A Battery is not a TANK!

-or-

Most of what you think you know about EV's might be wrong

- One Million EVs by 2015 is the goal.
- The Infrastructure Response is great!...

But are we doing it right?

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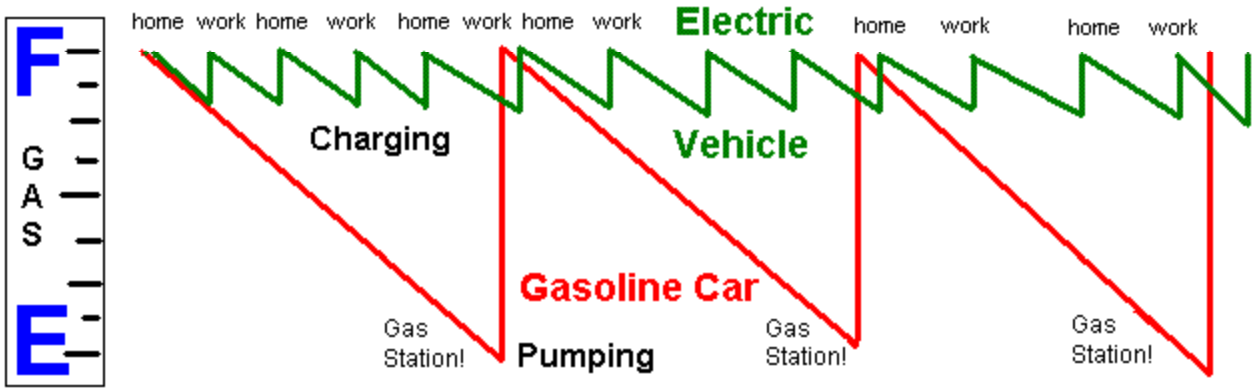
A Battery is not a Tank!



Gas cars drive-to-empty, then fill-to-full

EV's charge daily at home and (eventually) at work

Not to-full for best battery life

Not to-empty for best battery life

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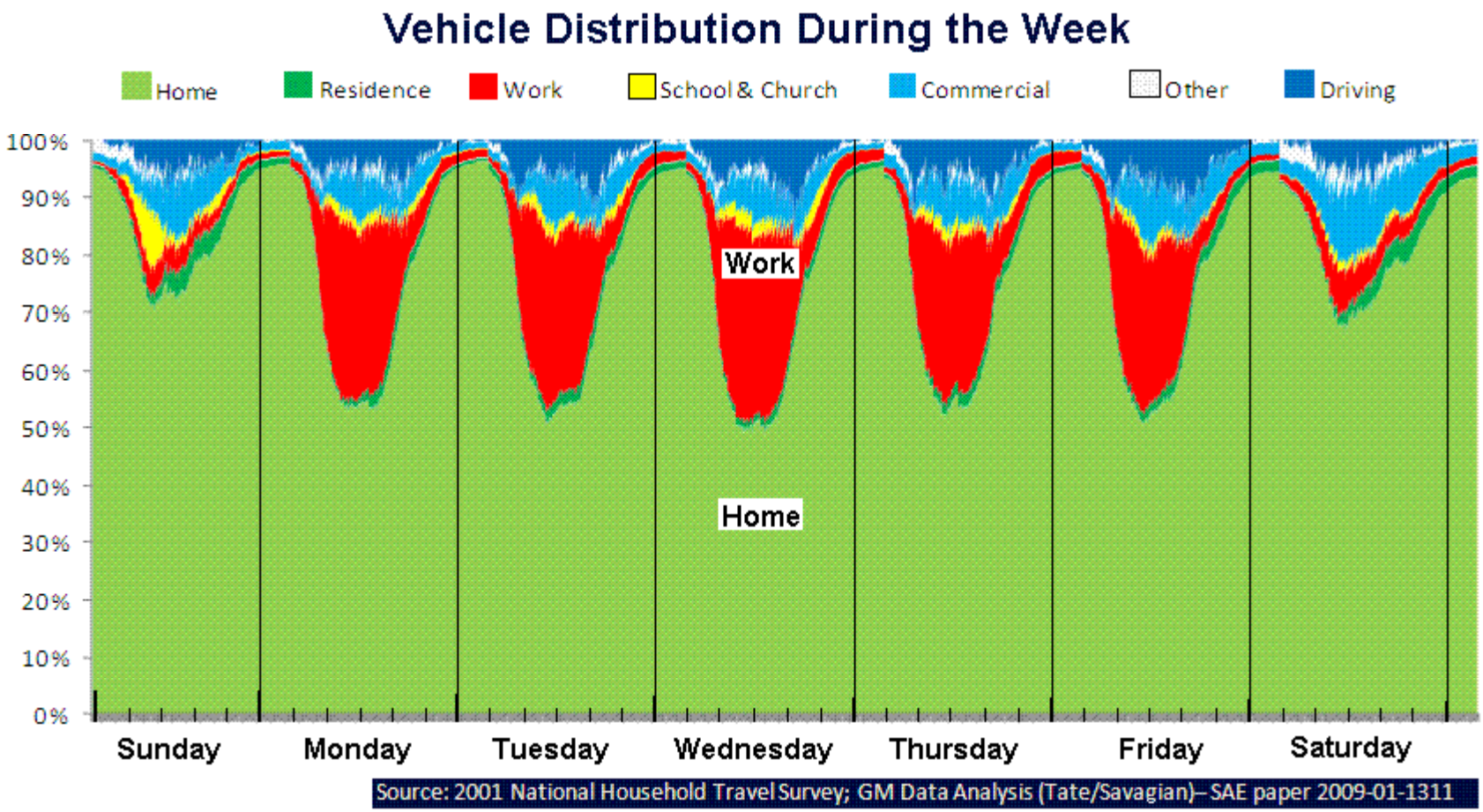
Where are the Cars?



