



# **Do You Mind if I Plug-in My Car?**

## **How etiquette shapes PEV drivers' vehicle charging behavior**

Nicolette Caperello

Dr. Kenneth S. Kurani

Jennifer TyreeHageman

# Research Question

- Does a lack of etiquette appear to inhibit PEV charging?
- Etiquette: defines correct and acceptable behavior within specific social interactions. Etiquette may differ by interaction, as well as across societies, cultures, and groups.

# Methods

- **Setting:**
  - March & April, 2012
  - San Diego County, California
  - 28 household interviews
  - 1-2 hours long
- **Sample:**
  - PEV driver recipients of the California Clean Vehicle Rebate
  - Own or lease a PEV, mostly Nissan Leafs
  - Most had a 220/240V (Level 2) home charger
  - Homeowners selected on: income, age, gender of the primary driver, employed and retired, home solar photovoltaic system or not

## 5 Etiquette Experiences

1. Do you mind if I plug-in my car?
2. Attempting to create charging etiquette
3. Charging etiquette conflicts between car owners and car sharers
4. PEV drivers create rules and etiquette to manage charging at work
5. Discontent with employees using 'customer' public chargers

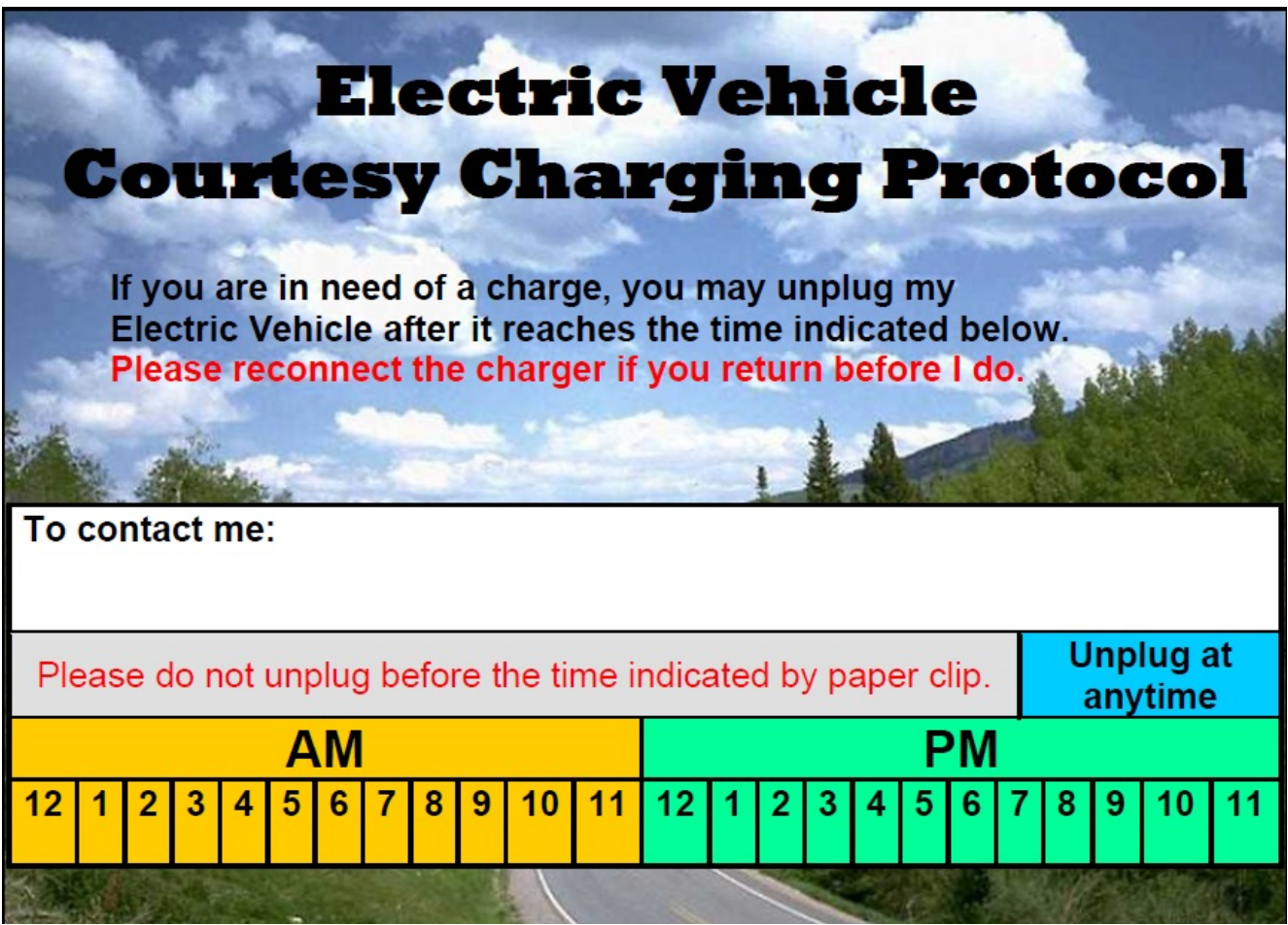
# 1. Do you mind if I plug-in my car?

