



# One Year Update: San Mateo County Smart Region

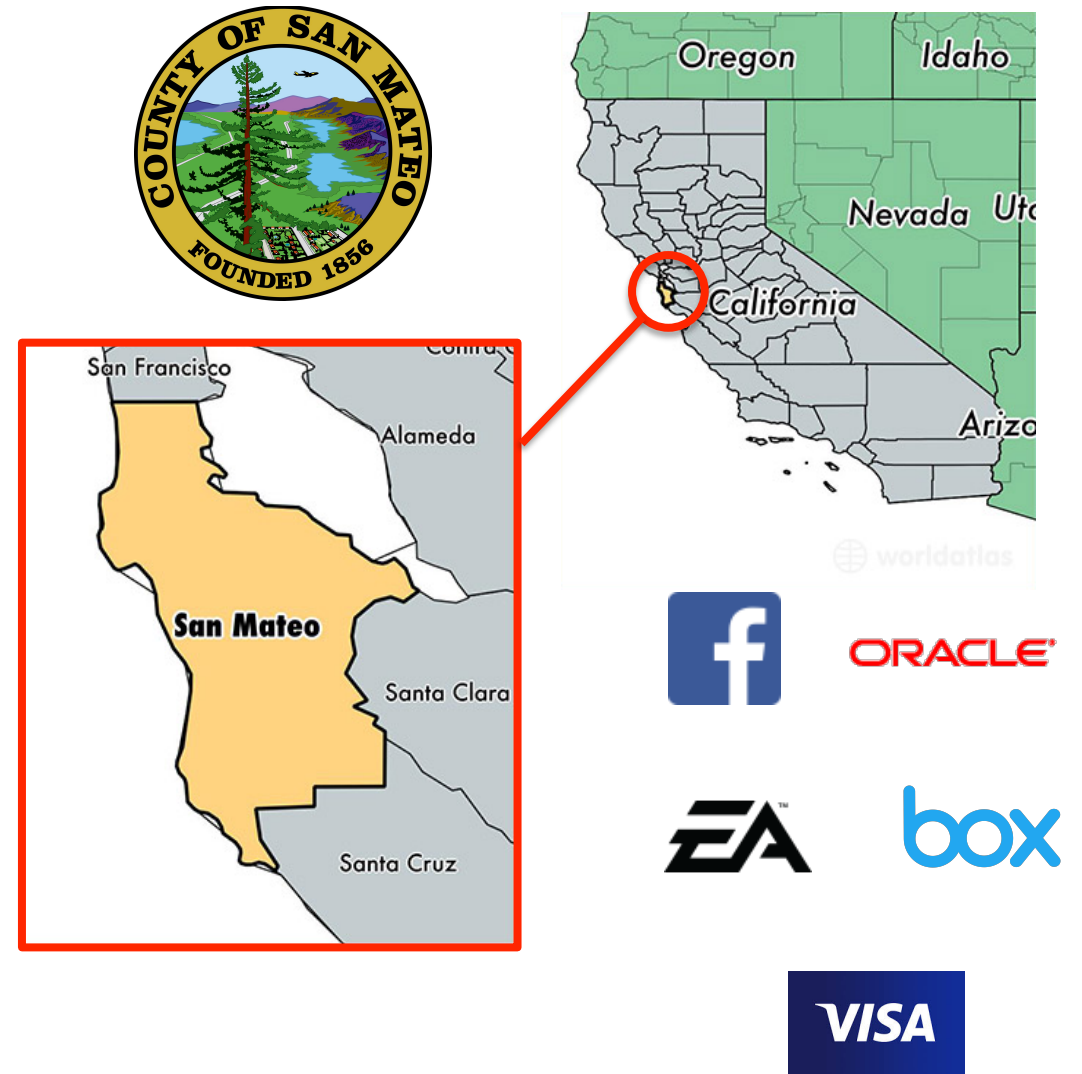
16 May, 2019



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Director, SMC Labs  
San Mateo County

# San Mateo County Overview

- Located between San Francisco and San Jose
- 455 square miles with dense core (bayside) and rural coastal region
- Diverse population of 756K
- \$2.75 billion operating budget (2018-19)
- 20 incorporated cities with no single “dominant” city
- 23 School Districts
- Median income - \$88,202
- Median home price - \$1.2M
- Diverse business base



