

PRESENTATION TO:

DIGITAL SOLUTIONS – FOR A CONNECTED WORLD

CITIES AND COUNTIES ISSUES ARE COMPLEX AND NEED INTEGRATED SOLUTIONS



Traffic congestion

The number of cars will more than double, reaching 2.5 billion by 2050



Outdated infrastructure

Affects fresh-water supplies, sewage, and public health



Safety concerns

Citizens are losing trust in their emergency responders



Expensive healthcare

EU's public health expenditure will grow to 8.5% of GDP by 2060



Education crisis

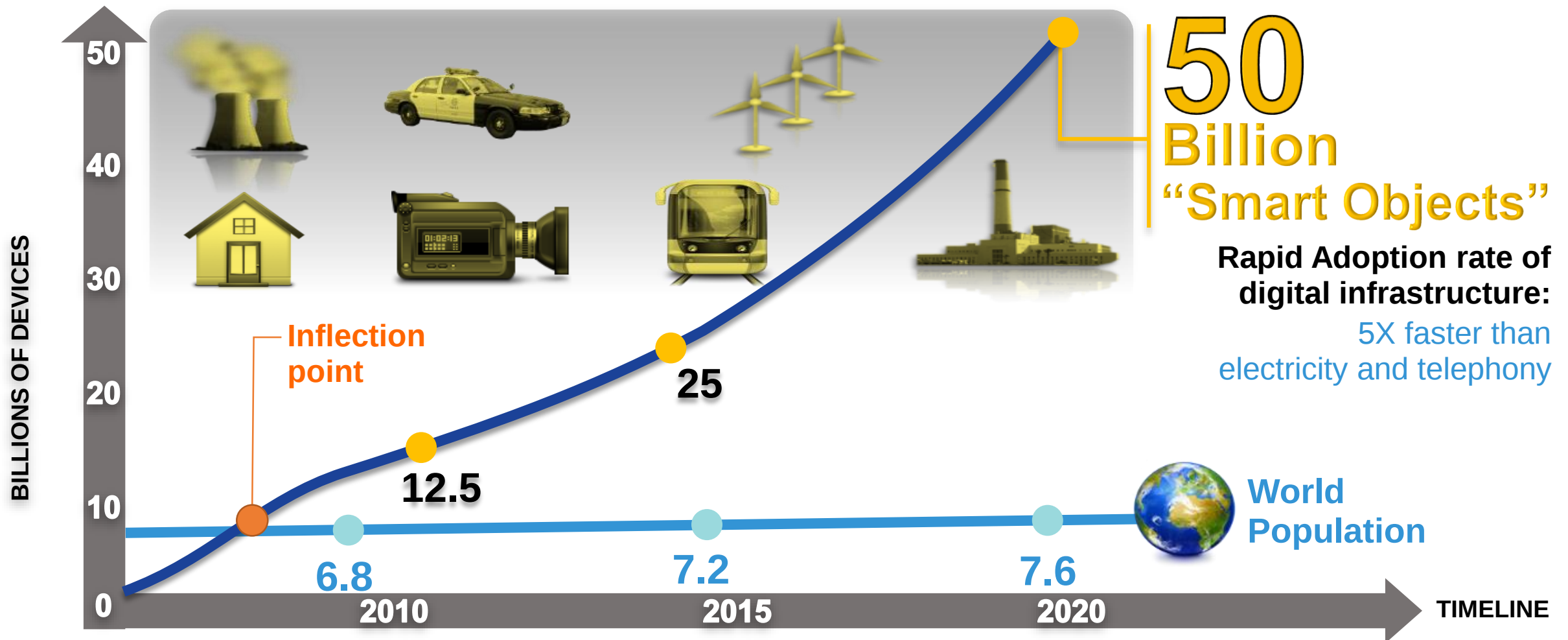
Digital divide, need for more teachers



Energy consumption

40% of all energy consumed through buildings

The Internet of Things (IoT) is already here

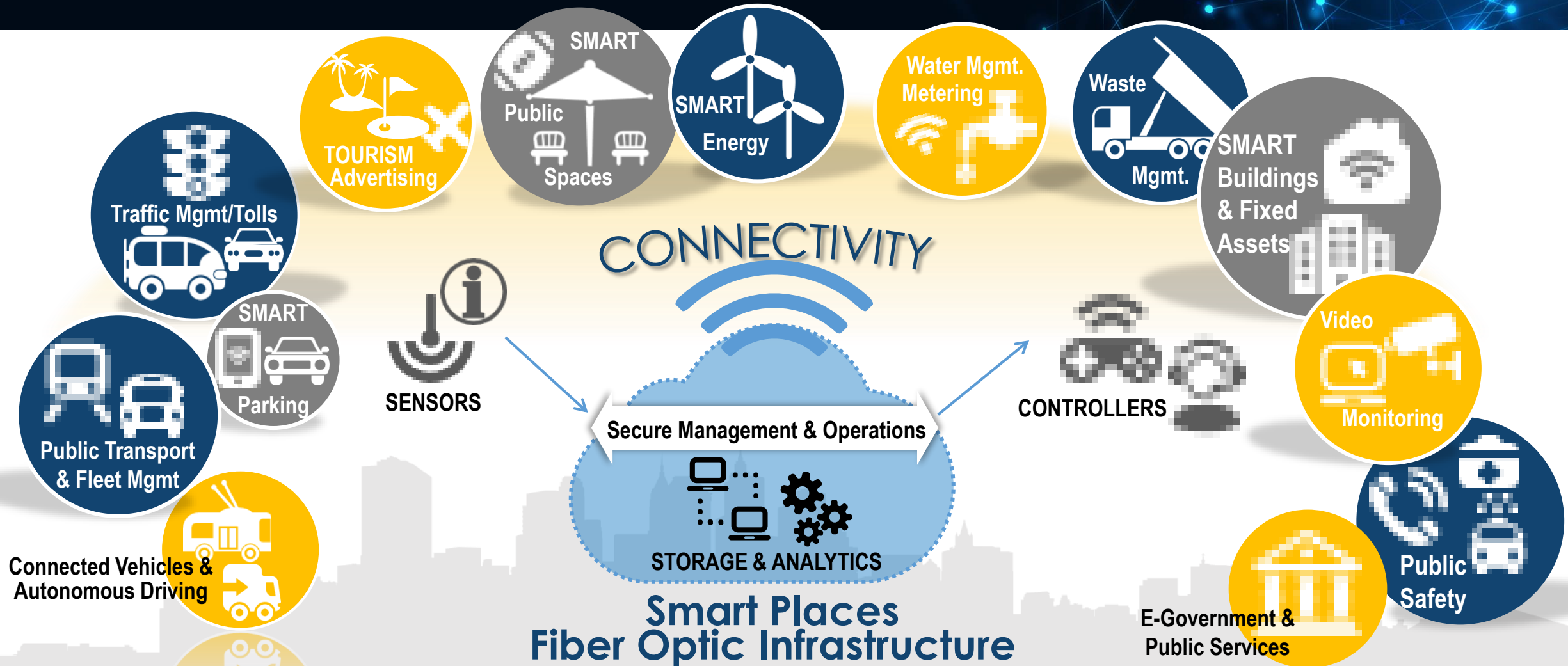


SMART AND CONNECTED PLACES INTEGRATE

- Land Use and Information Communication Technology to Promote
 - Livability
 - Sustainability
 - Economic growth



Fiber Network is the foundation for Multiple Smart and Connected Places Solutions



Smart & Connected Places Development Process

1. Diagnostic Assessment

- Define vision
- Capture stakeholder values
- Quantify challenges
- Identify opportunities
- Maturity Model
- Develop priorities
- Review projects
- Identify access-ready funding sources

2. Digital Road Map Development

- Perform decision analysis and evaluate initial scenarios
- Develop comprehensive schedule of projects
- Evaluate funding options
- Identify alternative finance opportunities
- Analyze return on investment
- Advanced modeling to optimize funding/financing, network requirements, project timing and to mitigate risk

3. Implementation Strategy

- Planning and design
- Permitting/environmental
- Engineering
- Program management
- Asset management
- Operations
- Construction management

1 Diagnostic Assessment

2
Road Map Development

3
Implementation Strategy



SMART & CONNECTED PLACES

SMART AND CONNECTED PLACES (Outcome based solutions)

1. Smart Mobility
2. Smart Digital Infrastructure
3. Smart Public Safety & Cybersecurity
4. Smart Buildings
5. Smart Governance
6. Smart Utilities: **WATER**
7. Smart Utilities: **ENERGY**
8. Smart Utilities: **WASTE MANAGEMENT**



