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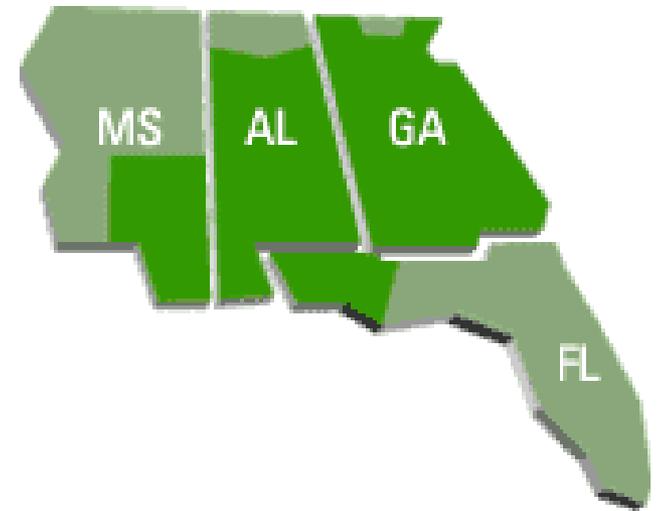
A River of Energy Solutions

Electric Transportation Update – August 8, 2011

Lee Robinson – Gulf Power

Southern Company

- Southern Company (NYSE: SO), an investor-owned energy company in the Southeast, owns 290 generating units at 77 power plants with a combined capacity of more than 43,000 megawatts.
- Southern Company is one of the largest producers of electricity in the United States and is the largest wholesale power provider in the Southeast.
- Four main Operating Companies with 4.4 MM retail customers and \$17.46 billion in revenues
- Strategic Priorities



Southern Company Strategy

In July 1901, the first electric automobile came to Atlanta. It was owned by Henry M. Atkinson, founder of the power company. He said he was also buying one for use by the Georgia Electric Light Company.



Southern Company Involvement

- **Mission-Drive, shape and grow electric transportation in non-road and on-road segments. We are an enabler.**
 - Sales-Grow market beyond forklifts
 - Southern Company Fleet-Evaluate fleet conversion opportunities
 - PEV Readiness-Promote off peak and home charging
 - Education/Leadership-Environmental impact, Technology, Market information
 - R&D Activities-Evaluate electric transportation technology for non-road and on-road alternatives

What Is Electric Transportation?

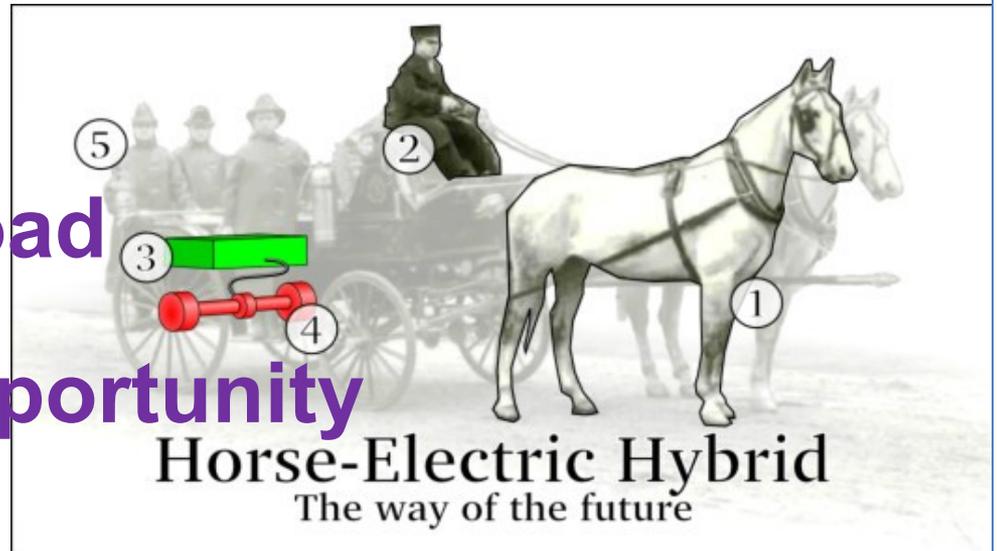
Electricity Moves People and Goods

The Market Arrives

Success in Non-Road

Customers See Opportunity

It is the Future



THIS IS NOW!!!