# Challenges facing San Mateo County

**Bay Area's air quality near nation's worst, climate change to blame** Source: SFGate, 17 April 2018

**Horgan: A traffic apocalypse is brewing in San Mateo**

Source: Mercury News, 29 December 2017

**San Mateo County's Latino Digital Divide**

Source: San Mateo Daily Journal, 15 October 2016

**Many in San Mateo County priced, pushed out of affordable housing**

Source: Berkeley News, 16 May 2017

# Solving these challenges is outside the capabilities of any one city in San Mateo County

## City Centric

One City Focus

City Specific Problems

Limited Funds, Resources  
and Knowledge Base

Connectivity &  
Infrastructure Challenges

City centric experience  
for citizens

## Region Centric

Multi-city Regional Focus

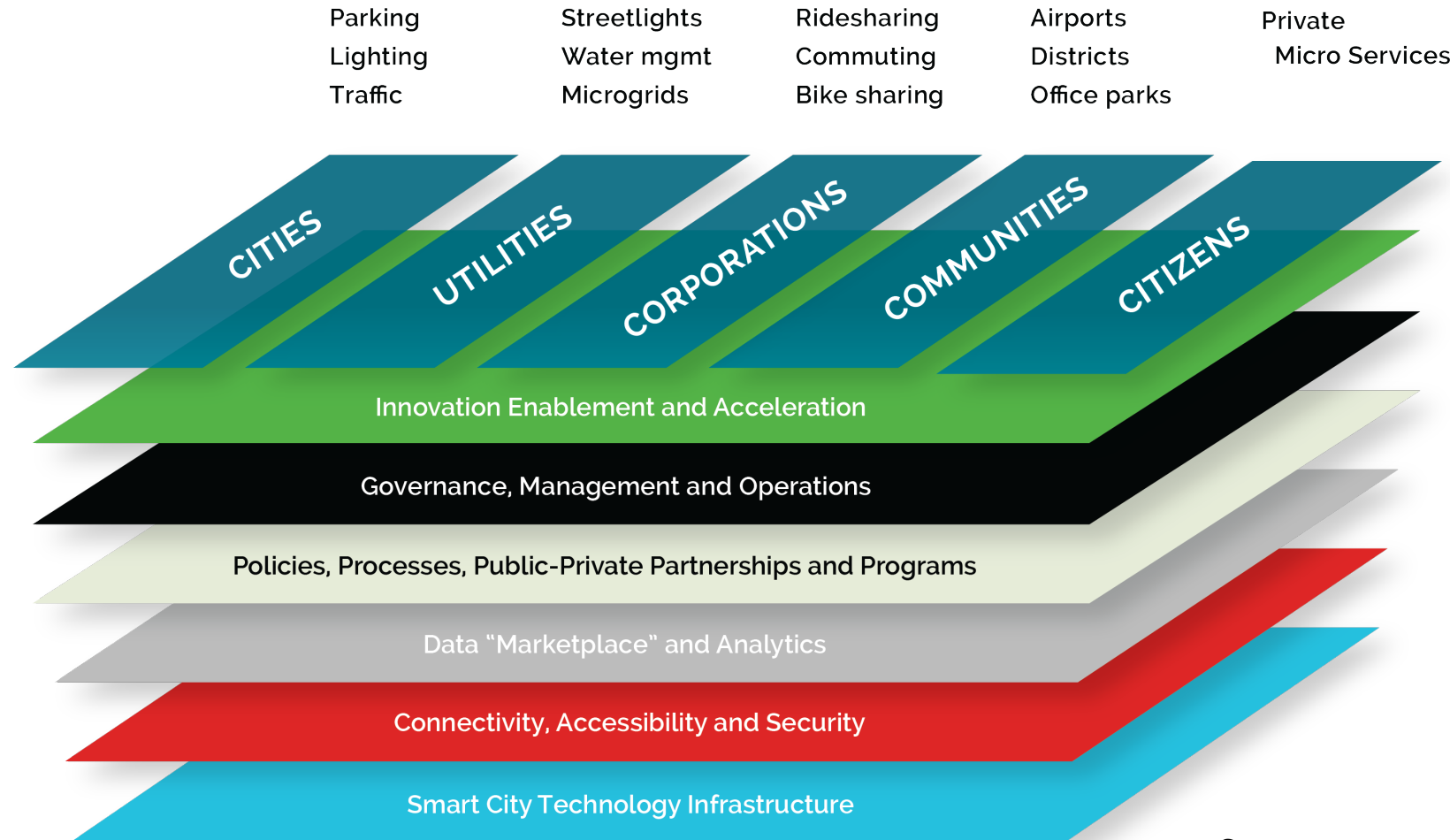
Regional Problems

Shared Funds, Resources  
and Knowledge Base

Shared Connectivity &  
Infrastructure

Regional experience  
for citizens

# SMC Smart Region is built on an ecosystem framework



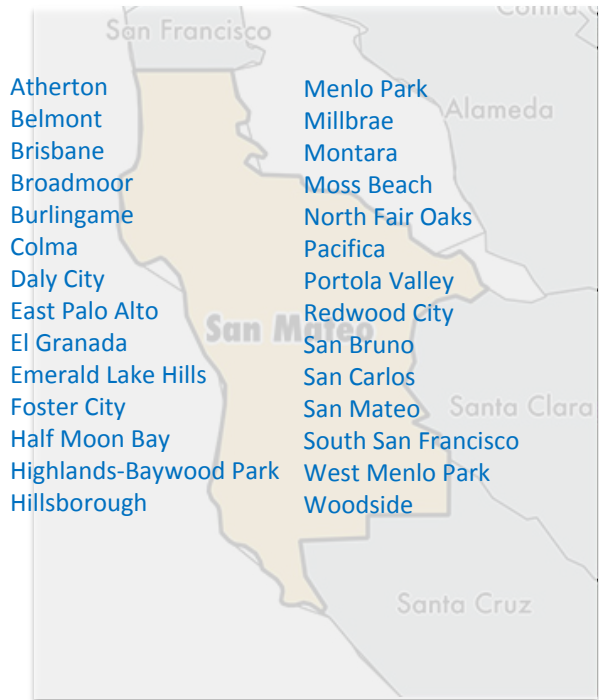
Source: [www.strategyofthings.io/smart-city-ecosystem](http://www.strategyofthings.io/smart-city-ecosystem)



