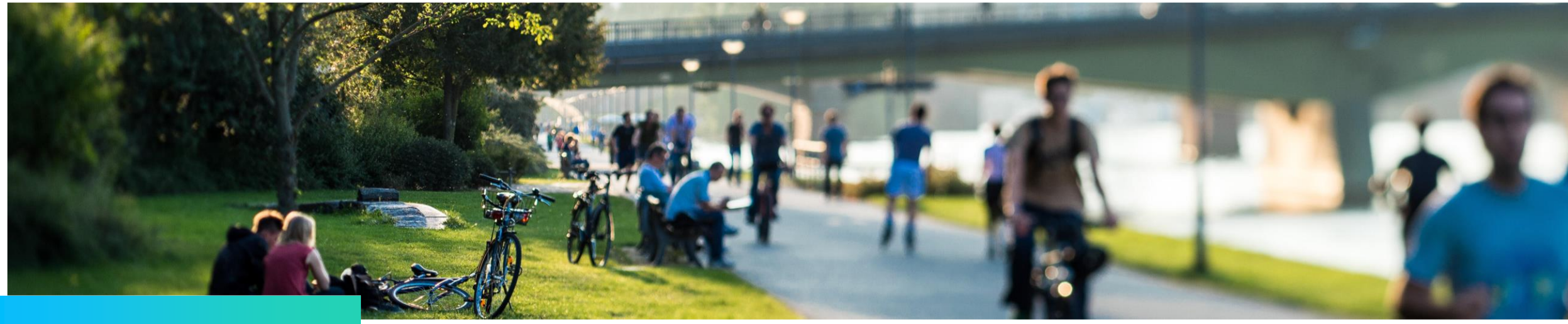

Intelligent Water and Energy System Upgrades: The Key to Sustainable Infrastructure Renewal

WEF eShowcase Webcast

ENGIE | Milpitas

Speakers & Agenda

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Deputy Public Works Director
City of Milpitas, California

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Agenda

1. The growing need to connect and automate water systems
2. Milpitas Smart City Infrastructure Program
3. Designing municipal “smart” infrastructure initiatives with a focus on savings and ease of operation
4. Q&A session

