

# **TRANSPORTATION, CITIES & THE FUTURE**

CITIZENS ADVISORY COMMITTEE | FEBRUARY 28, 2017

# AGENDA

A QUICK LOOK AHEAD

## 1. TRANSPORTATION & CITIES

Revolutions Happen Every Century

## 2. EVOLUTION OF THE CAR

Electric, Autonomous and Shared Vehicles

## 3. FUTURE: SHORT AND LONG TERM

And Other Things to Consider Across Industries

# **TRANSPORTATION & CITIES**

# TRANSPORTATION SHAPES CITIES

A CENTURY AT A TIME



1700's

- Cities developed around water transportation
- Trading routes
- Moving people



1800's

- Railway towns arose
- Small towns flourished around railways
- New towns formed around rail stations



1900's

- Shift toward automobile cities
- Suburbs developed around cities
- Freeways made cities pass-throughs



2000's

- Revolution has started
- "Car" will come to mean something new
- Cities change
- End to congestion

# **EVOLUTION OF THE CAR**



# ELECTRIC-AUTONOMOUS-SHARED VEHICLES

THREE DISRUPTIVE FORCES WITHIN THE AUTO INDUSTRY



## ELECTRIC

—  
Currently available on the market.

Replaces engine and transmission.

Disrupts the car industry and its suppliers.

Fundamentally changes how cars gets made.

But not how cars are used.



## AUTONOMY

—  
Radically alters the transportation industry.

Impact to cities as significant as the automobile.

Many technical hurdles to overcome.

Changes the nature of what cars are.



## VEHICLE SHARING

—  
“Car” means something completely different.

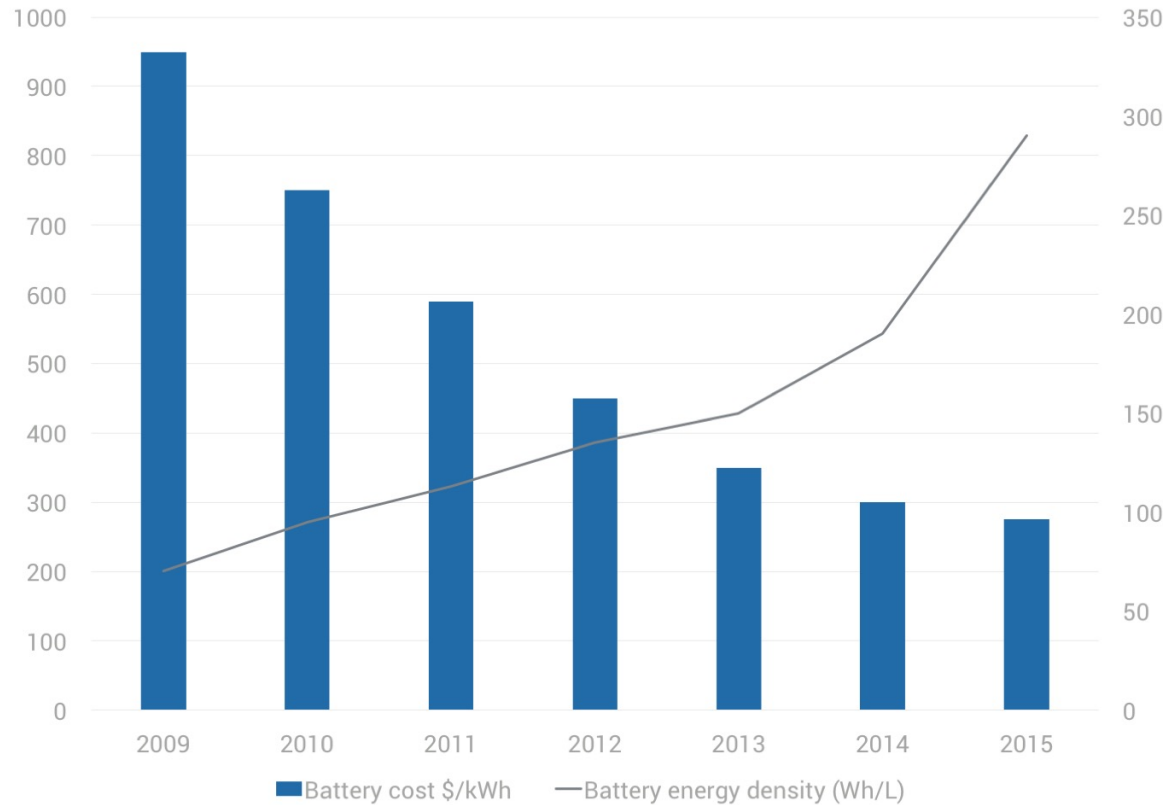
Transportation as a service—gradually replaces car ownership.

