

Energy Modernization for Public Infrastructure:

The Foundation of Smart Cities

Why leading U.S. municipalities are prioritizing energy partnerships in the move to smart city infrastructure.





Executive Summary

ENGIE's Smart City Solutions provide municipalities across the United States with the energy modernization capabilities required to make smart city initiatives a success.

ENGIE offers a comprehensive approach based on our global experience, spanning the planning, implementation, and management of public infrastructure modernization programs including renewable energy systems, public lighting, electrified transportation (eMobility), water and wastewater systems, building efficiency and automation, and energy storage and resiliency. ENGIE's phased programs allow municipalities to progress at their own pace, supported by flexible financing and energy performance guarantees that fully fund projects. Cities often experience immediate cost, efficiency, and resiliency benefits.

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The Rise of Smart Cities

Designing Cities for a Changing World

Smart cities, which use connected devices to improve public infrastructure and benefit citizens, are emerging in response to major challenges that are reshaping the urban landscape. These include:



Aging Infrastructure

In 2021, the American Society of Civil Engineers gave an overall grade point average of C- to American infrastructure.

Budget Pressures

U.S. cities were challenged by a combined \$90 billion budget shortfall in 2021.

Population Growth

83% of the U.S. population lives in cities and urban areas.

Environmental Decline

93% of city leaders say their people and infrastructure are at risk from climate change.

Smart city solutions help cities and urban areas respond to these and other challenges through data-driven efficiency and automation. For example, smart cities can drive a 10-15% reduction in a city's total energy emissions and a 10-30% improvement in key quality-of-life indicators such as crime rates, commute times, and health burdens.

Four Reasons to Start with Energy

Ripe with immediate and longterm benefits, the ideal place for city leaders to start the journey to smarter cities is with energy-related improvements. Key drivers include:



Cost Reductions

Around 10% of a local government's annual operating budget is spent on energy. Reducing this cost allows leaders to justify new infrastructure investments.

Climate Action

Around 600 local governments in the U.S have developed climate action plans that include carbon reduction targets. Smart efficiency programs can help city leaders deliver on their commitments fast.

Technology Integration

Energy is a common component in all smart city infrastructure. By starting with energy-related modernization, city leaders can establish a strong base for all future initiatives.

