INDUSTRIAL LPWAN

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ON World Inc.
Emerald Plaza Center
402 West Broadway
Suite 400
San Diego, California 92101
http://www.onworld.com

Toll free (U.S.): 888.312.2619
International: 858.259.2397

Executive Summary

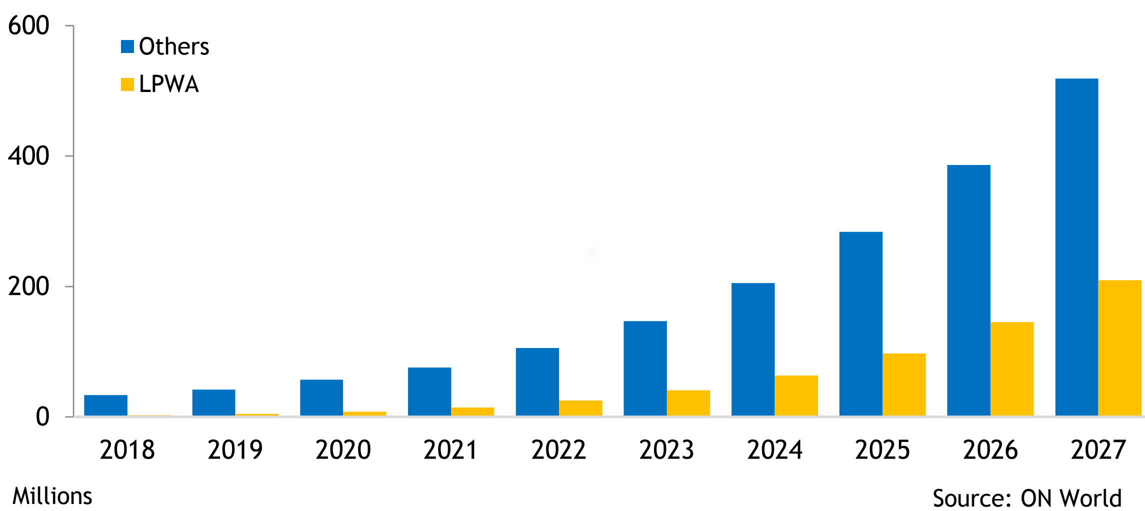
Unlicensed Low Power Wide Area Networks (LPWANs) such as Sigfox and LoRaWAN™ are providing much of the growth for the industrial Internet of Things (IoT) despite accelerated rollouts of NB-IoT and LTE-M networks. With low-cost, battery-powered wireless sensors, LPWANs are connecting assets many miles away, monitoring equipment deployed in multiple factory sites and providing continuous visibility of mobile assets with significantly reduced connectivity and maintenance costs. Connected industrial LPWAN devices will triple by 2020.

ON World's 2018 survey with 160 industrial IoT professionals-- completed with the International Society of Automation (ISA) and the LoRa Alliance™-- found that 57% are researching or developing industrial LPWAN solutions. Three quarters of LPWAN developers are targeting new industrial IoT applications that cannot be addressed with existing technologies.

Competition among LPWAN technologies has driven IoT innovations such as multi-radio devices, radio-based geolocation, disposable devices and evolving network operator business models. The growing licensed and unlicensed public LPWAN ecosystem has resulted in services now available in hundreds of countries. While North American telecom operators focus on NB-IoT and LTE-M, many operators in Europe and Asia are providing both NB-IoT or LTE-M and LoRaWAN services. With 80 public network operators worldwide, growth is accelerating for private LoRaWAN networks that provide rapidly deployable, dedicated networks for enterprises.

Within the next decade, there will be 650 million wireless sensor network (WSN) devices in use worldwide for industrial automation, logistics, agriculture, construction and related areas. LPWANs will make up 1 in 3 by this time, with the largest impact for asset tracking and locating, precision agriculture, remote equipment monitoring and smart water solutions.

Figure 1: Global Smart Industry WSN Connections, LPWAN & Others (2018-2027)



Source: ON World

Driving IoT Innovations

Asset tracking and locating is the fastest growing LPWAN application area with the largest total potential market size. LoRaWAN networks support radio-based geolocation to significantly lower the cost of mobile asset tracking within a 100-meter radius without requiring GPS. Sigfox's recently launched Atlas WiFi service which combines WiFi infrastructure registered in the HERE location suite with Sigfox network technology, also without using GPS. In October 2018, the LoRa Alliance announced three specifications that support standards-based firmware over the air updates, a required feature for widespread adoption of LPWAN solutions such as asset tracking.

