

SMC-101: Introducing the Smart City

Abhijit Grewal | September 2021



Smart Cities Driving Sustainability Goals

▪ Justification/market drivers

- Utilities losing \$96 billion each year to electricity theft, fraud and billing errors¹
- Up to 40% of all water distribution is lost to leaks²
- Renewables share in US electricity generation to grow from 21% in 2020 to 42% in 2050³
- Global EV market share growing from single digits in 2020 to 30% by 2030⁴

▪ That make a major impact

- Smart Electric Meters help in reducing non-technical losses¹
- Smart meters recover up to 40% of water lost to leaks
- Smart grid technology drives 18% reduction in CO2⁵
- Lifecycle emissions of EVs more than 3x lower than conventional vehicles⁶



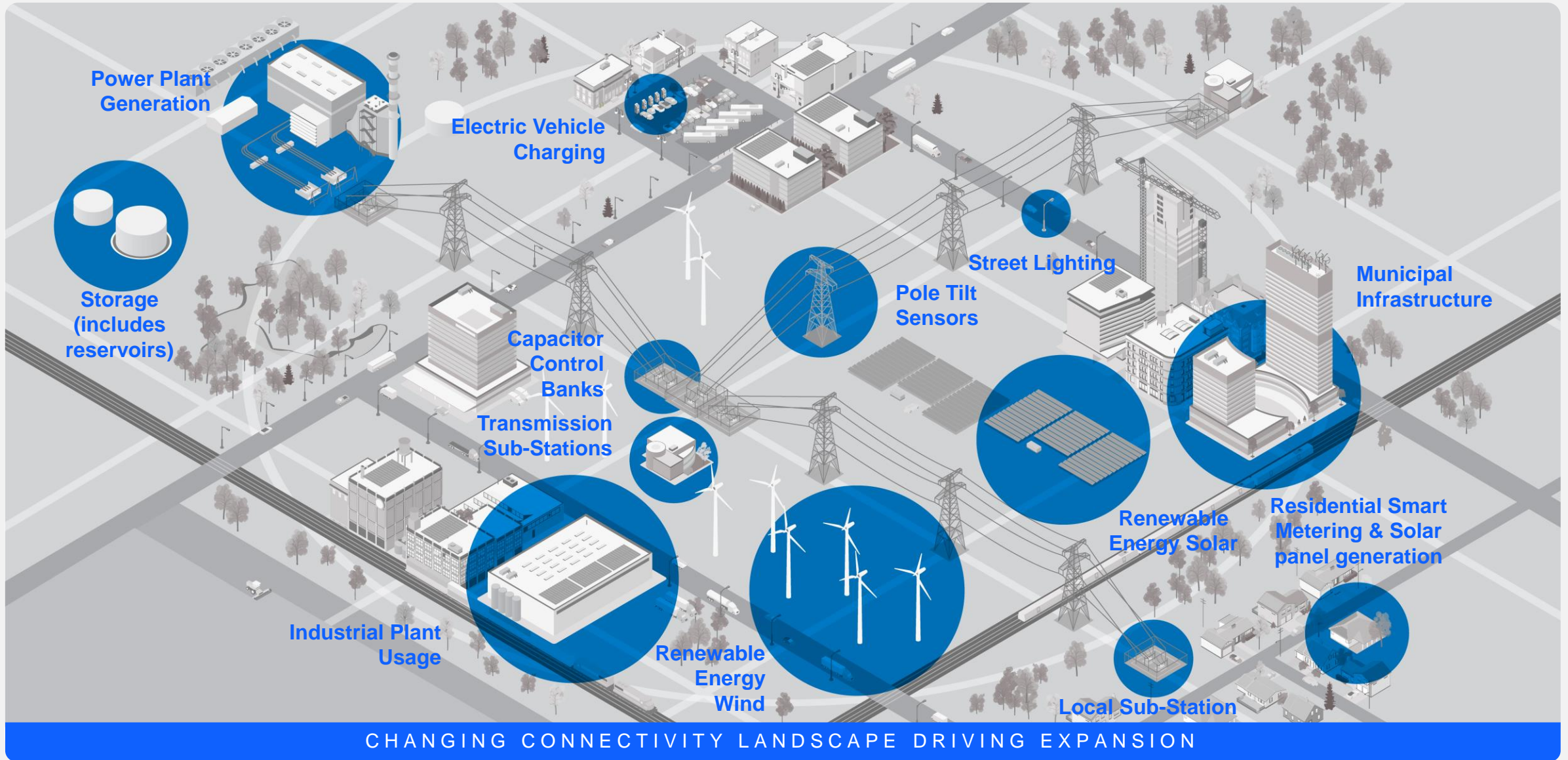
 Smart Cities committed to Sustainable Development Goals