Preliminary form currently on the market.

Disrupts city life , real estate and much more.

# THE EVOLUTION OF BATTERIES

MORE POWER AT LESS COST DRIVES ELECTRIC VEHICLES

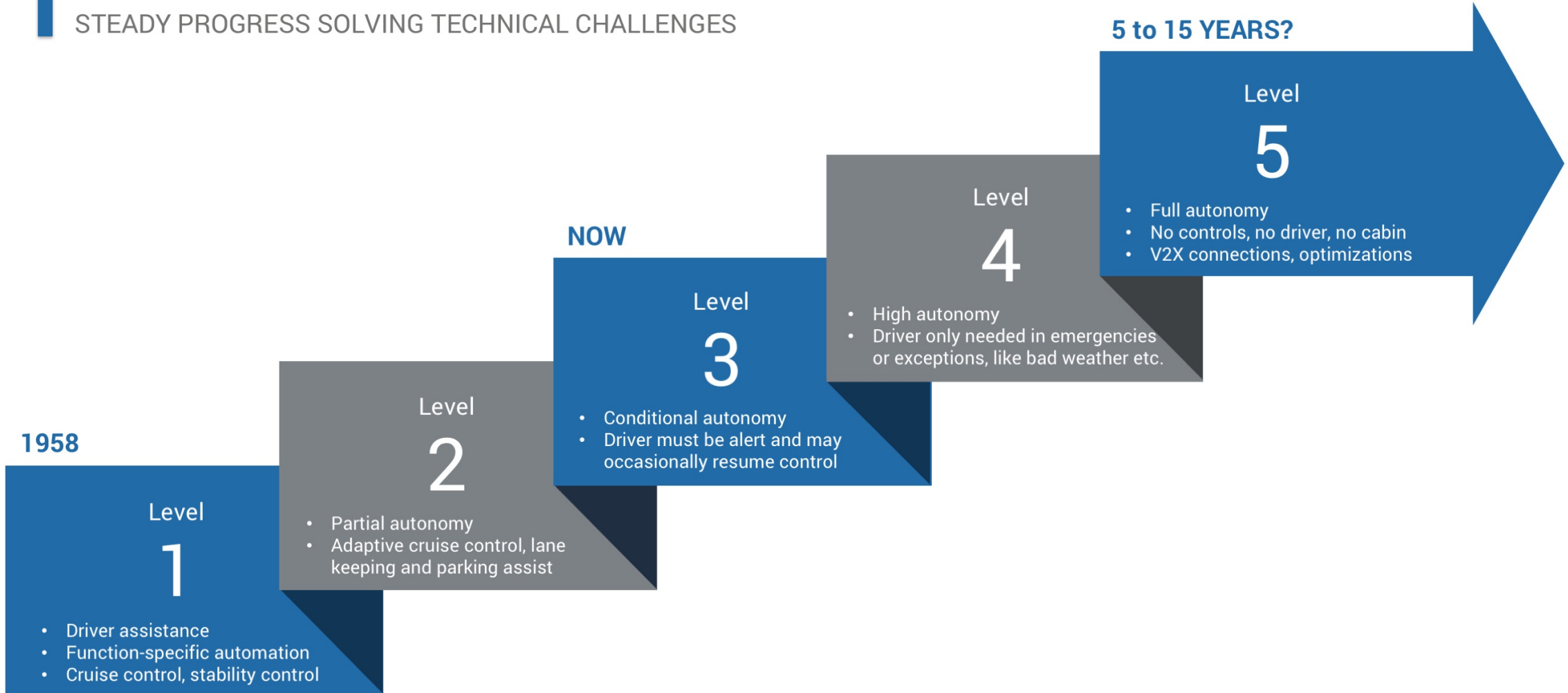


## BATTERY COST CURVE

- Battery economics is the reason for the emergence of electric cars
  - Current battery manufacturing cost: \$200 per kWh
  - When the cost drops to \$100 per kWh (est. 2022), batteries and gasoline become competitive
- 
- As a consumer, electric charging equivalent to \$1/gallon of gas

