MONTGOMERY COUNTY, MARYLAND

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Montgomery County

Montgomery County Smart Transit Spotlight Project

February 1st, 2017

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Historic Red Brick Courthouse – Rockville, Maryland

Sharing: On-demand ride services, car-sharing, bike-sharing, and car-pooling
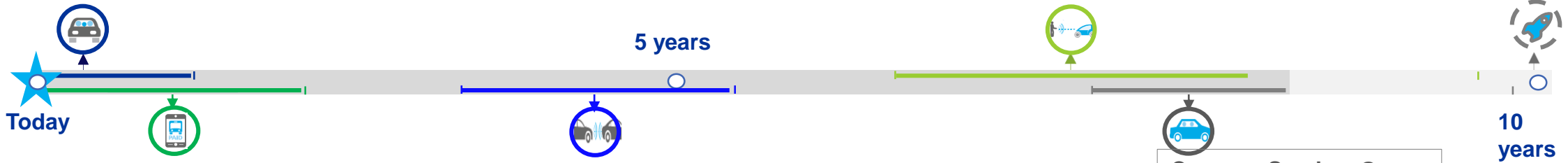
- Uber's revenues are expected to increase 150% from 10.8B in 2015 to $26.1B in 2016[1]
- Car-sharing services led Americans to forego the purchase of 500,000 cars between 2006 and 2013[2]
- Paris is expected to pay-off its $47M investment Autolib car-sharing three years ahead of schedule[3]

Autonomous Vehicles: Vehicles capable of navigating without human input

- Within the next 20 years full automation of transport is predicted[5,10]
- Google's autonomous car has clocked 1.4M miles of driver-less driving[11]
- Tesla's "Autopilot" and GM's Cadillac "Super Cruise," offer hands-free and feet-free driving[9]
- Seven states in the US allow autonomous drive testing; 16 states introduced legislation regarding autonomous vehicles in 2015[12]

New Modes: Long term possibilities

Start-ups such as Terrafugia and AeroMobil are investigating development of flying cars and Japan is testing speeds and feasibility of MagLevs[14]

5 years

Today

10 years

Digital Rider Experience: Seamless rider experience using smart apps

- Comprehensive, real-time information will help riders make quick decisions in a multi-modal system[4]
- Digitization of payments, e-ticketing, and smartphone apps will transform transit sector in the next 5 years[5]
- Start-ups such as TrackSchoolBus provide customized solutions to track buses[6]