Smart Cities Overview



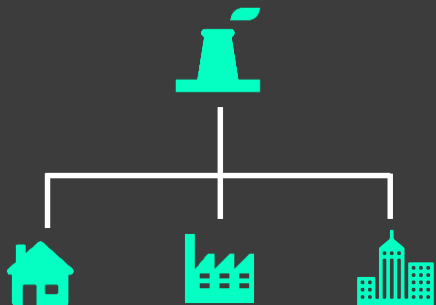
- **Applications tied to citywide networks such as**
 - Utility monitoring and control
 - Municipal Infrastructure
 - Energy Production
- **Uses proprietary or standard wireless**
 - Vendor specific proprietary networks (Itron, L+G, etc)
 - Standards based networks (Wi-SUN, WMBus, ZigBee)
 - Wide area public/private networks (NB-IoT, LoRa)
- **Includes device configuration using**
 - Bluetooth
 - Wi-Fi

Smart Cities Connectivity Landscape



Industry Disruption Driving Need for Grid Edge Intelligence

GRID EDGE INTELLIGENCE DRIVES DISTRIBUTION AUTOMATION RESULTING IN EFFICIENT ENERGY ROUTING



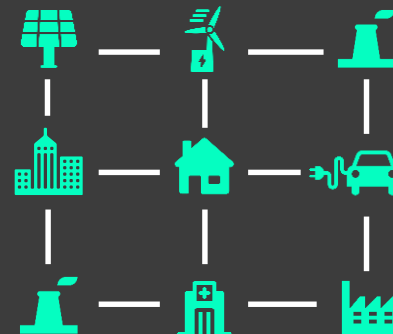
TRADITIONAL POWER GRID

- Central one-way power system
- Focused on safe reliable and affordable power



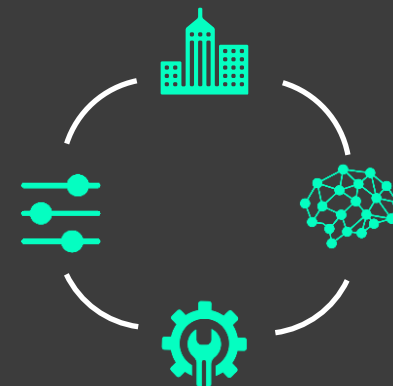
INDUSTRY DISRUPTION DRIVER

- Decarbonization, Decentralization, Digitalization disrupting utility industry
- Distributed and intermittent sources need integration
- New level of flexibility, security and resiliency needed



