

WHAT IS A SMART CITY?





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Overview: What is a Smart City?

By Gaspar Veiga, Alcatel-Lucent

The global population has reached 7 billion people – with more people living in cities than rural areas for the first time in history. This is just the beginning of an important trend that will redefine how people experience everyday life, with urban population projected to grow by 195 thousand people a day over the next 20 years.

As such, the demographic shift of world's population into urban areas is encouraging city leaders and stakeholders to invest in smart technologies based on intelligent infrastructure such as broadband (FTTH) and smart infrastructure (i.e.: Smart Buildings,...), so that connected; innovative and more efficient and effective communities can be developed to improve both quality of life and sustainability of urban infrastructure and services.

The smart city concept recognizes information and communication technologies (ICT) as essential elements to addressing this urbanization trend and challenges. The challenge for governments, private industry, non-governmental organizations and other stakeholders is to determine collectively how to realize a smart city vision and mission that meets their needs and accords with their local values. Political leadership is needed to address these challenges.

In a groundbreaking study, Alcatel-Lucent Strategic Marketers Revital Marom, Debbie Fisher and Louis Witters identified three key drivers of smart cities development: economic competitiveness, environmental sustainability and general livability. Additionally, Alcatel-Lucent explored this and other key questions, ultimately determining that while partnership is critical, traditional public-private partnerships are not fully equipped to execute smart city initiatives. A third player is essential to the mix: the citizen.

What makes a city 'smart'? How are imaginative cities adding the voice of the citizen to smart city initiatives? While technology is an essential part of the answer, it is only part. The concept of the smart city is really a framework: a way to fulfill a vision of modern urban development that can vary profoundly from place to place.

Alcatel-Lucent has prepared this ebook to take you on a world tour, sharing the insights, stories, and implications documented by our research team to spark innovative ideas in defining a smart city framework that fits your needs. We bring you to four different cities, including the voices of citizens, city leaders, and stakeholders. It would be difficult to think of four cities less alike than the ones at the center of this ebook: Chattanooga, Tennessee, USA, a former manufacturing stronghold in the American south; Zurich, Switzerland, a European capital; Wuxi, China, a Chinese 'megacity' whose history stretches back to the 11th century BC; and King Abdullah Economic City, Saudi Arabia, an industrial port being built on the edge of the Red Sea.

The differences between the four cities were vital to the research and the insights uncovered. Being a smart city does not mean being one particular kind of city: it's about applying smart principles in ways that suit the local economic, social and cultural context. Use these best practices and ideas to spark innovative strategies for your business and be part of the growth of smart cities by turning citizen visions into reality.

In short, making a city Smart is emerging around the world as a strategy to mitigate the problems generated by the urban population growth and rapid urbanization

Smart Cities Require the Voice of the Citizen and Dynamic Communications

By Susan J. Campbell, TMCnet Contributing Editor

In the quest for the more efficient use of our resources; most environmentally conscious citizens are willing to make the small changes necessary to promote the creation of smart cities. To fully realize this evolution and reap the benefits, however, it takes more than just a different mindset. It also requires information and communication technologies.

There is also the very real challenge for the collective community of governments, private industry, non-government organizations and other stakeholders to agree on the best approach to the smart city vision that will not only meet their needs, but also adhere to local values. Finding the right solution that meets all requirements is a challenge, but not one that is insurmountable. It simply demands a focus on priorities and healthy compromise.

To better understand many of the elements that contribute to or take away from the development of smart cities, Alcatel-Lucent and its Market and Consumer Insight team set out to explore the concept. In its white paper, [The Missing Piece: Voice of Smart City Citizens](#), the team explores key questions to determine that while the critical element is partnership, traditional partnerships between the public and private sectors are not yet ready or fully equipped to execute on the initiative of the smart city. A third player is an absolute: the citizen. They also investigate how dynamic communications as part of a smart grid deployment can play a key role in moving things along.

The “Smart” in Smart Cities

The technology integrated into the smart city is what makes it unique, yet it is not the only element that makes it smart. The smart city concept is supported fully by the framework, or a way to fulfill a vision of urban development in the modern age. This vision will vary from place to place, yet the “smart” in smart cities will enhance everything from democracy to education to healthcare to the economy and even environmental stability. These enhancements must not only focus on moving the city forward, but also in preserving its collective values and norms.