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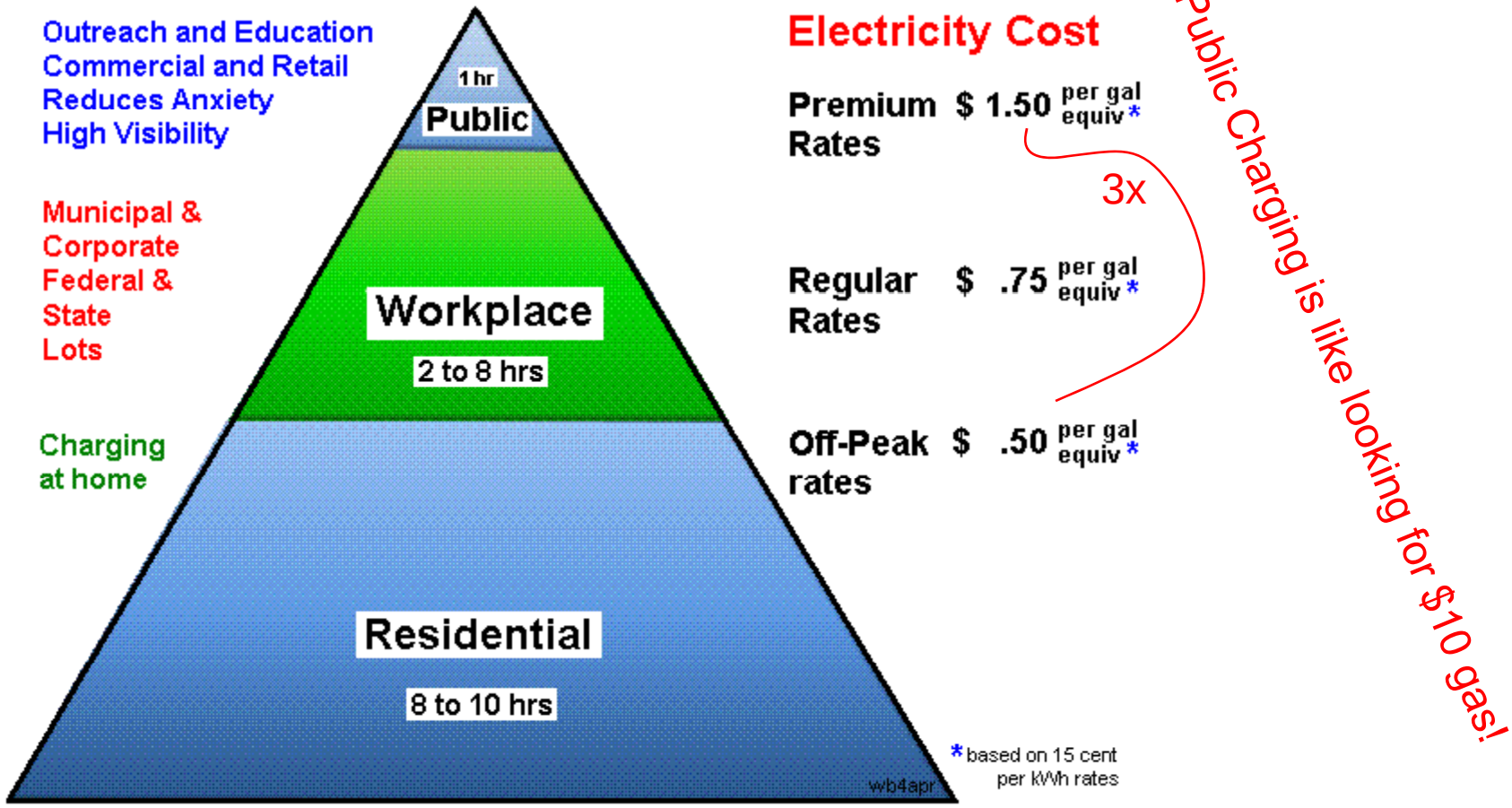
Why not Charge Them There?