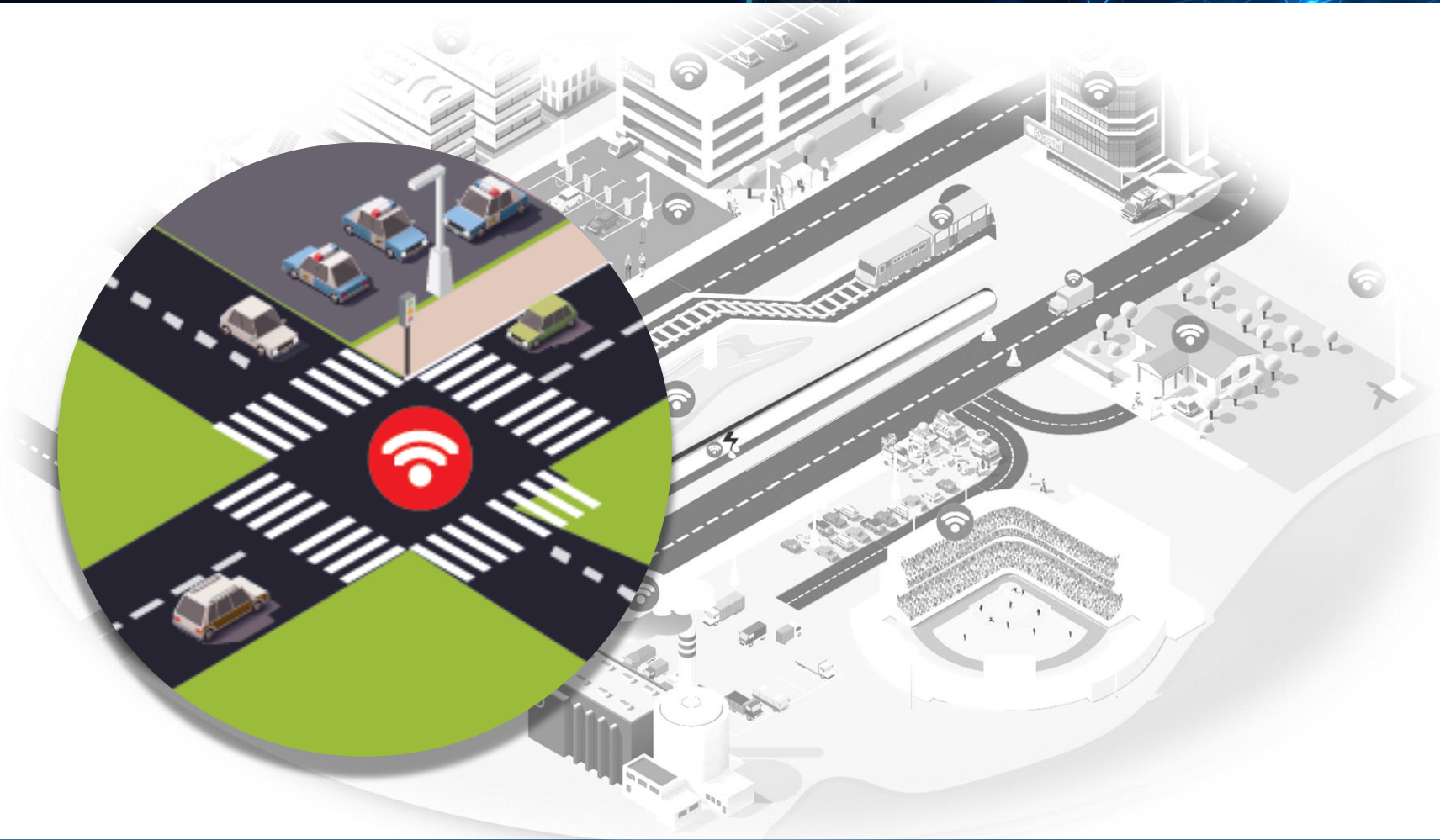
1. Smart Mobility

1. Traffic Flow & Optimization
2. Payment Systems & Road Usage Charge
3. Autonomous Shuttle
4. EV Charging Station
5. Vehicle & Asset Mapping
6. Live Bus Feed
7. Smart Parking
8. Multi Model Traffic Integration



2. Smart Digital Infrastructure

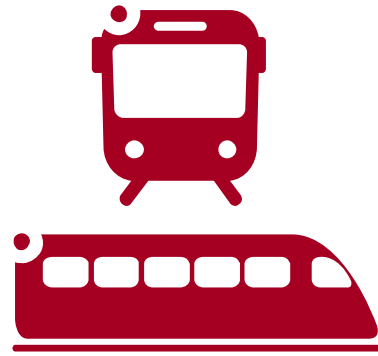
1. Fiber and Communications
2. Public Wi-Fi
3. Unified Communications (Voice, Video, and Data)
4. Command & Operations Center
5. Video and Predictive Analysis
6. Video Cameras/Surveillance
7. Smartphone App
8. Real Time Water and Energy Management for Buildings



