

**Value of EVs as Bidirectional Energy Storage**  
**Resiliency – Renewable Energy Integration – Infrastructure ROI**

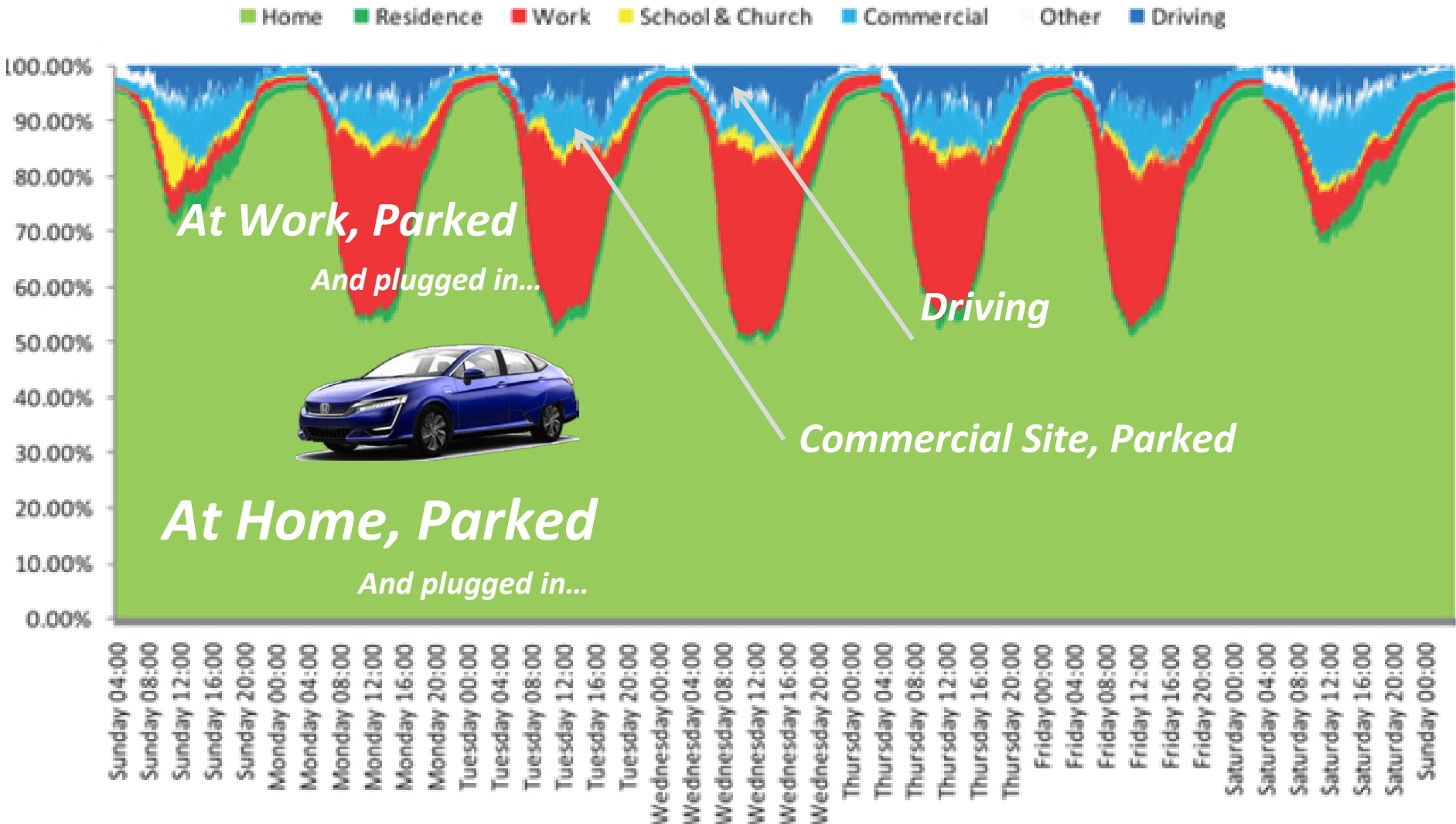
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# Opportunity of Vehicle to Home / Load / Grid (V2X)

*Where are the cars at any given time?*



**V2X Improves Value and Utilization of EVs for Resilience, RE, and Infrastructure**

# HONDA V2X Enables EVs as Resiliency Resource – Vehicle to Home / Load / Grid

Energy Storage Resource – V2H / V2G – Honda Smart Home US at UC Davis

[Hondasmarthome.com](http://Hondasmarthome.com)



Installed 2014. V2H 2016. V2G 2018.

