

A wide-angle, nighttime photograph of a city skyline, likely Denver, Colorado, viewed from an elevated position. The city lights are visible against a dark blue twilight sky. The foreground shows dark silhouettes of trees and a road.

# The Rocky Road to Shifting Load

Challenges of Installing Advanced Energy Storage and EV Chargers



# Overview

Why does it matter?

Smart Home Study

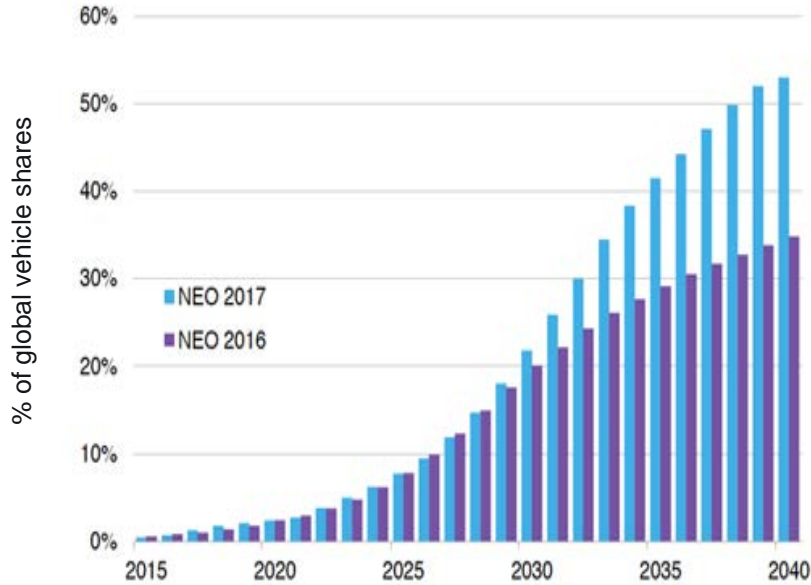
Equipment

Customer selection and preliminary sites

Reasons for installation failure

# INCREASE IN EV AND AES ADOPTION

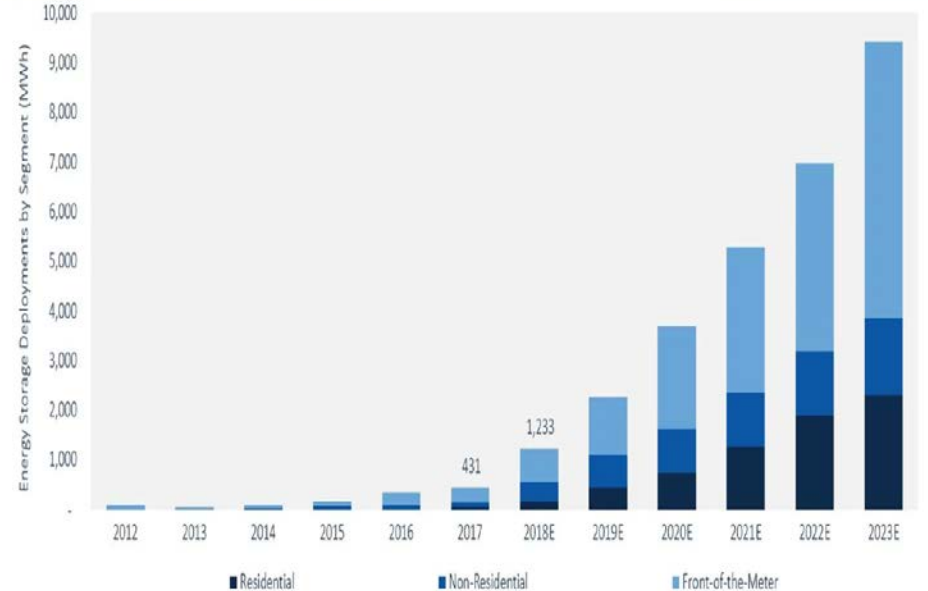
Project % of global vehicle shares attributed to EV's



Source: Bloomberg New Energy Finance

US annual expected energy deployment

U.S. Annual Energy Storage Deployment Forecast, 2012-2023E (MWh)



# SMART HOME STUDY



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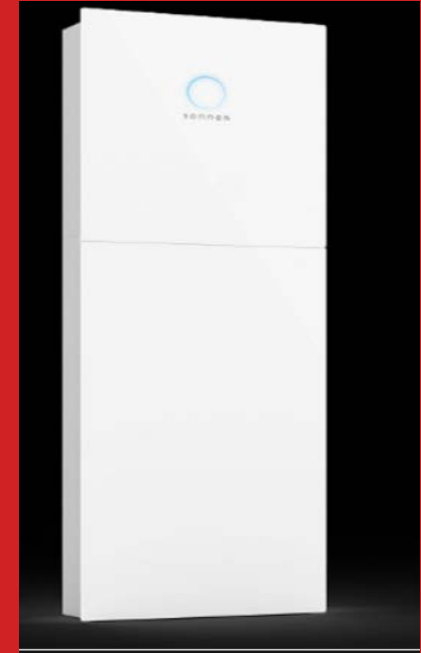
100 houses in San Diego