DECENTRALIZED GRID

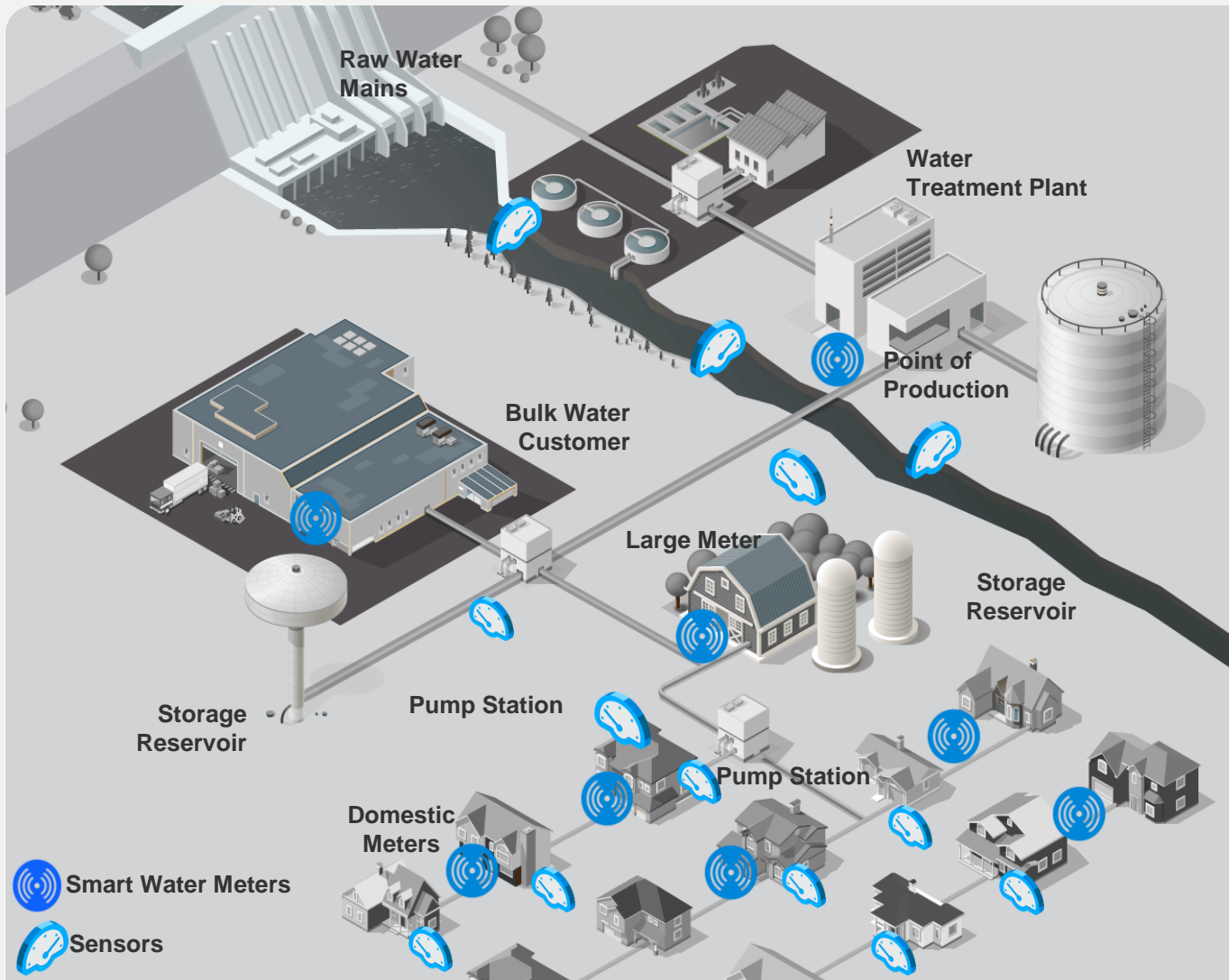
- Distributed two-way power flows
- Mobile energy resources
- Multiple energy players



GRID EDGE INTELLIGENCE

- Distributed intelligence at each end-point
- Electric Meter vital for edge intelligence
- Bandwidth and latency tailored to use-cases
- Near real time energy management and control

