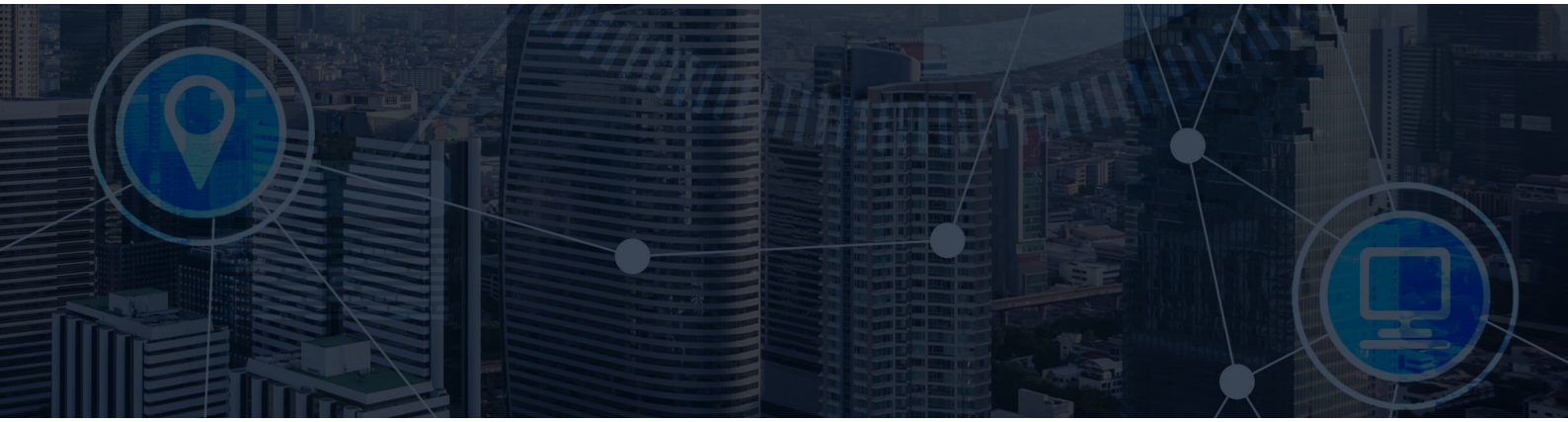
SIERRA WIRELESS™

TRANSFORMA INSIGHTS

Homogenous global cellular connectivity is key for the enterprise smart buildings market



The enterprise smart buildings market is characterised by many different applications, often deployed and operated in an isolated and non-integrated way. Market potential is huge, but to capitalise on the smart buildings opportunity vendors will need to offer homogenous 'platform' style solutions globally, including the potential to integrate many different application types into a cohesive proposition that is easy to deploy and manage. Global cellular connectivity with a single point of control will be a key enabler for such solutions.

The commercial buildings opportunity

The enterprise smart buildings market is a complex place, comprising multiple different applications and subject to a range of external pressures. The main applications include:

- **Building automation:** Including controllers and peripheral devices (monitoring devices, controlled devices and actuators) to support smart building functionality.
- **Heating, Ventilation, and Air-Conditioning (HVAC):** Systems are generally comprised of controllers and potentially smart peripheral devices.
- **Access Control & Intercoms:** Ranging from integrated building occupancy systems to simple connected doorbells.
- **Security & Fire Alarms:** Smart connected security alarms and fire alarms.
- **Building Lighting:** Including centrally monitored and controlled lighting solutions that respond to context, such as occupancy levels, weather, and the functional usage of space.
- **CCTV:** Often CCTV is included within building security solutions, but it is worth calling out separately firstly due to the bandwidth required to connect a CCTV camera and also the flexibility and potential of such solutions which are evolving to support all kinds of monitoring applications, often supported by Artificial Intelligence (AI). Examples include the monitoring of occupancy or people flows within buildings and behavioural monitoring (to identify, for instance, potentially criminal activities).

