

Pawan Divakarla

Data and Analytics Business Leader

Good Morning

Hello and Welcome

A Big Thank you from Progressive

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2



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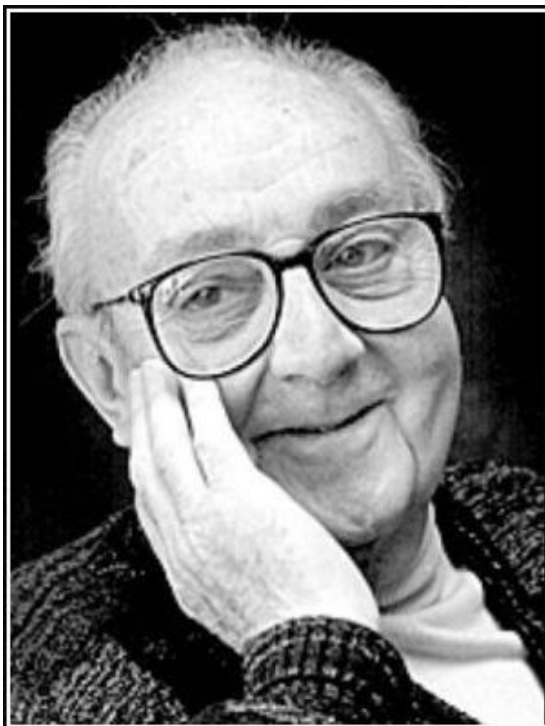
All of you...

about me

- P+Oven
- ~13 years at Progressive
- Various roles in both direct and agency
- Eat, Sleep & Dream Data!
- Live in Shaker Heights and have an IA!

Today's Topic

- An Analytical approach to emerging vehicle technology
- My plan is to use data and trends to help us sort through current and future state
- *Slides > Minutes..*



All models are wrong, but some are
useful.

— *George E. P. Box* —

AZ QUOTES

One more thing..



*Similar presentation also on investor.progressive.com

So, the times ...they are a changin..



A discussion framework

Fleet size

Frequency
&
Severity

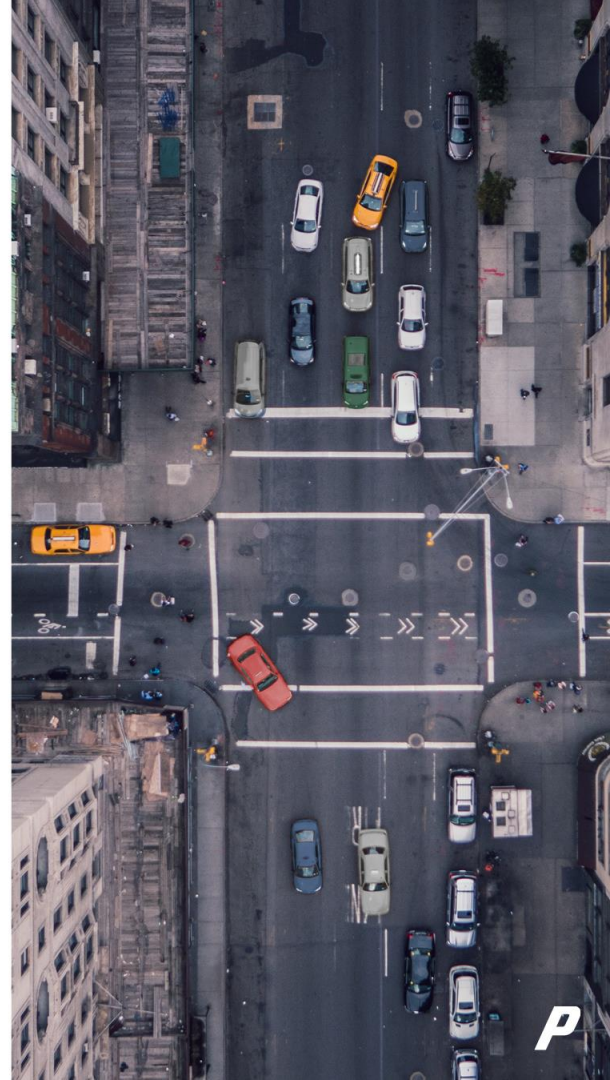
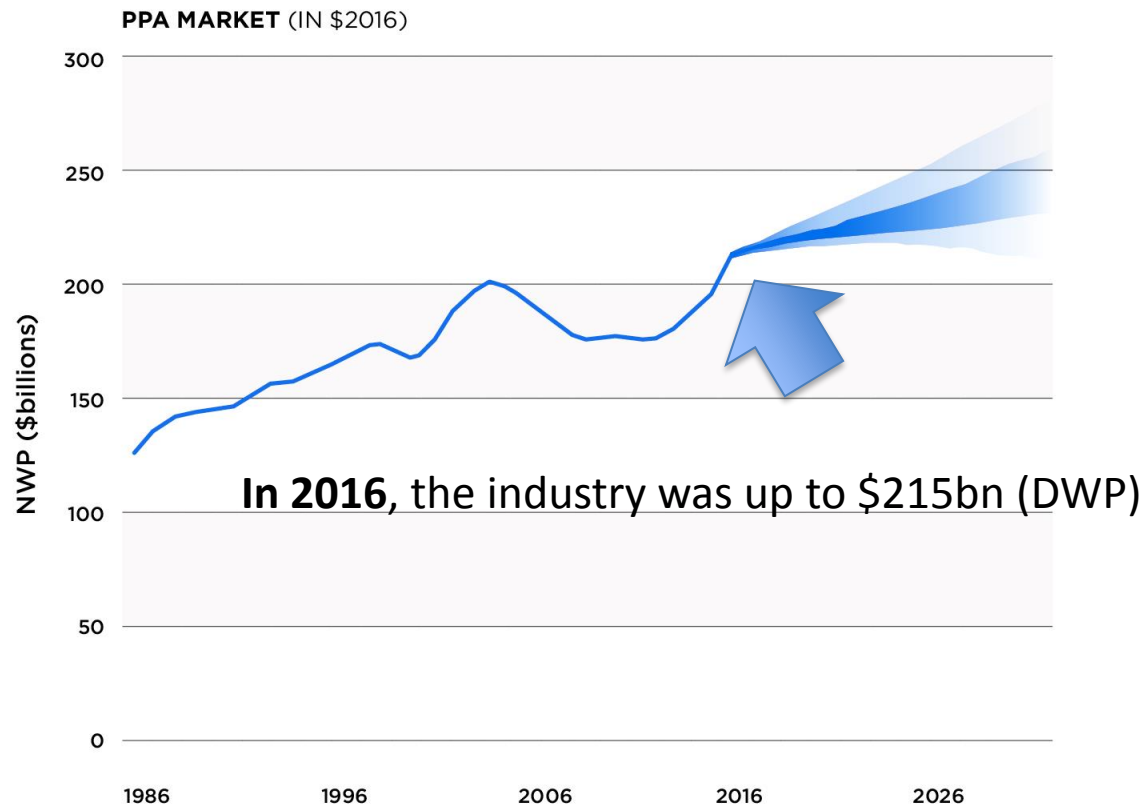
Time to
adoption

