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The Impact of Electric Vehicles in 2013 and Beyond

Rudy Garcia
National Sales Director, Verdek LLC

Nyla Westlake, CPM
Trammell Crow Residential

Kelly Vickers
Alliance Residential Company

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- Invented in the 1830s
- **33,842** electric cars registered in U.S. at the turn of the century
- Sales of electric cars peaked in 1912

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Bumps in the “Road” Initiate Alternatives

Previous

- **Oil Shortages**
- **Clean Air Concerns and Standards**

Current

- **U.S. Government Incentives/Mandates**
  - U.S. DOE goal – 1 Million EVs in the U.S. by 2015
  - 2020 regulatory standards
- **Technology Improvements**
- **Market Indicators/Influence (U.S. & Globally)**
  - Peak in oil production, rising oil prices
  - Global instability, energy security
  - Global EV activity (Israel, Denmark, Russia, China)

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Market Research Validates EV Industry Growth

Goldman Sachs (2010)
PEVs will be about 4% of global light-duty vehicle sales by 2020.
PHEVs: **2 million** (2020) - BEVs: **1.7 million** (2020)

Pike Research (Predictions)
PEV sales totaling **3.2 million vehicles** worldwide between 2010 and 2015 and a compound annual growth rate of 106%.
China: **888,000** PEVs sold by 2015 (27% of global market), by far largest BEV market
U.S.: **841,000** PEVs sold by 2015 (26%), by far largest PHEV market
Over one million PEVs sold in 2015 alone (44% PHEVs).

Fleet Buyers
Many fleet operators are purchasing electric vehicles to augment their traditional fleet vehicles in order to reduce fuel and maintenance costs and achieve emission reduction goals. General Electric Corporation's November 2010 announcement of its plans to buy 25,000 PEVs for its fleet by 2015. The U.S. Government, FedEx, UPS and many others are adding EV's to their fleets.

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EV Plug-in Types

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Nissan Leaf
In Market


Chevy Volt
In Market


Ford Transit
Connect Electric
In Market


Fisker Karma
Nov 2011


BMW ActiveE
Dec 2011


Ford Focus
Dec 2011


Toyota Prius
plug-in hybrid
2012

Consumers

Support for clean energy

Better driving experience

10:1 Long-term cost advantage

Auto manufacturers

Must average 35 MPG across the fleet by 2020

Delivering **40+ new EV models** in next few years

Governments

Providing purchase incentives

$2 billion in grants issued

Energy independence

Cost Declines

Supply chain improvements narrowing the initial cost gap

Battery cost declining significantly


Tesla Model S
Mid 2012


Toyota Rav4 EV
2012

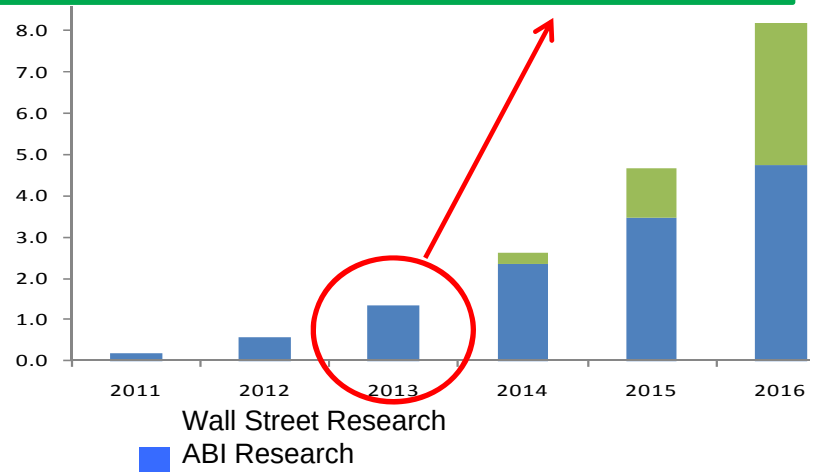

Audi A1 E-tron
2012


Ford C-MAX
Energi 2012


Honda Fit EV
2012

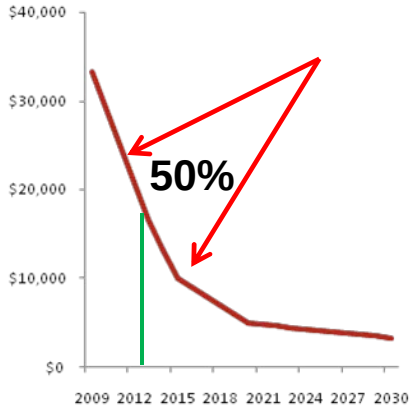

VW Golf Blue-
e-motion
2014

Projected EV Installed Base (millions)