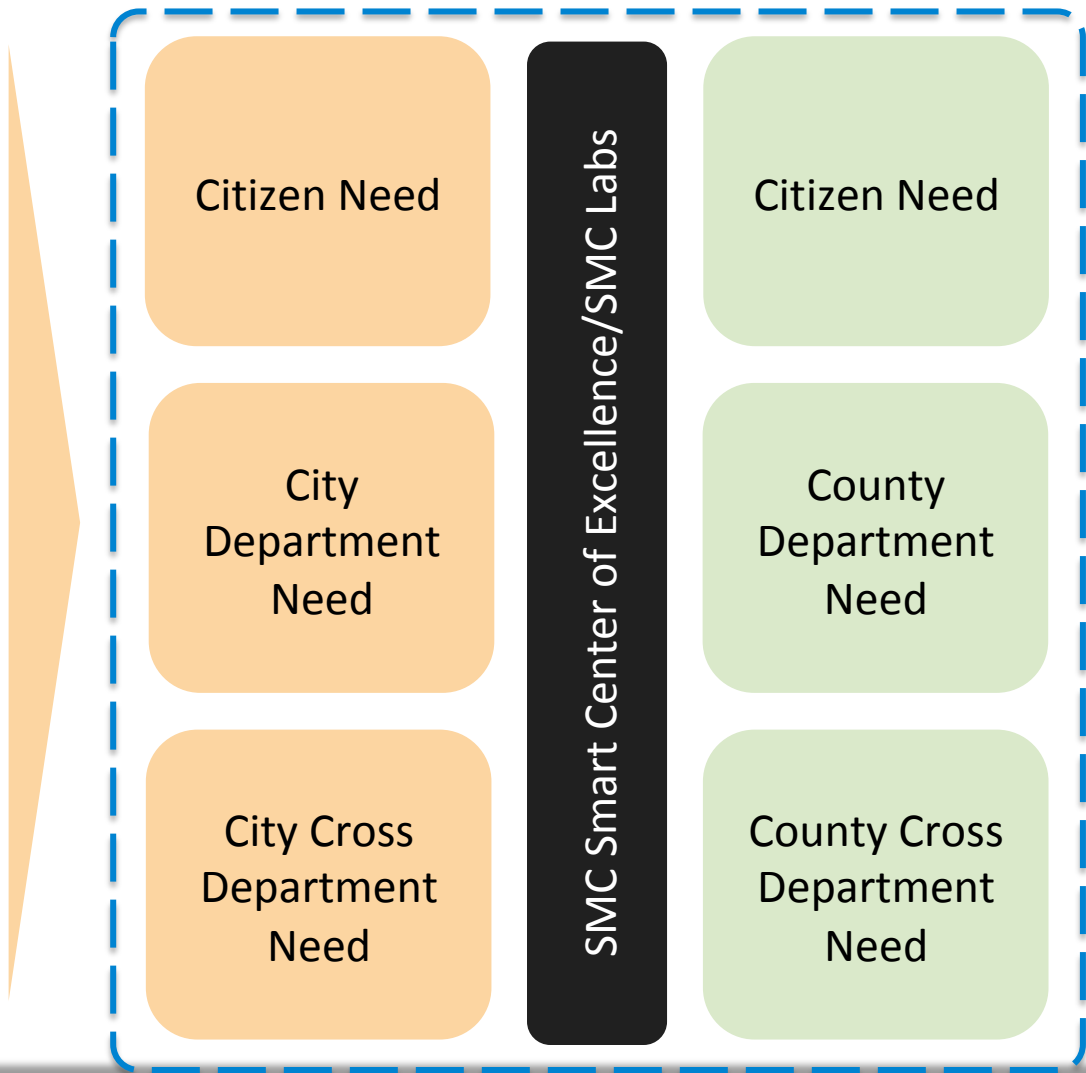
ISD

# We envision many constituents, many collaborators, one SMC


## 20 Cities in SMC



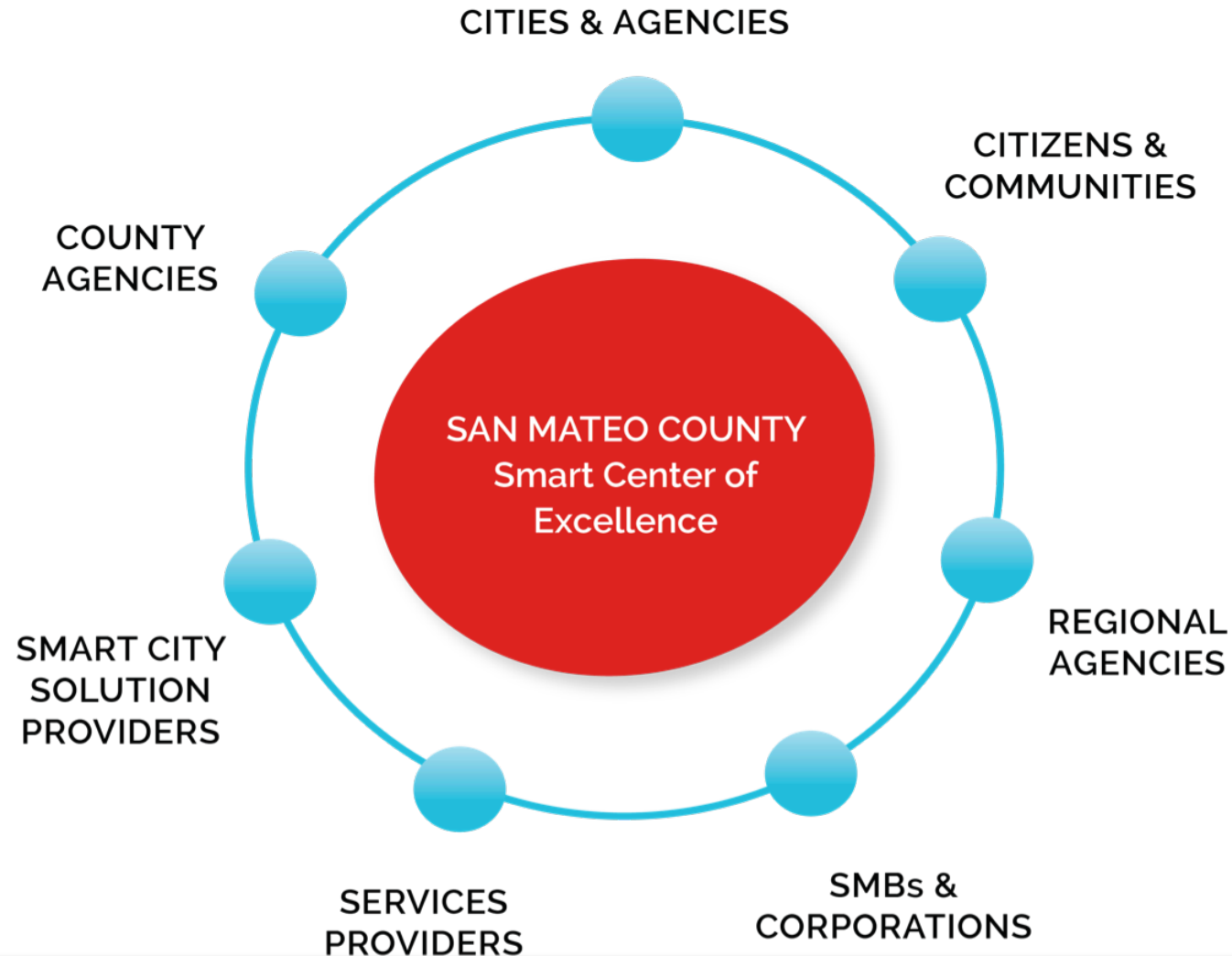
## City-County Collaboration Opportunities



## 29 SMC Agencies

- 
- Agriculture, Weights and Measures
  - Assessor, County Clerk-Recorder & Chief
  - Elections Officer
  - Board of Supervisors
  - Child Support Services
  - Controller
  - Coroner
  - County Counsel
  - County Managers Office/Clerk of the Board
  - Court
  - District Attorney
  - Fire Protection Services
  - Health System
  - Housing (Department of Housing)
  - Human Resources Department
  - Human Services Agency
  - Information Services Department
  - Parks Department
  - Planning and Building
  - Private Defender Program
  - Probation
  - Project Development Unit
  - Public Safety Communications
  - Public Works
  - SamCERA (Retirement)
  - San Mateo County Library
  - Sheriff's Office
  - Sustainability Office
  - Tax Collector / Treasurer / Revenue Services

# SMC Smart Center of Excellence



- Specialized Team
- Shared Capabilities
- Digital Innovation Resources
- Innovation Lab and Zones (SMC Labs)