Obama
touts
electric
cars, clean
energy
standard



THAT WAS THEN . . .



What Do Our Customers Want?

Consumer desires transportation

Efficient

Economical

State and federal incentives

Environmental

Energy independence

EASY!

Auto manufacturer support

Heightened consumer interest

**Environmental mandates for
autos**

**Federal funding and tax
incentives**

Sales commitments



Chicken Little versus Common Sense

- **Unknown Market Size:** The market size can range from 0 – 100%
- **Generation Planning:** Minimal impact in the short-term (three to five years) due to slow adoption rates
- **Distribution:** Minimal impact in the short-term due to excess capacity and slow adoption rates
- **Economic Development:** Opportunities exist for states who engage
- **Revenue Requirements:** Range from \$ 392M to \$ 1.9B over the next ten years
- **Holistic Approach:** The need for Southern to manage the load is critical to reliability, cost and revenue potential
- **Tipping Points:** Consumer behavior and automakers sales

On Road

Non Road



Electricity is Moving Goods

- Southern Company is an industry leader
- Promoting electric transportation technologies in many industries

Airports



Mines



Seaports



Rail yards



Warehouses



Truck stops

Why “Electric” Transportation for On Road?

- It's clean
- It's energy efficient and cost effective
- It's made in the USA
- It holds future energy opportunities



Why “Electric” Transportation?

