# Smart Principles for EV Infrastructure Investment

## Advanced Energy NY Conference

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Greenlots Background

What we do

# Leading provider of EV charging technology and solutions

## EV Charging Network Operating Platform

- Network management
- Dynamic pricing
- Smart charging software
- Open Standards

## Turnkey EV Charging Deployment

- Hardware agnostic
- Site identification & design
- Operation & Maintenance

## Advanced Grid Services

- Demand response
- Load-side grid management
- DER Integration
- Ancillary services

# Example Clients & Partners

LA DWP
SMUD
AVISTA
Hawaiian Electric Company
pepco
SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company
PG&E
Seattle City Light
PGE
AES
Southern Company
BC Hydro
SDGE
A Sempra Energy utility

LAX
Los Angeles World Airports
bp
NEW YORK STATE OF OPPORTUNITY. Thruway Authority
SUNOCO
ADP
CITY OF LOS ANGELES FOUNDED 1781
NTP TURNPIKE
NATIONAL PARK SERVICE
COUNTY OF SIMCOE
KAWARTHA LAKES
OXFORD
Toronto Parking Authority
Propark AMERICA

KIA
NISSAN
BMW
Ford
electrify america

greenlots

Electrify America

# $2B Investment in Building US Charging Infrastructure


## Community-Based Charging

Greenlots selected to deploy **900** stations in eight cities at more than **140** sites

## Nationwide Fast Charging Network

Greenlots selected to provide the network operating platform to manage **2000+** high power chargers across the US

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# LAPD Fleet Charging and Load Management

## PROJECT OVERVIEW

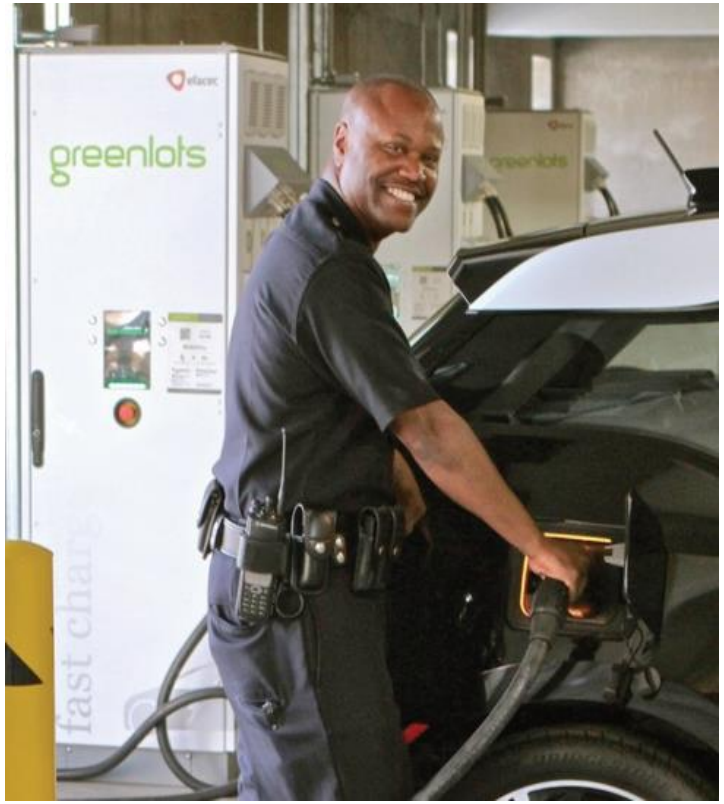
The City of Los Angeles has a target of 50% of new city fleet vehicles to be electric by 2017 and 80% by 2025.