# SMC Labs provides the mechanism for solving problems

## PROBLEMS

### County

traffic, air quality,  
flooding, connectivity

### City

public safety, parking  
housing, jobs

## INNOVATIONS

Experimented

SMC Labs

Ideate > Build > Test

Common Innovation  
Infrastructure

Smart  
Solution  
Vendors

Subject  
Matter  
Experts

Service  
Providers

## SOLUTIONS

Deployed

Smarter Parking

County

City

Affordable Housing

City

Air Quality

County

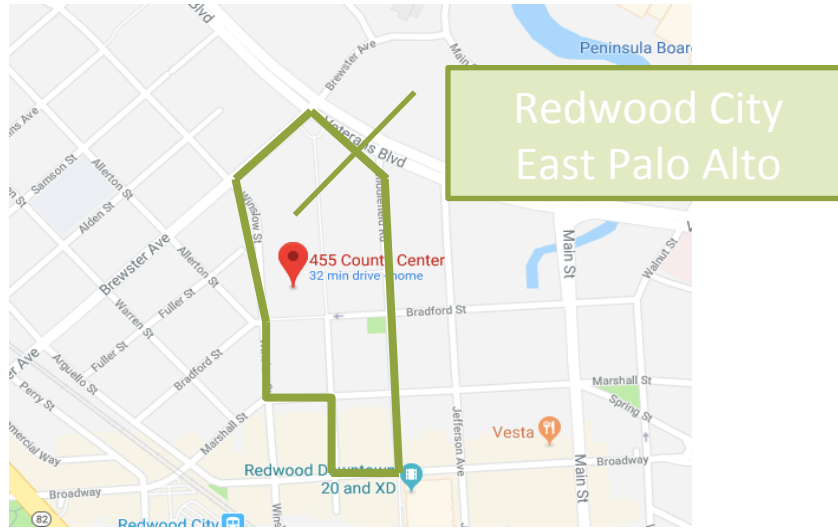
City

Drone Detection

County

# SMC Innovation Zones

## Local Innovation Zones



- A small area around 2 SMC owned buildings (2 cities) to set up gateways and deploy use cases
- Expedited access and setup
- First tests conducted in controlled environment

## Countywide Innovation Zone



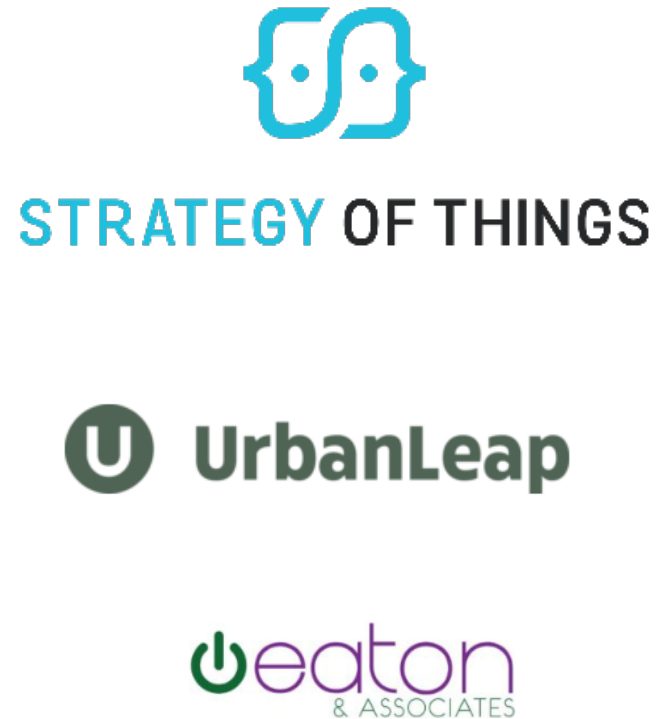
- Countywide coverage enabled using carrier and service provider LPWAN
- Use cases that require county wide connectivity and operations, including mobile use cases

# Building the Smart Region together – our partners

## Connectivity



## Innovation



## Use Cases



# Use Cases

## Public Wi-Fi



Connectivity is a basic digital prerequisite. Even in Silicon Valley, a large population of citizens don't have adequate online access. The goal is to provide connectivity at select locations to close this gap.

## Affordable Housing



The process to search and apply for affordable housing units is both complex and cumbersome. Goal is to provide citizens with a seamless process to identify, match and apply for affordable housing.

## Landscape Irrigation



Overwatering or underwatering of plants in parks, result in unhealthy plants and excessive water use. The goal is to give plants the exact amount of water needed throughout the year.

## Waste Management



Waste bins are over filling, or waste collectors are coming on days when the trash bins are still empty. Goal is to optimize routes and resources for efficient trash collection, reduced truck use, and better service.

# Use Cases

## Unauthorized Drone Detection



Increased usage of drones for malicious use of drones over public and municipal facilities. Goal is to detect and track these unauthorized drones and locate their operators.

## People and Mobility Patterns



Limited awareness of how people move around within a city results in improper service levels, suboptimal citizen engagement and experiences. Goal is to use the data to develop new and more relevant services.

## Community IoT Connectivity



IoT connectivity services are slow to roll out. Many communities that need them most are excluded because of economics. Goal is to create a co-create a community based LPWAN network.

## Citizen Engagement



City leaders and planners have limited visibility and tools into collecting and understanding citizen sentiment. Goal is to provide an efficient real time tool to collect, localize and analyze citizen and visit inputs and feedback.

# Use Case Deep Dive: Smarter Parking

## Problem #1:

Drivers with disabilities may voluntarily limit their mobility to certain areas because they are not sure if they can park their car nearby.

## Problem #2:

Drivers with electric vehicles may leave those cars at home and drive their gasoline powered vehicles because they don't know where the EV charging stations are, and whether it is available.