**100% ZNE for Living + Transportation**

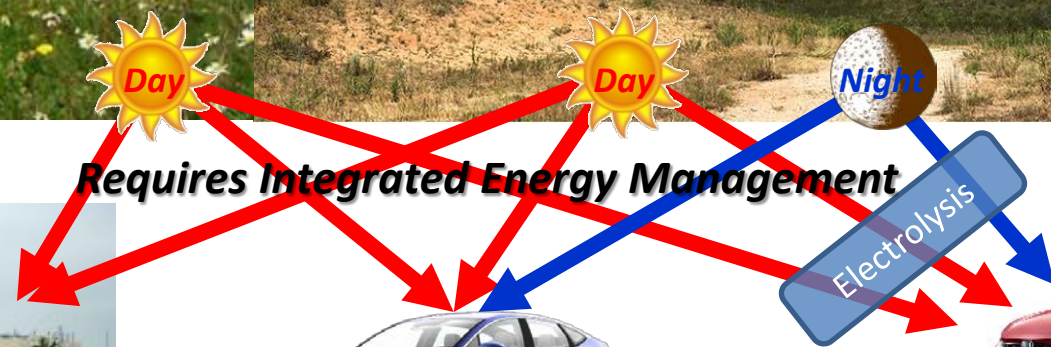
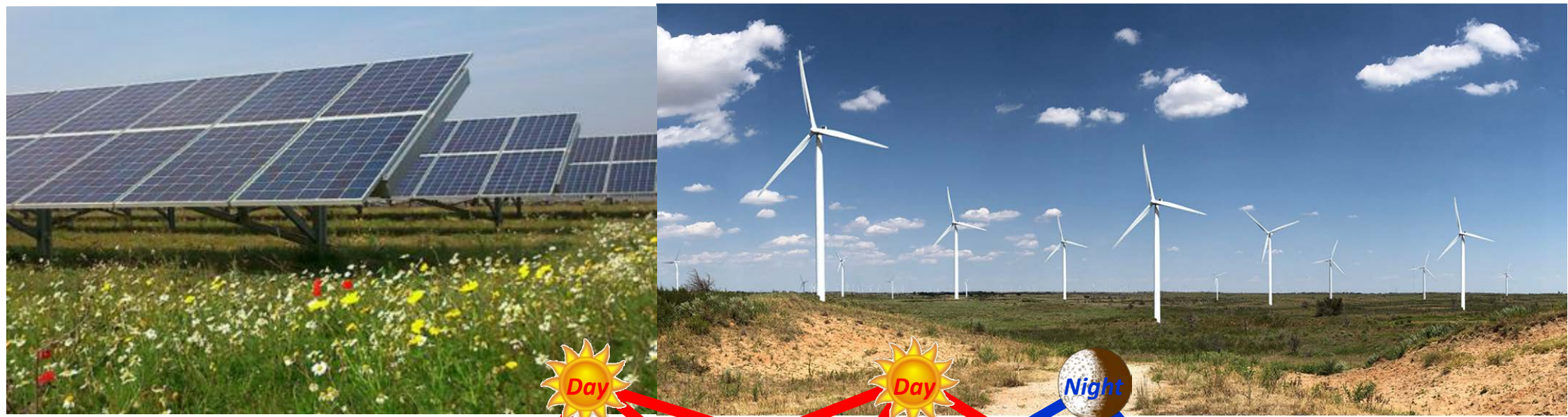
## Power Exporter for V2L, V2H