Connected Vehicles: Networked vehicles capable of V2V and V2I communication
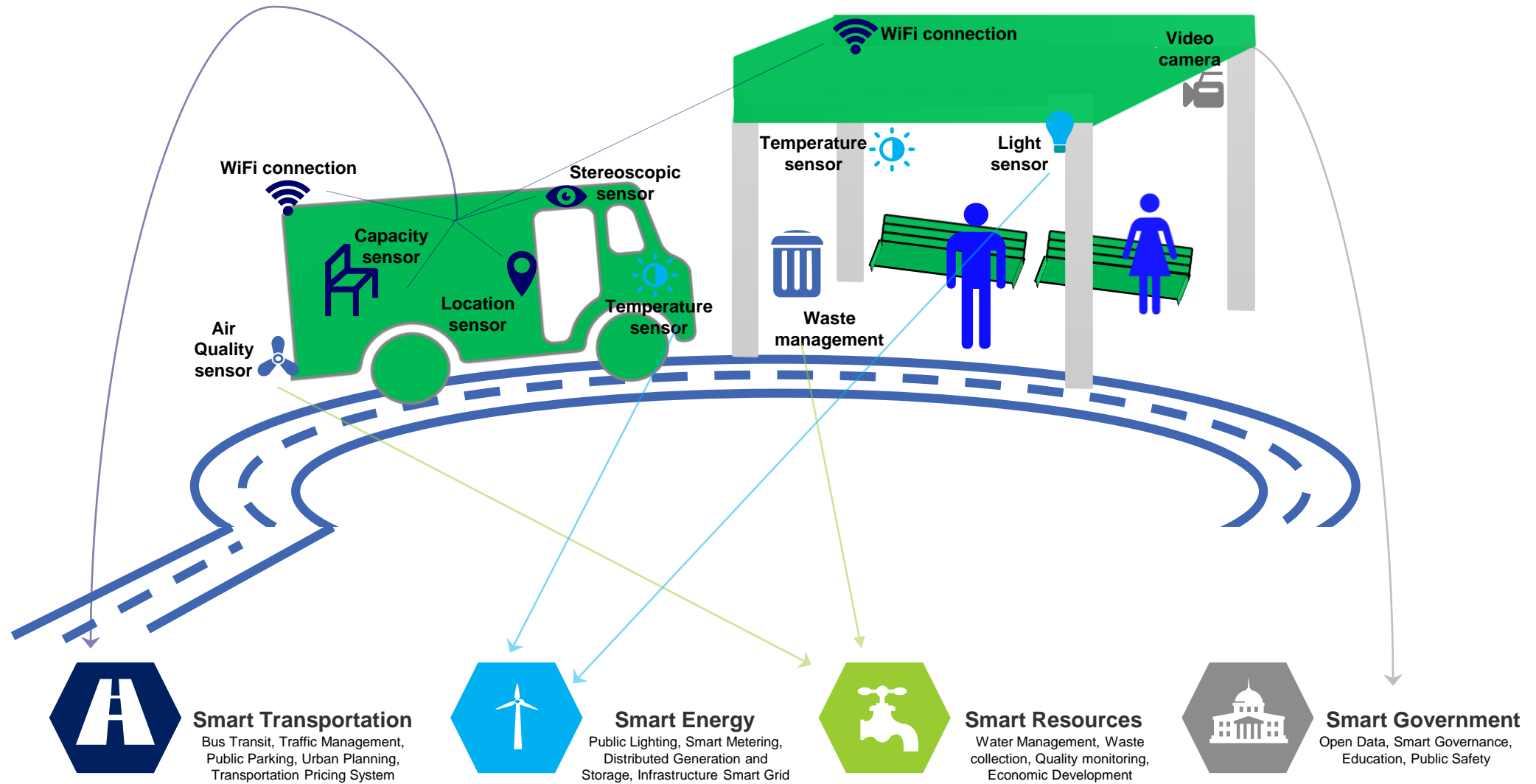
- "Massively networked vehicles with ubiquitous connectivity throughout the system" are predicted[4]
- In August 2012, USDOT launched the largest road test of V2V crash avoidance technology to date[4]
- USDOT is developing V2I applications to address critical crash scenarios[8]
- In Q3 of 2014, AT&T added more car data subscribers (500K) than smartphone subscribers (466K)[9]

Car-as-a-Service: On-demand autonomous vehicles

GM invested $500M in January 2016 in Lyft and will collaborate on development of a network of autonomous vehicles that can be summoned on-demand through the Lyft app[13]
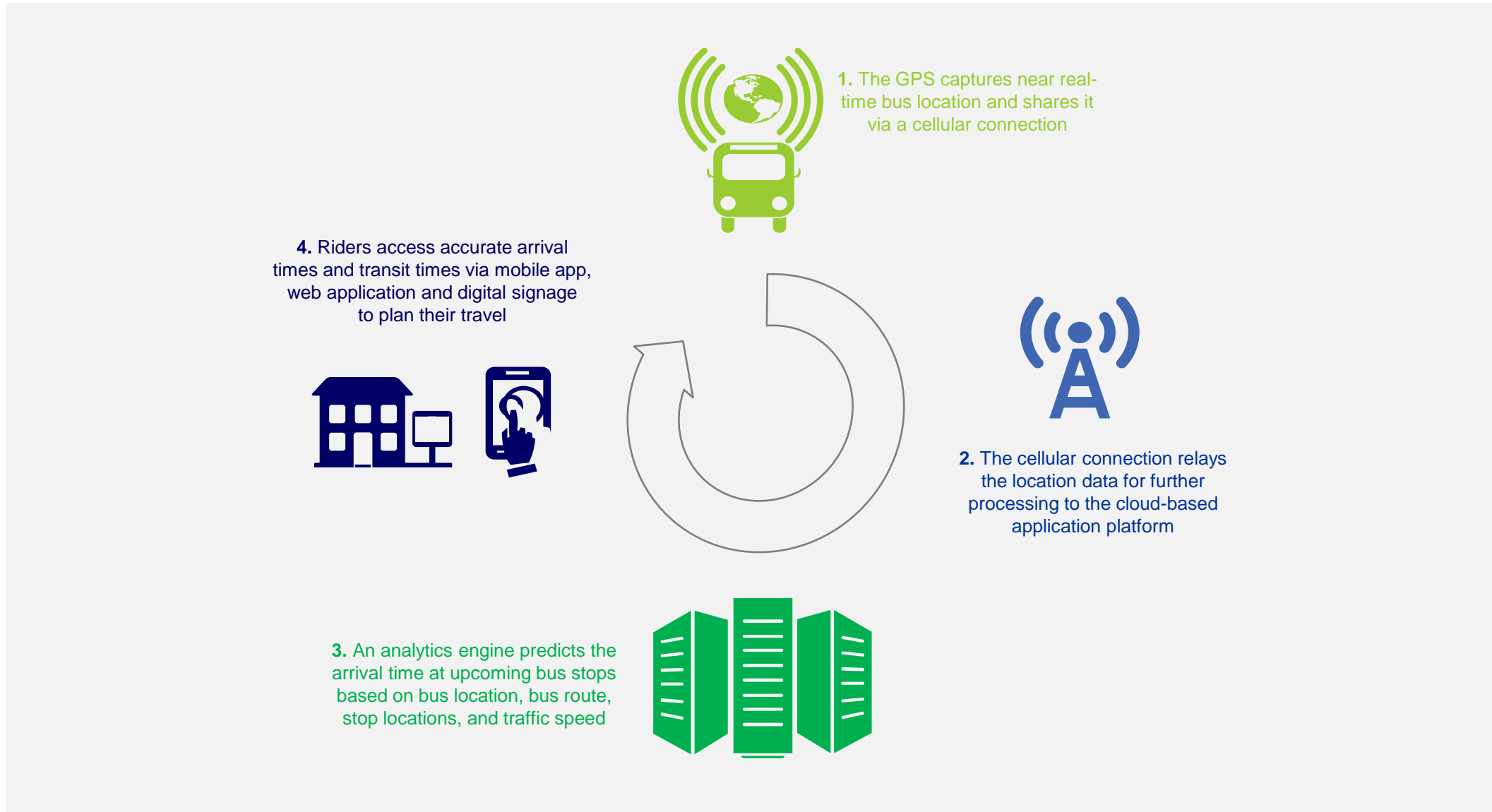
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Enabling 'Bus and Bus Shelter as a Platform' can support multiple Smart Cities' solutions

