Shared, Autonomous, Electric EVs and How to Charge Them

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June 8, 2017

EV Roadmap 10
Palm Pilot vs. iPhone: What made the difference for consumer adoption?

- Faster
- Sleeker
- More capable

Intuitive

Flexible – apps!

Fully connected – voice, text, and www
Are we there yet with EVs?

- Will next-gen EVs like the Chevrolet Bolt have iPhone-like mass appeal?

- If not, what are they missing to become the “gotta have” product?
Automation may be “it”

- Many automakers are developing automated EVs

Tesla Model 3 Concept
Source: tesla.com

Future BMW iNEXT will be an electric crossover, feature Level 3 autonomy
BMW i News | May 5th, 2017 by Nico DeMattie
When BMW displayed its concept for the BMW Vision NEXT 100, it looks like something plucked straight from the future. With a flexible skin-like body ...

Source: www.bmwblog.com

Volkswagen ID Concept
Source: media.vw.com
Expectations are also high for shared-automated vehicles

The future car is driverless, shared and electric

Self-driving electric vehicles to make car ownership vanish
We will need to rethink charging infrastructure

Shared mobility and shared-automated vehicles have different operating patterns and fueling infrastructure requirements than personal-use vehicles.

“San Diego’s leading car sharing company [replaced] its all-electric vehicle fleet with gas-powered cars due to a lack of charging stations, a symbolic setback for the emission-reduction aspirations of the city’s ballyhooed climate action plan.”

Research is underway at the National Labs

- The Advanced Fueling Infrastructure Pillar of DOE’s SMART Mobility initiative has begun researching the unique charging infrastructure requirements of shared mobility.
DC fast charging design study completed

- Larger batteries, longer range mean BEVs need faster charging infrastructure

- A study was completed to examine the design and costs of high-power, multi-port DC fast charging complexes that provide a gas station-like experience
Scope and key conclusions

The study included:

- Summary of lessons learned from previous fast charging projects
- Design considerations for multi-port DCFC complexes
- A design case study with rough-order-of-magnitude cost estimate and business case analysis

Findings include:

- Significant cost savings can be realized with a well planned strategy for upgrading to higher power levels
- Under multiple scenarios, the break-even cost to charge is very high – $5-$9/gas gallon equivalent
- On-site energy storage will likely play a role in some scenarios to balance operating cost vs. higher upfront capital cost
- A follow-on project has been started to refine analysis
Full report entitled “Considerations for Corridor and Community DC Fast Charging Complex System Design” available at:

avt.inl.gov/project-type/charging-infrastructure-studies

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