- LAPD is the largest fleet in the city and the first department to “go electric” with the first 150 BMW i3s out of 500 EVs in total
- Building on open standards allows HW to be selected based on specific site requirements
- Greenlots was selected to provide 100 L2 and 4 DC Fast Chargers at one location with DR capabilities

## KEY BENEFITS

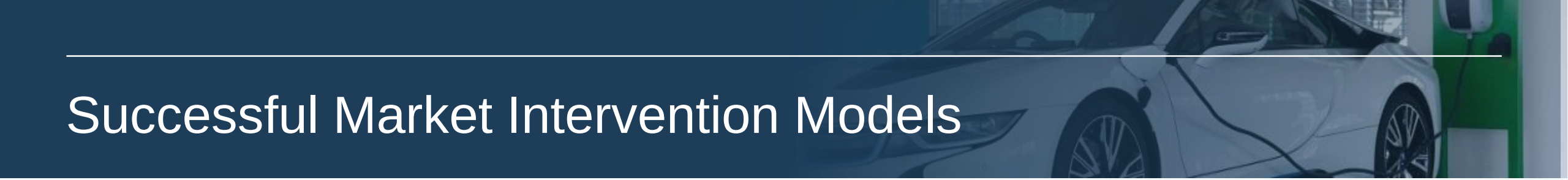
Load management avoids electrical infrastructure upgrades and reduces demand charges.

- Responds to real-time electricity demand of building
- Charge optimization and prioritization ensures vehicles are charged when they are needed
- Fleet reporting tracks fleet data, operating cost and efficiencies of an all electric fleet.
- Rolling out charging infrastructure at 25 facilities across city



# Market Intervention Options

# Successful Market Intervention Models



Successful Models

- Public DC Fast Charging
  - Incentives to Host or Developer
    - ?
    - greenlots
  - Utility Ownership
    - Hawaiian Electric
    - OGE Energy Corp.
    - Georgia Power
    - SMUD
    - LA DWP
    - Seattle City Light
- Level 2 Use Cases
  - Incentives to Host or Developer
    - Pacific Gas and Electric Company
    - Southern California Edison, An Edison International Company
    - electrify america
  - Utility Ownership
    - SDGE
    - KCP&L energizing life
    - Avista
    - Pacific Gas and Electric Company