WiFi connection

Video camera

Temperature sensor

Light sensor

Waste management

WiFi connection

Capacity sensor

Stereoscopic sensor

Location sensor

Temperature sensor

Air Quality sensor

Smart Transportation
Bus Transit, Traffic Management, Public Parking, Urban Planning, Transportation Pricing System

Smart Energy
Public Lighting, Smart Metering, Distributed Generation and Storage, Infrastructure Smart Grid

Smart Resources
Water Management, Waste collection, Quality monitoring, Economic Development

Smart Government
Open Data, Smart Governance, Education, Public Safety

Use Case 1: Bus Location Tracking and Arrival Time Prediction

Riders can access real-time bus location and predicted arrival time on mobile apps, website, and digital signage

1. The GPS captures near real-time bus location and shares it via a cellular connection

4. Riders access accurate arrival times and transit times via mobile app, web application and digital signage to plan their travel

2. The cellular connection relays the location data for further processing to the cloud-based application platform

3. An analytics engine predicts the arrival time at upcoming bus stops based on bus location, bus route, stop locations, and traffic speed

Use Case 2: Bus Occupancy Tracking

MCDOT can leverage occupancy data for data-driven capacity planning and provide it to riders to better plan their travel

1. Seat, step, and/or stereo vision sensors capture near real-time occupancy data and share it via a cellular connection

2. The cellular connection relays the raw data for further processing to a cloud-based application platform
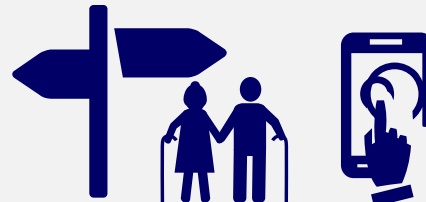
3. The application platform formats this data for use by demand planning, as well as riders who with to understand current bus capacity

4.A MCDOT uses comprehensive bus occupancy and bus utilization data for capacity planning

4.B Riders access occupancy data via mobile app, web application and digital signage to plan their travel

Use Case 3: Bus and Bus Shelter WiFi and Electric Outlet Access

Riders can access Wi-Fi connection and electric outlets on buses and shelters to increase productivity

Riders can log into MCDOT's WiFi connection, using an on-bus power outlet, to meet several consumer needs