Smart Thermostats



Level 2 EV chargers



AES

# SMART HOME STUDY

Tier	#Participants	Equipment Received
Tier 1	50	Smart Thermostat
Tier 2	20	Smart Thermostat + EV Charger
Tier 3	20	Smart Thermostat + AES system
Tier 4	10	Smart Thermostat, EV Charger and AES system

# PATH TO INSTALLATIONS

AC	PV	EV	Storage	Target Number	Applicants	Preliminary Sites	Installed Sites
Yes	Yes	Yes	Maybe	6	19	18	11
Yes	Yes	Yes	No	14	114	50	34
Yes	Yes	No	Maybe	20	19	18	18
Yes	Yes	No	No	48	157	60	28
Yes	No	Yes	Maybe	4	1	1	1
Yes	No	Yes	No	8	43	18	8
<b>Totals</b>				<b>100</b>	<b>353</b>	<b>165</b>	<b>100</b>

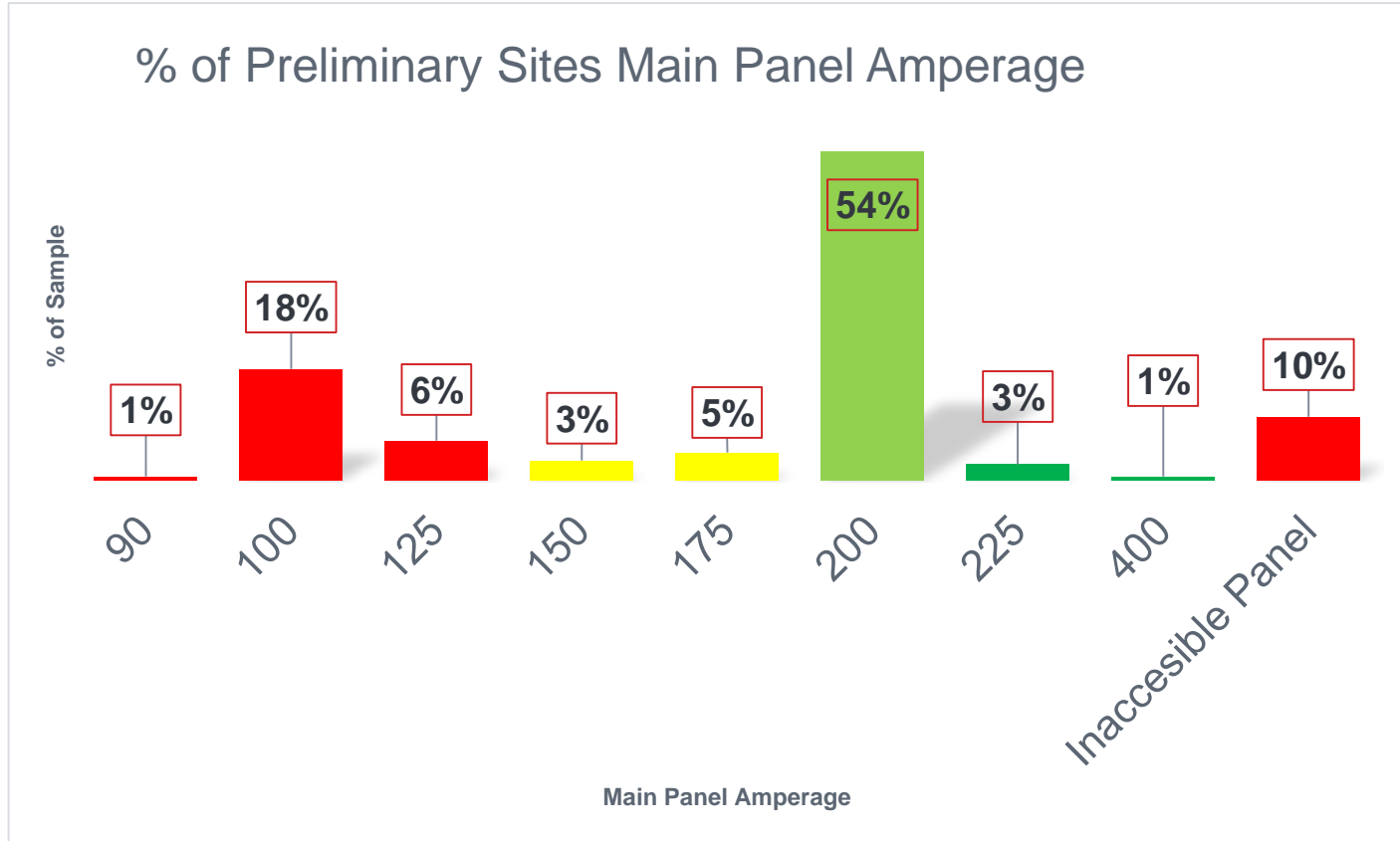