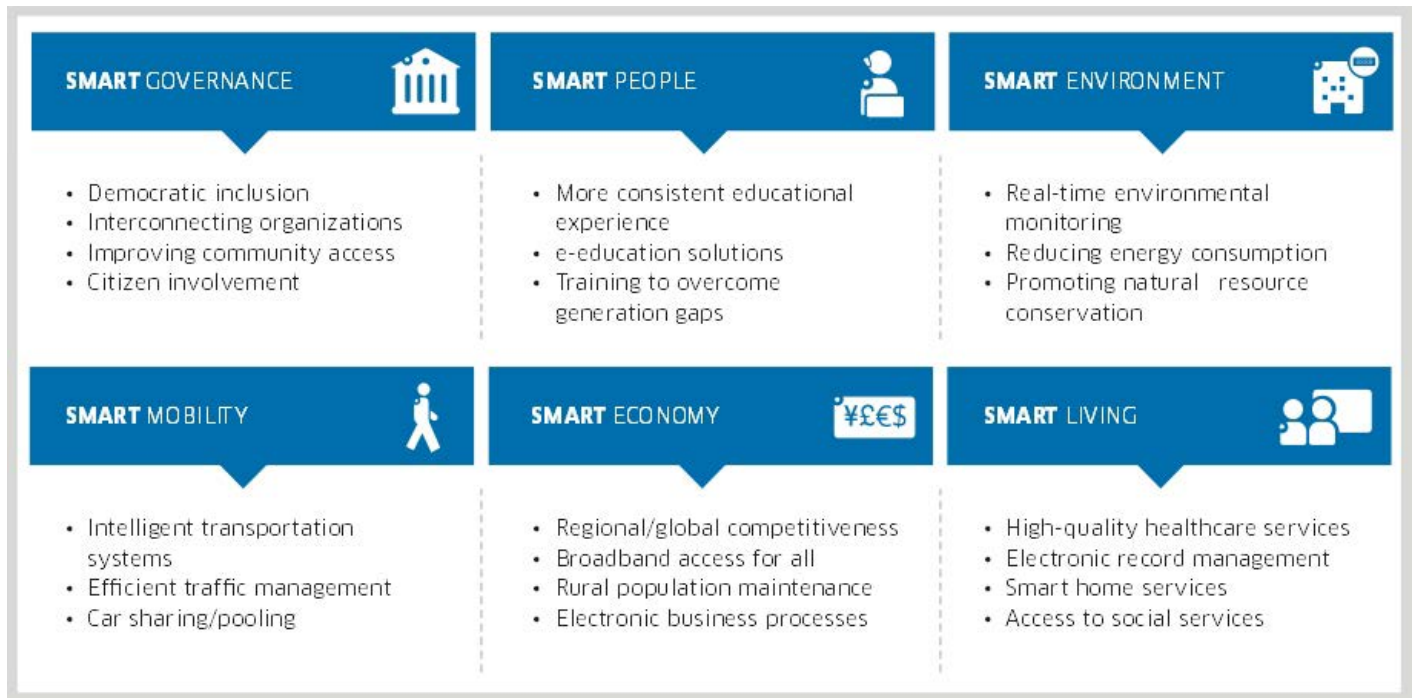
Based on Alcatel-Lucent research, the motivation to ‘go smart’ is generally a motivation of social, environmental or economic elements, often in some combination. Cities may want to bolster their economy; others may have the environment at top of mind; and still others may have their sights set on societal goals. Ultimately, regardless of the motivation to achieve the smart city, each community focused on the goal tends to have some form of a public-private partnership in place made up of a complex ecosystem of key players, including:

- Service providers
- Engineering procurement companies
- Enterprises in key verticals
- City planners
- Real estate developers
- Nongovernmental organizations
- Others

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Smart Cities Require the Voice of the Citizen and Dynamic Communications

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The Four Boxes

According to Alcatel-Lucent, projects for smart cities can be broken down into four categories or boxes:

- The IT box includes cities that focus on achieving IT excellence
- The dream box involves cities that take on turnkey smart city projects that make up their wide-range plans
- The fragmented box includes cities where a variety of projects are being carried out independently without clear integration
- The black box where projects are led and managed by governments within a closed ecosystem

For a city to select the right box, they must first examine their citizens.

The Citizen's Voice: The citizen makes up the critical missing piece in the development of smart cities as they are the ones who will live and work within the environment. Without a focus on how people live, work and play in the city, the application of features and amenities may not match and therefore, will deliver very little practical value.

As planners, analysts, IT companies and other experts continue to define the smart city as it relates to the infrastructure, wireless and Wi-Fi connectivity, the cloud, high-speed broadband, remote capabilities and more, a clear tie into how citizens live in that environment. [End-to-end smart grids](#) provided by the power companies can be a critical part of the solution, especially since citizens tend to want innovation and creativity, but only as far as it contributes to supporting their way of life and enhancing those things they already do and love.

Smart Cities like Calgary are Showing others How to Leverage Next Generation Communications

By Susan J. Campbell, TMCnet Contributing Editor

Calgary is considered Canada's most wired city. In the last 10 years, it experienced a boom in its population and economy that led to the explosion in demand for communications and computing services including those of the city itself. Calgary needed to future-proof its IT infrastructure to sustain growth and anticipate and deliver future user demands.

An Alcatel-Lucent case study, [Innovation Agenda: Calgary keeps progressing with its new MPLS network](#), provides a clear picture of the strain on Calgary's legacy network. It had not only started to show its age, the city was also seeing rapid increases in demand and simple wear and tear that was pushing the network to its breaking point.

"We were definitely at end-of-life on our existing network infrastructure," said Doug Hodgson, the City's Chief Information Officer. This spurred the City to seek out a technology partner that would help them determine the best way to make its network viable in the next generation of telecommunications. The City turned to Alcatel-Lucent to develop an MPLS setup to enable a new state-of-the-art design.

"Fiber exhaust is always one of the issues when you own a fiber plant," said Dave Basto, Network Infrastructure Leader for the City. "Without a network to multiplex that traffic, you're always going to encounter it. This (MPLS network) will help us in that regard tremendously and allow us to expand our fiber plant more efficiently."

As highlighted in this Alcatel-Lucent video, [The Calgary Story: Journey to a Smart City](#), Calgary needed to completely revamp its existing network architecture. In working with Alcatel-Lucent to achieve smart cities initiatives, Calgary was able to roll out a solution that will not only benefit the City, but also its citizens.

Calgary has roughly 30 different business units that run business operations across the geographic area. These business operations are very tech savvy and always have been. The goal was to stay ahead of the curve in terms of the use of technology. As the demand for services continued to expand, there was a clear need identified for a next generation technology approach.

As part of its [smart cities](#) initiative, Calgary not only wanted to ensure quick provisioning of services, it was also important to deliver secure services, lower the operating costs, guarantee interoperability and interagency communication, and be environmentally responsible. Separate networks for agencies that must come together for emergency response, for instance, can delay communications and put citizens at risk. It was important to put all services on the same reliable and protected network.

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Smart Cities like Calgary are Showing others How to Leverage Next Generation Communications

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By building out the new MPLS network, Calgary has effectively created a foundation for all future applications including providing infrastructure that will enable its power company to provide end-to-end [smart grid](#) capabilities. As the technology world continues to evolve and 4G LTE networks continue to build out and 4G applications in demand, the City of Calgary is ready for it. They now have a platform that will allow them to burnish in a service for any application.

One new capability under the smart cities approach for Calgary is the ability to quickly provision new services, which they were unable to do before. In the past, the provision of a new service could take weeks, if not months. Today, such a service can be provisioned in a matter of hours.