Broadband On Trains & Buses



CUSTOMER WIFI



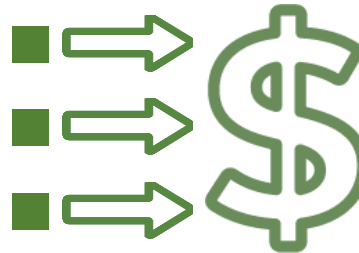
CONNECTED FLEET



CONNECTED STAFF



CONNECTED
PASSENGER



ADVERTISING

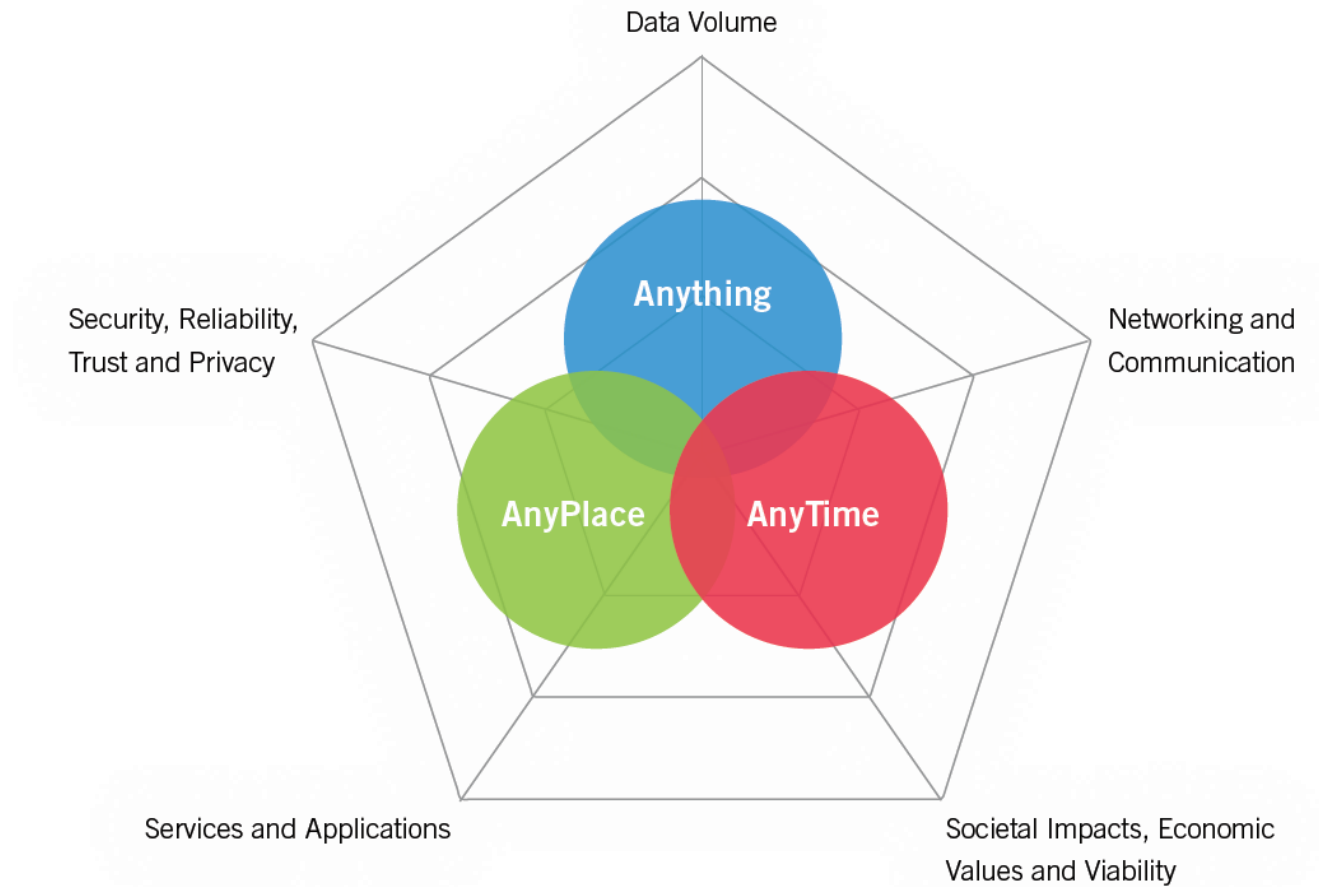


3. Smart Public Safety & Cybersecurity

1. Public Safety and Security
2. Threat Assessment & Mitigation
3. Homeland Security
4. Cybersecurity
5. Emergency Management & Response
6. Video Monitoring & Access Control Systems



