



Driving San Diego to be Plug-in Ready

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San Diego Gas & Electric

Clean Transportation Program

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SDG&E's Goal

Support growth of electric transportation while ensuring the safe, reliable & efficient integration with the grid

Charging Technology & Infrastructure

Widespread & convenient

Charging Pricing

Attractive to charge off-peak

Utility System Integration

Efficient & "smart"

Market Development

Educate & support

Create an Excellent Customer Experience and Build Consumer Confidence



PEV Glossary

Multi-unit Dwellings

Multi-unit Dwelling – Generic Term for the spectrum of multi residential unit communities (spans everything from Manufactured home parks, apartment complexes, attached and detached units, high rise buildings, etc.) Also referred to as: Multi Dwelling Units (MDUs), Multi family, residential communities, etc.

Vehicles

PEVs (Plug-in Electric Vehicles) – Generic Term for ALL plug-ins (see below)

that use grid electricity to charge a battery for transportation

- **EV** (Electric Vehicle) or **BEV** (Battery Electric Vehicle) – 100% electric motor drive
ELECTRIC FUEL ONLY – NO TAILPIPE
- **PHEVs** (Plug-in Hybrid Electric Vehicles) – Internal Combustion Engine + Electric Motor + Grid Electricity
GASOLINE + ELECTRICITY – TAILPIPE + PLUG

NEVs (Neighborhood Electric Vehicles) – EVs/BEVs **limited to low speeds/range**
ELECTRIC FUEL ONLY – NO TAILPIPE – SMALL/SLOW

Charging Infrastructure – EVSEs (Electric Vehicle Supply Equipment) – Generic Term – “Chargers”

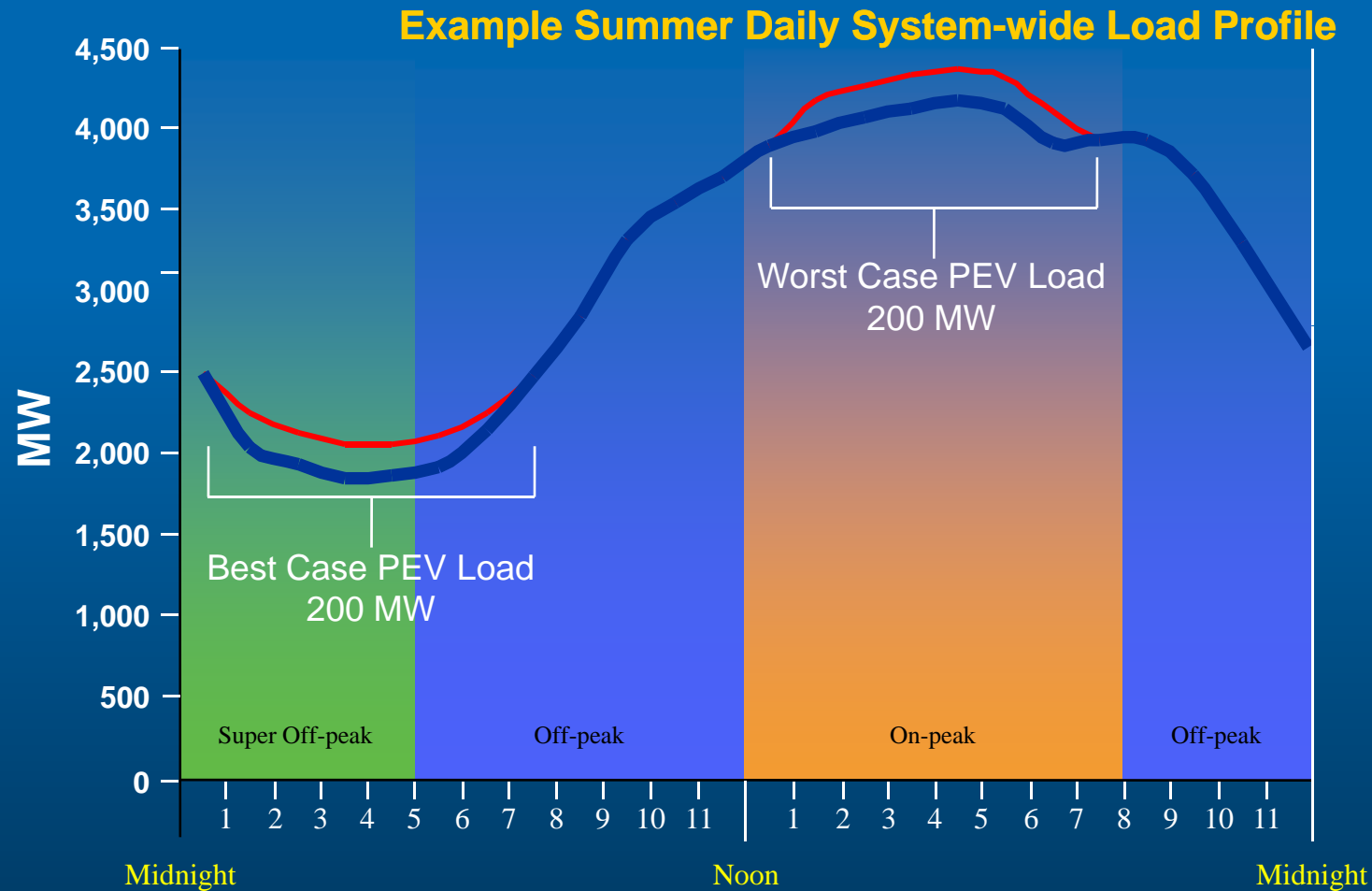
AC – Alternating Current (what is delivered to your home) – converted to DC on board