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Where does EV Electricity come from?

43.5%	Coal
22.2%	Natural Gas
19.1%	Nuclear
8.9%	Hydroelectric
5.4%	Solar,Wind,Geo
0.7%	Petroleum

The truth is:

Most EV'ers buy an EV for the environmental benefits and to reduce fossil fuel dependency.

So, many, (1/3rd) install Solar or Wind, or sign up for Clean Currents or other zero fossil fuel electricity source.

RESULT Today for EVs:

37 %	**Solar,Wind,Geo**
16 %	**Natural Gas**
8 %	**Nuclear**
7 %	**Hydroelectric**
31 %	**Coal**
0.5%	**Petroleum**

And it will only get better!

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Charging at Home

Level-2 gives 2 hr charge

- 67% of all Americans live in single family homes
- That's 205 million potential chargers.

Level-1 takes 8 hr charge
(overnight and at work)

$300 cord comes with all EVs and Outlets exist

$3000 installed

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Charging at Level-1

Every EV comes with a standard 115v charging cord!

Instead of showing
Hours to charge at L1:

Vehicle	Hours
Prius PHEV	4
Volt	11
Leaf	17
Tesla	36

Show L1 Miles in 8 Hrs:

Vehicle	Miles
Prius PHEV	15
Volt	32
Leaf	32
Tesla	32

Double this L1 range by charging at home and work

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Charging at Work:

- Level-2 charges 32 mile trip in 2 hours.
- Level-1 charges 32 mile trip in 8 hours.

L2

L1

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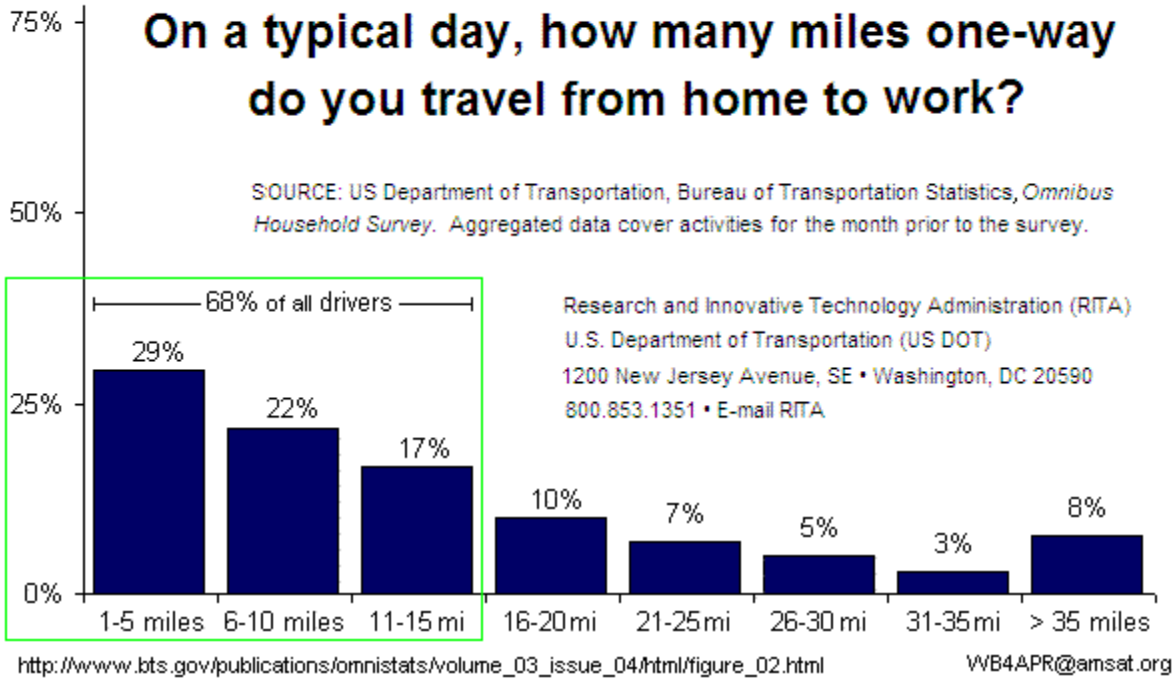
Charging at Work:

- Employees cars sit for 8 hours. Why not charge?
- 75% of all commuters drive to work less than 20 mi



Charging at Work L1 for Early Adopters:

- Many outlets already exist
- Just give us permission to. . .