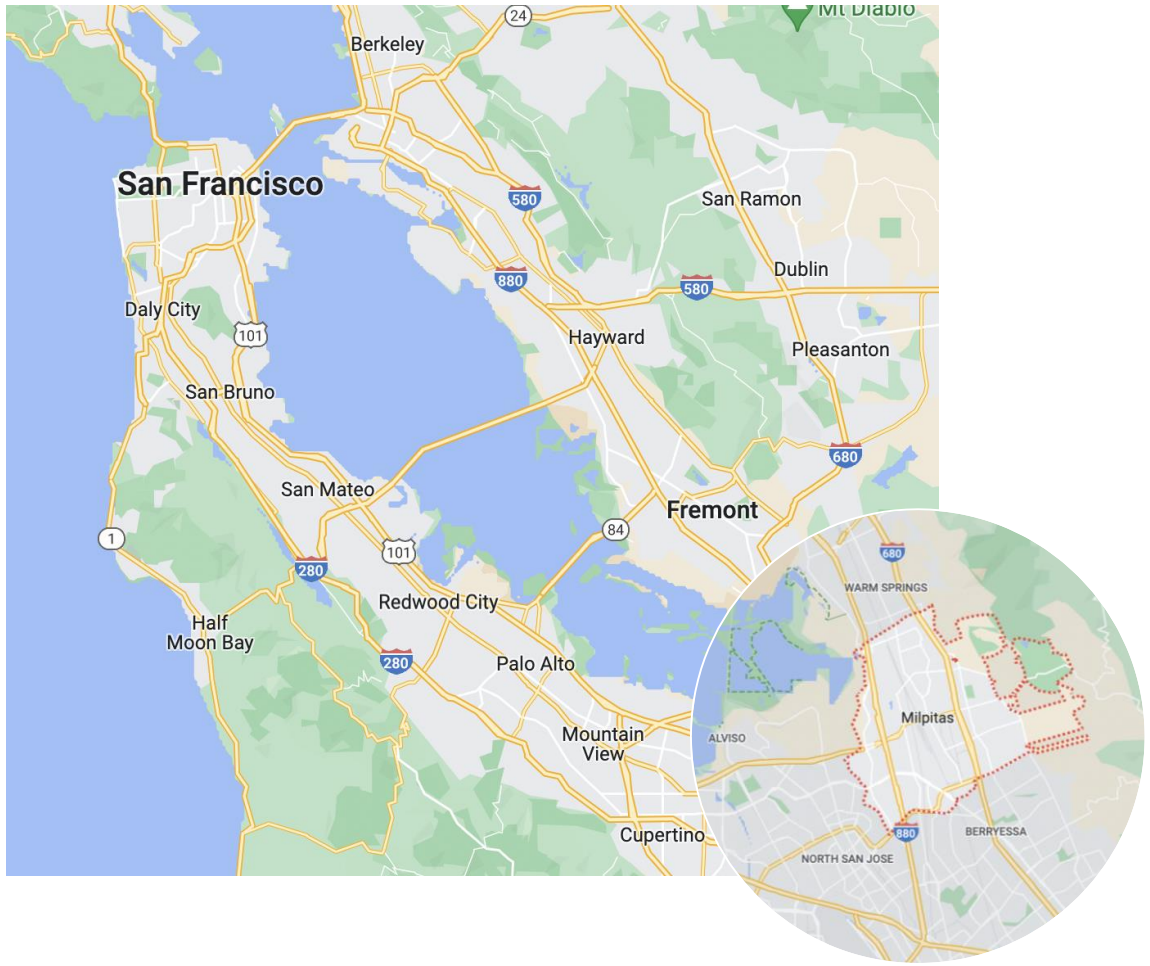
01

The growing need to connect and automate water systems

Common Challenges

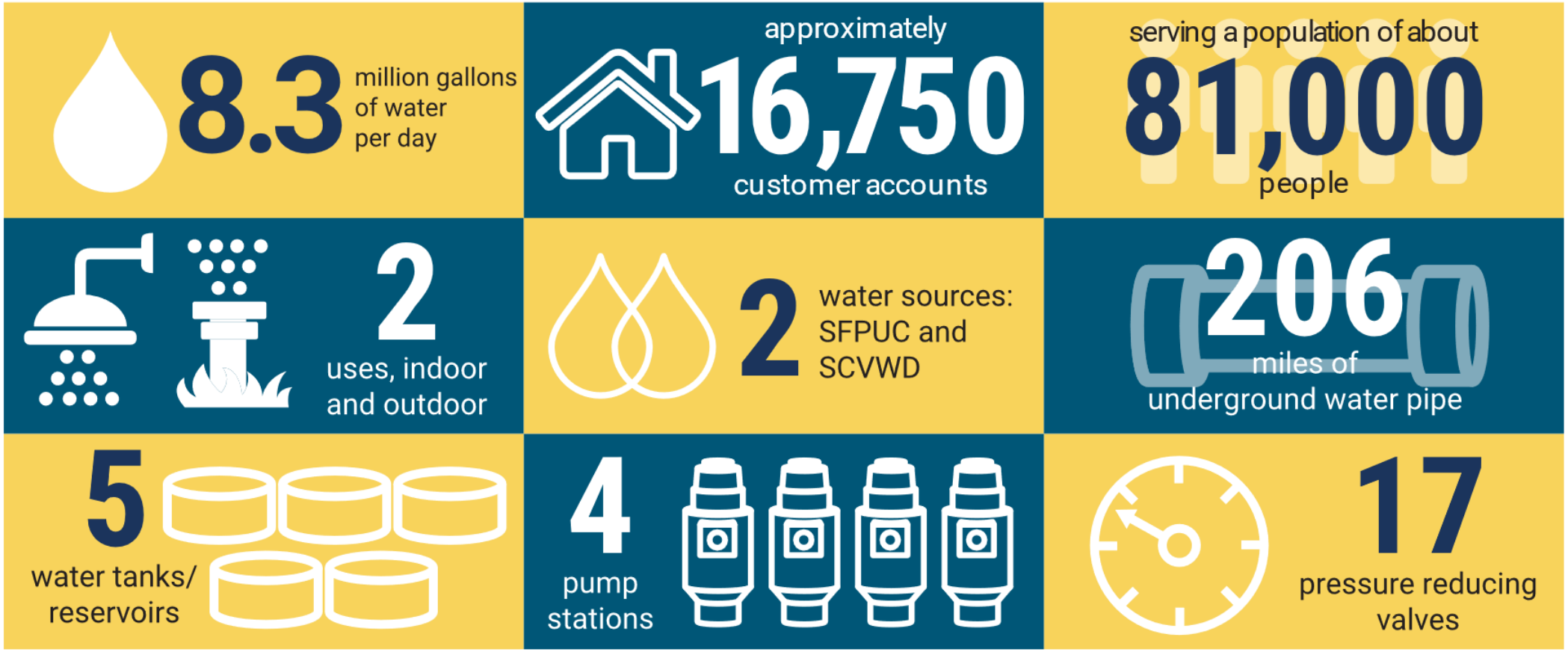
- Maintaining customer satisfaction and demonstrating value to the community
- Managing more operations with less resources
- Responding to more drastic changes in weather/environment