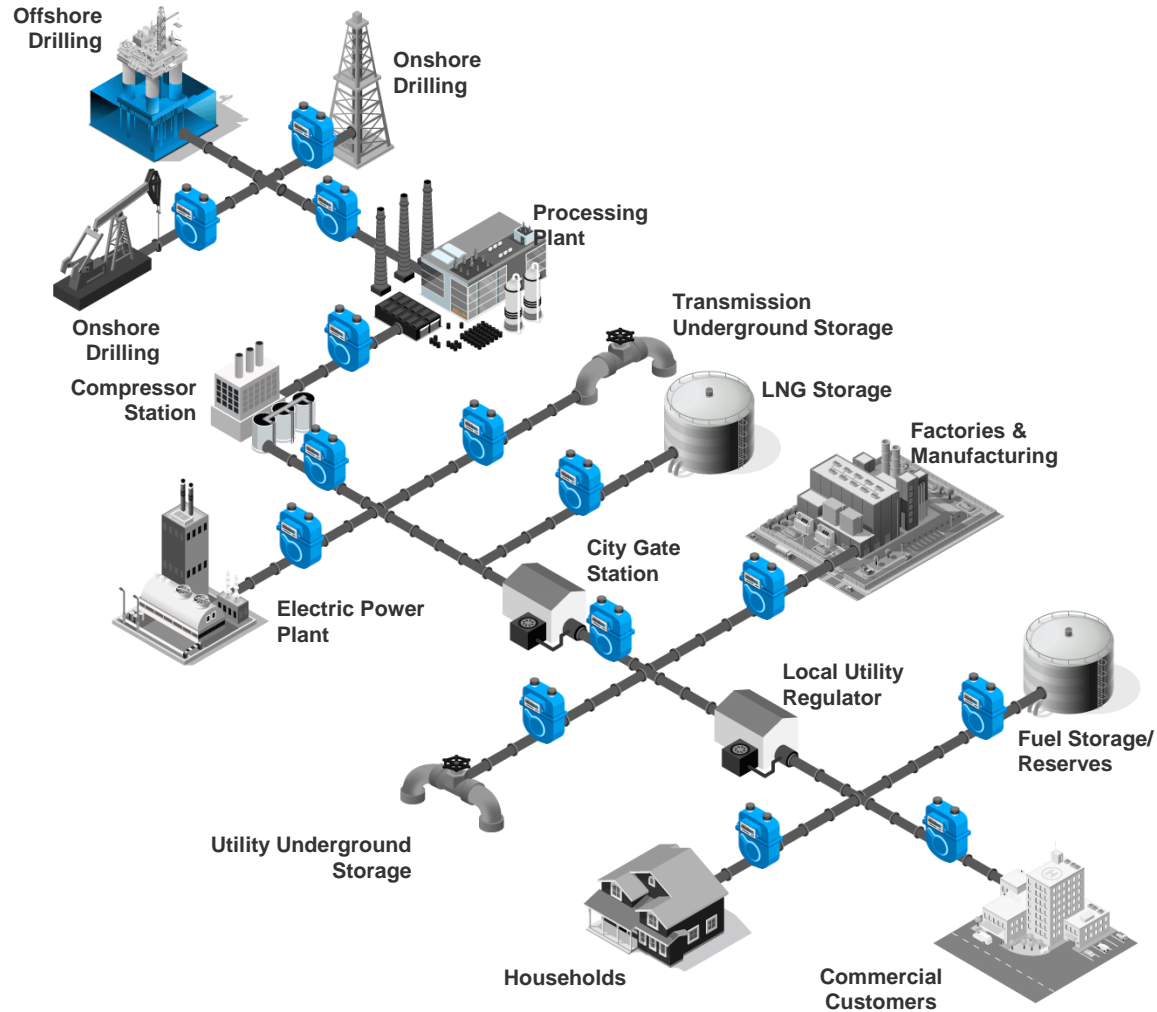
Smart Water Distribution - Minimizing Losses and Improving Efficiency



- Water a critical and valuable resource
- Water leaks and thieving -> huge financial impact
 - As much as 40% is “non-billable”
- Leaks raise electric usage at pump stations
- Smart Meters improve water management
- Sensors across network improve efficiency