Essentially, the City of Calgary built their own carrier cloud. In doing so, they have created the ability to reduce their operational expenditures and to provide next-generation services to their citizens and to their agencies across multiple needs within the City.

Safe City Success -The Key Role of Next Generation Networks

By Susan J. Campbell, TMCnet Contributing Editor

Alcatel-Lucent's LifeTalk e-zine recently focused on the desire that we all have to live in a [safe city](#) and the complexity involved in creating such an environment. There is no denying this is a multi-faceted challenge which includes not just issues of economics and education but also the need to address such concerns as physical security, convenience, freedom, privacy and transparency. In fact, city developers and managers in looking at the development and deployment of smart grids need to make the use of the capabilities of an associated next generation communications network as a key enabler of [enhanced public safety](#).

One of the articles in LifeTalk, [Citizen Engagement Critical for Safe City Success](#), explores how communications-enabled transparency needs to be a priority. It notes that the more transparency a safe city network can deliver, the safer citizens will feel. The bottom line is that if citizens are not just aware but are in the loop at every step of the process, their sense of safety and security increases.

"There are many ways in which these technologies will affect the way people behave," João Barros, Associate Professor of Electrical and Computer Engineering at the University of Porto, Portugal, and also Founding Director of its Institute for Telecommunications, shared in the Alcatel-Lucent article. "The most fundamental ones have to do with the way city managers and the citizens they serve make decisions, and the relationship between the two." The author further noted how thoughtful efforts can be utilized to ensure the comfort and confidence of data-intensive smart cities. When citizens are included in the planning process and full disclosure is assured through [transparency](#), the ongoing development and operations are more readily supported. The more transparent the process and the system, the safer its citizens will feel.

Barros notes that people tend to get worried when they discover a sensor system is deployed, yet no one asked them for input, told them why, or educated them on what is involved or the type of information that will be collected. When people are consulted from the beginning, the deployment of the system is much smoother and more successful. Likewise, usability is key to acceptance as citizens are prepared for the future.

What does this future entail? According to Frost & Sullivan, it requires the shared technologies ranging from HD video to sensors to analytics and even smartphones, providing law enforcement and other agencies the opportunity to gather and interpret significant quantities of data and act effectively. To optimize this type of communication, while taking proper privacy precautions, it's critical to implement an innovative gigabit fiber optic network, a Wi-Fi mesh network and utilize LTE wireless solutions. In fact, the reality is that a smart approach to leveraging a next generation communications network can actually increase [public safety](#) and the quality of life in a city while reducing costs.

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Safe City Success -The Key Role of Next Generation Networks

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The proof is in the execution

Chattanooga is one example of the progress toward a safe city. Part of the LifeTalk series includes an article, [Chattanooga's Safe City Orchestra](#). It highlights the city's gigabit fiber optic and Wi-Fi mesh networks that have become powerful platforms for enhancing the efficiency of the city and public safety. These enhanced networking capabilities have enabled such things as HD surveillance and a smart streetlight system which will save the city \$1 million each year. In addition, not just the perception but the reality of improved public safety is taking place as a result of police and fire departments enjoying superior response times. In addition, not just the perception but the reality of improved public safety is taking place as a result of police and fire departments enjoying superior response times. Debbie Fisher, Alcatel-Lucent Strategic Marketing Director reports that one citizen praised the smart lighting as it makes her feel safer allowing her to walk to work.

Chattanooga plans to continue to leverage assets across multiple departments and missions to continue to drive savings across the board, while also creating a safe city for all. It is a city to keep an eye on for innovation and metrics for measuring success for any governmental entity looking to improve both safety and their citizens' engagement.



Smart Cities Need Service Provider Engagement for Success

By Susan J. Campbell, TMCnet Contributing Editor

The hype surrounding greener technologies has expanded to include the development of the Smart Grid. Utilities throughout the U.S. are working toward the more efficient use of energy, while also empowering subscribers to play a role in deciding on their energy spend. Coupled with these efforts is the move toward not just smart homes but smart cities. As pointed out in a [previous article](#) on this subject, surprisingly while telecommunications will/must play a strategic role in any smart city project, communications service providers do not appear to currently play a primary role in their development.

It is useful to return to a recent Alcatel-Lucent (News - Alert) posting which examined this phenomenon, ["Getting Smart About Smart Cities - Executive Summary, Getting Smart About Smart Cities - Market Analysis."](#) The point is concise and well taken and documented, as much as smart cities can create significant business opportunities for service providers (SPs) their lack of a significant role early in the planning process poses the real risk of either missing opportunities or making sub-optimal decisions about solutions which could have long term impacts.

Alcatel-Lucent also points out that the failure of telecom SPs creates the potential for increased opportunities for cable companies, utilities and other types of service providers, in provisioning a broad range of information and communications technology (ICT). This is clearly an oversight by everyone involved in evolving smart city ecosystems. Service providers are in a unique situation to leverage their assets. These include [broadband wireless](#) capabilities like 4G LTE and Wi-Fi for machine-to-machine ([M2M](#)) [connectivity](#), and the IP multimedia subsystem ([IMS](#)) for enhanced communications and collaboration between individuals to the benefit of themselves and key players. In the process they can change their role from facilitator to value-added strategic partner. Smart cities can be separated into four categories according to Alcatel-Lucent. These are:

- IT Box: Where the smart city is categorized by the initiation and management of the project by an IT company. The focus in this category is on IT excellence.
- Dream Box: Turnkey smart cities centered on a public-private partnerships.
- Fragmented Box: This encompasses a number of defined projects to cover various elements of the smart city.
- Black Box: Generally led and managed by a government or government-affiliated agencies.

Aside from the ICT platform service providers could provide within a smart city hierarchy, as stated they also have a number of assets that can be useful in the build out of the smart grid that is the connective tissue of the Internet of Things that such projects. Alcatel-Lucent believes these assets are well-positioned to serve as the foundation for an integrated approach to the smart city strategy giving service providers the role as not just enablers but also suppliers and integrators of key ICT components and services and hence a central role in the ecosystem value chain.