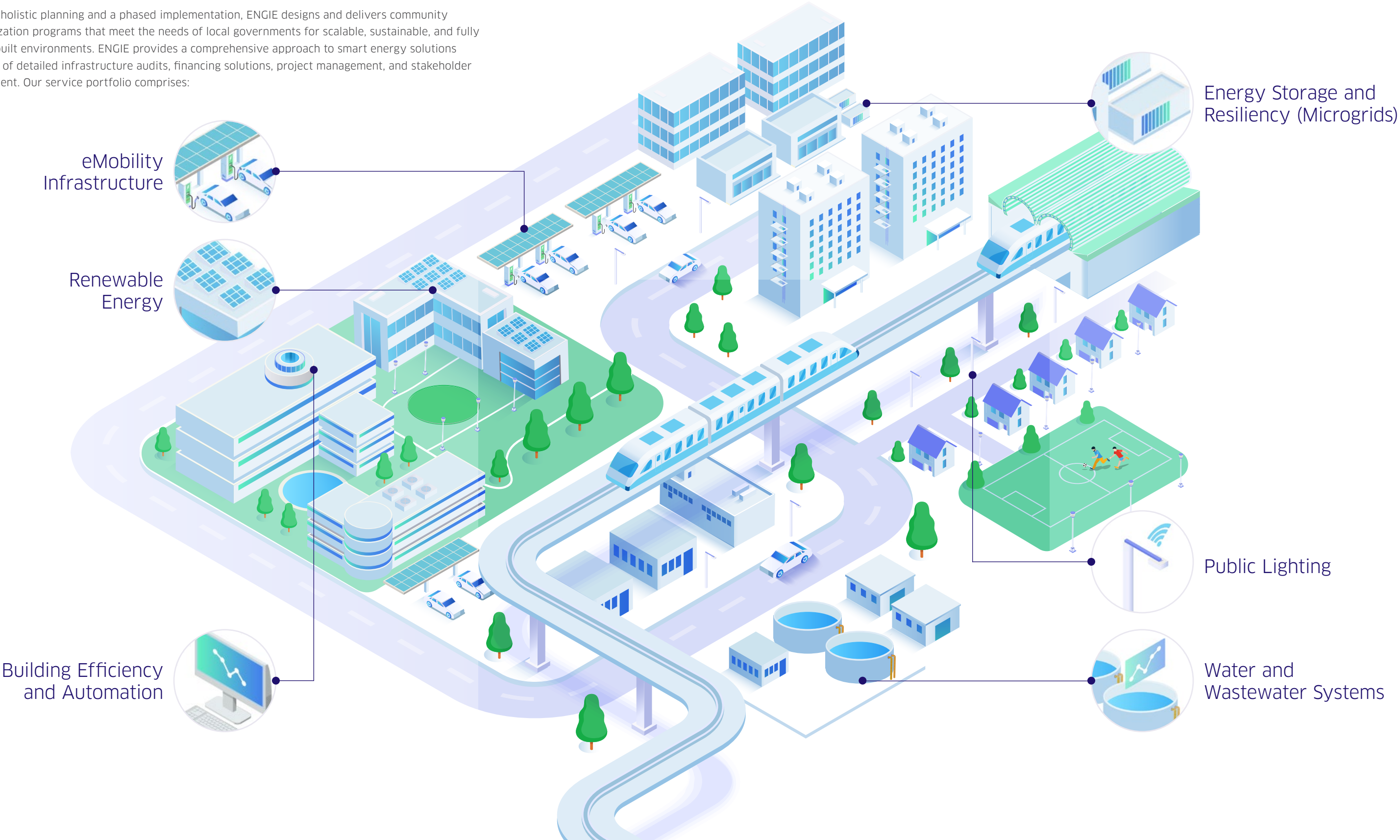
Community Development

Energy programs provide city leaders with an opportunity to advance their local economies and partner with industry on academic and career development initiatives. The efficiency and clean energy sectors are some of the fastest growing areas in energy with high demand for skilled labor.

Getting a smart city energy transformation underway can be daunting. There are many stakeholders with whom to engage and city leaders must prioritize across a wide range of departments. Relevant decision-makers need reassurance that they are getting the best possible solution. Getting the planning and implementation phases right is therefore crucial to the success of smart city programs.

Smart City Solutions at the Nexus of Energy

Through holistic planning and a phased implementation, ENGIE designs and delivers community modernization programs that meet the needs of local governments for scalable, sustainable, and fully funded built environments. ENGIE provides a comprehensive approach to smart energy solutions inclusive of detailed infrastructure audits, financing solutions, project management, and stakeholder engagement. Our service portfolio comprises:



Six Elements of a Smart City



Renewable Energy Onsite Solar PV and Performance Guarantees

Renewable energy is central to cities achieving the emissions reduction targets outlined in their climate action plans. Onsite solar panels are an important part of this mix, enabling municipalities to utilize space on rooftops and carports for energy generation. ENGIE delivers end-to-end onsite solar PV planning, construction, and management/maintenance services underpinned by performance guarantees.

ENGIE installed 1.33 MW of solar PV for the **City of San José** in California, helping to cut its total energy costs by half.

Public Lighting Citywide LED Upgrades, Controls, and Outage Detection

Municipalities that own their public lighting infrastructure have a great opportunity to jumpstart a smart city program and immediately realize a wide range of benefits including improved visibility (and safety) at night, cost savings, reduced light pollution, and efficient maintenance. ENGIE can help assess legacy infrastructure, integrate technology options, lighting configurations and design; and procure, build, and operate the new system.

ENGIE installed a total of 11,223 LED streetlights for the **City of Arlington** in Texas, helping secure \$18 million in energy savings over 15 years.



eMobility Infrastructure Energy and Smart Charging Services

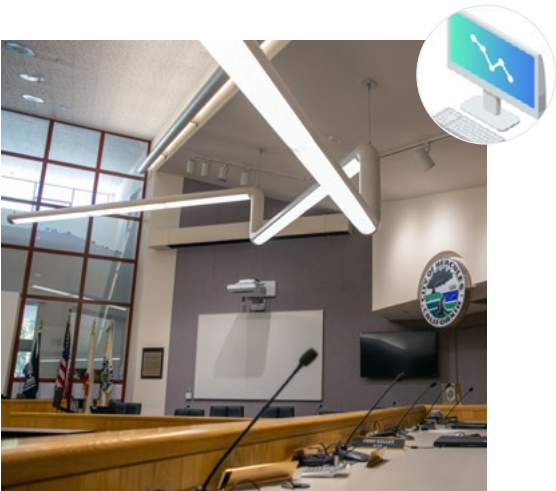
Local governments nationwide are embracing zero-emissions public transportation projects, in part catalyzed by clean air regulations and incentive programs. ENGIE accelerates the journey to zero emissions with a turnkey solution that includes fleet electrification, EV charging in public spaces (city and county facilities), energy infrastructure to support clean and efficient electrified transportation, and grant/incentive applications.