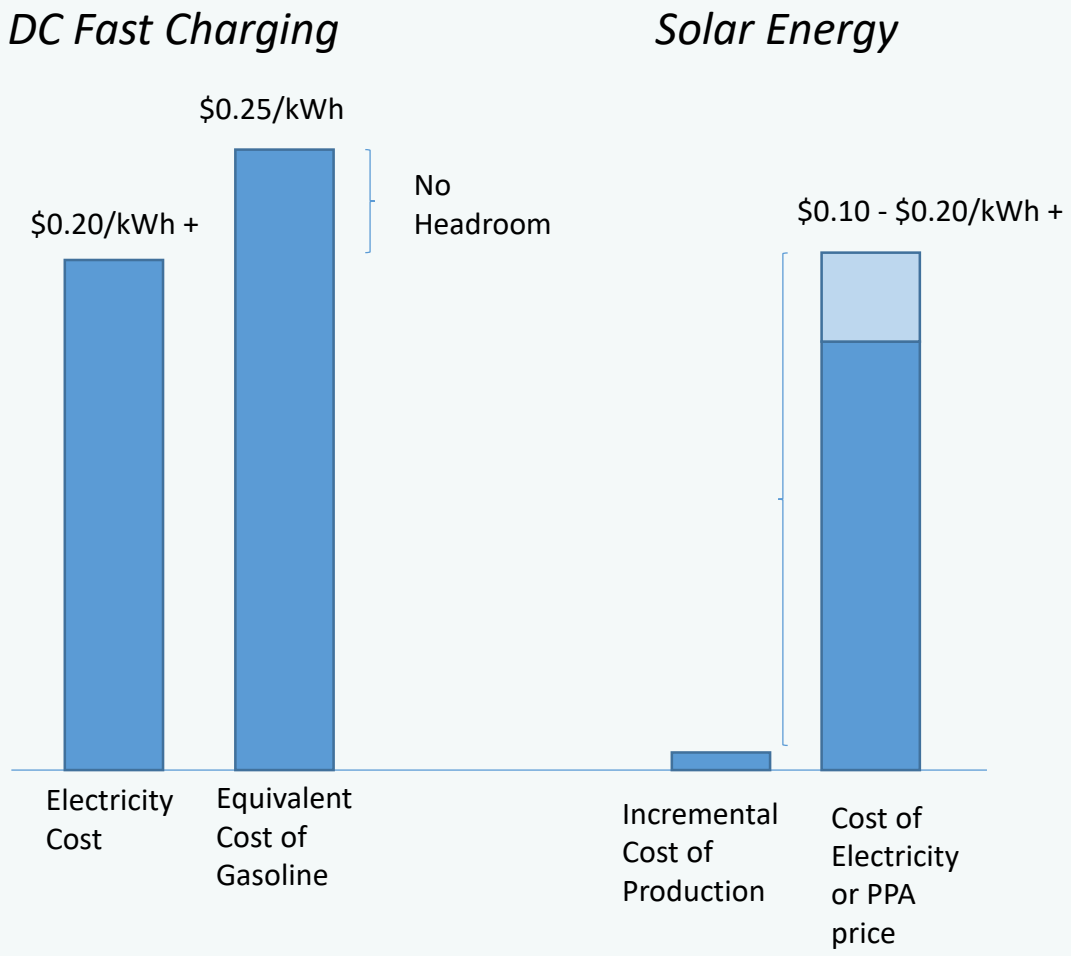
# DC Charging Economics

**Levelized Cost of DC Charging**

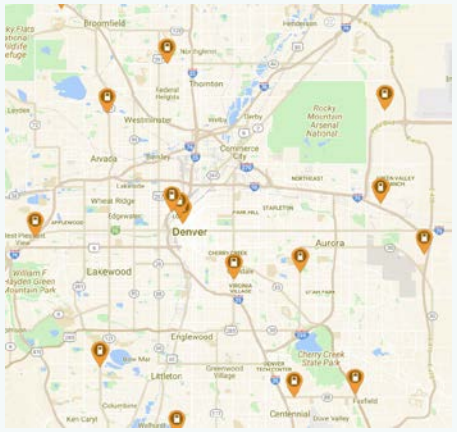
Assumes 16% utilization rate, 10% load factor and 10% pre tax cost of capital

| Cost Element | $/kWh | Notes |
|---|---|---|
| Site ID and Development | $0.06 | Assumes $30k for every 100 kW |
| Construction | $0.20-$0.30 | Assumes $100k - $150K for every 100 kW |
| Parking Fees | $0.02 | |
| Maintenance/ Network | $0.02 | |
| Electricity (including demand charge) | $0.15-0.20kWh | |
| Total | $0.45-$0.60 | |

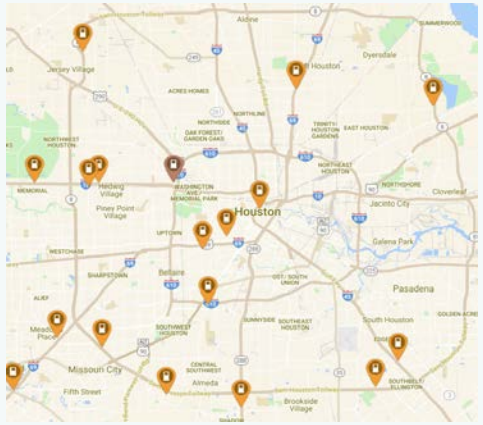
## Variable Economics to Owner AFTER Capital Costs