## Solution Pilot:

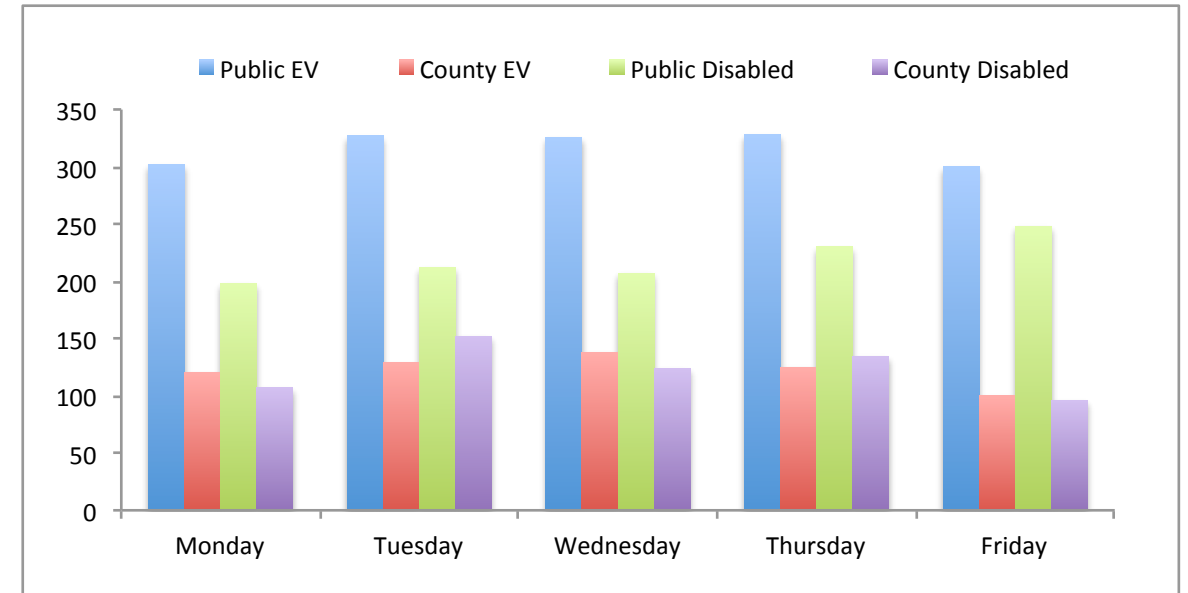
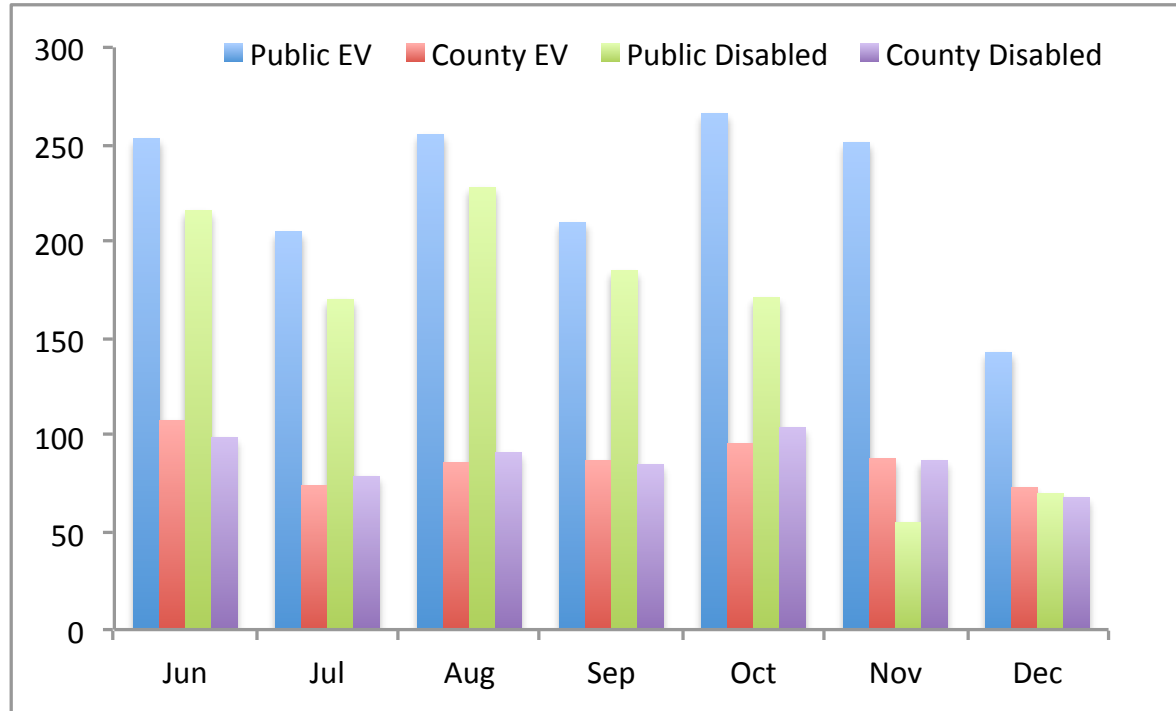
- 22 in ground sensors deployed in SMC garage
  - 6 public EV
  - 4 employee EV
  - 4 disabled public
  - 8 disabled employee
- Fybr smart city platform
- 2 FybrRadio gateways
- Alexa voice integration

## Learnings to date:

- Generally sufficient parking availability and turnover during core hours
- Must drive awareness of available parking to residents and downtown visitors during non-core hours
- Voice interface is a safe way to interact, but voice command needs maturing
- Coordinate sharing of parking information with Redwood City