SMART WATER DISTRIBUTION ECOSYSTEM MINIMIZES LOSSES AND IMPROVES EFFICIENCY

Gas Distribution Network – Improving Efficiency



- Complex network of supply sources, refining, processing, storage and distribution
- Storage and pumping occurs at multiple phases of the distribution network
- Peak and Standby reserves required to guarantee service
- Final distribution can be performed via multiple avenues
- Constant monitoring of pressure, temperature, flow, usage drives wireless sensor and control needs

SMART GAS DISTRIBUTION ECOSYSTEM IMPROVES EFFICIENCY

Distributed Energy Resources Management and Integration



▪ Renewables driving Distributed Energy Resources

- IOT connectivity forefront of generation and distribution
- Real time monitoring and maintenance reduces costs
- Rapid response to outages and other system issues
- Drive safe and efficient operation

▪ Key drivers for wireless connectivity

- Wireless connectivity in micro-inverters/DC-DC optimizers
 - ▶ Real time health monitoring of solar panels
 - ▶ Locate underperforming modules
 - ▶ Allow for rapid shutdown in case of fire hazard
- Wired to wireless for solar cell health monitoring
 - ▶ Wires costly for solar farms/large installations
- Connecting inverters to the gateway for cloud connectivity
 - ▶ Residential inverters located in the garage

IOT HELPING NAVIGATE CHALLENGES OF COMPLEX GRID WITH DISTRIBUTED ENERGY RESOURCES INTEGRATION

Intelligent Street Lighting Enables Municipal Infrastructure



▪ Intelligent Street Lights enable

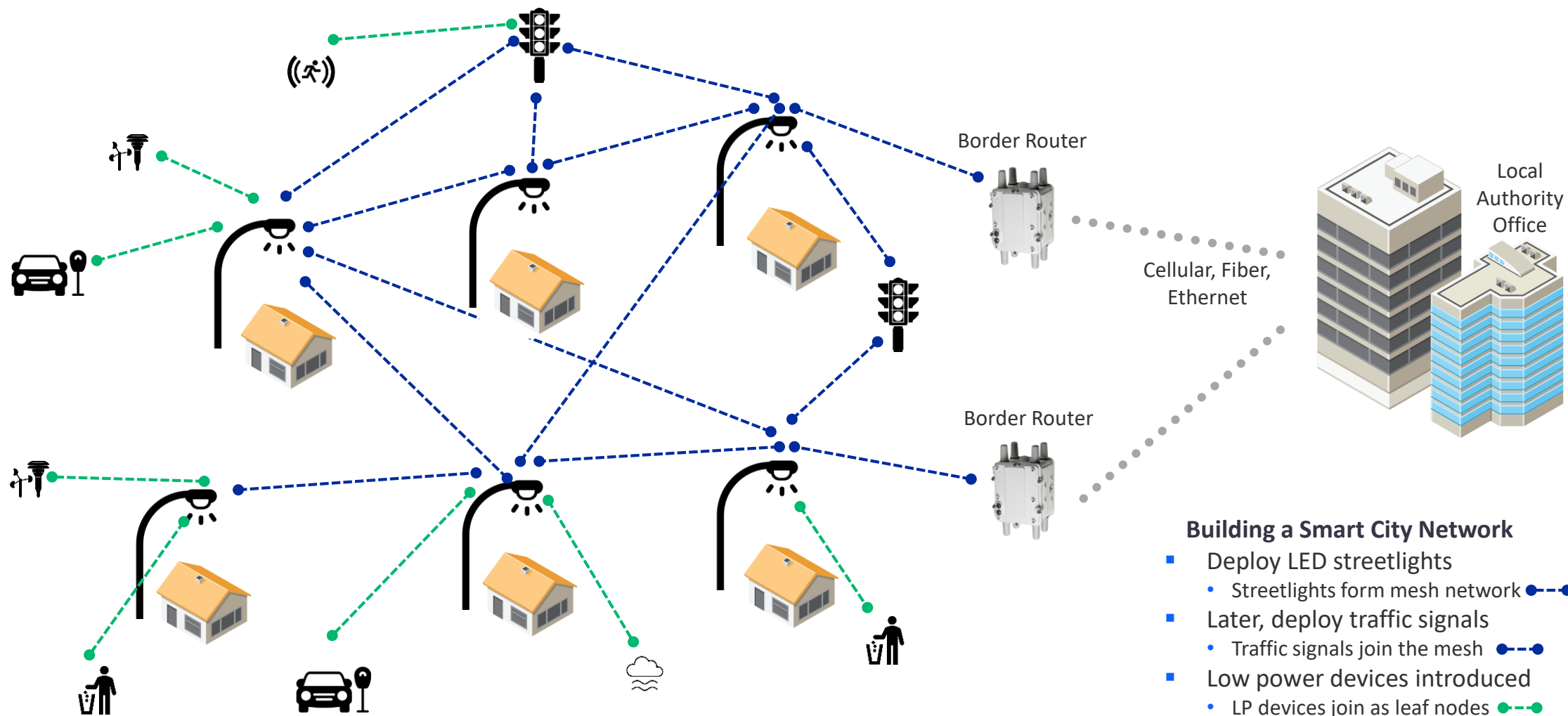
- Efficient energy usage drives energy conservation
- Remote management lowers maintenance costs
- Rapid response to outages and other system issues
- Increased network coverage and resiliency