First, Fleet Size

We love our
cars!



15 Year market forecast



Large addressable market

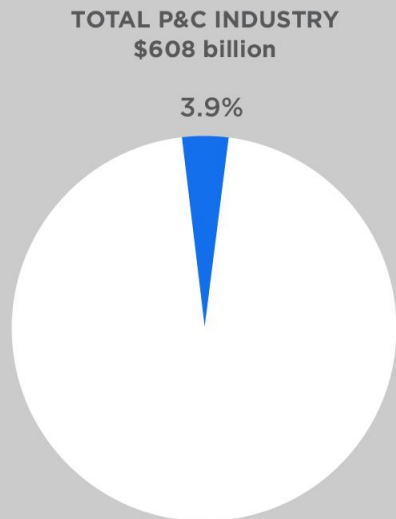
2016 DWP (in \$billions)



Industry



Progressive



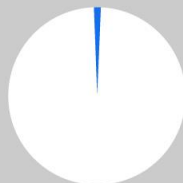
PERSONAL LINES
\$306 billion

6.7%



COMMERCIAL LINES
\$302 billion

1.1%



PERSONAL AUTO
\$215 billion

9.2%



HOMEOWNERS
\$91 billion

1.0%



COMMERCIAL AUTO
\$33 billion

7.9%



OTHER COMMERCIAL*
\$269 billion

0.3%



Innovation in Auto!



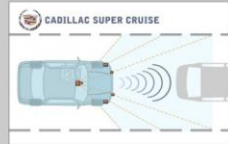
Exit 28
84 Woodside Rd
3/4 MILE

While we
have come a
long way, we
have ways to
go

2013 Runway Recap

Cadillac promises self-driving cars by 2015

ExtremeTech.com
By Bill Howard on April 23, 2012



Self-driving cars this decade? Could be. Super Cruise, a suite of General Motors technologies that lets a car drive itself on some roads, could be ready by the middle of the decade, Cadillac says. It's now 2012, so that means as little as three or four years from now. This is, GM suggests, a Cadillac that "is capable of fully automatic steering, braking and lane-centering in highway driving under certain optimal conditions."

Self-driving cars a reality for 'ordinary people' within 5 years, says Google's Sergey Brin

ComputerWorld.com
By James Niccolai on September 25, 2012



Google is known for setting ambitious targets for itself, and it's apparently making no exception for self-driving cars. Such "autonomous vehicles" will be a reality for "ordinary people" in less than five years, Google co-founder Sergey Brin said Tuesday.

Volvo plans self-driving cars in 2014, envisions accident-free fleet by 2020

Engadget.com
By Amol Koldhekar on December 3, 2012



Long hailed as one of the safest car producers in the world, Volvo hopes to retain that reputation by introducing vehicles that can avoid passenger injuries on their own by the year 2020. Its plans hinge on eliminating the largest cause of road accidents -- the drivers themselves.

Self-Driving Cars: Are They Just Around the Corner?

The Wall Street Journal
By WSJ Staff on January 18, 2013



Driverless cars are no longer the domain of science fiction. Auto manufacturers such as Audi AG and Toyota Motor Co. are beginning to roll out advanced prototypes of vehicles that can drive themselves, adopting new technologies like self-parking, lane-departure correction and collision avoidance.