IT'S MADE IN THE USA

- \$1 billion/day spent on foreign oil

**Energy
Independence!**

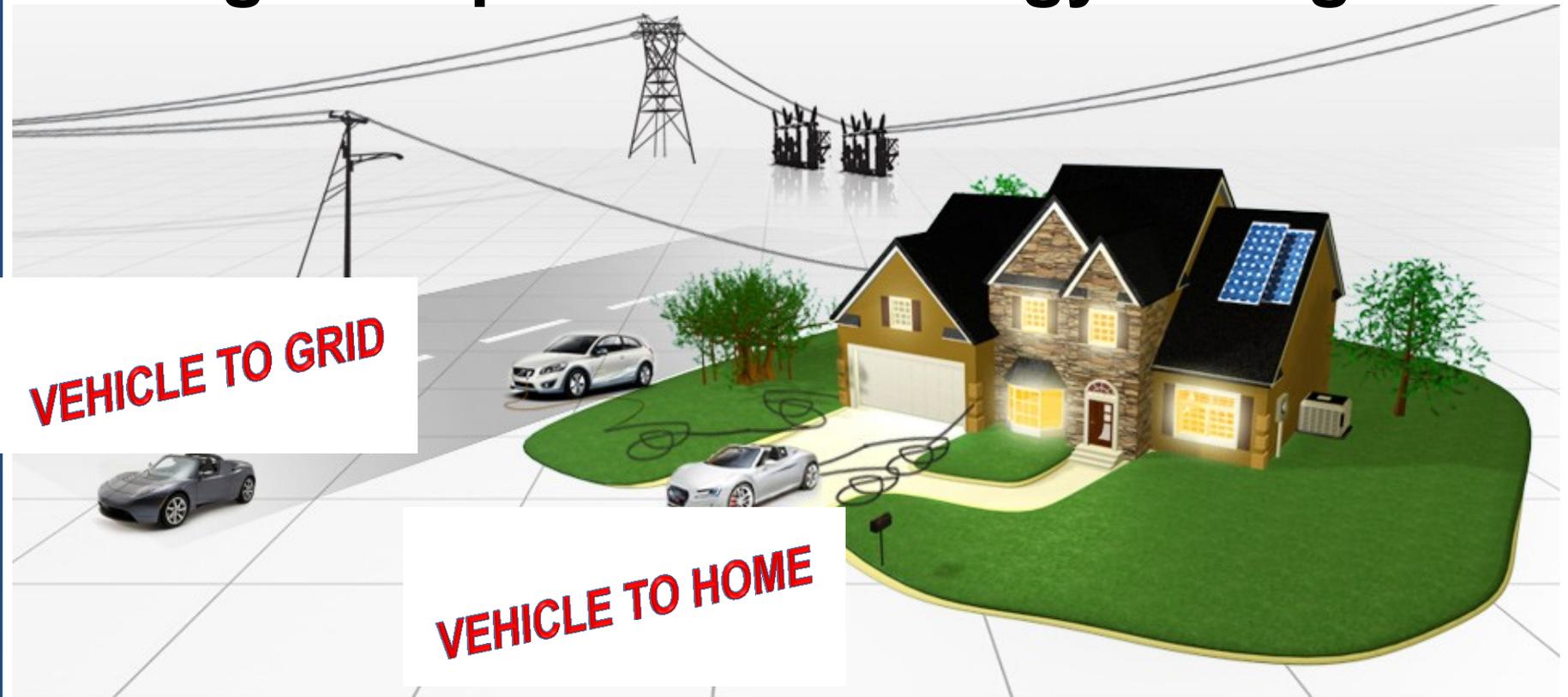


**SOUTHERN
COMPANY**

Why “Electric” Transportation?

FUTURE ENERGY OPPORTUNITIES

Long-term promise of energy storage



VEHICLE TO GRID

VEHICLE TO HOME

EV Market Arrives!

Variety – something for everyone

47 models announced

Technology improvements

Advanced battery technology

120/240-volt capability

Fast charging options

Decreasing costs



Battery Technology Advances

100,000-mile/8-year auto manufacturer warranty

Lithium-ion technology

100-plus-mile range

Second-life use



Understanding the Technology Terms

- **BEV – battery electric vehicle**
 - Total electric
 - 100-mile range
 - 24-kWh battery capacity
 - 7-hour recharge (240-volt)
- **PHEV – plug-in hybrid electric vehicle**
 - Primarily gasoline; supplemental electric
 - 30-plus low-speed electric miles
 - 300 high-speed blended gas-electric miles
 - 10 kWh battery capacity
 - 6- to 8-hour recharge (120-volt)



Understanding the Technology Terms

- **EREV – extended-range electric vehicle**
 - Primarily electricity; supplemented with gasoline
 - 35 all electric miles
 - 300-plus gas generator miles
 - 16 kWh battery capacity
 - 3- to 4-hour recharge (240-volt)



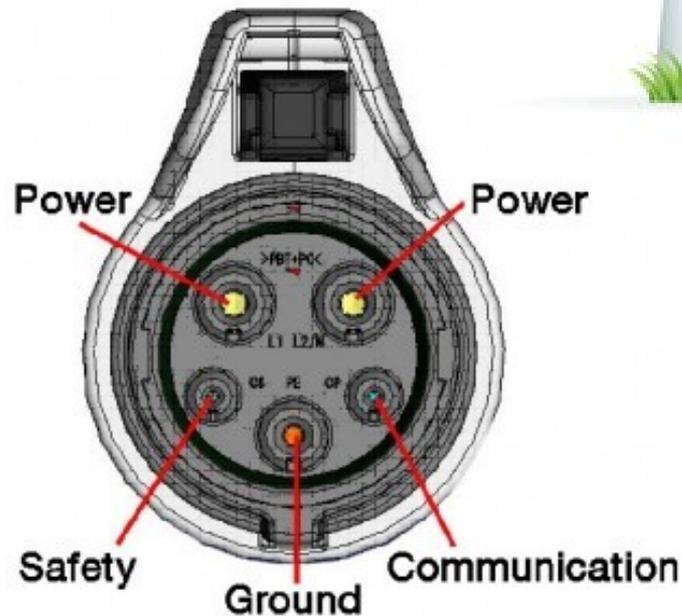
Understanding the Technology Terms

**LSV/NEV –
Low Speed Vehicle
Or Neighborhood Electric Vehicle**



Terminology and Definitions

- **EVSE – Electric Vehicle Service Equipment**



EV Success

- **Consumer Desires**
 - **Efficient**
 - **Cost Effective**
 - **State and Federal Incentives**
 - **Variety**
 - **EASY!**
- **Technology Improvements**
 - **Batteries**
 - **120V Capability**
 - **Fast Charge Capability**



How Much Energy?

Plasma TV



Annual Energy 886 kWh

Heat Pump



Annual Energy 8280 kWh

Chevy Volt



Avg. Annual Energy Consumption
= 1890 kWh

Nissan Leaf



Avg. Annual Energy Consumption
= 2964 kWh

CHARGING LEVELS

	Voltage(VAC)	Current (Amps)	Power (kVA)
Level 1	120	16	1.92
Level 2	208/240	12 - 80	2.5 – 19.2
Level 3	480	300 - 600	50 - 500?