Access information about community amenities and points of interest

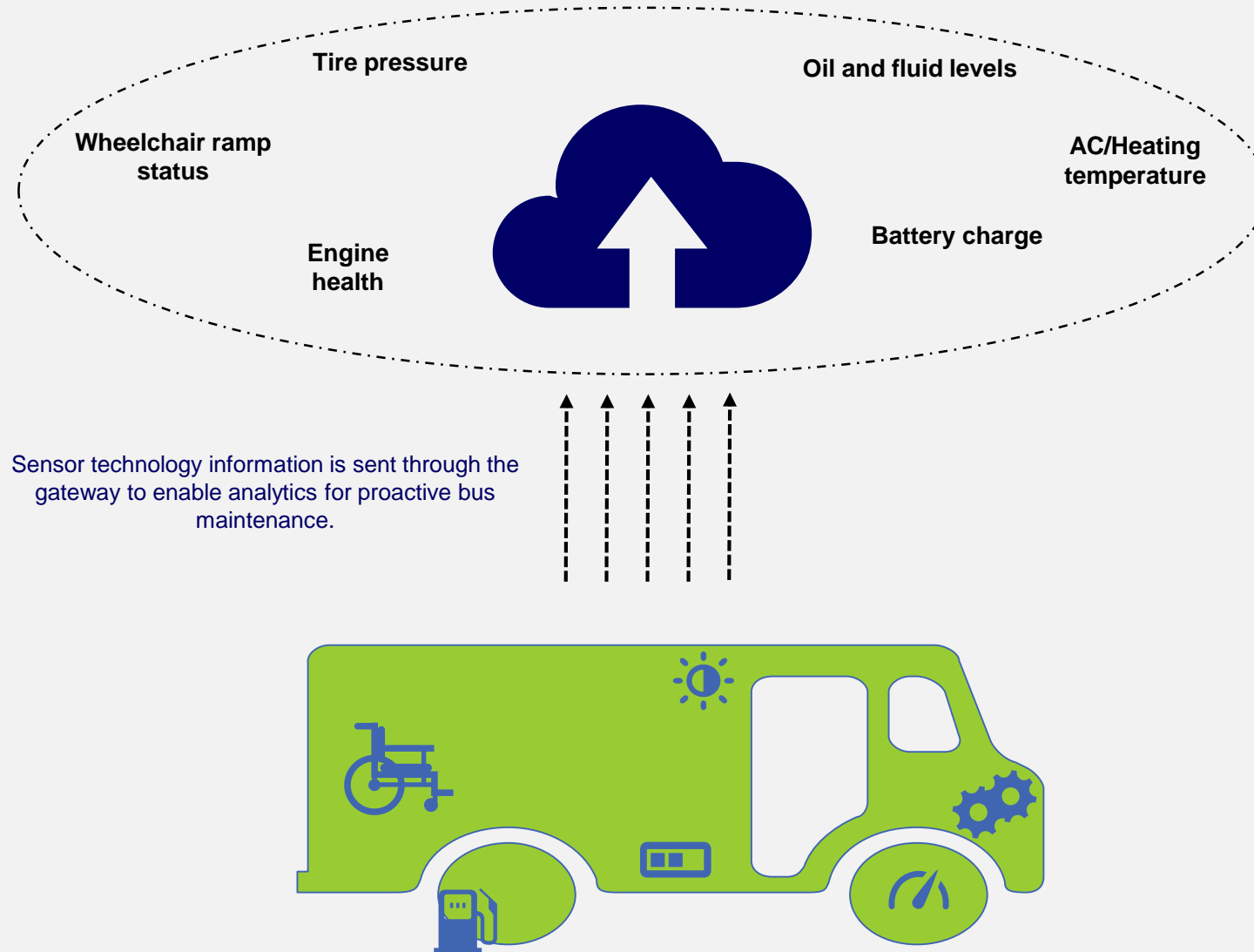Receive real-time bus location and arrival times