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What to do?

Alcatel-Lucent is a firm believer in being proactive. They advocate that telecom service providers need to promote the fact that they are a trusted brand. Their core assets are critical to smart cities and need to be promoted including the ability to deliver on their networks quality of service (QoS); high availability; privacy; security; mass-market customer care; self-service capabilities; real-time customer insights; consumers and commercial distribution and marketing channels; sophisticated authentication and billing capabilities; technology expertise in telecom, networking and IT; and data center scale. They must emphasize their proven ability to manage and ensure the delivery of large amounts of data over secure, protected and reliable network infrastructures. When these assets are effectively leveraged, the service provider can change their role in the development of the smart city ecosystem. While seemingly things that should be self-evident, in the context of something as complex as the planning, deployment and maintenance of a smart city they need to be clearly articulated.

Governments tend to be involved in most initiatives, therefore projects surrounding smart cities are considered to be secure when it comes to execution and return on investment. In other words, SP proactivity should be construed as relatively low risk even in an environment that has significant economic uncertainty.

The good news is that it is not too late for service providers. The development of smart cities is still in the early stages. LTE and IMS can be enormous assets in any smart city build. That said, with a broad range of smart city projects being initiated across the globe, service providers must be careful. They should not over-commit themselves in terms of their assets or capabilities, and have in place engagement models that will allow them the opportunity to have an important seat at the table from project conception through execution and beyond.

Ensuring the Future of the Smart Grid

By Susan J. Campbell, TMCnet Contributing Editor

Our growing reliance on energy has sparked a new focus on how to make consumption more efficient. The Smart Grid has emerged as an important focus in this space, projected to impact the business landscape, the energy marketplace and even the ways in which we interact.

According to a recent Alcatel-Lucent article, [EPB Chattanooga: Customers at the Center of the Smart Grid's Future](#), smart grids will also enhance convenience and control within the industrialized world while positive social progress is enabled in developing countries. The level of skill with which energy providers are able to manage change will determine when and how well the benefits of smart grid technology will gain traction.

Three things we know for certain regarding the potential in development and deployment of [smart grids](#):

- They will provide customers with unprecedented levels of control and convenience, while also ensuring communities have access to advanced communications services.
- Customers will enjoy many if not most of the benefits as a result of a greater reliance on wireless technologies for access and as service enabler.
- There will not be success until customer education and privacy concerns are seen as priorities for utilities going forward and properly addressed.

“These days we’re used to instant information, to quick response, and to having control over a lot more things in our homes and our lives, but that hasn’t been true for electricity, said Harold DePriest, President and CEO, Electric Power Board of Chattanooga (EPB), in the Alcatel-Lucent piece. “The Smart Grid is changing that reality, bringing electric systems into the 21st Century.”

EPB has been in the process of rolling out a gigabit passive optical fiber-to-the-home (FTTH) network for its entire service area. More than 170,000 customers and 90,000 smart meters have already been installed and connected to a smart grid. This roll out will easily become the model for future innovations as it is currently the fastest fiber-based smart grid in North America managing electrical usage information in real-time.

“Whether it’s providing advanced services or dealing with outages, we’re going to be able to do it quicker, with customers communicating interactively with the electric system through mobile devices and other platforms,” said DePriest. “It’s going to make us a more relevant and convenient part of people’s lives.”

While service providers and electric companies understand the value and importance of the [smart grid's future](#) implementation, convincing customers they must pay more for a service they don't quite understand will be an uphill battle. As such, utilities companies must create more value for the customers to ensure widespread support and adoption.

To accomplish this, utilities must be able to create more efficiency, better reliability and additional services. EPB has effectively demonstrated all three. In fact, according to the Electric Power Research Institute, EPB has created value for its customers to the tune of roughly \$300 million over 10 years in the form of reduced outages, energy conservation and other efficiencies. To promote the adoption of smart grid technology, this is a powerful case study for success.

Deploying IP/MPLS Helps Utilities Move Aggressively into the Smart Grid Future

By Mae Kowalke, TMCnet Contributor

Smart grids are the wave of the future for energy management by power companies around the world. However, getting there requires a whole new approach to communications networks from power utilities.

The benefits of [smart grids](#) are many. Smart Grids give utilities better visibility to operate their electric systems more efficiently. The increased movement of data with analysis provides the benefits of reduced operating costs, increased power quality and improved outage response. Customers also benefit from new features such as time-of-day charging and increased participation from independent power producers.

But smart grids require better [energy solutions](#) as enabled by communications networks that are substantially more advance than those currently being used by most electric utilities.

“A key enabler for the safe and efficient transformation of a power utility network is a modern, reliable, and flexible communications infrastructure that can route increasing amounts of monitoring, control and status information effectively, efficiently and on time,” according to a recent Alcatel-Lucent application note, “[Deploying IP/MPLS Communications Networks for Smart Grids](#).”

Smart grid communications require an end-to-end IP-based network, according to Alcatel-Lucent, which is different than the traditional time division multiplexing (TDM) over Synchronous Digital Hierarchy (SDH) or Synchronous Optical Network (SONET)-centric networks that many utilities currently use.

At the same time, however, utilities need a flexible transformation that preserves existing infrastructure investments and minimizes risks during the transition.

IP/Multi-protocol Label Switching (MPLS) as smart grid enabler

An IP/MPLS solution is recommended by Alcatel-Lucent. It needs to incorporate state-of-the-art technologies while continuing to support TDM and legacy applications. This means being future ready and capable while providing a smooth transition and high-performance path for utilities to migrate their communications as they transform their power generation and delivery infrastructure.

“This new IP/MPLS network will allow the utility to maximize the cost effectiveness and efficiency of its network without jeopardizing reliability, as well as enabling the deployment of new devices and applications that can improve operational and workflow efficiency,” according to the Alcatel-Lucent application note.