LPWAN hardware innovations are growing. Examples include multi-radio asset trackers that combine LPWAN technologies such as Sigfox, LoRaWAN or NB-IoT for outdoor asset tracking with short-range wireless technologies such as WiFi or Bluetooth Low Energy (BLE) for precise indoor real-time location systems (RTLS). Polysense's universal LPWAN sensor is targeted at multiple applications for manufacturing, electric power, water/wastewater and logistics. Yokogawa has created a "sushi" vibration sensor and thumb-sized gateway using LoRaWAN. Disposable devices are in the works. Sigfox has announced a 20 cent RF module prototype and the LoRa Alliance is currently testing a disposable asset tracker using a printed battery technology.

Evolving Network Operator Models

Established network operators such as Comcast, Deutsche Telekom, Objenious (Bouygues Telecom), Orange, Verizon and Vodafone are ramping up their IoT offerings with vertical solutions and disruptive connectivity service pricing. While North American telecom operators focus on NB-IoT and LTE-M, many operators in Asia and Europe provide both cellular and non-cellular LPWAN options. LoRaWAN offers enterprises with the flexibility of having dedicated, private networks with hosted network servers in the cloud or on-site as well as seamless roaming across multiple networks.

Dedicated IoT network operators have launched new business models aimed at accelerating IoT adoption. Senet offers a variety of cloud-based network connectivity and OSS and BSS platforms including Virtual Network Services that enable a variety of stakeholders to benefit from deploying IoT devices through a shared revenue model. Ingenu is delivering its Random Phase Multiple Access (RPMA) connectivity technology through a Platform-as-as-Service (PaaS) model.

This report is based on extensive phone interviews with industrial automation vendors, suppliers and end users as well as Q4 2018 survey with 160 industrial IoT professionals that was completed in collaboration with the International Society of Automation (ISA) and the LoRa Alliance. For the past 15 years, ON World's market research has been used by government agencies, Fortune 1000 companies and IoT developers worldwide.

*LoRa Alliance™ and LoRaWAN™ are marks used under license from the LoRa Alliance.

Methodology/Scope

This report covers the market opportunity, value system and technology developments for industrial Low Power Wide Area Networks (LPWAN) including 30+ market segments/applications. Our research methodology includes extensive phone interviews and surveys with organizations across the whole IoT value chain, an in-depth technology evaluation and a competitive analysis of 100+ companies with industrial IoT/LPWAN products and services.

The major components of our research include the following:

Data Collection/Investigation:

- 200+ surveys/phone interviews with leading industrial automation vendors and LPWA developers, suppliers and network operators
- Extensive review of technical, financial and company published materials.

Segmentation:

Geographies:	North America, Western Europe, Asia Pacific, and Rest of World
Markets:	Manufacturing, oil and gas, electric power, water and wastewater, logistics/supply chain management, agriculture, construction, mining, logging and others.
Solutions:	Condition monitoring; Health, safety and environmental monitoring; Smart tags (tracking/locating); Smart buttons and others
Product segments:	LPWA equipment (End nodes, gateways/base radios, chipsets/modules), connectivity and value-added services.

Competitive Forces & Technology Dynamics:

- Product segmentation, value chain and business model analysis
- Distribution channels, product availability and vendor strength
- Standards developments, technology adoption and emerging technologies
- Analysis of products' performance, pricing, functionality and potential for disruption

Market Size Forecasts:

- **Primary Research:** Recent market data is collected from vendors and end users on unit sales, growth trends, applications, hardware/service pricing, distribution channels, etc.
- **Market drivers:** Analysis of the weighted driver impact for each solution/market.
- **Projections**: Using all of the above, we create data models from a conservative, moderate and aggressive viewpoint. Unit forecast breakdowns are provided by target market, application, geography, technology and product segment. Revenues are for equipment and associated software/services.
- **Verification**: Forecasts are benchmarked with related markets using extensive internal and secondary sources and verified/confirmed with vendors/industry experts.

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ON World provides global business intelligence on Internet of Things markets. Since 2003, our market research has been used by Fortune 1000 companies, investors and IoT developers worldwide.

If you have any questions on the report, please call us or send us an email at: research@onworld.com