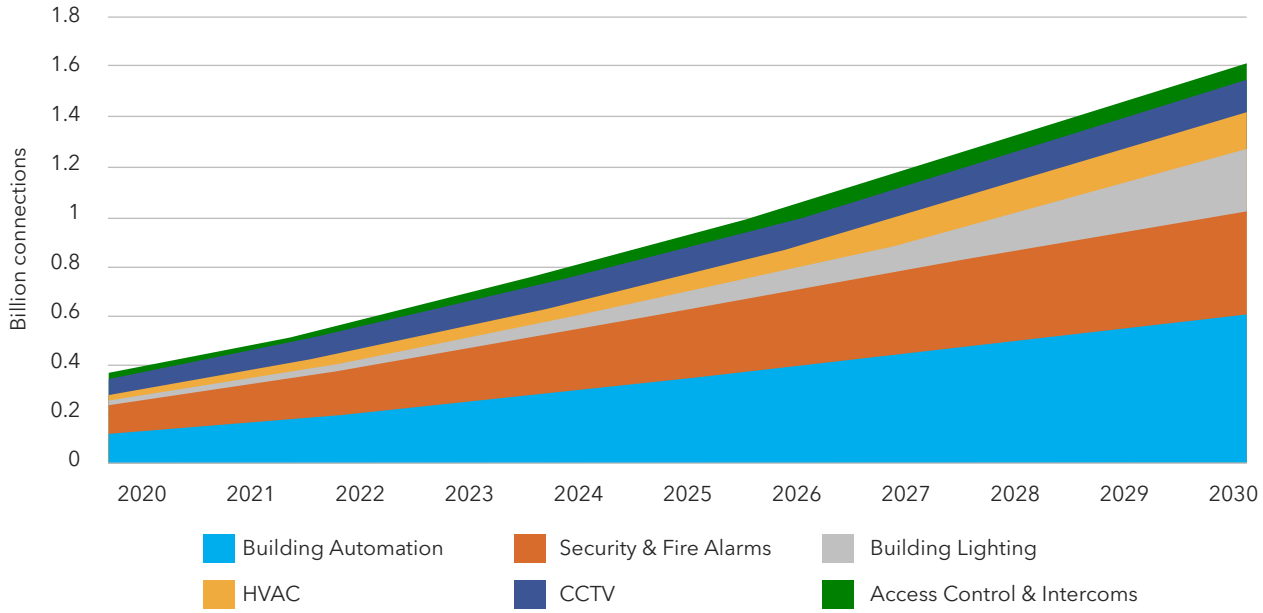
Beyond these core applications, there is an additional set of applications that can be integrated into overall smart buildings systems, including things like Parking Space Monitoring and Public Space Lighting.

Besides the accelerating adoption of smart buildings solutions, the main trend in the smart buildings space is an increasing desire to integrate different kinds of smart building solution into more cohesive solutions. For example, there are clear benefits to be gained by integrating a building occupancy monitoring system, a smart lighting system, a connected HVAC system, and a smart fire alarm system so that these different systems can work in a coordinated way.

Overall, the benefits of smart buildings solutions include energy savings, increased efficiency, and better security. These factors together are enough to drive the fast development of the market, but there is also a range of external factors that are accelerating adoption of smart buildings solutions. These range from regulatory pressure (such as green building certification schemes) to pressures resulting from developments in adjacent markets. For instance, the trend towards renewable energy sources and the increasing adoption of eVehicles has resulted in a particular focus on Virtual Power Plants (VPPs) which seek to balance load and generation within a typically campus context, and also simpler Demand Response (DR) systems. One of the effects of the VPP context is to again extend the scope of smart building systems to include monitoring of microgeneration (for example, solar or wind generation), and the control of devices that represent potentially significant power drains and for which power consumption peaks can be shifted in time (for example eV charging) to coincide with the availability of renewable energy. Solutions such as HVAC systems can be stitched into the same kind of VPP solution when other factors such as occupancy and weather are taken into account.

As illustrated in **Figure 1**, below, the enterprise smart buildings market overall is a significant and fast growing opportunity with connections growing to exceed 1.6 billion by 2030 (excluding consumer markets, and also public sector deployment of CCTV). Much of the growth over the period is driven by Building Automation, and Building Lighting in the later years, but all key smart buildings applications show strong growth through the forecast period.

Figure 1: *Connections for key enterprise smart building applications 2020-2030*



[Source: Transforma Insights, 2021]

The current state of the market and key success factors

As is clear from the preceding discussion, the smart buildings market is a complex place, and one that benefits significantly from the integration of many disparate point solutions.

However, the current state of the smart buildings market is some way from maturity. Larger buildings in more developed countries (or those countries with more extreme climates) tend to have some level of smart buildings solutions already deployed. However, these solutions are more often than not 'stove-pipe' in nature: they exist to perform a certain narrow function, and do not integrate into a wider and more cohesive system. A clear priority for owners of such larger buildings will be to focus on the integration between systems to deliver more comprehensive and cohesive solutions.

This is both an opportunity and a threat for existing providers in the smart buildings space, since a trend towards more integrated solutions will inevitably result in market consolidation: stronger players in different parts of the market will expand into adjacent spaces with well-integrated offerings, whilst weaker players will be out competed.