City of Milpitas Profile & Public Works Department History

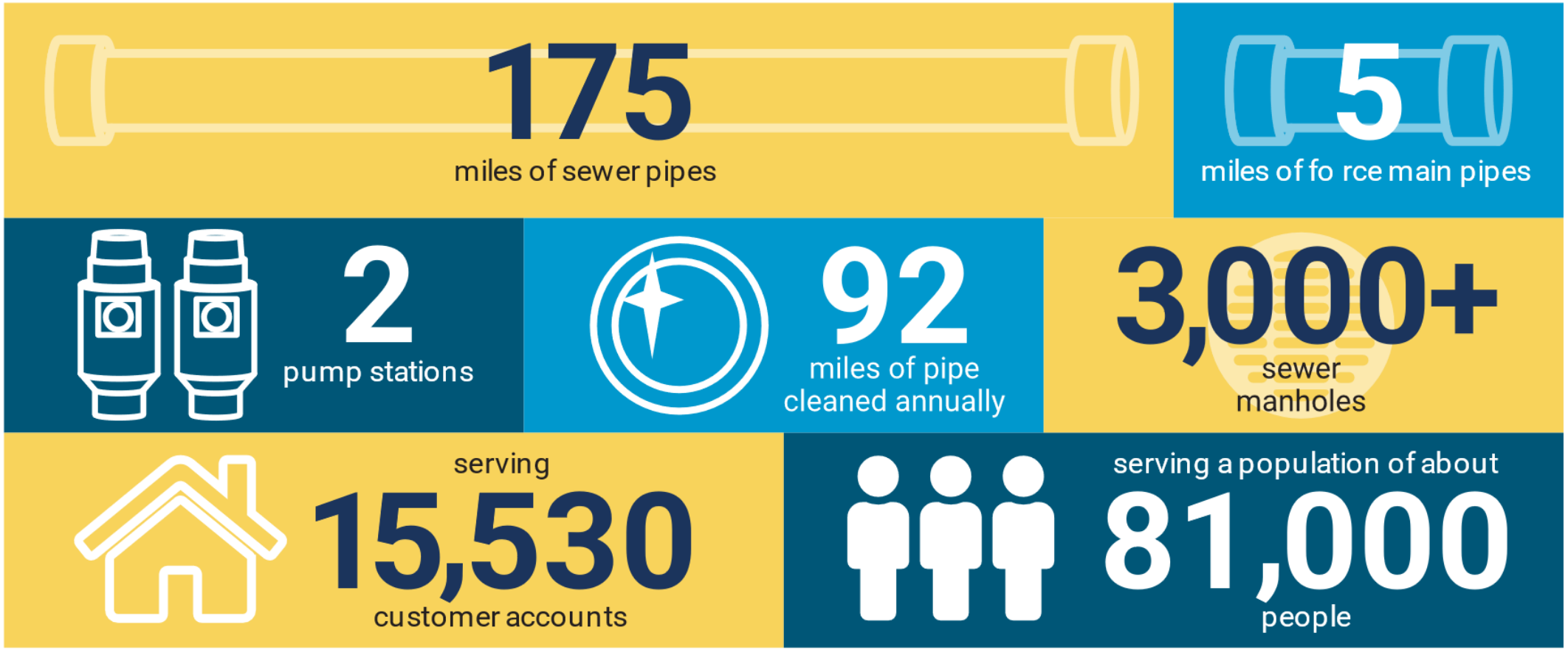


- Located in Northern California, about 45 miles south of San Francisco
- Population of 80,839
- Land area of 13.6 square miles
- Full-service city with police, fire, parks & recreation services, and public works operations
  - Public works operations include water system, storm and sanitary sewer collection system

Milpitas Water System by the Numbers



Milpitas Sewer System by the Numbers



02

Milpitas Smart City Infrastructure Program

Smart City Infrastructure Program

Milpitas, CA

- ENGIE was selected for its infrastructure modernization program designed to improve citywide services, conserve and generate clean energy, and reduce operation and maintenance expenses
- The program consists of 10 different measures covering three broad categories: advanced **water infrastructure**, efficient **lighting upgrades**, and **energy resiliency**
- Together, these measures will reduce utility electricity consumption by more than 4.2 million kWh per year, generate $50M in lifetime savings, and help the city meet its climate action goals
- Community engagement and communications support are also provided – including the sponsorship of a CivicSpark fellowship
- Savings and grant funding are completely offsetting the costs of the program

Smart City Infrastructure Program

Milpitas, CA

Resilient Community Centers

- **200 kW PV system** will reduce consumption of electricity from the grid, which in turn will reduce energy costs
- **Battery energy storage system** will provide an initial source of backup power during an outage and reduce peak demand costs on an ongoing basis
- **Natural gas generator** will provide a second source of backup power for longer-duration outages
- **EV chargers** will be installed for both staff and community use, encouraging broad adoption of electric vehicles

To provide backup power to a community center and a senior center, ENGIE is designing and deploying a microgrid to serve each location – consisting of solar energy equipment installed on rooftops and parking canopies, battery energy storage, and a natural gas generator.

Smart City Infrastructure Program

Milpitas, CA

Lighting Infrastructure Improvements

- Replacement of older-generation lamps and ballasts with **LED fixtures** in public buildings and spaces
- Installation of **motion sensors and updated controls**, which will further reduce energy usage
- Implementation of new **outage-detection capabilities** across 4,453 streetlights to minimize outage durations

When lighting upgrades are complete, the City of Milpitas will be standardized on LED lighting throughout city parks, sports facilities, streetlights, and most city-owned buildings.