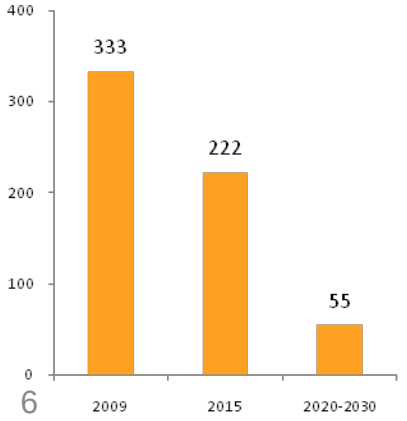


Battery Technology Roadmap

Battery costs expected to collapse



Battery weight expected to plummet



Source: Wall Street Research

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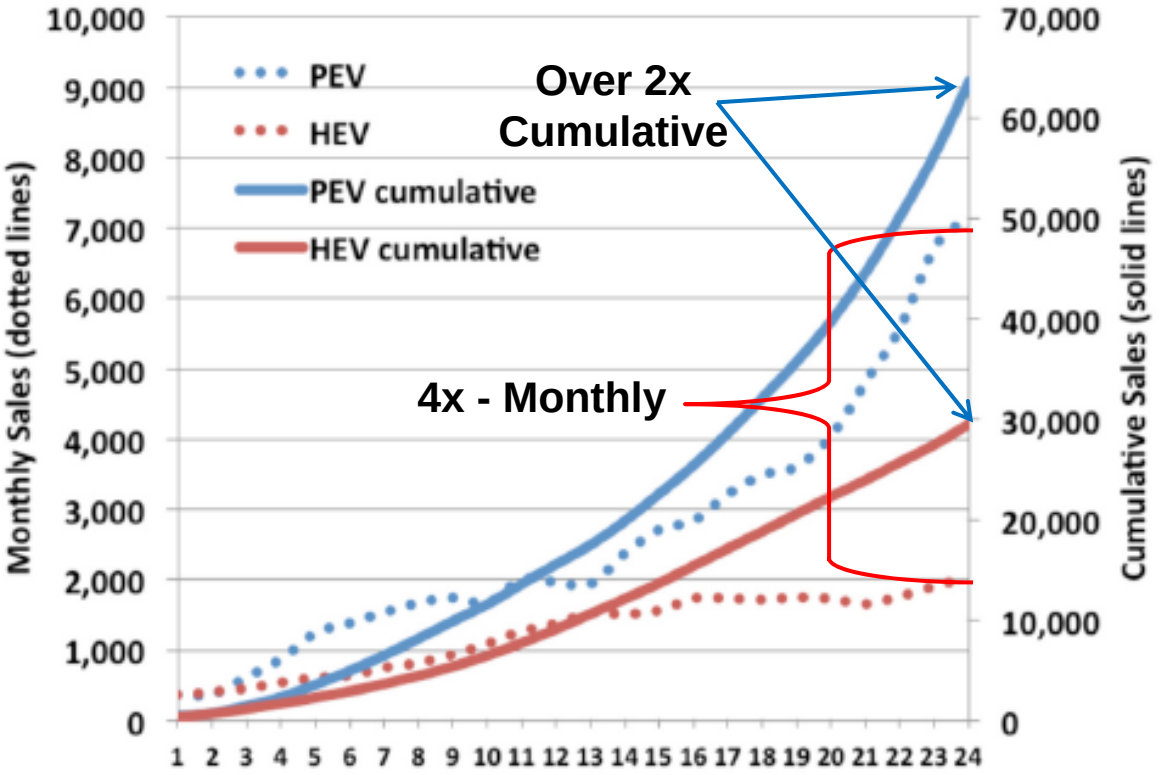
New PEV Sales

Compared to HEV sales over their same respective 24 month introductory periods



PEV sales 12/2010 through 11/2012, HEV sales 12/1999 through 11/2001

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Standards Drive Growth

- EVSE Connectors (J1772 & J1772 combo)
- **"Level 1"** Standard household current – 110V - 208/240V - 20A
- **"Level 2"** Residential & Public - 208/240V - 40A,
- **"Fast DC"** Public Charging - 208 three phase or 480V – 60-100A
- EVSE kWh outputs vary - (ChargePoint is 7.5kWh)
- Vehicle on-board chargers - varies by manufacturer - impacts charging times