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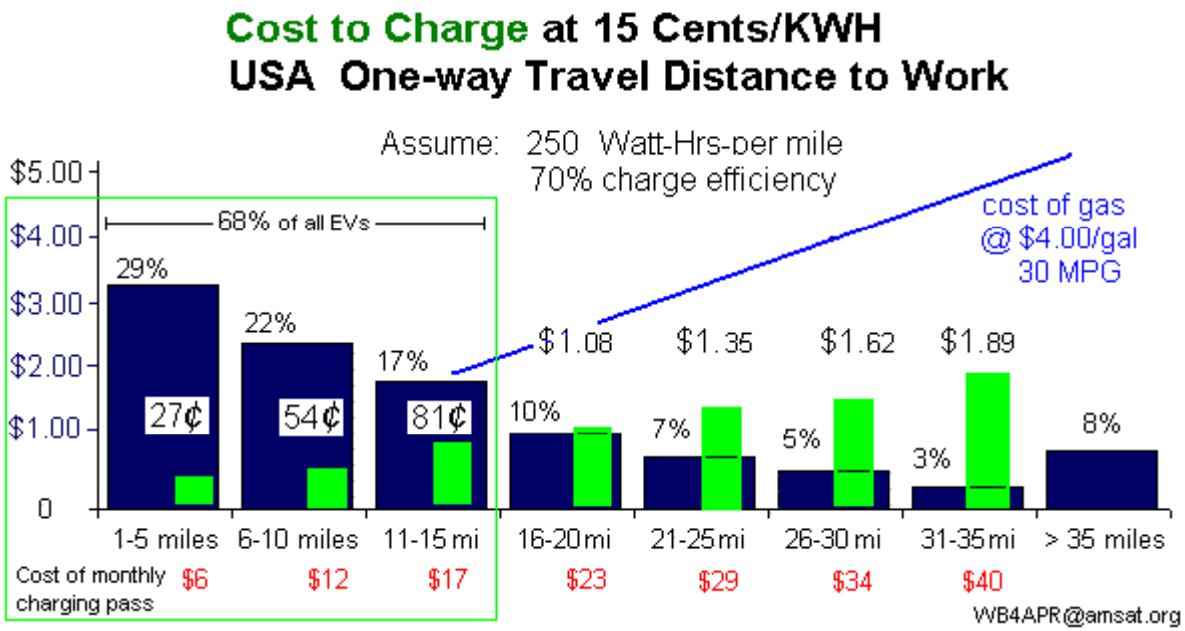
Charging at Work at L1:

- Charging for 8 hours:
- 75% of all commuters (<20 mi) could charge for < $1/day



Charging at work L1:
Payin-to-Plugin

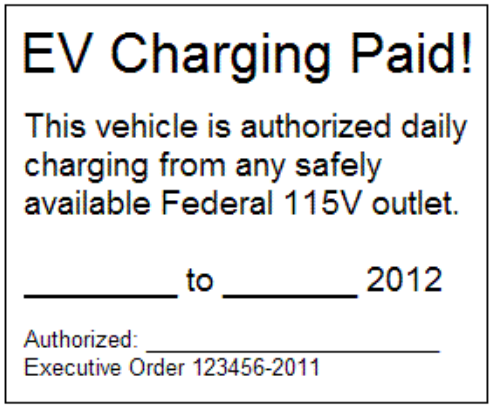
Simply let us purchase a monthly Charging Pass for the same cost of 8hr charging per day.

About $12 to $24 per month for 10 to 20 mile commuters.

Until a formalized placard system is in place, local copier forms may be issued by local Pass-and-Tag offices (shown below).

$12/mo

For 10 mi commute



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Charging at work L1:
Payin-to-Plugin

Cannot be abused!

- 115v charging cord & outlet limited to 12 amps
- Employees arrive 1-way from full charge at home
- Cannot Draw more than $1.50 in 8 hours
- Cannot grab-and-run… takes 8 hours!
- Beyond full charge, no more power can be drawn
- Government, State and Corporate parking controls already exist
- As easy to monitor as Handicapped or other illegal parking