ENGIE devised an eMobility plan for the **Victor Valley Transit Authority** in Hesperia, California, which included battery energy storage combined with solar to support an electric and hydrogen bus fleet. The battery energy storage has reduced the authority's demand charges by 40%.

Water and Wastewater Systems Advanced Metering, Pumps, and Process Improvements

Smart infrastructure technologies including control systems, sensors, and advanced metering can help municipalities maintain their facility assets and ensure efficient, safe, and compliant operations. ENGIE helps with plant-wide assessments to create a masterplan for upgrades. This includes rehabilitating, repairing, or replacing treatment components and controls, as well as creating long-term savings from energy and operational efficiencies. What's more, ENGIE can support new revenue generating opportunities from infrastructure upgrades, including electricity generation from waste and the production of pipeline-quality gas.

In Florida, ENGIE installed a methane fueled engine-generator for **Broward County's** wastewater plant, helping to transform biogas into power and providing energy savings of \$26 million over 17 years.



Building Efficiency and Automation Energy Conservation Measures and Building Controls

Smart buildings save energy by automating controls and optimizing systems to achieve 30-50% energy savings. ENGIE helps municipalities realize these efficiencies by assessing energy usage in buildings, retrofitting energy conservation measures, and installing and operating cutting-edge automated control systems to ensure the complete efficiency of building systems.

ENGIE overhauled the **City of Hercules' HVAC** systems and introduced smart thermostats and software controls across city buildings, saving this California city \$2 million in energy costs over the life of the projects.

Energy Storage and Resiliency (Microgrids) Peak Demand Management and Emergency Backup Power

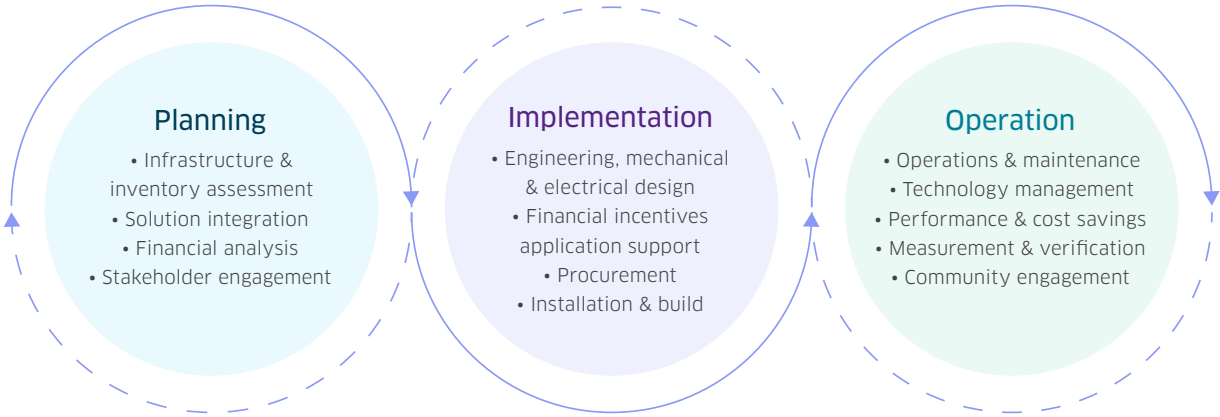
By incorporating renewables and energy storage, a microgrid can regularly generate and store enough energy to significantly reduce demand for power from the utility. This can make the microgrid economically viable beyond its role as a backup power source – generating energy cost savings. ENGIE helps city leaders assess their community's needs, sustainability goals, and the current state of their equipment before designing a portfolio of technology options. After planning and design, ENGIE builds and operates the microgrid, providing routine service and preventative testing.