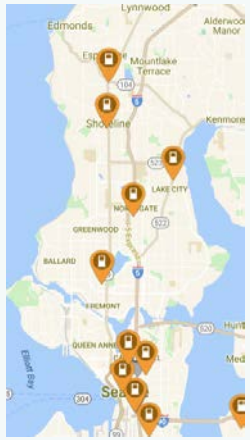
# DC Charging Station Population



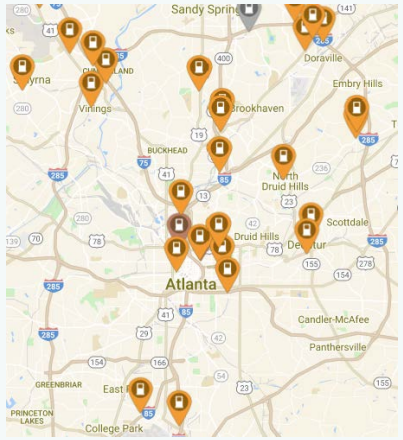

*Denver*



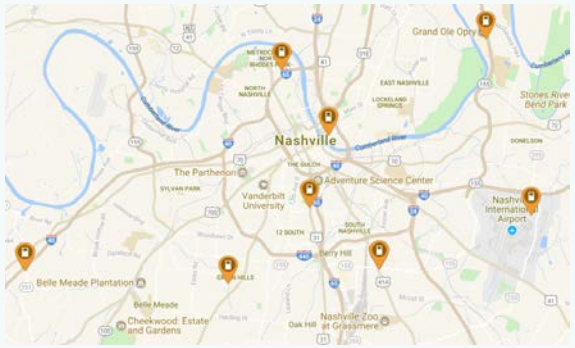

*Houston*



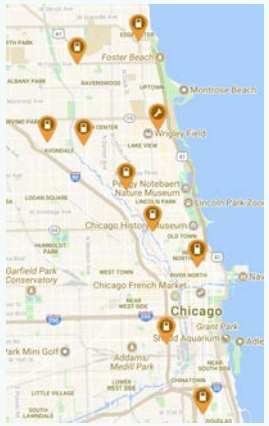

*Seattle*



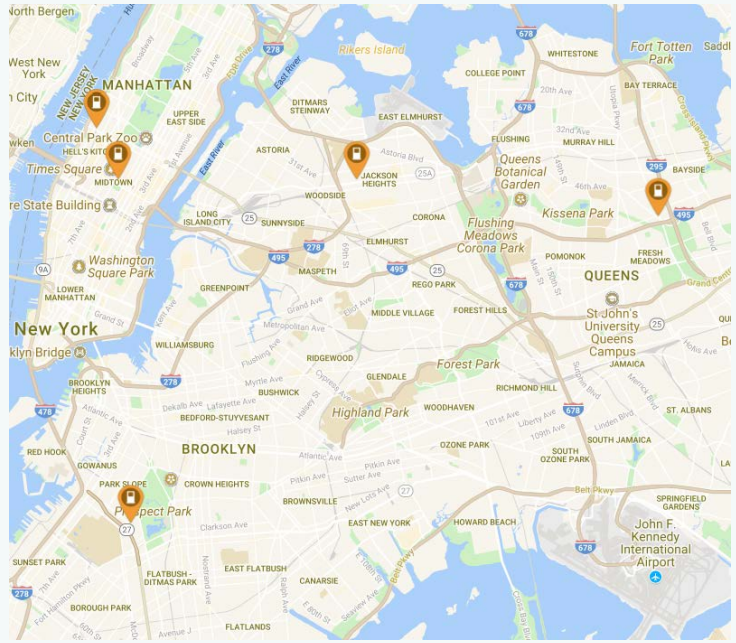

*Atlanta*




*Nashville*




*Chicago*




*NYC*

*Source: Plugshare*

# Important for REV to Adapt

- Make-ready/incentives for DC charging do not work on paper, so why would they work in practice?
- Reliance on automaker funding alone for DC charging (Electrify America, Nissan, BMW, Tesla, etc.) will not bring us the DC charging we need to fulfill policy goals
- New York is not a leader in DC charging deployment, and REV process has – to date - held the state back
  - REV focus on “public private” collaboration sounds good, but it is not the right fit at this stage in the market for public fast charging
  - Utilities are spending too much time fitting their projects into a REV box, and not enough time helping the market grow
  - Better to focus on market growth – the figure out the right model

- *Study after study (MA, NJ, OH, MD) has shown a positive ratepayer return for utility EV charging investments – let’s focus on that first important first principle*

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