Smart City Infrastructure Program

Milpitas, CA

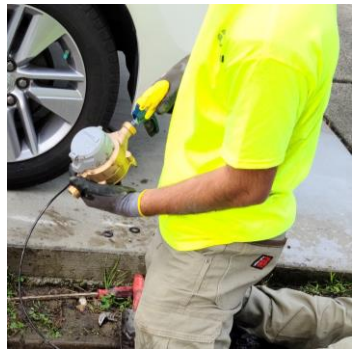
Water Infrastructure Improvements

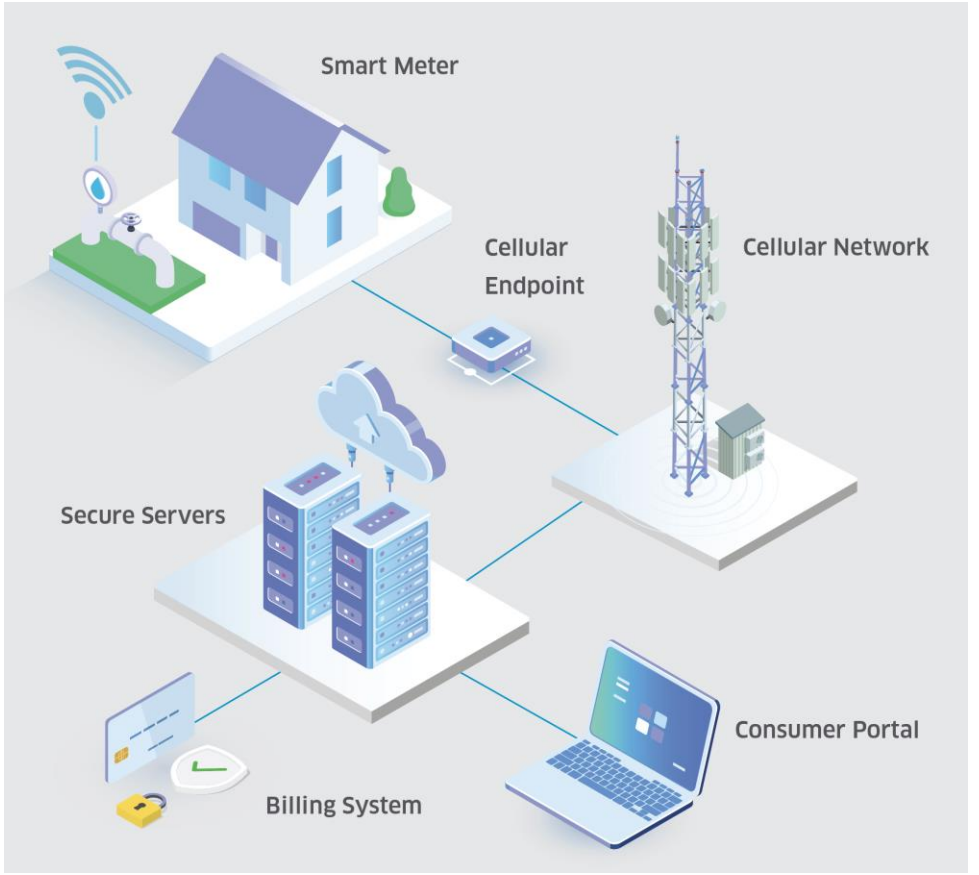
- 15,600 **advanced metering infrastructure (AMI)** water meters with leak detection
- A **supervisory control and data acquisition (SCADA) system** to better manage the City's water, stormwater, and wastewater infrastructure
- **New pumps and automated treatment** of the water supply, for longer storage and reduced waste
- **Touchless, efficient fixtures** throughout city facilities to reduce water usage

By modernizing the City's water, stormwater, and wastewater infrastructure, the Milpitas Smart City Infrastructure Program will improve efficiency and reduce water usage throughout the city. At the same time, the program will improve water quality, accelerate resolution of leaks, and provide city residents with information to better manage water usage in their homes and businesses.

Citywide Advanced Metering Infrastructure (AMI)

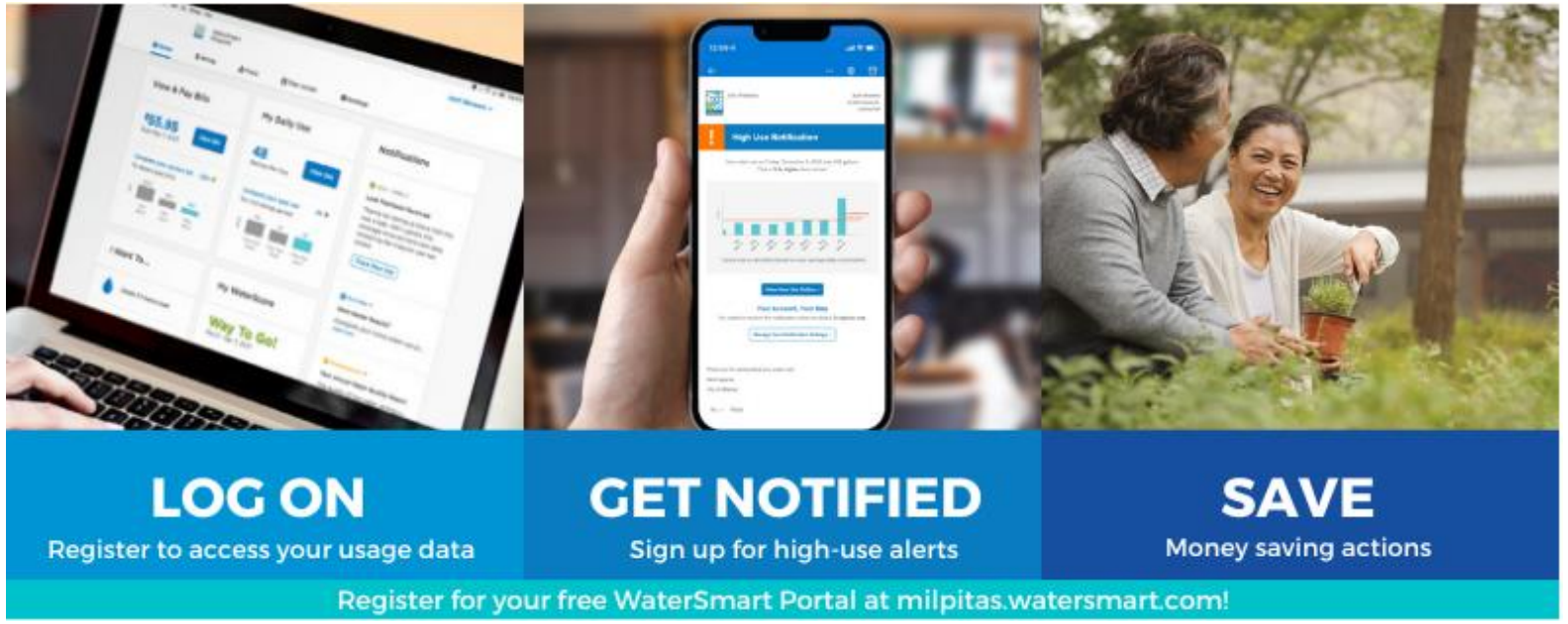
- Most existing water meters in Milpitas were beyond the manufacturer's recommended life span of 20 years
- Milpitas replaced 15,600 water meters at residential, industrial, and commercial buildings with "smart meters"
- The new meters will:
  - Improve billing accuracy
  - Automatically transmit water usage information
  - Provide customers with timely information - including alerts to possible leaks