Framework for personal transportation

VEHICLE SAFETY TECHNOLOGY



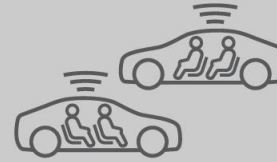
Driver

Autonomous

Driver Assist



Personally Owned
Autonomous



Shared Usage
Autonomous



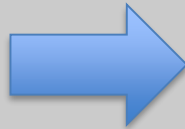
Personally Owned
Driver Driven



Shared Usage
Driver Driven

Personal

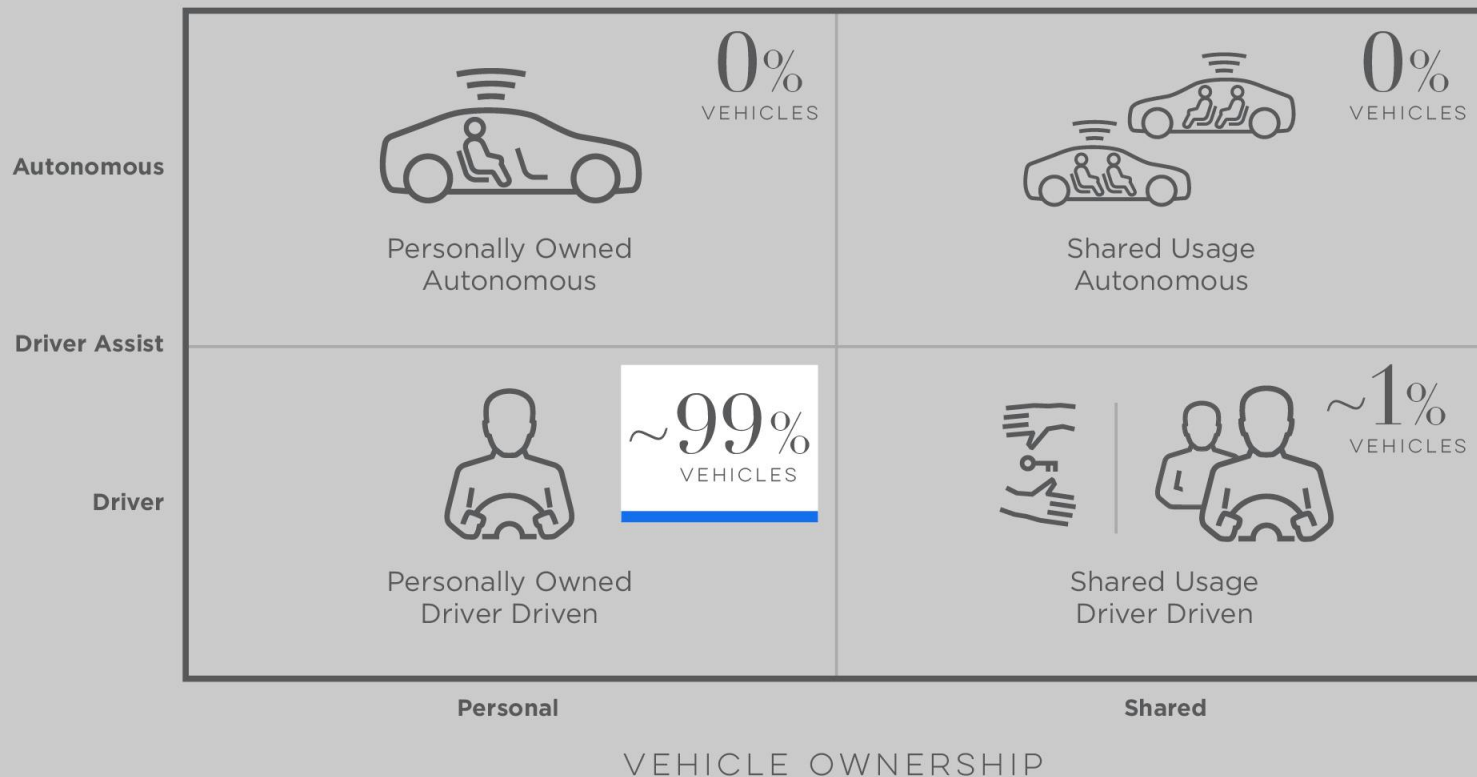
Shared



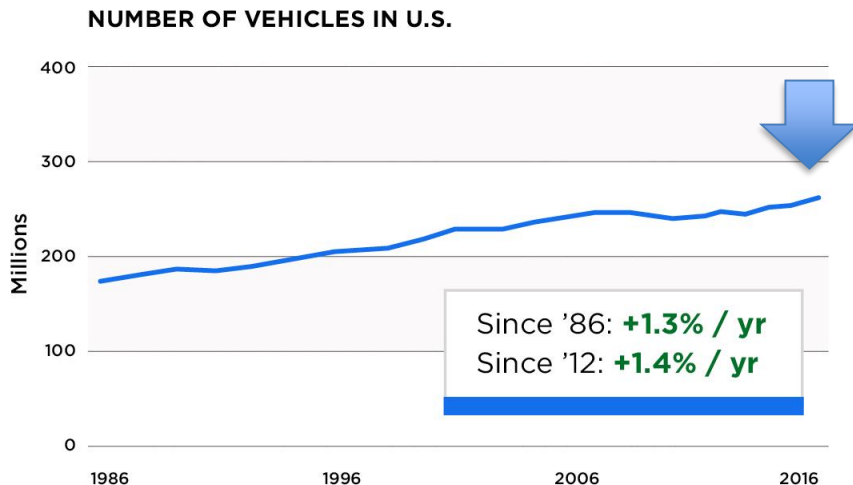
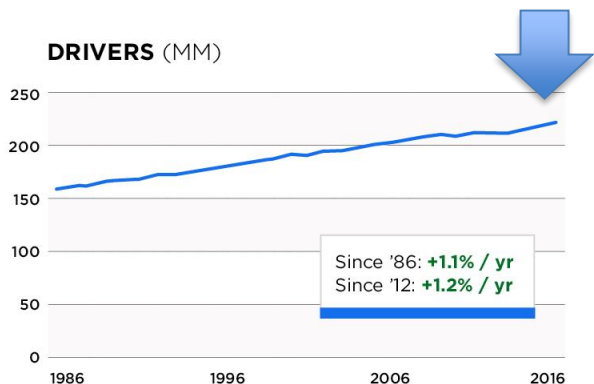
VEHICLE OWNERSHIP

Composition of today's personal auto fleet

VEHICLE SAFETY TECHNOLOGY



Private passenger auto fleet has been steadily growing



JD Powers – millennials are one of the fastest growing car buying segments.
Kelly Blue Book and Auto Trader suggest that within Generation Z, 92% plan to own a car