Southern Company Involvement

Active Research

- Studying Grid Impact
- Evaluating Technologies and Gathering Data
- Evaluating Technologies for our Operations

Education

Leading Non-Road Sales

Developing Customer Response Plan

Helping to Develop Industry Standards

Implementing Beneficial Charging Rates

Enhance the Customer Experience



Southern Company Projects



Ford Escape PHEV

Ford/Eaton F-550 PHEV Bucket Truck



TESLA & BAREFOOT ATV



Plug-In Converted Prius

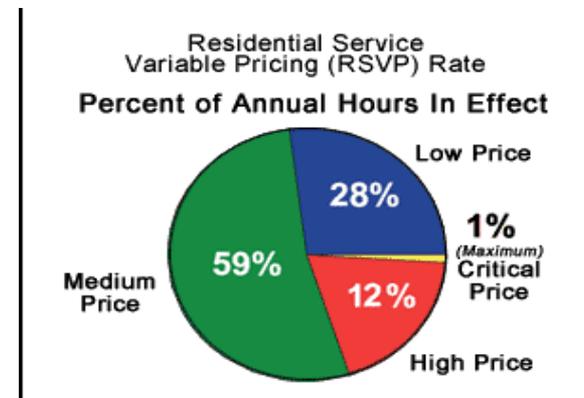
ENERGY
select[®]
an earthcents program



Plug-in Hybrid Electric Vehicle (PHEV) Research – Gulf Power

Research Objective

Obtain experience with and data on PHEV energy flows, operational characteristics, costs, and effects on the grid when charged using Energy Select.



Energy SELECT is a residential advanced energy management system that gives customers control over their energy purchases by allowing them to program their central heating and cooling system, electric water heater, PHEV, and their pool pump to automatically respond to varying prices.

The Research Project

**Base 2009 Toyota Prius Hybrid ~\$23k
Converted to a “Plug-in” Hybrid**

Added a 5kWh Lithium Ion battery pack to augment stock 3kWh NMH battery pack Li battery pack supplants spare tire

**Produced by A123/Hymotion
and installed by AVRC in
North Carolina ~\$10k**

**Crash tested to NHTSA
standards**

**Includes integrated A/C
charger**

One of 200 Vehicles Studied



Results



Two driving modes will be shown:

“Short-commute” – 7 Mile “Long-commute” – 26 Mile

SHORT COMMUTE - Trips with no battery charge at start of trip

Just the Hybrid without the plug-in benefit

Avg. Mileage = 45 mpg

SHORT COMMUTE - Trips with some battery charge at start of trip

Receiving the extra plug-in benefit

Avg. Mileage = 90 mpg

LONG COMMUTE - Trips with no battery charge at start of trip

Just the Hybrid without the plug-in benefit

Avg. Mileage = 46 mpg

LONG COMMUTE - Trips with no battery charge at start of trip

Just the Hybrid without the plug-in benefit

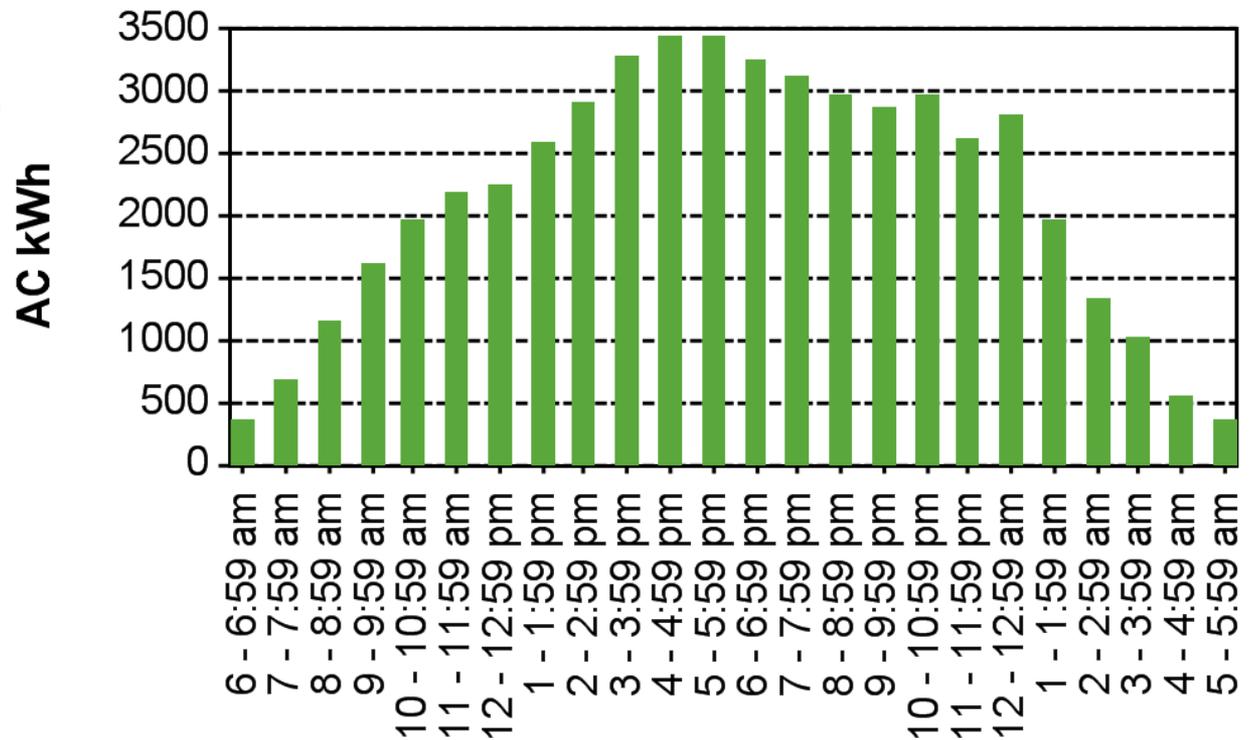
Avg. Mileage = 68 mpg

**Energy SELECT a SUCCESS in
Controlling the Peak Load!**

Charging Times – Other 199 Vehicles



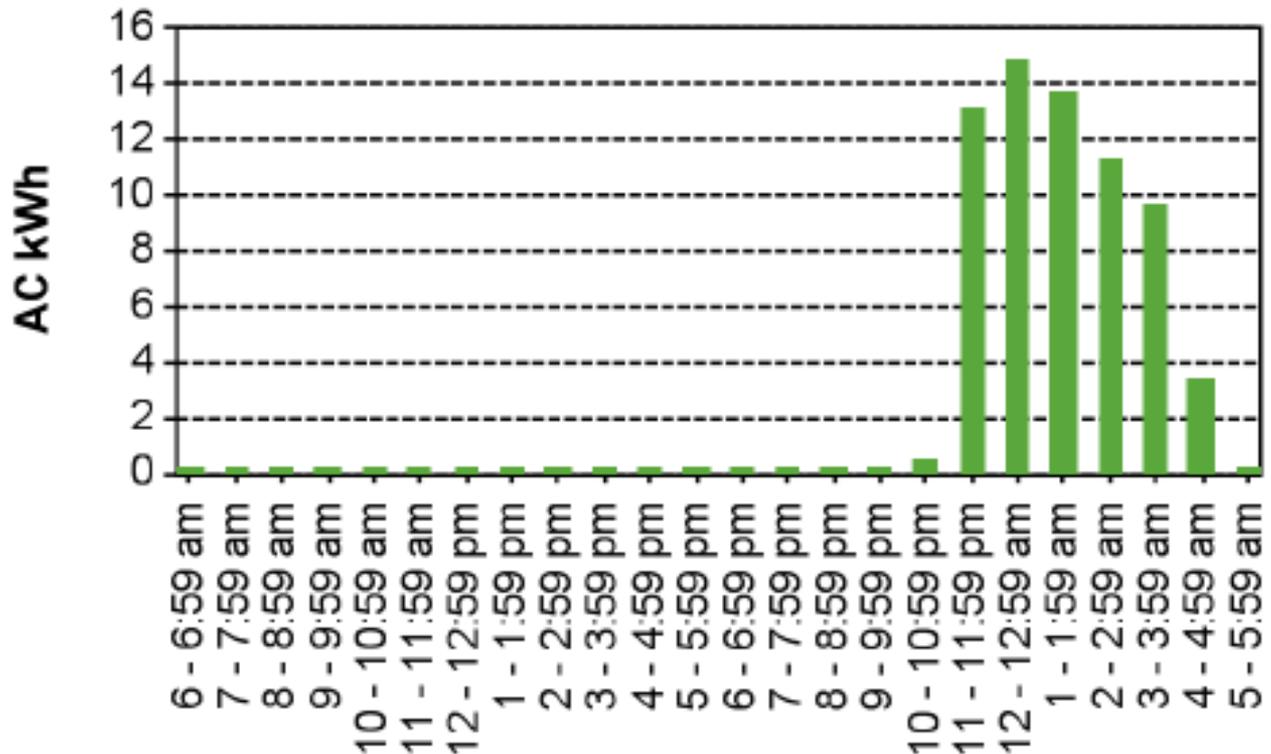
Time of Day When Charging



Charging Times – Gulf Power (Short-Commute from 11/16/09 to 12/17/09)