# Challenges to Installing AES and EV chargers

1. Main electrical panel capacity
2. Physical space in panel and garage
3. Incompatible system



# MAIN PANEL AMPERAGE



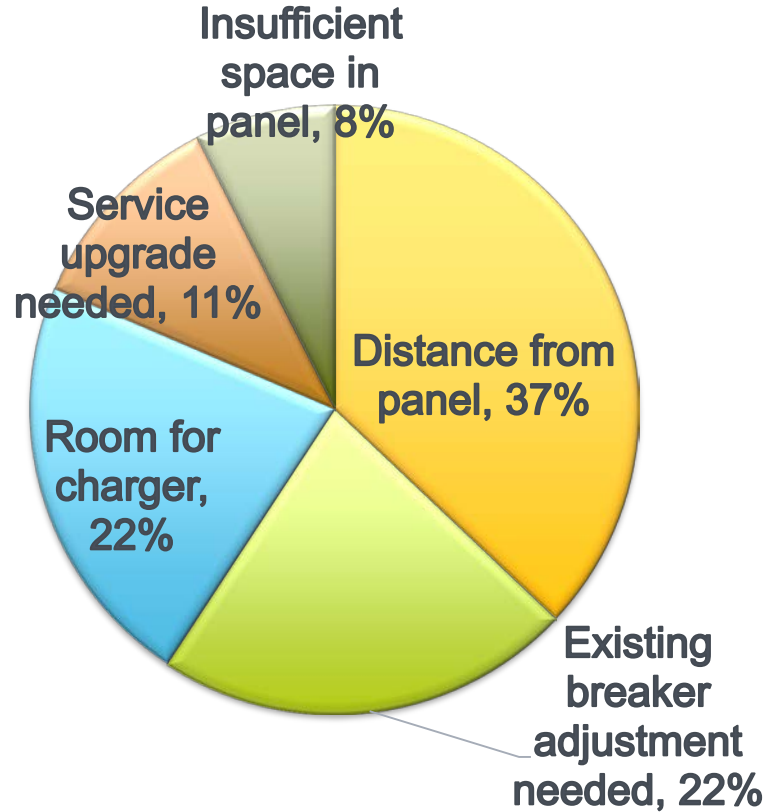
# PHYSICAL SPACE IN PANEL



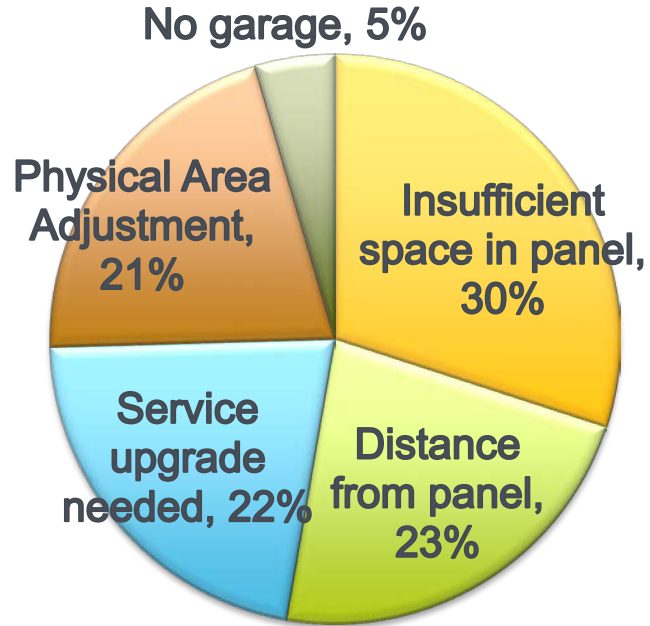
# INSTALLED EQUIPMENT



# EV CHARGER ISSUES



# BATTERY ISSUES





# Conclusion

Limiting Factors include

- Residence type
- Building age
- Breaker panel
- Physical space



# Recommendations

Prepare any programs with these thoughts in mind  
Provide some incentives toward upgrade costs



**Questions?**





# THANK YOU

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