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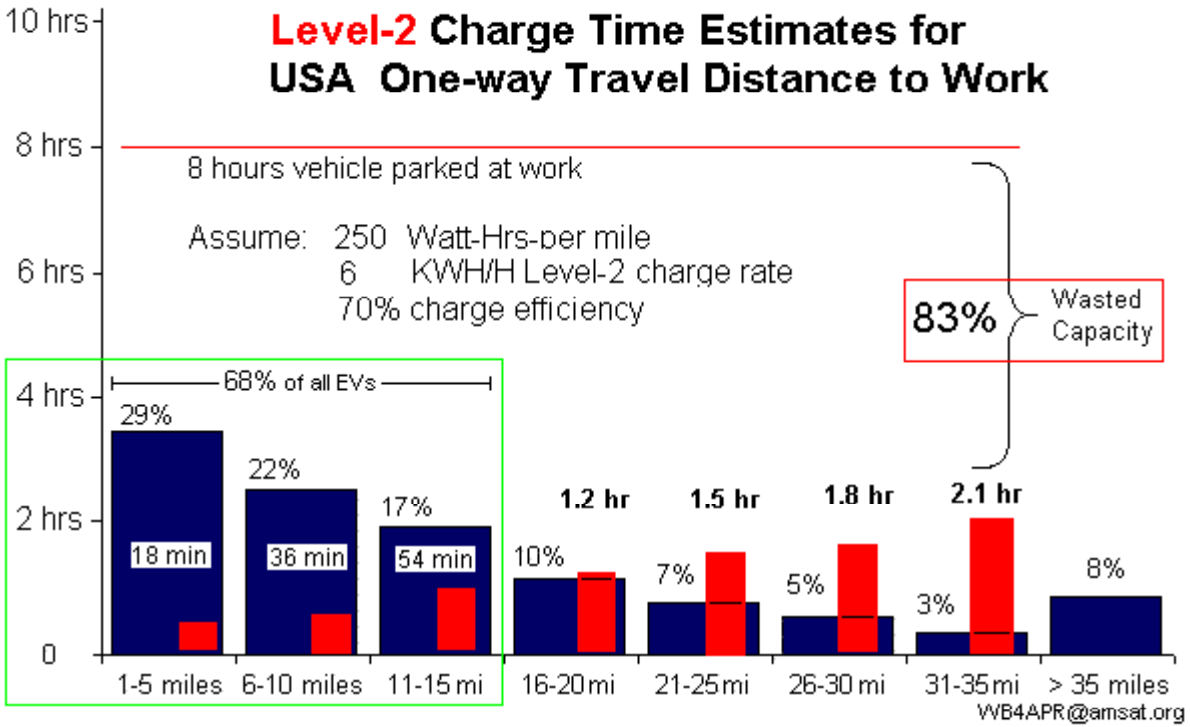
Charging at Work L2:

- 75% of all commuters (< 20 mi) could charge for < $1
- Meaning Level-2 chargers would be idle 83% of the time



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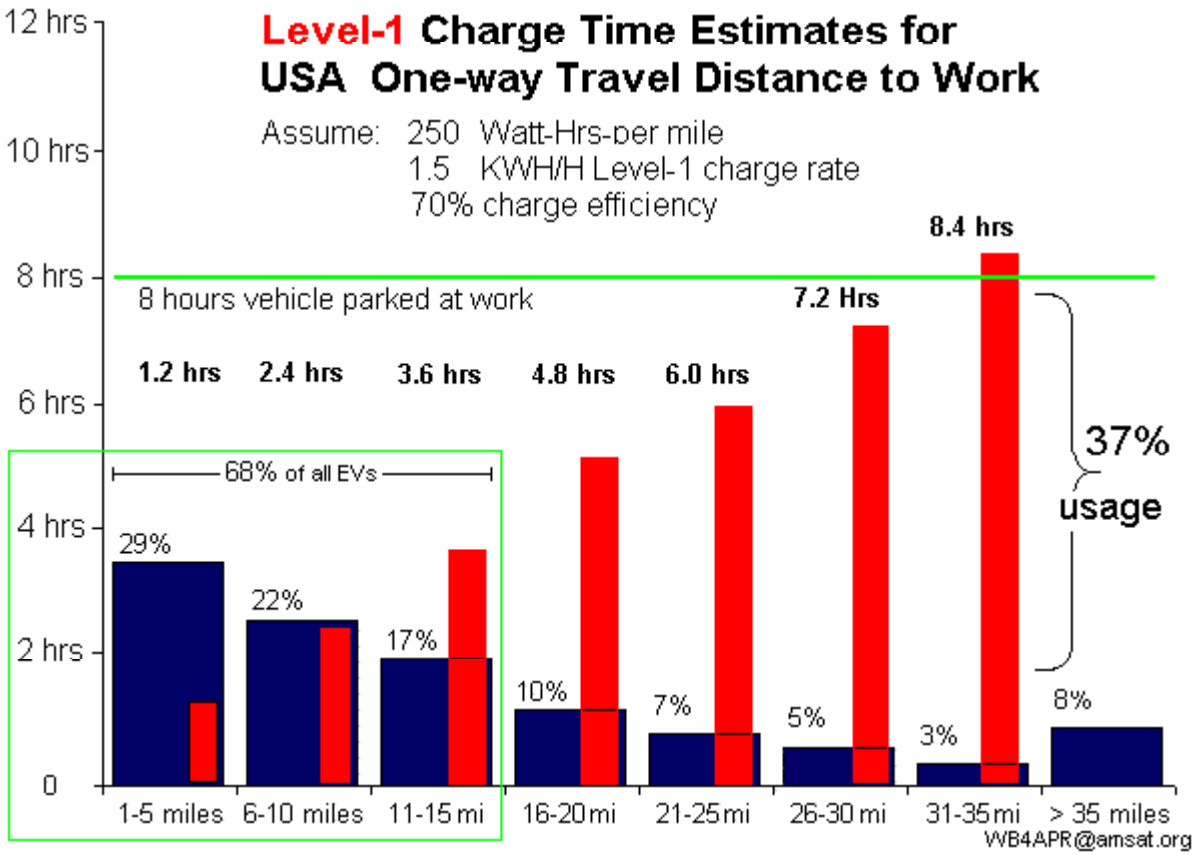
Level-1 can fully charge 92% of all commuters in 8 hours (at home & work)