Cyber Security Solutions



6. Water

1. Advanced Meter Infrastructure (AMI)
2. Contamination Warning Systems
3. Water and Sewer Information Management
4. Sewer Overflow Sensors
5. Security & Emergency Management
6. Drought & Climate Resiliency
7. Rain Gauge Sensors



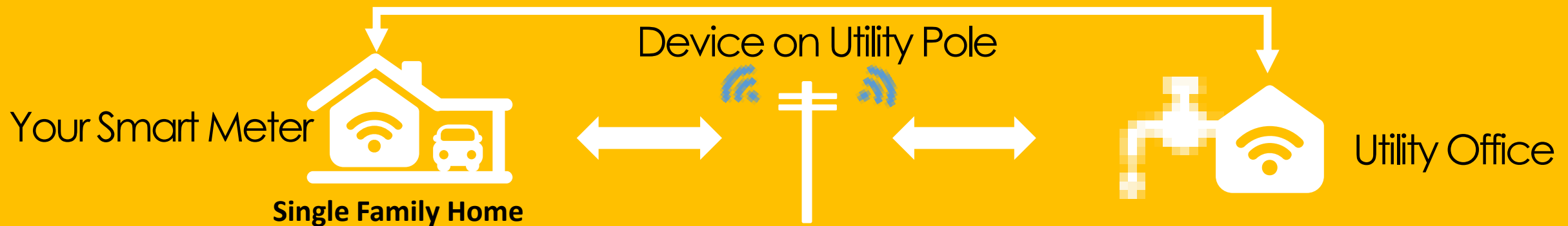
AMI – Advanced Metering Infrastructure

What is it?

- Smart meters at the consumer's location
- Fixed communication networks between consumers and service providers
- Data reception and management systems (meter data management system or “MDMS”)
- MDMS: software applications that receive and store meter data and perform other functions

Benefits

- Enables a two-way flow of information between consumers and utilities
- Enables proliferation of demand response
- Allows service provider to control consumers' electricity usage (load control)
- Facilitates Smart Grid deployment and distributed generation

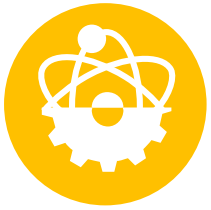


7. Energy

1. Time-of-Use Rates and Demand-Side Management
2. Smart Grid: *Transmission & Distribution Networks - operational and energy measures including smart meters, smart appliances, renewable energy resources, and energy efficiency resources*
3. Load Balancing with Renewable Energy Sources
4. Smart Street Lighting
5. Renewable Energy
6. Demand Side Management
7. Energy Storage