In California, to provide reliable backup power during outages, ENGIE deployed a microgrid solution for the **City of Milpitas' community centers**, comprising solar generation and battery energy storage.



The ENGIE Difference

With ENGIE Smart City Solutions, cities and counties benefit from a holistic, end-to-end approach that supports their entire energy infrastructure modernization program across its lifecycle including:



There are many proven benefits to ENGIE's approach to smart city development:



Reduced carbon emissions. ENGIE's Smart City Solutions increase energy efficiency and help municipalities meet their carbon reduction targets. The City of Arlington (TX) has seen the benefits first-hand. Having tasked ENGIE to help it meet its sustainability goals, the company has slashed its CO2 emissions by 2,162 metric tons, equivalent to removing more than 385 cars from the road every year. The City's water consumption is also reduced by more than 3,500,000 gallons every year.

"The City of Arlington is pleased to take this step in a Public-Private Partnership with ENGIE to improve our energy efficiency, reflecting strong financial stewardship, while also bringing economic development to the American Dream City. This partnership will help make us a greener city through guaranteed savings."

Robert Cluck, Former Mayor, City of Arlington, Texas



Lower energy bills. By reducing energy consumption and waste, ENGIE's Smart City Solutions also deliver significant cost savings. The City of San José (CA) is a good example. ENGIE installed 18,100 smart streetlights and 1.33 MW of solar PV which, along with HVAC efficiency upgrades, will save the city \$30 million and cut energy costs by more than half over the life of the program. Meanwhile, the City of Milpitas (CA) is realizing \$50 million in net savings over the life of the smart city infrastructure program ENGIE is delivering on its behalf.



100% return on investment. Thanks to ENGIE's energy performance contract, municipalities can fully fund their modernization programs through guaranteed future energy savings. For instance, the cost of Suisun City's (CA) comprehensive citywide infrastructure refresh is being paid for by \$464,000 in annual savings on its electricity bills.

"The partnership with ENGIE means we not only pay for the entire capital project through savings over time, but we are in effect also given a \$3 million boost to our budget. We are thereby able to serve our community better while also executing on our fiduciary responsibility."

Greg Folsom, City Manager, Suisun City



Financing assistance. With budgets tight, city leaders need all the help they can get accessing financial incentives for their modernization plans. ENGIE helps plan project financials, including a full assessment of potential grants and incentives that help minimize costs for customers. For instance, with ENGIE's help, one California water district is receiving \$7 million in incentives under California's Self-Generation Incentive Program. Additionally, ENGIE supports multiple approaches to financing, including service-based offerings and leasing arrangements.



Revenue generation opportunities. Through our Smart City Solutions, ENGIE can help unlock new opportunities for municipalities to generate revenue. For example, the City of Austin's (TX) comprehensive energy program with ENGIE means that it now purchases enough green power to meet 100% of its electricity use. Under a net metering agreement supported by ENGIE, excess power is sold to Austin Energy, creating a new revenue stream for the city. Water treatment and wastewater utilities can also add additional plant capacity and, in turn, lease such capacity to nearby utilities as needed.



One single point of contact. Partnering with ENGIE means that city leaders need only deal with one point of contact for their entire smart city energy transformation. Clear accountability from a partner working from a comprehensive masterplan and managing the projects on an ongoing basis means that projects are completed on time and on budget. For Broward County (FL), the benefits of this one-stop-shop approach have been seen in a greatly simplified procurement process and zero errors or omissions, saving money on expensive change orders.

The Best Energy Foundation for Smarter Cities

ENGIE has built the most comprehensive suite of smart city solutions at the energy nexus. Proven in cities, counties, school districts, and other social infrastructure organizations across North America, ENGIE delivers on the environmental, financial, economic, and social needs of today's urban centers.

Our turnkey approach is built around the unique needs of each city or county and reflects the values, goals, and operational requirements of each community we work with. And our team includes experts in local regulations and incentive programs who help ensure that the smart city modernization plans of local governments are fully funded and in line with wider state objectives and mandates.

Smart cities will usher in a new age of urban living, one which is more sustainable, efficient, and better suited to the needs of residents. ENGIE can enable a modern, resilient, and cost-effective approach to infrastructure modernization and energy conservation that is designed, built, and delivered by a true strategic partner.

To learn more or start a free assessment of your municipality's energy infrastructure needs, contact ENGIE today.

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