Imagine a city that offers its citizens free public Wi-Fi and interactive digital kiosks. Taxis with touch payments enabled by GPS technologies or smart parking sensors that provide information about accessible on-street parking spaces. Smart meters that measure water consumption and even detect and isolate leaks. Or how about a networked smokestack that cuts emissions when the wind blows in the direction of schools or a residential area?
Some or all of these things are already happening in locations as far-flung as Boston, Bogota, Kansas City and Seoul. They are part of initiatives in cities across the globe working to leverage technology to improve the lives of their citizens.

The smart city, once a topic of discussion among academics, urban planners and technology experts, is now a hot media topic with a wide range of definitions. According to global information company IHS Technology, smart cities are “cities that have deployed—or are currently piloting—the integration of more functional areas of a city.”¹

The smart cities concept received a real boost this year with the launch of a new “Smart Cities” initiative by the Obama administration that will invest more than $160 million in federal research and launch a number of important technology collaborations. These projects are designed to help local communities find solutions for critical economic and quality of life challenges, including reducing traffic congestion, energy efficiency, combatting crime and improving the delivery of city services.

Among the infrastructure initiatives is the Department of Energy’s Office of Electricity Delivery and Energy Reliability Smart Grid Integration Challenge for Cities, which is offering $1 million in funding to city governments with action plans and targets for reducing energy consumption.

Why smart cities need smart grids

Of all the smart city projects being tracked by Pike Research, nearly one-third are focused on smart grids, with nearly half focused on energy-centered projects. These smart grid investments are critical because they contribute to an intelligent infrastructure that can support a wide range of city operations and provide a platform for new benefits, services and energy efficiencies.

Smart city projects are serving as pilot environments for smart grid technologies and innovations that promise to support renewables integration, electric vehicle (EV) charging and demand management programs. After all, the connection between smart grids and smart cities is undeniable. A city served by infrastructure connected to an intelligent, automated network gains new capabilities for addressing a range of challenges.

Smart Transportation

In many cases, a smart city initiative begins with a single area, expanding and integrating other areas as they evolve. Most often, smart city planners in the United States start by focusing on energy consumption and transportation. One notable aspect of the transportation function is smart street lighting programs, because street lighting consumes significant portions of a city’s energy budget.
In the United States, smart grid vendors are leveraging their networks of connected endpoints to communicate with networked devices, enabling the use of smart parking meters, traffic sensors and smart street lighting programs.

Many cities are also looking to implement smart technologies to manage traffic to reduce the environmental impact of traffic congestion. In Portland, OR, for example, the city is working with the local Climate Trust to leverage information and communications technology (ICT) solutions to achieve real-time traffic signal timing adjustments and transit signal priority systems that may reduce delays, congestion and pollution.

**Smart Buildings**

Buildings are also a high priority for smart city planners. Because they consume 40 percent of all energy in the United States, the National Academy of Sciences has stated that if buildings fully deploy energy efficiency technologies and programs, the nation could postpone construction of new electricity-generating plants until 2030.

The good news is that smart technologies are being developed to enable building owners to serve the needs of occupants and control heat, ventilation and lighting, while balancing electricity supply and demand. New smart building solutions will also integrate EVs into the management of a building. EVs will communicate with charging stations, providing information that can be used to enable the EVs to deliver electricity to the building when needed. Other technology innovations are also in development to connect entire buildings into microgrids that can serve as cost-effective peak power suppliers.

**Wi-Fi Networks**

Smart cities that deploy Wi-Fi networks for their citizens are able to provide a communications platform for their smart grid operations. The Chattanooga Electric Power Board, a city-owned utility, is now known as “Gig City,” largely because of the fiberoptic network it built accessible by every home and business in its service territory. The smart grid that serves the city is the foundation for the fiberoptic network and, with its ability to automatically reroute power, it has reportedly enabled utility customers to avoid or reduce outages (up to 124.7 minutes of electric interruptions, according to utility estimates).

**The future of smart cities**

IHS Technology projects the number of smart cities will increase from 21 (in 2013) to 88 by 2025, with Asia-Pacific accounting for the most (32), followed closely by Europe (31), and the Americas (25). In the United States, where smart city projects typically have a single focus, many are seeing progress in making their infrastructures smarter and more efficient.

Envision America, an outgrowth of the Obama administration’s Smart City initiative, is a nonprofit program committed to accelerating deployment of innovative technologies for energy, water, waste and air challenges. The effort, which is scheduled to launch in January 2016, will begin with a workshop at which industry and academia representatives, as well as leaders from 10 urban communities will come together to diagnose needs, discover solutions and develop new smart initiatives. Landis+Gyr is a corporate sponsor of the program.
Smart technologies can automate and orchestrate the operation and maintenance of city infrastructure and services

Less energy/use, pollution and congestion—and more efficient service delivery—are among the goals of the smart city

**PARKS AND GARDENS**
- Sensors deployed in parks monitor moisture, temperature and humidity to automate/ regulate irrigation.
- Sensors on garbage cans alert collectors when full; sensors on street lamps activate when a person approaches.

**SMARTPHONE USERS**
- Smartphone users/subscribers receive alerts of events occurring in the city and can retransmit information to others.
- Smartphone app delivers contextually useful data to users, e.g., point phone at a bus stop to learn when the next bus will arrive.
- Citizens use phones to capture and report infrastructure problems, such as potholes, to the city for repair.

**BUILDING**
- Smart meters communicate with utilities autonomously, eliminating the need/expense of a meter reader.
- IoT devices on street lights and buildings monitor/report environmental conditions—such as temperature and pollution—to data servers.

**ROADS**
- Devices positioned on roads and at intersections measure/report traffic volumes and road speeds.
- Sensors buried beneath parking areas detect available spaces.
- Panels at main intersections relay data from parking sensors to guide drivers to available spots.

Source: IHS Technology