National vehicle ownership rate unchanged since '09



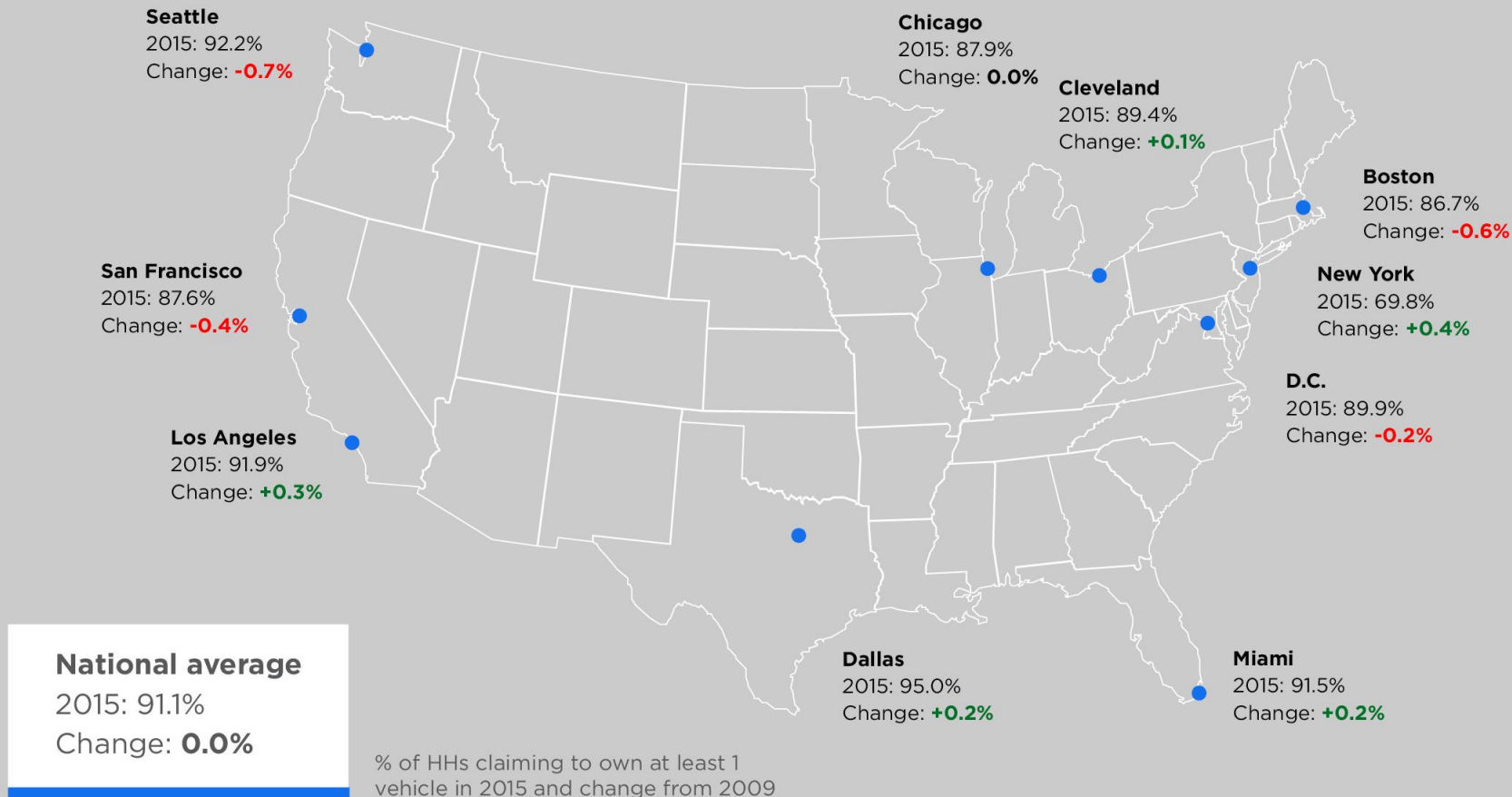
National average

2015: 91.1%

Change: **0.0%**

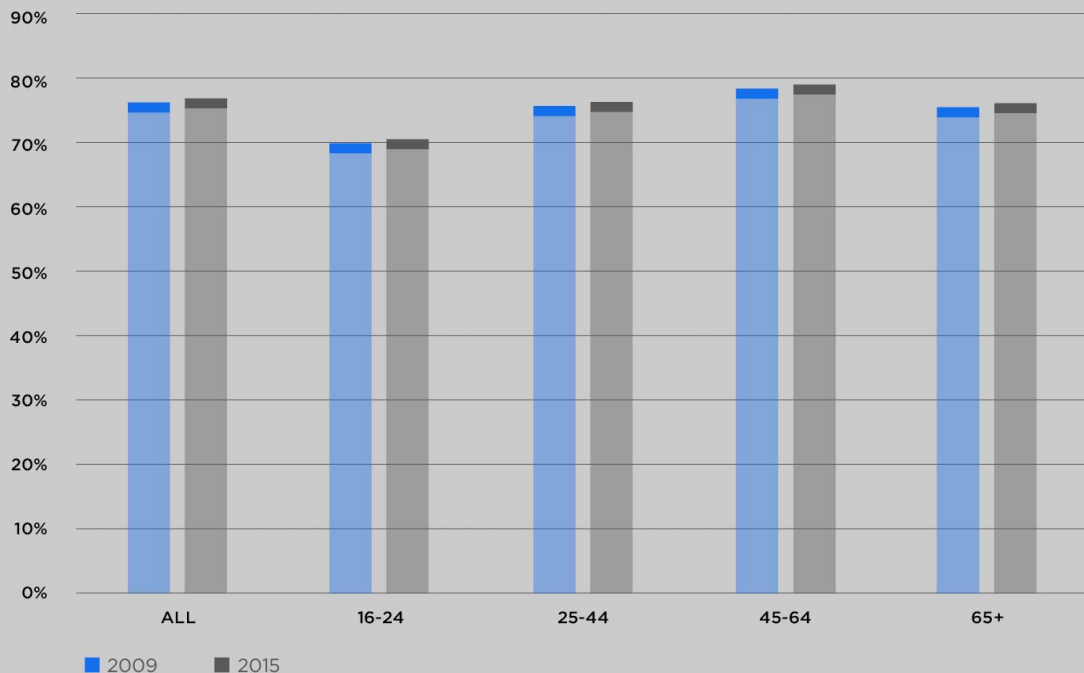
% of HHs claiming to own at least 1
vehicle in 2015 and change from 2009