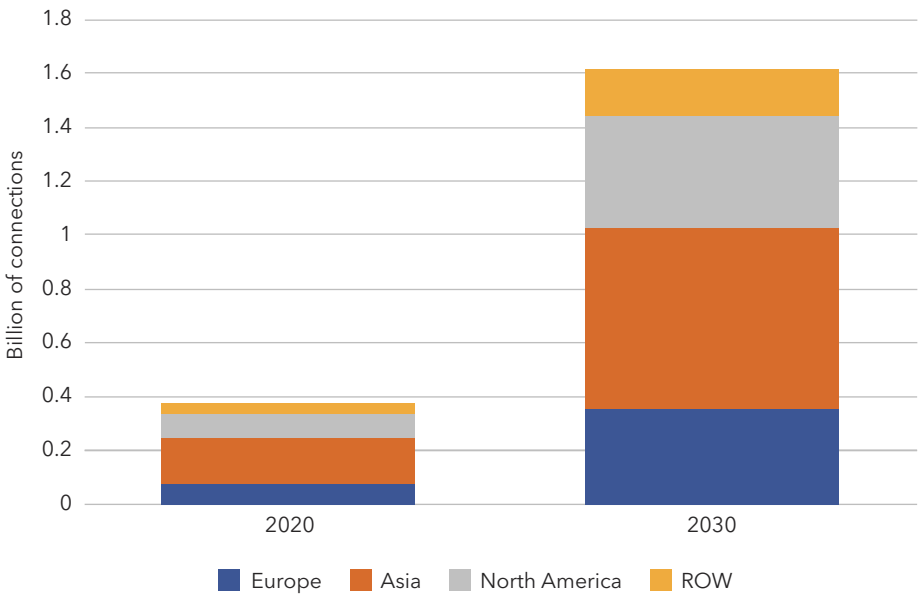
Key for any existing provider of smart buildings solutions for these established markets to benefit from market consolidation will be the ability to offer multiple different smart buildings applications, all integrated into a cohesive proposition, and underpinned by a flexible and robust software, hardware, and connectivity platform. In absence of these capabilities, it is likely that an existing provider will lose market share as a direct result of market consolidation.

Meanwhile, much of the underlying growth in the smart buildings market will be increasingly driven by the deployment of smart solutions into smaller commercial buildings, and also into consumer environments. These two markets are very different from the more established large building market, both in terms of scale and complexity of requirements. Overall, smart buildings propositions for these new, as yet mostly untapped, market opportunities will need to be simpler and more productised in nature. In terms of market potential, however, there are many many more small-to-medium size buildings in the world than there are large buildings, and opportunities associated with emerging smaller-building markets will be significant.

Key for providers of smart buildings solutions to penetrate newly emerging, smaller scale, markets will be the ability to offer simpler more productised solutions that can be deployed and managed easily, ideally across multiple geographies worldwide. These smaller-scale markets would also benefit from a richer proposition in terms of support, remote management and maintenance (possibly AI-enabled). They would also benefit from a commercial proposition that lowers the barriers to adoption, which could be enabled by a number of techniques ranging from simple leased (or subscription-based) solutions right through to 'as-a-service' business models which are likely to emerge in the context of Virtual Power Plants (or Demand Response) operations, and particularly in terms of efficiently stitching renewable microgeneration assets into existing electricity grids. A compelling proposition for a smart buildings vendor might be to rent roof space on a building to deploy solar panels that are managed as-a-service, and with some level of smart building functionality as a further inducement to the building owner.

Another key success factor across both established and newer emerging smart buildings markets will be the ability to support multiple geographies. As can be seen from Figure 2, below, the market for smart buildings solutions is becoming increasingly global, with strong growth expected in all geographies.

Figure 2: *Connections for key enterprise smart building applications, by region, 2020 & 2030*



[Source: Transforma Insights, 2021]

The role of connectivity

Clearly, connectivity is a key aspect of any smart building solution and there are number of different ways in which a smart buildings solution can be connected. Within buildings connectivity can be relatively easily achieved using a range of protocols and standards, ranging from Zigbee to Wi-Fi and (bus based) KNX to Ethernet.