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Building Codes

2010 GREEN BUILDING CODE REQUIREMENTS
(CALGreen Code) Effective January 1, 2011.

A5.106.5.3 Electric vehicle charging. Provide facilities meeting Section 406.7 (Electric Vehicle) of the *California Building Code* and as follows:

A5.106.5.3.1 Electric vehicle supply wiring. For each space required in Table A5.106.5.3.1, provide one 120 VAC 20 amp and one 208/240 V 40 amp, grounded AC outlets or panel capacity and conduit installed for future outlets.

TABLE A5.106.5.3.1

TOTAL NUMBER OF PARKING SPACES[1]	NUMBER OF REQUIRED SPACES
1–50	1
51–200	2
201 and over	4

1. In a parking garage, the total number of parking spaces is for each individual floor or level.

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On Highway Charging Progress

West Coast Green Highway

- First border to border highway to offer fast charge technology
- Based on Public/private partnerships
- Will provide electric vehicle charging every 40 - 60 miles
- Operational by spring 2012 – Canada to Oregon border

I-15 Electric Highway Project

- Regional EV network spreading across the entire 1,350 miles of I-5 connecting three states and three countries and serving the 2 million electric vehicles anticipated by 2020 on the west coast, British Columbia to Baja California

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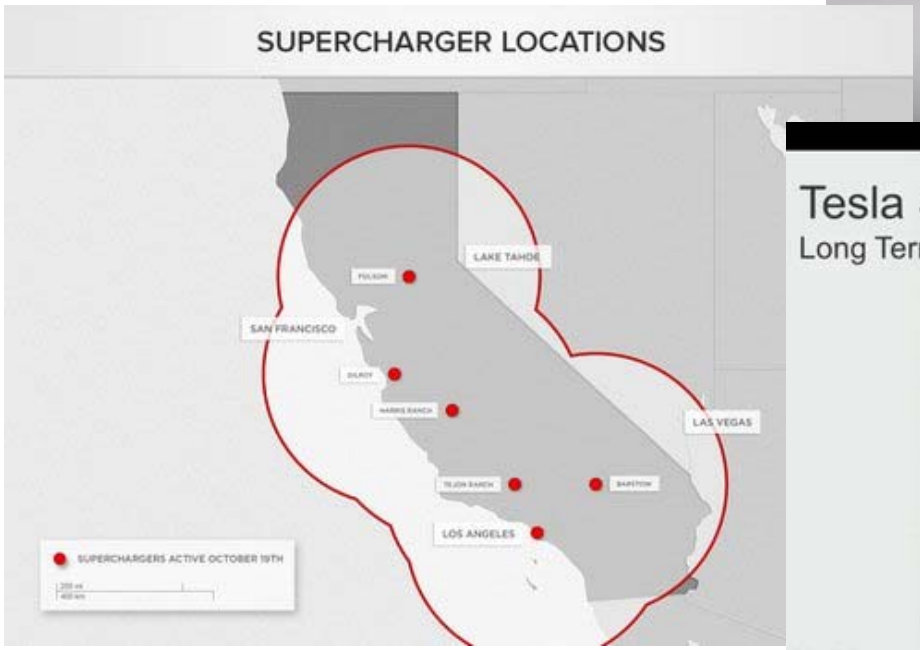
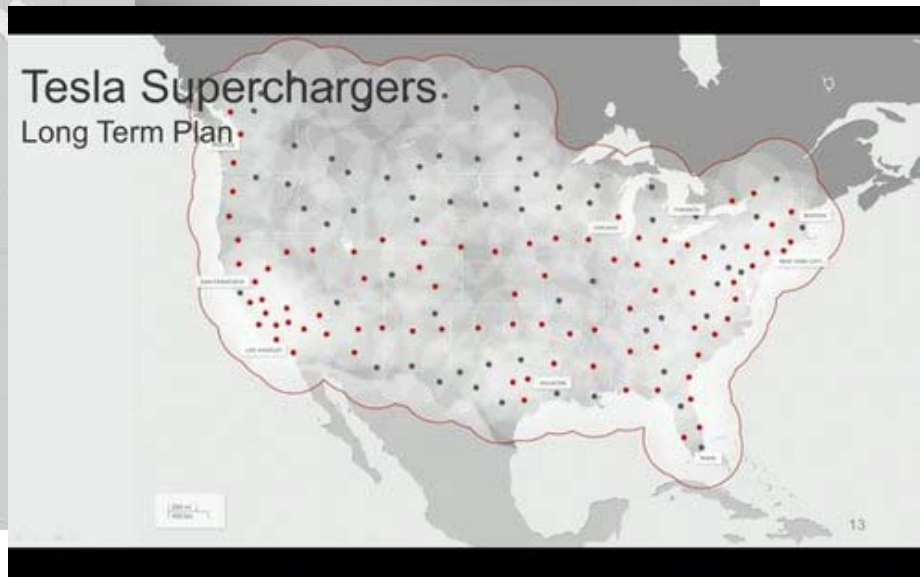
TESLA MOTORS