▪ Intelligent Street Lights enable Smart Cities

- Environmental Sensors
- City Infrastructure
 - Waste Management
 - Weather Systems
- Parking
- Asset Tracking

INTELLIGENT STREET LIGHTS DRIVE ENERGY CONSERVATION, REDUCE COSTS AND ENABLE SMART CITY ECOSYSTEM

Connected Infrastructure for a Better, More Sustainable World



WI-SUN TECHNOLOGY ENABLES IOT NETWORK CONVERGENCE

Wi-SUN: Unlocking Massive IoT



Standards based



Ubiquitous



Scalable



Versatile



Secure & resilient

IPv6 Benefits

- IPv6 provides scalable addressing backbone
- IPv6 brings in flexibility to unify IoT
- IP-based architecture is manageable & highly secure

Wi-SUN FAN Alliance

- Global ecosystem of member companies seeking to accelerate open standards implementation of FAN



- 11 promoter members
- 78 contributor members

Over 240 members representing 43 countries
Growing global membership



>96.5 Million Wi-SUN
Capable Endpoints
Deployed Worldwide
– Navigant Research



Wi-SUN FAN

- FAN addresses specifications for PHY, stack & product
- PHY – based on IEEE 802.15.4g standard
- Stack – IPv6 with 6LoWPAN protocol suite
- Product certification offered by Wi-SUN Alliance