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Deploying IP/MPLS Helps Utilities Move Aggressively into the Smart Grid Future

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Alcatel-Lucent's next-generation IP/MPLS offers several advantages for power utilities looking to develop smart grid communications. The solution:

- Supports existing mission-critical TDM services and new IP and Ethernet applications and smart grid services including SCADA and Teleprotection
- Minimizes costs without compromising features, functionality and reliability
- Scales, allowing the utility to increase services and grow the number of users, devices, applications and capacity
- Ensures network and operational system security
- Is highly available and resilient
- Enables advanced QoS to prioritize mission-critical applications over other traffic
- Provides reliable transmission over different transport technologies including wireless microwave and WDM systems

As the paper notes, "Alcatel-Lucent leverages cutting-edge technologies, along with the company's broad and deep experience in the utility industry, to help utilities build better, new generation networks with IP/MPLS."

Finally, it is important to stress the end-to-end aspects in terms of enabling utilities to fully leverage the benefits of their smart grid deployments. Better information from all of the utilities' power networks translates into substantially improved operational efficiencies, faster mean times to restoration, improved planning and a host of other benefits that improve not just operations but the customer experience and brand loyalty.

4G LTE and Smart Grid Changing the Broadband Game for Electric Utilities

By Mae Kowalke, TMCnet Contributor

Almost every industry has or will be affected by cloud computing and the ubiquity of data exchange that's facilitated by mobile communications. [Utilities](#) are no exception, and mobile communication is rapidly making the smart grid a reality.

A crucial new technology that can assist utilities with their [smart grid](#) is 4G LTE.

Cellular [4G LTE technology](#) enables high-speed, high-bandwidth applications such as video streaming and online gaming for consumers, but it also can benefit utilities in six key ways:

- Improved performance.
- Reduced complexity
- Better security
- Improved quality of service management
- Network sharing

The benefits of LTE

First, let's talk performance

LTE, which stands for Long Term Evolution, uses multiple-input multiple-output (MIMO) technology that allows several antennas to be used on each tower or terminal. This significantly improves both coverage and capacity. LTE also uses orthographic frequency division multiple access (OFDMA), making it better able to leverage wireless spectrum. Thus, LTE is able to deliver more data, something obviously useful for a utility's smart grid.

Second, LTE is based off a simplified all-IP architecture, which means fewer network elements. That translates into an ability to easily include a larger number of devices per network, something almost tailor-made for the smart grid and its multitude of network-enabled reporting devices.

Third, low latency is a feature of 4G LTE technology. LTE offers latency of 10-15 milliseconds, making it ideal for voice and video communications.

The technology's ability to server extremely demanding applications because of this low latency will give utilities opportunities undreamed of before. A utility might use video-enabled drones to inspect transmission lines, for instance. This would hardly be possible before.

Fourth, LTE uses some of the most advanced security mechanisms on the market, making it much more secure than wireless systems in the past. Air interface security protects against wireless attacks while network security protects against security attacks generated in the wired part of the network. With utilities increasingly a threat for attack by cyber-criminals, the beefed-up security that comes from 4G LTE is almost mission-critical and comes not a bit too soon.

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4G LTE and Smart Grid Changing the Broadband Game for Electric Utilities

By Mae Kowalke, TMCnet Contributor

LTE also benefits quality of service (QoS) prioritization. Being an all-IP architecture, LTE uses a sophisticated QoS control that utilities can leverage to guarantee that incident and emergency traffic takes priority over less critical wireless data. With quality QoS, the most important data from the smart grid always has priority.

Finally, LTE facilitates network sharing. The architecture of LTE works with frequency bands and encryption to allow different parties and applications to share the same network. Utilities can therefore choose a variety of deployment methods, including licensing their own spectrum, piggybacking off the machine to machine network of a commercial mobile operator, or partnering with another organization such as public safety agencies.

Source of new revenues

LTE is also emerging as a potential new revenue stream for utilities. In fact, as the result of LTE deployments in conjunction with smart grid deployments, under a concept known as [UTelco](#), electric utilities are now positioned to offer their customers such services as high-speed data, voice and video either directly or based on a wholesale model. While you may not currently think of your power company as your communications service provider, the day that is a reality may be closer than you think. LTE in combination with smart grid is clearly changing the broadband landscape and it may be sooner than you think.

UTelco: Will Municipalities Answer the Call?

By Susan J. Campbell, TMCnet Contributing Editor

When talking about telecommunications service providers, municipalities don't tend to be brought up as part of the conversation. We think of them as separate entities that have little to do with one another and are viewed not as possible competitors but as customers when mentioned at all. However, one expert with a deep background in telecom public policy believes municipalities should get into the service provider game to offer citizens another alternative and become central players in the major shifts in the economic and social landscape now underway.

According to a recent Alcatel-Lucent [GridTalk](#) article, [Building for the New Creative Economy](#), John Eger, former Director of the White House Office of Telecommunication Policy, and currently the Director of the Creative Economy Initiative at San Diego State University, explores the current status of telecommunications, how it relates to the economic development and social interactions and the role municipal owned utilities, particularly electric ones, can and should play in providing citizens the full capabilities of broadband.

In an environment where knowledge is king, those without adequate access to high-speed broadband to access that knowledge will limit their ability to develop economically. The UTelco, as Eger refers to his vision of a municipally-owned broadband and electric utility, could provide businesses, residents and others throughout the community with access to enhanced services. "Right now we're going through what's been called a 'jobless recovery...and when the dust settles after all of the outsourcing and off-shoring, as Steve Jobs told Barack Obama, 'Those jobs aren't coming back.' In fact, the U.S. Department of Education projects that 80 percent of the jobs by 2020 are going to require some college or higher education."

Eger believes broadband today is as important as railways, waterways and highways were to our ancestors. In the past, with municipalities leading the charge to ensure the implementation of infrastructure, cities were able to develop and compete on a global scale. These same municipalities, through their owned and operated capabilities, and through public-private partnerships and acting alone or in concert with other local governmental entities in under-served areas, need to take a leadership role assuring citizens can fully participate in the broadband digital economy.