Customer Water Use Portal

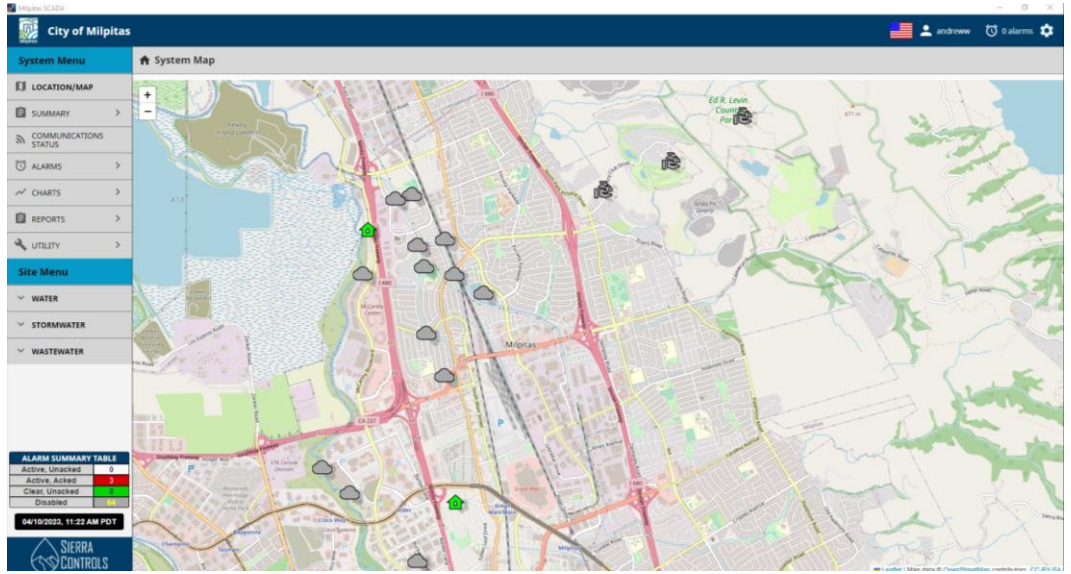
- With AMI technology, customers are also able to monitor and track near real-time water use
- Automated leak alerts and other notifications
- Customized water conservation recommendations and links to rebates and incentives

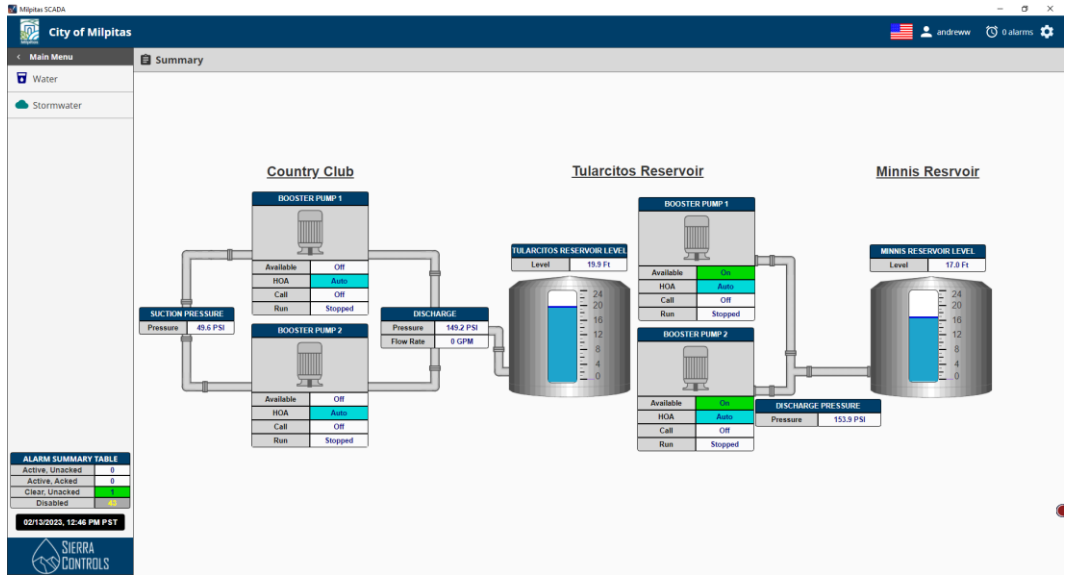


Supervisory Control & Data Acquisition

SCADA

- SCADA has the potential to allow cities to monitor multiple systems on a single platform
- Integrate multiple systems for control & monitoring
  - Water treatment
  - Pumping
  - Pressure zones
  - Wastewater
  - Stormwater
- Using open API's, staff can monitor other subsystems & trend data
  - Lighting
  - Building controls
  - Irrigation
  - Smart grid & microgrid
- Allows cities to free up resources to be used elsewhere, particularly maintenance staff
- Helps better monitor equipment and predict problems early
- Remote alerts & callouts for on duty staff
- Can integrate maintenance scheduling





Pumping Improvements
Upgrades & Advanced Controls

- **More Efficient Pumps**
  - Improved efficiency
  - Lower peak power
  - ‘Right sized’ for actual conditions
- **Reduced Maintenance**
  - Better pump designs
  - Easier to maintain
- **Replaced Aging Infrastructure**
  - Upgraded equipment that is at end of life
  - Modernized equipment
  - Updated monitoring capabilities
  - Monitor pump performance via SCADA

Milpitas Ayer Reservoir & Pump Station

Water Treatment
Challenges

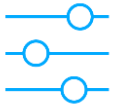
- Most municipalities have existing treatment in place but many have trouble maintaining water quality in storage & distribution due to several factors including aging infrastructure
- Two primary types of treatment residuals in drinking water:
  - Chlorine
  - Monochloramine (chloramine)
- Improve water quality in storage and distribution by:
  - Boosting residual chlorine & chloramine levels
  - Preventing water quality degradation in water storage reservoirs
  - Improving mixing
  - Reducing the need to turn over water quickly to prevent quality degradation
  - Monitoring system continuously via SCADA

Water Treatment
Upgrade Benefits

Reporting
Fast, accurate and more detailed reports with less manual work for city staff.