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chargepoint

11,000+ charging spots

14 countries
70% of the public charging station market

Ranked #1 In the World

4,100 times every day EV drivers plug into a ChargePoint station

Over 50% of all EV drivers use ChargePoint (35K+)

1,500+ companies are providing charging via ChargePoint

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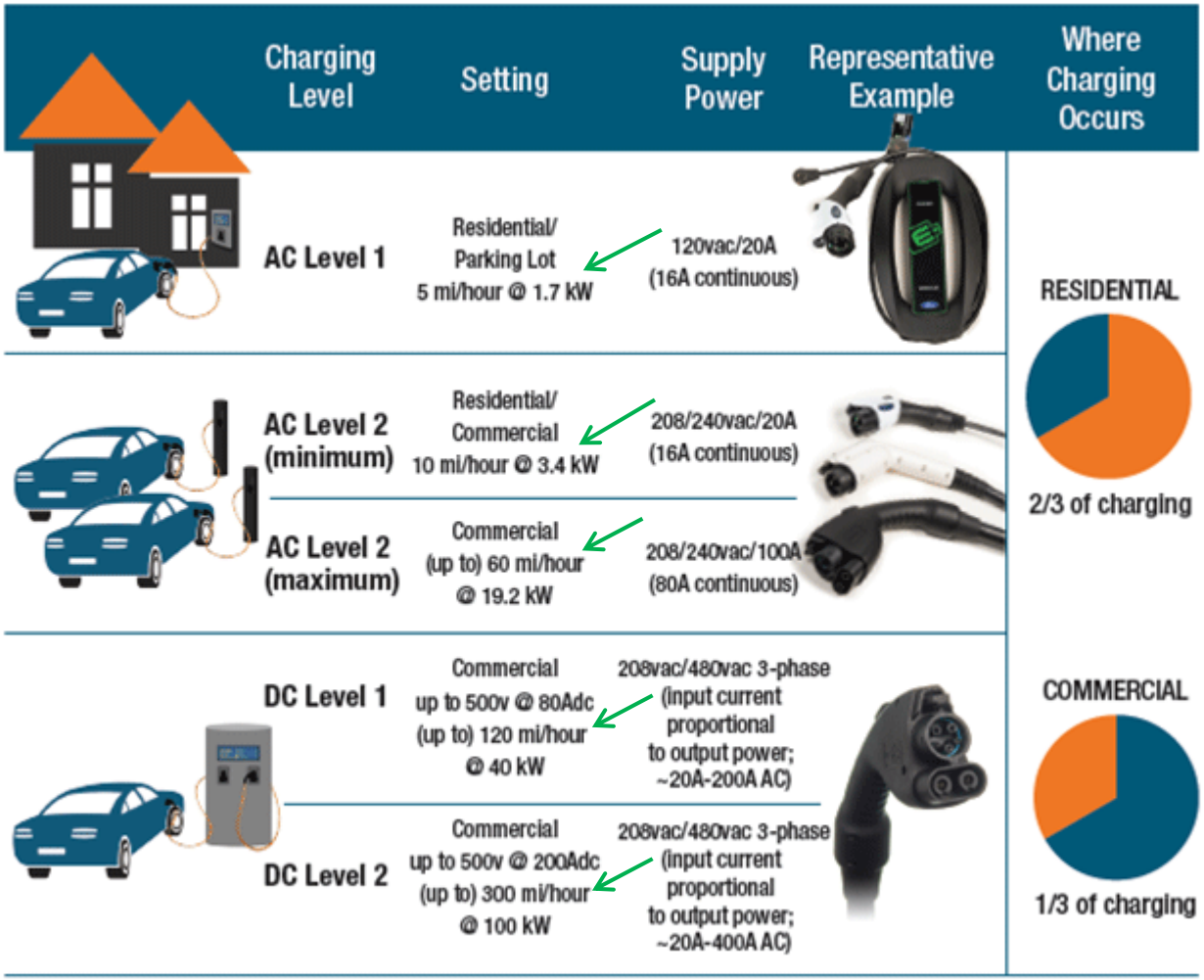