Eger notes that while the advancement of its citizens should be a priority for municipalities, consideration of a [UTelco](#) can be foundational because of its importance for generating economic development and enhancing regional business growth. He cites municipal electric companies as bearing a particularly significant responsibility here as a means to utilize their rights of way and access to customers and new telecom infrastructures as a means leverage the provision of broadband communications more attractive to business. He cautions that to do so, they must develop a compelling and cohesive strategy that can be clearly articulated to get community buy-in.

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UTelco: Will Municipalities Answer the Call?

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“Each community has to assume the responsibility for this,” Eger added. “Is there business awareness of the benefit? Yes, I think there is, and that is clearly spelled out in most corporate strategies. But is there a widespread public awareness? No, certainly not of the regulatory issues. And I don’t think that the market players, and particularly the local municipalities, are doing enough to educate the community.”

Eger hits on an important point – are the municipalities themselves educated enough on the benefits and importance of telecommunications, as it relates to economic development and quality of life, to put together a viable strategy for growth and become meaningful players in providing next generation access to their communities? The first step may be to identify who bears the responsibility of communicating the message and clearly defining the business case for investments.

We hear a lot about the digital divide and efforts to serve the under-served in non-urban areas. Reality is municipalities in these areas have an opportunity, and one could even say almost an obligation to step up when the marketplace is under willing to fill the void. Using the assets they too have like municipally owned electric utilities, either acting alone or through creative public-private partnerships is a tantalizing way to create a win/win situation. As Eger notes the idea of municipalities becoming next generation service providers has been around for a long time. It may be that his formulation of UTelco is an idea whose time has come.

The Smart City and the Critical Role to be Played by Service Providers

By Debbie Fisher and Revital Marom, of Market and Consumer Insights at Alcatel-Lucent

In talking to Smart City stakeholders, Alcatel-Lucent recognized that there are a number of key areas of their business model where they need the involvement of private partners to better assess the ICT infrastructure and to identify the options for partnership.

Therefore the Smart City approach includes five key portfolio elements which are:

- **Financing model:** Allowing Smart City stakeholders to manage business case funding and defer payments over longer periods. The partner must have the credibility in facilitating development finance with trade partners, facilitating export credit agency insurance/financing, and experience of forming vehicles to manage execution risk for larger programs.
- **Integration services:** Allowing customers to validate their business model in addition to reviewing opportunities to expose further services on their future infrastructure.
- **Operational model:** The complexity of launching new services and collaborating with other networks is managed through operational assurance services.
- **Broadband network:** Based on intelligent network infrastructure such as broadband, so that connected and sustainable cities can be planned. However, before these Smart Cities can be built, trans-sector policies and strategies need to be developed.
- **Security:** Security is critical for Smart City assets. At the Smart City inception, the infrastructure needs to be designed taking into account all security aspects of the physical and logical infrastructure

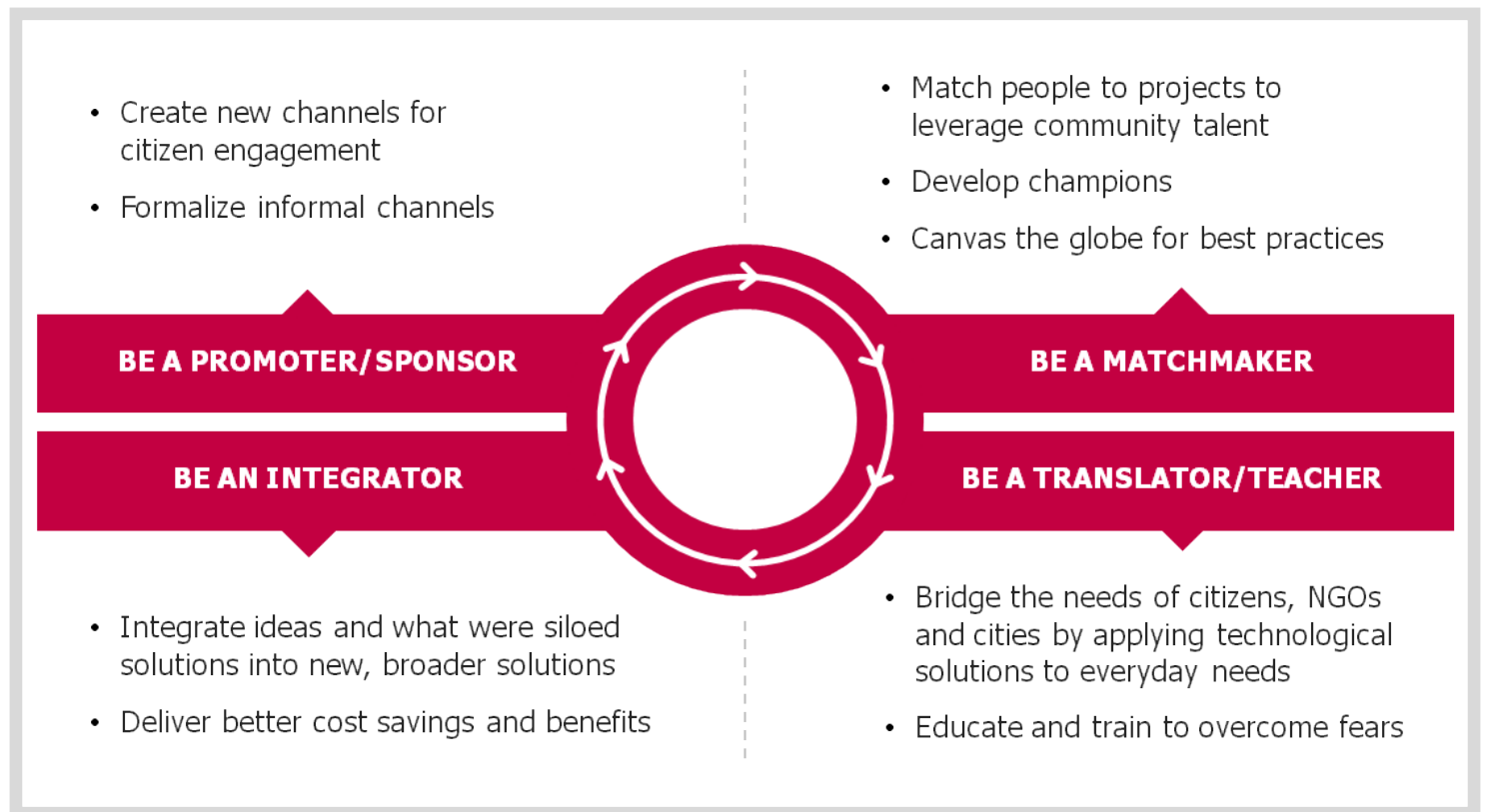
Deciding which operational or engagement model to follow is fundamental, as it will determine the associated business and financial model. This decision is also dependent on local regulations, the competitive environment, and the organization's core business activities and competencies. Each type of business model has its own opportunities and challenges