Compliance

- Improved water quality
- More accurate reporting
- Reduced risk of fines



Controls
More precise control over systems including water treatment, pumping, and stormwater systems.

Energy Savings

- Reduced need to re-pump water
- Improved control over pumps & distribution

Monitoring
Continuous, remote monitoring of all sites with improved system alert features.

Operations & Maintenance

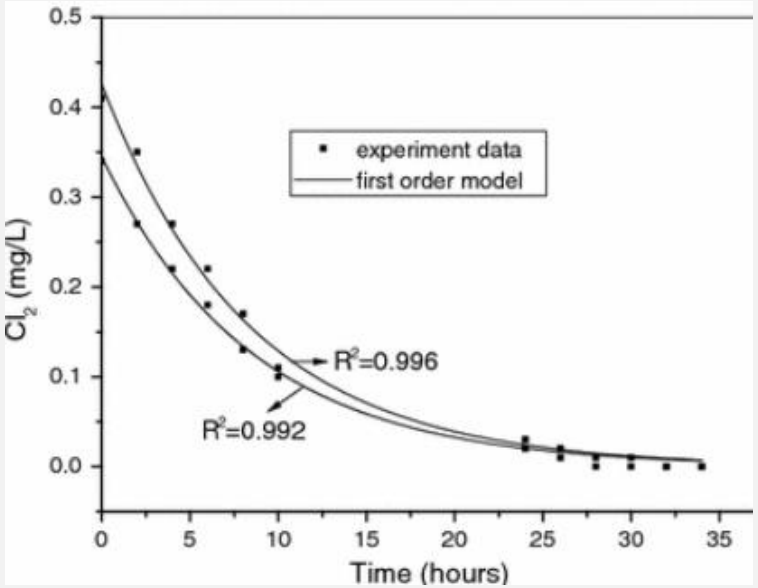
- Fewer site visits
- Reduced chemical costs

Automated Tank Mixing and Dosing

Residual Control

- Goal is to maintain a set residual level in distributed water to guarantee disinfection
- Reduces the need for city staff to visit sites to monitor water quality, especially during high temperatures
- Integration with SCADA allows for remote monitoring of tank water conditions
- Reduces the need to re-pump water to maintain water quality and fire reserve capacity
- Reduces the effects of water stratification in tanks
- Determines when water in tank needs to be cycled to maintain water quality

Chloramine Degradation Curve

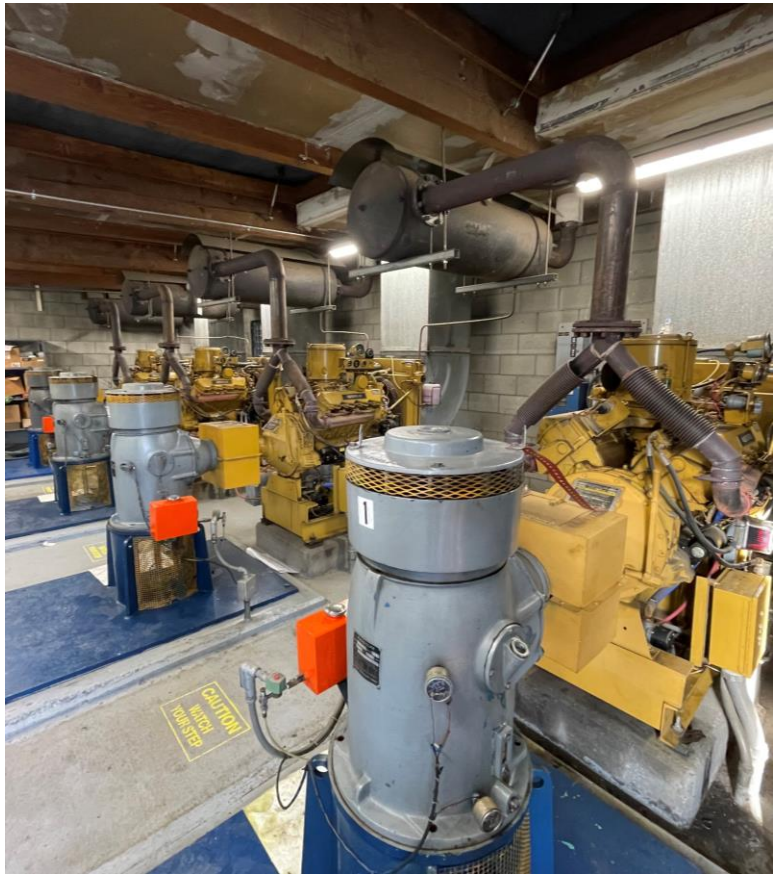


- Chloramine **degradation** (ammonia formation)
- Nitrification (nitrite and nitrate MCLs)

