,950 | Enterprise license – \$6,995

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.