# LEVELS OF AUTONOMY

STEADY PROGRESS SOLVING TECHNICAL CHALLENGES





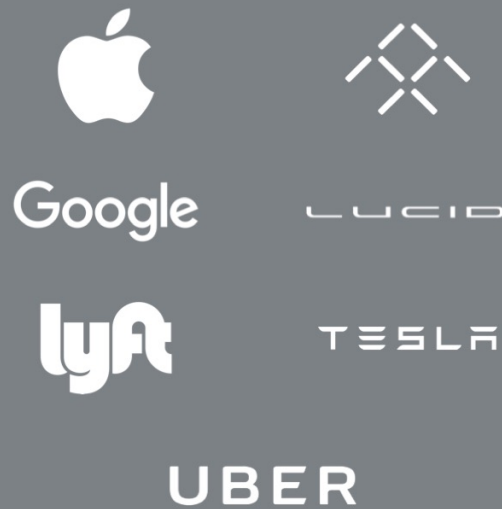
# THE BATTLE FOR OWNING THE AUTO INDUSTRY

WHEN OWNING CARS IS UP IN THE AIR

## INCUMBENTS



## SILICON VALLEY



### BUY/LEASE

- Existing business model
- Cars become “super cars”
- But if cars are fully autonomous, do we need to own them?



### SUBSCRIPTION SERVICE

- Transportation-as-a-service
- Radical shift for auto industry
- Would start to resemble airline industry (B2B)
- Consumer loyalty shifts to the fleet provider, not the auto manufacturer

**FUTURE: SHORT AND LONG TERM**

# THE SHORT TERM

FUTURE OF CITIES



## SMART CITIES LEVERAGE BIG DATA

As cars evolve to include various sensors, the data collected will allow us to see the heartbeat of a city. The massive amount of data collected can be used to evaluate the best path for:



Signals



Lanes



Variable Lanes



End Congestion

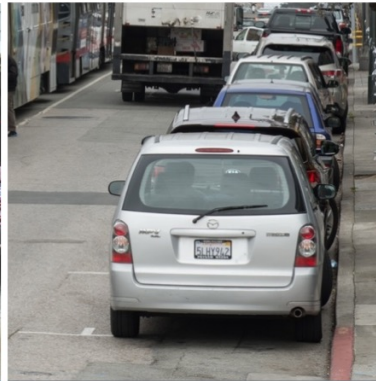
# THE LONG TERM

FUTURE OF CITIES

*"In every American city, with the exception of maybe New York, more space is devoted to sleeping cars than sleeping people."*



GARAGE



CURB



PARKING GARAGE



PARKING LOT

# THE LONG TERM

## FUTURE OF CITIES

Mass adoption of **transportation as a service** opens up a huge amount of real estate **to be reclaimed.**



### HOUSING

Where housing is scarce and expensive, new housing development may reclaim that space.



### COMMERCE

Workplaces could open up based on the needs of the community and interests of commerce.



### EXPERIENCES

The healthiest cities are measured by their walkability. Create beautiful spaces and experiences—like High Line Park in New York.





# THE LONG TERM IMPACTS

RADICAL CHANGES ACROSS INDUSTRIES



## TAXES

Gas tax obsolete, how will roadways be funded?



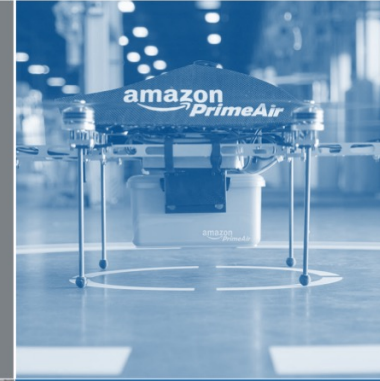
## REAL ESTATE

What will be the impact to the market?



## DRIVERS

Largest profession in the United States



## SHOPPING

Online shopping revolution and autonomous delivery



## PROFESSIONALS


Work becomes decentralized. You don't need offices.



**OCTA**  
Transportation planning and funding; traffic engineers and analysis; buses, trains and taxis.



**REAL ESTATE**  
What will be the impact to the market?



**SHOPPING**  
Online shopping revolution and autonomous delivery



“It was easy to predict mass car ownership, but hard to predict Walmart.” - Carl Sagan

# THE LONG TERM IMPACTS

WE ONLY KNOW WHAT WE KNOW



“Going to the opera in the year 2000”

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**THANK YOU**