Source: PSI Water Technologies

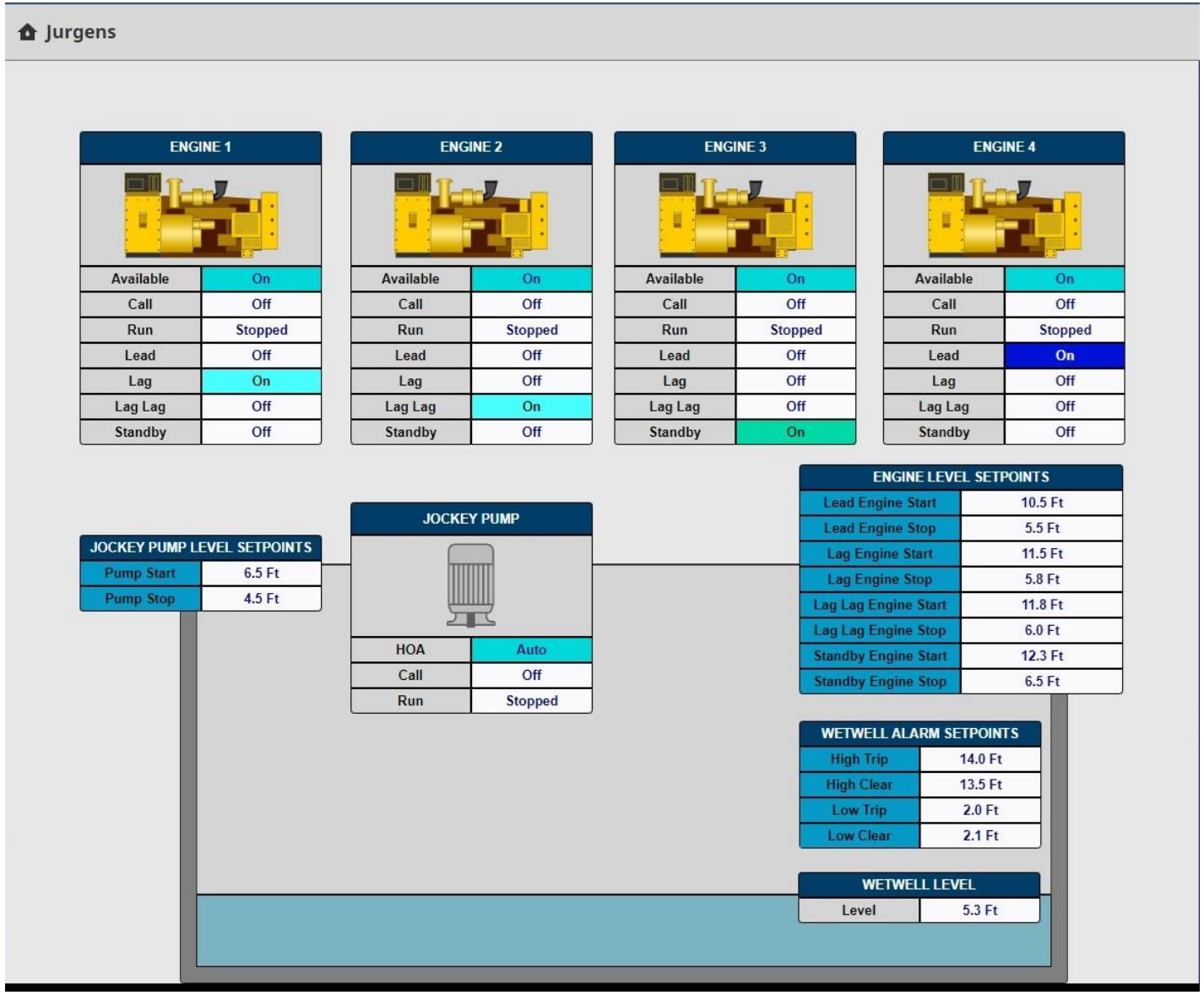
Site Monitoring Retrofit

Stormwater Controls



Stormwater Monitoring
SCADA Design

- Provides overview of all site conditions
- Allows staff to see all active alarms and current operation
- Monitors critical engine driven pump parameters



03

Designing municipal “smart” infrastructure initiatives with a focus on savings and ease of operation

Why Start with Energy?

Cost Reduction

Energy costs are a significant budget item that can be controlled

10% of a local government's annual operating budget is spent on energy

Climate Action

Energy consumption is a major contributor to carbon emissions and an opportunity for action

25% of total U.S. greenhouse gas emissions come from burning fossil fuels for electricity

Technology Integration

Energy is a ubiquitous component of city infrastructure and can become a platform for new technology adoption

States and localities are facing $873 billion in deferred maintenance costs - energy systems and infrastructure represent a significant portion of this backlog

Community Development

Energy is a powerful area of focus to advance local economies, careers, and academic collaboration

Efficiency and clean energy sectors have the fastest growing employment numbers in energy, with skilled labor identified as a barrier to continued growth

Smart Infrastructure Solutions @ the Energy Nexus

eMobility Infrastructure
Equipment and smart charging services

Renewable Energy
Onsite solar PV, performance guarantees

Building Efficiency & Automation
Energy conservation measures, building controls

Energy Storage & Resiliency (microgrids)
Peak demand management and emergency backup power