**V2X Provides Energy Resiliency - At Home and At Play**

# V2X Enables Vehicle-Grid Integration for Renewable Energy

*Renewable Electricity Can Supply Electric and Transportation Energy Systems:*



**Requires Integrated Energy Management**



**Electricity**



V1G = Charge Timing Control  
 V2G (future) = Bidirectional Power Transfer

**Electricity**

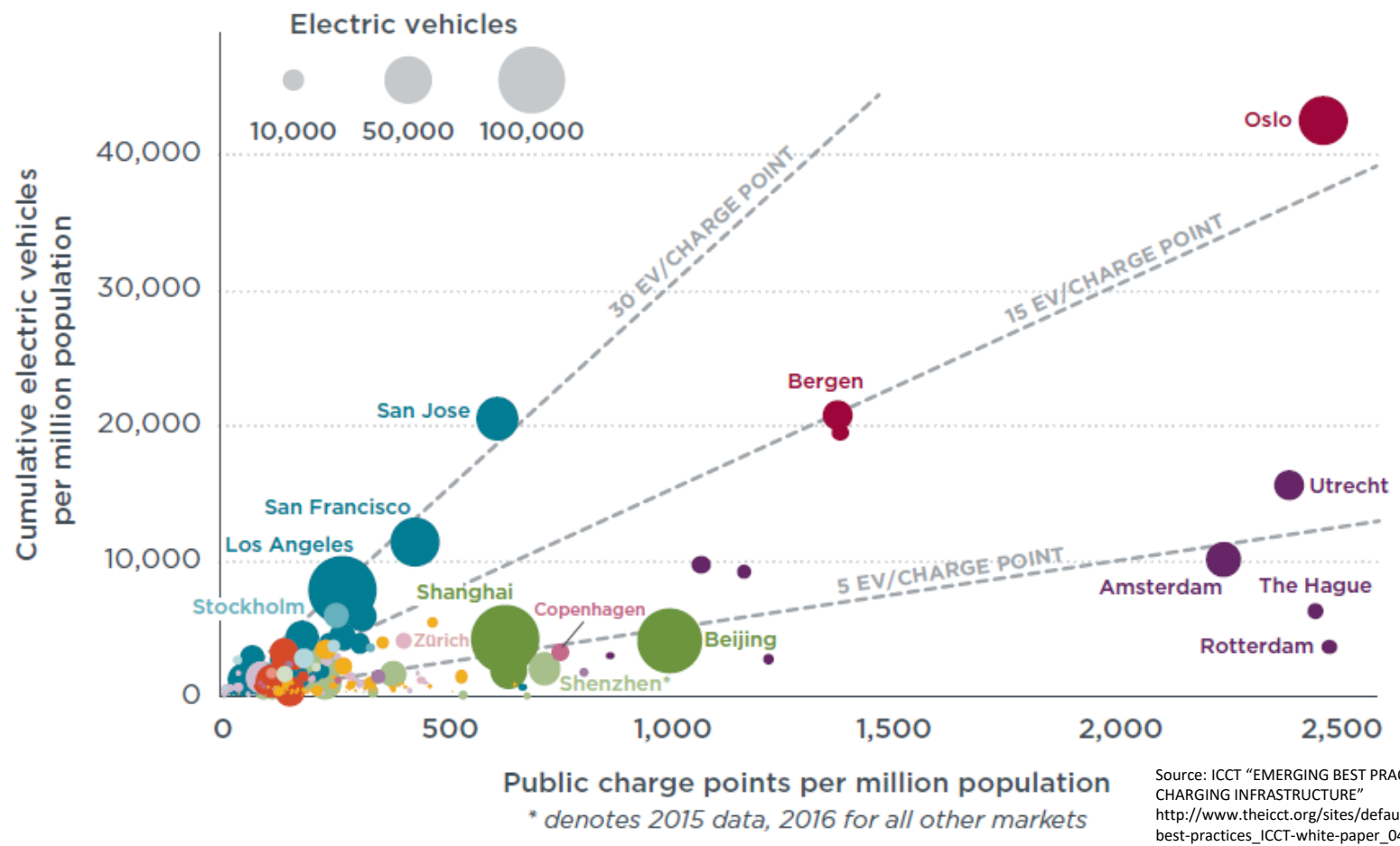


Massive Energy Storage  
 Seasonal Energy Storage  
 Decouple Generation and Use

**Hydrogen**

**V2X Improves Renewable Energy Integration**

# Charging Infrastructure is Very Important to Promote EV Adoption



***In any market with consistent policy, EV adoption tracks Charging Infrastructure Investments***

**Figure 2.** Public charging infrastructure and electric vehicle registrations per million population by metropolitan area, with size of circles indicating total electric vehicles.

**V2X Improves ROI for EV Charging Infrastructure. Positive ROI Promotes Investment.**