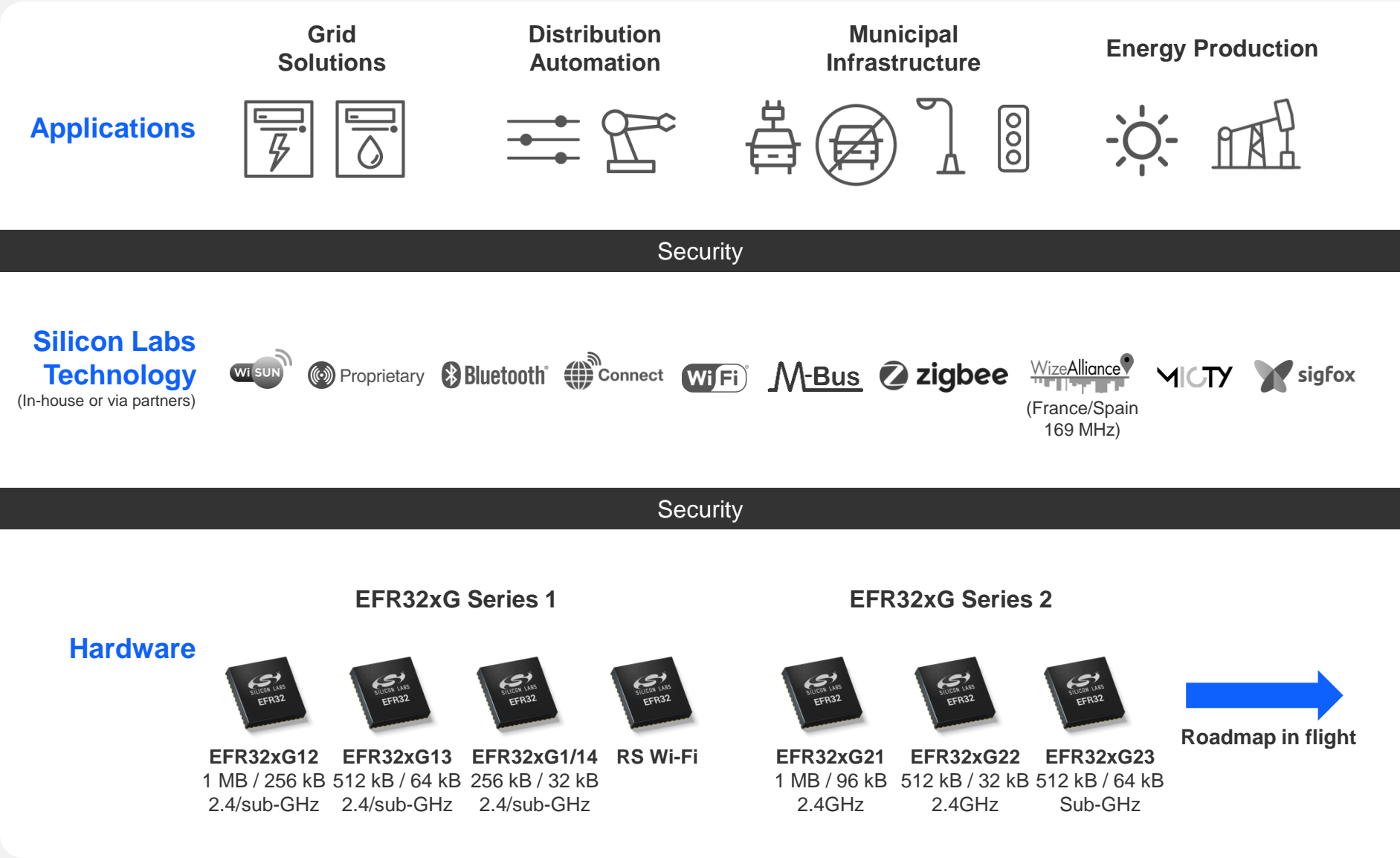
Benefits of FAN Certification



Wi-SUN Key Applications



Silicon Labs Delivers Smart Cities Foundation





works with
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VIRTUAL CONFERENCE

September 14–15, 2021

workswith.silabs.com

Wi-Sun Sessions

Session ID	Session Name
SMC-102	Why Wi-SUN is Ideal for Smart Street Lighting?
SMC-103	Smart City Network Management in the Cloud Using Pelion
WSN-101	Introduction to Wi-SUN, It's markets and the Alliance
WSN-300	Building Large Scale Smart City Networks with Wi-SUN

Also Don't Miss

Session ID	Session Name
LPW -101	What options do I have for LPWAN Applications
APP-203	Energy Saving Tips for Battery Powered Metering
LOC-102	Energy Reduction & Utility Grid Stabilization with Demand Response
SMC-105	Smart City Street Lighting Options



Multiprotocol



Proprietary
100s of Technologies



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