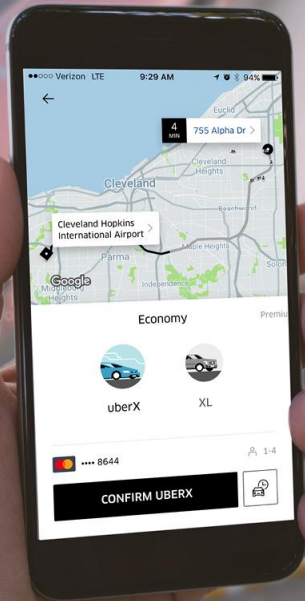
National vehicle ownership rate unchanged since '09



Commuting patterns are also unchanged

PERCENT OF COMMUTERS DRIVING ALONE BY AGE

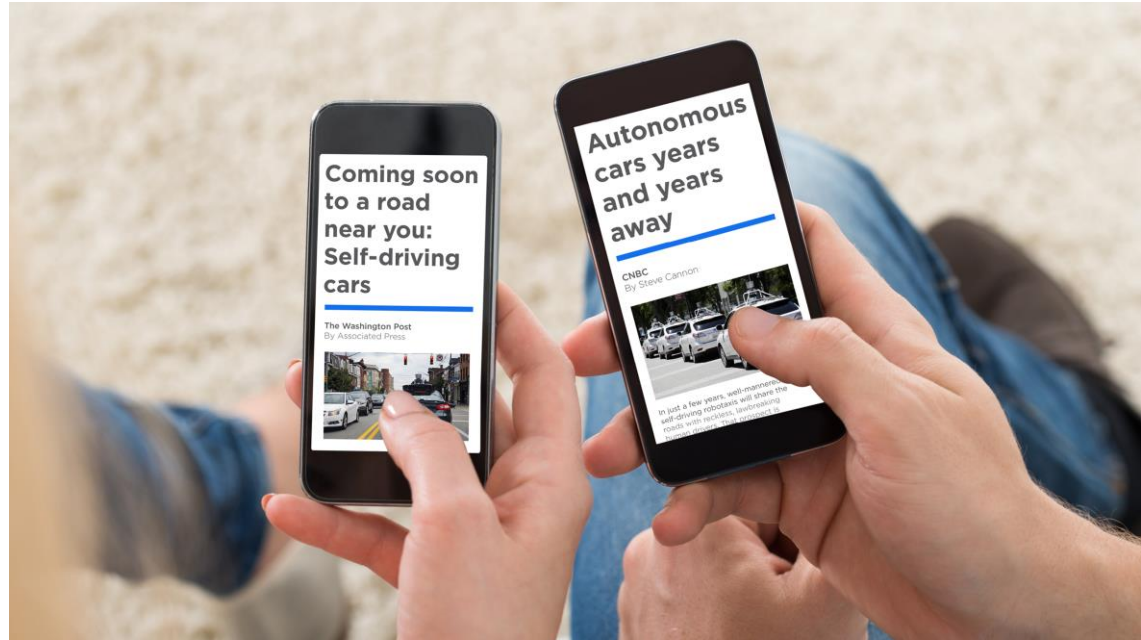




- **Ride share and car share as a supplement to owning a vehicle but not a substitute**
- **Vehicles will need to be insured and will therefore create opportunities for us in both commercial and private passenger businesses**



Let's talk Vehicle Technology



Gradually moving from Level 0 to Levels 1 and 2


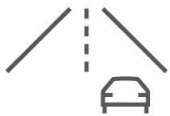



Driver

Autonomous

	0	1	2	3	4	5
Level	No Automation	Driver Assist	Partial Automation	Conditional Automation	High Automation	Full Automation
Example	Electronic Stability Control Anti-Lock Brakes Seatbelts	Auto Emergency Braking Lane Keeping	Tesla Autopilot GM Super Cruise	Audi Traffic Jam Pilot	Autonomous Highway Autonomous Urban	Self-driving Car
Date of First Introduction	Long History	2006	2014	By 2020	2020s	TBD Rideshare 1st Geofenced
Current Fleet Mix*	~95%	<5%	<1%	0%	0%	0%
Potential Requirements		Technology Consumer Demand	Technology Consumer Demand	Technology Consumer Demand Driver Engagement Regulatory Framework Legal Responsibility	Technology Consumer Demand Regulatory Framework Legal Responsibility Data Management Data Security V2V V2I	Technology Consumer Demand Regulatory Framework Legal Responsibility Data Management Data Security V2V V2I
	Driver responsible for monitoring environment			Driving system responsible for monitoring environment		

*Based on PGR estimates.