Yet beyond these key elements, Alcatel-Lucent Strategic Marketing Director Debbie Fisher suggests City Leaders and Stakeholders can go beyond these ICT oriented offers and expand their involvement to increase their share in the smart city market.

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Creating new engagement models and expanding your role can lead to tangible results including attracting and retaining Citizens and development of new services which can be delivered to smart cities across the globe. Fisher put together a list of the top stories and visions that she heard while visiting Chattanooga. She heard much of the same in Switzerland's famous city, where she was greeted with the phrase "I have everything I need" on numerous occasions. Alcatel-Lucent's customer, EWZ, provides citizens with ubiquitous Web access, while the Swiss Railway and city planners have created travel apps that help eliminate traffic and congestion. After interviews in Saudi Arabia, a young entrepreneur, [Ossama Natta shared his view](#) that smart cities are no longer a luxury but a necessary element to improve lives.

Revital Marom, Head of Alcatel-Lucent's Market and Consumer Insights team, has been busy researching projects both looking at data and obtaining first-hand knowledge from initiatives such as its recent trip to India to look at the phenomena of neo-urbanization and the role ICT is playing. How and why will/can service providers be key players in smart city initiatives is a fascinating subject which is why we have prepared this ebook to keep you up-to-date on news and insights from around the world.

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LTE: The Best Thing to Happen to Wireless Networks

By Maniam Palanivelu, Director, Global 4G LTE Solutions Marketing, Alcatel-Lucent

Accelerate Beyond 3G

Momentum around the globe speaks volumes: LTE is delivering on its promise to help operators [rise above the data storm](#). 4G LTE can deliver more data, faster, with a better experience and greater economies of scale than 3G. And operators are moving extremely quickly to reap the rewards.

According to the Global mobile Suppliers Association (GSA), 4G LTE is the fastest developing mobile system technology ever. As of early 2012, the GSA reports there are already:^[1]

- 285 operators in 93 countries investing in LTE
- 49 commercial LTE networks in 29 countries
- 119 commercial LTE networks in 53 countries forecast by the end of 2012

When it comes to gaining and retaining customers, LTE's advantages over 3G make it the new benchmark for competition. As a result, operators in all markets are evolving their [wireless networks](#) to LTE:

- In developing markets, wireline deployments are often logistically impossible or cost prohibitive. Operators in these markets are using LTE to cost effectively bring the mobile Internet to areas that previously had no Internet access at all.
- In developed markets, operators need to make more money from data services to offset declining voice revenues. Premium data services, such as mobile video, gaming and business apps, need LTE's big bandwidth and low latency.

Deliver More Data

3G gave people a taste of data. And they liked it — a lot. As people adopted Apple iPhones®, Android™ smartphones and tablets that let them take advantage of data, their behavior changed. They also adopted apps that have been purpose-built for data. Now, with a single touch they can easily consume and share large volumes of data, no matter where they are.

Global mobile traffic is increasing by 25 times according to a recently concluded Bell Labs Traffic Index study. Average consumption per device is also growing 14-20 fold. To make money from this seemingly insatiable appetite for mobile data, operators must deliver more data, more efficiently and more profitably. Now is the time for operators to seize this opportunity and profit from the growing data storm.

In many countries, people update their mobile devices every 12 to 18 months and more people are switching to affordable and more powerful smartphones. They expect the latest and greatest capabilities and a better experience with each new device. Whether they're watching videos, gaming, shopping or working while on-the-move, they expect all apps to perform as they would on a wireline network. In 3G networks, upload speeds are reaching their limit as more content is generated and shared from devices such as advanced smartphones with HD cameras (including front-facing), high resolution large screens and social network friendly apps. This means the customer experience will also reach its limit if the network cannot stay ahead of the demand.

» [Continued](#)

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LTE delivers the speed and efficiencies operators need to offer consumers and enterprises the apps they want with the experience they expect. Compared to 3G, today LTE gives operators:

- Up to 10 times the speed
- 3 to 5 times lower latency
- 2-3 times the spectral efficiency (and further improving with LTE enhancements)

These capabilities translate into superior app support. Table 1 compares 4G LTE and 3G HSPA support for key consumer and enterprise apps.

CONSUMER APPLICATION	TECHNOLOGY FIT	
	LTE	HSPA
Connected car	●	●
Live messaging	●	●
Next generation music	●	●
Enhanced mobile video	●	●
Multi-party video calling	●	●
Image-enabled search	●	●
Location-based service	●	●
Mobile video monitoring	●	●
Mobile gaming	●	●
Mobile advertising	●	●
Mobile payment and banking	●	●

● Very good ● Good ● Not good

ENTERPRISE APPLICATION	TECHNOLOGY FIT	
	LTE	HSPA
Secure/manage data on devices	●	●
Mobile collaboration	●	●
Multi-party video calling	●	●
Mobile cloud computing	●	●
Wireless broadband branch office	●	●
Location-based comm. and services	●	●
Navigation helper	●	●
Interactive digital signage	●	●
M2M	●	●
Public safety	●	●
Surveillance	●	●

Source: Alcatel-Lucent Market & Customer Insight - Europe, Consumer

Table 1 compares LTE and HSPA support for consumer and enterprise apps.