Stay connected through messaging, basic web browsing, and social media applications
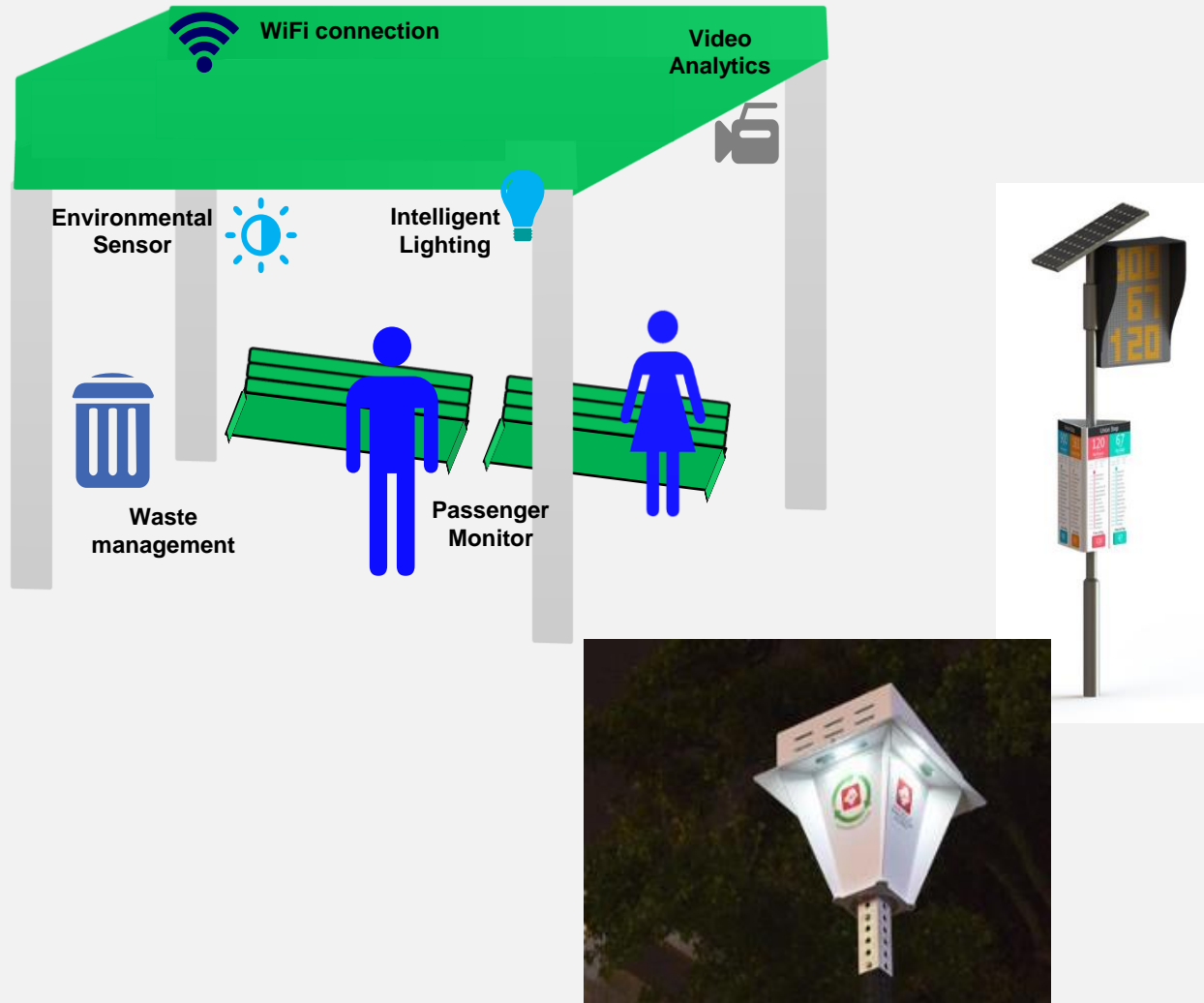
Use Case 4: Real Time Maintenance Status

The County can enhance maintenance through sensor technology to increase fleet efficiency and reduce spending

Tire pressure

Oil and fluid levels

Wheelchair ramp status

AC/Heating temperature

Battery charge

Engine health

Sensor technology information is sent through the gateway to enable analytics for proactive bus maintenance.

Complimentary Initiative: Reimagine the Bus Stop Challenge

Universities, the private sector and government come together the reimagine the bus stop from the ground up

Executive Summary

Situation

- Technology will dramatically impact RideOn in the next 5-15 years. There is much speculation about what exactly RideOn will need to do to compete
- Montgomery County and other counties have begun to leverage new technologies such as vehicle location and automatic people counters to improve transit experiences
- There is, however room for improvement in data accuracy, analytics capabilities, breadth of information and rider engagement

Opportunities

- The Internet of Things (IOT) is changing transportation worldwide
- Some examples of significant trends shaping the transportation landscape include connected vehicles, the growth in shared vehicles and autonomous vehicles
- A smart transit proof of concept (POC) test bed with RideOn in Montgomery county will help inform how the county can offer innovative services over the next decade

Challenges

- Project is in need of more university partnerships that will provide technical resources onsite
- More ideas are needed in order to flesh out the concept of "bus as a platform." What should we sense? How should in be structured? Potential business models?
- Additional partner jurisdictions would be welcome
- Bus Stop Challenge needs sponsors and federal leadership in order to proceed

THANK YOU

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