# Parking sessions activity

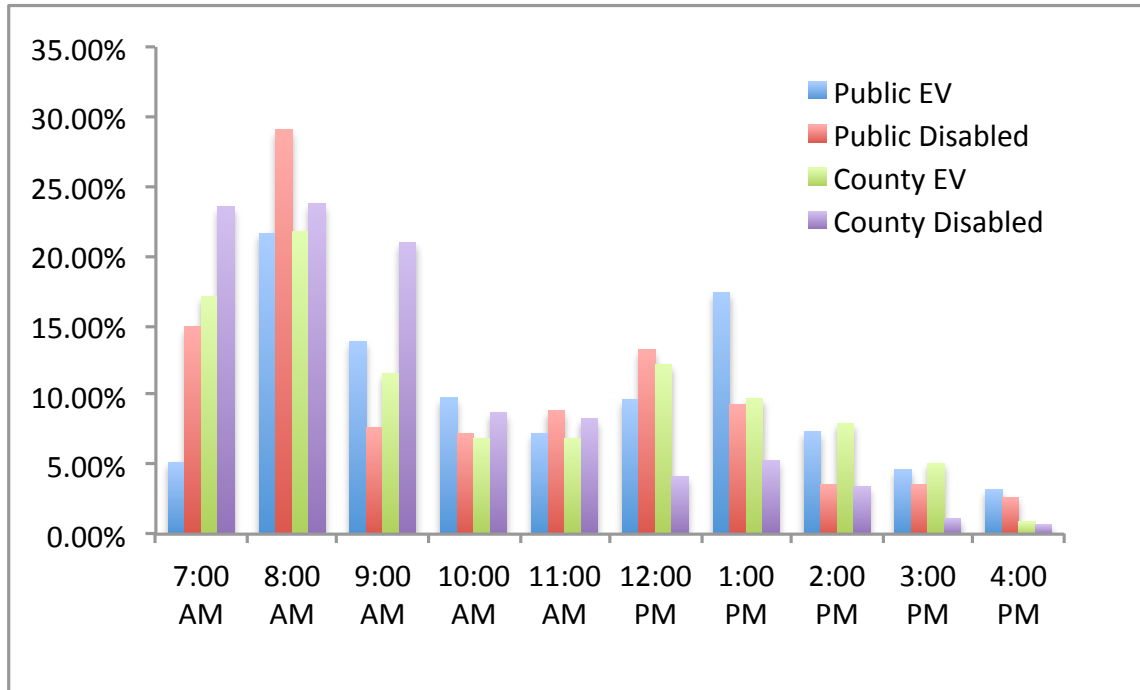
June 1 to Dec 22, 2018



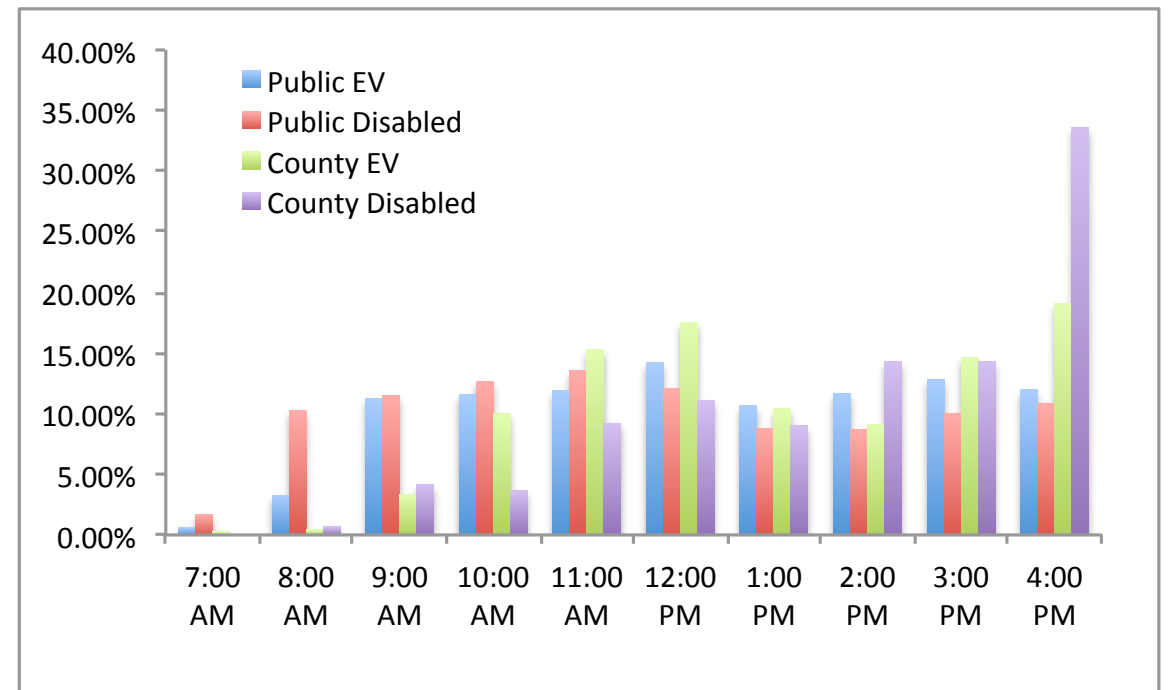
# Parking sessions activity

June 1 to Dec 22, 2018

What are the popular times to park?

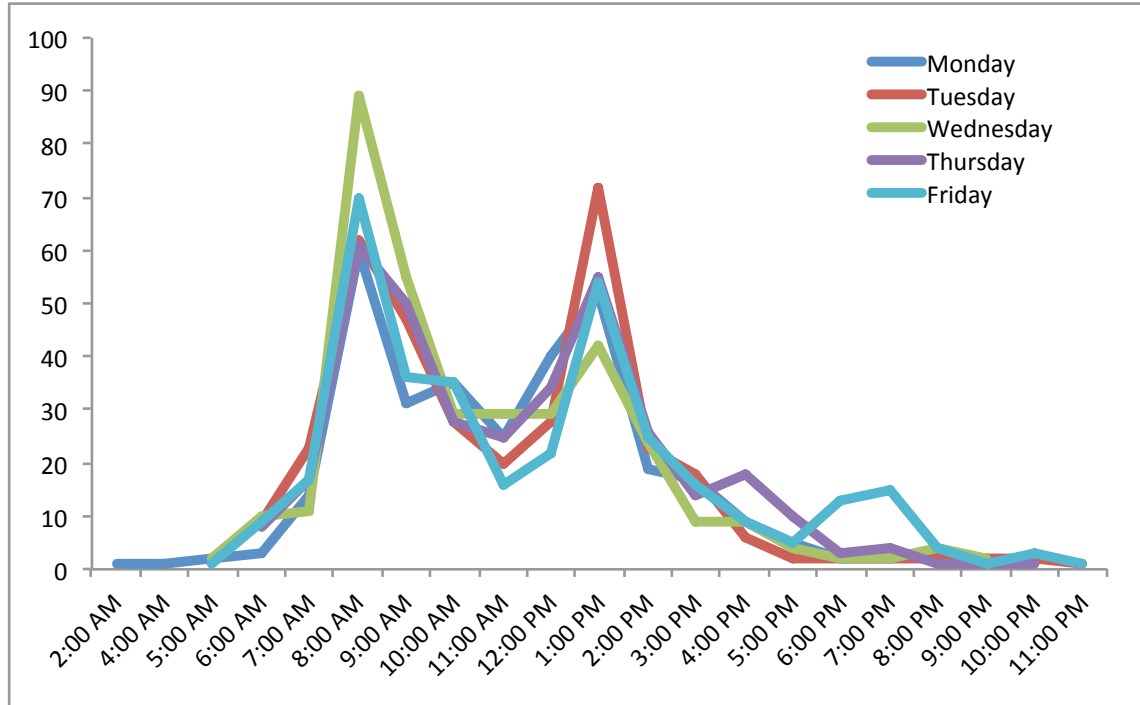


When do most people leave?