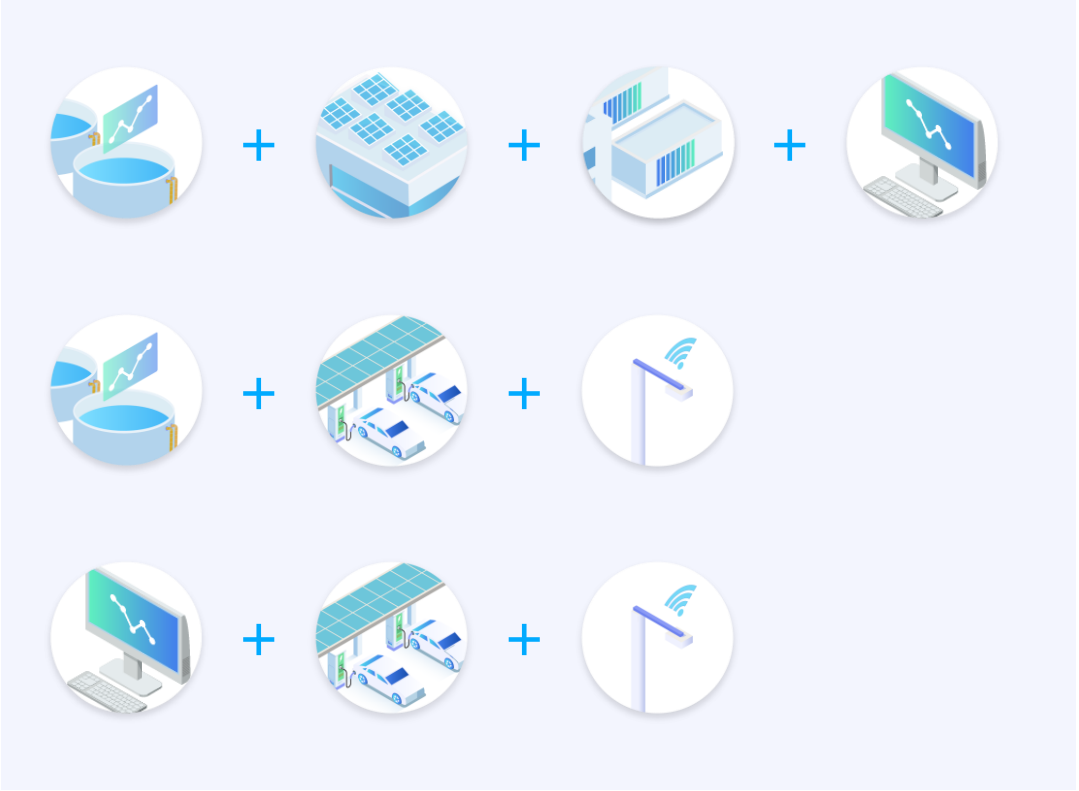
Streetlighting
Citywide LED upgrades, controls and outage detection

Water & Wastewater Systems
Advanced metering, pumps, and process improvements

The Benefits of Bundling Projects

Bundling upgrades across different types of municipal infrastructure can help pay for projects, improve services, and engage local communities.

- **More Savings**
  - Leverage projects with long-term and short-term ROI, and a combination of energy, water and operational savings
- **More Incentives**
  - Take advantage of adders for government/utility incentives to pair certain technologies or locate projects in certain areas
- **Deployment Efficiencies**
  - More efficiently work through backlogs of deferred maintenance with fewer disruptions to operations
- **Community Engagement**
  - Engage your local community with an innovative portfolio of upgrades – building appreciation for advanced technologies and responsible resource management



ENGIE’s Comprehensive Approach

ENGIE is with you every step of the way providing detailed infrastructure audits, financing solutions, project management, and stakeholder engagement.

Planning

- **Infrastructure & inventory assessment:** state of current equipment and operations (needs assessment)
- **Solution integration:** technology options and configurations (sensors, controls, other peripheral smart technology)
- **Financial analysis:** cost and savings estimates, incentives, financing and ownership structures
- **Stakeholder engagement:** communications, outreach and approvals

Implementation

- **Site design:** engineering, mechanical and electrical design
- **Incentive applications:** filing and compliance support
- **Procurement:** luminaires, nodes, controls, poles, wires, peripheral smart technology (cameras, sensors, data, etc.)
- **Installation:** construction, testing and commissioning
- **Utility interconnection:** construction, testing and commissioning

Operation

- **Operations & maintenance:** preventive maintenance and repairs
- **Energy management:** IOT platform (automatic/remote controls, outage detection, repair dispatch)
- **Measurement & verification:** report on performance and savings
- **Community engagement:** programming and project impact

04

Q&A’s

Questions?

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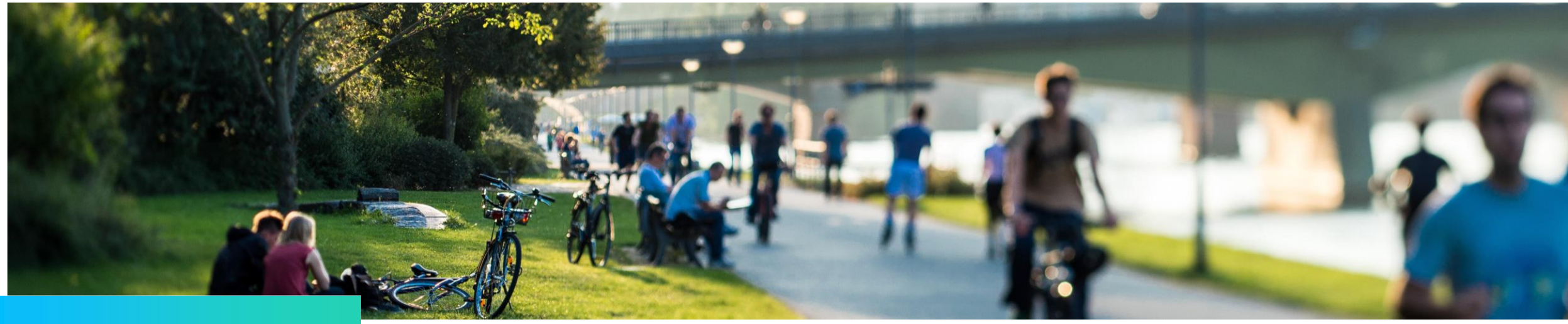
For questions related to your infrastructure needs, email **info@es.engie-na.com**



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