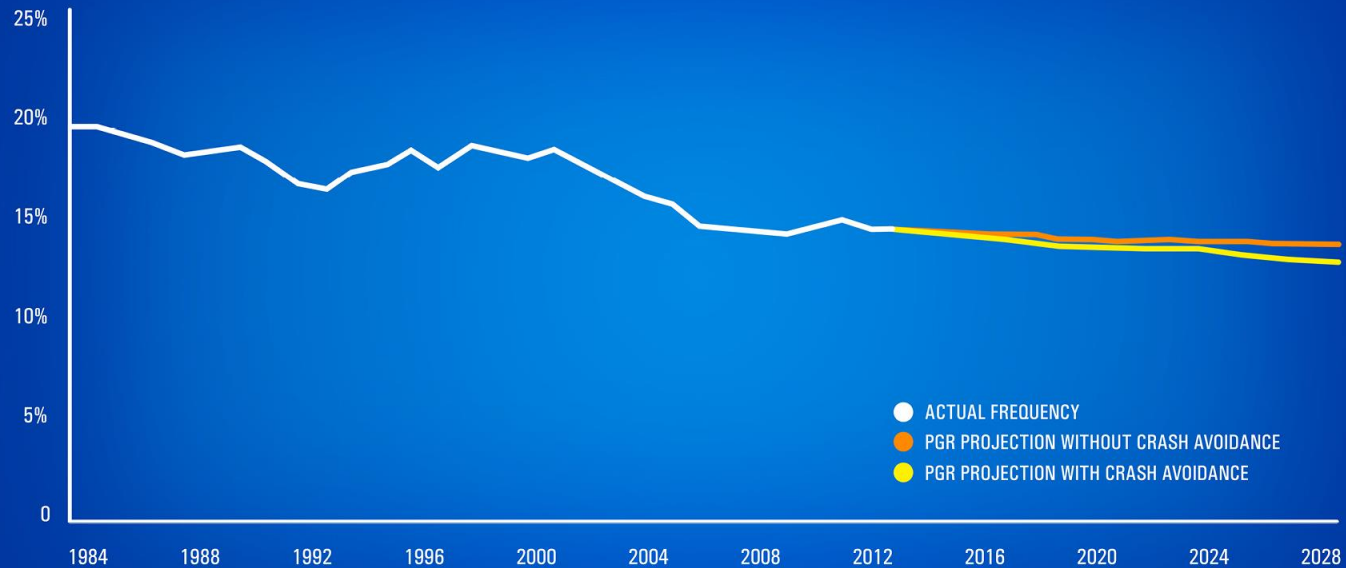
→ Autonomous		
3	4	5
Conditional Automation	High Automation	Full Automation
 <p>Traffic Jam Pilot</p> <p>By 2020</p> <p>0%</p> <p>Technology Consumer Demand Driver Engagement Regulatory Framework Legal Responsibility</p>	 <p>Autonomous Highway Autonomous Urban</p> <p>2020s</p> <p>0%</p> <p>Technology Consumer Demand Regulatory Framework Legal Responsibility Data Management Data Security V2V V2I</p>	 <p>Self-driving Car</p> <p>TBD Rideshare 1st Geofenced</p> <p>0%</p> <p>Technology Consumer Demand Regulatory Framework Legal Responsibility Data Management Data Security V2V V2I</p>
Driving system responsible for monitoring environment		

- At these levels **deployment** is about **more than just technology**
- Changes to our **Regulation, Laws & insurance**. Ensure **data privacy** and **security**.
- Could also require **V2V or V2I investment (significant)**.
- Challenge - how to keep driver engaged?

Next, Frequency & Severity

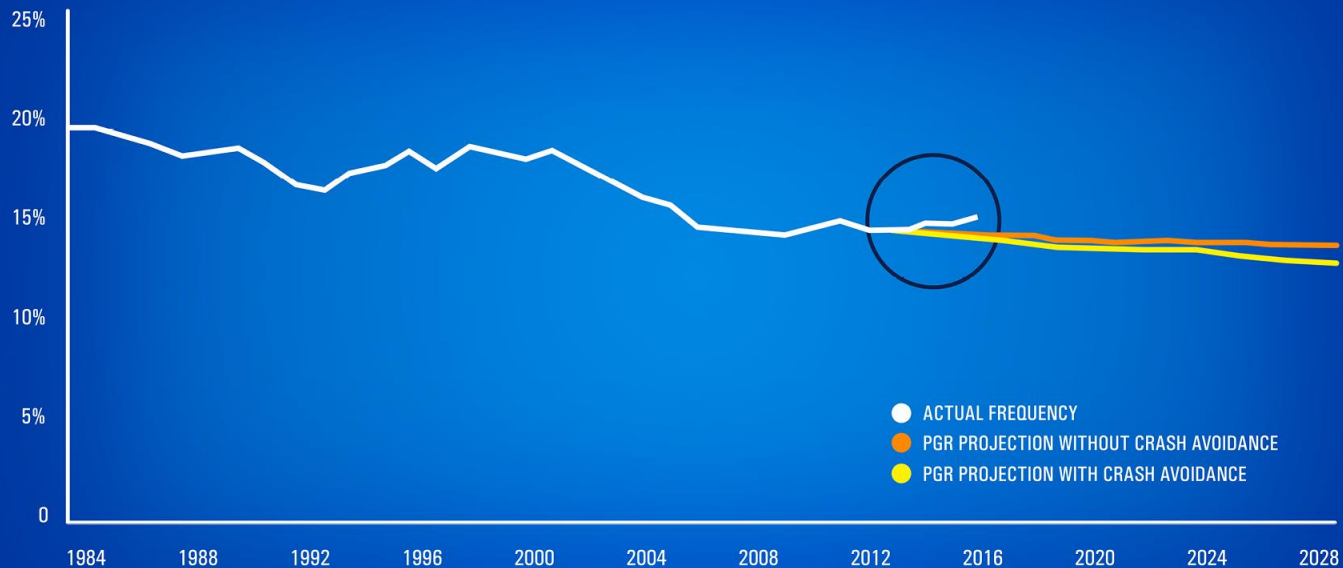
2013 Runway Recap

PROGRESSIVE 15-YEAR FREQUENCY FORECAST



2013 Runway Recap

PROGRESSIVE 15-YEAR FREQUENCY FORECAST



Indicated impact on loss cost

FREQUENCY ESTIMATES

TECHNOLOGY	PROPERTY DAMAGE	COLLISION
Forward collision warning with autobrake	-13%	-2%
Adaptive headlights	-5%	-1%
Side view assist (blind spot)	-9%	-2%
Rear camera	-4%	1%