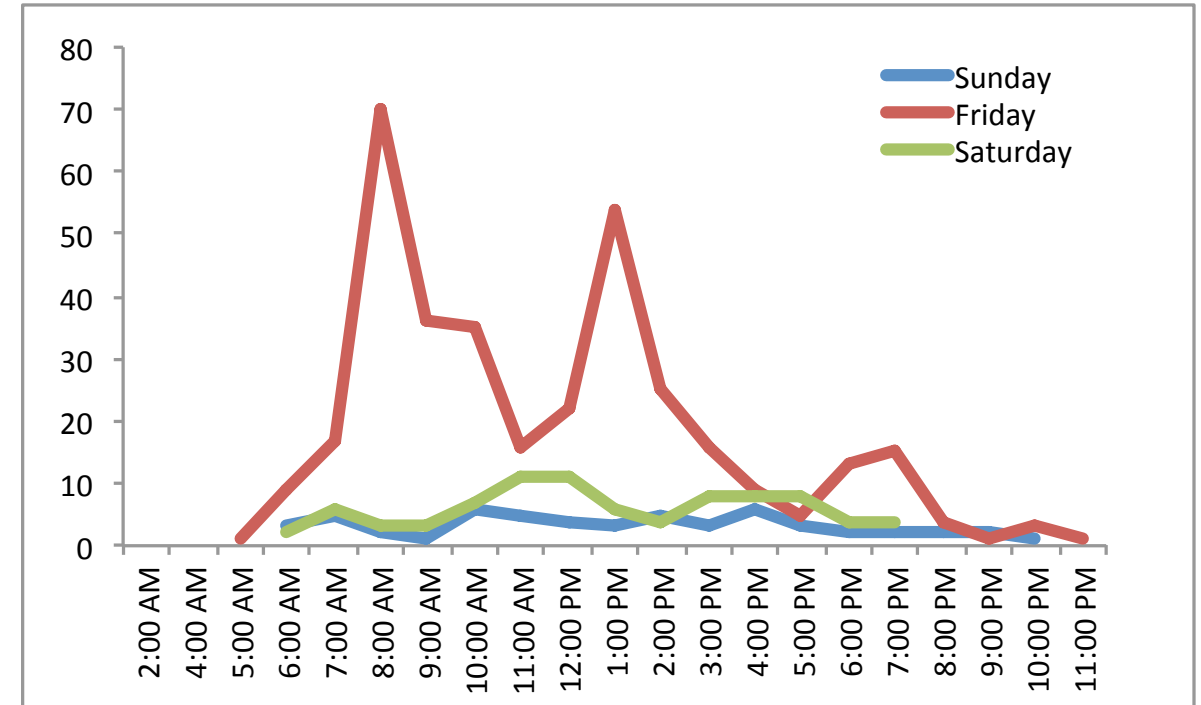


# Public EV parking activity by time of day

June 1 to Dec 22, 2018



During the weekday, two spikes in when people were parking – around 8 am and at 1 pm. This coincides with getting in the morning, and getting back from lunch.



During the weekends, there is significantly less activity. In addition, the parking activity starts after 11 am. On Friday, we see people coming to downtown and parking around the dinner hours.

# Use Case Deep Dive: Localized Air Quality Monitoring

## Problem:

The BAAQMD regional air quality monitoring network uses a small network (<30) of high cost sensors to monitor AQ conditions in the SF Bay Area. In San Mateo County, there is only one sensor that covers the entire 455 square mile county.

AQ conditions vary block by block, community to community. BAAQMD sensors do not provide the fidelity needed to plan and act locally.

## Solution Pilot:

- 10 Clarity AQ sensors network with cloud dashboard
- 3 Fybr AQ sensors integrated into Fybr Smart City platform
- Aclima mobile AQ sensor network and cloud platform
- 10 Purple Air air quality sensors with cloud dashboard

## Learnings to date:

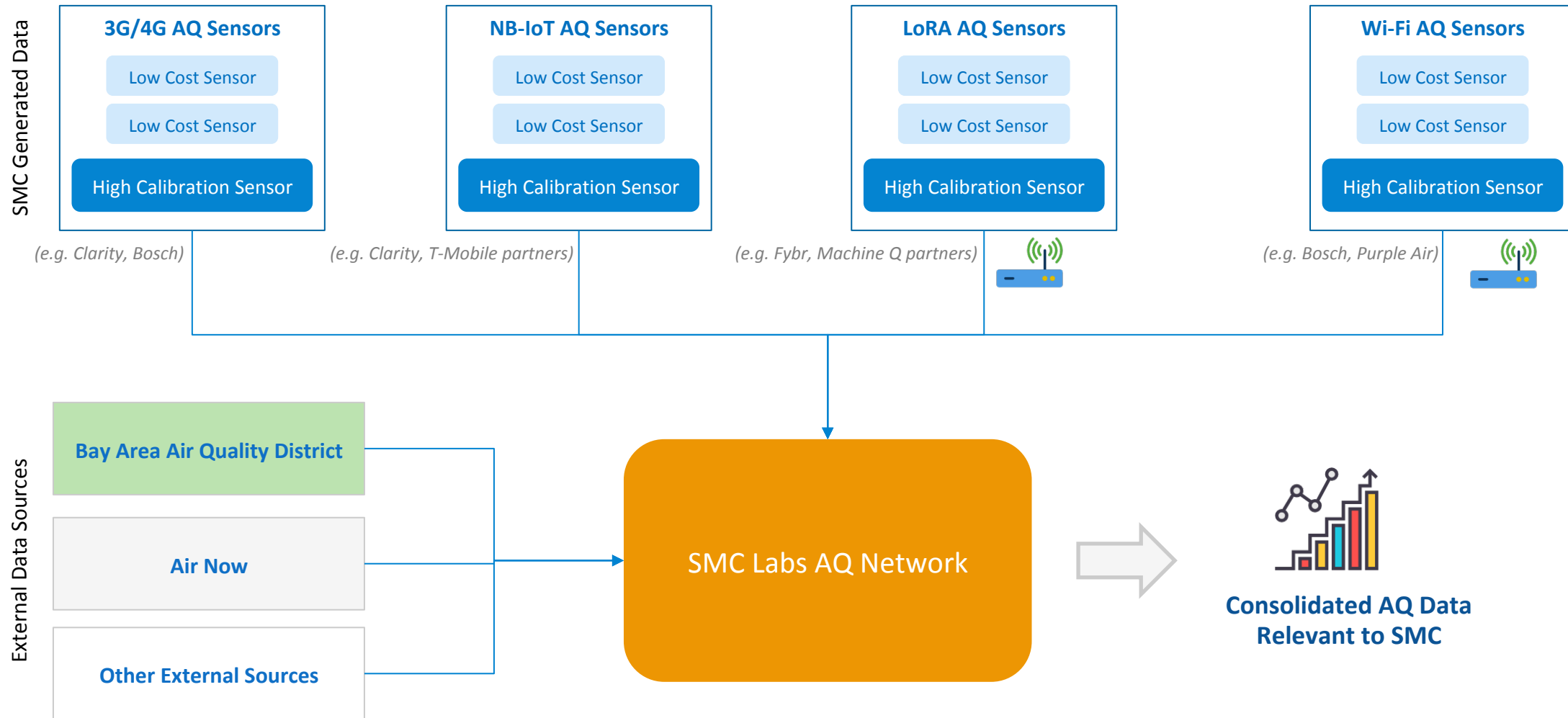
- There is no “one size fits all” approach with AQ monitoring. All have different goals but co-exist with each other.
- Local and “small” events can be detected.
- AQ sensor accuracy will vary from sensor to sensor, brand to brand. Understanding of the “science” behind AQ is key to interpreting results.