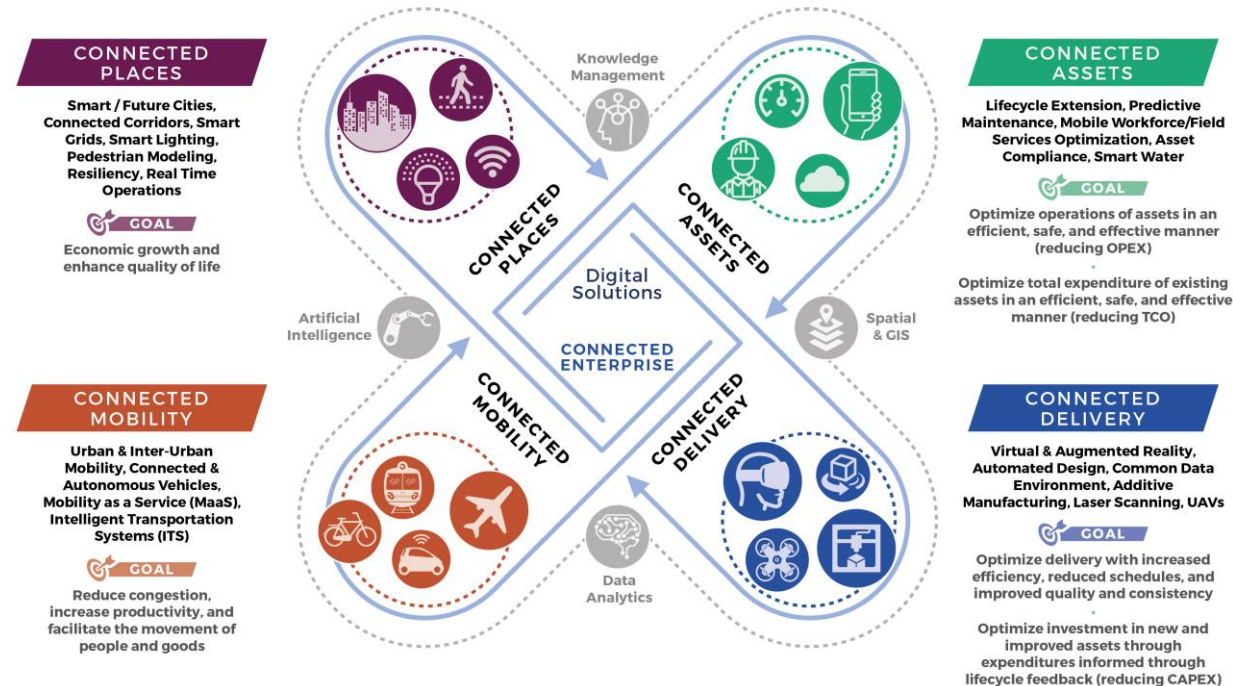


Smart Services & Benefits



Foundational Fiber-optic Network

- Convergence of all networked services (voice, video data, machine, etc.) onto a single network, reducing infrastructure duplication and cost
- Accelerate innovation due to the ability to obtain high-speed access to network assets



Benefit Smart Services



Traffic Management



Smart Parking



Smart Lighting



Emergency Response



Security Cameras



Gunshot Detection



Air Quality



Citizen Engagement



Waste Management



Water Meters



Smart Health



Vehicle, Asset, and Disabled Person Tracking



Open Data



Electric Vehicle Charging Station



Bike Sharing

IMPLEMENTATION CHALLENGES

- Technology
- Funding
- Governance + Policy
- Stakeholder Engagement



FOR SMART AND CONNECTED PLACES

Representative Smart and Connected Places Portfolio



Network and Connectivity

- Small Cell Design: Nationwide, AT&T , Multiple Markets USA
- Fiber Fronthaul: Laying the Foundation for the 5G Network Multiple Markets, USA



Advanced Planning

- Australian Education City Master Plan East Werribee, Australia
- Technopole Fom El Qued Master Plan Laayoune, Morocco



P3 Advisory Services

- FasTracks Denver, Colorado Denver Regional Transport District Denver, USA
- Luis Muñoz Marín International Airport Privatization Puerto Rico Parts Authority, Puerto Rico



Urban Mobility

- City of Philadelphia, Department of Street Traffic Operations Centre, USA
- Pennsylvania Station New York, USA



Utilities

- Cairns Cleaner Seas Northern and Southern Wastewater Treatment Upgrades, Cairns, Australia
- Baker Pump Station No. 3 Trinity Watershed Management, Dallas, TX, USA



Integrated Infrastructure:

- AURIC Industrial Smart City India
- London Olympics, London, UK



Resiliency

- MTA New York City Transit Flood Mitigation Study and Preventive Measure Concepts, New York, NY, USA
- Hong Kong Preventive Landslip Works, Hong Kong, China



Operations and Asset Management

- Stanford Health Care Enterprise Asset Management System, Palo Alto, CA, USA
- Citywide Operations Management, City of Centennial, CO, USA



Design

- Light Rail Transit, Tri-County Metropolitan Transportation District, Portland, OR, USA
- Elgin O'Hare Western Access Project, Illinois State Tollway Authority, Statewide, IL , USA



Safety and Cyber Security

- Massport Data Centre Consolidation Statewide, USA
- Amtrak Advance Controls System Network Pennsylvania Station New York, USA

JACOBS VALUE PROPOSITION



Enable smarter decisions and better business outcomes



Leverage global and diverse perspectives that span the Jacobs enterprise



Support digital transformation and help clients thrive in the age of digital disruption

Jacobs combines leading-edge information and operational technology with deep domain expertise and intimacy, to provide holistic solutions that help our clients make better business decisions

Summary

- Developed for the community
- Needs integrated solutions
- Leverage technology as an enabler
- Based on systems thinking
- Requires partnerships for success



QUESTIONS AND DISCUSSION