- Effectiveness varies by coverage
- Frequency benefits may not be additive





SEVERITY ESTIMATES

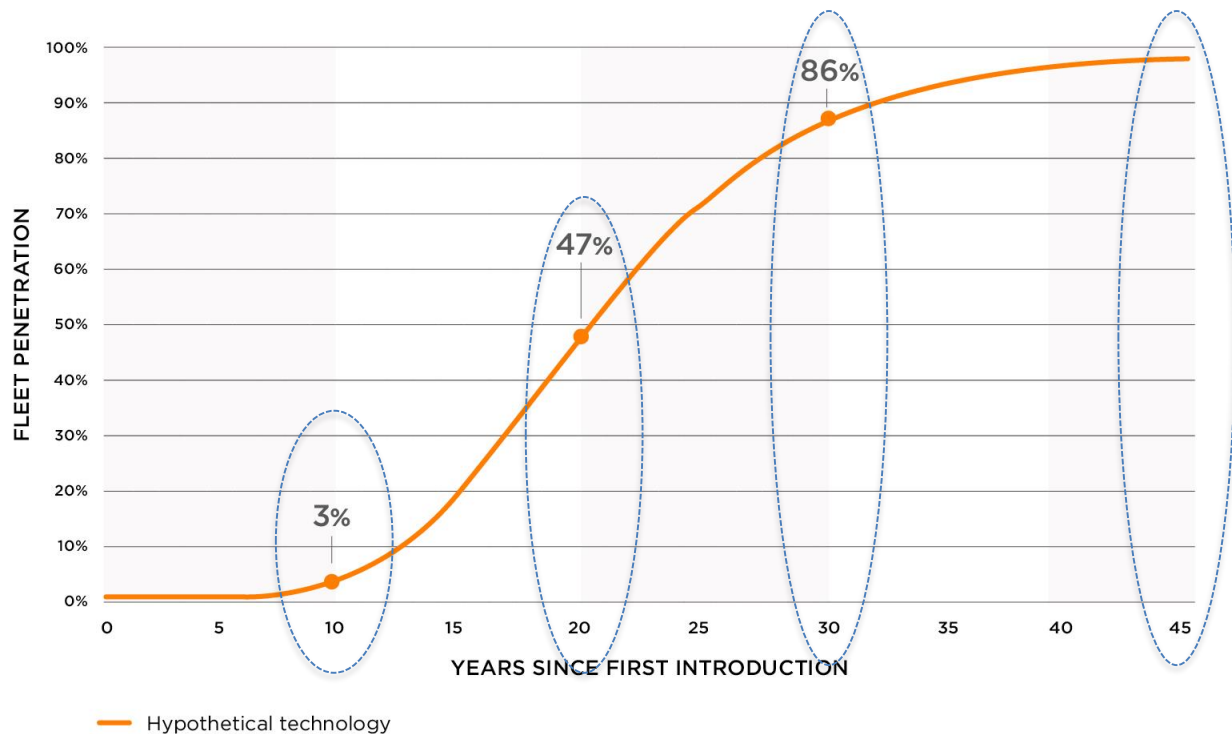
TECHNOLOGY	PROPERTY DAMAGE	COLLISION
Forward collision warning with autobrake	2%	0%*
Adaptive headlights	-1%*	3%
Side view assist (blind spot)	-1%*	0%*
Rear camera	2%	1%

**Early indicative data, not wholly credible based on actuarial standards*

- More complex cars = higher repair costs
- Above-average inflation on replacement parts
- Will the technology make accidents less severe?

and finally Time→

Slow penetration results in gradual reductions in frequency trend



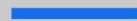
HYPOTHETICAL TECHNOLOGY:

Reduction in claims frequency when fully deployed:

-15%

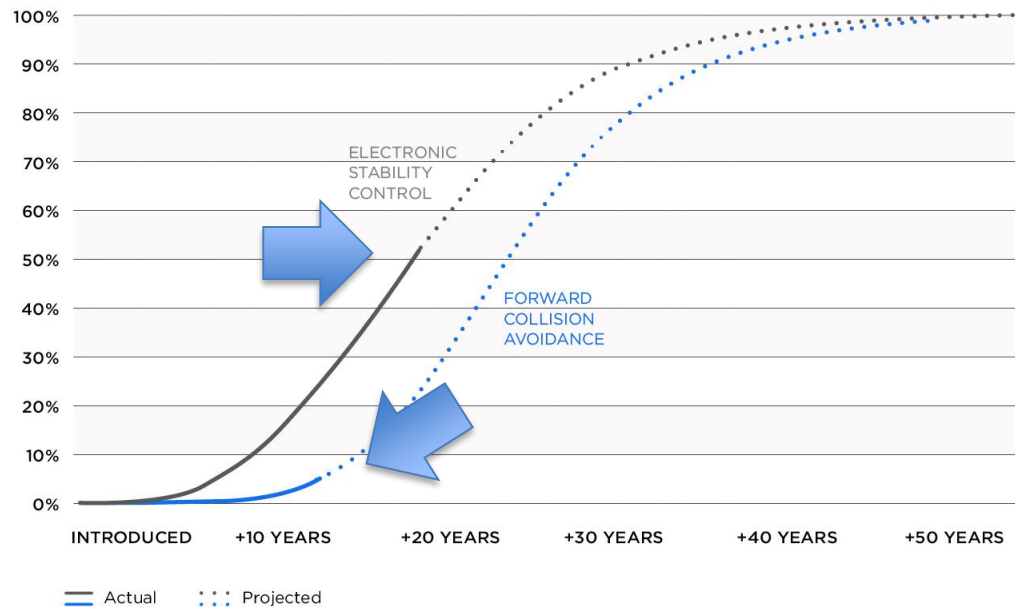
Claims frequency trend:

-0.4% per year



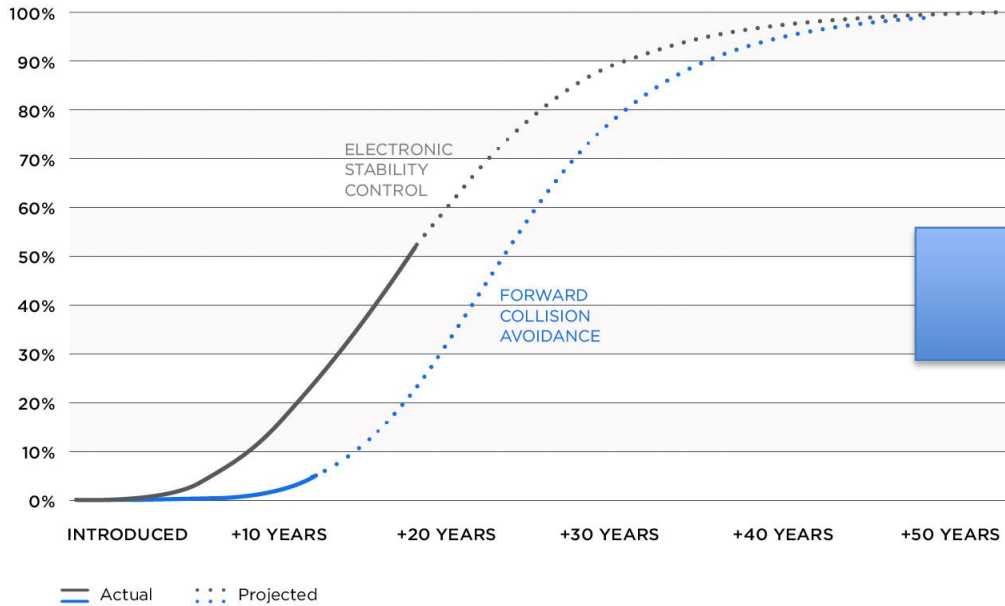
PREDICTED % REGISTERED VEHICLES WITH TECHNOLOGY AVAILABLE

AVAILABLE = STANDARD + OPTIONAL EQUIPMENT



PENETRATION RATES
HISTORICALLY SLOW

PREDICTED % REGISTERED VEHICLES WITH TECHNOLOGY AVAILABLE
AVAILABLE = STANDARD + OPTIONAL EQUIPMENT

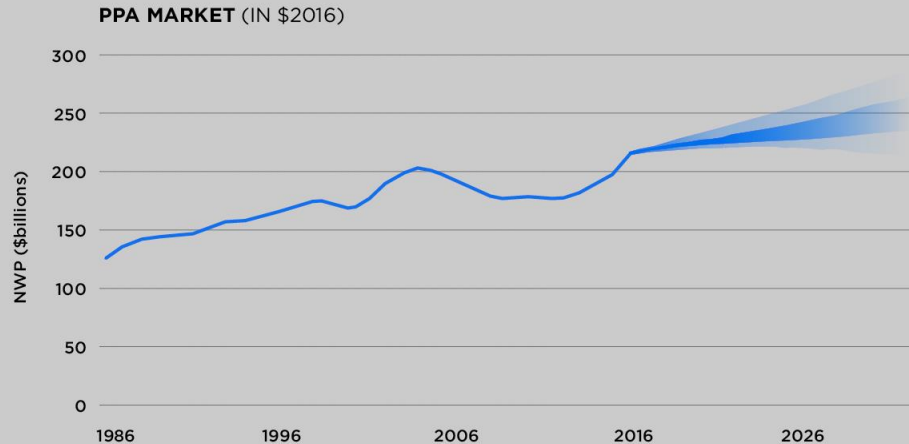


FUTURE
CONSIDERATIONS:

- Fleet turnover rate
- Pace of technology advancement
- Cost of technology
- Consumer demand
- Standard vs. optional feature
- Regulatory and legal frameworks
- Data security and privacy
- V2V and V2I

Considerations for future market sizing

	FLEET	FREQUENCY	SEVERITY
HISTORICAL	Since '86: +1.3% / yr Since '12: +1.4% / yr	Since '86: -0.7% / yr Since '12: +1.3% / yr	Since '86: +1.3% / yr Since '12: +1.8% / yr
NEXT 10-15 YEARS	Similar growth rates Minimal impact from shared mobility	Gradual penetration results in reductions in frequency trend	Claims severity trend will continue to outpace inflation



Progressive personal auto actions

- PRICING FOR ADVANCED SAFETY FEATURES
- LEADERSHIP IN UBI WITH SNAPSHOT®
- TNC ENDORSEMENT
- ORGANIZATIONAL AGILITY AND RESPONSIVENESS

Large addressable market

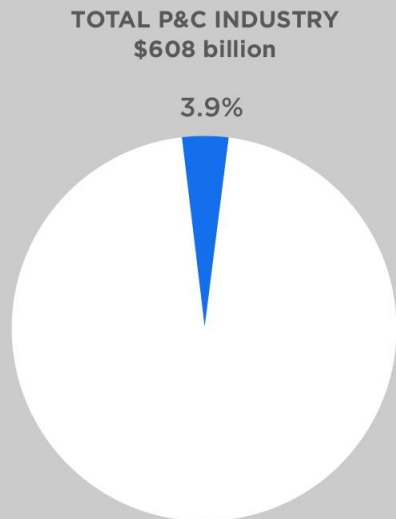
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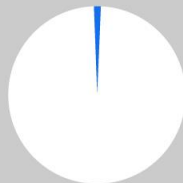
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Thankyou...