- At the end of a long day of errands Sunshine found her PEV nearly out of charge, far from home, and no idea where the nearest charger was.
- “I’m thinking, what am I going to do. Then [another] Leaf went the other way. I followed them home and begged them to use a little charge and they were great.” Her husband chimed in, “You gave them \$5.” Sunshine added, “I did, I did. I was so happy.”
- Sunshine knew no etiquette to dictate if or what she should pay, she offered \$5 which the other PEV owner readily accepted for a 20 minute charge.

## 2. Attempting to create charging etiquette

- Many PEV drivers expressed frustration regarding the lack of etiquette for public charging. They weren't sure if or when they could unplug another PEV so they could charge theirs or how to contact another PEV driver whose vehicle was parked at a charger.
- At a meeting organized by local PEV drivers, Floyd and Sunshine were introduced to a method of between-driver communication developed by PEV drivers in the 1990s.
- Floyd and Sunshine were thrilled to learn this etiquette and acquire the tool to implement it. But once they had it, they were disappointed that almost no other PEV drivers were using it.

# 2. Attempting to create charging etiquette



**Electric Vehicle  
Courtesy Charging Protocol**

If you are in need of a charge, you may unplug my Electric Vehicle after it reaches the time indicated below.  
**Please reconnect the charger if you return before I do.**

To contact me:

Please do not unplug before the time indicated by paper clip.												Unplug at anytime											
AM											PM												
12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11

### 3. Charging etiquette conflicts between car owners and car sharers

- Julie explained the shared-car PEVs were being parked and charged in spots she perceived to be for “public” charging. In frustration, she wrote to the president of the car-share company, “You need to be able to support your business. You need to buy chargers... To make it so no one else can use [public] chargers because your cars are parked there 24/7—it’s not okay.”
- Household PEV drivers were irritated because car-sharing users were monopolizing what the households perceived to be a public resource.



## 4. PEV drivers create rules and etiquette to manage charging at work

- PEV drivers created a system of rules for charging at their workplace. The primary rule was “first come, first serve,” but is subject to conditions.
- Phil explained that the PEV drivers developed a Wiki to communicate with each other, “There’s how to deal with charging, the etiquette...questions about when spots are available and people talk about the [charger] software, what to expect as a new driver, vacating a spot, plug in whoever is on deck. It’s all a little community.”

## 5. Discontent with employees using 'customer' public chargers

- David explained, “There’s always a silver Leaf [parked in the PEV charging space]. I went in the morning and I had to go back in the afternoon...and there’s the car...charge is complete. Well I went back purposely that evening and the car was still there; I realize it’s an employee. So now not only are you competing with other [PEV] owners and [shared-car PEVs], you now have the employees who have a [PEV] and are going to park their car there all day. It’s like waiting in line at Disneyland. Are you willing to wait 2 hours to get on?”
- He is frustrated that there are no limits on charging in “public” and believes it is bad etiquette to leave a car at a charger all day especially if the car has finished charging.

# Discussion and Implications:

## What does this mean for the future?

- PEV drivers want widely shared, understood, and practiced charging etiquette, rules, and other guidelines to feel comfortable and confident in charging away-from-home.
  - They want to be certain of what to expect and know how to navigate different charging situations.
  - A lack of shared and practiced rules inhibits use of away-from-home charging. We are not able to estimate the size of the effect based on this study.

# Discussion and Implications:

## What does this mean for the future?

- Many PEV drivers in this study want a reservation system to secure access to a public charger at a specific place and time.
  - Without such a reservation system, it is possible that etiquette will be just as important after more formal rules are imposed as charging shifts from a free convenience to a paid service.

# Discussion and Implications:

## What does this mean for the future?

- This study was completed at a time when public charging was free to these PEV drivers. Billing for access to public charging started in the meantime, and will likely impact public charging behavior.
  - Having to pay for charger access may necessitate such a reservation system and replace uncertainty in etiquette with more steadfast rules or regulations.
- The new expectations and rules that apply because a financial transaction is now required for more and more public charging may simply open whatever existing etiquette there is to re-examination and renegotiation, i.e., a new round of uncertainty about the rules.