- **Level 1** (120 VAC – 20 A) - Simple cord set that plugs into 3 prong plug wall outlet – comes with car (GFCI/sep. circuit)
Slower charging - approx. twice the time of Level 2 (~4-6 miles/hr of charging)
- **Level 2** (208 -240 VAC – 40 A) - Wall or pedestal mounted EVSE requires electrician (residential and “destination” charging)
Medium charging – standard charging rates in specs – 12 miles /hr charging

DC – Direct Current (required to charge the battery – converted from AC to DC within charger unit curbside)

DC Fast Charge (480 VAC – 100 A) – EVSE provides converted DC direct to vehicle – High voltage high price (\$40-50K)
FAST or Quick “trip continuation” charging (e.g. highway corridors) 80 % of 24kWh battery in less than 30 min (~80 miles)

Efficient Integration of PEV Loads with the Grid



System & PEV charging load profile are for illustrative purposes only, and not intended for forecasting.

The EV Project--ECOtality, Nissan & SDG&E® Collaboration

- Largest EV and charging infrastructure project in US history
San Diego is one of 5 original
(addition funding for Volt and 8 regions)
- ~ **\$100** million from ARRA / DOE + \$15 MM) – original program
- **\$8 million** from CEC awarded to ECOtality



Residential Public & Fleet Chargers

- ~1,000 LEAF Home Base (240VAC)
- ~150-250 Volt Home Base (240VAC)

Commercial & Public Chargers

- ~1,450 - Public Access (240VAC)
- ~ 60 - DC Fast Chargers (480VAC)
- Workplace being added (240VAC)

SDG&E's Residential EV TOU Rates

(adopted by CPUC and in place since 1990's)

EV TOU — Separate meter socket installed by customer's electrician, utility locates and does final install of vehicle TOU meter. Requires customer apply for the rate. A \$15 new service fee is assessed.

EV TOU2 — Single meter for the whole house is replaced by utility with a TOU meter (no cost). The entire home's use now becomes TOU. Only requires customer request for rate change to meter.

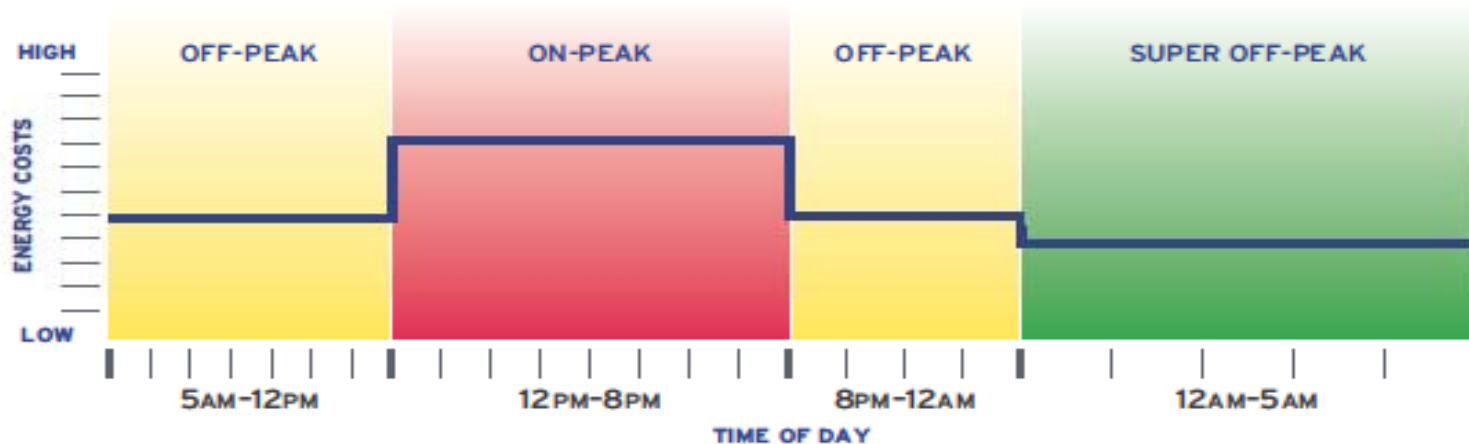
EV TOU3 — (ON HOLD) separate TOU metering configuration using dual meter adaptor is presently being worked out for this rate. One meter is whole house on residential rate, one is one vehicle EVSE at TOU. Monthly fee for installation and additional meter (TBA)

SDG&E EV TOU Rates (EVTOU & EVTOU2)



Electric Vehicle Time-Of-Use Rates

It matters when you charge your electric car.