Charging levels and resulting charging times

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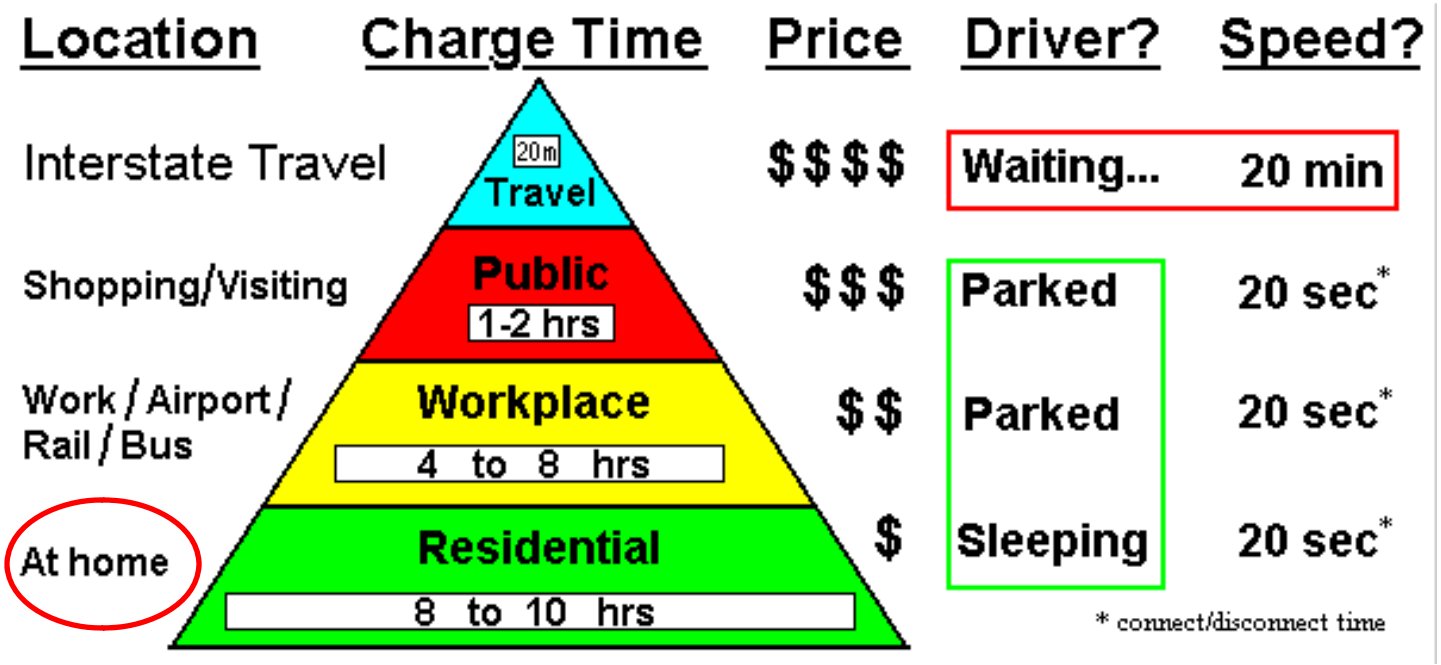
Infrastructure Opportunities



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What is your “EV” Industry key role?

How or when did your “key role” position accept and adopt previous technology waves?

- Personal Computers
- Cellular Phones
- Wireless Internet
- Smart Phones
- Social Media
- Tablets