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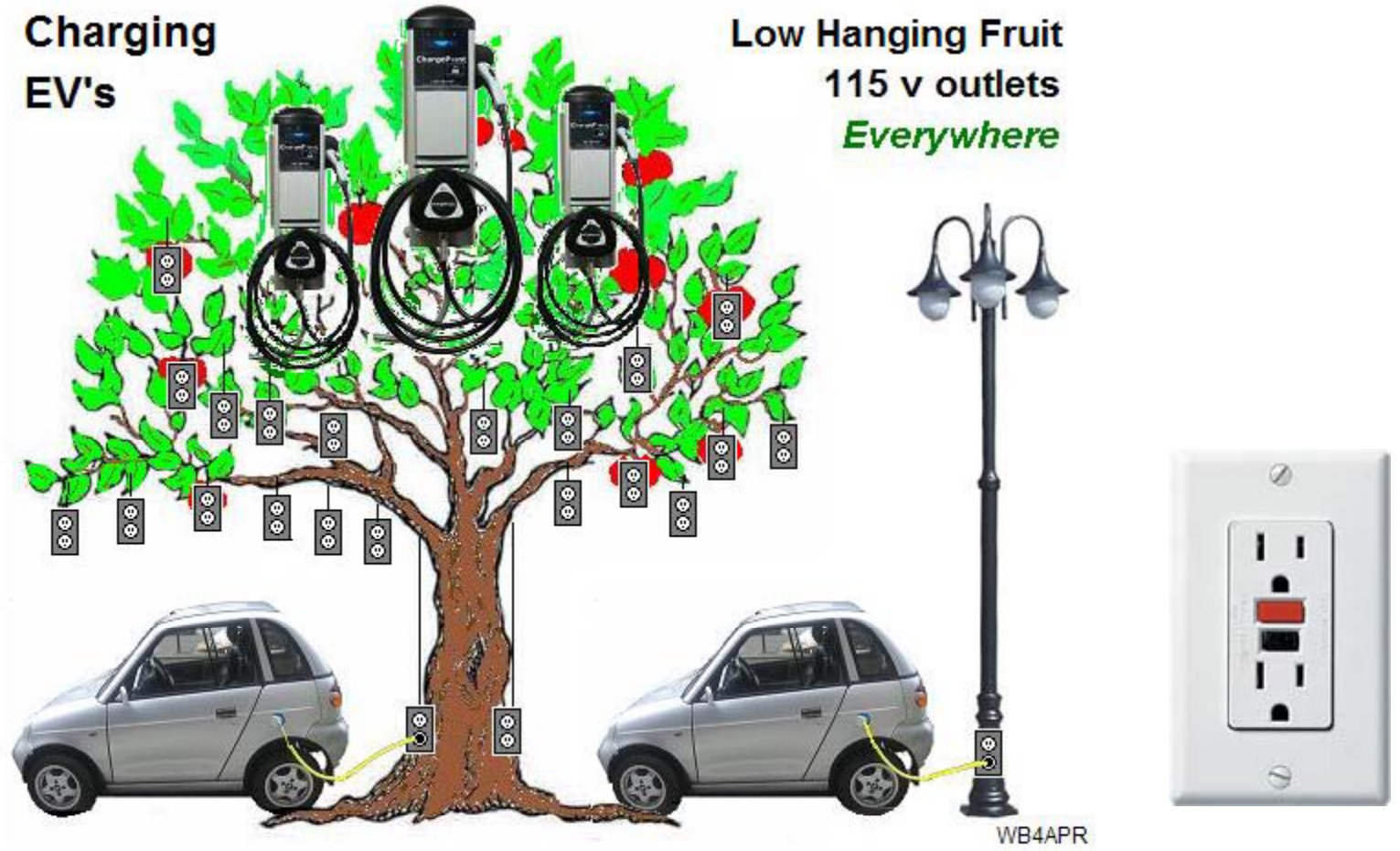
Many 115v outlets (L1) already exist!
This is the low hanging fruit of EV Infrastructure!