# AQ Sensor Capability and Use Categories

	Consumer Air Quality Monitoring	Commercial Air Quality Monitoring	Industrial Air Quality Monitoring	Regulatory Air Quality Air Monitoring
Cost	\$	\$\$	\$\$\$	\$\$\$\$
Field Accuracy	Low	Medium	High	Very High
Use Cases (examples)	<ul style="list-style-type: none"> <li>▪ Indicative or informational use only</li> <li>▪ Homes, schools, etc.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Indicative or informational use only</li> <li>▪ Community, district or neighborhood monitoring</li> </ul>	<ul style="list-style-type: none"> <li>▪ Informs policymaking</li> <li>▪ Compliance and audits</li> <li>▪ High reliability, accuracy and consistency</li> <li>▪ Facilities and plant monitoring and compliance</li> <li>▪ Construction site monitoring and compliance enforcement</li> </ul>	<ul style="list-style-type: none"> <li>▪ Informs policy</li> <li>▪ Compliance and audits</li> <li>▪ Government monitoring and alerts</li> <li>▪ Plant emissions monitoring and compliance</li> </ul>



# SMC Labs AQ Network approach

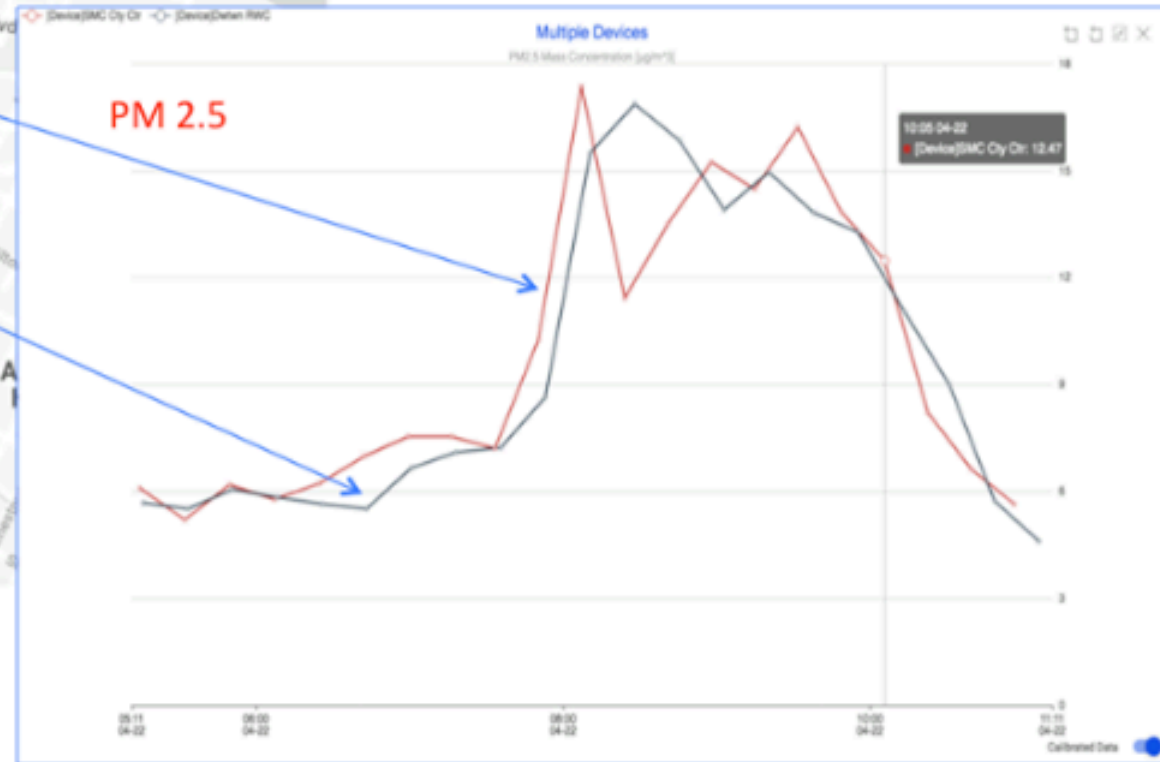


# Use Case Deep Dive: Localized Air Quality Monitoring

## How do AQ levels vary?



April 22, 2019  
5:11 am to 11:11 am



# Use Case Deep Dive: Localized Air Quality Monitoring

## What is the AQ levels street by street?



# SMC Smart Region Guiding Principles



Multi-Connectivity



Engage Use Case  
Beneficiaries



Start Small  
and Learn



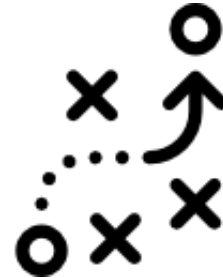
Focus on problems and  
outcomes, not technology



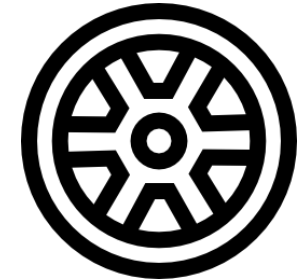
Small Investments  
spread around



Establish True  
Partnerships



Balance strategy  
with tactical



Don't reinvent  
the wheel



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# For more information



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