ENERGY
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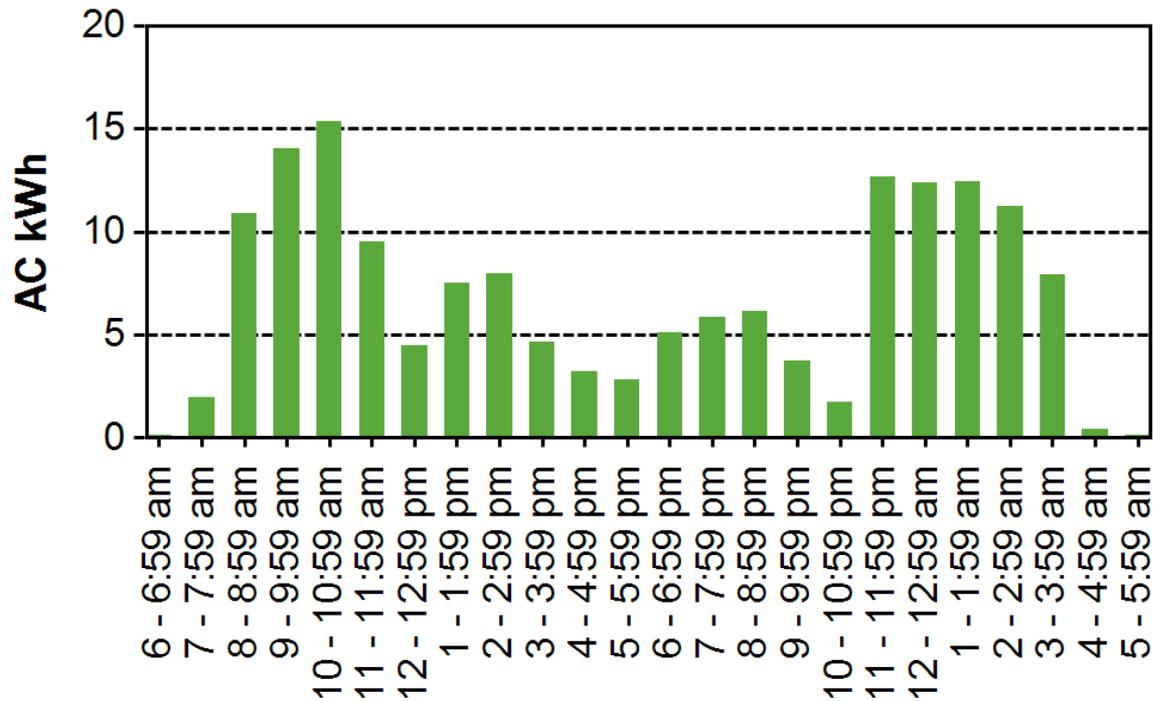
Time of Day When Charging - This Month



Charging Times – Gulf Power (Long-Commute in June 2010)

ENERGY
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Time of Day When Charging - This Month



STEALTH PROJECT

EPRI, Southern Company, and Stealth Electric Vehicles

Test 3 Vehicles - EGLIN AFB and in Gulf Breeze/Pensacola Beach, FL

LSV Package on Vehicles

Solar Charged

64 and 72 Volt

25 MPH Speed

40 Mile Range

Range and Performance

EPRI Working Paper Produced



STEALTH PROJECT



STEALTH PROJECT

STEALTH COMMANDER

ELECTRIC VEHICLES



Electric Transportation

Summary

Electricity Moves People and Goods – on-road & non-road

The Market Arrives

Southern Company Leads in Non-Road Technology

Customers See Opportunity

Manufacturers Are Supporting

Remember Lessons Learned



ELECTRIC transportation

ON THE ROAD AND BEYOND

QUESTIONS?