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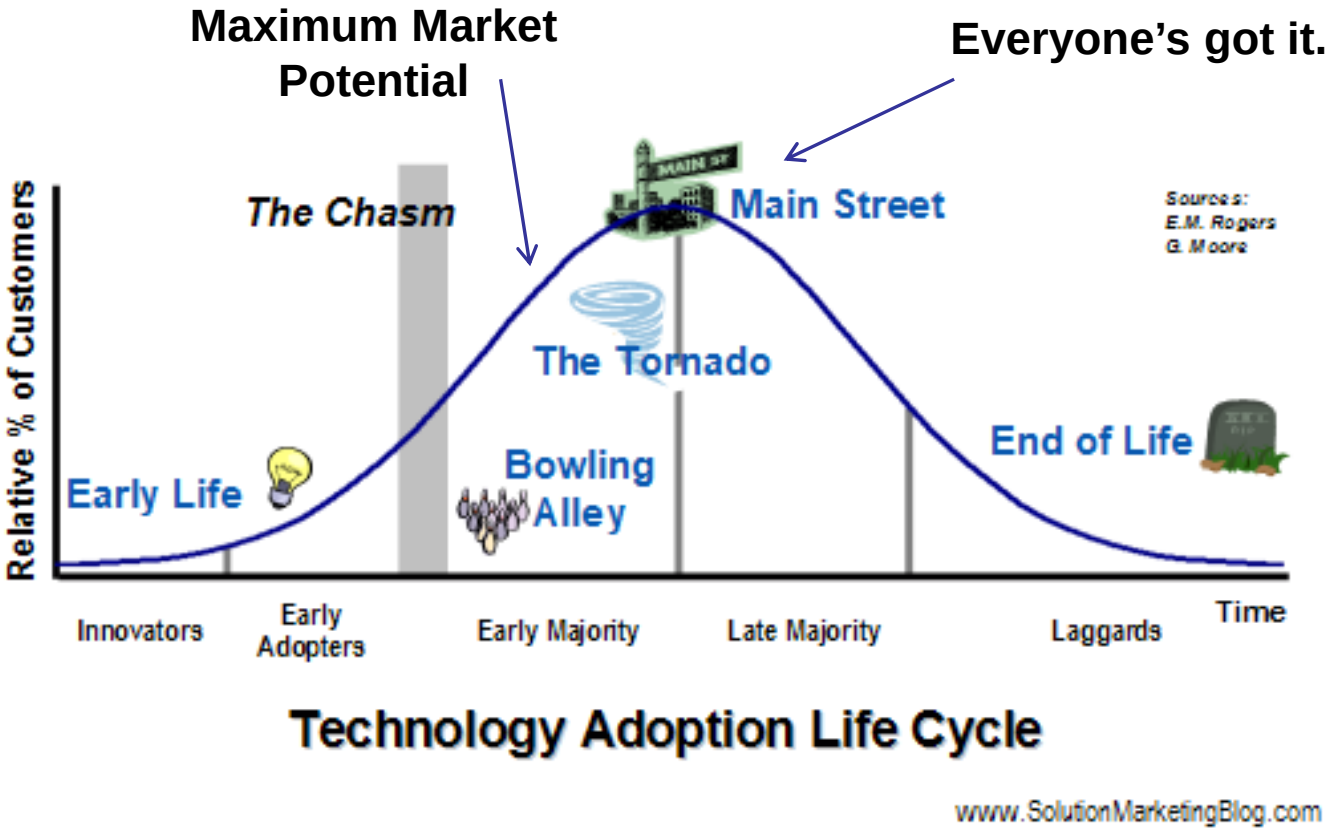

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2001

BELLSOUTH
MCI WORLDCOM
Qwest
Sprint
NEXTEL
CELLULARONE
VoiceStream WIRELESS
verizon
SBC

2011

at&t
Sprint
T-Mobile
verizon

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Community Amenities/Services 2008

A **REAL** State-Of-The-Art Fitness Center
Pool/Sauna/Jacuzzi
Dog Park
Putting Green
Car Washing Stations (w/vacuums)
Jogging/Walking Trails
Tennis/Volleyball Courts
Playgrounds
Grilling Picnic Areas
Gated Entrance

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Community Amenities/Services Today

Fitness pool with fire/water features
Splash pool with volleyball
Splash pad
Hot tub
24/7 fitness center
Juice bar
Towel service
Personal training services
Outdoor kitchen/lounge areas
24/7 clubhouse with Wi-Fi, gaming, pool table and screening area
Private fiber-optic data network
Professionally managed wired and wireless network with tech support
Playground
Bark park
Private garages
Covered parking
Car Care Center
Electric Car Charging Stations
Recycling center
Valet recycling and trash
Valet dry cleaning

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Innovator

Early Adopter

Early Majority

Late Majority

Laggard

If not now . . .

When?

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Thank you.

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Rudy Garcia

National Sales Director – Verdek LLC

rgarcia@verdek.com – (602) 686-0347

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