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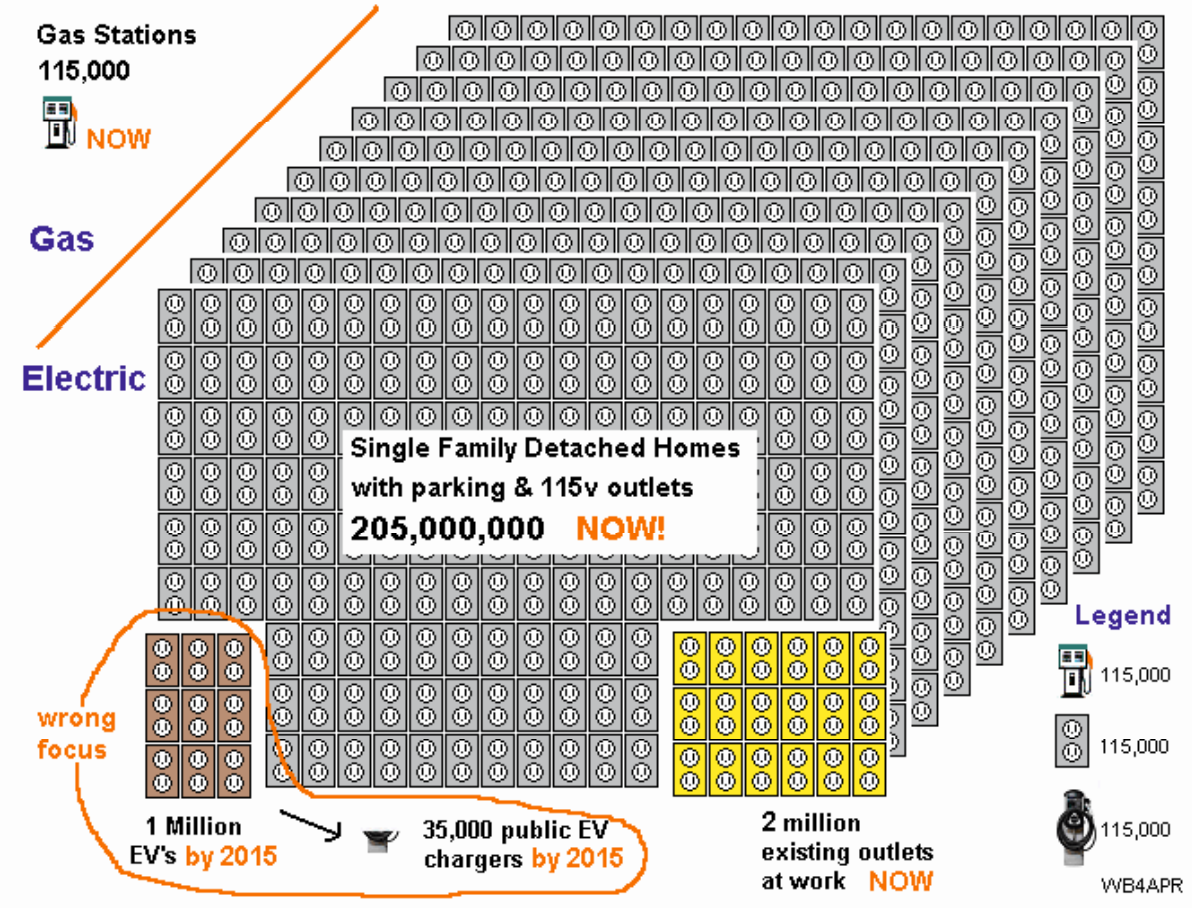
There are millions of 115v Level-1 outlets!



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L1 can charge 92% of Commuters and 115v outlets exist!

L1 charging should not be overlooked:

Five of the ideas for good battery life benefit by L1 charging:

1.* Avoid full charging when you can.

2.* Avoid deep discharging your battery pack.

4.* Minimize the time spent at a high state of charge.

6.* … plug in whenever you can.

8.* To maximize battery life, minimize use of DC quick charge.

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Charging Infrastructure Issues, concerns, Problems, Obstacles, & Challenges:

- Charging Equipment Cost
- Installation Cost
- New high current wiring Costs
- New larger circuit breaker box often required
- Metering (Payment System) Costs
- Neighborhood Clustering
- Neighborhood Utility Transformer upgrade
- Grid Loading
- Time-of-use and Peak Demands at Peak load
- Charging Speed
- High rates reduce battery life

Fact or Fiction?

Charging Infrastructure Issues concerns, Problems, Obstacles, Challenges:

Level 2 = FACT

- Charging Equipment Cost
- Installation Cost
- New high current wiring Costs
- New larger circuit breaker box often required
- Metering (Payment System) Costs
- Neighborhood Clustering
- Neighborhood Utility Transformer upgrade
- Grid Loading
- Time-of-use and Peak Demands at Peak load
- Charging Speed
- High rates reduce battery life

It depends on what you are talking about!

Level 1 = Fiction

Few Issues apply!

- Free - exists
- Uses standard wiring
- Costs from 50 cents to $1.50 / day
- No Utility issues. Same as a coffee pot
- Charge overnight at off-peak
- Best battery life

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Charging Infrastructure Issues concerns, Problems, Obstacles, Challenges:

We must clarify at every level of discussion and Public Policy,

WHAT WE ARE TALKING ABOUT

Level 2 FACTS

Lots of Issues

Level 1 Facts

Few Issues apply!

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EV Incentives, Help ?

- Federal and local tax credits for purchase.
- HOV lane and other incentives.
- Prime parking spaces.
- Incentives for charging stations.

- Just being good for You and the Planet

What Else?

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EV incentives at Work ?