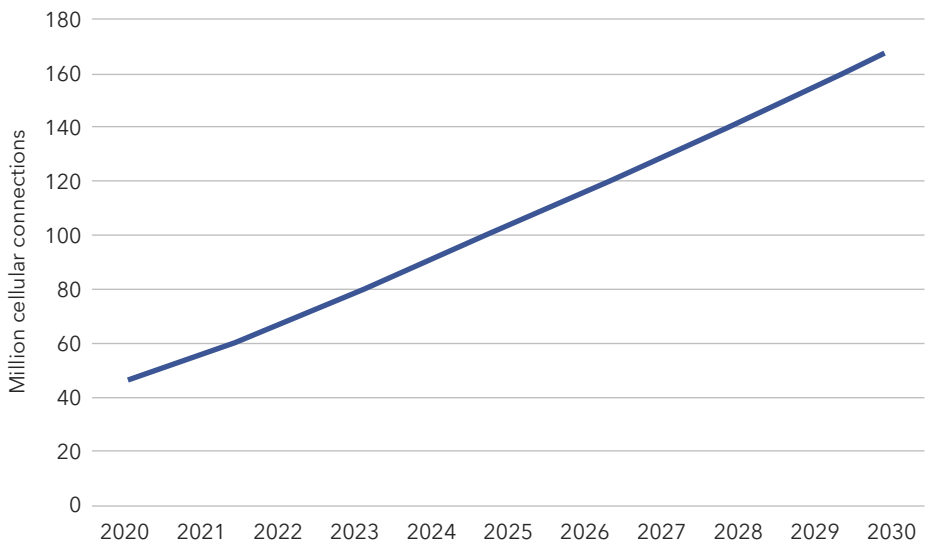
The connection of a smart building solution to the outside world is, however, more of a challenge. A Wi-Fi- or Ethernet-based VPN connectivity solution may be appropriate for more basic smart buildings propositions, but there are significant downsides to such an approach, mostly due to the fact that such a connection is controlled by, and is the responsibility of, the end user.

Any provider of smart building solutions to multiple geographies worldwide that adopts such a basic VPN solution will face challenges associated with a lack of control of the wide area network connectivity for their solutions. These range from network and connectivity outages that are impossible to analyse, through to communications interruptions caused by user actions (for instance, unplugging a LAN cable, or misconfiguring a Wi-Fi router).

Ultimately, it becomes very difficult for a smart building solutions provider to commit to delivering a SLA-backed service, or a managed service, or a solution as-a-service, if they do not also control the wide area connectivity that supports such services. Accordingly any end user that requires better than a 'best efforts' solution, where the user himself is responsible for configuring and maintaining wide area connectivity, would be best supported by a solution that is bunded with connectivity provided as a service as part of the solution.

It is in this context that cellular connectivity has strong advantages. Cellular connectivity is standards-based, covers more than 95% of the population worldwide, and has security built-in. Devices enabled by cellular connectivity are directly connected to mobile operator networks, and mobile operators are able to undertake effective fault resolution remotely in the case that connectivity drops, potentially also using the wide area connection to test for problems with local smart building solution hardware. For these reasons, cellular connectivity is likely to play a strong role in supporting smart buildings systems in the future. Figure 3, below, illustrates the forecast number of cellular connections deployed to support key enterprise smart building applications, growing to exceed 160 million in 2030.

Figure 3: *Cellular connections for key enterprise smart building applications, 2020-2030*



[Source: Transforma Insights, 2021]

The challenge with global cellular connectivity, however, is that different mobile networks in different countries are run by different network operators. Coverage outside of a specific operator's own network is often supported by roaming agreements, which tend to enable data traffic throughput from remote networks, but tend not to support the same level of fault resolution capabilities for roaming devices as they do for devices that are connected to a home network.

As a result, any smart building solution provider seeking to procure global cellular connectivity can be faced with a patchwork of different providers, each with different technical network interfaces and different commercial terms. Ideally, what such a smart buildings solution provider needs is a one-stop provider of global cellular connectivity, enabled with a single technical interface, and with consistent commercial terms worldwide.

Sierra Wireless' Smart Connectivity solution is one such proposition. It offers:

- One point of accountability, in the form of a Global Network Operation Centre (GNOC) to manage network operations, and work with local partner network operators to resolve problems when outages do occur.
- One core network, enabling access to over 600 partner networks in over 190 countries worldwide.
- One worldwide Smart SIM, including technology to dynamically identify the best local network connectivity options available in real-time.
- One management platform, enabling API access to all connected devices on the platform.

Based on this capability, Sierra Wireless also offer a product called Octave that is specifically intended to help industrial users to securely extract, orchestrate, and act on data from their industrial assets in the cloud. Octave is intended to eliminate the complexities of implementing and scaling IoT solutions such as smart building solutions, allowing companies to cost-effectively access the benefits of IoT without the risks.

Overall, the smart buildings market unquestionably offers a significant and fast-growing opportunity for vendors in the space. But the nature of the opportunity is changing and to be successful vendors will need to offer more cohesive solutions addressing multiple application domains. Such solutions will need to be easy to deploy and manage as 'platform' propositions, and homogenous global cellular connectivity capabilities are likely to play a strong role in supporting such propositions.