- On-Peak:** Highest energy cost daily.
- Off-Peak:** Medium energy cost daily.
- Super Off-Peak:** Lowest energy cost daily.

*Rates during "On-Peak" hours typically increase during Summer Season (May 1 - October 31).
**On-Peak" hours and rates are different for customers with separate electric vehicle meters.

For more information on electric vehicle rates visit sdge.com/CleanTransportation.

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Web Focused Resource

ELECTRIC VEHICLE TIME-OF-USE RATES



Receive lower rates by charging during "Off-Peak" and "Super Off-Peak" hours.

Electric vehicle rates are based on:

- ▶ when you charge your car
- ▶ how much electricity you use

For more information on electric vehicle rates visit sdge.com/CleanTransportation.

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Projects

- Distribution Impact of PEVs (EPRI)
- Pricing Study (in conjunction with LEAF ECOtality customers)
- Notification Project (GM & Nissan on board – Next steps?)
- Smart Charging (PG&E/EPRI)
- Level 1/Cord Set Monitoring (Plug Smart/SDG&E)
- PEV/Smart Grid Communications/Coordination
- Public Access EVSE Siting modeling (ECOtality and Regional Stakeholders)
- Smart Transformer (monitoring) Project (TBA)
- Multi-unit Dwellings Outreach Workshops – begin June 2011

Multi-unit Dwellings – Complexity



There is no “cookie-cutter” solution

Challenging Metering Configurations



Diversity of Charging Solutions

Examples of some Key Elements that Drive the Charging Solution

- **Legalities**
 - **Codes, Covenants & Restrictions (CC&R's) for community**
 - Agreements between property owners & residents
 - **Rental contracts**
 - Agreements between property owners & renters
- **Metering & wiring**
 - Restrictive facility configurations (master meter, remote parking, etc.)
 - Alternative location schemes (e.g., use of commons areas)
- **Cost allocation to residents**
 - Based on use (e.g., equipment, parking, shared service areas)
 - Fee structures

Multi Unit – SDG&E Support

- Workshop meetings with Multi-unit home stakeholders (Property managers/owners, renter/homeowner associations, contractors, etc.)
 - Sharing challenges, ideas & solutions (priorities are internal)
- Utility provides PEV 101 – terminology, alternatives & timelines
 - EVSE configurations – features, networked benefits & communications & how to get started
- Cite available resources
 - Web (GoElectricDrive.com, SDGE.COM/CleanTransportation), studies, accumulated experiences

Other Major Challenges

- Growth in metering solutions is essential
 - Develop policy & requirements
- Early notification to utility improves reliability
 - Develop mechanisms for notification (e.g. purchase, permitting, DMV, etc.)
- Multi-unit dwellings are diverse – require diverse solutions
 - **EDUCATION** - Offer spectrum of simple “pre-engineered” configurations, illustrations, business models, **etc.**
- Service planning demands
 - Document & catalogue mix of charging solutions, regional inspection resources
- “Workplace” charging impacts
 - **EDUCATION** – rate/grid impact, payment/taxes, peak impact

SDG&E Communications

www.SDGE.COM/CleanTransportation

GETTING THE WORD OUT

SDG&E is helping to get the region ready for plug-in electric vehicles

- **SDG&E Web resource**
- **Working with dealerships**
- **Participation/coordination community PEV events**
- **Targeted Communications to Rate Study Participants**
- **Contractor and Inspector Training/Forums**
- **National Plug-in Vehicle Initiative (GoElectricDrive.com)**
- **Multi-unit dwelling outreach forums**

Resources

FOR ALL: Primarily Website : **SDGE.com/cleantransportation**

Non-EV Project Customers (all others)

Email: **ETProgram@sdge.com** (via web – contact us)

Encourage Early contact in the decision/purchase process

To request EV-TOU rate analysis and additional questions

The EV Project Customers (LEAF & Volt – TheEVProject.com)

Customers with **utility related** questions to: **EVStudy@sdge.com**

(SPX is Volt contact point via Volt Advisor referral)

Multi-unit Dwellings (National effort to collect challenges and successes)

Email: **MultiUnit@sdge.com**

Thank you - Questions?

WEB

- www.SDGE.COM/CleanTransportation

EMAIL:

- General Questions - ETProgram@sdge.com
- Related to The EV Project - EVStudy@sdge.com
- Multi- unit Dwellings – MultiUnit@sdge.com

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