- Can we get Permission to Plugin?
- Why can't we Payin-to-Plugin for Electricity used?
- Do we wait for an act of Congress or Legislature?
- No. We simply need an executive order!

From the President, Governor, Mayor and/or CEO

Costs Nothing to Implement!

Doubles range of all EV's instantly

Easier to manage and lower loading

Eliminates most Charging issues

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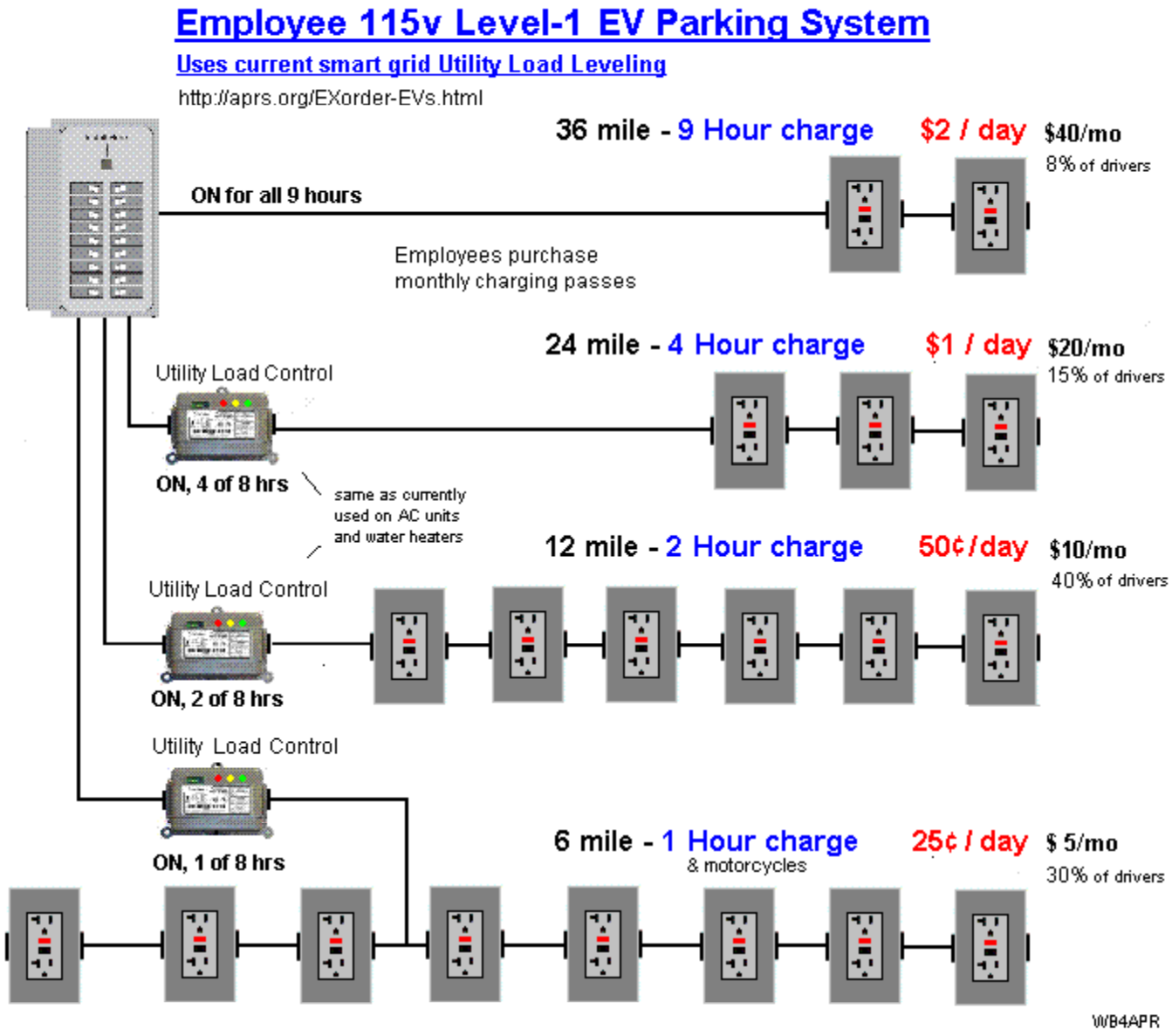
Easy to add L1 charging in Daily Parking lots at a flat rate of $1/day added to Parking Fee



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It should be noted, however, that the EV Owner's desire to Charge-at-Work is counter to the Utility's desire for all EV charging at-Home during off-peak.

But this CAN BE MANAGED as shown in the previous slide by centralized load control by the utilities, and this is easier to implement in bulk at Employer installations than at every home.

But unless we talk about L1 charging, nothing is going to happen!

Need More info?

http://aprs.org/payin-to-plugin.html

Get a Gold Star for your Boss

Enacting Payin-to-Plugin is a WIN-WIN for him

If you have success where you work,

let us know!

Others will follow!