Source: Alcatel-Lucent Market and Consumer Insight, Europe.

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Move to All IP

Operators know they need to move to all-IP wireless networks just as they moved to all-IP wireline networks. It no longer makes business or financial sense to run multiple disparate networks. To deliver the massive capacity required to serve the demand, today's networks must change.

The **lightRadio™** Network solution introduced by Alcatel-Lucent offers an innovative approach and a platform purpose-built for mobile broadband. It changes the way networks are designed, deployed and managed by bringing together a unique blend of radio access (macro cells, small cells and Wi-Fi), advanced IP backhaul/transport, and core. The introduction of this new architecture:

- lowers the total cost of ownership of the network
- reduces power consumption and footprint, delivering a greener sustainable solution
- offers an order of magnitude increase in capacity and flexibility to manage growth
- integrates seamlessly with the existing network paving the way for faster migration to 4G and enriched user experiences

Unlike 3G, LTE is all IP. In fact, it's based on IPv6 which supports massive numbers of additional IP addresses and provides other improvements over IPv4. And it opens up access to new market segments like machine-to-machine. With IP across the radio access network (RAN), backhaul network, packet core network and backbone, operators benefit from a simpler, more scalable and cost-effective architecture.

Adopt a Global Standard

LTE provides a converging path for all wireless technologies. According to the GSA, LTE is the natural migration choice for GSM, HSPA, CDMA and WiMAX operators.^[2]

As a standard that can be deployed in every network, LTE helps align today's fragmented network and device ecosystems. That's important because fragmented standards make it difficult to scale globally.

Device alignment is particularly important. In the last 6 months there has been a 6-fold increase in the number of LTE smartphones in the market.^[3] Today there are service providers who sell LTE smartphones for less than \$50. If an operator can't scale, then the cost of introducing new smartphones, tablets or other devices is simply not a sustainable business model.

The good news is, the industry is aligning around LTE devices. In January 2012, the GSA reported 269 LTE devices had been launched in the market by 57 suppliers. This marks a 36% increase compared to the figures reported in October 2011.^[4]

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Profit from LTE

Two key facts confirm that operators believe it pays to invest in LTE:

- The GSA expects the number of commercial LTE networks will more than double in 2012, jumping from 49 to 119.^[5]
- Operators around the globe are spending billions on LTE spectrum that has already been auctioned in many countries, while other countries are preparing to provide spectrum for mobile broadband.

The return on investment for LTE varies for each operator. [Business modeling services](#), such as those available from [Alcatel-Lucent Bell Labs](#), help operators make the right investment decisions for their strategic, market and business goals.

To help ensure their move to LTE is profitable, operators are turning to vendors with experience and expertise in both [wireless and IP](#). Ecosystems are another important part of their strategies. For example, [ng Connect](#), an industry ecosystem with more than 125 members is developing prototype solutions that showcase LTE's potential in retail, health and wellness, entertainment, learning, transportation and other areas. In addition, early adopters of LTE such as Verizon and AT&T have acknowledged the importance of ecosystems with the introduction of their innovation programs.

The faster operators can bring LTE to market, the faster they can rise above the data storm to grow profitably and drive new revenues. Once they have the spectrum, there's no reason to wait another day to invest in LTE and commercialize its vast potential.

Footnotes

- [1] © 2012, January 5, GSA Evolution to LTE Report: GSM/3G Market/Technology Update, Global mobile Suppliers Association.
- [2] © 2012, January 5, GSA Evolution to LTE Report: GSM/3G Market/Technology Update, Global mobile Suppliers Association.
- [3] © 2012, January 20, GSA, Status of the LTE Ecosystem Report.
- [4] © 2012, January 20, GSA Status of the LTE Ecosystem Report.
- [5] © 2012, January 5, GSA Evolution to LTE Report: GSM/3G Market/Technology Update, Global mobile Suppliers Association.



More Information

Downloads

[Deploying IP/MPLS Communications Networks for Smart Grids](#)
[Getting Smart About Smart Cities - Enterprise Market Analysis](#)
[Get Smart About Smart Cities: Understanding the market opportunity in the cities of tomorrow](#)
[Get Smart About Smart Cities: Recommendations for Smart City Stakeholders](#)
[Voice of Smart City Citizens - Executive Presentation](#)
[Innovation Agenda: Calgary keeps progressing with its new MPLS network](#)
[Voice of Smart City Citizens-Wuxi](#)
[Voice of Smart City Citizens-Zurich](#)
[Voice of Smart City Citizens-Chattanooga](#)
[Voice of Smart City Citizens-Saudi](#)

Videos



[The Calgary Story: Journey to a Smart City](#)

Calgary, Canada's most wired city, recently experienced an economic and population boom that resulted in an explosion in demand for services coupled with a parallel rise in technology usage.



[Living in a Smart City - Zürich, Switzerland](#)

Long regarded as a prosperous and modern city, Zürich (Switzerland), impacted by global challenges, is now innovating with a 2000 Watt Society vision along with an open access network and smart grid services.



[Living in a Smart City - Chattanooga, TN](#)

The only one Gigabit broadband service in the United States for residential and business customers is now available citywide in Chattanooga, Tennessee.



[Living In Smart Cities - Saudi Arabia](#)

Saudi citizens are excited about the opportunity to have a voice in smart city development, satisfying basic need for Internet connectivity and a safe, modern way of life as well as supporting their entrepreneurial goals.



[Living in a Smart City - Wuxi China](#)

In a city where the population is growing rapidly, discover how ICT helps the Chinese city of Wuxi to deliver new services to all citizens, from infants to the elderly, while respecting longstanding cultural traditions.

Webpages

[Alcatel-Lucent Smart Cities blogs](#)
[Smart Cities Eco-Sustainability](#)
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